Annual Progress Report (APR)

2024 Air Quality Annual Progress Report (APR) for Dundee City Council

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

Local Air Quality Management

August 2024

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Executive Summary: Air Quality in Our Area

Air Quality in Dundee City Council

In 2006 Dundee City Council (DCC) declared the whole of DCC local authority area as an 'Air Quality Management Area' (AQMA) for the nitrogen dioxide (NO_2) annual mean Air Quality Objective (AQO). A single AQMA rather than several connecting AQMAs was declared to enable wider consideration of air quality improvements in Dundee. In 2010, DCC amended the initial AQMA to include the annual mean AQO for particulate matter (PM_{10}) and in 2013 DCC further amended the AQMA to include the 1-hour mean AQO for NO_2. In line with other cities, the predominant source contributing to these exceedances is road traffic.

DCC published its 'Air Quality Action Plan' (AQAP) in January 2011, introducing a set of 32 measures to work towards achievement of the AQOs in the AQMA. The implementation of these measures has helped to reduce pollutant levels across the local authority, with the number of exceedance locations greatly reducing over the 13 years that the AQAP has been in place.

Dundee City Council currently monitors for NO_2, PM_{10} and $PM_{2.5}$, the latest results and trends are discussed in Chapter 3. Additional analysis is also available on the Air Quality in Scotland website within the 2023 annual summary report prepared by Ricardo Energy & Environment - https://www.scottishairquality.scot/assets/reports/365/Dundee_City_annual_2023.html.

The 2023 monitoring results indicate compliance with the air quality objectives for the pollutants monitored across Dundee.

No potential exceedance of the NO_2 annual mean objective was identified at any of the 88 passive diffusion tube (PDT) monitoring locations across the city for the 2023 calendar year.

Our 2021 Annual Progress Report (APR) referred to lockdown measures imposed in response to the COVID19 pandemic during 2020 leading to a significant reduction in road traffic within Scotland's cities, including Dundee, which contributed to large decreases in measured NO_2 concentrations. With the gradual increase of traffic levels, NO_2 concentration levels raised slightly in 2021, however, in 2022 NO_2 annual mean levels returned to lower than 2020 levels. In 2023 measured levels for all NO_2 monitoring locations were in compliance with the annual mean NO_2 AQO. There were slight variations on 2022 levels observed across the NO_2 monitoring locations, however there were no NO_2 annual mean concentrations above 36.0 ug/m^3 in 2023. This was the first year since monitoring began that there were no NO_2 monitoring locations that exceeded this figure and therefore indicating that there were no potential exceedances of the NO_2 annual mean at relevant receptors in Dundee City Council. Improvements to bus fleets, the removal of non-

compliant vehicles in readiness for the forthcoming Low Emission Zone (LEZ) and lower traffic levels post-pandemic are considered main contributors to the reduction in NO_2 annual mean levels in recent years.

In 2013 the Dundee AQMA was amended to include the 1-hour mean NO_2 air quality objective owing to this objective being exceeded at the Lochee Road monitoring station in the preceding years. As of the end of 2023, there have been no exceedances of this 1-hour mean objective (no more than 18 exceedances of 200ug/m^3 hourly concentration permitted per year) at the Lochee Road site, or any other monitoring site, for the past 10 years. Our 2023 APR included that one further year of compliance with this AQO post COVID-19 pandemic should be observed before concluding that this aspect of the Dundee AQMA can be considered for revocation. The revocation of this 1-hour mean NO_2 AQO was also encouraged by the statutory agencies that appraised the 2023 APR. As monitoring showed compliance with the 1-hour mean objective for the 2023 calendar year, it is appropriate to progress with the revocation of this part of the Dundee AQMA.

Reductions in the annual mean levels for PM_{10} and $PM_{2.5}$ on 2022 levels were observed across the monitoring locations in 2023. Local PM levels can be influenced by transboundary events, with the 2023 APR referring to such events being observed during 2022. No specific events were reported on in 2023, and compliance with the air quality objectives for annual mean and daily-mean PM_{10} and annual mean $PM_{2.5}$ being observed across the monitoring locations in 2023.

During 2023 Dundee City Council continued its ongoing work with Transport Scotland, Scottish Environment Protection Agency (SEPA) and the regional transport partnership (Tayside and Central Scotland Transport Partnership - TACTRAN) in preparation for the commencement of enforcement of the Dundee LEZ scheme on 30 May 2024.

During 2023 SEPA also consulted with the local authority on any new industrial process applications within the local authority boundary and have also provided an update on existing processes in the city that they are the Regulators for.

The Council's existing 2011 AQAP includes wide ranging measures that aim to assist with achieving further improvements in air quality across the city. The action measures are not focussed on specific locations but in combination contribute to improvements in air quality across the city. In line with Local Air Quality Management (LAQM) Policy Guidance (Scotland) 2023, a review and update of the 2011 AQAP has commenced with publication of the 2024 AQAP update due to be completed and submitted to the Scottish Government later in 2024.

Actions to Improve Air Quality

Dundee City Council has taken forward a number of measures linked to our AQAP during the current reporting year of 2023 in pursuit of improving local air quality.

Updates on AQAP related actions progressed during 2023 include:

- Installation of on street enforcement infrastructure, road markings and signage for the Dundee Low Emission Zone scheme progressed during 2023 in preparation for the commencement of enforcement in May 2024. Awareness raising of the May 30th commencement of LEZ enforcement included the running of television advertisements during March and April 2023.
- 40 Cyclehoop Bikehangars were installed at various locations across the city in 2023. The rental of these spaces is managed by Cyclehoop and DCC have worked with them, community groups and active travel organisations across the city to promote these.
- Membership of the ECO Stars commercial fleet scheme increased by 17 to give a total of 276 members in 2023. This increased the number of vehicles included by 606, bringing the total number of vehicles included to 10,086. The number of members of the Taxi / Private Hire scheme increased by 4 to give a total of 20 members in 2023, with 576 vehicles now included.
- A new electric vehicle (EV) charging hub at Clepington Road opened in 2023. In 2023 DCC also deployed a series of on street chargers across the city that are fully PAS 1899:2022 compliant charge points.
- The Drive Dundee Electric campaign continued to successfully engage with current and potential electric vehicle (EV) owners (both public and business) through the local media in the form of EV related articles encouraging people to make the switch to EV.
- The Dundee City Council Fleet section continued to replace older vehicles with newer, less polluting models. There were 250 fully electric vehicles within the DCC fleet by the end of 2023 which is an increase of 43 from the year before.
- At the end of 2023 there were 202 pure electric taxis in Dundee, representing 31% of taxis in Dundee.
- A small ‘Clean Air Day 2023’ event was held on June 15th at the Douglas Community Park. Clean Air Day was also promoted via social media channels to help raise awareness of air quality and how we can protect those most vulnerable to the impacts of exposure to poor air quality.
- School Streets (vehicle exclusion zone) were launched at another five schools in 2023. The introduction of these School Streets was supported by other behavioural change programmes such as walking buses, Dr. Bike sessions, banner competitions and school assemblies.

- Places for Everyone projects continued throughout Dundee during 2023 with funding secured to move to their next stages of delivery in Broughty Ferry, Union Street, East End Campus, Ninewells, Western Gateway, St. Leonard Park, Bell Street and Magdalen Green.

Local Priorities and Challenges

Air Quality Action Plan linked measures to be progressed over the course of the next reporting year include:

- Support for Active Travel related projects will continue, such as the School Active Travel Delivery programme, through joint working with the Dundee Cycle Hub and the Ancrum School Active Travel Team.
- Work on provision of EV infrastructure at the Bell Street carpark will progress as a part of its redevelopment to a Low Carbon Hub.
- Enforcement of the Dundee LEZ scheme will commence on 30th May 2024.
- Revocation of the 1-hour mean NO_2 air quality objective aspect from Dundee AQMA will be progressed with the statutory authorities.
- In line with LAQM PG(S)2023, the review and update of the 2011 AQAP will be progressed with a new 2024 AQAP to be published in the second half of the year.

How to Get Involved

Further information on air quality in Dundee can be found on the website at the following location: www.dundeecity.gov.uk/air-quality/ .

Further information on the Dundee LEZ scheme can be found at www.dundeecity.gov.uk/LEZ .

	*"40 Cyclehoop Bikehangars were installed at various locations across the city in 2023. The rental of these spaces in managed by Cyclehoop and DCC have worked with them, community groups and active travel organisations across the city to promote these."*
	*"A small 'Clean Air Day 2023' event was held on June 15th at the Douglas Community Park. Clean Air Day was also promoted via social media channels to help raise awareness of air quality and how we can protect those most vulnerable to the impacts of exposure to poor air quality."*

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1 Local Air Quality Management

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

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

Table 1-1 Summary of Air Quality Objectives in Scotland

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

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

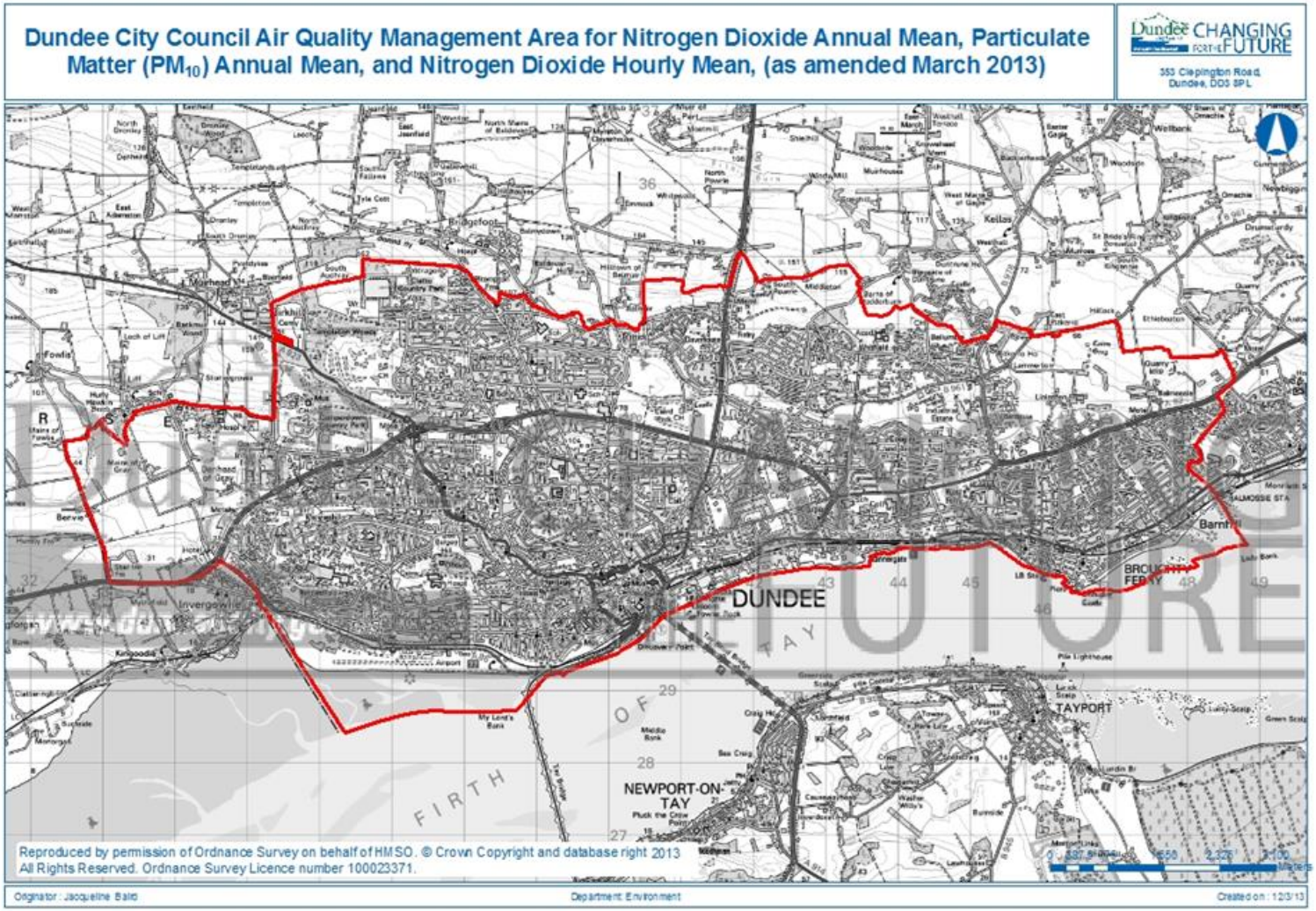
Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare publish and implement an Air Quality Action Plan (AQAP) within the shortest possible time and no later than 12 months of the date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

A summary of AQMAs declared by Dundee City Council can be found in Table 2-1 . Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=365.

Table 2-1 – Declared Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City / Town	Description	Action Plan
Dundee City Council AQMA	NO_2 annual mean PM_{10} annual mean NO_2 hourly mean	Dundee	The whole of the local government area of the City of Dundee was declared an AQMA in respect of the annual mean objective for NO_2 in July 2006. In October 2010 the AQMA Order was amended to include the annual mean objective for PM_{10}. The AQMA was further amended in March 2013 to include the hourly mean objective for NO_2. See Figure 1 for a map of the Dundee AQMA.	Air Quality Action Plan for Nitrogen Dioxide (NO_2) and Fine Particulate Matter (PM_{10}) - January 2011 www.dundeecity.gov.uk/service-area/neighbourhood-services/community-safety-and-protection/air-quality-in-dundee/air-quality-action-plan

Figure 1 Dundee Air Quality Management Area map



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 Dundee City 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.

Dundee City Council has several plans and policies within which air quality considerations are contained, including (links to each plan provided where available):

- Staff Travel Plan 2023,
- the Climate Action Plan 2019,
- the 2019 Cycling Action Strategy,
- the draft Sustainable Transport Delivery Plan,
- the Dundee Local Development Plan 2019 and associated Supplementary Guidance Air Quality & Land Use Planning,
- the 2023 Net Zero Transition Plan (NZTP), and
- the City Centre – Strategic Investment Plan 2050.

In addition, both the Dundee LEZ Delivery Group and the Dundee Corporate Air Quality Steering Group contain members from a wide range of service areas within Dundee City Council. There has been good cross departmental working during the delivery of both the Dundee LEZ scheme and the Air Quality Action Plan.

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.

The Dundee Low Emission Zone Scheme received Scottish Ministerial approval in May 2022 and was then introduced on the 30th May 2022. A two-year grace period commenced meaning that enforcement of the LEZ will not begin until the end of May 2024.

During 2023 DCC engaged in regular public communications on the LEZ including television adverts and social media postings to compliment other communications work being undertaken nationally by Transport Scotland. Further details on progression made with being prepared for the commencement of enforcement of the Dundee LEZ scheme follows in section 2.2.3.

Opportunities to promote the LEZ within existing zero-carbon initiatives, such as the 'Drive Dundee Electric' campaign and 'Sustainable Dundee', have been carried out during 2023. The first steps to deliver the Council's '*Sustainable Transport Delivery Plan 2024 - 2034*' was undertaken in 2023 with a draft version of the Plan launched. The Delivery Plan focuses on local level project interventions associated with sustainable forms of transportation. The delivery plan sets out the city's keys objectives in the following modes of sustainable transport:

- Active Travel
- Public Transport
- Mobility As A Service and Shared Transport
- Low Carbon Vehicle Infrastructure

2.2.3 Dundee Low Emission Zone Scheme

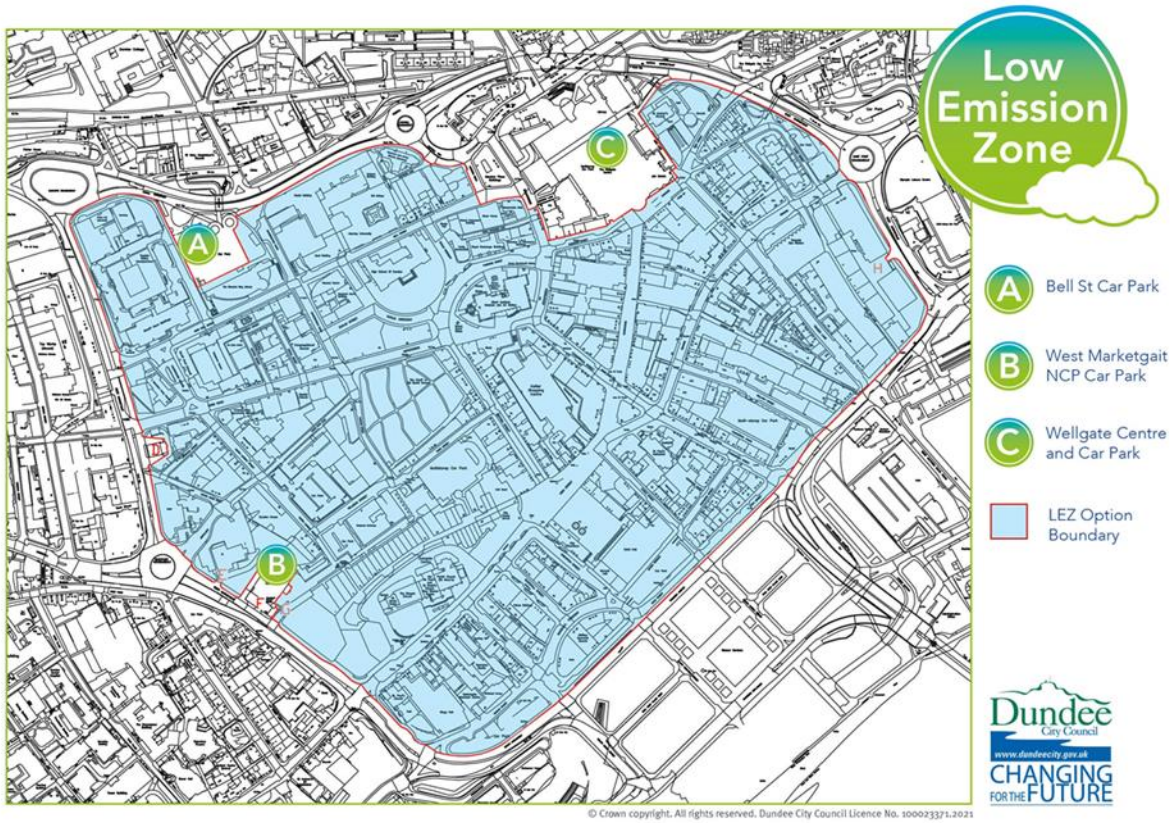
Full details of the approved Dundee LEZ scheme design are available on the LEZ pages of the DCC website – www.dundeecity.gov.uk/lez . The LEZ webpage also contains links to reports and other documents produced during the LEZ development process, such as the National Low Emission Framework (NLEF) reports, the SEPA emissions analysis and air quality evidence reports, and the Integrated Impact Assessment (IIA). A map of the Dundee LEZ area within DCC is shown in Figure 2.

During 2023, preparations for the commencement of enforcement of the LEZ scheme in May 2024 focussed on road signage installations, road markings, automatic number plate recognition (ANPR) cameras installation and connection of the ANPR cameras to the back-office enforcement system.

An ongoing programme of communications to raise awareness of the Dundee LEZ scheme continued through 2023 which included:

- A local television advert campaign which ran through the months of March to June 2023
- Continued updating of the Council's LEZ webpage to include information on support funding available to help motorists prepare for the LEZ
- Regular social media postings to regularly remind motorists of the forthcoming scheme and providing links to tools available to allow motorists to check compliance status of the vehicle and to register for Blue Badge exemptions.

Figure 2 Dundee Low Emission Zone scheme area map



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

In order to ensure that local authorities implement the measures within an action plan by the timescales stated within that plan, the Scottish Government expects authorities to submit updates on progress through the APR process. Dundee City Council has taken forward a number of measures within the action plan during the current reporting year of 2023 in pursuit of improving local air quality and meeting the air quality objectives within the shortest possible time. Details of all measures completed, in progress or planned are set out in Table 2-2.

Dundee City Council has taken forward a number of measures linked to our AQAP during the current reporting year of 2023 in pursuit of improving local air quality.

- Installation of on street enforcement infrastructure, road markings and signage for the Dundee Low Emission Zone scheme progressed during 2023 in preparation for the commencement of enforcement in May 2024. Awareness raising of the May 30th commencement of LEZ enforcement included the running of television advertisements during March and April 2023.
- 40 Cyclehoop Bikehangars were installed at various locations across the city in 2023. The rental of these spaces is managed by Cyclehoop and DCC have worked with them, community groups and active travel organisations across the city to promote these.
- Membership of the ECO Stars commercial fleet scheme increased by 17 to give a total of 276 members in 2023. This increased the number of vehicles included by 606, bringing the total number of vehicles included to 10,086. The number of members of the Taxi / Private Hire scheme increased by 4 to give a total of 20 members in 2023, with 576 vehicles now included.
- A new electric vehicle (EV) charging hub at Clepington Road opened in 2023. In 2023 DCC also deployed a series of on street chargers across the city that are fully PAS 1899:2022 compliant charge points.
- The Drive Dundee Electric campaign continued to successfully engage with current and potential electric vehicle (EV) owners (both public and business) through the local media in the form of EV related articles encouraging people to make the switch to EV.
- The Dundee City Council Fleet section continued to replace older vehicles with newer, less polluting models. There were 250 fully electric vehicles within the DCC fleet by the end of 2023 which is an increase of 43 from the year before.
- At the end of 2023 there were 202 pure electric taxis in Dundee, representing 31% of taxis in Dundee.

- A small ‘Clean Air Day 2023’ event was held on June 15th at the Douglas Community Park. Clean Air Day was also promoted via social media channels to help raise awareness of air quality and how we can protect those most vulnerable to the impacts of exposure to poor air quality.
- School Streets (vehicle exclusion zone) were launched at another five schools in 2023. The introduction of these School Streets was supported by other behavioural change programmes such as walking buses, Dr. Bike sessions, banner competitions and school assemblies.
- Places for Everyone projects continued throughout Dundee during 2023 with funding secured to move to their next stages of delivery in Broughty Ferry, Union Street, East End Campus, Ninewells, Western Gateway, St. Leonard Park, Bell Street and Magdalen Green.

Progress on the following measures has been slower than expected:

- The commencement of the review and update of the current 2011 Air Quality Action Plan was delayed however the tender process to appoint a consultant to undertake this work was completed in the second half of 2023 with winning bidder appointed soon after. It is proposed that the updated Air Quality Action Plan will be approved and published in the second half of 2024.

Dundee City Council expects the following Air Quality Action Plan linked measures to be progressed over the course of the next reporting year:

- Enforcement of the Dundee LEZ scheme will commence on 30th May 2024.
- Support for Active Travel related projects will continue, such as the School Active Travel Delivery programme, through joint working with the Dundee Cycle Hub and the Ancrum School Active Travel Team.
- Work on provision of EV infrastructure at the Bell Street carpark will progress as a part of its redevelopment to a Low Carbon Hub.
- Subject to funding support, ECO Stars schemes for commercial fleet and taxi/private hire vehicles will continue through 2024.
- In line with LAQM PG(S)2023, the review and update of the 2011 AQAP will be progressed with a new 2024 AQAP to be published in the second half of the year.

Table 2-2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Expected / Actual Completion year	Measure Status	Funding Status	Key Milestones	Progress	Barriers to implementation
1	**Measure M1:** Existing Road Infrastructure Improvements City Centre Improvements - **Union Street.**	Transport, planning and infrastructure	2011	Completed		The continuous automatic air monitoring station was removed from Union Street in 2016.	Union Street Road Infrastructure improvements were completed December 2011. Two-way traffic was maintained. Pavement widths were altered, and the bus stops were removed to reduce congestion and bus idling. Bus services redistributed to bus stops on Whitehall Street and Nethergate. Union Street, between the Nethergate and Whitehall Crescent, was pedestrianised from August 2020 through Sustrans Spaces for People, with this subsequently being made permanent.	
	Northwest Arterial Route improvements – **Lochee Road**	Transport, planning and infrastructure	2012 / ongoing	Completed / in progress	Funding for modelling of the impact of infrastructure changes was obtained via the Scottish Air Quality Action Plan grant scheme in 2022/23.		Alterations carried out at Lochee Road/Rankine Street in February 2012 with the central reservation removed to free up road space and reduce congestion. Road infrastructure changes on Lochee Road at the Cleghorn Street / Rankine Street were implemented in early 2022 to benefit road safety and to help ease congestion caused by vehicles turning right into these streets from Lochee Road. This included the installation of a central island to prevent drivers from turning right from Cleghorn Street on to Lochee Road, from Lochee Road on to Cleghorn Street and from Rankine Street on to Lochee Road. Drivers are not able to cross Lochee Road from Rankine Street on to Cleghorn Street or vice-versa. There have also been pedestrian improvements to Lochee Road / Dudhope Terrace Junction. Air quality modelling to identify impacts of the preferred infrastructure changes option was completed by SEPA in 2022. However, owing to the larger 'Active Travel Freeways' project, these changes are no longer to be progressed.	
	Arterial Route Improvements - **Stannergate**	Transport planning and infrastructure	2016	Completed			Consultants engaged in 2013 to carry out traffic micro-simulation modelling and air dispersion modelling. Final draft of the AD Modelling was received in April 2016, with the summary of findings presented in the 2016 APR.	

Measure No.	Measure	Category	Expected / Actual Completion year	Measure Status	Funding Status	Key Milestones	Progress	Barriers to implementation
	City Centre Improvements - **Meadowside**	Transport planning and infrastructure	2016 / 2021	Completed			Meadowside – in 2012 a trial lane closure at the north end of street to increase separation distance between traffic and receptors was put in place. A temporary paving surface was introduced in October 2013 to allow the impact on monitored concentrations to be studied for a 12-month period. Permanent street infrastructure changes were completed in Feb/March 2016. Bus priority measures were introduced on Meadowside in March 2021. The measures remove general traffic (cars etc) going north bound at the Meadowside signals near the Wellgate centre, with traffic diverted onto Bell Street from Meadowside to join at Victoria Street west of the Meadowside signals.	
	City Centre Improvements - **Upgrade 13 traffic signals with fibre optic connections**	Transport planning and infrastructure	2019	Completed			A Fibre network was implemented to improve Traffic Signals communication (and revenue saving) with the Control Room in Dundee House. This network improved reliability and efficiency of Urban Traffic Management and Control (UTMC).	
	City Centre Improvements – **Seagate / St. Andrews Street**	Transport planning and infrastructure	2017	Completed			In 2014, consultants were commissioned to undertake a review of transport activity on the Seagate with a specific focus on identifying actions that would address its poor air quality. The report concluded that there were no affordable actions that could ensure AQ thresholds were met but a range of actions could help reduce emissions. Air Dispersion Modelling demonstrated that if all buses and HDVs were Euro VI then no exceedances of the NO_2 or PM_{10} objectives would persist in the city centre. Traffic modelling undertaken by SYSTRA with 2016/17 funding showed that the proposed transport management options would be unacceptable on traffic congestion, access and air quality grounds.	

Measure No.	Measure	Category	Expected / Actual Completion year	Measure Status	Funding Status	Key Milestones	Progress	Barriers to implementation
	City Centre Improvements – **Crichton Street / Whitehall Street / Nethergate**	Transport planning and Infrastructure	2017	Completed			Consultants were commissioned in March 2017 to examine the current bus movements through the city centre. The executive summary of this report is in **Appendix C.5** of the 2018 DCC APR.	
2	**Measure M2:** DCC will enhance the Urban Traffic Management and Control (UTMC) system to reduce congestion Real-time traffic monitoring. Improved control regime to smooth out peak traffic.	Traffic management	2013 – UTMC 2016 – Bluetooth Traffic Speed Monitoring System	Completed Completed			UTMC scheme was implemented in March 2013 to expand UTMC to two congested junctions in Lochee Rd AQ hotspots. Seagate / Commercial Street traffic light refurbishment to improve bus and traffic flows completed Feb 2013. Coupled with increased enforcement of waiting restrictions to reduce congestion. TACTRAN funding provided in 2014/15 to expand Bluetooth Traffic Speed Monitoring System to include the Lochee Road. The system was expanded along the eastern corridor on the A92 coming in from Arbroath and Broughty Ferry. Bluetooth journey time monitoring is now undertaken on all major arterial routes leading into the city centre area.	
	Paramics / AIRE modelling of key junctions – Kingsway / Forfar Rd & Lochee Rd corridor to test improvement options	Traffic management	2016	Completed			Consultants were engaged in 2013 to carry out traffic micro-simulation modelling and air dispersion modelling. A detailed summary of the options is contained in **Appendix C** of the 2016 APR.	
3	**Measure M3:** DCC to identify partnership and funding to continue benefits of Smarter Choices / Smarter Places: Dundee Travel Active Programme	Promoting travel alternatives	ongoing	In progress	AQAP funding has been applied for on an annual basis to partially fund projects related to this action plan measure.		Embark Dundee –Electric bike hire Scheme operated during 2022, installing new docking stations and attracting new members throughout the year. The scheme entered a winter shutdown in November 2022 however went into liquidation in February 2023. The Dundee Cycle Hub (DCH) opened in September 2021. The team at the DCH have continued to strengthen their offerings during 2022 providing outreach services around the city and regular activity at the Waterfront hub location. AQAP funding was awarded in 2023/24 to help support initiatives undertaken by this active travel hub. 40 Cyclehoop Bikehangars were installed at various locations across the city in 2023. The rental of these spaces in managed by Cyclehoop and DCC have worked with them,	

Measure No.	Measure	Category	Expected / Actual Completion year	Measure Status	Funding Status	Key Milestones	Progress	Barriers to implementation
							community groups and active travel organisations across the city to promote these.	
	Behavioural Change Primary School programme to promote sustainable travel options in all primary schools	Promoting travel alternatives	Ongoing	In progress	Joint funded, contribution for post applied for annually through Air Quality Action Plan support funding.		The Active Travel Schools team based at the Ancrum Centre have expanded their delivery of Bikeability and cycling and walking initiatives working closely with schools around Dundee. AQAP funding has been awarded in 2021/22, 2022/23 and 2023/24 to help cover the cost of this team enabling it to reach as many schools as possible in Dundee. School Streets (vehicle exclusion zone) was launched at Fintry Primary School in September 2021. Five additional School Streets five sites (seven schools) were introduced in Autumn 2022, with further school streets zones introduced at another five schools in 2023. The introduction of these School Streets was supported by other behavioural change programmes such as walking buses, Dr. Bike sessions, banner competitions and school assemblies.	
4	**Measure M4:** DCC will introduce measures to improve bus services and reduce emissions Statutory Bus Quality Partnership. Voluntary Bus Quality Partnership	Transport planning and infrastructure	Ongoing	In progress			The Tayside Bus Alliance was established in 2020 to develop a joint submission to the Scottish Government's Bus Partnership Fund. Dundee City Council is a member of this. The alliance has helped lay some foundations for a future Bus Service Improvement Partnership in Dundee. The Scottish Government announced in early 2024 that the Bus Partnership Fund was being suspended to allow for a review of activity and reprioritisation of funding.	
	Fleet Renewal – Emissions Improvements	Vehicle Fleet efficiency	Ongoing	In progress	Local bus operators have received funding through schemes such as the BEAR retrofit scheme to retrofit older models to bring them up to EUROVI equivalent emission standards.		Xplore Dundee launched 12 new Zero-Emission electric buses in December 2021, which began full service in January 2022 on the Service 28 route serving Lochee Road. Most Xplore Dundee vehicles based in Dundee are now LEZ compliant (Euro VI). A small number of Euro V buses remain within the Xplore Dundee fleet for operation as a school bus network. Stagecoach and Moffatt & Williamson now use Euro VI for their Dundee operations.	

Measure No.	Measure	Category	Expected / Actual Completion year	Measure Status	Funding Status	Key Milestones	Progress	Barriers to implementation
	ECO Stars Dundee Fleet Management Recognition Scheme introduced	Vehicle Fleet efficiency	Ongoing	In progress	Funding to continue the scheme will be applied for on an annual basis through the AQAP grant scheme.		See Measure 6	
5	**Measure M5**: DCC will explore provision of Park and Ride facilities that do not have adverse impact on air quality Provision of Park and Ride (P&R) facilities	Alternatives to private vehicle use	Ongoing	In progress	Further funding required for any progression of the Tay South Park & Ride, while potential funding opportunities for DCC Park & Rides to be investigated.		Dundee City Council supported a bid from Fife Council to secure Levelling Up funding for a new Park & Ride on the south side of the Tay Road Bridge. No further progress here due to funding being required. Other potential P&R sites were considered and included in the developing Bus Partnership Fund submission prepared by SYSTRA.	
6	**Measure M6:** DCC will introduce measures to reduce emissions from Heavy Goods Vehicles ECO Stars Dundee Fleet Management Recognition Scheme being introduced in 2013	Freight and delivery management	Ongoing	In progress	Funding to continue the scheme will be applied for on an annual basis through the AQAP grant scheme.	Member number 250 was achieved during 2022.	Dundee City Council received funding from the Scottish Government's Air Quality Support Funding to enable continuation of the ECO Stars scheme for larger commercial vehicles and the separate scheme for Taxis and Private Hire Vehicles during 2023. 17 new members, bringing 606 new vehicles, joined the Dundee commercial fleet scheme in 2023. This increased number of members to 276 (10,086 vehicles) by the end of 2023.	
7	**Measure M7**: DCC will seek improvements in emissions standards, including NO_2 and PM_{10} for the council fleet and public service vehicles Development of Green Procurement Strategy to set target for Euro category/fuel type	Promoting Low Emission Transport	Ongoing	In progress	Various funding streams utilised by corporate fleet to facilitate switch to EV		See also measure 14. In March 2023 Dundee City Council opened a new electric vehicle (EV) charging hub at Clepington Road in Dundee, Scotland. The 4th Hub, as it is called, is a ground-breaking development that aims to improve accessibility and equality in EV charging infrastructure. The hub comprises 4 x 50kW and 1 x 150kW SWARCO charging units available for public use, with all the units being fully accessible bays. There were 250 fully electric vehicles within the fleet at DCC by the end of 2023. An order for a further 50 was due to be delivered by the end of March 2024.	
	Participation in ECO Stars Dundee-Fleet Management Recognition Scheme	Vehicle Fleet Efficiency	Ongoing	In progress			DCC Fleet continues to work closely with the ECO Stars Recognition Scheme and remains at a 4-star rating.	

Measure No.	Measure	Category	Expected / Actual Completion year	Measure Status	Funding Status	Key Milestones	Progress	Barriers to implementation
8	**Measure M8:** DCC in consultation with the Taxi Liaison Group will explore means of reducing emissions from taxis and private car hire vehicles in AQMA Enforce No idling for taxis. Increase cleaner taxis.	Promoting low emission transport		In progress			At the end of 2023 there were 202 pure electric taxis in Dundee. Presently 31% of taxis in Dundee are fully electric.	
	Explore the potential of introducing Licensing Conditions for minimum taxi Euro category for certain classes of vehicles;	Vehicle Fleet Efficiency	Ongoing	In progress			DCC continues to implement a policy first introduced in 2016 that any applications for new Taxi Licences & Private Hire Car would only be granted on the condition that only an electric vehicle from the approved list can be placed in service. The introduction of Dundee's LEZ is also helping to accelerate the taxi trade electric vehicle adoption.	
	Expansion of ECOSTARS to include taxi / private hire operators	Vehicle Fleet Efficiency	2015	Completed	Funding for this measure is applied for annually through the Scottish Governments AQ Action Plan support funding, with running of the scheme dependent on this.		Funding to expand ECO Stars in Dundee to include taxi and private hire vehicle operators was obtained in 2014/15, with the scheme formally launched on the 11th of March 2015. The number of members of the ECO Stars Dundee taxis / private hire vehicles scheme increased to 20 in 2023. The number of vehicles had increased by 6 to 576 at the end of 2023.	Recruitment of new taxi / private hire vehicle operators remains a challenge as most of the remaining are individual operators.
9	**Measure M9:** DCC will investigate to initiate a Roadside Emission Testing (RET) scheme inside the AQMA and routes leading to AQMA To investigate into the establishment of a programme of RET in the AQMA.	Traffic Management	Not expected to be completed				Not progressed during 2023. This measure is unlikely to be progressed during the life of the Action Plan.	
10	**Measure M10:** DCC will ensure local air quality is fully integrated into the Local Development Plan (LDP) process and development scenarios are appropriately assessed with	Policy Guidance And Development Control	2019	Completed		Supplementary Guidance and associated Technical Guidance documents for Air Quality and Planning were published in 2019.	The 2019 Local Development Plan was adopted in February 2019. Along with this Plan, the Supplementary Guidance Air Quality & Land Use Planning document was also adopted with technical guidance which can be updated as necessary.	

Measure No.	Measure	Category	Expected / Actual Completion year	Measure Status	Funding Status	Key Milestones	Progress	Barriers to implementation
	respect to the potential impacts on air quality Provide AQ policy within Local Development Plan with commitment to improve air quality. Produce air quality Supplementary Planning Guidance (SPG)							
11	**Measure M11:** DCC will ensure effective co-ordination between climate change and air quality strategies and action plan measures Strategy to be developed to improve co-ordination between climate change and air quality strategies and action plan measures	Policy Guidance And Development Control	Ongoing	In progress	Funding for projects undertaken within this measure have been applied for through the Scottish Governments AQ Action Plan support funding scheme. Various other Climate Change focussed funding streams have been utilised.		The Sustainability & Climate Change Manager sits on the Corporate Air Quality Steering Group and the Dundee Low Emission Zone Delivery Group to ensure synergy between AQ and CC policy. Dundee City Council declared a climate emergency in June 2019 and has worked through the Dundee Partnership to develop and deliver a citywide Climate Action Plan in support of the transition to a net-zero and climate resilient future. In line with Scottish Government and Council objectives for CAFS, tackling air quality and decarbonising transport are key objectives of this plan. Of the 62 actions in the plan, 18 are related to air quality. AQAP funding was obtained for 2021/22 to help run projects under the Sustainable Dundee banner. The Net Zero Transition Plan was approved at committee in November 2022, with implementation to commence in February 2024. Governance, monitoring and reporting processes agreed with each service area and implementation initiated. Updated Climate Risk and Vulnerability Assessment based on 2-degree and 4-degree scenarios commissioned - TBC August 2024. Will result in prioritised adaptation actions. Regional climate resilience partnership (with Perth & Kinross Council and Angus Council) to commence in January 2024, supported by Adaptation Scotland. A grant application has been submitted to Pathways2resilience European Fund to help drive these. The plan is to identify adaptation synergies between the 3 LA's and develop cross border actions e.g. potential for cross border nature network which could include active travel etc. Communication and engagement will also be	

Measure No.	Measure	Category	Expected / Actual Completion year	Measure Status	Funding Status	Key Milestones	Progress	Barriers to implementation
							much more effective if delivered regionally and this will also be prioritised. Urban ReLeaf research officer in post, more stakeholders engaged, a perceptions app has been developed and citizens will be asked to comment on various aspects of green spaces, including safety, access, active travel, biodiversity, interventions, equipment, facilities etc. This will be fed into the new open space strategy evidence report as qualitative data.	
12	**Measure M12:** DCC will continue its active involvement and support of TACTRAN	Policy Guidance And Development Control	Ongoing	In progress			This is on-going and TACTRAN are involved in the Dundee LEZ delivery group. Dundee City council through its Sustainable Transport Plan supports the Regional Transport Strategy (RTS).	
13	**Measure M13:** DCC will promote the uptake and use of cleaner and/or alternative fuels where possible for transport DCC will explore the development of electric charging point infrastructure Determine strategy/advise note and annually review content Install Electric Charging Facilities in Car Parks	Promoting low emission transport	Ongoing	In progress	Various funding schemes including the Scottish Government AQAP grant scheme for which applications are made on an annual basis.		See also measures 7 and 14 Dundee City Council has continued to use the platform of its Drive Dundee Electric campaign to successfully engage with current and potential electric vehicle (EV) owners (both public and business) through the local media in the form of EV related articles encouraging people to make the switch to EV. In late 2023 Dundee City Council deployed a series of on street chargers across the city that are fully PAS 1899:2022 compliant charge points. It is accessible for all EV drivers.	
14	**Measure M14:** DCC will establish and implement a rolling programme for replacing older more polluting vehicles with newer cleaner vehicles, which comply with the prevailing EURO standard. Development of Green Procurement Strategy.	Vehicle Fleet Efficiency	Ongoing	In progress			See also Measure 7. There were 250 fully electric vehicles within the fleet at DCC by the end of 2023 which is an increase of 43 from the year before.	
15	**Measure M15:** DCC will improve the Council's vehicle fuel consumption efficiency by better management of fleet activities.	Vehicle Fleet Efficiency	Ongoing	In progress			See also Measures 7, 13 and 14. The council has continued to increase the deployment of its GIS route optimisation system to further increase efficiency across the council corporate fleet.	

