South Cambridgeshire Hall
Cambourne Business Park
Cambourne
Cambridge
CB23 6EA

t: 01954 713000
f: 01954 713149
www.scambs.gov.uk

South Cambridgeshire District Council

Wednesday 29 November 2023

To: Chair - Councillor Pippa Heylings
Vice-Chair – Councillor Dr. Martin Cahn

Members of the Climate and Environment Advisory Committee – Councillors Geoff Harvey, Dr. Shrobona Bhattacharya, Ariel Cahn, Dr. Tumi Hawkins, Dr Lisa Redrup, Peter Sandford, Natalie Warren-Green and Bunty Waters

Substitutes: Councillors Graham Cone, Heather Williams, Dr. Richard Williams, Lina Nieto, Sue Ellington, Stephen Drew, Peter Fane and Sunita Hansraj

Dear Sir / Madam

You are invited to attend the next meeting of **Climate and Environment Advisory Committee**, which will be held in **Council Chamber - South Cambs Hall** at South Cambridgeshire Hall on **Thursday, 7 December 2023** at **2.00 p.m.**

Yours faithfully
Liz Watts
Chief Executive

The Council is committed to improving, for all members of the community, access to its agendas and minutes. We try to take all circumstances into account but, if you have any specific needs, please let us know, and we will do what we can to help you

---

Agenda

Guidance For Visitors to South Cambridgeshire Hall

Notes to help those people visiting the South Cambridgeshire District Council offices

While we try to make sure that you stay safe when visiting South Cambridgeshire Hall, you also have a responsibility for your own safety, and that of others.

Security

When attending meetings in non-public areas of the Council offices you must report to Reception, sign in, and at all times wear the Visitor badge issued. Before leaving the building, please sign out and return the Visitor badge to Reception.

Public seating in meeting rooms is limited. For further details contact Democratic Services on 03450 450 500 or e-mail democratic.services@scambs.gov.uk

Emergency and Evacuation

In the event of a fire, a continuous alarm will sound. Leave the building using the nearest escape route; from the Council Chamber or Mezzanine viewing gallery this would be via the staircase just outside the door. Go to the assembly point at the far side of the staff car park opposite the staff entrance

- **Do not** use the lifts to leave the building. If you are unable to use stairs by yourself, the emergency staircase landings have fire refuge areas, which give protection for a minimum of 1.5 hours. Press the alarm button and wait for help from Council fire wardens or the fire brigade.
- ***Do not*** re-enter the building until the officer in charge or the fire brigade confirms that it is safe to do so.

First Aid

If you feel unwell or need first aid, please alert a member of staff.

Access for People with Disabilities

We are committed to improving, for all members of the community, access to our agendas and minutes. We try to take all circumstances into account but, if you have any specific needs, please let us know, and we will do what we can to help you. All meeting rooms are accessible to wheelchair users. There are disabled toilet facilities on each floor of the building. Infra-red hearing assistance systems are available in the Council Chamber and viewing gallery. To use these, you must sit in sight of the infra-red transmitter and wear a 'neck loop', which can be used with a hearing aid switched to the 'T' position. If your hearing aid does not have the 'T' position facility then earphones are also available and can be used independently. You can get both neck loops and earphones from Reception.

Toilets

Public toilets are available on each floor of the building next to the lifts.

Recording of Business and Use of Mobile Phones

We are open and transparent about how we make decisions. We allow recording, filming and photography at Council, Cabinet and other meetings, which members of the public can attend, so long as proceedings at the meeting are not disrupted. We also allow the use of social media during meetings to bring Council issues to the attention of a wider audience. To minimise disturbance to others attending the meeting, please switch your phone or other mobile device to silent / vibrate mode.

Banners, Placards and similar items

You are not allowed to bring into, or display at, any public meeting any banner, placard, poster or other similar item. Failure to do so, will result in the Chairman suspending the meeting until such items are removed.

Disturbance by Public

If a member of the public interrupts proceedings at a meeting, the Chairman will warn the person concerned. If they continue to interrupt, the Chairman will order their removal from the meeting room. If there is a general disturbance in any part of the meeting room open to the public, the Chairman may call for that part to be cleared. The meeting will be suspended until order has been restored.

Smoking

Since 1 July 2008, South Cambridgeshire District Council has operated a Smoke Free Policy. No one is allowed to smoke at any time within the Council offices, or in the car park or other grounds forming part of those offices.

Food and Drink

Vending machines and a water dispenser are available on the ground floor near the lifts at the front of the building. You are not allowed to bring food or drink into the meeting room.

This page is left blank intentionally.

South Cambridgeshire District Council

Minutes of the Climate and Environment Advisory Committee held on
Thursday, 12 October 2023 at 2.00 p.m.

Chair: Pippa Heylings
Vice-Chairs: Dr. Martin Cahn and Geoff Harvey

Committee Members in attendance:
Geoff Harvey
Ariel Cahn
Dr Lisa Redrup
Natalie Warren-Green
Bunty Waters
Heather Williams
Cllr Brian Milnes was in attendance remotely, as Lead Cabinet Member for Environment.

Officers:

John Cornell	Natural Environment Team Leader
Laurence Damary-Homan	Democratic Services Officer
Orla Gibbons	Project Officer, Climate and Environment
Jane Green	Built and Natural Environment Manager
Alex Snelling-Day	Waste Policy, Climate and Environment Team Manager
Luke Waddington	Project Officer, Climate and Environment

1. Chair's Announcements

The Chair made several brief announcements. It was noted that Councillor Paul Bearpark had stepped down from the Committee; Councillor Bearpark was thanked for his time and work with the Committee and Councillor Natalie Warren-Green was welcomed as a full Member. The Chair also noted that the Council had been accredited as a Bronze Carbon Literate Organisation by the Carbon Literacy Project, and that an Action on Energy workshop had been held with officers and colleagues from all Cambridgeshire Councils, as well as community representatives, to discuss the challenges around retrofitting housing in the County.

2. Apologies

Apologies for absence were received from Councillors Shrobona Bhattacharya, Ariel Cahn and Peter Sandford. Councillor Heather Williams was present as a substitute.

3. Declarations of Interest

There were no Declarations of Interest.

4. Minutes of the Previous Meeting

By affirmation, the Committee authorised the Chair to sign the Minutes of the meeting held on 06 June 2023 as a correct record.

5. Update on actions in support of Biodiversity Net Gain

The Natural Environment Team Leader presented the report on Biodiversity Net Gain (BNG) and informed the Committee that pending introduction of mandatory BNG requirements into the Town & Country Planning Act, as laid out in the Environment Act 2021, was projected to be implemented in January 2024, although Government guidance was pending release. Consequently, officers were operating on best practice guidance from other bodies, with Natural Cambridge and the Wildlife Trust being cited as examples.

Throughout the discussion, Members asked a number of questions regarding how the BNG legislation would work in practice. Throughout their responses, officers gave the following advice on how they expected BNG requirements to be implemented:

- Most development that requires planning permission, with some exceptions such as Householder Full (HFUL) applications, would be subject to Biodiversity Management Plan (BMP) conditions to ensure that a minimum of 10% BNG was achieved.
- Developers would be obligated to maintain the habitats for a minimum of 30 years.
- Site assessment would be undertaken, both pre-commencement and in the lifetime of the obligations, by both the developers (or their appointed representatives) and Council Ecologists. Developers would present reports to the Council, whose Ecologists would conduct their own investigations (including site visits) and compare the findings. Where issues arise and BMPs were not followed, statutory requirements would ensure that the developers were obliged to resolve them.
- Data was required to be gathered through the standardised DEFRA Biodiversity Metric. Reports were to be produced and provided to DEFRA, as part of their national register for net gain delivery sites, in annual intervals for the first 5 years post-development, followed by reports every 5 years for the remainder of the obligation.

Members enquired as to what biodiversity data management systems were in place and officers detailed the work undertaken to identify and procure the best available software in advance of the implementation of the BNG legislative requirements. Members enquired as to if residents could contribute to the biodiversity baseline data set. Officers advised that, given the complexity of the DEFRA Metric and technical understanding required to utilise it, BNG baseline data was not an area which was expected to benefit greatly from public engagement. Both officers and Members stated that residents had a major role to play in enhancing biodiversity in the District and wider region, and it was suggested that residents submit any data they have that could be useful to the Cambridgeshire & Peterborough Environmental Records Centre (based in Cambourne). Members also expressed optimism that greater engagement with Parish Councils, noting the bid to the National Lottery Heritage Fund to assist with funding, would help empower residents to feed into the BNG process.

Further explanation was given on how BNG requirements were expected to be implemented:

- The current mitigation hierarchy (avoidance, mitigation and compensation for biodiversity loss) would be maintained.
- BNG and habitat delivery could be delivered on-site or off-site. BNG delivery would be highly contextual and implemented on a case-by-case basis, as all planning considerations were, but the 10% BNG laid out by the BMP would have to be fully delivered.
- Full on-site BNG would be very hard to achieve in practicality, but development sites would likely contribute to BNG through green infrastructure, soft landscaping, trees on site and other common parts of development that contribute to nature. Off-siting would be necessary to enable developers to provide full delivery of BNG and ensure the viability of BNG.
- Off-siting should be sought as close to the site as possible where possible in developments that impacted priority habitat areas, such as the calcareous grasslands found in South Cambridgeshire, based on guidance from non-governmental bodies.
- Priority habitat areas in the region had been mapped- Members expressed a desire to see baseline data gathered for any priority areas that might be impacted by planned future development.
- Off-site delivery of BNG measures could often involve contributions to strategic BNG sites. The network of strategic site would allow for effective management and maintenance of BNG gains, and in many cases off-siting would lead to more effective and sustainable biodiversity enhancement measures and provide greater benefit to the region as a whole.

Members discussed the need for ecologists to implement the legislation and commended the Council for hiring a new Ecologist before the requirements came into force. The Committee noted that there was a national shortage of ecologists and many public authorities were struggling to successfully recruit to posts; some Members suggested that the Council's 4 Day Week trial may have helped fill the role. Officers informed the Committee that BNG work undertaken by Council Ecologists would be funded by the charging scheme that would accompany the introduction legislative changes, which would allow the Planning Service to charge developers for both pre-application advice on BNG, and for the monitoring work undertaken in the 30 years following the completion of development. This would ensure that funding was available to ensure BMPs were effectively produced and complied with.

Further clarity was provided by officers:

- Established nature areas with existing protections, such as Sites of Special Scientific Interest, would continue to be protected and harm to them would carry

significant weight in the planning balance.

- Timescales for indications for success would vary depending on the habitat, with the example of a grassland likely taking less time to establish than a woodland being used. Monitoring and maintenance would reflect the context of each individual BNG site.
- Council owned BNG sites were very difficult to implement due to legislative requirements; sites would have to be managed by an arms-length management organisation.
- Lessons were being learned from existing strategic BNG sites in the District, such as Lower Valley Farm.
- Regional initiatives, such as the Cambridgeshire Local Nature Recovery Strategy, would assist in the progress towards doubling nature and enhancing biodiversity in the District.
- Collaboration with local stakeholders was ongoing. Ecologists from local authorities continued to meet to discuss biodiversity and doubling nature in the region, and that Council Ecologists provided advice to statutory bodies in the region, such as the local Highway Authority.

Officers stated that there was room for improvement on partner-organisation collaboration, and Members encouraged officers to do so wherever possible. Members requested that, once the BNG requirements had been made law, that Members of the Planning Committee be given a briefing on the legislative changes, and also that officers explore translocation of trees rather than felling where possible.

The Committee thanked officers for the thorough explanation the pending changes to BNG requirements, and congratulated them for all the hard work that had been done to ensure the Council was prepared for the legislative change. Members raised the aspiration of 20% BNG wherever possible and officers advised that there had been some success in BNG negotiations with developers, and that planning policy officers were continue to build the evidence base to justify a 20% BNG requirement in the next Local Plan. Officers suggested that feelings around the evidence to justify 20% BNG were positive, but that the Local Plan process was still ongoing and Members would be updated on progress when appropriate.

The Committee **noted** the report.

6. Climate Risk and Adaptation Update

The Waste Policy, Climate and Environment Team Manager provided the verbal update to the Committee. The update provided a definition of climate adaptation and risk, and the Committee was advised that a climate risk subgroup had been established with climate lead representatives from various local bodies, such as neighbouring authorities, combined authorities and other public services (e.g. police, NHS) and had held an initial workshop in July 2023. The key points of discussion from the workshop were detailed and the Committee was advised of the next steps of the subgroup, including wider stakeholder

engagement. Members were informed that an update would be brought to one of the next meetings of the Committee.

The Committee discussed the nature of climate risk and adaptation and commended officers for undertaking assessments of climate risk and potential adaptations that could be made in the region. The Net Zero and Doubling Nature strategies, as well as other initiatives, were recognised as existing climate adaption that was ongoing in the District and the need to integrate new measures with existing action was raised. Members noted the challenges to implementing carbon reduction measures arising from changes to national Net Zero legislation. Business continuity was discussed and Members encouraged officers to utilise existing relationships with local business to inform them on climate risk. Officers advised that the work of the subgroup would explore how businesses can be helped to adapt to climate risks, alongside the adaptations that could be implemented by local authorities.

The Committee **noted** the verbal update.

The Meeting ended at 3.25 p.m.

This page is left blank intentionally.

South Cambridgeshire District Council

Report to:	Climate and Environment Advisory Committee 7 December 2023
Lead Cabinet Member:	Lead Cabinet Member for Environment - Cllr Brian Milnes
Lead Officer:	Head of Climate, Environment & Waste - Bode Esan

Air Quality Update

Executive Summary

1. South Cambridgeshire District Council have an adopted Air Quality Strategy to cover the period 2021-2025. This report presents an update on the progress made in line with that air quality strategy. Updates include:
    a. Details of new continuous monitors and the intention to remove older monitors.
    b. Update on the 2023 Annual Status Report
    c. Update on school studies using the 'Zephyr' monitor and other planned promotional work such as supporting Clean Air Night
2. Conclusion on the study into the use of Public Space Protection Orders to prevent vehicle idling
3. Officers are also seeking a decision on updating the strategy early to allow two key elements to be incorporated into a revised strategy before bringing a final strategy to the Climate and Environment Advisory Committee for scrutiny.
    a. Investigate the opportunity for a joint strategy with Cambridge City Council (CCC)
    b. The adoption of the World Health Organisation (WHO) global air quality guidelines as long-term aspirational targets.

Recommendations

4. The committee are recommended to:
    a. Review and comment upon the updates on the Air Quality Strategy
    b. Note the conclusions of the use of Public Space Protection Orders and recommend to the Lead Cabinet Member to progress a positive engagement campaign rather than enforcement of vehicle idling
    c. Recommend to the Lead Cabinet Member to progress an early revision of the South Cambridgeshire District Council Air Quality Strategy as a joint Greater Cambridge Air Quality Strategy with Cambridge City Council with the finalised strategy coming before committee in Spring 2024

d. Recommend to the Lead Cabinet Member to adopt World Health Organisation (WHO) Air Quality Guidelines as the air quality standard to work towards across Greater Cambridge

Background

5. Local authorities are required to monitor key pollutants across their district under the Local Air Quality Management (LAQM) framework. If key pollutants exceed objective levels (see table 1 below) then an Air Quality Management Area (AQMA) must be declared alongside an Air Quality Action Plan (AQAP) outlining how pollutants will be reduced.

6. New national legally binding $PM_{2.5}$ targets have been set, which comprise an annual mean target of 10µg/m^3 as well as a population exposure reduction of 35% on a 2018 baseline, both to be achieved by 2040. The National Air Quality Strategy (2023) sets out how local authorities are expected to contribute to delivering these targets. Whilst it is acknowledged within the strategy that not all sources of $PM_{2.5}$ originate from within a local authority district the strategy expects local authorities to consider those that are.

7. The Environment Act 2021 require local authorities to produce an Air Quality Strategy where LAQM objective levels are being achieved. Local Authorities are expected to be pro-active, not re-active to ensure that good air quality is maintained including how they will help deliver the national $PM_{2.5}$ targets.

8. Pollutant levels across South Cambridgeshire District have been reducing and are now typically below LAQM objective levels. The SCDC AQMA along the A14 was revoked in January 2022.

9. Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children, the elderly, and those with existing heart and lung conditions.

Air quality strategy update

10. The adopted Air Quality Strategy outlines 3 focussed actions which are presented below:

    a. Action A: air quality is monitored and understood district wide and appropriate measures are introduced to meet air quality objectives.
    b. Action B: policies are in place to minimise impacts from future developments
    c. Action C: public engagement is aimed at increasing local knowledge and supporting better choices in reducing daily impact on air quality.

11. A summary of progress made on each action since the last update to CEAC in March 2022 (report reference is provided below:

<u>Action A: air quality is monitored and understood district wide and appropriate measures are introduced to meet air quality objectives</u>

12. Air quality is monitored using a number of methods in SCDC, including diffusion tubes, continuous monitor and ‘Zephyr’ sensors. A full update on current monitoring and further detail on the below points is provided in **Appendix A**.

13. Significant updates include the expansion of the diffusion tube network, the newly operating continuous monitors in Harston and Northstowe and the decommissioning of the

continuous monitors at Girton and Orchard Park with full reasoning for this in Appendix A. The Zephyr sensors are also continuing to operate well with a number of six-month monitoring projects ongoing.

14. The live results from continuous monitors are available to the public via the Air Quality England website run by Ricardo (www.airqualityengland.co.uk/local-authority/?la_id=316). While the data from the Zephyrs can be accessed via the Zephyr portal (https://portal.earthsense.co.uk/SouthCambsCouncilPublic/).

15. All of our collected data is published annually within our Annual Status Report (ASR). The ASR is a statutory requirement and requires sign off by Defra. We can confirm that the 2023 report received approval from Defra on the 20 October 2023 and a copy of the ASR is available on our website as well as being included as **Appendix B** to this report.

Action B: policies are in place to minimise impacts from future developments

16. Air quality is consulted on planning applications for major developments where we use low emission strategies to promote and accommodate sustainable transport. In 2023 this has included 55 applications up to the end of October 2023.

