Annual Progress Report (APR)

2021 Air Quality Annual Progress Report (APR) for Angus Council

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

June 2021

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Executive Summary: Air Quality in Our Area

Air Quality in Angus

The air quality monitoring data available for 2020 confirm that air quality across Angus remains good. Measured concentrations of nitrogen dioxide (NO_2) and particulate matter (PM_{10}) are below the relevant objectives and continue to reduce at most monitoring locations.

Previous Review and Assessments have concluded that concentrations of carbon monoxide, benzene, 1,3-butadiene, lead, sulphur dioxide, PM_{10}, and NO_2 are compliant with the relevant objectives, and no Air Quality Management Areas (AQMAs) have been declared.

No new significant sources of pollutant emissions have been identified within the Angus Council administrative area.

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), which is currently undergoing review. The policies in the LDP aim to improve air quality by facilitating sustainable development, reducing the need to travel and ensuring appropriate controls on development and apply to all types of development in the Angus Council administrative area.

The LDP aims to reduce the need to travel by co-locating development and promoting local facilities in accessible locations such as town centres. The policies in the LDP promote accessible and sustainable development which includes access to a range of modes of transport. Development planning must include design principles which support well connected and resource efficient places, including the provision of active travel routes, green space and amenity considerations. There are also dedicated policies on maintaining and improving environmental quality, control of emissions and specifically considering impacts on air quality (DS2 Accessible development, DS3 Design Quality and Placemaking, and Policy DS4 Amenity)

The LDP also promotes non-vehicular travel through policies such as: Policy TC11 Park & Ride Facilities, Policy TC13 Digital Connectivity & Telecommunications Infrastructure.

Site briefs and the planning application process help deliver development that creates better places and includes working with Environmental Health colleagues to deliver quality development and the use of conditions and guidance to control emissions. Specific policies cover waste management and minerals - PV 17, PV 18, and PV 19.

Planning also has a role in meeting emissions targets through supporting the delivery of renewable energy and energy efficiencies. There is a duty under The Climate Change Act to deliver increasing energy efficiency measures and the reduction of energy use. (Primarily through the Building Standards process). Policies PV 9, PV 10, and PV 11 refer.

The Plan is also subject to Strategic Environmental Assessment. This process identifies where policies and proposals might impact on air quality and opportunity for mitigation of negative effects.

In future planning's contribution to a low carbon society will become increasingly important – as evidenced by the Clean Air for Scotland (CAFS) review (major developments should not result in increased emissions); Planning (Scotland) Act 2019 and the emerging National Planning Framework (NPF) 4. This will be reflected in our next local development plan – AngusPlan.

Local Priorities and Challenges

Angus Council will:

- Continue to monitor NO_2 and PM_{10} concentrations during 2020 and will report on progress in 2021.
- Publish and deliver the Angus Sustainable Energy Climate Action Plan (SECAP) and review the policy landscape to align with this. SECAP is due to be reported to committee in August.
- Develop and deliver the Mercury Programme which will underpin all activity and aim to make Angus a low carbon, sustainable region.
- Implement a new Active Travel Plan & support Transforming Angus Programme

to consolidate estate, facilitate home working where possible, and reduce staff travel through the Smart Working programme; and

- Implement the current Angus Local Development Plan (2016), which sets out the strategies and policies to promote development which minimises adverse impacts on the environment.

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.

A number of online tools are available to help you plan your journey at www.travelinescotland.com.

When you do travel by car, avoiding excessive acceleration and hard braking will also 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 during 2020. 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 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	31.12.2020
Sulphur dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
Sulphur dioxide (SO_2)	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
Sulphur dioxide (SO_2)	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005
Benzene	3.25 µg/m^3	Running annual mean	31.12.2010
1,3 Butadiene	2.25 µg/m^3	Running annual mean	31.12.2003
Carbon Monoxide	10.0 mg/m^3	Running 8-Hour mean	31.12.2003

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 Council currently does not have any AQMAs.

2.2 Cleaner Air for Scotland

Cleaner Air for Scotland – The Road to a Healthier Future (CAFS) is a national cross-government strategy that sets out how the Scottish Government and its partner organisations propose to reduce air pollution further to protect human health and fulfil Scotland's legal responsibilities as soon as possible. A series of actions across a range of policy areas are outlined, a summary of which is available at https://www.gov.scot/Publications/2015/11/5671/17. Progress by Angus Council against relevant actions within this strategy is demonstrated below.

2.2.1 Transport – Avoiding Travel – T1

Angus Council's current Local Development Plan (LDP) has numerous policies to facilitate sustainable development, reduce the need to travel and ensure appropriate controls on development. The LDP aims to reduce the need to travel by co-locating development and promoting local facilities in accessible locations such as town centres.

The LDP includes policies which promote: accessible and sustainable development (access to a range of modes of transport); design principles supporting well connected and resource efficient places, including the provision of active travel routes, green space and amenity considerations; maintaining and improving environmental quality, control of emissions and specifically considering impacts on

air quality (specific policies for reference are DS2 Accessible development, DS3 Design Quality and Placemaking, and DS4 Amenity)

The Plan also promotes non-vehicular travel through policies such as: Policy TC11 Park & Ride Facilities, Policy TC13 Digital Connectivity & Telecommunications Infrastructure.

