

Annual Progress Report (APR)



2023 Air Quality Annual Progress Report (APR) for Perth & Kinross Council

In fulfilment of Part IV of the Environment Act 1995, as amended by the Environment Act 2021

Local Air Quality Management

July 2023

Perth & Kinross Council

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Executive Summary: Air Quality in Our Area

Air Quality in Perth & Kinross

The air quality within Perth and Kinross is generally good; however, there are a few known hotspots within Perth city centre, and previously in Crieff. The main pollutants of concern are Nitrogen Dioxide (NO₂) and Particulate Matter (PM₁₀/PM_{2.5}) from vehicle emissions, which cannot escape due to the canyoning effect of high buildings within the effected streets.

Perth & Kinross Council (PKC) has declared two air quality management areas (AQMA), one covering the whole of Perth City (2006) and another encompassing the high street corridor running through Crieff (2014).

For a fourth year in a row, no exceedances of NO₂ were identified within Perth and Kinross during the reporting year. While there was a notable increase in NO₂ levels in 2021 versus 2020, in 2022 levels have reduced once again, in some cases to similar levels as 2020. This indicates that a new “normal” is still to emerge following the Covid-19 pandemic, as no trend can be identified between the years of 2020, 2021 and 2022. This may be a result of homeworking/flexible working continuing to be popular, leading to the 9-5 commuting traffic peaks being spread throughout the day. Further investigation into post-Covid traffic movements may be required to determine the cause of reduced NO₂ levels in Perth & Kinross. It should also be noted that the bias adjustment factor for our 2022 diffusion tubes is more than usual: 0.79 compared to the previous year’s 0.88.

No new sources of NO₂ emissions have been identified within Perth & Kinross.

PM₁₀ levels have increased from last year and are at their highest level since 2018. This increase was seen across all monitors including the Muirton Background RTM (Perth), leading to the assumption that the increase may not be solely attributed to traffic emissions. The RTM relocated from High St to Bridgend (Perth) was upgraded from TEOM to FIDAS, allowing PM₁₀ levels to be monitored as well as PM_{2.5}, however a trend has yet to be established due to the short monitoring period so far.

There were no exceedances of the annual mean objective and no exceedance of the overall PM₁₀ 24-Hour Mean national objective during the reporting year. There were two

more exceedances of the 50 µg/m³ 24-Hour Mean at Bridgend than last year, and one more at Muirton than last year. Similar to last year, there were 7 exceedances of the 50 µg/m³ 24-Hour Mean at Atholl St. This was once again likely caused by the ongoing building works directly behind the monitor and do not indicate a change in roadside vehicle emissions. These high levels are expected to subside once the building works are complete.



Construction surrounding Atholl Street RTM

PKC also monitors for PM_{2.5} at all RTMs; no exceedances of objective levels were observed in 2022. Therefore, at present there is no evidence to indicate that the AQMA orders in either Perth or Crieff require to be amended to include PM_{2.5}.

A review of the existing Perth Air Quality Action Plan (AQAP) continues to progress. Following feedback from the AQAP steering group in mid-2022, the decision was made to redraft the AQAP to make it more publicly accessible as the existing draft was deemed too technical. Alongside this redraft, PKC commissioned Sweco to create a bespoke Emissions Factor Toolkit (EFT) for Perth to further refine our air quality model. This EFT was made using data from an Automatic Number Plate Recognition (ANPR) study carried out in 2020, and ensured our modelling and source apportionment accurately reflected the vehicle types and ages currently passing through Perth.

In early 2023, Scottish Government released updated LAQM policy guidance which included new guidelines for the format of Air Quality Action Plans. In order to ensure our updated Perth AQAP met these guidelines, the draft AQAP is currently being aligned with the new template issued by SEPA before progressing any further.

Public consultation on the final draft AQAP is expected later in 2023, with completion and publication to follow, in 2024.

The Crieff AQAP was approved in mid-2019 and implementation of the agreed measures will be progressed through consultation with the local community and internal and external stakeholders. Progress in this area of work was delayed both by the Covid-19 situation and staff resource in 2021/22. As was the case across P&K in 2022, PM₁₀ and PM_{2.5} levels have increased in Crieff from those during 2021, however NO₂ levels decreased. No exceedances were recorded for NO₂, PM₁₀ or PM_{2.5} and based on ongoing reduction in pollution levels PKC will initiate revocation of Crieff's AQMA in 23/24.

Crieff 's AQMA has the A85 trunk road running through it which Transport Scotland (TS) has adopted, and BEAR Scotland maintains, therefore PKC work closely with TS and BEAR Scotland in addressing the air quality issues at this location. PKC also works in close partnership with TACTRAN (Tayside and Central Scotland Transport Partnership) and SEPA.

Actions to Improve Air Quality

- Work on the Cross Tay Link Road has significantly progressed in 2022/23, with main construction works well underway and on programme for completion in Spring 2025. These works can be split into three significant areas: the link road from Scone (A94) to the River Tay, the construction of the bridge over the River Tay, and the realignment of the A9 and construction of tie-ins with the CTRL.

At the time of writing, the current progress of these three areas of work are as follows:

- A94 to River Tay – Progress on this 6km stretch of road is well advanced, with road widening works and construction of the roundabouts at A93 and A94 for the link road nearing completion. The Link Road is expected to open later in 2023
- River Tay Bridge – Piling operations to support the bridge foundations on the east and west side of the river are now complete, with construction of the east pier foundation now underway. The bridge is currently forecast for completion in summer 2024

- A9 – Traffic is gradually being moved onto the completed Northbound A9 realignment, facilitating work on the southbound carriageway section. The construction of the new A9 overbridge towards the River Tay is also well underway. The realigned A9 is expected to be completed later in 2023.



CTLR Progress from River Tay to A94, April 2022 (left) to April 2023 (right)



CTLR & Bridge Progress, April 2022 (top) to April 2023 (bottom)

- Following steering group feedback, the decision was made in mid-2022 to redraft the draft Perth AQAP to make it more publicly accessible as the existing draft was deemed too technical. Following the release of updated LAQM Policy Guidance in early 2023, the draft Perth AQAP is currently being aligned with the new guidelines before progressing further.
- PKC commissioned Sweco to create a bespoke Emissions Factor Toolkit for Perth to further refine our Perth air quality model using data from an ANPR study carried out in 2020. The AQ model and source apportionment were then updated using the new EFT to ensure the most accurate data on Perth's air quality could be used in the updated Perth AQAP
- PKC also commissioned Sweco to carry out a monitoring study from April 2022 to March 2023 using Earthsense Zephyr monitors to determine whether the pollution levels in the Bridgend and Crieff street canyons were higher than those recorded by the nearby RTMs. Due to size constraints of the narrow street canyons, the large RTMs cannot be placed within the canyons themselves.



Zephyr Monitor in West High Street, Crieff

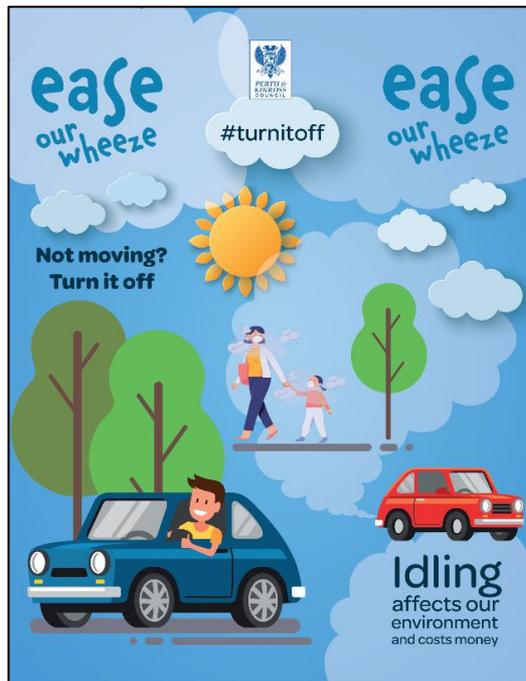
Throughout the course of the monitoring study, a number of issues arose including:

- loss of power for periods in the winter due to solar panel use
- Errors in PM readings due to faulty monitoring cartridges
- SD Card issues

However sufficient data was gathered to draw conclusions from the study. Although the monitoring study concluded in 2023, the final survey report with full data results is still to be published. Full results from the study will therefore be presented in next year's Annual Progress Report.

Early conclusions from the study indicate that pollutant levels within the Crieff street canyon were slightly higher than those measured at the RTM, however both monitors showed levels far below national objectives. The Bridgend Zephyr was measuring slightly lower than the RTM, again far below national objectives.

- PKC's Environment and Infrastructure Committee in March 2022 approved an anti-idling strategy. PKC parking attendants will carry out anti-idling enforcement on an intelligence-led basis following the '4 E's' approach – Engage, Explain, Encourage, Enforce. Only if after following the first three E's there is continued refusal by the offender to stop idling unnecessarily will the final sanction of Enforcement be carried out: issuing a fixed penalty notice. Enforcement began in early 2023, following a comms campaign spanning radio, press and social media. At the time of writing, no fixed penalty notices have been issued. A further follow up comms campaign will be carried out in October 2023.



PKC Anti-Idling graphic, promoted during Comms campaign.

- PKC ECO Stars Scheme commenced in April 2019 and has since recruited over 190 members, covering over 6,600 vehicles. ECO Stars is a scheme aimed to reduce emissions from businesses with large vehicle fleets, with ECO Stars staff working on PKC's behalf to recruit members who operate within P&K, assess their fleet vehicles/operations, and give a roadmap on reducing their emissions and fuel usage. In 2022, 31 new members were recruited to PKCs ECO Stars Scheme, covering 1,411 new vehicles. New members have not included taxis due to difficulties with engagement resulting in a poor uptake in 2022, compounded by a reduction in funding for this project. Current focus is therefore on commercial vehicles.
- PKC once again took part in Clean Air Day in June 2022. Alongside social media content, education activities were delivered at three primary schools and one high school within Perth's AQMA, designed to help pupils understand key issues around air pollution and climate change. Air quality monitoring data from Airly Particulate Matter (PM) sensors installed outside each of the primary schools in 2021 was used as part of these class activities to help pupils learn about their local air quality. More advanced activities were carried out at Perth Academy where students learned about data handling and analysis of air quality monitoring data from a Bosch air quality monitor which had been installed outside their school in 2021.



Bosch AQ Monitor installed at Perth Academy (left) & Perth Academy students learning about air quality monitoring on Clean Air Day (right)

- PKC has continued to work with Sustrans to employ an IBike Officer to provide sessions at schools throughout Perth and Kinross. In 2022 these sessions included Bikeability cycle training, bike maintenance, led walks and cycles and Walk to School challenges across 21 schools to encourage pupils and their parents to take up sustainable and active travel.
- Investment continues to be made in the provision of attractive and secure cycle parking in Perth city centre, with the aim being to provide facilities for existing users as well as attract new cyclists to use active travel for their day to day as well as for recreational cycling. In 2022, 3 new “Bike Nests” were procured and will be installed in Perth City Centre in 2023
- PKC continues to upgrade the bus stop infrastructure throughout the region with new shelters and Real Time Passenger Information Displays to encourage the move to public transport. In 2022 seven new RTPI displays were installed in Perth City and have been utilised to advertise public transport related sites such as PK On The Go and Traveline Scotland. Smarter Choices Smarter Places (SCSP) funding has allowed Perth On The Go Vinyls to be installed on bus shelters on a number of bus corridors into Perth.

- Twelve new electric vehicle charge points were installed within Perth & Kinross in 2022, including four at Community Campuses: Strathearn CC, North Inch CC, Loch Leven CC and Breadalbane CC. EV Chargers are now available at all PKC car parks in Crieff (Strathearn CC, Leadenflower, James Square and King St).

Local Priorities and Challenges

PKC will seek to complete the review of the Perth AQAP in 2023/24. Following the release of new AQAP guidance in Local Air Quality Management Policy Guidance 23, the draft AQAP is being aligned with the new guidelines at the time of writing this APR, after which internal and public consultations will be undertaken. It is expected that the review of the Perth AQAP will be completed by March 2024.

Following several years of no exceedances within the Crieff AQMA and with the results of this year's Zephyr study indicating that there is no significant difference between the RTM results and the pollutant concentrations within the street canyon, PKC will move to revoke the Crieff AQMA during 2023/24.

PKC will continue to deliver the Perth Transport Futures Project in order to address key congestion points in the existing road network and provide linkages to growth areas set out in the Local Development Plan.

This project is split into four phases and will be delivered over several years. Progress is as follows:

- **Phase 1 A9/A85 Junction Improvement and Link Road to Bertha Park** – Completed in 2019
- **Phase 2 Cross Tay Link Road (CTLR)** – Connecting the A9 to A93 and A94 – Work well underway, expected completion in 2025. Completion of the link road from A94 and A93 to the River Tay as well as the completion of the realigned A9 is expected during 2023.
- **Phase 3 Bertha Park North Link to A9** (Linking phase 1 and 2 and will be taken forward by the developer)

- **Phase 4 Associated Perth City Centre Improvements** – Mill Street public realm improvement development to create a ‘Cultural Quarter’ linking Perth Concert Hall, Theatre, Museum and Art Gallery completed. Further city centre improvements are to be undertaken such as walking and cycling infrastructure on major routes into the city.

More information on the Perth Transport Futures Project can be found at

<https://www.perthtransportfutures.co.uk/>

How to Get Involved

For further information on air quality within Perth and Kinross visit the PKC air quality

website at: <https://www.pkc.gov.uk/airquality>

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1 Local Air Quality Management

This report provides an overview of air quality in Perth & Kinross during 2022. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Progress Report (APR) summarises the work being undertaken by Perth & Kinross Council to improve air quality and any progress that has been made.

Table 1.1 Summary of Air Quality Objectives in Scotland

Pollutant	Air Quality Objective Concentration	Air Quality Objective Measured as	Date to be Achieved by
Nitrogen dioxide (NO ₂)	200 µg/m ³ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
Nitrogen dioxide (NO ₂)	40 µg/m ³	Annual mean	31.12.2005
Particulate Matter (PM ₁₀)	50 µg/m ³ , not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
Particulate Matter (PM ₁₀)	18 µg/m ³	Annual mean	31.12.2010
Particulate Matter (PM _{2.5})	10 µg/m ³	Annual mean	31.12.2021
Sulphur dioxide (SO ₂)	350 µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
Sulphur dioxide (SO ₂)	125 µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
Sulphur dioxide (SO ₂)	266 µg/m ³ , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005
Benzene	3.25 µg/m ³	Running annual mean	31.12.2010
1,3 Butadiene	2.25 µg/m ³	Running annual mean	31.12.2003
Carbon Monoxide	10.0 mg/m ³	Running 8-Hour mean	31.12.2003

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare and publish an Air Quality Action Plan (AQAP) within the shortest possible time and no later than 12 months of the date of AQMA Designation Order. The AQAP must set out measures the local authority intends to put in place in pursuit of the objectives within the shortest possible time. Measures should be provided with milestones and a final date for completion. The action plan itself should have a timescale for completion and for revocation of the AQMA. Where measures to reduce air pollution may require a longer timescale an action plan shall be reviewed and republished within five years of initial publication and then five-yearly thereafter.

A summary of AQMAs declared by PKC can be found in Table 2.1. Further information related to declared AQMAs, including maps of AQMA boundaries are available in Figure 2.1 and Figure 2.2 below as well as online at [PKC's Air Quality webpage](#).

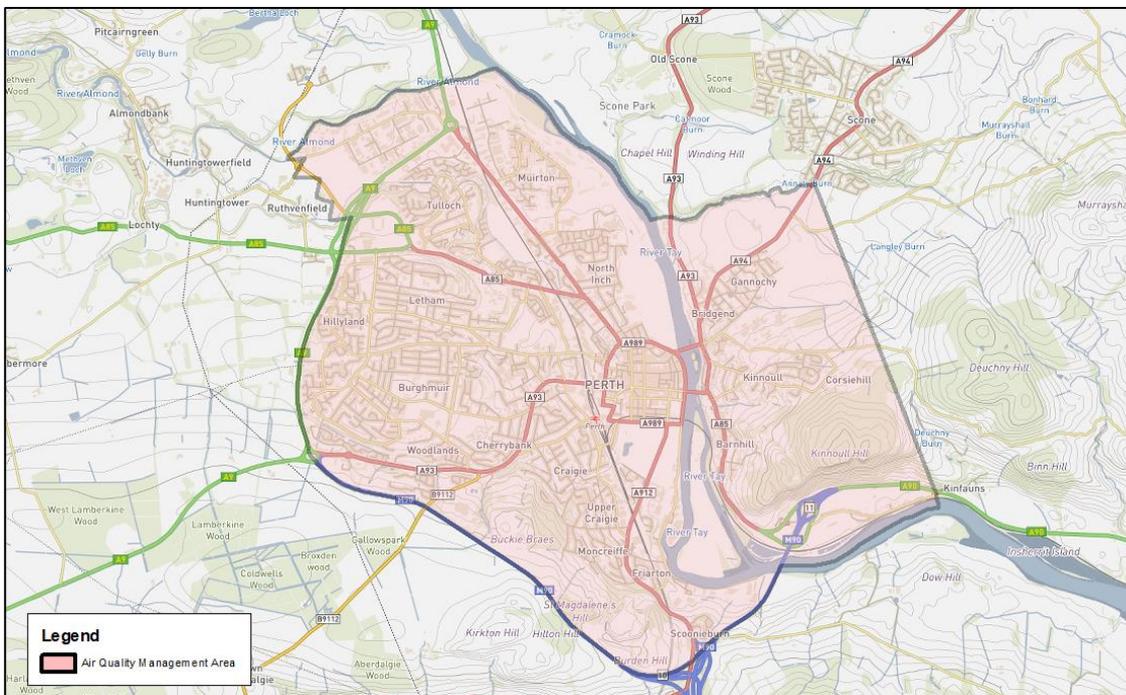


Figure 2.1: Perth AQMA Boundary

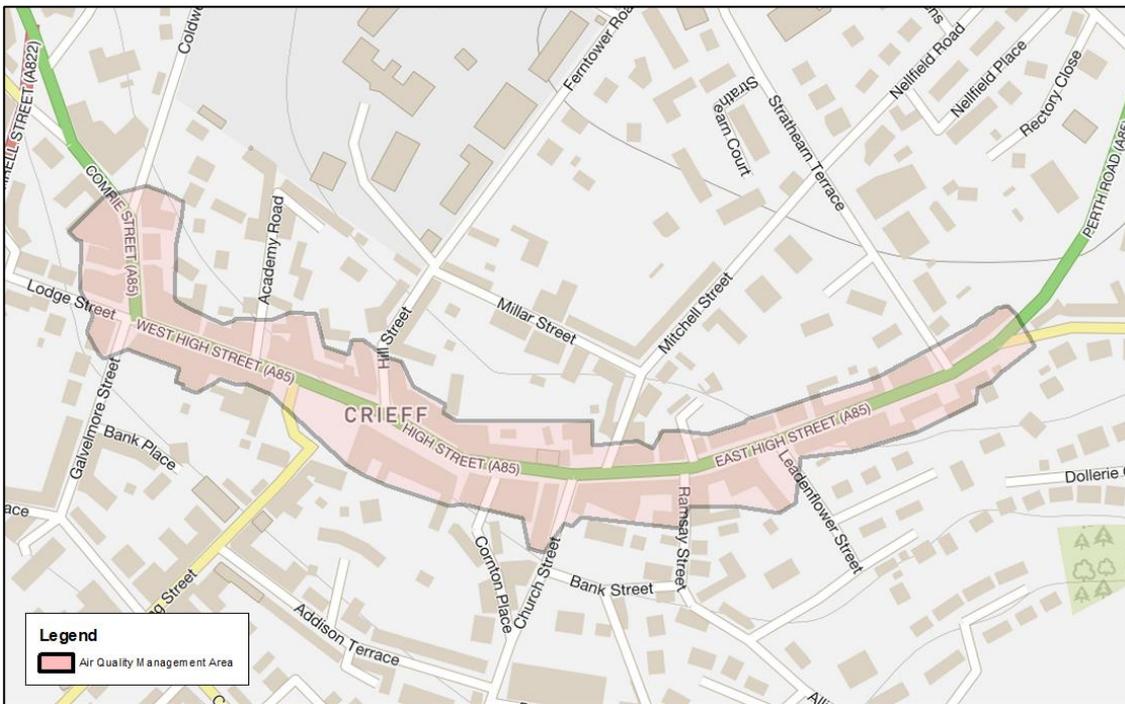


Figure 2.2: Crieff AQMA Boundary

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City / Town	Description	Action Plan
Perth AQMA	<ul style="list-style-type: none"> NO₂ annual mean PM₁₀ 24-hour mean 	Perth	The whole area of Perth City was designated an AQMA in 2006.	Perth and Kinross AQAP 2009 http://www.pkc.gov.uk/media/35448/2009-Air-Quality-Action-Plan/pdf/Perth and Kinross Air Quality
Crieff AQMA	<ul style="list-style-type: none"> NO₂ annual mean PM₁₀ 24-hour mean 	Crieff	Follows the A85 from the Y-Junction of Dollerie Terrace/Perth Road westwards to the Y-Junction of Comrie St/Coldwells Rd. The AQMA takes in the whole of the buildings along East High St/High St/West High St and Comrie St (to Coldwells Road).	Crieff AQAP https://www.pkc.gov.uk/media/44879/2019-Crieff-Air-Quality-Action-Plan/pdf/(2) 2019 Perth and Kinross Council Crieff Air Quality Action Plan.pdf?m=637080263860030000

2.2 Cleaner Air for Scotland 2

[Cleaner Air for Scotland 2 – Towards a Better Place for Everyone \(CAFS2\)](#) is Scotland's second air quality strategy. CAFS2 sets out how the Scottish Government and its partner organisations propose to further reduce air pollution to protect human health and fulfil Scotland's legal responsibilities over the period 2021 – 2026. CAFS2 was published in July 2021 and replaces [Cleaner Air for Scotland – The Road to a Healthier Future \(CAFS\)](#), which was published in 2015. CAFS2 aims to achieve the ambitious vision for Scotland "to have the best air quality in Europe". A series of actions across a range of policy areas are outlined, a summary of which is available on the Scottish Government's website.

Progress by PKC against relevant actions for local authorities within this strategy is demonstrated below.