Action C: public engagement is aimed at increasing local knowledge and supporting better choices in reducing daily impact on air quality

17. Zephyr initiative: monitoring of air quality near primary schools:

    The major reason for investigating air quality around primary schools is that children are amongst the most vulnerable to the effects of air pollution. This is due to children's airways and respiratory systems being less developed than an adult's and because they breathe more rapidly than adults. This was reflected by the theme of National Clean Air Day in June 2021 of 'protect our children's health from air pollution'.

18. Studies have been undertaken at six schools (Cambourne, Harston, Histon, Milton, Northstowe and Swavesey) with the reports from each school available on our website. The most recent study, Milton, is included as **Appendix C** to this committee report.

19. Currently other studies involve assessing the impact of domestic burning in a residential area, a school study at Barton primary school and monitoring along the A10 in Waterbeach. Once monitors become available, monitoring is intended to be undertaken at Cottenham and Shelford. The team are inviting further areas of study from either members or the public.

20. Plans are currently being developed to support clean air night, a new campaign aimed at raising awareness of the impacts of domestic burning on air quality. A recent report by Urban Health has shown that domestic burning is not only bad for air quality but is also more costly than gas central heating when buying approved wood, and emits more carbon dioxide emissions than gas central heating.

Public Space Protection Orders for reducing vehicle engine idling

21. Officers were requested to investigate the use of PSPOs to reduce vehicle idling around schools and a full report is included in **Appendix D.**

22. Having looked at PSPO regulations, other available regulations to control vehicle idling and best practice from other local authority areas, the conclusion is that PSPOs are not an appropriate mechanism to control idling and other legislation, Fixed Penalty Notices

(FPNs) specific to idling, is already available. The FPNs specific to vehicle idling do have some limitations and, where used, are generally only used as a last resort in extreme circumstances.

23. Best practice from other LAs indicates that positive promotional and awareness raising work is generally considered best practice and has proven successful in other areas.

24. The recommendation is for increasing our promotional and educational work around schools using existing resources, with a more in-depth engagement plan presented to CEAC in April 2024.

Greater Cambridge Air Quality Strategy and WHO guideline values

25. Cambridge City Council (CCC) currently have an Air Quality Management Area (AQMA) in the centre of Cambridge; however, they are likely to revoke their AQMA due to the continued compliance with national air quality objectives. Where councils do not have any AQMAs they are required to have an air quality strategy to ensure continued improvements to air quality.

26. CCC will therefore be required to produce an air quality strategy. SCDC already have an air quality strategy. The production of a new joint air quality strategy will have the following benefits:

    a. Alignment with the emerging local plan and joint Greater Cambridge planning service.
    b. Allow for better and smoother partnership working on cross boundary infrastructure projects.
    c. Allow for more streamlined engagement with other key stakeholders, such as Cambridgeshire County Council highways and public health departments, Great Cambridge Partnership and Cambridgeshire Combined Authority.
    d. Allow for wider and more impactful awareness raising campaigns.

27. CCC have already approved the principle of developing a Greater Cambridge air quality strategy with SCDC.

28. The joint Air Quality Strategy will follow much of the same format as the existing strategy and will not result in a change of direction or significant new burdens on SCDC. The four Key Priorities of the proposed strategy are:

29. Key Priority 1: Policy & Development Control

    Minimising emissions through development is key. The Strategy will be integrated into the local plan policy and can be updated in response to evolving national and local policy. Proposed measures will design out air quality impacts during both construction and operation phases to prevent ‘creep’ as large-scale development comes forward. This may include ‘Air quality Neutral’ developments, reducing NRMM emissions during construction and EVCP. This is similar to Action B in our existing AQS.

30. Key Priority 2: Infrastructure Improvements

    Continuing to work with partners to deliver improved infrastructure; facilitating the uptake of more sustainable transport solutions and active travel options. Planning has a major role to play in infrastructure provision. Examples include support of public transport options, freight consolidation / last mile deliveries, road hierarchy, improvements to cycling and walking infrastructure and facilitating EVCP infrastructure provision.

31. Key Priority 3: Community Engagement & Promotion

    In parallel to active measures to reduce exposure to pollutants we need to actively promote and engage with residents and visitors enabling access to better information to facilitate behavioural change. This may include anti idling campaigns, better burning campaign, improved public engagement through accessibility of air quality data and promoting awareness on air quality. We will continue to work closely with Public Health. This is similar to Action C in our existing AQS.

32. Key Priority 4: Monitoring

    Continued monitoring is required given the scale of the future developments and the potential to introduce new hotspots where air quality could be at risk, the need for a robust and up to date monitoring network across the district is a priority. This is similar to Action A in our existing AQS.

33. To allow for the differences between Cambridge City and South Cambridgeshire areas, there will be a series of actions at the rear of the strategy that will either be applicable to both authorities, or to the relevant authority where the issue is localised.

34. The overall aim of the AQS will be to ensure continued improvement of air quality within both South Cambridgeshire and Cambridge City as it is widely accepted that there is no safe level of air pollution, with a shift away from specific levels towards exposure reduction and delivering the known health benefits that these reductions can offer.

35. Research undertaken by the Committee on Medical Effects of Air pollution (COMEAP) concluded that, even low concentrations of pollutants are likely to be associated with adverse effects on health.

36. The World Health Organisation (WHO) produced updated Air Quality Guidelines (AQG) in 2021. These targets are based on the evidence linking concentrations of pollutants in ambient air with adverse effects on health and are targets that protects public health. COMEAP considers these WHO 2021 guidelines as suitable long-term targets.

37. Table 1 compares the LAQM objective levels and national targets for key pollutants against the WHO Air Quality Guidelines 2021.

Table 1: Air quality Objective Levels and WHO guideline values

Pollutant	Averaging Period	Concentration	
		Current UK Limit	WHO 2021
AQ (England) Regulations 2000 (Apply to LAQM)			
PM_{10} µg/m^3	Annual Mean	40 µg/m^3	15 µg/m^3
	24 Hour Mean	50 µg/m^3	45 µg/m^3
NO_2 µg/m^3	Annual Mean	40 µg/m^3	10 µg/m^3
	24 Hour Mean	200 µg/m^3	
Environmental Targets (PM) Regulations 2023 (apply to national government)			
$PM_{2.5}$	Annual Mean	10 µg/m^3	5 µg/m^3
	Exposure Targets	35% Reduction	

38. Adopting the WHO guideline values will allow for a long term target for air quality improvements in the Greater Cambridge area and will prevent pollution levels from increasing given the scale of development and population increase coming forward in the next 20 years through the emerging Greater Cambridge local Plan.

39. CCC have already approved the principle of working towards the WHO guideline values.

40. Given the ambitious nature of some of the WHO guideline values, it's proposed to have interim targets that may be more achievable in the five year life cycle of the proposed AQS.

41. If the approval to continue with a joint air quality strategy is approved at this meeting the timelines for progressing the proposed joint strategy are:

    a. Public consultation in January and February 2024
    b. Final air quality strategy to be presented to CEAC in April 2024

Alignment with Council Priority Areas

Being green to our core

Appendices

Appendix A: Update on air quality monitoring network
Appendix B: Annual Status Report 2023
Appendix C: Zephyr Milton School Study
Appendix D: Public Space Protection Orders for reducing vehicle engine idling

Report Author:

Matthew Axton – Scientific Officer (Air Quality)

APPENDIX A:

Update on air quality monitoring network

1. Air quality is monitored using a number of methods in SCDC, including diffusion tubes, continuous monitors and 'Zephyr' sensors.

Diffusion tubes

2. Diffusion tubes are used to monitor for the pollutant nitrogen dioxide at approximately 36 locations throughout the district. These are mostly targeted at roadside locations (as nitrogen dioxide is strongly linked to pollution from vehicles, especially diesel vehicles) but also including background locations.
3. Diffusion tubes provide good annual mean pollution data and allow for a large coverage of locations given their low cost.
4. Details of all monitoring locations are included in the Annual Status Report (ASR) included as Appendix B to this committee report, however, since the publication of the ASR new locations have been introduced to monitor in some parishes where monitoring has not previously taken place, these include Gamlingay, Meldreth, Melbourn, Fulbourn, Fen Ditton and Great Shelford. Additional new tubes have been positioned in Linton to complement the existing diffusion tubes in the village.
5. Monitoring has continued at a number of existing sites, including areas of significant growth, such as Cambourne, Northstowe and Waterbeach, to ensure continuity and to allow for analysis of long-term trends.
6. As confirmed in the ASR, all monitoring locations are well below (i.e. compliant with) UK national objectives.

Continuous monitors

7. Continuous monitors are used to measure both nitrogen dioxide and particulate matter pollution. These monitors provide ratified and accurate results accepted by Defra although they are more costly to run and represent a single fixed location. SCDC currently operates three continuous monitors:
    a. Impington continuous monitor situated adjacent to the A14 in Impington parish.
    b. Harston continuous monitor situated in the centre of the village adjacent to the A10.
    c. Northstowe continuous monitor situated in the centre of the village to monitor the impacts of growth in this major growth area.
8. Harston and Northstowe are both newly operational this year (2023) and the live results from all monitors are available to the public via the Air Quality England website run by Ricardo (www.airqualityengland.co.uk/local-authority/?la_id=316). Although there have been some initial teething problems, these monitors are now performing well and providing data.
9. Northstowe monitor is due to be moved as we have received complaints about its visual impact in its current location. The new location is currently being decided but should still be close to the centre of Northstowe and adjacent to the B1050. We will consult with the town council as well as district and county councillors prior to any relocation.
10. Continuous monitors have been discontinued at two locations (Orchard Park school and Girton, adjacent to the A1307 Huntingdon Road). The monitors at both locations were reaching the end of the operational life. Data had been collected at these locations for over

five years and these areas are no longer likely to be significantly impacted by the regional growth. These units will be fully decommissioned and removed in the following year.

11. The Orchard Park monitor was original installed to assess the impacts of works to the A14 on the local air quality with a requirement that monitoring continued for three years following the completion of works. The monitor has been in place throughout the course of the works to the A14 and for three years following the completion of these works on the 5 May 2020. Levels of nitrogen dioxide and particulate matter have been consistently low throughout this period, well below the nationally set annual mean objective and consistently lower than the other two continuous monitors over the past five years.
12. Monitoring in Orchard Park will continue through the use of diffusion tubes in other parts of Orchard Park, which show similar levels of NO_2, and the Impington continuous monitor adjacent to the A14 less than 1km to the west. These monitoring points are easier to access than the continuous monitor which is located on school grounds and has complications around access for contractors during school times.
13. Although the concern around Orchard Park primary school being located close to the A14 is recognised, there is no evidence that the air pollution at the school has been adversely affected. Any significant changes to the air pollution associated with the A14 or the Orchard Park area will be identified through other monitoring methods.
14. We are therefore satisfied that the removal of the Orchard Park monitor is acceptable.

Zephyr sensors

15. Zephyr sensors are a lower cost monitoring option that can be used to measure nitrogen dioxide, $PM_{2.5}$ and PM_{10}. They can be relatively easily moved to new monitoring locations and they provide instant monitoring data via an online portal. However, they are not calibrated to the same standards as the continuous monitors and the results cannot be used for reporting to Defra.
16. Zephyr monitors have been used for studies outside schools in Harston, Cambourne, Northstowe, Swavesey, Histon and Milton, which are all available on the air quality pages of the SCDC website. They are currently operating in Waterbeach, Girton and Barton.
17. We will continue to use Zephyr monitors to monitor pollution in public locations such as schools, but also to target areas of significant solid fuel burning or other sources of particulate pollution.
18. Although the results are not ratified to a standard that can be used in reporting to Defra, we have been able to have good confidence in the results, especially for particulate matter pollution which can be compared to the continuous monitors.
19. Figure 1 compares the levels of $PM_{2.5}$ at the three continuous monitors operated by SCDC to the Zephyr currently operating in Girton. The closest Defra operated background continuous monitor, at Wicken Fen, has also been included as a control. The graph covers a typical four-day period.
20. All of the instruments follow approximately the same trend with corresponding high and low periods, including some periods of very close correlation.
21. There is little difference in $PM_{2.5}$ pollution levels between the roadside monitors (Harston adjacent to A10 and Impington adjacent to A14), and the Defra background monitor at Wicken Fen, which is stationed remote from any roads or buildings. This is because $PM_{2.5}$ pollution is dominated by regional factors rather than local factors.
22. Significant local events can be picked out by comparing all monitors. A potential local event can be observed at the Harston monitor during the beginning of the period shown on Figure 1.

23. The general conclusions from the Zephyr school studies are as follows:

    a. Nitrogen dioxide pollution levels are observed as being lower around schools during holiday periods when compared to term time indicating school traffic does impact pollution levels.

    b. $PM_{2.5}$ pollution levels are not necessarily lower during school holidays than term time as $PM_{2.5}$ can be largely influenced by regional events.

    c. Data varies from day-to-day and during the day dependant on weather conditions (wind, rain, sunshine and atmospheric pressure), traffic volumes, traffic make-up and regional pollution levels. It has not therefore been possible to identify clear and specific peaks around school drop off and pick up times.

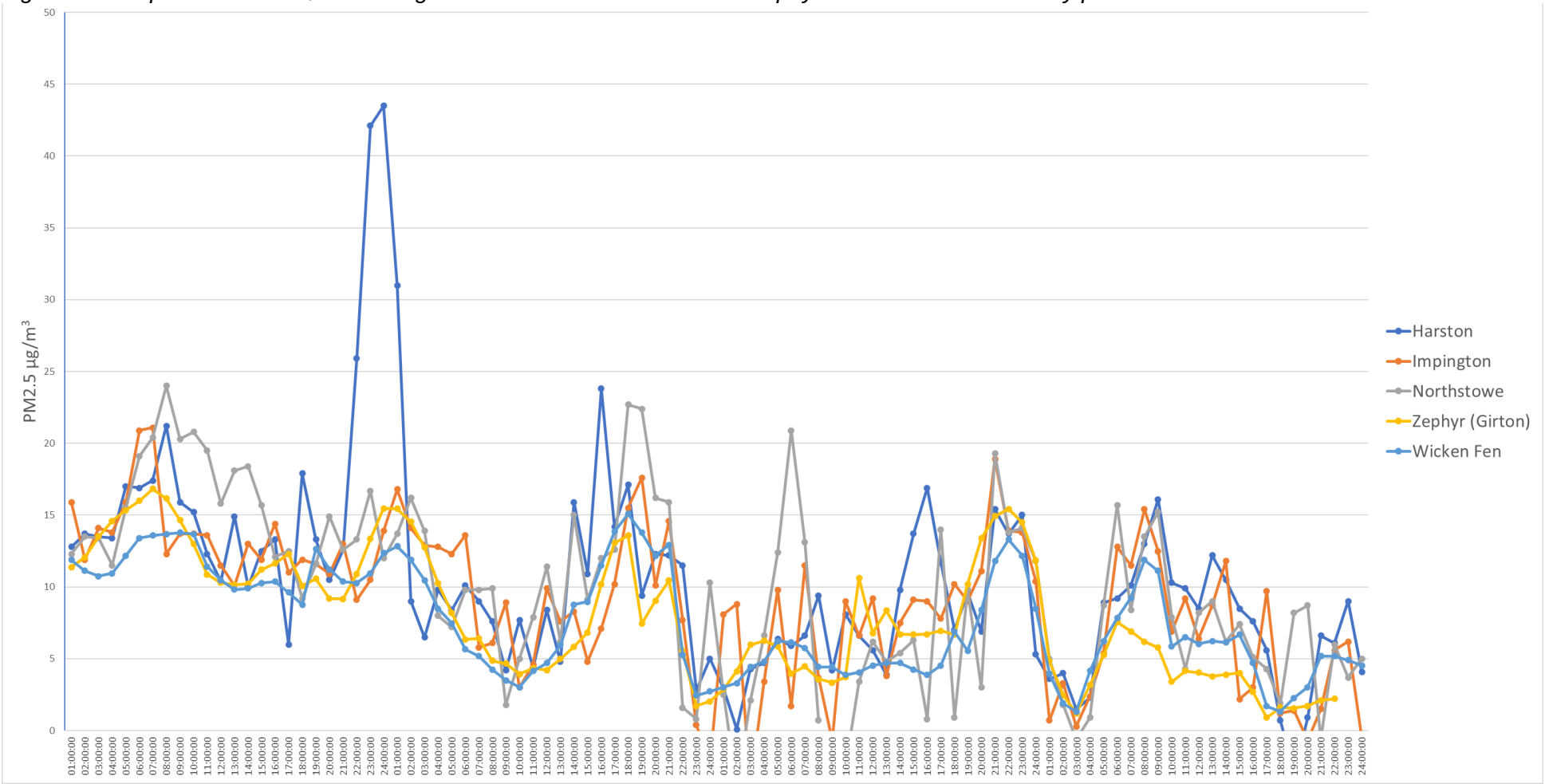
24. Current and future planned monitoring projects with the Zephyr include:

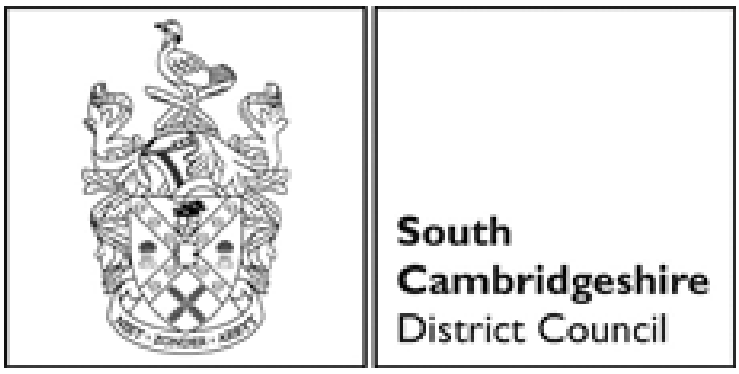
    a. Monitoring in residential area of Girton to identify pollution from domestic burning.

    b. Monitoring at Barton CE Primary School.

    c. Monitoring close to the location of the proposed new Waterbeach school as part of the new Waterbeach major development.