Measure No.	Measure	Category	Expected / Actual Completion year	Measure Status	Funding Status	Key Milestones	Progress	Barriers to implementation
	Develop fleet management plan to improve fuel efficiency.							
16	**Measure M16:** DCC will promote options for better travel planning amongst Dundee City Council employees. Review DCC Travel Plan. DCC to investigate use of annual survey on how/what modes of transport employees use to travel to work	Promoting Travel Alternatives	2023	In progress	Funding for the initial development of the Staff Travel Plan was obtained via the Scottish Government AQAP grant scheme.		See also Measures 3, 17 & 22. The Staff Travel Plan was launched March 2023. Due for review 2026. Staff travel measures promoted and bike tagging, repairs and cycling lessons also promoted during Clean Air Day 2023. A small Clean Air Day event was held at Douglas Community Garden event with Fleet, SCARF, Active travel teams in attendance. Hello Lamppost, QR marketing campaign messaging in partnership with AQ team was put in place around the city, including signage on air quality monitoring stations.	
17	**Measure M17:** DCC will continue to promote and encourage their employees to consider the use of bicycles in their daily duties by providing cycle usage mileage Continue to investigate and develop the use of various incentive schemes. Develop cycling strategies. DCC to investigate use of annual survey on how/what modes of transport employees use to travel to work.	Promoting Travel Alternatives	Ongoing		AQAP funding to help part-fund an embedded Sustrans Cycling Officer has been applied for on an annual basis since 2018.		See also Measures 3, 16 & 22. An updated Dundee Cycling Strategy was launched in September 2019. This refresh of the 2016 strategy sets out how Dundee City Council will deliver its duties, powers and policies to enable and encourage more people to cycle more often. AQAP funding has been obtained in recent years to enable the continued employment of an embedded Sustrans officer. This 'Cycling Action Plan officer' takes a lead role in developing and delivering the policies of the Council in respect of Active Travel. Dundee City Council progressed actions contained within the 2019 Dundee Cycling Strategy to enable and encourage more people to cycle more often. Information on modes of transport to work are covered in the Dundee Walking & Cycling Index 2023. DCC has promoted the use of the pool bikes at Dundee House for travel to meetings and site visits. The Cycle to Work scheme is available for all DCC employees through employee benefits scheme. DCC published its draft Sustainable Transport Delivery Plan 2024-2034 in 2023. The draft	

Measure No.	Measure	Category	Expected / Actual Completion year	Measure Status	Funding Status	Key Milestones	Progress	Barriers to implementation
							plan showcases how infrastructure will be provided for a sustainable mobility future, outlining how Dundee's plan ties in with national and regional strategies, and details potential investment from external sources of approximately £230 million in a number of projects over the ten-year period.	
18	**Measure M18:** DCC will assess the Council's energy needs, make recommendations and implement reductions of carbon emissions which result in corresponding reductions of NO_2 and PM_{10}. DCC to implement annual energy reduction action plan.	Policy Guidance And Development Control	Ongoing	In progress			The Net Zero Transition plan was approved at committee in November 2022. Implementation commences in February 2024. Governance, monitoring and reporting processes agreed with each service area and implementation initiated. Target for net zero emissions by 2038. Actions across emissions reduction, climate resilience, circular economy and Just Transition. Refresh of the city-wide Climate Action Plan with the Climate Leadership Group. LHEES (Local Heat and Energy Efficiency Strategy) and LAEP (Local Area Energy plan) development - decarbonization of buildings and infrastructure in the city. LHEES to be published March 2024, LAEP due August 2024.	
19	**Measure M19**: DCC to promote and support localised energy generation that doesn't compromise Air Quality in private households. Determine strategy/advise note and annually review content	Promoting Low Emission Plant	Ongoing	In progress			Heat decarbonisation plan for council buildings commissioned. Now prioritising buildings to develop an application for Scottish Government Heat Decarbonisation Fund.	
20	**Measure M20:** DCC will provide the public with relevant air quality information. Investigating the potential for uptake of an air pollution information system, such as Air Alert. Improvements to AQ website information.	Public Information	Ongoing	In progress	Funding to improve the air quality pages on the DCC website was obtained via the Scottish Government AQAP scheme. Funding to assist with communications work for the introduction of the Dundee LEZ scheme has been obtained through the Transport Scotland LEZ Support fund for local authorities.		The 2023 APR was submitted to the statutory consultees and can be accessed via the Dundee City Council website. Historical air quality monitoring data for the 2006 – 2015 period is also directly available through the DCC website. The DCC website also contains links to recent real-time and historical air pollutant data from Dundee's continuous automated monitors and passive diffusion tube network presented on the Scottish Air Quality (SAQ) website.	

Measure No.	Measure	Category	Expected / Actual Completion year	Measure Status	Funding Status	Key Milestones	Progress	Barriers to implementation
	Make up to date air quality information available to the public through Councils digital website.						The Dundee Low Emission Zone webpage (www.dundeecity.gov.uk/LEZ) contains detailed reports created during the process to identify the preferred scheme for Dundee's LEZ, including air quality evidence reports created by SEPA using outputs from the National Modelling Framework (NMF) AQ City Model and Paramics Traffic modelling. The 'Hello Lamp Post' project included QR codes that directed participants to conversations through text messaging relating to air quality, with signage placed on air quality monitoring stations across Dundee.	
21	**Measure M21:** DCC will continue its work to increase uptake and implementation of School and Workplace Travel Plans, particularly where likely to impact on the AQMA. DCC to ensure all relevant commercial planning applications have travel plan conditions applied in accordance with current best practice.	Promoting Travel Alternatives	Ongoing	In progress			DCC Sustainable Transport project officers have supported schools with travel plans and information on safe routes to school in partnership with Leisure & Culture Dundee staff who deliver work with schools. DCC Sustainable Transport team comment on relevant planning applications to highlight opportunities and issues around sustainable and active travel.	
22	**Measure M22:** DCC will continue working in partnerships with TACTRAN and local active travel networks to ensure that walking and cycling initiatives are promoted and supported in Dundee. Identify walking & cycling schemes (such as Park & Cycle). Identify walking & cycling promotional opportunities around Dundee City	Promoting Travel Alternatives	Ongoing	In progress			See also Measures 3, 16 & 17. DCC continues to participate in all TACTRAN meetings focused on active and sustainable travel developments and works in partnership. A number of Places for Everyone projects were continued throughout Dundee with funding secured to move to their next stages of delivery in Broughty Ferry, Union Street, East End Campus, Ninewells, Western Gateway, St. Leonard Park, Bell Street and Magdalen Green.	
23	**Measure M23:** DCC will continue to work with transport providers to support and promote increased uptake of public transport modes.	Transport planning and infrastructure	Ongoing	In progress			Bus service reliability and punctuality has improved significantly during 2023 allowing DCC to work with Xplore Dundee to develop new promotional material for publicising bus journeys. Xplore Dundee have initiated	

Measure No.	Measure	Category	Expected / Actual Completion year	Measure Status	Funding Status	Key Milestones	Progress	Barriers to implementation
	Promote schemes such as the SQUID card including Dundee and surrounding towns. Introduce smart and integrated ticketing.						Project Boost to restore trust and greater community ownership of their services.	
24	**Measure M24:** DCC will continue to work in partnership with other organisations to promote and implement energy efficiency measures in Dundee. To implement an Annual Action Plan of energy efficiency measures.	Policy Guidance and Development Control	Ongoing	In progress			The Housing Department continues to maximise the impact of the Home Energy Efficiency Programme Scotland – Area Based Schemes (HEEPS:ABS now more commonly referred to as EES:ABS- Energy Efficient Scotland: Area Based Schemes)) funding by combining it with its own capital budget to provide external wall insulation (EWI) for mixed tenure blocks of flats in Council estates with high levels of fuel poverty that are either solid wall or non-traditional construction. This has resulted in more than £50m total investment in EWI in the city since the inception of the EWI Programme in 2013 with more than 5,000 residents in Dundee seeing their properties thermally upgraded. As this programme nears its end, attention turns to the stock that has cavity-walls. Most of this stock of just under 6,000 units had cavity-wall insulation installed 40 years ago and this now needs to be upgraded. Decisions are still to be made about the best solution to upgrade the energy efficiency of this stock, but it is likely to entail going beyond simply removing and replacing existing cavity wall insulation (CWI) and installing EWI too. A pilot project to identify the best methods of doing so will start on site in early 2024. By insulating stock in this way - the fabric-first approach - it is readied for the later installation of decarbonised heat such as heat pumps which operate most efficiently in well-insulated, air-tight properties.	
25	**Measure M25:** DCC Environment Department will comment upon planning applications to ensure that all relevant air quality issues are highlighted and mitigation measures are considered wherever possible.	Policy Guidance and Development Control	Ongoing	In progress			Officers from the pollution team within Community Safety and Protection respond to consultations and check weekly planning lists and respond to the Planning Officers on all applications which may adversely impact on local air quality. 23 responses were made in the 2023 calendar year.	

Measure No.	Measure	Category	Expected / Actual Completion year	Measure Status	Funding Status	Key Milestones	Progress	Barriers to implementation
26	**Measure M26:** DCC will enforce statutory legislation to control smoke, dust, fumes or gas emissions from commercial and domestic premises which are causing a nuisance or are prejudicial to health. DCC will continue to monitor and enforce statutory legislation in this area.		Ongoing	In progress			For the period 1st January to 31st December 2023, officers investigated a total of 14 relevant complaints of which 11 (78%) had been resolved with 3 still being investigated.	
27	**Measure M27:** DCC will enforce relevant legislation to reduce the burning of commercial and domestic waste. DCC will continue to monitor and enforce legislation in this area.		Ongoing	In progress			During 2023, officers investigated 9 complaints of smoke from commercial waste burning and 23 complaints from domestic waste burning (bonfires). All 32 complaints were resolved.	
28	**Measure M28:** DCC will promote composting in a bid to reduce pollution from domestic bonfires. Reintroduce discount / promotion campaign for compost bins	Policy Guidance and Development Control	Ongoing	In progress			In March 2020 a charge was introduced for the collection of garden waste. Householders who decided not to sign up were provided with different options for disposal of garden waste and discouraged from using the general waste bin or burning waste. DCC continued to offer a home composting bin as an alternative to the annual garden waste collection permit.	
29	**Measure M29:** DCC will continue to monitor a range of air pollutants throughout Dundee and make the monitoring information freely available to the public in an easily understandable form. Continued support for Dundee Air Quality Monitoring Network	Public Information	Ongoing	In progress			See **Chapter 3** of this report for details of the automatic and non-automatic monitoring locations in Dundee. See **Measure 20** re availability of air quality monitoring data on both the Dundee City Council and Scottish Air Quality websites and the 2023 Annual Progress Report being available for viewing and download via the DCC website.	
30	**Measure M30:** DCC will ensure that all air quality monitoring data reported to the public is both accurate and precise by implementing quality control measures	Public Information	Ongoing	In progress			See **Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC** of main report for details of processes. All diffusion tube changeovers were in accordance with the 2023 diffusion tube calendar.	

Measure No.	Measure	Category	Expected / Actual Completion year	Measure Status	Funding Status	Key Milestones	Progress	Barriers to implementation
	Regular calibrations and filter changing of continuous monitoring equipment in DCC's air quality stations. At least annual audit of air quality stations' equipment. Appropriate use and care of NO_2 diffusion tubes regularly deployed around the City Council area.							
31	**Measure M31:** DCC will establish additional monitoring sites across the City in locations where poor air quality is suspected. DCC will continue to carry out and report on their statutory duties under the Review & Assessment process for LAQM.	N/A	Ongoing	In progress			See Measure 29 regarding pollutant monitoring locations. Two passive diffusion tube (PDT) monitoring locations were changed during 2023. See **Chapter 3** of this report for further details.	
32	**Measure M32:** DCC will implement road traffic counts to inform the review and assessment process. Undertake classified traffic counts.	Traffic Management	Ongoing	In progress			Traffic counts of the Lochee Road corridor were undertaken in March 2022 to support the SEPA air quality model that was used to model air quality impacts of possible road infrastructure changes along this corridor. Annual road count data (as Annual Average Daily Traffic (AADT)) from the council's long-term Road Traffic Reduction Act (RTRA) Sites from 2005-2023 is presented in **Appendix E** of the main report.	

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

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

Dundee City Council undertook automatic (continuous) monitoring at 10 sites during 2023. Table A.1 in Appendix A shows the details of the sites. Three different PM_{10} monitors (CM3, CM13, CM16) are co-located at the Broughty Ferry Road site to help improve data accuracy and validity. There were no changes from 2022 to the continuous monitoring sites in 2023.

The Serinus NOx analyser at the Meadowside site was removed at the start of October 2023 to protect the analyser from damage from temperature fluctuations due to the breakdown of the air-conditioning unit for the enclosure. This resulted in a lower than anticipated data collection percentage of NO_2 for this calendar year (72.9%) as the Serinus NO_X analyser at Meadowside was not re-installed by the end of 2023.

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

National air quality monitoring results are made available at www.scottishairquality.co.uk . Further analysis of the 2023 monitoring is also available on the Air Quality in Scotland website within an annual summary report prepared by Ricardo Energy & Environment. This can be accessed via: www.scottishairquality.scot/assets/reports/365/Dundee_City_annual_2023.html

3.1.2 Non-Automatic Monitoring Sites

Dundee City Council undertook non- automatic (passive diffusion tube (PDT)) monitoring of NO_2 at 88 sites during 2023. Table A.2 in Appendix A shows the details of the sites.

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

There were two amendments to the PDT monitoring network during the 2023 calendar year. Diffusion tube DT248 was introduced at the start of 2023 due to access to DT241 at Customs House on the south side of Dock Street being stopped at in December 2022. However, part way during 2023 the infrastructure that DT248 was attached to was removed. This led to the DT241 location becoming available again with results from August obtained. Owing to vegetation growth outside of the control of DCC and difficulties in accessing the PDT, DT204 (Broughty Ferry Rd (129)) was removed at the start of 2023. DT186 (Carolina Court 30mph sign) was re-instated at lower Broughty Ferry Road – this PDT had previously been deployed in this location but was removed at the end of 2014.

3.1.3 Other Monitoring Activities

No additional monitoring activities were undertaken by the local authority in 2023.

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 monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40 µg/m^3 at automatic monitoring sites.

Table A.4 in Appendix A compares the adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40 µg/m^3 at non-automatic monitoring sites. Details of how the local bias correction factor of 0.78 applied to NO_2 passive diffusion tubes for 2023 was determined is contained within Appendix C.

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

Annualisation of data was required at one automatic monitoring location (Meadowside) due to the Serinus NOx analyser being removed in October 2023 and had not been re-installed by the end of 2023. This resulted in the data collection percentage for the year being only 72.9%.

The highest NO_2 annual mean concentrations were predicted on Victoria Road / Hilltown, which is on the main bus corridor immediately adjacent to the north of the city centre, and the northwest arterial route including Lochee Road and Logie Street. Both areas are outside of the Dundee LEZ scheme but are both inside the Dundee AQMA. No NO_2 annual mean concentrations were predicted to be above 36.0 µg/m^3 in 2023. This is the first year of NO_2 monitoring locations not

exceeding this figure therefore indicating that there were no potential exceedances of the NO_2 annual mean AQO where NO_2 is monitored at relevant receptors in Dundee City Council.

Long term trends in NO_2 concentrations at automatic monitors with at least 5 years data capture are shown in Figure 4 in Appendix A**.** Long term trends in NO_2 concentrations at PDT sites with at least 5 years data capture are shown in Figure 8 in Appendix A.

Pre-pandemic, the greatest improvements in NO_2 annual mean concentration had been at Meadowside. AQAP measure applications, such as road layout changes to increase the separation distance between the active carriageway and receptors, contributed strongly to this improvement. More recently, traffic movement restrictions have been put in place at Meadowside removing access to the northbound carriageway for all vehicles other than buses and taxis. Travel movement restrictions applied during the COVID-19 pandemic slightly accentuated the long-term trend downwards at some sites during 2020 and 2021 due to the reduction in traffic flow numbers, however the improvement continued to be maintained during 2022 and 2023. In 2023, NO_2 annual mean concentrations at all locations were below the AQO. Air quality modelling of the impact of the proposed LEZ scheme on NO_2 concentrations within the LEZ undertaken by SEPA in 2021 suggest that annual mean concentrations would reduce following the commencement of enforcement in May 2024.

An overview of how NO_2 annual mean concentrations have improved in different areas across the city can be seen in maps and graphs shown in Appendix D. In addition, Figure 46 compares the ranked annual mean NO_2 concentrations measured at long-term monitoring sites for 2009, 2011 (the year of the action plan), 2018, and 2023. This shows an overall reduction in the highest monitored concentration, the reduction of sites exceeding the annual mean objective (in particular since 2011 which is when the AQAP was published), and how all 2023 concentrations are now at or below 36.0ug/m^3.

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

No exceedances of the hourly mean objective were identified at automatic monitoring locations in 2023. No exceedances of the hourly mean objective were indicated by the diffusion tube annual mean concentrations in 2023 as none exceeded 60µg/m^3. No automatic monitoring locations recorded any hourly mean level where the concentration was over 200µg/m^3 in 2023.

Figure 9 in Appendix A shows the number of exceedences of the 200ug/m^3 hourly level at monitoring locations since 2006. The Lochee Road automatic monitor is the only location in Dundee where the hourly mean AQO limit has previously been exceeded. There have been no

exceedances of the hourly mean AQO at this automatic monitor since 2013, with no hourly mean concentrations above 200ug/m^3 being recorded at this location, or any other location in Dundee, since 2019.

Figure 10 in Appendix A shows the long-term trend in the 99.8th percentile concentration of hourly means at Lochee Road. The trend line for the 16-year period that hourly levels have been monitored has been drawn using an Excel simple regression statistical program. In 2019 a negative value was identified for the first time since the AQMA for the hourly objective was declared in 2013. Diffusion tube monitoring and dispersion modelling show that the automatic monitor is not sited in the most polluted location.

The 2020 APR reported that an established downward trend for the NO_2 hourly mean objective should be present before being able to consider revocation of this aspect of the Dundee AQMA. While the trend has been downward since 2019, levels recorded in 2020 and 2021 will have been impacted on by restrictions associated with the COVID-19 pandemic, meaning that 2022 was the first complete year since 2019 that may be considered unimpacted. In our 2023 APR we wrote that one further year of compliance with this AQO should be observed before concluding that this part of the Dundee AQMA could be considered for revocation. The revocation was also encouraged by the statutory agencies that appraised the 2023 APR. As the 2023 monitoring data shows further compliance with the 1-hour mean AQO, it is appropriate to progress with the revocation of this part of the Dundee AQMA.

Figure 11 in Appendix A shows the long-term trend in the 99.8th percentile concentration of hourly means across the roadside and background NO_2 continuous monitoring locations.

3.2.2 Particulate Matter (PM_{10})

Table A.6 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 18µg/m^3. As per the Scottish Government Guidance note published on 17 May 2023[1], annual mean PM data collected using Palais Fidas 200 is to be corrected using factors (PM_{10} divided by 0.909 and $PM_{2.5}$ multiplied by 1.06) as identified by the “Scottish Government Equivalence Study to Investigate Particulate Matter

[1] www.scottishairquality.scot/news/local-authority-guidance-note-laqm-reporting-scottish-pm-data

Monitoring In Scotland Using The Fidas 200"[2]. Local authorities are required to present both measured and corrected data for LAQM reporting. Table A.6 contains both measured and corrected data results. No exceedance of the Scottish AQO for PM_{10} annual mean was observed at any of the PM_{10} monitoring locations in Dundee in 2023, with slight decreases on 2022 annual mean PM_{10} concentrations being observed at PM_{10} monitoring locations.

Annual mean PM_{10} concentrations at monitoring sites with at least five years data are shown in Figure 12 and Figure 13. Figure 14 shows the improving trend across all current PM_{10} monitoring locations however the impact of the COVID-19 pandemic may have slightly accentuated the long-term trend downwards at some sites. The 2023 APR reported slight increases in the 2022 annual mean AQO for PM_{10} on 2021 levels, however all sites were in compliance with the Scottish annual mean PM_{10} AQO. References to the influence of transboundary events on PM levels was noted, with PM pollution episodes in late March 2022 being made. A 'Pollution episode report'[3] for this episode was published on the Scottish Air Quality website on 25 March 2022 with specific reference to monitoring stations in Dundee. No significant transboundary events affecting Dundee were reported during 2023.

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

Transboundary events are known to influence PM_{10} levels. In March 2022 a number of exceedances of the 50µg/m^3 daily level were observed across PM_{10} monitoring locations in Dundee during a significant transboundary event. This contributed to an overall increased number of days above the 50ug/m^3 limit across the monitoring locations, with the seven times per year limit being exceeded at one location (Albert Street OSIRIS) in 2022. It is noted though that OSIRIS analyser results for daily levels should be treated with caution as they are indicative monitors and are known to over-estimate the number of daily exceedences due to the correction methodology required to correct data prior to reporting.

During 2023, the number of days that the 50µg/m^3 daily mean level was exceeded was significantly lower than 2022, with exceedence of the daily mean level occuring once at one

[2] https://www.scottishairquality.scot/technical-reports/equivalence-study-investigate-particulate-matter-monitoring-scotland-using-fidas

[3] https://www.scottishairquality.scot/news/latest-air-pollution-episode

reference analyser (Lochee Road FIDAS) during 2023. When applying the FIDAS adjustment factor for $PM_{2.5}$, the number if exceedences is increased to two in 2023 at the Lochee Road location. Figure 15 in Appendix A shows the number of the daily mean PM_{10} concentrations greater than 50µg/m^3 recorded at the PM_{10} monitors. It is hard however to draw conclusions on trend analysis of short-term PM_{10} exceedances because, apart from the influence of annual transboundary events (usually in March and April), most are caused by transient and sometimes unpredictable events such as road works, fires, road gritting and demolition / construction activities. It is therefore considered appropriate to continue monitoring for PM_{10} at the existing locations, however, should a location of concern be identified then consideration will be given to the relocation of one of the existing OSIRIS units.

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.8 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/m^3.

As per the Scottish Government Guidance note published on 17 May 2023[4], annual mean PM data collected using Palas Fidas 200 is to be corrected using factors (PM_{10} divided by 0.909 and $PM_{2.5}$ multiplied by 1.06) as identified by the "Scottish Government Equivalence Study to Investigate Particulate Matter Monitoring In Scotland Using The Fidas 200"[5], with local authorities to present both measured and corrected data for LAQM reporting. Table A.8 contains both measured and corrected data.

Dundee City Council began monitoring for $PM_{2.5}$ using a Fidas 200 analyser at the background site at Mains Loan in October 2017. The Lochee Road Fidas 200 analyser was installed in March 2018. $PM_{2.5}$ monitoring at Whitehall Street, Seagate and Meadowside commenced in March 2019. The most recent installation is at the Urban Industrial site on Broughty Ferry Road, with the analyser installed in January 2020. All six of the $PM_{2.5}$ monitors are Palas Fidas analysers measuring both PM_{10} and $PM_{2.5}$.

[4] www.scottishairquality.scot/news/local-authority-guidance-note-laqm-reporting-scottish-pm-data

[5] https://www.scottishairquality.scot/technical-reports/equivalence-study-investigate-particulate-matter-monitoring-scotland-using-fidas

No exceedances of the $PM_{2.5}$ annual mean Scottish AQO were observed at any of the Palas Fidas monitoring locations in 2023 with or without the applied correction factor. All locations showed slight reductions on the 2022 annual mean levels.

Four of the OSIRIS monitors are at roadside PM_{10} monitoring locations (Albert Street, Logie Street, Myrekirk Road, Stannergate) and therefore represent relevant locations for $PM_{2.5}$ calculations. The Broughty Ferry Road OSIRIS is considered an Urban Industrial monitoring location. The DEFRA Guidance does not recommend calculating $PM_{2.5}$ from PM_{10} at Industrial sites owing to their unique site-specific characteristics. Chapter 7 of LAQM.TG (22) provides methodology for estimating $PM_{2.5}$ concentrations from PM_{10} measurements, with options provided for when local sites measuring both PM_{10} and $PM_{2.5}$ are and are not available. Paragraph 7.119 of LAQM.TG (22) advises that when local sites measuring both PM_{10} and $PM_{2.5}$ are available, the 'PM_{course}' can be calculated for the site by subtracting the annual average $PM_{2.5}$ concentration from the annual average PM_{10} concentration. This PM_{course} can then be used at sites of the same classification to estimate the $PM_{2.5}$ by subtracting the calculated PM_{course} split. Alternatively, Paragraph 7.120 provides a methodology of using a nationally derived factor for either background or roadside locations for when there are no local sites measuring both PM_{10} and $PM_{2.5}$. Prior to 2022, the prediction methodology used an assumed ratio of 0.7 (as described in LAQM.TG (16) (April 2021) (paragraph 7.111)) to estimate $PM_{2.5}$ levels. As there are four local roadside sites (Lochee Rd, Meadowside, Seagate, Whitehall Street) measuring both PM_{10} and $PM_{2.5}$ in Dundee, a local PM_{course} split has been identified for roadside locations. Through application of the LAQM.TG (22) methodology, the overall PM_{course} figure for Dundee in 2023 is 6.4.

Table A.9 in Appendix A shows estimated $PM_{2.5}$ annual mean levels using the 0.7 ratio prediction methodology for years prior to 2022, and PM_{course} prediction methodology from 2022 onwards. Locations where the $PM_{2.5}$ annual mean AQO (10ug/m^3) was estimated to be exceeded are highlighted in **bold**. In 2022, one location (Albert Street) potentially exceeded the 10ug/m^3 annual mean AQO, however, as the OSIRIS monitor at Albert Street is an indicative analyser, consideration of AQMA declaration for $PM_{2.5}$ was considered unnecessary although levels should continue to be monitored. In 2023, the predicted $PM_{2.5}$ annual mean level for the Albert Street OSIRIS unit (6.6ug/m^3) was well below the 10ug/m^3 annual mean AQO limit. The predicted $PM_{2.5}$ annual mean levels for Logie Street, Myrekirk Road and Stannergate were also compliant with the $PM_{2.5}$ AQO.

3.2.4 Sulphur Dioxide (SO_2)

Dundee City Council does not currently monitor SO_2.

3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene

Dundee City Council does not currently monitor any of these pollutants.

4 New Local Developments

4.1 Road Traffic Sources

Since the Annual Progress Report 2023 none of the following have been identified as being new:

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

Annual road count data (as Annual Average Daily Traffic (AADT)) from Dundee City Council's long-term Road Traffic Reduction Act (RTRA) Sites from 2005-2023 are presented in Table E.1 in Appendix E. Data for some previously reported RTRA sites remain unavailable however the table will be updated in future years APRs if this data is provided. Table E.1 shows that COVID-19 lockdown restrictions on travel and work in 2020 and 2021 reduced road traffic levels across the city. Traffic levels have not returned to pre-pandemic levels in all locations, with traffic flows across in some locations remaining around 10% lower than pre-pandemic 2019 levels.

Table E.2 in Appendix E shows the percentage growth at each of the RTRA sites since 2005. Only one site, Tay Bridge, had experienced a significant increase (>10%) in traffic flows over the period ending 2019. There is currently no relevant exposure within 10m of this location. Data for 2023 shows reduced traffic levels across the sites in Dundee compared to 2019 pre-pandemic levels. Consequently, updated assessments of NO_2 and PM_{10} are not required for those RTRA Sites where there is relevant exposure.

More recent changes to the road network have been introduced to put limitations on certain vehicle types or vehicle manoeuvres, with the aim of aiding the movement of buses, easing congestion and to benefit road safety. These have included bus priority measures on Meadowside (which has diverted general traffic away from the Meadowside automatic monitor) and road infrastructure changes at Lochee Road / Cleghorn Street / Rankine Street.

Enforcement of the Dundee Low Emission Zone scheme will commence at the end of May 2024, with vehicles not meeting the minimum criteria being driven on a road within the scheme area to be issued with a Penalty Charge Notice (PCN). Traffic modelling and forecasting undertaken during the LEZ development process suggested that around 1500 non-compliant cars (approximately 12% of all trips in the LEZ area) could still be entering/exiting the inner ring road area on a daily

basis in 2024[6]. It is suggested that, as a PCN would be issued for driving a non-compliant vehicle on a road in the LEZ area, drivers of non-compliant vehicles would therefore avoid driving in the scheme and park outside of the LEZ area, meaning that traffic flows in the LEZ area will be lower. The level of reduction of traffic in the LEZ after enforcement commences in 2024 is likely to be less than the 12% figure suggested as vehicles, i.e. buses, will have been upgraded or have been granted exemptions (blue badge) to allow them to access the LEZ. Traffic flow levels will be monitored in the lead up to and post commencement of enforcement of the LEZ and reported on as a part of the LEZ reporting process in future years.

4.2 Other Transport Sources

None of the following transport sources have been identified as new since the 2023 Annual Progress Report:

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

4.3 Industrial Sources

Under this section the local authority is required to identify any of the following which are new:

- **Industrial installations:** new or proposed installations for which an air quality assessment has been carried out;
- **Industrial installations:** existing installations where emissions have increased substantially, or new relevant exposure has been introduced;
- **Industrial installations:** new or significantly changed installations with no previous air quality assessment;

[6] Chapter 4.3 of the Dundee LEZ Integrated Impact Assessment: https://www.dundeecity.gov.uk/sites/default/files/publications/2021-10-27_dundee_low_emission_zone_integrated_impact_assessment.pdf

- Major fuel storage depots storing petrol;
- Petrol stations; and
- Poultry farms.

Industrial sources are regulated by the Scottish Environment Protection Agency (SEPA) under the Pollution Prevention and Control Regulations (PPC). Local authorities also have controls over smaller industrial and commercial sources, largely through the Clean Air Act and its associated control of stack heights. As a result of these controls, there should be few sources that may be relevant to local authorities under the Local Air Quality Management (LAQM) regime. The majority of these sources will have been previously addressed and the focus is, therefore, on new installations and those with significantly changed emissions or new exposure.

A list of industrial processes in the city that are regulated by SEPA is provided in Appendix F**.**

- **New or Proposed Installations for which an Air Quality Assessment has been Carried Out**

See Appendix F for details of industrial installations present within Dundee. No new or proposed installations resulted in an air quality assessment being carried out during 2023.

- **Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been Introduced**

No existing installations have increased emissions significantly or had new relevant receptors introduced near to them.

- **New or Significantly Changed Installations with No Previous Air Quality Assessment**

SEPA advised that a new PPC Part B was issued for the Energy Centre at Ninewells Hospital under the Medium Combustion Plant (MCP) regulations. This is an existing MCP installation that was put into operation before 20/12/2018 with rated thermal inputs of greater than 5MW up to and including 20MW, falling under Schedule 1, Part 1, Chapter 1, Section 1.1, Part B (d).

- **Major Fuel (Petrol) Storage Depots**

The assessment considers benzene, with respect to the 2010 objective. There are no major fuel (petrol) storage depots within the Local Authority area.

- **Petrol Stations**

The assessment considers benzene with respect to the 2010 objective. Large petrol stations, where the annual throughput is more than 2000m^3 of petrol (2 million litres per annum) and with a busy road nearby (i.e. >30,000 annual average daily traffic flows) require consideration where there is relevant exposure (e.g. residential properties) within 10m of the pumps. All existing petrol stations have been assessed previously and there are no residences within 10m of the pumps.

Dundee City Council confirms that there are no new petrol stations meeting the specified criteria.

- **Poultry Farms**

Farms housing in excess of: 400,000 birds if mechanically ventilated; 200,000 birds if naturally ventilated; and 100,000 birds for any turkey unit, require consideration if there is residential exposure within 100m of the poultry units. The assessment needs to consider only PM_{10}.

Dundee City Council confirms that there are no poultry farms meeting the specified criteria in Dundee.

4.4 Commercial and Domestic Sources

Under this section the Council is required to identify any of the following which are new since the last Annual Progress Report:

- Biomass[7] combustion plant – individual installations (50kW to 20MW);
- Areas where the combined impact of several biomass combustion sources may be relevant;
- Areas where domestic solid fuel burning may be relevant; and
- Combined Heat and Power (CHP) Plant.

Since the 2023 Annual Progress Report there have been no new biomass combustion installations nor areas identified where the combined impact of several biomass sources may be relevant. Smoke Control Orders cover most of the local authority area and there are currently no areas identified with significant solid fuel use, though regular enquiries / complaints to the Council about domestic solid fuel burning and planning applications for the installation of wood/solid fuel burning stoves, are received.

The requirement to consider CHP Plant is a new requirement that local authorities have had to report since the APR 2016. No new CHP plants were identified during 2023.

4.5 New Developments with Fugitive or Uncontrolled Sources

Under this section the Council is required to identify any of the following potential sources of fugitive or uncontrolled particulate matter, which are new:

[7] Note (from Defra FAQ 2009): the term 'biomass' strictly applies to all solid fuels made from plants, i.e. coal, smokeless fuels, wood, straw etc... However, the term biomass is now frequently taken to be synonymous with renewable fuels such as wood and straw. For the purposes of air quality review and assessment the strict definition of biomass is applicable.

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

The Port of Dundee is an ever-changing area of activity with many varying projects to improve the facilities and capabilities of the Port undertaken in recent years. This has included the addition of increased lifting capabilities and a new quayside at the eastern end of the Port to help bring forward opportunities for decommissioning and the offshore wind farm industry. The Port also provides accommodation for jack up drilling rigs for inspection, repair and maintenance of these jack up rigs which may remain at the Port for many months at a time. The Port is a major grain handling port and has the largest grain drying facility in Scotland located within the Port boundary.

An extensive set down area for the storage of items arriving to the Port, such as wind turbine components, was created in 2021 with a significant amount of earthwork carried out during its construction. The access point to this area is approximately 200m south of the Stannergate PM_{10} OSIRIS unit. In our 2022 APR we reported sharp increase in the annual mean PM_{10} concentration at this indicative monitor compared to previous years, with a possible source being this project. The PM_{10} annual mean concentration at the Stannergate OSIRIS monitor indicated compliance with the AQO for 2023, with there being an improvement on the 2022 annual mean level. Data collection for the year though was slightly down (77.8%) due to some issues with the analyser, however sufficient data was collected to be able to report without needing to annualise the data. No instances of the daily mean level were recorded during the year, however the data percentage for daily mean levels was slightly lower at 73.9%. As the data collection figure was below 85%, the 98.1st percentile figure was identified, with this being 35.9ug/m^3.

As many of the activities carried out at the Port are potential sources of fugitive particulate emissions, pollutant monitoring will continue at locations adjacent to the port.

5 Planning Applications

This section identifies any major planning applications that were granted permission during 2023 that may impact on air quality. All planning applications referred to in Table 5.1 can be found on the Council's website (https://idoxwam.dundeecity.gov.uk/idoxpa-web/) using the application numbers detailed below.

Table 5-1 Major Planning Applications

Planning Application	Application Number	Air Quality Impacts
Erection of a Warehouse (Class 6) With Ancillary Offices, Associated Vehicle Parking, Van Storage, Landscaping and Infrastructure	22/00852/FULM	This application was approved subject to conditions on the 19th of April 2023. The approved storage and distribution warehouse would be located towards the centre of the site, with a 156-space staff and visitor car park to the east. Within the west of the site a 489-space van storage area is proposed. The warehouse is to include direct access to 7 HGV loading bays to the east of the warehouse and van loading bays to the north. An Air Quality Assessment was submitted for review by Environmental Health, which considered the air quality impacts of the development on previous air quality hot spots on A90/Forfar Road near the Forfar Road / Kingsway junction. Following a review of the submitted Air Quality Assessment, it was concluded that the proposed development would not have any significant impact on air quality within the local area or the identified location on A90/Forfar Road.
Erection of Purpose-Built Student Accommodation, South Ward Road	23/00311/FULM	This application was approved subject to conditions on the 13th of December 2023. The proposal would provide 215 student beds comprising a mix of studio apartments and cluster apartments (4 and 5 bed apartments each sharing a lounge/kitchen/diner). As part of the development, internal amenity spaces are to be provided for residents, including a gym and lounge areas. To the rear (north) of the proposed building external amenity space is to be proposed.

		The applicant submitted an Air Quality Assessment which was reviewed by Environmental Health. The proposal is to heat the building with an electric system, comprising under floor heating or panel radiators, while a standby diesel generator was also included in the proposal. As such, Environmental Health requested planning conditions that required for the submission of full details of the heating system and any associated flues to ensure that any such system discharges at an appropriate height, and one which required full details of the diesel generator and flue to be submitted to the council for approval prior to construction works to ensure any system has no detrimental impact on air quality. Both were included within the conditions attached to the Planning consent.

6 Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

Monitoring data for 2023 indicates that were no potential exceedances of the NO_2 annual mean objective (40µg/m^3) at receptor locations within the Dundee AQMA. The NO_2 annual means at real-time monitors were similar to that recorded for 2022, with the improvements since 2019 remaining. AADT traffic levels counted at the RTRA sites indicated that traffic levels remained lower than 2019 pre-pandemic levels, with traffic flows being around 10% lower than 2019 pre-pandemic levels across these monitoring locations.

No exceedances of the NO_2 hourly mean objective were identified by automatic monitors or indicated by diffusion tubes in 2023. No exceedances of the hourly mean level were recorded in 2023. Compliance with the NO_2 hourly mean AQO (18 exceedances of the hourly NO_2 level) are allowed) has been achieved for the past 9 years. Lochee Road is the only area of the city where the hourly AQO has been exceeded previously. The downward trend in the 99.8th percentile concentration at the Lochee Road monitor first reported in 2019 has continued and it is now considered appropriate to progress with the revocation of the NO_2 hourly mean component of the Dundee AQMA.

