FIFE AIR QUALITY ANNUAL PROGRESS REPORT 2025

Fife Council

Report for: Fife Council

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2025 Air Quality Annual Progress Report (APR) for Fife Council

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

June 2025

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Executive Summary: Air Quality in Our Area

AIR QUALITY IN FIFE

Air quality is generally good across Fife; however, Fife Council continue to strive to reduce air pollution where possible to improve the lives of its residents. This Annual Progress Report has been undertaken to fulfil Fife Council's duty to review and assess air quality annually. The report provides the latest monitoring results and discusses the implications for air quality management in the Fife area.

The Annual Progress Report utilises monitoring data collected throughout 2024.

Fife Council (Fife) carry out monitoring of nitrogen dioxide (NO_2) at four automatic stations in Cupar, Dunfermline, Kirkcaldy, and Rosyth. Non-automatic monitoring of NO_2 was carried out using diffusion tubes at 49 sites. All NO_2 concentrations measured during 2024 were below the annual and hourly mean air quality strategy (AQS) objectives.

PM_{10} and $PM_{2.5}$ are measured at the four automatic sites within Fife at Cupar, Dunfermline, Kirkcaldy and Rosyth. During 2024 all concentrations were below the annual and daily AQS objectives for both PM_{10} and $PM_{2.5}$.

During 2024, five AQMesh site sensors were added to Fife's sensor monitoring network. They were; Main Street, Lumphinnans; Dunfermline Road, Crossgates; Harley Street, Rosyth; Aberdour Road, Dunfermline and Baldridgeburn, Dunfermline. Monitoring at Appin Crescent East, Dunfermline ceased in January 2024 and the AQMesh was relocated to Aberdour Road, Dunfermline in February 2024.

The 2024 data obtained from all 10 AQMesh sensor units indicated no exceedances of any of the NO_2, PM_{10} and $PM_{2.5}$ AQS Objectives.

The review of all available data relating to benzene monitoring indicates that it is unlikely that any air quality objectives relating to benzene were exceeded during 2024.

The review of all other local developments has not identified any locations where there may be a risk of the air quality objectives being exceeded, so no additional air quality assessment is recommended at this time.

Following the review of all available data, it is recommended that Fife Council carry out the following actions:

- Produce an Annual Progress Report in 2026, reporting concentrations measured during 2025.
- Continue to implement the ongoing measures outlined in the Air Quality Strategy (AQS) (2025 – 2030).
- Continue to monitor NO_2, PM_{10} and $PM_{2.5}$ concentrations throughout Fife including previous AQMAs.
- Continue to review the NO_2 diffusion tube monitoring programme and seek to relocate any tubes where deemed appropriate.

Fife received grant funding for 2024/25 to support local air quality management responsibilities and various air quality projects. A summary of each measure is provided throughout the report as shown in Table 1 below.

Table 1 Grant funding summary 2024/25

Measure	Summary
Two new AQMesh units are to be used for monitoring at educational establishments in light of recent findings and recommendations from the Royal College of Physicians.	Details in Section 3.1.3
Continuation of TRL Fleet and Taxi ECO Stars schemes within Fife	Details in Section 2.4.1
AQMesh data management and reporting for existing pods	Details in Section 3.1.3
Clean Air Day (CAD) 2024	Further information is provided in Section 2.3.6
Air Quality Strategy Update 2025-2030	Further information is provided in Section 2.2

ACTIONS TO IMPROVE AIR QUALITY

Fife Council's Air Quality Strategy (AQS) includes measures for delivering air quality improvements across Fife now that the AQMAs have all been revoked and the AQAPs are no longer required. Fife has selected key measures to focus on within this APR including the ongoing implementation of the Fife ECO Stars scheme. It is being rolled out in Fife to help fleet operators improve efficiency, reduce fuel consumption and reduce emissions – all helping to improve local air quality whilst at the same time, making cost savings.

Public engagement and raising awareness is one of the main actions taken by Fife throughout 2024. This has included the continued implementation of the Anti-Idling Campaign and also educational events at several schools across Fife.

During 2024 Fife Council produced a new Air Quality Strategy (2025 – 2030) which was released in January 2025.

LOCAL PRIORITIES AND CHALLENGES

Fife has been awarded grant funding from the Scottish Government for 2025-26. The funding will be used in conjunction with existing resources to carry out the following air quality initiatives and studies, to achieve the aims set out in the air quality strategy. The priorities include:

- Implement the commitments set out within the new air quality strategy with the overall approach being
    - Maintain pollutant concentrations below Scottish Air Quality Standard (AQS) objective levels;
    - Integrate air quality into our strategies and policies, particularly in areas such as transport, planning, climate change and public health;

    - Focus on behaviour changing initiatives; and Improve collaboration with neighbouring authorities to address the management of regional air pollution sources.
- Continuation of the implementation of Fife Council's travel plan including encouraging walking and cycling infrastructure and associated initiatives.
- Fife ECO Stars schemes for Fleet and Taxis operators will continue to encourage and promote 'clean fleet operations'.
- The continued interrogation of monitoring data from the existing monitoring sites to further understand pollutant concentrations and trends.

In addition to the above, educational events to highlight Clean Air Day are due to be delivered at several schools throughout Fife as part of Clean Air Day on and around the 19th of June 2025. The events will include bite-size air quality presentations as well as air quality monitoring in the vicinity of the selected schools and will follow on from the successful implementation of the anti-idling campaign carried out in 2023/24.

HOW TO GET INVOLVED

Members of the public can find information related to air quality on the Fife Council website. Actions that members of the public can take to help reduce air pollution include:

- Car sharing
- Reducing car journeys by choosing to walk, cycle or take public transport instead
- Maintain and look after your vehicle properly
- Consider switching to an electric vehicle
- Get involved in the anti-idling campaign – Switch your engine off and show you care about cleaner air! | Fife Council

Further information is available on the dedicated Fife Council air quality web pages at www.fife.gov.uk/airquality and on the What can I do about air pollution page on the Scottish Air Quality website What can I do about air pollution? (scottishairquality.scot).

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1. LOCAL AIR QUALITY MANAGEMENT

This report provides an overview of air quality in Fife during 2024. 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. This Annual Progress Report (APR) summarises the work being undertaken by Fife Council to improve air quality and any progress that has been made.

Table 1-1 below summarises the Air Quality Objectives applicable to Scotland.

Table 1-1 Summary of Air Quality Objectives in Scotland

AQ Objective-Pollutant	Concentration	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	31.12.2020
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
Lead	0.25 µg m^{-3}	Annual Mean	31.12.2008

1.1 PREVIOUS REVIEW AND ASSESSMENT

Fife Council have carried out a number of reviews and assessments in relation to air quality since 2007. All reports can be accessed via the Fife Council website and Air Quality in Scotland website.

1.1.1 2024 Annual Progress Report Summary

The 2024 APR utilised monitoring data collected throughout 2023. Fife carried out NO_2 automatic monitoring at four sites in Cupar, Dunfermline, Kirkcaldy and Rosyth. Non-automatic monitoring of NO_2 was carried out at 44 sites (a total of 52 diffusion tubes). Nine diffusion tube sites were decommissioned during 2023 due to historically low readings and reducing triplicate sites to single tube sites. These were replaced by three new sites in the Crossgates area where modelling data showed NO_2 levels that would be worthy of consideration. All NO_2 concentrations measured during 2023 were below the annual mean objective of 40 µg m^{-3}.

PM_{10} and $PM_{2.5}$ were measured at four automatic sites in Cupar, Dunfermline, Kirkcaldy and Rosyth. All concentrations were below the annual mean objective of 18 µg m^{-3} for PM_{10} and 10 µg m^{-3} for $PM_{2.5}$.

Additional indicative monitoring of NO_2, PM_{10} and $PM_{2.5}$ was carried out using AQMesh sensor units within Cupar, Dunfermline, Kirkcaldy and St Andrews. An additional AQMesh sensor unit was installed in Bonnygate North in April 2023. The 2023 data obtained from all six sites showed no exceedances of any of the NO_2, PM_{10} and $PM_{2.5}$ objectives.

A review of all available data relating to CO, SO_2 and benzene monitoring during 2023 indicated that it was unlikely that any air quality strategy objectives relating to these pollutants were exceeded.

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 publish and implement an Air Quality Action Plan (AQAP) within the shortest possible time and no later than 12 months of the date of the 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 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.

Fife Council currently does not have any AQMAs. After being advised by Scottish Government and SEPA, Fife council when through the process (detailed in the LAQM Technical Guidance) of revoking their AQMAs for NO_2 in 2021 and for PM_{10} in 2023. Table 2-1 below provides a summary of the previously revoked AQMAs.

Table 2-1 Revoked Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City/Town	Description	Revocation Date
Bonnygate, Cupar	NO_2 annual mean	Cupar	An area comprising of Bonnygate (A91), Crossgate (A914) and St Catherine Street (A91). There are a number of residential properties within the area close to the road at 1st floor height above commercial properties.	September 2021
	PM_{10} annual mean			December 2023
Appin Crescent, Dunfermline	NO_2 annual mean	Dunfermline	An area comprising of Appin Crescent, Dunfermline. There are a number of residential properties within the area close to the road at both ground level and 1st floor height.	September 2021
	PM_{10} annual mean			December 2023

2.2 AIR QUALITY STRATEGY

Fife Council has had an Air Quality Strategy in place since 2015, outlining the steps taken to achieve significant improvements to air quality in the Fife area. The Strategy is updated every five years as a minimum and in accordance with LAQM guidance.

During 2024, work was undertaken to update the strategy again, to build on the success of previous actions and set out how emerging issues will be tackled.

The new updated Fife Council Air Quality Strategy 2025 - 2030, published in January 2025, now covers the period 2025-2030.

The Strategies approach is to:

- Maintain pollutant concentrations below Scottish Air Quality Standard (AQS) objective levels;
- Integrate air quality into our strategies and policies, particularly in areas such as transport, planning, climate change and public health;
- Focus on behaviour changing initiatives; and Improve collaboration with neighbouring authorities to address the management of regional air pollution sources.

The strategy focuses on nine commitments that follow the Clean Air For Scotland 2 main policy areas. These are;

1. **Health** - Implement abatement measures to ensure that the Scottish Air Quality Objectives continue to be achieved, and public health continues to be protected.
2. **Integrated Policy** - Integrate air quality considerations within related Council plans and strategies and across different departments.
3. **Placemaking** - Support Council proposals for infrastructure changes that will facilitate improvements in vehicle movements and ensure that development proposals are assessed for air quality impacts.
4. **Data** - Provide high-quality air pollution data for; continuous compliance with objectives; accurate informing of mitigation decision making and identifying trends or gaps in the information gathered.
5. **Public Engagement & Behaviour Change** - Raise public awareness and understanding of local air quality issues within Fife and inform communities about ways that they can contribute to air quality improvements and take part in initiatives.
6. **Industrial** - Support the control and reduction of air pollution from industrial sources in collaboration with SEPA, and communicate with local residents the work carried out.
7. **Non-transport** - Control and reduce air pollution from non-transport sources.
8. **Transport** - Maintain the reductions achieved in pollutant concentrations from road traffic by continuing to ensure that air quality is considered in all transport planning decisions and promoting active and sustainable travel.
9. **Governance** - Continue to employ a dedicated air quality team to provide the public with an informative, easily accessible and transparent resource for dealing with air quality issues.

2.3 CLEANER AIR FOR SCOTLAND 2

Cleaner Air for Scotland 2 - Towards a Better Place for Everyone (CAFS) 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[1].

Progress for Fife Council against relevant actions for which local authorities are the lead delivery bodies within this strategy is demonstrated below.

2.3.1 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.

Fife has embedded air quality in its current Fife Local Development Plan (FIFEplan), Fife Local Transport Strategy and Joint Health Protection Plan. This has been facilitated through the setting up of a Fife Core Air Quality Steering Group which consists of the relevant teams/organisations/agencies and meets quarterly to assess progress. Within the latest update of the Plan4Fife (Local Outcome Improvement Plan) 2017-2027 specific reference is made to "Improved air quality to meet prescribed standards to reduce preventable ill-health".

The Local Transport Strategy for Fife 2023-2033 was approved by the Fife Council Cabinet Committee on 30th November 2023 and sets out our vision and priorities for transport in Fife over that ten-year period. One of the key aims is to work with others to decarbonise the transport sector by encouraging sustainable travel and enabling the roll-out of zero-emission vehicles (including the development of a Public EV Strategy & Expansion Plan).It also set out the first-year objective of undertaking an anti-idling campaign which was already undertaken in 2023.

The first action point of the Local Transport Strategy (LTS) is the development of an Active Travel Strategy. The Active Travel Strategy and Action Plan sets out our vision for active travel in Fife over the next 10 years; from now until 2034. The strategy will include a series of action points on how we can improve active travel in Fife. This will help make the case for investment in active travel. Developing an active travel strategy is the first action point in the Local Transport Strategy (LTS). This will help support the LTS' vision of 'fair, sustainable access for all'. In January and February 2024, stakeholder and public consultation was undertaken. In addition, nine 'in person' events were held and 11 online webinars, where additional comments and data was collected from key stakeholders. The next step is to compile a final draft of the active travel strategy, and this will be presented to the Environment, Transportation and Climate Change Scrutiny Committee in 2025. The document will then be considered by Cabinet Committee.

[1] https://www.scottishairquality.scot/lez

Scotland's fourth National Planning Framework (NPF4) is now part of the statutory Development Plan for Fife and is therefore a key consideration for new development proposals. Policy 23 of NPF4 provides high-level policy protection in relation to air quality.

The replacement for Fife's current Local Development Plan (LDP) will be named Fife's Place Plan and this is currently programmed to be adopted by the Council in 2028. Fife's Place Plan is currently being formulated with comments currently being made in relation to air quality on around 350 existing identified LDP sites at the time of writing (May 2025). Towards the end of 2024, there was also an opportunity for stakeholders, including Community Councils, landowners and developers to submit ideas or new sites for consideration within the new Fife's Place Plan. This consultation window was open between 18th November 2024 and 24th February 2025 with the submissions currently being reviewed by the Planning department. It is anticipated that a second round of comments in relation to air quality will be required later in 2025 once this initial review process has been completed.

Fife has also promoted the use of the Place Standard tool in relation to Local Place Plans across Fife with training provided across various teams across the Council. It is currently being used by Communities & Neighbourhood Services to help with various forms of local community-based planning.

Fife has also in partnership with NHS Fife updated its Joint Health Protection Plan (JHPP) which now covers the period 1st April 2024 to 31st March 2026 and includes specific reference to the Air Quality Strategy Update (2025-2030) and joint working to respond to enquiries from members of the public. This collaborative approach is demonstrated by membership of NHS Fife on the Fife Core Air Quality Steering Group and, Mossmorran and Braefoot Bay Expert Advisory Group on Air Quality.

Fife and NHS Fife have produced a MUSTER model (Meeting, Understanding, Surveillance, Toxicology, Evaluation and Reporting) risk communication tool and have produced a standard pro forma for reporting Environmental Health complaints (including those relating to air quality). Fife will also engage further with NHS Fife on health-related promotion activities such as encouraging walking and cycling in preference to the car.

2.3.2 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 Low Emission Zone (LEZ) structure.

Fife has undertaken the relevant screening process and have determined that there is currently no requirement for any LEZs in Fife. Fife has also provided comments in relation to the proposed LEZs being introduced within neighbouring local authorities (Edinburgh and Dundee).

2.3.3 Integrated Policy

Fife maximises co-benefits between air quality and related policy areas such as climate change, noise, transport, planning and agriculture amongst others to deliver enhanced benefits. Fife Council's Protective Services has worked in conjunction with colleagues in our Climate and Zero Waste Team to finalise Phase 1 of a Climate Change Co-Benefits Evidence Base study with Phase 2 proposed to follow at a later date when funding allows.

Fife are also integrating air quality issues into transport and planning as outlined in the above Placemaking – Plans and Policies section. Further consideration of noise and agriculture will be the subject of future Scottish Government air quality grant submissions to undertake the relevant studies.

Additionally, the Climate Change and Zero Waste team have moved into Fife Council's Planning Service to further strengthen action in this area. This demonstrates how responding to the Climate Emergency is seen as core to the work moving forward in Fife. Fife Council's Land & Air Quality team continues to work closely with the Climate Change and Zero Waste team to ensure air quality is considered.

In December 2023 Fife Council approved the Fife Local Heat and Energy Efficiency Strategy (LHEES) and Delivery Plan. This new duty for Scottish Local Authorities is to plan energy efficiency and decarbonised heat of all buildings in its area. Recognising the challenges with indoor air quality, Fife Council Protective Services is represented on the Steering Group to provide specialist advice and input. Air quality is included in the priorities for the plan and work is currently being undertaken to understand the impact of actions on air quality.

2.3.4 Tackling Non-Transport Emissions Sources

Fife address emissions from domestic (household) burning and agriculture, going beyond current regulatory and management approaches. Fife have previously undertaken a domestic fuel use survey in the two (now recently revoked) AQMAs (Bonnygate, Cupar and Appin Crescent, Dunfermline) to further understand the contribution of this source. The Scottish Government are considering domestic burning under CAFS2 and Fife await further information in this regard should formal guidance be provided by the Scottish Government. In the meantime, Fife are currently investigating the potential for general guidance to be made available on the various Fife Council social media platforms for members of the public. Fife Council have already produced a specific web page for wood burning stoves on their Air Quality Website.

The Scottish Government are also considering ammonia emissions under CAFS2 and Fife also await further information in this regard before potentially exploring other funding options in order to progress.

Fife are also actively supporting the SGN (H100 Fife) project which aims to give residents in the Levenmouth area the opportunity to be at the leading edge of the low-carbon economy. A world-first green hydrogen network has been constructed in Buckhaven and Denbeath and will bring renewable hydrogen into around 300 homes in 2025/26 allowing residents to heat their homes and cook their food using 100% zero-carbon hydrogen (produced by a dedicated electrolysis plant, powered by a nearby offshore wind turbine). Participating customers will use hydrogen boilers and hobs during the initial trial which is due to run until 2027. The project is the first of its kind to employ a direct supply of clean power to produce hydrogen for domestic heating which will put Fife at the forefront of the clean energy revolution.

The homes involved (a mix of private householders, private & Housing Association tenants and Council tenants) will have the above equipment installed and maintained free of charge throughout the trial. The hydrogen will be charged at the same price as gas for all customers, enabling householders to switch to cheaper energy suppliers throughout the H100 Fife project if they wish. Householders who participate in the trial will also receive an incentive payment of £1,000, paid in instalments throughout the customer's involvement in the project.

As of March 2025, the construction of the 8.4km network has been completed We've completed construction of our world-first green gas network | SGN Your gas. Our network and demonstration homes have been opened by the First Minister allowing residents involved in the trial to see the appliances that will be installed in their own homes First Minister opens Scotland's first hydrogen homes | SGN Your gas. Our network. Fife College will also be opening the UK's first hydrogen training facility in 2025 to allow existing gas safe engineers to be upskilled in terms of the installation and maintenance of the appliances.

Further information on the first-of-a-kind demonstration project that is leading the way in decarbonising home heating is available at https://sgn.co.uk/H100Fife and https://h100fife.co.uk.

2.3.5 Transport – Avoiding unnecessary travel and Active Travel

Fife supports a modal shift to active travel and public transport. This will mean, amongst other objectives, providing a transport system that facilitates active travel choices, better public transport provision and constraints upon private vehicle use, especially in urban centres where pollution and congestion are most acute. Fife has a number of active travel initiatives in place which are discussed further below.

Fife will work with active travel partners to identify funding for permanent active travel infrastructure and behavioural change programmes, through grant funded programmes in line with the National Transport Strategy (NTS) Sustainable Travel Hierarchy and the Sustainable Investment Hierarchy, and where the projects are aligned to the active travel outcomes framework. Relevant examples include:

- Partnership working with Sustrans to develop projects as well as seek grant funding from Sustrans to expand the shared use network across Fife
- Partnership working with SEPA to develop projects and jointly seek funding to implement
- SEStran working with community groups directly to encourage active travel, with grant funding where available

Fife will work collaboratively with various partners to deliver our Active Travel vision of enabling walking, cycling and wheeling to be the most popular mode of travel for short, everyday journeys in our towns and cities. Further information on Active Travel is available at www.fife.gov.uk/activetravel and recent examples from the Active Travel Strategy include:

- Encourage School Travel Plans to be developed for all schools
- Promote the "Walk Once a Week" initiative in schools to encourage active travel
- Promote Hands Up Scotland surveys in schools
- Promote Bikeability in schools, teach pupils how to cycle and develop road sense
- Undertake marketing and promotion to encourage the use of public transport
- Community engagement to increase the active travel network across Fife

Within the Dunfermline area a 'Greenspace Strategy' has been developed and is a new community owned organisation (Dunfermline Greenspace) that will support various local projects and groups. There are 10 interlinked themes within the strategy which include energy, health and wellbeing as well as active travel. With regards to active travel within Dunfermline a Walking and Cycling Index 2023 was published in March 2024 and included the results of a survey undertaken by Sustrans to identify the extent of active travel within

Dunfermline and these results will be updated when the results are made available. The initial survey results for 2023 show that 48% of residents walk or wheel at least 5 days a week (wheeling relates to the use of wheeled mobility aids) with 9% of residents cycling at least once a week. At the time of writing (May 2025) updated figures have not yet been issued for 2024. As part of the 'Greenspace Strategy' a local group in Dunfermline is also in the process of creating a Cycling Action Plan for the city, aiming to make Dunfermline an easy place to cycle to, from and around. At the time of writing (May 2025) no update is available regarding the status of this document.

Protective Services were invited by Dunfermline Greenspace to attend a Climate Fair on 21st September 2024 (Figure 2-1) where a representative spoke to the local community regarding our air quality commitments and highlighted our success in terms of the recent revocation of the Appin Crescent AQMA. Other discussions took place regarding sustainable travel and idling vehicles.

Figure 2-1 Collage of images from Climate Fair attended in September 2024 by a member of Protective Services

Specific details on several of the above active travel initiatives which are targeted at primary schools are provided below:

28 schools across Fife have completed Travel Plans since April 2024 and a further 7 are due to be completed by the end of March 2025.

During 2023/24 Fife Council trialled its own new travel tracker (Fresh Air Frankie Travel Tracker) which collects data daily on how pupils travel to school and it was hoped that this will be rolled out to all Fife primary schools in the next academic year (2024/25). Transportation have however advised that the Fresh Air Frankie Travel Tracker will now only be used when specific campaigns are being run such as walking or biking to school.

During 2024/25 the Fresh Air Frankie Travel Tracker was used during the Bike to School Week in September 2024 across several primary schools of varying sizes as summarised in Table 2-2.

Table 2-2 Results from the Fresh Air Frankie Travel Tracker used during the Bike to School Week in September 2024

School Size	Number of schools taking part	% of pupils cycling to school over week	Winning School
Small (up to 99 pupils)	4	10%	St Serf's RC, High Valleyfield
Medium (100-249 pupils)	10	18%	Newport
Large (250 pupils upwards)	4	32%	Capshard, Kirkcaldy

The wining schools were offered the opportunity to claim prizes. Capshard Primary have not yet claimed a prize. St Serf's RC have claimed a scooter rack but this has yet to be installed at the school. Newport Primary claimed a road safety kit and a picture of this is shown in Figure 2-2.

Figure 2-2 Pupils from Newport Primary with their road safety kit

The "Walk Once a Week" Campaign is a partnership between Fife and Living Streets Scotland that continues to progress the active travel agenda in Fife Primary schools and increase the uptake of active travel. The 2024/25 period saw a maximum of nine schools

and 2,243 pupils take part. The 2023/24 period by comparison saw the same number of schools take part (nine) with a slightly higher number of pupils (2,377).

The nine schools that took part during 2024/25 cover various parts of Fife and the schools are: Culross Primary, Dalgety Bay Primary, Guardbridge Primary, McLean Primary (Dunfermline), Mountfleurie Primary (Leven), Newport Primary, St Marie's RC Primary (Kirkcaldy), Star Primary and Tayport Primary.

These nine schools include several where other key areas of work are being undertaken or have been completed:

- Guardbridge Primary who took part in CAD activities in 2024 (see below)
- McLean Primary (Dunfermline) is a school where we currently undertake monitoring and are hoping to proceed with an educational programme in 2025/26
- Mountfleurie Primary (Leven) previously won our anti-idling campaign competition and had a banner installed at the school to encourage behavioural change
- Newport Primary who are mentioned in Figure 2-2 in terms of the winning school with the new Fresh Air Frankie Travel Tracker
- St Marie's RC Primary (Kirkcaldy) is a school where an ongoing 'School Exclusion Zone' trial is taking place aimed at improving road safety and promoting active travel (see below)

The Hands Up Scotland survey is a project funded by Transport Scotland and is a joint survey between Sustrans and all 32 local authorities across Scotland whereby each September schools across Scotland complete the survey by asking their pupils 'How do you normally travel to school?' and the results provide a valuable annual snapshot of typical school travel habits. The results for Fife primary schools in 2024 show that active travel decreased slightly from 57% in 2023 (44% walking, 6% cycling and 7% scooter/skate) to 52% in 2024 (42% walking, 5% cycling and 5% scooter/skate). An increase in the percentage of children driven to their primary schools was noted from 20% in 2023 to 24% in 2023 as well as those opting to park and stride which increased slightly from 14% in 2023 to 16% in 2024.

Cycling is promoted through encouraging active schools and is further promoted within Primary schools via the Bikeability scheme. Over 2024 the number of pupils signed up to take part across Levels 1 and 2 of Bikeability were:

- Level 1 – 1,100 pupils took part from 27 schools (17% of schools across Fife delivered the scheme) with a 70% pass rate (771 pupils passed). In comparison, 1,334 pupils from 31 schools took part in 2023 with a 37% pass rate.
- Level 2 – 625 pupils took part from 20 schools (13% of schools across Fife delivered the scheme) with a 40% pass rate (200 pupils passed). In comparison, 908 pupils from 25 schools took part in 2023 with a 22% pass rate.

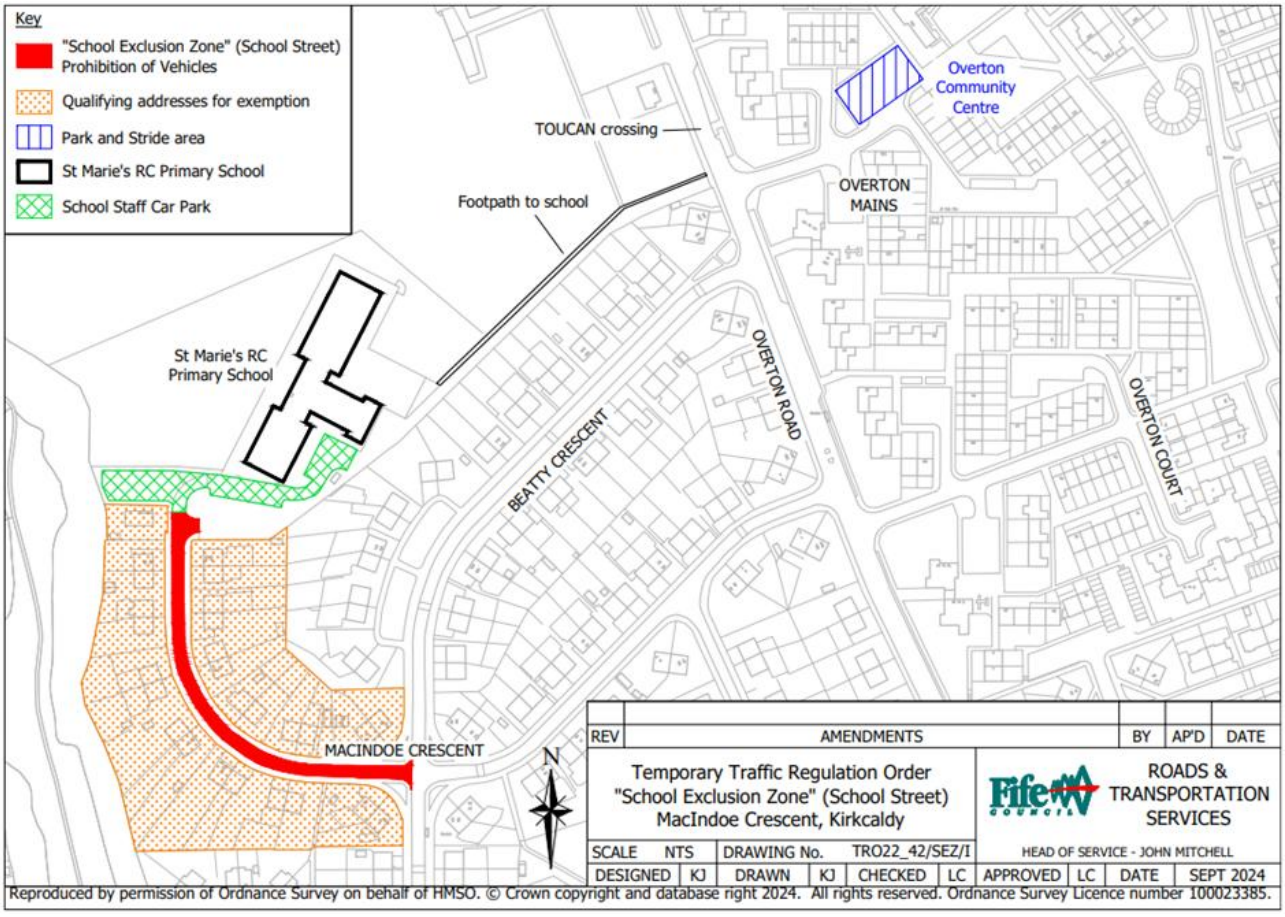
Colleagues in Transportation have advised that some schools have been impacted in terms of delivering Bikeability. Some schools are receiving external instructors to deliver Bikeability (paid model), also there are other cycling projects being delivered with funded internal coaches, causing disruption to schools committed to working on a sustainable model.

In November 2022 'School Exclusion Zones' (SEZs) were trialled at three schools across Fife over a scheduled 18-month period (ended in May 2024), whereby the schools involved were:

- Denend Primary, Cardenden
- Pitcoudie Primary, Glenrothes
- St Marie's RC Primary, Kirkcaldy

The objectives of the SEZs included improving road safety outside the schools and encouraging more active travel to and from school. Following the completion of the intitial trial it has been decided to extend the trial at one of the three schools (St Marie's RC) to gather more data. This trial extension started on 21st October 2024 and will run for a further 18-month period after which a decision will be made regarding further expansion of the scheme. A plan of the SEZ for St Marie's RC is shown in Figure 2-3.

Figure 2-3 School Exclusion Zones for St Marie's RC Primary, Kirkcaldy



2.3.6 Public Engagement and Behavioural Change

Fife carry out a large number of public engagement activities, including the promotion of sustainable travel choices that are aimed towards encouraging changes in behaviour that will contribute to improving local air quality. These activities aim to encourage a shift away from the use of private motor vehicles for travelling to more sustainable forms of transport or reducing the need for travel.

Travel to school is still a necessity and Fife actively promote ways to make this a sustainable journey through initiatives such as WOW (Walk Once a Week), The Hands Up Scotland survey and Bikeability which are all discussed in more detail above.

In recent years Clean Air Day (CAD) has become a successful platform for allowing Fife to raise awareness of air quality issues while also encourage sustainable travel options.

For Clean Air Day 2024, Fife Council arranged for five primary schools in and around St Andrews to take part in CAD events via one of our Steering Group partners 'Transition St Andrews', the schools were:

- Canongate Primary School, St Andrews
- Lawhead Primary School, St Andrews
- Greyfriars RC Primary School, St Andrews
- Strathkinness Primary School, Strathkinness
- Guardbridge Primary School, Guardbridge

Prior to Clean Air Day, each school was provided with bitesize air quality presentations and air quality monitoring equipment (Atmotube) by Ricardo on behalf of Fife Council. Pupils used the information provided to determine monitoring locations and undertake a traffic survey.

Over the course of the week each school was visited by a member of staff from one of our Steering Group partners 'Transition St Andrews' who helped with the above activities and also undertook Bikeability training with the pupils. Over the course of the week the schools were encouraged to post on social media what they were involved in as part of the day, examples of what was posted is shown in Figure 2-4.

Depending on future funding there would be a hope to run similar types of events in future years.

Figure 2-4 Transition St Andrews Facebook Post from Clean Air Day 2024 showing pupils from Canongate Primary Schools getting involved in Clean Air Day activities

2.4 IMPLEMENTATION OF AIR QUALITY ACTION PLANS AND MEASURES TO ADDRESS AIR QUALITY

In order to ensure that local authorities implement the measures within a strategy by the timescales stated within that strategy, the Scottish Government expects authorities to submit updates on progress through the APR process. Fife Council has taken forward a number of measures within the strategy during the current reporting year of 2024 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 2-3.

The full list of key actions undertaken by Fife Council are detailed within the updated Air Quality Strategy (2025-2030) and the main actions are summarised in Table 2-3. A copy of the updated Air Quality Strategy can be found at: Fife Council Air Quality Strategy 2025 - 2030.

Such actions will continue to be implemented during 2025 as Fife seek to maintain local air quality improvements across Fife.

Table 2-3 Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Expected/Actual Completion year	Organisations Involved	Measure Status	Funding Status	Key Milestones	Progress	Barriers to implementation
1	Fife ECO Stars	Vehicle Fleet Efficiency	2030 (when strategy next due for review)	Fife Council (Env Health and Fleet), TRL and a range of Fleet and Taxi operators	In progress	Funded annually using SG AQ Grant and Council revenue if required	All years (ensuring membership continues to increase)	Scottish Government funding issued in 2024 allowed the ECO Stars scheme to continue in Fife. As of January 2024, the Fife Commercial Fleet Membership grew to 299 members covering 10,638 vehicles operating in Fife and beyond (note this figure includes the number of bus operators and vehicles noted above). As of January 2024, the Taxi & Private Hire Membership has increased to 163 members operating 672 vehicles. The requirement for all Fife Council school and social work contract operators to become members of ECO Stars is a key factor in the continued growth of the Taxi & Private Hire Membership scheme.	Funding important for continued implementation
2	Raise awareness of the health impacts of air pollution and the health benefits of alternative travel within schools	Promoting travel alternatives	2030 (when strategy next due for review)	Fife Council (various services)	In progress	Funded annually using SG AQ Grant and Council revenue if required	All years (ensuring Travel Plans implemented and CAD events are undertaken)	Scottish Government funding issued in 2024 allowed for CAD activities to be undertaken at several schools along with a more detailed educational programme. Proposed to continue in 2025 (subject to Scottish Government funding being issued). Colleagues in Transportation deal with schools regularly in terms of travel plans and sustainable travel with a range of surveys regularly undertaken at schools. Since April 2024 28 schools across Fife have competed Travel Plans with a further 7 due to be completed by end of March 2025. Have also installed anti-idling posters at several schools where complaints of idling vehicles have been received in an attempt to change behaviours.	Funding important for continued implementation
3	Implement abatement measures outlined in the AQAPs to ensure that the Scottish Air Quality Objectives (AQOs) continue to be achieved and public health continues to be protected	Policy guidance and development control	2030 (when strategy next due for review)	Fife Council (various services)	In progress	Maintenance of monitoring equipment funded annual using SG AQ Grant (monitoring required to show improvements still being made)	All years (ensure downwards data trends continue)	Abatement measures that were active within the Appin Crescent and Bonnygate AQAPs continue to be implemented and monitored and continued air quality improvements are still evident in the data that is collected with downward trends continuing to be shown.	Funding is important for continued monitoring to show air quality improvements continue to be maintained
4	Incorporate Sensor technology into the Fife monitoring Network	Public information	2030 (when strategy next due for review)	Fife Council, Ricardo and associated equipment suppliers	Compete	Funded annually using SG AQ Grant and Council revenue if required	2024 (network expanded to include 10 units)	Scottish Government funding issued in 2024 to procure more mobile monitors and funding also provided for associated data management and reporting from the units. As of March 2025, 10 portable monitors are now included with our monitoring programme focussing on a range of areas including our former AQMAs as well as educational establishments. There are no current plans to expand further.	Funding is important for the continued implementation and maintenance of units
5	Review and update Fife Air Quality Strategy every five years	Policy guidance and development control	2030 (when strategy next due for review)	Fife Council (various services) and Ricardo	In progress	Latest update funded using SG AQ Grant	2025 (latest update published)	Scottish Government funding issued in 2024 allowed for the Fife Air Quality Strategy to be updated and cover the period of 2025-2030.	Funding is important to support future updates of the Strategy
6	Raise public awareness of the impact of emissions from biomass boilers/ domestic wood burners	Domestic solid fuel burning	2030 (when strategy next due for review)	Fife Council (Env Health)	In progress	Not funded	2024 (Council website updated with specific information on solid fuel burning)	Specific information pages are available on the Fife Council air quality web pages in relation to biomass boilers and wood burning stoves with a range of information and guidance available - https://www.fife.gov.uk/kb/docs/articles/environment2/environmental-health/air-quality To work with the Scottish Government on any public awareness campaigns in relation to wood-burning stoves.	Staffing availability to ensure the website is updated regularly and for public awareness campaigns
7	Attend and contribute to air quality seminars, training events and pollution liaison group meetings where national measures are discussed	Policy guidance and development control	2030 (when strategy next due for review)	Fife Council (Env Health)	In progress	Not funded	2024 (several key events attended including vehicle idling and public engagement)	Members of the team regularly attend online and in-person meetings/seminars including those run by the Scottish Government with recent examples including vehicle idling and public engagement. Members of the team also attend local pollution liaison meetings and discuss wider air quality matters.	Staffing availability to ensure regular attendance

Measure No.	Measure	Category	Expected/Actual Completion year	Organisations Involved	Measure Status	Funding Status	Key Milestones	Progress	Barriers to implementation
8	Progress the sustainable travel programme, including decarbonising the Council's fleet	Promoting Low Emission Transport	2030 (when strategy next due for review)	Fife Council (Fleet)	In progress	Funded annually using various funding streams including Council revenue funding and SG AQ Grant and other such funding (e.g. Switched On Fleet)	All years (ensuring Fleet being upgraded especially in terms of EVs and hybrids)	As of January 2024 Fife Council had 72 fully electric vehicles and 19 hybrid vehicles in service (either leased or purchased). The number of electric and hybrid vehicles being added to the Fleet continues to increase every year with new vehicles identified and brought in on trial. Recent trial vehicles included another electric Refuse Collection Vehicle with funding obtained to install another 150kW charging station at the principal Fife Council depot (Bankhead Central) with installation and commissioning in progress as of February 2024.	Issues with revenue funding available to Fleet Switched On Fleet funding has not been available now for several years for vehicles
9	Collect and publish high-quality data as part of LAQM obligations and identify trends or gaps in the information gathered	Public Information	2030 (when strategy next due for review)	Fife Council (Env Health)	In progress	Maintenance of monitoring equipment funded annually using SG AQ Grant (monitoring required to show improvements still being made)	All years (ensure equipment maintained as to ensure data is of highest quality)	Data obtained is high quality and subject of detailed AQ/QC and analysis as part of LAQM obligations with our work often cited as examples of 'best practice'.	Funding is important to maintain equipment and ensure data obtained is of the highest quality for reporting purposes
10	Encourage contributions towards improving local air quality and minimising negative impacts from existing and future Council strategies	Policy guidance and development control	2030 (when strategy next due for review)	Fife Council (various departments)	In progress	Not funded	All years (ensure Council strategies are updated frequently)	The Local Transport Strategy for Fife 2023-2033 was approved by the Fife Council Cabinet Committee on 30th November 2023 and sets out the vision and priorities for transport in Fife over the ten years. One of the key aims is to work with others to decarbonise the transport sector by encouraging sustainable travel and enabling the roll-out of zero-emission vehicles (including the development of a Public EV Strategy & Expansion Plan). Further information on the LTS is available here: https://www.fife.gov.uk/__data/assets/pdf_file/0020/450155/Local-Transport-Strategy-for-Fife-2023-2033.pdf In December 2023 Fife Council approved the Fife Local Heat and Energy Efficiency Strategy and Delivery Plan. This new duty for Scottish Councils is to plan energy efficiency and decarbonised heat of all buildings in its area. Recognising the challenges with indoor air quality Protective Services is represented on the steering group to provide specialist advice and input. Air quality is included in the priorities for the plan. Work is being undertaken to understand the impact of actions on air quality.	Staffing availability to ensure regular updates to existing Strategies

2.4.1 Fife ECO Stars Scheme

Fife's ECO Stars Fleet Recognition scheme and parallel ECO Stars Taxi and Private Hire scheme has continued to grow and expand membership during 2024.