Figure 5: Comparison of $PM_{2.5}$ monitoring from continuous monitors and Zephyr sensors over a four-day period





2023 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

Date: August 2023 (Revision A)

Information	South Cambridgeshire District Council Details
Local Authority Officer	Peter Gibson
Department	Environmental Health
Address	South Cambridgeshire Hall Cambourne Business Park Cambourne, Cambridgeshire CB23 6EA
Telephone	01954 713000
E-mail	air.quality@scambs.gov.uk
Report Reference Number	SCDC 2023 ASR
Date	August 2023 (Revision A)

Executive Summary: Air Quality in Our Area

Air Quality in South Cambridgeshire District Council

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

The mortality burden of air pollution within the UK is equivalent to 29,000 to 43,000 deaths at typical ages[3], with a total estimated healthcare cost to the NHS and social care of £157 million in 2017[4].

South Cambridgeshire District Council (SCDC) is a rural district with good rail and road links to London and South-East, including the A14 and M11/A11 corridors which benefits from good air quality. The only Air Quality Management Area (AQMA) was declared along the A14 between Bar Hill and Milton in 2008 was revoked in 2022 owing to consistent air quality improvements in that area.

Following the revocation of the AQMA, a new Air Quality Strategy[5] has been approved setting out a new approach to monitor air quality across the district and to identify potential hotspots.

Given that future developments in the district are mainly residential and reliant on road-based transport for travel, there is a potential for cumulative impacts on local air quality. This strategy outlines three focussed actions to ensure that:

1. air quality is monitored and understood district wide and appropriate measures are introduced to meet air quality objectives,

---

[1] Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

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

[3] Defra. Air quality appraisal: damage cost guidance, January 2023

[4] Public Health England. Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report, May 2018

[5] South Cambridgeshire District Council 2021 Air Quality Strategy

2. policies are in place to minimise impacts from future developments and
3. public engagement is aimed at increasing local knowledge and supporting better choices in reducing daily impact on air quality.

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades, there are some areas where local action is needed to protect people and the environment from the effects of air pollution.

The Environmental Improvement Plan[6] sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term $PM_{2.5}$ targets. The National Air Quality Strategy, due to be published in 2023, will provide more information on local authorities' responsibilities to work towards these new targets and reduce $PM_{2.5}$ in their areas. The Road to Zero[7] details the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

The key actions undertaken or underway to monitor and improve air quality are summarised here:

- The Council's Air Quality Strategy has been approved and continues to be implemented. The Strategy outlines a new approach to monitor and improve the air quality across the district and to ensure both the new and existing communities are considered to benefit a better air quality district wide.
- A review of the monitoring network has been completed, focusing on the areas of future major development in the district. As the result, the monitoring network has been updated with new diffusion tubes, new automatic continuous monitors and new indicative real-time Zephyr monitors.
- Two new automatic continuous monitors are now operational in new locations of areas of high predicted growth i.e., Northstowe and Harston in 2022. This will allow

[6] Defra. Environmental Improvement Plan 2023, January 2023

[7] DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

the Council to establish a new continuous monitoring network across the district. The existing network is likely to be subject to relocation or decommissioning in line with the new Air Quality Strategy as areas of predicted growth are considered.

- A hotspot monitoring initiative is carried out using indicative real-time monitors (Zephyrs). The aim of this initiative is to conduct targeted studies such as monitoring air quality near schools and different areas of concern e.g., idling vehicles or areas of prevalent use of solid fuel appliances. Details of these studies are made available via a report after a minimum of 6-months operation and have engaged local communities.

Further consideration has been given to air quality and its improvement across the district, in line with the Council's key objective to 'Being green to our core'[8]. The supporting actions are summarised here:

- Electric vehicle charging points were installed at our Waterbeach depot as well as South Cambridgeshire Hall, which has also undertaken work to install a ground source heat pump to replace the need for gas.
- Our first electric refuse vehicle was purchased in 2020 and is in operation. This has now been increased to 3 electric vehicles. In addition to the electric option the service is also investigating other options such as hydrotreated vegetable oil (HVO) as the solution to reducing our CO_2 impact to the environment.
- Our Zero Carbon Action Plan 2020-25 outlines the actions we are taking to reduce carbon emissions from our own estate and operations by 45% on a 2018-19 baseline by 2025 and how we are supporting the district to reach net zero[9].
- Our Zero Carbon Communities Grant[10],scheme funds community initiatives to improve sustainability.

[8] Being green to our core

[9] Zero Carbon Strategy

[10] Zero Carbon Communities Grant

Conclusions and Priorities

The review of the monitoring data in 2022 has identified the following:

- No exceedances of any of the national air quality objectives were reported at any of the monitoring locations.
- Whilst there has been a slight increase or equivalent levels in concentrations to the previous year seen at some monitoring locations, these are still below pre pandemic levels.
- There continues to be no exceedances of any objectives at any of the sites in the AQMA which is now revoked.
- Low data capture was reported for several diffusion tubes. However, sufficient data was available to allow annualisation for the majority of these sites.
- Data capture for the automatic continuous monitors required annualisation for the Girton site for nitrogen dioxide and particulates and just particulates for Impington and Orchard Park.
- New monitors have been installed at areas of predicted growth. These monitors will be reported on in future years and support the justification for the decommissioning of future real time monitors owing to the historic low levels of air pollution.
- No new sources of pollution have been identified.

Local Engagement and How to get Involved

Previous Annual Status Reports and details on air quality monitoring are available on our website[11] and you can share your views via our email address air.quality@scambs.gov.uk and follow our Facebook page[12] for general updates and news. The website contains a link to live data from our continuous monitor locations and a link to data from the Zephyr monitors is due to go live soon. Ways you can help to improve air quality in South Cambridgeshire include:

- Minimise car use wherever possible:
    - Avoid using your car for short trips (under 2 miles) – short trips are very polluting as modern engines need to reach a very high temperature to work efficiently; on short trips it won't reach that temperature.

[11] SCDC Local Air Quality Management

[12] SCDC Facebook

    - For short journeys try cycling or walking more often – this helps you stay healthy and saves you money in fuels costs.
    - For longer journeys consider public transport options.
    - Use journey-planning apps such as MyBusTrip or MotionMap for travel by bus, train, walking and cycling.
- Switch it off – don't leave your car engine idling if you are stationary e.g. waiting to pick someone up, in a traffic jam or waiting at level crossings.
- When driving, use techniques that help you use less fuel, like driving more slowly and smoothly.
    - You could use 10% less fuel by following the tips on the AA website
    - Like switching your engine off when stationary, this will not only reduce your emissions of air pollution but will save fuel and therefore money too!
- Consider making your next vehicle an electric vehicle.
- Join a car club or car-share regularly.
- Consider working at home where possible – the first Covid-19 lockdown showed widespread improvements in the air quality as the amount people travelled reduced.
- Use less energy at home – consider a smart meter to monitor usage and be aware of boiler standards.
- Opt for 'green energy' tariffs where available or switch to renewable sources of heating or power.
- Reduce the use of solid fuel stoves and open fires – domestic burning is now the single biggest source of particulate matter pollution in the UK (greater than traffic and industry).
    - If you are burning wood or coal ensure any fuel used meets the new standards of moisture content and emissions. Find more information
- Improve indoor air quality by ensuring adequate ventilation through opening windows, especially when cooking or cleaning, as these activities produce pollutants.

Make your children aware of the impact that day to day activities have on air quality.

Local Responsibilities and Commitment

This ASR was prepared by the Environmental Health Department of South Cambridgeshire District Council. If you have any comments on this ASR please send them to: Environmental Health - Air Quality

Address: South Cambridgeshire Hall, Cambourne Business Park, Cambourne, Cambridgeshire, CB23 6EA

Telephone: 01954 713640

Email: air.quality@scambs.gov.uk

This ASR has been approved by the Head of Climate, Environment & Waste for South Cambridgeshire District Council.

Table of Contents

Figures

Tables

1 Local Air Quality Management

This report provides an overview of air quality in South Cambridgeshire District Council during 20222. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in order to achieve and maintain the objectives and the dates by which each measure will be carried out. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by South Cambridgeshire District Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England are presented in Table E.1.

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 should prepare an Air Quality Action Plan (AQAP) within 18 months. The AQAP should specify how air quality targets will be achieved and maintained, and provide dates by which measures will be carried out.

South Cambridgeshire District Council currently does not have any declared AQMAs. A local Air Quality Strategy is in place to prevent and reduce polluting activities. The Local Air Quality Strategy is available at Local air quality management - South Cambs District Council (scambs.gov.uk)

2.2 Progress and Impact of Measures to address Air Quality in South Cambridgeshire District Council

Defra's appraisal of last year's ASR concluded that the report was well structured, detailed, and provided the information specified in the Guidance. We will continue to report this information in the same format.

South Cambridgeshire District Council has taken forward a number of direct measures during the current reporting year of 2022 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.1. The measures are included within Table 2.1, with the type of measure and the progress South Cambridgeshire District Council have made during the reporting year of 2022 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.1.

South Cambridgeshire District Council's priorities for the coming year are in line with the Council's Air Quality Strategy. This strategy outlines three focussed actions to ensure that:

1. air quality is monitored and understood district wide and appropriate measures are introduced to meet air quality objectives,
2. policies are in place to minimise impacts from future developments and
3. public engagement is aimed at increasing local knowledge and supporting better choices in reducing daily impact on air quality.

Much focus will be on monitoring the effects of solid fuel appliances and providing education to local residents.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	Low Emission Strategies	Policy Guidance and Development Control	Low Emissions Strategy	2019	2022	SCDC Environmental Health, GCP Planning Department	Developer contributions	N/A	N/A	N/A	Implementation	N/A	To be confirmed – May involve ratio of PPs issued with LES	In progress/ongoing - Low Emission Strategies required as per Local Plan and Supplementary Planning Document	
2	Guided Bus Way	Transport Planning and Infrastructure	Bus route improvements	2009	2011	Cambridgeshire County Council (CCC)	CCC	N/A	N/A	N/A	Completed	N/A	N/A	Completed	
3	A14 improvement - Junction 31-32 (EB & WB)	Traffic Management	Strategic highway improvements	2015	2015	CCC	CCC	N/A	N/A	N/A	Completed	N/A		Completed Autumn 2015	
4	A14/M11 re-alignment	Traffic Management	Strategic highway improvements	2016	2020	CCC/Highways England	CCC/Highways England	N/A	N/A	N/A	Completed	N/A	Central gov/Highways England Commitment	Completed 2020	
5	Policy Guidance and Development Control	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2015	2016	SCDC		N/A	N/A	N/A	Completed	N/A		SPD or Developers Guide for Low Emission Strategy measures	
6	City Deal	Transport Planning & Infrastructure and Promoting Travel Alternatives	Bus route improvements & Promotion of cycling/Sustainable Transport	2015	2015-2030	CCC/Cambridge City Council	CCC/Cambridge City Council	N/A	N/A	N/A	Implementation	N/A	Connect existing and new residential and employment areas with high quality public transport networks, including new orbital bus routes around Cambridge & comprehensive network of pedestrian and cycle route.	Continually ongoing Proposed scheme for making bus, cycle and walking journeys more convenient and safer from Northstowe announced.	Tranche 1 schemes by 2019

2.3 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG22 (Chapter 8), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

South Cambridgeshire District Council undertakes monitoring for $PM_{2.5}$ at four sites, three roadside sites at Girton, Northstowe and Harston and one urban background site at Orchard Park.

Furthermore, indicative real-time zephyr monitors are used for targeted hotspot monitoring, including monitoring $PM_{2.5}$. The main initiative has been to study air quality around primary schools as it is recognised that children are among the most vulnerable to the impacts of air pollution. Studies have been completed at Harston and Newton Community Primary School in Harston, Monkfield Park Primary School in Cambourne and Pathfinder C of E Primary School in Northstowe, Swavesey and Histon. The results are made available via a report on the council's website after a minimum of 6-months operation. The details of completed studies is available on the Council's website Air quality monitoring - South Cambs District Council (scambs.gov.uk)

Public Health England (PHE) reports the health impacts of Particulate Matter ($PM_{2.5}$) through the fraction of mortality attributable to particulate air pollution. This was reported as 5.4% for Cambridgeshire in 2019[13]. This is very similar to the East of England regional average of 5.5%, which is slightly above the national average for England of 5.1%.

The Council has participated in publicity campaigns both by Defra and locally highlighting the impacts of wood burning stoves on local air quality, which is now recognised as the biggest source of small particulate matter, providing information about what type of wood to burn and how to burn it efficiently[14]. In addition, Greater Cambridgeshire Partnership (GCP) is working on a network of twelve separate routes into Cambridge from surrounding towns and villages to increase the level of safe cycling and walking and to reduce traffic

[13] Public Health Outcome Framework
[14] Wood Burning Stoves Information

congestion[15]. Cambridgeshire County Council (CCC) elected members have also noted the impacts of poor air quality and have passed a resolution to work with different councils and other public bodies more collaboratively across Cambridgeshire.

In 2023, South Cambridgeshire District Council will be monitoring areas with a high prevalence of solid fuel appliances with a view to educating them on the affects (if identified) of emissions when utilised.

[15] Greenways Project information

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance

This section sets out the monitoring undertaken within 2022 by South Cambridgeshire District Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2018 and 2022 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

South Cambridgeshire District Council undertook automatic (continuous) monitoring at three sites during 2022. The Automatic Monitoring Stations at Girton and Impington sites are representative of nearby receptors. The Orchard Park monitor is a background site located within the school grounds. Two new automatic monitoring sites became operational in 2023 and will be reported upon in future years.

Table A.1 in Appendix A shows the details of the automatic monitoring sites. The automatic monitoring results also available through the UK-Air website.

The data capture for the automatic monitoring sites are as follows:

- NO_2: Impington site 92.1%, Orchard Park site 89.9% and Girton site 36.2%.
- PM_{10}: Impington site 80.4%, Orchard Park site 62.3% and Girton site 34.5%.
- $PM_{2.5}$: Impington site 26.1% and Orchard Park site 72.4%.
  As a result, the Girton site data was annualised.

The monitoring results demonstrate that:

- No exceedances of the annual mean objective for NO_2 or PM_{10} were recorded.
- No exceedances of annual mean objective for $PM_{2.5}$ were recorded.
- The hourly mean objective for NO_2 hourly mean was achieved at all sites.
- The daily mean objective for PM_{10} was achieved at all sites.
- Whilst a slight increase or equivalent levels in concentrations to the previous year has been seen at all monitoring locations, these are still below pre pandemic levels.

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

3.1.2 Non-Automatic Monitoring Sites

South Cambridgeshire District Council undertook non- automatic (i.e. passive) monitoring of NO_2 at 28 sites during 2022, one of which was a triplicate site.

The monitoring network was updated in 2021 with these new locations in areas of concern and where no previous monitoring was undertaken. The new locations include Cambourne and Hardwick to the west of Cambridge, Teversham and Cherry Hinton to the East of Cambridge. These locations are listed below.

DT31 located on Church Road, Teversham.

DT32 located on Gazelle Way, Cherry Hinton.

DT33 located on Hudson Road, Upper Cambourne.

DT34 located on Jeavons Lane, Great Cambourne.

DT35 located on Swansley Lane, Lower Cambourne.

DT35 located on St Neots Road, Hardwick

Furthermore, the following locations were removed from the network during 2022 due to consistent low concentrations.

DT10 located on adjacent to the Co-op, Girton.

DT11 located at Heath House on the A505.

DT20 located on Chieftain Way, Orchard Park

DT23 located at Orchard Park Primary School.

The data capture for the diffusion tubes was generally good. Annualisation was required for a small number of sites, including some of the sites that were removed from the network. Other sites removed from the network did not have sufficient data to calculate an annual mean. The monitoring results demonstrate:

- No exceedance of any long-term or short-term objective at any monitoring site.

- Overall, the majority of sites had a slight decrease in concentrations to the previous year, although some had a slight increase. Where increases were seen these were still below pre pandemic levels.

Table A.2 in Appendix A presents the details of the non-automatic sites. Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. annualisation and/or distance correction), are included in Appendix C.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, annualisation (where the annual mean data capture is below 75% and greater than 25%), and distance correction. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2022 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

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

There were no exceedances of any of the air quality objectives for NO_2 at any monitoring site in 2022. The maximum annual concentration measured was 19.9µg/m^3, recorded at the Gables, High Street, Histon.

Overall, a long term trend (i.e. over the past five years) of decreasing concentrations was observed at all monitoring sites.

3.2.2 Particulate Matter (PM_{10})

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of 40µg/m^3.

Table A.7 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past five years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

There were no exceedances of the annual mean air quality objectives for PM_{10} at any monitoring site in 2022. The maximum annual concentration measured in 2022 was 18 µg/m^3, recorded at the Impington site. The Impington site recorded two days where the daily mean of 50µg/m^3 was exceeded, which is significantly below the allowable 35 days.

Overall, the result are slightly higher or combarible to recent year's results, with no obvious long term trend in concentrations, but still well below objective concentrations.

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.8 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past five years.