2.2.1 Placemaking – Plans and Policies

Local authorities with support from the Scottish Government will assess how effectively air quality is embedded in plans, policies, City Deals and other initiatives, and more generally in cross departmental working, identifying and addressing evidence, skills, awareness and operational gaps.

Perth & Kinross Council has worked hard over recent years to ensure air quality is a consideration through all relevant plans and policies across the council, and has a number of cross departmental groups in place to co-ordinate best practices across all services:

- The Perth & Kinross Local Development Plan (2019) was adopted on 29 November 2019 and covers the whole Perth and Kinross area (apart from those areas covered by the National Parks). Air Quality is considered within the new plan for the whole region, not just AQMAs. Supplementary air quality planning guidance was approved in 2020 and sets out how air quality will be considered when determining planning applications and detail the circumstances in which an air quality assessment may be required.
- PKC released a [Placemaking Guide](#) in 2020 to help achieve the policy requirements within the Local Development Plan and ensure high quality development within the Perth & Kinross Council area that responds to our unique setting. Air quality is a key consideration within this document, providing guidance to developers on how to avoid

exacerbation of pollution during construction or resident exposure to pollutant sources such as busy roads.

- In addition to the above Placemaking Guide and the supplementary air quality planning guidance, Officers of Environmental Health review all planning applications received by PKC to assess potential air quality impacts caused both directly by the development and through increased traffic on the existing road network. All planning applications containing a wood burning or biomass appliance are also assessed and documented to keep record of the continually growing number of domestic burning appliances in the council area.
- PKC and TACTRAN continue to work in conjunction to ensure air quality is considered within the Regional Transport Strategy and projects such as freight consolidation, park and ride, lift share, walking and cycling initiatives. The Regional Transport Strategy is currently under review, to be adopted late 2022, and PKC are involved in the review consultation process.
- A TACTRAN-wide freight quality partnership (FQP) was formed a number of years ago, including members from PKC, Scottish Enterprise, and the private freight sector. PKC and Dundee Council Environmental Health teams continue to attend meetings to ensure air quality is integrated into the FQP.
- To work towards the delivery of Perth and Kinross Council's climate change plans and targets, a Climate Change Working Group (CCWG) has been set up. The CCWG consists of representatives from relevant teams which allows for collaborative working across Council services. The CCWG is divided into thematic subgroups (Energy & Buildings, Transport, Climate Resilience, Waste & Circular Economy, Education & Engagement, Business & Industry, and Land use) and although 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.

2.2.2 Transport – Low Emission Zones

Local authorities working with Transport Scotland and SEPA will look at opportunities to promote zero-carbon city centres within the existing LEZs structure.

Perth & Kinross Council has no Low Emission Zones established within the Local Authority area. A National Low Emission Framework (NLEF) Stage 1 Screening Appraisal was carried out by PKC for both the Perth and Crieff AQMAs as part of the 2020 APR. The screening appraisal results suggested that a low emission zone was not necessary to address air quality issues in Perth as proposed projects were expected to impact positively on the AQ. Similarly, due to the Crieff AQMA covering essentially a single street, in line with the guidance provided for carrying out the NLEF assessment a low emission zone was not thought to be a proportionate measure in this situation.

Results from the 2020 NLEF Stage 1 Screening Appraisal can be seen in Appendix D.

2.2.3 Climate Change – Co-ordination of climate change and air quality policies

Perth and Kinross Council's Climate Change Strategy and Action Plan 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 & Buildings, Transport, Climate Resilience, Waste & Circular Economy, Education & Engagement, Business & 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.

2.3 Implementation of Air Quality Action Plan(s) and/or measures to address air quality.

In order to ensure that local authorities implement the measures within an action plan by the timescales stated within that plan, the Scottish Government expects authorities to submit updates on progress through the APR process. Perth & Kinross Council has taken forward a number of measures within the action plan during the current reporting year of 2022 in pursuit of improving local air quality and meeting the air quality objectives within the shortest possible time. Details of all measures completed, in progress or planned are set out in Table 2.2 and Table 2.3. More detail on these measures can be found in the air quality Action Plan relating to each AQMA.

Key completed measures for this reporting year are:

- CTLR – Main construction works began in 2022 and are well underway, CTLR is on programme for completion in Spring 2025. Significant milestones expected later this year will be the opening of the Link Road and new realigned A9. Piling works continue on the new River Tay structure with the main bridge construction due to commence in October 2023.
- Perth AQAP – An ANPR study carried out in Perth in 2020 was used to build a bespoke EFT for Perth. This was then used to update the Perth traffic model and source apportionment analysis, ensuring Perth AQ modelling is as accurate as possible for the updated AQAP. Following steering group feedback, the AQAP was redrafted for better public accessibility. The draft is also currently being aligned with newly released PG23 guidelines to ensure it meets SG and SEPA’s requirements.
- Zephyr Monitoring Study – AQ consultants Sweco completed a monitoring study on PKC’s behalf utilising two Zephyr monitors in Crieff and Perth to determine canyon NO₂ and PM concentrations where it was not possible to place a Real Time Monitor. Results will be presented in the 2023 APR
- Anti-idling enforcement proposal went to PKC Environment & Infrastructure Committee in 2022 and was approved for implementation. Enforcement began in April 2023, following a comms campaign spanning radio, press and social media.
- ECO Stars scheme continuation, recruiting a further 31 new members covering 1,411 new vehicles.
- Clean Air Day event delivered with social media, school participation and use of Airly and Bosch AQ sensors at three primary schools and one high school.
- iBike Officer continued to provide cycle activities and training at schools across Perth & Kinross.
- 3 new “Bike Nests” procured to further increase cycle parking in Perth City.
- 12 new electric vehicle charge points installed in 2022, further expanding PKC charging network.

Progress on the following measures has been slower than expected due to:

- Review of Perth's AQAP – After consultation with the steering group in mid-2022, the draft AQAP was deemed too technical, and the decision was made to redraft the AQAP to make it more accessible to the public. However due to staff resource being taken up in late 2022 - early 2023 with the preparation of PKC's Anti Idling Enforcement launch, the change of SG bid submission dates to January rather than March and the release of new guidance for AQAPs issued in PG 23 in February, the draft Perth AQAP was delayed and is still to be concluded.
- EV Chargers Perth – Due to a severe lack of EV staff capacity, Riverside Car Park and Victoria Car Park charger projects could not be completed in 2022. The contract for their installation has been awarded and they are to be completed in 2023.
- Zephyr Monitor & Traffic Management Trial – Due to issues procuring the Zephyrs, this project was delayed. Zephyrs are now installed, and the project will be completed over the next reporting year.

PKC expects the following measures to be completed over the course of the next reporting year:

- Review of Perth's AQAP to be completed in 2023/24 as per SG/SEPA instruction
- Following the recommendation of SG in response to our 2022 APR, PKC will move to revoke the Crieff AQMA in 2023/24
- Future Scenario testing will be carried out for both Perth and Crieff AQMAs. This package of work will be used to inform the Perth AQAP and the revocation of Crieff's AQMA
- Continuation of the ECO Stars Scheme to achieve air quality improvements within Perth City and Crieff
- Zephyr Monitor & Traffic Management Trial – 2 Zephyr monitors will be incorporated within our traffic control system (Stratos) for a 12-month pilot. Air quality limits will

be set, and when exceeded will trigger additional traffic signal green time to try reducing congestion and air pollution within Atholl Street

- EV Chargers Perth – PKC’s Transport Planning team will carry-out the installation of 5 EV charge points at Riverside Car Park and 5 EV charge points at Victoria Street Car Park Perth in 2023/24. These charge points will be available to both commuters and residents who do not have access to private parking, a garage, or a driveway to install a home charge point for overnight use.
- Bus Infrastructure Improvements – PKC will continue to improve bus stop infrastructure in Perth City with the installation of a further 6 Real Time Passenger Information boards to be installed in 2023/24.
- Clean Air Day – PKC has once again taken part in Clean Air Day for 2023. Further details will be included as part of next year’s APR

Table 2.2 – Progress on Perth AQAP Measures to Improve Air Quality

Measure No.	Measure	Category	Expected/ Actual Completion year	Measure Status	Funding Status	Key Milestones	Progress	Barriers to implementation
1.	Cross Tay Link Road (CTLR) - New crossing of the Tay linking the A9 to the A94 north of Scone, including package of associate bus priority, cycle, and pedestrian measures	Transport Planning and Infrastructure	2025/26	In Progress	Fully Funded PKC Capital Funding & SG Funding (£110.5M PKC + £40M SG)	<p>2019 - Phase 1 A85/A9 completed and is open to connect with Bertha Park</p> <p>2019 - AQ and Noise assessment as part of EIA 18/01661/SCOP undertaken by consultants and peer reviewed</p> <p>2021 - Contract for the CTLR design and construction was awarded on 23 June 2021.</p> <p>2022 – Groundworks on CTLR began</p>	The detailed design of the CTLR is substantially complete and the main construction works are well underway and on programme for completion in Spring 2025. Significant milestones will be the opening of the Link Road and new realigned A9 later this year. Piling works continue on the new River Tay structure with the main bridge construction due to commence in October 2023	Lengthy timescale, potential delays may arise in the future
2.	Integrate AQ into Regional Transport Strategy (RTS) - Ensure that this AQAP is integrated into the delivery of the RTS.	Policy guidance and development control	N/A	In Progress	N/A	N/A	<p>PKC and TACTRAN continue to work in conjunction to ensure AQ is considered in the RTS.</p> <p>Regional Transport Strategy is currently under review, and TACTRAN have been liaising with PKC re air quality as part of the review process. The updated strategy is intended to run from 2023-2033</p>	No barriers predicted

3.	Integrate AQ into Local Transport Strategy (LTS) - Ensure that the AQAP is integrated into the delivery of the LTS.	Policy guidance and development control	N/A	In Progress	N/A	LTS published in 2010. Mobility Strategy to replace LTS in development, main issues report public consultation underway	PKC is currently developing a Mobility Strategy encompassing all travel within the local authority area, due 2024. As part of the updated Perth AQAP, a new measure is proposed ensuring this mobility strategy is created in line with CAFS2 and air quality considerations	No barriers predicted
4.	Park & Ride - Operate existing Park & Ride (PR) Schemes and maintain high levels of usage	Transport Planning and Infrastructure	N/A	In Progress	Fully Funded Annual funding source, Smarter Choices Smarter Places (RTPI Boards) Local Authority Investment Programme (Scone EV Charger) Tay Cities Deal (Low Carbon Transport Hub)	2021 - Emtec Energy awarded a contract to design & build the Broxden P&R low carbon transport hub on PKC's behalf 2022 – Fast EV Charger installed at Scone P&R, additional RTPI board installed at Broxden P&R	A new fast EV charger was installed at Scone P&R in 2022, and an additional RTPI board was installed at Broxden P&R opposite the main passenger waiting facility. No further progress regarding the proposed Walnut Grove P&R, discussion between PKC and the developer/landowner re the Section 75 legal agreement are ongoing	Walnut Grove progress reliant on developer collaboration. Further P&R improvement reliant on sourcing funding
5.	Bus Quality Improvements – Bus Strategy and Quality Bus Partnerships	Transport Planning and Infrastructure	N/A	In Progress	N/A	N/A	Continued improvements involving PKC, TACTRAN and bus operators and improvements on bus shelter facilities and interchanges. Continued review of timetables which are amended to reflect demand and fares revised	No barriers predicted
6.	Freight Improvements - Establish a TACTRAN – wide Freight Quality Partnership (FQP) to help deliver cost effective packages of freight	Freight and Delivery Management		Completed	N/A	A TACTRAN –wide freight quality partnership was formed including members from PKC, Scottish Enterprise, and the	PKC and Dundee's EH managers are members of the Freight Quality Partnership. AQ is integrated into the Freight Quality partnership.	No barriers predicted

	related interventions across the region					private freight sector.	A freight consolidation centre has been proposed as part of the Perth West Development	
7.	Travel Planning – PKC Corporate Travel Plan	Promoting Travel Alternatives	Unknown	In Progress	N/A	<p>2019 - Base-line staff travel survey carried out.</p> <p>2021 - Staff travel report went to Senior Management with recommendations of focus for the Corporate Travel plan.</p>	<p>Travel Plan is to be integrated within a wider Council Remobilisation strategy following the Covid-19 pandemic.</p> <p>PKC will be vacating our main office at Pullar House in April 2024 and will move staff to our offices at 2 High Street. As there is not enough space in 2 High Street for all staff, this move is a long-term commitment to hybrid working, one of the recommendations included within the Staff Travel Report in 2019 as a way to reduce emissions.</p> <p>PKC also promotes a car hire salary sacrifice scheme (Tusker) to staff which only provides LEV or ULEVs to encourage a reduction in staff vehicle emissions.</p>	No barriers predicted
	Encourage development and employee use of Green Travel Plans in our large employers.		N/A	In Progress	N/A	N/A	TACTRAN has been represented on SSE's Travel Plan Steering group and provided advice and promotional material. Perth College has also been given information and support of use of lift share. Aviva, PRI and Murray Royal Hospitals have been given advice and guidance in travel planning process and PRI provided with	No barriers predicted

							grants for travel planning measures, promotion of travel plan implementation software, TACTRAN travel knowhow to support businesses developing and implementing travel plans.	
	Continue to support schools developing Green Travel Plans (GTP)		N/A	In Progress	N/A	N/A	<p>PKC Roads team are currently requesting travel plans from schools to assess their status. Also working on school climate audits that include school travel plans.</p> <p>School exclusion zones are being considered for further schools, dependant on suitability of the school's adjacent street network.</p> <p>A review of all school travel plans is proposed as a measure for inclusion within the updated Perth AQAP.</p>	Limited school staff resource may result in longer timescales
	Regional/PKC car and Lift Share schemes		N/A	Completed	N/A	2021 - PKCs Liftshare platform no longer has the engagement or membership to make the licence cost economically viable moving forward. PKC Liftshare members have been transferred to the Perth & Kinross regional Liftshare platform, which is paid for by TACTRAN.	<p>Continued promotion of Lift share including PKC and PRI, SSE and Aviva with stalls within workplaces</p> <p>Proposed measure within the updated Perth AQAP will focus more on development of car share scheme than liftshare</p>	No barriers predicted
	Continue to seek GTPs from large development		N/A	In Progress	N/A	N/A	This is a continual process through planning and is	No barriers predicted

	under existing planning arrangements						requested by Transport Planning Team who are internal consultees for planning.	
8.	Traffic Management – Keep City Traffic Management under constant review	Traffic Management	N/A	In Progress	<p>Fully Funded</p> <p>Annual funding source, SG AQ Grant funding (Zephyr Trial)</p> <p>PKC funding source, School Road Safety Measures Capital Budget (School traffic signals)</p>	<p>21/22 - Reviewed and Validated the traffic signal operation, phasing and timings of the Dunkeld Road/Atholl Street Corridor and Bridgend/Perth Bridge Corridor to try and improve traffic flow through the corridors.</p> <p>2022 – Two new signal sites installed to support school active travel</p> <p>2023 – T&N Zephyr monitor trial began</p>	<p>Two new traffic signal sites installed in 2022 to promote/support active travel for school children.</p> <p>Traffic & Network Zephyr monitor trial was delayed due to procurement issues but began in early 2023. This project will aim to link AQ sensor data with traffic signalling in Atholl St and Bridgend to try reducing pollution peaks resulting from congestion.</p>	No barriers predicted
9.	Planning and Air Quality - Consider air quality as an issue for the Local Development Plan.	Policy Guidance and Development Control	2019	Complete	N/A	<p>Air Quality a key consideration in the 2019 Local Development Plan</p> <p>Statutory AQ SPG, adopted in March 2020 and is linked with the new revised LDP</p>	<p>The Perth & Kinross Local Development Plan (2019) was adopted on 29 November 2019 and covers the whole Perth and Kinross area.</p> <p>AQ is considered within the new plan for the whole region, not just AQMAs.</p> <p>PKC produced a statutory AQ SPG, which was adopted in March 2020 and is linked with the new revised LDP</p>	No barriers predicted
	Complete the supplementary planning guidance (SPG) on Air Quality		2020	Completed	N/A	2020 - SPG approved & implemented	Supplementary air quality planning guidance was approved in 2020 and sets out how air quality will be	N/A

							considered when determining planning applications and details the circumstances in which an air quality assessment may be required	
	Consider air quality in planning decisions and formalise decision making process/interaction with Environmental Health		N/A	In Progress	N/A	N/A	Environmental Health continue to check the weekly planning list and comment on applications which may adversely impact on local air quality. The AEA/EPUK screening tools are used to assess applications.	No barriers predicted
10.	Procurement and Air Quality – Formally consider air quality in tendering process for new PKC vehicles	Vehicle Fleet Efficiency	N/A	In Progress	Fully Funded Annual Funding Source, Switched On Fleet	2022 - Chargers installed at Loch Leven and Strathearn Community Campuses, with charger installation at North Inch and Breadalbane Community Campuses in progressed or scheduled 2023 - 17 EVs in PKC Fleet, 88 EV Charge Points available for Fleet use	PKC continue to replace Euro Standard vehicles with newer Euro 6 vehicles or EVs where appropriate. Currently PKC has a total of 17 EVs in its fleet. PKC continue to expand electric charging point network to accommodate a more electric fleet. PKC Fleet now have a total of 88 EV charge points installed, including chargers at two of the 6 Community Campuses in P&K A Fleet EV Strategy is near completion which will cover all council Depots (Friarton, Crieff, Kinross, Blairgowrie and Pitlochry)	No barriers predicted
11.	Eco-Driver Training - lower fuel use in our fleet to reduce emissions in the AQMA	Vehicle Fleet Efficiency	Unknown	Delayed	Not Funded	N/A	PKC Fleet currently does not have the resources to deliver this training. Alternative resources or eco driver training will be reviewed as part of the updated Perth AQAP	Lack of available Fleet staff resource to pursue

12.	Provision of Travel Information - Develop, promote and maintain a comprehensive Travel Information System	Public Information	N/A	In Progress	N/A	N/A	Traveline Scotland in partnership with PKC continues to develop the website and apps to provide and enhance public transport information Scotland-wide.	No barriers predicted
13.	Signage - Investigate the potential of variable message signage linked to pollution monitoring system	Public Information	Unknown	Planned	Not Funded	2023 - Committee proposal prepared; decision expected mid/late 2023	Traffic & Network have proposed 5 new Variable Messaging Signs around Perth City to provide live information about the road network. Air Quality information is being considered as one of the items shown on these signs. The proposal is due to go to Committee in mid/late 2023.	Sourcing funding for the project, multiple sources may be required.
14.	Alternative Modes of Transport - Work closely with Tactran to aid delivery of the Walking and Cycling Strategy for the region	Promoting Travel Alternatives	N/A	In Progress	Fully Funded 50% SG AQ Grant funding 50% Sustrans funding (iBike Officer)	2022/23 – 207 iBike activities carried out in 22/23 and 8431 pupils engaged with	SG funding was attained again this year to match fund the iBike Officer. Various activities such as bikeability training, bike maintenance sessions etc. were carried out at over 21 locations across P&K over the course of the year.	No barriers predicted
15.	Improve Access to Public Transport - Work with planning colleagues to assess provision of public transport at new and existing developments	Transport Planning and Infrastructure	N/A	In Progress	N/A	N/A	Continue to assess transport schemes through planning for new and existing developments.	No barriers predicted
16.	Idling Emission Reduction - Enforce Vehicle Idling Regulations	Promoting Low Emission Transport	2023	Completed	Partially Funded Annual funding source, SG AQ Grant funding (used for comms campaign in 2022 only, enforcement	2022 - Anti-Idling enforcement approved by Committee 2023 – Anti Idling Enforcement Begins	Anti-Idling enforcement began in April 2023 following a comms campaign. At the time of writing, no fixed penalty notices have been issued for idling	No barriers predicted

					carried out using PKC resource)			
17.	Roadside Emission Testing - Authorised Personnel to carry out roadside testing	Roadside Emission Testing	Unknown	Delayed	Not Funded	N/A	No Progress	Lack of staff capacity and funding to pursue, ANPR surveys used as an alternative for local vehicle emission knowledge
18.	LAQM Marketing - Enhance existing provisions of publicity materials. Organise publicity initiatives in schools, large employers and public sector.	Public Information	N/A	In Progress	Fully Funded Annual funding source, SG AQ Grant funding (Clean Air Day) Annual funding source, Smarter Choices Smarter Places (Perth & Crieff on the Go)	2022 – Social media and school activities carried out on Clean Air Day 2023 – PKC AQ Website updated	'PK on the Go' continued to spread positive messages on sustainable transport choices through social media and the website www.pkonthego.co.uk . Leaflets, banners etc advertising PK on the Go were also distributed at various events throughout the year. PKC collaborates with TACTRAN's Get On The Go, Perth & Kinross Countryside Trust, Liftshare and other partners to promote active travel across the region. Alongside social media content, Clean Air Day activities were carried out at three Perth primary schools and one high school in 2022, promoting active and sustainable travel as well as informing the public on AQ issues. PKC AQ website was updated in early 2023 to improve provision of information for the public	No barriers predicted
19.	LAQM Monitoring and Reporting - Continue to monitor and report air	Statutory Duties LAQM	N/A	In Progress	Fully Funded	2021 - High St. RTM was relocated to Bridgend to	PKC continue to review monitoring network.	No barriers predicted

	pollution within Perth and Kinross				Annual Funding, SG AQ Grant	<p>assess potential exceedances of NO₂.</p> <p>2022 - Three diffusion tubes relocated.</p> <p>2022 -Zephyr monitor installed in Bridgend in April 2022 for a 12-month study</p>	<p>Three diffusion tubes were relocated in 2022 to areas of potential high NO₂ identified using the new Perth dispersion model.</p> <p>A Zephyr monitor was installed in Bridgend in April 2022 for a 12-month study to assess whether the new RTM readings are representative of street canyon pollution levels, both for NO₂ and PM₁₀. Early results confirm Bridgend RTM is representative and levels are below objectives</p>	
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Table 2.3 - Progress on Crieff AQAP Measures to Improve Air Quality