Since the Fife Fleet scheme was initiated in 2014, membership has steadily increased year on year. As of February 2025, the Fife Fleet scheme stands at 306 members (up from 299 members in January 2024) made up of operators in the freight, bus and coach sectors, as well as many van fleets. Fife Fleet Recognition scheme members now operate a total of 10,770 vehicles (up from 10,638 vehicles in January 2024).

A notable milestone was reached in 2024 with the 300th Fleet member joining the scheme in the form of MGS Logistics who are a medium sized heavy haulage specialist with a local depot in Rosyth, along with other UK depots in Aberdeen and Great Yarmouth as well as a depot if Unihoorn, Holland. To celebrate the milestone MGS Logistics were presented with a certificate at their Rosyth depot in August 2024 (Figure 2-5).

Figure 2-5: Stuart Paley, MGS Logistics' HSEQ Manager

Alongside continued recruitment, there is an ongoing focus on supporting existing members by means of regularly re-engaging with individual members to hear their progress and re-assessing fleets when asked by existing members. Maintaining an ongoing relationship with members is essential in guiding their progress towards maximising fuel efficiency.

The requirement for all school and social work contract operators to become members of ECO Stars has resulted in a continued increase in membership numbers for the ECO Stars Taxi and Private Hire scheme. As of February 2025, the Taxi and Private Hire scheme stands at 172 members (up from 163 members in January 2024), operating 689 vehicles (up from 672 vehicles in January 2024).

ECO Stars continues to be supported by the Scottish Government as part of its Clean Air Strategy.

2.4.2 Targeting emissions from Council Fleet

Fife Council continues to make good progress towards increasing the number of electric and hybrid vehicles within its Fleet and the installation of publicly available charging points. These actions have direct impacts on reducing transport emissions. By February 2025 Fife Council's Fleet Operations had 80 full electric vehicles and 19 hybrid vehicles in service with recent changes including a Kia E-Niro which was brought in for Building Services as well as 7 Nissan Leafs which were brought into the Fleet to be used as pool cars replacing existing diesel pool cars.

Fife Council Fleet have been working to improve the emissions/efficiency of Council Refuse Collection Vehicles (RCVs) through the installation/upgrade of FuelSense 2.00 software within the transmissions of the Fleet of RCVs. In October 2024 a change to shifts was introduced which means RCVs are no longer on double shifts so it is hoped this will lead to RCVs lasting longer with fewer repairs being required. Ahead of this shift change, 22 new RCVs were brought in (with 9 replacing older RCVs) with FuelSense 2.00 software included on 9 of the new vehicles (brought in from stock). 19 of the new 22 RCVs also had electric bin lifts fitted which will bring about additional fuel savings due to not requiring a diesel motor to run the hydraulic bin lifts.

Fife Council Fleet were also successful in obtaining additional funding for the installation of another 150kW charger at its main depot in Glenrothes in anticipation of trialling fully electric RCVs and other larger electric vehicles. The installation and commissioning of this charger was completed in March 2024. In January 2025 a Renault RCV was brought in on trial for a week covering the Levenmouth area for the uplift of green bins (household plastics and cans) and it is hoped that additional vehicles can be brought in on trial during 2025.

The extent of the charging infrastruture within Fife is best viewed using the interactive map on the Zapmap website (https://www.zap-map.com/live/). The live map functionality on this site can allow the user to search for the location, type, status and availability of chargers within the Fife Council area and includes ChargePlace Scotland charging sites along with other public chargers run by other operatores such as Osprey, Instavolt etc.

Due to the sheer number of charging sites within Fife, it is not within the scope of the APR to keep track of the actual numbers involved but the extent of coverage of the live map functionality will be a useful indicator to track how the extent of monitoring sites extends over time. Examples of what can be viewed using the live map functionality are shown in Figure 2-6, Figure 2-7 and Figure 2-8 indicating the current position of the charging network within Fife as of March 2024.

Figure 2-6 Extent of charging infrastructure in the north of Fife as of March 2024. The sites include a range of charging speeds operated by a range of providers such as ChargePlace Scotland, Osprey and Instavolt

Figure 2-7 Extent of charging infrastructure in central Fife as of March 2024. The sites include a range of charging speeds operated by a range of providers such as ChargePlace Scotland, Osprey and Instavolt

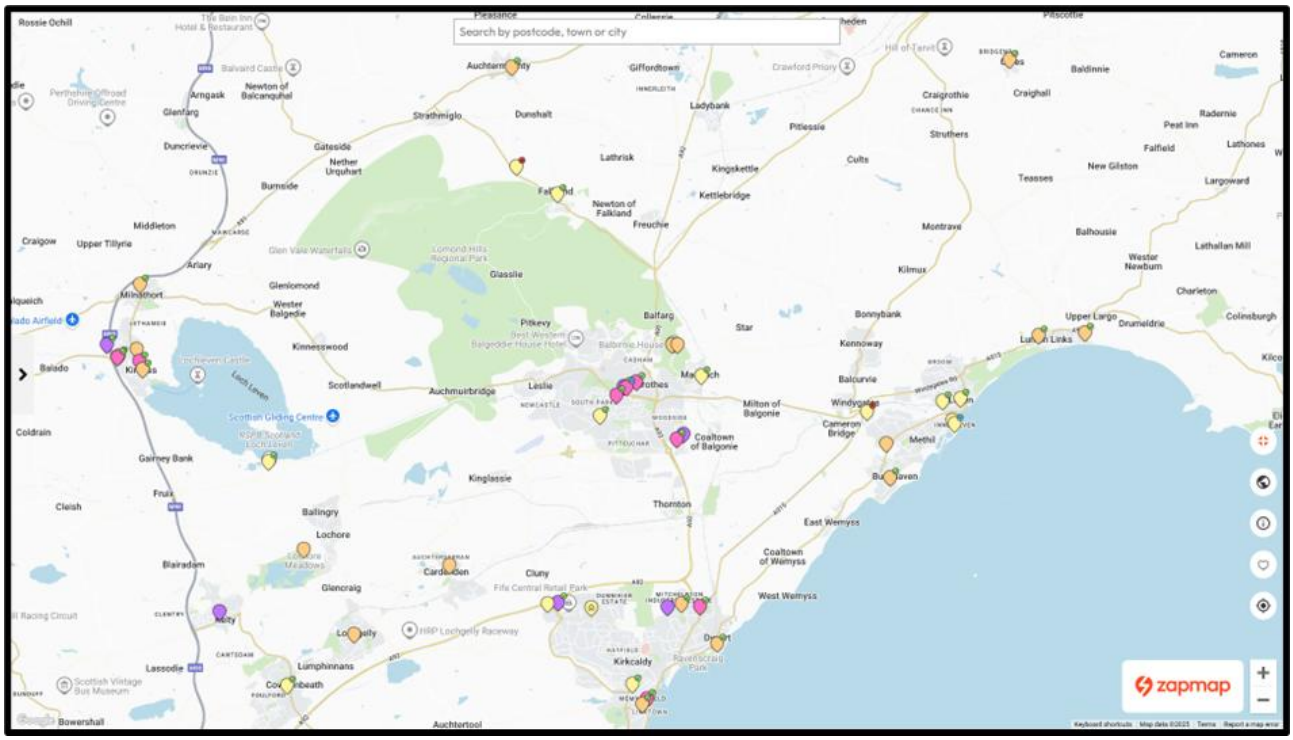
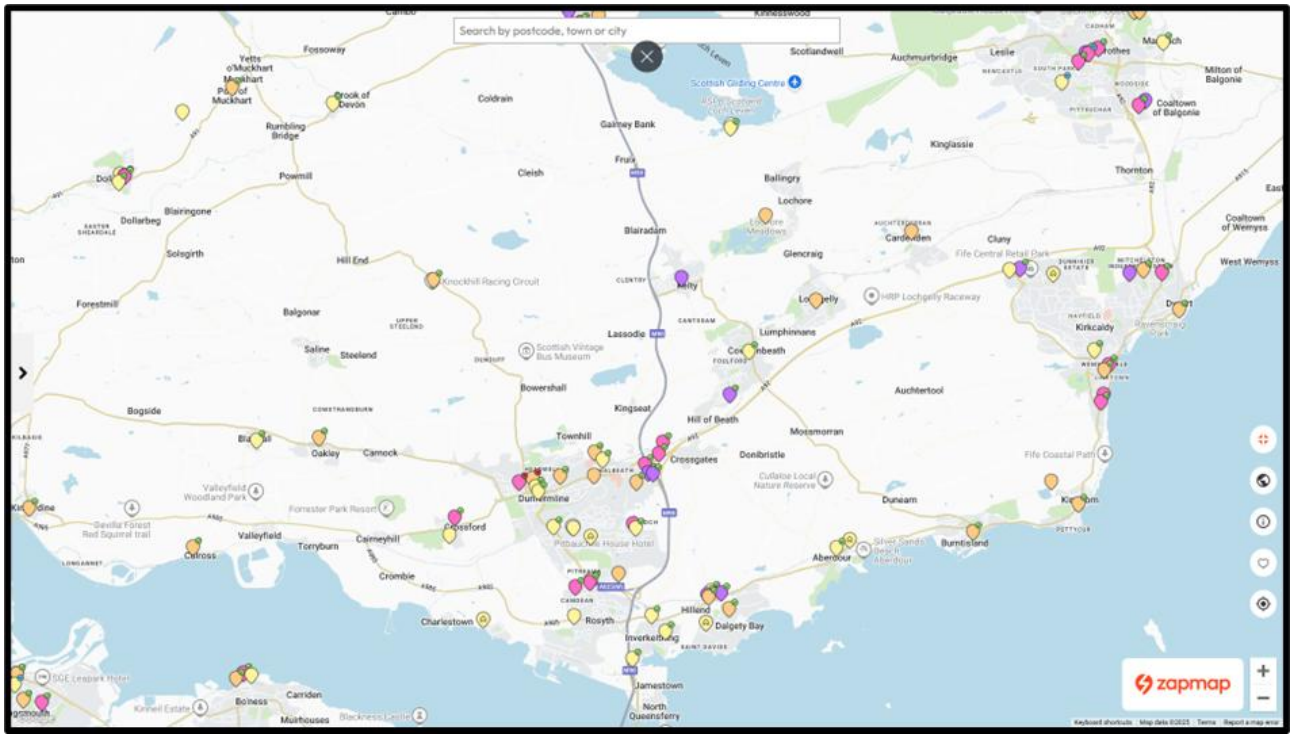


Figure 2-8 Extent of charging infrastructure in the south of Fife as of March 2024. The sites include a range of charging speeds operated by a range of providers such as ChargePlace Scotland, Osprey and Instavolt



Additional chargers were installed in 2024 at various public and Council facilities by Transportation/Chargeplace Scotland. This includes the new Dunfermline Learning Campus where 12 22kW dual socket posts were installed and Wemyssfield, Kirkcaldy where a new 7kW twin charger was installed for staff booking pool cars from Town House, Kirkcaldy.

Correspondence with Transportation Services indicates that it is becoming increasingly difficult to determine the number of public charge point users owing to the number of options now available to access and utilise ChargePlace Scotland chargers so the number of charging sessions will be summarised instead.

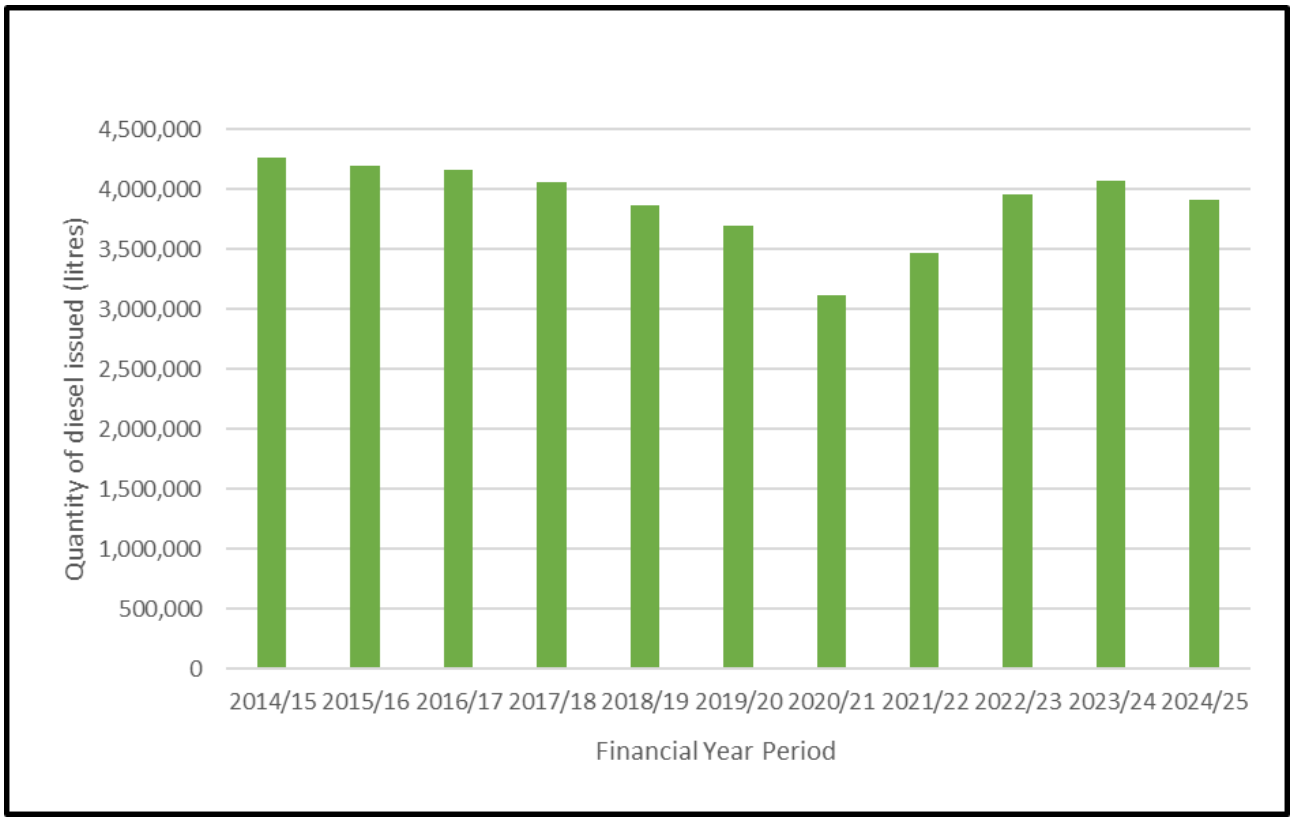
During 2024 a total of 3,029 public charging sessions took place at ChargePlace Scotland charging sites in Cupar using 67,419 kW of electricity in total, up on 2023 when there were 1,919 public charging sessions which used 40,908 kW of electricity. This shows a significant increase in the number of charging sessions and amount of electricity used indicative of an increased uptake in electric/plug in hybrid vehicles.

During 2024 a total of 14,625 public charging sessions took place at ChargePlace Scotland charging sites in Dunfermline using 349,869 kW of electricity in total, down slightly from 2023 when there were 14,699 public charging sessions using 369,258 kW of electricity in total. It is unclear why there has been an overall reduction but the figures are still encouraging in terms of showing a significant number of charging places are taking place.

Associated with the increased uptake of electric and hybrid vehicles within the Council Fleet is an overall reduction in the size of the Council Fleet. Over the last six years, the size of the Council Fleet has reduced from 1,551 vehicles in 2019 to 1,357 vehicles in February 2025. The amount of diesel used by the Council Fleet decreased in 2024/25 to 3,908,852 litres

from 4,075,792 litres in 2023/24 (Figure 2-9) which the Fleet believes is due to the removal of several 32-tonne hooklift vehicles from active service.

Figure 2-9 Quantity of diesel issued by Fife Council



2.4.3 Anti-idling Campaign

Following the "Switch your engine off and show you care about cleaner air!" anti-idling campaign undertaken at various Fife primary schools during 2022/23, the winning posters and banner designs were manufactured and distributed to the winning schools in 2023 in order to raise awareness and change behaviour.

Extra copies of the posters have also been installed in 2024 at other locations where complaints of anti-idling vehicles have been received by Fife Council's Environmental Health team including at key sensitive receptors with such schools and hospitals as shown in Figure 2-10 and Figure 2-11. Additional copies of the posters are likely to be manufactured in 2025 for installation at future idling complaint sites.

Figure 2-10 Winning poster designs on display at Victoria Hospital, Kirkcaldy

Figure 2-11: Winning poster designs on display at Heath High School, Hill of Beath

3. AIR QUALITY MONITORING DATA AND COMPARISON WITH AIR QUALITY OBJECTIVES

3.1 SUMMARY OF MONITORING UNDERTAKEN

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

3.1.1 Automatic Monitoring Sites

Fife Council undertook automatic (continuous) monitoring at four sites during 2024, which measure NO_2, PM_{10}, and $PM_{2.5}$ concentrations. These automatic monitors are located at Cupar, Dunfermline, Kirkcaldy and Rosyth. Table A. 1 in Appendix A shows the details of the sites. National monitoring results are available on the measurement and annual statistics page of the Scottish Air Quality Website.

All PM_{10} analysers were upgraded to FIDAS during 2016 and included monitoring of $PM_{2.5}$, PM_1 and total suspended particles (TSP). However, only PM_{10} and $PM_{2.5}$ are considered within the LAQM assessment and reporting process, and it is only these that are reported within this APR.

The PM equivalence study[2] carried out by the Scottish Government identified that when publishing data that was monitored using the FIDAS 200 technique, correction factors for PM_{10} (divide by 0.909) and $PM_{2.5}$ (multiply by 1.06) should be applied. The Scottish Government guidance[3] states that these corrections should be applied when reporting data within the LAQM reporting regime.

Maps showing the location of the monitoring sites are provided in Figure 3-1 to Figure 3-4. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

Short-period CO monitoring has not been undertaken by Fife Council's Transportation Department during 2024.

Concentrations of 1,3 butadiene, benzene, nitrogen dioxide and sulphur dioxide measured independently in 2024 have been summarised in the INEOS Grangemouth Oil Refinery Annual Community Air Quality Monitoring Report[4].

3.1.2 Non-Automatic Monitoring Sites

Fife Council undertook non-automatic (passive) monitoring of NO_2 at 49 sites during 2024 using 57 diffusion tubes in total. Of these, four sites are triplicate sites being co-located with the automatic analysers at Cupar, Dunfermline, Kirkcaldy and Rosyth. There were five new sites added (selected Fife Council Primary Schools), these were: Park Road, Rosyth; 23 Main Street, Lumphinnans; Aberdour Road, Dunfermline; Nightingale Place, Dunfermline and Pittsburgh Road, Dunfermline. Table A. 2 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Figure 3-1 to Figure 3-8. These focus on the main monitoring areas of Cupar, Dunfermline, Kirkcaldy, Rosyth and St

[2] https://www.scottishairquality.scot/technical-reports/equivalence-study-investigate-particulate-matter-monitoring-scotland-using-fidas
[3] https://www.scottishairquality.scot/technical-reports/local-authority-guidance-note-laqm-reporting-scottish-pm-data
[4] Community Air Quality Monitoring Report, Ambient Atmospheric Survey in the vicinity of Grangemouth – 2024, INEOS April 2025

Andrews but also show the new monitoring locations mentioned above. All monitoring sites can be seen on the NO_2 Diffusion Tube Network Map. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

Figure 3-1 Location of automatic monitor and NO_2 diffusion tubes – Bonnygate, Cupar

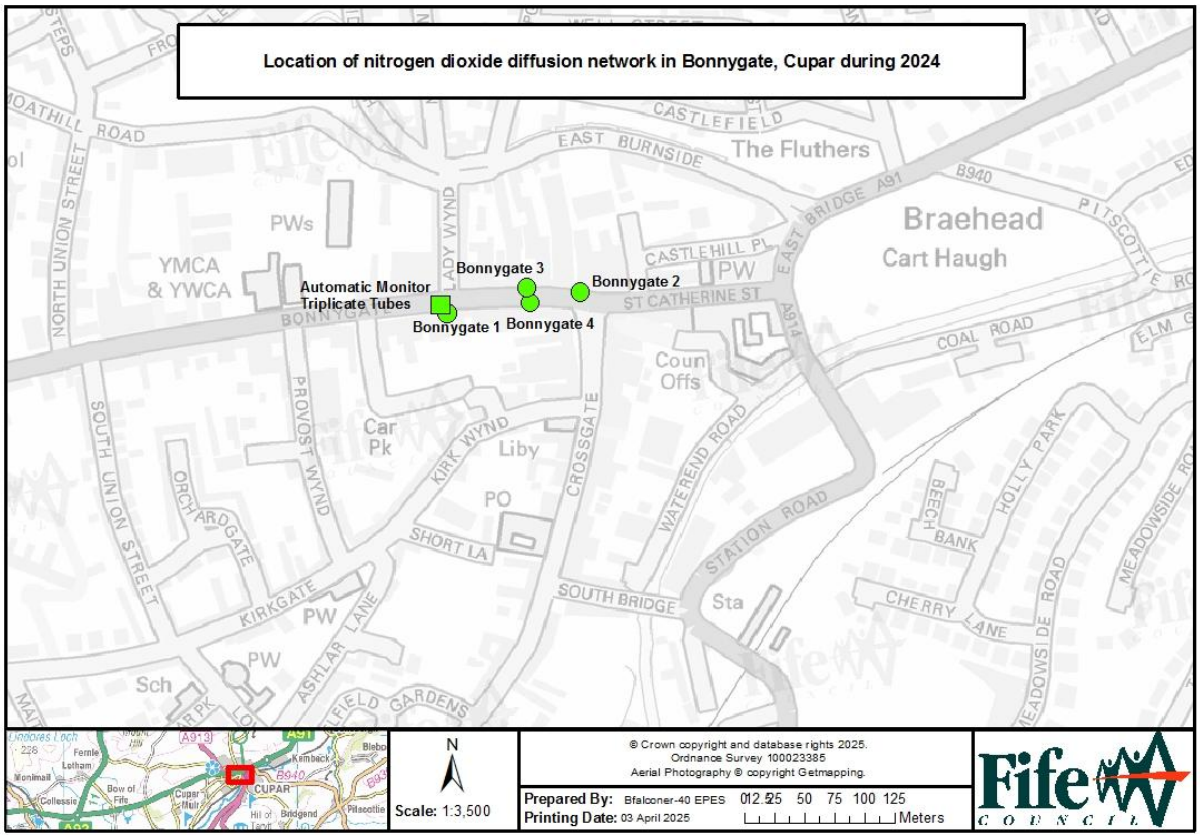


Figure 3-2 Location of automatic monitor and NO_2 diffusion tubes – Appin Crescent, Dunfermline

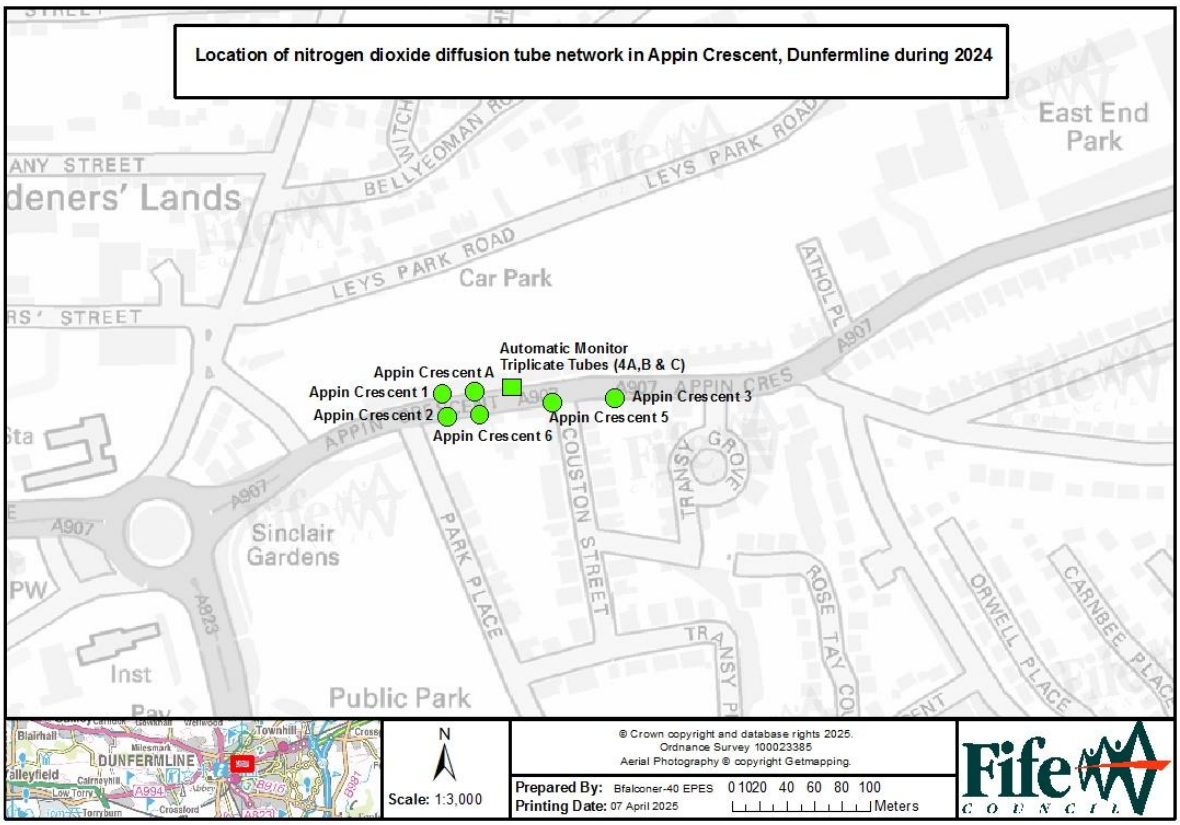


Figure 3-3 Location of automatic monitor and NO_2 diffusion tubes – St Clair Street, Kirkcaldy

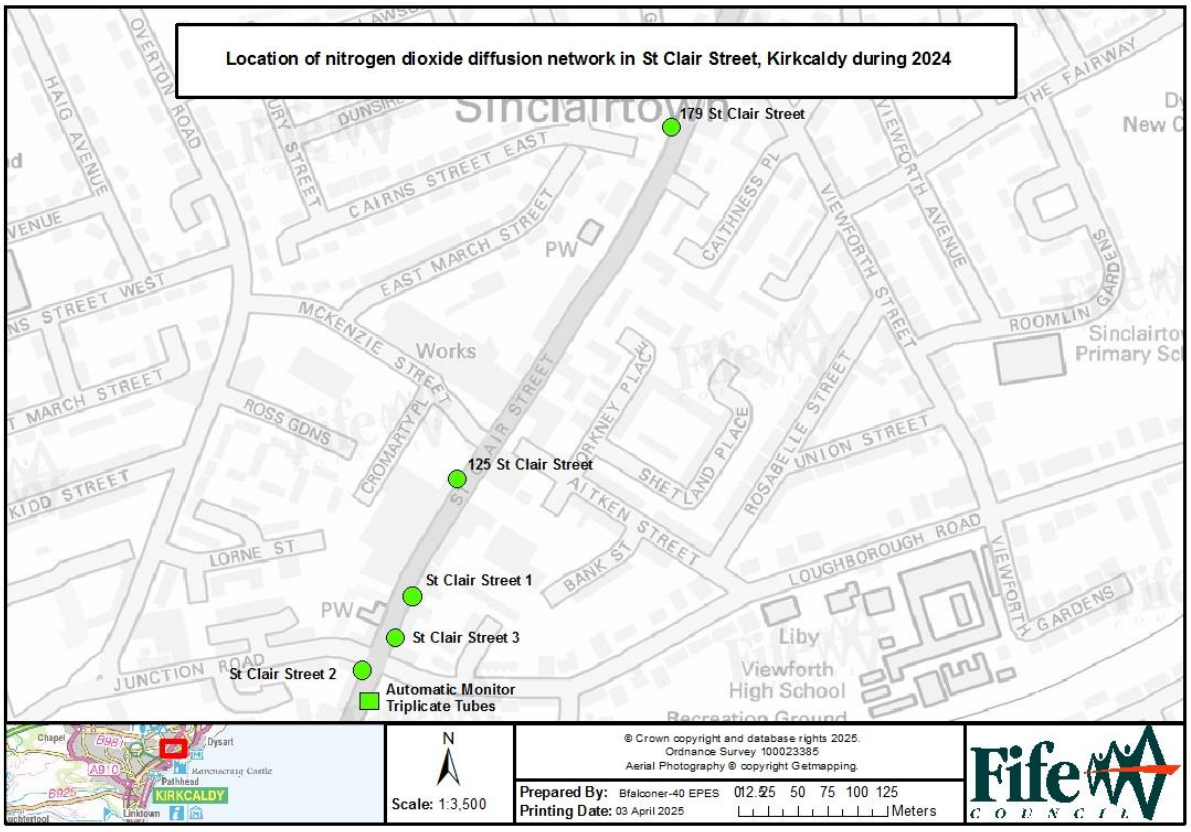


Figure 3-4 Location of automatic monitor and NO_2 diffusion tubes – Admiralty Road, Rosyth

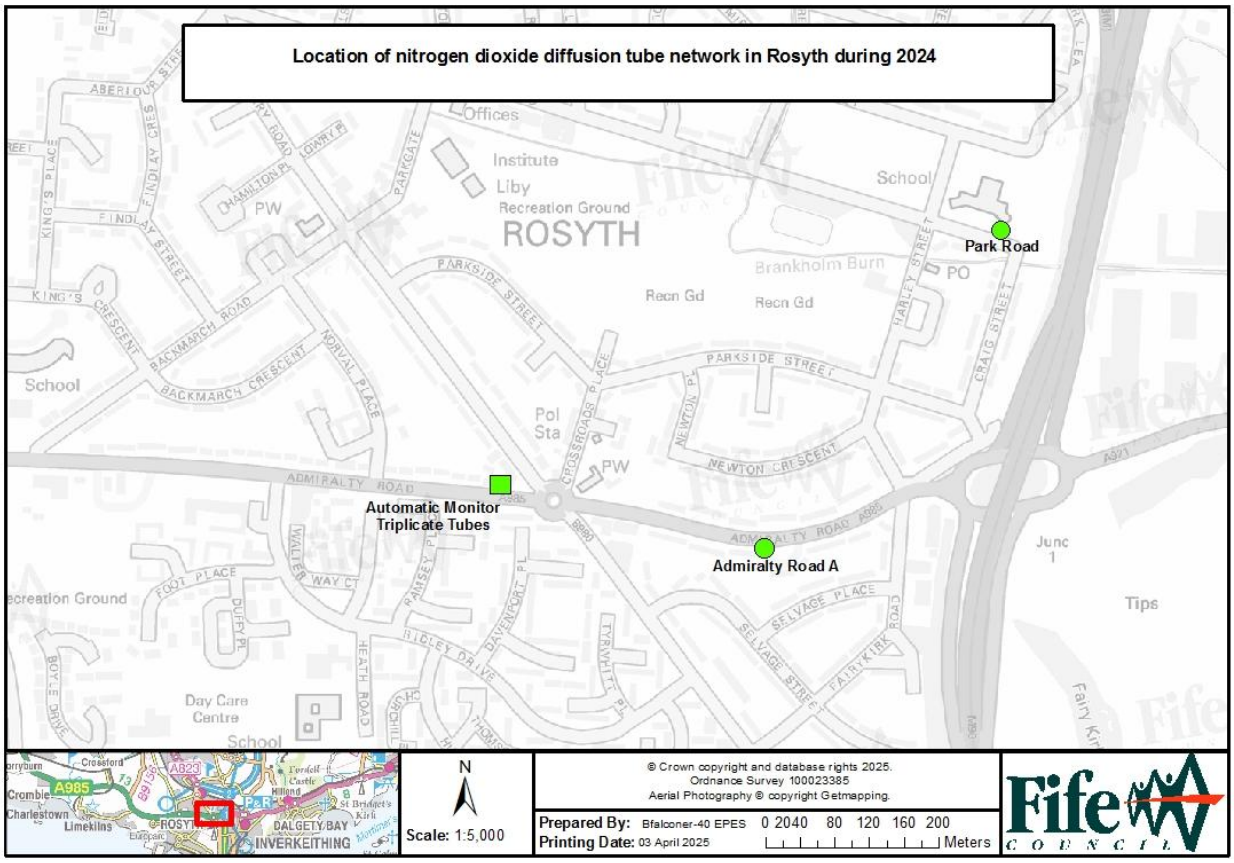


Figure 3-5 Location of NO_2 diffusion tubes – St Andrews

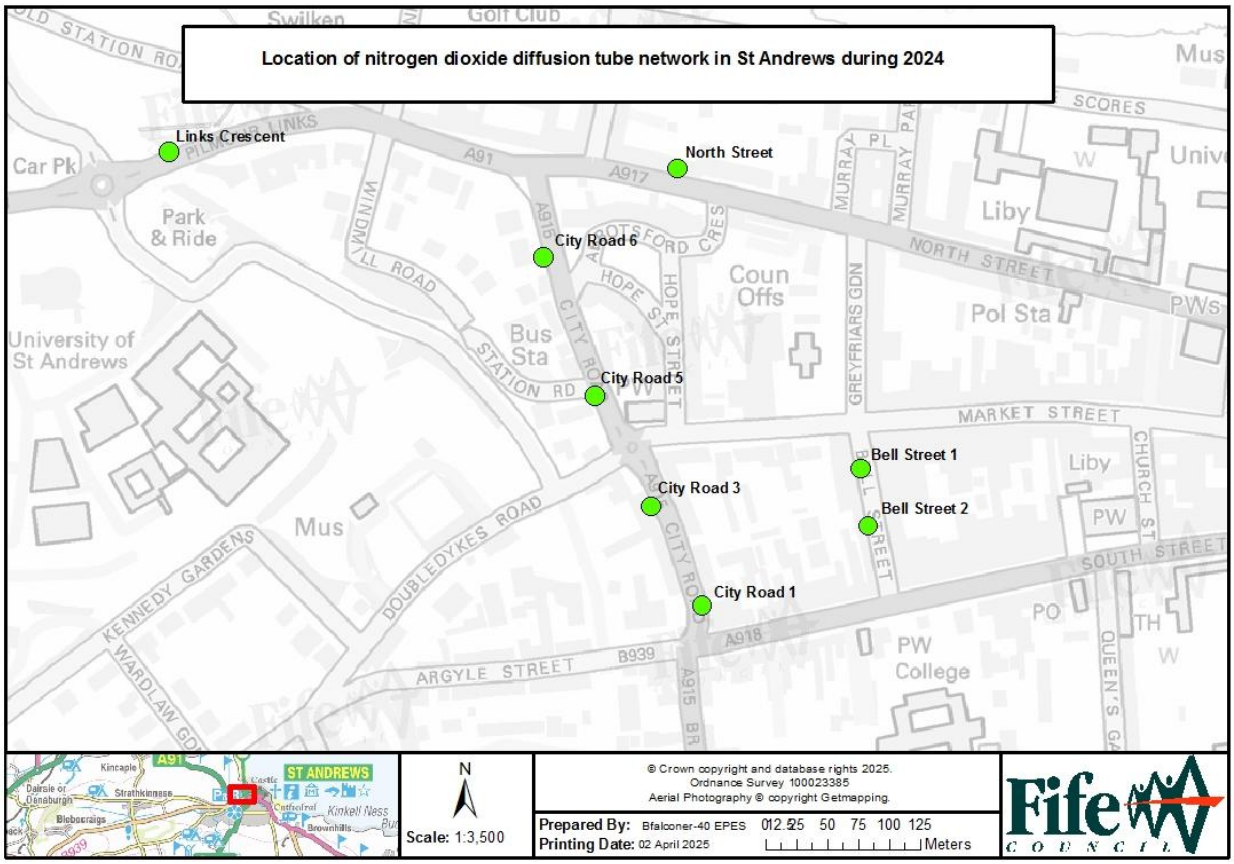


Figure 3-6 Location of NO_2 diffusion tubes – Nightingale Place and Aberdour Road, Dunfermline