2.2.2 Active travel – Deliverance of the Cycling Action Plan for Scotland vision, that by 2020, 10% of everyday journeys will be made by bike – T3

The Angus Active Travel Strategy (2016) details the actions that Angus Council will take to improve active travel networks, and infrastructure, as well as coordinate the actions and garner the support of a range of organisations. The aim is to promote walking and cycling in Angus as a means of sustainable transport, to improve public health and reduce traffic congestion. Examples of some of the implemented measures can be seen in Table 2.1.

The Accessible Development policy (DS2) will also require that any new development proposals must demonstrate, where appropriate, that they can provide and/or enhance safe and pleasant paths for walking and cycling which are suitable for use by all, and link existing and proposed path networks.

2.2.3 Climate Change – Effective co-ordination of climate change and air quality policies to deliver co-benefits – CC2

Scottish Government expects any Scottish local authority which has or is currently developing a Sustainable Energy Action Plan to ensure that air quality considerations are covered. Angus Council published the Climate Change Strategy and Action Plan 2012 - 2016, which set out the strategies for adaptation to climate change and guidelines for sustainable development with respect to several environmental aspects, including air quality. Angus Council, in partnership with three other local authorities, Aberdeenshire, Aberdeen City, and Moray, produced a regional North East Scotland Sustainable Energy Action Plan (NE SEAP). This scheme will be superseded by a Sustainable Energy and Climate Action Plan (SECAP) which is designed to cover all areas of sustainable energy across business and commercial, domestic and transport, including some aspects of land use and fuel supply. Implementation of the measures set out in the SECAP will result in

the overall reduction in greenhouse gas emissions, and improvement of air quality, aligning with the aim of meeting emissions targets set for 2050.

2.3 Progress and Impacts of Measures to address Air Quality in Angus Council

Angus Council has taken forward several measures during the current reporting year of 2020 in pursuit of improving local air quality. The Angus Sustainable Energy & Climate Action Plan (SECAP) is still in development and is due to be published in 2021. The SECAP proposes climate change mitigation policies and actions to develop the low carbon economy in the region, encompassing mitigation strategies specific to Angus authority as well as regional mitigation activities. The potential effects each policy may have on energy and greenhouse gases are estimated and compared to relevant targets for reductions, whilst also considering the impacts on local air quality. This document will be published in 2021.

School Exclusion Zones are being trialled at three primary schools in Angus. The exclusion zone will prevent vehicles from entering streets surrounding the schools at certain times of day, while the school term is in progress. The aim is to reduce congestion on the roads surrounding the schools and encourage active travel, such as cycling and walking. The trial began in June 2021 and is initially planned to last 18 months. The outcomes of the trial will be examined for their effectiveness and this evidence will inform the decision on whether to implement these exclusion zones permanently.

The Accessible Arbroath project culminates with *Arbroath: A Place for Everyone*. This project has seen Angus Council work in collaboration with the charity Sustrans, and the design and consultancy firm Arcadis, to implement several improvements in the Arbroath area, including the improvement of traffic flow and junctions, improving access for active travel methods and those with reduced mobility, improving the quality and use of green spaces, and the development of paths and links between railways, bus stations, and the town centre. Angus Council will continue to encourage public engagement with this project over the coming months via. virtual meetings, and a household survey, to be implemented in 2022.

In addition, Angus Council are committed to delivering the Mercury Programme, the purpose of which is to increase productivity through Clean Growth, and by protecting and creating places for future generations to live, work and visit. The focus will be on projects in the Clean Growth, Agri-Tech and Low Carbon transport and housing sectors.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Progress to Date	Completion Date
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	2018 – 2019	• 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 • Raising 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	These measures have been implemented or are ongoing (e.g., the Cycle Hub) Funding Secured from European Regional Development Fund	Ongoing TBC

