Annual Progress Report (APR)

2024 Air Quality Annual Progress Report (APR) for Orkney Islands Council

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

Local Air Quality Management

June 2024

Information	**Orkney Islands Council**
Local Authority Officer	Nick Blowfield
Department	Environmental Health
Address	School Place, Kirkwall, KW15 1NY
Telephone	01856 873535
E-mail	Env.health@orkney.gov.uk
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Executive Summary: Air Quality in Our Area

Air Quality in Orkney

The Orkney Islands is an archipelago of over 70 islands and skerries located some seven miles north of the Scottish mainland and covering an area of just under 100,000 hectares. The county has a population in the region of 22,500 with over 80% of the population inhabiting the main island (called The Mainland) and linked Isles. Orkney's two main towns of Kirkwall (population approximately 9,000+) and Stromness (population approximately 2,200) are situated on The Mainland.

The main traffic routes in Orkney are a series of 'A' roads that link the west mainland to the east, through Kirkwall and southwards across the barriers to South Ronaldsay. The highest volume of traffic can be found within Kirkwall, with very light levels of traffic found across the mainland and the Outer Isles. The islands are linked to mainland Scotland via its airport situated 2 miles outside Kirkwall, and via ferry services across three routes. Other smaller air and ferry links serve the outer isles and link to 'The Mainland'.

Because of the islands predominantly rural nature and the lack of large-scale industrial processes the main potential source of pollution that may impact on human health is that produced by motor vehicles with Nitrogen Dioxide the main pollutant of concern. However, traffic flows are low and reflect Orkney's small population. A network of diffusion tubes is maintained to monitor those areas deemed to be subject to higher concentrations. Recently acquired monitoring data clearly shows that Orkney is currently meeting the air quality objectives and that pollutant levels remain at consistently low levels with no significant risk of Orkney exceeding these objectives.

Therefore, in conclusion there are no air quality issue within the Local Authority Area.

Actions to Improve Air Quality

As indicated above air quality in Orkney is considered very good. The Council has not identified any areas where there is a risk of exceeding the air quality objectives and where consequent action is required to improve air quality.

Local Priorities and Challenges

Although no specific priorities or challenges have been identified, Orkney Islands Council will continue to monitor nitrogen dioxide at existing locations unless there becomes reason to do otherwise. These monitoring results will be discussed in the 2025 Progress Report.

How to Get Involved

Whether you are a visitor or resident of Orkney, you can contribute to improving local air quality by taking one or a number of measures, such as choosing to use alternative modes of transport where possible, taking part in a cycle to work scheme, or just walking short distances instead of taking the car.

Detailed information on local transport options and how to find out more about active and sustainable travel can be found at: https://www.orkney.gov.uk/our-services/transport/

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1 Local Air Quality Management

This report provides an overview of air quality in Orkney Islands Council during 2023. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), and the relevant Policy and Technical Guidance documents.

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

Table 1.1 – Summary of Air Quality Objectives in Scotland

Pollutant	Air Quality Objective Concentration	Air Quality Objective Measured as	Date to be Achieved by
Nitrogen dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
Nitrogen dioxide (NO_2)	40 µg/m^3	Annual mean	31.12.2005
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
Particulate Matter (PM_{10})	18 µg/m^3	Annual mean	31.12.2010
Particulate Matter ($PM_{2.5}$)	10 µg/m^3	Annual mean	31.12.2021
Sulphur dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
Sulphur dioxide (SO_2)	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
Sulphur dioxide (SO_2)	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005
Benzene	3.25 µg/m^3	Running annual mean	31.12.2010
1,3 Butadiene	2.25 µg/m^3	Running annual mean	31.12.2003
Carbon Monoxide	10.0 mg/m^3	Running 8-Hour mean	31.12.2003

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

Orkney Islands Council currently does not have any AQMAs and from this report and previous annual reporting it is unlikely that there will be a reason to declare any AQMAs in the future. Furthermore, Orkney Islands Council does not have an Air Quality Strategy or similar document to address air quality issues.