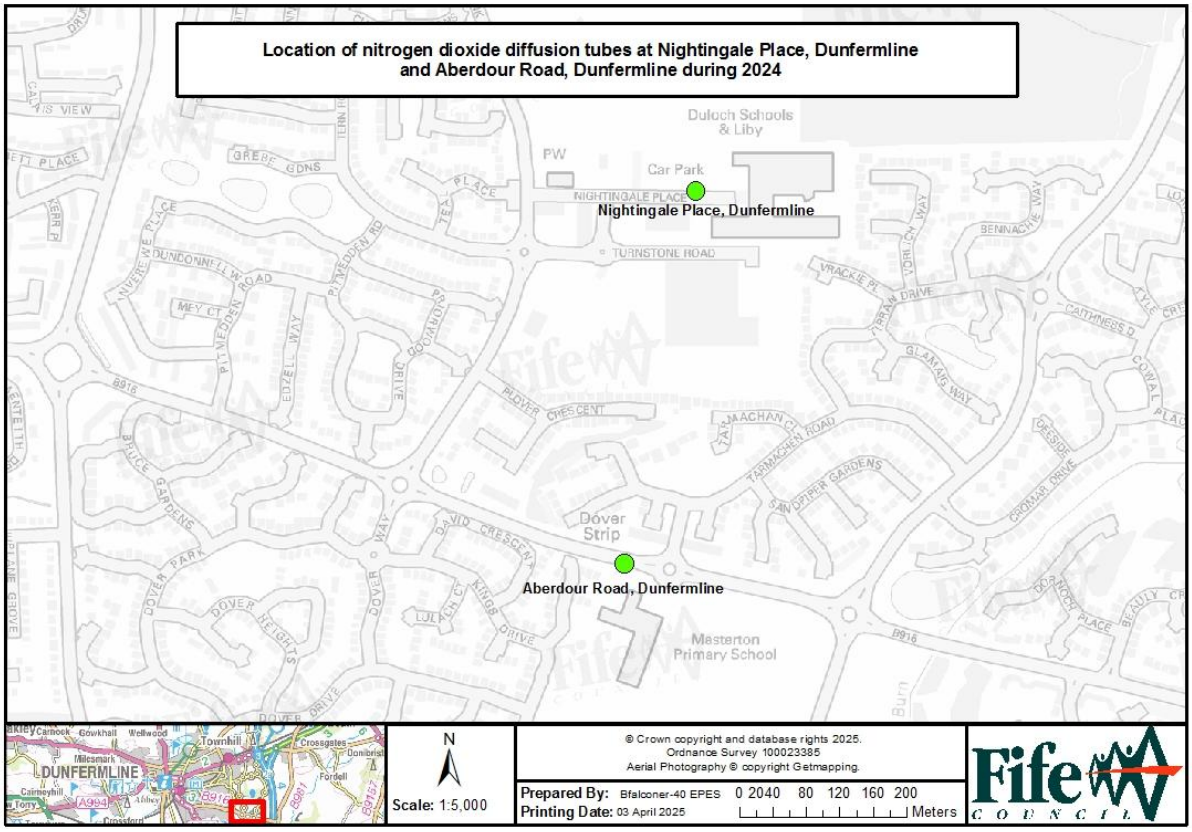


Figure 3-7 Location of NO_2 diffusion tube – Lumphinnans

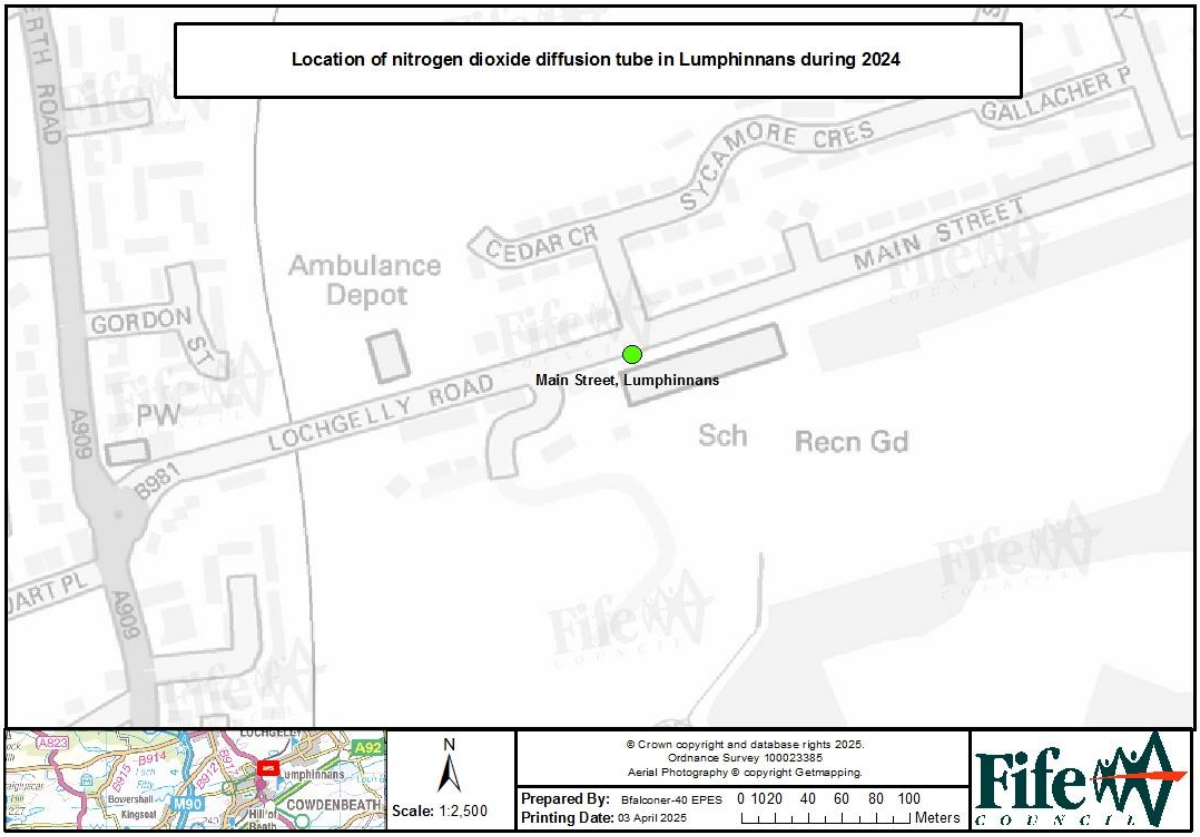
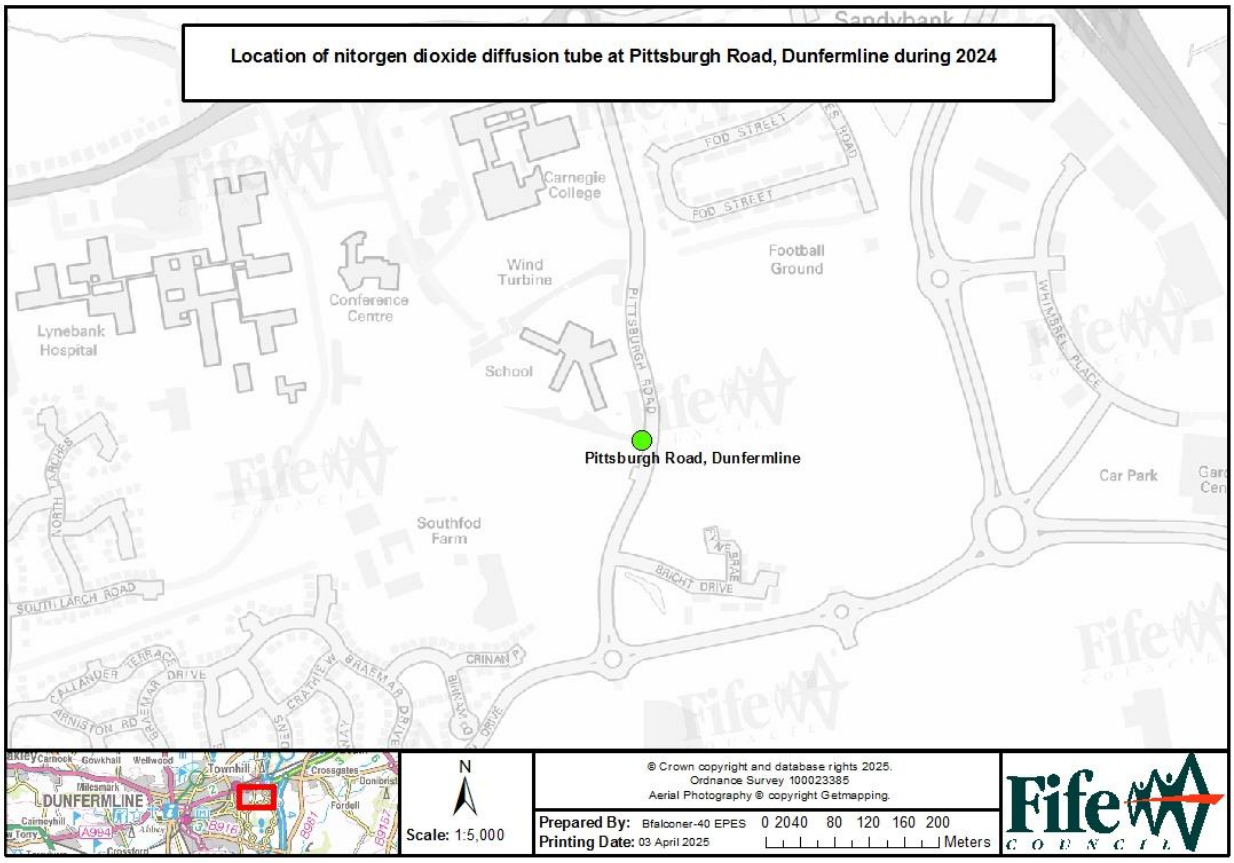


Figure 3-8 Location of NO_2 diffusion tube – Pittsburgh Road, Dunfermline



3.1.3 Other Monitoring Activities

Fife Council undertook AQMesh sensor monitoring of NO_2, PM_{10} and $PM_{2.5}$ at 10 sites during 2024. The monitoring results from the Fife AQMesh network are provided in a separate report[5] which can be obtained from Fife Councils Land and Air Quality team. This APR will provide a summary of the main findings from this report in Section 3.2 under the relevant pollutants of concern.

Five new monitoring sites (selected Fife Council Primary Schools) were added in 2024. They were

- Dunfermline Road, Crossgates (started 29th July 2024)
- Main Street, Lumphinnans (started 29th July 2024)
- Aberdour Road, Dunfermline (started 14th February 2024)
- Baldridgeburn, Dunfermline (started 14th November 2024)
- Harley Street, Rosyth (started 14th November 2024)

In January 2024 the AQMesh unit at Appin Crescent East, Dunfermline was removed due to vandalism and relocated at Aberdour Road, Dunfermline once repairs were completed. The four other monitoring sites mentioned above had new AQMesh units installed.

The locations of the sensors are illustrated in Figure 3-9 to Figure 3-17.

[5] Fife Council AQMesh Monitoring Data Management and Processing 2024, June 2025

Figure 3-9 Location of AQMesh pods – Bonnygate, Cupar

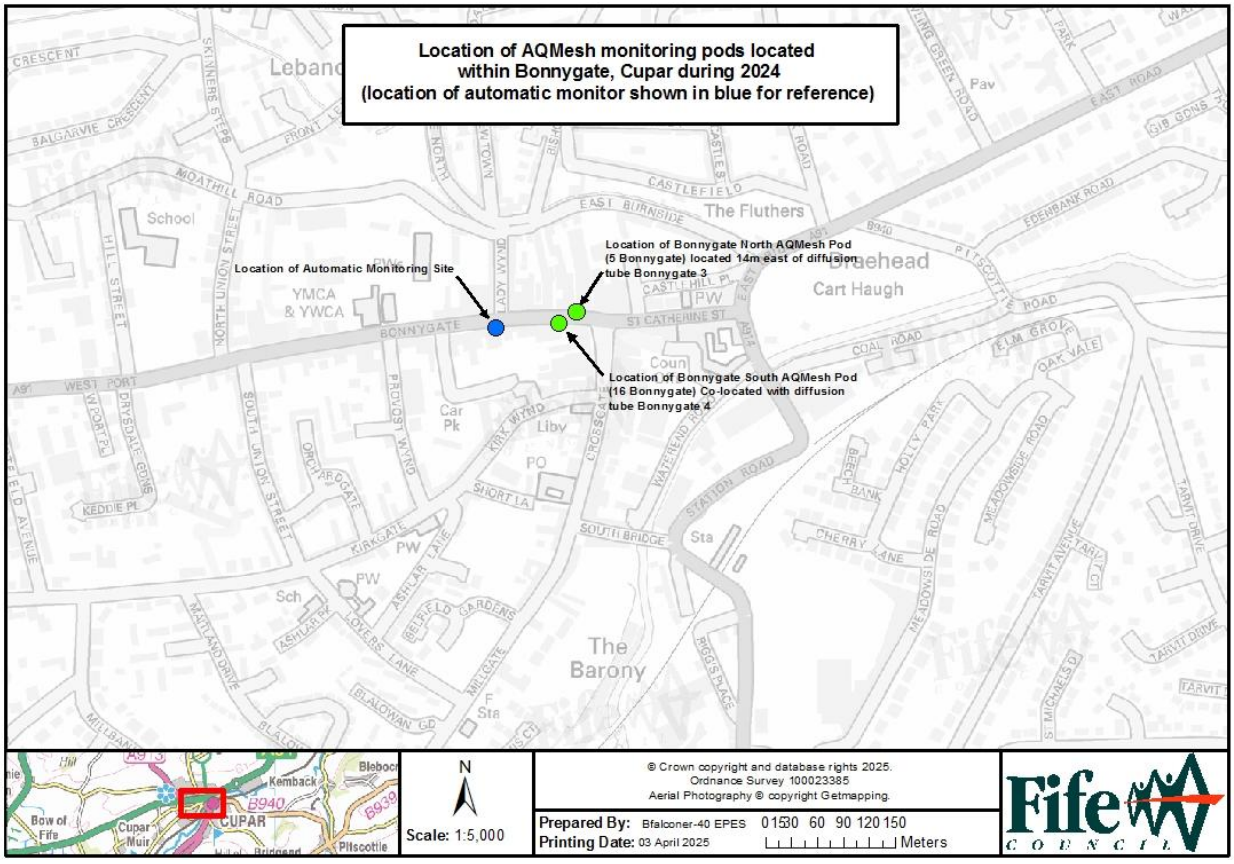


Figure 3-10 Location of AQMesh pod - Appin Crescent, Dunfermline

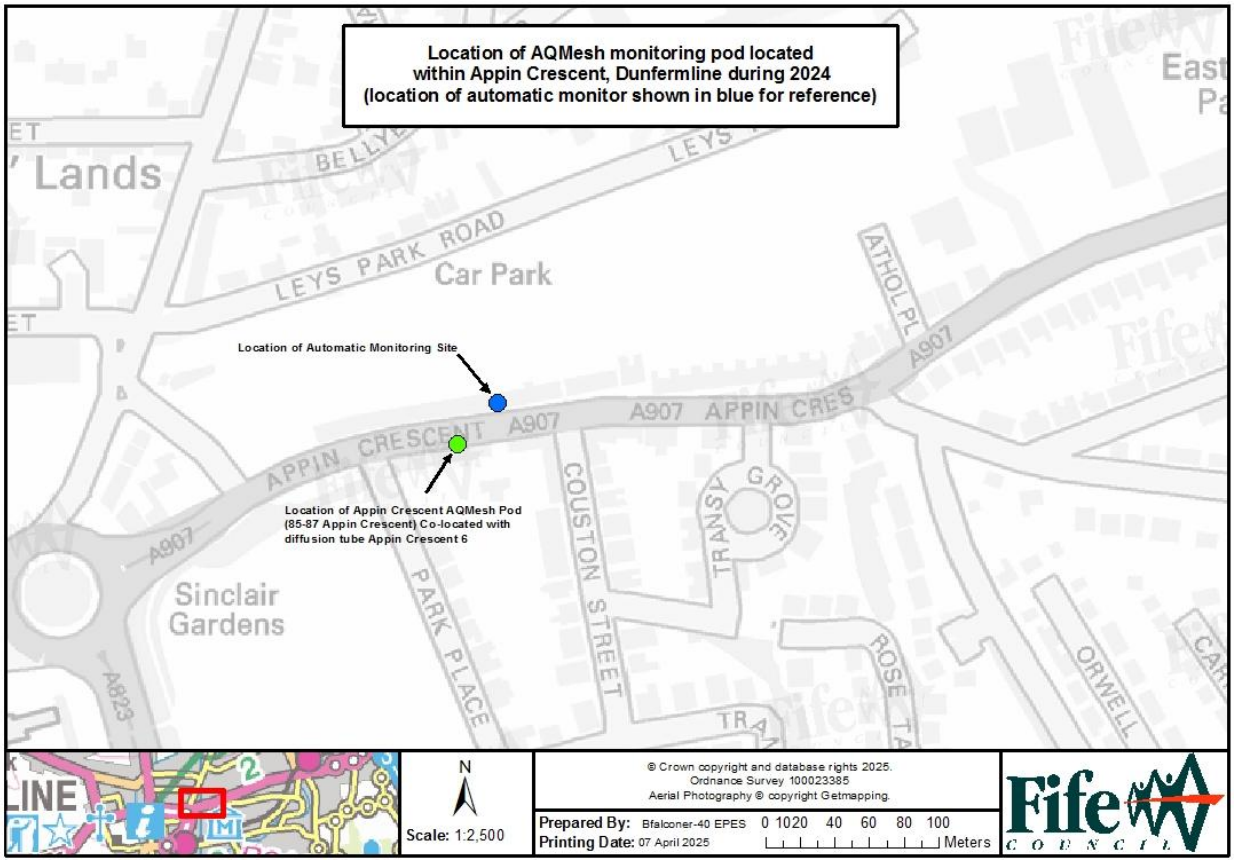


Figure 3-11 Location of AQMesh pod – Kirkcaldy

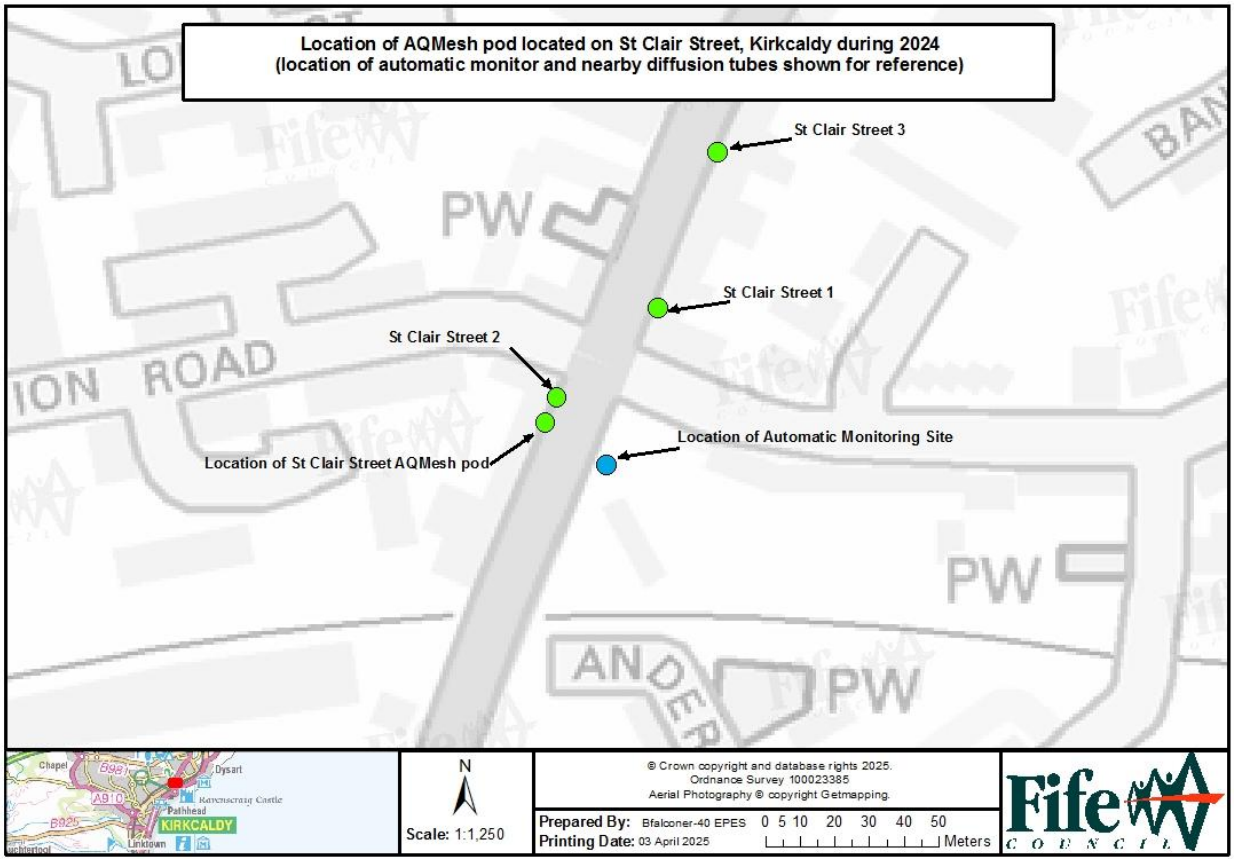


Figure 3-12 Location of AQMesh pod – Rosyth

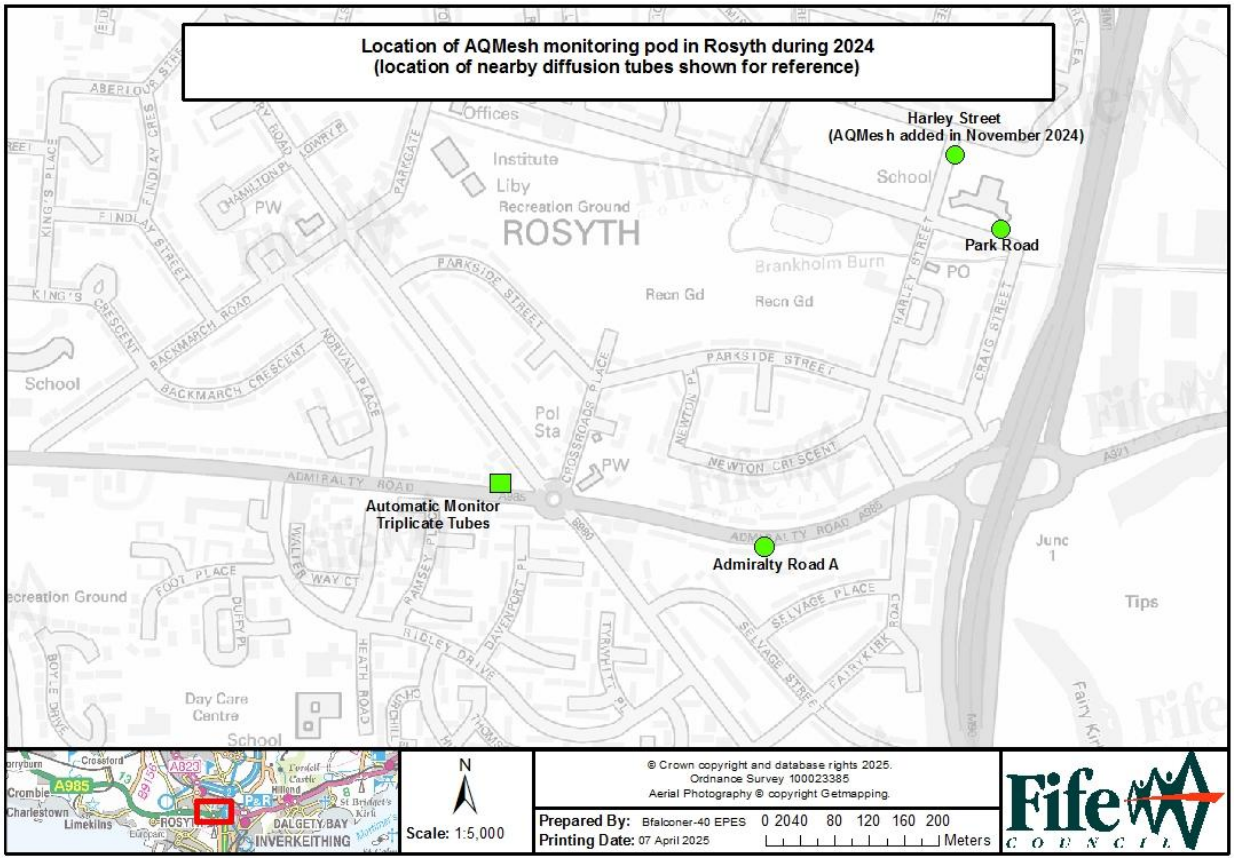


Figure 3-13 Location of AQMesh pod – St Andrews

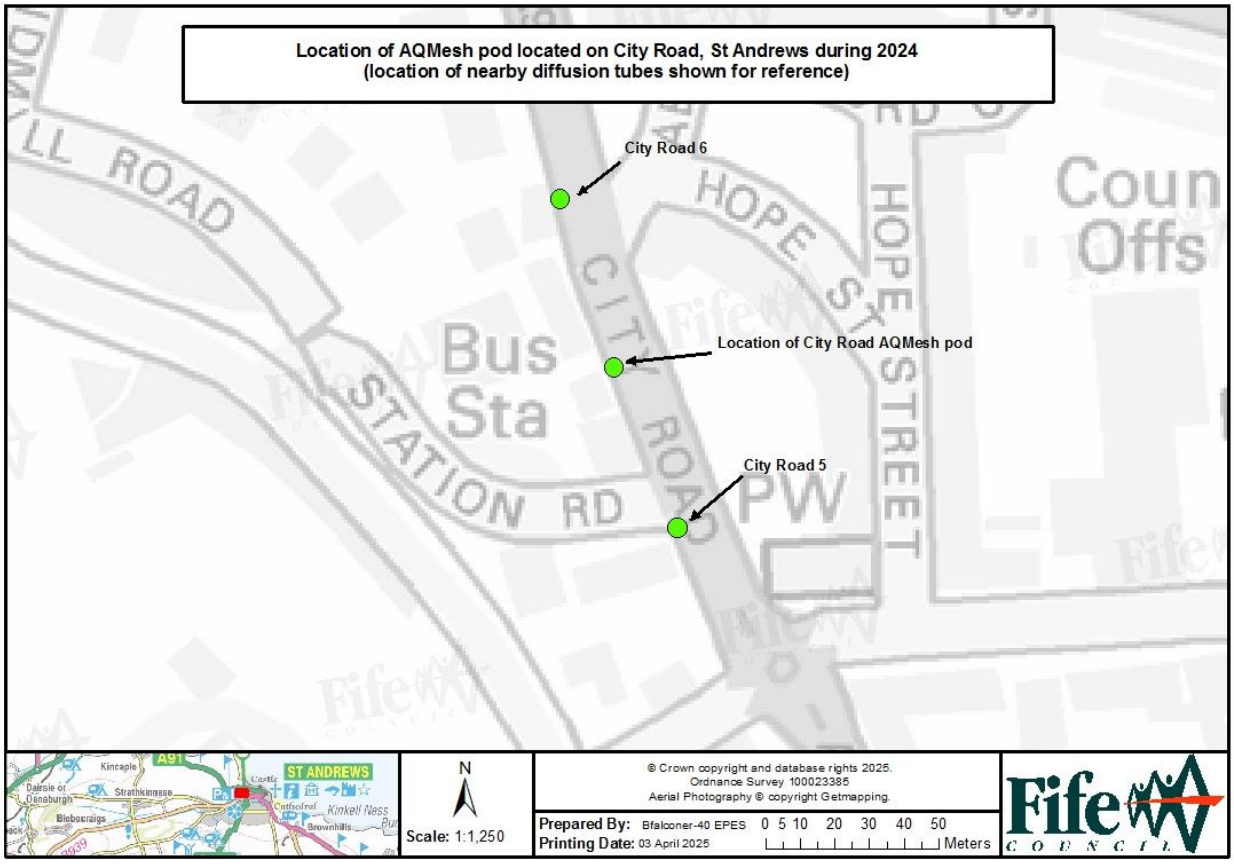


Figure 3-14 Location of AQMesh pod – Aberdour Road, Dunfermline

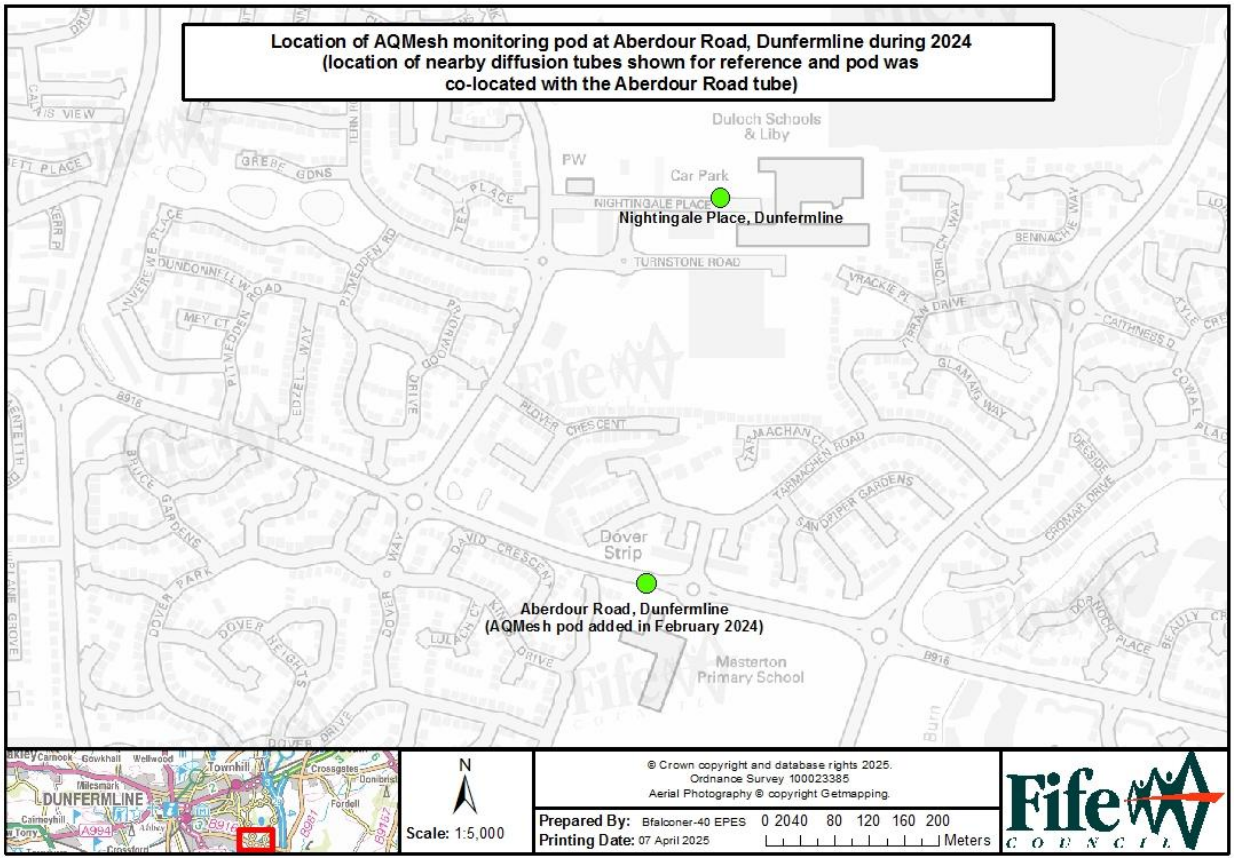


Figure 3-15 Location of AQMesh pod – Lumphinnans

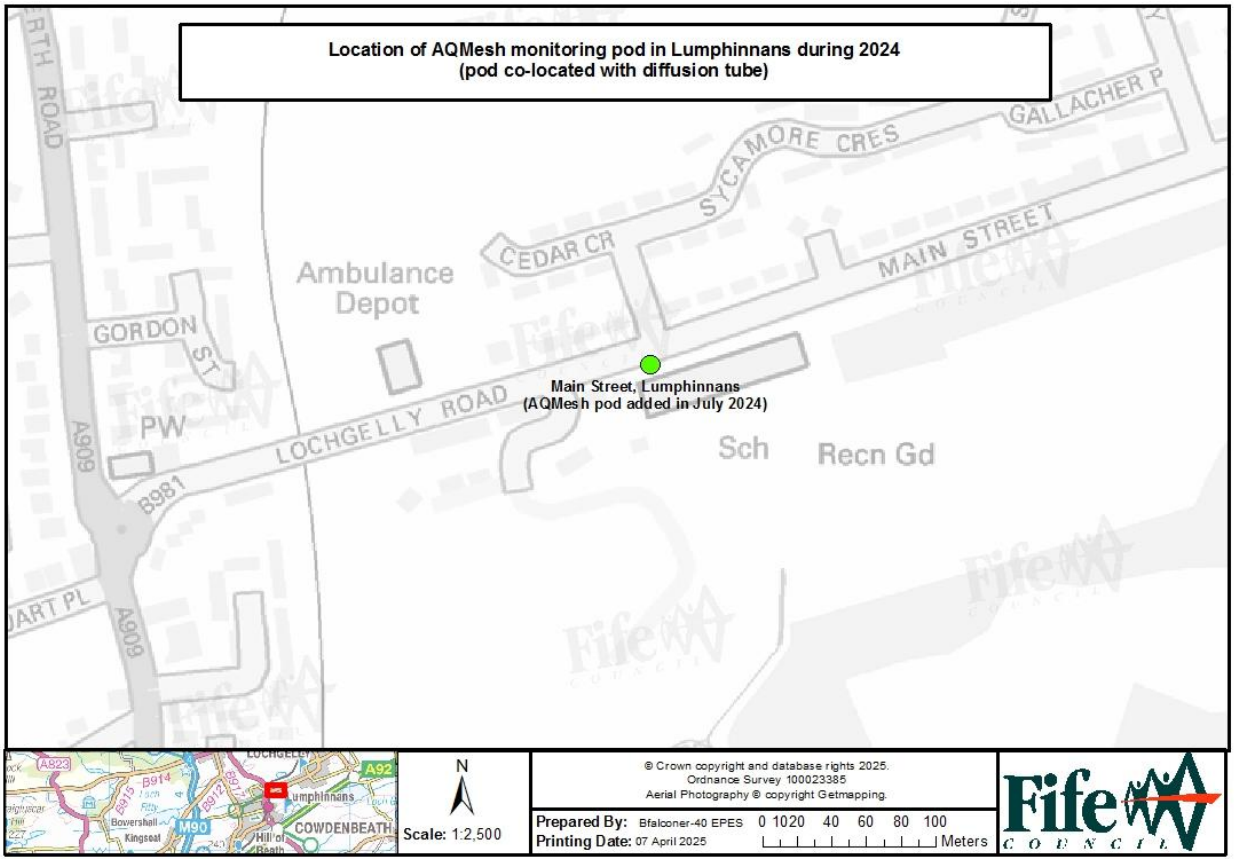


Figure 3-16 Location of AQMesh pod – Crossgates

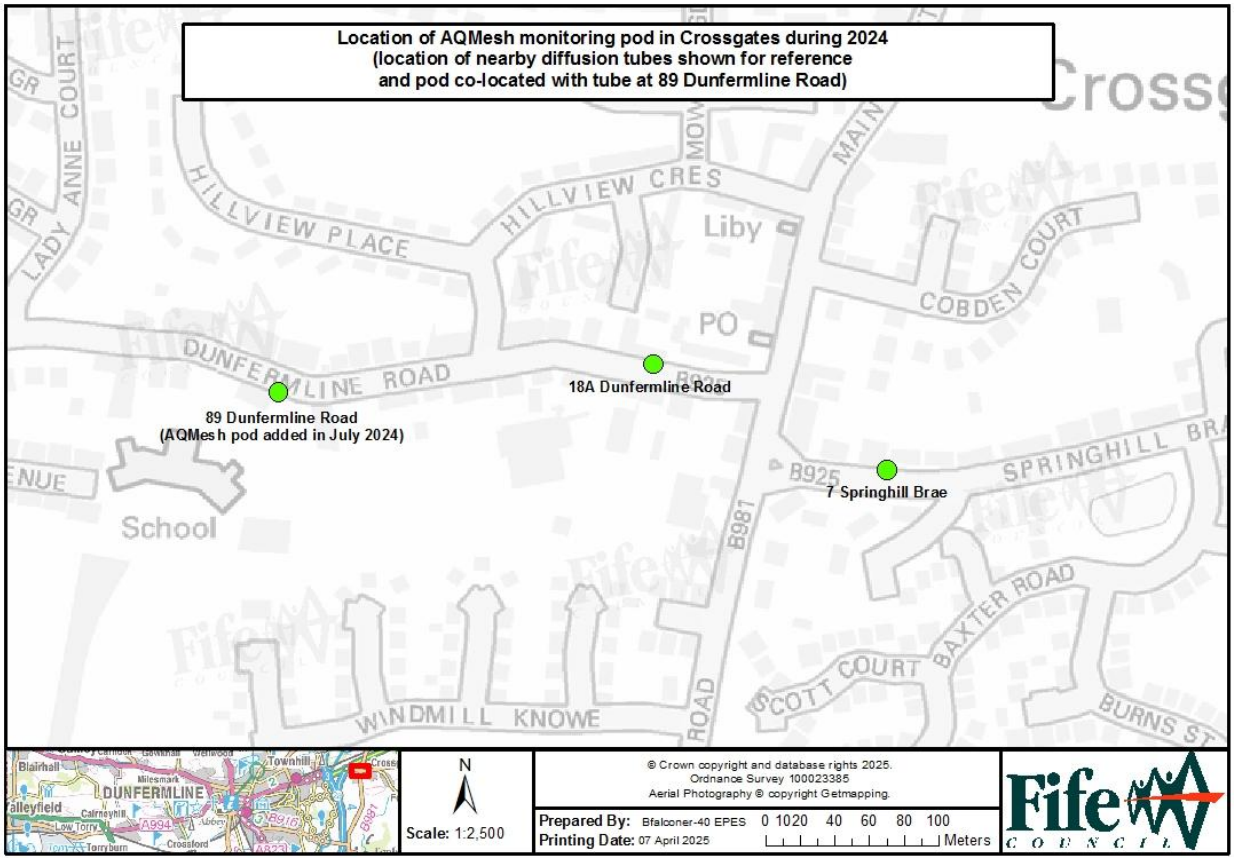
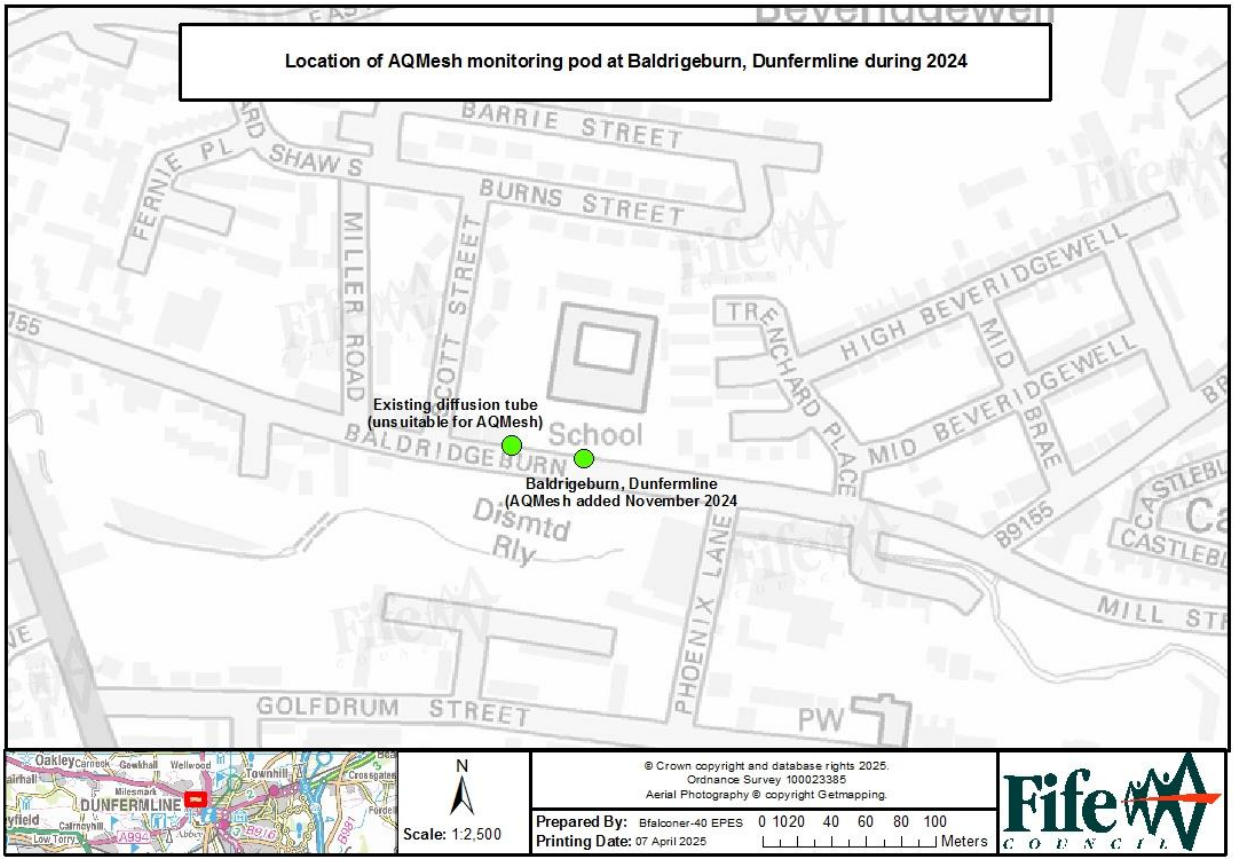


Figure 3-17 Location of AQMesh pod – Baldridgeburn, Dunfermline



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.