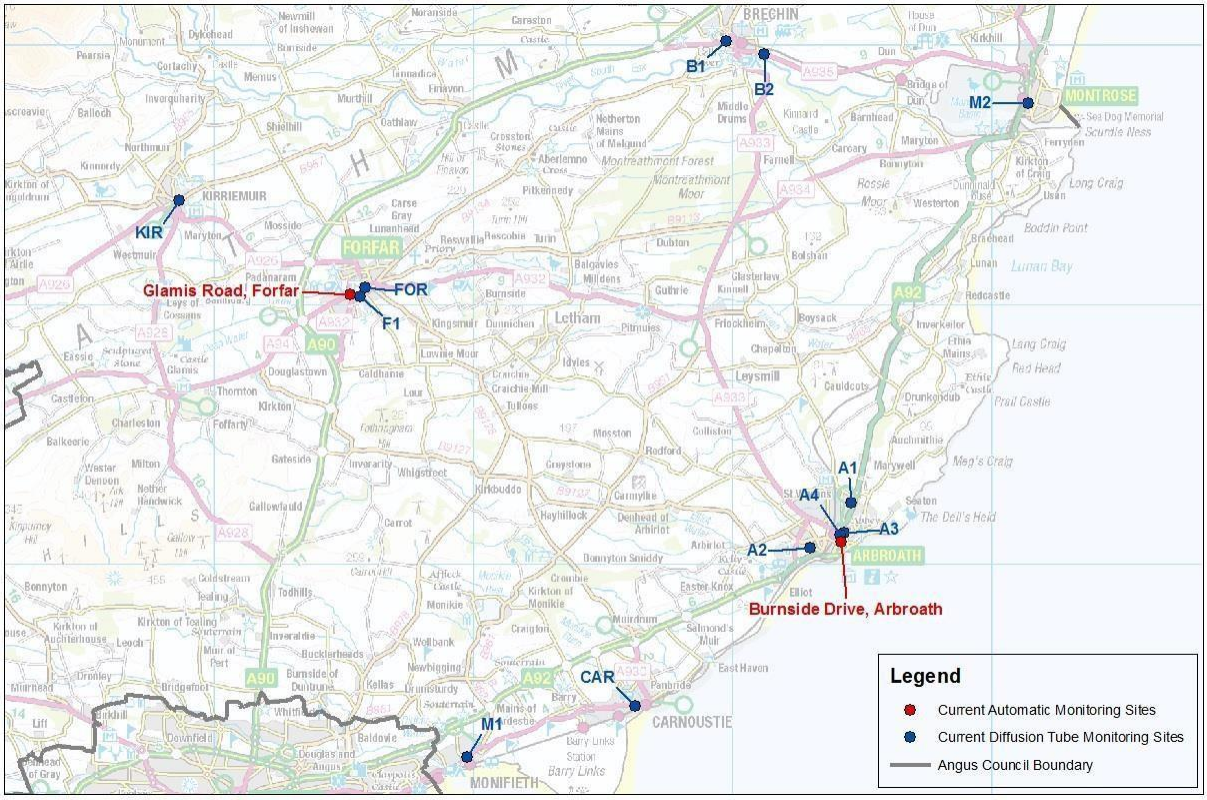
2	Switched on Towns and Cities feasibility bid	Transport planning and infrastructure	Feasibility study for in-depth support from the Scottish Government fir improving electric vehicle infrastructure in the town	Scottish Government / Angus Council	2018	2018 – 2019	• Winning the bid • Feasibility of Angus towns to be electrified fully to receive vast infrastructure boost • Number of electric cars in the town	Feasibility study completed	2025
3	Cycling Walking Safer Streets Program	Transport planning and infrastructure Promoting travel alternative s; Vehicle fleet efficiency	Grant funding used to promote active and sustainable travel	Angus Council	2018	2019	• Upgrading of existing footpaths in Arbroath, Montrose, Ferryden and Carnoustie • Construction of new footpaths in Forfar	Upgraded foot paths at Keptie Pond; Arbroath; Lordburn Park, Forfar; and King George's Field.	Ongoing TBC
4	Angus Sustainable Energy & Climate Action Plan	Policy guidance and development control	Angus Sustainable Energy & Climate Action Plan	Angus Council	2018 -21	2021onwards	Produce a strategic document which covers all areas of sustainable energy across business and commercial, domestic and transport including certain aspects of fuel supply. Sustainable landuse practices which aid in greenhouse gas emissions are also a focus.	Ongoing. SECAP to be published in 2021.	Ongoing TBC

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives

3.1 Summary of Monitoring Undertaken

This section sets out the monitoring that has taken place in 2020 and how local concentrations of the measured pollutants compare with the objectives. The locations of the current monitoring sites are shown in Figure 3-1.

Figure 3-1 Current air quality monitoring sites in Angus



3.1.1 Automatic Monitoring Sites

Angus Council undertook continuous monitoring of PM_{10} at two sites during 2020. A gravimetric Partisol sampler is located at the Burnside Drive, Arbroath site, whilst an automatic FDMS TEOM 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 do not carry out any automatic monitoring of NO_2 concentrations.

Further details on how the monitors are calibrated and how the data have been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

Angus Council undertook non-automatic (passive) monitoring of NO_2 at 12 sites during 2020. Appendix A shows the details of the sites, whilst Appendix B provides the full 2020 dataset of monthly mean values for each site.

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.3 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40 µg/m^3.

For diffusion tubes, the full 2020 dataset of monthly mean values is provided in Appendix B.

Concentrations at all 12 sites were well below the annual mean objective limit in 2020; the highest annual mean concentration was 15.6 µg/m^3, which was measured at monitoring site A3 located on Abbey Path, Arbroath. This is a significant decrease from the concentration measured in 2019 of 23.4 µg/m^3 . Concentrations at all monitors have decreased from 2019 to 2020; this is most likely attributed to the COVID-19 pandemic and the effect that susequent lockdowns had on local traffic (and therefore the level of daily emissions), as well as other meteorolgical conditions. Excluding 2020, measured concentrations have not varied greatly over the past four years. Monitor A3 showed the greatest variance with an increase in NO_2 concentration in 2018, which remained similar in 2019. All concentrations remain well below the annual mean objective.

3.2.2 Particulate Matter (PM_{10})

Table A.4 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of 18 µg/m^3. Table A.5 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past five years with the air quality objective of 50 µg/m^3, not to be exceeded more than seven times per year.