Measure No.	Measure	Category	Expected/ Actual Completion year	Measure Status	Funding Status	Key Milestones	Progress	Barriers to implementation
A.1	Liase with the Scottish Government re. the consideration of national measures to reduce background concentrations of PM	Policy guidance and development control	N/A	Delayed	N/A	N/A	No Progress	Reduced officer capacity & ongoing/annual projects.
A.2	Improving Links with Local Transport Policies	Policy guidance and development control	N/A	In Progress	N/A	N/A	PKC is in the process of developing a Mobility Strategy encompassing all transport within the local authority area, due 2024. Air Quality will be a key consideration within this document	No barriers predicted
A.3	Improve Links with Regional Transport Strategy	Policy guidance and development control	N/A	Complete	N/A	N/A	PKC and TACTRAN continue to work in conjunction to ensure AQ is considered in the RTS. Regional Transport Strategy is currently under review, and TACTRAN have been liaising with PKC re air quality as part of the review process. The updated strategy is intended to run from 2023-2033	No barriers predicted
A.4	Ensure Integration of Air Quality with Other Council Strategies and Policies	Policy guidance and development control	N/A	In Progress	N/A	2019 - LDP considered AQ within the plan for the whole region, not just AQMAs, and was in line with CAFS. 2021 - Air Quality a key consideration	AQ will be a key factor in the upcoming PKC Mobility Strategy, due 2024. EH is regularly consulted on upcoming Council plans and strategies regarding Air Quality integration	No barriers predicted

						within the PKC Climate Action Plan		
A.5	LDP – Assess Merit of further development in Crieff	Policy guidance and development control	2019	Completed	N/A	2019 - Further development in Crieff considered in 2019 LDP, no increases beyond existing proposals until 2024	The Local Development Plan was reviewed and a new LDP was adopted in 2019. During the review, the environmental impacts of directing future development towards or away from Crieff was assessed. The outcome was that the plan should not propose an increase in development – beyond existing proposals – in Crieff for the next five-year plan period (2019-24).	N/A
B.1	Redirect local road traffic movements away from A85	Traffic management	N/A	Delayed	Not Funded	N/A	No Progress	Reduced officer capacity & ongoing/annual projects
B.2	Incentivise parking out with AQMA	Transport planning and infrastructure	Unknown	Delayed	Not Funded	N/A	EH is working with PKCs Transport & Network team to remove 6 parking spaces on West High Street responsible for significant narrowing of road space at this point, causing congesting and increased vehicle emissions. Due to Traffic & Network's high workload across P&K, there is currently no predicted timescale for this project	Lack of available Traffic & Network staff resource to progress
C.1	Possible provision of SMART parking in Crieff	Transport planning and infrastructure	Unknown	Delayed	Not Funded	N/A	No Progress	Reduced officer capacity & ongoing/annual projects
C.2	Urban Traffic Control Systems congestion management	Traffic management	Unknown	Delayed	Not Funded	N/A	No Progress	Reduced officer capacity & ongoing/annual projects

C.3	Anti-Idling Enforcement	Policy guidance and development control	2023	Completed	Partially Funded Annual funding source, SG AQ Grant funding (used for comms campaign in 2022 only, enforcement carried out using PKC resource)	2022 - Anti-Idling enforcement approved by Committee 2023 – Anti Idling Enforcement Begins	Anti-Idling enforcement began in April 2023 following a comms campaign. At the time of writing, no fixed penalty notices have been issued for idling	No barriers predicted
C.4	Undertake a review of the current locations of pedestrian crossings	Transport planning and infrastructure	Unknown	Delayed	Not Funded	N/A	No Progress	Reduced officer capacity & ongoing/annual projects
C.5	Limit or prioritise traffic turning right onto High Street	Traffic management	Unknown	Delayed	Not Funded	N/A	No Progress	Reduced officer capacity & ongoing/annual projects
D.1	Encourage private and public operators to pursue cleaner vehicles	Vehicle fleet efficiency	N/A	In Progress	Fully Funded Annual funding source, SG AQ Grant funding (ECO Stars, James Sq. Chargers) Annual Funding Source, Switched On Fleet (other chargers)	2019 – PKC ECO Stars Scheme launched 2022 – EV chargers now installed in all Crieff PKC car parks & Community Campus	PKC ECO Stars works with operators in the area to improve fleet efficiency, supporting their move to more efficient vehicles. 31 new members were recruited in 2022 to PKCs ECO Stars Scheme, covering 1,411 new vehicles. EV Charger installed at Strathearn Community Campus in 2022. Chargers now available at all PKC car parks (Strathearn CC, Leadenflower, James Square and King St). Chargers also available at Broich Road recycling centre for council use only.	No barriers predicted
D.2	Maintenance of the Local/Voluntary Bus Quality Partnership -	Promoting travel alternatives	Unknown	Delayed	N/A	N/A	No Progress	Lack of PKC Public Transport staff resource to pursue
D.3	School Travel Plans	Promoting travel alternatives	N/A	In Progress	N/A	N/A	Roads team are currently requesting travel plans from schools to assess their status. Also working on school climate audits	Limited school staff resource may result in longer timescales

							that include school travel plans. School exclusion zones are being considered for further schools, dependant on suitability of the school's adjacent street network. A review of all school travel plans is proposed as a measure for inclusion within the updated Perth AQAP.	
D.4	Public transport improvements	Promoting travel alternatives	N/A	In Progress	Fully Funded Annual funding source, SG AQ Grant funding (RTPI Screens) Annual funding source, Smarter Choices Smarter Places (Ticket Machines, RTPI)	2021 - RTPI screens installed in two locations within Methven in 20/21, & power supply installed at a bus shelter in Comrie in preparation for a RTPI. 2022 - Two electronic ticket machines with contactless payment facilities installed at Sweeneys Garage in Muthill, who operate in the Crieff area	No further improvements to public transport within Crieff during 2022	No barriers predicted
D.5	Restrict access for polluting vehicles within AQMA	Traffic management	2020	Completed	N/A	2020 - NLEF Stage 1 Screening complete and LEZ found not necessary in Crieff	NLEF Stage 1 Screening Appraisal was carried out by PKC for both the Perth and Crieff AQMAs as part of the 2020 APR. Due to the Crieff AQMA covering essentially a single street, in line with the guidance provided for carrying out the NLEF assessment a low emission zone was not thought to be a	N/A

							proportionate measure in this situation.	
D.6	Implement ECO Stars scheme for HGV and bus operators	Vehicle fleet efficiency	2019	Completed	Fully Funded Annual funding source, SG AQ Grant funding	2019 – PKC ECO Stars Scheme Launched	31 new members were recruited to PKCs ECO Stars Scheme in 2022, across a range of industries, covering 1,411 new vehicles.	No barriers predicted
E.1	Promotion of lift sharing and development of car clubs	Alternatives to private vehicle use	N/A	In Progress	Not Funded	2022 - PKCs Liftshare platform no longer has the engagement or membership to make the licence cost economically viable moving forward. PKC Liftshare members have been transferred to the Perth & Kinross regional Liftshare platform, which is paid for by TACTRAN.	Continued promotion of Lift share including PKC and PRI, SSE and Aviva with stalls within workplaces Proposed measure within the updated Perth AQAP will focus more on development of car share scheme than liftshare (this will be PKC wide and will include Crieff)	No barriers predicted
E.2	Travel plans for large institutions and businesses	Promoting travel alternatives	N/A	In Progress	N/A	N/A	TACTRAN utilises Transport Scotland funding to provide travel planning advice for businesses across Scotland under the guises of the TravelKnowHow programme. This is through both online tools and direct 1-1 support	No barriers predicted
E.3	Create and implement PKC Corporate Travel Plan	Promoting travel alternatives	Unknown	In Progress	N/A	2019 - Base-line staff travel survey carried out. 2021 - Staff travel report went to Senior Management with recommendations of focus for the	Travel Plan is to be integrated within a wider Council Remobilisation strategy following the Covid-19 pandemic. PKC will be vacating our main office at Pullar House in April 2024 and will move staff to our offices at 2 High Street. As there is not	No barriers predicted

						Corporate Travel plan.	<p>enough space in 2 High Street for all staff, this move is a long-term commitment to hybrid working, one of the recommendations included within the Staff Travel Report in 2019 as a way to reduce emissions.</p> <p>PKC also promotes a car hire salary sacrifice scheme (Tusker) to staff which only provides LEV or ULEVs to encourage a reduction in staff vehicle emissions.</p>	
E.4	Promotion of active travel	Promoting travel alternatives	N/A	In Progress	<p>Fully Funded</p> <p>Annual funding source, 50% SG AQ Grant funding 50% Sustrans funding (iBike Officer)</p> <p>Annual funding source, Smarter Choices Smarter Places (PK on the Go)</p>	<p>2022/23 – 207 iBike activities carried out in 22/23 and 8431 pupils engaged with</p>	<p>SG funding was attained again this year to match fund the iBike Officer. Various activities such as bikeability training, bike maintenance sessions etc were carried out at over 21 locations across P&K over the course of the year.</p> <p>'PK on the Go' continued to spread positive messages on sustainable transport choices through social media and the website www.pkonthego.co.uk. Leaflets, banners etc advertising PK on the Go were also distributed at various events throughout the year.</p> <p>PKC collaborates with TACTRAN's Get On The Go, Perth & Kinross Countryside Trust, Liftshare and other</p>	No barriers predicted

							partners to promote active travel across the region.	
E.5	Awareness raising and education, presentations at local schools/community meetings	Public information	N/A	In Progress	Fully Funded Annual funding source, SG AQ Grant funding (Clean Air Day)	2020 - A community event focussed on air quality and road safety was held in February 2020 2020 - Clean Air Day 2020 activities were carried out at two schools in Perth and one in Crieff	No further progress in 2022	Reduced officer capacity & ongoing/annual projects
E.6	Cycling and walking routes to be routed to link in with the campus for sport.	Promoting travel alternatives	N/A	In Progress	N/A	N/A	Planning proposals for upcoming major developments along south side of Broich Road, Crieff will be required to include a multi-user path to link the sites to the Strathearn Community Campus	No barriers predicted
E.7	Provision of PKC “Champions” for transportation methods	Promoting travel alternatives	Unknown	Delayed	N/A	N/A	No Progress	Reduced officer capacity & ongoing/annual projects
F.1	Biomass installations and other developments likely to cause pollution – review developments which may cause pollution	Policy guidance and development control	N/A	In Progress	N/A	N/A	Environmental Health continue to check the weekly planning list and comment on applications which may adversely impact on local air quality. The AEA/EPUK screening tools are used to assess applications	No barriers predicted
G.1	Increase AQ monitoring network	Policy guidance and development control	N/A	In Progress	Fully Funded Annual Funding, SG AQ Grant	2022 – Zephyr monitoring study carried out in West High Street	NO ₂ tube network increased since AQAP was published to increase reliability of results. A Zephyr monitor was installed in West High St in April 2022 for a 12-month study to assess whether RTM readings are	No barriers predicted

							representative of street canyon pollution levels, both for NO ₂ and PM ₁₀ . Early results confirm Crieff RTM is representative, and levels are below objectives	
G.2	Regional AQ modelling study	Policy guidance and development control	2020	Completed	Fully Funded Annual Funding, SG AQ Grant	2020 - Crieff baseline dispersion model completed	Crieff baseline dispersion model was completed in 2020 by Sweco UK Ltd	N/A
G.3	Cycling and walking routes to be incorporated into transport model	Public information	Unknown	Delayed	N/A	N/A	No Progress	It is not possible to add cycling and walking routes to the current Microsimulation model
G.4	Transport assessments for developments to be required as part of planning process	Policy guidance and development control	N/A	In Progress	N/A	N/A	This is a continual process through planning and is requested by Transport Planning Team who are internal consultees for planning.	No barriers predicted

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how local concentrations of the main air pollutants compare with the objectives.

Perth and Kinross Council undertook automatic (continuous) monitoring at 4 sites during 2022. Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at <https://www.scottishairquality.scot/latest>.

Maps showing the location of the monitoring sites are provided at the above link. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

Perth and Kinross Council undertook non- automatic (passive) monitoring of NO₂ at 76 sites during 2022. Table A.2 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in <https://www.scottishairquality.scot/latest> as well as in Figure 3.1, Figure 3.2, Figure 3.3 and Figure 3.4. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

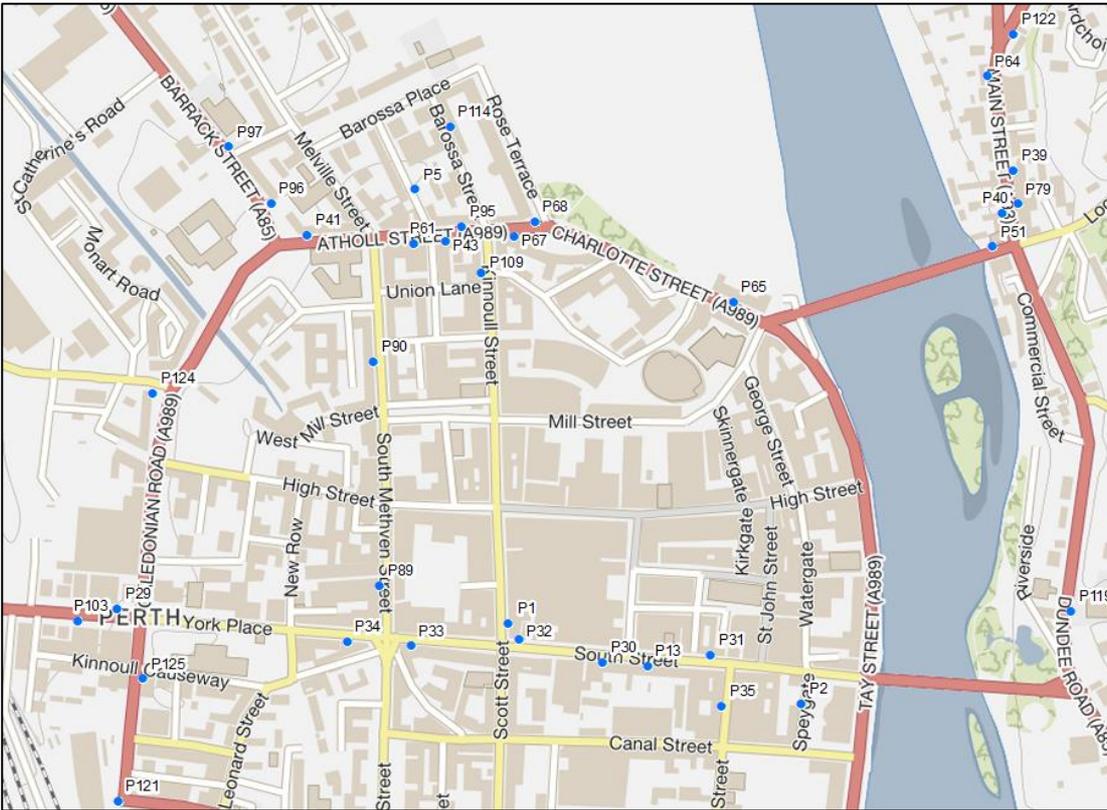


Figure 3.1: Perth City Centre NO₂ Diffusion Tube Locations

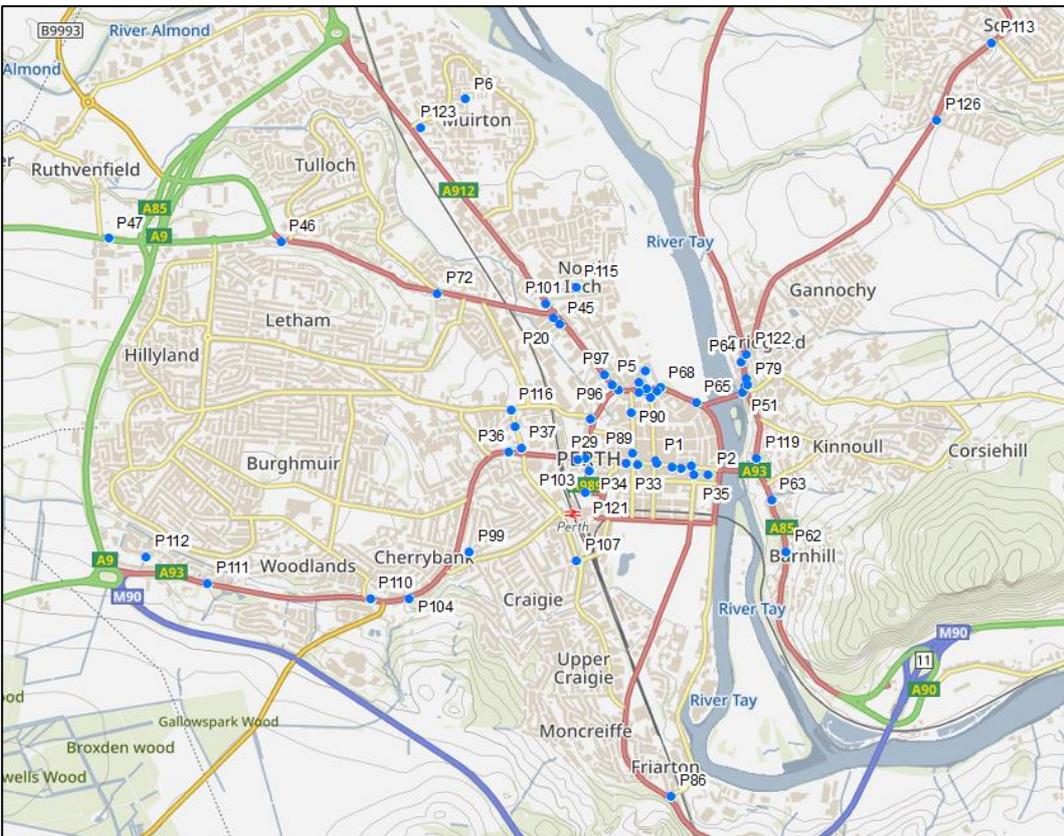


Figure 3.2: Perth Area NO₂ Diffusion Tube Locations

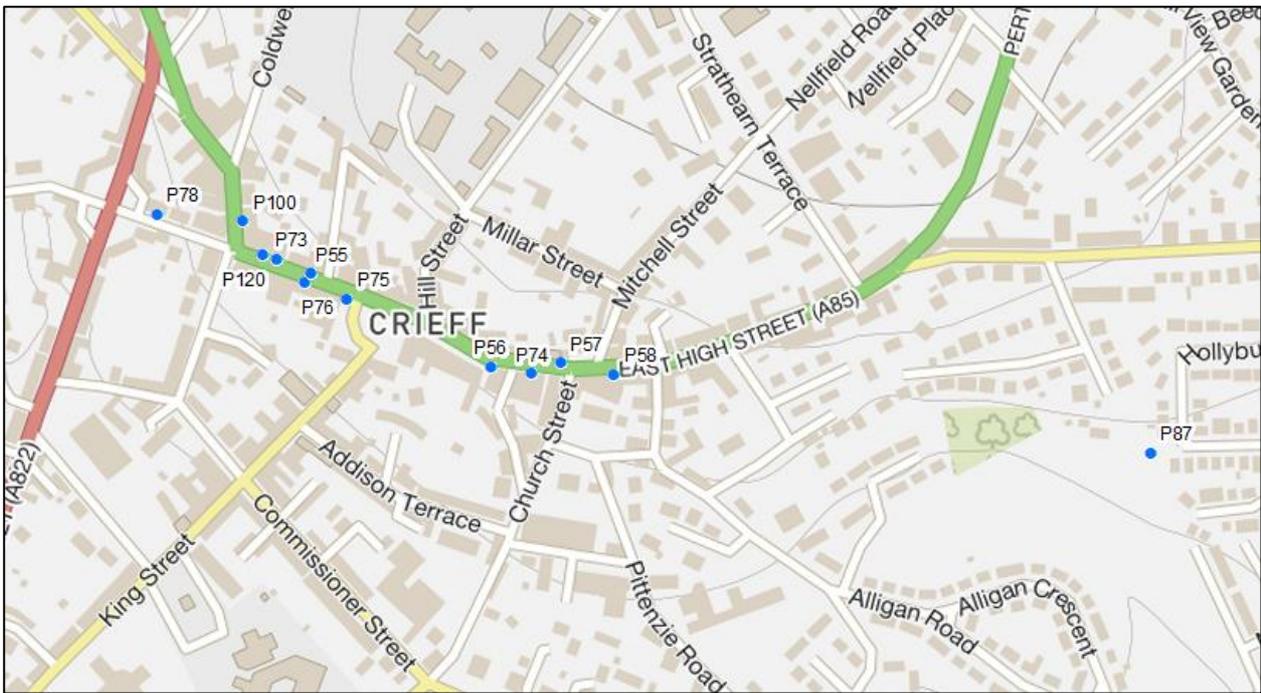


Figure 3.3: Crieff NO₂ Diffusion Tube Locations

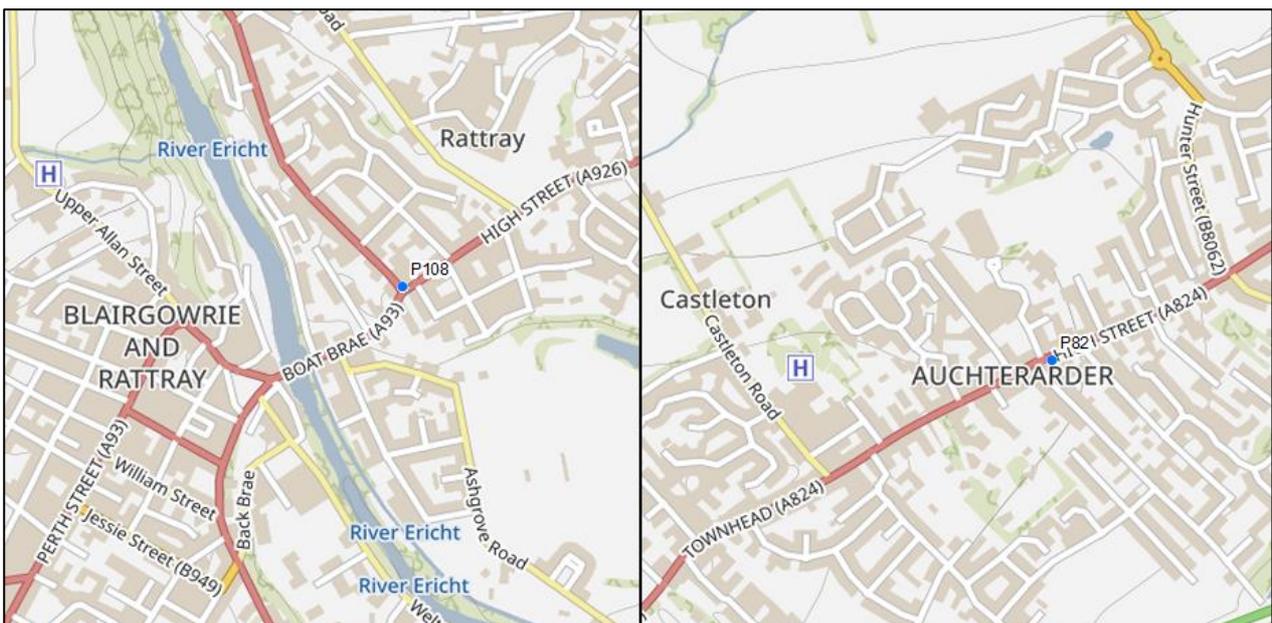


Figure 3.4: Blairgowrie and Auchterarder NO₂ Diffusion Tube Locations

3.1.3 Other Monitoring Activities

PKC commissioned Sweco to carry out a monitoring study using Earthsense Zephyr monitors during 2022. Due to the size and power requirements of an automatic monitor and the narrow pavements in both Crieff and Bridgend, both RTMs at these locations are not located within the street canyon and therefore may not be measuring the full extent of

air pollution in the area. Therefore, small AQ sensors were chosen to determine whether the RTMs in Bridgend and Crieff were underreading air pollution in their areas, as they could be deployed within the street canyons mounted on lampposts. Monitoring locations can be seen in Figure 3.5 and Figure 3.6.

