Anderson Drive

Air Quality Management Area

Revocation Report

July 2024

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1 Background

1.1 Introduction

Aberdeen City Council declared the Andeson Drive/Haudagain roundabout/Auchmill Road corridor an Air Quality Management Area (AQMA) in 2008 due to measured exceedances of the annual mean nitrogen dioxide (NO_2) air quality objective and predicted exceedances of the particulate (PM_{10}) annual mean and 24-hour objectives. The AQMA was subsequently amended on several occasions during the period 2011-2018. An Air Quality Action Plan was published in 2011 describing measures that the Council would undertake to improve air quality in the City's 3 AQMA – the City Centre, Wellington Road and Anderson Drive Corridor.

Air quality along the Anderson Drive corridor progressively improved from around 2012 with the greatest reduction in NO_2 and PM_{10} concentrations observed between 2019 and 2023 due to the opening of the Aberdeen Western Peripheral Route (AWPR) and new road infrastructure measures around Haudagain roundabout. There has been no exceedance of the objectives since 2018. Aberdeen City Council is satisfied that the objectives will continue to be met at all locations in the future and consequently proposes to revoke the AQMA.

1.2 Legislation

Under section 83 of the Environmental Act 1995 (the 1995 Act) local authorities are required to regularly review and assess the current and future air quality within their geographical areas against the air quality objectives set out in the Air Quality (Scotland) Regulations 2000, as amended in 2002 and 2016. Where the levels are exceeded, or modelling suggests levels are likely to be exceeded at any location the authority must declare the affected area an Air Quality Management Area (AQMA). Local authorities must then develop and publish an Air Quality Action Plan (AQAP) detailing the actions the authority proposes to improve air quality in the designated area.

The Scottish Government Air Quality Policy Guidance PG(S) 24 provides guidance to local authorities on the steps that should be considered to manage air quality and report on in their areas. The Guidance describes the review and assessment process, the declaration and revocation of an AQMA and development of an AQAP.

Where air quality has improved, and the authority is satisfied that the objectives are being met within an AQMA and unlikely to be exceedance in any future occasion the authority is required to revoke the AQMA.

1.3 Summary of Proposal

The proposal is to revoke the whole of the Anderson Drive AQMA for both NO_2 and PM_{10} due to compliance with the air quality objectives at all monitoring locations in the last 5 years and predicted compliance in future years.

2 Description of AQMA

The Anderson Drive AQMA was declared in 2008 due to pockets of measured and predicted exceedance of the annual mean objectives for NO_2 and PM_{10} and the PM_{10} 24-hour objective at major junctions and congested areas with receptors close to the carriageway. The AQMA covered the following areas:

(1) All of Anderson Drive, from the Bridge of Dee to the Haudagain Roundabout;
(2) Part of Great Northern Road, from 815 Great Northern Road to 829 Great Northern Road

The AQMA was subsequently extended in 2011 to include the section from the Haudagain roundabout to the junction between Auchmill Road and Howes Drive due to exceedances of the objectives at locations on Auchmill Road.

In 2018 the AQMA was again amended to omit the inclusion of the PM_{10} 24-hour objective as there had been no exceedance of the objective and no future exceedance were predicted.

The current AQMA, which the authority aims to revoke, relates to measured exceedances of the annual mean NO_2 and predicted exceedances of the PM_{10} objectives. The AQMA covers the following locations:

(1) All of Anderson Drive from Bridge of Dee, including Haudagain Roundabout;
(2) Part of Great Northern Road, from 815 Great Northern Road to Auchmill Road;
(3) Part of Auchmill Road, from Great Northern Road to the junction with Howes Road.

Appendix 1 shows a map of the of the current AQMA.