The meaured concentrations at both monitors continue to remain below the relevant objectives for PM_{10}. Concentrations at the Burnside Drive, Arbroath monitor have decreased over the past 5 years; the greatest decrease was observed between 2017 and 2018, where concentrations decreased by 0.9 µg/m^3. A slight decrease has been observed from 2019 to 2020, by 0.4 µg/m^3 This decrease could be attributed to the COVID-19 pandemic, as well as any other number of factors including variations in meteorological and general local traffic conditions. At the Glamis Road, Forfar monitoring site, concentrations decreased from 12.7 µg/m^3 in 2019 to 10.0 µg/m^3 in 2020. The magnitute of this change is simialr to what was previously observed; i.e., the increase by 2.8 µg/m^3 between 2017 and 2018. This decrease of 2.7 µg/m^3 may also be attributed to the COVID-19 pandemic, as well as meteorological and traffic variations.

3.2.3 Particulate Matter ($PM_{2.5}$)

Angus Council do not currently monitor $PM_{2.5}$ concentrations and have no plans to do so in the future.

3.2.4 Sulphur Dioxide (SO_2)

Angus Council do not currently monitor SO_2 concentrations and have no plans to do so in the future.

3.2.5 Carbon Monoxide, Lead, and 1,3-Butadiene

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

4 New Local Developments

4.1 Road Traffic Sources

Angus Council confirm 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 confirm 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 confirm that no new Industrial sources of the following nature have been identified which may have a significant impact on local air quality:

- **Industrial installations:** existing installations where emissions have increased substantially, or new relevant exposure has been introduced.
- Major fuel storage depots storing petrol.
- Petrol stations.
- Poultry farms.

Angus Council confirm that a new industrial source of the following nature has been identified and is dealt with under **Section 5 Planning Applications**:

- **Industrial installations:** new or significantly changed installations with no previous air quality assessment.

4.4 Commercial and Domestic Sources

Angus Council confirm that no new Commercial or Domestic sources of the following nature have been identified which may have a significant impact on local air quality:

- Areas where domestic solid fuel burning may be relevant.
- Combined Heat and Power (CHP) plant.

Angus Council confirm that new commercial or domestic sources of the following nature have been identified and are dealt with under Section 5 Planning Applications:

- Biomass combustion plant – individual installations.
- Areas where the combined impact of several biomass combustion sources may be relevant.

4.5 New Developments with Fugitive or Uncontrolled Sources

Angus Council confirm that no new sources of fugitive or uncontrolled particulate matter of the following nature have been identified which may have a significant impact on local air quality:

- Landfill sites.
- Quarries.
- Unmade haulage roads on industrial sites.
- Waste transfer stations, etc.
- Other potential sources of fugitive particulate matter emissions.

5 Planning Applications

5.1 Planning applications granted approval

19/00447/FULL - Planning permission for the generation of energy from burning biomass including storing of biomass and installation of a flue at Mains Of Carmyllie Farmhouse Carmyllie Arbroath.

This application sought retrospective permission for a 350-kW biomass boiler. The boiler is used to warm up potatoes prior to grading, facilitate grain drying, heat the workshop and grading shed, as well as providing heat and hot water to the farmhouse and two nearby cottages. As this proposal has the potential to increase emissions of particulate matter (PM_{10}) and NO_2 a screening assessment was undertaken, and the results are reproduced in the tables 5.1 and 5.2. The type of boiler, the type of fuel, and the height of the stack have subsequently been controlled by planning conditions.

20/00139/FULL - Retrospective planning permission for erection of replacement agricultural shed and biomass boiler with fuel storage silo at East Memus Farm Forfar.

This application sought retrospective permission for an agricultural shed, a 300-kW biomass boiler, and associated fuel silo. The biomass boiler provides heat to the agricultural shed

and heating and hot water to the farm offices and 3 residential properties. As this proposal has the potential to increase emissions of PM_{10} and NO_2 a screening assessment was undertaken, and the results are reproduced in the tables 5.1 and 5.2. The type of boiler, the type of fuel and the height of the stack have subsequently been controlled by planning conditions.

20/00455/FULL - Erection of biomass boiler (Phase 1) at Field 450M West Of Windyhills Farm Seahills Auchmithie.

This application sought permission for the installation of a 2 MW biomass boiler to provide heating to existing and future agricultural polytunnels. As this proposal has the potential to increase emissions of PM_{10} and NO_2 including cumulative impacts due to a number of existing biomass boilers on site an air quality assessment including dispersion modelling was undertaken. The results are produced in the tables 5.1 and 5.2. The type of boiler and the type of fuel have subsequently been controlled by planning conditions.

20/00553/FULL – Installation of a biomass boiler at Over Bow Farm Forfar

This application sought permission for the installation of a 220-kW biomass boiler to provide heating and hot water to the farm buildings and farmhouse. As this proposal has the potential to increase emissions of PM_{10} and NO_2 a screening assessment was undertaken, and the results are reproduced in the tables 5.1 and 5.2. The type of boiler and the type of fuel have subsequently been controlled by planning conditions.

Table 5-1 Data Used in Assessments

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**
Mains of Carmyllie	Biomass Boiler	7.4	0.35	8.45	11.76	2.98	0.0019	0.021
East Memus	Biomass Boiler	5.4	0.3	6	11.44	3.24	0.0054	0.0288
Windyhills	Biomass Boiler	6.0	0.46	12.0	11.6	3.7	0.094	0.031
Over Bow	Biomass Boiler	6.0	0.3	9.0	11.75	4.05	0.006	0.0071

Table 5-2 Target emission rates from biomass calculator

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?
Mains of Carmyillie	0.0137	NO	0.0844	NO	0.1094	NO
East Memus	0.0087	NO	0.049	NO	0.085	NO
Windyhills	0.0999	NO	0.5668	NO	0.6334	NO
Over Bow	0.0372	NO	0.2142	NO	0.2622	NO

5.2 Pending Planning Applications

20/00830/FULL Erection of Crematorium Building and associated works at Land Northeast of Duntrune House, Duntrune

This application has the potential to increase PM_{10} and NO_2 levels. The developer has been advised that an air quality assessment is required, and the application is currently under consideration.