South Cambridgeshire District Council undertakes monitoring for $PM_{2.5}$ at two sites, one roadside site at Impington and one urban background site at Orchard Park. In 2022, these measured annual mean concentrations of 7.5 and 12.4 µg/m^3 respectively. This was the third year that data was available at the Orchard Park and it represents a slight increase in concentration compared to 2021. For Impington, the value of 7.5 µg/m^3 represents a significant decrease, however, it should be noted that the data capture was only 26% and although annualisation has taken place the result should still be treated with some caution.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	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)
IMP	Impington (A14)	Roadside	543739	261625	NO_2, PM_{10}, $PM_{2.5}$	NO	Chemiluminescent; BAM	12	2	2
ORCH	Orchard Park Primary School (A14)	Urban Background	544558	261579	NO_2, PM_{10}, $PM_{2.5}$	NO	Chemiluminescent; BAM	1	N/A	2
GIRT	Girton	Roadside	542676	260667	NO_2, PM_{10},	NO	Chemiluminescent; BAM	5	5	2

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

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	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)
DT1	The Coppice, Impington	Urban Background	544230	262048	NO2	N	7.0	0.5	No	2.0
DT2	The Gables, High Street, Histon	Roadside	543770	263678	NO2	N	1.0	1.0	No	2.0
DT-28N	73 Cambridge Road, Milton	Roadside	547436	262295	NO2	N	15.0	2.0	No	2.0
DT4	96 High Street, Sawston	Urban Background	548600	249136	NO2	N	5.0	1.0	No	2.0
DT5	Rhadegund Farm Cottage, Bar Hill, A14	Roadside	538744	263640	NO2	N	1.0	18.0	No	2.0
DT-6N	22 High Street, Linton	Roadside	555942	246680	NO2	N	1.0	2.0	No	2.0
DT7	20 High Street, Tadlow	Roadside	528131	247399	NO2	N	10.0	1.0	No	2.0
DT-8N	47 High Street, Harston	Roadside	542555	251001	NO2	N	5.0	2.0	No	2.0
DT9	3 Garner Close, Milton	Urban Background	547452	263175	NO2	N	5.0	1.0	No	2.0
DT10	1A Weavers Field, opp. Co-op, Girton	Urban Background	542537	261467	NO2	N	20.0	1.0	No	2.0
DT11	Heath House, A505, Thriplow	Urban Background	544034	244585	NO2	N	15.0	2.0	No	2.0
DT12	Lone Tree Avenue, Impington	Roadside	544119	261862	NO2	N	7.0	1.0	No	2.0

DT13	1 Brook Close, Histon	Urban Background	543955	263588	NO2	N	2.0	1.0	No	2.0
DT14	22 Water Lane, Histon	Roadside	544050	263306	NO2	N	2.0	2.0	No	2.0
DT15	72 Cambridge Road, Impington	Urban Background	544243	261819	NO2	N	7.0	1.0	No	2.0
DT17	5 Mill Lane, Sawston	Roadside	548545	249366	NO2	N	6.0	1.0	No	2.0
DT-32N	Banworth Lodge, Ely Road, A10	Roadside	548742	264698	NO2	N	8.0	7.0	No	2.0
DT20	Chieftain Way, Orchard Park	Roadside	544828	261738	NO2	N	4.0	0.5	No	2.0
DT21	Neal Drive, Orchard Park	Roadside	545056	261784	NO2	N	7.0	0.5	No	2.0
DT22	Flack End, Orchard Park	Roadside	545435	261906	NO2	N	7.0	35.0	No	2.0
DT23a, DT23b, DT23c	Orchard Park Primary School	Urban Background	544557	261571	NO2	N	1.0	50.0	Yes	2.0
DT26	Co-op, High Street, Histon	Roadside	543768	263708	NO2	N	1.0	4.5	No	2.0
DT27	Engledow Drive, Orchard Park	Urban Background	545259	261873	NO2	N	2.0	4.5	No	2.0
DT28	22 Topper Street, Orchard Park	Roadside	545169	261764	NO2	N	4.0	0.5	No	2.0
DT29	Church Lane, Little Abington	Urban Background	552961	249251	NO2	N	14.0	2.0	No	2.0
DT-30N	63 Denny End Road,Waterbeach	Roadside	549154	266006	NO2	N	7.0	2.0	No	2.0
DT31	Church Road, Teversham	Roadside	549457	258573	NO2	N	14.0	1.5	No	2.0

DT32	Gazelle Way, Cherry Hinton	Roadside	549406	257551	NO2	N	18.0	2.0	No	2.0
DT33	Hudson Road, Upper Cambourne	Urban Background	533359	259765	NO2	N	7.0	2.0	No	2.0
DT34	Jeavons Lane, Great Cambourne	Roadside	532092	259086	NO2	N	6.0	1.0	No	2.0
DT35	Swansley Lane, Lower Cambourne	Roadside	531247	259475	NO2	N	17.0	1.0	No	2.0
DT36	55 St Neots Road	Roadside	538122	259523	NO2	N	20.0	3.0	No	2.0

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.3 – Annual Mean NO_2 Monitoring Results: Automatic Monitoring (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
IMP	543739	261625	Roadside	92.13	92.13	19	16	13	16	16
ORCH	544558	261579	Urban Background	89.86	89.86	14	15	11	11	12
GIRT	542676	260667	Roadside	36.18	36.18	18	17	12	12	13.4

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

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

Notes:

The annual mean concentrations are presented as µg/m^3.

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

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

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

Table A.4 – Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2022 (%) [2]	2018	2019	2020	2021	2022
DT1	544230	262048	Urban Background	0	0	14.7	14.7	11.4	10.5	-
DT2	543770	263678	Roadside	100	100	27.1	27.2	19.7	21.1	19.9
DT-28N	547436	262295	Roadside	92.3	92.3	22.8	23.0	18.8	17.3	15.1
DT4	548600	249136	Urban Background	92.3	92.3	24.7	23.0	16.5	17.0	17.1
DT5	538744	263640	Roadside	38.5	38.5	19.4	13.4	10.8	12.2	12.1
DT-6N	555942	246680	Roadside	67.3	67.3	20.2	21.0	15.1	16.5	15.8
DT7	528131	247399	Roadside	0	0	8.6	10.2	8.5	7.8	-
DT-8N	542555	251001	Roadside	100	100	17.3	15.3	12.3	13.1	13.0
DT9	547452	263175	Urban Background	84.6	84.6	14.4	15.5	13.3	12.0	12.8
DT10	542537	261467	Urban Background	100	15.4	25.8	19.0	15.4	16.5	-
DT11	544034	244585	Urban Background	100	7.7	24.9	22.5	15.0	16.9	-
DT12	544119	261862	Roadside	84.6	84.6	15.1	16.3	12.7	12.2	11.9
DT13	543955	263588	Urban Background	100	100	17.2	16.3	11.5	12.1	12.7

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2022 (%) [2]	2018	2019	2020	2021	2022
DT14	544050	263306	Roadside	92.3	92.3	23.6	22.3	20.2	17.1	17.7
DT15	544243	261819	Urban Background	92.3	92.3	17.5	18.5	13.4	11.9	11.7
DT17	548545	249366	Roadside	0	0	13.1	13.8	10.4	12.2	-
DT-32N	548742	264698	Roadside	75	75	23.4	21.6	19.0	15.3	16.9
DT20	544828	261738	Roadside	100	7.7	23.2	14.7	13.9	13.6	-
DT21	545056	261784	Roadside	0	0	16.7	15.8	12.9	13.1	-
DT22	545435	261906	Roadside	67.3	67.3	17.5	15.9	13.3	13.5	14.2
DT23a, DT23b, DT23c	544557	261571	Urban Background	73.3	34.6	16.3	-	10.6	10.5	10.6
DT26	543768	263708	Roadside	100	100	17.8	17.1	13.2	13.2	13.1
DT27	545259	261873	Urban Background	0	0	17.9	16.8	13.5	13.3	-
DT28	545169	261764	Roadside	100	100	16.6	16.7	14.1	13.9	13.5
DT29	552961	249251	Urban Background	100	100	10.0	10.9	8.4	7.8	8.0
DT-30N	549154	266006	Roadside	100	100	16.0	-	12.2	12.1	12.3
DT31	549457	258573	Roadside	100	100	-	-	-	14.0	12.3

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
DT32	549406	257551	Roadside	90.4	90.4	-	-	-	14.6	14.4
DT33	533359	259765	Urban Background	100	100	-	-	-	10.7	9.2
DT34	532092	259086	Roadside	100	100	-	-	-	12.3	10.3
DT35	531247	259475	Roadside	92.3	92.3	-	-	-	11.5	11.2
DT36	538122	259523	Roadside	90.4	90.4	-	-	-	12.3	12.0

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

☒ **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:

The annual mean concentrations are presented as µg/m^3.

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined**.

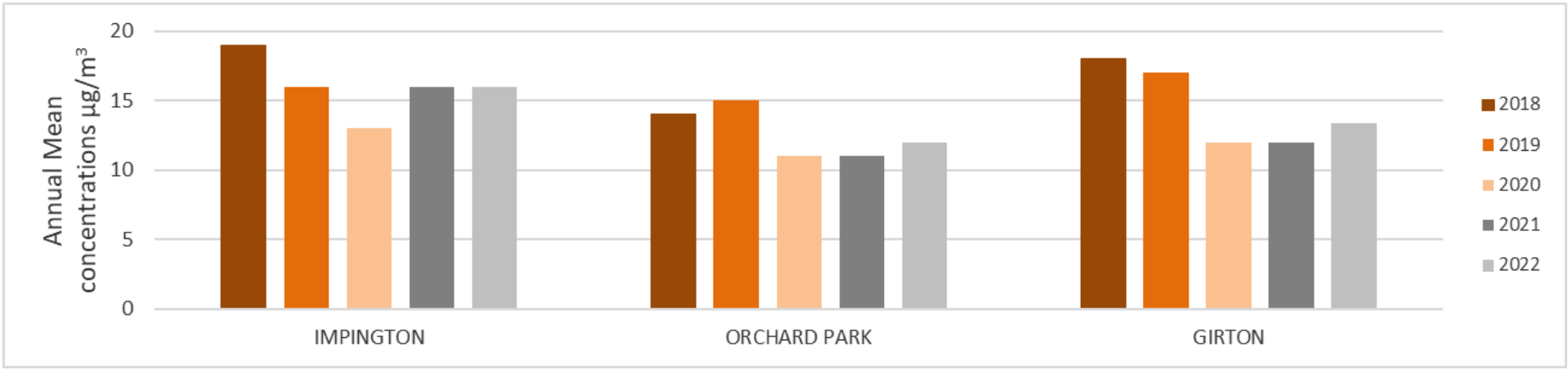
Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

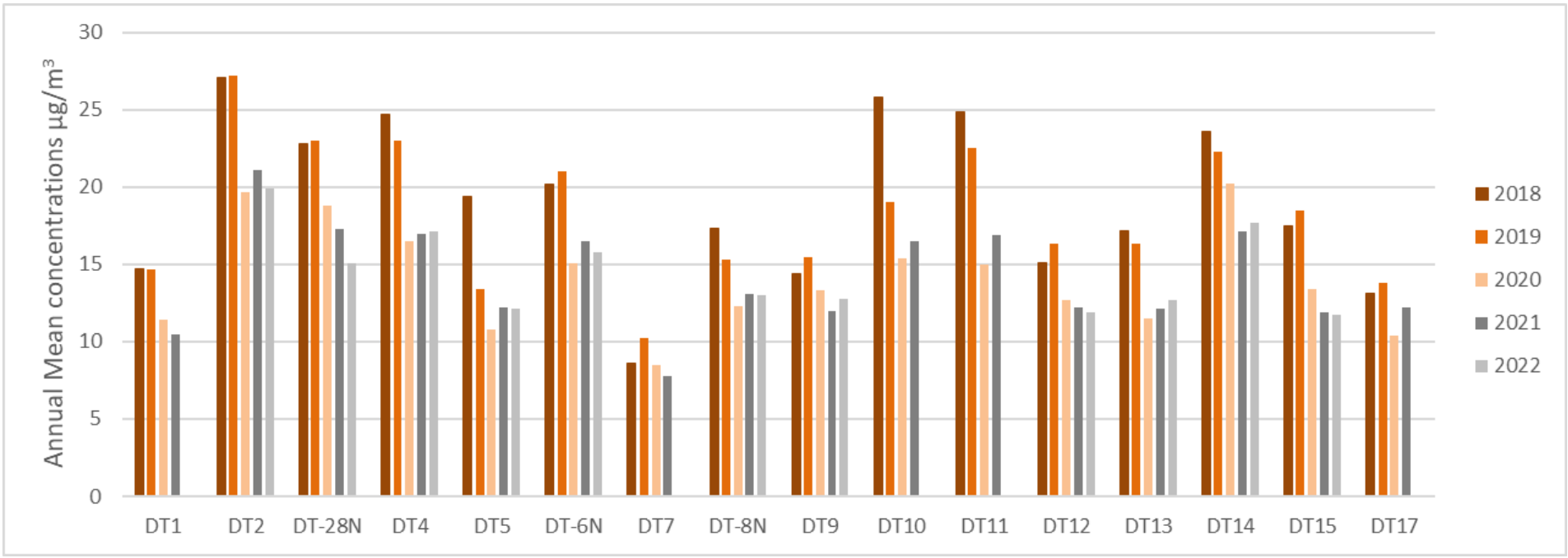
Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

(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 – Trends in Annual Mean NO_2 Concentrations





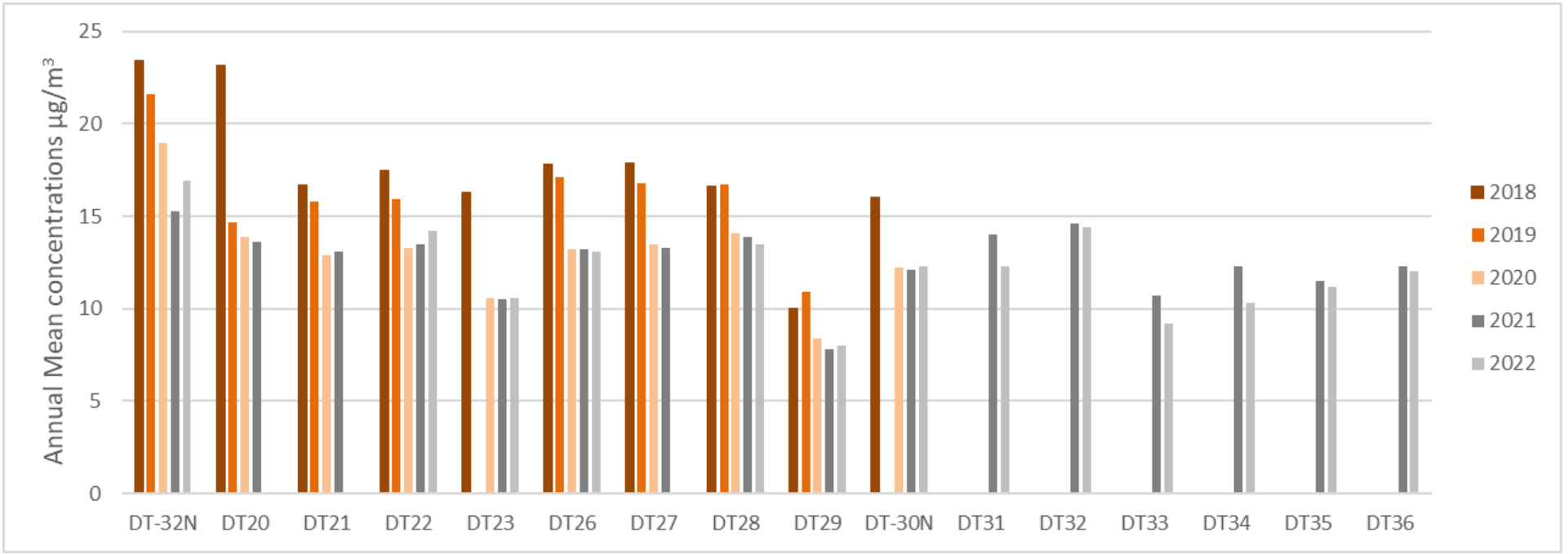

Annual Mean concentrations µg/m³
25
20
15
10
5
0
DT-32N
DT20
DT21
DT22
DT23
DT26
DT27
DT28
DT29
DT-30N
DT31
DT32
DT33
DT34
DT35
DT36
2018
2019
2020
2021
2022

Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2018	2019	2020	2021	2022
IMP	543739	261625	Roadside	92.13	92.13	0	0	0	0	0
ORCH	544558	261579	Urban Background	89.86	89.86	0	0	0	0	0
GIRT	542676	260667	Roadside	36.18	36.18	0	0	0	0	0 (65)

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m^3 have been recorded.

Exceedances of the NO_2 1-hour mean objective (200µg/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%).

Table A.6 – Annual Mean PM_{10} Monitoring Results (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
IMP	543739	261625	Roadside	80.37	80.37	17	16	15	15	18.0
ORCH	544558	261579	Urban Background	62.32	62.32	14	14	12	12	12.8
GIRT	542676	260667	Roadside	34.5	34.5	17	17	14	15	15.0

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

Notes:

The annual mean concentrations are presented as µg/m³.

Exceedances of the PM_{10} annual mean objective of 40µg/m³ are shown in **bold**.

All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

Figure A.2 – Trends in Annual Mean PM_{10} Concentrations

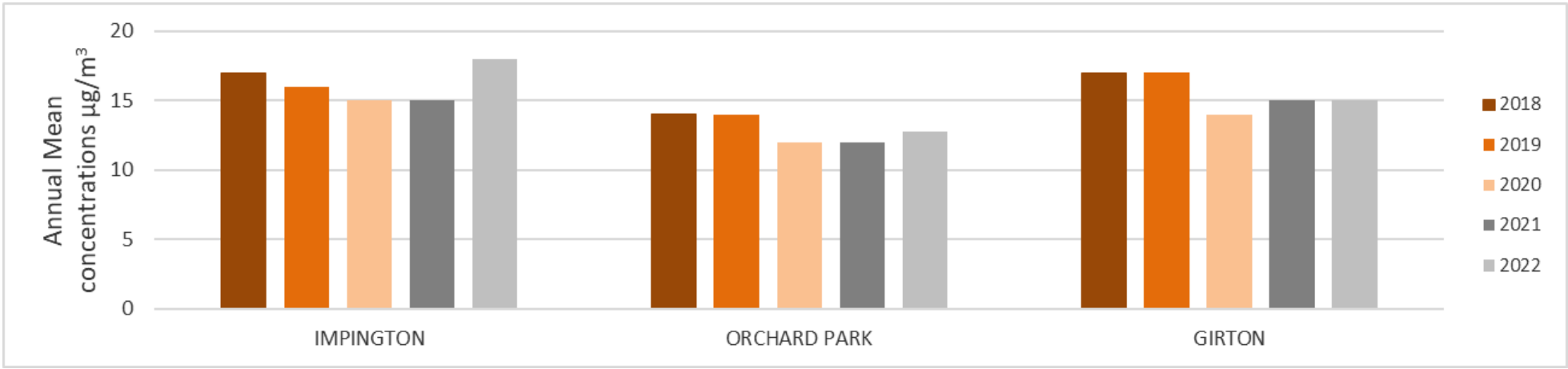


Table A.7 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2018	2019	2020	2021	2022
IMP	543739	261625	Roadside	80.4	80.4	1	2	0 (22)	0	2 (28)
ORCH	544558	261579	Urban Background	62.3	62.3	1	1	0	0	0 (26)
GIRT	542676	260667	Roadside	34.5	34.5	1	3	0	0 (22)	0 (19)

Notes:

Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m^3 have been recorded.

Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

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

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

Table A.8 – Annual Mean $PM_{2.5}$ Monitoring Results ($\mu g/m^3$)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
ORCH	544558	261579	Urban Background	72.4	72.4	-	-	13	12	12.4
IMP	542676	260667	Roadside	26.1	26.1	11	11	10	13	7.5

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

Notes:

The annual mean concentrations are presented as $\mu g/m^3$.

All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1 – NO_2 2022 Diffusion Tube Results (µg/m^3)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.76)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DT2	543770	263678	40.3	32.0	30.7	21.7	25.5	13.3	23.3	21.2	25.7	26.3	27.7	27.0	26.2	19.9	-	
DT-28N	547436	262295	39.6	28.9	15.7	15.8	18.6	9.7	15.2	10.3	17.8	22.1		25.4	19.9	15.1	-	
DT4	548600	249136	33.5	23.9	26.9	23.5	17.7	9.2	18.3	19.5	23.8	23.1		27.9	22.5	17.1	-	
DT5	538744	263640	16.6	11.3					13.5	20.1	16.8				15.7	12.1	-	
DT-6N	555942	246680	33.7	25.5	24.3	16.2			22.7		23.2	20.8		22.2	23.6	15.8	-	
DT-8N	542555	251001	25.1	16.0	24.8	16.4	11.7	11.7	12.8	16.9	16.2	16.5	16.6	21.3	17.2	13.0	-	
DT9	547452	263175	27.0	19.4	18.6	11.5	11.3	11.3			13.0	18.2	15.1	22.7	16.8	12.8	-	
DT10	542537	261467	32.0	20.1											-	-	-	
DT11	544034	244585	32.1												-	-	-	
DT12	544119	261862			24.9	12.6	12.3	10.8	11.4	13.0	15.4	21.7	14.3	20.8	15.7	11.9	-	
DT13	543955	263588	25.4	19.2	22.0	13.7	11.7	10.7	10.0	11.6	14.3	17.9	20.5	22.8	16.7	12.7	-	
DT14	544050	263306	38.4	27.5	28.7	19.5	18.0	18.4	17.5	15.5	21.3	24.7		26.5	23.3	17.7	-	
DT15	544243	261819	25.5	18.2	20.9	12.7	13.1	10.8	10.4	10.8	13.8	15.8		17.6	15.4	11.7	-	
DT-32N	548742	264698	32.6	21.9	21.4	18.7				16.3	20.0	20.6	20.6	27.5	22.2	16.9	-	
DT20	544828	261738	26.4												-	-	-	
DT22	545435	261906	30.6	21.3	23.4	18.4	13.5	11.3			15.7	16.4			18.8	14.2	-	
DT23a	544557	216571	24.8	14.7		9.3	10.0								-	-	-	Triplicate Site with DT23a, DT23b and DT23c - Annual data provided for DT23c only
DT23b	544557	216571	16.2	14.6		9.6	9.3								-	-	-	Triplicate Site with DT23a, DT23b and DT23c - Annual data provided for DT23c only

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.76)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DT23 c	544557	216571	21.6	19.9			9.3								14.1	10.6	-	Triplicate Site with DT23a, DT23b and DT23c - Annual data provided for DT23c only
DT26	543768	263708	25.8	16.2	25.0	14.6	12.3	13.1	11.7	12.8	15.3	20.3	18.3	22.0	17.3	13.1	-	
DT28	545169	261764	30.6	20.2	24.0	16.6	13.3	10.9	10.5	12.9	15.4	18.9	20.7	19.7	17.8	13.5	-	
DT29	552961	249251	19.0	11.6	16.1	8.6	7.3	5.7	6.3	7.3	7.4	9.1	10.5	17.1	10.5	8.0	-	
DT-30N	549154	266006	25.0	19.0	21.1	14.7	12.3	10.9	10.0	20.3	13.5	17.7	20.1	9.3	16.2	12.3	-	
DT31	549457	258573	31.5	20.0	19.3	13.0	11.3	10.8	10.2	14.3	7.1	16.8	14.2	26.2	16.2	12.3	-	
DT32	549406	257551	28.7	18.2	24.8	15.6		12.8	14.9	16.9	15.9	14.5	18.7	27.4	18.9	14.4	-	
DT33	533359	259765	20.9	16.3	17.9	5.7	9.5	7.4	7.1	10.0	8.8	12.3	10.4	18.7	12.1	9.2	-	
DT34	532092	259086	23.7	16.1	18.3	6.4	10.1	10.2	9.0	9.9	11.6	15.0	11.4	20.6	13.5	10.3	-	
DT35	531247	259475	25.9	14.8	18.8	12.7	9.1	8.2		9.1	11.0	13.1	16.3	22.5	14.7	11.2	-	
DT36	538122	259523	25.8	16.2	21.7	12.9		8.8	11.1	14.8	13.1	13.3	13.1	23.0	15.8	12.0	-	

☒ **All erroneous data has been removed from the NO_2 diffusion tube dataset presented in Table B.1 (confirm by selecting in box).**

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22 (confirm by selecting in box).**

☒ **National bias adjustment factor used (confirm by selecting in box).**

☒ **Where applicable, data has been distance corrected for relevant exposure in the final column (confirm by selecting in box).**

☒ **South Cambridgeshire District Council confirm that all 2022 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.**

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined**.

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within South Cambridgeshire District Council During 2022

South Cambridgeshire District Council has not identified any new sources relating to air quality within the reporting year of 2022.

Additional Air Quality Works Undertaken by South Cambridgeshire District Council During 2022

South Cambridgeshire District Council has not completed any additional works within the reporting year of 2022.

QA/QC of Diffusion Tube Monitoring

NO_2 monitoring was undertaken at 28 sites within the district using passive diffusion tubes. The tubes were supplied and processed by SOCOTEC Didcot, who supplied the following information. 'The samples have been analysed in accordance with SOCOTEC's standard operating procedure ANU/SOP/1015. This method meets the guidelines set out in DEFRA's 'Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance.' The tubes were prepared by spiking acetone:triethanolamine (50:50) onto the grids prior to the tubes being assembled. The tubes were desorbed with distilled water and the extract analysed using a segmented flow autoanalyser with ultraviolet detection. Please note:

(i) As set out in the practical guidance, the results were initially calculated assuming an ambient temperature of 11°C, the reported values have been adjusted to 20°C to allow for direct comparison with EU limits.

(ii) The reported results have not been bias adjusted.

This analysis of diffusion tube samples to determine the amount of nitrogen dioxide present on the tube is within the scope of our UKAS schedule. Any further calculations and assessments requiring exposure details and conditions fall outside the scope of our

accreditation. In the AIR PT inter-comparison scheme for comparing spiked Nitrogen Dioxide diffusion tubes, SOCOTEC currently holds the highest rank of a Satisfactory laboratory.

All monitoring has taken place in line with the 2022 diffusion tube monitoring calendar as published by Defra.

Diffusion Tube Annualisation

Annualisation is required for any site with data capture less than 75% but greater than 25%. Four diffusion tube monitoring locations (one of which was a triplicate site) within South Cambridgeshire District Council recorded data capture of less than 75% and these have been annualised in line with the TG.22 Guidelines and the annualisation has been summarised in Table C.2.

All sites used for annualisation were background sites forming part of the Defra AURN network within 50 miles of South Cambridgeshire.

Table C.1 – Annualisation Summary (concentrations presented in µg/m^3)

Site ID	Annualisation Factor Northampton Spring Park	Annualisation Factor Wicken Fen	Annualisation Factor Boreham-wood Meadow Park	Annualisation Factor London Haringey Priory	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
DT5	1.0269	0.9988	1.0354	1.0216	1.0207	15.7	16.0
DT-6N	0.8814	0.8572	0.8821	0.9060	0.8817	23.6	20.8
DT22	0.9943	0.9811	1.0064	0.9906	0.9931	18.8	18.7
DT23a	0.9598	0.9770	1.0404	1.0036	0.9952	-	-
DT23b	0.9598	0.9770	1.0404	1.0036	0.9952	-	-
DT23c	0.9598	0.9770	1.0404	1.0036	0.9952	14.1	14.0

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2021 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG16 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

South Cambridgeshire District Council have applied a national bias adjustment factor of 0.76 to the 2022 monitoring data.

The national bias adjustment factor was used as although a local co-location study was undertaken in 2022, there was insufficient data capture for applying a local bias adjustment factor over a national factor, as per Box 7.11 of LAQM.TG22. A summary of bias adjustment factors used by South Cambridgeshire District Council over the past five years is presented in Table C.2.

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	National	03/23	0.76
2021	National	03/22	0.78
2020	National	03/21	0.77
2019	National	03/20	0.75
2018	National	-	0.76

QA/QC of Automatic Monitoring

South Cambridgeshire District Council is a member of the Calibration Club, operated by AEAT now Ricardo – AEA. All NOx analysers are chemiluminescence analysers. All particulate matter analysers are BAMs. In line with current guidance, BAM data is multiplied by 1.3 to give the gravimetric equivalent. QA/QC of automatic monitoring data is carried out by Ricardo. Tri-annual audits of the monitoring stations are carried out by Ricardo. Services of all the three AQ monitoring stations i.e. Impington, Girton and Orchard Park are carried out bi-annually by the appointed Equipment Support Unit (ESU) – ACOEM (Air Monitors). The sites are manually calibrated on a monthly basis by a Council Officer serving as Local Site Operative (LSO). The output from the calibrations is forwarded to Ricardo – AEA for QA/QC and ratification purposes. The monitoring data in the ASR has been ratified. Live and historic data is available at https://scambs-airquality.ricardo-aea.com/.

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

The type of PM_{10}/$PM_{2.5}$ monitor(s) utilised within South Cambridgeshire District Council do not required the application of a correction factor.

Automatic Monitoring Annualisation

Annualisation is required for any site with data capture less than 75% but greater than 25%. Annualisation was required for all data recorded at Girton site with data capture of 36.18% for NO_2 and 34.50% for PM_{10}. For Impington, just the $PM_{2.5}$ required annualisation, with data collection of 26.1%. At Orchard Park, both $PM_{2.5}$ and PM_{10} required annualisation with data capture of 72.4% and 62.32% respectively.

The annualisation summaries are included in Tables C.3 to C.5 for the various pollutants. All sites used for annualisation are Defra AURN background sites, where possible within 50 miles of the subject site, although some of the sites used for PM may be slightly further given the lack of background PM sites with an acceptable data set close to South Cambridgeshire.

Table C.3 – Annualisation Summary NO_2 (concentrations presented in µg/m^3)

Site ID	Annualisation Factor Northampton Spring Park	Annualisation Factor Wicken Fen	Annualisation Factor Boreham-wood Meadow Park	Annualisation Factor London Haringey Priory	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
Girton	0.89	0.85	0.96	0.88	0.89	15.1	13.4

Table C.4 – Annualisation Summary PM_{10} (concentrations presented in µg/m^3)

Site ID	Annualisation Factor Norwich Lakenfields	Annualisation Factor Leicester University	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
Girton	0.80	0.85	0.825	18.2	15.0
Orchard Park	1.09	1.03	1.06	12.1	12.8

Table C.5 – Annualisation Summary $PM_{2.5}$ (concentrations presented in µg/m^3)

Site ID	Annualisation Factor Northampton Spring Park	Annualisation Factor Norwich Lakenfields	Annualisation Factor Leicester University	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
Impington	1.20	1.29	1.15	1.21	6.2	7.5
Orchard Park	0.92	0.89	0.91	0.9066	13.7	12.4

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

No automatic NO_2 monitoring locations within South Cambridgeshire District Council required distance correction during 2021.

Appendix D: Map(s) of Monitoring Locations and AQMAs

Figure D.1 – Map of Automatic Monitoring Site

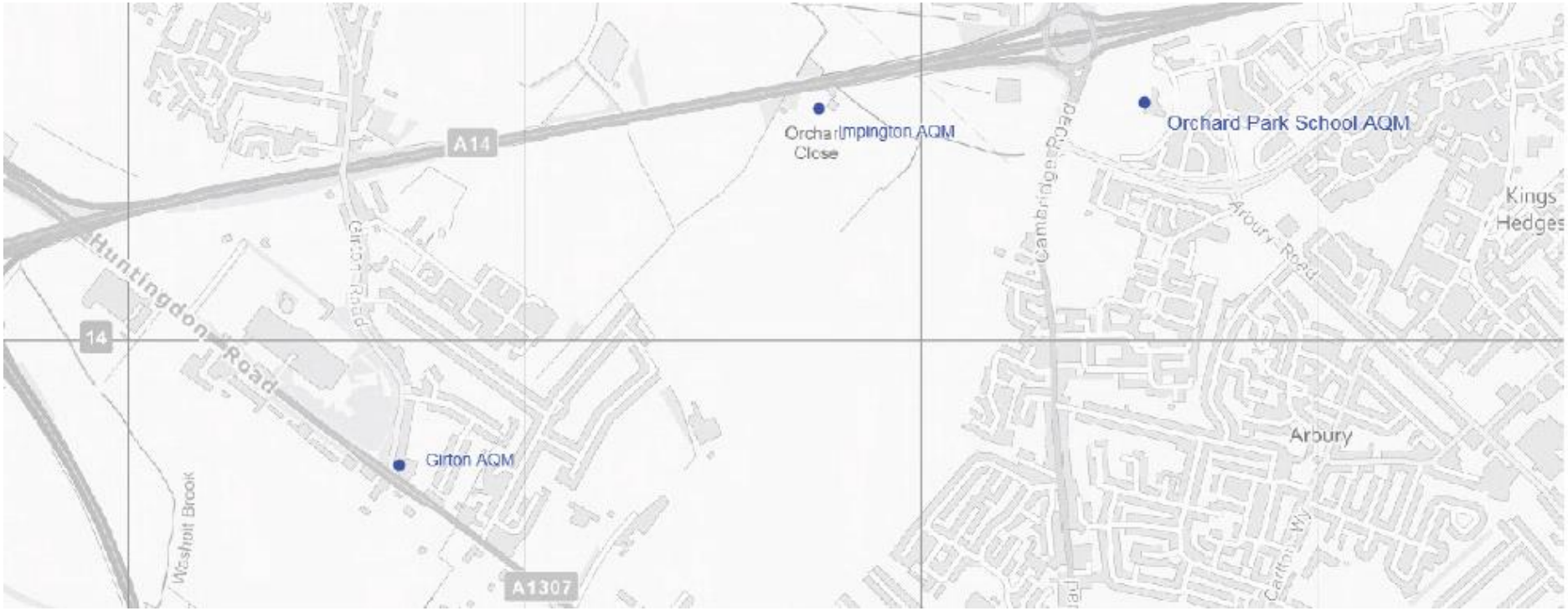
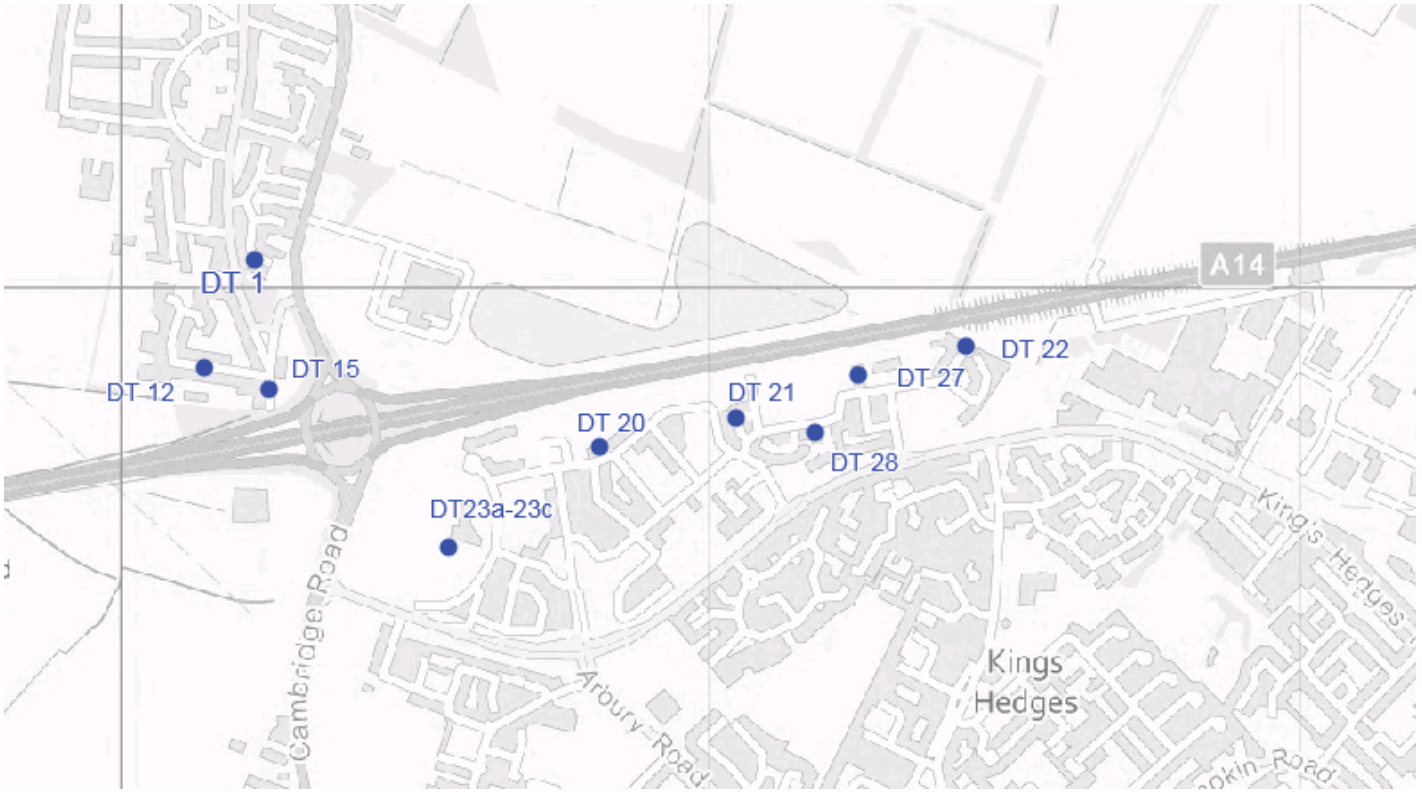