3. Description of local sources

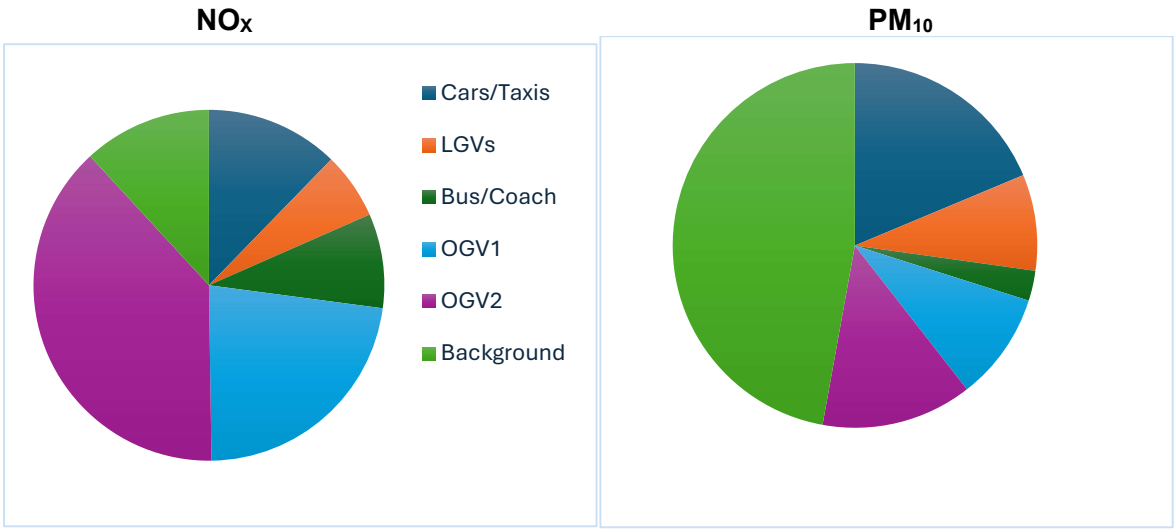
3.1 Local Sources

Road traffic is the most significant local source of the raised NO_2 and PM_{10} concentrations. There is no industry or other point or local diffuse sources of emissions in the area. Table 1 shows the source apportionment information at the Haudagain roundabout predicted by modelling undertaken in 2011. The same information is provided in graphical form in Figure 1.

Table 1 - Predicted Source Apportionment 2011

Source Contribution	NO_x	PM_{10}	Traffic Source Breakdown			
			Vehicle Type	NO_x	PM_{10}	$PM_{2.5}$
Background	8%	52%	Cars/Taxis	23%	50%	48%
Traffic	92%	48%	LGVs	6%	12%	13%
			Bus/Coach	23%	11%	12%
			OGV1	21%	13%	15%
			OGV2	27%	14%	32%

Figure 1- Predicted NO_X and PM_{10} emissions by source 2011



OGV1s: Other goods vehicles: 2 or 3 axle rigid commercial vehicles
OGV2s: Other goods vehicles 4 axles or greater (rigid or articulated) and 3 axle articulated commercial vehicles

3.2 Action Planning Measures Implemented

The Air Quality Acton Plan 2011 described a range of measures to improve air quality in the designated area. Action planning measures that have been implemented include:

- Opening of the Aberdeen Western Peripheral Route (AWPR) in 2019, contributing to reduced traffic flows and congestion throughout the city.
- A92/A96 Haudagain Roundabout Improvements, reducing queuing traffic and emissions at this congestion hotspot.
- Completion of the Roads Hierarchy review including a programme of city centre road reclassifications to reflect its status as a destination rather than a through-route for traffic;
- Ongoing improvements to strategic and local walking and cycling routes and the Core Path network.
- Launch of I Bike Schools and Communities projects to encourage more cycling, particularly amongst traditionally hard to reach groups.
- Launch of the Scottish Government's Bus Partnership Fund, with a number of corridor improvement strategies underway to identify opportunities for bus priority improvements.
- Commencement of Aberdeen Rapid Transit (ART) appraisal to assess options for a high-capacity rapid public transport system in Aberdeen.
- Continued expansion and promotion of the Grasshopper integrated and multi-operator bus ticket.
- Aberdeen to Inverness Rail Improvements, including dualling of the track between Aberdeen and Inverurie and the re-opening of Kintore Station.
- Ongoing improvement and expansion of the Aberdeen Car Club.
- Ongoing expansion of the public Electric Vehicle (EV) charging network.
- Ongoing expansion of the local hydrogen fleet and hydrogen refuelling capabilities.
- Launch of the Eco Stars fleet recognition scheme to support and encourage bus, freight and van fleet operators to reduce emissions and running costs; and
- Ongoing programme of events and promotions.

The following major road and rail infrastructure measures have had the greatest contribution to improved air quality across the Anderson Drive corridor:

1. The opening of the Aberdeen Western Peripheral Route (AWPR) in 2019 provided a direct route for traffic, particularly HGVs, to pass round the City. The traffic reduction resulted in less direct emissions from vehicle exhausts while also significantly reducing congestion in the area which also contributed to improved air quality. Traffic counts undertaken by SEPA and Transport Scotland as part of the Low Emission Zone (LEZ) appraisal showed a 13% reduction in traffic flow between 2017 and 2023 adjacent to the Anderson Drive continuous air quality monitoring station. HGVs reduced by over 50% and LGVs by over 20%.
2. Haudagain roundabout was historically a major bottleneck causing significant traffic congestion and raised pollution levels on the local road network. Road infrastructure improvements to provide a slip road connecting North Anderson Drive to Auchmill Road were completed in 2022. Traffic can now avoid the roundabout thereby reducing the traffic flow in the vicinity of the roundabout and reduced congestion.
3. The opening of Kintore railway station, which lies to the west of the AQMA, providing an opportunity for commuters and residents to park and ride by train to the city centre.

4. Local Monitoring Equipment

4.1 Automatic

There is one automatic monitoring station within the AQMA located on the grass verge adjacent to the north carriageway of South Anderson Drive between the junction of Broomhill Road and Ruthrieston Road. Monitoring commenced in 2004. Details of the monitoring site and equipment are shown in Table 2. Appendix 2 shows the monitoring location.