The study ran from April 2022 to March 2023. Throughout the course of the monitoring study, a number of issues arose including:

- loss of power for periods in the winter due to solar panel use
- Errors in PM readings due to faulty monitoring cartridges
- SD Card issues

However sufficient data was gathered to draw conclusions from the study. As the project concluded in 2023 and the final survey report has not been concluded, full results from the study will be presented in next year’s Annual Progress Report.

Early conclusions from the study indicate that pollutant levels within the Crieff street canyon were slightly higher than those measured at the RTM, however both monitors showed levels far below national objectives. The Bridgend Zephyr was measuring slightly lower than the RTM, again far below national objectives.

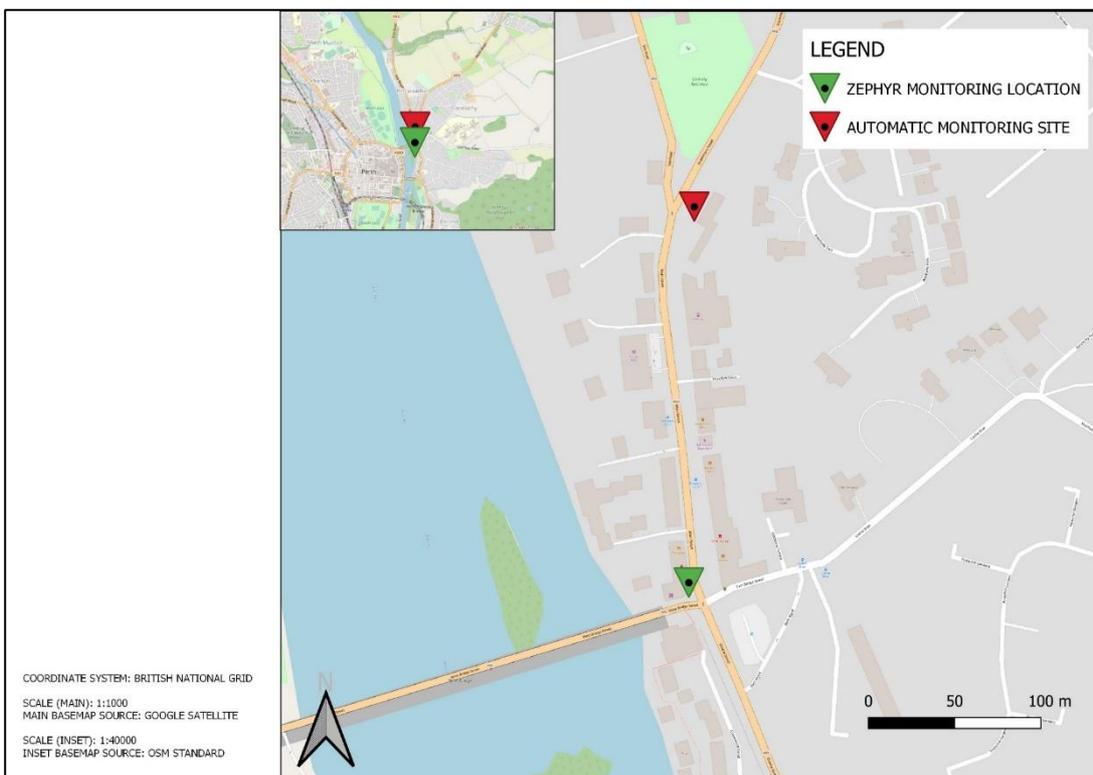


Figure 3.5: Automatic and Zephyr Monitoring Locations in Bridgend, Perth

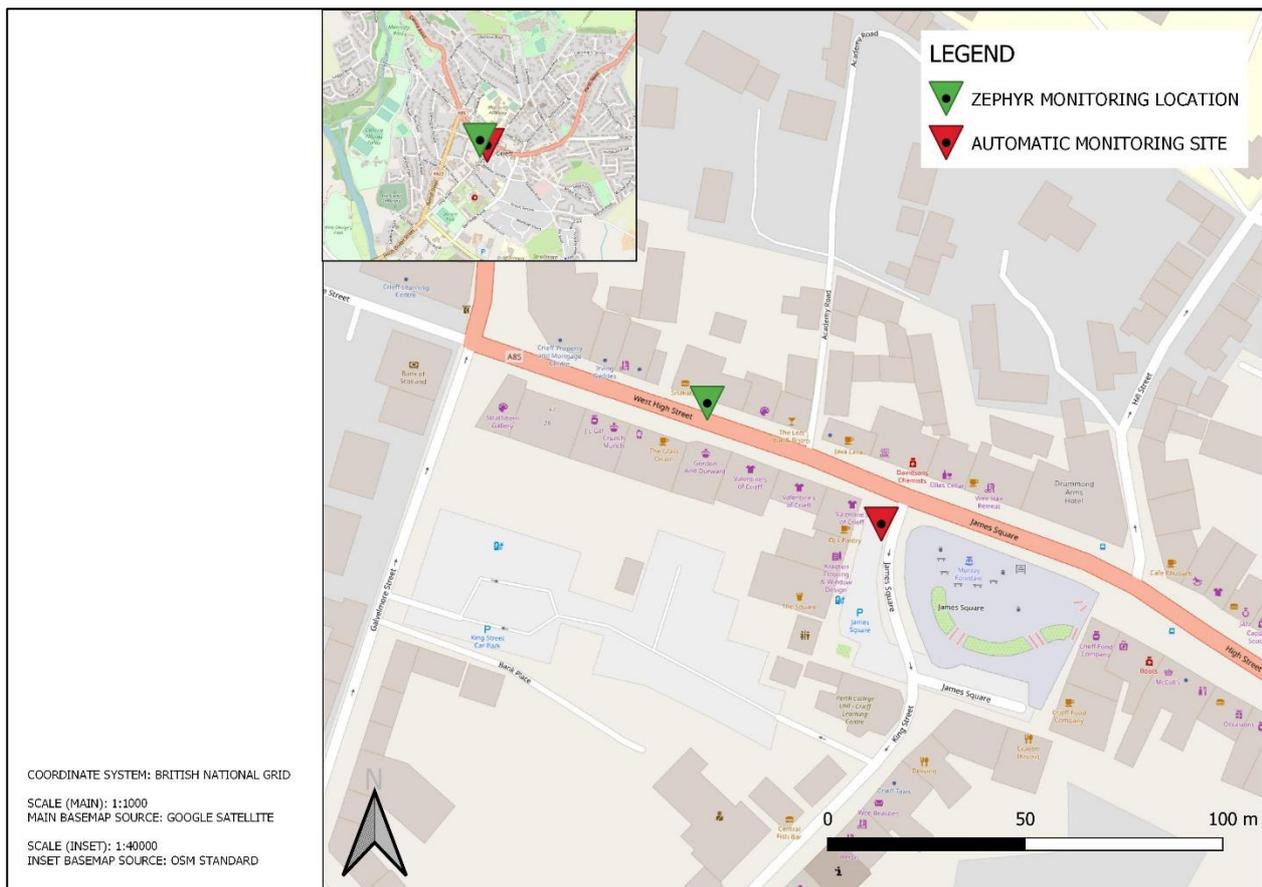


Figure 3.6: Automatic and Zephyr Monitoring Locations in Crieff

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for annualisation and bias. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO₂)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past five years with the air quality objective of 40 µg/m³.

For diffusion tubes, the full 2022 dataset of monthly mean values is provided in Appendix B. As none of the monitoring locations had a result of greater than 36µg/m³ it has not been necessary to carry out any calculations for the fall off of NO₂ with distance.

Table A.4 in Appendix A compares the ratified continuous monitored NO₂ hourly mean concentrations for the past five years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year.

No exceedances of either the annual mean objective level or the hourly mean objective level were observed during 2022 at any of the three automatic monitoring sites where NO₂ levels are monitored. This follows on from no exceedances at these locations since 2017. The continuing downward trend is shown in Figure A.1 and Figure A.2 in Appendix A for the Atholl St and Crieff automatic monitoring sites. As the Bridgend site has only been in place since 2020, there is not enough data to establish a trend yet.

Diffusion tube monitoring also indicated no exceedances of NO₂ at any locations across the monitoring network. While there was a notable increase in NO₂ levels in 2021 versus 2020, in 2022 levels have reduced once again, in some cases to similar levels as 2020.

It is clear from the above data that a new “normal” is still to emerge following the Covid-19 pandemic, as no trend can be identified between the years of 2020, 2021 and 2022. This may be a result of homeworking/flexible working continuing to be popular, leading to the 9-5 commuting traffic peaks being spread throughout the day. Further investigation into post-Covid traffic movements may be required to determine the cause of reduced NO₂ levels in Perth & Kinross.

It should also be noted that the bias adjustment factor for our 2022 diffusion tubes is more than usual, possibly leading to lower results: 0.79 compared to the previous year's 0.88.

Due to limited pavement space the continuous monitors in Crieff and Bridgend are not located within the street canyons, and therefore the RTM's PM₁₀ results may not represent the worst case. In order to address this, a Zephyr monitor was installed in both Bridgend and Crieff in April 2022 within the street canyon for a 12 month study to try and build a more accurate picture of both NO₂ and PM₁₀ levels in these locations. The study concluded in March 2023, and preliminary results indicate that though the NO₂ levels within Crieff West High St are higher than those recorded at the RTM, it is marginal difference. Similarly, the Bridgend Zephyr recorded NO₂ concentrations slightly below those recorded at the RTM, but again it was a marginal difference. Both RTM results can therefore be considered a reasonable representation of pollution levels.

3.2.2 Particulate Matter (PM₁₀)

Table A.5 in Appendix A compares the ratified and adjusted monitored PM₁₀ annual mean concentrations for the past five years with the air quality objective of 18µg/m³.

Table A.7 in Appendix A compares the ratified continuous monitored PM₁₀ daily mean concentrations for the past five years with the air quality objective of 50µg/m³, not to be exceeded more than seven times per year.

PM₁₀ levels have increased from last year, and are at their highest level since 2018. This increase was seen across all monitors including the Muirton Background RTM, leading to the assumption that the increase may not be solely attributed to traffic emissions. PM₁₀ trends for Atholl Street, Muriton and Crieff can be seen in Figure A.3 - Figure A.5 in Appendix A.

The RTM relocated from High St to Bridgend was upgraded from TEOM to FIDAS in 2021, allowing PM₁₀ levels to be monitored as well as PM_{2.5}, however a trend has yet to be established due to the short monitoring period so far.

In 2022 there were no exceedances of the annual mean level and no exceedance of the overall PM₁₀ 24-Hour Mean national objective. There were two more exceedances of the 50 µg/m³ 24-Hour Mean at Bridgend than last year, and one more at Muirton than last year. Similar to last year, there were 7 exceedances of the 50 µg/m³ 24-Hour Mean at Atholl St.

The exceedances at Atholl Street were likely caused by the continued building works being undertaken within the building directly behind the RTM (18 North William Street). The full renovation of the building's interior has resulted in significant quantities of dust being released into Atholl St since June 2021. As was indicated in our 2022 APR, it was expected that the building works would continue to affect RTM readings in 2022, however these levels are not expected to remain once the works are concluded. Officers of Environmental Health work closely with Planning colleagues to ensure the strict implementation of a Construction Environmental Management Plan (CEMP) by the developer to keep future pollutants to a minimum during the construction.

It should be noted that due to limited pavement space the continuous monitors in Crieff and Bridgend are not located within the street canyons, and therefore the RTM's PM₁₀ results may not represent the worst case. In order to address this, a Zephyr monitor was installed in both Bridgend and Crieff in April 2022 within the street canyon for a 12 month study to try and build a more accurate picture of both NO₂ and PM₁₀ levels in these locations. The study concluded in March 2023, and preliminary results indicate that though the PM₁₀ levels within both street canyons are higher than those recorded at the RTM, it is

marginal difference. Therefore the RTM results can be considered a reasonable representation of pollution levels.

FIDAS 200 PM₁₀ Correction

Following the [Scottish Government Pilot Research Study to investigate Particulate Matter Monitoring Techniques in Scotland](#), Scottish Government recommended PM₁₀ and PM_{2.5} data recorded on Fidas 200 analysers require a correction be applied. In the case of PM₁₀ data, all data should be divided by 0.909.

The results of this correction can be seen in Table A.7 and Table A.8. The correction factor caused an increase in recorded PM₁₀ levels, though not enough to result in an exceedance of the annual mean. However, the corrected results show 11 exceedances of the 50 µg/m³ 24-Hour Mean at Atholl Street, beyond the objective of 7 per year. This would be the first PM₁₀ exceedance in Perth since 2012, however can be attributed to the building works detailed above.

The correction also resulted in one exceedance of the 50 µg/m³ 24-Hour Mean in Crieff, but no changes to the number in Bridgend and Muirton.

3.2.3 Particulate Matter (PM_{2.5})

Table A.9 in Appendix A compares the ratified and adjusted monitored PM_{2.5} annual mean concentrations for the past five years with the air quality objective of 10µg/m³.

Monitoring of PM_{2.5} began at three locations within Perth and Kinross in late 2017 – Atholl Street (Perth), Perth High Street and Crieff. Monitoring at the fourth continuous monitoring site at Muirton (Perth) began in late January 2019. Perth High Street RTM was moved to Bridgend in 2021, where PM_{2.5} monitoring has continued.

The data indicates no exceedances of the objective at any of these locations during 2022, however like PM₁₀, levels have increased from the previous year and are now at similar levels to those recorded in 2019.

PM_{2.5} trends for Atholl Street, Muirton and Crieff can be seen in Figure A.6 - Figure A.8 in Appendix A. Levels have remained fairly steady since monitoring began, with a clear increasing or decreasing trend still to emerge.

FIDAS 200 PM_{2.5} Correction

As set out above, Scottish Government recommended PM_{2.5} data recorded on Fidas 200 analysers require a correction be applied. In the case of PM_{2.5} data, all data should be multiplied by 1.06.

The results of this correction can be seen in Table A.10. The correction factor caused an increase in recorded PM_{2.5} levels, though there is still no exceedance of the annual mean.

3.2.4 Sulphur Dioxide (SO₂)

PKC do not currently monitor SO₂ as there are no significant sources within Perth & Kinross

3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene

PKC do not currently monitor carbon monoxide, lead or 1,3-butadiene as there are no significant sources within Perth & Kinross

4 New Local Developments

4.1 Road Traffic Sources

No new sources within Perth and Kinross have been identified.

4.2 Other Transport Sources

No new sources within Perth and Kinross have been identified.

4.3 Industrial Sources

22/01290/FLM - *Formation of replacement poultry rearing farm comprising 4 rearing sheds.*

No detailed assessment as modernisation of shed design so improvement and reduction of emissions of Particulates. Application approved with conditions.

4.4 Commercial and Domestic Sources

22/01772/FLL - *Installation of 990KW biomass boiler and flue (in retrospect) Binn Skips, Binn Farm, Glenfarg for Binn Group Ltd.*

An AQIA was requested for the cumulative effect of this proposed 990kW biomass boiler and previously consented 22/00362/FLL for a 150kW biomass boiler. The submitted Air Quality Impact Assessment AQIA “Assessment of Cumulative Emissions from two biomass boilers at Binn Farm, Glenfarg” dated 13 February 2023, Report No 6062 V1.0 which was undertaken by ITPENERGISED.

- NO₂ - the AQIA predicted the emissions from the boilers have a Negligible impact on annual mean and 1-hour concentrations at all sensitive human receptors.
- PM₁₀ - the AQIA predicted the emissions from the boilers have a Negligible impact on annual mean and 24-hour concentrations at all sensitive human receptors.
- PM_{2.5} - the AQIA predicted the boilers have a Negligible impact at all sensitive human receptors.

The 150 kW and 990 kW biomass boilers operating in isolation or cumulatively are considered to have an overall negligible impact on air quality at nearby sensitive receptors, and the significance of air quality effects as a result of the operation of the boilers is concluded as not significant. The 22/01772/FLL was approved.

22/00808/FLL - *Installation of plant and equipment, Sandvik Heating Technology Ruthvenfield Road Inveralmond Industrial Estate Perth for Biosus Energy Limited.*

Applicant was requested to submit further information on the Combined Heat and Power plant. A CHP emissions screening tool was submitted and the estimated maximum annual mean NO₂ contribution from the CHP was given as 12514.96ug/m³. - Application was refused. Site location outwith, but adjacent to Perth's AQMA.

4.5 New Developments with Fugitive or Uncontrolled Sources

22/02133/MWM - *Northern lateral extension to quarry with further excavation works (for a temporary period) Collace Quarry Collace Perth.*

An AQIA 'Collace Quarry Extension, Perth & Kinross- Johnson Poole & Bloomer' Report No. R22.10907/2/JH dated 9 November 2022 which was undertaken by Vibrock Limited was submitted in accordance with Planning Advice Note (PAN) 50: Annex B Control of Dust at Surface Mineral Workings and the Institute of Air Quality Management (IAQM) guidance. The IAQM assessment undertaken predicted that dust effects from mineral extraction would be negligible at residential properties and with the implementation of suitable dust mitigation measures, is considered to be not significant. Application approved with condition for a Dust Management Plan

22/01174/FLL - *Excavation of soil and other material, H71 Crieff Road Perth and*

22/01171/FLL - *Importation of soil and other material, Former Hill Park Quarry Perth*

The soil and material to be excavated from Newton Farm, Perth, planning application 22/01174/FLL are to be imported to the Hill Park site 22/01171/FLL and will be transported by lorries via the M90 to Hill Park, this will be carried out, from start to finish, over an eight week period at both sites. An Environmental Plan was submitted with both the applications and included a Dust Management Plan and dust control mitigation measures, for the control of dust and emissions to the air during the operations of works. Both applications approved with condition for Dust Management Plan.

5 Planning Applications

22/00816/FLL - *Erection of shop (Class 1), formation of vehicular access, car parking, landscaping, and associated works, Land North Of 288 Strathtay Road Perth for Lidl Great Britain Ltd.*

An AQIA for the operational and construction stages was requested as application site was within Perth's AQMA. The applicant submitted an AQIA, "Proposed Lidl Store, Crieff Road, Perth," document reference 5064 V1.0 dated 26 July 2022 which was undertaken by ITP Energised. The predicted overall effect on local air quality of the proposed development was assessed as not significant. Application was withdrawn.

22/00951/IPL - *Residential development (LDP site H17) (in principle) Land 100 Metres North Of 8 Cameron Walk, Church Road, Woodside.*

The Transport Statement submitted stated that at peak am and pm that a total of 14 trips will enter and exit the site daily therefore, there would not be a significant change in traffic flow and the Indicative EPUK & IAQM Planning for Air Quality Guidance criteria of 500 AADT change in Light Duty Vehicle would not be exceeded. Taking this into account and the low background levels for the area for both Particulates (PM₁₀ & 2.5) and Nitrogen Dioxide (NO₂) a detailed Air Quality Assessment was not required, as the impact of the proposed development on the local air quality can be considered to have insignificant effects. Application Approved.

22/00916/FLL - *Erection of a care home, formation of vehicular access, parking areas, landscaping and associated works Former Hillside Hospital Dundee Road Perth*

An AQIA was submitted "Air Quality Impact Assessment for Proposed Care Home and Residential Development at Barnhill Perth" dated 7 May 2020, document reference AS 0745 Dundee Road Perth which was undertaken by The Airshed consultants. The predicted impacts for NO₂, PM₁₀ and PM_{2.5} are also of negligible significance at all sensitive receptors assessed in terms of the objective levels due to the proposed development. Application Approved

22/00727/SCOP - *Proposed residential development Land 250 Metres Southeast of Wilmarean Luncarty.*

The EIA scoping report, submitted with this application, dated 10 April 2022 which was undertaken by Bidwell states that Air Quality is to be assessed to determine the impacts of the development at the construction and operational phases. The scoping report also concluded that the cumulative assessment within the EIAR will consider the CTRL.

23/00009/PREAPM - *Residential development comprising 227 dwellings at Broich Road, Crieff.*

Application out with Crieff's AQMA however applicant advised that an AQIA would be required for the development and any cumulative effects do not have an adverse effect on Air Quality especially within the AQMA. The AQ assessment should assess both operational and construction stages (Dust Assessment).

22/00005/PREAPM - *Residential development Land 350 Metres Northwest Of Davis Park Springfield Road Kinross.*

Advised that an Air Quality Impact Assessment would be required to assess air quality impacts from the proposed development and the air quality impacts from the M90 on the future residents of the development.

6 Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

No exceedances for either NO₂ were identified at any location across Perth and Kinross, and levels decreased in 2022. No exceedances for PM₁₀ or PM_{2.5} were identified in Perth & Kinross; however, levels had increased from the previous year. When PM data from Fidas 200 Analysers were corrected as per Scottish Government guidelines, PM₁₀ and PM_{2.5} levels were further increased. This increase resulted in an exceedance of the 50 µg/m³ 24-Hour Mean at Atholl Street 11 times, beyond the objective of 7 per year. This would be the first PM₁₀ exceedance in Perth since 2012, however could be attributed to the building works as detailed in 4.2.2.

