

Annual Progress Report (APR)



2023 Air Quality Annual Progress Report (APR) for Angus Council

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

June 2023

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Executive Summary: Air Quality in Our Area

Air Quality in Angus

The 2022 air quality monitoring data confirm that air quality across Angus remains good. Measured concentrations of nitrogen dioxide (NO₂) and particulate matter (PM₁₀) are below the relevant objectives.

Previous Review and Assessments have concluded that concentrations of carbon monoxide, benzene, 1,3-butadiene, lead, sulphur dioxide, PM₁₀, PM_{2.5}, and NO₂ are compliant with the relevant objectives, and no Air Quality Management Areas (AQMAs) have been declared.

There are no significant air quality issues in Angus.

Actions to Improve Air Quality

Angus Council has implemented numerous actions to improve air quality as detailed in the current [Angus Local Development Plan](#) (LDP). Angus LDP is now supplemented by National Planning Framework 4 (NPF4) adopted by the Scottish Government in February 2023. Together, the Angus LDP and NPF4 make up the development plan in Angus. Angus Council is currently in the early stages of preparing a new LDP which will be based on new legislative requirements.

Angus Council's Transition to Net Zero Action Plan: 2022 To 2030 was approved in September 2022.

The SECAP is now being delivered and monitored, with a new team member in the Environment and Climate team to support the review process. The SECAP and associated work programme will be reviewed regularly, with a full review of the actions taking place every two years to monitor progress and identify remedial actions, or new actions, that need to occur to achieve targets. This will ensure the SECAP fully considers and reflects changes to technology, market conditions, and environmental concerns. A progress review will be developed later this year (2023).

Developing and delivering the Mercury Programme will be achieved by utilising Tay Cities Deal funding.

Active Travel – Angus Council has asked ARCADIS to look at options available to improve active travel to some routes in Angus. This includes Brechin to Montrose, Kirriemuir to Forfar, Friockheim to Arbroath, School Road (Tealing), and National Cycle Network (NCN) Route 1 between Elliot Links and East Haven.

The Arbroath Places for Everyone scheme design is complete and the scheme is with the contractor (Balfour Beattie) for pricing under the SCAPE Framework. A report will go before the Communities Committee in May 23 requesting approval to proceed with the construction phase. We are targeting a start in the summer of 2023 if committee approval is granted.

Angus Council has installed 5 School Friendly Zones in 2022/23 at Letham Primary School, Carlogie Primary School, Andover Primary School, Liff Primary School, and Southesk Primary School. The zones prohibit traffic from driving on the roads directly outside the schools at the start and end of the school day. The Zones are provided to help promote active travel to and from school with the associated benefit of air quality improvement.

Angus Council is running a Smarter Choices Smarter Places programme for 2022/23, with projects funded by Paths For All, which is a series of behaviour change initiatives to promote active travel and encourage walking and cycling.

Angus Council again ran free bus travel schemes during the spring, summer, and autumn school holidays. These allowed families to travel on public transport free of charge in Angus and to Dundee. 40,396 qualifying bus trips were taken.

Angus Council has commissioned a concept design project for the Newtyle to Dundee Green Circular Active Travel Scheme.

Local Priorities and Challenges

Angus Council will:

- Continue to monitor NO₂, PM₁₀, and PM_{2.5} concentrations during 2022 and will report on progress in 2024
- Procure 5 hydrogen powered 26t Refuse Collection Vehicles within the next financial year and streamline rounds to reduce the fleet by one small RCV

How to Get Involved

We can all help to maintain good air quality within Angus. Travel choices can have a significant impact on pollutant emissions. Reducing single-occupancy car travel, using alternatives such as public transport, and walking or cycling for short journeys all help to reduce emissions.

Several online tools are available to help you plan your journey at

www.travelinescotland.com.

Avoid excessive acceleration and hard braking when you do travel by car to reduce the pollution impacts of the journey.

If you would like further information on Air Quality within Angus, please visit our website, or contact us via ACCESSline (08452 777 778).

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1 Local Air Quality Management

This report provides an overview of air quality in Angus Council during 2022. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) 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 Angus 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 an Air Quality Action Plan (AQAP) within 12 months, setting out measures it intends to put in place in pursuit of the objectives. Angus currently does not have any AQMAs.

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 Angus 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.

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.

Angus has no plans to introduce LEZs within its administrative area.

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

Angus Council has taken forward a number of 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.