Table 2 - Details of Anderson Drive Automatic Monitoring Site

Site ID	Site Location	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	Monitoring Technique	Distance to Relevant Exposure (m)	Distance to kerb of nearest road (m)
CM3	Anderson Drive	Road side	X392 506	Y804 186	PM_{10}, $PM_{2.5}$, NO2 (NO, NO_x)	Fidas 200* Chemi-luminescence	10	6

***** The Fidas PM_{10} monitor was installed in 2021 replacing a TEOM.

4.2 Non-Automatic Monitoring

Non-automatic monitoring consists of diffusion tubes located wiithin or just outwith the AQMA. Table 3 details the sites, distances to receptors and monitoring periods. All diffusion tubes are changed every 4 weeks. Appendix 2 shows the location of the diffusion tubes.

Table 3 - Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	Distance to Relevant Exposure (m) (1)	Distance to Kerb of Nearest Road (m) (2)	Monitoring Period
DT2	885 Gt Northern Rd	Roadside	391149	809164	NO2	11	3	Pre 2010-2020*2
DT8	107 Anderson Dr	Roadside	392337	804340	NO2	14	3	Pre 2010-ongoing
DT15	Northfield swimming pool	Urban background	390801	808132	NO2	N/A	N/A	Pre 2010-2021*1
DT24	40 Auchmill Rd	Roadside	389930	809603	NO2	0	3	Pre 2010-2022
DT39	819 Gt Northern Rd	Roadside	391293	809136	NO2	0	3	Pre 2010-
DT40	852 Fullerton Ct (facade)	Facade	391353	809158	NO2	0	7	Pre 2010-ongoing
DT41	852 Fullerton Ct (roadside)	Roadside	391352	809151	NO2	7	0.1	Pre 2010-ongoing
DT45	111 S Anderson Dr	Facade	392311	804349	NO2	0	13	Pre 2010-ongoing
DT67	37 Inverurie Rd	Roadside	389756	809583	NO2	6	3	2016-ongoing
DT86	21 Manor Av	Roadside	391330	808904	NO2	10	0.1	2019-2020 *2
DT98	5 Anderson Drive	Roadside	391973	804775	NO2	3	2	2022-ongoing *2
DT100	537 North Anderson Drive	Roadside	391441	808897	NO2	2	4	2022-ongoing *2
DT101	13 Manor Avenue	Roadside	391361	808923	NO2	10	5	2022-ongoing *2
DT103	Northfield Swimming Pool	Urban Background	390796	808123	NO2	N/A	N/A	2022-ongoing*1

*1 Relocated due to refurbishment and extension of the swimming pool complex

*2 Provided to monitor potential new exposure around the new slip road or due the removal of the tube site during the Haudagain roundabout infrastructure improvements

5 Local Monitoring data

5.1 Results and Interpretation from Automatic Monitoring Sites

Table 4 shows the annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations and number of exceedances of the short term NO_2 and PM_{10} objectives at the Anderson Drive automatic monitoring station over the period 2018-2023.

Table 4 - Annual mean and short term mean for NO_2 and PM_{10} concentrations at Anderson Drive Automatic Monitoring Station

	2018	2019	2020	2021	2022*[1]	2023*[1]
Annual mean NO_2 (ugm^{-3})	19	17	12	13	11.6	11.3
Annual mean PM_{10} (ugm^{-3})	14	13	9	9	10.1 (11.1)	9.4 (10.4)
Annual mean $PM_{2.5}$ (ugm^{-3})				5	5.6(6)	5.1 (5.4)
***[2] No of NO_2 1-hour mean >200ugm^{-3}**	0	0	0	0	0	0
***[3] No of PM_{10} 24-hour mean >50ugm^{-3}**	0	3	0	0	1	0

*[1] Corrected results as recommended by Ricardo for the Scottish Government report in brackets.
*[2] Exceedances of the NO_2 1-hour mean (200ugm^{-3}) not to be exceeded more than 18 times/year.
*[3] Exceedances of the PM_{10} 1-hour mean (50ugm^{-3}) not to be exceeded more than 7 times/year.

No exceedance of any of the air quality objectives have been recorded at the Anderson Drive continuous air quality monitoring station during the 20 years of monitoring. Annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$ have progressively reduced over the last 6 years and are substantially below the air quality objectives. The 1-hour NO_2 concentration of 200ugm^{-3} (not to be exceeded more than 18 times per year) has not been exceeded on any occasion and the 24-hour PM_{10} concentration of 50ugm^{-3} (not to be exceeded more than 7 times a year) has only been exceeded on 2 occasions in the last 6 years (2019 and 2022)

5.2 Results and Interpretation from Non-Automatic Monitoring Sites

Annual Mean NO_2 concentrations from the diffusion tube monitoring are shown in Table 5.