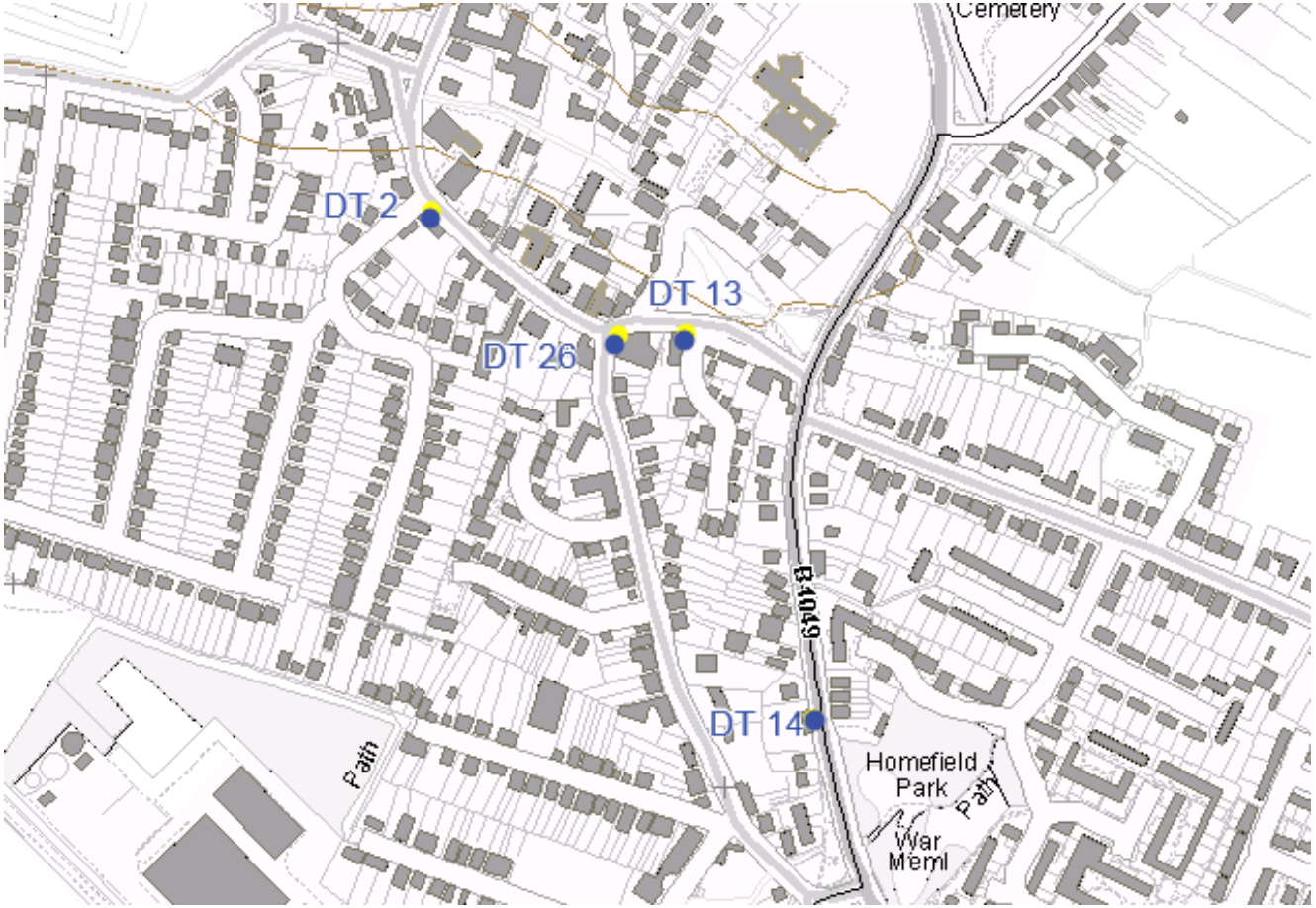
Figure D.3 - Map of Non-Automatic Monitoring Site

Diffusion Tube Locations – Orchard Park and Impington (AQMA)



Diffusion Tube Locations – A14 and Bar Hill (AQMA)

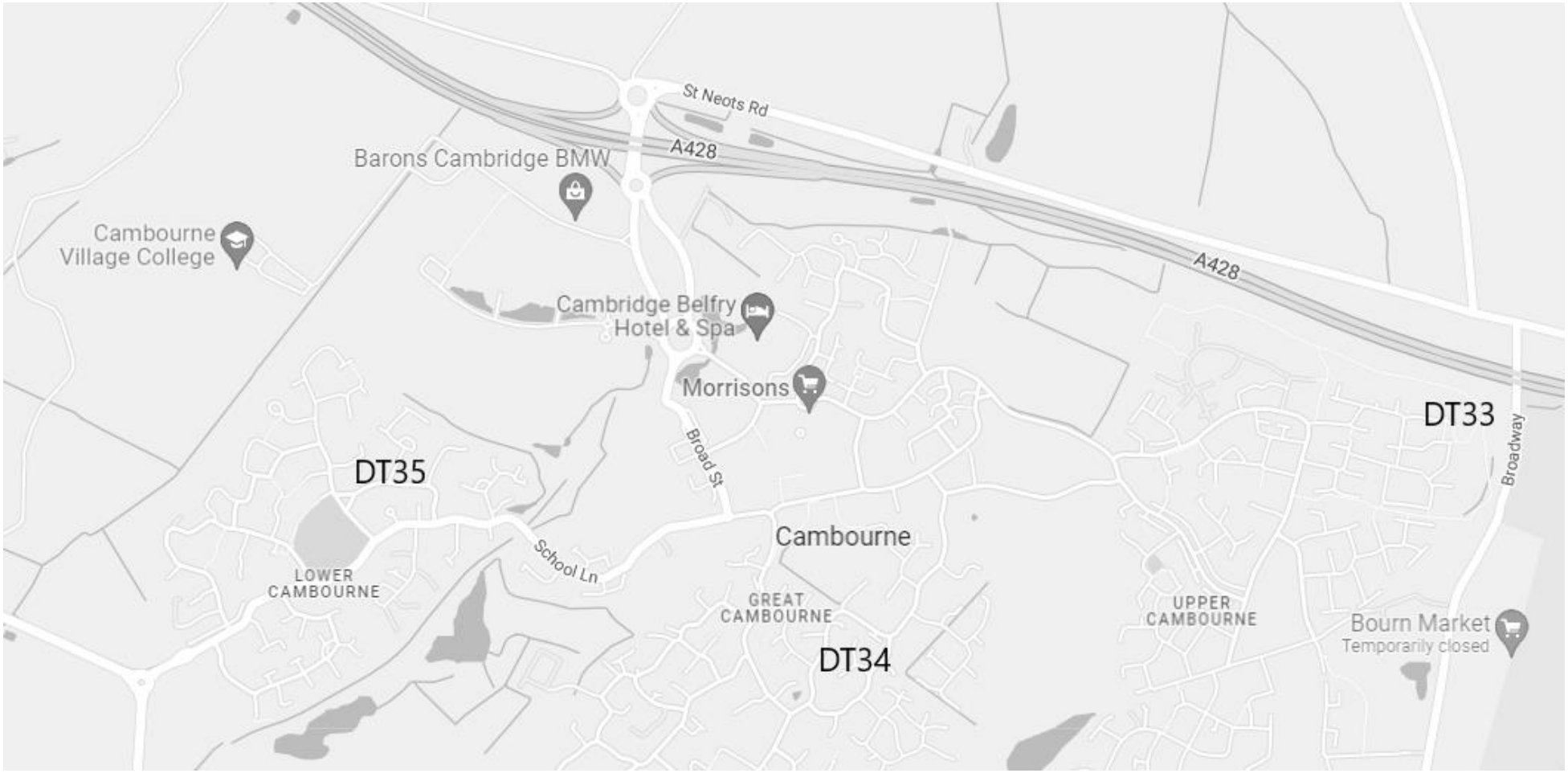
Diffusion Tube Locations – Histon



Diffusion Tube Locations – Waterbeach, Milton and A10

Diffusion Tube Locations – Northstowe

New Tubes Location – Cambourne



New Tubes Location – Hardwick

New Tubes Location - Teversham and Cherry Hinton

Diffusion Tube Locations South of District - Harston, Sawston, A505, Great Abington and Linton

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[16]

Pollutant	Air Quality Objective: Concentration	Air Quality Objective: Measured as
Nitrogen Dioxide (NO_2)	200µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
Nitrogen Dioxide (NO_2)	40µg/m^3	Annual mean
Particulate Matter (PM_{10})	50µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
Particulate Matter (PM_{10})	40µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
Sulphur Dioxide (SO_2)	125µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
Sulphur Dioxide (SO_2)	266µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

[16] The units are in microgrammes of pollutant per cubic metre of air (µg/m^3).

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
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
ASR	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

References

- Local Air Quality Management Technical Guidance LAQM.TG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Cambridgeshire County Council - The Local transport Plan 3 (2011 – 2031)
- Air Quality Regulations 2000 and (Amendment) regulations 2002
- Air Quality Action Plan for the Cambridgeshire Growth Areas (2010)
- Deriving NO_2 from NO_x for Air Quality Assessments of Roads – Updated to 2006
- The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2000)
- The SCDC Detailed Assessment of Nitrogen Dioxide along the A14 Corridor (2006)
- The SCDC Detailed Assessment of PM_{10} along the A14 Corridor (2008)
- The SCDC Further Assessment of NO_2 and PM_{10} along the A14 Corridor (2008)

Short term air quality monitoring in Milton, Cambridgeshire

August 2023

Executive Summary

Air quality was monitored in Milton using new Zephyr monitoring technology during the period September 2022 to February 2023 as part of a study into air quality around primary schools. Monitoring was carried out by South Cambridgeshire District Council outside Milton Primary School, as it is recognised that children are among the most vulnerable to the impacts of air pollution. Milton Primary School was selected due to the school being near the A10. It was found that concentrations of the main pollutants, nitrogen dioxide and particulate matter, were comfortably below the national objectives for annual mean concentrations and there were no exceedances of the short-term objectives, representing good air quality. This is in line with long-term concentrations measured across the South Cambridgeshire district and reflects the rural nature of the area. Differences were seen between the school holiday periods compared to term time for nitrogen dioxide, with lower concentrations in the holidays, likely reflecting the impact of reduced school traffic.

South Cambridgeshire residents can help to improve local air quality through actions such as reducing idling of car engines and increasing walking and cycling where possible. Reducing solid fuel burning and only burning Woodsure Ready to Burn certified wood will also help to reduce particulate pollution. This report can be read alongside the yearly Air Quality Annual Status Report (ASR) and the reports from other localised studies, which are available on our website.

Glossary

Annualisation – a calculation process used to estimate an average concentration for a full year from a shorter period.
Annual mean – the average concentration across a full calendar year.
AQMA – Air Quality Management Area – an area where air pollutant concentrations exceed or are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives.
Continuous monitor/monitoring station – instruments which measure air pollution all the time and therefore can give a concentration attributed to a specific time.
Diffusion tube – small plastic tube containing a metal mesh which is coated with a chemical that absorbs nitrogen dioxide. This is exposed to the air in a fixed location for a known amount of time, usually a month, and then sent to a lab for analysis. This provides an average concentration for the time it is exposed.
Nitrogen dioxide (NO_2) – a gas predominantly formed following the burning of fossil fuels, which can cause irritation of the airways and exacerbate symptoms of other conditions.
Particulate matter ($PM_{2.5}$ and PM_{10}) – the number refers to the size of the particulates in micrometres (one millionth of a metre) – a mix of solid particles and liquid droplets of various sizes and composition, the smallest of which can get into the blood and be transported around the body.
Real-time monitoring – see also continuous monitoring – monitoring which takes place at regular intervals all the time and therefore can give a concentration attributed to a specific time.
µg/m³ – micrograms per cubic metre, the standard units of measurement of air pollutants including nitrogen dioxide and particulate matter.
Zephyr – a type of relatively compact and lightweight air pollution sensors that measure harmful gases and particle matter in real-time.

Results of Zephyr air quality monitoring in Milton, Cambridgeshire

Introduction

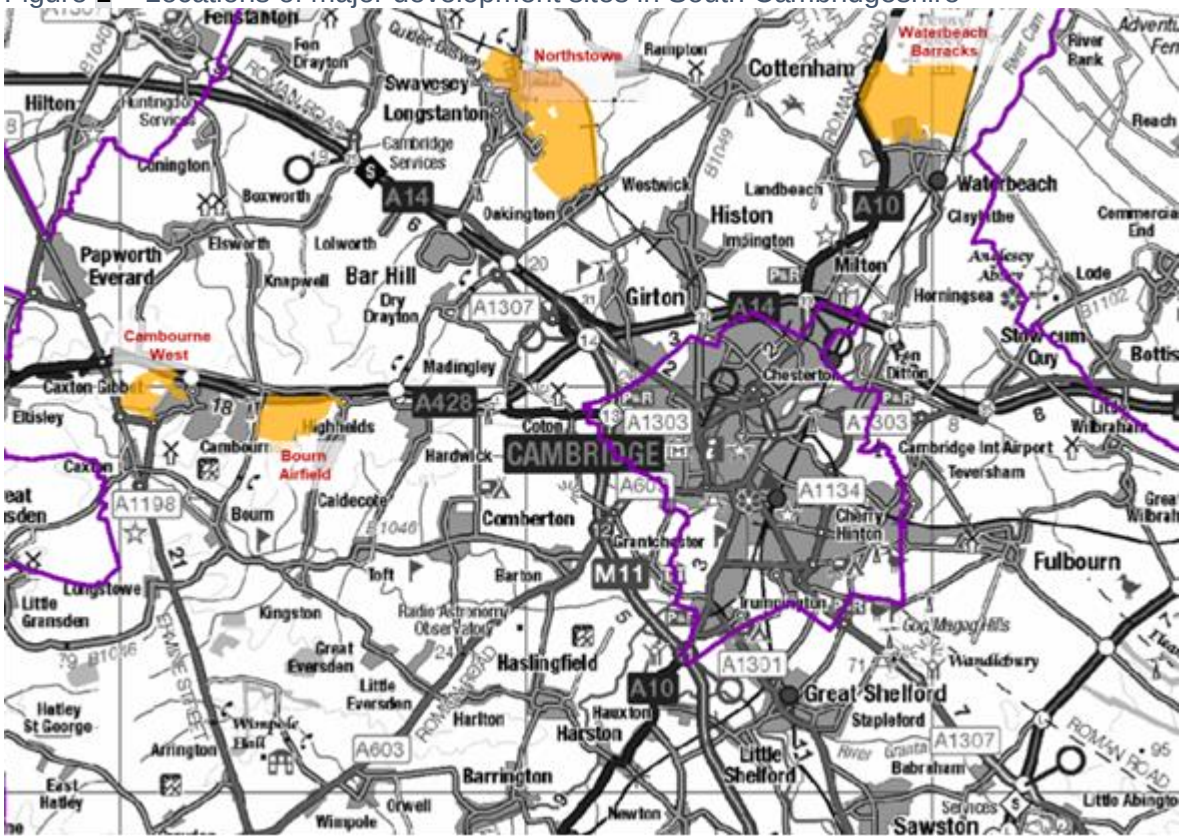
Purpose of this report

This is a report to provide the results of the short-term air quality monitoring study undertaken in Milton, Cambridgeshire, using a new style 'Zephyr' monitor. Monitoring was carried out during the period September 2022 and February 2023. The study was designed to be a short-term study monitoring air quality outside Milton Primary School as part of South Cambridgeshire District Council's study into air quality around primary schools. It also serves to create additional local awareness of air quality in our area and enable people to make informed choices around how they can impact on improving air quality in their area.

Air Quality in South Cambridgeshire

South Cambridgeshire is a rural district which enjoys generally good air quality, with both short-term and long-term pollution levels below the national objectives at all monitored locations. This means we benefit from cleaner air to breathe and less pollution related health problems. The district is undergoing significant growth with major developments to keep up with the increase in demand for housing, including Northstowe (10,000 dwellings), Waterbeach Barracks (6000-10,000 dwellings), Bourn Airfield and Cambourne West, shown in Figure 1.

Figure 1 – Locations of major development sites in South Cambridgeshire



Air quality impacts in the district are mainly related to road traffic, which is likely to increase due to these areas of growth, and the major roads running through the district, including the A14 and M11/A11 corridors. Another important source of particulate matter pollution is domestic solid fuel burning, which nationally contributed 27% of the $PM_{2.5}$ emissions in 2021 according to Defra.

Air quality is an important topic as air pollution can impact our health, particularly effecting the most vulnerable, including children and those with underlying conditions such as asthma, lung conditions or heart disease. Air quality is monitored across the district using a network of diffusion tubes and continuous monitoring stations, which provide accurate air quality measurements in real-time, in addition to the new Zephyr monitors which are used for short term monitoring projects. Although the air quality in South Cambridgeshire is generally good when compared to more urban areas, there is emerging evidence that even low levels of pollutants can cause health impacts, and the World Health Organisation (WHO) have published ambitious targets for some pollutants that are lower than the national objectives.

For more information and detail on the importance of air quality and air quality in South Cambridgeshire, please refer to Appendix 1 – Air Quality Frequently Asked Questions or visit our website. Additionally, ideas on how anyone can play a role in improving local air quality can be found in Appendix 2 – How to get Involved with Local Air Quality.

The 'Zephyr' Air Quality Sensor

Zephyr monitors are compact and lightweight air pollution sensors that measure harmful gases and particles in real-time, including the main pollutants of concern (NO_2, PM_{10} and $PM_{2.5}$). They can run off internal batteries or be powered by a solar panel and can therefore be fixed in a specific location, mostly commonly a lamp post, or used as a mobile monitor. The sensors provide detailed air quality measurements in real-time to help identify pollution hotspots at a localised level, for example busy junctions. Other potential studies include investigating air quality around schools and looking into the impacts of wood burning stoves. Zephyr sensors can be used in isolation individually or deployed as a network of sensors across a wider area to build up a more detailed picture.

The data from a Zephyr sensor cannot be treated with the same confidence as that from one of our continuous monitor stations, where the data is 'ratified' after checks, however, it has been shown to provide accurate indicative measurements and is therefore appropriate for a wide range of studies, including this.