A dynamic style report containing embedded statistical data for Fife can be found here: https://www.scottishairquality.scot/assets/reports/372/Fife_annual_2024.html. The key areas have been extracted and included below however further details can be found online. The embedded data allows the reader to interact with some of the report findings, providing additional insight. This approach enables a more easily navigated and streamlined report providing an engaging and intuitive reader experience. The analysis has been carried out for the pollutants NO_2, PM_{10} and $PM_{2.5}$ using the Openair analysis tool. Further figures are provided in Appendix E. This type of analysis helps the Council inform future policy making.

Openair is an innovative tool to analyse, interpret and understand air pollution data using "R". R is a free and open-source programming language designed for the analysis of data. The Openair tool can perform complex and innovative analysis of current and archived air pollutant data allowing powerful data visualisation and interrogation. For this report, Fife Council has utilised the following analysis tools:

- **Time variation** – This tool produces four separate panes combined into a single plot: The plotted output shows the average variation by day of the week and hour of the day combined (the top-most pane), hour of the day (diurnal variation, shown in the lower left pane), month of the year (seasonal variation in the lower middle pane) and day of week (lower right pane) of one or more variables or at one or multiple sites over a user selected time range. The plots have been created for all four automatic monitoring sites in Fife for the period 1st January – 31st December 2024. The variation of a pollutant by time of day and day of the week can reveal useful information concerning the likely sources at a particular site.
- **Polar Plots** – This tool produces polar plots of pollutant concentrations by wind speed and wind direction. Polar plots are useful to gain a quick graphical representation of the relationship between pollutant concentrations and meteorological conditions. This can be useful in identifying potential sources of pollution affecting the location, for example, particle suspension is increased as higher wind speeds come from a specific direction.
- **Calendar Plots** – This tool provides a way of visualising trends in daily pollutant concentrations across a year in the familiar form of a calendar. Concentrations are represented with a colour scale and the meteorological conditions can be represented using arrows giving the vector averaged wind direction, scaled according to the wind speed based on modelled wind speed and direction from data from the UK air quality forecast. In this way, pollution episodes can be identified by date and sources potentially indicated by the combination of pollutant and meteorological conditions.
- **Back trajectory Analysis Plots –** The back trajectory plots show data from the HYSPLIT model (NOAA HYSPLIT[6]) run in the analysis mode. This shows the air mass back trajectories for the period covered by this report. Two different kinds of plots are shown. One statistically groups the trajectories into similar clusters and shows the proportion of time during the reporting period that each represents. This

[6] https://www.arl.noaa.gov/hysplit/hysplit

is useful to get an overview of air mass origins during the reporting period. Plots in Trajectories associated with the top 10 most polluted days provide information on the trajectory direction associated with the top 10 measured concentrations.

3.2.1 Nitrogen Dioxide (NO_2)

3.2.1.1 Automatic Monitoring Data

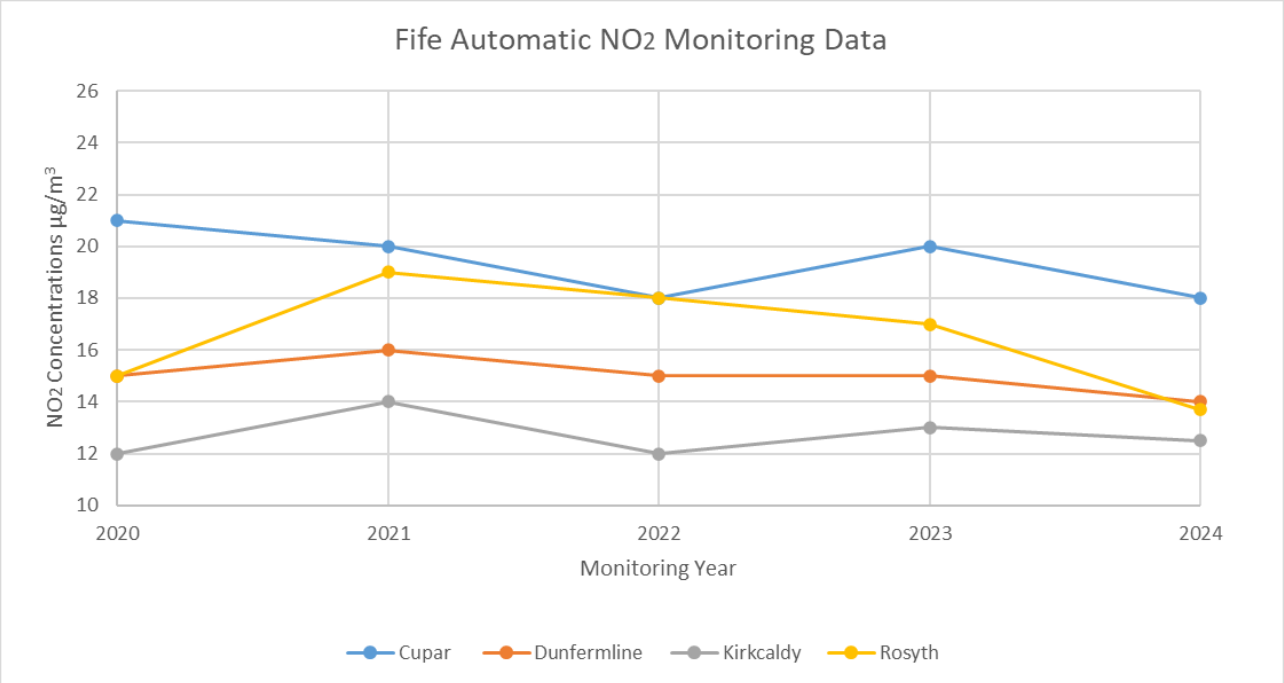
Table A. 4 in Appendix A compares the ratified monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40 µg m^{-3} at automatic monitoring sites.

Table A. 5 in Appendix A compares the ratified continuously monitored NO_2 hourly mean concentrations for the past five years with the air quality objective of 200 µg m^{-3}, not to be exceeded more than 18 times per year.

All four automatic monitoring sites did not record any exceedances of the AQS NO_2 annual or 1-hour mean objectives during 2024 and have been consistently well below the objectives for the past five years.

Figure 3-18 provides the monitoring results for 2024 and the previous four years. Its shows that all sites concentrations have been consistently low, within a couple of µg m^{-3}, for the last 5 years. There have been slight decreases for all sites apart from Kirkcaldy, however nothing significant.

Figure 3-18 Fife automatic monitoring sites NO_2 annual mean concentrations (µg m^{-3})



3.2.1.2 Automatic Sites NO_2 Trends Analysis 2024

Figure 3-19 compares the time variation plots for NO_2 in 2024 at each of the automatic sites; Cupar, Dunfermline, Kirkcaldy and Rosyth. All four sites have similar time variations on data throughout the year, with Cupar generally being the highest and Kirkcaldy the lowest. However, it should be noted that Cupar is located at kerbside (less than 0.5 metres from the kerb) rather than roadside (between 0.5 and 5 metres from the kerb) like the three other sites. This proximity to the source will contribute to the higher concentrations as NO_2 drops

off significantly the further you are from the source. The highest concentrations are measured between Monday to Friday with rush hour periods (approximately 8am and 5pm) showing the highest concentrations. This indicates traffic is the main source of NO_2 for all sites. Concentrations at all four sites significantly drop at the weekend. Cupar is significantly higher than the other three sites. There is a strong seasonal variation at all sites with winter months seeing significantly higher concentrations than in summer months. This is likely due to a decrease in traffic during summer months and winter conditions providing poorer pollution dispersion conditions.

Figure 3-19 NO_2 Time Variation for Fife Automatic sites

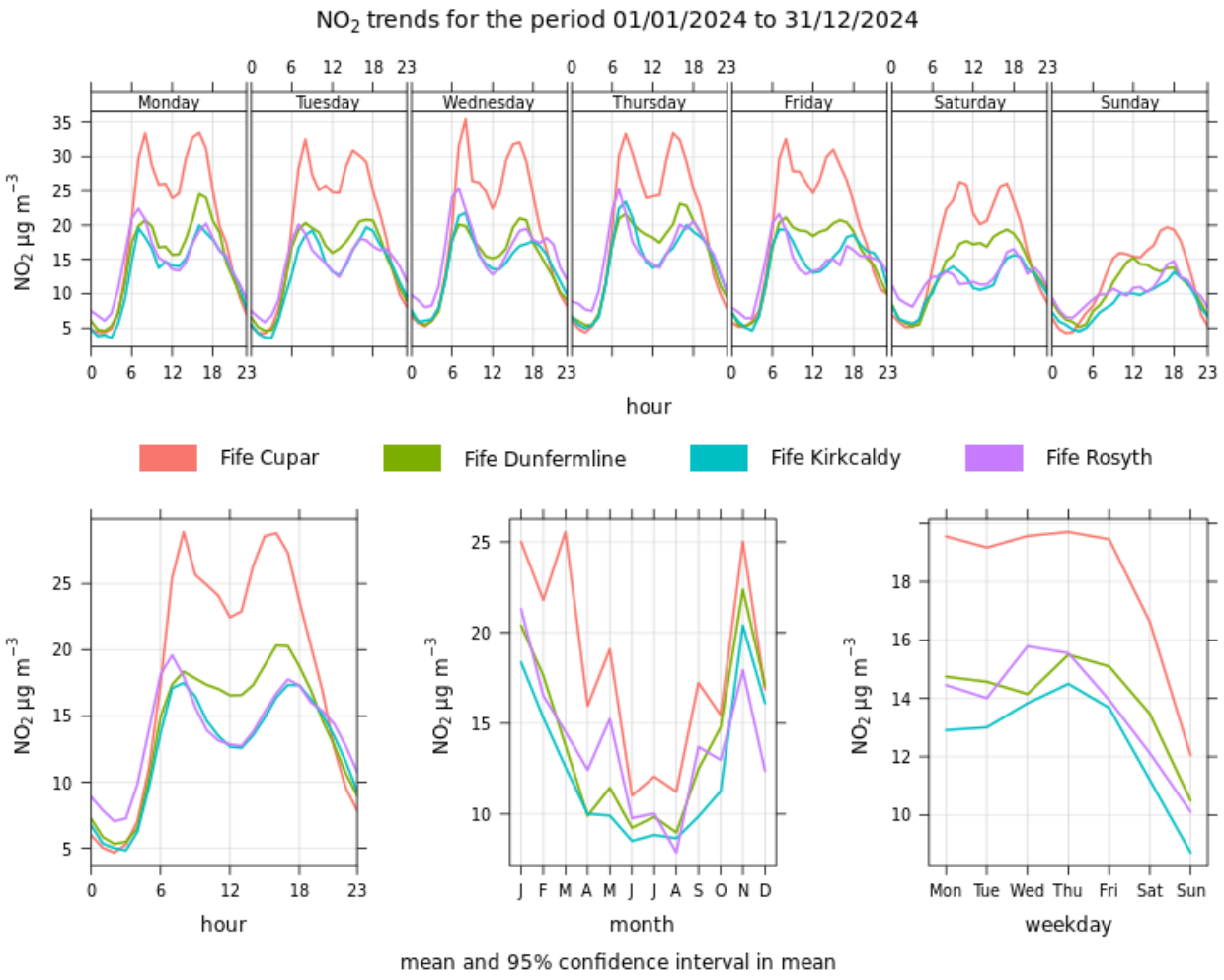


Figure E. 1 to Figure E. 4 in Appendix E show the NO_2 time series plots for each monitoring site independently.

Figure E. 13 to Figure E. 16 show NO_2 calendar plots for each of the monitoring stations across Fife. Calendar plots provide an easily identifiable illustration of what days had the highest concentrations. For 2024 these plots show that higher concentrations were from November, to February. This is similar to 2023 when it was November, December and January that the concentrations were higher.

Figure E. 25 to Figure E. 28 show NO_2 polar plots at each of the monitoring stations. This report will focus on the polar plots analysis for the now revoked AQMAs at Cupar (left) and Dunfermline (right) shown in Figure 3-20. Both plots indicate a broadly east-west signal which is consistent with parallel winds through the street canyon. It also shows that

concentrations are highest when wind speeds are generally low. For Cupar, the plot indicates that concentrations were highest in 2024 when the wind was from the south east. Whereas for Dunfermline the concentrations were highest when wind speed was low and coming from the west.

Figure 3-20 Polar plots of NO_2 concentrations by wind speed and direction

3.2.1.3 Diffusion Tube Monitoring Data

Table A. 4 in Appendix A compares the bias adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40 µg m^{-3}.

For diffusion tubes, the full 2024 dataset of monthly mean values is provided in Appendix B.

The diffusion tube data has been bias corrected using the average local bias adjustment factor. The following local bias adjustments were calculated for this report using the latest version of the "Diffusion Tube Data Processing Tool (v5.3)" – further details are provided in Appendix C:

- Cupar = 0.79
- Dunfermline = 0.74
- Kirkcaldy = 0.69
- Rosyth = 0.73
- Average of Local = 0.74

The average local bias adjustment factor was applied to all diffusion tubes for consistency.

Details of the diffusion tube bias adjustment are found within Appendix C of this report. Diffusion tube results from 2020 to 2024 are presented in Appendix A, Table A. 3. Diffusion tube trend graphs are provided for the different areas of interest within Fife, these are presented in Figure A. 1 to Figure A. 7.

The 2024 diffusion tube results indicate that there were no exceedances of the annual mean objective at any monitoring locations, including locations within Dunfermline and Cupar which have exceeded in previous years. The highest annual mean concentration measured in Appin Crescent, Dunfermline during 2024 was 24 µg m^{-3} at Appin Crescent 6A. The highest annual mean measured at Bonnygate, Cupar during 2024 was 22 µg m^{-3} at Bonnygate B4.

3.2.1.4 AQMesh Sensor Monitoring – NO_2

Table A. 6 in Appendix A provides a summary of monitoring results from AQMesh sensor monitoring network. Monitoring indicated that no site exceeded either the annual or hourly air quality objective. For more analysis of this data go to AQMesh data report[5] which can be obtained from Fife Councils Land and Air Quality team.

3.2.2 Particulate Matter (PM_{10})

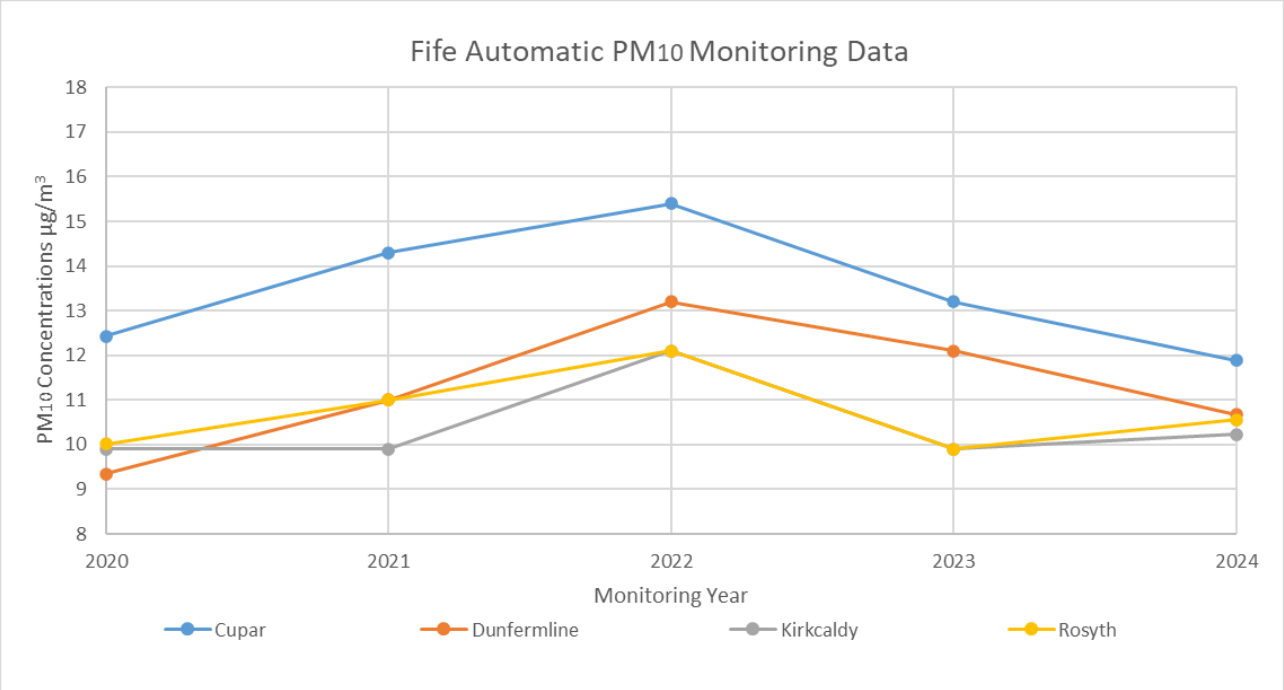
Table A. 7 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of 18 µg m^{-3}. The data provided (including historic years) has been corrected following the Scottish Government guidance[3] which states that PM_{10} data should be divided by 0.909.

Table A. 8 in Appendix A compares the ratified continuously monitored PM_{10} daily mean concentrations for the past five years with the air quality objective of 50 µg m^{-3}, not to be exceeded more than seven times per year.

Figure 3-21 provides the PM_{10} monitoring results for 2024 and the previous four years.

All four automatic monitoring sites did not record an exceedance of the PM_{10} annual, or 24-hour mean statutory objectives during 2024 and have been consistently below the objectives for the past five years.

Figure 3-21 Fife automatic monitoring sites PM_{10} annual mean concentrations (µg m^{-3})



Between 2020 and 2022 concentrations have been increasing slightly then begin decreasing from 2022. Between 2023 and 2024 concentrations decrease at Cupar and Dunfermline but increase slightly at Kirkcaldy and Rosyth. Concentrations remain well remain below the annual mean objective.

3.2.2.1 PM_{10} Trends Anlysis 2024

Figure 3-22 compares the time variation plots for PM_{10} in 2024 at each of the automatic monitoring stations. All four sites have similar time variations in data throughout the year,

with Cupar significantly standing out as having the highest concentrations, with the exception of midday on Saturdays when Rosyth spikes. The highest concentrations at all sites are generally measured between Monday to Friday (similar to NO_2 but not to the same extent).

The data spike which appears for Saturdays is an anomaly and should be ignored. A very large data spike occurred on the 7th December which has significantly skewed the time variation analysis in this occasion. The data spike was investigated during the ratification process however there was no data available which would result in it being nulled.

The time variation analysis suggests that traffic at Cupar has a greater effect on concentrations than the other locations however, this is probably due to the location of the site (kerbside rather than roadside). It does however show the contribution traffic has to PM_{10} at kerbside locations. There is a drop on Thursdays at all sites except Cupar which remains higher. The monthly analysis also illustrates the effect transboundary pollution has on PM_{10} concentrations between March and May. Scotland is often affected by easterly winds from the continent during this period that bring over transboundary particulate matter from continental Europe. In addition, more localised farming activity can also cause increased particulate matter concentrations.

Figure 3-22 PM_{10} Time Variation for Fife

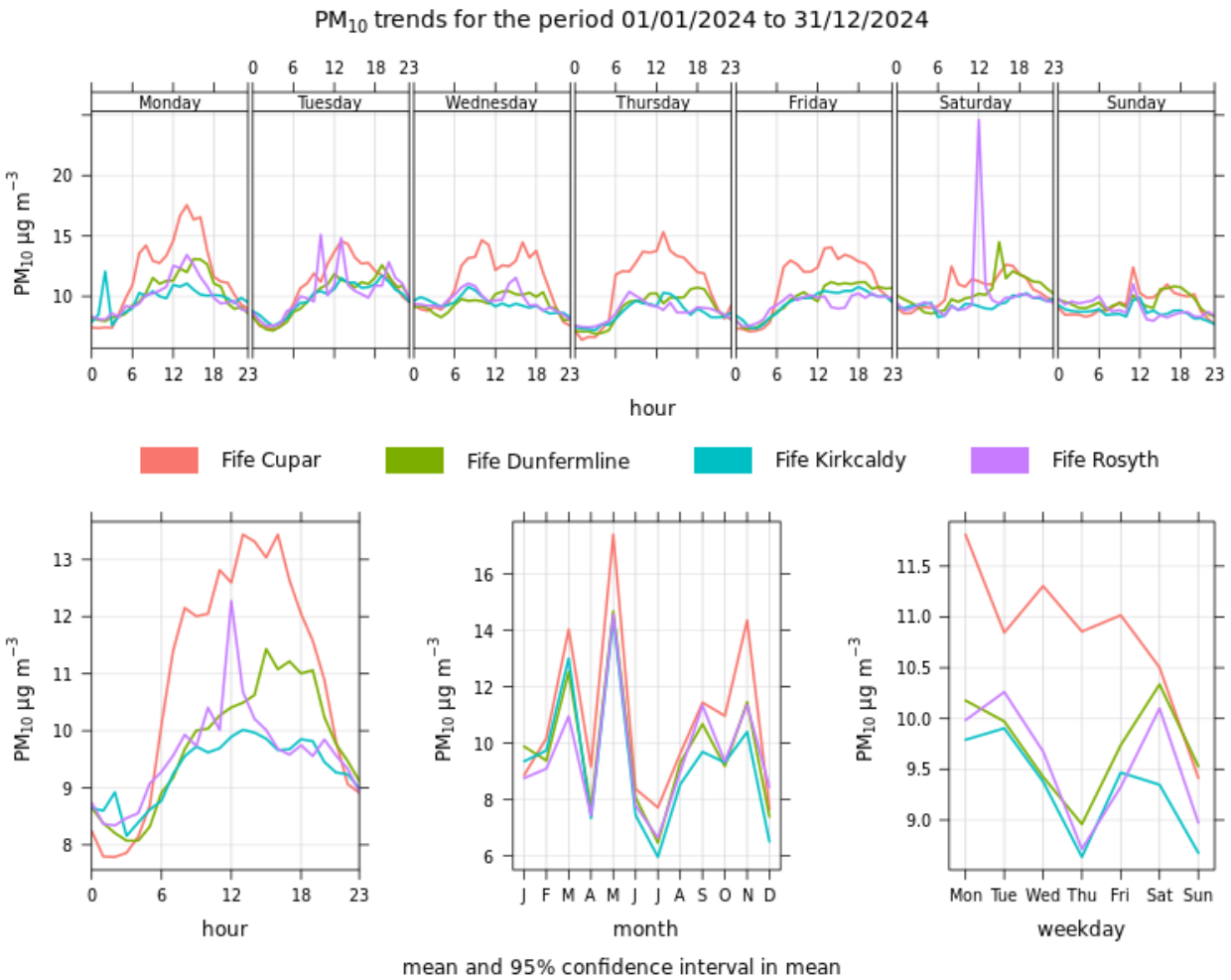
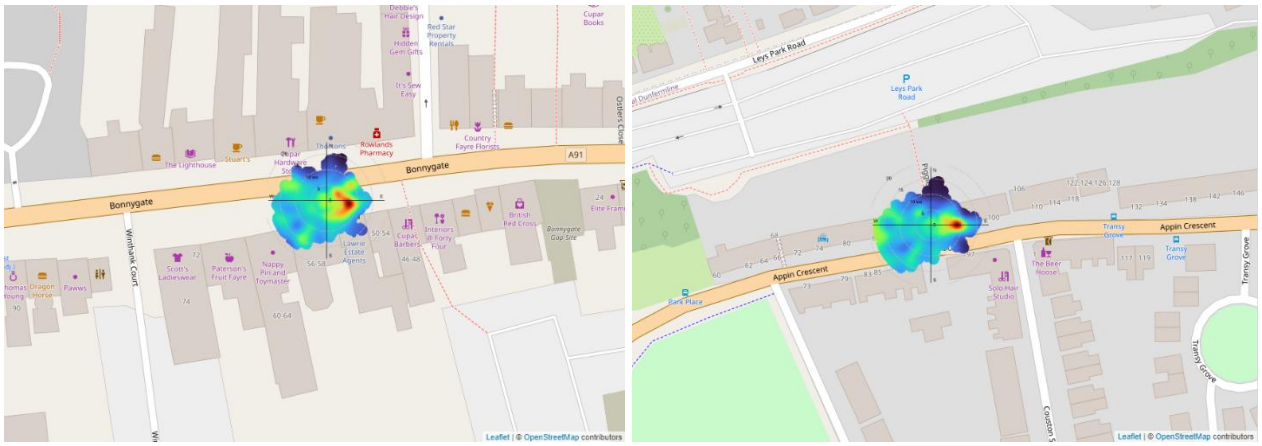


Figure E. 5 to Figure E. 8 in Appendix E show the PM_{10} time series plots for each monitoring site individually.

Figure E. 17 to Figure E. 20 show PM_{10} calendar plots for each of the monitoring stations across Fife. It shows that concentrations are relatively consistent throughout the year at all sites with the exception of March and May when transboundary particulate matter affects Scotland as a whole.

Figure E. 29 to Figure E. 32 show PM_{10} polar plots at each of the monitoring stations. Polar plots analysis for the now revoked AQMAs at Cupar (left) and Dunfermline (right) are shown in Figure 3-23. Both plots indicate that concentrations are highest when moderate winds are coming from the northeast. This can indicate that the sites are being influenced by sources out with the now revoked AQMAs potentially farming and or transboundary pollution.

Figure 3-23 Polar plots of PM_{10} concentrations by wind speed and direction



3.2.2.2 AQMesh Sensor Monitoring – PM_{10}

Table A. 9 in Appendix A provides a summary of monitoring results from AQMesh sensor monitoring network. Monitoring indicated that no site exceeded either the annual or 24 hour mean air quality objectives. For more analysis of this data go to AQMesh data report[5] which can be obtained from Fife Councils Land and Air Quality team.

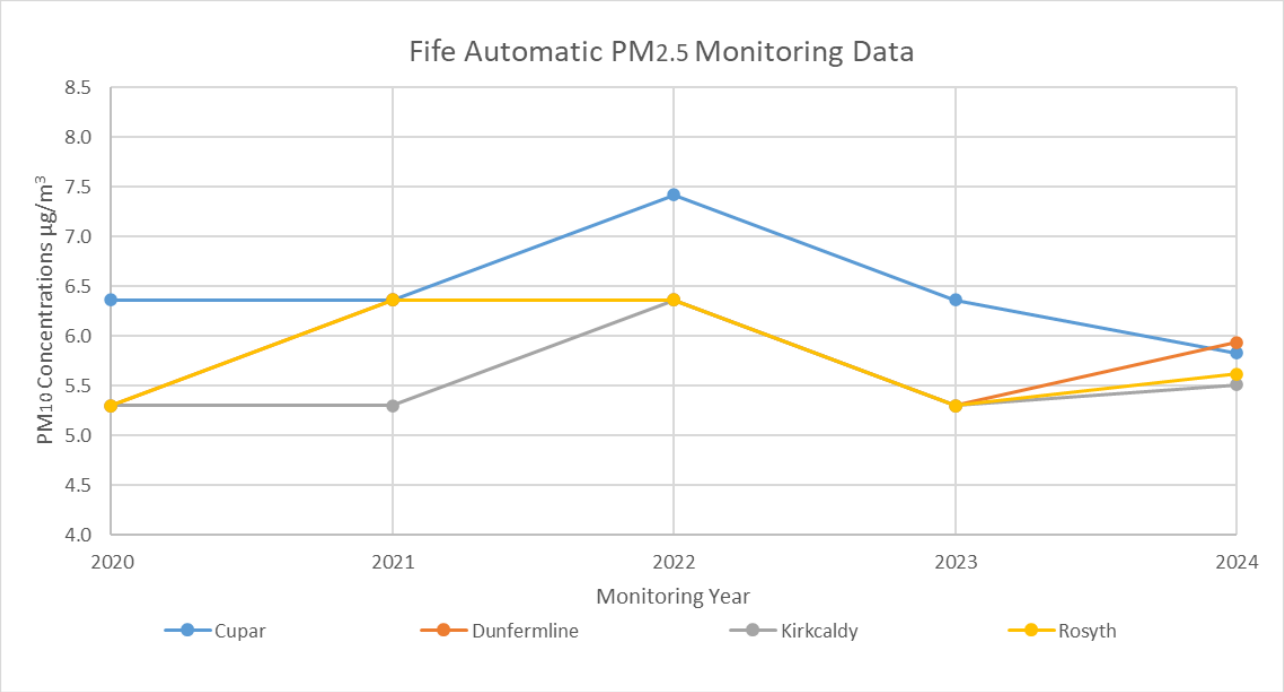
3.2.3 Particulate Matter ($PM_{2.5}$)

Table A. 10 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 10 µg m^{-3}. This data has been corrected following the Scottish Government guidance[3] which states that $PM_{2.5}$ data should be multiplied by 1.06.

Figure 3-24 provides the $PM_{2.5}$ monitoring results for 2024 and the previous four years.

All four automatic monitoring sites did not record an exceedance of $PM_{2.5}$ annual mean objective during 2024 and have been consistently below the objectives for the past five years.

Figure 3-24 Fife automatic monitoring sites $PM_{2.5}$ annual mean concentrations (µg m^{-3})



Between 2020 and 2022 concentrations increased but remained below the annual mean objective. Since 2022 have decreased overall at all sites.

3.2.3.1 $PM_{2.5}$ Trends Analysis 2024

Figure 3-25 compares the time variation plots for $PM_{2.5}$ in 2024 at each of the automatic monitoring stations. All four sites have very similar time variations in data throughout the year. Analysis shows that concentrations vary across the week at all sites. Diurnal variations show that concentrations at all sites appear to increase during the night indicating a non-traffic source. As with the PM_{10}, the monthly time variation analysis illustrates the potential effect transboundary particulate matter has on $PM_{2.5}$ concentrations across all sites especially in March and May.

Figure 3-25 $PM_{2.5}$ Time Variation for Fife

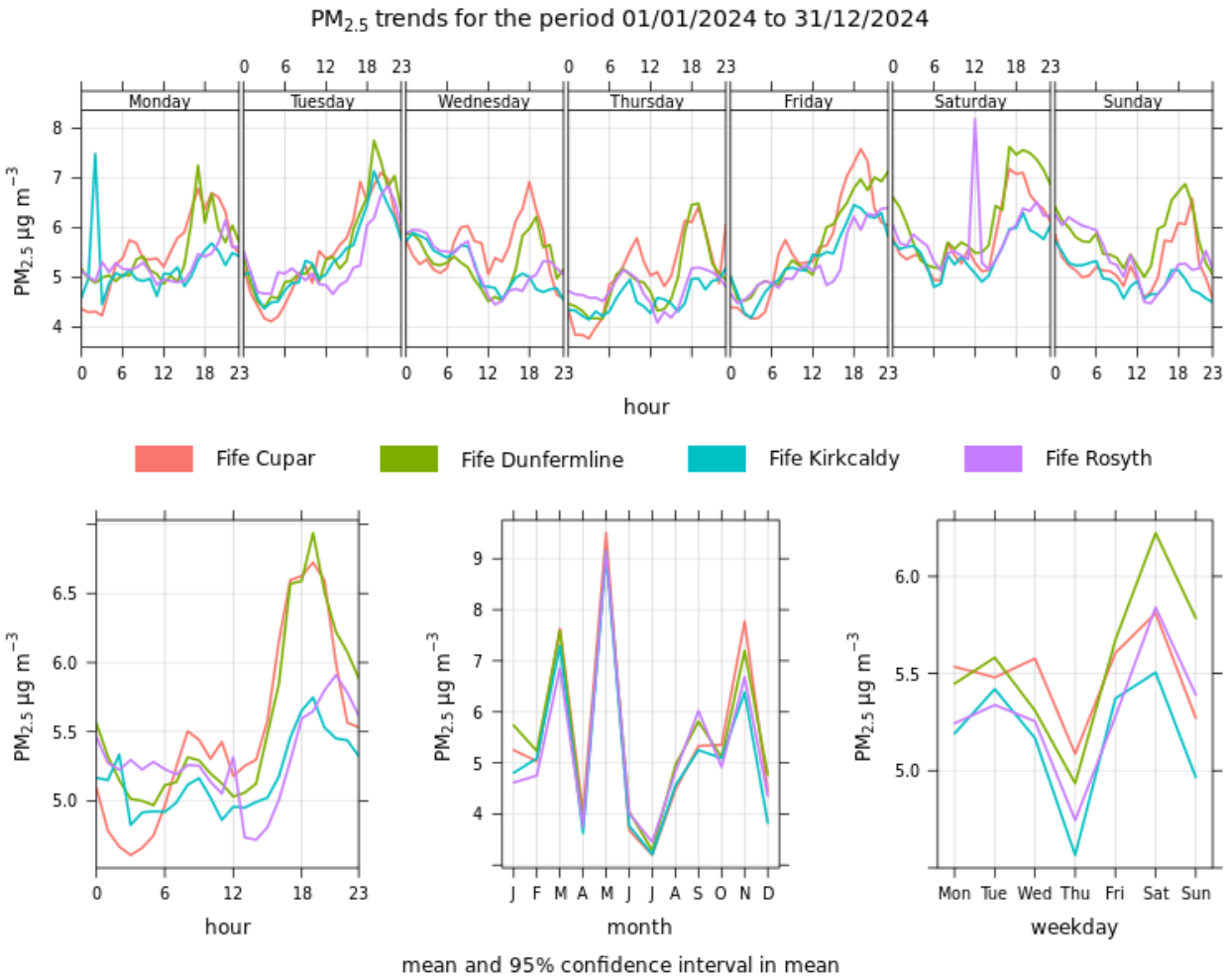
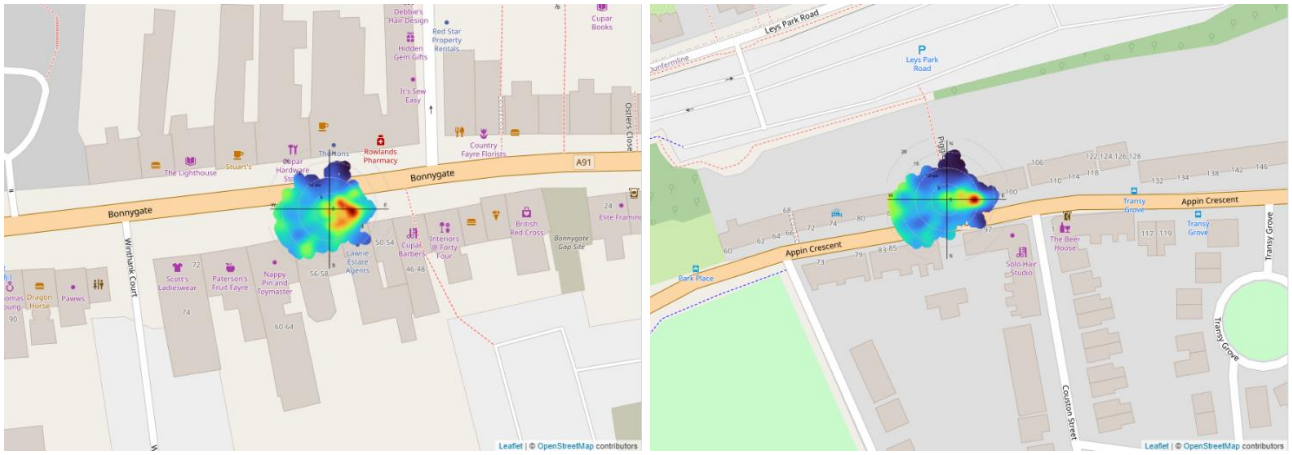


Figure E. 9 to Figure E. 12 in Appendix E show the $PM_{2.5}$ time series plots for each monitoring site individually.