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

1. Ongoing implementation of the 'Smarter Choices Smarter Places' scheme promoting low emission transport and travel alternatives.
2. Ongoing focus on the winning the 'Switched on Towns and Cities' feasibility bid, to boost the number of electric vehicles.
3. Ongoing implementation of the 'Cycling Walking Safer Streets Program', focusing on upgrading existing and providing new footpaths.
4. Continuing to produce the 'Angus Sustainable Energy & Climate Action Plan', focusing on sustainable energy and land use practices.
5. Implementation of a quality active travel infrastructure plan between Dundee Road and Guthrie Port in Arbroath.
6. Continuing focus on finding safer and more attractive routes for everyday journeys between Newtyle and Dundee.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
1	Smarter Choices Smarter Places	Promoting low emission transport; Public information. Promoting travel alternatives	Grant funding used to promote active and sustainable travel	Angus Council	2018	Ongoing	- Promotion of bus travel with on-bus adverts and display in shelters - Provision of cycle racks and cycle training in schools - Provision of active travel training in schools - Promoting sustainable travel choices to some of the main trip attractors in Angus - Angus Cycle Hub will roll out a new Rural Towns Active Travel Project and funding will continue to promote the Angus Get on the Go brand. - Informing young people about travel alternatives - Raise awareness and use of active and sustainable modes by residents - Liftshare system and count challenge introduction - Holiday Hop scheme – reduced price bus tickets for children during school holidays in Summer, October, and Christmas. - Free bus travel scheme during the Easter Holidays	N/A	These measures have been implemented or are ongoing (e.g., the Cycle Hub) Funding Secured from European Regional Development Fund	Ongoing TBC	

2	Switched on Towns and Cities feasibility bid	Transport planning and infrastructure	Feasibility study for in-depth support from the Scottish Government for improving electric vehicle infrastructure in the town	Scottish Government / Angus Council	2018	Ongoing	- Winning the bid - Feasibility of Angus towns to be electrified fully to receive vast infrastructure boost - Number of electric cars in the town	N/A	Feasibility study completed	2025	
3	Cycling Walking Safer Streets Program	Transport planning and infrastructure Promoting travel alternatives; Vehicle fleet efficiency	Grant funding used to promote active and sustainable travel	Angus Council	2018	Ongoing	- Upgrading of existing footpaths in Arbroath, Montrose, Ferryden, and Carnoustie - Construction of new footpaths in Forfar	N/A	Upgraded footpaths at Keptie Pond; Arbroath; Lordburn Park, Forfar; and King George's Field. Upgraded cycle stands for schools.	Ongoing TBC	
4	Angus Sustainable Energy & Climate Action Plan	Policy guidance and development control	Angus Sustainable Energy & Climate Action Plan	Angus Council	2018 - 21	2021 onwards	Produce a strategic document that covers all areas of sustainable energy across business and commercial, domestic, and transport including certain aspects of fuel supply. Sustainable land-use practices which aid in greenhouse gas emissions are also a focus.	N/A	Ongoing. SECAP is to be published in 2021.	Approved in Nov 21	

5	A Place for Everyone	Transport planning and infrastructure; Promoting travel alternatives; Traffic management	Grant funding used to promote active and sustainable travel	Scottish Government / Angus Council	2020 - 2022	2023 – 2025	To plan, develop, and implement quality active travel infrastructure between Dundee Road and Guthrie Port in Arbroath	N/A	Design Development Completed	2025	
6	Active Travel	Transport planning and infrastructure Promoting travel alternatives	Feasibility study	Angus Council	2022	2022 onwards	Identify and promote easier, safer, and more attractive routes to walk, wheel and cycle for everyday journeys between Newtyle and Dundee	N/A	Public Consultation phase	Ongoing	

Table 2.2 – Responses to DEFRA Comments on Angus Council APR 2022

DEFRA Comments	Response
The report confirms Angus Council continues to have no exceedances of any relevant air quality objectives, with no requirement for an AQMA.	No response needed.
The Council have provided a clear map of the diffusion tube monitoring network; trends are displayed and discussed in the report.	No response needed.
The Council plans to review the diffusion tube monitoring sites in summer of 2022 to ensure that the monitoring locations continue to represent relevant areas of interest. This is encouraged and updates on the locations should be reported in next year's reports.	A2 has been moved to Arbirlot Road, Arbroath, co-ordinates 625360, 408430. A3 has been moved to Keptie Street, Arbroath, co-ordinates 638840, 408910.
The Council plans to report on PM _{2.5} at the Glamis Road, Forfar site from 2023. The decision to start PM _{2.5} monitoring is welcomed.	PM _{2.5} was monitored in 2022 and is reported in this APR.
Following last year's appraisal, the Council have carried out annualisation calculations for sites with low data capture rate.	Annualisation calculations have been completed for the relevant diffusion tubes in this APR.
The automatic monitoring site at Burnside Drive is currently missing a Site ID. It would be useful for the reader to have an associated ID for this site on the report.	This monitor is now ID AA1.
Overall the report is detailed, concise and satisfies the criteria of relevant standards. The Council should continue their good and thorough work.	No response needed.