2.2 Cleaner Air for Scotland 2

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

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

2.2.1 Placemaking – Plans and Policies

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

Orkney Islands Council considers Orkney to have excellent air quality and therefore it is not an active issue that is generally focused on. Through the Local Development Plan processes and the national focus on place and climate change, various departments within the Council work collaboratively, along with partner organisations such as Sustrans, NatureScot and Voluntary Action Orkney in delivery of this function. Indirectly and with the remit of place and climate change Orkney Islands Council is working actively to facilitate improvements to our public realm to improve places and encourage active travel (walking, cycling and wheeling). New development must consider the use of Green Infrastructure Networks. These are networks where active travel; sustainable urban drainage systems and biodiversity corridors are located together.

2.2.2 Transport – Low Emission Zones

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

Orkney Islands Council has no Low Emission Zones established within the Local Authority area. Given the Local Authority's rural nature and the low levels of pollutants is unlikely that there will be a requirement for low emission zones to be implemented.

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

Orkney Islands Council does not have an Air Quality Action Plan (AQAP). However, along with its local partner organisations Orkney has a number of plans and Strategies which do not specifically address air quality, but the measures within them will help maintain or improve air quality within the county. These plans include but are not limited to;

- The 'Orkney Local Transport Strategy 2024-2044'[1] As well as other objectives, seeks to contribute to a successful transition to a net-zero carbon and sustainable

community which includes reducing car vehicle kilometres where possible and the de-carbonisation of Orkney's transport sectors as a whole.

- The 'Orkney Sustainable Energy Strategy 2017-2025'[2] which continues the drive for a sustainable low carbon island economy and provides a basis for further strategies such as the 'Orkney Hydrogen Strategy - The Hydrogen Islands 2019 – 2025'[3]

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives

3.1 Summary of Monitoring Undertaken

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

3.1.1 Automatic Monitoring Sites

Orkney Islands Council does not undertake any automatic (continuous) monitoring within the authority's area.

3.1.2 Non-Automatic Monitoring Sites

Orkney Islands Council undertook non- automatic (passive) monitoring of NO_2 at 8 sites during 2023. Table A.1 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO_2)

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

For diffusion tubes, the full 2023 dataset of monthly mean values is provided in Appendix B.

The County has been continuously monitored for a number of years through the placement of diffusion tubes. However, Orkney Islands Council is continuously assessing its NO_2 diffusion tube network with regards to the appropriateness of the localities and revised, if necessary. There have been no changes to the network since the last progress report.

All results for 2023 can be seen in Table A.2 and there has been no significant change in levels of NO_2 with the annual mean concentrations continuing to be well below the annual objectives.

With the majority of sites having been monitored continuously for over 10 years trends have been plotted in Figure A.1 for the two main population centres within the islands and these continue to show the annual average trend is downwards.

Even though it is unlikely that levels will ever exceed the NAQS objective of 40 µg/m3, it is essential that Orkney Islands Council does not become complacent with the knowledge that air quality in the county is very good and will seek to ensure that measures are taken as and when necessary to maintain NO_2 at these low levels, or better still reduce them.

3.2.2 Particulate Matter (PM_{10})

Orkney Islands Council does not monitor PM_{10} and has no plans to do so in the future. This decision takes into consideration data within the background concentration maps[4] for Orkney, where it can be concluded that there is no expected exceedance of the NAQS objective for PM_{10}.

3.2.3 Particulate Matter ($PM_{2.5}$)

Orkney Islands Council does not monitor $PM_{2.5}$ and has no plans to do so in the future.

3.2.4 Sulphur Dioxide (SO_2)

Orkney Islands Council does not monitor SO2 and has no plans to do so in the future.

3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene

Orkney Islands Council does not monitor Carbon Monoxide, Lead and 1,3-Butadiene and has no plans to do so in the future.

4 New Local Developments

Orkney Islands Council confirms that there are no new local developments that require further assessment.