Figure E. 21 to Figure E. 24 show $PM_{2.5}$ calendar plots for each of the automatic monitoring stations across Fife. Calendar plots show elevated concentrations. Concentrations are consistent throughout the year with the exception of March and May when transboundary particulate matter affects Scotland as a whole.

Figure E. 33 to Figure E. 36 show $PM_{2.5}$ polar plots at each of the monitoring stations. Polar plots analysis for the now revoked AQMAs at Cupar (left) and Dunfermline (right) shown in Figure 3-26. As with PM_{10}, the plots indicate a transboundary component with highest concentrations being measure with moderate winds from the north-east.

Figure 3-26 Polar plots of $PM_{2.5}$ concentrations by wind speed and direction



3.2.3.2 AQMesh Sensor Monitoring – $PM_{2.5}$

Table A. 11 in Appendix A provides a summary of monitoring results from AQMesh sensor monitoring network. Monitoring indicated that no site exceeded either the annual mean air quality objective. For more analysis of this data go to AQMesh data report which can be obtained from Fife Councils Land and Air Quality team.

3.2.4 Sulphur Dioxide (SO_2)

Fife Council does not undertake any SO_2 monitoring as previous review and assessment has not identified the need for this.

3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene

Fife Council did not undertake any CO monitoring during 2024. In previous years CO monitoring was undertaken by Fife's Transportation Services at a number of roadside locations. However, monitored levels have been found to be consistently well below the objective level in recent years so no monitoring was undertaken in 2024.

Other hydrocarbons:

Monitored concentrations of iso-butane, n-butane, iso-pentane, n-pentane, n-hexane, n-heptane, benzene, toluene, and xylenes and total C3 to C10 hydrocarbons are measured by INEOS as part of their annual reporting requirements at Grangemouth and Houndpoint. Measured annual average concentrations for 2024 were found to be lower than the set air quality limit for these substances. The INEOS Grangemouth[4] annual community air monitoring report for 2024 states that there is no significant trend when compared to historical data. Iso-pentane and n-pentane showed a decreasing trend, while iso-butane, n-butane and n-hexane have shown a slight increase compared to those concentrations found in 2023. N-heptane, toluene and xylenes were all below the detection limit. The total hydrocarbon concentrations show a slight increasing trend compared to 2023. The results associated with INEOS Houndpoint are discussed below in the Benzene section.

At the time of writing, The Mossmorran and Braefoot Bay Independent Air Quality Monitoring Review Annual Report 2024 has not yet been published. It is anticipated that this will be finalised by the end of 2025 and the findings incorporated into any revised versions of this

Annual Progress Report. The Mossmorran and Braefoot Bay Independent Air Quality Monitoring Review Annual Report 2023 was recently published and no associated exceedances were identified. A Summary Report/Extract of the Executive Summary is included in Appendix F for reference.

3.2.6 Benzene

There are currently two benzene monitoring programmes carried out within the Fife Council boundary:

- Monitoring in the area of the Grangemouth oil refinery on behalf of INEOS,
- Monitoring along the Fife coastline on behalf of INEOS (associated with Houndpoint).

INEOS Grangemouth Benzene Monitoring

Benzene monitoring is presented for INOES Grangemouth oil refinery in their annual monitoring report for 2024[7]. This report concludes that the annual average concentrations of Benzene are below the Air Quality (Scotland) Regulations 2000 air quality objective of 3.25 µg m^{-3} (1ppb).

INEOS Houndpoint Benzene Monitoring

INEOS FPS Ltd. Commissioned the National Physical Laboratory (NPL) to monitor the ambient air hydrocarbon levels at 12 locations on the Forth Estuary coastline during 2024 (29th December 2023 to 27th December 2024). Twelve locations on both shores of the Forth Valley between Edinburgh and West Wemyss were used. Benzene monitoring is presented for INEOS Houndpoint in their annual monitoring report for 2024.

The ambient air samples were collected over two-week periods using passive diffusive tubes. These samples were analysed for iso-butane, n-butane, iso-pentane, n-pentane, n-hexane, n-heptane, benzene, toluene, xylene and total hydrocarbons (C4-C10). These hydrocarbons may be emitted from a variety of sources around the Forth Estuary including INEOS operations at Hound Point Terminal, road traffic, and other industrial sites such as the operations of ExxonMobil and Shell at Braefoot Bay and Mossmorran.

The average benzene concentrations measured during this survey were found to be in the range of 0.2 ppb v/v to 0.3 ppb v/v, with the highest average concentration of benzene found to be at Carling Nose Point, North Queensferry, HP4B.

The highest individual concentration observed during this survey was 1.4 ppb during fortnight 19 at HP4B.

Benzene concentrations in 2024 therefore indicates compliance with AQS Objectives

Monitoring data for all pollutants measured during 2024 identified no exceedances of any of the Scottish AQS objectives.

Fife Council will continue to monitor locations throughout Fife and seek to identify areas of concern to monitor. The monitoring data for 2025 will be reported in the next Annual Progress Report (2026).

[7] Community Air Quality Monitoring Report, Ambient Atmospheric Survey in the vicinity of Grangemouth – 2024, INEOS April 2025

3.3 ADDITIONAL STUDIES

3.3.1 Appin Crescent Data Analysis

Fife Council commissioned Ricardo to undertake analysis on pollutant data from monitoring sites to assess whether road works undertaken in summer 2024 have had a detrimental effect on air pollution in the area.

Works were carried out at Elgin Street and Moodie Street crossroads and signals added to Bothwell Gardens roundabout. It had been noted that standing traffic increased significantly in the Appin Crescent area during the roadworks. Data from two monitoring sites in the area were analysed for the period when roadworks were undertaken and compared to air quality limits, and to data from previous years.

The analysis indicated that there were no exceedances observed of the NO_2 hourly air quality objective (200 µg m^{-3}) or the PM_{10} daily objective (50 µg m^{-3}) at either the Fife Dunfermline or Fife Appin Crescent West monitoring sites during the period when the roadworks were present.

Further analysis can be found in the full Appin Crescent Data Report.

3.3.2 Detailed Schools Monitoring Programme

In October 2024, to support Fife Council's ongoing air quality education activities, and the recent installation of AQMesh units at selected schools, Ricardo visited four primary school classes, within the following three schools:

- Crossgates Primary School, Crossgates
- Lumphinnans Primary School, Cowdenbeath
- Masterton Primary Schools, Dunfermline

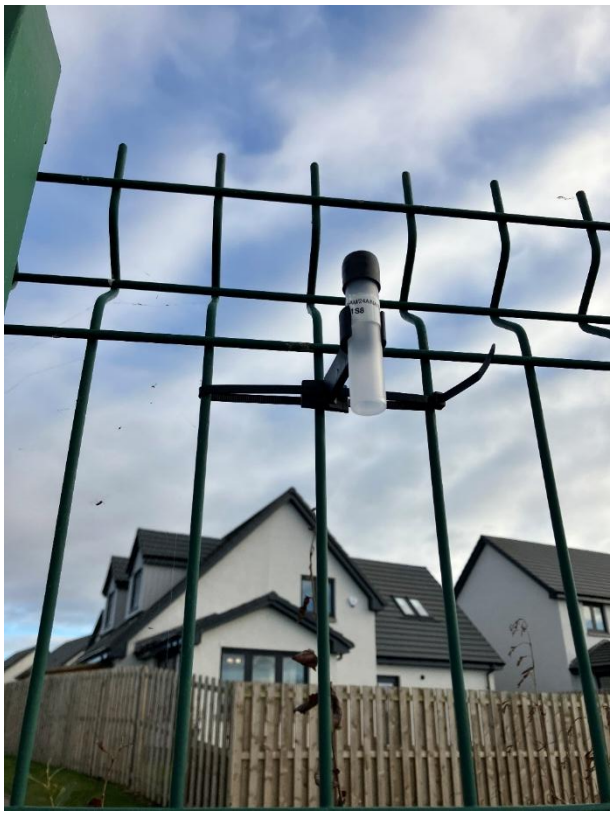
Ricardo gave a presentation on air quality and highlighted the new AQMesh monitoring around these primary schools. Topics covered included 'What is Air Pollution?', 'How is Air Quality Measured?', as well as information highlighting how pupils could best avoid coming into contact with air pollution. Positive behaviour changes to help improve local air quality were also promoted, with school travel plans, Fife Councils 'Fresh Air Frankie' travel tracker guides and other sustainable travel options highlighted.

During this initial session pupils were able to try on a sensor backpack and also created their own class diffusion tube monitoring study as shown in Figure 3-27 and Figure 3-28. Atmotube sensors were provided to classes by Fife Council for the whole monitoring period, allowing pupils to get hands on experience using a personal monitoring sensor.

Depending on future funding there would be a hope to run similar types of events in future years whilst Fife Council installs AQMesh units at other school sites.

Figure 3-27 Pupils From Lumphinnans Primary School Creating Their Monitoring Study And Putting Out Diffusion Tubes

Figure 3-28 Masterton Primary School Deployed Their Diffusion Tubes in A Good Variety Of Locations Including The School Boundary Fence And Their Eco-Garden



4. NEW LOCAL DEVELOPMENTS

4.1 ROAD TRAFFIC SOURCES

There has only been one significant change in the existing road network in 2024 and this is associated with the signalisation of Bothwell Gardens roundabout, Dunfermline (June to August 2024). There have also been several new residential streets adopted by Fife Council during 2024.

The start of the signalisation of Bothwell Gardens brought about increased traffic flow in Appin Crescent so a dedicated study was undertaken to assess air quality within Appin Crescent throughout the roadworks. Further information can be found in Section 3.3.1 above.

4.2 OTHER TRANSPORT SOURCES

Fife Council confirms that there are no new transport sources that have been identified that meet the associated criteria for further consideration.

4.3 INDUSTRIAL SOURCES

SEPA has recently issued a new Pollution Prevention and Control (PPC) Part B permit for the combustion of fuels at MCP Leven Global Supply, Banbeath Industrial Estate in Leven (PPC/B/5005678).

Fife Council confirms that there are no new industrial sources that have not been adequately considered in previous rounds of Review and Assessment.

4.4 COMMERCIAL AND DOMESTIC SOURCES

Fife Council confirms that there are no new commercial or domestic sources that have not been adequately considered in previous rounds of Review and Assessment.

4.5 NEW DEVELOPMENTS WITH FUGITIVE OR UNCONTROLLED SOURCES

SEPA has recently issued a variation to the existing Waste Management Licence (WML) at Brackmont Mill Transfer Station, Brackmont Mill in St Michaels (WML/E/0000286).

Fife Council confirms that there are no new developments with fugitive or uncontrolled sources that have not been adequately considered in previous rounds of Review and Assessment.

5. PLANNING APPLICATIONS

5.1 APPLICATIONS

The relevant planning guidance controls how Fife Council will manage potential air quality impacts from proposed developments. During 2024 the Land & Air Quality Team commented on numerous planning applications in relation to air quality matters mostly focused on residential and mixed-use developments. The types of comments made by the team are summarised in Table 5-1:

Table 5-1 Summarised air quality related planning application comments

Comment	Number of planning applications
Air Quality Impact Assessment (AQIA) advised and/or submitted for applications located out with AQMA's	36
AQIA advised and/or submitted for applications located within AQMA's	0
Biomass boiler/wood burning Stove questionnaire requested and/or submitted	7
General information provided (e.g., agreeing scope of AQIA, further info required, retaining air quality condition(s) etc)	7

Applications of note include the following:

24/00394/FULL – Residential Development (up to 210 dwellings) with associated infrastructure including accesses, landscaping, drainage, SUDS and engineering works at Land to North of Manse Road, Crossgates, Fife

An EnviroCentre 'Air Quality Assessment' dated March 2024 has been submitted and determined that the predicted NO_2, PM_{10} and $PM_{2.5}$ concentrations at all sensitive receptors will meet the relevant air quality objectives. Application not yet approved.

24/01277/FULL – Erection of 256 residential units with associated engineering, infrastructure, landscaping and open space at Pitdinnie Farm, Cairneyhill

An AirShed 'Air Quality Impact Assessment' dated April 2024 has been submitted and determined that the predicted NO_2, PM_{10} and $PM_{2.5}$ concentrations at all sensitive receptors will meet the relevant air quality objectives. Application not yet approved.

22/00076/FULL – Erection of supermarket (Class 1) and associated works (demolition of existing building) at Victoria Works, 147 - 151 St Clair Street, Kirkcaldy, Fife

A Mabbet 'Air Quality Assessment' dated June 2023 was submitted in February 2024 and determined that the predicted NO_2, PM_{10} and $PM_{2.5}$ concentrations at all sensitive receptors will meet the relevant air quality objectives. Application approved May 2023.

24/00785/FULL – Change of use from former quarry to holiday site including the erection of up to 75 holiday lodges, reception arrival building, management/maintenance facilities, play areas, linked network of

pathways/footways/cycleways, car park and associated works at Eden Springs Country Park, Melville Lodges, Cupar, Fife

An ITP Energised 'Air Quality Impact Assessment' dated October 2023 was submitted in March 2024 and determined that the predicted NO_2, PM_{10} and $PM_{2.5}$ concentrations at all sensitive receptors will meet the relevant air quality objectives. This application was subsequently refused.

24/01407/FULL – Erection of 44 affordable residential dwellings (36 Houses (Class 9) and 8 Flats (Sui Generis)) and other associated infrastructure including access, roads, parking, drainage, retaining walls and landscaping at Land To The East Of Spittalfield Road, Fraser Avenue, Inverkeithing, Fife

An 'Air Quality Assessment' by consultants 'The Airshed' dated June 2024 was submitted in June 2024 and determined that the predicted NO_2, PM_{10} and $PM_{2.5}$ concentrations at all sensitive receptors will meet the relevant air quality objectives. Application approved December 2024.

22/02117/CND012 – Compliance with Condition 12 of Planning Permission 22/02117/EIA - BEFORE ANY WORKS COMMENCE ON SITE; evidence shall be provided to demonstrate that the National Air Quality Strategy objectives would not be exceeded during demolition, construction or normal site use following completion. The methodology shall be agreed in writing with Fife Council as Planning Authority, and it shall include an appropriate air quality impact assessment for the proposal. Where the assessment predicts that objectives will be exceeded, the applicant shall provide a scheme for mitigating the impacts for submission to and approval by this Planning Authority. The development shall, thereafter, be carried out fully in accordance with these approved details. Land North Of Lochore Meadows, Great North Road, Kelty, Fife

An 'Air Quality Assessment' by consultants 'The Airshed' dated June 2024 was submitted in June 2024 and determined that the predicted NO_2, PM_{10} and $PM_{2.5}$ concentrations at all sensitive receptors will meet the relevant air quality objectives. Application approved January 2024.

24/03090/PPP – Planning permission in principle for residential development of up to 360 units (including 25% affordable housing), formation of vehicular accesses, SuDS, landscaping, open space and associated development and infrastructure works including engineering operations at Castlandhill House, Ferry Toll Road, Rosyth, Fife

An 'Air Quality Assessment' by consultants 'The Airshed' dated November 2024 was submitted in November 2024 and determined that the predicted NO_2, PM_{10} and $PM_{2.5}$ concentrations at all sensitive receptors will meet the relevant air quality objectives. Application not yet approved.

6. CONCLUSIONS AND PROPOSED ACTIONS

6.1 CONCLUSIONS FROM NEW MONITORING DATA

The 2025 APR has considered the available monitoring data measured during 2024.

Nitrogen Dioxide

During 2024, NO_2 was measured at four sites using automatic reference monitors; Cupar, Dunfermline, Kirkcaldy and Rosyth. Non-automatic, diffusion tube monitoring was undertaken at 49 locations within Fife (covering 57 diffusion tubes in total). There were no exceedances of the NO_2 annual mean or 1-hour mean objective at any automatic or non-automatic monitoring locations during 2024.

There were five new diffusion tube sites added during 2024, these were; Park Road, Rosyth; 23 Main Street, Lumphinnans; Aberdour Road, Dunfermline; Nightingale Place, Dunfermline and Pittsburgh Road, Dunfermline.

AQMesh Sensor monitoring was carried out at 10 locations in Fife. No exceedances of the annual or hourly mean objectives for NO_2 were measured during 2024.

Particulate Matter

PM_{10} and $PM_{2.5}$ concentrations are measured using reference equivalent techniques at four locations in Fife; Cupar, Dunfermline, Kirkcaldy and Rosyth. 2024 measured concentrations of both PM_{10} and $PM_{2.5}$ did not exceed the annual or daily mean objectives for both PM_{10} and $PM_{2.5}$.

PM_{10} and $PM_{2.5}$ AQMesh Sensor monitoring was carried out at ten locations in Fife. No exceedances of the annual or daily mean objectives for PM_{10} and $PM_{2.5}$ were measured during 2024.

Sulphur Dioxide

SO_2 was not measured in Fife during 2024. Historical SO_2 monitoring data from the Longannet power station site is available in previous year's APR reports for Fife Council.

Carbon Monoxide

CO was not measured in Fife during 2024. Historical monitoring data from the roadside locations have been consistently well below the objective level and can be found in previous year's APR reports for Fife Council.

Benzene and 1,3 Butadiene

Benzene and 1,3 Butadiene monitoring carried out in the area of the INEOS Grangemouth refinery indicated that it is unlikely that the AQS objective for these pollutants were exceeded within the Fife Council boundary during 2024.

A summary of the monitoring data from INEOS Houndpoint states that concentrations of the monitored substances appear to show a slight increase in concentration compared to 2023 but remain below the relevant statutory AQO.

6.2 CONCLUSIONS RELATING TO NEW LOCAL DEVELOPMENTS

Fife Council have not identified any New Local Developments out with the applications previously considered and assessed by Fife Council where there may be a risk of the air quality objectives being exceeded. Therefore, no additional air quality assessment is recommended at this time.

6.3 PROPOSED ACTIONS

Following the review of all available data and updated air quality strategy Fife Council will carry out the following actions:

1. Produce an Annual Progress Report in 2026, reporting concentrations measured during 2025.
2. Continue to implement the measures outlined in the updated Air Quality Strategy 2025 - 2030.
3. Continue to monitor NO_2, PM_{10} and $PM_{2.5}$ concentrations throughout Fife including within the revoked AQMAs.
4. Continue to review the NO_2 diffusion tube monitoring programme and seek to relocate any tubes where it is deemed appropriate.

6.4 GRANTS AWARDED

In May 2025 Fife Council was provided with the grant funding allocation from the Scottish Government to support local air quality management responsibilities and various air quality projects over 2025. The awarded funding will cover key areas as detailed in Table 6-1:

Table 6-1 Grant funding allocation 2025/26

Measure
Continuation of TRL Fleet and Taxi ECO Stars schemes within Fife
AQMesh data management and reporting over 2025 for 10 units in total. The AQMesh pods are used at a range of locations including within recently revoked AQMAs (Bonnygate, Cupar and Appin Crescent, Dunfermline) and other sites of interest at St Clair Street, Kirkcaldy and City Road, St Andrews along with several educational establishments associated with recent recommendations from the Royal College of Physicians.

A summary of progress on the above items will be provided in the 2026 APR.

Last year funding was provided to support local air quality management responsibilities and several air quality projects, summaries of which are provided in Table 6-2 below in terms of the use of the funding and the associated outcomes along with where in the APR additional information is available:

Table 6-2 Grant funding summary 2024/25

Measure	Summary
Two new AQMesh units to be used for monitoring at educational establishments in light of recent findings and recommendations from the Royal College of Physicians.	Funding was initially granted for two units but funding was reallocated from another funding stream to allow for another two units to be obtained. Two units were installed in July 2024 and two installed in November 2024. Further information is available in Section 3.1.3.
Continuation of TRL Fleet and Taxi ECO Stars schemes within Fife.	Funding was used to ensure TRL continued to recruit new members while also liaising with existing members (as detailed in Section 2.4.1).
AQMesh data management and reporting for existing pods	Funding was used to ensure data from all existing AQMesh pods was appropriately managed, quality assured, quality controlled and reported (as detailed in Section 3.1.3). These pods cover a range of areas including recently revoked AQMAs and educational establishments.
Clean Air Day (CAD) 2024	Funding was used to provide four schools across Fife with educational packages, including materials (Citizen Science Packs) allowing them to carry out their own monitoring. Alternative funding was utilised by Fife Council to provide materials to a fifth school. Further information is provided in Section 2.3.6
Air Quality Strategy Update 2025-2030	Update to Fife Councils Air Quality Strategy was undertaken and the new version covers from 2025 to 2030. Further information is provided in Section 2.2.

APPENDICES

Appendix A Monitoring Results

Table A. 1 – Details of Automatic Monitoring Sites

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)
Cupar	Kerbside	337403	714571	NO_2, PM_{10}, $PM_{2.5}$	NO	NO_x Analyser (Chemiluminescence), FIDAS (since December 2016)	N (1.0)	<0.5	1.9
Dunfermline	Roadside	309926	687722	NO_2, PM_{10}, $PM_{2.5}$	NO	NO_x Analyser (Chemiluminescence), FIDAS (since September 2016)	Y (1.0)	4	2
Kirkcaldy	Roadside	329143	692986	NO_2, PM_{10} $PM_{2.5}$	NO	NO_x Analyser (Chemiluminescence), FIDAS (since April 2016)	N (10.0)	5	2
Rosyth	Roadside	311755	683503	NO_2, PM_{10} $PM_{2.5}$	NO	NO_x Analyser (Chemiluminescence) FIDAS (since July 2015)	Y (1.5)	6	2.1

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 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)
Central Area									
Glenlyon, Leven	Kerbside	337357	701318	NO_2	No	26.8	1	No	2.2
ASDA Roundabout, Kirkcaldy	Kerbside	328742	694045	NO_2	No	28.0	1	No	2.2
Victoria Road, Kirkcaldy	Roadside (Façade)	328144	692315	NO_2	No	0.0	2.5	No	2.2
Dunnikier Road, Kirkcaldy	Roadside (Façade)	328152	692352	NO_2	No	0.0	3.4	No	2.2
Henry Road, Kirkcaldy	Roadside	327437	692270	NO_2	No	16.0	1.7	No	2.2
Chapel Level, Kirkcaldy	Roadside	325526	694027	NO_2	No	10.0	10	No	2.2
Oriel Road, Kirkcaldy	Roadside	327239	691669	NO_2	No	5.0	2	No	2.2
Pratt Street, Kirkcaldy	Roadside	327415	690432	NO_2	No	2.0	2	No	2.2
St Clair Street 1, Kirkcaldy	Roadside	329157	693030	NO_2	No	2.0	1.3	No	2.2
St Clair Street 2, Kirkcaldy	Roadside	329131	693008	NO_2	No	2.0	1.8	No	2.2
St Clair Street 3, Kirkcaldy	Roadside (Façade)	329174	693069	NO_2	No	0.0	2	No	2.2
125 St Clair Street, Kirkcaldy	Roadside (Façade)	329208	693163	NO_2	No	0.0	1.5	No	2.2
179A St Clair Street, Kirkcaldy	Roadside (Façade)	329310	693326	NO_2	No	0.0	1.5	No	2.2
St Clair Street Romon A, B, C, Kirkcaldy*	Roadside	329143	692986	NO_2	No	10.0	5	Yes	2.2
East Area									
City Road 1, St Andrews	Roadside	350590	716570	NO_2	No	1.0	1.5	Yes	2.2
Bell Street 1, St Andrews	Roadside (Façade)	350712	716691	NO_2	No	0.0	1.6	No	2.2
Bell Street 2, St Andrews	Roadside (Façade)	350721	716646	NO_2	No	0.0	2.1	No	2.2

City Road 3, St Andrews	Roadside	350538	716682	NO_2	No	14.0	1.5	No	2.2
City Road 5, St Andrews	Roadside	350499	716748	NO_2	No	5.0	1.9	No	2.2
City Road 6, St Andrews	Roadside	350470	716826	NO_2	No	5.0	2.2	No	2.2
Links Crescent, St Andrews	Roadside (Façade)	350156	716947	NO_2	No	0.0	3	No	2.2
North Street, St Andrews	Roadside	350519	716935	NO_2	No	3.0	2.2	No	2.2
Bonnygate B1, Cupar	Roadside (Façade)	337409	714570	NO_2	No	0.0	5.3	No	2.2
Bonnygate B2, Cupar	Roadside (Façade)	337507	714584	NO_2	No	0.0	1.7	No	2.2
Bonnygate B4, Cupar	Roadside (Façade)	337467	714576	NO_2	No	0.0	1.9	No	2.2
Bonnygate B3, Cupar	Roadside (Façade)	337480	714586	NO_2	No	0.0	1.6	Yes	2.2
Bonnygate Monitor A, B, C, Cupar*	Kerbside	337403	714571	NO_2	No	4.8	0.6	Yes	2.2
West Area									
89 Dunfermline Road, Crossgate	Roadside (façade)	314223	688775	NO_2	No	0.0	2	No	2.2
18A Dunfermline Road, Crossgate	Roadside (façade)	314440	688792	NO_2	No	0.0	2	No	2.2
7 Springhill Brae, Crossgate	Roadside	314576	688730	NO_2	No	5.0	2	No	2.2
Admiralty Road A, Rosyth	Roadside (Façade)	312069	683431	NO_2	No	0.0	9	No	2.2
Admiralty Road ROMAN A, B, C, Rosyth*	Roadside (Façade)	311755	683503	NO_2	No	0.0	6.5	Yes	2.2
Park Road, Rosyth	Kerbside	312346	683791	NO_2	No	45	1	No	2.2
High Street, Cowdenbeath	Kerbside	316527	691742	NO_2	No	3.5	0.5	No	2.2
Carnegie Drive A Dunfermline	Roadside (Façade)	309023	687632	NO_2	No	0.0	2.3	No	2.2
Pilmuir Street, Dunfermline	Roadside	309143	687774	NO_2	No	0.0	2	No	2.2
Mill Street, Dunfermline	Roadside	308888	687968	NO_2	No	0.0	2	No	2.2
102 Baldridgeburn, Dunfermline	Kerbside	308447	688068	NO_2	No	3.0	0.5	No	2.2

23 Main Street, Lumphinnans	Kerbside	316881	692530	NO_2	No	10	3	No	2.2
Aberdour Road, Dunfermline	Roadside	312311	685903	NO_2	No	35	1	No	2.2
Nightingale Place, Dunfermline	Roadside	312707	686343	NO_2	No	30	1.7	No	2.2
Pittsburgh Road, Dunfermline	Roadside	312640	687919	NO_2	No	18	1	No	2.2
Appin Crescent A Dunfermline	Roadside	309900	687716	NO_2	No	5.1	1.6	No	2.2
Appin Crescent 1, Dunfermline	Roadside (Façade)	309888	687719	NO_2	No	0.0	6.5	No	2.2
Appin Crescent 4A, 4B, 4C, Dunfermline*	Roadside (Façade)	309926	687722	NO_2	No	0.0	3.9	Yes	2.2
Appin Crescent 2, Dunfermline	Roadside (Façade)	309883	687701	NO_2	No	0.0	1.5	No	2.2
Appin Crescent 3, Dunfermline	Roadside (Façade)	309975	687716	NO_2	No	0.0	1.8	No	2.2
Appin Crescent 5A Dunfermline	Roadside (Façade)	309957	687714	NO_2	No	0.0	1.5	No	2.2
Appin Crescent 6A Dunfermline	Roadside (Façade)	309904	687704	NO_2	No	0.0	1.5	No	2.2

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.

* Triplicate sites

Kerbside = 0-1m from the kerb of a busy road. Roadside = 1-5m from the kerb. Roadside (Façade) = Façade of buildings on street.

Table A. 3 – Details of AQMesh Sensor Monitoring Sites

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)
Cupar Bonnygate North	Roadside	337413	714553	NO_2, PM_{10}, $PM_{2.5}$	NO	AQMesh Sensor Unit	<0.5	2.0	2.2-2.5
Cupar Bonnygate South	Roadside	337476	714580	NO_2, PM_{10}, $PM_{2.5}$	NO	AQMesh Sensor Unit	<0.5	2.0	2.2-2.5
Crossgates Dunfermline Road	Roadside	314223	688775	NO_2, PM_{10}, $PM_{2.5}$	NO	AQMesh Sensor Unit	<0.5	2.0	2.2-2.5
Dunfermline Appin Crescent West	Roadside	309904	687704	NO_2, PM_{10} $PM_{2.5}$	NO	AQMesh Sensor Unit	<0.5	2.0	2.2-2.5
Dunfermline Aberdour Road	Roadside	312611	685903	NO_2, PM_{10} $PM_{2.5}$	NO	AQMesh Sensor Unit	35.0	2.0	2.2-2.5
Dunfermline Baldridgeburn	Roadside	308484	688065	NO_2, PM_{10}, $PM_{2.5}$	NO	AQMesh Sensor Unit	3.0	2.0	2.2-2.5
Kirkcaldy St Clair Street	Roadside	329142	693002	NO_2, PM_{10} $PM_{2.5}$	NO	AQMesh Sensor Unit	2.0	2.0	2.2-2.5
Lumphinnans	Roadside	316881	692530	NO_2, PM_{10} $PM_{2.5}$	NO	AQMesh Sensor Unit	10.0	2.0	2.2-2.5
St Andrews City Road	Roadside	350467	716846	NO_2, PM_{10} $PM_{2.5}$	NO	AQMesh Sensor Unit	2.2	2.0	2.2-2.5
Rosyth Harley Street	Roadside	312346	683791	NO_2, PM_{10}, $PM_{2.5}$	NO	AQMesh Sensor Unit	45.0	2.0	2.2-2.5

Table A. 4 – Annual Mean NO_2 Monitoring Results (µg m^{-3})

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2024 (%) [2]	2020	2021	2022	2023	2024
Cupar	Kerbside	Automatic	99.6	99.6	20.9	20	17.7	19.4	18.0
Dunfermline	Roadside	Automatic	92.9	92.9	15.2	16.1	14.7	15.1	14.0
Kirkcaldy	Roadside	Automatic	94.3	94.3	12.2	14.1	12.5	13.0	12.5
Rosyth	Roadside	Automatic	99.5	99.5	15.4	19.3	17.9	17.1	13.7
Central Area									
Glenlyon, Leven	Kerbside	Diffusion Tube	100	100	16.0	20.0	18	17.2	15.8
ASDA Roundabout, Kirkcaldy	Kerbside	Diffusion Tube	100	100	16.0	19.0	17	18.7	16.4
Victoria Road, Kirkcaldy	Roadside (Façade)	Diffusion Tube	100	100	16.0	22.0	17	18.2	16.7
Dunnikier Road, Kirkcaldy	Roadside (Façade)	Diffusion Tube	100	100	16.0	18.0	15	20.5	19.3
Henry Road, Kirkcaldy	Roadside	Diffusion Tube	100	100	16.0	19.0	17	19.0	19.6
Chapel Level, Kirkcaldy	Roadside	Diffusion Tube	100	100	-	-	11	12.3	12.2
Oriel Road, Kirkcaldy	Roadside	Diffusion Tube	100	91	-	-	11	13.2	11.7
Pratt Street, Kirkcaldy	Roadside	Diffusion Tube	100	100	-	-	11	12.7	11.9
St Clair Street 1, Kirkcaldy	Roadside	Diffusion Tube	100	83	18	21.0	19	22.9	20.6
St Clair Street 2, Kirkcaldy	Roadside	Diffusion Tube	100	100	23	23	21	24.6	21.7
St Clair Street 3, Kirkcaldy	Roadside (Façade)	Diffusion Tube	100	100	16	19	17	18.9	17.7
125 St Clair Street, Kirkcaldy	Roadside (Façade)	Diffusion Tube	100	100	18	20	19	20.6	19.8
179A St Clair Street, Kirkcaldy	Roadside (Façade)	Diffusion Tube	100	100	18	18	17	19.7	18.1
St Clair Street Romon A, B, C, Kirkcaldy*	Roadside	Diffusion Tube	100	100	13	14	12	14.3	13.3
East Area									
City Road 1, St Andrews	Roadside	Diffusion Tube	100	100	13	16	14	16.8	14.7
Bell Street 1, St Andrews	Roadside (Façade)	Diffusion Tube	100	83	14	15	16	16.9	14.6

Bell Street 2, St Andrews	Roadside (Façade)	Diffusion Tube	100	91	13	14	14	13.9	13.0
City Road 3, St Andrews	Roadside	Diffusion Tube	100	100	16	17	16	17.3	15.4
City Road 5, St Andrews	Roadside	Diffusion Tube	100	100	13	15	14	15.8	14.4
City Road 6, St Andrews	Roadside	Diffusion Tube	100	100	21	24	21	20.3	21.1
Links Crescent, St Andrews	Roadside (Façade)	Diffusion Tube	100	100	14	16	15	14.0	13.0
North Street, St Andrews	Roadside	Diffusion Tube	100	100	13	17	16	15.4	14.4
Bonnygate B1, Cupar	Roadside (Façade)	Diffusion Tube	100	100	18	21	17	17.9	16.1
Bonnygate B2, Cupar	Roadside (Façade)	Diffusion Tube	100	100	21	23	20	21.5	19.9
Bonnygate B4, Cupar	Roadside (Façade)	Diffusion Tube	100	100	22	27	24	25.1	22.4
Bonnygate B3, Cupar	Roadside (Façade)	Diffusion Tube	100	100	20	27	22	24.8	20.7
Bonnygate Monitor A, B, C, Cupar*	Kerbside	Diffusion Tube	100	100	16	19	17	18.4	16.7
West Area									
89 Dunfermline Road, Crossgate	Roadside (façade)	Diffusion Tube	100	100	-	-	-	17.5	14.5
18A Dunfermline Road, Crossgate	Roadside (façade)	Diffusion Tube	100	100	-	-	-	14.0	12.6
7 Springhill Brae, Crossgate	Roadside	Diffusion Tube	100	100	-	-	-	13.8	12.5
Admiralty Road A, Rosyth	Roadside (Façade)	Diffusion Tube	100	100	20	23	22	20.9	15.0
Admiralty Road ROMAN A, B, C, Rosyth*	Roadside (Façade)	Diffusion Tube	100	100	17	19	18	14.9	13.1
Park Road, Rosyth	Kerbside	Diffusion Tube	100	100	-	-	-	-	10.6
High Street, Cowdenbeath	Kerbside	Diffusion Tube	100	100	14	16	14	15.4	12.7
Carnegie Drive A Dunfermline	Roadside (Façade)	Diffusion Tube	100	100	18	22	19	21.5	17.8
Pilmuir Street, Dunfermline	Roadside	Diffusion Tube	100	100	17	17	16	17.3	14.2
Mill Street, Dunfermline	Roadside	Diffusion Tube	100	100	22	25	23	24.1	20.7
102 Baldridgeburn, Dunfermline	Kerbside	Diffusion Tube	100	83	16	17	16	17.1	15.3
23 Main Street, Lumphinnans	Kerbside	Diffusion Tube	100	100	-	-	-	-	10.3

Aberdour Road, Dunfermline	Roadside	Diffusion Tube	100	91	-	-	-	-	11.8
Nightingale Place, Dunfermline	Roadside	Diffusion Tube	100	100	-	-	-	-	8.4
Pittsburgh Road, Dunfermline	Roadside	Diffusion Tube	100	100	-	-	-	-	11.0
Appin Crescent A Dunfermline	Roadside	Diffusion Tube	100	100	20	21	20	21.4	20.2
Appin Crescent 1, Dunfermline	Roadside (Façade)	Diffusion Tube	100	100	19	21	19	20.5	18.7
Appin Crescent 4A, 4B, 4C, Dunfermline*	Roadside (Façade)	Diffusion Tube	100	100	15	16	15	15.4	13.7
Appin Crescent 2, Dunfermline	Roadside (Façade)	Diffusion Tube	100	100	24	26	24	24.4	21.7
Appin Crescent 3, Dunfermline	Roadside (Façade)	Diffusion Tube	100	100	21	26	24	24.9	21.5
Appin Crescent 5A Dunfermline	Roadside (Façade)	Diffusion Tube	100	100	23	24	23	24.4	20.1
Appin Crescent 6A Dunfermline	Roadside (Façade)	Diffusion Tube	100	100	24	26	25	25.9	23.9

☒ **Diffusion tube data has been bias adjusted.**

☒ **Reported concentrations are those at the location of the monitoring site (bias adjusted and annualised, as required), i.e. prior to any fall-off with distance correction.**

Notes:

Means for diffusion tubes have been corrected for bias. 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. 5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200 µg m^{-3} (not to be exceeded more than 18 times/year)

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2024 (%) (2)	2020	2021	2022	2023	2024
Cupar	Kerbside	Automatic	100	100	0	0	0	0	0
Dunfermline	Roadside	Automatic	100	93	0	0	0	0	0
Kirkcaldy	Roadside	Automatic	100	94	0	0	0	0	0
Rosyth	Roadside	Automatic	100	100	0	0	0	0	0

Notes:

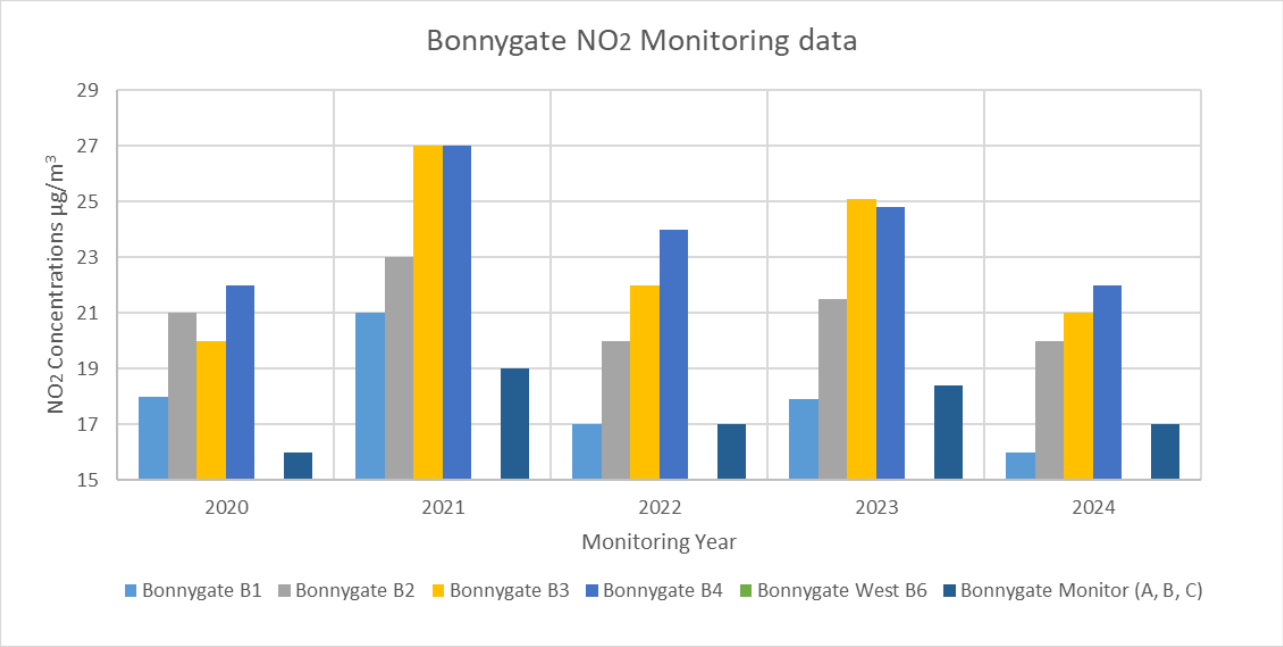
Exceedances of the NO_2 1-hour mean objective (200 µg m^{-3} not to be exceeded more than 18 times/year) are shown in bold.