Table 5 - Annual Mean Diffusion Tube Concentrations Anderson Drive AQMA

Site ID	2018 (ugm^{-3})	2019 (ugm^{-3})	2020 (ugm^{-3})	2021 (ugm^{-3})	2022 (ugm^{-3})	2023 (ugm^{-3})
DT2*[1]	27	29	30	N/A	N/A	N/A
DT8	**48**	39	31	32	29	23.8
DT15*[1]	11	9	7	8	9	N/A
DT24*[1]	24	21	14	15	15	N/A
DT39	43	37	27	25	24	20.6
DT40	30	26	19	19	18	15.2
DT41	**40**	36	27	24	24	23.9
DT45	24	21	16	17	15	15.4
DT67	38	32	21	21	21	20.2
DT86*[1]	n/a	17	13	N/A	N/A	N/A
DT98	N/A	N/A	N/A	N/A	34	31.3
DT100	N/A	N/A	N/A	N/A	17	14.9
DT101	N/A	N/A	N/A	N/A	18	15.0
DT103	N/A	N/A	N/A	N/A	10	7.5

Exceedances of the annual mean objective for NO_2 of $40ugm^{-3}$ are shown in **bold**.
*[1]Monitoring ceased due to the consistently low concentrations well below the annual mean objective for NO_2.

No exceedance of the annual mean NO_2 objective at any of the diffusion tubes sites has been recorded since 2018. Concentrations of NO_2 have steadily reduced and were lower than $30ugm^{-3}$ in both 2022 and 2023 at all monitoring sites except for DT98 (5 Anderson Drive) where the concentration was $34ugm^{-3}$ in 2022 and $31.3ugm^{-3}$ in 2023.

5.3 Trends in monitoring data

Trends in annual mean NO_2 concentrations at the Anderson Drive continuation monitoring station and the diffusion tube locations are shown in are shown in Figure.2. Trends in the annual mean PM_{10} and $PM_{2.5}$ concentrations are shown in Figure 3.

Figure 2 - 2 Anderson Drive monitoring station (CM) and diffusion tube (DT) annual mean NO_2 concentrations 2018 - 2023

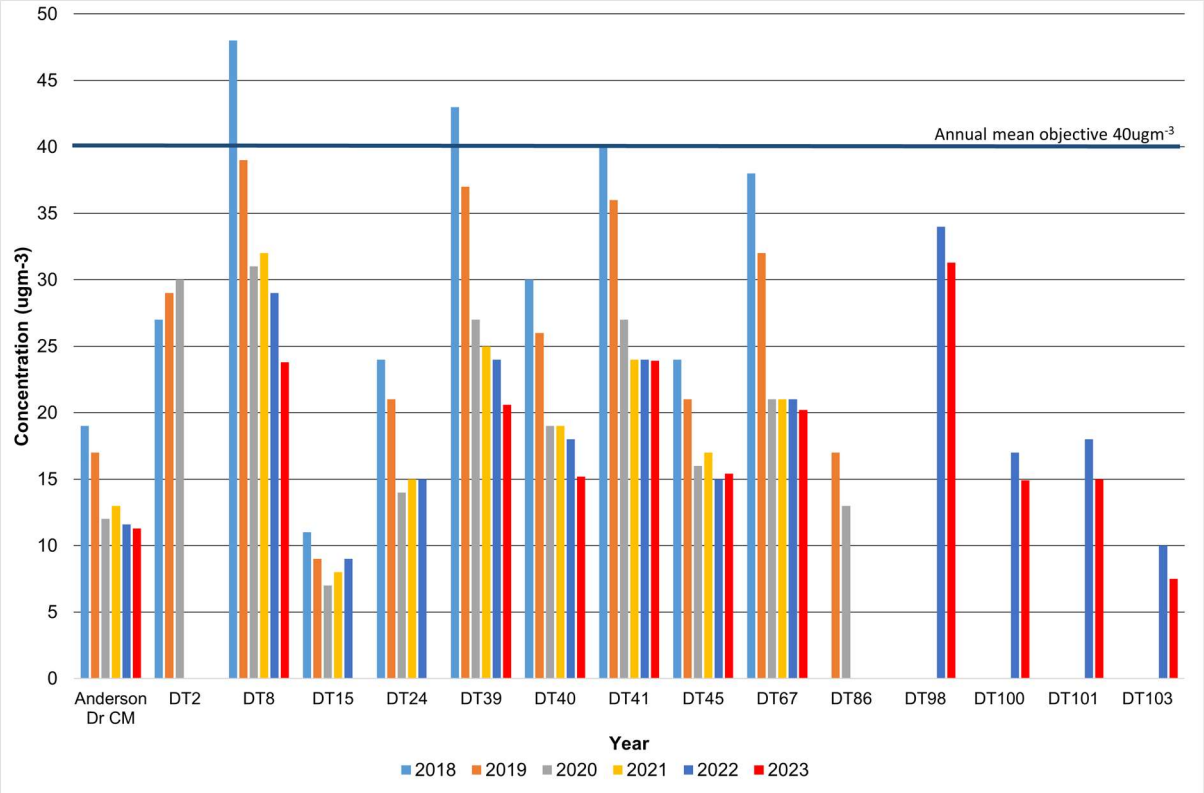
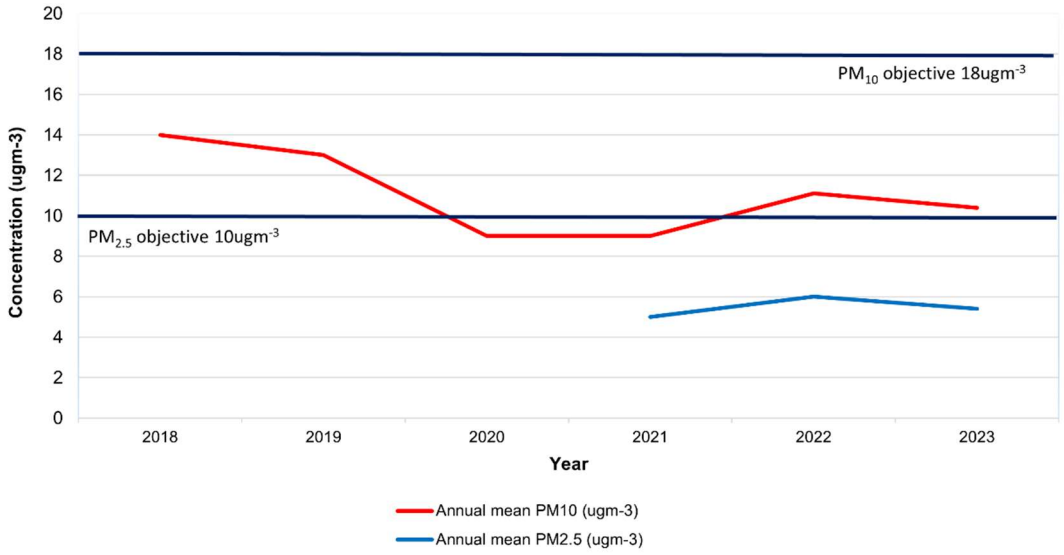