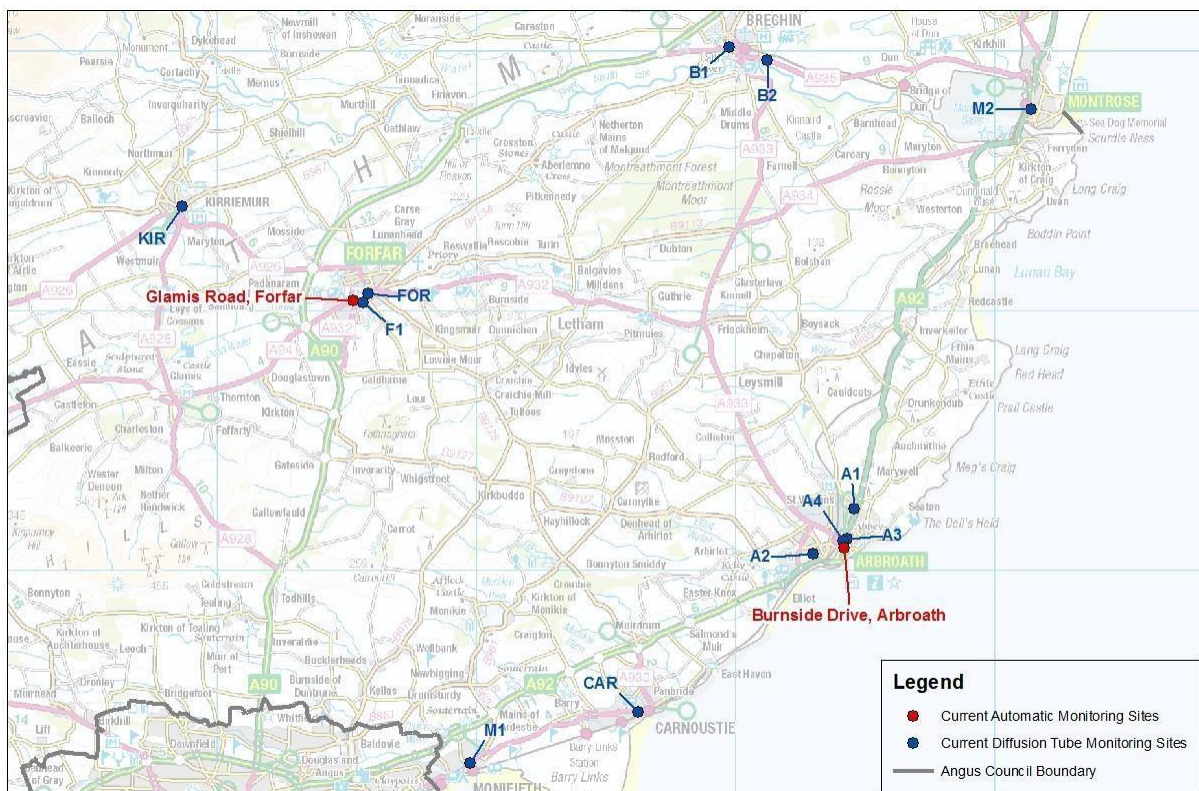
3 Air Quality Monitoring Data and Comparison with Air Quality Objectives

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. The locations of the current monitoring sites are shown in Figure 3.1.

Some alternative diffusion tube locations are being identify and will look to be implemented in the coming years. In 2022, A2 was moved to Arbirlot Road, Arbroath, co-ordinates 625360, 408430, and A3 was moved to Keptie Street, Arbroath, co-ordinates 638840, 408910.

Figure 3.1. Current air quality monitoring sites in Angus



3.1.1 Automatic Monitoring Sites

Angus Council undertook automatic (continuous) monitoring at 2 sites during 2022. A gravimetric Partisol sampler is located at the Burnside Drive, Arbroath whilst an automatic Fidas 200 analyser is located at the Glamis Road, Forfar site. Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at <http://www.scottishairquality.co.uk/>. Angus Council does not carry out automatic monitoring of NO₂. 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

Angus Council undertook non- automatic (passive) monitoring of NO₂ at 11 sites during 2022. Table A.2 in Appendix A shows the details of the sites. 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 (NO₂)

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

For diffusion tubes, the full 2021 dataset of monthly mean values is provided in Appendix B.