6 Impact of COVID-19 upon LAQM

In the Angus Council administrative area, the main impacts of COVID-19 on LAQM were the interruption of the diffusion tube and particulate matter monitoring calendar; the lockdown commencing March 24th, 2020, affected all submissions of diffusion tubes for analysis, due to the closure of our nominated laboratory. The last submitted 4-week exposure diffusion tube was March 4th. Therefore, there were no measurements submitted between the March 5th and August 5th.

LSO visits were suspended during the lockdown period, and servicing visits for the TEOM/FDMS analysers were also suspended. The analyses for the gravimetric partisol monitor were also paused from the period spanning lockdown.

At Angus Council we currently do not carry out any low-cost monitoring, and currently have no plans to do in future.

The TEOM/FDMS monitor in Forfar experienced a breakdown in November 2020. This unit was replaced with a Fidas 200 monitor early in June 2021

7 Conclusions and Proposed Actions

7.1 Conclusions from New Monitoring Data

Concentrations of NO_2 measured at 12 monitoring sites across the Angus Council area were well below the annual mean objective limit in 2020. The measured NO_2 concentrations have not varied greatly over the past four years, apart from the Arbroath kerbside site (Abbey Path), where concentrations were slightly higher in 2018 and 2019 than in previous years. All locations experienced a drop in NO_2 concentrations in 2020, with some locations, for example Manse Close, Kirriemuir, experiencing a decrease in concentrations by approximately 50%. The overall decrease of NO_2 concentrations from 2019 to 2020 is likely attributable to the COVID-19 pandemic. All concentrations at all monitoring sites remain well below the annual mean objective.

PM_{10} concentrations measured at two kerbside/roadside monitoring sites were also below the annual mean and 24-hour mean objectives limits in 2020.

Measured PM_{10} concentrations were also slightly higher in 2018 and 2019 than in previous years at the Forfar monitoring site (Glamis Road) but continued to fall at the monitoring site in Arbroath (Burnside Drive). In 2020, both sites reported a decrease in PM_{10} concentrations, however the decrease observed at Glamis Road was relatively significant; approximately a quarter of what was observed in 2019. This is likely attributable to the COVID-19 pandemic. Measured concentrations at both sites were well below the annual mean objective limit.

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

7.2 Conclusions relating to New Local Developments

New commercial sources of pollutant emissions were identified within the Angus Council area in 2020. The screening assessments for the four new commercial sources found that the contributions from these new developments would not raise pollutant levels above the Air Quality Standards objectives and therefore, no further action is required.

In 2020 there have been no new road traffic, other transport, industrial, domestic, or fugitive sources of emissions for which a detailed assessment is required.

7.3 Proposed Actions

It is acknowledged that the current monitoring sites have been maintained for several years, however, the Council is satisfied that the locations for PM_{10} monitoring represent the worst-case scenario as they consider the two busiest interchanges with relevant exposure.

With regards to the programme of NO_2 monitoring, the sites are constantly under review and it is anticipated that some locations may change this year to reflect new developments etc. Our future monitoring strategy will consider the capability of our equipment, increasing domestic scale combustion of solid fuels, and the proposed Low Emissions Zone for Dundee City which could result in traffic displacement affecting Angus.

Angus Council will continue monitoring NO_2 and PM_{10} concentrations.

An APR will be submitted in 2022 setting out 2021 monitoring data and details of any newly identified emissions sources.

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?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
-	Burnside Drive, Arbroath	Kerbside	364169	740861	PM_{10}	N	Gravimetric	4.0	1.0	1.5
AFR1	Glamis Road, Forfar	Roadside	345249	750386	PM_{10}	N	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?
A1	Ethie Terrace, Arbroath	Urban Background	364585	742349	NO_2	N	0.0	1.0	N
A2	Inchcape Road, Arbroath	Urban Background	362987	740642	NO_2	N	0.0	20.0	N
A3	Abbey Path, Arbroath	Roadside	364299	741225	NO_2	N	1.5	<1	N
A4	22 Lordburn, Arbroath	Roadside	364158	741122	NO_2	N	3.0	<1	N
B1	High St, Brechin	Kerbside	359727	760170	NO_2	N	2.0	1.0	N
B2	Sacone 1, Brechin	Industrial	361216	759644	NO_2	N	N/A	8.0	N
CAR	High St, Carnoustie	Kerbside	356243	734526	NO_2	N	3.0	2.0	N
FOR	High St, Forfar	Kerbside	345825	750674	NO_2	N	3.0	<1	N
F1	St James Road, Forfar	Roadside	345628	750307	NO_2	N	<1	2.0	N
KIR	Manse Close, Kirriemuir	Kerbside	338621	754032	NO_2	N	5.0	6.0	N

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?
M1	High St, Monifieth	Kerbside	349759	732549	NO_2	N	0.0	2.0	N
M2	High St, Montrose	Kerbside	371418	757767	NO_2	N	2.0	1.0	N