Figure 3 - Anderson Drive monitoring station Annual mean PM_{10} and $PM_{2.5}$ concentrations 2018 - 2023



Data from the last 6 years shows a progressive decreased in annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations at all monitoring locations. This improvement air in quality was particularly apparent in 2020 due to the opening of the AWPR in early 2019 and the commencement of the covid pandemic which resulted in a significantly lower traffic volume. Although concentrations rose very slightly in 2021 when society returned to normality, concentrations levels remained well below the 2020 values and the trend of improved air quality continued in 2022 and 2023.

The reduction in traffic volume and improved traffic flow due to the AWPR and Haudagain roundabout improvements are the main reasons for the significantly improved air quality. Other contributing factors include the gradual replacement of older, higher polluting vehicles with a cleaner fleet, increased home working resulting in a reduce traffic flow, the opening of Kintore railway station and improved cycling routes in the area.

5.4 City Centre LEZ and City Centre Vehicle Access Restrictions

A City Centre Low Emission Zone (LEZ) was introduced in June 2024 preventing the most polluting vehicles from entering the restricted areas. The following significant vehicle access restrictions in the City Centre were introduced in 2022 and 2023 which also had the potential to generate additional traffic in the wider area around the city centre, including Anderson Drive.

- Bus gates in June 2022 introduced on the central section of Union Street/Market Street (between the junction with Hadden Street and the Adelphi), and
- Vehicle access restrictions introduced in August 2023 on Market Street (north of Guild Street), Guild Street (east of Wapping Street) and Bridge Street

The purpose of these restrictions is to minimise the amount of traffic in parts of the city centre and prevent general traffic from using the streets as a through route thereby supporting a more reliable and efficient bus service.

Modelling and traffic count surveys were carried out by the Scottish Environmental Protection Agency (SEPA) and Transport Scotland in 2023 as part of the LEZ appraisal work and used to undertake a road traffic source apportionment exercise. Key locations within and outwith the LEZ, including the South Anderson Drive continuous monitoring station, were selected to illustrate the predicted NOx concentrations and change in percentage source contribution comparing the 2019 base year to 2024 with the LEZ operational. The modelling included predicted changes in traffic flows and air quality due to the city centre bus gates and vehicle access restrictions.

The modelling predicted small and localised increases in NO_2 concentrations along Anderson Drive of 1-4 ugm^{-3}. This increase is in part due to a displacement of non-compliant traffic unable to enter the LEZ. The increase in traffic and NO_2 concentration was not predicted to result in a risk of exceedance of the air quality objectives within the Anderson Drive AQMA.

6 Future Actions to be Retained for the AQMA

6.1 Measures to be Continued to Ensure Future Air Quality Compliance

The monitoring of NO_2, PM_{10} and $PM_{2.5}$ at the Anderson Drive continuous monitoring station and NO_2 diffusion tube location will be retained to ensure continued compliance with the objectives within the AQMA. The modelling will also indicate if the trend of increasingly improved air quality is maintained.

A Draft Area Quality Action Plan (AQAP) was developed in 2023 to replace the 2011 Action Plan. The draft Plan was issued for stakeholder consultation in November 2023 as an appendix within the Council's draft revised Transport Strategy (2023-2030). The proposed new AQAP describes the actions the Council will implement to continue to improve air quality within the City's 3 AQMA. It is anticipated the refreshed Transport Strategy and new AQAP will be submitted for council approval and adoption in late 2024/early 2025.The key priorities within the draft 2023 AQAP that will contribute to further air quality improvements in the Anderson Drive AQMA are:

- Ongoing development and delivery of transport corridor improvement strategies: and
- Ongoing strategic and city-wide infrastructure and behaviour-change measures to promote and encourage more walking and cycling, more public transport use and further adoption of alternative fuel vehicles, in preference to continued use of fossil fuel (particularly diesel) vehicles.