4.1 Road Traffic Sources

Orkney Islands Council confirms that there are no new:

- Narrow congested streets with residential properties close to the kerb.
- Busy streets where people may spend one hour or more close to traffic.
- Roads with a high flow of buses and/or HGVs.
- Junctions.
- Roads with significantly changed traffic flows.
- Bus or coach stations.

that require further assessment.

4.2 Other Transport Sources

Orkney Islands Council confirms that there are no new:

- Airports.
- Locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.
- Locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.
- Ports for shipping.

that require further assessment.

4.3 Industrial Sources

Orkney Islands Council confirms that there are no new/newly identified:

- Industrial installations: new or proposed installations for which an air quality assessment has been carried out.
- Industrial installations: existing installations where emissions have increased substantially, or new relevant exposure has been introduced.
- Industrial installations: new or significantly changed installations with no previous air quality assessment.
- Major fuel storage depots storing petrol.
- Petrol stations.
- Poultry farms

that require further assessment.

4.4 Commercial and Domestic Sources

Orkney Islands Council confirms that there are no new:

- Biomass combustion plant – individual installations.
- Areas where the combined impact of several biomass combustion sources may be relevant.
- Areas where domestic solid fuel burning may be relevant.
- Combined Heat and Power (CHP) plant.

that require further assessment.

4.5 New Developments with Fugitive or Uncontrolled Sources

Orkney Islands Council confirms that there are no new potential sources of fugitive or uncontrolled particulate matter that require further assessment.

5 Conclusions and Proposed Actions

5.1 Conclusions from New Monitoring Data

The recently acquired monitoring data included in this report shows that Orkney continues to meet the air quality objectives. The graph in Appendix A comparing historic data against the current data clearly show a long-term falling trend and that NO_2 levels have remained at consistently low levels with no significant risk of Orkney exceeding the air quality objective.

5.2 Conclusions relating to New Local Developments

There are no new developments which are considered likely to have a significant effect on air quality in Orkney.

5.3 Proposed Actions

The new monitoring data has not identified any exceedance in the air quality objective for NO_2. NO_2 will continue to be monitored via the network of diffusion tubes going forwards and the current monitoring regime for NO_2 within Orkney will continue to show and ensure that the high standard of air quality in the county continues.

The results of the continued monitoring and any other work addressing air quality will be contained in the next Annual Progress Report due in 2025.

Appendix A: Monitoring Results

Table A.1 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube co-located with a Continuous Analyser?	Tube Height (m)
KW	Kirkwall	Roadside	344812	1011017	NO2	No	0.0	1.0	No	2.8
SN	Stromness	Roadside	325590	1009553	NO2	No	0.0	1.0	No	2.8
SM	St Mary's	Roadside	347140	1001235	NO2	No	10.0	1.0	No	2.4
WM	Waulkmill	Rural	339525	1006985	NO2	No	N/A	1.0	No	1.5
MH	St Margarets Hope	Roadside	344598	993509	NO2	No	0.0	3.0	No	2.8
FT	Finstown	Roadside	335993	1013893	NO2	No	0.0	1.0	No	2.4
PD	Papdale	Other	345419	1010847	NO2	No	4.0	1.0	No	2.8
CL	Clay Loan	Roadside	344732	1010592	NO2	No	0.0	1.0	No	2.4

Notes:

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

(2) N/A if not applicable.

Table A.2 – 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 2023 (%) [2]	2019	2020	2021	2022	2023
KW	344812	1011017	Roadside	92.3	92.3	13.5	10.8	12.3	8.7	8.6
SN	325590	1009553	Roadside	100	100.0	8.1	7.1	7.3	6.1	5.8
SM	347140	1001235	Roadside	92.3	92.3	3.8	4.1	3.5	3.4	3.3
WM	339525	1006985	Rural	100	100.0	2.9	2.8	2.5	2.1	3.1
MH	344598	993509	Roadside	100	100.0	3.6	3.9	3.6	3.5	3.4
FT	335993	1013893	Roadside	100	100.0	8.3	6.5	6.6	5.9	7.1
PD	345419	1010847	Other	92.3	92.3	4.5	4.3	4.5	3.7	4.2
CL	344732	1010592	Roadside	100	100.0	-	-	16.0	14.0	14.4