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 NO_2 Monitoring Results (µg/m^3)

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
A1	Urban Background	Urban Background	83.3	40.4	8.2	8.3	8.1	8.0	7.1
A2	Roadside	Roadside	100	50.0	11.3	10.3	12.2	11.1	8.3
A3	Roadside	Roadside	100	50.0	20.1	19.9	23.4	23.4	15.6
A4	Kerbside	Kerbside	100	50.0	17.5	17.7	16.6	17.9	14.0
B1	Industrial	Industrial	100	50.0	14.2	12.3	12.6	12.6	7.8
B2	Kerbside	Kerbside	83.3	42.3	6.2	5.9	7.3	5.6	4.1
CAR	Kerbside	Kerbside	83.3	40.4	15.1	14.4	15.1	14.8	10.3
FOR	Roadside	Roadside	100	50.0	16.8	14.9	15.2	14.7	10.0
F1	Kerbside	Kerbside	100	50.0	21.2	18.2	19.1	19.0	13.2
KIR	Kerbside	Kerbside	66.7	32.7	13.3	12.0	11.6	10.9	5.5
M1	Kerbside	Kerbside	100	50.0	15.9	13.9	13.2	13.9	10.0
M2	Urban Background	Urban Background	100	50.0	19.3	18.2	19.2	18.1	13.1

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(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%).

7.4 Figure A-1 Trend in Annual Mean NO_2 Concentrations

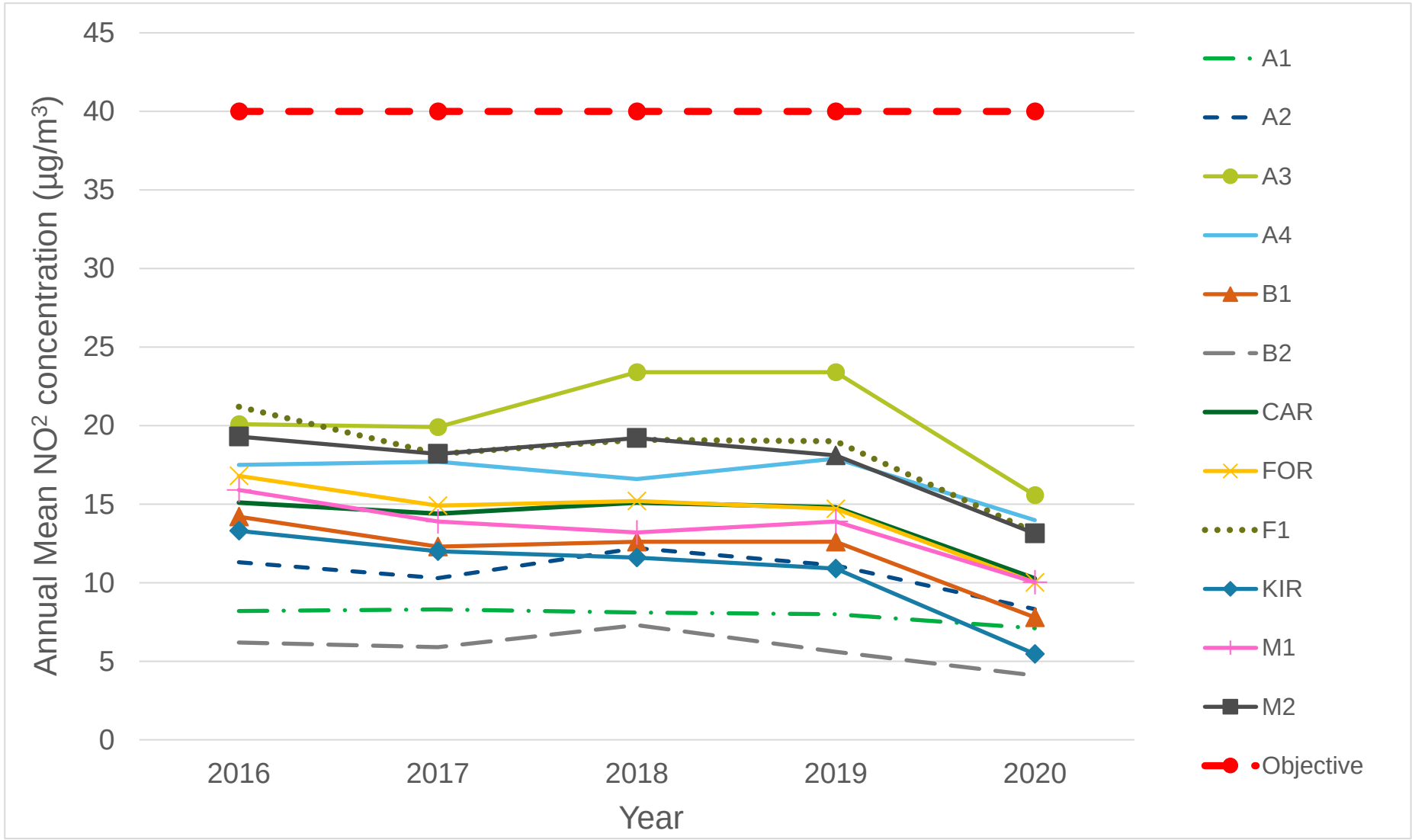


Table A.4 – Annual Mean PM_{10} Monitoring Results ($\mu g/m^3$)