Monitoring Location

Milton was selected as part of a council study looking into air quality around schools as it is a primary school located near the A10, which is a busy main road and potential source of pollution. The major reason for investigating air quality around primary schools is that children are amongst the most vulnerable to the effects of air pollution, which was reflected by the theme of Clean Air Day in 2021 of 'protect our children's health from air pollution'. This is due to children's airways and respiratory systems being less developed than an adult's and because they breathe more rapidly than adults.

The monitor was located on a lamp post within the grounds of Milton Primary School, to be representative of the air quality at the school. It measured the main pollutants of concern, nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$), among others. The location of the Zephyr can be seen on Figure 2, with a photograph of the unit in Figure 3.

Figure 2 – Location of the Zephyr sensor in Milton

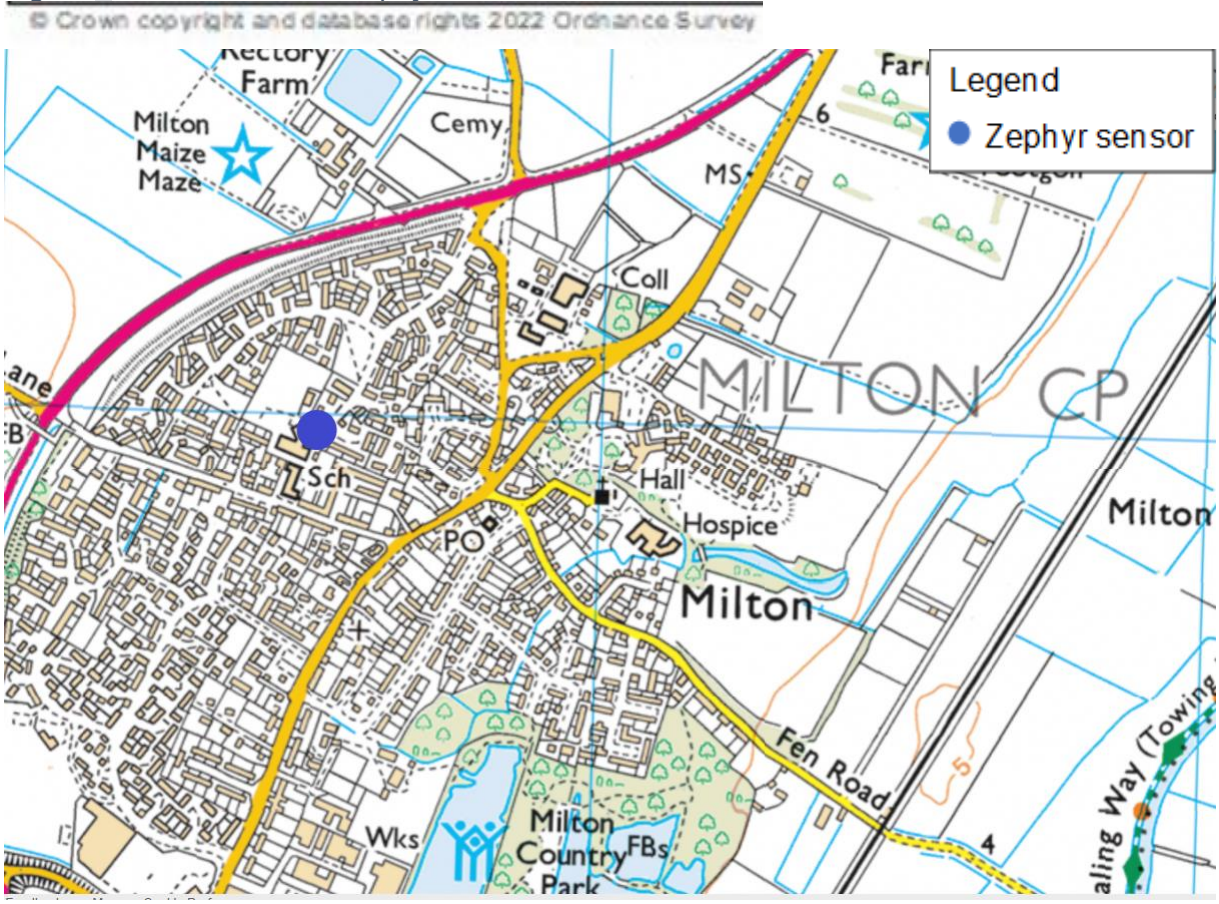


Figure 3 – Photograph of the Zephyr sensor in Milton Primary School grounds

Monitoring Data and Comparison with Objectives

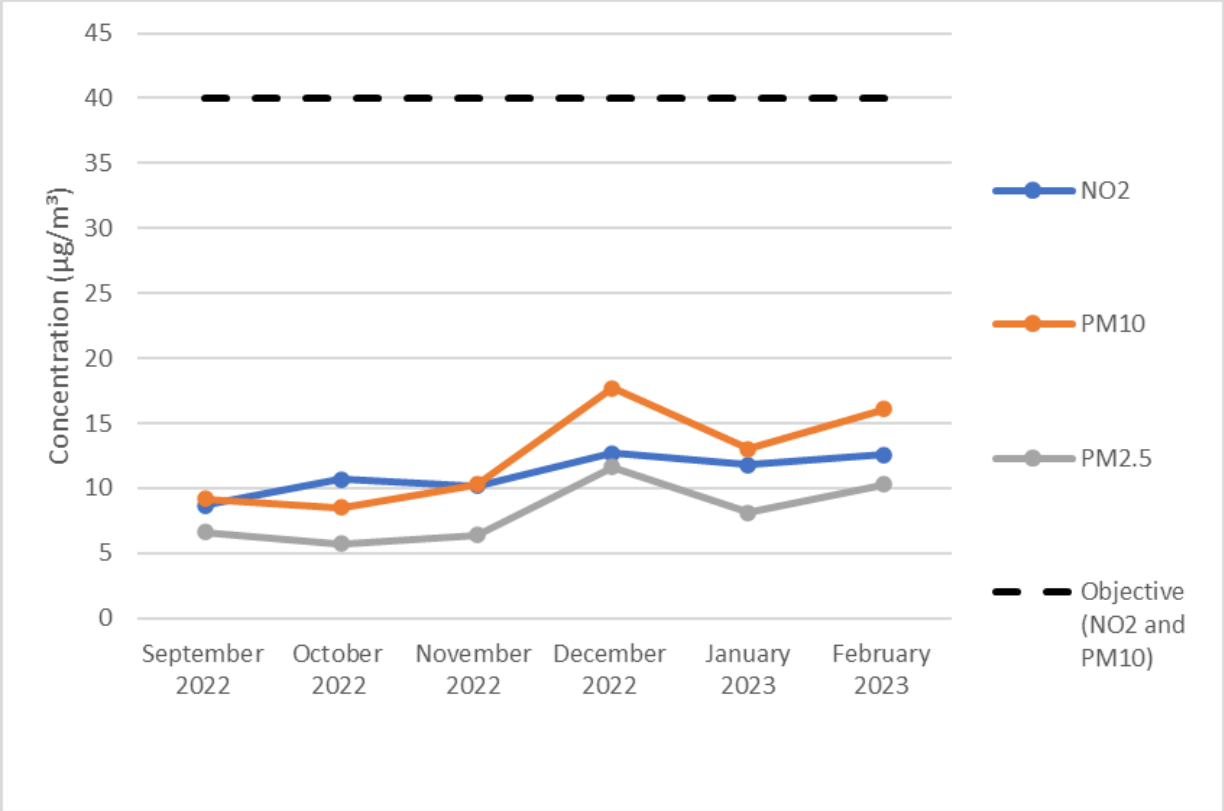
The average monthly concentrations measured in the period September 2022 to February 2023 are shown in Table 1, below, with the annual mean objective shown for information. This data is also represented in Figure 4.

Table 1 – Zephyr Air Quality data – monthly average concentrations

	Pollutant monthly average concentration / µg/m^3		
Month	NO_2	PM_{10}	$PM_{2.5}$
September 2022	8.7	9.2	6.6
October 2022	10.7	8.5	5.7
November 2022	10.2	10.3	6.4
December 2022	12.7	17.7	11.6
January 2023	11.8	13.0	8.1
February 2023	12.6	16.1	10.3
Objective (annual mean)	40	40	10*

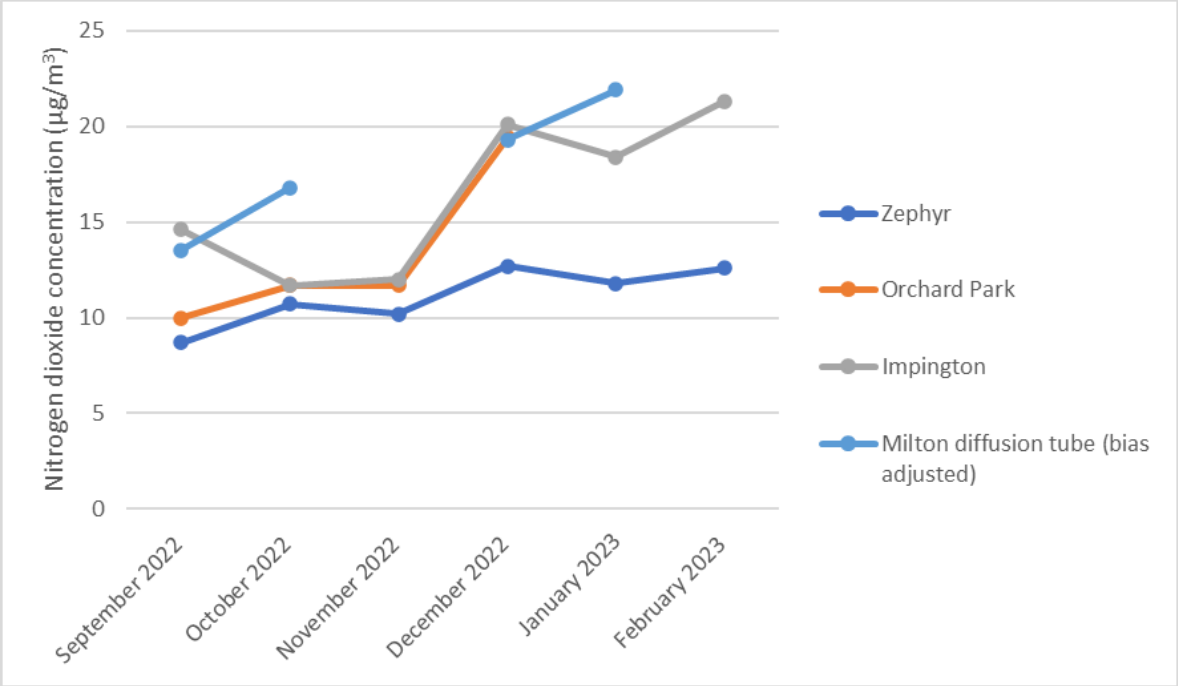
*target to be achieved by 2040

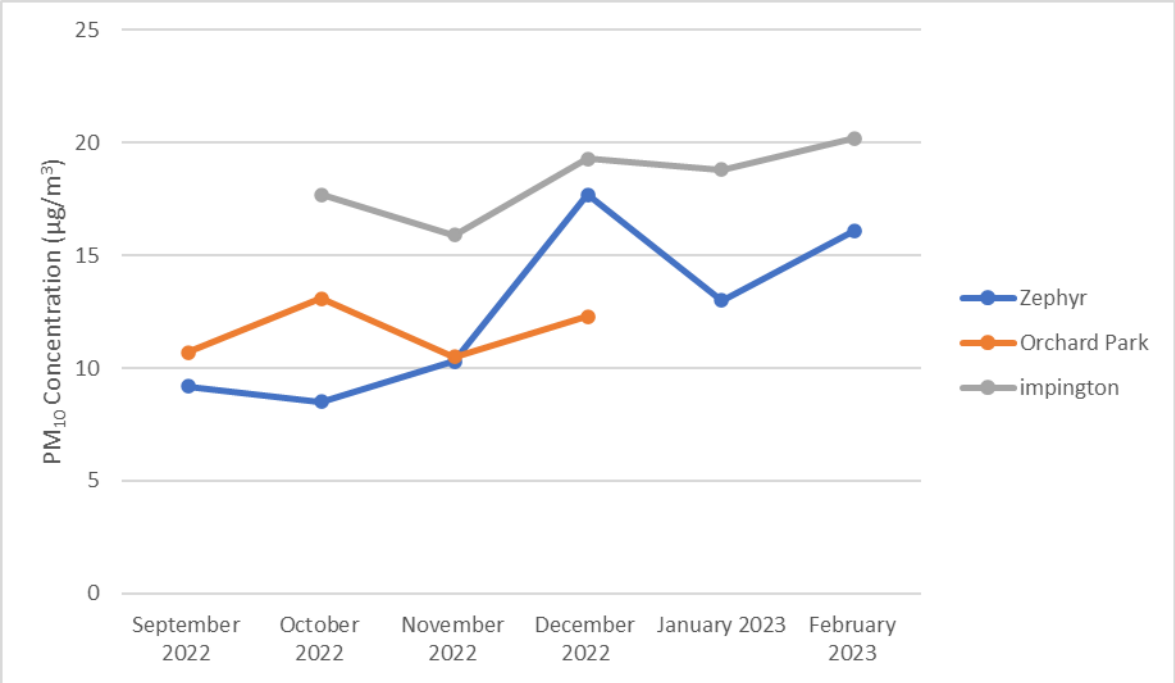
Figure 4 – Zephyr Air Quality data – monthly average concentrations and national annual mean objective



The data recorded in Milton was also compared to that recorded in the same monitoring period by the Council's automatic monitoring stations for each pollutant, as well as the nitrogen dioxide diffusion tube from Cambridge Road, Milton. As shown in Figure 5, below, the data and trends recorded by the Milton Zephyr are consistent with those seen at other monitoring locations across the district. This suggests that there can be a reasonably high degree of confidence in the data collected by the Zephyr monitor.

Figure 5 – Comparison of Milton Zephyr data to automatic monitoring sites in South Cambridgeshire for all pollutants





In addition, the average concentrations of each pollutant for the whole period September 2022 to February 2023 were calculated and then 'annualised' to give estimated annual mean concentrations to allow better comparison to the annual mean objectives. Annualisation is a calculation process used to estimate an average concentration for a full year from a shorter period, such as the approximately 6 months in this study. This is done to avoid the annual average being influenced by short-term events or seasonal changes, such as one day of high pollution like bonfire night, or pollution concentrations often being higher in the winter than the summer. The data was annualised using 2021 data from a range of continuous monitoring

background sites and is shown in Table 2, below. Full annualisation details are available in Appendix 3 – Annualisation of short-term data.

Table 2 – Zephyr Data – annualised annual mean concentrations

	Pollutant average concentration / µg/m^3		
	NO_2	PM_{10}	$PM_{2.5}$
Measured data average Sept 2022 – Feb 2023 –	11.1	12.5	8.1
Annualisation factor	0.83	1.07	1.08
Annualised annual mean – Milton Zephyr	9.21	13.38	8.75
Objective (annual mean)	40	40	10*

*to be achieved by 2040

As shown in Table 1 and Table 2, the long-term annual mean concentrations of the main pollutants of concern at the Milton Zephyr are significantly below the national objectives for NO_2, PM_{10} and $PM_{2.5}$, indicating good air quality. The $PM_{2.5}$ concentration is above the ambitious World Health Organisation annual guidelines, announced in September 2021 of 5µg/m^3, although it remains well below the current UK objective of 10 µg/m^3 to be achieved by 2040 as set in The Environmental Targets (Fine Particulate Matter) (England) Regulations 2022. Typically, $PM_{2.5}$ is a pollutant that is more regional than local as it can travel long distances suspended in the air. Therefore, its concentration is often more impacted by national and regional sources and less by local factors than other pollutants (such as nitrogen dioxide).

The Zephyr also allows measurements of the short-term concentrations of pollutants, which are studied through 1-hour means for NO_2 and 24-hour means for PM_{10}. These are presented and compared to the national objectives in Table 3, below. The short-term objectives are presented as hourly/daily concentrations that should not be exceeded more than a certain number of times in a year. There is currently no short-term objective for $PM_{2.5}$.

Table 3 – Zephyr Air Quality data – short-term average concentrations

Month	Number of exceedances of short-term objective	
	NO_2 1-hour mean	PM_{10} 24-hour mean
January 2022	0	0
February 2022	0	0
March 2022	0	5
April 2022	0	0
May 2022	0	0
June 2022	0	0
Objective	200 µg/m^3*	50 µg/m^3**

*Not to be exceeded more than 18 times a year
**Not to be exceeded more than 35 times per year

As shown in Table 3, there were no exceedances of the short-term objectives for NO_2 or PM_{10}.

The relevant maximum 1-hour mean concentration of NO_2 was recorded as 50.82 µg/m^3 in the evening of the 8 February 2023. This however remains well below the 200 µg/m^3 threshold.

For PM_{10} the maximum recorded 24-hour mean value was 46.17 µg/m^3 on the 25 January 2023. This was likely associated with a regional event as levels were consistently high for a few days during this period, which was matched at regional background monitors in Cambridgeshire run by DEFRA.

In addition to the overall picture outlined above, the difference between concentrations during term time and school holidays was looked at, as this can give an indication of the impact of traffic related to the school. The school holidays were: Autumn half term (24th to 28th October), the Christmas holidays and February half term (13th to 17th February). We have compared the Monday to Friday of the last full week before and first full week after the school holiday to the Monday to Friday during the school holiday period as there can be seasonal variations caused by weather and other factors that impact the levels of pollutants, especially nitrogen dioxide.

Table 4 – Comparison of pollutant concentrations between the Autumn half term and the weeks immediately before and after.

	Pollutant average concentration / µg/m^3		
	NO_2	PM_{10}	$PM_{2.5}$
Week before half term (17th to 21st October)	11.8	10.2	6.8
Autumn half term (24 – 28th October)	9.6	7.0	4.4
Week after half term (31st October to 4th November)	9.6	9.0	4.7

Table 5 – Comparison of pollutant concentrations between the Christmas holiday and the last full weeks of term before and after the Christmas holiday

	Pollutant average concentration / µg/m^3		
	NO_2	PM_{10}	$PM_{2.5}$
Week before Christmas holidays (12th to 16th December)	17.4	31.2	21.5
Christmas Holidays	6.8	5.0	2.4
Week after Christmas Holidays (9th to 13th January)	8.3	5.5	2.9

Table 6 – Comparison of pollutant concentrations between February half term and the weeks immediately before and after.