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.

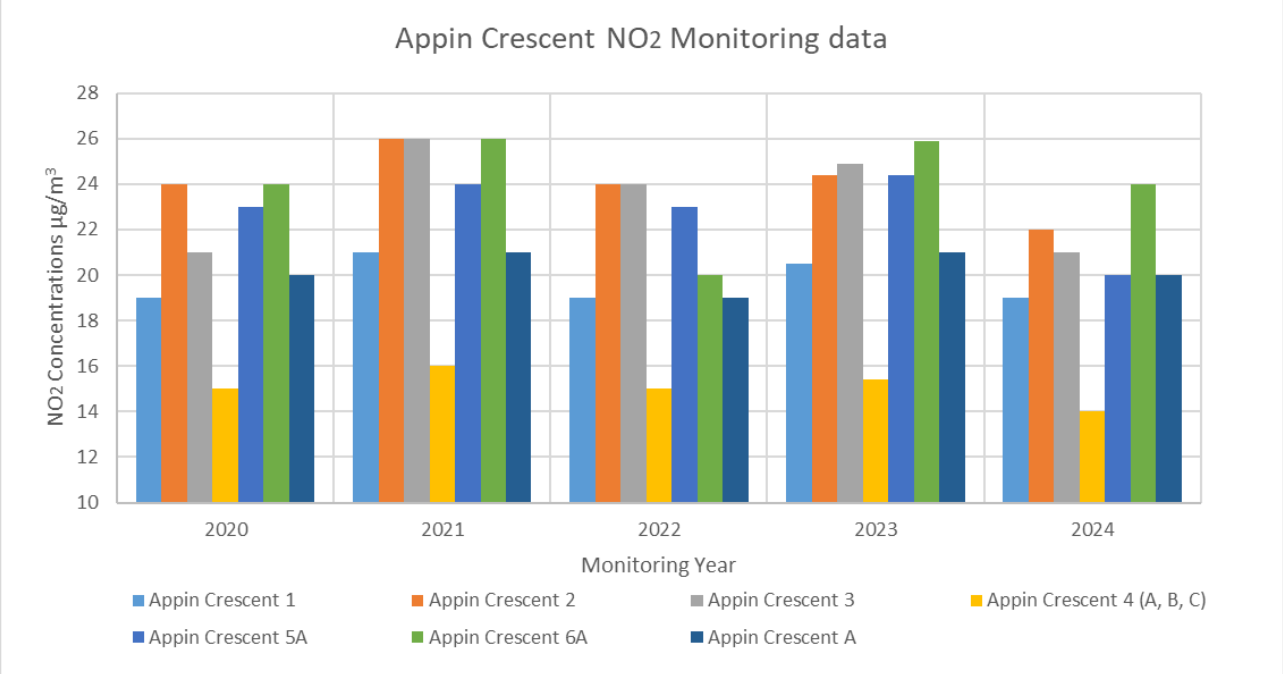
(2) Data capture for the full calendar year (e.g., if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Figure A. 1 Bonnygate Diffusion Tube Annual Mean Concentrations 2020-2024 (µg m^{-3})



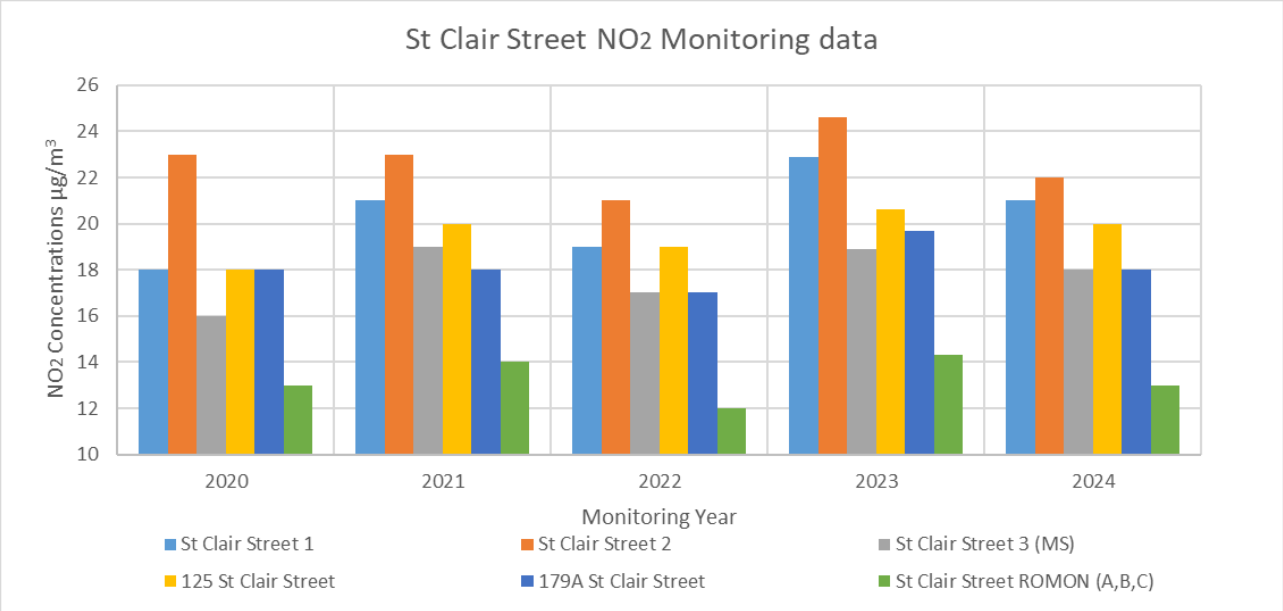
NO_2 annual mean concentrations for the Bonnygate area are presented in Figure A. 1. Concentrations increased at all sites between 2020 and 2021 before decreasing in 2022 although not as much as 2020 levels. There was a slight increase in 2023 before concentrations dropped again in 2024 closer to 2020 levels.

Figure A. 2 Appin Crescent Diffusion Tube Annual Mean Concentrations 2020-2024 (µg m^{-3})



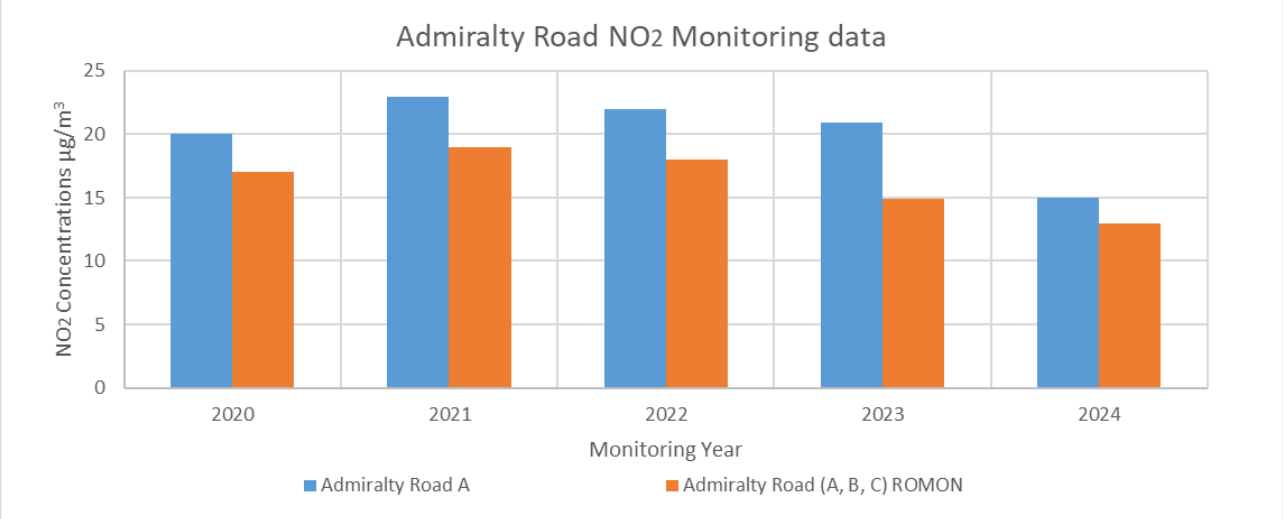
NO_2 annual mean concentrations for the Appin Crescent area are presented in Figure A. 2. Concentrations have increased then decreased slightly compared to the previous year but overall have remained fairly consistent since 2020.

Figure A. 3 St Clair Street Diffusion Tube Annual Mean Concentrations 2020-2024 (µg m^{-3})



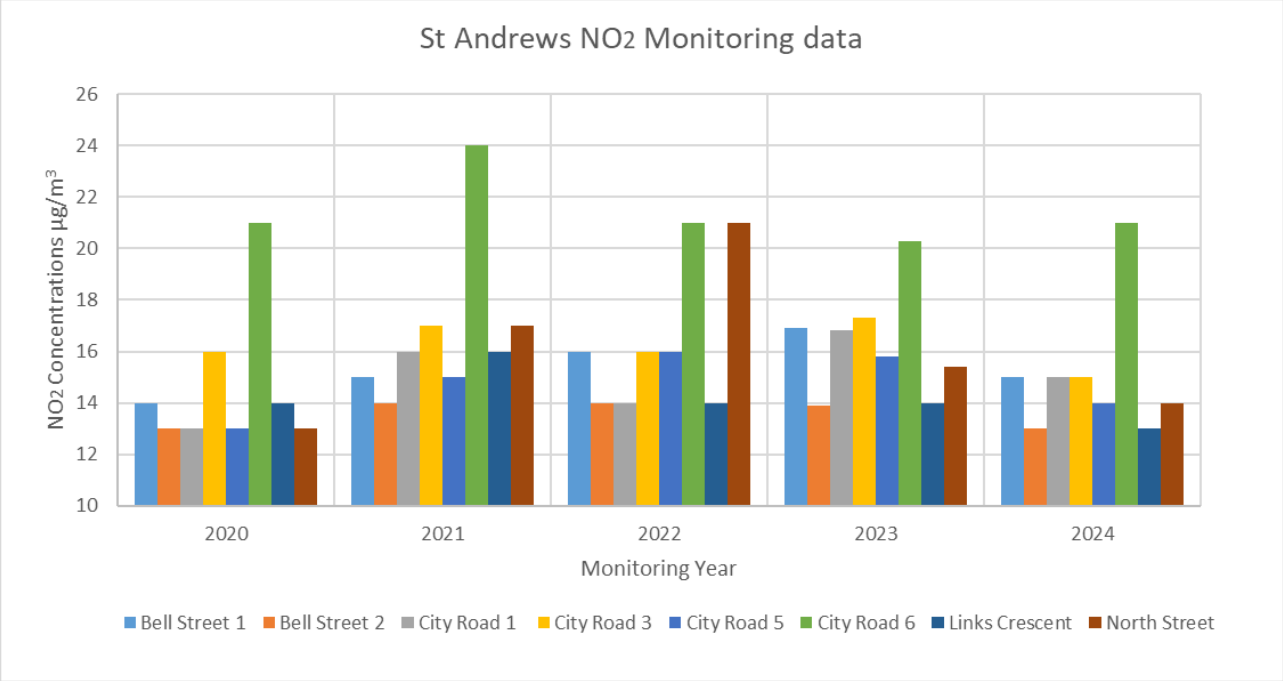
NO_2 annual mean concentrations for the St Clair Street area are presented in Figure A. 3. Concentrations have remained fairly consistent since 2020 with a slight increase in 2023. Then a slight drop in concentrations in 2024.

Figure A. 4 Admiralty Road Diffusion Tube Annual Mean Concentrations 2020-2024 (µg m^{-3})



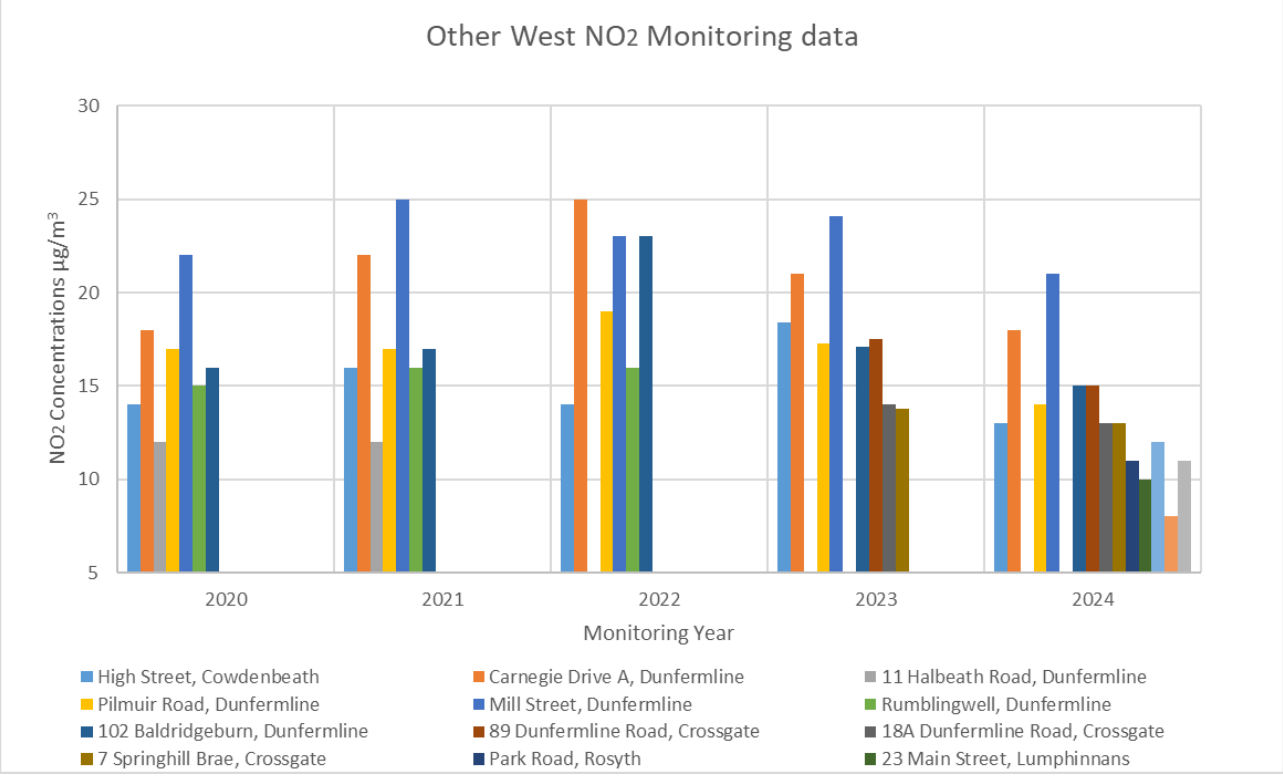
NO_2 annual mean concentrations for the Admiralty Road area are presented in Figure A. 4. Concentrations increased slightly between 2020 and 2021 then have been gradually decreasing since 2021.

Figure A. 5 St Andrews Diffusion Tube Annual Mean Concentrations 2020-2024 (µg m^{-3})



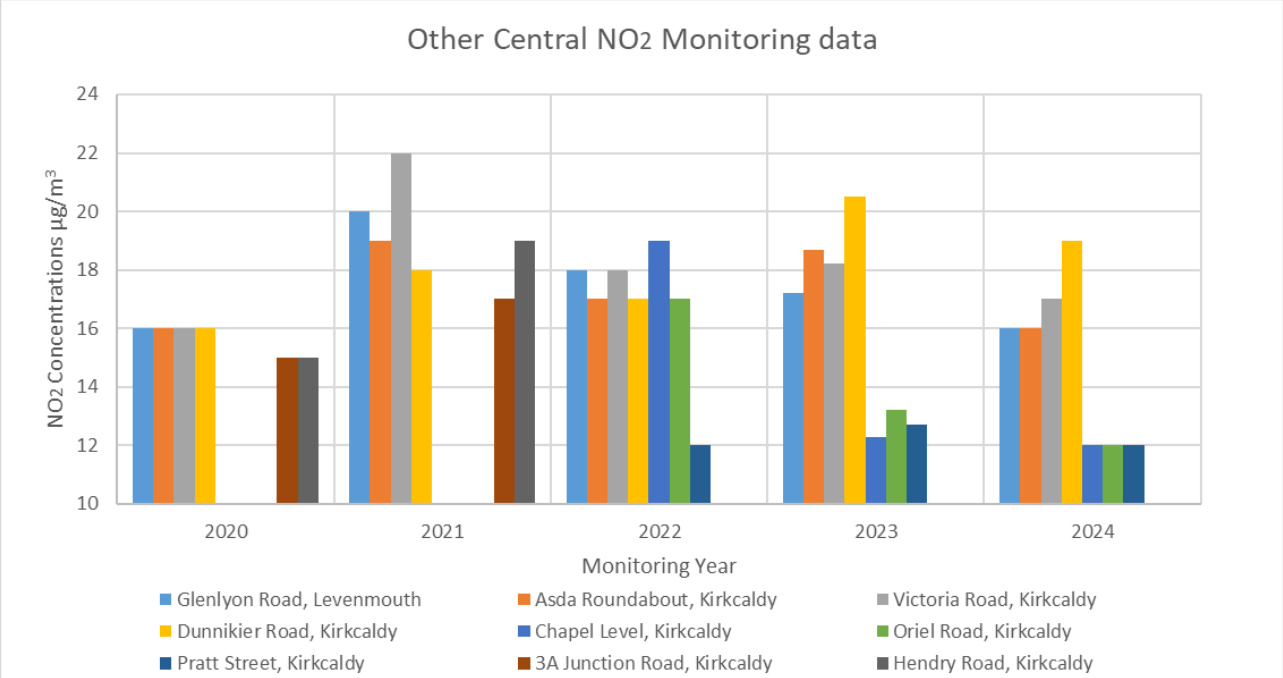
NO_2 annual mean concentrations for the St Andrews area are presented in Figure A. 5. Concentrations increased slightly in 2021 before dropping again in 2022. Concentrations have remained fairly consistent across 2022, 2023 and 2024. City Road 5 was an exception and increased slightly between 2020 and 2023 before decreasing in 2024.

Figure A. 6 Other West Diffusion Tube Annual Mean Concentrations 2020-2024 (µg m^{-3})



NO_2 annual mean concentrations for the other west areas in Fife are presented in Figure A. 6. Concentrations increased in 2021 and compared to 2020. Then dropped slightly in 2023 and 2024. Three new sites were added in 2023 and five new sites were added in 2024.

Figure A. 7 Other Central Diffusion Tube Annual Mean Concentrations 2020-2024 (µg m^{-3})



NO_2 annual mean concentrations for the other central areas in Fife are presented in Figure A. 7. Concentrations increased between 2020 and 2021 at all monitoring sites. Concentrations decreased in 2022, two sites were decommissioned and three sites were added. Concentrations increased slightly in 2023 with the exception of Chapel Level, Kirkcaldy; Oriel Road, Kirkcaldy and Pratt Street, Kirkcaldy. Concentrations at all sites dropped in 2024 compared to 2023.

Table A. 6 – 2024 AQMesh Sensor Monitoring results – NO_2

Site	Annual Mean (μgm^{-3})	Annualised Mean (μgm^{-3})	Data Capture	Hourly Max (μgm^{-3})	Max 24-hour mean (μgm^{-3})	Low	Moderate	High	Hours exceeding hourly Objective	98.8th Percentile
Fife Appin Crescent West	13.7		92.1%	93.1	31.1	99.1%	0.0%	0.0%	0	52.1
Fife Bonnygate North	21.3		87.2%	107.7	47.4	99.9%	0.0%	0.0%	0	87.6
Fife Bonnygate South	16.2	14.9	72.5%	83.8	33.3	99.2%	0.0%	0.0%	0	66.9
Fife Crossgates Dunfermline Road	9.7	9.2	41.8%	65.4	36.0	95.9%	0.0%	0.0%	0	52.7
Fife Dunfermline Aberdour Road	13.7		80.0%	77.4	41.5	98.9%	0.0%	0.0%	0	66.0
Fife Dunfermline Baldridgeburn*	13.5*		13.2%	58.3	33.9	94.7%	0.0%	0.0%		55.5
Fife Kirkcaldy St Clair St	23.7		96.7%	146.8	64.6	99.1%	0.0%	0.0%	0	102.8
Fife Lumphinnans Main Street	10.0	9.5	41.4%	72.6	40.7	98.9%	0.0%	0.0%	0	56.7
Fife Rosyth Harley Street*	15.7*		13.4%	74.9	42.0	94.8%	0.0%	0.0%		73.0
Fife St Andrews City Rd	18.8		98.6%	183.2	39.7	99.8%	0.0%	0.0%	0	76.1

* Period mean from when the monitoring started not annual mean. Due to low data capture the data could not be annualised.

Table A. 7 – Annual Mean PM_{10} Monitoring Results (µg m^{-3})

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2024 (%) (2)	2020	2020 Corrected#	2021	2021 Corrected#	2022	2022 Corrected#	2023	2023 Corrected#	2024	2024 Corrected#
Cupar	Kerbside	100	100	11.3	12.4	13.0	14.3	14.0	15.4	12.0	13.2	10.8	11.9
Dunfermline	Roadside	100	100	8.5	9.4	9.6	10.6	12.0	13.2	11.0	12.1	9.7	10.7
Kirkcaldy	Roadside	100	100	9.0	9.9	9.4	10.3	11.0	12.1	9.0	9.9	9.3	10.2
Rosyth	Roadside	100	99	9.1	10.0	9.9	10.9	11.0	12.1	9.0	9.9	9.6	10.6

Notes:

Exceedances of the PM_{10} annual mean objective of 18 µg m^{-3} are shown in bold.

All means have been corrected using factors (PM_{10} divided by 0.909) identified by the "Scottish Government Equivalence Study To Investigate Particulate Matter Monitoring In Scotland Using The Fidas 200"[2]

(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 PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50 µg m^{-3}

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2024 (%) (2)	2020	2021	2022	2023	2024
Cupar	Kerbside	100	100	0	0	0	0	0
Dunfermline	Roadside	100	100	0	0	0	0	0
Kirkcaldy	Roadside	100	100	0	0	0	0	0
Rosyth	Roadside	100	99	0	0	0	0	0

Notes:

Exceedances of the PM_{10} 24-hour mean objective (50 µg m^{-3} 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.

All data have been corrected using factors (PM_{10} divided by 0.909) identified by the "Scottish Government Equivalence Study To Investigate Particulate Matter Monitoring In Scotland Using The Fidas 200"[2]

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

(1) 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. 9 – 2024 AQMesh Sensor Monitoring results – PM_{10}

Site	Annual Mean (μgm^{-3})	Annualised Mean (μgm^{-3})	Data Capture	Hourly Max (μgm^{-3})	Max 24-hour mean (μgm^{-3})	Low	Moderate	High	Number of Days exceeding Daily Objective	98.1st Percentile
Fife Appin Crescent West	8.4		88.4%	157.8	40.9	100.0%	0.0%	0.0%	0	26.2
Fife Bonnygate North	8.1		88.3%	250.6	41.6	99.8%	0.2%	0.0%	0	32.9
Fife Bonnygate South	10.4	10.4	72.4%	104.1	59.0	99.1%	0.9%	0.0%	1	37.6
Fife Crossgates Dunfermline Road	11.4	12.3	41.8%	96.7	49.6	99.5%	0.5%	0.0%	0	42.0
Fife Dunfermline Aberdour Road	9.6		76.5%	116.0	64.0	99.2%	0.8%	0.0%	1	36.7
Fife Dunfermline Baldridgeburn*	6.6*		12.3%	44.3	23.4	100.0%	0.0%	0.0%		18.4
Fife Kirkcaldy St Clair St	7.5		99.4%	47.6	30.2	100.0%	0.0%	0.0%	0	19.4
Fife Lumphinnans Main Street	7.6	8.1	39.7%	140.0	42.2	100.0%	0.0%	0.0%	0	26.1
Fife Rosyth Harley Street*	6.4*		12.6%	32.9	19.6	100.0%	0.0%	0.0%		17.9
Fife St Andrews City Rd	9.6		97.7%	104.6	46.9	99.7%	0.3%	0.0%	0	35.8

* Period mean from when the monitoring started not annual mean. Due to low data capture the data could not be annualised

Table A. 10 – Annual Mean $PM_{2.5}$ Monitoring Results (µg m^{-3})

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2024 (%) (2)	2020	2020 Corrected#	2021	2021 Corrected#	2022	2022 Corrected#	2023	2023 Corrected#	2024	2024 Corrected#
Cupar	Kerbside	100	100	5.6	5.9	6.3	6.7	7.0	7.4	6.0	6.4	5.5	5.8
Dunfermline	Roadside	100	100	4.8	5.1	5.5	5.8	6.0	6.4	5.0	5.3	5.6	5.9
Kirkcaldy	Roadside	100	100	5.0	5.3	5.3	5.6	6.0	6.4	5.0	5.3	5.2	5.5
Rosyth	Roadside	100	99	5.1	5.4	5.5	5.8	6.0	6.4	5.0	5.3	5.3	5.6

Notes:

Exceedances of the $PM_{2.5}$ annual mean objective of 10 µg m^{-3} are shown in bold.

All means have been corrected using factors ($PM_{2.5}$ multiplied by 1.06) identified by the "Scottish Government Equivalence Study To Investigate Particulate Matter Monitoring In Scotland Using The Fidas 200"[2]

(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. 11 – 2024 AQMesh Sensor Monitoring results – $PM_{2.5}$

Site	Annual Mean (μgm^{-3})	Annualised Mean (μgm^{-3})	Data Capture	Hourly Max (μgm^{-3})	Max 24-hour mean (μgm^{-3})	Low	Moderate	High
Fife Appin Crescent West	5.2		88.4%	98.3	27.8	100.0%	0.0%	0.0%
Fife Bonnygate North	5.8		88.3%	141.2	29.0	99.9%	0.1%	0.0%
Fife Bonnygate South	4.9	5.0	73.3%	39.9	23.2	100.0%	0.0%	0.0%
Fife Crossgates Dunfermline Road	3.7	3.8	41.8%	29.8	16.1	100.0%	0.0%	0.0%
Fife Dunfermline Aberdour Road	5.4		76.5%	82.7	39.2	99.5%	0.5%	0.0%
Fife Dunfermline Baldridgeburn*	3.9*		12.3%	73.5	19.7	100.0%	0.0%	0.0%
Fife Kirkcaldy St Clair St	4.8		99.4%	33.1	21.3	100.0%	0.0%	0.0%
Fife Lumphinnans Main Street	4.2	4.6	39.8%	45.6	17.6	100.0%	0.0%	0.0%
Fife Rosyth Harley Street*	3.4*		12.7%	29.8	16.1	100.0%	0.0%	0.0%
Fife St Andrews City Rd	5.6		98.5%	135.3	29.2	100.0%	0.0%	0.0%

* Period mean from when the monitoring started not annual mean. Due to low data capture the data could not be annualised

Appendix B Full Monthly Diffusion Tube Results for 2024

Table B. 1 – NO_2 2024 Monthly Diffusion Tube Results (µg m^{-3})

Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted (1)
Central														
Glenlyon, Leven	29.5	25.1	23.4	21.2	19.9	17.8	16.2	15.3	21.8	20.5	25.1	21.2	21.4	15.8
ASDA Roundabout, Kirkcaldy	24.3	22.4	29.9	20.3	23.2	16.4	15.3	17.8	20.4	25.7	26.5	24.1	22.2	16.4
Victoria Road, Kirkcaldy	23.5	25.0	28.0	21.2	25.9	18.2	18.1	17.5	20.9	21.9	28.5	22.6	22.6	16.7
Dunnikier Road, Kirkcaldy	31.1	28.4	32.2	20.8	27.3	21.7	21.5	20.6	26.7	26.8	29.8	27.7	26.2	19.3
Henry Road, Kirkcaldy	32.8	29.4	26.4	25.2	22.9	23.8	22.4	18.6	26.6	23.8	37.3	30.2	26.6	19.6
Chapel Level, Kirkcaldy	24.9	19.1	17.9	13.7	12.5	13.6	11.7	11.1	14.3	15.1	24.4	20.2	16.5	12.2
Oriel Road, Kirkcaldy	18.0	17.6	18.9	14.0	17.4	11.2	12.3	10.8	18.0	17.0	19.9	No return	15.9	11.7
Pratt Street, Kirkcaldy	20.7	18.5	17.5	15.8	13.4	13.1	14.2	11.7	14.4	17.3	20.8	15.9	16.1	11.9
St Clair Street 1, Kirkcaldy	30.0	26.1	34.0	23.3	33.2	20.2	No return	No return	28.7	28.0	28.5	26.8	27.9	20.6
St Clair Street 2, Kirkcaldy	42.4	35.9	29.4	27.1	24.1	26.1	24.4	25.1	29.1	30.0	22.6	36.1	29.4	21.7
St Clair Street 3, Kirkcaldy	24.9	24.0	30.8	22.2	26.9	18.8	19.8	18.8	25.0	26.6	24.9	24.7	24.0	17.7
125 St Clair Street, Kirkcaldy	35.3	33.0	23.2	22.1	18.5	21.3	21.1	21.9	23.6	23.4	34.8	43.7	26.8	19.8
179A St Clair Street, Kirkcaldy	32.4	29.2	21.0	20.7	16.5	24.1	19.3	20.3	22.6	26.5	33.8	27.6	24.5	18.1
St Clair Street Romon A, Kirkcaldy	20.9	22.6	17.3	15.7	10.7	13.4	12.5	13.6	15.8	19.1	23.3	21.7	18.0	13.3
St Clair Street Romon B, Kirkcaldy	28.1	21.9	17.9	15.3	13.7	14.3	12.7	13.9	17.0	19.9	24.2	24.3		
St Clair Street Romon C, Kirkcaldy	17.8	18.5	19.9	13.6	14.4	13.9	13.6	15.0	16.1	22.5	27.6	24.8		
East														
City Road 1, St Andrews	21.7	20.9	29.0	20.4	26.5	14.6	14.9	11.7	22.6	19.4	21.7	15.9	19.9	14.7
Bell Street 1, St Andrews	20.6	23.8	23.0	20.1	20.7	18.5	16.5	13.8	20.1	20.4	No return	No return	19.8	14.6

Bell Street 2, St Andrews	18.8	20.0	17.8	18.1	No return	16.1	14.8	13.4	18.4	17.8	21.3	17.6	17.6	13.0
City Road 3, St Andrews	27.7	23.8	23.3	21.1	20.3	19.9	17.3	16.6	17.1	20.1	24.7	18.2	20.8	15.4
City Road 5, St Andrews	23.8	22.4	21.8	20.4	17.1	17.0	14.5	15.5	17.8	19.4	24.5	20.3	19.5	14.4
City Road 6, St Andrews	30.3	30.2	26.9	25.5	28.6	29.2	26.6	24.3	34.7	29.8	35.0	21.2	28.5	21.1
Links Crescent, St Andrews	21.4	19.8	18.4	17.0	18.2	17.2	15.2	14.3	17.3	18.7	19.1	14.9	17.6	13.0
North Street, St Andrews	21.4	19.9	18.4	17.7	17.0	19.8	16.1	16.0	21.7	19.7	25.7	20.3	19.5	14.4
Bonnygate B1, Cupar	27.7	27.5	26.2	19.0	21.4	16.0	15.8	16.6	23.2	24.2	24.1	20.2	21.8	16.1
Bonnygate B2, Cupar	32.6	30.5	29.0	22.0	35.0	21.8	18.2	17.2	27.7	26.0	35.8	27.0	26.9	19.9
Bonnygate B4, Cupar	37.7	34.5	33.4	26.8	29.3	27.0	25.8	24.7	30.8	31.5	36.3	27.2	30.4	22.4
Bonnygate B3, Cupar	34.4	28.5	35.4	29.3	23.4	24.6	24.8	20.6	24.9	37.4	28.3	24.6	28.0	20.7
Bonnygate Monitor A, Cupar	28.2	26.9	27.4	19.3	23.3	17.3	15.1	16.9	24.2	22.1	35.4	19.8	22.6	16.7
Bonnygate Monitor B, Cupar	27.0	25.8	27.2	19.5	22.9	16.5	15.9	18.4	21.8	23.5	36.1	22.6		
Bonnygate Monitor C, Cupar	26.2	24.5	28.0	18.9	23.6	16.5	15.9	14.6	24.5	15.1	33.7	18.9		
West														
89 Dunfermline Road, Crossgate	29.9	18.9	23.3	15.7	18.4	18.7	12.0	12.2	19.0	21.5	26.0	20.8	19.7	14.5
18A Dunfermline Road, Crossgate	19.9	21.9	17.6	14.2	14.4	14.7	12.0	11.0	16.4	17.7	25.5	19.0	17.0	12.6
7 Springhill Brae, Crossgate	23.8	18.6	18.4	11.9	16.1	13.9	11.9	10.5	17.5	18.3	23.4	19.2	17.0	12.5
Admiralty Road A, Rosyth	25.0	21.6	24.1	17.9	21.2	16.6	14.8	14.1	21.1	23.0	24.0	20.1	20.3	15.0
Admiralty Road ROMAN A, Rosyth	24.1	18.0	17.9	15.1	17.9	17.2	13.9	11.1	17.7	21.2	24.6	17.7	17.7	13.1
Admiralty Road ROMAN B, Rosyth	24.9	20.2	18.2	15.3	16.7	13.9	13.7	No return	No return	19.5	24.5	17.7		
Admiralty Road ROMAN C, Rosyth	23.1	19.4	18.2	14.9	17.9	14.5	13.2	11.6	19.0	18.4	21.5	14.8		
Park Road, Rosyth	20.0	15.8	19.1	11.9	14.3	9.8	9.9	8.5	13.3	16.1	20.7	12.9	14.4	10.6
High Street, Cowdenbeath	18.2	18.2	22.0	18.3	22.0	12.8	11.9	11.7	17.7	20.8	20.2	12.2	17.2	12.7
Carnegie Drive A, Dunfermline	29.3	24.3	29.4	23.4	29.8	20.5	18.1	17.7	25.8	27.5	24.5	18.5	24.1	17.8
Pilmuir Street, Dunfermline	27.1	22.4	20.8	15.4	20.5	16.4	13.9	15.5	16.6	20.7	23.6	17.3	19.2	14.2
Mill Street, Dunfermline	33.9	31.2	26.1	28.7	28.2	24.4	23.2	17.6	28.6	27.7	36.0	30.2	28.0	20.7

102 Baldridgeburn, Dunfermline	28.9	20.4	18.4	18.4	18.4	19.0	No return	No return	18.7	18.3	26.9	19.4	20.7	15.3
23 Main Street, Lumphinnans	18.3	17.6	17.6	11.5	11.0	12.0	10.0	9.6	12.0	15.5	17.8	14.1	13.9	10.3
Aberdour Road, Dunfermline	23.6	21.0	15.9	11.7	13.4	13.2	11.4	11.1	15.1	15.3	24.2	No return	16.0	11.8
Nightingale Place, Dunfermline	19.3	15.7	10.6	7.9	7.2	7.8	7.3	6.6	9.1	12.6	17.2	15.4	11.4	8.4
Pittsburgh Road, Dunfermline	20.4	18.7	16.9	12.1	13.1	11.9	10.0	10.4	13.4	16.4	21.6	14.5	15.0	11.0
Appin Crescent A, Dunfermline	37.4	30.7	27.9	23.4	25.4	26.0	20.3	19.3	26.5	27.0	33.7	31.2	27.4	20.2
Appin Crescent 1, Dunfermline	38.5	33.2	26.0	21.6	20.3	22.7	21.3	17.7	23.4	26.7	31.9	20.5	25.3	18.7
Appin Crescent 4A, Dunfermline	27.8	21.0	23.7	14.0	15.0	15.6	14.7	14.1	15.9	20.2	23.2	21.6	18.6	13.7
Appin Crescent 4B, Dunfermline	25.6	17.8	20.9	13.8	14.3	16.5	14.9	14.0	16.5	19.3	24.5	18.8		
Appin Crescent 4C, Dunfermline	21.7	21.9	19.8	14.1	14.5	15.5	14.3	13.7	16.8	20.1	31.5	21.7		
Appin Crescent 2, Dunfermline	39.5	33.8	28.1	23.7	23.6	27.4	25.3	25.9	24.7	33.4	37.3	30.4	29.4	21.
Appin Crescent 3, Dunfermline	42.5	31.4	31.2	23.7	21.0	30.0	25.9	24.5	24.2	28.7	34.5	31.4	29.1	21.5
Appin Crescent 5A, Dunfermline	28.4	34.7	29.4	17.5	20.0	26.6	24.7	25.0	24.0	30.1	34.5	32.4	27.3	20.1
Appin Crescent 6A, Dunfermline	41.7	43.3	32.3	24.0	28.4	27.5	27.1	28.1	30.3	37.1	34.8	33.3	32.3	23.9

☒ **All erroneous data has been removed from the NO_2 diffusion tube dataset presented in Table B. 1.**

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.**

☒ **Local bias adjustment factor used.**

☒ **Fife Council confirm that all 2024 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System**.