Concentrations at all 11 sites were well below the annual mean objective limit in 2022. The highest annual mean concentration was 16.9µg/m³ at monitoring site A3 located on Abbey Path, Arbroath; this is a decrease from the concentration measured in 2021 of 18.9µg/m³. The annual mean NO₂ concentration at most of the locations have decreased from 2021 to 2022; this may be attributed to more hybrid working and working from home following the Covid-19 pandemic.

3.2.2 Particulate Matter (PM₁₀)

Table A.4 in Appendix A compares the ratified and adjusted monitored PM₁₀ annual mean concentrations for the past five years with the air quality objective of 18µg/m³. Table A.5 in Appendix A compares the ratified continuous monitored PM₁₀ daily mean concentrations for the past five years with the air quality objective of 50µg/m³, not to be exceeded more than seven times per year.

The measured concentrations at both automatic monitors remain below the PM₁₀ objective limit. However, there was a small increase in PM₁₀ concentration at both monitors in 2022 from 2021.

The limit of 7 exceedances of the 24-hour mean objective limit was not exceeded in 2022. There were 3 exceedances of the 24-hour mean objective limit at the Burnside Drive monitors in 2022, which is an increase from 0 in 2021. There were 2 exceedances of the 24-hour mean objective limit at the Glamis Road monitor, a decrease of 1 from 2021.

3.2.3 Particulate Matter (PM_{2.5})

Table A.6 in Appendix A compares the ratified and adjusted monitored PM_{2.5} annual mean concentrations for the past five years with the air quality objective of 10µg/m³.

3.2.4 Sulphur Dioxide (SO₂)

Angus Council does not currently monitor SO₂ concentrations and has no plans to do so in the future.

3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene

Angus Council does not currently monitor Carbon Monoxide, Lead, or 1,3-Butadiene concentrations and has no plans to do so in the future.

4 New Local Developments

4.1 Road Traffic Sources

Angus Council confirms that no new Road Traffic sources have been identified which may have a significant impact on local air quality.

4.2 Other Transport Sources

Angus Council confirms that no new Other Transport sources have been identified which may have a significant impact on local air quality.

4.3 Industrial Sources

Angus Council confirms that no new Industrial sources have been identified which may have a significant impact on local air quality.

4.4 Commercial and Domestic Sources

Angus Council confirms that no new Commercial or Domestic sources have been identified which may have a significant impact on local air quality.

4.5 New Developments with Fugitive or Uncontrolled Sources

Angus Council confirms that no new fugitive or uncontrolled sources have been identified which may have a significant impact on local air quality.

5 Planning Applications

The following are new or substantially varied applications under the Pollution Prevention & Control (PPC) and Waste Management Licensing (WML) Regulations in Angus during 2022:

- PPC/E/0030059: Waulkmill Quarry, Arbroath, Angus, DD11 4SA.
Application type: Operational Technical (Substantial) Variation to existing authorisation.
- PPC/B/5003146: Montrose Service Station, 108 North Esk Road, Montrose, DD10 9AY.
Application type: New licence.
- WML/L/SEPA2021-8003: John Lawrie Montrose Port, South Quay, Ferryden, Montrose, Angus, DD10 9SL.
Application type: Operational Technical (Substantial) Variation to existing authorisation.
- WML/E/0000210: Forties Road Industrial Estate, Forties Road, Montrose, DD10 9ET.
Application type: Full transfer.

There are three planning applications relevant to air quality considered by Angus Council in 2022, which are:

- 22/00333/FULL - Installation of bio-mass boiler and housing building to service proposed new Micro-distillery at Woodhill, Barry, by Carnoustie.
- 22/00128/FULL - Alterations and extension to existing building to form biomass facility at Glenskinno Farm, Pugeston, by Montrose.
- 22/00595/FULL – The replacement of heating oil boilers and steam heating system to new gas fired Combined Heat and Power (CHP), two hot water boilers and associated works at Glenesk Maltings, Kinnaber Road, Hillside.

Table 5.1 – Planning Application Key Information

Location	Source	Building Height (m)	Stack Diameter (m)	Stack Height (m)	Background Concentration (µg/m³)		Emission Rates (g/s)	
					PM ₁₀	NO ₂	PM ₁₀	NO ₂
Woodhill, Barry	Biomass Boiler	7	0.25	10	12.4	5.02	0.0112	0.0756
Glenskinno	Biomass Boiler	16	0.5	8	11.5	3.5	0.0075	0.0375
Glenesk	CHP System	20	0.45	11.25		4.01		0.0320

Table 5.2 – Target Emission Rates from Biomass Calculator for Woodhill, Barry (Application 22/00333/FULL)