No exceedances of the PM_{10} annual mean objective (18µg/m^3) were predicted during 2023, with levels across Dundee decreasing on those reported for 2022.

The PM_{10} daily mean objective (50µg/m^3, not to be exceeded more than 7 times per year) was met at all monitoring locations during 2023. The number of days above the 50ug/m^3 level recorded decreased in all locations when compared to 2022, with the daily mean level being exceeded only on one occasion across all locations in 2023, with this being at the Lochee Road FIDAS monitor.

It is hard to draw conclusions from any analysis of trends in short-term PM_{10} exceedances because, apart from the influence of annual transboundary events (usually in March and April), most are caused by transient and sometimes unpredictable short-term events such as road works, fires, road gritting and demolition and construction activities.

No monitored or calculated predicted exceedances of the $PM_{2.5}$ annual mean objective (10µg/m^3) were observed across the monitoring locations for 2023.

6.2 Conclusions relating to New Local Developments

No new major developments that are likely to impact on air quality were approved during 2023. An assessment of the impact of traffic from a proposed storage and distribution warehouse was

carried out during 2023 with the conclusion being that the proposed development would not have any significant impact on air quality.

Traffic flows from the council's Road Traffic Reduction Act Sites from 2023 were reviewed, with traffic flow levels at some sites remaining at around 90% of the 2019 pre-pandemic level. No new areas requiring assessment were identified. There were no new 'other transport' sources identified in Section 4 during 2023.

No new industrial sources requiring air quality assessments to be carried out were identified in 2023.

No new commercial or domestic sources which met the criteria outlined in Section 4 were identified during 2023.

The potential for an increase in uncontrolled fugitive particulate matter as a consequence of movements of heavy vehicles over unmade ground within the port remains. Activities within the port were previously identified as contributing to elevated PM_{10} concentrations measured at the Stannergate monitoring station. Higher levels in 2021 and 2022 were considered to be related to earthworks during the construction of the new quay and increasing the setting down area capability. As many of the activities carried out at the Port are potential sources of fugitive particulate emissions, pollutant monitoring will continue at locations adjacent to the Port.

6.3 Proposed Actions

The 2023 monitoring data did not identify the need to declare an AQMA for any additional pollutants or objectives. None of the 2023 NO_2 passive diffusion tubes identified any new areas of exceedance.

The following actions are proposed following the review and assessment of monitoring data and new developments:

- Progress with the revocation of the 1-hour mean NO_2 air quality objective aspect from the Dundee AQMA;
- Continue monitoring of fugitive PM_{10} sources around the port area;
- Continue monitoring of PM on Albert Street, noting any transient activities with risk of PM_{10} / $PM_{2.5}$ emissions;
- Report on any new or significantly changed SEPA prescribed process;
- Continue to monitor planning applications for new pollution sources, relevant exposure and creation of 'street canyons', while also reviewing additional information being provided for applications approved in and prior to 2024;
- Implement the AQAP measures being taken forward subject to grant funding in 2024/25;

- In line with LAQM PG(S)2023, finalise the review and update of the current 2011 Air Quality Action Plan including carrying out statutory consultation on a draft version. The new 2024 Air Quality Action Plan update is proposed to be published following Committee approval in the second half of 2024; and
- Submit the next Annual Air Quality Progress Report in 2025.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites 2023

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA? (Y/N)	Monitoring Technique	Distance to Relevant Exposure? (m)[1]	Distance to Kerb of Nearest Road (m)[2]	Inlet Height (m)
CM 3	Broughty Ferry Road Rollalong	Urban Industrial	341970	730977	PM_{10}	Y	TEOM	0	6.88	2.93
					NO_2		Chemiluminescent [g]		6.63	2.97
					PM_{10} & $PM_{2.5}$	Y	Fidas [k]		6.63	2.86
CM 13	Broughty Ferry Road Partisol	Urban Industrial	341971	730978	PM_{10}	Y	Partisol	0	6.11	2.84
CM 4	Lochee Road Romon	Roadside	338861	730773	NO_2	Y	Chemiluminescent [b f]	2.15 (2.24)	1.00 (1.15)	1.95 (1.77)
					PM_{10}		Beta Attenuation (BAM) [f]	2.24	1.15	2.06
					PM_{10} & $PM_{2.5}$		Fidas [f]	1.98	1.36	2.21
CM 9	Logie Street Osiris	Kerbside	338176	731298	PM_{10}	Y	Osiris (nephthalometer)	1.65	0.57	3.31
CM 12	Mains Loan	Urban Background	340972	731893	NO_2	Y	Chemiluminescent [c]	0	N/A	1.80
					PM_{10} & $PM_{2.5}$		Fidas [e]			2.43
CM 5	Seagate Romon	Roadside	340487	730446	NO_2	Y	Chemiluminescent [b]	2.00	1.10	1.70
					PM_{10}		Beta Attenuation (BAM)			2.06
					PM_{10} & $PM_{2.5}$		Fidas [h]	1.81	1.37	2.53
CM 2	Union Street Rollalong [j]	Roadside	340235	730091	NO_2	Y	Chemiluminescent [b]	3.55	1.64	2.92
					PM_{10}		Beta Attenuation (BAM)[a]		1.64	3.00
CM 6	Whitehall Street Romon	Roadside	340278	730156	NO_2	Y	Chemiluminescent [b]	1.86	3.26	1.80
					PM_{10}		Beta Attenuation (BAM)	1.79	3.33	2.06

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA? (Y/N)	Monitoring Technique	Distance to Relevant Exposure? (m)[1]	Distance to Kerb of Nearest Road (m)[2]	Inlet Height (m)
					PM_{10} & $PM_{2.5}$		Fidas [h]	1.63	3.52	2.62
CM 14	Meadowside Romon	Roadside	340243	730653	NO_2	Y	Chemiluminescent [d]	0.42	3.59 (1.60)[i]	2.26
					PM_{10}		Beta Attenuation (BAM)		3.65 (1.63)[i]	2.17
					PM_{10} & $PM_{2.5}$		Fidas [h]	0.79	3.53	2.63
CM 15	Albert Street Osiris	Kerbside	341090	731105	PM_{10}	Y	Osiris (nephthalometer)	1.54	0.89	3.15
CM 16	Broughty Ferry Road Osiris	Urban Industrial	341970	730977	PM_{10}	Y	Osiris (nephthalometer)	0	7.15	3.00
CM 17	Myrekirk Osiris	Roadside	335438	731740	PM_{10}	Y	Osiris (nephthalometer)	0.4	14.00	3.11
CM 18	Stannergate Osiris	Roadside	343322	731073	PM_{10}	Y	Osiris (nephthalometer)	1.93	1.16	3.11

Notes: (1) "0" if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property or representative of a residential area).

(2) 'Kerb' is taken as being the edge of the carriageway with flowing traffic.

(a) During 2013 equipment was updated from TEOM to BAM.

(b) During 2013 equipment was updated from model ML 9841A to model API T200.

(c) Equipment model up to 21 September 2022 was Thermo 42i. From 21 September 2022 it was a TAPI T200.

(d) Equipment model up to 1st March 2021 was ML 2041. From 1st March 2021 the equipment was Serinus S40 IZS configuration.

(e) During 2017 equipment was updated from TEOM to Palas Fidas.

(f) On 23rd March 2018 monitoring station upgraded with new enclosure and Palas Fidas replaced BAM. NOx inlet position changed slightly old measurements shown in brackets.

(g) API T200 NOx analyser relocated from closed Union Street Station in January 2016.

(h) During March 2019 equipment was updated from BAM to Palais Fidas.

(i) Measurements amended to reflect change in pavement width, see Erratum in Appendix C.5 APR2020, old measurements shown in brackets

(j) CM2 Union Street – was discontinued in January 2016.

(k) On 8th January 2020 equipment was updated from TEOM to Palas Fidas.

N/A if not applicable

Figure 3 Automatic Monitoring Sites 2023

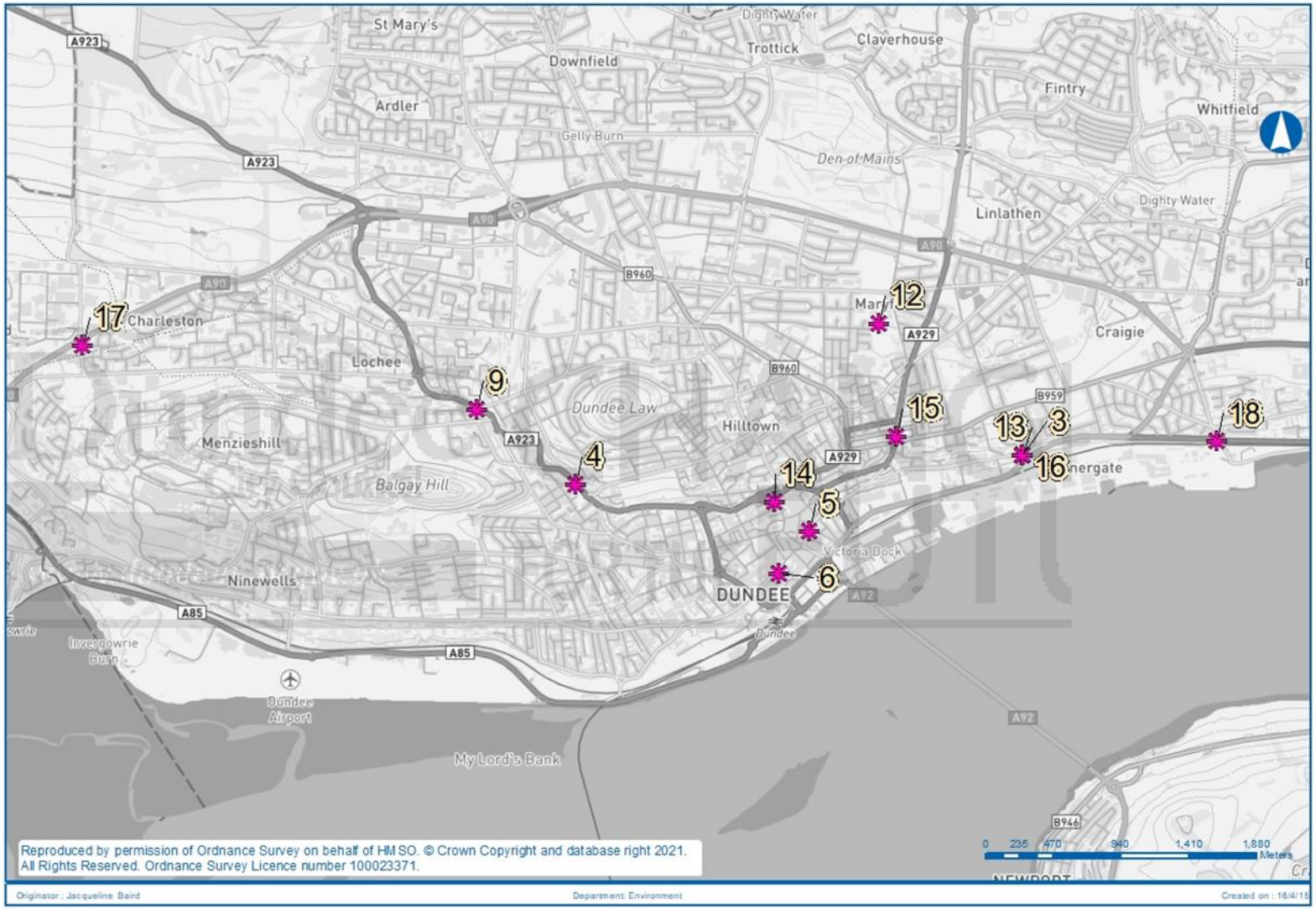


Table A.2 – Details of Non-Automatic Monitoring Sites

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)
DT 92	Abertay 2	Roadside	340018.5473	730612.4218	NO_2	Dundee AQMA	2.0	2.0	No	2.4
DT 179	Albert St (15)(Façade)	Roadside	341092.4237	731120.6783	NO_2	Dundee AQMA	0.3	2.0	No	2.4
DT 180	Albert St (15)(Roadside)	Kerbside	341090.9354	731120.7113	NO_2	Dundee AQMA	1.8	0.5	No	2.4
DT 167	Albert St (191)	Kerbside	341161.4264	731534.7429	NO_2	Dundee AQMA	2.7	0.6	No	2.5
DT 5	Arbroath Rd (13)	Kerbside	341110.9866	731069.6793	NO_2	Dundee AQMA	2.5	0.7	No	2.8
DT 223	B/ Ferry Rd Lower (Cyclesign)	Urban Background	343529.613	730937.3423	NO_2	Dundee AQMA	N/A	2.8	No	2.5
DT 139	B/Ferry Rd (141) Downpipe	Roadside	343317.4851	731072.0073	NO_2	Dundee AQMA	0.2	4.3	No	2.4
DT 145	B/Ferry Rd Greendykes	Roadside	342662.2696	731111.7514	NO_2	Dundee AQMA	7.7	4.1	No	2.4
DT 7	Balgavies Pl	Urban Background	343082.2747	731465.3006	NO_2	Dundee AQMA	N/A	N/A	No	2.4
DT 9	Birnam Pl	Urban Background	337531.2319	730914.2557	NO_2	Dundee AQMA	N/A	N/A	No	2.6
DT 11	Broughty Ferry Rd (141)	Roadside	343321.9239	731073.2263	NO_2	Dundee AQMA	2.0	1.3	No	2.7
DT 186	Carolina Court 30mph sign	Roadside	342342.1514	731082.9253	NO_2	Dundee AQMA	-0.4	7.6	No	2.4
DT 155	Carolina Court Lp6	Urban Background	342353.292	731058.094	NO_2	Dundee AQMA	N/A	N/A	No	2.4

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)
DT 171	Claypotts / Arbroath Rd (502)	Roadside	345346.8733	732080.2242	NO_2	Dundee AQMA	5.3	11.2	No	2.5
DT 246	Clepington Rd/ Forfar Rd_2	Roadside	341387.3	732123.301	NO_2	Dundee AQMA	8.28	2.38	No	2.5
DT 188	Commercial St (9)	Roadside	340544.2188	730290.5439	NO_2	Dundee AQMA	2.4	2.6	No	2.3
DT 84	Commercial St / Dock St (40)	Roadside	340565	730263	NO_2	Dundee AQMA	0.2	2.8	No	2.7
DT 85	Dock St (21)	Roadside	340523.6	730215.9	NO_2	Dundee AQMA	0.3	5.1	No	2.4
DT 156	Dock St (57)	Roadside	340656.4944	730343.3923	NO_2	Dundee AQMA	3.3	2.5	No	2.5
DT 241	Dock St (Customs House) DT 241	Roadside	340691.2965	730343.9471	NO_2	Dundee AQMA	1.4	3.2	No	2.7
DT 248	Dock St (Customs House/sign) DT 248	Roadside	342342	730347	NO_2	Dundee AQMA	1.1	3.8	No	2.2
DT 240	Dock St/Gellatly St	Roadside	340637.5125	730328.1996	NO_2	Dundee AQMA	0.7	5.0	No	2.8
DT 233	Dock St/Trades Lane	Roadside	340689.8115	730381.5431	NO_2	Dundee AQMA	-0.4	6.1	No	2.0
DT 227	Dudhope Crescent Road (40)	Kerbside	339829.8758	730618.7713	NO_2	Dundee AQMA	2.0	0.8	No	2.7
DT 20	Dura St (100)	Kerbside	341150.3635	731575.6125	NO_2	Dundee AQMA	1.7	0.6	No	2.6
DT 214	East Dock St (26)	Roadside	340725	730417	NO_2	Dundee AQMA	0.2	3.7	No	2.6
DT 22	Eastport Roundabout	Roadside	340651	730623	NO_2	Dundee AQMA	1.6	1.0	No	2.7

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)
DT 245	Forfar Rd (104)_2	Kerbside	341435.903	732360.19	NO_2	Dundee AQMA	7.7	0.7	No	2.8
DT 244	Harefield Rd (14)	Roadside	338181.804	731848.272	NO_2	Dundee AQMA	1.4	4.7	No	2.6
DT 26	Kingsway East Roundabout	Roadside	343107.3765	731739.678	NO_2	Dundee AQMA	14.3	2.9	No	2.7
DT 27	Kingsway/ Mains Loan	Roadside	341123.6085	732468.2592	NO_2	Dundee AQMA	15.4	6.2	No	2.6
DT 177	Kingsway / Strathmartine Rd (N)	Roadside	339179.113	732896.0877	NO_2	Dundee AQMA	3.6	3.1	No	2.5
DT 30	Lochee Rd (138)	Kerbside	338935.7273	730680.429	NO_2	Dundee AQMA	2.1	0.4	No	2.8
DT 31	Lochee Rd (140) (Traffic Lts)	Roadside	338927.1945	730685.1518	NO_2	Dundee AQMA	0.3	2.2	No	2.6
DT 32	Lochee Rd (184)	Kerbside	338767	730856	NO_2	Dundee AQMA	3.2	0.7	No	2.4
37, 38, 39	Lochee Rd (Romon 3)	Roadside	338860.6181	730773.4427	NO_2	Dundee AQMA	2.0	1.3	Yes	2.0
DT 36	Lochee Rd / Polepark Rd	Kerbside	339016	730586	NO_2	Dundee AQMA	9.2	1.0	No	2.7
DT 37	Logie St (114)	Roadside	338183.8374	731292.7572	NO_2	Dundee AQMA	0.5	1.7	No	2.7
DT 38	Logie St (98)	Kerbside	338252.2046	731257.587	NO_2	Dundee AQMA	N/A	0.8	No	2.6
DT 39	Loons Rd (1)	Roadside	338211.0935	731293.3741	NO_2	Dundee AQMA	0.5	1.9	No	2.7
DT 237	Lower Princess St	Roadside	340964.11	730855.22	NO_2	Dundee AQMA	0.0	2.4	No	2.5

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)
DT 40	Marketgait (Palais Crt)	Roadside	339952.8515	730093.5454	NO_2	Dundee AQMA	3.5	1.3	No	2.7
91, 92, 93	Meadowside (Romon 3)	Roadside	340243.2026	730652.7362	NO_2	Dundee AQMA	0.3	3.7	Yes	2.1
DT 42	Muirton Rd (6)	Roadside	338156.3999	731294.2079	NO_2	Dundee AQMA	0.3	1.1	No	2.5
DT 185	Murraygate (46)	Urban Background	340409.4354	730483.9398	NO_2	Dundee AQMA	N/A	N/A	No	2.5
DT 189	Myrekirk Rd (29)	Roadside	335420.2401	731725.6942	NO_2	Dundee AQMA	5.2	2.0	No	2.3
DT 48	Nethergate (132) / Marketgait	Roadside	340073.82	729983.84	NO_2	Dundee AQMA	3.6	1.3	No	2.6
DT 47	Nethergate (40)	Roadside	340230.2583	730123.8366	NO_2	Dundee AQMA	2.7	1.3	No	2.7
DT 45	Nethergate (6)	Roadside	340274	730171	NO_2	Dundee AQMA	2.5	1.3	No	2.7
DT 213	Nethergate (64)	Roadside	340196	730089	NO_2	Dundee AQMA	2.4	4.2	No	2.6
DT 44	Nethergate (88)	Kerbside	340163.1958	730060.9256	NO_2	Dundee AQMA	5.0	0.9	No	2.1
DT 46	Nethergate (95)	Kerbside	340032.502	729957.0337	NO_2	Dundee AQMA	1.8	0.9	No	2.6
DT 239	Princes St (185)	Kerbside	341077.1707	731030.7122	NO_2	Dundee AQMA	2.4	0.6	No	2.3
DT 49	Rankine St (2)	Roadside	338768.35	730900.23	NO_2	Dundee AQMA	0.4	1.8	No	2.7
DT 228	Riverside Esplanade/S. Crichton St.	Roadside	340516.03	729990.96	NO_2	Dundee AQMA	1.2	2.7	No	2.6

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)
DT 224	Seagate (112)	Roadside	340528.065	730537.2449	NO_2	Dundee AQMA	0.0	2.6	No	2.6
DT 236	Seagate (36-40)	Roadside	340463.2445	730420.3345	NO_2	Dundee AQMA	0.2	2.8	No	2.5
DT 54	Seagate (9)	Roadside	340466.9999	730388.1178	NO_2	Dundee AQMA	0.9	1.7	No	2.8
DT 190	Seagate (97)	Roadside	340515.9765	730499.1667	NO_2	Dundee AQMA	0.0	2.3	No	2.3
DT 217	Seagate (99)	Roadside	340535.1598	730521.6779	NO_2	Dundee AQMA	0.0	2.4	No	2.5
56, 57, 58	Seagate (Romon 3)	Roadside	340486.5819	730446.0412	NO_2	Dundee AQMA	1.8	1.3	Yes	1.7
DT 55	Soapwork Lane	Roadside	340099.3457	730649.9545	NO_2	Dundee AQMA	0.0	3.5	No	2.8
DT 218	South Marketgait (Lampost 18)	Roadside	340291.3722	729978.8577	NO_2	Dundee AQMA	N/A	2.6	No	2.6
DT 247	South Marketgait (Street Sign)	Roadside	340124.806	729952.385	NO_2	Dundee AQMA	N/A	1.87	No	2.4
DT 151	South Road (1 Denbank)	Roadside	335187.5086	731527.8202	NO_2	Dundee AQMA	0.3	1.8	No	2.4
DT 162	St Andrews St / Seagate (116)	Roadside	340532.158	730548.3841	NO_2	Dundee AQMA	0.2	2.5	No	2.5
DT 59	Strathmore Ave (353)	Kerbside	339608.7559	731871.0098	NO_2	Dundee AQMA	1.5	0.7	No	2.7
DT 219	Thomson Avenue (Street Sign)	Roadside	340541.7744	730193.5939	NO_2	Dundee AQMA	1.8	2.2	No	2.6
DT 229	Thomson Avenue / S.Crichton St	Kerbside	340420.6	730077.95	NO_2	Dundee AQMA	3.1	0.9	No	2.7

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)
DT 60	Trades Lane (31)	Kerbside	340574.5935	730499.7581	NO_2	Dundee AQMA	1.8	0.4	No	2.7
DT 93	Victoria Rd (10)	Kerbside	340229.7177	730672.7587	NO_2	Dundee AQMA	2.7	0.3	No	2.6
DT 184	Victoria Rd (104)/William St)	Roadside	340696.8958	730949.7502	NO_2	Dundee AQMA	1.5	1.4	No	2.5
DT 191	Victoria Rd (4 India Buildings)	Roadside	340212.9721	730633.0717	NO_2	Dundee AQMA	0.0	2.8	No	2.3
DT 68	Victoria Rd (60)	Roadside	340374.81	730778.68	NO_2	Dundee AQMA	0.6	2.2	No	2.7
DT 70	Victoria Rd / Hilltown	Roadside	340274	730714	NO_2	Dundee AQMA	2.0	1.2	No	2.8
DT 71	Victoria St / Albert St	Kerbside	341070.9744	731072.249	NO_2	Dundee AQMA	1.7	0.8	No	2.6
DT 205	West Marketgait / Old Mill (23)	Roadside	339773.4489	730435.932	NO_2	Dundee AQMA	0.1	2.8	No	2.7
DT 231	West Marketgait / Ward Road	Roadside	339834.1588	730313.577	NO_2	Dundee AQMA	0.0	2.7	No	2.7
DT 183	West Marketgait / Guthrie St	Roadside	339805.2336	730338.471	NO_2	Dundee AQMA	2.0	1.2	No	2.4
DT 72	Westport (2)	Roadside	339842	730122	NO_2	Dundee AQMA	2.5	0.5	No	2.6
DT 73	Whitehall Cr (4)	Kerbside	340376	730109	NO_2	Dundee AQMA	3.0	0.9	No	2.6
DT 161	Whitehall Cr / Union St (50)	Kerbside	340305.1556	730050.6132	NO_2	Dundee AQMA	4.8	0.6	No	2.5
DT 76	Whitehall St (1)	Kerbside	340264.8235	730153.1891	NO_2	Dundee AQMA	5.6	0.9	No	2.7

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)
DT 81	Whitehall St (12)	Roadside	340292.6578	730142.1103	NO_2	Dundee AQMA	2.7	3.0	No	2.8
DT 77	Whitehall St (15)	Kerbside	340321.839	730097.9292	NO_2	Dundee AQMA	4.6	0.8	No	2.7
DT 74	Whitehall St (40)	Kerbside	340329.6	730105.6	NO_2	Dundee AQMA	3.6	0.8	No	2.8
DT 75	Whitehall St (5)	Roadside	340289.1	730128.14	NO_2	Dundee AQMA	3.2	2.5	No	2.6
82, 83, 84	Whitehall St (Romon 3)	Roadside	340278.1319	730156.2116	NO_2	Dundee AQMA	1.7	3.5	Yes	1.8
DT 82	Woodside Ave	Urban Background	340776	732306.99	NO_2	Dundee AQMA	N/A	0.6	No	2.6

Notes:
R = Roadside, K = Kerbside, UB = Urban Background, 'Kerb' is taken as being the edge of the carriageway with flowing traffic.
New sites first located in 2023 are highlighted in yellow.

(1) "0" if the monitoring site is at a location of exposure (e.g. installed on, adjacent to, or equivalent to the façade of a residential property, or is representative of a residential area).
(2) N/A if not applicable. (e.g. PDT at background or no relevant receptor at location).

Figure 4 NO_2 Diffusion Tube Locations (City Centre)

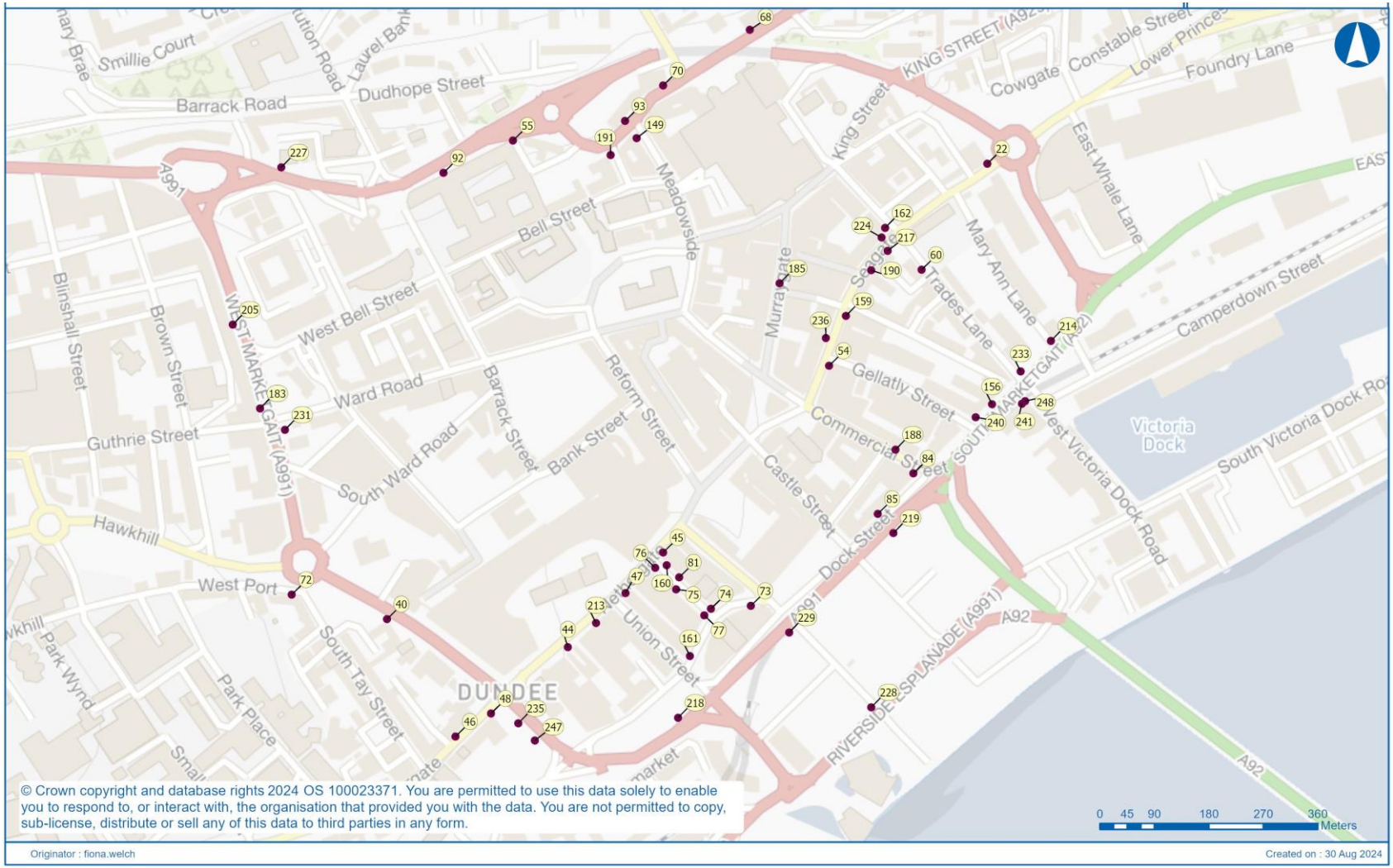


Figure 5 NO_2 Diffusion Tubes locations (East)

Figure 6 NO_2 Diffusion Tube locations (West)

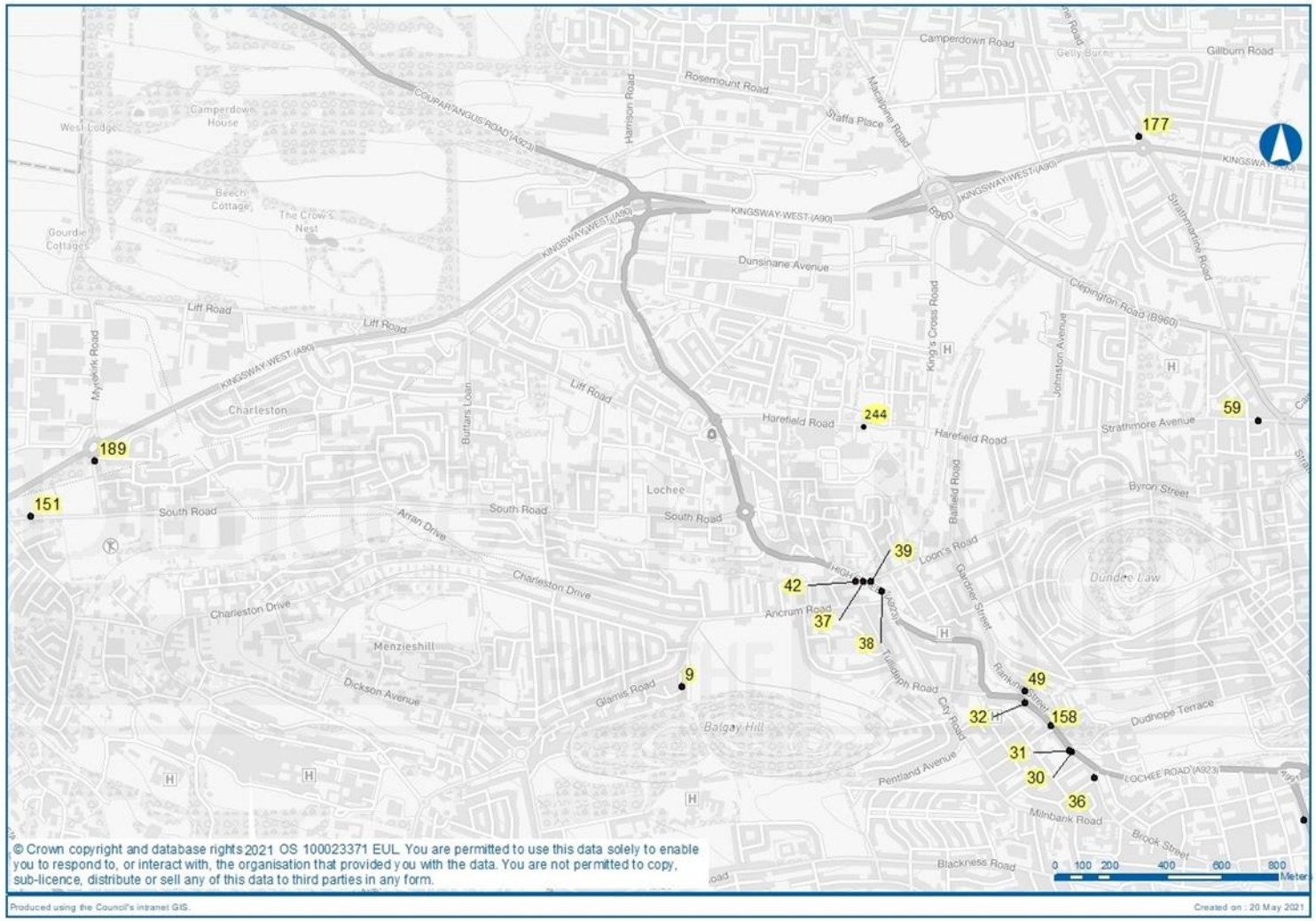


Table A.3 – Annual Mean NO_2 Monitoring Results: Automatic Monitoring (µg/m^3)

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
CM 3	Broughty Ferry Road	UI	Automatic	99.0	99.0	22.9	19.6	12.9	11.2	11.8
CM 4	Lochee Rd Romon	R	Automatic	99.8	99.8	**43.0**	31.2	31.7	29.0	28.5
CM 12	Mains Loan	UB	Automatic	99.0	99.0	11.0	8.5	8.4	9.1	7.3
CM 14	Meadowside Romon	R	Automatic	72.9	72.9	33.9	25.6	27.1	26.1	26.9
CM 5	Seagate	R	Automatic	95.3	95.3	**44.5**	28.5	30.3	26.5	28.7
CM 6	Whitehall St Romon	R	Automatic	99.0	99.0	33.4	24.0	27.5	20.1	21.3

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**.
All means have been "annualised" as per LAQM.TG(22) (TG(16) for 2018 – 2021 data) if valid data capture for the full calendar year is less than 75% (highlighted by shading). 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.4 – Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3)

Diffusion Tube ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2023 (%) [2]	2019	2020	2021	2022	2023
DT 92	Abertay 2	340018.5473	730612.4218	Roadside	100	100.0	36.5	26.2	29.8	26.6	27.9
DT 179	Albert Street (15) (Façade)	341092.4237	731120.6783	Roadside	100	100.0	30.3	24.5	24.1	19.9	22.7
DT 180	Albert Street (15) (Roadside)	341090.9354	731120.7113	Kerbside	100	100.0	31.7	25.2	24.9	22.0	24.3
DT 167	Albert Street 191	341161.4264	731534.7429	Kerbside	100	100.0	30.6	20.8	23.6	20.7	23.9
DT 187	Albert Street (81)	341113	341113	Kerbside			27.1				
DT 5	Arbroath Road (13)	341110.9866	731069.6793	Kerbside	100	100.0	32.1	27.2	23.5	21.2	21.4
DT 223	Broughty Ferry Road – Lower (Cycle sign)	343529.613	730937.3423	Urban Background	100	100.0	22.0	19.1	14.2	8.9	12.7
DT 204	Broughty Ferry Road (129)	342244	731066	Roadside			37.0	27.0	26.8	26.4	
DT 139	Broughty Ferry Road (141 Downpipe)	343317.4851	731072.0073	Roadside	100	100.0	30.1	24.4	24.1	21.5	23.2
DT 145	Broughty Ferry Road (Greendykes)	342662.2696	731111.7514	Roadside	100	100.0	32.2	24.7	25.4	19.6	19.9
DT 7	Balgavies Place	343082.2747	731465.3006	Urban Background	100	100.0	14.3	12.6	10.6	9.8	10.5
DT 9	Birnam Place	337531.2319	730914.2557	Urban Background	100	100.0	8.5	6.5	6.7	5.8	7.6
DT 11	Broughty Ferry Road (141)	343321.9239	731073.2263	Roadside	100	100.0	36.3	26.7	26.8	23.1	25.3
DT 186	Carolina Court 30mph sign	342342.1514	731082.9253	Roadside	100	100.0					17.2

Diffusion Tube ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2023 (%) [2]	2019	2020	2021	2022	2023
DT 155	Carolina Court LP6	342353.292	731058.094	Urban Background	100	100.0	19.4	15.7	14.6	12.5	13.6
DT 171	Claypotts / Arbroath Rd (502)	345346.8733	732080.2242	Roadside	100	100.0	24.8	21.0	17.8	16.4	16.6
DT 13	Clepington Rd/ Forfar Rd	341385	732121	Kerbside			29.4	21.7	22.1		
DT 246	Clepington Rd/ Forfar Rd_2	341387.3	732123.301	Roadside	100	90.4				18.6	19.7
DT 188	Commercial St (9)	340544.2188	730290.5439	Roadside	100	92.3	33.8	25.7	27.5	21.2	24.1
DT 84	Commercial St/Dock St (40)	340565	730263	Roadside	100	100.0	31.6	24.7	25.8	21.2	22.5
DT 85	Dock St (21)	340523.6	730215.9	Roadside	100	100.0	33.1	25.7	27.0	22.3	23.9
DT 156	Dock St (57)	340656.4944	730343.3923	Roadside	100	100.0	**44.2**	32.6	34.8	31.1	31.9
DT 241	Dock St (Customs House)	340691.2965	730343.9471	Roadside	100	42.3		27.8	27.2	23.0	22.8
DT 248	Dock St (Customs House)_2	342342	730347	Roadside	100	50.0					27.3
DT 240	Dock St / Gellatly St	340637.5125	730328.1996	Roadside	100	100.0		28.5	28.8	25.9	29.2
DT 233	Dock St / Trades Lane	340689.8115	730381.5431	Roadside	100	100.0	33.5	27.8	27.0	23.0	24.1
DT 227	Dudhope Crescent Rd (40)	339829.8758	730618.7713	Kerbside	100	100.0	38.8	28.9	29.6	25.7	26.6
DT 20	Dura St (100)	341150.3635	731575.6125	Kerbside	100	100.0	32.7	24.7	24.6	22.0	23.6
DT 214	East Dock Street (26)	340725	730417	Roadside	100	100.0	32.9	27.1	27.8	22.8	24.9