	Pollutant average concentration / µg/m^3		
	NO_2	PM_{10}	$PM_{2.5}$
Week before half term (6th to 10th February)	22.0	24.5	16.5
Half term (13th to 17th February)	12.7	29.5	18.9
Week after half term (20th to 24th February)	11.6	13.5	8.6

Tables 4, 5 and 6 show that in general levels of nitrogen dioxide were lower in holiday periods when compared to the surrounding weeks. On average the reduction in nitrogen dioxide concentrations during the holidays was approximately 22%. This could be a result of less traffic at the school during the holiday period as nitrogen dioxide concentrations are closely associated with vehicle exhaust emissions.

For particulate matter, both the autumn half term and the Christmas holiday showed a reduction in PM concentrations for both PM_{10} and $PM_{2.5}$. However, the February half term had higher levels of PM than the week before or after, suggesting that the reduction in traffic did not have such a significant impact. Although exhaust emissions do contribute to PM pollution, there are other sources and pollution events tend to be regional rather than localised.

Summary

The data measured by the Zephyr real-time monitor in the period September 2022 to February 2023 shows that the air quality around Milton Primary School remains good, with estimated annual mean concentrations (as well as the measured monthly averages) of the main pollutants of concern well below the national objectives. There were no exceedances of the short-term national objectives. It was found that concentrations of the pollutant nitrogen dioxide were lower during the school holidays which was likely due to reduced traffic around the school at these times. This highlights the impacts of school-run traffic and the potential air quality benefits of reduced driving. The data from the Zephyr was generally consistent with that from the rest of the monitoring sites in the district during the monitoring period, which provides confidence in the instrument. This also matches the general patterns seen across the South Cambridgeshire district of good air quality. However, due to the importance of air quality and its links to health, even at very low levels, it remains important to both monitor air quality across the district and take actions to improve air quality in our area.

Ideas on how to play a role in improving local air quality can be found in Appendix 2.

Appendix 1 – Air Quality Frequently Asked Questions

Why is air quality important?

There are a number of reasons air quality is important. In particular, polluted air is the biggest environmental threat to health in the UK. It is linked to up to 36,000 deaths per year from long-term exposure. The main impacts of poor air quality are contributing to heart and lung conditions, but air quality has also been linked to a wide range of issues. Air pollution also particularly effects the most vulnerable, including children and older people and those with existing lung and heart conditions. Air quality also strongly links to climate change, as many of the causes of the issues are the same, such as the burning of fossil fuels. This means that actions taken to improve air quality also helps prevent climate change.

How does the Council monitor air quality?

South Cambridgeshire District Council operates a monitoring network of over 30 locations across the district, made up of diffusion tubes and three continuous monitoring sites, which measure air quality accurately in real-time. This existing monitoring network allows the long-term monitoring of trends and changes in air quality across the district. Live data from the three continuous monitoring stations are available at https://scambs-airquality.ricardo-aea.com/. In addition, the Council has purchased three Zephyr air quality sensors which provide real-time measurements for the main pollutants of concern from a single monitor. These can be used for shorter-term monitoring to identify hotspots of pollution or be used in a range of targeted studies to complement our existing monitoring network. The first of these instruments was installed in Harston, with subsequent monitors installed in Swavesey, Northstowe, Histon and most recently Swavesey.

What else does the Council do around air quality?

As well as monitoring air quality, the Council acts to improve air quality through its Green to the Core focus, including an air quality strategy designed to go beyond simply meeting the national objectives, Zero Carbon Community Grants to fund community initiatives to improve sustainability, such as encouraging and enabling cycling which in turn helps air quality, and by considering air quality during the planning process[5,6]. Ideas on how anyone can play a role in improving local air quality can be found in Appendix 2 – How to get Involved with Local Air Quality.

What are the main pollutants of concern?

The main pollutants of concern are:

- Nitrogen Dioxide (NO_2) – a gas predominantly formed following the burning of fossil fuels, which can cause irritation of the airways and exacerbate symptoms of other conditions
- Particulate Matter (PM_{10} and $PM_{2.5}$), where the number refers to the size of the particulates in micrometres – a mix of solid particles and liquid droplets of various sizes and composition, the smallest of which can get into the blood and be transported around the body[7]

What are the air quality objectives?

For NO_2 and PM_{10} national objective levels have been set which must be achieved by local authorities, otherwise an Air Quality Management Area (AQMA) must be declared for the objective which is being exceeded. Objectives have been set for both long-term concentrations (measured as annual means) and short-term concentrations (hourly means for NO_2 and daily means for PM_{10}). South Cambridgeshire District Council does not currently have any AQMAs, although there has historically been an AQMA along a stretch of the A14, which was revoked in early 2022 due to sustained compliance with the relevant objectives in line with Defra guidance and the Council's constitution. The Air Quality Objectives applicable to local authorities through the Local Air Quality Management (LAQM) requirements in England are set out in Table 7. In addition, local authorities are expected to work towards reducing emissions and concentrations of $PM_{2.5}$ (particulate matter with a diameter of 2.5 µm or less), although there is currently no legal objective for local authorities.

Table 7 – Air Quality Objectives in England

Pollutant	Air Quality Objective – Concentration	Air Quality Objective – Measured as
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
Nitrogen Dioxide (NO_2)	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
Particulate Matter (PM_{10})	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
Sulphur Dioxide (SO_2)	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
Sulphur Dioxide (SO_2)	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

If air pollution is a result of vehicles utilising the A14, how can local residents change this?

There are a number of way local residents can have an impact on air quality through everyday actions, such as those mentioned in Appendix 2 – How to get Involved with Local Air Quality. Many of these are very small changes that can add up to a big impact.

Appendix 2 – How to get Involved with Local Air Quality

Annual reports and details on air quality monitoring are available on our website, https://www.scambs.gov.uk/environment/pollution/air-pollution/local-air-quality-management/, and you can share your views via our email address, air.quality@scambs.gov.uk.

Although air quality in the South Cambridgeshire District is generally good, with concentrations below the objectives, there are actions we can all take to improve it further. Ways you can help to improve air quality in South Cambs include:

- Minimise car use wherever possible:
    - Avoid using your car for short trips (under 2 miles) - short trips are very polluting as modern engines needs to reach a very high temperature to work efficiently; on short trips it won't reach that temperature.
    - For short journeys try cycling or walking more often – this helps you stay healthy and saves you money in fuels costs.
    - For longer journeys consider public transport options.
    - Use journey-planning apps such as MyBusTrip or MotionMap for travel by bus, train, walking and cycling.
- Switch it off – don't leave your car engine idling if you are stationary e.g. waiting to pick someone up, in a traffic jam or waiting at level crossings.
- When driving, use techniques that help you use less fuel, like driving more slowly and smoothly .
    - You could use 10% less fuel by following the tips on the AA website http://www.theaa.com/motoring_advice/fuels-and-environment/drive-smart.html.
    - Like switching your engine off when stationary, this will not only reduce your emissions of air pollution but will save fuel and therefore money too!
- Consider making your next vehicle an electric vehicle.
- Join a car club or car-share regularly.
- Consider working at home where possible – the first Covid-19 lockdown showed widespread improvements in the air quality as the amount people travelled reduced.
- Use less energy at home – consider a smart meter to monitor usage and be aware of boiler standards.
- Opt for 'green energy' tariffs where available or switch to renewable sources of heating or power.
- Reduce the use of solid fuel stoves and open fires – domestic burning is now the single biggest source of particulate matter pollution in the UK (greater than traffic and industry).
    - If you are burning wood or coal ensure any fuel used meets the new standards of moisture content and emissions – more information is available at https://woodsure.co.uk/are-you-ready-to-burn/
- Make your children aware of the impact that day to day activities have on air quality.

Appendix 3 – Annualisation of short-term data

Annualisation is a calculation process used to estimate an average concentration for a full year from a shorter period, such as the 6 months in this study. Annualisation ratios are worked out as a ratio of the average concentration in a full year (annual mean (Am)) to the average in the actual monitoring period measured (period mean (Pm)), using data from background continuous sites. The average concentration from the Zephyr data during the monitoring period is then multiplied by that ratio to give an estimate of the average concentration at the Zephyr for a full year.

The data from the period January to June 2022 was annualised according to the process set out in box 7.9 of Defra's Local Air Quality Management Technical Guidance (TG16). Continuous monitoring background sites were used for the annualisation calculations. A full year from 1 March 2022 to 28 February 2023 was used for the annual mean concentrations as the monitoring covered two calendar years.

NO_2:

Background Site	Annual mean (Am)	Period mean (Pm)	Ratio (Am/Pm)
Wicken Fen	6.35	7.55	0.84
Northampton Spring Park	10.1	12.7	0.79
Norwich	9.3	10.9	0.85
Average ratio	-	-	0.83

PM_{10}:

Background Site	Annual mean (Am)	Period mean (Pm)	Ratio (Am/Pm)
Orchard Park	17.9	17.6	1.02
Norwich	13.1	11.7	1.12
Average Ratio	-	-	1.07

$PM_{2.5}$:

Background Site	Annual mean (Am)	Period mean (Pm)	Ratio (Am/Pm)
Northampton Spring Park	8.2	7.6	1.08
Norwich	8.4	7.5	1.08
Average ratio	-	-	1.08

APPENDIX D: Public Space Protection Orders for reducing vehicle engine idling.

Background

The use of Public Space Protection Orders (PSPO) around sensitive locations, namely schools, has been previously suggested as a possible solution to reduce the number of idling vehicles. Monitoring using a Zephyr sensor has been undertaken at a number of schools to try and quantify the increase in pollution around schools during term time when compared to school holidays. This paper considers the results from the various school studies, the practicalities of implementing PSPOs and presents alternative options.

Vehicle idling and air quality

The act of idling in a vehicle (that is leaving your vehicle engine running when you are parked) and the impact on air quality is not a simplistic relationship in that turning off your engine for short periods is not always beneficial. The air quality benefit from turning your engine off and restarting the car is dependent on numerous factors, and there is no absolute time that idling becomes worse for air quality than switching your engine off and on again. Most campaigns, such as Clean Air Day, and other local authority websites suggest that it is best to switch off if you know you're going to be stationary for more than one minute, but other figures are quoted, such as the RAC who state two minutes and some local authorities that suggest 10 seconds. Many newer vehicles have technology to reduce idling such as stop-start systems or REST buttons which enables residual heat from the engine to be blown into the cabin to continue to heat the interior of the car warm.

TRL research from 2021 (TRL- Idling Research) using vehicles typically encountered in London indicates that idling for a 30 second period produces nearly twice as much nitrogen dioxide pollution as switching off then restarting the engine. Other research undertaken by the US Department of Energy shows that restarting a warm engine can emit significantly more nitrogen oxide than 30 seconds of idling, although the research concluded that restarting a warm engine is not as bad as starting a cold engine. Both of these reports focused on nitrogen dioxide rather than PM, where there is little research.

Air quality emissions (which normally consider nitrogen dioxide and particulates) should not be confused with carbon dioxide emissions (linked to climate change) from vehicle idling. The benefits in terms of carbon dioxide are often easier to quantify and are generally considered to be about 10 seconds of idling is worse than switching off and restarting.

Measuring air quality benefits with relation to any reduction in vehicle idling is difficult given both the long term and short-term variations in air quality levels and the number of various other issues that impact pollutant (especially nitrogen dioxide) levels. Day to day, concentrations of nitrogen dioxide can be impacted by the amount of sunlight, temperature, wind speed, wind direction, atmospheric pressure, rainfall and traffic volumes.

During our school studies with the Zephyr monitors, there was an increase in nitrogen dioxide levels during term time compared to holidays, however, there were not necessarily clear peaks in pollution at school drop off and collection times and it is not possible to differentiate the contribution from idling and normal driving. PM levels were not impacted so much by term time / holiday time, with some holiday periods showing higher levels of PM pollution than the surrounding term time dates. It should be noted that impacts from Idling

can be very localised and will not necessarily be possible to identify from a single, stationary, monitoring point.

Public Space Protection Orders

The Anti-social Behaviour, Crime and Policing Act 2014 provides a broad legal framework within which Public Space Protection Orders (PSPOs) can be implemented.

Orders can be introduced in a specific public area where the local authority is satisfied on reasonable grounds that certain conditions have been met. The first test concerns the nature of the anti-social behaviour, requiring that:

- activities that have taken place have had a detrimental effect on the quality of life of those in the locality, or it is likely that activities will take place and that they will have a detrimental effect
- the effect or likely effect of these activities:
    - is, or is likely to be, persistent or continuing in nature
    - is, or is likely to be, unreasonable
    - justifies the restrictions being imposed.

The Home Office statutory guidance states that proposed restrictions should focus on specific behaviours and be proportionate to the detrimental effect that the behaviour is causing or can cause, and are necessary to prevent it from continuing, occurring or recurring.

As a minimum, each PSPO must set out:

- what the detrimental activities are
- what is being prohibited and/or required, including any exemptions
- the area covered
- the consequences for breach
- the period for which it has effect.

The legislation sets out a number of requirements for consultation and communication before an Order is introduced. Local authorities are obliged to consult with the local chief officer of police; the police and crime commissioner; owners or occupiers of land within the affected area where reasonably practicable, and appropriate community representatives. The county council, parish or community councils that are in the proposed area covered by the
PSPO must be notified. Wider public consultation would also be necessary.

A PSPO would be applicable for a period of three years.

To ensure any PSPO was effective there would need to be signage erected and regular enforcement.

Existing legislation

Enforcement powers do exist with regards to vehicle idling, as laid out in the Road Traffic (Vehicle Emissions) (Fixed Penalty) (England) Regulations 2002. These allow for personnel authorised by the local authority to issue a £20 Fixed Penalty Notice (FPN) where drivers refuse to turn off their engines when requested to do so by an authorised officer. There is no legal requirement to erect signage, declare a special ‘zone’ or gain permission from any other body (such as the secretary of state) before issuing FPNs for idling, but some publicity

of the intention to commence enforcement is expected. These regulations only apply on the public highway.

The regulations require the authorised officer to speak to the offending driver and warn them of the potential FPN prior to it being issued. The FPN can only be issued if the driver has received the warning from the authorised officer and still refuses to turn their engine off.

It is possible for drivers that are warned by an authorised officer to drive off following the warning to avoid any fine.

There are exemptions to this legislation, which include:

1. Undertaking diagnostics on a vehicle for maintenance or repairs.
2. Refrigerated HGV vehicles making deliveries as their engines need to be kept running for their fridge/freezer compartments.
3. Demisting/de-icing of a vehicle's front windscreen and windows before setting of in the winter months.

The FPN can be challenged. The evidence needed to support the Council to defend any FPN challenge would be difficult to produce. This could include evidence that the vehicle was idling when the FPN was issued and evidence that the request to the driver to switch off their engine was correctly issued. It may also be necessary to provide evidence that one of the exemptions did not apply.

However, local authorities have struggled to implement the FPNs. An FOI request made by Air Quality News in 2019 to five local authorities that had adopted the regulations identified that only a handful of fines where issued the previous year, with three of the authorities having issued no fines at all in the previous year. Tunbridge Wells Borough Council proposed the adoption of a scheme to allow existing parking enforcement officers to issue FPNs to idling motorists, however it was subsequently reported that the scheme would not go ahead as it was not practical and would be too costly to implement.

Local Authority best practice

A review of best practice local authorities has taken place. The Air Quality Hub, a local authority air quality practitioner's website, provides a case study from York City Council and resources from Oxford City, Cheshire East and West Berkshire councils. For all of these local authorities, the focus is strongly on education and awareness raising including engagement with schools.

Two of these local authorities discuss the potential for FPNs, however, York City Council make it clear that this would only be used as a last resort. None of the best practice examples discuss the potential for PSPOs.

Idling Action London has been undertaking anti-idling events for a number of years and has commissioned research as part of this. "Research for Idling Action on campaign strategies and messaging" Final Report January 2022 Coolworld Consulting (Idling Action research public final) found the following:

- 78% of respondents usually or always switch off the engine when parked or pulled over
- Between 77% and 85% of drivers switch off when a direct request is made as part of an anti-idling event.
- The most common reasons for idling given by drivers were: Dropping someone off or picking them up; Running the vehicle's heating or cooling system; Just habit.

- The message rated as most effective by drivers from across all surveys was: Switching off engines when parked is better for the health of those who work, live and go to school on this street.
- The message that idling is illegal and could result in a fine was considered less effective by drivers.

Discussion

Air pollution is harmful, and children are especially vulnerable to the effects of air pollution due to their developing lungs. Vehicle idling is often an unnecessary behaviour that can cause additional air pollution. Where idling takes place around schools it can be particularly harmful. Tackling vehicle idling around schools is therefore considered an appropriate targeted action to help reduce air pollution.

Although significant periods of idling will clearly be worse for air quality, and therefore people's health, defining when idling will have a detrimental effect and when it becomes 'unreasonable' for the purposes of any PSPO would be difficult given the variations between vehicles and individual circumstances.

Defining the area for each PSPO and undertaking the necessary consultation would be a significant burden on officer time and resources. There would be additional costs associated with the erection of signage and ongoing enforcement.

Alternative enforcement options (i.e., fixed penalty notices) are available that could be implemented without any significant legal complications. However, wide scale enforcement would not be possible due to the difficulties with training, software updates, administrative and potential legal costs associated with the management of the fines as identified by other councils. However, retaining the option of issuing an FPN as a last resort in extreme examples could be possible.

However, best practice from other local authorities identifies education and positive engagement with the school communities as the most effective method of reducing vehicle idling.

Recommendations

The following recommendations are made:

1. Public Space Protection Orders are not adopted for the purposes of enforcing vehicle idling.
2. The Road Traffic (Vehicle Emissions) (Fixed Penalty) (England) Regulations 2002 are adopted for use as last resort only where education and positive engagement is ineffective.
3. A plan for greater community engagement and promotion is drawn up and presented to this committee for approval in April 2024.