Location	PM ₁₀ Annual Mean		Nitrogen Dioxide Annual Mean		Nitrogen Dioxide Hourly Mean	
	Target Emission Rate (g/s)	Detailed Assessment Required?	Target Emission Rate (g/s)	Detailed Assessment Required?	Target Emission Rate (g/s)	Detailed Assessment Required?
Woodhill Barry	0.0311	N	0.1953	N	0.2315	N

Table 5.3 – Detailed Assessment Figures including Cumulative Impacts Glenskinno Farm (Application 22/00128/FULL) and Glenesk Malting (Application 22/00595/FULL)

Source Location	PM ₁₀ Annual Mean (µg/m³)			Nitrogen Dioxide Annual Mean (µg/m³)			Nitrogen Dioxide Hourly Mean (µg/m³)		
	PC	PEC	PEC > AQS	PC	PEC	PEC > AQS	PC	PEC	PEC > AQS
Glenskinno Farm	3.4	14.9	NO	12.1	15.6	NO	55.0	62.4	NO
Glenesk Maltings	-	-	-	0.55	4.56	NO	11.25	19.26	NO

6 Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

Concentrations of NO₂ measured at 12 monitoring sites across the Angus Council area were well below the annual mean objective limit in 2022. The annual mean NO₂ concentration at most of the locations have decreased from 2021 to 2022; this may be attributed to more hybrid working and working from home following the Covid-19 pandemic. All concentrations at all monitoring sites remain well below the annual mean objective.

The measured annual mean PM₁₀ concentrations were higher in 2022 than in 2021, but remain below the annual mean objective limit. The limit of 7 exceedances of the 24-hour mean objective limit was not exceeded in 2022. There were 3 exceedances of the 24-hour mean objective limit at the Burnside Drive monitor in 2022, which is an increase from 0 in 2021. There were 2 exceedances of the 24-hour mean objective limit at the Glamis Road monitor, a decrease of 1 from 2021.

Considering the above, a detailed assessment is not required for either pollutant.

6.2 Conclusions relating to New Local Developments

Angus Council is satisfied there have been no new local developments proposed or completed during 2022 that have the potential to introduce new exceedances of any relevant air quality objectives.

6.3 Proposed Actions

Monitoring in 2022 has shown no exceedances of any relevant air quality objectives, meaning a detailed assessment is not required for any pollutants.

Monitoring locations will continue to be reviewed to ensure the locations are still relevant, though relocation may not be necessary.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
AA1	Burnside Drive, Arbroath	Kerbside	364169	740861	PM ₁₀	No	Gravimetric	4.0	1.0	1.5
AFR1	Glamis Road, Forfar	Roadside	345249	750386	PM ₁₀ , PM _{2.5}	No	FDMS	20.0	6.0	1.5

Notes:

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

(2) N/A if not applicable.

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

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube co-located with a Continuous Analyser?	Tube Height (m)
A1	Ethie Terrace, Arbroath	Urban Background	364585	742349	NO2	N	0.0	1.0	No	2.4
A2	Inchcape Road, Arbroath	Urban Background	362987	740642	NO2	N	0.0	2.0	No	2.4
A3	Abbey Path, Arbroath	Kerbside	364299	741225	NO2	N	1.5	1.0	No	2.4
A4	22 Lordburn, Arbroath	Kerbside	364158	741122	NO2	N	3.0	1.0	No	2.4
B1	High St, Brechin	Kerbside	359727	760170	NO2	N	2.0	1.0	No	2.4
B2	Sacone 1, Brechin	Industrial	361216	759644	NO2	N	N/A	8.0	No	2.4
CAR	High St, Carnoustie	Roadside	356243	734526	NO2	N	3.0	2.0	No	2.4
FOR	High St, Forfar	Kerbside	345825	750674	NO2	N	3.0	1.0	No	2.4
F1	St James Road, Fordar	Roadside	345628	750307	NO2	N	1.0	2.0	No	2.4
KIR	Manse Close, Kirriemuir	Roadside	338621	754032	NO2	N	5.0	6.0	No	2.4
M1	High St, Monifieth	Roadside	349759	732549	NO2	N	0.0	2.0	No	2.4
M2	High St, Montrose	Kerbside	371418	757767	NO2	N	2.0	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.3 – Annual Mean NO₂ Monitoring Results (µg/m³)