Diffusion Tube ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2023 (%) [2]	2019	2020	2021	2022	2023
DT 22	Eastport Roundabout	340651	730623	Roadside	100	100.0	30.0	21.7	22.6	19.6	21.0
DT 83	Forfar Rd (104)	341437	732360	Kerbside			38.1	28.5	27.9		
DT 245	Forfar Rd (104)_2	341435.903	732360.19	Kerbside	100	100.0				21.1	20.1
DT 244	Harefield Road (14)	338181.804	731848.272	Roadside	100	100.0				13.9	15.9
DT 26	Kingsway East Roundabout	343107.3765	731739.678	Roadside	100	100.0	34.1	27.6	27.4	24.8	24.4
DT 27	Kingsway/ Mains Loan	341123.6085	732468.2592	Roadside	100	100.0	27.5	20.5	21.3	18.2	19.2
DT 177	Kingsway / Strathmartine Rd (279)	339179.113	732896.0877	Roadside	100	100.0	28.7	23.2	22.8	22.1	20.9
DT 30	Lochee Rd (138)	338935.7273	730680.429	Kerbside	100	100.0	**45.8**	39.0	34.9	33.2	32.5
DT 31	Lochee Rd (140) Traffic Lts	338927.1945	730685.1518	Roadside	100	90.4	**46.2**	37.6	36.1	32.4	32.7
DT 32	Lochee Rd (184)	338767	730856	Kerbside	100	100.0	32.4	29.2	24.8	25.5	24.0
37, 38, 39	Lochee Rd (Romon) Average	338860.6181	730773.4427	Roadside	100	100.0	**41.5**	32.4	32.0	30.4	29.3
DT 36	Lochee Rd/Polepark Rd	339016	730586	Kerbside	100	100.0	25.7	20.1	18.6	17.4	18.8
DT 37	Logie St (114)	338183.8374	731292.7572	Roadside	100	100.0	**47.1**	**40.9**	38.6	34.1	35.7
DT 38	Logie St (98)	338252.2046	731257.587	Kerbside	100	100.0	30.2	26.2	24.0	22.2	22.4
DT 39	Loons Rd (1)	338211.0935	731293.3741	Roadside	100	100.0	35.1	28.9	29.8	25.3	27.5

Diffusion Tube ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2023 (%) [2]	2019	2020	2021	2022	2023
DT 237	Lower Princess St	340964.11	730855.22	Roadside	100	100.0	29.8	21.2	21.8	19.4	20.3
DT 40	Marketgait (Palais Crt)	339952.8515	730093.5454	Roadside	100	100.0				16.6	17.3
91, 92, 93	Meadowside (Romon) Average	340243.2026	730652.7362	Roadside	100	100.0	37.7	27.9	28.1	25.8	25.7
DT 238	Meadowside Halls	340281	730586	Roadside			28.4				
DT 42	Muirton Rd (6)	338156.3999	731294.2079	Roadside	100	100.0	24.1	19.0	19.7	17.7	19.3
DT 185	Murraygate (46)	340409.4354	730483.9398	Urban Background	100	90.4	21.6	14.3	13.8	11.8	13.0
DT 189	Myrekirk Rd (29)	335420.2401	731725.6942	Roadside	100	100.0	28.3	21.4	21.7	19.3	19.4
DT 48	Nethergate(132) / Marketgait	340073.82	729983.84	Roadside	100	100.0	27.2	20.3	20.7	20.8	22.2
DT 47	Nethergate (40)	340230.2583	730123.8366	Roadside	100	100.0	33.3	22.0	25.0	19.5	20.4
DT 45	Nethergate (6)	340274	730171	Roadside	100	100.0	32.2	24.6	25.8	20.8	21.6
DT 213	Nethergate (64)	340196	730089	Roadside	100	100.0	34.6	25.9	28.3	22.4	22.9
DT 44	Nethergate (88)	340163.1958	730060.9256	Kerbside	100	100.0	39.0	26.5	28.5	23.8	26.3
DT 46	Nethergate (95)	340032.502	729957.0337	Kerbside	100	100.0	30.7	19.0	20.4	19.2	21.0
DT 239	Princes St (185)	341077.1707	731030.7122	Kerbside	100	100.0	39.9	30.6	30.8	26.4	28.9
DT 49	Rankine St (2)	338768.35	730900.23	Roadside	100	100.0	36.7	28.6	25.9	24.8	24.0

Diffusion Tube ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2023 (%) [2]	2019	2020	2021	2022	2023
DT 228	Riverside Esplanade / S. Crichton St.	340516.03	729990.96	Roadside	100	100.0	25.4	20.6	21.4	19.2	20.3
DT 224	Seagate (112)	340528.065	730537.2449	Roadside	100	100.0	37.1	29.1	27.9	25.4	27.4
DT 236	Seagate (36 - 40)	340463.2445	730420.3345	Roadside	100	92.3	35.1	26.6	26.2	20.5	23.1
DT 54	Seagate (9)	340466.9999	730388.1178	Roadside	100	100.0	28.8	21.3	22.4	17.7	20.8
DT 190	Seagate (97)	340515.9765	730499.1667	Roadside	100	100.0	**41.0**	29.0	29.9	25.6	26.8
DT 217	Seagate (99)	340535.1598	730521.6779	Roadside	100	100.0	37.9	28.3	29.3	23.9	25.3
56, 57, 58	Seagate(Romon) Average	340486.5819	730446.0412	Roadside	100	100.0	39.1	26.5	28.4	24.2	26.4
DT 55	Soapwork Lane	340099.3457	730649.9545	Roadside	100	100.0	33.7	25.6	24.2	23.6	23.4
DT 218	South Marketgait (lamp post 18)	340291.3722	729978.8577	Roadside	100	100.0	29.3	20.6	21.5	19.4	20.8
DT 247	South Marketgait (street sign)	340124.806	729952.385	Roadside	100	100.0				24.9	25.3
DT 151	South Rd (1 Denbank)	335187.5086	731527.8202	Roadside	100	100.0	30.6	23.2	23.3	20.9	21.2
DT 235	South Marketgait / Nethergate	340516	340516	Roadside			23.7	17.4	17.9		
DT 56	St Andrews St (26)	340516	340516	Kerbside			26.2				
DT 162	St Andrews St PB (façade)	340532.158	730548.3841	Roadside	100	100.0	32.4	25.3	24.8	21.2	22.9
DT 59	Strathmore Avenue (353)	339608.7559	731871.0098	Kerbside	100	100.0	31.6	23.6	25.7	22.9	25.9

Diffusion Tube ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2023 (%) [2]	2019	2020	2021	2022	2023
DT 219	Thomson Avenue (street sign)	340541.7744	730193.5939	Roadside	100	90.4	30.3	22.7	22.3	19.4	21.8
DT 229	Thomson Avenue / South Crichton St.	340420.6	730077.95	Kerbside	100	100.0	27.9	21.7	21.2	20.0	21.1
DT 60	Trades Lane (31)	340574.5935	730499.7581	Kerbside	100	100.0	23.8	18.3	17.6	15.7	16.9
DT 93	Victoria Rd (10b)	340229.7177	730672.7587	Kerbside	100	100.0	31.3	24.8	24.9	22.3	23.4
DT 184	Victoria Rd (104) / William St	340696.8958	730949.7502	Roadside	100	100.0	27.2	20.2	21.3	18.7	21.4
DT 191	Victoria Rd (4) - India Buildings	340212.9721	730633.0717	Roadside	100	100.0	28.9	21.9	22.9	20.2	21.9
DT 68	Victoria Rd (60)	340374.81	730778.68	Roadside	100	100.0	33.0	26.8	26.3	22.7	25.1
DT 70	Victoria Rd/Hilltown	340274	730714	Roadside	100	100.0	**48.3**	38.0	**40.6**	36.3	36.0
DT 71	Victoria St/Albert St	341070.9744	731072.249	Kerbside	100	100.0	26.8	21.8	20.6	17.5	19.5
DT 205	West Marketgait / Old Mill (23)	339773.4489	730435.932	Roadside	100	100.0	**47.1**	36.1	36.5	36.9	31.7
DT 231	West Marketgait / Ward Road	339834.1588	730313.577	Roadside	100	100.0	33.5	24.5	23.5	21.5	20.7
DT 183	West Marketgait / Guthrie St	339805.2336	730338.471	Roadside	100	90.4	38.3	34.0	32.7	29.3	28.5
DT 72	Westport (2)	339842	730122	Roadside	100	100.0	28.4	19.9	17.6	17.3	17.2
DT 73	Whitehall Cr (4)	340376	730109	Kerbside	100	100.0	30.7	23.6	23.4	18.9	19.9
DT 161	Whitehall Cr /Union St (50)	340305.1556	730050.6132	Kerbside	100	100.0	23.2	16.9	16.7	14.5	16.1

Diffusion Tube ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
DT 76	Whitehall St (1)	340264.8235	730153.1891	Kerbside	100	90.4	**40.3**	31.8	33.0	25.5	26.3
DT 81	Whitehall St (12)	340292.6578	730142.1103	Roadside	100	100.0	35.4	27.9	28.9	21.4	23.0
DT 77	Whitehall St (15)	340321.839	730097.9292	Kerbside	100	100.0	31.0	22.9	23.6	19.1	20.9
DT 74	Whitehall St (40)	340329.6	730105.6	Kerbside	100	100.0	33.4	24.9	27.8	21.4	23.3
DT 75	Whitehall St (5)	340289.1	730128.14	Roadside	100	100.0	35.8	27.7	27.5	20.3	21.0
82, 83, 84	Whitehall St (Romon) Average	340278.1319	730156.2116	Roadside	100	100.0	34.6	23.8	27.2	20.1	22.2
DT 82	Woodside Ave	340776	732306.99	Urban Background	100	100.0	11.4	9.1	8.5	7.7	8.4

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold.** (borderline values are orange).

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**.

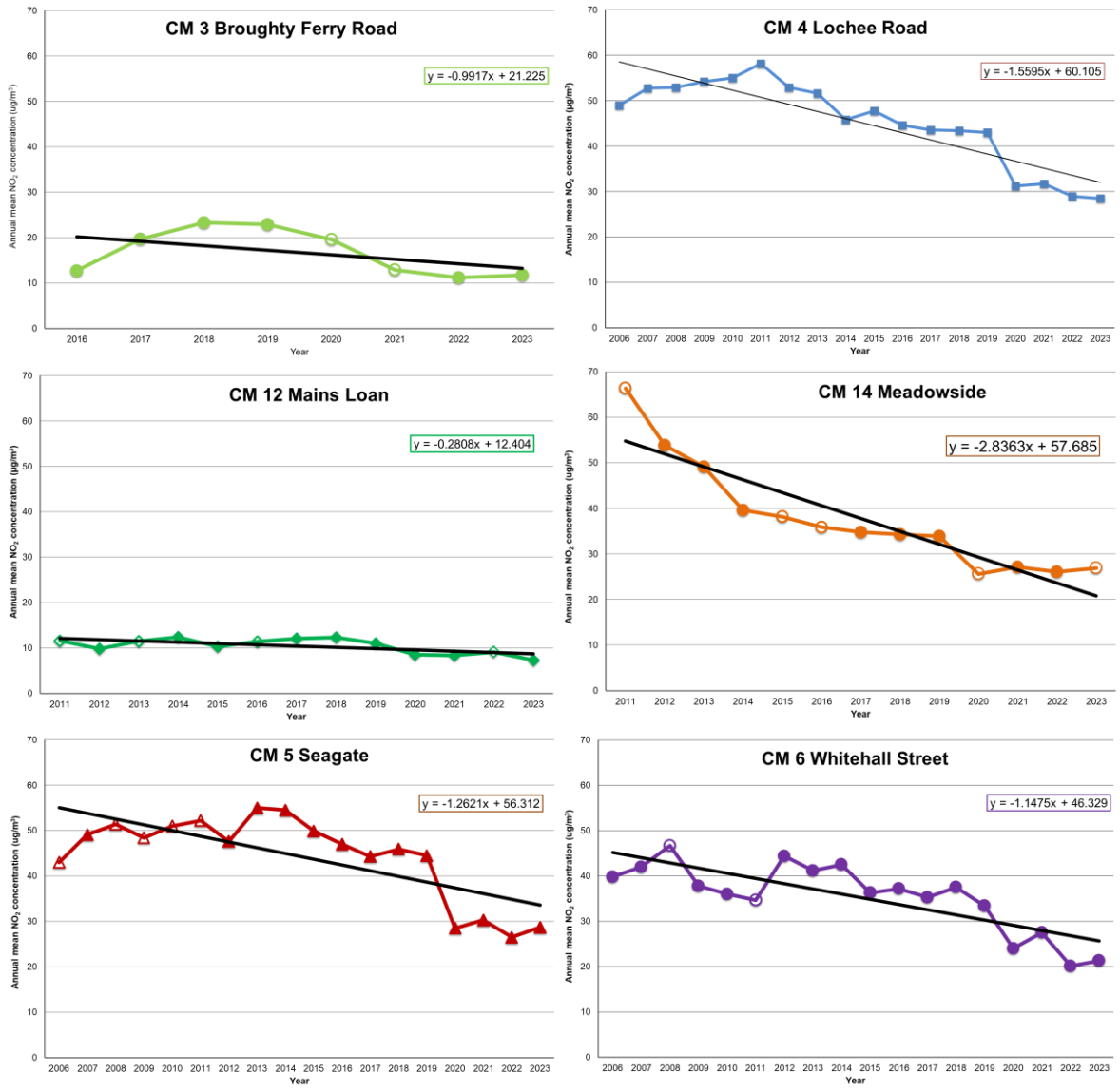
All means have been "annualised" as per LAQM.TG(22) (TG(16) for 2018 – 2021 data) if valid data capture for the full calendar year is less than 75% (highlighted by shading). See Appendix C for details.

(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%).

(3) New sites first located in 2023 are highlighted in yellow

Figure 7 Trends in Annual Mean NO_2 at Automatic Monitors



Notes:

1) Graphs show the trends (**black** lines) in the NO_2 annual mean concentrations measured at the continuous analysers.
2) A minimum of five years data is required to show a valid trend. More years (data points) give greater certainty in the trend.
3) The trend line equation is shown. Decreasing trends have a negative "x" value, increasing trends a positive "x" value.
4) For strict comparison with the annual mean objective of 40µg/m^3 data capture should be greater than 85%. Annual means where data capture was below 85% are shown by a 'hollow' marker.
5) Means have been "annualised" as per LAQM.TG(22) if valid data capture for the full calendar year is less than 75%. See **Appendix C** for details.

Figure 8 Trend Analysis at Long-term NO_2 Monitoring Locations

Site Id.	Location	No. of years for trend	Trend
DT 217	Seagate (99)	7	-3.40
DT 236	Seagate (36-40)	5	-3.01
DT 227	Dudhope Crescent Road (40)	6	-2.91
DT 190	Seagate (97)	11	-2.85
DT 205	West Marketgait/Old Mill (23)	9	-2.69
DT 149	Meadowside (Romon) Average	13	-2.65
DT 239	Princes St (185)	5	-2.62
DT 231	West Marketgait/ Ward Road	6	-2.56
DT 213	Nethergate (64)	8	-2.45
DT 233	Dock St/Trades Lane	5	-2.36
DT 223	Broughty Ferry Road Lower (Cyclesign)	7	-2.34
DT 183	West Marketgait / Guthrie St	11	-2.27
DT 218	South Marketgait (Lampost 18)	7	-2.20
DT 219	Thomson Avenue (Street Sign)	7	-2.15
DT 237	Lower Princess St	5	-2.07
DT 188	Commercial St (9)	11	-1.96
DT 177	Kingsway / Strathmartine Rd (279)	11	-1.93
DT 171	Claypotts / Arbroath Rd (502)	9	-1.92
DT 224	Seagate (112)	7	-1.92
DT 156	Dock St (57)	13	-1.81
DT 229	Thomson Avenue/S.Crichton St	6	-1.81
DT 228	Riverside Esplanade / S. Crichton St.	6	-1.77
DT 180	Albert St (15) (Rdside)	11	-1.70
DT 189	Myrekirk Rd (29)	11	-1.68
DT 179	Albert St (15) (Facade)	11	-1.66
DT 162	St Andrews St PB (façade)	12	-1.59
DT 75	Whitehall St (5)	18	-1.57
DT 214	East Dock Street (26)	8	-1.56
DT 167	Albert St (191)	11	-1.53
DT 161	Whitehall Cr /Union St (50)	12	-1.52
DT 159	Seagate(Romon) Average	18	-1.43
DT 72	Westport (2)	18	-1.37
DT 185	Murraygate (46)	11	-1.34
DT 151	South Rd (1 Denbank)	13	-1.32
DT 184	Victoria Rd (104) / William St	11	-1.31
DT 92	Abertay 2	15	-1.28
DT 44	Nethergate (88)	18	-1.26
DT 54	Seagate (9)	18	-1.25
DT 191	Victoria Rd (4) - India Buildings	11	-1.25
DT 31	Lochee Rd (140) Traffic Lts	18	-1.21
DT 30	Lochee Rd (138)	18	-1.21
DT 139	Broughty Ferry Rd (141 Downpipe)	13	-1.20
DT 47	Nethergate (40)	18	-1.19
DT 70	Victoria Rd/Hilltown	18	-1.19
DT 46	Nethergate (95)	18	-1.14
DT 5	Arbroath Rd (13)	18	-1.10
DT 37	Logie St (114)	18	-1.09
DT 84	Commercial St/Dock St (40)	18	-1.09
DT 158	Lochee Rd (Romon) Average	18	-1.08
DT 68	Victoria Rd (60)	18	-1.07
DT 11	Broughty Ferry Rd (141)	18	-1.07
DT 60	Trades Lane (31)	18	-1.06
DT 45	Nethergate (6)	18	-1.05
DT 93	Victoria Rd (10b)	15	-1.05
DT 20	Dura St (100)	18	-1.02
DT 71	Victoria St/Albert St	18	-1.00
DT 77	Whitehall St (15)	18	-0.99
DT 27	Kingsway/ Mains Loan	18	-0.98
DT 76	Whitehall St (1)	18	-0.96
DT 59	Strathmore Avenue (353)	18	-0.94
DT 49	Rankine St (2)	18	-0.91
DT 26	Kingsway East Roundabout	18	-0.90
DT 39	Loons Rd (1)	18	-0.90
DT 81	Whitehall St (12)	18	-0.85
DT 48	Nethergate(132) / Marketgait	18	-0.85
DT 85	Dock St (21)	18	-0.83
DT 22	Eastport Roundabout	18	-0.82
DT 36	Lochee Rd/Polepark Rd	18	-0.82
DT 155	Carolina Court LP6	12	-0.80
DT 32	Lochee Rd (184)	18	-0.76
DT 74	Whitehall St (40)	18	-0.69
DT 38	Logie St (98)	18	-0.68
DT 42	Muirton Rd (6)	18	-0.64
DT 82	Woodside Ave	18	-0.61
DT 55	Soapwork Lane	18	-0.58
DT 73	Whitehall Cr (4)	18	-0.46
DT 7	Balgavies Place	18	-0.45
DT 9	Birnam Place	18	-0.26

Note: Blue is an improving trend, red is a worsening trend. Trend value methodology explained after Figure 14.

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

Site ID	Site Name	Site Type (1)	Monitoring Type	Valid Data Capture for Monitoring Period (%) (2)	Valid Data Capture 2023 (%) (3)	2019	2020	2021	2022	2023
CM3	Broughty Ferry Rd	UI	Automatic	99.0	99.0	0	0 (61.1)	0 (61.9)	0	0
CM4	Lochee Rd Romon	R	Automatic	99.8	99.8	2	0	0	0	0
CM12	Mains Loan	UB	Automatic	99.0	99.0	0	0	0	0 (58.4)	0
CM14	Meadowside Romon	R	Automatic	72.9	72.9	0	0 (95.1)	0 (107.2)	0	0 (99.2)
CM5	Seagate	R	Automatic	95.3	95.3	0	0	0	0	0
CM6	Whitehall St Romon	R	Automatic	99.0	99.0	0	0	0	0	0

Notes:2

Exceedances of the NO_2 1-hour mean objective (200 µg/m^3 not to be exceeded more than 18 times/year) are shown in bold.

If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

(1) R=Roadside, K=Kerbside, UB=Urban Background, UI=Urban Industrial

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

(3) 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 9 Number of 1-hour mean NO_2 levels > 200ug/m^3 each year (maximum 18 per year allowed)

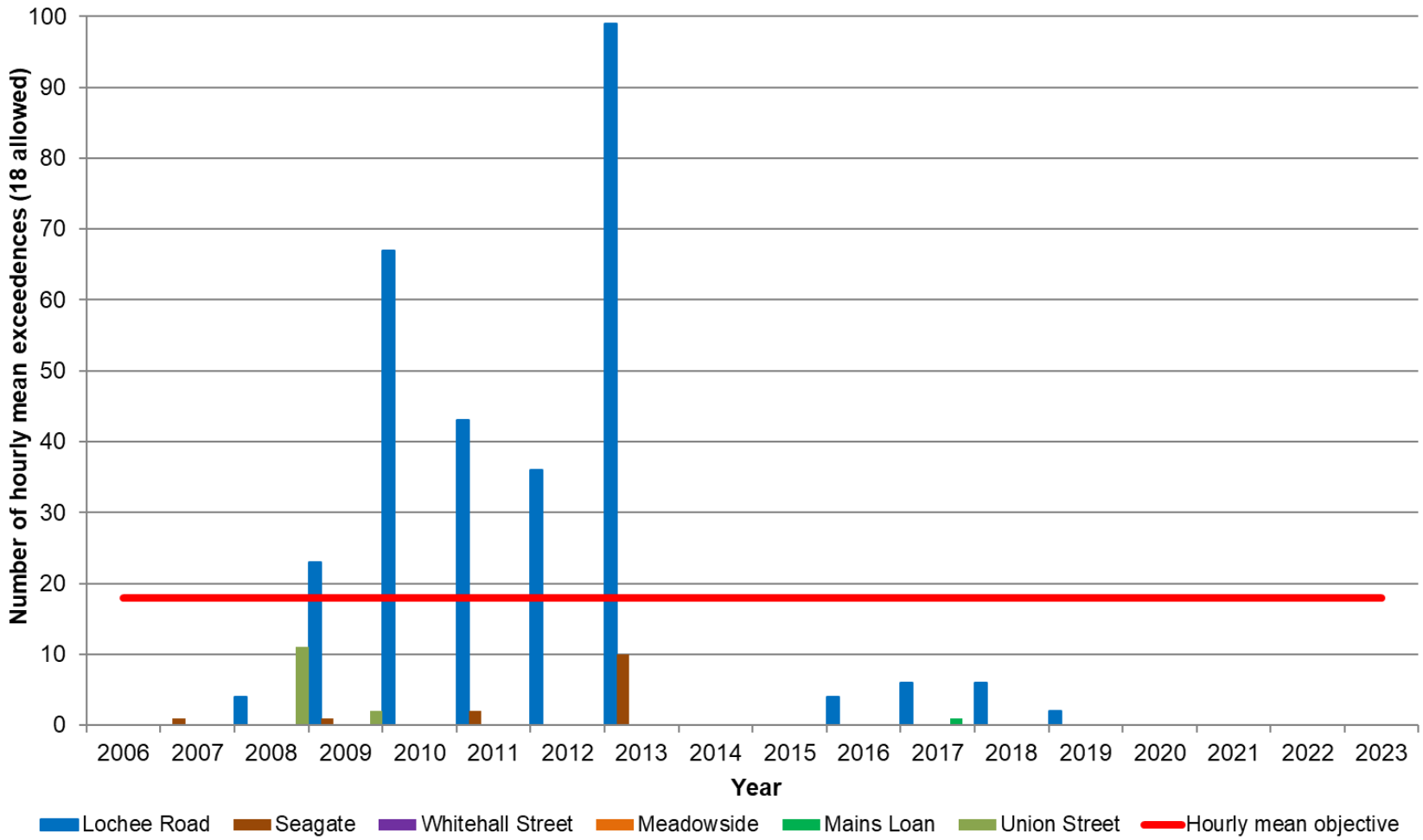


Figure 10 Trend in 99.8th percentile of hourly mean NO_2 concentrations at CM4 Lochee Road

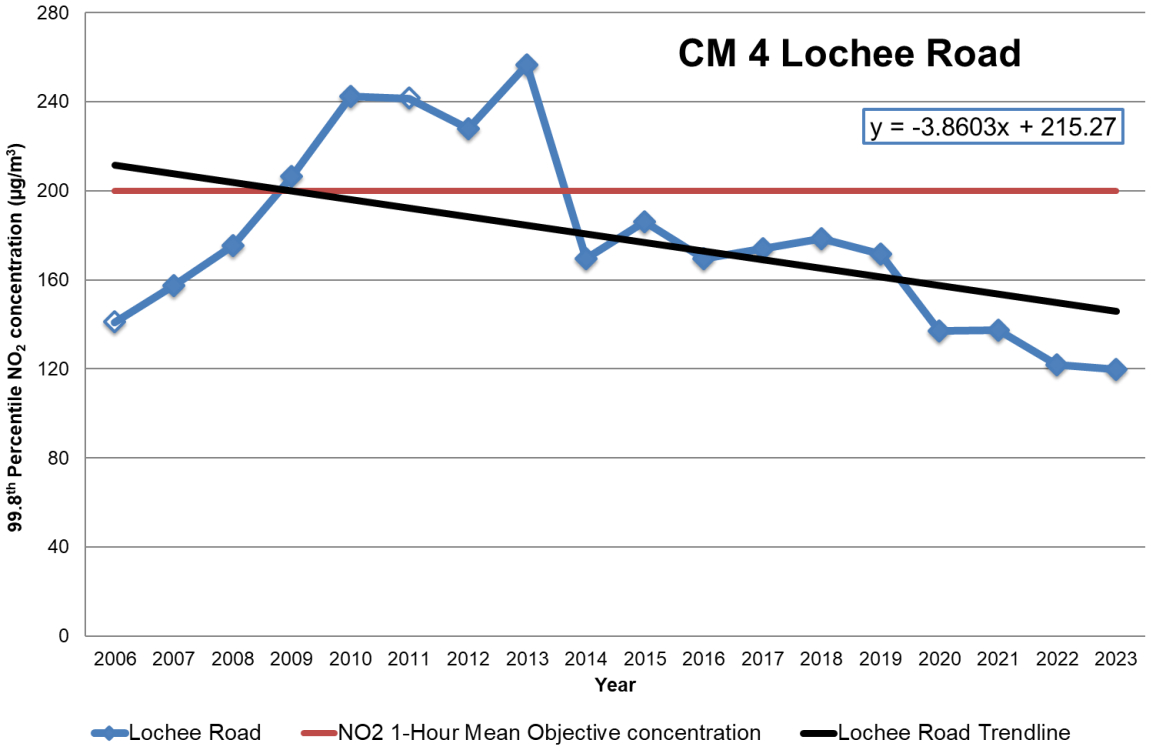


Figure 11 Trend in 99.8th percentile of NO_2 hourly mean concentrations at all continuous analysers

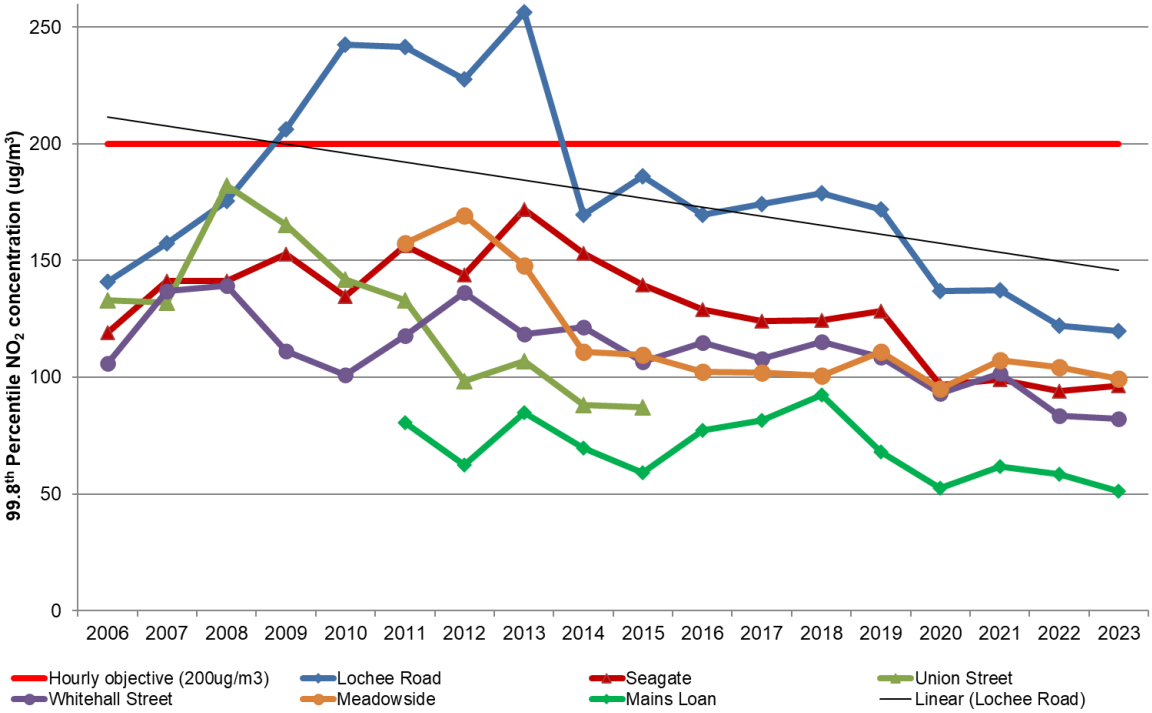


Table A.6 – Annual Mean PM_{10} Monitoring Results ($\mu g/m^3$)

Site ID	Site Name (analyser)	Site Type (1)	Monitoring Type	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022 (3)	2023 (3)
CM 3	Broughty Ferry Rd (TEOM / **FIDAS**)	UI	Automatic	99	13.6	8.9	10.1	11.8 (13.0)	10.2 (11.2)
CM 4	Lochee Rd (BAM / **FIDAS**)	R	Automatic	100	11.8	9.8	10.7	12.5 (13.8)	10.8 (11.9)
CM 12	Mains Loan (TEOM / **FIDAS**)	UB	Automatic	98	9.2	7.0	7.5	8.9 (9.8)	7.6 (8.4)
CM 14	Meadowside (BAM / **FIDAS**)	R	Automatic	97	14.1	9.1	10.1	12.0 (13.2)	10.7 (11.8)
CM 5	Seagate (BAM / **FIDAS**)	R	Automatic	99	13.7	9.6	11.0	13.6 (15.0)	13.2 (14.5)
CM 6	Whitehall St (BAM / **FIDAS**)	R	Automatic	99	11.9	7.9	8.3	10.2 (11.2)	9.8 (10.8)
CM 13	Broughty Ferry Rd (Partisol)	UI	Automatic	100	11.3	10.0*	10.2*	11.5	10.4
CM 16	Broughty Ferry Rd (OSIRIS)	UI	Automatic	93	11.2	9.7	9.9*	11.6	10.5
CM 9	Logie St (OSIRIS)	K	Automatic	91	15.4*	14.0*	11.4*	15.1	12.4
CM 17	Myrekirk Tce (OSIRIS)	R	Automatic	91	12.3*	11.0	12.8*	14.5	12.5
CM 15	Albert St (OSIRIS)	K	Automatic	91	15.1	13.9*	11.1	17.9	13.0
CM 18	Stannergate (OSIRIS)	R	Automatic	78	13.3*	11.5	16.4*	16.8	14.1

Notes:

Exceedances of the PM_{10} annual mean objective of 18 $\mu g/m^3$ are shown in **bold** (borderline values are orange).

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

* indicates data capture less than 85%.

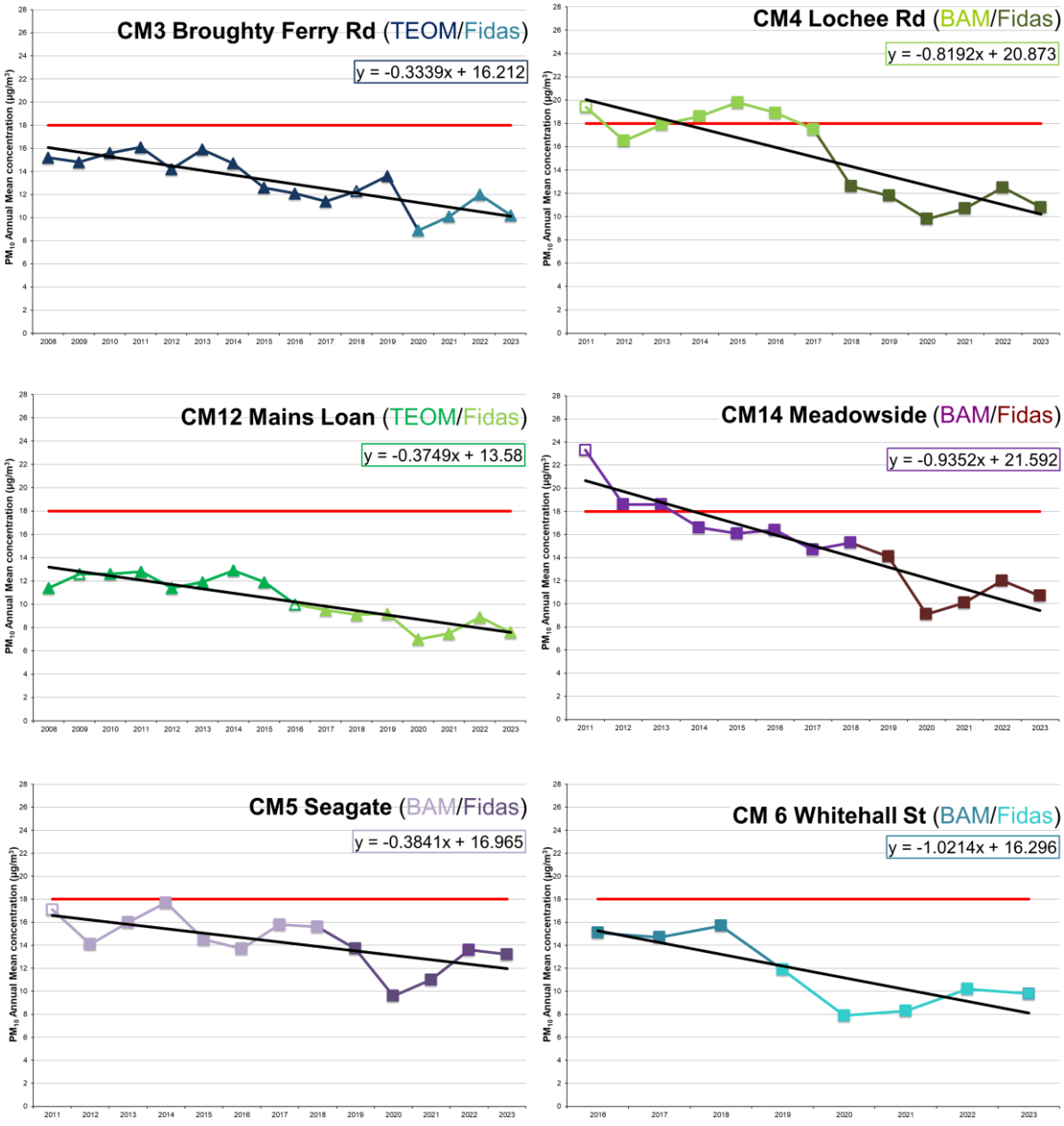
(1) R=Roadside, K=Kerbside, UB=Urban Background, UI=Urban Industrial

(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%).

(3) Corrected results as per the Scottish Government Guidance note published on 17 May 2023^ advising that annual mean PM data collected using **FIDAS** 200 is to be corrected using factors (PM_{10} divided by 0.909 and $PM_{2.5}$ multiplied by 1.06) identified by the "Scottish Government Equivalence Study to Investigate Particulate Matter Monitoring In Scotland Using The Fidas 200". Local authorities are to present both measured and corrected data for LAQM reporting.

^ www.scottishairquality.scot/news/local-authority-guidance-note-laqm-reporting-scottish-pm-data

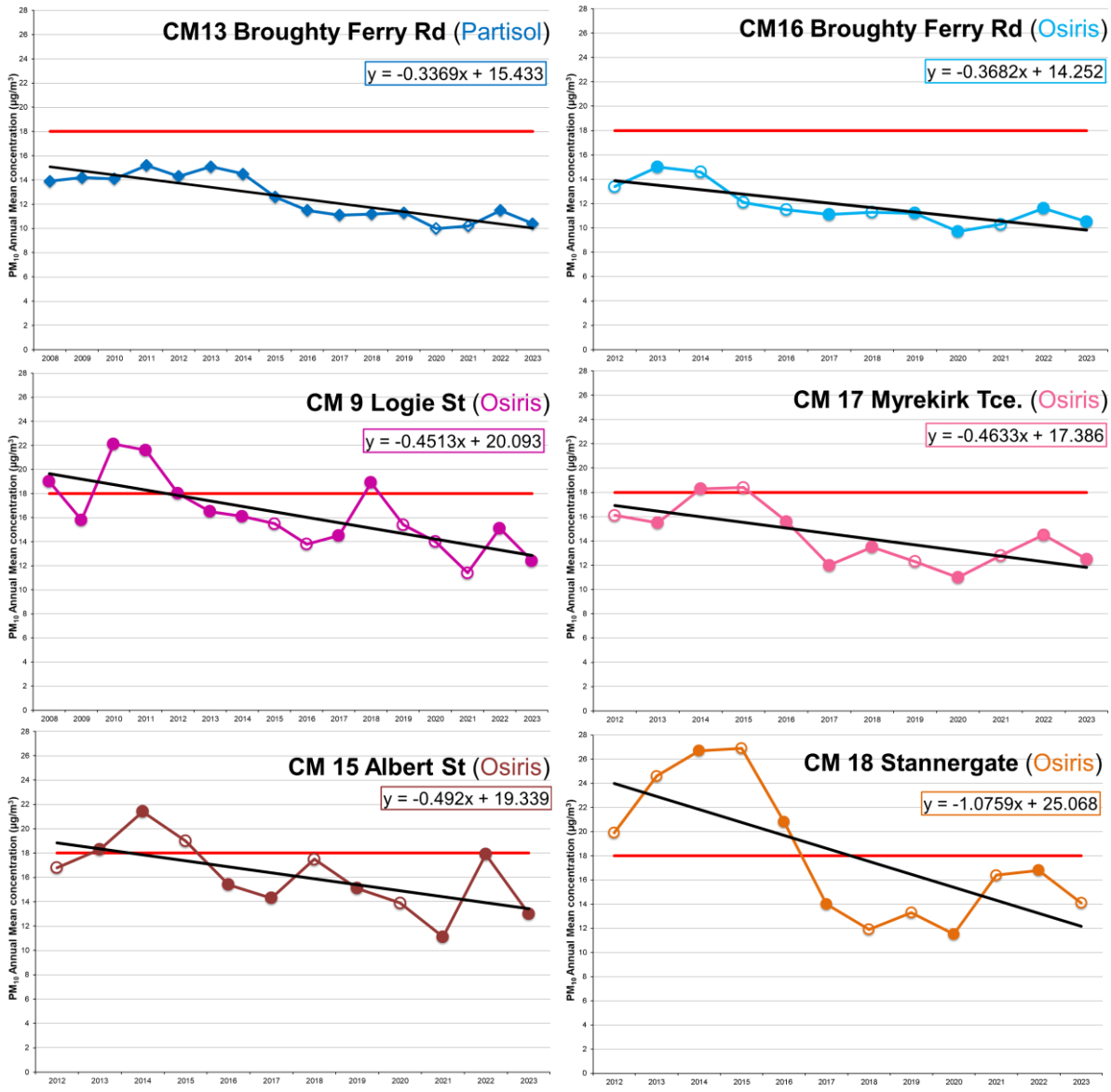
Figure 12 Trends in Annual Mean PM_{10} Concentrations at Automatic Monitors



Notes:

1) Graphs show the trends (**black** lines) in the PM_{10} annual mean concentrations measured at the continuous analysers.
2) A minimum of five years data is required to show a valid trend. More years (data points) give greater certainty in the trend.
3) The trend line equation is shown. Decreasing trends have a negative "x" value, increasing trends a positive "x" value.
4) For strict comparison with the annual mean objective of 18µg/m^3(shown by the **red** line), data capture should be greater than 85%. Annual means where data capture was below 85% are shown by a 'hollow' marker.
5) Means have been "annualised" as per LAQM.TG(22) if valid data capture for the full calendar year is less than 75%. See **Appendix C** for details.