It is clear from this year's data that a new "normal" is still to emerge following the Covid-19 pandemic, as no obvious trend can be identified between the years of 2020, 2021 and 2022. Further investigation into post-Covid traffic movements may be required to determine the cause of reduced NO₂ levels in Perth & Kinross and increased PM₁₀ and PM_{2.5} levels.

Though no exceedances have been recorded for NO₂ in the Perth AQMA, levels remain borderline without a consistent downward trend. Though the PM₁₀ exceedances at Atholl Street are likely attributed to the ongoing building works by the RTM, true roadside PM₁₀ levels at Atholl street remain unclear and a trend cannot be determined until the external influences subside. Due to these uncertainties, PKC would therefore not seek to revoke the Perth AQMA this year.

NO₂, PM₁₀ and PM_{2.5} levels within the Crieff AQMA have remained well below objective levels for a several years, and early results from this year's Zephyr monitoring study in West High Street indicate that though the RTM is outside the street canyon, there is not a significant difference in levels between the RTM and the Zephyr within the canyon. Therefore PKC will move to revoke the Crieff AQMA in 2023/24 as per Scottish Government recommendation.

6.2 Conclusions relating to New Local Developments

Nine proposed developments were considered for potential impact in air quality in 2022 – four of these were within the Perth AQMA, with a further development being in Crieff. Though the Crieff development is out with the Crieff AQMA, an AQ assessment was required to ensure any cumulative effects do not have an adverse effect on the air quality within the AQMA.

Of the assessments received so far for these developments, all but one identified that it was unlikely that they would have a significant impact upon local air quality. An application for the installation of a combined heat and power plant within the Perth AQMA was refused due to insufficient information on the CHP. The CHP emissions screening tool found the estimated maximum annual mean NO₂ contribution from the CHP to be 12514.96ug/m³, raising concerns about the impact it would have on air quality within the Perth AQMA.

It is also worth noting that there are other developments progressing, but these have been considered in previous progress reports. Developments assessed for air quality impacts in previous Annual Progress Reports can be found here:

<https://www.pkc.gov.uk/article/15307/Air-quality-reports>

6.3 Proposed Actions

- Based on the information gathered in 2022 no changes are currently recommended to the Perth AQMA at this time. However, as data collected from Crieff continues to indicate that there have been no exceedances of either NO₂ or PM₁₀ for a significant number of years, PKC will move to revoke the Crieff AQMA during 2023/24.
- PKC will also seek to complete the review of the Perth AQAP in 2023/24. Following the release of new AQAP guidance in Local Air Quality Management Policy Guidance 23, the draft AQAP is being aligned with the new requirements at the time of writing this APR, after which internal and public consultations will be undertaken. It is expected that the review of the Perth AQAP will be completed by March 2024.
- Once this is complete and the new Action Plan is in place, PKC will work towards implementation of the newly agreed measures and continue to deliver those measures which have already been started. One such measure which will be completed during the next reporting year will be the Zephyr study being carried out by PKC's Traffic &

Network team, where small Zephyr monitors will be linked with traffic signals on Atholl Street and Bridgend with an aim to reduce congestion and the resulting high levels of air pollutants from stationary traffic.

When air pollutant concentrations detected by the Zephyr sensors cross a set threshold, traffic signals along the Bridgend and Atholl Street corridors will prioritise green time to clear the street canyon of traffic as quickly as possible. If successful, this method could result in a significant reduction of vehicle emissions in some of the worst hotspots in Perth without the need for changes in road layout or other more expensive interventions.

- Due to redevelopment works at the location of the North Muirton background PM monitor, the RTM will be relocated to a new location in 2023. Following modelling work carried out by Sweco as part of the Perth AQAP review, potentially high levels of NO₂ and PM₁₀ are predicted close to Broxden Roundabout on Glasgow road (due to the proximity to the M90), leading to PKC's decision to relocate the North Muirton RTM to this location. The RTM will also have an NO₂ analyser installed as part of this move.

Appendix A: Monitoring Results

Table A.1 - Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
Perth 1	Bridgend	Roadside	312254	724159	NO ₂ ; PM ₁₀ ; PM _{2.5} ; PM ₁	Y; Perth AQMA	Chemiluminescent; FIDAS	2.90	2.92	1.8
Perth 2	Atholl Street	Roadside	311575	723917	NO ₂ ; PM ₁₀ ; PM _{2.5} ; PM ₁	Y; Perth AQMA	Chemiluminescent; FIDAS	22.3	2.3	1.5
Perth 3	Muirton	Background	310658	725658	PM ₁₀ ; PM _{2.5} ; PM ₁	Y; Perth AQMA	FIDAS	N/A	N/A	2
Crieff 1	James Square	Roadside	286363	721614	NO ₂ ; PM ₁₀ ; PM _{2.5} ; PM ₁	Y; Crieff AQMA	Chemiluminescent FIDAS	9.5	5.3	1.5

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g., installed on the façade of a residential property).

(2) N/A if not applicable.

Table A.2 - Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube co-located with a Continuous Analyser?	Tube Height (m)
P1C, P1L, P1R	42 Scott St Perth	Roadside	311674	723501	NO ₂	Yes, Perth City	0.6	2.3	No	2.7
P2	17 Speygate Perth	Roadside	312018	723411	NO ₂	Yes, Perth City	3.8	1.2	No	2.3
P5	8 Stormont Street	Urban Centre	311584	723993	NO ₂	Yes, Perth City	13.6	1.3	No	2.5
P6	41 Mull Place	Urban Background	310501	725764	NO ₂	Yes, Perth City	6.6	1.6	No	2.4
P13	86 South Street	Roadside	311846	723454	NO ₂	Yes, Perth City	0.0	2.6	No	2.9
P20	2 Crieff Road	Roadside	311058	724395	NO ₂	Yes, Perth City	0.3	4.4	No	2.3
P29	37 York Place	Roadside	311252	723518	NO ₂	Yes, Perth City	2.8	4.9	No	2.8
P30C, P30L, P30R	114 South Street	Roadside	311797	723457	NO ₂	Yes, Perth City	0.0	2.5	No	2.9
P31	45-47 South Street	Roadside	311925	723465	NO ₂	Yes, Perth City	0.0	3.6	No	2.8
P32	135 South Street	Roadside	311704	723483	NO ₂	Yes, Perth City	0.0	5.3	No	2.7

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube co-located with a Continuous Analyser?	Tube Height (m)
P33	216 South Street	Roadside	311587	723475	NO ₂	Yes, Perth City	0.0	2.2	No	3.0
P34	10 County Place	Roadside	311503	723480	NO ₂	Yes, Perth City	0.0	2.1	No	2.9
P35	17 Princes Street	Roadside	311930	723416	NO ₂	Yes, Perth City	7.2	1.5	No	2.7
P36	51 Glasgow Road	Roadside	310773	723557	NO ₂	Yes, Perth City	12.4	1.6	No	2.4
P37	Riggs Road	Roadside	310857	723577	NO ₂	Yes, Perth City	0.0	7.6	No	2.4
P39	39 Main Street	Roadside	312257	724013	NO ₂	Yes, Perth City	2.0	2.6	No	2.4
P40	18 Main Street	Roadside	312245	723965	NO ₂	Yes, Perth City	0.1	2.2	No	2.6
P41	76 Atholl Street	Roadside	311462	723941	NO ₂	Yes, Perth City	0.5	2.2	No	2.9
P43C, P43L, P43R	17 Atholl Street	Roadside	311619	723933	NO ₂	Yes, Perth City	0.0	2.3	No	2.9
P45	Ballantine Place	Urban Centre	311095	724356	NO ₂	Yes, Perth City	3.7	1.8	No	3.1
P46	204 Crieff Road	Roadside	309364	724875	NO ₂	Yes, Perth City	11.7	4.0	No	2.1

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube co-located with a Continuous Analyser?	Tube Height (m)
P47	5 East Huntingtower	Roadside	308293	724892	NO ₂	Yes, Perth City	5.3	1.9	No	2.8
P51	2 West Bridge St	Roadside	312233	723921	NO ₂	Yes, Perth City	2.5	1.9	No	2.5
P55	7 West High Street, Crieff,	Roadside	286334	721640	NO ₂	Yes, Crieff	1.8	0.4	No	2.4
P56	39 High Street, Crieff,	Urban Centre	286541	721559	NO ₂	Yes, Crieff	0.0	1.3	No	2.4
P57	62 High Street, Crieff,	Urban Centre	286541	721563	NO ₂	Yes, Crieff	0.6	1.6	No	2.5
P58	9 East High Street, Crieff,	Urban Centre	286582	721553	NO ₂	Yes, Crieff	0.5	1.2	No	2.5
P61C, P61L, P61R	RTM, Atholl Street	Roadside	311584	723931	NO ₂	Yes, Perth City	0.6	2.2	Yes	1.8
P62	84 Dundee Road	Roadside	312503	722930	NO ₂	Yes, Perth City	0.8	1.6	No	2.6
P63	30 Dundee Road	Roadside	312413	723252	NO ₂	Yes, Perth City	1.2	1.2	No	2.6
P64	Isla Road	Roadside	312228	724120	NO ₂	Yes, Perth City	0.2	2.6	No	2.6
P65	5 Charlotte Street	Roadside	311943	723864	NO ₂	Yes, Perth City	2.4	2.0	No	2.5
P67	1 Atholl Street	Roadside	311697	723939	NO ₂	Yes, Perth City	0.3	2.4	No	2.5
P68	2 Atholl Street	Roadside	311720	723955	NO ₂	Yes, Perth City	6.6	1.3	No	2.1

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube co-located with a Continuous Analyser?	Tube Height (m)
P71	134 Dunkeld Road	Roadside	310621	724951	NO ₂	Yes, Perth City	4.3	1.8	No	2.7
P72	82 Crieff Road	Roadside	310335	724550	NO ₂	Yes, Perth City	11.1	2.4	No	2.4
P73	19 West High Street, Crieff	Urban Centre	286302	721651	NO ₂	Yes, Crieff	0.0	1.6	No	2.4
P74	43 High Street, Crieff	Urban Centre	286517	721559	NO ₂	Yes, Crieff	2.4	1.5	No	2.4
P75C, P75L, P75R	RTM, Crieff	Roadside	286360	721617	NO ₂	Yes, Crieff	5.1	3.7	Yes	1.6
P76	10/12 West High Street, Crieff	Urban Centre	286324	721632	NO ₂	Yes, Crieff	0.0	1.4	No	3.2
P78	1 Lodge Street, Crieff	Urban Centre	286194	721692	NO ₂	Yes, Crieff	0.0	1.7	No	3.1
P79C, P79R, P79L	17 Main Street	Roadside	312262	723976	NO ₂	Yes, Crieff	0.0	3.0	No	2.5
P82	66 High Street, Auchterarder	Roadside	294569	712888	NO ₂	No	1.7	0.5	No	3.1
P86	2 Friarton Road	Roadside	311788	721397	NO ₂	Yes, Perth City	3.7	1.2	No	2.1
P87	Hollybush Road	Suburban	287043	721486	NO ₂	No	17.0	7.0	No	2.6
P89	59 South Methven St	Roadside	311546	723544	NO ₂	Yes, Perth City	0.0	3.0	No	2.2
P90	22 North Methven St	Roadside	311539	723798	NO ₂	Yes, Perth City	0.0	3.0	No	2.6

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube co-located with a Continuous Analyser?	Tube Height (m)
P95	26-28 Atholl Street	Kerbside	311636	723950	NO ₂	Yes, Perth City	1.7	0.9	No	2.2
P96	22 Barrack St	Kerbside	311424	723976	NO ₂	Yes, Perth City	3.0	0.5	No	2.6
P97	St Ninians School,	Roadside	311370	724040	NO ₂	Yes, Perth City	7.0	1.9	No	2.4
P99	5 Murray Cr Perth	Roadside	310536	722928	NO ₂	Yes, Perth City	6.8	1.6	No	2.3
P100	9 Comrie Street, Crieff	Urban Centre	286271	721684	NO ₂	Yes, Crieff	0.0	2.0	No	2.3
P101	28 Dunkeld Road	Roadside	311012	724483	NO ₂	Yes, Perth City	4.1	3.1	No	2.4
P103	28 York Place	Roadside	311207	723504	NO ₂	Yes, Perth City	8.0	2.1	No	2.6
P104	202 Glasgow Road	Roadside	310157	722634	NO ₂	Yes, Perth City	5.6	1.5	No	2.4
P106	Victoria Terrace, Crieff	Roadside	286491	721913	NO ₂	No	2.9	1.5	No	2.5
P107	1 Glover Street Perth	Roadside	311201	722871	NO ₂	Yes, Perth City	3.5	1.0	No	2.6
P108	Balmoral Road, Blairgowrie	Roadside	318293	745415	NO ₂	No	0.2	1.8	No	2.3
P109	44 Kinnoull Street, Perth	Roadside	311660	723897	NO ₂	Yes, Perth City	2.8	2.4	No	2.4

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube co-located with a Continuous Analyser?	Tube Height (m)
P110	231 Glasgow Road, Perth	Roadside	309922	722633	NO ₂	Yes, Perth City	2.8	2.4	No	2.3
P111	Glasgow Road nr Lamberkine Road, Perth	Roadside	308904	722731	NO ₂	Yes, Perth City	0.9	1.0	No	2.6
P112	Lamberkine Drive, Perth	Roadside	308528	722895	NO ₂	Yes, Perth City	20.3	1.8	No	2.9
P113	38 Perth Road, Scone	Roadside	313781	726119	NO ₂	No	4.7	1.8	No	2.5
P114	Barossa Street, Perth	Roadside	311625	724063	NO ₂	Yes, Perth City	0.0	1.3	No	2.6
P115	Balhousie Street, Perth	Roadside	311197	724857	NO ₂	Yes, Perth City	5.0	3.2	No	2.4
P116	Jeanfield Road, Perth	Roadside	310791	723817	NO ₂	Yes, Perth City	8.0	1.6	No	2.6
P117	19 Riggs Rd, Perth	Roadside	310791	723817	NO ₂	Yes, Perth City	6.0	1.7	No	2.6
P118	Springfield Rd, Kinross	Roadside	311654	703014	NO ₂	No	12.0	1.5	No	2.6
P119	Kinnoull PS, Dundee Rd	Roadside	312322	723515	NO ₂	Yes, Perth City	18.0	2.3	No	2.5
P120	25 West High St, Crieff	Roadside	286286	721656	NO ₂	Yes, Crieff	4.0	1.8	No	2.5
P121	Railway Sidings, Caledonia Rd	Roadside	311252	723301	NO ₂	Yes, Perth City	16.0	2.2	No	2.6

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube co-located with a Continuous Analyser?	Tube Height (m)
P122C, P122L, P122R	Bridgend RTM	Roadside	312260	724170	NO ₂	Yes, Perth City	5.0	2.5	Yes	1.8
P123	9 Lismore Court, Perth	Roadside	310231	725590	NO ₂	Yes, Perth City	5.5	24.0	No	2.4
P124	12 St Catherine's Road	Roadside	311290	723761	NO ₂	Yes, Perth City	0.0	5.1	No	2.4
P125	Andrew Heiton Court, Perth	Roadside	311279	723437	NO ₂	Yes, Perth City	0.0	2.9	No	2.9
P126	131 Perth Road, Scone	Roadside	313438	725637	NO ₂	No	2.9	1.8	No	2.4

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g., installed on/adjacent to the façade of a residential property).

(2) N/A if not applicable.

Table A.3 - Annual Mean NO₂ Monitoring Results (µg/m³)

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
Atholl St RTM	Roadside	Automatic	99.7	99.7	37.2	36.4	27.5	31.1	29.9
Bridgend RTM	Roadside	Automatic	99.3	99.3	N/A	N/A	N/A	19.3	18.2
Crieff RTM	Roadside	Automatic	97.3	97.3	17.4	16.3	13.1	13	12.3
P1C, P1L, P1R	Roadside	Diffusion Tube	90	90.0	33.0	33.0	26.0	28.6	23.3
P2	Roadside	Diffusion Tube	100	100.0	18.0	18.0	13.0	12.8	13.0
P5	Urban Centre	Diffusion Tube	100	100.0	18.0	18.0	13.0	13.6	12.8
P6	Urban Background	Diffusion Tube	100	100.0	10.0	10.0	8.0	8.6	7.2
P13	Roadside	Diffusion Tube	100	100.0	27.0	26.0	22.0	22.3	17.5
P20	Roadside	Diffusion Tube	100	100.0	25.0	23.0	16.0	19.7	17.8
P29	Roadside	Diffusion Tube	64.6	64.6	29.0	28.0	19.0	25.9	19.5
P30C, P30L, P30R	Roadside	Diffusion Tube	100	100.0	30.0	29.0	24.0	23.6	20.8
P31	Roadside	Diffusion Tube	100	100.0	23.0	22.0	18.0	19.1	17.9
P32	Roadside	Diffusion Tube	100	100.0	29.0	30.0	22.0	24.7	19.9
P33	Roadside	Diffusion Tube	100	100.0	30.0	32.0	23.0	26.7	23.2
P34	Roadside	Diffusion Tube	100	100.0	38.0	37.0	30.0	32.3	27.0
P35	Roadside	Diffusion Tube	100	100.0	21.0	20.0	16.0	16.5	14.1
P36	Roadside	Diffusion Tube	100	100.0	27.0	26.0	18.0	21.7	18.2
P37	Roadside	Diffusion Tube	100	100.0	23.0	22.0	16.0	18.5	16.0
P39	Roadside	Diffusion Tube	100	100.0	36.0	32.0	25.0	28.0	23.2
P40	Roadside	Diffusion Tube	100	100.0	34.0	32.0	27.0	27.1	24.0
P41	Roadside	Diffusion Tube	100	100.0	34.0	31.0	24.0	28.4	22.8
P43C, P43L, P43R	Roadside	Diffusion Tube	100	100.0	41.0	38.0	32.0	34.9	32.7
P45	Urban Centre	Diffusion Tube	93.9	93.9	17.0	18.0	14.0	16.5	13.4
P46	Roadside	Diffusion Tube	100	100.0	25.0	19.0	15.0	16.9	14.3

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
P47	Roadside	Diffusion Tube	100	100.0	21.0	19.0	14.0	16.2	14.3
P51	Roadside	Diffusion Tube	100	100.0	24.0	23.0	18.0	19.0	15.7
P55	Roadside	Diffusion Tube	100	100.0	37.0	35.0	23.0	28.3	23.8
P56	Urban Centre	Diffusion Tube	100	100.0	25.0	22.0	16.0	18.0	14.3
P57	Urban Centre	Diffusion Tube	100	100.0	24.0	24.0	18.0	18.8	16.9
P58	Urban Centre	Diffusion Tube	100	100.0	31.0	29.0	23.0	27.1	22.4
P61C, P61L, P61R	Roadside	Diffusion Tube	100	100.0	37.0	36.0	28.0	31.4	30.1
P62	Roadside	Diffusion Tube	92.2	92.2	25.0	23.0	16.0	19.0	16.1
P63	Roadside	Diffusion Tube	92.2	92.2	31.0	30.0	22.0	25.3	22.0
P64	Roadside	Diffusion Tube	100	100.0	39.0	36.0	28.0	31.7	28.0
P65	Roadside	Diffusion Tube	90.3	90.3	26.0	24.0	18.0	18.2	15.5
P67	Roadside	Diffusion Tube	100	100.0	30.0	28.0	23.0	24.3	22.3
P68	Roadside	Diffusion Tube	100	100.0	23.0	26.0	23.0	20.9	19.9
P71	Roadside	Diffusion Tube	100	31.5	14.0	13.0	10.0	11.5	8.9
P72	Roadside	Diffusion Tube	100	100.0	28.0	28.0	24.0	25.6	22.5
P73	Urban Centre	Diffusion Tube	100	100.0	47.0	34.0	24.0	28.8	24.0
P74	Urban Centre	Diffusion Tube	92.2	92.2	25.0	21.0	15.0	20.4	16.4
P75C, P75L, P75R	Roadside	Diffusion Tube	100	100.0	17.0	16.0	14.0	13.7	12.4
P76	Urban Centre	Diffusion Tube	100	100.0	31.0	28.0	21.0	24.4	21.6
P78	Urban Centre	Diffusion Tube	100	100.0	20.0	19.0	16.0	17.7	12.9
P79C, P79R, P79L	Roadside	Diffusion Tube	100	100.0	32.0	30.0	24.0	26.4	22.6
P82	Roadside	Diffusion Tube	84.4	84.4	22.0	20.0	17.0	16.4	14.9
P86	Roadside	Diffusion Tube	100	100.0	23.0	20.0	15.0	16.9	15.3
P87	Suburban	Diffusion Tube	100	100.0	6.0	6.0	4.0	5.2	3.8
P89	Roadside	Diffusion Tube	100	100.0	28.0	29.0	23.0	24.9	21.6
P90	Roadside	Diffusion Tube	100	100.0	26.0	25.0	21.0	20.6	17.6
P95	Kerbside	Diffusion Tube	90.3	90.3	35.0	36.0	26.0	31.6	26.7
P96	Kerbside	Diffusion Tube	100	100.0	33.0	30.0	24.0	27.7	22.6
P97	Roadside	Diffusion Tube	100	100.0	33.0	27.0	24.0	26.4	19.9
P99	Roadside	Diffusion Tube	100	100.0	15.0	14.0	11.0	11.8	9.4

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
P100	Urban Centre	Diffusion Tube	90.3	90.3	18.0	19.0	11.0	14.3	10.9
P101	Roadside	Diffusion Tube	100	100.0	23.0	24.0	22.0	22.6	19.8
P103	Roadside	Diffusion Tube	100	100.0	37.0	35.0	22.0	29.5	25.8
P104	Roadside	Diffusion Tube	100	100.0	27.0	26.0	18.0	19.0	15.4
P106	Roadside	Diffusion Tube	100	31.5	9.0	9.0	6.0	6.4	6.0
P107	Roadside	Diffusion Tube	100	100.0	29.0	25.0	21.0	23.5	19.8
P108	Roadside	Diffusion Tube	100	100.0	23.0	24.0	17.0	18.8	17.3
P109	Roadside	Diffusion Tube	93.9	93.9	26.0	25.0	20.0	20.6	18.5
P110	Roadside	Diffusion Tube	100	100.0	N/A	23.0	16.0	17.4	13.8
P111	Roadside	Diffusion Tube	82.2	82.2	N/A	24.0	19.0	21.2	17.8
P112	Roadside	Diffusion Tube	100	100.0	N/A	19.0	13.0	15.6	13.9
P113	Roadside	Diffusion Tube	92.2	92.2	N/A	21.0	17.0	17.8	15.1
P114	Roadside	Diffusion Tube	100	100.0	N/A	16.0	13.0	10.8	10.1
P115	Roadside	Diffusion Tube	100	100.0	N/A	18.0	14.0	13.6	11.1
P116	Roadside	Diffusion Tube	100	100.0	N/A	26.0	22.0	21.3	16.3
P117	Roadside	Diffusion Tube	100	100.0	N/A	N/A	16.0	16.0	13.5
P118	Roadside	Diffusion Tube	100	31.5	N/A	N/A	9.0	11.0	9.2
P119	Roadside	Diffusion Tube	92.2	92.2	N/A	N/A	13.0	19.0	16.6
P120	Roadside	Diffusion Tube	100	100.0	N/A	N/A	20.0	23.7	18.9
P121	Roadside	Diffusion Tube	100	100.0	N/A	N/A	25.0	29.8	23.8
P122C, P122L, P122R	Roadside	Diffusion Tube	100	100.0	N/A	N/A	N/A	19.4	18.5
P123	Roadside	Diffusion Tube	100	100.0	N/A	N/A	N/A	12.7	11.8
P124	Roadside	Diffusion Tube	85	48.7	N/A	N/A	N/A	N/A	18.5
P125	Roadside	Diffusion Tube	100	58.5	N/A	N/A	N/A	N/A	20.9
P126	Roadside	Diffusion Tube	100	58.5	N/A	N/A	N/A	N/A	10.5

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in bold.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.TG(22) if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

- (1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
- (2) Data capture for the full calendar year (e.g., if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Table A.4 - 1-Hour Mean NO₂ Monitoring Results, Number of 1-Hour Means > 200µg/m³

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
Perth 1 (Bridgend)	Roadside	Automatic	99.3	99.3	N/A	N/A	N/A	0	0
Perth 2 (Atholl Street)	Roadside	Automatic	99.7	99.7	0	0	0	0	0
Crieff (James Square)	Roadside	Automatic	97.3	97.3	0	0	0	0	0

Notes:

Exceedances of the NO₂ 1-hour mean objective (200 µg/m³ not to be exceeded more than 18 times/year) are shown in bold.