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
A1	Urban Background	Diffusion Tube	90.9	81.4	8.1	8.0	7.1	5.1	5.7
A2	Urban Background	Diffusion Tube	72.7	65.0	12.2	11.1	8.3	8.0	7.2
A3	Kerbside	Diffusion Tube	90.9	82.5	23.4	23.4	15.6	18.9	16.9
A4	Kerbside	Diffusion Tube	90.9	82.5	16.6	17.9	14.0	12.9	10.8
B1	Kerbside	Diffusion Tube	100	89.5	12.6	12.6	7.8	8.2	7.4
B2	Industrial	Diffusion Tube	100	89.5	7.3	5.6	4.1	4.9	4.2
CAR	Roadside	Diffusion Tube	100	89.5	15.1	14.8	10.3	12.0	9.3
FOR	Kerbside	Diffusion Tube	100	89.5	15.2	14.7	10.0	10.1	9.7
F1	Roadside	Diffusion Tube	90.9	81.9	19.1	19.0	13.2	13.7	11.9
KIR	Roadside	Diffusion Tube	100	89.5	11.6	10.9	5.5	7.8	7.1
M1	Roadside	Diffusion Tube	72.7	62.0	13.2	13.9	10.0	10.2	10.6
M2	Kerbside	Diffusion Tube	100	89.5	19.2	18.1	13.1	14.8	13.3

Notes:

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

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

Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.TG(16) 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. Trend in Annual Mean NO₂ Concentrations

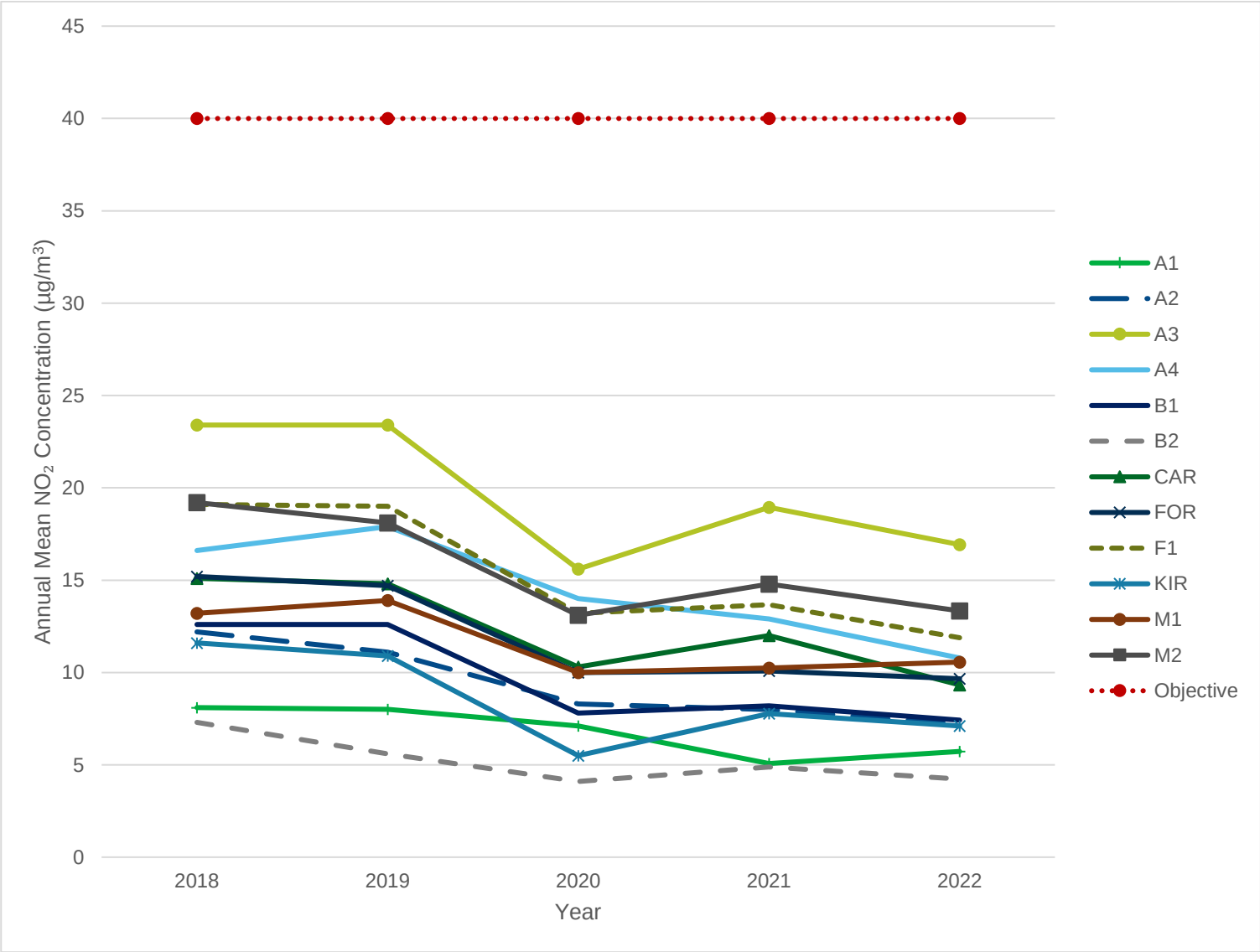


Table A.4 – Annual Mean PM₁₀ Monitoring Results (µg/m³)