☐ **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:

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

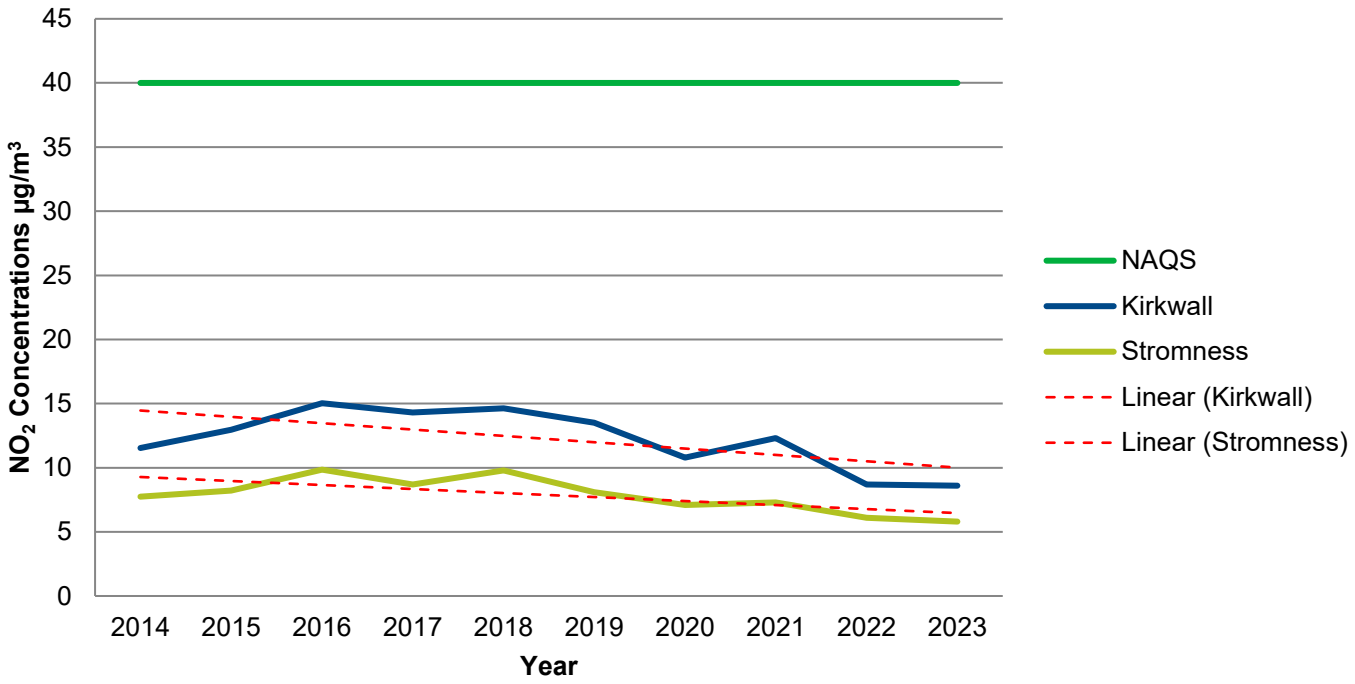
NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined**.

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

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

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

Figure A.1 - Chart showing the trend of annual NO_2 levels in the County's main population centres of Kirkwall and Stromness over last 10 years.