If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g., if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Figure A.1: Annual Mean Trend for NO₂ at Atholl Street

De-seasonalised Data trend at Perth Atholl Street for the period 01/01/2005 to 13/06/2023



Figure A.2: Annual Mean Trend for NO₂ at Crieff

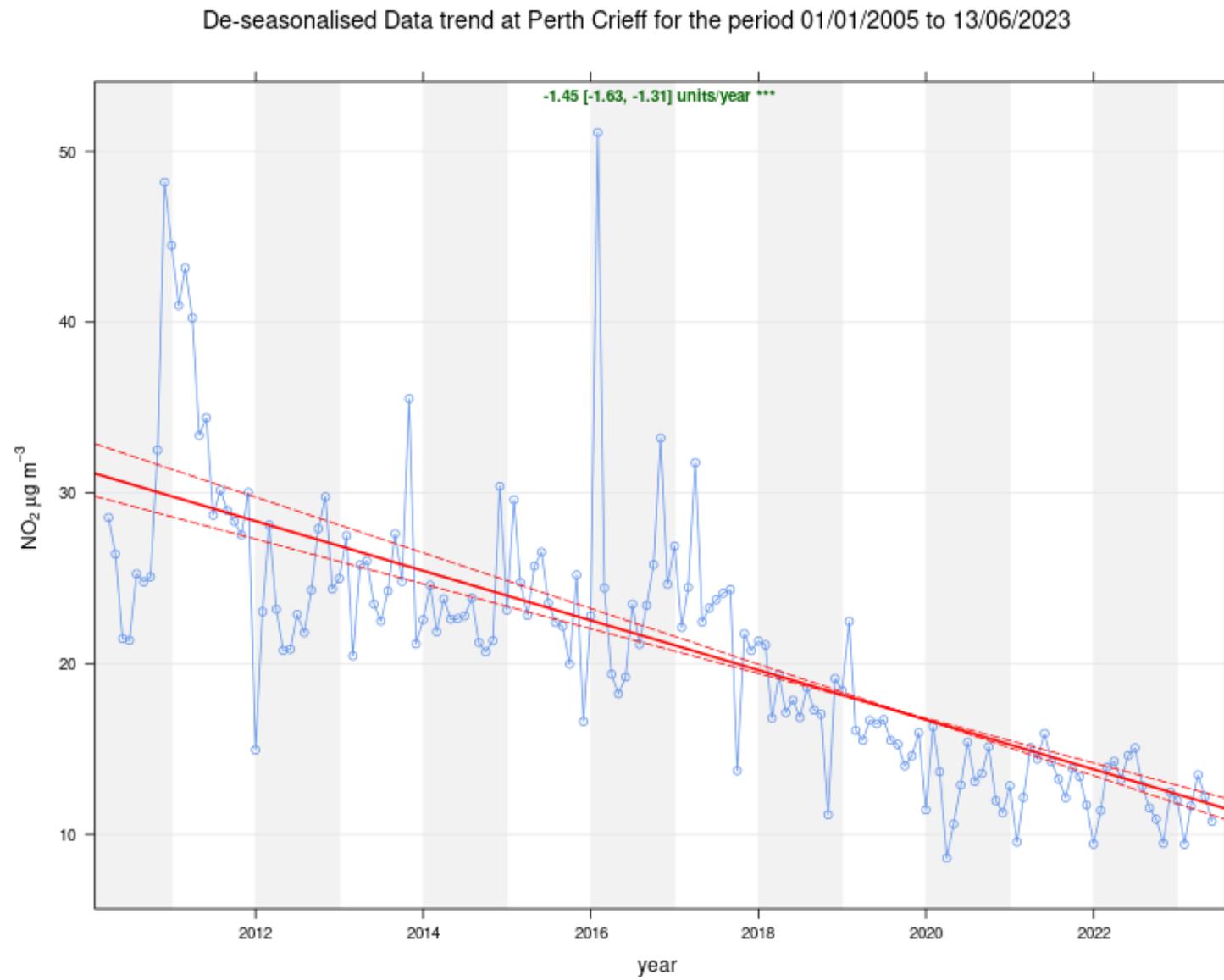


Table A.5 - Annual Mean PM₁₀ Monitoring Results (µg/m³)

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
Perth 1 (Bridgend)	Roadside	99	99	N/A	N/A	N/A	10	9.7
Perth 2 (Atholl Street)	Roadside	97	97	14	13	10	14	15.9
Perth 3 (Muirton)	Urban Background	100	100	10	9	6	8	9.6
Crieff (James Square)	Roadside	95	95	10	9	7	9	9.7

Notes:

Exceedances of the PM₁₀ annual mean objective of 18 µg/m³ are shown in bold.

All means have been “annualised” as per LAQM.TG(22), valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g., if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Table A.6 – Annual Mean PM₁₀ Monitoring Results (µg/m³) - Corrected FIDAS 200 Data

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
Perth 1 (Bridgend)	Roadside	99	99	N/A	N/A	N/A	10.6	10.7
Perth 2 (Atholl Street)	Roadside	97	97	15	14	11.2	15.4	17.5
Perth 3 (Muirton)	Urban Background	100	100	10.3	9.3	6.8	8.8	10.5
Crieff (James Square)	Roadside	95	95	11.2	10.2	7.9	9.8	10.6

Notes:

Exceedances of the PM₁₀ annual mean objective of 18 µg/m³ are shown in bold.

All means have been “annualised” as per LAQM.TG(22), valid data capture for the full calendar year is less than 75%. See Appendix C for details. The above data has also been corrected as per Scottish Government Guidance following the [Scottish Government Pilot Research Study to investigate Particulate Matter Monitoring Techniques in Scotland](#).

(3) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(4) Data capture for the full calendar year (e.g., if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Table A.7 – 24-Hour Mean PM₁₀ Monitoring Results, Number of PM₁₀ 24-Hour Means > 50µg/m³

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
Perth 1 (Bridgend)	Roadside	99	99	N/A	N/A	N/A	0	2
Perth 2 (Atholl Street)	Roadside	97	97	0	1	0	7	7
Perth 3 (Muirton)	Urban Background	100	100	0	1	0	0	1
Crieff (James Square)	Roadside	95	95	0	1	0	0	0

Notes:

Exceedances of the PM₁₀ 24-hour mean objective (50 µg/m³ not to be exceeded more than seven times/year) are shown in bold.

If the period of valid data is less than 85%, the 98.1st percentile of 24-hour means is provided in brackets.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g., if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Table A.8 – 24-Hour Mean PM₁₀ Monitoring Results, Number of PM₁₀ 24-Hour Means > 50µg/m³ - Corrected FIDAS 200 Data

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
Perth 1 (Bridgend)	Roadside	99	99	N/A	N/A	N/A	0	2
Perth 2 (Atholl Street)	Roadside	97	97	0	3	0	8	11
Perth 3 (Muirton)	Urban Background	100	100	0	1	0	0	1
Crieff (James Square)	Roadside	95	95	0	1	0	0	1

Notes:

Exceedances of the PM₁₀ 24-hour mean objective (50 µg/m³ not to be exceeded more than seven times/year) are shown in bold.

If the period of valid data is less than 85%, the 98.1st percentile of 24-hour means is provided in brackets. The above data has also been corrected as per Scottish Government Guidance following the [Scottish Government Pilot Research Study to investigate Particulate Matter Monitoring Techniques in Scotland](#).

(3) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(4) Data capture for the full calendar year (e.g., if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Figure A.3: PM₁₀ Trend for Atholl Street

De-seasonalised Data trend at Perth Atholl Street for the period 01/01/2005 to 13/06/2023

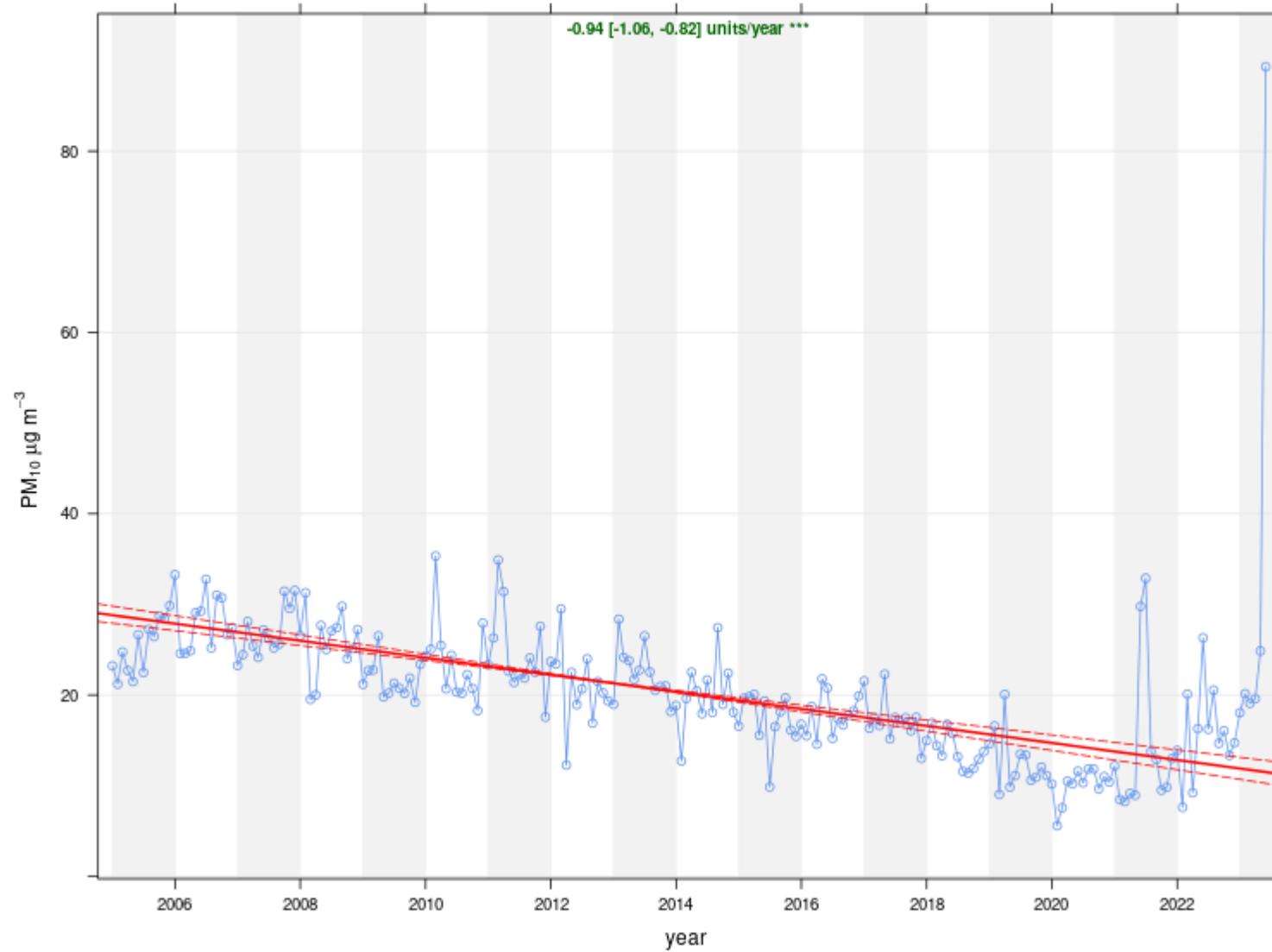


Figure A.4: PM₁₀ Trend for Muirton

De-seasonalised Data trend at Perth Muirton for the period 01/01/2005 to 13/06/2023

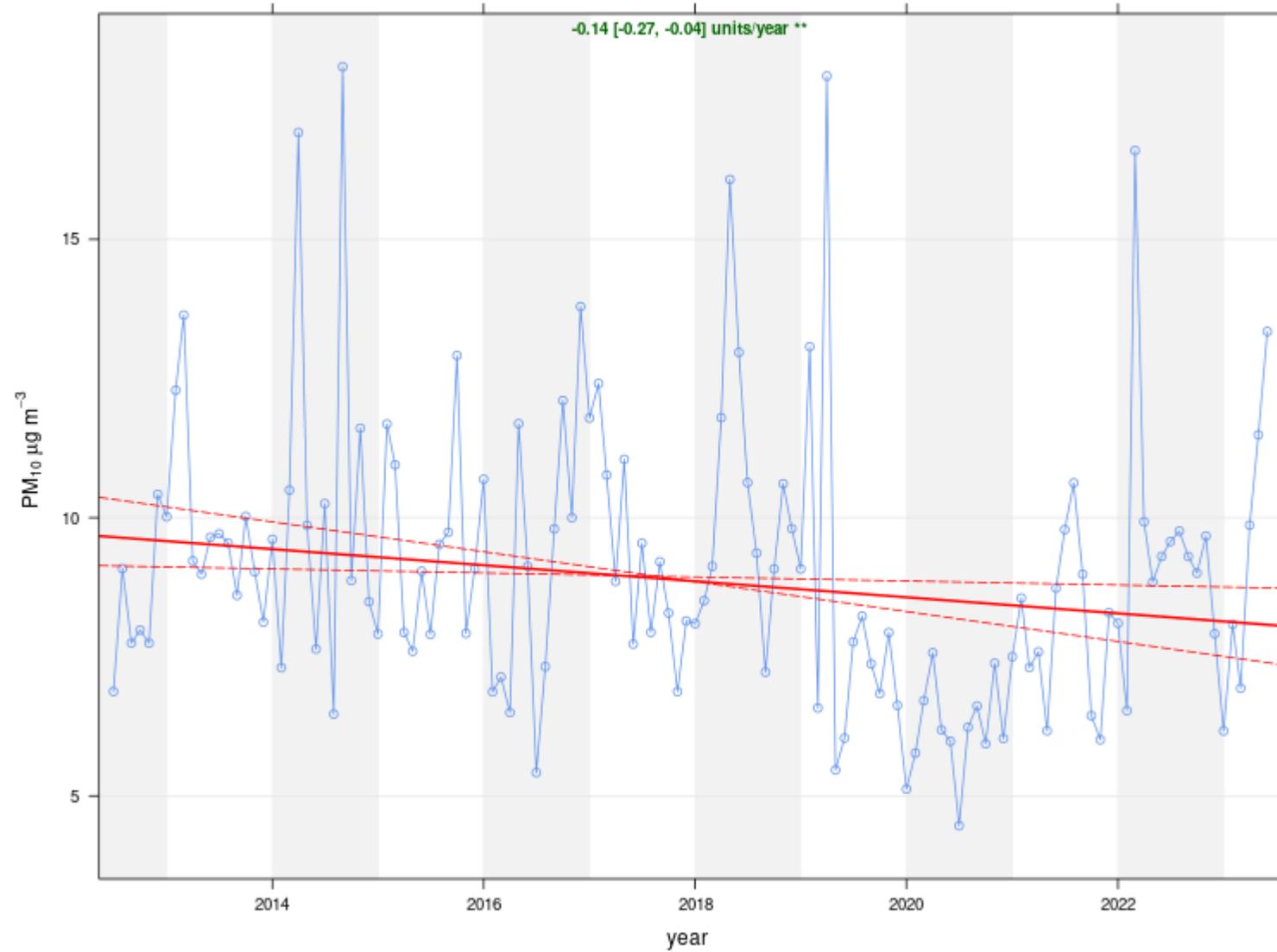


Figure A.5: PM₁₀ Trend for Crieff

De-seasonalised Data trend at Perth Crieff for the period 01/01/2005 to 13/06/2023

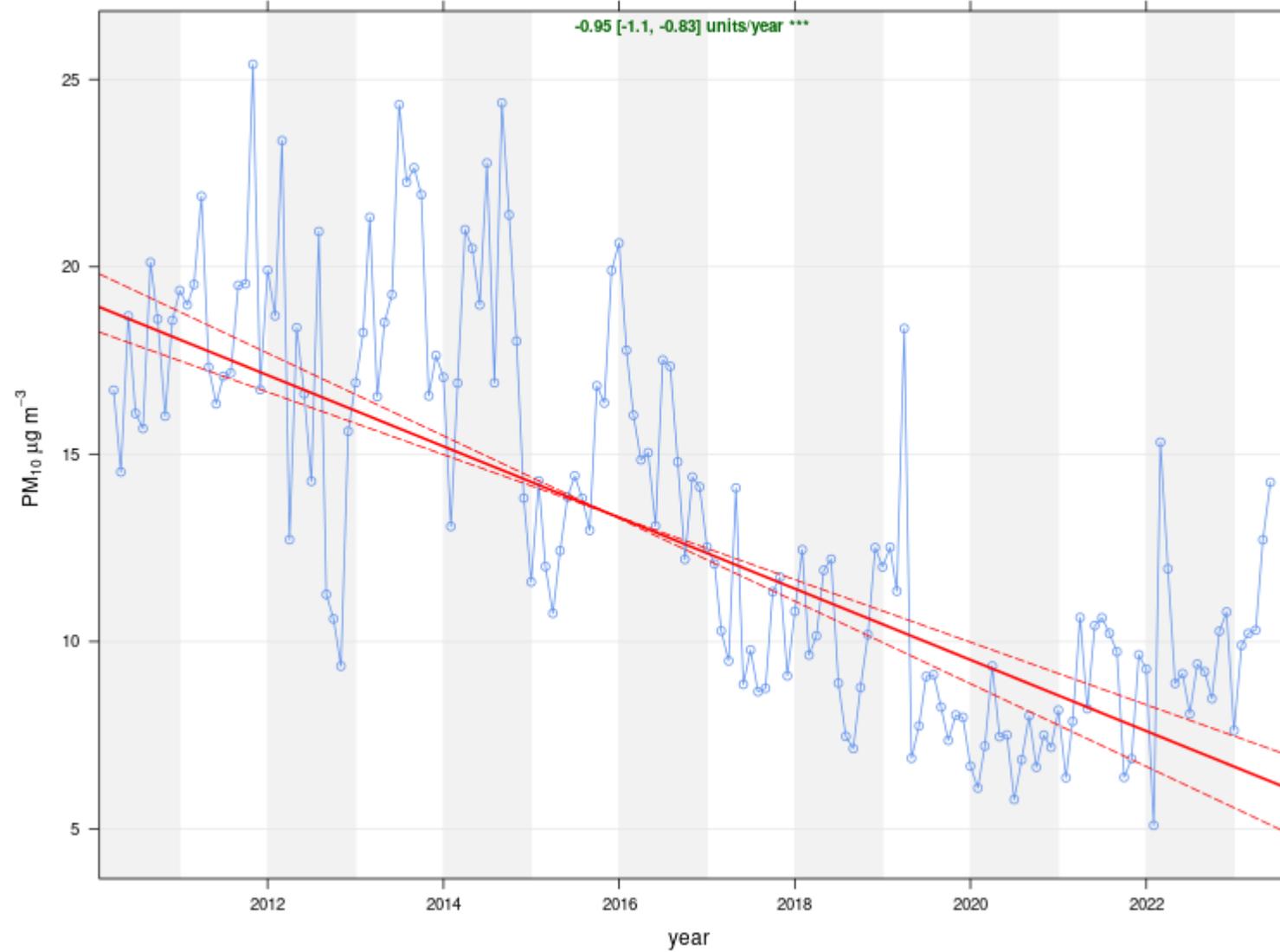


Table A.9 – Annual Mean PM_{2.5} Monitoring Results (µg/m³)

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
Perth 1 (Bridgend)	Roadside	99	99	N/A	N/A	N/A	5	5.3
Perth 2 (Atholl Street)	Roadside	97	97	7	7	6	6	6.9
Perth 3 (Muirton)	Urban Background	100	100	N/A	5	4	5	5.1
Crieff (James Square)	Roadside	95	95	6	5	4	5	5.2

Notes:

Exceedances of the PM_{2.5} annual mean objective of 10 µg/m³ are shown in bold.