Compliance with the national air quality objectives was achieved at all monitoring locations within the 3 AQMA for the first time in 2023. It is anticipated that, through the implementation of the city centre LEZ and the action within the 2023 draft AQAP, compliance with the objectives will be achieved at all locations in future years. Should this be case the Council will look towards the replacement of the AQAP with an Air Quality Strategy that will support the implementation of measures to improve air quality across the city.

7 Conclusions and Recommendations

The annual mean air quality objectives for NO_2, PM_{10} and $PM_{2.5}$ and the 1-hour NO_2 and 24-hour PM_{10} objectives have never been exceeded at the Anderson Drive continuous monitoring station. Diffusion tubes at roadside locations along the route have not exceeded the annual mean NO_2 objective since 2018 and all sites recorded concentrations well below the objective in the period 2020-2023. The opening of the AWPR in 2019 and road infrastructure improvements around the Haudagain roundabout completed in 2022 were the most significant factors in the significantly improved air quality across the AQMA. These measures contributed to a substantial reduction in traffic flow along the route and reduced congestion, most significantly around the Haudagain roundabout. Modelling undertaken by SEPA as part of the city centre LEZ appraisal work did not predict any likelihood of exceedance of the objectives with the LEZ and other recently adopted city centre vehicle access restrictions operational. Revocation of the Anderson Drive AQMA is therefore proposed.

The Council will continue to implement measures within the 2023 draft air quality action plan and draft refreshed Transport Strategy to further improve air quality both in the 3 AQMAs and the wider area. Progress on actions to improve air quality will be reported in future Annual Progress Reports as required by LAQM PG24. Monitoring of NO_2, PM_{10} and $PM_{2.5}$ will continue across the AQMA to ensure continued compliance with the objectives and that air quality continues to improve. The replacement of the Air Quality Action Plan with an Air Quality Strategy to support improvement in air quality across the City will also be considered.

8. Glossary of Terms

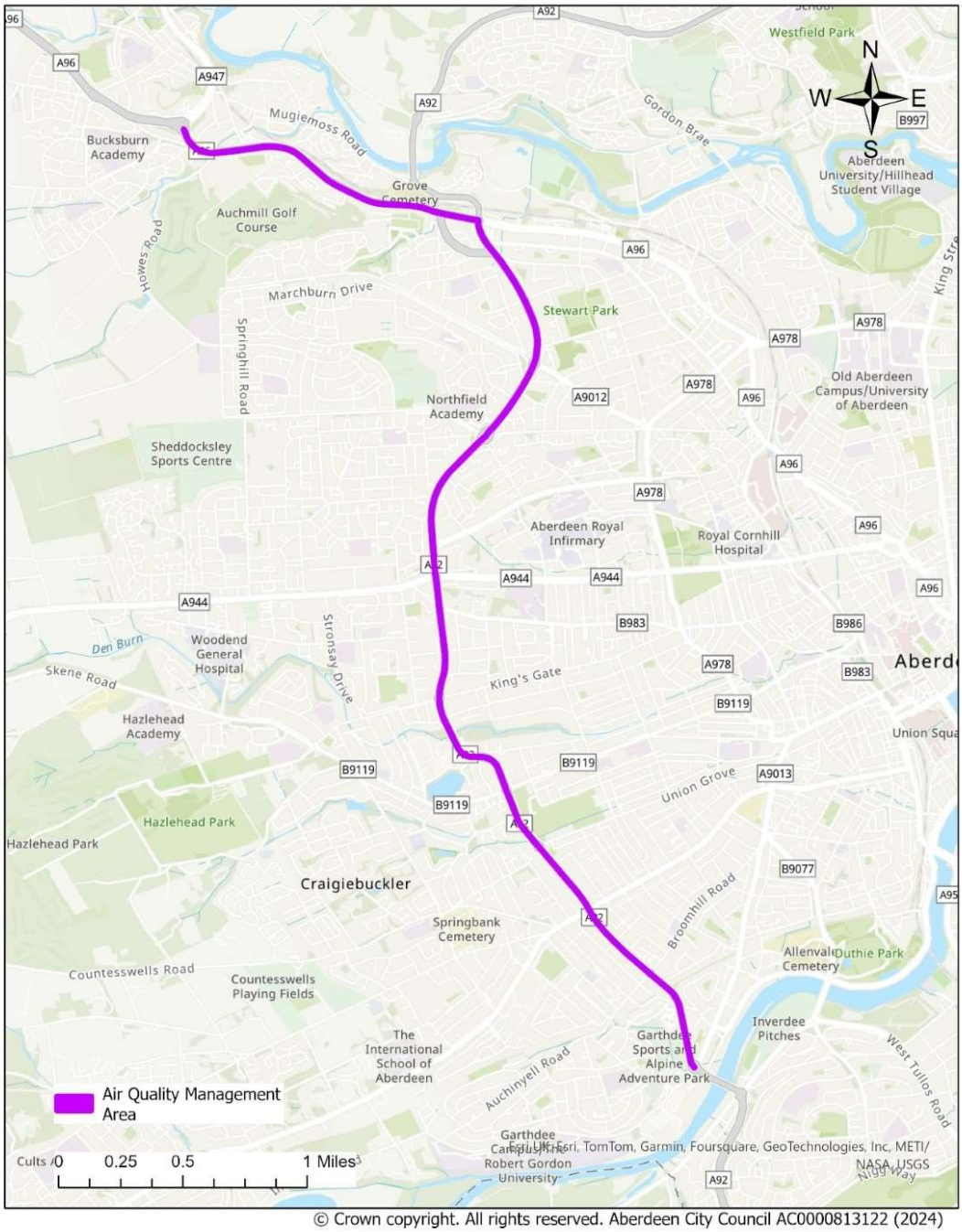
Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the LA intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
AWPR	Aberdeen Western Peripheral Route
CCMP	City Centre Masterplan
LAQM	Local Air Quality Management
LEZ	Low Emission Zone
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
SEPA	Scottish Environmental Protection Agency