Figure 13 Trends in Annual Mean PM_{10} Concentrations at Automatic Monitors



Notes:

1) Graphs show the trends (**black** lines) in the PM_{10} annual mean concentrations measured at the continuous analysers.
2) A minimum of five years data is required to show a valid trend. More years (data points) give greater certainty in the trend.
3) The trend line equation is shown. Decreasing trends have a negative "x" value, increasing trends a positive "x" value.
4) For strict comparison with the annual mean objective of 18µg/m^3(shown by the **red** line), data capture should be greater than 85%. Annual means where data capture was below 85% are shown by a 'hollow' marker.
5) Means have been "annualised" as per LAQM.TG(22) if valid data capture for the full calendar year is less than 75%. See **Appendix C** for details.

Figure 14 Trend analysis of PM_{10} annual means at long term monitoring sites

Site Id.	Location	No. of years for trend	Trend(1)
CM18	Stannergate (Osiris)	12	-1.08
CM6	Whitehall St (BAM/Fidas)	8	-1.02
CM14	Meadowside (BAM/Fidas)	13	-0.94
CM4	Lochee Rd (BAM/Fidas)	13	-0.82
CM15	Albert St (Osiris)	12	-0.49
CM17	Myrekirk Tce (Osiris)	12	-0.46
CM9	Logie St (Osiris)	16	-0.45
CM3	Broughty Ferry Rd (TEOM/Fidas)	16	-0.40
CM5	Seagate (BAM/Fidas)	13	-0.38
CM12	Mains Loan (TEOM/Fidas)	16	-0.38
CM16	Broughty Ferry Rd (Osiris)	12	-0.37
CM13	Broughty Ferry Rd (Partisol)	16	-0.34

Note: (1) Blue is an improving trend, red is a worsening trend

Explanation of Methodology for Figure 8 and Figure 14: The trend values have been generated using the LINEST function in Microsoft Excel. This function can be used to return a value that describes the slope of a best fit straight line for a number of points (in this case 5 or more values) i.e. simple linear regression. A negative value denotes a downwards slope hence an improving trend and, a positive value denotes an upwards slope or worsening trend. The magnitude of the number generated by the LINEST function can be used to compare the magnitude of the (improving or worsening) trend.

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

Site ID	Site Name	Site Type (1)	Monitoring Type	Valid Data Capture 2023 (%)(2)	2019	2020	2021	2022(3)	2023(3)
CM 3	Broughty Ferry Rd (TEOM / FIDAS)	UI	Automatic	99	1	0	0	5 *(6)*	0
CM 4	Lochee Rd (BAM / FIDAS)	R	Automatic	100	1	0	0	4 *(4)*	1 *(2)*
CM 12	Mains Loan (TEOM / FIDAS)	UB	Automatic	98	1	0	0	2 *(2)*	0
CM 14	Meadowside (BAM / FIDAS)	R	Automatic	97	3 (43.4)	0	0	5 *(6)*	0
CM 5	Seagate (BAM / FIDAS)	R	Automatic	99	1	0	0	4 *(4)*	0
CM 6	Whitehall St (BAM / FIDAS)	R	Automatic	99	1	0	0	2 *(2)*	0
CM 13	Broughty Ferry Rd (PARTISOL)	UI	Automatic	100	0	0 (24.5)	0 (21.8)	4	0
CM 16	Broughty Ferry Rd (OSIRIS)	UI	Automatic	93	1	0	0 (22.8)	1	0
CM 9	Logie St (OSIRIS)	K	Automatic	91	3 (41.1)	0 (30.3)	1 (25.7)	5 (46.0)	0
CM 17	Myrekirk Tce (OSIRIS)	R	Automatic	91	1 (39.7)	0	0 (27.0)	2	0
CM 15	Albert St (OSIRIS)	K	Automatic	91	7	0 (38.5)	0	**12**	0
CM 18	Stannergate (OSIRIS)	R	Automatic	74	1 (32.9)	0	3 (43.9)	4	0 (35.9)

Notes:

Exceedances of the PM_{10} 24-hour mean objective (50 µg/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 (and shaded grey).

(1) R=Roadside, K=Kerbside, UB=Urban Background, UI= Urban Industrial

(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%).

(3) Corrected results for FIDAS 200 analysers as per the Scottish Government Guidance note published on 17 May 2023^ are indicated in *italics*. Local authorities are to present both measured and corrected data for LAQM reporting.

^ www.scottishairquality.scot/news/local-authority-guidance-note-laqm-reporting-scottish-pm-data

Figure 15 24-hour mean PM_{10} concentrations greater than 50ug/m^3

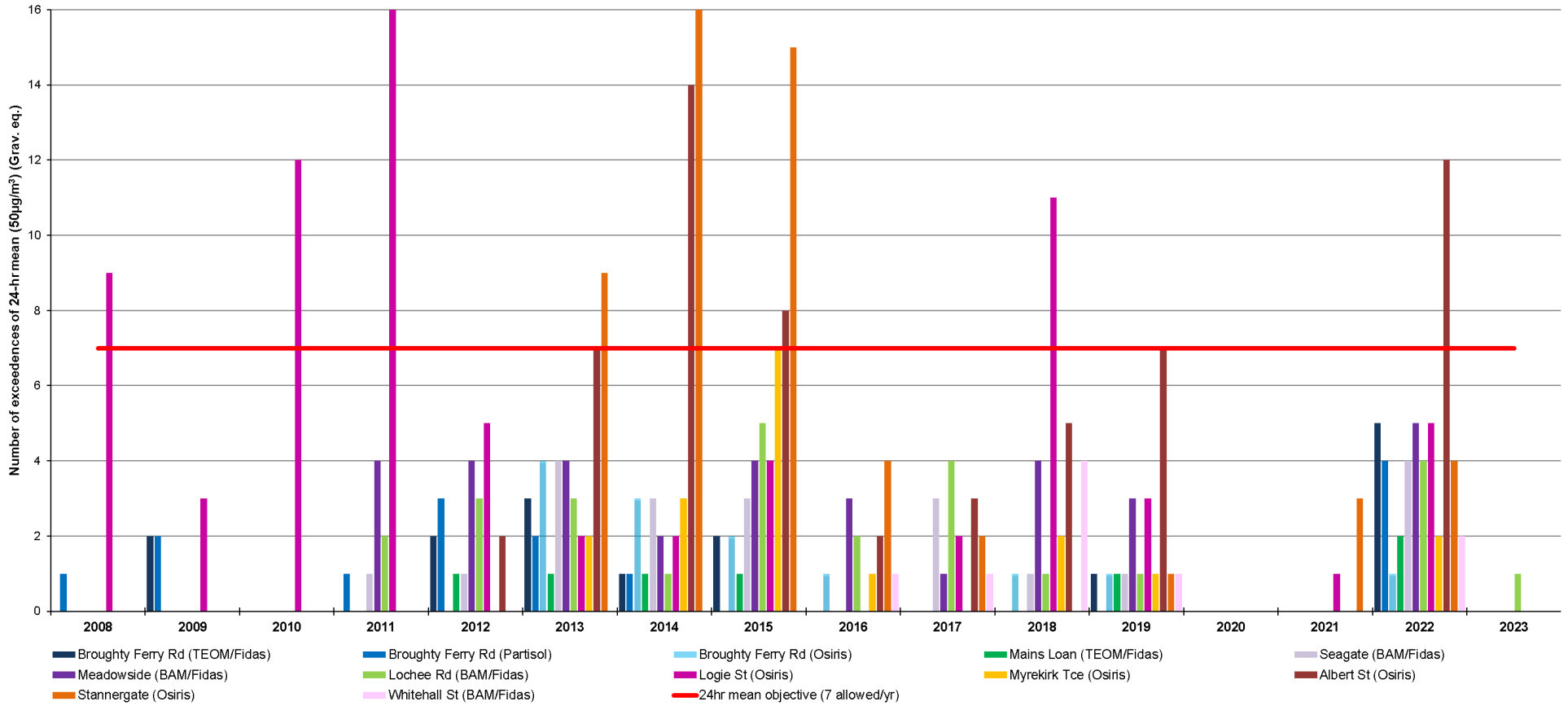


Table A.8 – Annual Mean $PM_{2.5}$ Monitoring Results (µg/m^3)

Site ID	Site Name	Site Type (1)	Monitoring Type	Valid Data Capture 2023 (%)(2)	2019	2020	2021	2022(3)	2023(3)
CM 3	Broughty Ferry Rd (TEOM / FIDAS)	UI	Automatic	99	N/A	4.4	4.9	6.0 (6.3)	5.0 (5.3)
CM 4	Lochee Rd (BAM / FIDAS)	R	Automatic	100	6.4	5.2	5.7	6.5 (6.9)	5.4 (5.7)
CM 12	Mains Loan (TEOM / FIDAS)	UB	Automatic	98	5.5	4.1	4.4	5.2 (5.5)	4.3 (4.6)
CM 14	Meadowside (BAM / FIDAS)	R	Automatic	97	6.6*	4.6	5.3	5.8 (6.1)	5.2 (5.6)
CM 5	Seagate (BAM / FIDAS)	R	Automatic	99	6.9*	5.0	5.7	6.7 (7.1)	6.2 (6.5)
CM 6	Whitehall St (BAM / FIDAS)	R	Automatic	99	6.3*	4.3	4.7	5.7 (6.1)	5.3 (5.6)

Notes:

All means have been "annualised" as per LAQM.TG(22),if valid data capture for the full calendar year is less than 75% (highlighted by shading). See Appendix C for details.

* indicates data capture less than 85%.

(1) R=Roadside, K=Kerbside, UB=Urban Background, UI= Urban Industrial

(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%).

(3) Corrected results (shown in brackets) as per the Scottish Government Guidance note published on 17 May 2023^ advising that annual mean PM data collected using FIDAS 200 is to be corrected using factors (PM10 divided by 0.909 and PM2.5 multiplied by 1.06) identified by the "Scottish Government Equivalence Study to Investigate Particulate Matter Monitoring In Scotland Using The Fidas 200". Local authorities are to present both measured and corrected data for LAQM reporting.

^ www.scottishairquality.scot/news/local-authority-guidance-note-laqm-reporting-scottish-pm-data

Table A.9 - Estimated $PM_{2.5}$ Annual Mean Concentrations 2019 to 2023*(µg/m^3)

Site name	2019	2020	2021	2022 [a]	2023 [b]
Scottish Annual Mean Objective (ug/m^3)	*10*	*10*	*10*	*10*	*10*
Logie St (OSIRIS)	**10.8**	9.8	8.0	9.2	6.0
Myrekirk Tce (OSIRIS)	8.6	7.7	8.9	8.6	6.1
Albert St (OSIRIS)	**10.6**	9.7	7.8	**11.1**	6.6
Stannergate (OSIRIS)	9.3	8.1	**11.5**	10.0	7.7

Estimated exceedances of the $PM_{2.5}$ annual mean objective of 10µg/m^3 are shown in **bold.**

* Until 2022 estimated $PM_{2.5}$ levels were obtained using an assumed ratio of 0.7. Estimated $PM_{2.5}$ levels from 2022 onwards were obtained using the PM_{course} split methodology as outlined paragraph 7.119 of LAQM.TG (22) as outlined in Section 3.2.3 of the 2024 APR.

(a) 2022 PM_{course} split = 6.8

(b) 2023 PM_{course} split = 6.4

Appendix B: Full Monthly Diffusion Tube Results for 2023

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

Diffusion Tube ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)												Simple Annual Mean (µg/m3)		
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.78) and Annualised	Distance Corrected to Nearest Exposure (see Appendix C)
DT 92	Abertay 2	340019	730612	36.4	32.2	42.3	39.2	37.4	38.9	31.7	33.3	37.4	32.3	36.5	33.9	36.0	27.9	-
DT 179	Albert St (15) (Façade)	341092	731121	30.2	29.7	37.2	26.8	22.1	28.8	25.8	28.4	30.3	25.9	37.0	28.7	29.2	22.7	-
DT 180	Albert St (15) (Roadside)	341091	731121	30.4	30.8	40.5	29.6	23.3	30.9	27.8	31.7	32.8	28.5	39.3	30.6	31.4	24.3	-
DT 167	Albert St (191)	341161	731535	23.9	26.0	38.7	31.0	25.4	29.5	26.4	27.2	32.6	32.4	44.4	33.0	30.9	23.9	-
DT 5	Arbroath Rd (13)	341111	731070	35.2	32.5	31.1	23.3	25.0	21.8	22.1	27.0	29.8	21.9	34.9	26.7	27.6	21.4	-
DT 223	B/ Ferry Rd Lower (Cyclesign)	343530	730937	26.1	30.7	15.7	7.1	9.9	8.1	12.1	13.1	13.7	13.5	24.9	21.6	16.4	12.7	-
DT 139	B/Ferry Rd (141) Downpipe	343317	731072	39.2	39.1	32.3	23.5	25.6	25.0	25.7	30.3	30.6	21.4	34.6	32.2	30.0	23.2	-
DT 145	B/Ferry Rd Greendykes	342662	731112	33.6	32.1	30.4	8.7	25.7	24.4	24.5	26.0	27.1	19.8	30.0	25.1	25.6	19.9	-
DT 7	Balgavies Pl	343082	731465	20.0	21.5	16.1	6.9	8.3	7.3	9.9	11.3	13.6	10.5	22.2	15.6	13.6	10.5	-
DT 9	Birnam Pl	337531	730914	10.0	9.3	8.9	24.7	6.6	6.2	6.5	7.5	8.1	8.5	11.5	9.3	9.8	7.6	-
DT 11	Broughty Ferry Rd (141)	343322	731073	44.7	48.3	36.3	12.3	29.2	29.0	28.2	32.2	33.8	27.6	35.9	34.0	32.6	25.3	-
DT 186	Carolina Court 30mph sign	342342	731083	28.9	24.1	23.9	20.5	18.5	17.4	18.4	20.8	21.4	19.3	28.7	25.0	22.2	17.2	17.4
DT 155	Carolina Court Lp6	342353	731058	24.6	22.3	18.7	19.3	12.1	10.9	14.1	15.3	15.6	12.8	24.3	20.2	17.5	13.6	-
DT 171	Claypotts / Arbroath Rd (502)	345347	732080	34.4	34.4	24.0	14.1	14.5	11.8	13.9	17.9	20.6	16.9	30.6	24.5	21.5	16.6	-
DT 246	Clepington Rd/ Forfar Rd_2	341387	732123	31.5	30.4	30.7	22.7	17.3	M	17.2	20.8	22.9	24.4	35.6	26.6	25.5	19.7	-
DT 188	Commercial St (9)	340544	730291	25.8	33.0	36.8	32.9	30.9	29.1	M	27.7	28.6	28.5	36.7	32.0	31.1	24.1	-

Diffusion Tube ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)												Simple Annual Mean (µg/m3)		
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.78) and Annualised	Distance Corrected to Nearest Exposure (see Appendix C)
DT 84	Commercial St / Dock St (40)	340565	730263	31.5	31.4	33.5	27.0	26.6	25.0	22.5	27.0	28.2	26.1	36.9	32.1	29.0	22.5	-
DT 85	Dock St (21)	340524	730216	37.7	34.2	37.2	28.4	27.6	24.4	25.3	27.9	29.5	25.8	39.1	32.2	30.8	23.9	-
DT 156	Dock St (57)	340656	730343	58.9	51.0	46.9	36.3	37.8	33.7	30.2	33.7	37.5	35.9	48.8	43.7	41.2	31.9	-
DT 241	Dock St (Customs House)	340691	730344	NT	NT	NT	NT	NT	NT	NT	29.8	30.5	27.6	39.0	31.2	31.6	22.8	-
DT 248	Dock St (Customs House/sign)	342342	730347	40.4	37.4	39.8	30.1	35.1	26.9	M	NT	NT	NT	NT	NT	35.0	27.3	-
DT 240	Dock St / Gellatly St	340638	730328	48.2	45.6	43.8	32.2	36.0	33.3	30.2	35.1	37.3	30.7	42.6	36.7	37.6	29.2	-
DT 233	Dock St/Trades Lane	340690	730382	38.9	33.1	33.6	29.9	31.4	26.6	26.2	29.4	31.4	27.9	35.7	28.7	31.1	24.1	24.4
DT 227	Dudhope Crescent Road (40)	339830	730619	43.4	38.9	40.9	30.8	30.2	27.6	26.8	30.6	32.6	30.9	43.8	35.0	34.3	26.6	-
DT 20	Dura St (100)	341150	731576	37.2	33.8	36.6	27.9	27.4	26.5	23.0	27.2	28.9	24.3	42.5	29.6	30.4	23.6	-
DT 214	East Dock St (26)	340725	730417	28.8	32.4	39.6	31.7	32.9	29.8	27.4	29.3	30.9	32.4	38.0	31.7	32.1	24.9	-
DT 22	Eastport Roundabout	340651	730623	31.9	31.6	32.5	24.9	21.9	20.6	20.2	23.1	26.0	26.5	37.9	27.6	27.1	21.0	-
DT 245	Forfar Rd (104)_2	341436	732360	34.3	31.1	31.9	23.2	20.6	20.7	20.7	23.9	25.7	21.0	31.9	26.3	25.9	20.1	-
DT 244	Harefield Rd (14)	338182	731848	24.4	20.5	23.9	19.1	19.3	17.3	16.6	16.7	18.1	17.9	29.1	22.6	20.5	15.9	-
DT 26	Kingsway East Roundabout	343107	731740	37.3	34.2	36.0	28.5	30.4	30.4	27.5	32.4	31.6	25.9	34.8	29.2	31.5	24.4	-
DT 27	Kingsway/ Mains Loan	341124	732468	24.4	21.1	29.6	30.2	24.7	22.5	22.3	22.2	22.3	24.4	31.0	22.0	24.7	19.2	-
DT 177	Kingsway/Strathmartine Rd (N)	339179	732896	36.7	32.0	29.6	22.2	23.7	24.0	20.4	24.2	31.2	19.0	33.2	27.8	27.0	20.9	-
DT 30	Lochee Rd (138)	338936	730680	56.1	46.9	46.7	35.9	40.5	35.5	35.3	36.1	42.7	34.4	49.9	42.9	41.9	32.5	-
DT 31	Lochee Rd (140) (Traffic Lts)	338927	730685	53.7	46.9	M	33.8	38.6	35.1	34.4	38.7	42.0	35.5	57.4	47.5	42.1	32.7	-
DT 32	Lochee Rd (184)	338767	730856	45.5	34.9	33.9	25.9	27.2	24.1	24.4	27.8	34.6	25.4	37.1	31.1	31.0	24.0	-
37	Lochee Rd (Romon 3)	338861	730773	54.0	44.9	41.9	31.3	34.2	30.9	30.9	34.3	38.3	32.3	44.2	39.7	-	-	-

Diffusion Tube ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)												Simple Annual Mean (µg/m3)		
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.78) and Annualised	Distance Corrected to Nearest Exposure (see Appendix C)
38	Lochee Rd (Romon 3)	338861	730773	52.0	41.5	40.1	31.0	33.4	30.5	31.1	34.3	37.2	31.9	46.7	37.9	-	-	-
39	Lochee Rd (Romon 3)	338861	730773	50.0	43.6	42.8	31.8	34.3	31.8	32.1	32.6	39.6	32.8	44.5	38.8	37.8	29.3	-
DT 36	Lochee Rd / Polepark Rd	339016	730586	34.8	27.7	26.2	21.1	20.3	19.7	17.9	19.6	23.8	22.1	31.3	26.0	24.2	18.8	-
DT 37	Logie St (114)	338184	731293	56.4	49.1	52.1	38.8	47.1	42.7	40.5	43.5	47.4	37.6	53.8	43.5	46.0	35.7	-
DT 38	Logie St (98)	338252	731258	38.6	35.1	31.5	24.0	25.1	21.2	21.6	25.7	28.9	27.4	36.1	31.5	28.9	22.4	-
DT 39	Loons Rd (1)	338211	731293	37.9	35.4	41.1	39.0	35.3	32.7	28.2	31.0	34.1	35.2	42.0	34.4	35.5	27.5	-
DT 237	Lower Princess St	340964	730855	27.5	27.3	32.4	28.2	25.6	28.1	24.2	21.4	24.9	21.2	26.7	27.2	26.2	20.3	-
DT 40	Marketgait (Palais Crt)	339953	730094	27.1	23.2	25.6	23.7	23.2	21.7	18.5	13.9	21.6	20.2	26.1	23.0	22.3	17.3	-
91	Meadowside (Romon 3)	340243	730653	41.1	36.7	37.7	31.9	32.7	27.6	29.1	31.4	28.5	25.9	38.1	34.3	-	-	-
92	Meadowside (Romon 3)	340243	730653	42.5	37.2	39.2	32.4	34.2	28.5	29.4	31.9	29.3	26.8	36.8	34.3	-	-	-
93	Meadowside (Romon 3)	340243	730653	43.1	35.3	38.2	32.2	33.7	28.6	30.0	31.5	28.4	26.0	36.6	33.9	33.2	25.7	-
DT 42	Muirton Rd (6)	338156	731294	23.4	20.7	29.2	28.8	26.2	27.2	20.4	21.3	25.3	21.7	28.8	25.1	24.8	19.3	-
DT 185	Murraygate (46)	340409	730484	23.4	17.6	M	14.6	14.5	15.2	12.5	12.7	15.8	16.4	22.8	19.0	16.8	13.0	-
DT 189	Myrekirk Rd (29)	335420	731726	33.8	30.1	27.2	19.4	21.0	19.2	21.1	22.8	23.6	21.6	33.7	26.5	25.0	19.4	-
DT 48	Nethergate (132) / Marketgait	340074	729984	25.9	29.9	35.1	30.1	28.6	26.3	24.6	25.9	30.2	26.0	33.2	28.3	28.7	22.2	-
DT 47	Nethergate (40)	340230	730124	27.0	25.3	32.2	28.9	26.8	24.5	23.2	24.7	26.3	20.8	30.6	25.9	26.4	20.4	-
DT 45	Nethergate (6)	340274	730171	33.4	28.8	31.2	25.2	26.5	23.6	22.7	25.7	28.7	25.9	33.6	28.7	27.8	21.6	-
DT 213	Nethergate (64)	340196	730089	35.2	32.9	33.0	26.4	27.8	24.9	25.5	27.7	33.9	26.2	32.7	28.6	29.6	22.9	-
DT 44	Nethergate (88)	340163	730061	35.4	29.5	38.9	39.7	36.9	35.8	29.1	32.3	33.2	31.5	34.6	29.9	33.9	26.3	-
DT 46	Nethergate (95)	340033	729957	30.3	29.4	35.0	27.8	24.3	21.6	21.1	24.7	26.6	24.1	32.8	28.1	27.2	21.0	-

Diffusion Tube ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)												Simple Annual Mean (µg/m3)		
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.78) and Annualised	Distance Corrected to Nearest Exposure (see Appendix C)
DT 239	Princes St (185)	341077	731031	33.9	33.8	45.1	44.8	37.8	39.9	32.1	34.7	36.8	31.1	41.8	35.3	37.3	28.9	-
DT 49	Rankine St (2)	338768	730900	41.9	36.7	35.3	27.1	26.9	23.3	22.8	24.9	30.2	25.4	44.4	32.8	31.0	24.0	-
DT 228	Riverside Esplanade / Sth. Crichton St.	340516	729991	28.4	26.8	28.7	24.9	25.1	24.1	23.0	25.0	26.7	24.5	31.0	26.0	26.2	20.3	-
DT 224	Seagate (112)	340528	730537	43.3	38.3	36.4	29.9	32.8	31.0	28.6	31.6	37.2	35.3	43.0	36.5	35.3	27.4	-
DT 236	Seagate (36-40)	340463	730420	M	35.3	34.7	26.9	24.7	22.9	23.4	26.0	31.1	29.4	40.7	33.0	29.8	23.1	-
DT 54	Seagate (9)	340467	730388	31.7	27.4	31.6	26.9	26.1	23.6	22.1	23.2	24.5	23.8	34.1	27.5	26.9	20.8	-
DT 190	Seagate (97)	340516	730499	34.2	33.0	38.8	34.0	35.3	35.3	31.1	33.3	36.9	35.4	39.0	28.0	34.5	26.8	-
DT 217	Seagate (99)	340535	730522	31.9	30.3	36.7	34.6	32.1	32.6	29.2	31.0	35.6	31.0	34.2	31.9	32.6	25.3	-
56	Seagate (Romon 3)	340487	730446	38.2	35.4	32.4	32.5	32.4	31.5	30.0	30.8	35.5	25.0	38.3	34.7	-	-	-
57	Seagate (Romon 3)	340487	730446	37.1	35.1	37.8	33.9	33.3	30.6	29.4	30.5	34.3	35.8	35.5	35.6	-	-	-
58	Seagate (Romon 3)	340487	730446	37.3	38.0	38.1	33.4	32.9	31.0	30.0	32.4	36.4	36.6	39.3	33.2	34.0	26.4	-
DT 55	Soapwork Lane	340099	730650	36.4	32.5	34.6	27.4	29.1	27.0	25.0	26.8	28.5	29.1	35.4	30.5	30.2	23.4	-
DT 218	South Marketgait (Lamppost 18)	340291	729979	25.9	24.8	31.7	29.1	23.5	25.1	23.5	25.4	25.1	26.3	31.9	29.0	26.8	20.8	-
DT 247	South Marketgait (Street Sign)	340125	729952	42.3	41.9	39.1	29.0	30.6	25.7	23.7	29.7	34.9	26.7	37.0	31.6	32.7	25.3	-
DT 151	South Road (1 Denbank)	335188	731528	34.2	32.0	30.8	23.7	26.1	24.0	24.6	25.9	29.8	23.0	35.5	18.8	27.4	21.2	-
DT 162	St Andrews St/Seagate(116)	340532	730548	35.4	31.1	34.2	26.6	27.7	26.7	25.0	26.8	29.0	28.1	34.4	29.3	29.5	22.9	-
DT 59	Strathmore Ave (353)	339609	731871	35.9	28.5	36.6	32.8	32.6	31.7	28.7	32.7	34.3	28.7	43.3	34.5	33.4	25.9	-
DT 219	Thomson Avenue (Street Sign)	340542	730194	32.2	30.0	32.5	28.1	24.5	M	23.0	24.3	26.1	24.7	34.1	29.4	28.1	21.8	-
DT 229	Thomson Avenue / Sth. Crichton St	340421	730078	34.3	32.3	33.0	24.1	24.6	21.4	22.5	24.2	25.7	22.2	34.8	27.4	27.2	21.1	-
DT 60	Trades Lane (31)	340575	730500	24.8	22.5	24.5	19.7	19.6	19.2	17.7	18.6	20.0	21.9	28.4	25.3	21.9	16.9	-

Diffusion Tube ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)												Simple Annual Mean (µg/m3)		
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.78) and Annualised	Distance Corrected to Nearest Exposure (see Appendix C)
DT 93	Victoria Rd (10)	340230	730673	34.1	34.7	37.5	31.2	26.6	23.4	24.7	24.7	28.3	27.7	39.0	29.7	30.1	23.4	-
DT 184	Victoria Rd (104)/William St)	340697	730950	28.7	27.7	33.1	28.7	27.9	24.5	24.1	23.5	23.9	25.8	34.8	28.7	27.6	21.4	-
DT 191	Victoria Rd (4 India Buildings)	340213	730633	33.0	30.2	33.1	28.3	25.6	24.1	22.6	23.1	24.2	28.1	36.6	30.0	28.2	21.9	-
DT 68	Victoria Rd (60)	340375	730779	33.8	35.1	38.3	32.7	30.7	28.1	26.2	29.4	29.6	30.0	41.5	33.5	32.4	25.1	-
DT 70	Victoria Rd / Hilltown	340274	730714	62.0	60.5	49.2	39.0	46.8	35.0	40.9	43.3	44.5	39.8	54.1	42.1	46.4	36.0	-
DT 71	Victoria St / Albert St	341071	731072	27.7	26.3	31.2	24.3	21.1	19.9	19.8	22.1	22.5	24.2	36.5	26.9	25.2	19.5	-
DT 205	West Marketgait / Old Mill (23)	339773	730436	56.2	34.2	46.5	32.4	36.8	32.8	34.7	40.6	45.4	34.7	55.9	40.3	40.9	31.7	-
DT 231	West Marketgait / Ward Road	339834	730314	34.7	31.9	25.0	25.9	24.3	18.7	20.7	26.3	26.0	24.8	33.3	28.3	26.7	20.7	-
DT 183	West Marketgait / Guthrie St	339805	730338	48.5	43.0	41.8	31.8	33.3	28.5	29.4	M	39.2	28.5	41.9	39.1	36.8	28.5	-
DT 72	Westport (2)	339842	730122	29.1	27.7	24.9	18.6	19.7	16.8	17.1	18.6	22.6	19.3	27.6	24.0	22.2	17.2	-
DT 73	Whitehall Cr (4)	340376	730109	30.4	27.5	28.9	22.7	23.2	22.0	19.7	23.7	24.4	24.3	32.6	28.6	25.7	19.9	-
DT 161	Whitehall Cr / Union St (50)	340305	730051	25.0	22.5	25.0	19.2	19.6	16.6	16.6	18.3	18.9	18.5	26.1	23.2	20.8	16.1	-
DT 76	Whitehall St (1)	340265	730153	41.3	35.2	M	32.7	33.8	30.9	28.5	32.0	34.4	31.6	38.8	34.1	33.9	26.3	-
DT 81	Whitehall St (12)	340293	730142	31.0	27.2	36.2	32.1	29.5	27.6	24.7	26.1	27.0	28.6	35.7	30.5	29.7	23.0	-
DT 77	Whitehall St (15)	340322	730098	32.3	29.7	30.5	25.7	25.0	21.2	21.1	24.6	25.2	24.7	34.1	28.8	26.9	20.9	-
DT 74	Whitehall St (40)	340330	730106	34.7	30.3	34.9	31.8	27.8	24.2	25.5	27.8	26.6	29.8	36.8	30.4	30.1	23.3	-
DT 75	Whitehall St (5)	340289	730128	34.6	27.2	31.2	23.1	27.0	22.1	23.7	25.4	27.3	23.4	32.4	27.3	27.1	21.0	-
82	Whitehall St (Romon 3)	340278	730156	35.3	29.0	32.3	29.9	28.0	25.3	24.7	26.7	27.0	27.2	31.4	29.3	-	-	-
83	Whitehall St (Romon 3)	340278	730156	31.3	31.3	33.2	29.3	27.3	25.0	25.0	26.4	27.3	26.4	34.3	28.0	-	-	-
84	Whitehall St (Romon 3)	340278	730156	30.8	28.7	33.3	29.5	27.6	26.1	24.6	26.5	26.6	26.1	32.3	28.7	28.7	22.2	-

Diffusion Tube ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)												Simple Annual Mean (µg/m3)		
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.78) and Annualised	Distance Corrected to Nearest Exposure (see Appendix C)
DT 82	Woodside Ave	340776	732307	14.8	11.7	12.6	8.2	7.9	6.9	7.3	8.5	10.3	9.8	19.0	13.4	10.9	8.4	-

Notes:

'M' means that the diffusion tube was either missing or else interference meant that the results were considered invalid.

'NT' means that there was NO diffusion tube deployed at this location during that monitoring period.

Sites shaded yellow were monitoring locations installed in 2023.

See Appendix C for details on bias adjustment, annualisation and distance correction.

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

New or Changed Sources Identified Within Dundee City Council During 2023

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

Additional Air Quality Works Undertaken by Dundee City Council During 2023

Dundee City Council has not completed any additional works within the reporting year of 2023.

QA/QC of Diffusion Tube Monitoring

The diffusion tubes used by Dundee City Council are supplied by Gradko and analysed by Tayside Scientific Services utilising the 20% Triethanolamine (TEA) in water preparation method. Diffusion tubes are exposed for 4 to 5 weeks in accordance with the recommended dates supplied by Defra. The method for preparing and analysing tubes has remained unchanged since 2001. Two diffusion tubes from each monthly batch are used as blanks. These tubes are not exposed but are taken round during the monthly deployment and collection and stored in the refrigerator during the exposure period. They are analysed along with the appropriate batch of exposed tubes. The purpose of the blanks is to determine whether contamination occurred during the preparation or deployment.

Defra and the Devolved Administrations advise that diffusion tubes used for Local Air Quality Management should be obtained from laboratories that have demonstrated satisfactory performance in the AIR Proficiency Testing (PT) scheme. Laboratory performance in AIR PT is also assessed by the National Physical Laboratory (NPL) alongside laboratory data from the monthly NPL Field Intercomparison Exercise carried out at Marylebone Road, central London.

AIR is an independent analytical proficiency-testing (PT) scheme, operated by LGC Standards and supported by the Health and Safety Executive (HSE). AIR PT started in April 2014 and combines two long running PT schemes: LGC Standards STACKS PT scheme and HSL WASP PT scheme. AIR NO_2 PT forms an integral part of the UK NO_2 Network's QA/QC and is a useful tool in assessing the analytical performance of those laboratories supplying diffusion tubes to Local

Authorities for use in the context of Local Air Quality Management (LAQM). With consent from the participating laboratories, LGC Standards provides summary proficiency testing data to the LAQM Helpdesk for hosting on the webpages at http://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html . This information is updated on a quarterly basis following completion of each AIR PT round.

Tayside Scientific Services demonstrated satisfactory performance in the most recent round participated in during 2023.

All diffusion tube changeovers during 2023 were in accordance with the diffusion tube calendar.

Diffusion Tube Annualisation

Annualisation of data was required for two diffusion tube sites with data capture less than 75% but greater than 25% in 2023. The LAQM Diffusion Tube Data Processing Tool was used to complete annualisation of the monitoring data from the two locations, which were DT 241 and DT 248. Table C.2 includes details of the background monitoring data sites used in the annualisation process.

Diffusion Tube Bias Adjustment Factors

Dundee City Council have applied a local bias adjustment factor of 0.78 to the 2023 monitoring data. A summary of bias adjustment factors used by Dundee City 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
2023	Local	-	0.78
2022	Local	-	0.80
2021	Local	-	0.85
2020	Local	-	0.85
2019	Local	-	0.85

The diffusion tubes are supplied by Gradko and analysed by Tayside Scientific Services utilising the 20% Triethanolamine (TEA) in water preparation method. The bias adjustment factor available

on the LAQM Support Website for Tayside Scientific Services is 0.68[8] (Spreadsheet Version Number: 06/24). This is based on the kerbside National inter-comparison site at Marylebone Road (0.68).

Factor from Local Co-location Studies

Dundee City Council co-locates three NO_2 diffusion tubes with each of the roadside automatic NO_2 analysers. Co-location studies were carried out at 4 automatic monitoring locations in 2023. A minimum of 9 months is required to make a valid bias calculation and three of the four Dundee City Council co-location studies met the criteria in 2023. The factor for each study is shown in Table C.3 along with the factor for the national inter-comparison site at Marylebone Road in London. The QA/QC procedures for all the Dundee City Council automatic analysers used in the bias-calculation is equivalent to the Automatic Urban and Rural Network (AURN), which is run by the national government. Tayside Scientific Services have demonstrated satisfactory performance for the analysis of diffusion tubes over quarterly AIR-PT/WASP rounds in 2023. The automatic analyser period means are calculated from mid-day on tube changeover days.

The majority of NO_2 diffusion tubes operated by Dundee City Council are located at roadside or kerbside locations. In view of this it is normally considered appropriate to use an overall factor derived from roadside and kerbside sites. The LAQM Diffusion Tube Data Processing Tool was used to obtain the local bias adjustment factor. The factor obtained using only local roadside sites with sufficient data was 0.78. The Marylebone Road national inter-comparison site factor was 0.68. The 0.78 bias correction factor represents a more conservative approach and has been used to bias correct the diffusion tube data presented in this report.

NO_2 Fall-off with Distance from the Road

Table B.1 and Table C.4 includes details of NO_2 Fall off With Distance Calculations (concentrations presented in µg/m^3) for the PDTs located at Carolina Court (30mph sign)(DT 186) and Dock Street / Trades Lane (DT233). These two PDTs are further from the kerb than the façade of the nearest receptor at these locations. No diffusion tubes required distance correction for the reason of having an annual mean concentration greater than 36µg/m^3. The LAQM Diffusion Tube Data Processing Tool was used to obtain these results.

[8] https://laqm.defra.gov.uk/wp-content/uploads/2024/07/Database_Diffusion_Tube_Bias_Factors_v06_24-FINAL.xlsx

QA/QC of Automatic Monitoring

All automatic analysers (excluding Osiris units) are audited twice yearly by an external consultant, Ricardo AEA, as a part of their contracted Local Site Operator (LSO) duties for Dundee City Council. The gas analysers do not have on-site gases and are manually calibrated every 3 weeks by the LSO using National Physical Laboratory (NPL) traceable gas.

All instruments (excluding OSIRIS units) are serviced and calibrated every 6 months by the equipment supplier. OSIRIS units undergo quarterly flow checks and filter changes as well as annual service and calibration by the manufacturer (Turnkey Instruments).

The Partisol is a semi-automatic reference equivalent PM_{10} analyser. It contains 16 'Emfab' filters, each is exposed for 24 hours allowing for 2 weeks continuous operation (usually with two blanks). The filters used during 2023 were supplied by the equipment manufacturer and conditioned and weighed before and after the sampling period by Tayside Scientific Services using in-house procedures.

The Fidas 200 is a nephalometer, which is calibrated using a HEPA filter and 'CalDust' by our LSO, Ricardo AEA, during the twice-yearly service and audits.

Ricardo have ratified all the real-time monitoring data reported on the Scottish Air Quality Website from 2006 onwards under contract from the Scottish Government.
http://www.scottishairquality.scot/latest/summary?view=la

Data presented in the APR is ratified data unless otherwise noted.

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

Dundee has used several methods for monitoring particulate matter (PM_{10}) within the city, with the type of analyser used at all the main monitoring stations changing to Fidas analysers in recent years.

Prior to 2022, data from the Fidas was not required to be adjusted, however as a result of the "Scottish Government Equivalence Study to Investigate Particulate Matter Monitoring In Scotland Using The Fidas 200"[9], the Scottish Government advised in May 2023 that Fidas PM_{10} monitoring

[9] https://www.scottishairquality.scot/technical-reports/equivalence-study-investigate-particulate-matter-monitoring-scotland-using-fidas

data requires correction by dividing by 0.909, while $PM_{2.5}$ monitoring data is to be corrected by multiplying by 1.06.