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
Burnside Drive, Arbroath	Kerbside	80.4	39.3	13.0	12.9	12.0	11.8	11.4
Glamis Road, Forfar	Roadside	95.3	77.3	10.5	9.9	12.7	12.7	10.0

Notes: Exceedances of the PM_{10} annual mean objective of 18 $\mu g/m^3$ 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 PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50$\mu g/m^3$

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
Burnside Drive, Arbroath	Kerbside	80.4	39.3	1 (34.9)	0 (23.5)	0 (23.9)	0 (27.6)	0 (27)
Glamis Road, Forfar	Roadside	95.3	77.3	1 (32.0)	0	0 (39.5)	0	0 (23.5)

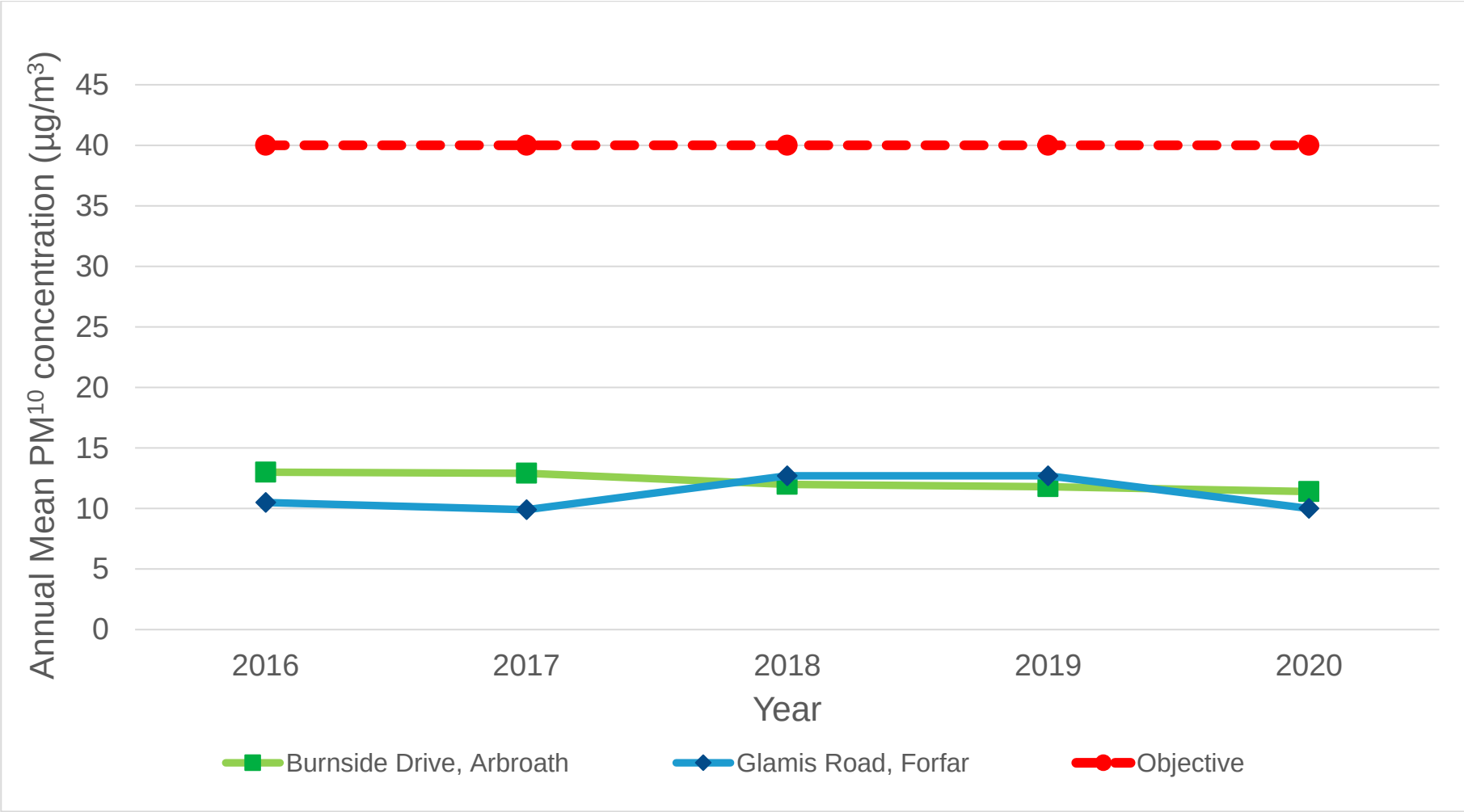
Notes: Exceedances of the PM_{10} 24-hour mean objective (50 $\mu g/m^3$ not to be exceeded more than seven times/year) are shown in **bold**.

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

(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%).