Notes:

(1) See Appendix C for details on bias adjustment.

Appendix C Air Quality Monitoring Data QA/QC

New or Changed Sources Identified Within Fife Council During 2024

Fife Council has not identified any new sources relating to air quality within the reporting year of 2024.

Additional Air Quality Works Undertaken by Fife Council During 2024

Fife Council has not completed any additional works within the reporting year of 2024.

QA/QC of Diffusion Tube Monitoring

Diffusion tubes used by Fife Council are supplied and analysed by SOCOTEC. The tube preparation method is 20% TEA in water. SOCOTEC is a participant in the centralised QA/QC services provided by Defra and the devolved administrations. These services compromise of:

- Promotion of the independent AIR-PT scheme, operated by LGC Standards and supported by the Health and Safety Laboratory, with yearly assessment against agreed performance criteria. AIR-PT combines two long running PT schemes: the LGC Standards STACKS PT scheme and the HSL Workplace Analysis Scheme for Proficiency (WASP) PT scheme.
- Provision of quality control standard solutions, free of charge to laboratories that prepare and analyse NO_2 diffusion tubes used by Local Authorities for LAQM purposes.

Diffusion Tube Annualisation

All diffusion tube monitoring locations within Fife Council recorded data capture of at least 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.

Diffusion Tube Bias Adjustment Factors

Fife Council have applied a local bias adjustment factor of 0.74 to the 2024 monitoring data. A summary of bias adjustment factors used by Fife Council over the past five years (and agreed with the Scottish Government and SEPA) is presented in Table C. 1.

Table C. 1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2024	Local	-	0.74
2023	Local	-	0.77
2022	Local	-	0.71
2021	Local	-	0.75
2020	Local	-	0.68

Diffusion tube samplers are a simple and cost-effective method of measuring NO_2. However, they are classed as an indicative method and are known to have a systematic bias compared to more accurate results obtained from calibrated automatic analysers. The local bias factor

is calculated using sites where a triplicate set of diffusion tubes are co-located with a chemiluminescence analyser. The national bias adjustment factor is derived using the national database co-location studies.

Fife Council has four co-location sites that have been used to calculate the local bias adjustment factor. These are Cupar – Bonnygate, Dunfermline – Appin Crescent, Kirkcaldy – St Clair Street and Rosyth – Admiralty Road. The local bias adjustment factor for each individual location was calculated using the "LAQM Diffusion Tube Processing Tool" described in LAQM TG(22). The results are shown in Table C. 2 and summarised in Table C. 3 below. The average of the local bias adjustment factors is 0.74.

The average local bias adjustment was applied to all diffusion tubes for consistency.

Table C. 2 – Local Bias Adjustment Calculations

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4
Periods used to calculate bias	11	12	11	12
Bias Factor A	0.79 (0.74 - 0.85)	0.74 (0.69 - 0.81)	0.69 (0.65 - 0.73)	0.73 (0.69 - 0.78)
Bias Factor B	26% (17% - 35%)	34% (23% - 46%)	45% (36% - 54%)	37% (28% - 46%)
Diffusion Tube Mean (µg m^{-3})	22.8	18.6	17.6	18.8
Mean CV (Precision)	4.5%	6.1%	7.5%	9.4%
Automatic Mean (µg m^{-3})	18.1	13.8	12.1	13.7
Data Capture	100%	100%	100%	100%
Adjusted Tube Mean (µg m^{-3})	18 (17 - 19)	14 (13 - 15)	12 (11 - 13)	14 (13 - 15)

Table C. 3 – Local Bias Adjustment Calculations

	Cupar	Dunfermline	Kirkcaldy	Rosyth	Average
Local Bias Adjustment	0.79	0.74	0.69	0.73	0.74

NO2 Fall-off with Distance from the Road

No diffusion tube NO_2 monitoring locations within Fife Council required distance correction during 2024.

QA/QC of Automatic Monitoring

The QA/QC procedures follow the requirements of the Technical Guidance (TG.22) and are equivalent to those used at UK levels for the National Network (AURN) monitoring sites. This gives a high degree of confidence in the data obtained, both for measured concentrations at the automatic sites and for establishing robust bias correction factors for diffusion tubes.

In order to satisfy the requirement in the Technical Guidance (TG.22), the following QA/QC procedures were implemented:

- 3-weekly calibrations of the NOx analyser;
- 6-monthly audits and servicing of the monitoring site;

- Data ratification.

The Local Site Operator (LSO) duties are carried out by EnviroTechnology Services on behalf of Fife. Calibrations of the NOx analyser were carried out using certified compressed gas standards (ISO17025). This ensured that the calibration gas was traceable to national and international standards. FIDAS diagnostics were recorded, and Cal dust checks were performed.

Audits of the monitoring sites consisted of a number of performance checks to identify any faults with the equipment. The calibration cylinder was also checked against another gas standard in order to confirm the gas concentration. Any identified faults during the audit were forwarded on to the service unit for repair.

The final stage of the QA/QC process was to ratify the data. The SAQD (Ricardo) are responsible for the data management. During ratification, all calibration, audit and service data are collected, and the data are scaled appropriately. Any suspect data identified are deleted therefore ensuring that the data are of a high quality.

Monitoring data presented within the APR is ratified. Live and historic data is available on the Scottish Air Quality Website.

PM_{10} and $PM_{2.5}$ Monitoring Adjustment

PM_{10} and $PM_{2.5}$ monitoring is completed within Fife Council. The PM equivalence study[8] carried out by the Scottish Government identified that when monitoring using the FIDAS 200 technique correction factors for PM_{10} and $PM_{2.5}$ should be applied. The Scottish Government guidance[8] states that corrections should be applied when reporting data within the LAQM reporting regime. The correction factors should be applied to the data collected within the SAQD. PM_{10} data should be divided by 0.909 and $PM_{2.5}$ data should be multiplied by 1.06.

Automatic Monitoring Annualisation

All automatic monitoring locations within Fife Council 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.

NO_2 Fall-off with Distance from the Road

No automatic NO_2 monitoring locations within Fife Council required distance correction during 2024.

[8] Equivalence Study to Investigate Particulate Matter Monitoring in Scotland Using the Fidas 200 | Scottish Air Quality

Appendix D Technical Specification of Automatic Monitoring Equipment

Figure D. 1 Bonnygate, Cupar

Station Name:	Bonnygate, Cupar
Easting:	337403
Northing:	714571
Site Classification:	Kerbside (<1m from Kerb)
Distance to kerb and road name/number	0.5m to Bonnygate (A91)
Distance to nearest junction and joining road name/number	Opposite the junction with Ladywynd
Start date of monitoring	19 December 2005
Manifold type and height:	Single Teflon tube, Inlet height 1.9m
Network affiliation:	Scottish Air Quality Database
Quality control procedures:	Manual certified calibration by EnviroTechnology Services with 6-monthly audits by Ricardo
Pollutants measured on site:	PM_{10}, $PM_{2.5}$, PM_1, TSP, NOx, NO, NO_2
Instrument manufacturer:	FIDAS 200 Teledyne API T200
Calibration procedure and frequency:	3-weekly manual calibration by EnviroTechnology Services
Site service arrangements:	6-monthly detailed service by EnviroTechnology Services
Co-located passive sampler	Triplicate NO_2 tubes installed

Figure D. 2 Appin Crescent, Dunfermline

Station Name:	Appin Crescent, Dunfermline
Easting:	309926
Northing:	687722
Distance to kerb and road name/number	3m + (A907)
Site Classification:	Roadside
Manifold type and height:	Single Teflon tube, inlet height 2m
Network affiliation:	Scottish Air Quality Database
Quality control procedures:	Manual certified calibration by EnviroTechnology Services with 6-monthly audits by Ricardo
Pollutants measured on site:	PM_{10}, $PM_{2.5}$, PM_1, TSP, NOx, NO, NO_2
Instrument manufacturer:	FIDAS 200 Teledyne API T200
Calibration procedure and frequency:	3-weekly manual calibration by EnviroTechnology Services
Site service arrangements:	6-monthly detailed service by EnviroTechnology Services
Co-located passive sampler	Triplicate NO_2 tubes installed

Figure D. 3 St Clair Street, Kirkcaldy

Station Name:	St Clair Street, Kirkcaldy
Easting:	329143
Northing:	692986
Site Classification:	Roadside
Distance to kerb and road name/number	4.8m, Saint Clair Street/A921
Start date of monitoring	February 2011
Manifold type and height:	Single Teflon tube, Inlet height 2m
Network affiliation:	Scottish Air Quality Database
Quality control procedures:	Manual certified calibration by EnviroTechnology Services with 6-monthly audits by Ricardo
Pollutants measured on site:	PM_{10}, $PM_{2.5}$, PM_1, TSP, NOx, NO, NO_2
Instrument manufacturer:	FIDAS 200 Teledyne API T200
Calibration procedure and frequency:	3-weekly manual calibration by EnviroTechnology Services
Site service arrangements:	6-monthly detailed service by EnviroTechnology Services
Co-located passive sampler	Triplicate NO_2 tubes installed

Figure D. 4 Admiralty Road, Rosyth

Station Name:	Admiralty Road, Rosyth
Easting:	311755
Northing:	683503
Site Classification:	Roadside
Distance to kerb and road name/number	6m (A985(T))
Start date of monitoring	March 2008
Manifold type and height:	Single Teflon tube, Inlet height 2.1m
Network affiliation:	Scottish Air Quality Database
Quality control procedures:	Manual certified calibration by EnviroTechnology Services with 6-monthly audits by Ricardo
Pollutants measured on site:	PM_{10}, $PM_{2.5}$, PM_1, TSP, NOx, NO, NO_2
Instrument manufacturer:	FIDAS 200 Teledyne API T200
Calibration procedure and frequency:	3-weekly manual calibration by EnviroTechnology Services
Site service arrangements:	6-monthly detailed service by EnviroTechnology Services
Co-located passive sampler	Triplicate NO_2 tubes installed

Appendix E Dynamic Report

A dynamic style report containing embedded statistical data for Fife can be found here: https://www.scottishairquality.scot/assets/reports/372/Fife_annual_2024.html. The key areas have been extracted and included below however further details can be found online. The embedded data allows the reader to interact with some of the report findings, providing additional insight. This approach enables a more easily navigated and streamlined report providing an engaging and intuitive reader experience. The analysis has been carried out for the pollutants NO_2, PM_{10} and $PM_{2.5}$ using the Openair analysis tool. This type of analysis helps the Council inform future policy making.

Openair is an innovative tool to analyse, interpret and understand air pollution data using "R". R is a free and open-source programming language designed for the analysis of data. The Openair tool can perform complex and innovative analysis of current and archived air pollutant data allowing powerful data visualisation and interrogation. For this report, Fife Council has utilised the following analysis tools;

- **Time variation** – This tool produces four separate panes combined into a single plot: The plotted output shows the average variation by day of the week and hour of the day combined (the top-most pane), hour of the day (diurnal variation, shown in the lower left pane), month of the year (seasonal variation in the lower middle pane) and day of week (lower right pane) of one or more variables or at one or multiple sites over a user selected time range. The plots have been created for all four automatic monitoring sites in Fife for the period 1st January – 31st December 2024. The variation of a pollutant by time of day and day of the week can reveal useful information concerning the likely sources at a particular site.
- **Polar Plots** – This tool produces polar plots of pollutant concentrations by wind speed and wind direction. Polar plots are useful to gain a quick graphical representation of the relationship between pollutant concentrations and the meteorological conditions. This can be useful in identifying potential sources of pollution affecting the location, for example particle suspension is increased at higher wind speeds come from a specific direction.
- **Calendar Plots** – This tool provides a way of visualising trends in daily pollutant concentrations across a year in the familiar form of a calendar. Concentrations are represented with a colour scale and the meteorological conditions can be represented using arrows giving the vector averaged wind direction, scaled according to the wind speed based on modelled wind speed and direction from data from the UK air quality forecast. In this way, pollution episodes can be identified by date and sources potentially indicated by the combination of pollutant and meteorological conditions.
- **Back Trajectory Analysis Plots** – The back trajectory plots show data from the HYSPLIT model (NOAA HYSPLIT) run in the analysis mode. This shows the air mass back trajectories for the period covered by this report. Two different kinds of plots are shown. One statistically groups the trajectories into similar clusters and shows the proportion of time during the reporting period that each represents. This is useful to get an overview of air mass origins during the reporting period. Plots in Trajectories associated with the top 10 most polluted days provide information on the trajectory direction associated with the top 10 measured concentrations.

Table E. 1 – Summary statistics for NO_2 (µg m^{-3})

Site	Mean	Data capture	Hourly max	Daily max	Low	Moderate	High	Hours exceeding	99.8th Percentile	98th Percentile	95th Percentile	50th Percentile
Fife Cupar	18.0	99.6%	108.2	50.3	366	0	0	0	90.1	62.4	50.7	13.4
Fife Dunfermline	14.0	92.9%	83.3	43.1	342	0	0	0	62.5	47.2	37.8	11.1
Fife Kirkcaldy	12.5	94.3%	87.3	40.1	347	0	0	0	70.6	48.3	36.0	9.4
Fife Rosyth	13.7	99.5%	77.2	42.1	366	0	0	0	67.7	48.1	38.4	9.9

Table E. 2 – Summary statistics for PM_{10} (µg m^{-3})

Site	Mean	Data capture	Hourly max	Max 24-hour mean	Low	Moderate	High	Days exceeding	98th Percentile daily	90th Percentile daily	98th Percentile hourly	95th Percentile hourly	50th Percentile hourly
Fife Cupar	10.8	100%	152.2	37.8	364	0	0	0	29.5	18	37.3	27.9	8.5
Fife Dunfermline	9.7	100%	191.5	37.3	366	0	0	0	27.0	16.6	31.7	24.2	7.8
Fife Kirkcaldy	9.3	100%	229.3	39.6	366	0	0	0	27.9	17.5	31.0	24.2	7.2
Fife Rosyth	9.6	99%	785.7	38.6	360	0	0	0	28.3	16.3	30.5	23.4	7.6

Table E. 3 – Summary statistics for $PM_{2.5}$ (µg m^{-3})

Site	Mean	Data capture	Max 24-hour mean	Low	Moderate	High
Fife Cupar	5.5	100%	23.6	364	0	0
Fife Dunfermline	5.6	100%	25.7	366	0	0
Fife Kirkcaldy	5.2	100%	25.1	366	0	0
Fife Rosyth	5.3	99%	24.2	360	0	0

Table E. 4 – SAQD Specific FIDAS corrected data Summary statistics for PM_{10} (µg m^{-3}) for LAQM Reporting

Site	Year	Mean	Mean Corrected	Hourly max	Hourly max Corrected	Max 24-hour	Max 24-hour Corrected
Fife Cupar	2018	13.7	15.1	219.8	241.7	61.4	67.5
Fife Cupar	2019	14.6	16.0	171.9	189.2	91.6	100.7
Fife Cupar	2020	11.3	12.4	203.0	223.3	43.3	47.6
Fife Cupar	2021	13.0	14.3	115.2	126.7	39.6	43.5
Fife Cupar	2022	14.3	15.7	450.5	495.6	73.9	81.3
Fife Cupar	2023	11.7	12.9	173.8	191.2	45.6	50.1
Fife Cupar	2024	10.8	11.9	152.2	167.4	37.8	41.6
Fife Dunfermline	2018	10.9	11.9	168.0	184.8	32.7	36.0
Fife Dunfermline	2019	11.2	12.3	459.3	505.3	69.6	76.5
Fife Dunfermline	2020	8.5	9.3	67.7	74.5	25.2	27.7
Fife Dunfermline	2021	9.6	10.6	320.4	352.5	46.9	51.6
Fife Dunfermline	2022	11.5	12.7	104.7	115.2	67.3	74.1
Fife Dunfermline	2023	10.6	11.6	625.3	687.8	53.6	59.0
Fife Dunfermline	2024	9.7	10.7	191.5	210.7	37.3	41.0
Fife Kirkcaldy	2018	10.3	11.3	115.8	127.4	43.5	47.8
Fife Kirkcaldy	2019	11.6	12.7	496.5	546.2	77.9	85.7
Fife Kirkcaldy	2020	9.0	9.9	60.5	66.6	26.2	28.8
Fife Kirkcaldy	2021	9.4	10.3	101.6	111.8	27.8	30.5
Fife Kirkcaldy	2022	10.7	11.8	87.9	96.7	63.9	70.3
Fife Kirkcaldy	2023	9.3	10.2	89.5	98.4	32.9	36.2
Fife Kirkcaldy	2024	9.3	10.2	229.3	252.3	39.6	43.6
Fife Rosyth	2018	10.5	11.6	70.5	77.6	43.4	47.7
Fife Rosyth	2019	10.0	11.0	139.9	153.9	69.4	76.3
Fife Rosyth	2020	9.1	10.0	299.2	329.2	41.5	45.7

Site	Year	Mean	Mean Corrected	Hourly max	Hourly max Corrected	Max 24-hour	Max 24-hour Corrected
Fife Rosyth	2021	10.0	11.1	126.0	138.6	29.4	32.4
Fife Rosyth	2022	10.6	11.7	438.2	482.1	67.7	74.5
Fife Rosyth	2023	9.0	9.9	554.0	609.5	32.7	35.9
Fife Rosyth	2024	9.6	10.5	785.7	864.3	38.6	42.5

Table E. 5 – SAQD Specific FIDAS corrected data Summary statistics for $PM_{2.5}$ (µg m^{-3}) for LAQM Reporting

Site	Year	Mean	Mean Corrected	Max 24-hour mean	Max 24-hour Corrected
Fife Cupar	2018	6.7	7.1	27.3	28.9
Fife Cupar	2020	5.6	5.9	21.3	22.6
Fife Cupar	2021	6.3	6.7	24.0	25.4
Fife Cupar	2024	5.5	5.8	23.6	25.0
Fife Dunfermline	2018	6.1	6.5	24.7	26.2
Fife Dunfermline	2020	4.8	5.1	19.1	20.2
Fife Dunfermline	2022	6.5	6.9	47.4	50.2
Fife Dunfermline	2023	5.5	5.8	23.1	24.5
Fife Dunfermline	2024	5.6	5.9	25.7	27.2
Fife Kirkcaldy	2018	5.8	6.2	27.0	28.7
Fife Kirkcaldy	2019	6.7	7.1	39.1	41.5
Fife Kirkcaldy	2020	5.0	5.3	17.6	18.7
Fife Kirkcaldy	2022	5.8	6.1	48.1	51.0
Fife Kirkcaldy	2024	5.2	5.5	25.1	26.6
Fife Rosyth	2020	5.1	5.4	32.9	34.8
Fife Rosyth	2022	5.9	6.2	47.1	49.9
Fife Rosyth	2023	4.9	5.2	22.7	24.1
Fife Cupar	2019	7.5	8.0	37.1	39.3

Site	Year	Mean	Mean Corrected	Max 24-hour mean	Max 24-hour Corrected
Fife Cupar	2022	7.3	7.8	48.2	51.1
Fife Cupar	2023	5.9	6.2	31.8	33.7
Fife Dunfermline	2019	6.4	6.8	38.8	41.1
Fife Dunfermline	2021	5.5	5.8	24.6	26.1
Fife Kirkcaldy	2021	5.3	5.6	21.1	22.4
Fife Kirkcaldy	2023	4.9	5.2	24.9	26.4
Fife Rosyth	2018	6.0	6.4	26.4	28.0
Fife Rosyth	2019	5.9	6.2	33.8	35.8
Fife Rosyth	2021	5.6	6.0	18.5	19.6
Fife Rosyth	2024	5.3	5.6	24.2	25.6