Both TEOM and OSIRIS monitors have heated inlets. These tend to drive off volatile organic particulate matter and in consequence the measured concentrations tend be lower than those measured by gravimetric reference standard monitors. The historic TEOM PM_{10} data presented in this report was corrected using the Volatile Correction Methodology (VCM). (The Partisol is a reference equivalent method and had been used historically to determine a local correction factor for the TEOMs, which were designated as non-equivalent in 2006.)

DCC has five OSIRIS analysers which have been in their current locations since at least 2012. These are also non-equivalent but their measurements are considered indicative of particulate concentrations. Annually, post service, all 5 OSIRIS monitors are co-located in-house and their data is compared with that of a designated "master" to derive, if necessary, individual adjustment factors. The factors used to adjust the 2023 data can be made available on request. The "master" OSIRIS unit has been co-located with the Partisol at the urban industrial site at Broughty Ferry Road since September 2012, thus allowing the OSIRIS results presented in this report to be gravimetrically corrected prior to reporting. The gravimetric factor applied to **2023 data was 1.231**. This methodology, although reasonable for annual mean data, tends to over-estimate the number of daily mean exceedances. Consequently, these results should be treated with some caution.

For comparison with the NAQS objectives annual mean concentrations are calculated from an hourly time base**.**

Automatic Monitoring Annualisation

Annualisation of data was required for one automatic monitoring site with less than 75% data capture in 2023 (CM14 Meadowside – 72.9%). The methodology outlined in Box 7.9 of LAQM.TG (22) was used to identify the annualised annual mean level for NO_2 at the Meadowside site. Table C.2 contains names of the urban background sites used and their annualisation factor for the specific period, as well as the annualisation factor applied to the data. Annualisation is required for any site with data capture less than 75% but greater than 25%.

NO_2 Fall-off with Distance from the Road

No automatic NO_2 monitoring locations within Dundee City Council required distance correction during 2023.

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

Site ID	Annualisation Factor Aberdeen Errol	Annualisation Factor Edinburgh St. Leonards	Annualisation Factor Dundee Mains Loan	Annualisation Factor Site 4 None	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DT 241	1.0112	0.8839	0.8991	-	0.9314	31.6	29.5	
DT 248	0.9363	1.0633	1.0248	-	1.0082	35.0	35.2	
CM 14	1.0345	1.1242	1.1130		1.0903	24.7	26.9	

Table C.3 – Local Bias Adjustment Calculations

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4
Periods used to calculate bias	12	11	12	
Bias Factor A	0.75 (0.7 - 0.82)	0.84 (0.79 - 0.9)	0.74 (0.7 - 0.78)	
Bias Factor B	33% (22% - 43%)	19% (11% - 27%)	35% (28% - 43%)	
Diffusion Tube Mean (µg/m^3)	37.8	34.4	28.7	
Mean CV (Precision)	2.6%	5.0%	2.5%	
Automatic Mean (µg/m^3)	28.5	28.9	21.2	
Data Capture	100%	100%	99%	
Adjusted Tube Mean (µg/m^3)	28 (26 - 31)	29 (27 - 31)	21 (20 - 22)	

Notes:

A combined local bias adjustment factor of **0.78** has been used to bias adjust the 2023 diffusion tube results.

Table C.4 – NO_2 Fall off With Distance Calculations (concentrations presented in µg/m^3)

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted)	Background Concentration	Concentration Predicted at Receptor	Comments
DT 186	7.6	7.2	17.2	11.0	17.4	
DT 233	6.1	5.7	24.1	11.0	24.4	

Appendix D: Overview of NO_2 Annual Mean Concentrations across the City

Notes:

1) Graphs show the NO_2 annual mean concentrations measured at the passive diffusion tube locations and continuous monitoring stations that are highlighted in the accompanying map.

2) 'Hollow' markers for the graphs denote for that year there was <85% data capture at continuous monitor (CM) locations or <75% data capture for passive diffusion tube (DT) locations

Union Street and Whitehall Street

Figure 16 NO_2 Monitoring Locations in Union St and Whitehall St.

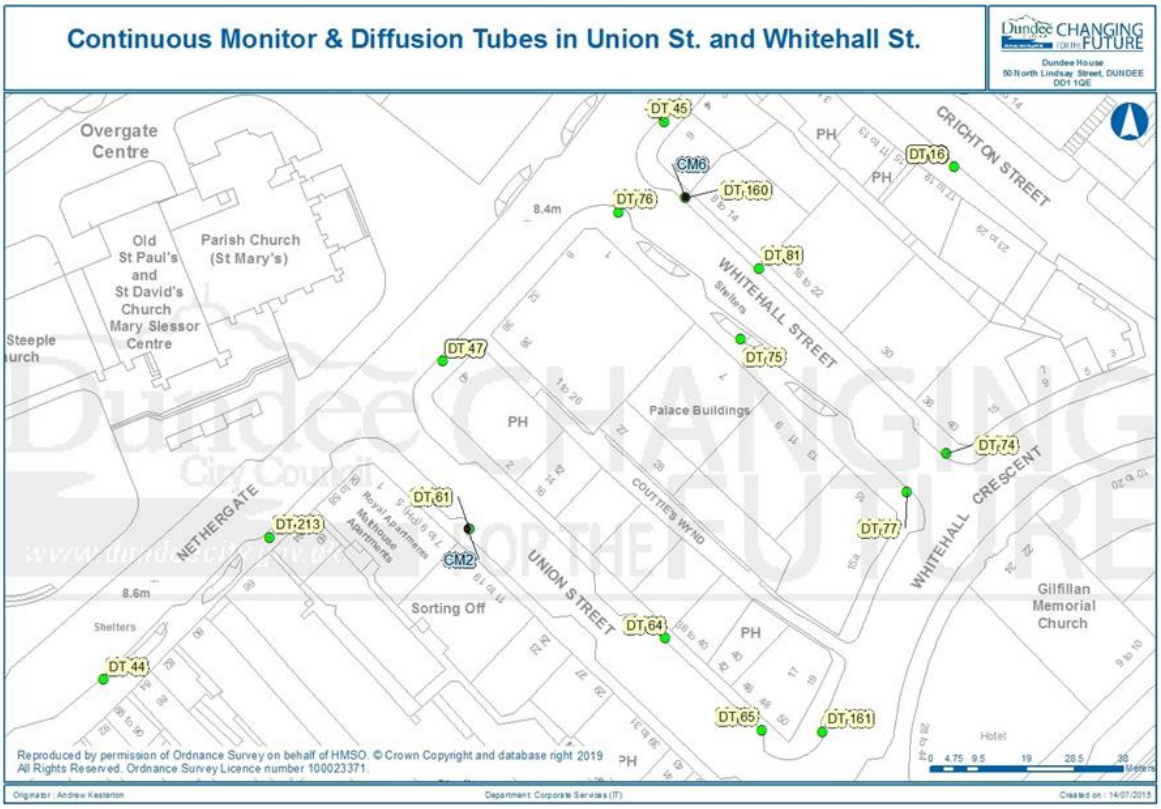


Figure 17 Overview of NO_2 concentrations in Union St and Nethergate (east of Marketgait)

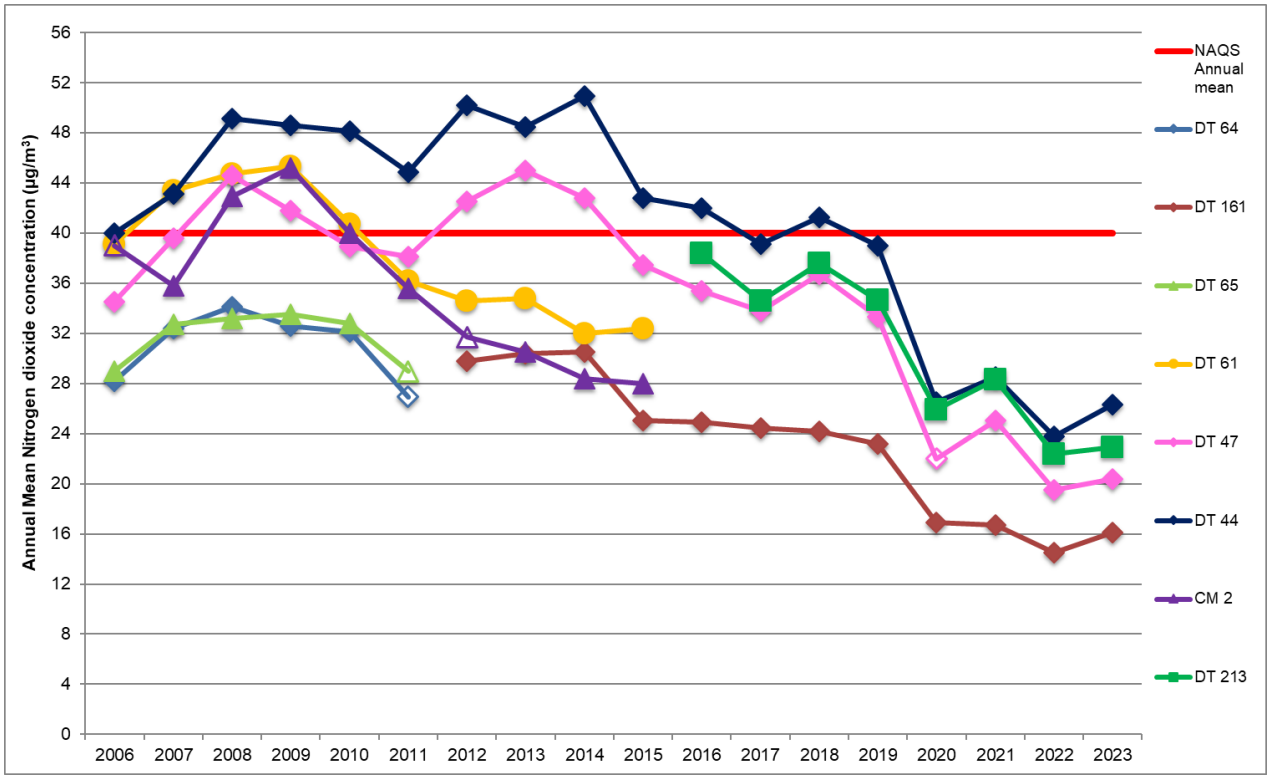
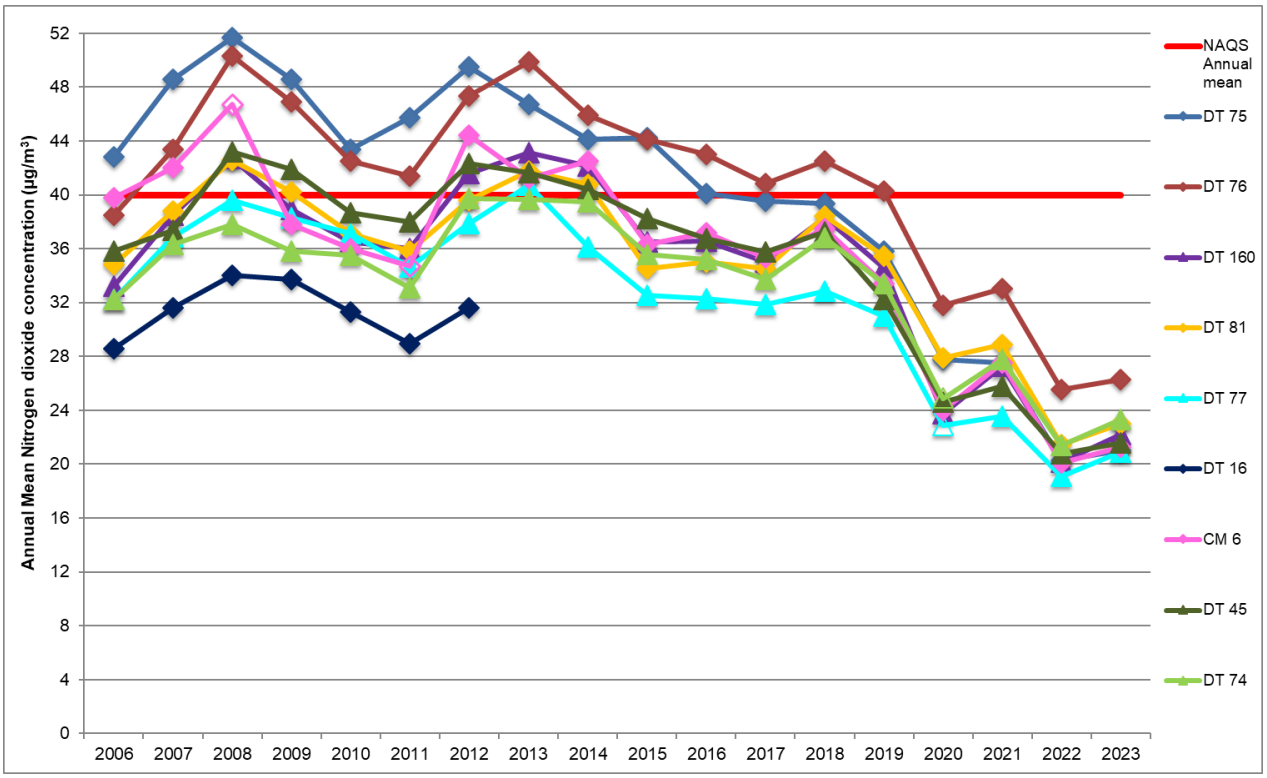


Figure 18 Overview of NO_2 concentrations in Whitehall St and Crichton St.



Nethergate

Figure 19 NO_2 Monitoring Locations in Nethergate

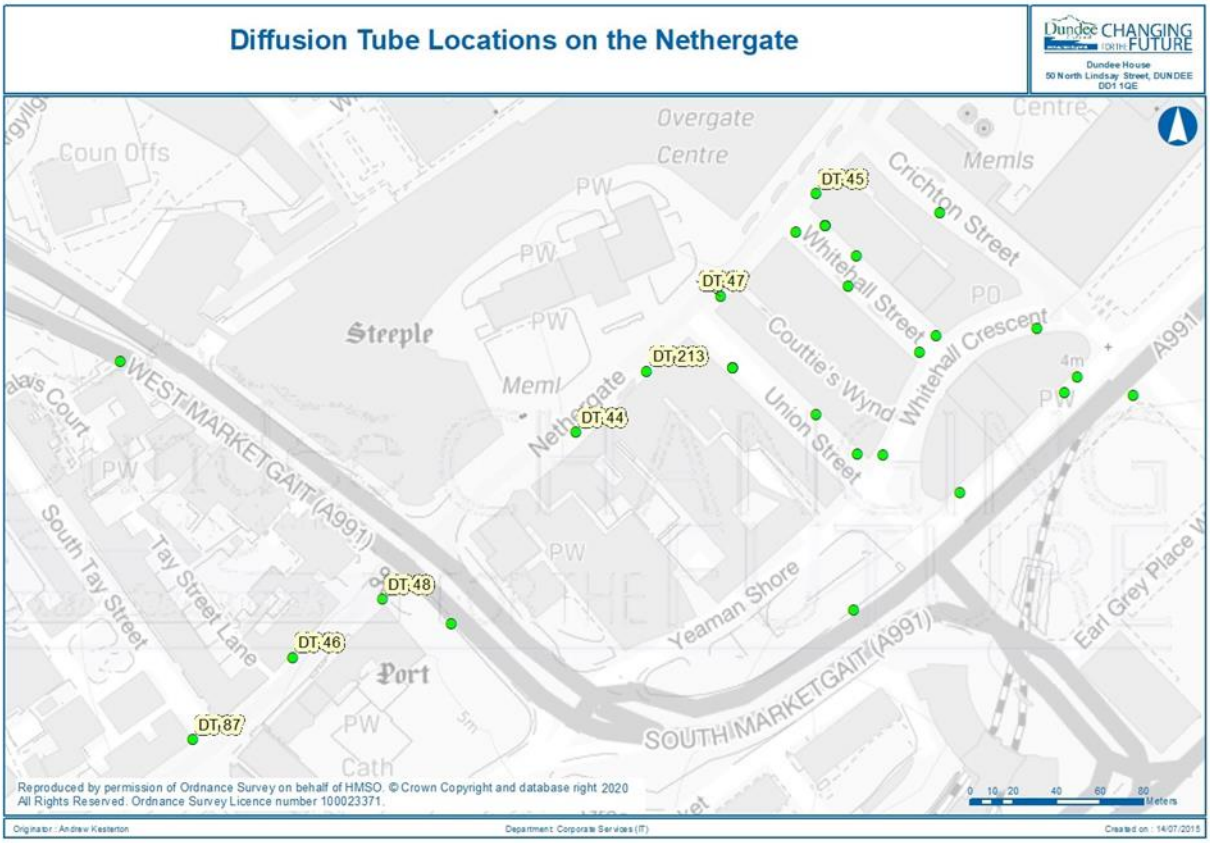
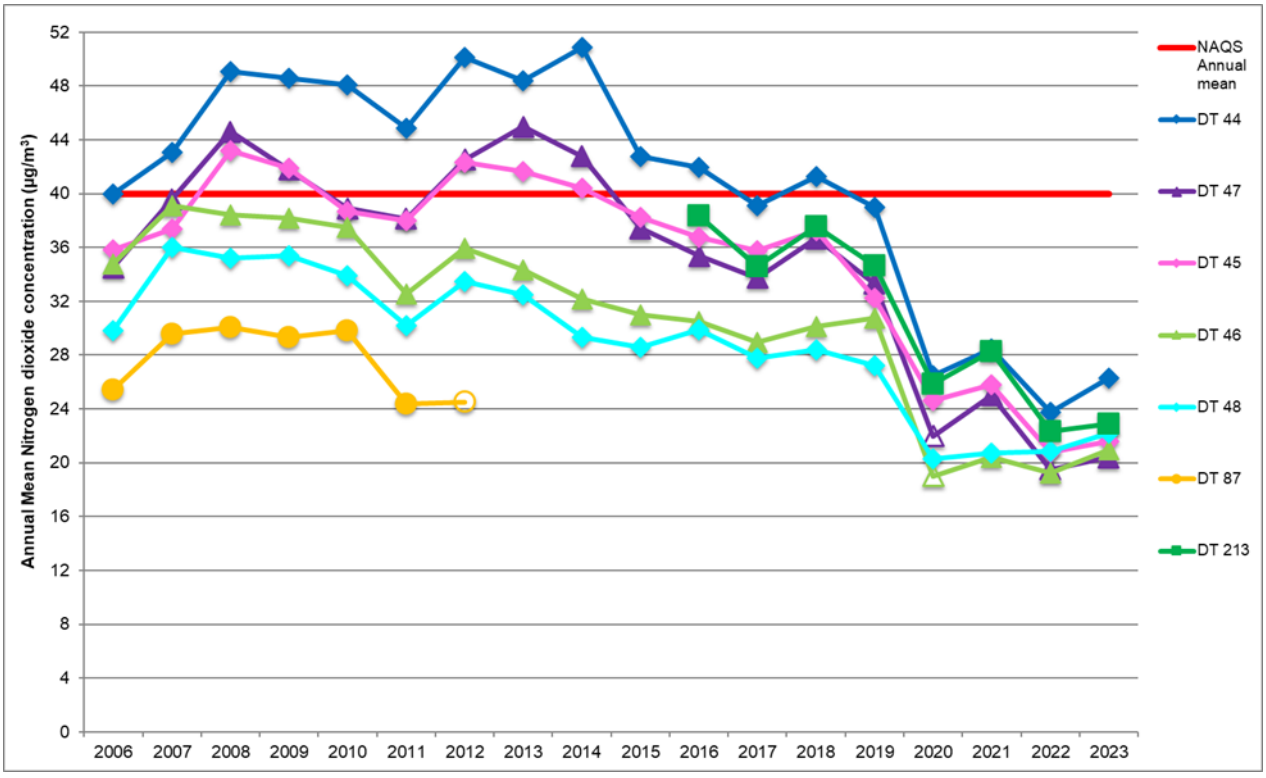


Figure 20 Overview of NO_2 concentrations in Nethergate



Seagate

Figure 21 NO_2 Diffusion Tube Locations in Seagate

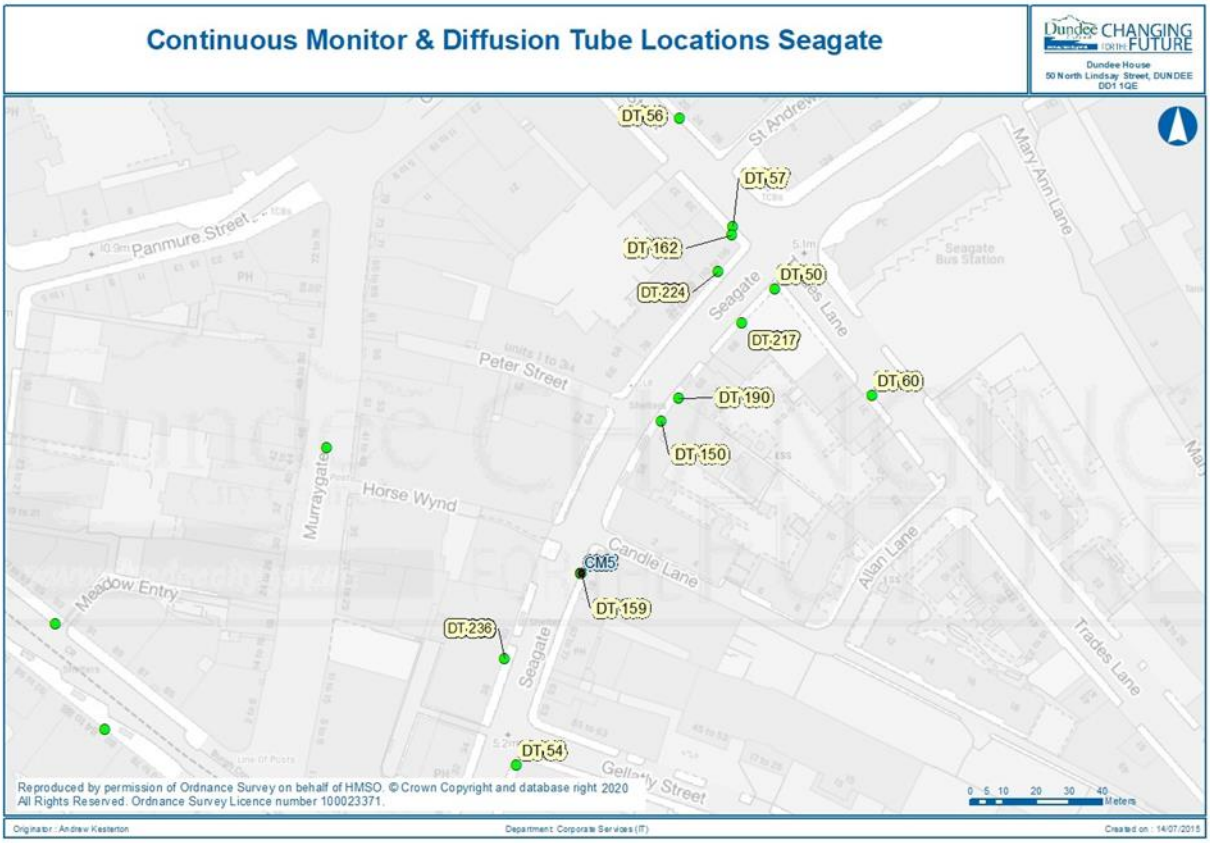
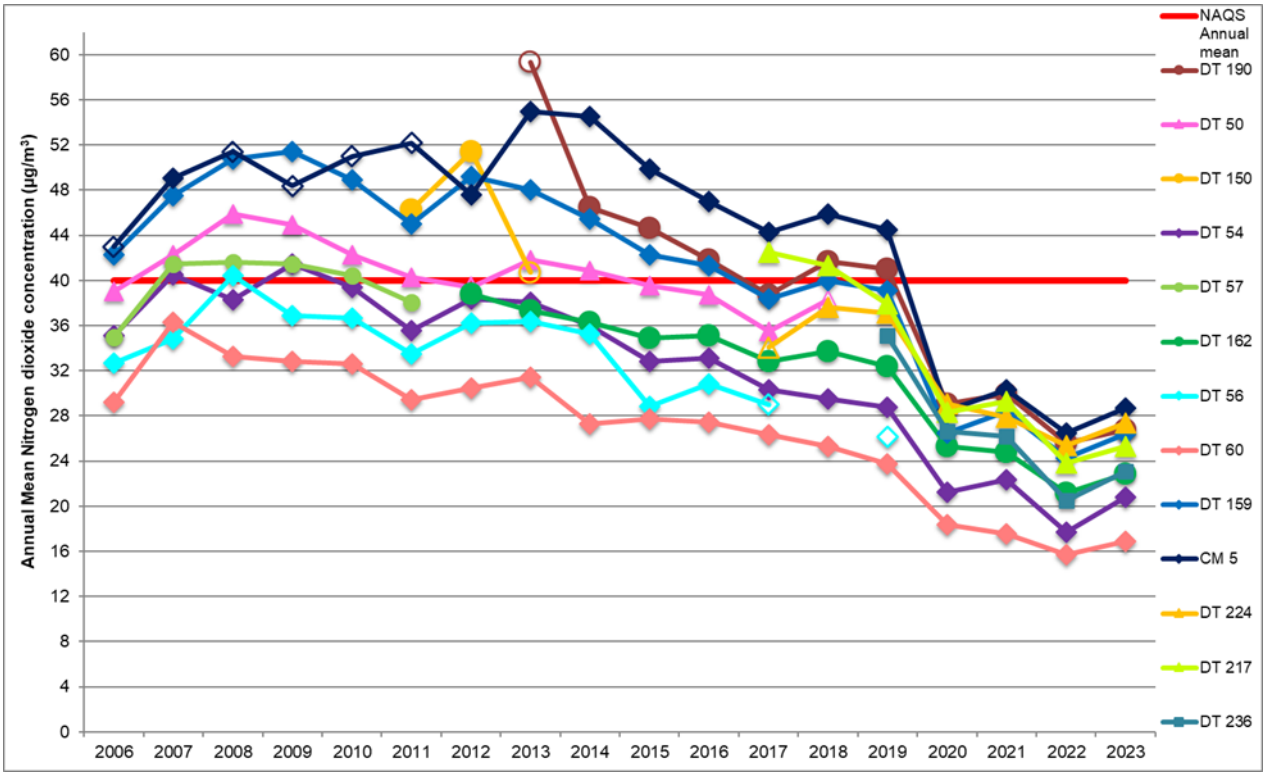


Figure 22 Overview of NO_2 diffusion tube concentrations in Seagate



Victoria Road / Meadowside

Figure 23 NO_2 Diffusion Tube Locations in Victoria Road / Meadowside

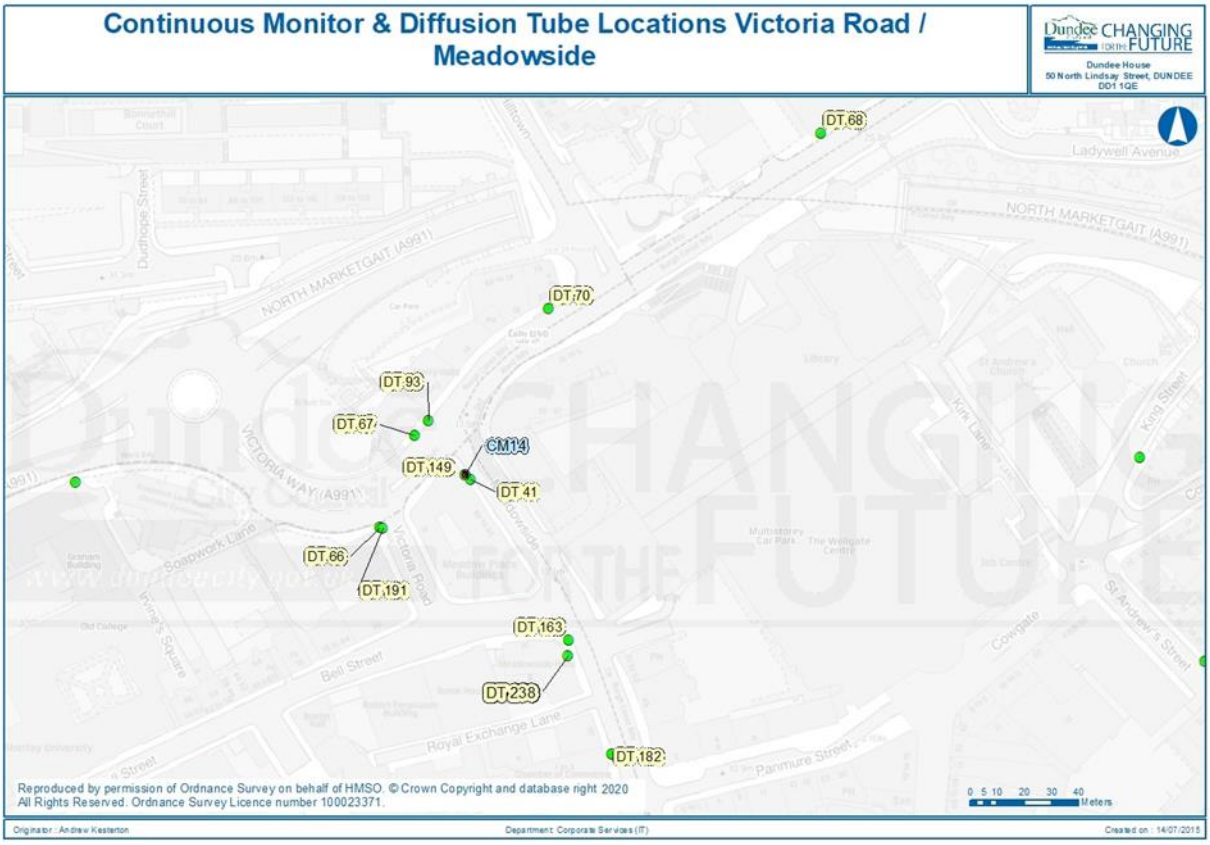
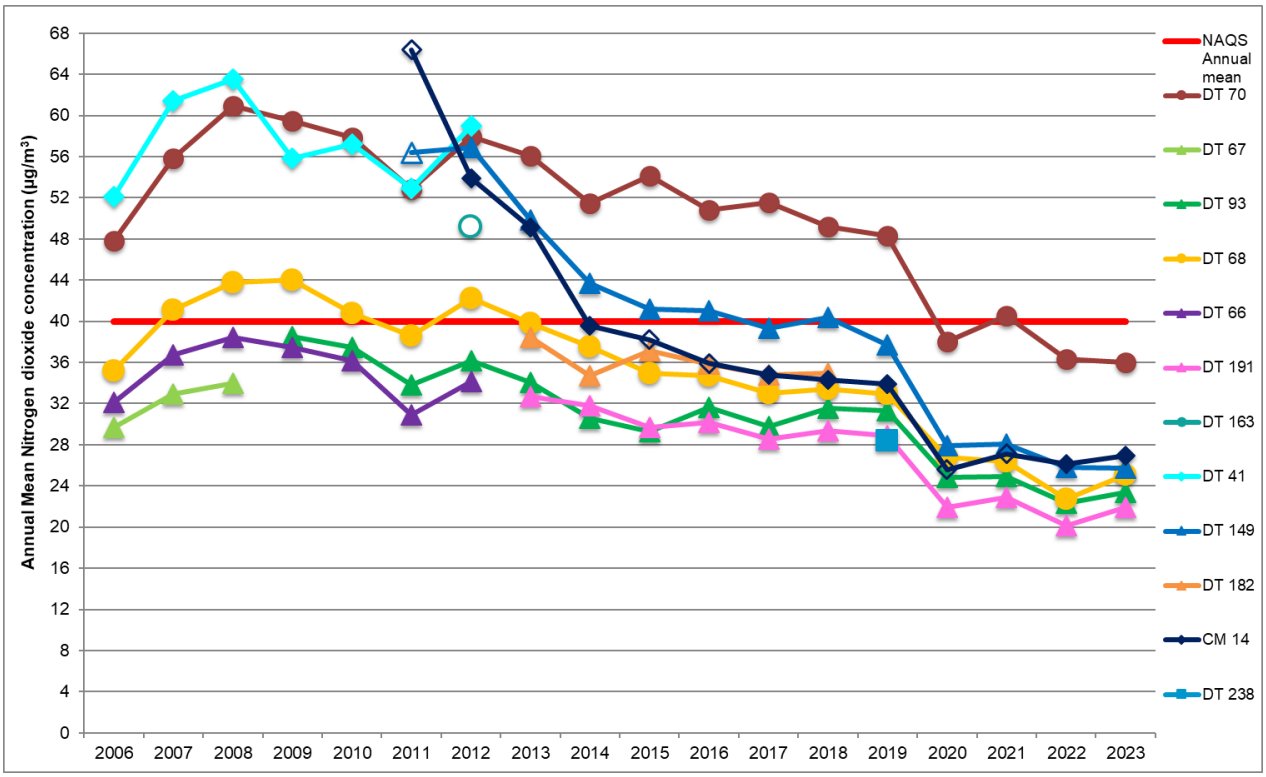


Figure 24 Overview of NO_2 concentrations in Victoria Road / Meadowside



Albert Street / Dura Street

Figure 25 NO_2 Diffusion Tube Locations in Albert Street / Dura Street

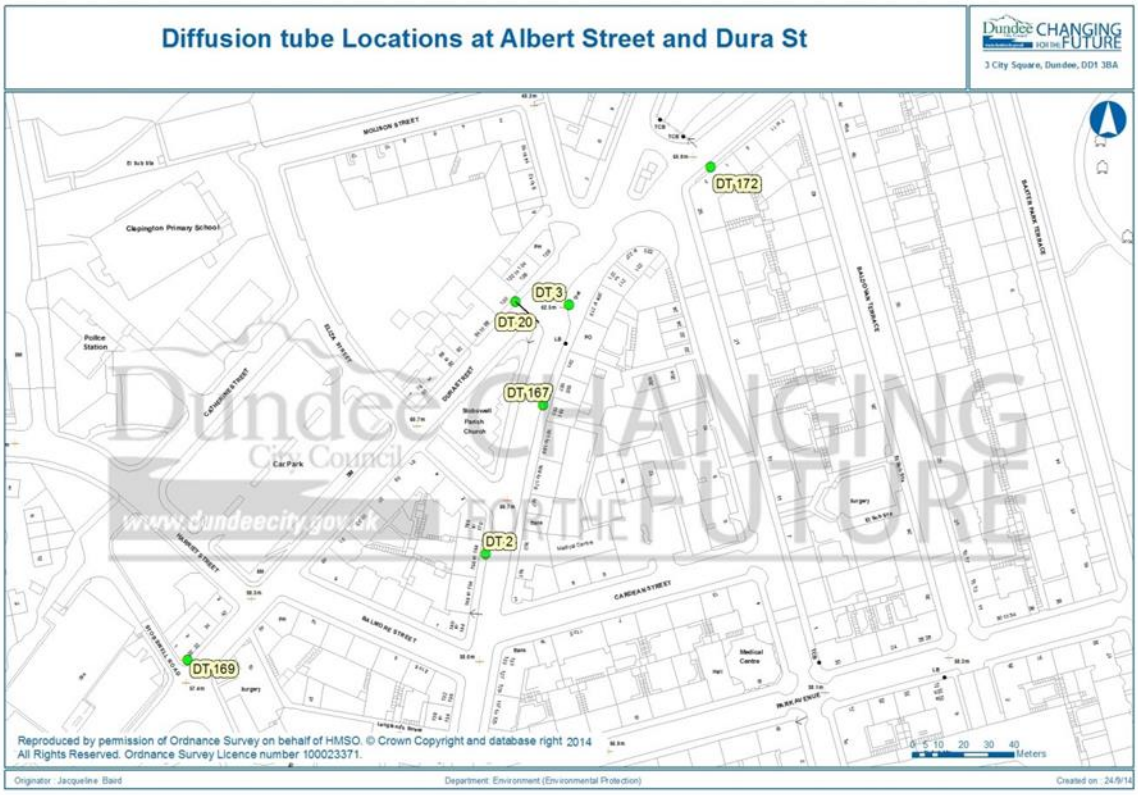
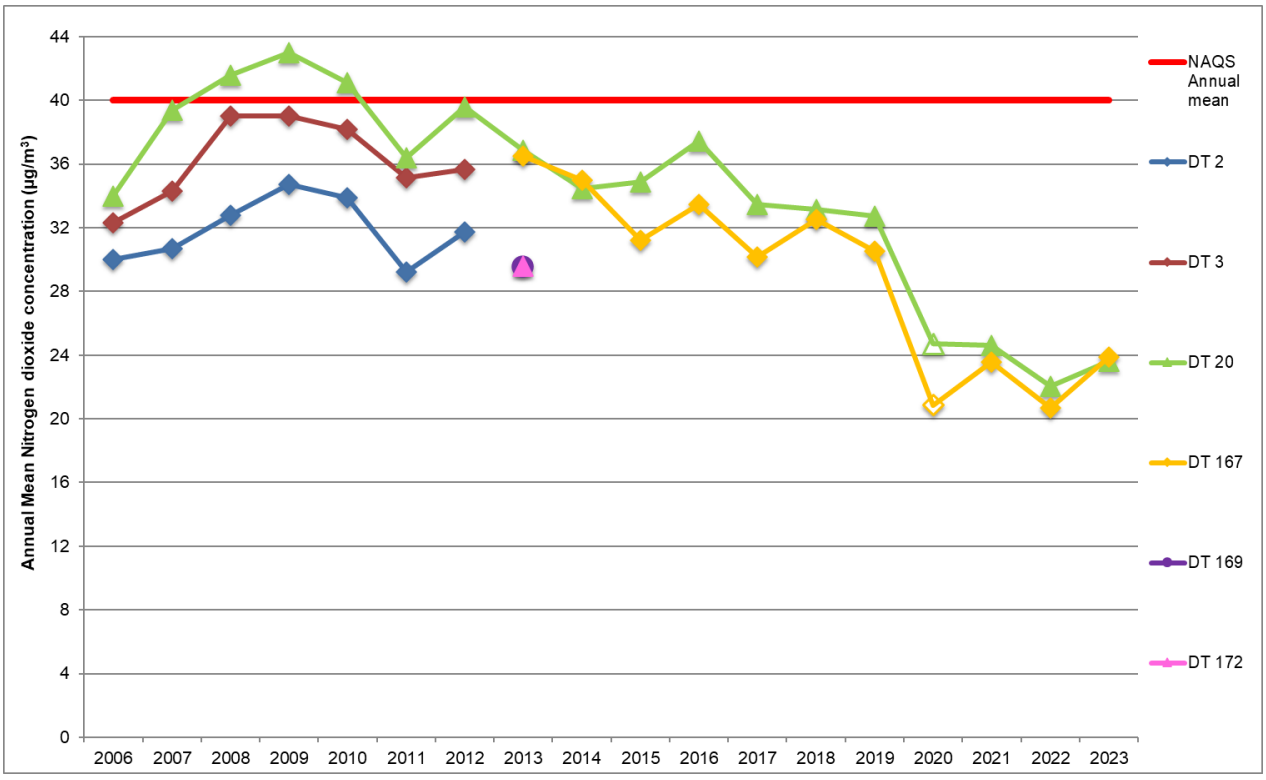


Figure 26 Overview of NO_2 diffusion tube concentrations in Albert Street / Dura Street