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
AA1	Kerbside	98.4	85.8	12.0	11.8	11.4	10.9	11.7
AFR1	Roadside	98.4	98.4	12.7	12.7	10.0	9.1	9.6

Notes:

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

All means have been “annualised” as per LAQM.TG(16), valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

Table A.5 – 24-Hour Mean PM₁₀ Monitoring Results, Number of PM₁₀ 24-Hour Means > 50µg/m³

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
AA1	Kerbside	98.4	85.8	0 (23.9)	0 (27.6)	0 (27.0)	0 (27.9)	3
AFR1	Roadside	98.4	98.4	0 (39.5)	0	0 (23.5)	3 (23.7)	2

Notes:

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

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

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

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

Figure A.3. Trend in Annual Mean PM₁₀ Concentrations

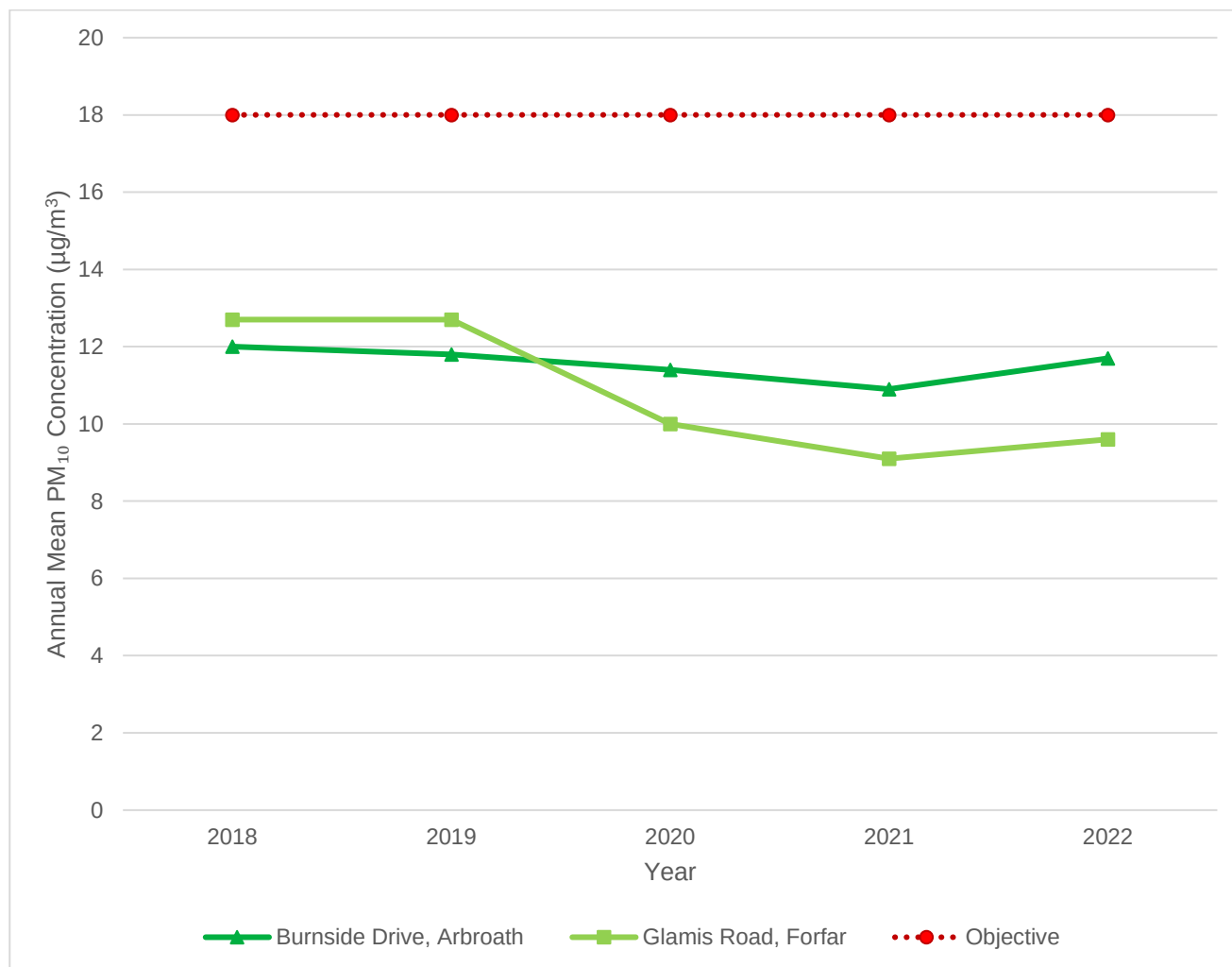


Table A.6 – Annual Mean PM_{2.5} Monitoring Results (µg/m³)