7.5 Figure A-2 Trend in Annual Mean PM_{10} Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2020

Table B.1 – NO_2 2020 Monthly Diffusion Tube Results (µg/m^3)

Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Bias Adjusted and Annualised Annual Mean (µg/m3) (1)
A1	12.2	8.3	-	-	-	-	-	7.0	6.3	-	21.1	-	11.0	7.1
A2	15.4	11.0	-	-	-	-	-	13.7	9.5	11.8	15.0	-	12.7	8.3
A3	32.3	25.4	-	-	-	-	-	17.9	17.8	22.9	26.7	-	23.8	15.6
A4	32.7	23.1	-	-	-	-	-	13.9	15.0	20.4	23.3	-	21.4	14.0
B1	11.5	10.8	-	-	-	-	-	12.2	8.8	14.7	13.6	-	11.9	7.8
B2	-	5.2	-	-	-	-	-	4.8	5.1	6.0	8.4	-	5.9	4.1
CAR	21.9	14.2	-	-	-	-	-		12.7	17.1	20.4	-	17.3	10.3
FOR	20.1	14.8	-	-	-	-	-	10.0	12.5	16.6	17.9	-	15.3	10.0
F1	30.9	24.0	-	-	-	-	-	13.7	13.6	18.8	20.3	-	20.2	13.2
KIR	2.7	< 0.5	-	-	-	-	-	7.7	8.8	< 0.5	14.0	-	8.3	6.2
M1	20.9	15.0	-	-	-	-	-	10.3	11.2	16.7	18.0	-	15.4	10.0
M2	25.7	20.2	-	-	-	-	-	14.9	15.1	20.5	24.2	-	20.1	13.1

Notes:

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

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

Additional Air Quality Works Undertaken by Angus Council During 2020

Angus Council has not completed any additional works within the reporting year of 2020.

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.

Monitoring when performed has been completed in adherence with the 2020 Diffusion Tube Monitoring Calendar. Divergences from the calendar are attributed to the COVID-19 pandemic, where the nominated laboratory was closed, and diffusion tubes were not able to be collected and/or processed as necessary.

Diffusion Tube Annualisation

Annualisation was required at all non-automatic monitoring sites, excluding KIR which has data capture below 33%, in 2020; sites with data capture below 33% do not require annualization.

Diffusion Tube Bias Adjustment Factors

Angus Council have applied a national bias adjustment factor of 0.75 to the 2020 monitoring data. A summary of bias adjustment factors used by Angus Council over the past five years is presented in

Table C.1. The adjustment factor is based on 1 study, and available at: https://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html. This factor has been applied to all 2020 diffusion tube data, excluding 2020 data for KIR, as any sites with a data capture below 33% do not require annualisation.

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2020	National	03/21	0.75
2019	National	03//20	0.80
2018	National	03/19	0.80
2017	National	03/18	0.72
2016	National	03/17	0.82

NO_2 Fall-off with Distance from the Road

No diffusion tube NO_2 monitoring locations within Angus required distance correction during 2020.

QA/QC of Automatic Monitoring

The Partisol is a gravimetric reference equivalent PM_{10} analyser. It contains 16 filters which 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.

Data from the FDMS analyser is collected via automatic telemetry by Ricardo Energy & Environment. The analyser is serviced and audited every six months. All data are ratified on a 3-monthly basis using procedures comparable to those used for national network monitoring data. Data are available on the Scottish air quality website (www.scottishairquality.co.uk).

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

The type of PM_{10} monitor(s) utilised within Angus do not require the application of a correction factor.

Automatic Monitoring Annualisation

One automatic monitoring location (Burnside Drive, Arbroath) within Angus recorded data capture of less than 75% and greater than 33%, therefore annualization of monitoring data was required for this location.

NO_2 Fall-off with Distance from the Road

No automatic NO_2 monitoring locations within Angus Council required distance correction during 2020.

Table C.2 – Annualisation Summary (concentrations presented in µg/m^3)

Site ID	Annualisation Factor Aberdeen Errol Place	Annualisation Factor Glasgow Townhead	Annualisation Factor Falkirk Grangemouth	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
Burnside Drive, Arbroath	1.1390	0.9857	0.8891	1.0046	10.2	10.3	
A1	0.8257	0.8558	0.9059	0.8625	11.0	9.5	
A2	0.8312	0.8579	0.9244	0.8712	12.7	11.1	
A3	0.8312	0.8579	0.9244	0.8712	23.8	20.8	
A4	0.8312	0.8579	0.9244	0.8712	21.4	18.6	
B1	0.8312	0.8579	0.9244	0.8712	11.9	10.4	
B2	0.9006	0.9005	0.9758	0.9256	5.9	5.5	
CAR	0.7584	0.7868	0.8355	0.7935	17.3	13.7	
FOR	0.8312	0.8579	0.9244	0.8712	15.3	13.3	
F1	0.8312	0.8579	0.9244	0.8712	20.2	17.6	
KIR	0.8314	0.8719	0.9316	0.8783	8.3	7.3	Data capture below 33%
M1	0.8312	0.8579	0.9244	0.8712	15.4	13.4	
M2	0.8312	0.8579	0.9244	0.8712	20.1	17.5	

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

References

Angus Council, 2016. An Active Travel Strategy for Angus. Available at:

https://www.angus.gov.uk/sites/angus-cms/files/2017-07/401_AppA.pdf

Angus Council Local Development Plan, 2016. Available at:
http://www.angus.gov.uk/sites/angus-cms/files/Angus%20local%20development%20plan%20adopted%20September%202016.pdf

TAYPlan, Strategic Development Plan (2019 Update), available at:
https://www.tayplan-sdpa.gov.uk/publications

The Mercury Programme, available at:
https://www.investinangus.com/the-mercury-programme/