Lochee Road

Figure 27 NO_2 Monitoring Locations in Lochee Road

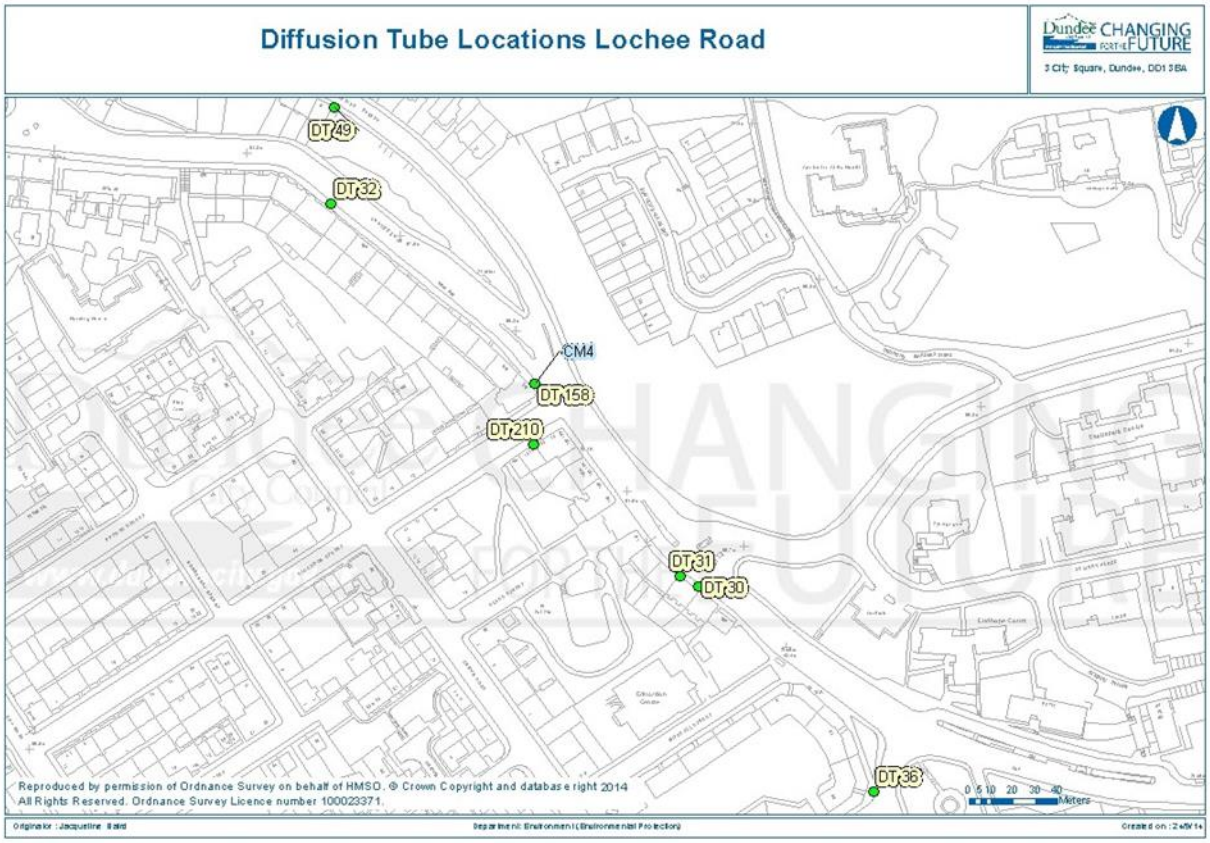
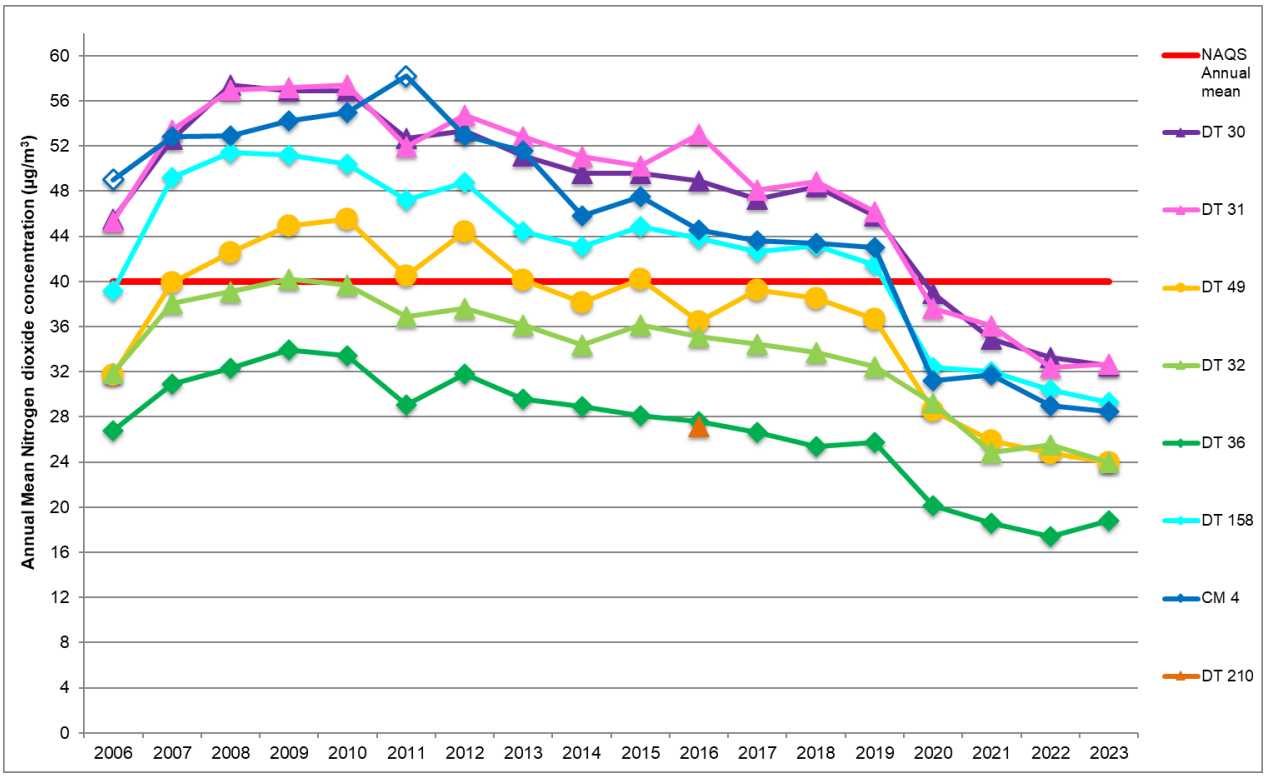


Figure 28 Overview of NO_2 concentrations in Lochee Road



Logie Street

Figure 29 NO_2 Diffusion Tube Locations in Logie Street

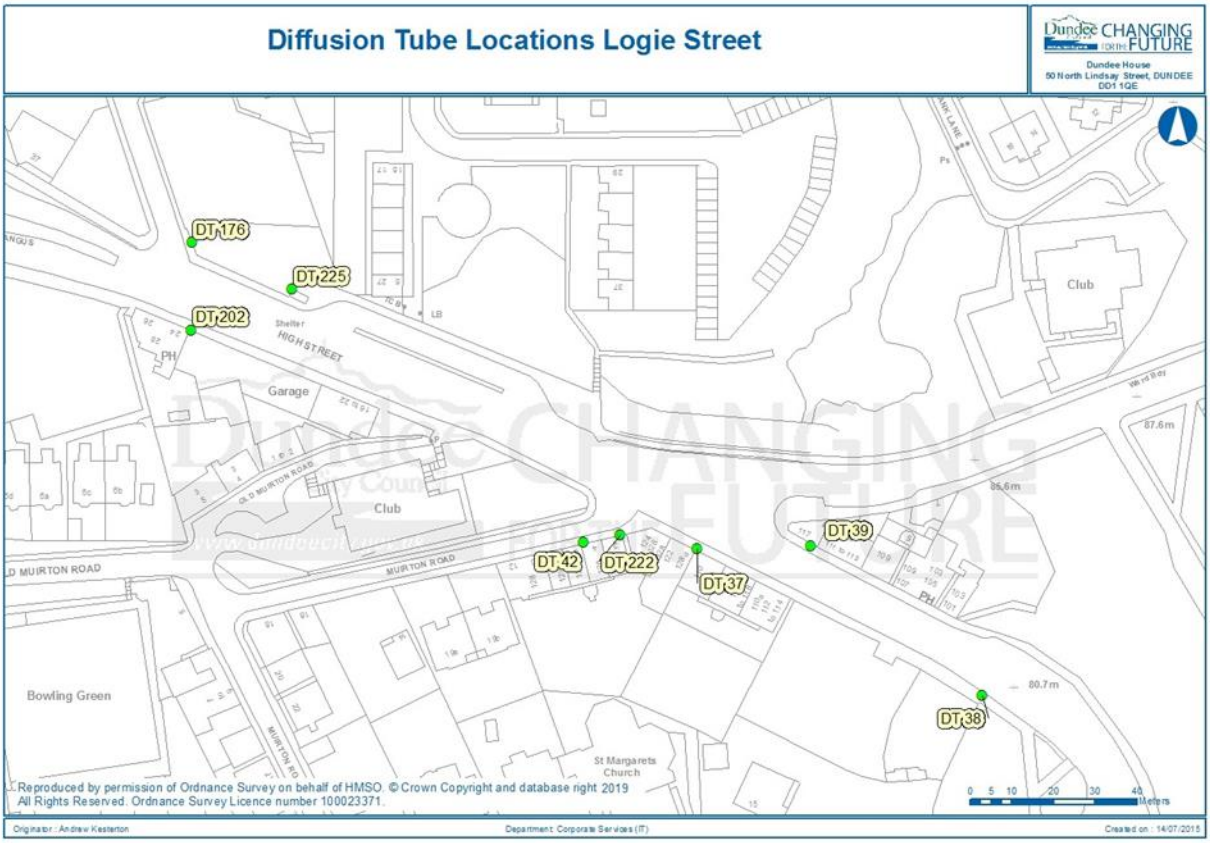
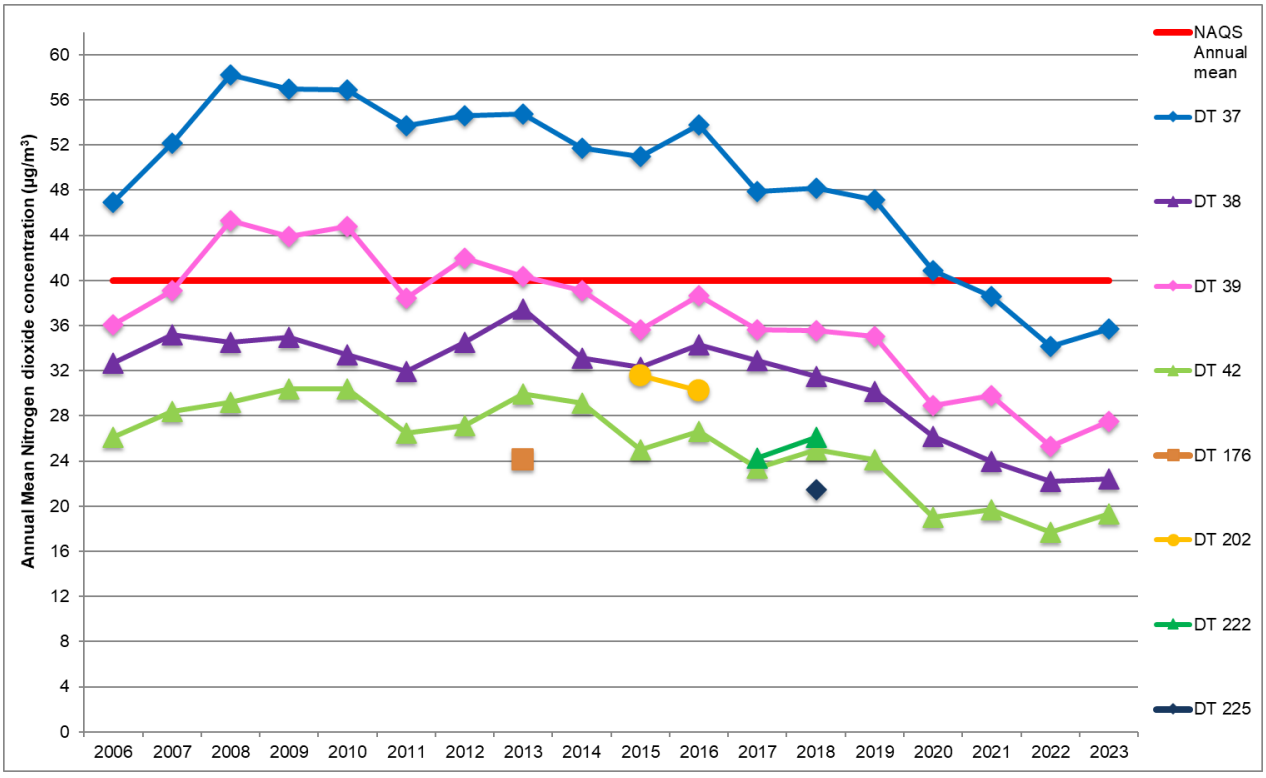


Figure 30 Overview of NO_2 diffusion tube concentrations in Logie Street



Albert Street / Arbroath Road

Figure 31 NO_2 Diffusion Tube Locations in Albert Street / Arbroath Road

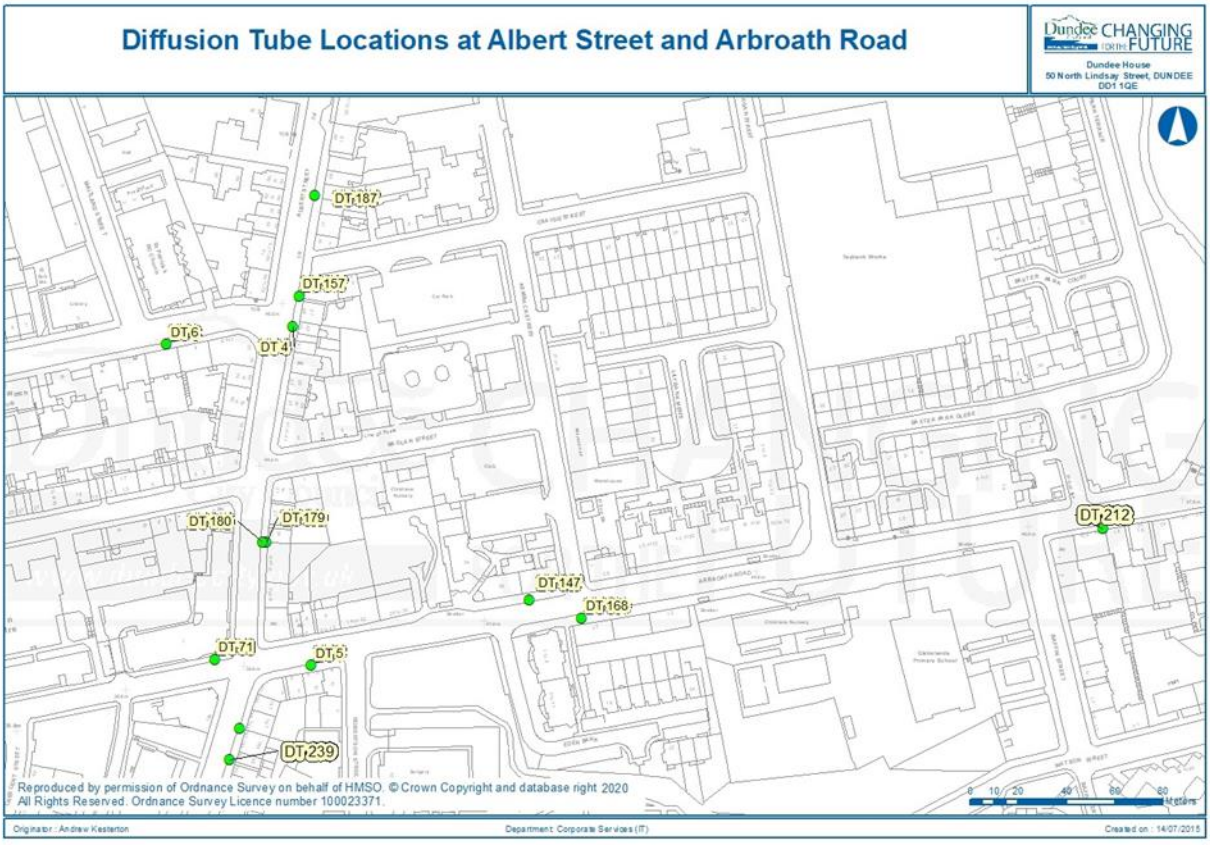
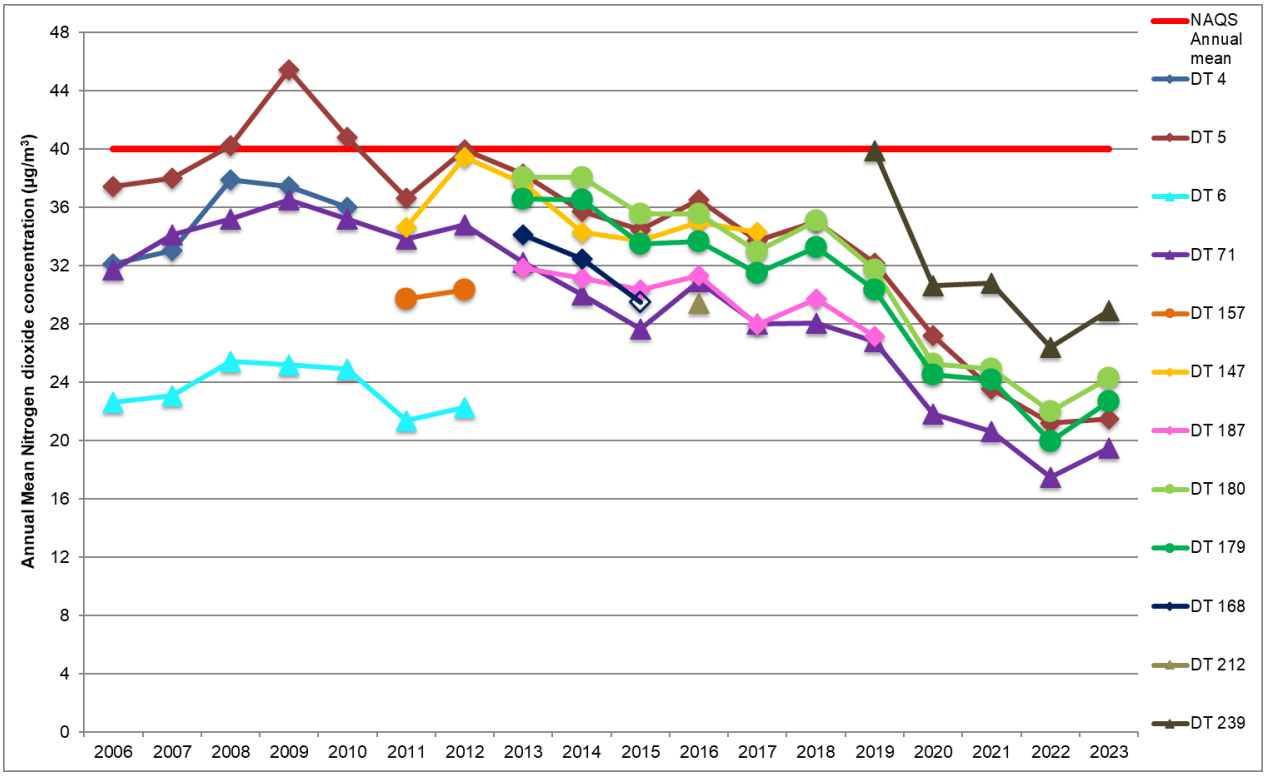


Figure 32 Overview of NO_2 diffusion tube concentrations in Albert Street / Arbroath Road



Kingsway / Forfar Road

Figure 33 NO_2 Diffusion Tube Locations on / near Kingsway / Forfar Road

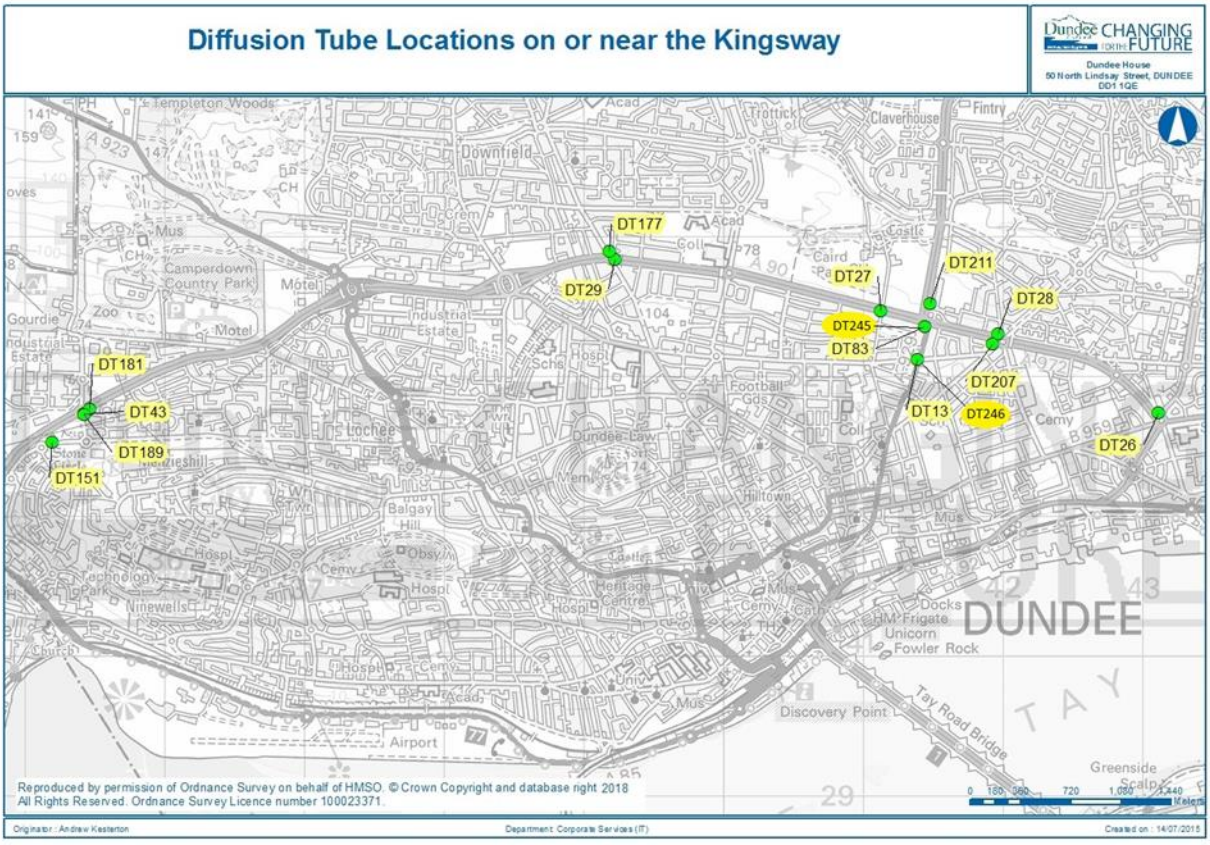
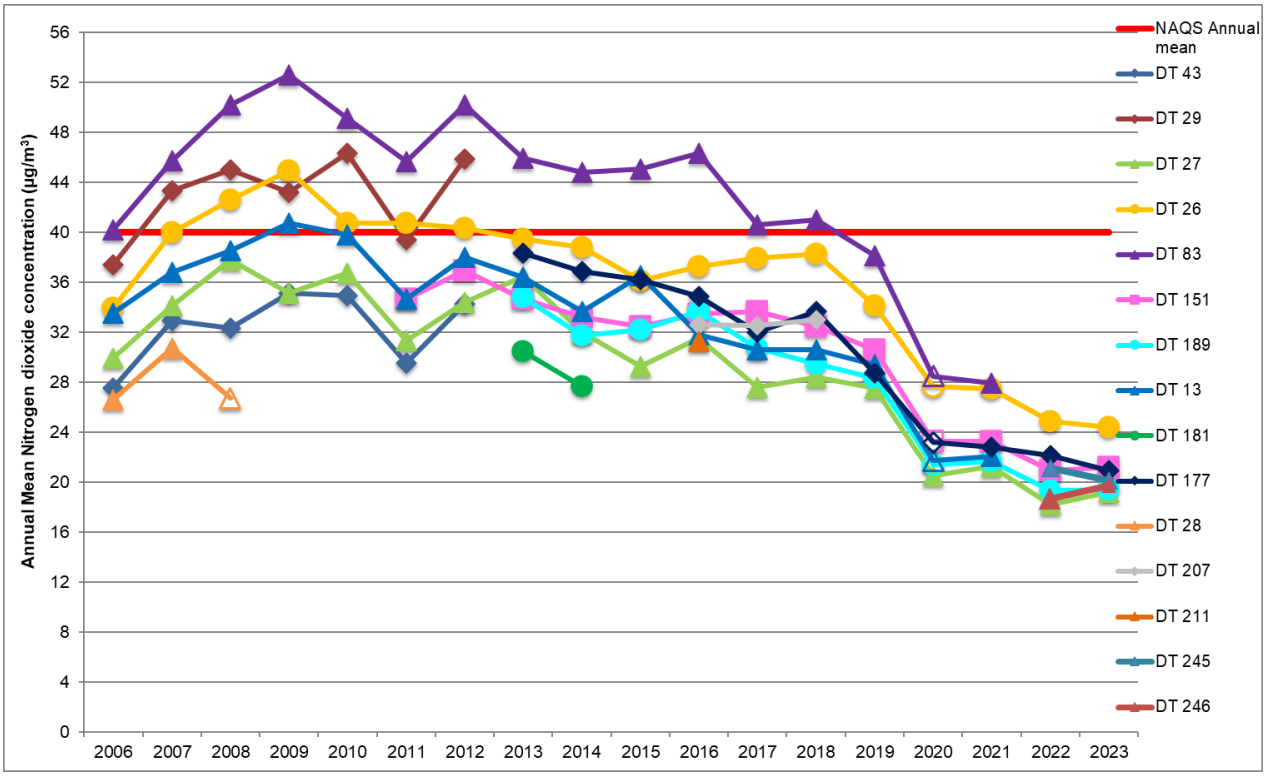


Figure 34 Overview of NO_2 diffusion tube concentrations on / near the Kingsway / Forfar Road



Bus corridor

Figure 35 Other NO_2 Diffusion Tube Locations on bus corridor

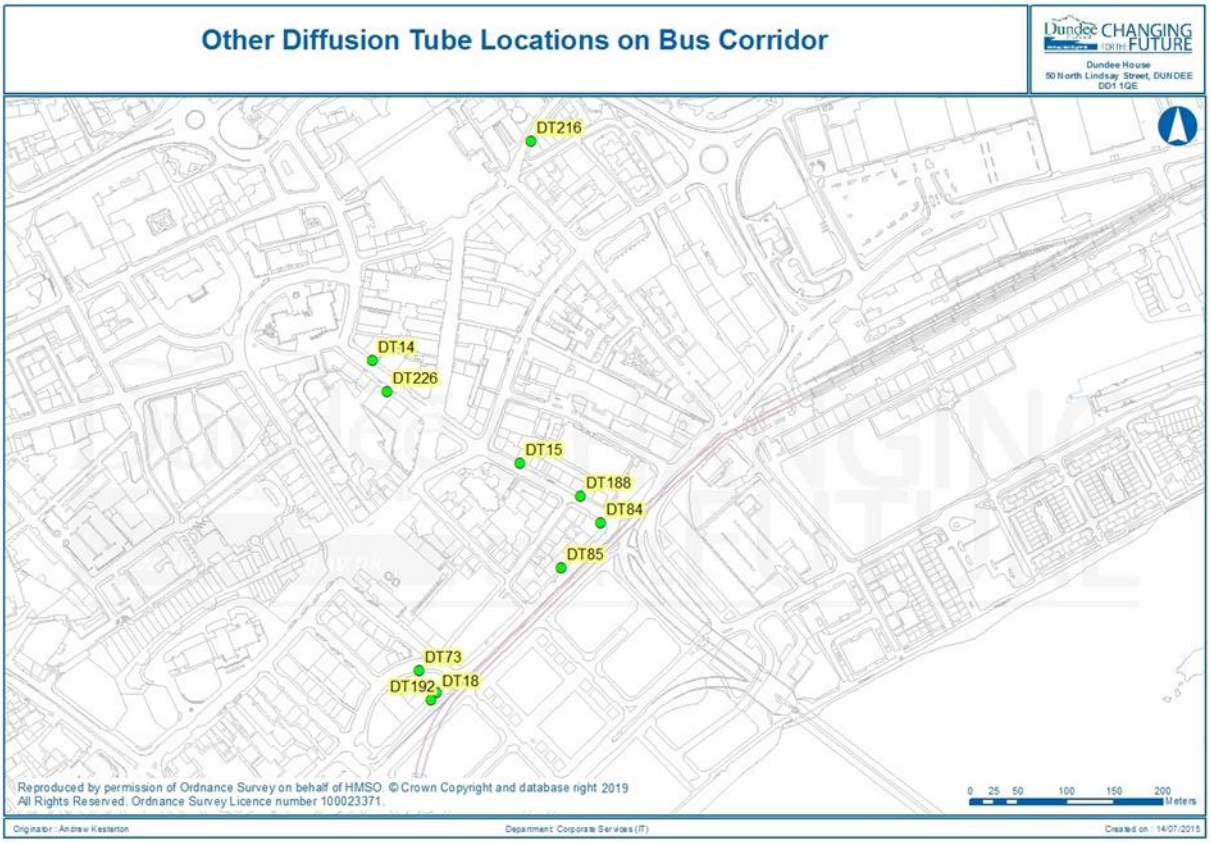
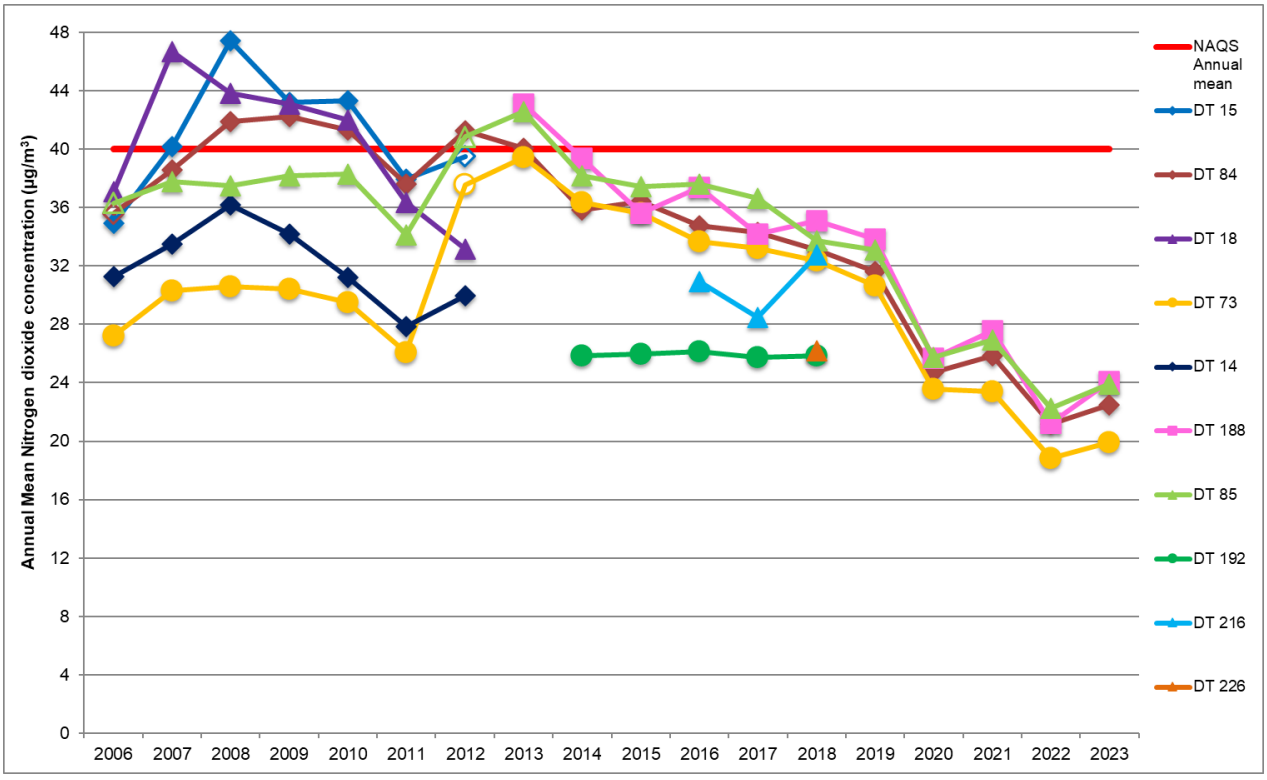


Figure 36 Overview of NO_2 diffusion tube concentrations on bus corridor



Inner ring road

Figure 37 NO_2 Diffusion Tube Locations on the Inner Ring Road

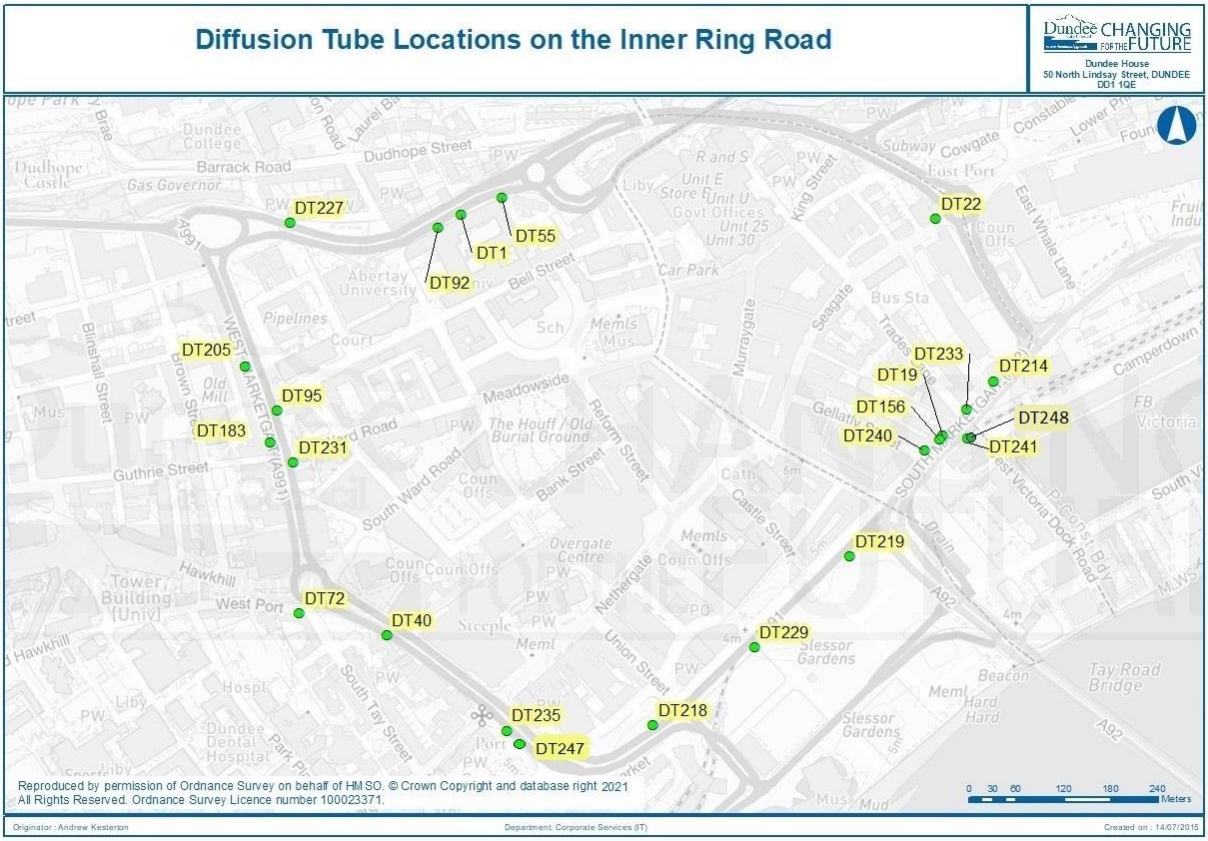


Figure 38 Overview of NO_2 diffusion tube concentrations on Inner Ring Road (West & North Marketgait)