All means have been “annualised” as per LAQM.TG(22), valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g., if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Table A.10 – Annual Mean PM_{2.5} Monitoring Results (µg/m³) - Corrected FIDAS 200 Data

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
Perth 1 (Bridgend)	Roadside	99	99	N/A	N/A	N/A	5.2	5.7
Perth 2 (Atholl Street)	Roadside	97	97	7.4	7.5	6	6.8	7.4
Perth 3 (Muirton)	Urban Background	100	100	N/A	5.4	3.9	5	5.4
Crieff (James Square)	Roadside	95	95	6.3	5.8	4.2	5.1	5.5

Notes:

Exceedances of the PM_{2.5} annual mean objective of 10 µg/m³ are shown in bold.

All means have been “annualised” as per LAQM.TG(22), valid data capture for the full calendar year is less than 75%. The above data has also been corrected as per Scottish Government Guidance following the [Scottish Government Pilot Research Study to investigate Particulate Matter Monitoring Techniques in Scotland](#). See Appendix C for details.

(3) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(4) Data capture for the full calendar year (e.g., if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Figure A.6: PM_{2.5} Trend for Atholl St

De-seasonalised Data trend at Perth Atholl Street for the period 01/01/2005 to 13/06/2023

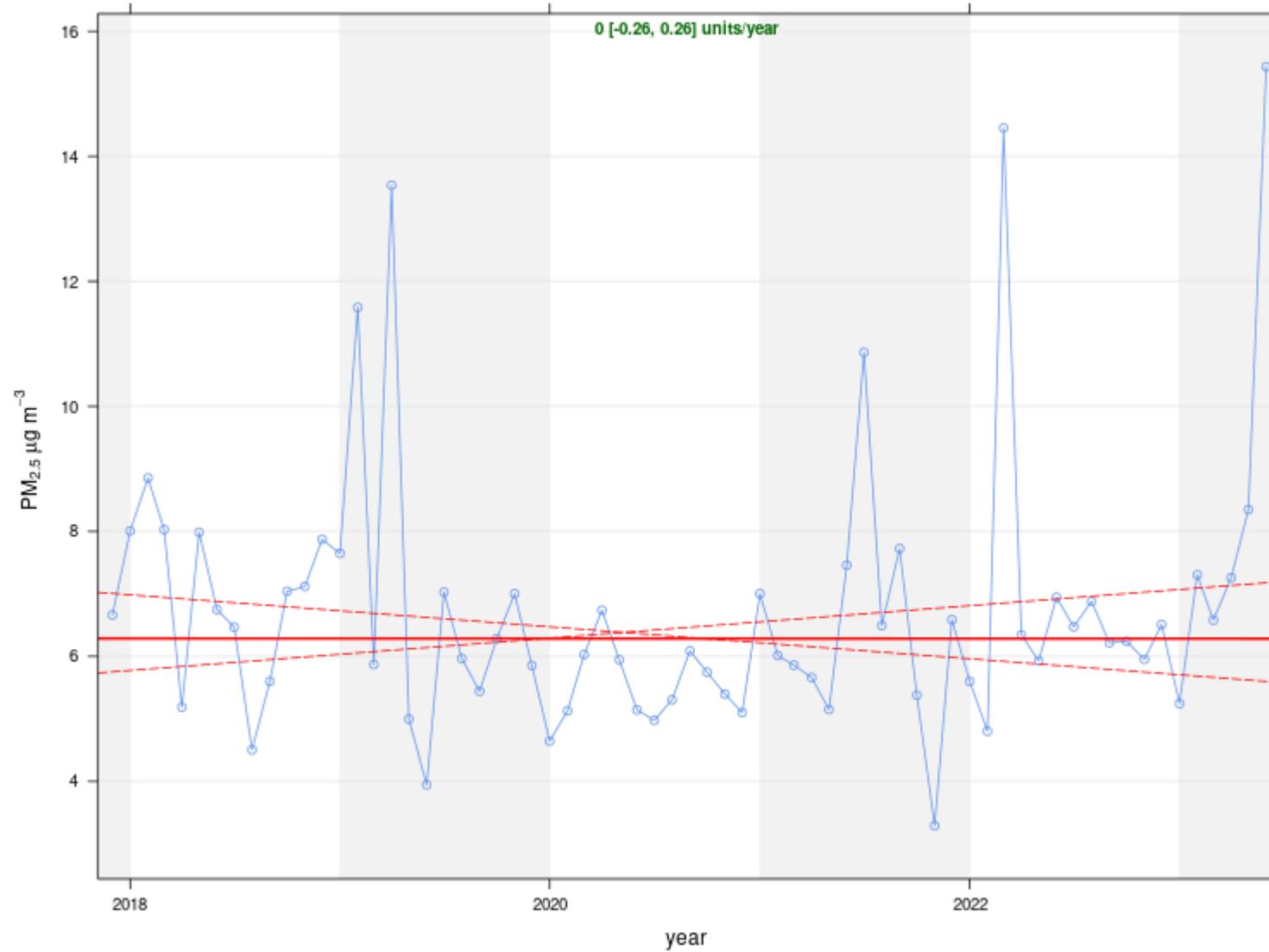


Figure A.7: PM_{2.5} Trend for Muirton

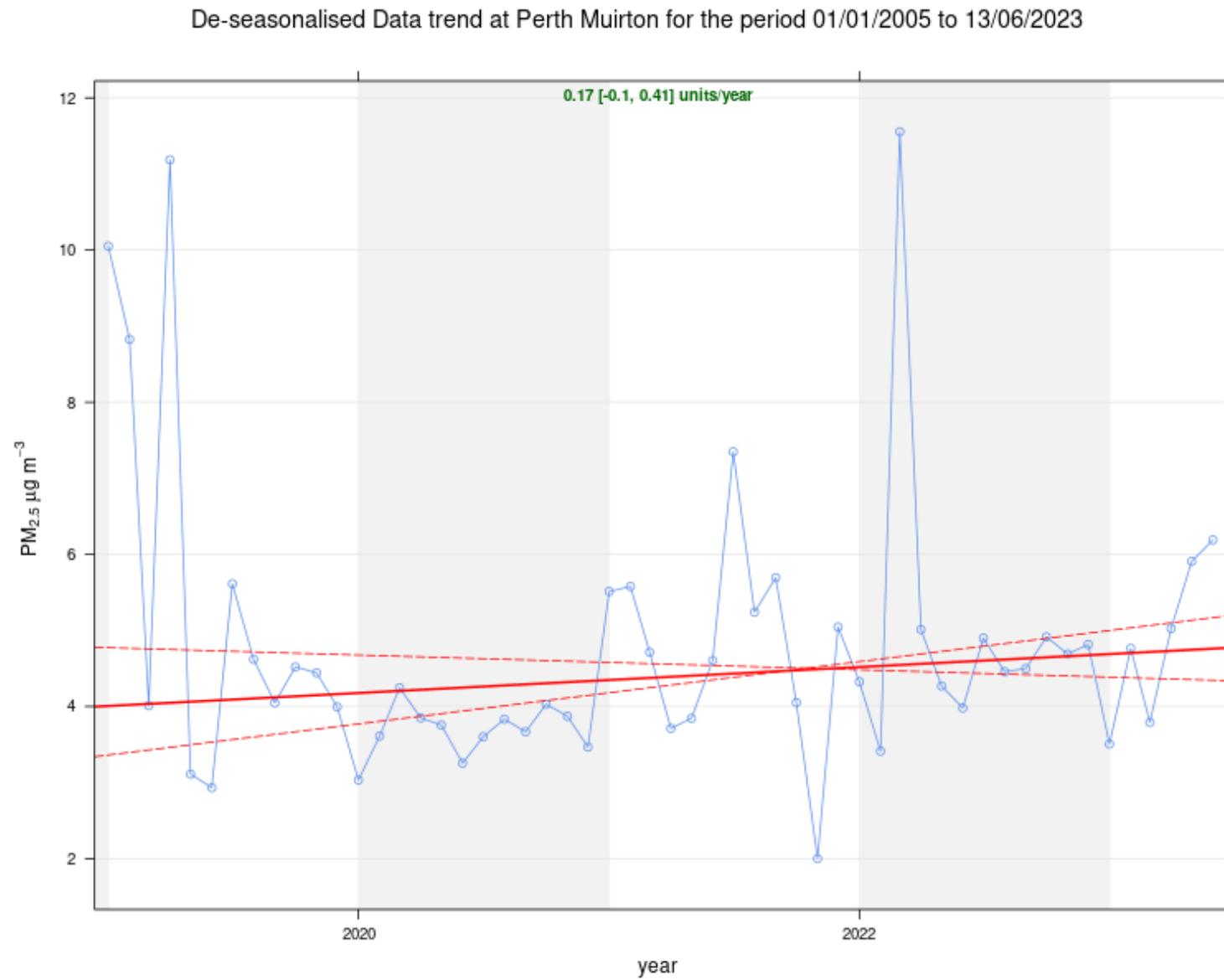
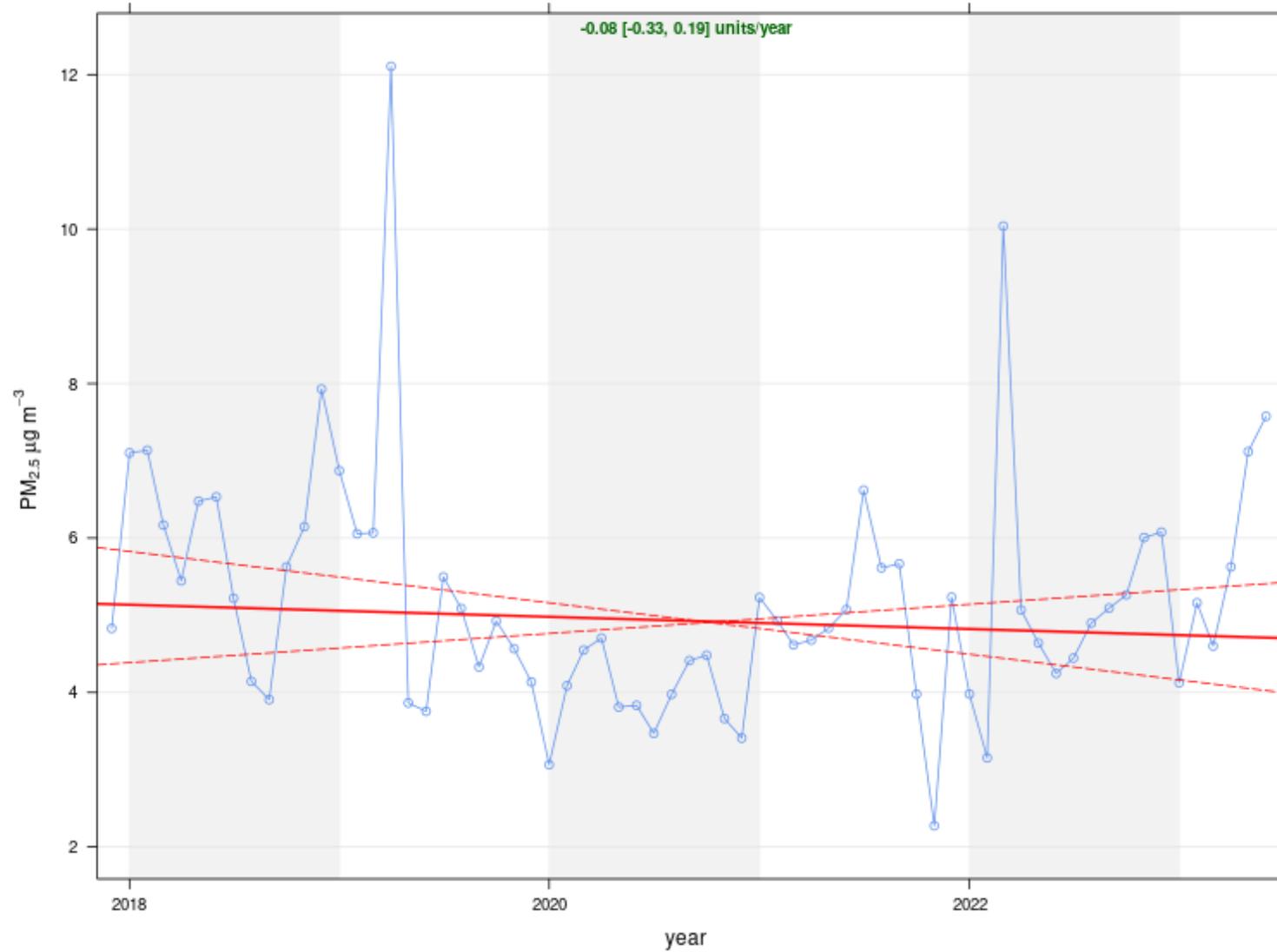


Figure A.8: PM_{2.5} Trend for Crieff

De-seasonalised Data trend at Perth Crieff for the period 01/01/2005 to 13/06/2023



Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1 – NO₂ 2022 Monthly Diffusion Tube Results (µg/m³)

Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted ⁽¹⁾
P1C	30.0	26.0	39.1	31.3	-	16.0	-	29.4	23.4	26.6	35.6	43.0	-	-
P1L	24.3	27.3	38.4	33.6	-	17.3	26.0	27.9	22.0	30.5	35.5	40.5	-	-
P1R	29.5	28.8	38.2	33.3	-	17.2	22.2	24.7	26.1	27.6	33.5	38.6	29.6	23.3
P2	22.6	19.0	20.6	11.6	9.9	9.6	10.3	12.6	14.5	16.1	19.3	32.7	16.5	13.0
P5	21.4	22.2	21.5	12.7	10.0	11.6	10.2	10.6	10.3	18.2	22.4	25.4	16.3	12.8
P6	11.9	10.1	11.8	7.0	4.4	4.4	5.6	5.9	5.0	8.9	16.4	19.0	9.2	7.2
P13	30.1	29.4	29.7	20.6	17.6	17.8	15.6	13.4	13.7	22.9	26.9	31.6	22.3	17.5
P20	25.1	26.5	31.2	22.6	14.2	13.3	15.6	17.8	19.6	20.7	28.5	37.6	22.7	17.8
P29	29.7	28.4	34.9	25.5	-	-	17.1	13.7	-	23.2	34.5	-	25.6	19.5
P30C	35.0	32.6	29.7	23.6	19.7	19.9	21.3	24.3	22.3	27.4	28.8	37.9	-	-
P30L	34.7	32.8	30.7	22.8	16.3	20.4	20.8	22.9	22.9	24.5	28.8	41.5	-	-
P30R	36.7	34.7	30.7	23.2	19.5	19.3	21.4	20.0	20.9	23.9	30.1	39.7	26.5	20.8
P31	24.0	21.6	24.9	22.9	13.3	10.6	19.3	20.6	18.7	19.8	30.1	46.2	22.8	17.9
P32	30.3	28.1	30.6	25.4	17.9	15.6	22.4	19.2	24.6	21.5	27.6	40.7	25.3	19.9
P33	29.0	31.1	35.1	27.2	19.1	17.6	21.2	20.9	26.1	29.3	54.9	43.9	29.5	23.2
P34	42.4	41.5	41.9	31.6	26.6	27.6	31.3	32.9	27.0	33.2	35.7	43.3	34.4	27.0
P35	22.1	19.2	22.5	13.5	11.7	11.1	13.2	15.1	14.8	17.0	20.7	34.6	18.0	14.1
P36	25.5	23.6	33.2	22.4	15.3	13.1	15.4	18.9	17.7	21.3	30.7	40.6	23.2	18.2
P37	20.0	19.8	27.8	21.5	12.1	10.4	14.2	17.2	17.3	19.9	28.3	34.3	20.3	16.0
P39	29.6	30.3	40.2	37.9	25.8	21.3	27.5	28.8	26.5	28.1	19.9	36.2	29.6	23.2
P40	40.2	37.3	32.5	29.9	25.7	24.2	28.6	28.6	28.4	27.0	26.3	40.1	30.6	24.0
P41	28.0	29.6	37.5	37.1	22.1	15.3	22.9	25.5	30.3	26.9	34.4	37.4	29.0	22.8
P43C	46.8	47.0	48.4	42.5	37.6	31.7	36.1	36.6	35.2	41.9	42.9	51.2	-	-
P43L	45.7	45.5	44.0	42.8	33.7	32.6	36.7	38.1	34.9	40.4	42.0	47.6	-	-
P43R	47.7	47.3	47.5	45.5	35.6	43.0	36.7	38.0	35.6	42.6	45.2	54.0	41.7	32.7
P45	-	16.2	26.1	16.6	9.4	6.6	10.0	13.8	15.1	13.9	24.4	34.1	17.0	13.4
P46	13.4	14.7	29.1	22.3	13.0	9.1	12.2	15.0	16.6	17.4	27.5	26.0	18.2	14.3
P47	15.8	16.0	26.9	21.0	14.0	10.4	14.3	15.6	16.8	17.1	25.3	24.8	18.3	14.3

Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted ⁽¹⁾
P51	22.3	20.6	23.7	21.3	14.7	12.4	15.1	17.5	18.8	16.4	21.1	35.6	20.1	15.7
P55	27.3	30.6	40.3	37.6	21.7	17.4	23.9	29.7	30.4	27.2	38.8	38.2	30.3	23.8
P56	18.9	18.6	25.6	20.5	13.3	10.7	13.2	15.3	16.1	15.1	24.9	26.7	18.2	14.3
P57	19.9	20.9	29.6	22.1	14.1	11.1	16.4	15.4	20.9	18.3	26.6	40.3	21.5	16.9
P58	29.5	30.3	39.8	29.9	22.8	20.2	20.7	24.7	25.0	29.8	34.6	34.3	28.5	22.4
P61C	47.0	42.6	44.3	36.9	32.8	33.6	35.4	40.6	31.7	40.6	42.7	50.2	-	-
P61L	44.7	33.1	43.8	37.4	32.4	35.0	31.1	34.0	28.6	40.6	40.7	47.7	-	-
P61R	42.8	42.2	46.4	36.5	29.7	33.2	31.5	34.8	31.0	38.9	40.9	46.8	38.3	30.1
P62	21.3	17.9	<0.7	22.9	13.9	13.3	18.2	18.3	21.6	19.6	26.4	31.7	20.5	16.1
P63	29.7	-	34.7	30.9	22.4	20.6	23.3	24.4	31.6	26.5	28.8	35.5	28.0	22.0
P64	45.7	38.2	37.8	35.4	31.2	29.0	29.2	35.6	33.8	30.8	37.8	45.2	35.6	28.0
P65	22.2	20.7	25.8	23.6	15.5	10.9	15.7	17.4	20.7	19.0	26.7	-	19.7	15.5
P67	47.1	39.5	31.0	24.7	23.1	25.2	23.5	21.0	20.8	26.2	30.8	33.7	28.4	22.3
P68	37.1	32.0	27.3	21.7	19.2	18.6	19.4	18.0	21.6	26.5	29.5	35.7	25.3	19.9
P71	9.5	10.9	18.5	12.3	-	-	-	-	-	-	-	-	12.9	8.9
P72	31.8	33.0	35.2	25.4	20.9	25.8	25.7	25.5	21.0	22.4	44.0	37.6	28.7	22.5
P73	24.0	24.7	38.0	38.4	22.4	17.1	18.9	24.7	34.4	30.7	46.1	43.0	30.5	24.0
P74	24.5	-	26.2	23.4	17.2	0.6	17.1	17.9	20.9	20.9	27.4	32.1	20.9	16.4
P75C	21.0	22.1	18.9	13.6	10.8	10.7	13.0	10.4	30.9	13.6	23.6	20.1	-	-
P75L	20.3	19.9	18.7	12.8	10.4	9.5	13.1	11.3	13.3	13.9	17.9	21.4	-	-
P75R	19.9	19.8	18.9	13.6	-	13.2	13.0	11.0	12.1	14.2	15.6	21.7	15.8	12.4
P76	28.0	26.3	36.7	28.0	23.0	21.0	26.8	25.7	25.1	26.6	30.2	33.2	27.5	21.6
P78	10.1	13.8	25.3	22.1	13.8	9.0	11.3	13.8	18.4	17.8	24.8	15.2	16.4	12.9
P79C	28.8	24.8	37.8	37.1	24.2	20.1	25.9	25.2	30.3	27.9	33.5	39.4	-	-
P79R	20.5	27.1	39.2	28.5	25.4	19.9	26.0	20.7	30.9	27.9	34.4	36.1	-	-
P79L	24.9	24.9	37.3	35.1	24.1	19.6	23.0	27.3	28.4	25.8	33.5	35.0	28.8	22.6
P82	20.0	23.9	26.0	18.3	14.0	11.3	12.1	-	-	16.7	21.4	26.4	18.9	14.9
P86	18.9	16.9	29.1	18.5	13.5	11.5	14.4	16.3	17.5	21.4	30.4	25.9	19.5	15.3
P87	4.9	5.5	7.0	3.5	2.7	1.4	3.9	2.1	2.9	4.6	11.5	8.9	4.9	3.8
P89	28.4	33.2	36.4	22.5	18.4	18.7	21.4	21.0	20.7	32.0	32.5	43.4	27.5	21.6
P90	27.0	28.1	29.2	18.5	13.0	14.6	20.2	15.0	18.2	21.2	26.7	38.2	22.4	17.6
P95	43.9	35.1	43.4	37.6	27.4	23.1	33.5	30.0	37.8	30.7	35.1	-	34.0	26.7
P96	25.9	28.4	40.5	31.2	20.4	14.2	20.9	22.4	28.7	25.8	36.3	47.7	28.7	22.6
P97	29.3	31.6	35.6	21.6	15.5	18.1	17.4	17.6	20.3	26.1	32.8	39.0	25.3	19.9
P99	13.0	11.6	18.1	10.4	6.9	5.0	6.9	6.2	9.4	10.3	18.1	26.6	12.0	9.4

Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted ⁽¹⁾
P100	12.0	14.0	20.6	16.5	12.6	7.7	10.0	11.4	12.3	14.8	20.4	-	13.9	10.9
P101	30.3	28.6	33.3	21.1	18.6	15.8	19.4	21.7	23.1	23.1	30.6	38.2	25.2	19.8
P103	35.4	42.1	48.4	31.1	23.1	22.3	24.1	26.3	25.7	32.2	42.4	43.5	32.9	25.8
P104	21.0	17.6	24.5	19.1	13.7	10.6	12.5	15.2	16.8	19.7	26.7	35.6	19.6	15.4
P106	8.4	8.1	12.7	6.3	-	-	-	-	-	-	-	-	8.7	6.0
P107	27.1	24.8	35.7	25.0	18.6	16.0	19.7	22.8	21.0	24.6	30.9	36.0	25.2	19.8
P108	20.7	21.7	28.2	23.4	18.8	17.9	16.9	18.4	19.0	23.8	28.3	26.6	22.1	17.3
P109	-	28.6	28.7	22.0	15.2	16.4	22.0	17.6	23.5	23.3	27.0	35.1	23.6	18.5
P110	18.4	19.0	27.2	17.4	12.7	8.7	10.1	14.7	17.1	14.5	25.7	25.6	17.5	13.8
P111	22.7	23.9	27.7	18.3	-	13.5	15.8	-	18.2	19.0	29.3	36.7	22.6	17.8
P112	19.5	18.8	24.1	14.4	12.5	11.7	13.2	14.9	12.2	17.7	21.4	30.9	17.7	13.9
P113	25.8	22.9	26.2	18.5	12.2	12.3	14.2	-	15.4	18.5	21.7	25.7	19.2	15.1
P114	11.1	16.1	19.2	9.5	7.2	7.2	8.7	8.0	7.9	13.5	19.8	25.0	12.8	10.1
P115	18.3	14.8	20.0	11.7	8.4	8.2	11.7	9.3	10.9	14.0	20.6	22.9	14.1	11.1
P116	25.4	23.2	25.8	21.1	16.5	15.6	17.8	18.1	19.6	22.0	31.4	16.4	20.8	16.3
P117	17.6	17.5	23.3	13.0	10.9	8.9	11.4	13.9	14.0	17.5	27.7	30.3	17.2	13.5
P118	12.2	12.6	17.4	11.7	-	-	-	-	-	-	-	-	13.4	9.2
P119	23.7	22.3	26.1	20.0	16.9	17.0	16.4	19.2	-	20.7	25.5	25.6	21.1	16.6
P120	19.0	20.9	30.1	29.9	19.6	10.5	18.6	20.2	26.2	22.3	32.5	35.1	24.0	18.9
P121	25.4	34.2	40.0	27.2	22.9	21.7	26.0	26.3	25.0	33.7	31.3	46.4	30.3	23.8
P122C	25.0	22.3	30.6	24.9	19.8	15.5	19.9	20.6	21.5	22.6	26.0	31.2	-	-
P122L	27.7	20.6	29.8	26.5	19.7	17.6	22.3	22.1	21.2	21.8	27.2	28.7	-	-
P122R	23.6	22.6	28.1	26.2	18.6	15.0	18.9	21.7	20.7	25.1	25.7	32.7	23.5	18.5
P123	21.3	16.5	20.9	12.1	9.3	9.5	13.2	11.3	12.2	12.9	19.9	23.6	15.0	11.8
P124	-	-	-	-	-	17.2	18.8	16.8	18.1	25.1	26.9	-	20.7	18.5
P125	-	-	-	-	-	16.9	20.4	20.5	21.2	28.0	35.2	37.9	26.2	20.9
P126	-	-	-	-	-	9.1	11.5	11.9	13.0	13.3	16.7	16.4	13.2	10.5

Notes:

(1) See Appendix C for details on bias adjustment

Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

New or Changed Sources Identified Within Perth & Kinross During 2022

PKC has not identified any new sources relating to air quality within the reporting year of 2022.

Additional Air Quality Works Undertaken by PKC During 2022

PKC commissioned Sweco to carry out a monitoring study from April 2022 to March 2023 using Earthsense Zephyr monitors to determine whether the RTMs in Bridgend and Crieff were underreading air pollution in their areas, due to the RTMs not being located within the street canyons as a result of size constraints. This study would also assist in the decision-making process regarding the revocation of Crieff's AQMA by confirming PM₁₀ levels are below national objectives within the street canyon, as indicated by the RTM.

Throughout the course of the monitoring study, a number of issues arose including:

- loss of power for periods in the winter due to solar panel use
- Errors in PM readings due to faulty monitoring cartridges
- SD Card issues

However sufficient data was gathered to draw conclusions from the study. As the project concluded in 2023 and the final survey report has not been concluded, full results from the study will be presented in next year's Annual Progress Report.

Early conclusions from the study indicate that pollutant levels within the Crieff street canyon were slightly higher than those measured at the RTM, however both monitors showed levels far below national objectives. The Bridgend Zephyr was measuring slightly lower than the RTM, again far below national objectives.

The early results also confirm that PM₁₀ levels in Crieff remain sufficiently below national objectives to justify the revocation of the Crieff AQMA. PKC will therefore begin the revocation process during the 2023 reporting year.

QA/QC of Diffusion Tube Monitoring

Analysis of diffusion tubes in 2022 was carried out by SOCOTEC at the Didcot lab. The method of preparation used was 20% TEA in water.

The analysis carried out by SOCOTEC on the diffusion tubes is covered within their UKAS schedule. SOCOTEC participate in the AIR-PT scheme in which they are rated a satisfactory laboratory.

Monitoring was carried out in line with the 2022 Diffusion Tube Monitoring calendar.

Diffusion Tube Annualisation

Annualisation is required for any site with data capture less than 75% but greater than 25%. As such, 7 sites within Perth & Kinross required annualisation in 2022. This was conducted using the latest version of the [Diffusion Tube Data Processing Tool \(v3.0\)](#) utilising data from three automatic monitoring sites. These sites, alongside the details of the calculation method undertaken, are provided in Table C.2.

Diffusion Tube Bias Adjustment Factors

Perth & Kinross Council have applied a local bias adjustment factor of 0.79 to the 2022 monitoring data. A summary of bias adjustment factors used by Perth & Kinross Council over the past five years is presented in Table C.1.

The adjustment factor has been calculated from all three of the roadside monitors –Perth Atholl Street, Bridgend and Crieff. The use of a local adjustment factor is consistent with our approach in previous years and is also more conservative than the relevant national adjustment factor ([0.76, SOCOTEC Didcot, 20% TEA in water](#)).

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	Local	-	0.79
2021	Local	-	0.88
2020	Local	-	0.8
2019	Local	-	0.8
2018	Local	-	0.85

NO₂ Fall-off with Distance from the Road

No diffusion tube NO₂ monitoring locations within Perth and Kinross required distance correction during 2022.

QA/QC of Automatic Monitoring

Ricardo E&E Ltd carries out the data management and Local Site Operator (LSO) duties for the automatic monitors in P&K.

The monitors are serviced on a six-monthly basis in coordination with Ricardo's QA/QC audits (i.e., service is carried out following the audit). During each site audit the performance of the analysers is checked, in addition to a traceable calibration to UK and international metrology standards for the on-site calibration gases. Site calibrations are also carried out on a three weekly basis using a traceable gas standard. Data is ratified on a 3-monthly basis, the process for which consists of detailed review of calibrations, diagnostics, faults and engineer visits.

All data used within this report has been ratified. Live and historic data for the RTMs is available from <https://www.scottishairquality.scot/latest>

PM₁₀ and PM_{2.5} Monitoring Adjustment

Perth & Kinross Council uses Fidas 200 monitors to measure PM₁₀ and PM_{2.5} within our Local Authority area. Following the completion of the [Scottish Government Pilot Research Study to investigate Particulate Matter Monitoring Techniques in Scotland](#), Scottish

Government issued the following guidance for local authorities on the reporting and use of PM data from Fidas 200 instruments within the SAQD network:

- Fidas 200 PM₁₀ data collected within the SAQD should be corrected by **dividing** ratified data by **0.909**
- Fidas 200 PM_{2.5} data collected within the SAQD should be corrected by **multiplying** ratified data by **1.06**
- For completeness, it is recommended that authorities report both the corrected and uncorrected ratified data statistics.

Following Scottish Government guidance, PKC has therefore reported both corrected and uncorrected ratified data statistics for PM₁₀ and PM_{2.5} in Table A.5 – A.10

Automatic Monitoring Annualisation

All automatic monitoring locations within Perth & Kinross recorded data capture of greater than 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

NO₂ Fall-off with Distance from the Road

No automatic NO₂ monitoring locations within Perth & Kinross required distance correction during 2022.

Table C.2 – Annualisation Summary (concentrations presented in $\mu\text{g}/\text{m}^3$)

Site ID	Annualisation Factor Atholl St	Annualisation Factor Bridgend	Annualisation Factor Crieff	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
P29	0.9801	0.9824	0.9391	0.9672	25.6	24.8	
P71	0.8670	0.9056	0.8494	0.8740	12.9	11.3	
P106	0.8670	0.9056	0.8494	0.8740	8.7	7.6	
P118	0.8670	0.9056	0.8494	0.8740	13.4	11.7	
P124	1.1810	1.1277	1.1078	1.1388	20.7	23.5	
P125	1.0447	1.0178	0.9821	1.0149	26.2	26.6	
P126	1.0447	1.0178	0.9821	1.0149	13.2	13.4	

Table C.3 – Local Bias Adjustment Calculations

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4	Local Bias Adjustment Input 5
Periods used to calculate bias	12	12	10		
Bias Factor A	0.78 (0.68 - 0.91)	0.77 (0.73 - 0.82)	0.8 (0.76 - 0.86)		
Bias Factor B	29% (10% - 47%)	29% (22% - 36%)	24% (16% - 32%)		
Diffusion Tube Mean ($\mu\text{g}/\text{m}^3$)	38.4	23.4	15.4		
Mean CV (Precision)	5.2%	5.3%	4.4%		
Automatic Mean ($\mu\text{g}/\text{m}^3$)	29.8	18.1	12.4		
Data Capture	99%	99%	99%		
Adjusted Tube Mean ($\mu\text{g}/\text{m}^3$)	30 (26 - 35)	18 (17 - 19)	12 (12 - 13)		

Notes:

A single local bias adjustment factor has been used to bias adjust the 2022 diffusion tube results.

Appendix D: NLEF Stage 1 Screening Appraisal (2020)

No.	NLEF Stage 1 Screening Appraisal Question	Appraisal Response
1	What is the name of the declared AQMA(s)?	Perth AQMA Crieff AQMA
2	What pollutants are the AQMA(s) declared for?	Both AQMAs are declared for nitrogen dioxide annual mean and PM ₁₀ annual mean. Neither AQMA is declared for PM _{2.5} . The recent monitoring data we have does not indicate any exceedances. Prior to monitoring, PM _{2.5} levels were estimated based upon the PM ₁₀ levels; again, this did not indicate any exceedances.
3	What are the main sources of air pollution, or other factors, contributing to the declaration of the AQMA? <i>(If the main source is not transport-related no further screening is required).</i>	In both AQMAs the main source of pollution is transport
4	Are the declared AQMA(s) (and therefore area(s) of exceedance) restricted in nature geographically to a small area for which a Low Emission Zone (LEZ) would not be appropriate or proportionate (e.g., single streets, road junctions, small town centre)?	Crieff AQMA Covers a very small area focussed around one street, High Street. Due to criteria set by Scottish Government, operating a LEZ on a single street would not be a proportionate response considering recent monitoring data indicates no exceedances. However, PKC continues to monitor air quality in Crieff to ensure it continues to improve. At this time, the Crieff AQMA will not be considered any further in this screening exercise. Perth AQMA Includes the majority of Perth, and as such it does cover a wide enough geographical area for a LEZ to be considered.

No.	NLEF Stage 1 Screening Appraisal Question	Appraisal Response
5	Do the monitored concentrations within the AQMA(s) meet the air quality objective(s)? If yes, for how long has compliance been achieved? If not, what are the extent of the exceedances?	<p>Perth AQMA</p> <p>Nitrogen dioxide – 2019 was the first year since monitoring began in which there were no exceedances of the air quality objectives for NO₂. Between 2015 and 2019 there were nine locations within the Perth AQMA where exceedances of NO₂ were recorded. These locations are shown in Figure 2.1. At each of these locations the NO₂ level has fallen, with reductions of between 15% and 30% from the peak recorded level, see Table 2.4. There are five locations where the recorded value for 2019 is still within 10% of the objective level; three of these locations are on one street – Atholl Street. Although the AQMA covers the whole of Perth the locations where there have been recent exceedances are contained within a much smaller area within the city centre and it is thought that this is the main area where the air quality benefits of the CTLR will be seen.</p> <p>PM₁₀ – There are no exceedances of the PM₁₀ air quality objectives within this AQMA, this has been the case since 2017.</p>
6	What is the current trend for pollutant concentrations within the AQMA(s) (state the trend for each pollutant declared)?	<p>Perth AQMA</p> <p>Nitrogen dioxide – Data indicates there has been a general decline in NO₂ levels within the AQMA over the last few years. Table 2.4 and Figure A.1 and Figure A.2 in Appendix A show the declining trend in NO₂ levels at a number of locations across Perth.</p> <p>PM₁₀ - Data indicates there has been a general decline in PM₁₀ levels within the AQMA over the last few years. Figure A.4 and Figure A.5 in in Appendix A show the declining trend in PM₁₀ levels at Atholl Street and Perth High Street, although no PM₁₀ monitoring has been carried out at Perth High Street since late 2017. It is recognised that the monitor at Perth High Street is not in the best location, and it has been decided to relocate it to the Bridgend area of Perth. This is a location where elevated levels of NO₂ have previously been reported, and so it would be useful to gain an understanding of PM₁₀ levels in this area. It is planned that this relocation will take place in 2020.</p>

No.	NLEF Stage 1 Screening Appraisal Question	Appraisal Response
7	Are there any major planned developments which could impact air quality within or surrounding the AQMA(s)?	<p>Perth AQMA</p> <p>The most recent version of the Local Development Plan for Perth and Kinross was released in 2019 and covers proposed development in the region over the next five years. There are a number of significant developments proposed in and around Perth which are summarised below. For some of these developments planning applications have already been submitted and approved while others are still at a much earlier stage. For the proposed developments which are still in these very early stages the details are included in Table 2.5: Early Stage Proposed Developments. The air quality impacts of these developments will be considered as part of the planning process. Where issues are identified appropriate measures will be required in order to mitigate negative effects, with particular attention paid to the impact on AQMAs. In order to try and highlight the importance of this and to encourage early discussion with developers PKC have recently introduced supplementary planning guidance for air quality. It is therefore not anticipated that any of the proposed development in and around Perth will have any significant negative impact upon the air quality.</p> <ul style="list-style-type: none"> • Bertha Park is a large development to the west of Perth. The development is out with the existing AQMA however it would be expected that traffic to and from the development will impact upon Perth. In total 3000+ units are proposed over a number of phases. An air quality assessment has been completed for the development which has indicated that the impact upon air quality in Perth will be negligible. The construction of the CTRLR formed part of this assessment and there is modelling which indicates without the CTRLR the combined impact of this and the Almond Valley development would be to increase pollution levels within Perth. • Almond Valley is a development west of Perth, with 704-1100 housing units proposed. An air quality assessment will be carried out for this development. • There are also early plans for a Perth West development, which would be 2210 – 3453 homes plus 25+ha of employment land. A requirement for transport assessments and modelling for this

No.	NLEF Stage 1 Screening Appraisal Question	Appraisal Response
		<p>development has been identified and submission of this information is pending. It is expected that there will be a park and ride site as part of this development, and that active travel will be a consideration.</p> <ul style="list-style-type: none"> • Charles Street/ Scott Street – 78+ homes. Concerns were initially raised regarding particulate emissions from a biomass boiler proposed as part of the development. However suitable mitigation has been identified which has addressed these concerns. • Gannochy Road – 68-96 homes. A transport assessment has identified potential capacity issues prior to the construction of the CTRL. However, an air quality assessment carried out for an initial development of 48 houses has not identified any significant impact upon air quality. • Former Auction Mart – 189-293 homes. An air quality assessment has been completed for this development which has identified a negligible impact upon air quality. • Murray Royal Hospital. A transport assessment will be used to determine what level of development can take place prior to construction of CTRL due to pressure on traffic at Bridgend. However, an air quality assessment has been carried out which indicated a negligible impact upon air quality, although it is acknowledged that the planned construction of the CTRL also provides reassurance regarding the air quality in the Bridgend area of Perth. <p>It has been agreed that an embargo will be in place for housing developments greater than 10 units on the A93 and A94 corridors until construction of the CTRL predetermined stages are completed to prevent further congestion and deterioration of air quality within the Bridgend area of Perth</p>
8	What are the current trends for vehicle movements within the AQMA and surrounding areas?	<p>Perth AQMA</p> <p>Traffic data from junctions within Perth city centre was collected in 2003, 2010, 2015, 2019 and 2020. This data provides a snapshot of the number of vehicle movements at five junctions in the city centre</p>

No.	NLEF Stage 1 Screening Appraisal Question	Appraisal Response
		<ul style="list-style-type: none"> • Caledonian Road/Barrack Street • Perth Bridge/Main Street • Caledonian Road/York Place • Dundee Road/ Queens Bridge • Edinburgh Road/Marshall Place <p>The data is recorded on one day in each year. However, it is worth noting that the time of year when the surveys were carried out does vary. There is also the potential for the data to be impacted traffic incidents or roadworks. In 2003 and 2010 data was collected in an AM period, 06:30 – 09:30 and a PM period 15:30 – 18:30, whereas in 2015, 2019 and 2020 data was also collected in the intervening off peak period of 09:30 – 15:30. Therefore when comparing the data across the years only the 06:30 – 09:30 and 15:30 – 18:30 periods have been used. The data from 2020 has been discounted as it was taken during the lockdown period and therefore does not give an accurate representation of normal conditions.</p> <p>Table 2.6 summarises the total number of vehicle movements across all vehicle classes at the junctions surveyed. The data does not appear to indicate any increase in traffic volume in the city centre which could be supported by the observed downward trend in air pollutant levels in this area over the last few years.</p>
9	Provide evidence showing how the AQAP (and associated plans, programmes and strategies) will deliver significant improvements towards achieving the air quality objective(s) in as short a timescale as possible?	<p>Perth AQMA</p> <p>The Cross Tay Link Road (CTRLR) is a major infrastructure project which will link the A93 and A94 with the A9 over the River Tay. This development is expected to help reduce traffic congestion in the city centre and Bridgend. It is also hoped that this reduction in traffic will provide an opportunity for a shift towards greener modes of transport.</p>

No.	NLEF Stage 1 Screening Appraisal Question	Appraisal Response
		<p>Previous modelling work carried out in 2015 of the impact of the CTRLR was updated in 2019 with an assumed completion date of 2023. The modelling suggests the construction of the road would give a reduction in Perth and Scone nitrogen dioxide levels of on average 2% - 3% compared with predicted 2023 levels without the CTRLR. The hotspots of Perth city centre and Bridgend would see the largest reductions in nitrogen dioxide levels, on average 4% and 13% respectively. Modelling of PM₁₀ and PM_{2.5} predicted a reduction in average Perth and Scone levels of around 1%, though there is uncertainty with this figure due to insufficient PM monitoring data. Planning consent for the CTRLR project has not yet been granted but is currently due to be considered this year.</p> <p>Work through the Smarter Choices, Smarter Places (SCSP) programme will continue. Through the promotion of active travel, it is expected that there will be a small positive impact on air quality. Uncertainties resulting from the current Covid-19 pandemic mean it is not currently possible to say which projects will be taken forward as part of this programme, and therefore it is difficult to gauge the likely scale of the impact on air quality.</p> <p>The Perth, People, Place project aims to deliver a new transport corridor from Luncarty into Perth city centre. This will comprise a cycle lane, improved space for buses, greenspace for communities and modal filters to remove through traffic along Balhousie Street. Once the initial concepts have been developed modelling will be carried out to identify if and where amendments to the proposals are required. The current timescale for completion of this project is 2023/24. As yet there is no information available on the expected impacts on air quality.</p> <p>There are also early proposals for a cycle lane in the Bridgend area of Perth. No further details or likely timescales for this work are available at present however the potential reduction in road space for vehicles has the potential to impact upon the air quality in this area. Bridgend is one of the areas where higher NO₂</p>

No.	NLEF Stage 1 Screening Appraisal Question	Appraisal Response
		<p>levels have been recorded, however until more detail regarding the proposal is available the impact upon local air quality cannot be estimated.</p> <p>There are a number of temporary changes proposed due to the current Covid-19 pandemic. These changes involve providing temporary cycling and pedestrian infrastructure to allow for physical distancing. The planned measures include an improved cycle network both to access Perth and within the city itself, road closures and access restrictions and a 20mph speed limit in a number of areas within Perth, including the city centre. There is some overlap in these proposed temporary measures and the Perth, People, Place project and the proposed Bridgend cycle lane.</p> <p>Due to the immediacy of the Covid-19 pandemic these temporary measures will be put in place over a very short timescale. It is recognised that these changes may have both positive and negative impacts upon air quality. PKC will monitor these impacts, with the possibility of measures being retained longer term if they are found to be successful.</p> <p>Obviously given the current situation things are happening and changing quite quickly and so at this time it is difficult to be definite about what measures will be implemented. It is also difficult to predict both the short- and long-term changes to how people will travel over the next year, and beyond, for example will there be an increase in homeworking, will public transport use change, will there be an increase in active travel – these will all potentially impact upon the local air quality.</p>

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the LA intends to achieve air quality limit values'
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
AURN	Automatic Urban and Rural Network (UK air quality monitoring network)
ANPR	Automatic Number Plate Recognition
CHP	Combined Heat and Power
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EV	Electric Vehicle
EFT	Emissions Factor Toolkit
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
LDP	Local Development Plan
LEZ	Low Emission Zone
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control

RTPI	Real Time Passenger Information
RTM	Real Time Monitor
SO ₂	Sulphur Dioxide
TACTRAN	Tayside & Central Scotland Transport Partnership

References

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Crieff Air Quality Action Plan https://www.pkc.gov.uk/media/44879/2019-Crieff-Air-Quality-Action-Plan/pdf/2_2019_Perth_Kinross_Council_Crieff_Air_Quality_Action_Plan.pdf?m=637080263860030000

Perth Transport Futures <https://www.perthtransportfutures.co.uk/>

Regional Transport Strategy <http://www.tactran.gov.uk/documents/TACTRANRTS-FinalNov2008.pdf>

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