Appendix B: Full Monthly Diffusion Tube Results for 2023

Table B.1 – NO_2 2023 Monthly Diffusion Tube Results (µg/m^3)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.81)
KW	344812	1011017		15.6	3.6	10.4	9.8	9.0	13.0	8.0	10.2	7.2	20.2	10.2	10.7	8.6
SN	325590	1009553	6.8	7.4	8.5	6.0	8.1	10.3	6.5	4.0	8.6	4.9	8.8	5.5	7.1	5.8
SM	347140	1001235	4.0		4.4	5.1	5.4	4.1	3.8	3.0	2.5	3.2	6.2	3.1	4.1	3.3
WM	339525	1006985	2.4	2.5	11.8	3.6	5.0	3.8	3.7	3.1	1.9	2.8	4.2	1.6	3.9	3.1
MH	344598	993509	3.8	3.6	4.0	5.0	4.2	5.2	5.2	4.8	2.9	3.6	4.9	3.2	4.2	3.4
FT	335993	1013893	7.4	7.6	8.4	8.1	10.0	11.8	9.4	7.6	8.1	6.2	13.6	6.3	8.7	7.1
PD	345419	1010847	6.3		4.9	8.6	4.5	4.4	4.4	2.9	2.8	3.3	7.4	7.0	5.1	4.2
CL	344732	1010592	19.6	18.4	18.6	15.4	17.2	20.3	14.6	15.5	18.8	14.4	25.7	15.4	17.8	14.4

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

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

☐ **Local bias adjustment factor used.**

☒ **National bias adjustment factor used.**

☐ **Where applicable, data has been distance corrected for relevant exposure in the final column.**

☒ **Orkney Islands Council confirm that all 2023 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 Orkney Islands Council During 2023

Orkney Islands Council has not identified any new sources relating to air quality within the reporting year of 2023.

Additional Air Quality Works Undertaken by Orkney Islands Council During 2023

Orkney Islands Council has not completed any additional works within the reporting year of 2023.

QA/QC of Diffusion Tube Monitoring

All diffusion tubes are supplied and analysed by Edinburgh Scientific Services and prepared using 50% TEA in acetone. Orkney Islands Council administers the county's diffusion tube network as per Section 3 of "Diffusion Tubes for Ambient NO_2 Monitoring:- Practical Guidance." The duration of exposure for all monitoring points is as suggested in the calendar provided annually by Defra.

Diffusion Tube Annualisation

All diffusion tube monitoring locations within Orkney Islands Council recorded data capture of 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

Diffusion Tube Bias Adjustment Factors

Orkney Islands Council have applied a national bias adjustment factor of 0.81 to the 2023 monitoring data. A summary of bias adjustment factors used by Orkney Islands council over the past five years is presented in Table C.1.

The national bias adjustment factor was used as there have been no local bias adjustment factors calculated through a co-location study. As per Table C.1, version 03/24 of the National Spreadsheet was used with 1 study attributed to the factor used.

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2023	National	03/24	0.81
2022	National	03/23	0.81
2021	National	03/22	0.87
2020	National	03/21	0.88
2019	National	03/20	0.87

NO_2 Fall-off with Distance from the Road

No diffusion tube NO_2 monitoring locations within Orkney Islands Council required distance correction during 2023.

Appendix D: Map of diffusion tube sites.

Figure D.1– Map of Diffusion tube locations across Mainland Orkney and the linked isles

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the LA intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
APR	Annual Progress Report
AURN	Automatic Urban and Rural Network (UK air quality monitoring network)
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
DT	Diffusion Tube
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 (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

References

1. Orkney Local Transport Strategy 2024-2044 Available at: https://www.orkney.gov.uk/Files/Transport/LocalTransportStrategy_2024to2044.pdf

2. Orkney Sustainable Orkney Energy Strategy 2017-2025 Available at: http://www.oref.co.uk/wp-content/uploads/2017/10/Orkney-Sustainable-Energy-Strategy-2017-2025.pdf

3. Orkney Hydrogen Strategy - The Hydrogen Islands 2019 – 2025 Available at: https://www.oref.co.uk/wp-content/uploads/2020/11/Hydrogen-Strategy.pdf

4. Air Quality in Scotland (2024) [online] Data for Local Authority Review and Assessment purposes available at: https://www.scottishairquality.scot/data/mapping/data