Figure E. 1 Cupar NO_2 time series

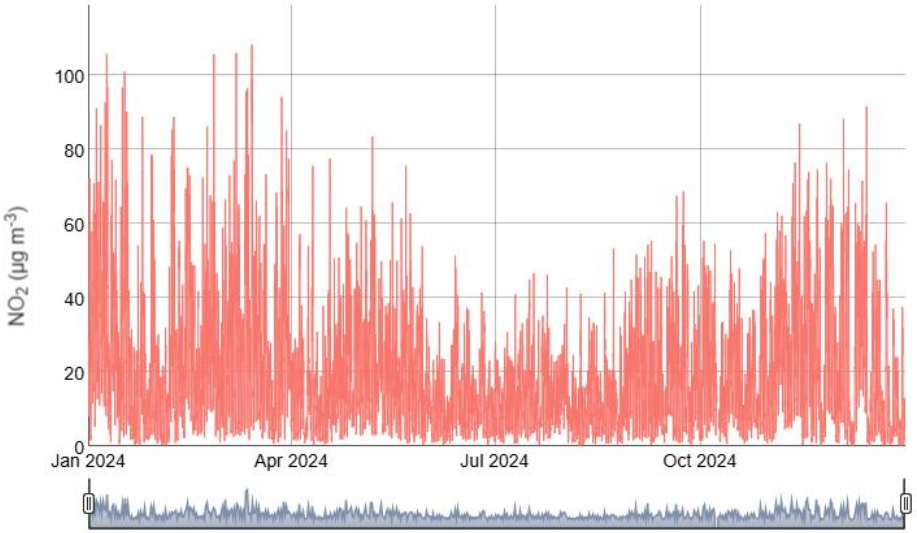


Figure E. 2 Dunfermline NO_2 time series

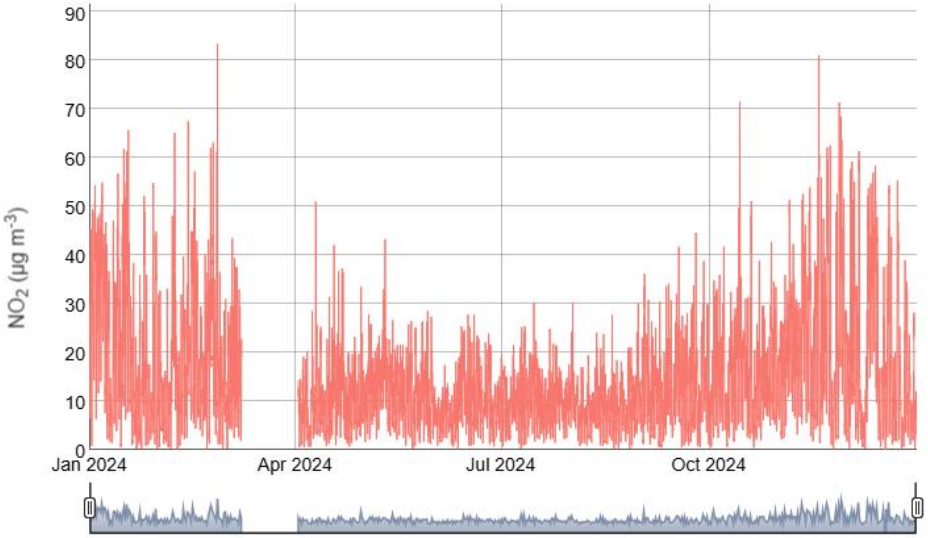


Figure E. 3 Kirkcaldy NO_2 time series

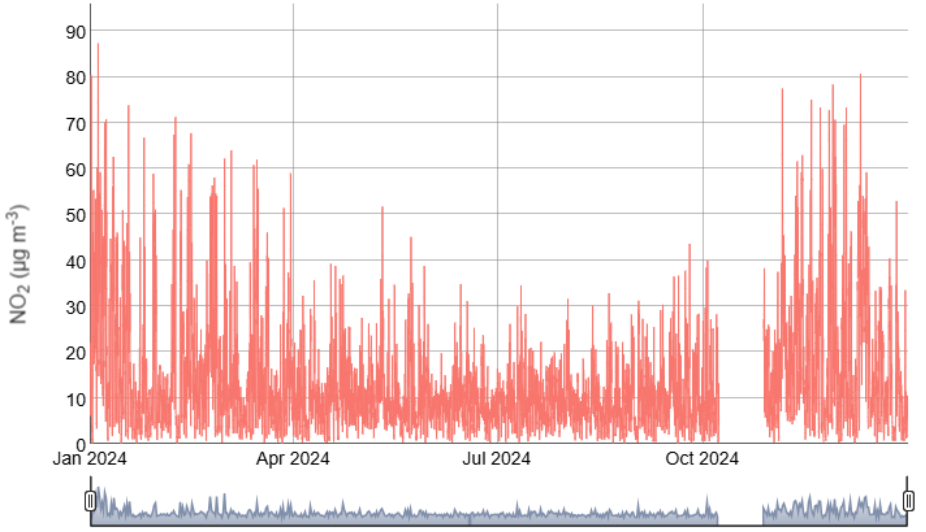


Figure E. 4 Rosyth NO_2 time series

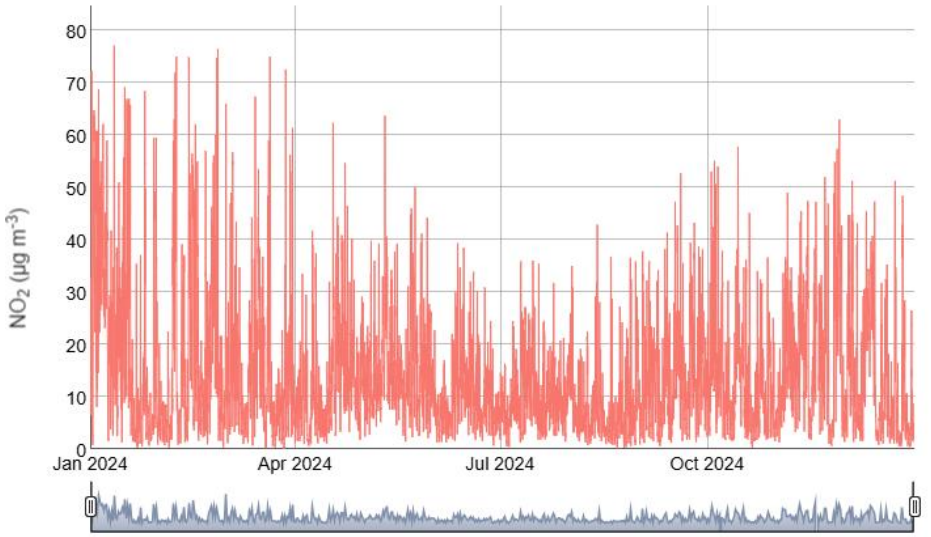


Figure E. 5 Cupar PM_{10} time series

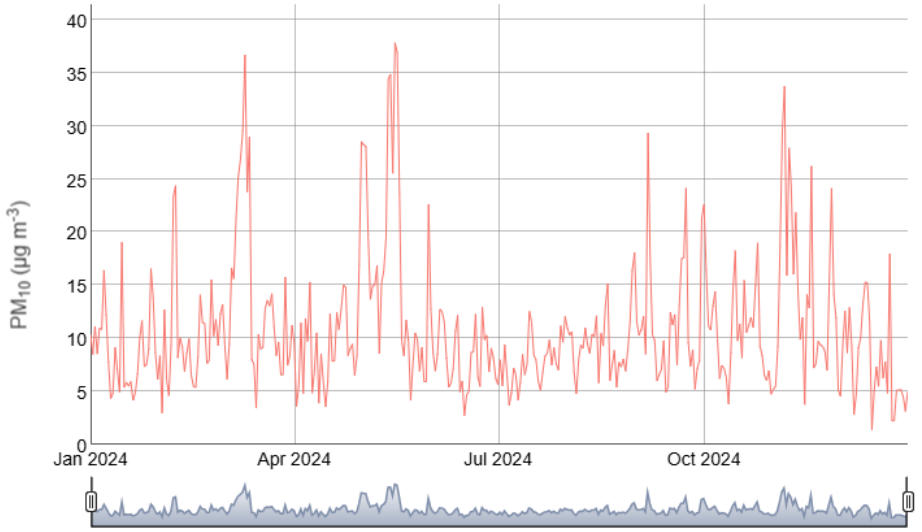


Figure E. 6 Dunfermline PM_{10} time series

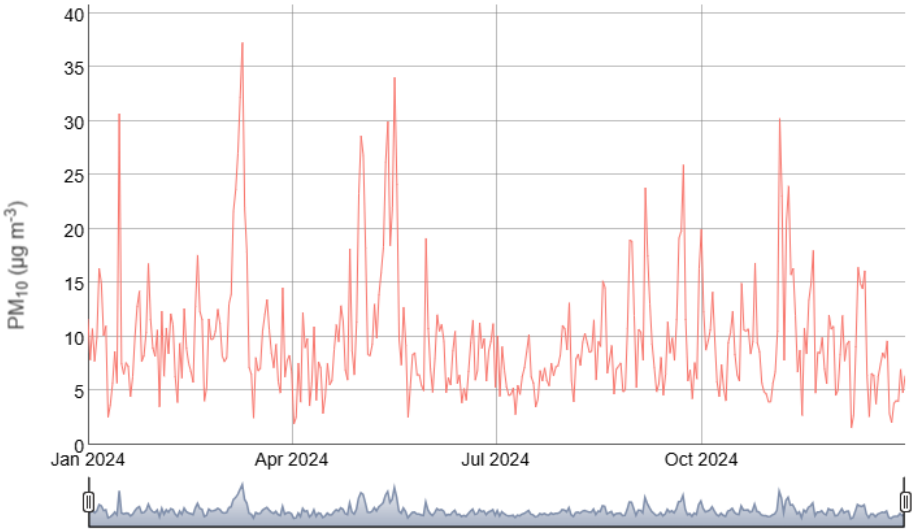


Figure E. 7 Kirkcaldy PM_{10} time series

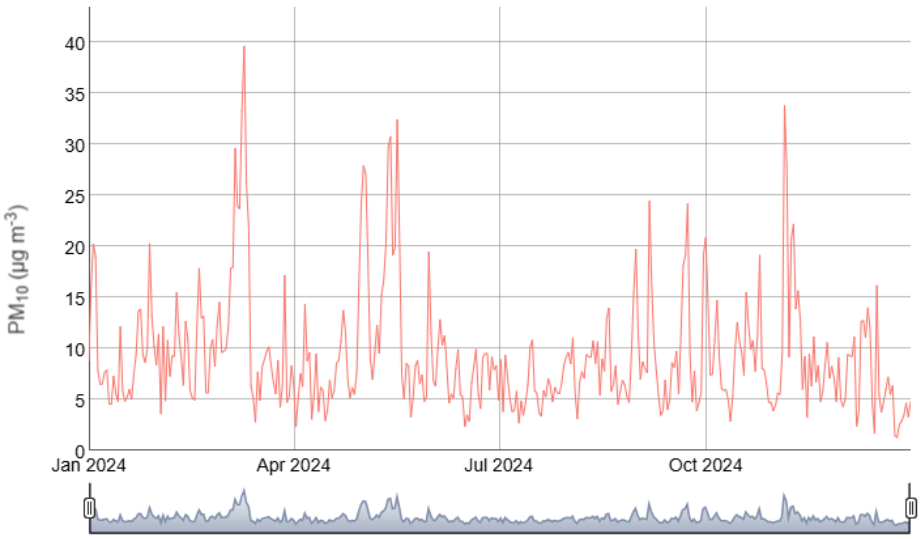


Figure E. 8 Rosyth PM_{10} time series

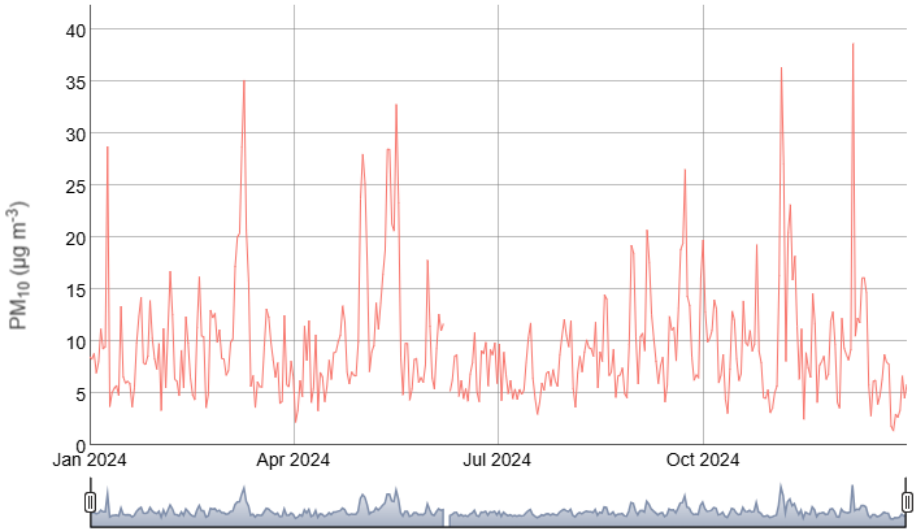


Figure E. 9 Cupar $PM_{2.5}$ time series

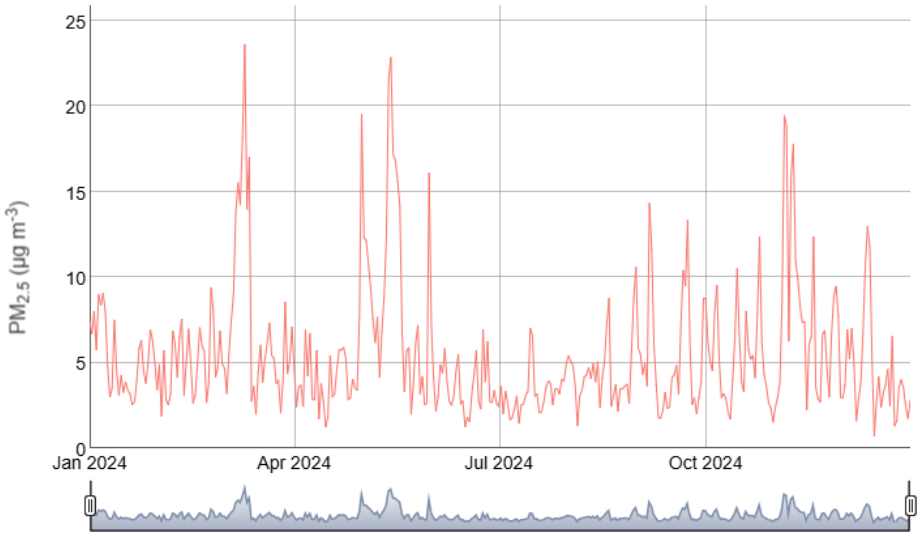


Figure E. 10 Dunfermline $PM_{2.5}$ time series

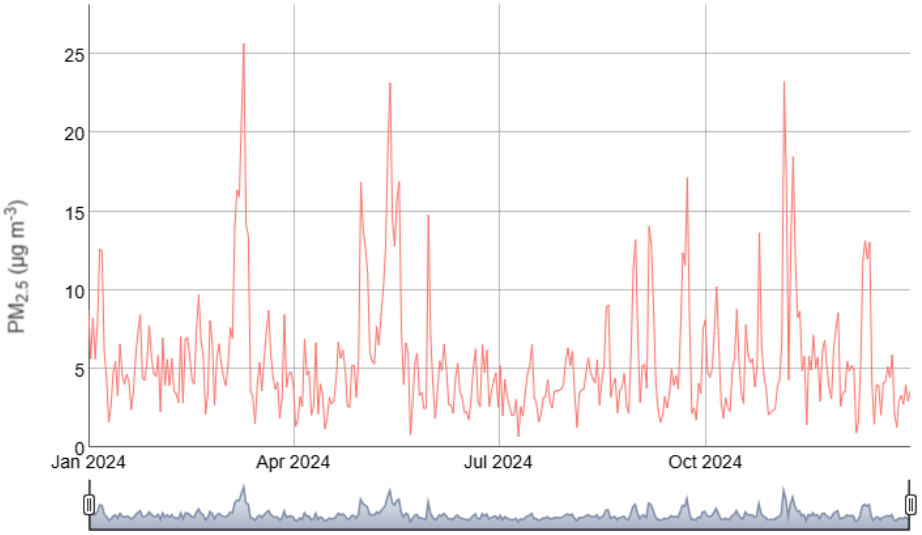


Figure E. 11 Kirkcaldy $PM_{2.5}$ time series

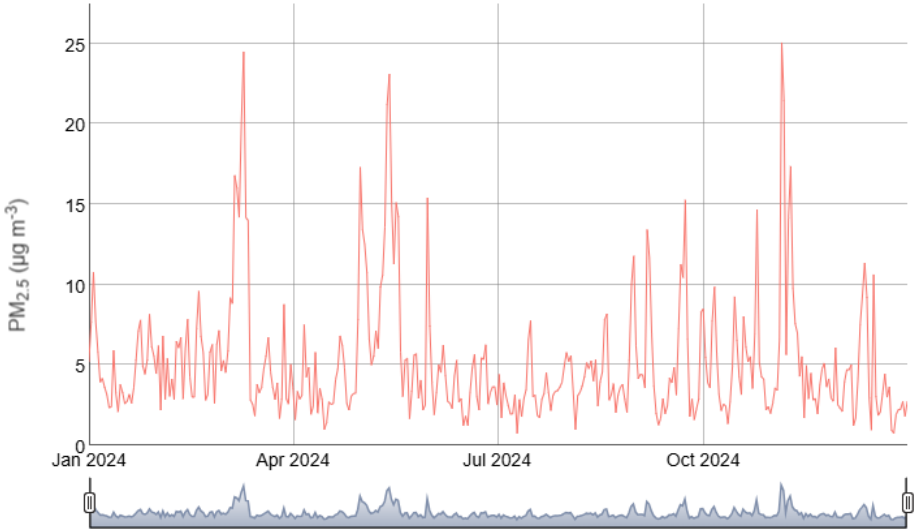


Figure E. 12 Rosyth $PM_{2.5}$ time series

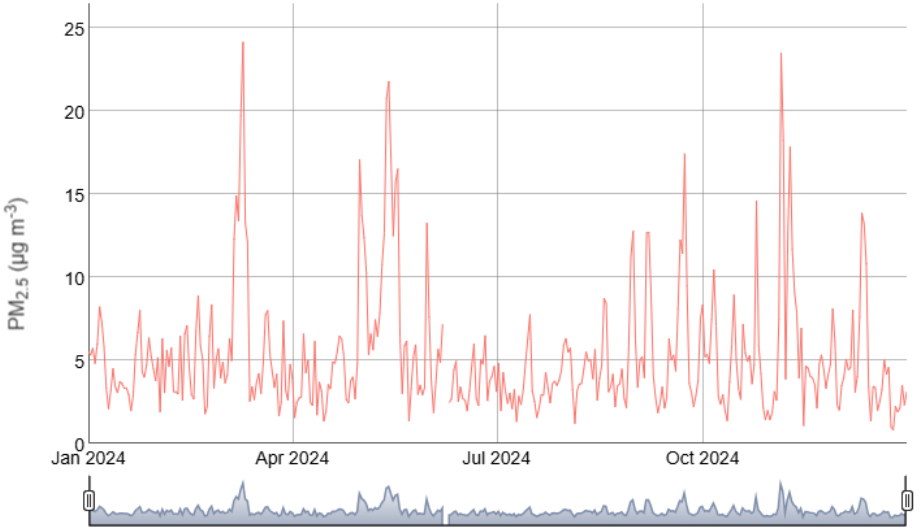


Figure E. 13 Cupar NO_2 calendar plots

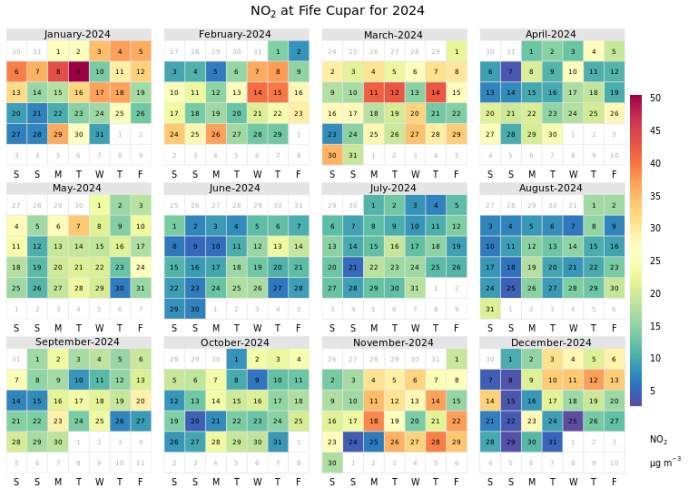


Figure E. 14 Dunfermline NO_2 calendar plots

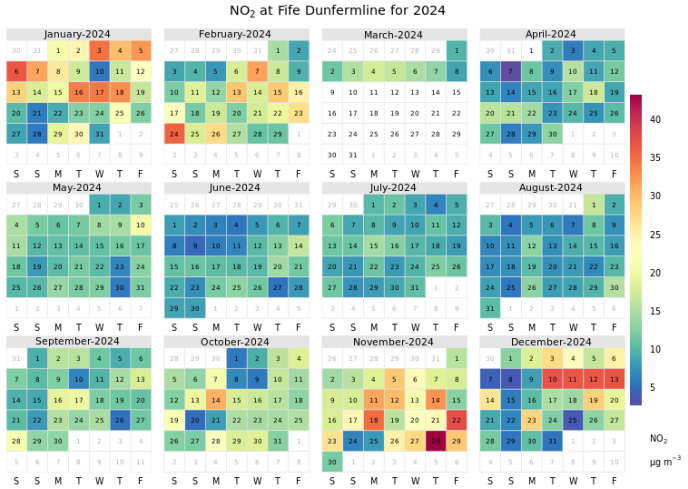


Figure E. 15 Kirkcaldy NO_2 calendar plots

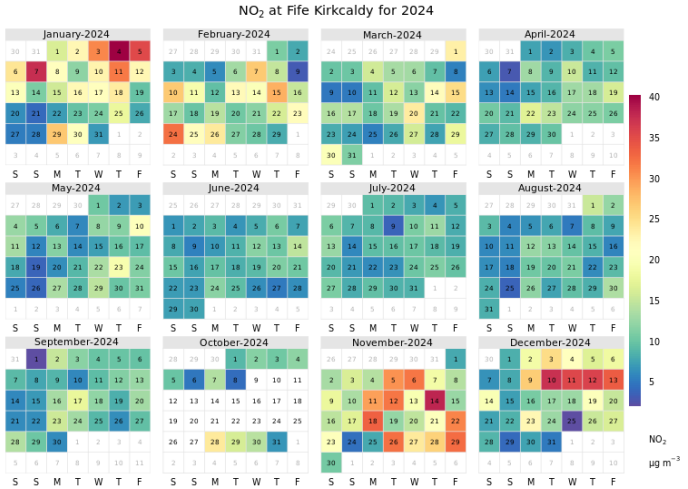


Figure E. 16 Rosyth NO_2 calendar plots

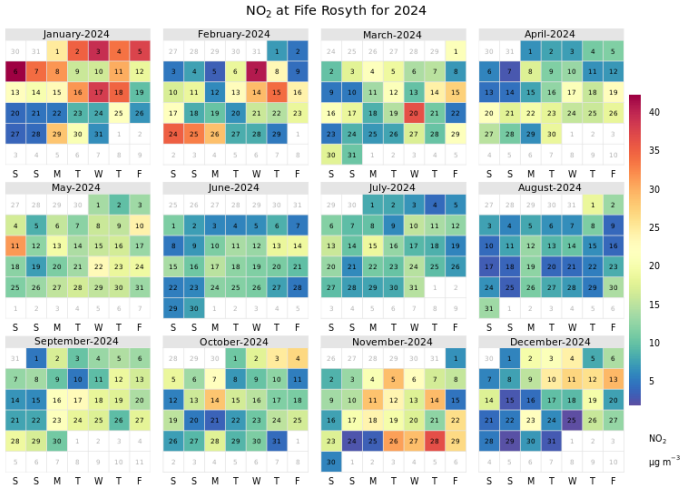


Figure E. 17 Cupar PM_{10} calendar plots

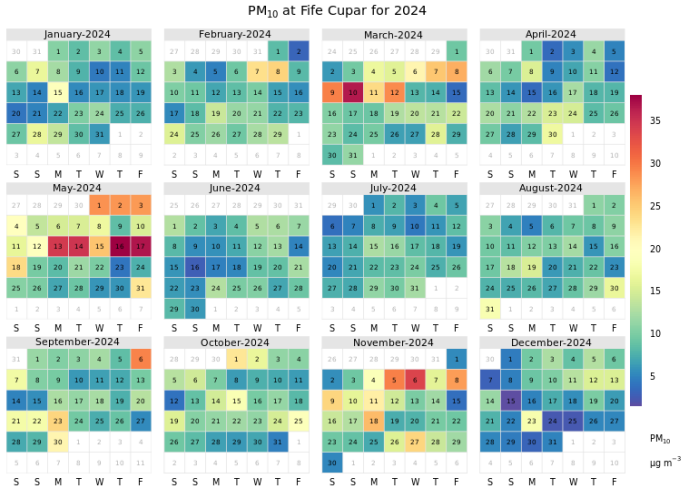


Figure E. 18 Dunfermline PM_{10} calendar plots

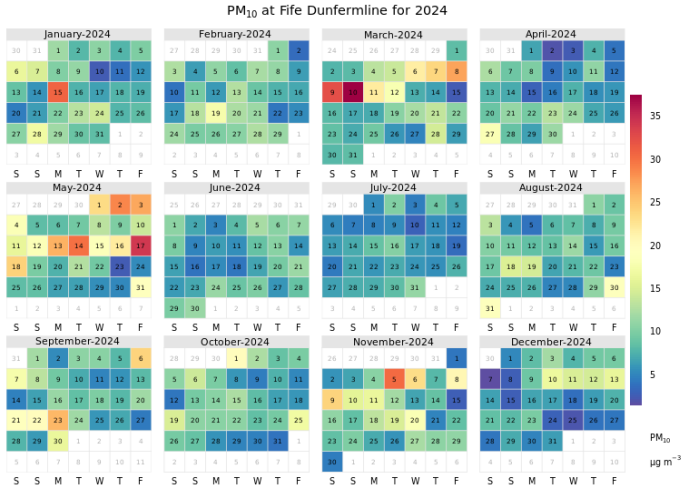


Figure E. 19 Kirkcaldy PM_{10} calendar plots

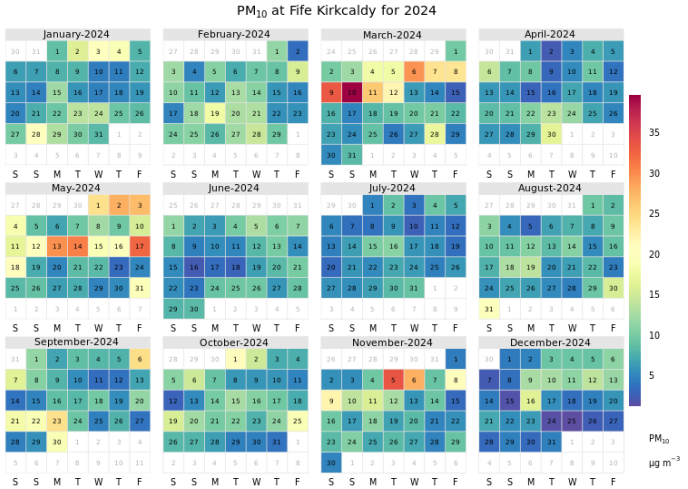


Figure E. 20 Rosyth PM_{10} calendar plots

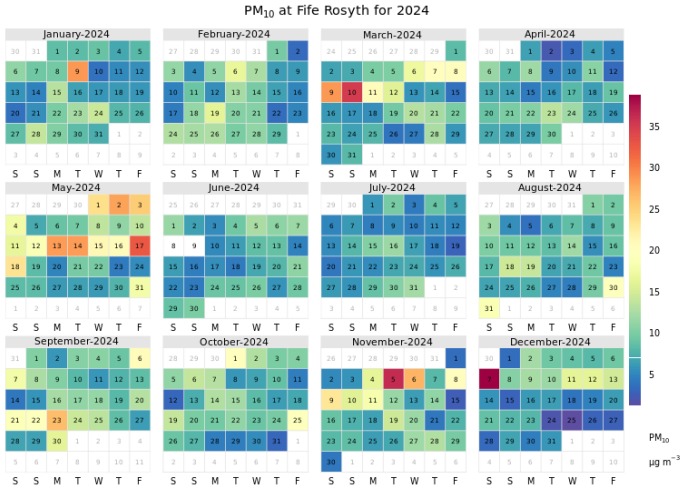


Figure E. 21 Cupar $PM_{2.5}$ calendar plots

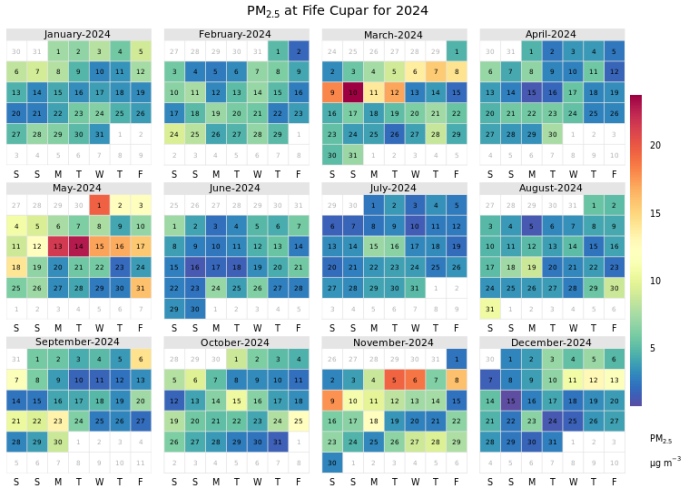


Figure E. 22 Dunfermline $PM_{2.5}$ calendar plots

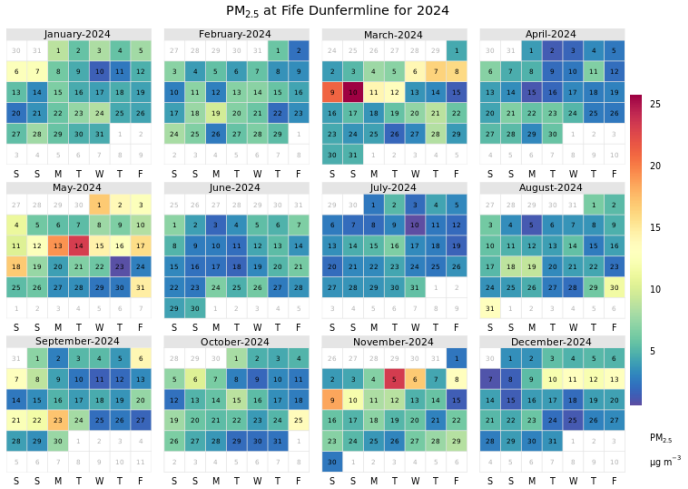


Figure E. 23 Kirkcaldy $PM_{2.5}$ calendar plots

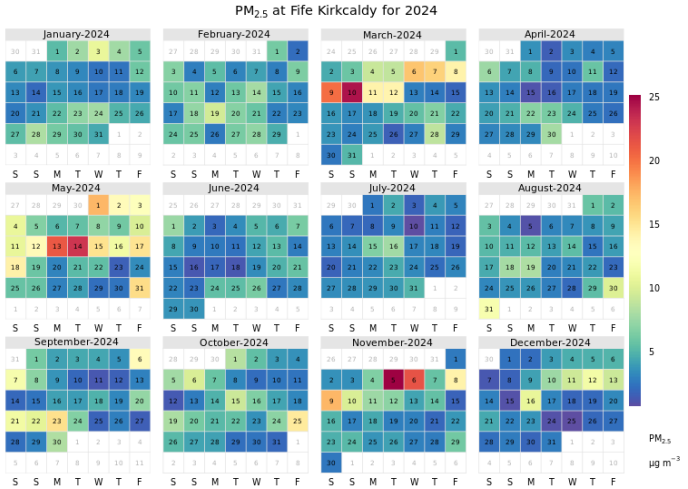


Figure E. 24 Rosyth $PM_{2.5}$ calendar plots

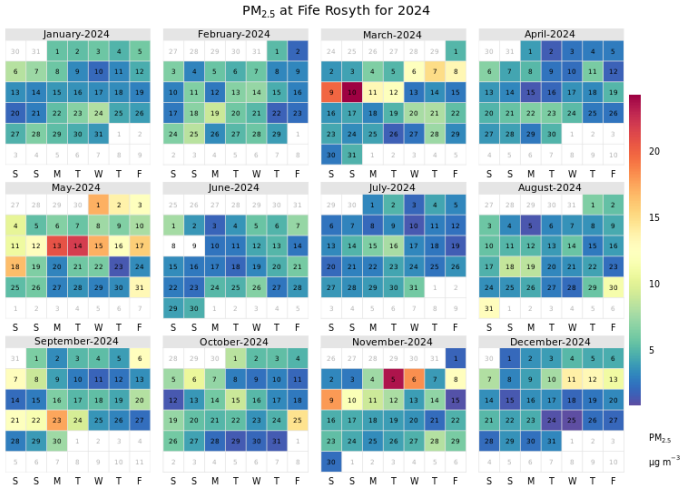


Figure E. 25 Cupar NO_2 polar plot

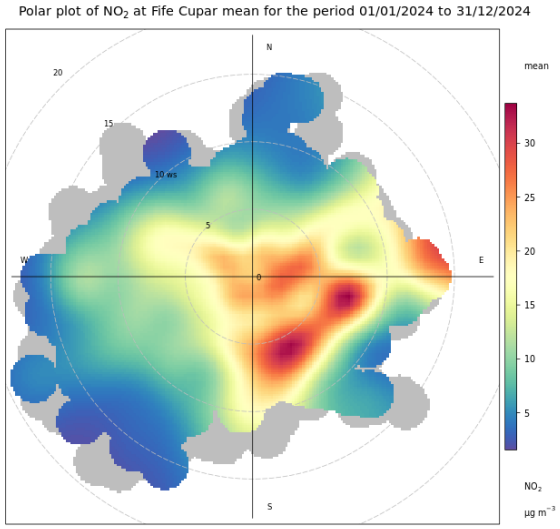


Figure E. 26 Dunfermline NO_2 polar plot

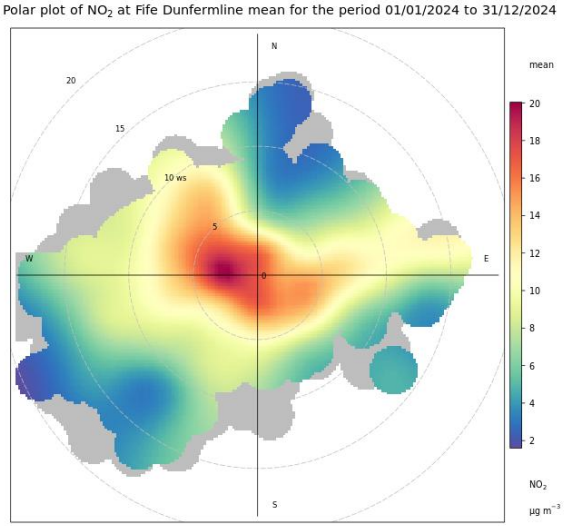


Figure E. 27 Kirkcaldy NO_2 polar plot

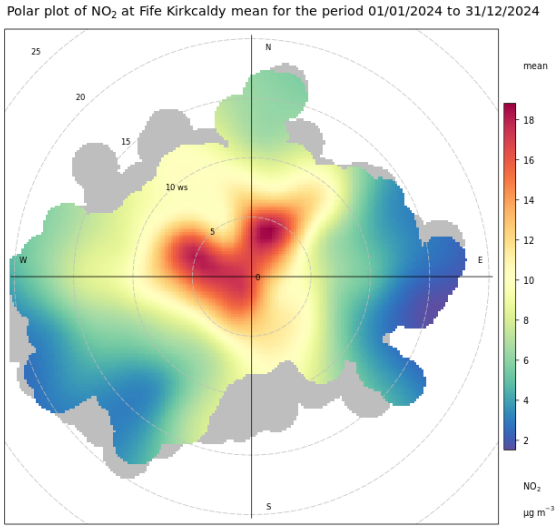


Figure E. 28 Rosyth NO_2 polar plot

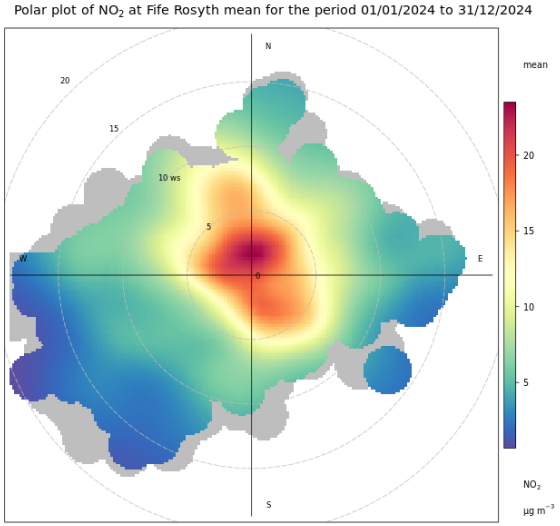


Figure E. 29 Cupar PM_{10} polar plot

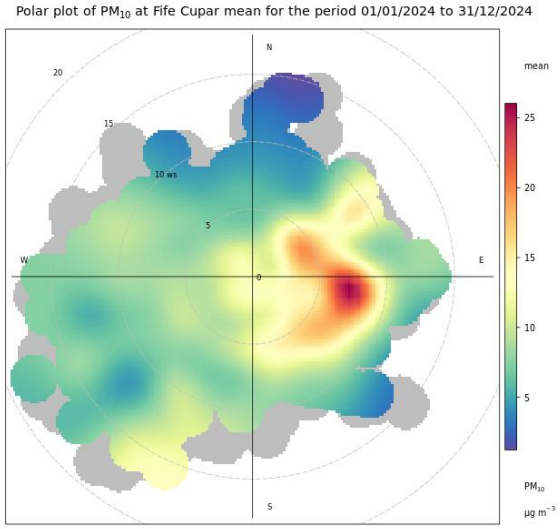


Figure E. 30 Dunfermline PM_{10} polar plot

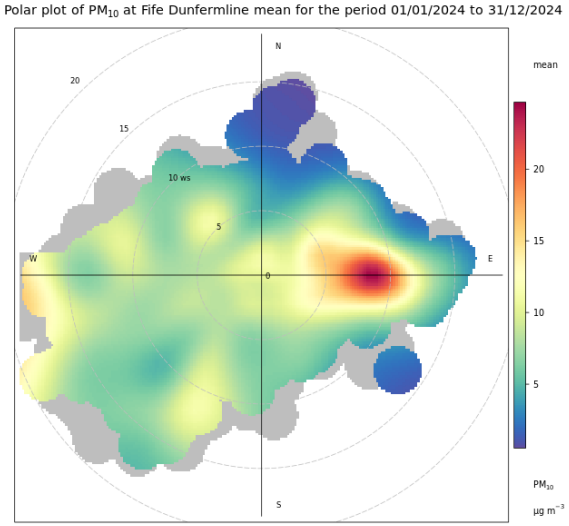


Figure E. 31 Kirkcaldy PM_{10} polar plot

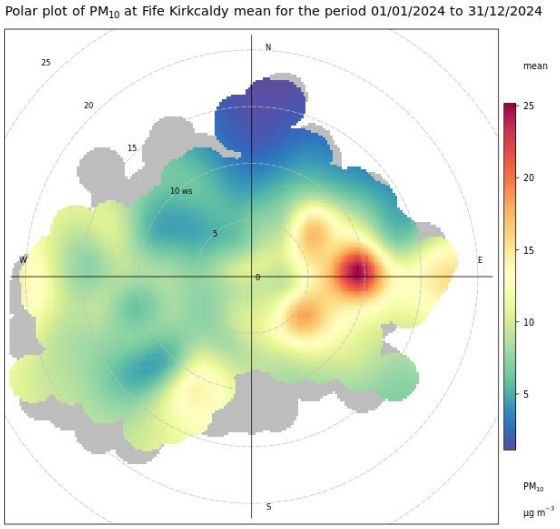


Figure E. 32 Rosyth PM_{10} polar plot

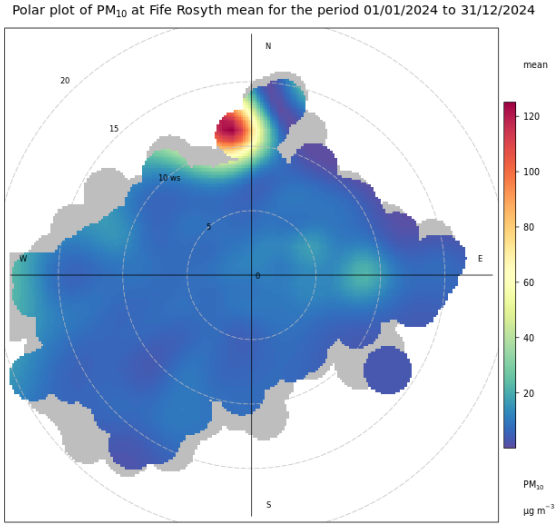


Figure E. 33 Cupar $PM_{2.5}$ polar plot

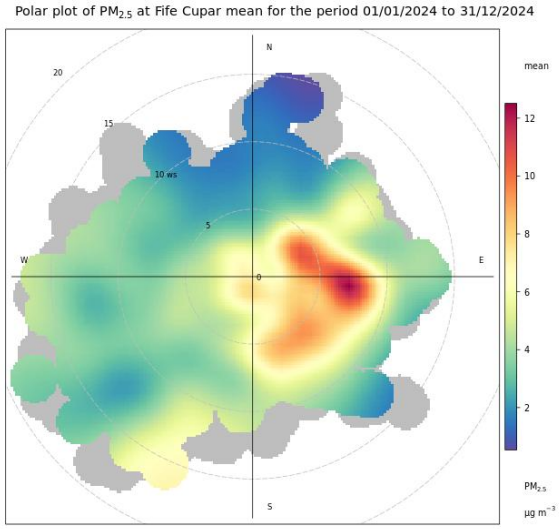


Figure E. 34 Dunfermline $PM_{2.5}$ polar plot

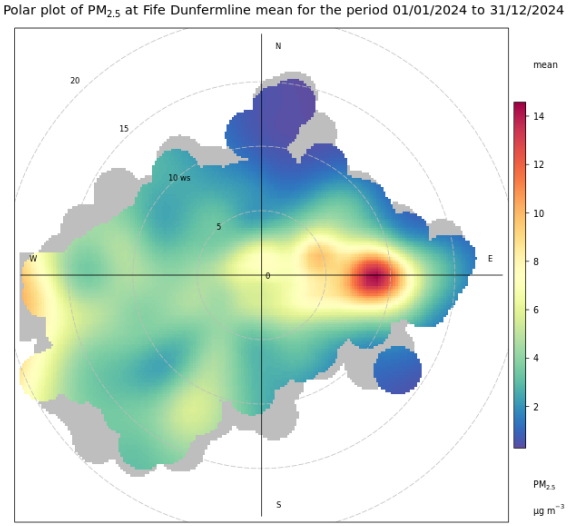


Figure E. 35 Kirkcaldy $PM_{2.5}$ polar plot

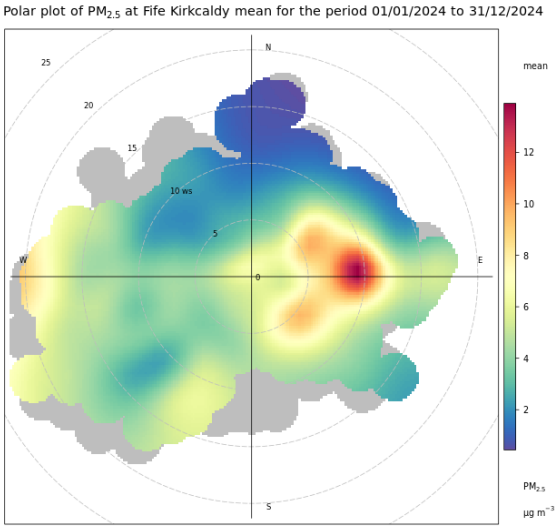


Figure E. 36 Rosyth $PM_{2.5}$ polar plot

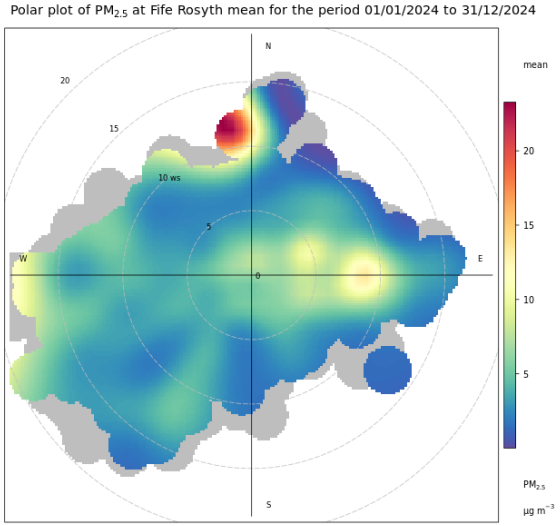


Figure E. 37 Trajectory Clusters

Figure E. 38 Trajectory plot for top ten highest daily NO_2 concentration

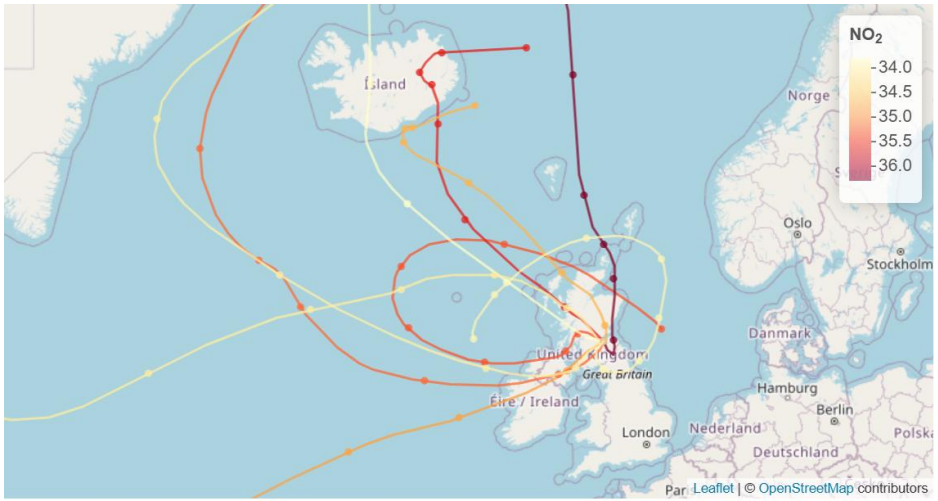


Figure E. 39 Trajectory plot for top ten highest daily PM_{10} concentration

Figure E. 40 Trajectory plot for top ten highest daily $PM_{2.5}$ concentration

Appendix F The Mossmorran and Braefoot Bay Independent Air Quality Monitoring Review Annual Report Summary 2023

IOM

Air Quality Around Mossmorran and Braefoot Bay 2023 – Summary Report

Image courtesy of SEPA

Monitoring has revealed no exceedances of air quality objectives in the areas around the Mossmorran and Braefoot Bay facilities, which includes ExxonMobil's Fife Ethylene Plant (FEP) and Shell UK Fife Natural Gas Liquids (NGL) Plant, in 2023. Levels of air pollutants remain within the objectives set by the Scottish Government to protect human health.

This conclusion comes from evaluating data collected by Scottish Environment Protection Agency (SEPA) and Fife Council at their air monitoring stations, along with additional data provided by INEOS along the Forth Estuary. SEPA's monitoring sites were chosen to reflect the location of residential communities, and includes a downwind site to represent the most exposed direction from the Mossmorran and Braefoot Bay facilities.

The quality of the air in the area is determined by measuring the amount of pollutants that are present. These pollutants can come from different sources or activities, including vehicles, industries, wood-burning and gas stoves. The measurements were compared to air quality objectives, which are set by the government to make sure the air we breathe is safe.

Pollutant	SEPA (8 monitoring sites)	Fife Council	INEOS
PM_{10}*	Highest annual mean found at Cowdenbeath: 11.0 µg m^{-3}	Highest annual mean found at Cupar: 13.2 µg m^{-3}	N/A
$PM_{2.5}$*	Highest annual mean found at Cowdenbeath: 8.9 µg m^{-3}	Highest annual mean found at Cupar: 6.4 µg m^{-3}	N/A
NO_2**	Highest annual mean found at Cowdenbeath: 14.9 µg m^{-3}	Highest annual mean found at Dunfermline: 25.9 µg m^{-3}	N/A
Benzene+	N/A	N/A	0.2 ppb

*PM_{10} and $PM_{2.5}$ are two different sizes of particulate matter. These are tiny particles which go deep into the lungs, affecting health in many ways.

**NO_2 is nitrogen dioxide, a gas that can affect lung health, causing irritation, especially for people with sensitive lungs.

+Benzene is a vapour known to be harmful to health.

In the table above, the highest average value out of all the monitoring sites is provided. The colours indicate whether any air quality objectives were exceeded. Green means the objective for that pollutant was not exceeded. No air quality objectives were exceeded. N/A indicates that no data were available. For more information on air quality objectives please see **www.scottishairquality.scot/air-quality/standards**.

How do emissions from the industries at Mossmorran and Braefoot Bay affect air quality?

Although operations at the Mossmorran and Braefoot Bay facilities produce air pollutants, all air quality remained good throughout the year.

Who evaluates air quality related to the Mossmorran and Braefoot Bay area?

The Mossmorran & Braefoot Bay Expert Advisory Group on Air Quality (AQ EAG) advises Fife Council on whether there are any air quality and related health impacts arising from operations at the Mossmorran and Braefoot Bay facilities.

The AQ EAG reviews air quality data collected from various sources, including air monitoring data from Fife Council, SEPA, INEOS, and emissions monitoring by ExxonMobil and Shell.

The AQ EAG also considers the potential impact that any major plant changes could have on air quality and liaises with representatives from community councils and the local health service.

This summary and the full report are independently developed by the Institute of Occupational Medicine (IOM) for the AQ EAG as required under the planning permits, and financed by the site operators. This summary has been approved by the Mossmorran and Braefoot Bay Community and Safety Liaison Committee's Expert Advisory Group on Communications. Fife Council covers costs of the administration of the Committee and constituent groups including the AQ EAG.

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For more information on the AQ EAG's reports, see **www.fife.gov.uk/kb/docs/articles/environment2/environmental-health/mossmorran-and-braefoot-bay**

GLOSSARY OF TERMS

Abbreviation	Description
APR	Air Quality Annual Progress Report
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
AQIA	Air Quality Impact Assessment
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
AQS	Air Quality Strategy
AURN	Automatic Urban and Rural Network (UK air quality monitoring network)
CAD	Clean Air Day
CAFS	Cleaner Air for Scotland – The Road to a Healthier Future
CAFS2	Cleaner Air for Scotland 2 – Towards a Better Place for Everyone
CO	Carbon Dioxide
Defra	Department for Environment, Food and Rural Affairs
FIDAS	Fine Dust Monitoring System
LAQM	Local Air Quality Management
LDP	Local Development Plan
LEZ	Low Emission Zone
LHEES	Local Heat and Energy Efficiency Strategy
LSO	Local Site Operator
LTS	Local Transport Strategy
MUSTER model	Meeting, Understanding, Surveillance, Toxicology, Evaluation and Reporting
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
NPF4	Scotland's fourth National Planning Framework
NPL	National Physical Laboratory
NTS	National Transport Strategy

Abbreviation	Description
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
PPC	Pollution Prevention and Control
QA/QC	Quality Assurance and Quality Control
RCV	Refuse Collection Vehicles
SEPA	Scottish Environment Protection Agency
SEZ	School Exclusion Zone
SO_2	Sulphur Dioxide
TSP	Total Suspended Particles
WASP	Workplace Analysis Scheme for Proficiency
WML	Waste Management Licence
WOW	Walk Once a Week

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