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2018	2019	2020	2021	2022
AFR1	Roadside	98.4	98.4	-	-	-	-	5.4

Notes:

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

All means have been “annualised” as per LAQM.TG(16), 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 – NO₂ 2022 Monthly Diffusion Tube Results (µg/m³)

Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted ⁽¹⁾
A1	9	6.2	9.9	7.7	6.1	4	4.7		11.5	8.8	6.3		7.6	5.7
A2	11.1	9	12.4	9				8.7	9	12.2	7.6		9.9	7.2
A3	25.4		48.9	21.1	16.5	14.4	17	21.5	21.5	24.7	14.5		22.6	16.9
A4	20.9	< 0.5	19.2	14.6	11.7	9.6	9.7	13.4	14.9	17.9	10.5		14.4	10.8
B1	12	3.9	13.9	13.9	9	4.9	7.3	10.3	9.9	12.4	9.4		9.9	7.4
B2	6.4	10	7.5	5.6	4.1	1.8	2.5	5	5.4	7.5	7		5.6	4.2
CAR	16.3	8.5	16.4	12.8	11.9	8.2	9.9	12.5	12.2	16.2	10.4		12.4	9.3
FOR	15.6	14.3	17.9	11.6	8.2	9.8	16.2	10.3	11.1	15.7	14		12.9	9.7
F1	21.9	20.9	18.9	15.5	12.8		9.6	13.8	14.9	18.2	12		15.8	11.9
KIR	13.8	11.5	12.4	8.2	7.1	5.8	5.3	7.9	10.1	12.5	10.1		9.5	7.1
M1	13.6	< 0.5	24.2		8.4	4.1	6.9	9.8		26.5	11.4		13.3	10.6
M2	20.5	19	15.9	17.8	17.6	14.6	13.8	16.6	17	26.8	13.4		17.8	13.3

Notes:

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

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

New or Changed Sources Identified Within Angus Council During 2022

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

Additional Air Quality Works Undertaken by Angus Council During 2022

Angus Council has not completed any additional works within the reporting year of 2022.

QA/QC of Diffusion Tube Monitoring

Angus Council deploy diffusion tubes prepared and analysed by Tayside Scientific Services (TSS; 20% TEA in water method). Tubes are changed monthly, although the tubes deployed on 5th Dec 2022 have not yet been changed due to resourcing issues. There have been minor deviations from the DEFRA calendar.

Diffusion Tube Annualisation

Diffusion tubes A2 and M1 required annualisation. The calculation method is in

Table C.2.

Diffusion Tube Bias Adjustment Factors

Angus Council have applied a national bias adjustment factor of 0.75 to the 2022 monitoring data. A summary of bias adjustment factors used by Angus Council over the past five years is presented in Table C.1.

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	National	03/23	0.75
2021	National	03/22	0.77
2020	National	03/21	0.80
2019	National	03/20	0.80
2018	National	03/19	0.72

NO₂ Fall-off with Distance from the Road

No diffusion tube NO₂ monitoring locations within Angus Council required distance correction during 2022.

QA/QC of Automatic Monitoring

The Partisol is a gravimetric reference equivalent PM₁₀ analyser. It contains 16 filters that are exposed for 24 hours and allow 2 weeks of continuous operation (usually with two blanks). The filters are supplied by the equipment manufacturer and conditioned and weighed before and after the sampling period by Tayside Scientific Services using in-house methodologies. The samplers are serviced annually by Air Monitors Ltd.

The Fidas monitor is serviced twice a year by Air Monitors Ltd.

PM₁₀ and PM_{2.5} Monitoring Adjustment

The type of PM₁₀ and PM_{2.5} monitors utilised within Angus do not require the application of a correction factor.

Automatic Monitoring Annualisation

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

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

Site ID	Annualisation Factor Aberdeen Erroll Park	Annualisation Factor Edinburgh St Leonards	Annualisation Factor Glasgow Townhead	Annualisation Factor Peebles	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
A2	0.9264	0.9663	0.9684	1.0073	0.9671	9.9	9.6	
M!	0.9834	1.0372	1.0964	1.1187	1.0589	13.3	14.1	

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the LA intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
APR	Air quality Annual Progress Report
AURN	Automatic Urban and Rural Network (UK air quality monitoring network)
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
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