9. References

1. Environment Act 1995
2. The Air Quality (Scotland) Regulations 2000
3. The Air Quality (Scotland) Amendment Regulations 2001 and 2016
4. Local Air Quality Management Technical Guidance LAQM (TG22), DEFRA, August 2022
5. Local Air Quality Management Policy Guidance, (PG(S) (24), the Scottish Government, May 2024
6. Aberdeen City Council Action Plan, March 2011
7. Aberdeen City Council draft Air Quality Action Plan, August 2023
8. Draft Aberdeen Local Transport Strategy Strategy (2023-2030)
9. Aberdeen City Council Progress Report, June 2023
10. Low Emission Zone Evidence Report, October 2021 and Addendum Report, January 2022

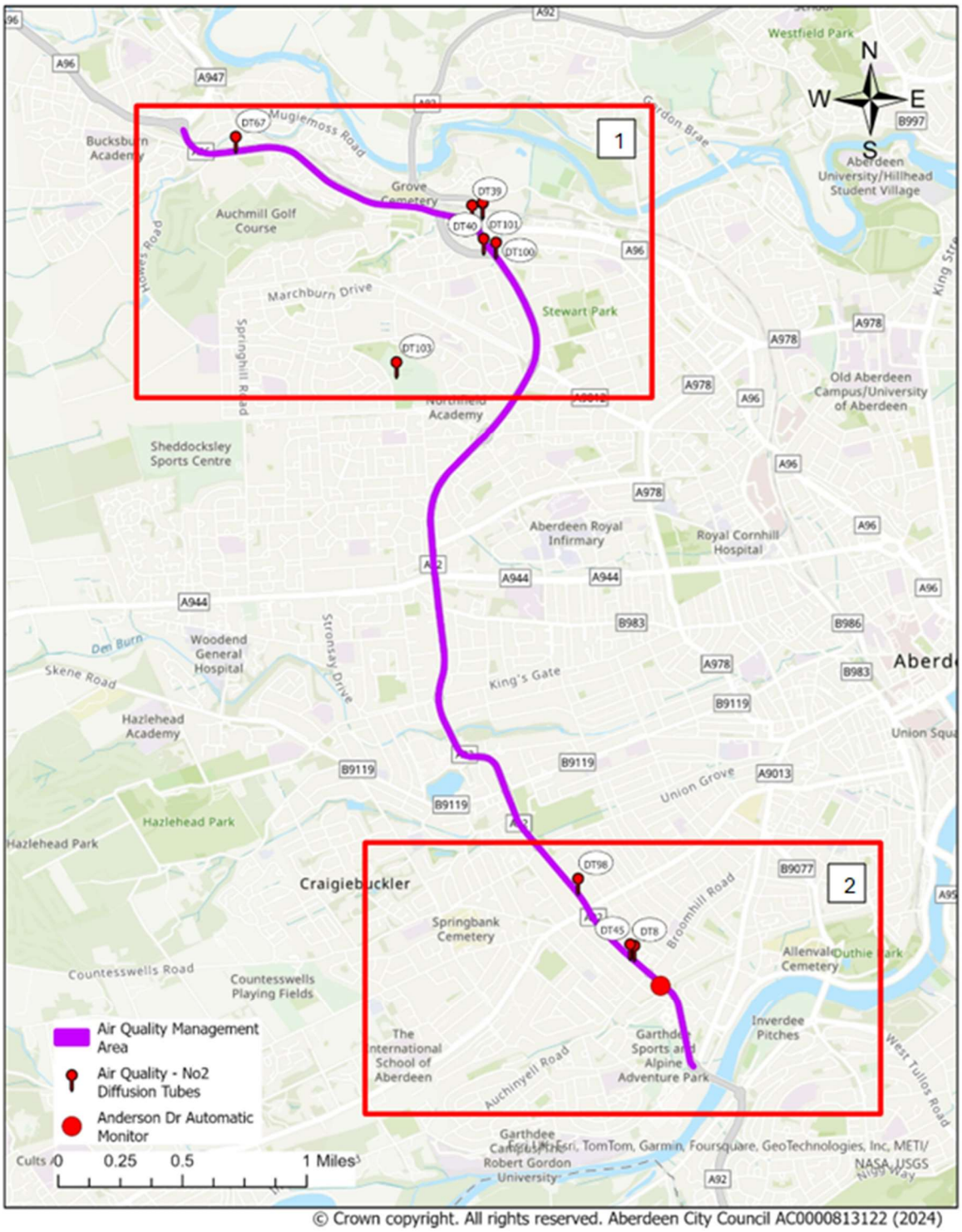
Appendix 1 - Map of Anderson Drive AQMA

Anderson Drive Air Quality Management Area



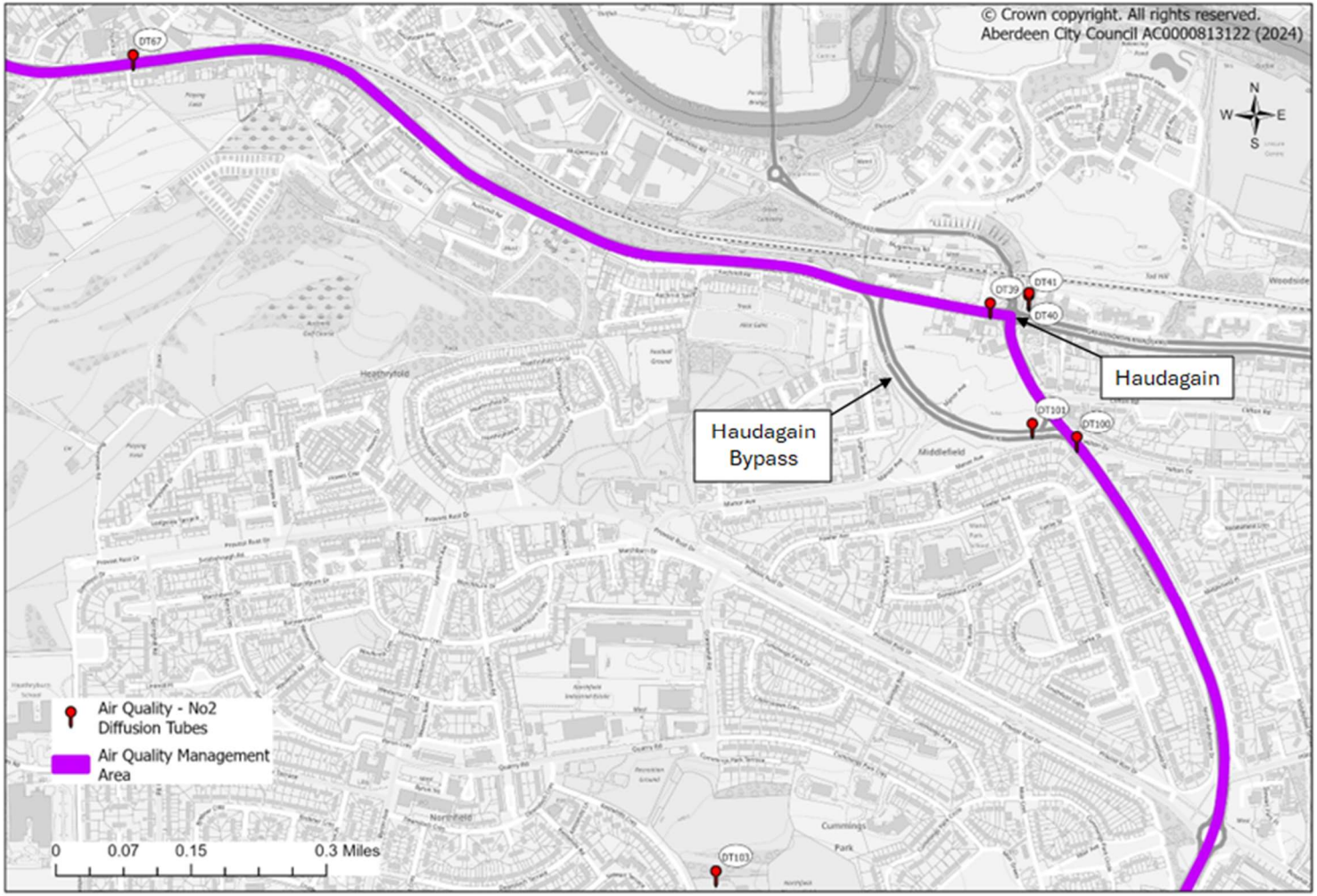
Appendix 2 - Anderson Drive Continuous Monitoring and Diffusion Tube Monitoring Locations

Anderson Drive AQMA Monitoring Locations



Appendix 2 – Plate 1

Plate 1 - Anderson Drive AQMA Monitoring Locations



Appedix 2 – Plate 2

Plate 2 - Anderson Drive AQMA Monitoring Locations