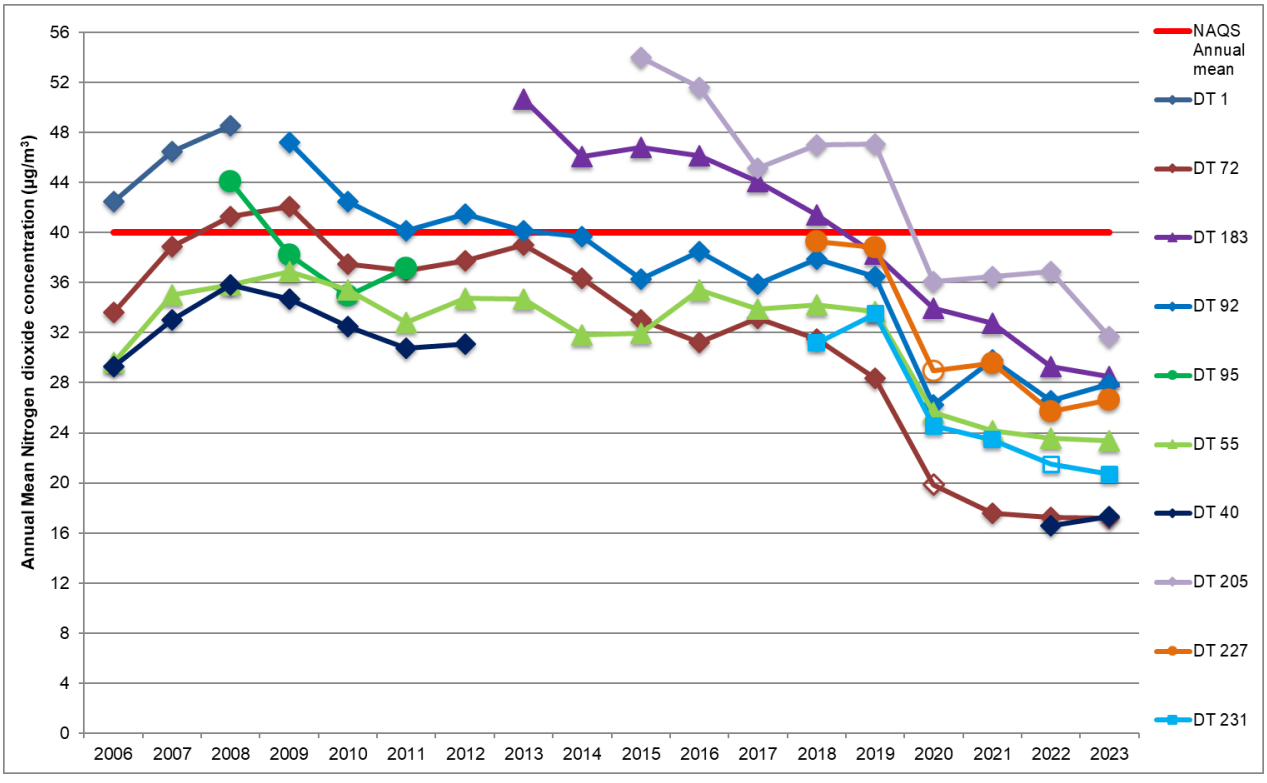
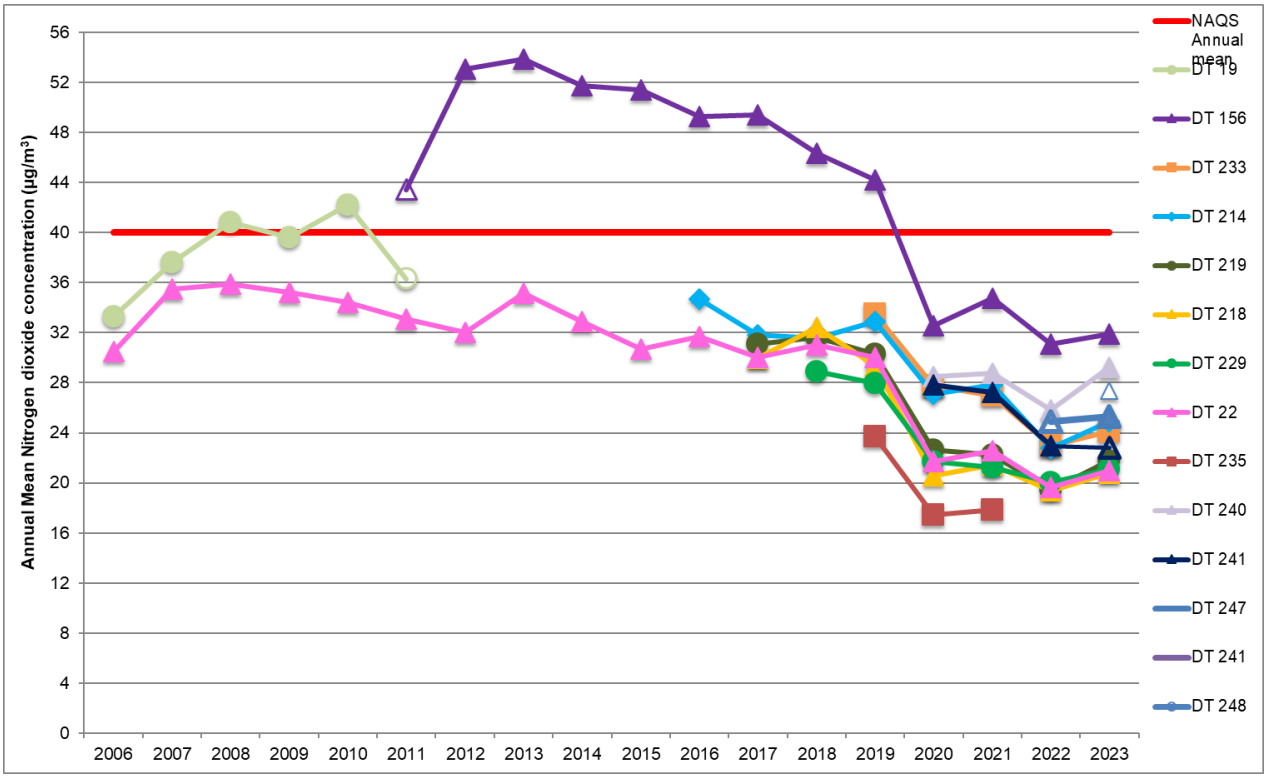


Figure 39 Overview of NO_2 diffusion tube concentrations on Inner Ring Road (East & South Marketgait)



Stannergate

Figure 40 NO_2 Diffusion Tube Locations at Stannergate

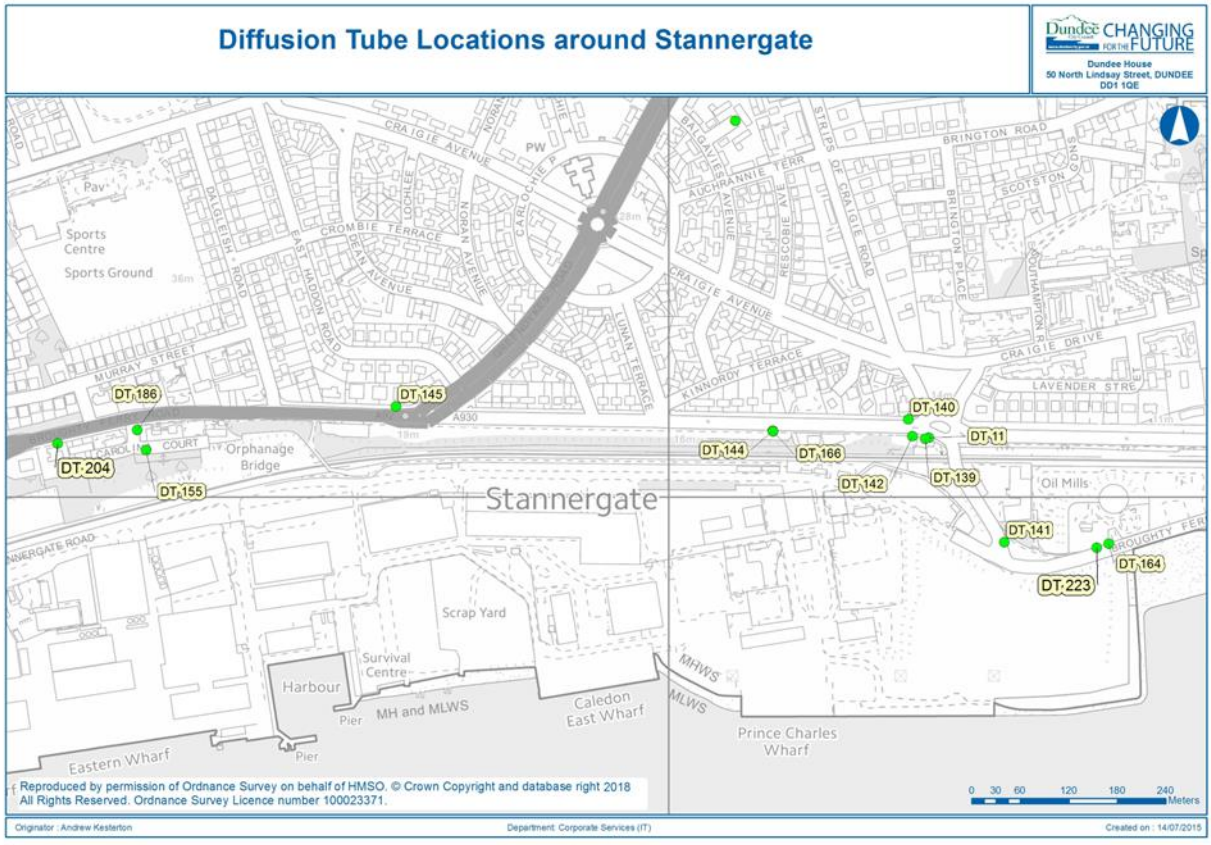
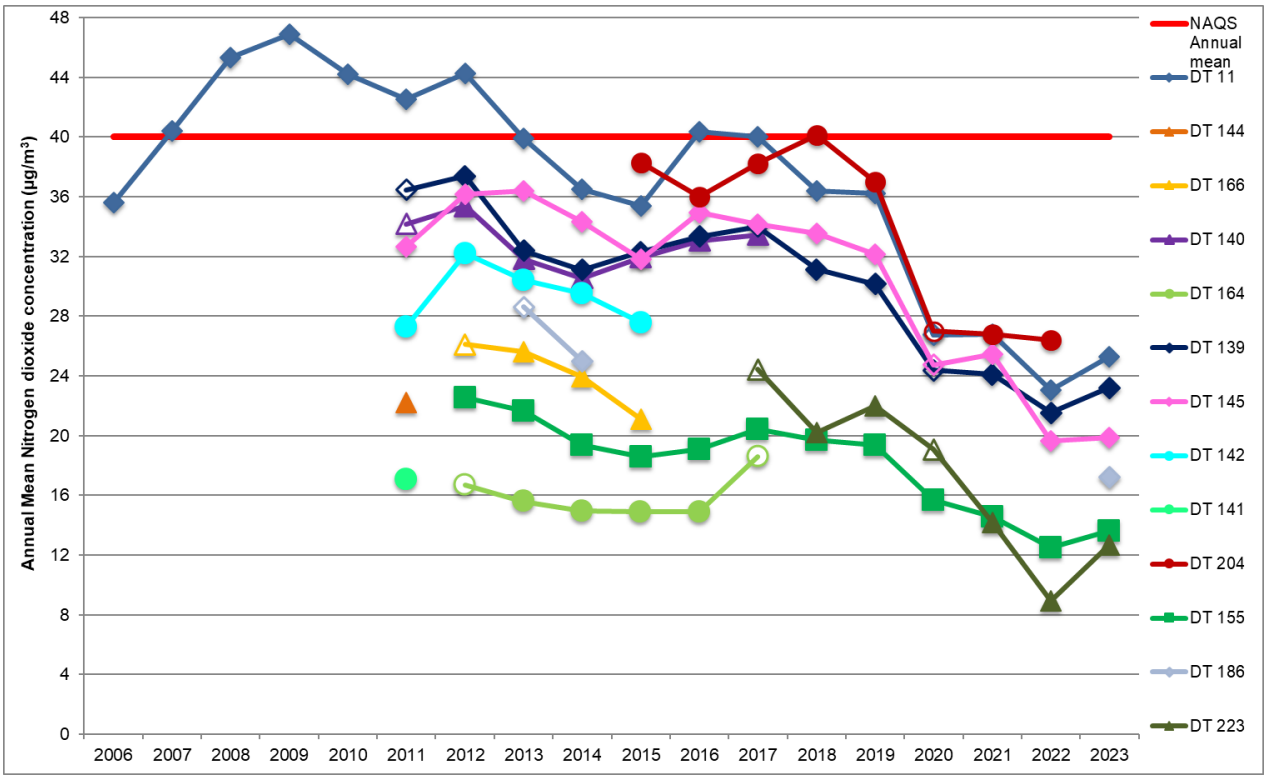


Figure 41 Overview of NO_2 diffusion tube concentrations at Stannergate



Strathmore Avenue

Figure 42 NO_2 Diffusion Tube Locations at Strathmore Avenue

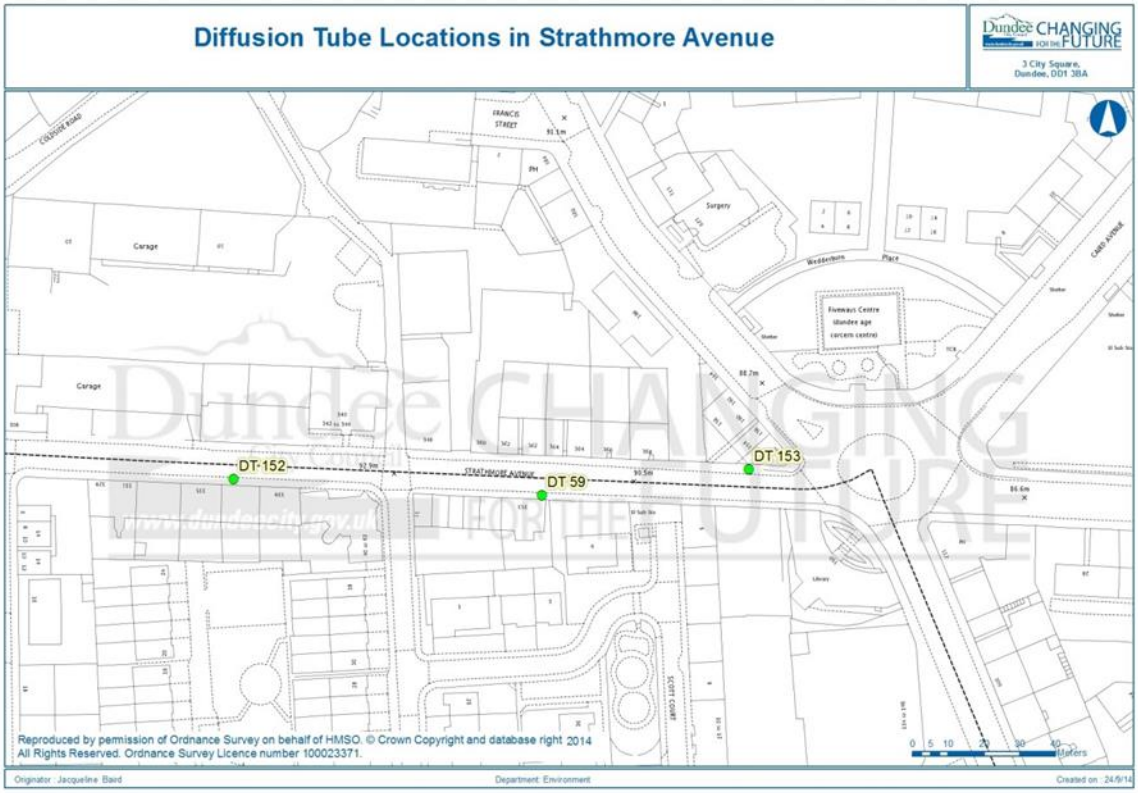
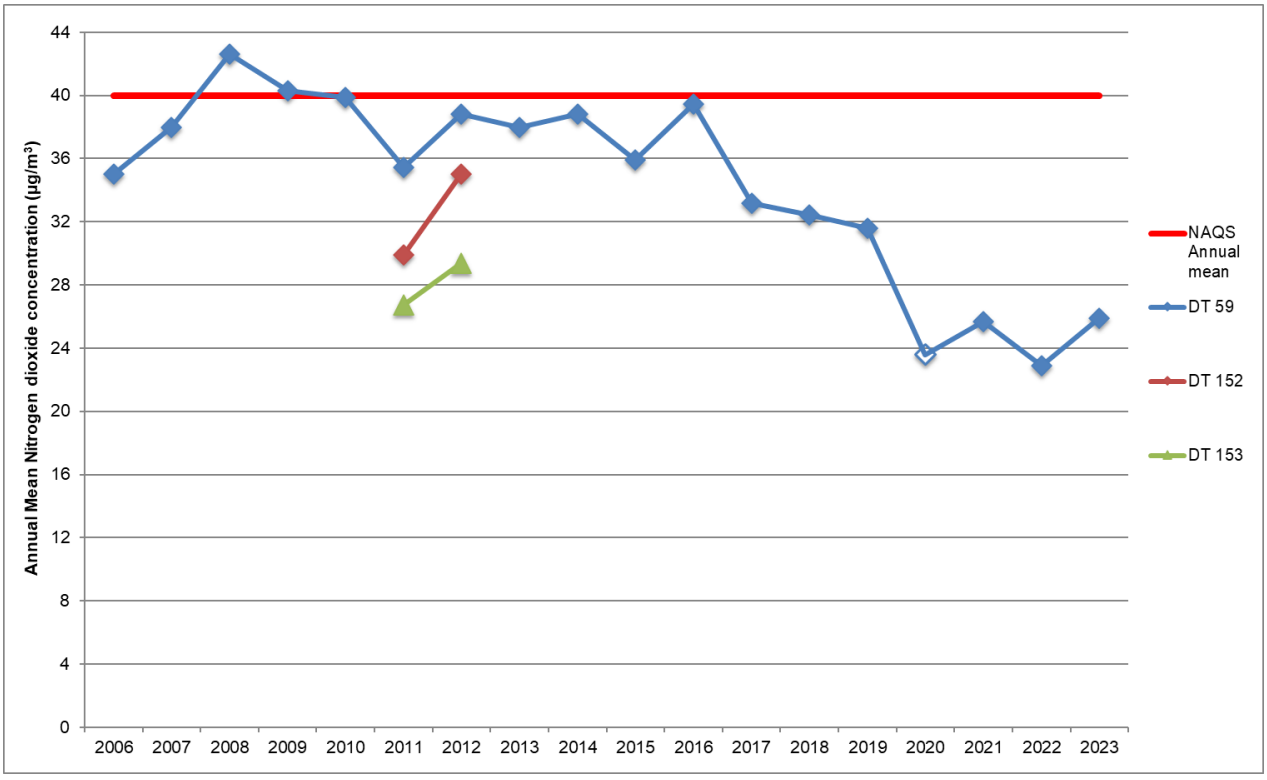


Figure 43 Overview of NO_2 diffusion tube concentrations in Strathmore Avenue



Urban background locations

Figure 44 Urban Background NO_2 Monitoring Locations

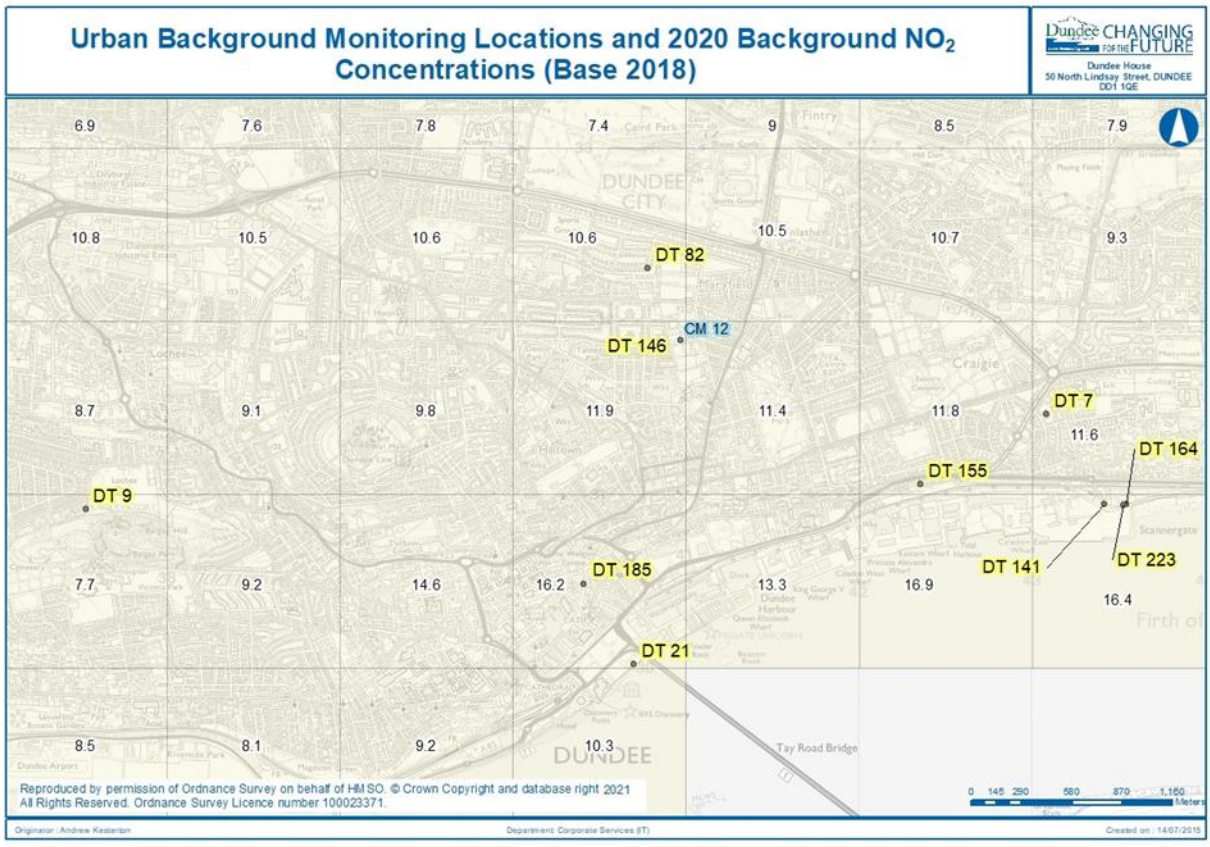
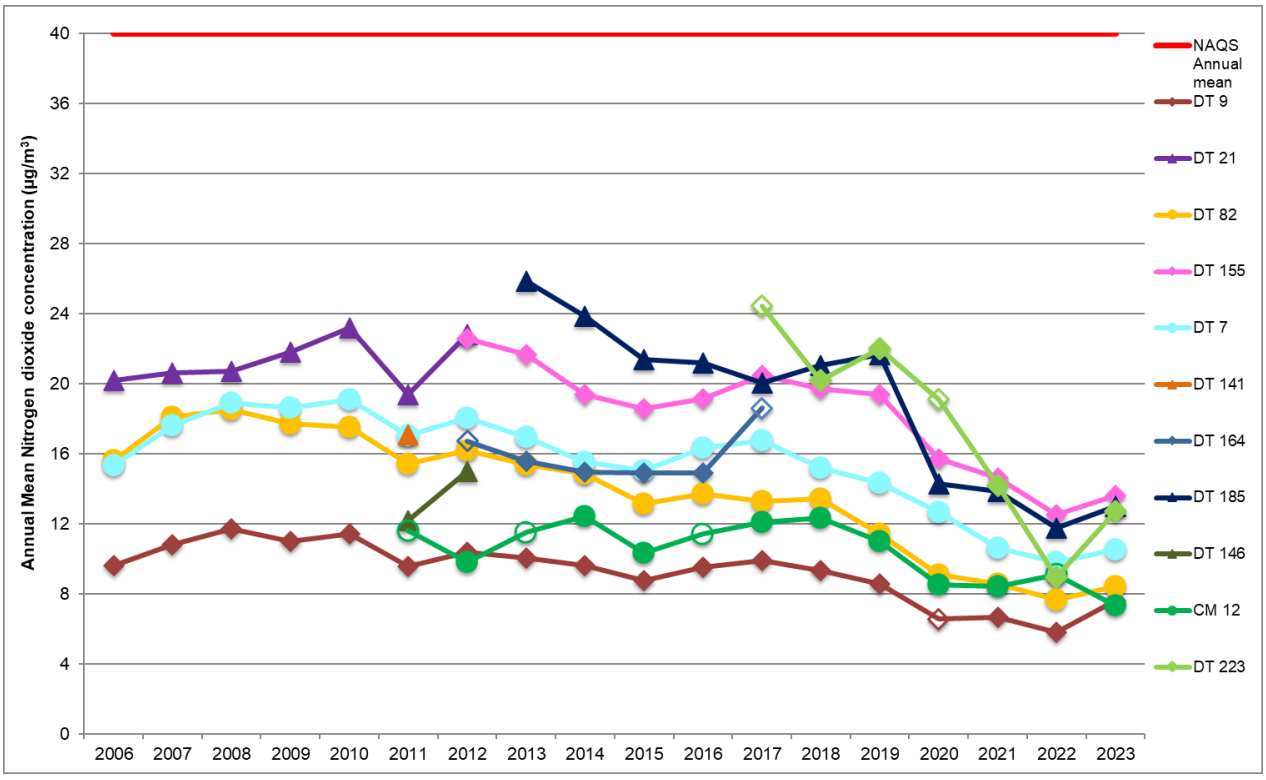
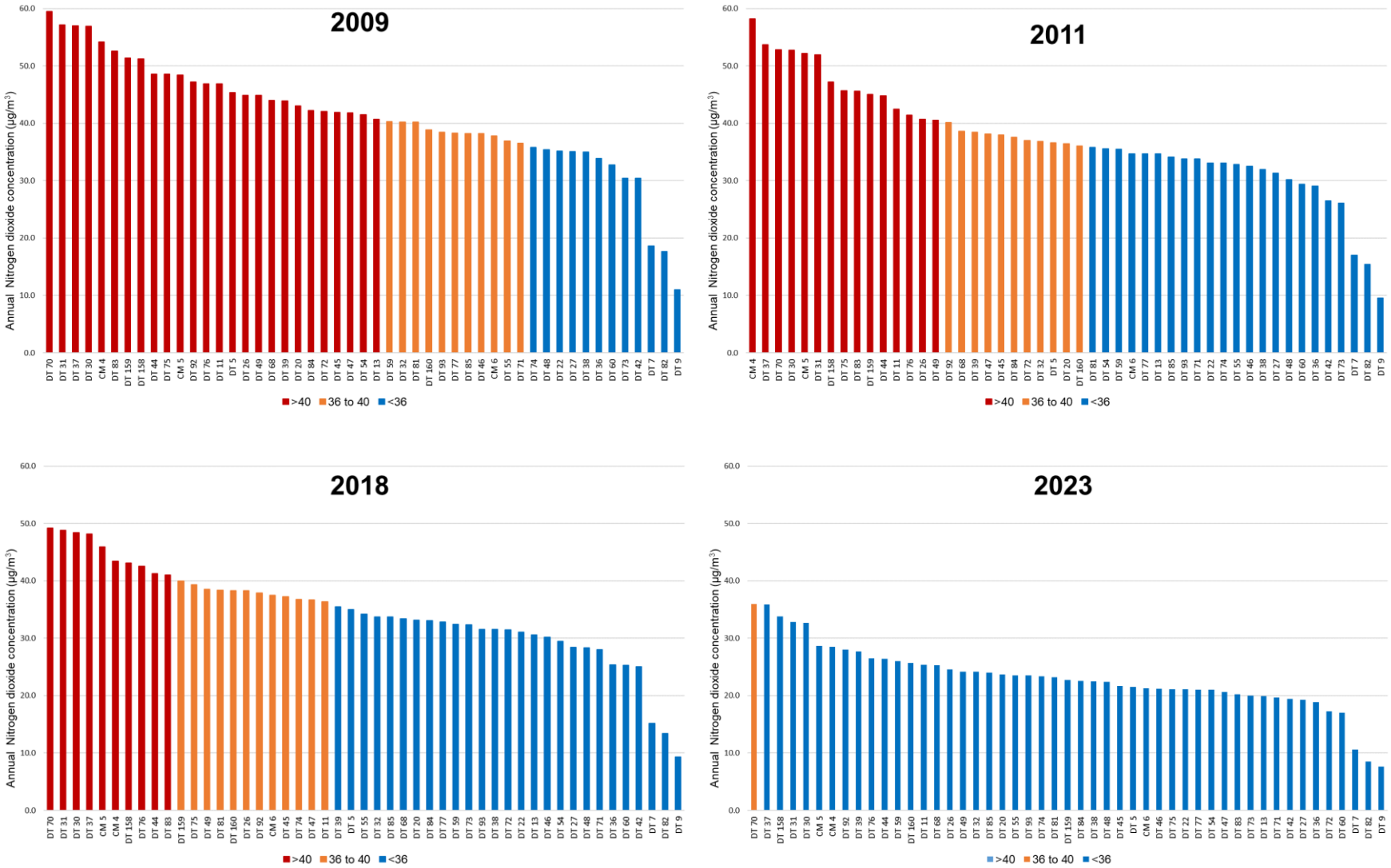


Figure 45 Overview of NO_2 concentrations at urban background locations



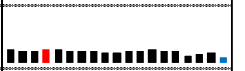
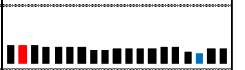
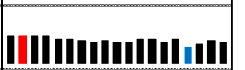
Long-term NO_2 annual mean sites comparison

Figure 46 Ranked Annual Mean NO_2 Concentrations at Long-term Sites in 2009, 2011, 2018 and 2023



Appendix E: Road Traffic data

Table E 1 - Road Traffic Reduction Act Sites - Annual Average Daily Traffic (AADT)

RTRA count location	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Bar Chart
Arbroath Rd (E of Kenilworth Ave)	13186	13335	14054	13153	13846	12869	13283	13697	13142	13174	13287	13642	13784	13526	13030	10194	11207	11754	11720	
Blackness Rd (W of Marchfield)	6574	6675	6435	6195	6145	5938	5911	5844	5102	5509	5676	6487	5819	5810	5540	4115	4419	4884	4824	
Broughty Ferry Rd (E of Dalgleish Rd)	31956	31802	31535	30098	27640	27756	27315	24741	29322	30272	26809	28161	29190	29832						
Dens Rd (S of Hillbank Rd)	10852	10664	10672	11023	10833	10083	10062	10178	9744	9707	10315	10322	10756	10409	9961	7900	8723	8934	6711	
Forfar Rd (N of Janefield Pl)	9278	9640	9880	8222	9224	9213	8861	9053	8768	9063	9209	8876	8991	9283	9055	6869	7437	7228	8189	
Hilltown (N of Stirling St)	6024	5710	5895	5701	5753	5656	5416	5492	5608	4268	5782	5828	5491	4601	4392	4491	4668	5118	5108	
Lochee Rd (N of Rankine St)	13477	13681	13438	13286	13296	12983	12684	11603	11285	11880	11821	11770	12453	12928	13135	9943	9080	11783	12515	
Perth Rd (E of Windsor St)	8341	7434	7583	7531	7695	7352	7053	7184	7180	7214	7328	6650	7316	7912	7495	5101	6009	6686	6656	
Pitkerro Rd (S of Baxter Park)	10107	9522	9975	9950	9789	9359	8623	8608	8827	8899	9085	9126	9584	8710	8774	7295	7908	8346	8780	
Rankine St (N of Lochee Rd)	8098	7294	8069	7927	7605	7121	7115	6862	7188	6939	7118	7035	7043	7484	7282					
Riverside Dr (nr Airport)	18875	19056	18918	19045	17907	17654	17024	15900	16213	15932	15923	17343	17503	15791	17315	12794	14985	16218	16105	
Rosebank St (N of Kinloch St)	4821	4867	4722	4623	4528	4603	4426	4489	4621	4587	4655	4615	4183	4015	4070	3326	3604	3901	3901	
Tay Bridge	24475	24686	24748	25045	25406	25235	25484	24753	24770	24925	21762	25993	26631	26633	27250	18312	22048	25407	25479	

Note: 1) Heights of the bars in the charts are relative to the range of values across all sites.

2) The red and blue bars are the highest and lowest count, respectively, at that count location.

Table E 2 - Road Traffic Reduction Act Sites - Percentage Growth

RTRA count location	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Bar Chart
Arbroath Rd (E of Kenilworth Ave)	100	101	107	100	105	98	101	104	100	100	101	104	105	103	99	77	85	89	88	
Blackness Rd (W of Marchfield)	100	102	98	94	93	90	90	89	78	84	86	99	89	88	84	63	67	74	72	
Broughty Ferry Rd (E of Dalgleish Rd)	100	100	99	94	86	87	85	77	92	95	84	88	91	93						
Dens Rd (S of Hillbank Rd)	100	98	98	102	100	93	93	94	90	89	95	95	99	96	92	73	80	82	63	
Forfar Rd (N of Janefield Pl)	100	104	106	89	99	99	96	98	95	98	99	96	97	100	98	74	80	78	85	
Hilltown (N of Stirling St)	100	95	98	95	96	94	90	91	93	71	96	97	91	76	73	75	77	85	89	
Lochee Rd (N of Rankine St)	100	102	100	99	99	96	94	86	84	88	88	87	92	96	97	74	67	87	91	
Perth Rd (E of Windsor St)	100	89	91	90	92	88	85	86	86	86	88	80	88	95	90	61	72	80	90	
Pitkerro Rd (S of Baxter Park)	100	94	99	98	97	93	85	85	87	88	90	90	95	86	87	72	78	83	92	
Rankine St (N of Lochee Rd)	100	90	100	98	94	88	88	85	89	86	88	87	87	92	90					
Riverside Dr (nr Airport)	100	101	100	101	95	94	90	84	86	84	84	92	93	84	92	68	79	86	85	
Rosebank St (N of Kinloch St)	100	101	98	96	94	95	92	93	96	95	97	96	87	83	84	69	75	81	80	
Tay Bridge	100	101	101	102	104	103	104	101	101	102	89	106	109	109	111	75	90	104	103	

Note: 1) Heights of the bars in the charts are relative to the range for that location.

2) The red and blue bars are the highest and lowest percentage growth, respectively, for that site.

Appendix F: List of industrial processes

Table F-1 List of industrial processes

Process Name/Address	Process Type	PPC Sector	New source since APR 2023?	Existing process with new exposure?	Is change substantial (>30%)?	Process Potentially Requiring Review & Assessment~	Nomogram screening assessment required?	Detailed assessment Required?	SEPA Comments
Rockwell Solutions, Wester Gourdie, Dundee	Chapter 6: Other Activities Surface treating with organic solvents - Also Chapter 7 SED	6.4.b	No	No	No	No	No	No	Variation in progress Granted. Changes on site mean it's likely there has been a reduction of solvent emissions
MVV Environmental (Baldovie) Ltd) Baldovie, Dundee	Chapter 5: Waste Management	Sector 5.1a and 5.1b under PPC 12	No	No	No	No, previously assessed	No	No	Granted Substantial Variation for replacement plant issued in February 2019. Planning Application submitted late 2019 to continue use of old incinerator alongside the new one.
Nynas UK AB, East Camperdown Street, Dundee DD1 3LG	Chapter 1: Energy Industries	Section 1.2 Part A Paragraph (f) (i)	No	No	No	No, previously assessed	No	No	Granted. Site is now effectively a Part B process, but a formal surrender of the Part A has not yet been submitted. Site is now solely burning natural gas, with a much-reduced inventory of bitumen and oil products.
Nationwide Crash Repair Centres Ltd, Liff Road, Dundee	Chapter 6: Other Activities vehicle respraying	6.4.b	No	No	No	No	No	No	No Change

Process Name/Address	Process Type	PPC Sector	New source since APR 2023?	Existing process with new exposure?	Is change substantial (>30%)?	Process Potentially Requiring Review & Assessment~	Nomogram screening assessment required?	Detailed assessment Required?	SEPA Comments
Hanson Aggregates Piper Street, Dundee	Chapter 3: Mineral Industries cement batchers	3.1.a.(ii)	No	No	No	No	No	No	Not operating.
Subsea Protection Systems	Chapter 3: Mineral Industries cement batching	3.1.b	No	No	No	No, previously assessed	No	No	Permit surrendered.
Discovery Filling Station	Chapter 1: Energy Industries-Petrol Station	1.2.c.(ii)	No	No	No	No, previously assessed	No	No	No Change
Brochtay Filling Station	Chapter 1: Energy Industries-Petrol Station	1.2.c.(ii)	No	No	No	No, previously assessed	No	No	No Change
Asda Stores Filling Station Kirkton	Chapter 1: Energy Industries-Petrol Station	1.2.c.(ii)	No	No	No	No, previously assessed	No	No	No Change
BP Kingsway West Filling Station	Chapter 1: Energy Industries-Petrol Station	1.2.c.(ii)	No	No	No	No, previously assessed	No	No	No Change
Shell Caird Park	Chapter 1: Energy Industries-Petrol Station	1.2.c.(ii)	No	No	No	No, previously assessed	No	No	No Change
Asda Stores Ltd, Milton of Craigie, Dundee	Chapter 1: Energy Industries-Petrol Station	1.2.c.(ii)	No	No	No	No, previously assessed	No	No	No Change
Tesco Stores Ltd, Riverside Drive, Dundee	Chapter 1: Energy Industries-Petrol Station	1.2.c.(ii)	No	No	No	No, previously assessed	No	No	No Change
Tapedrive Ltd, Marketgait F/S, Dundee	Chapter 1: Energy Industries-Petrol Station	1.2.c.(ii)	No	No	No	No, previously assessed	No	No	No Change

Process Name/Address	Process Type	PPC Sector	New source since APR 2023?	Existing process with new exposure?	Is change substantial (>30%)?	Process Potentially Requiring Review & Assessment~	Nomogram screening assessment required?	Detailed assessment Required?	SEPA Comments
Sainsburys Supermarket Ltd, Dundee	Chapter 1: Energy Industries-Petrol Station	1.2.c.(ii)	No	No	No	No, previously assessed	No	No	No Change
Jet Petrol Station, Forfar Road, Dundee	Chapter 1: Energy Industries-Petrol Station	1.2.c.(ii)	No	No	No	No, previously assessed	No	No	No Change
Dens Metals Ltd, West Pitkerro, Dundee	Chapter 2: Production and Processing of Metals	2.2.a	No	No	No	No, previously assessed	No	No	Surrendered 2015
Mctavish Ramsay Ltd, Barlow Ave, West Pitkerro	Chapter 6: Other Activities Timber Activity	6.6.(i)	No	No	No	No	No	No	Company in administration. Not operating
Johnsons, Asda Dundee	Chapter 7: SED Activities	Chapter 7: SED Activities	No	No	No	No	No	No	Surrendered 2015
Breedon Aggregates Ltd, Longtown Street, Dundee	Chapter 3: Mineral Industries Cement Batching	3.1.a.(ii)	No	No	No	No, previously assessed	No	No	No Change
Lochee Dry cleaning Centre Dundee	Chapter 7: SED Activities	Chapter 7: SED Activities	No	No	No	No	No	No	No Change
Ferry Laundrette Broughty Ferry	Chapter 7: SED Activities	Chapter 7: SED Activities	No	No	No	No	No	No	Fire in 2016, now operational again.
Care Clean, Dundee	Chapter 7: SED Activities	Chapter 7: SED Activities	No	No	No	No	No	No	No Change
Dignity Ltd, Dundee Crematorium, Dundee	Chapter 5: Waste Management	5.1c	No	No	No	No	No	No	No change

Process Name/Address	Process Type	PPC Sector	New source since APR 2023?	Existing process with new exposure?	Is change substantial (>30%)?	Process Potentially Requiring Review & Assessment~	Nomogram screening assessment required?	Detailed assessment Required?	SEPA Comments
Laundry On Line, Annfield Road, Dundee	Chapter 7: SED Activities	Chapter 7: SED Activities	No	No	No	No	No	No	permit surrendered March 2016
Wm Morrison Supermarkets Plc, Dundee	Chapter 1: Energy Industries-Petrol Station	1.2.c.(ii)	No	No	No	No	No	No	No Change
Wm Morrison Supermarkets plc, I Afton Way	Chapter 7: SED Activities	Chapter 7: SED Activities	No	No	No	No	No	No	No Change
Tesco Filling Station, South Road, Dundee	Chapter 1: Energy Industries-Petrol Station	1.2.c.(ii)	No	No	No	No	No	No	No Change
Halley Stevensons (Dyers & Finishers) Limited, Baltic Works, Annfield Road, Dundee DD1 5JH	Chapter 6: Other Activities	Section 6.4 Part A Paragraph (a)	No	No	No	No	No	No	No Change
Discovery Flexibles, Kemback St Dundee	Chapter 6: Other Activities surface treatment using organic solvents also Chapter 7 SED coating flexible packaging	6.4.b	No	No	No	No	No	No	Replacement of one of the process lines with updated equipment. May mean slight change to emissions but not likely to be significant. Variation in progress.
J T Inglis, Riverside Works, Dundee	Chapter 6: Other Activities Textile Treatment	6.4.d	No	No	No	No	No	No	Site Closed 2016, surrender application ongoing

Process Name/Address	Process Type	PPC Sector	New source since APR 2023?	Existing process with new exposure?	Is change substantial (>30%)?	Process Potentially Requiring Review & Assessment~	Nomogram screening assessment required?	Detailed assessment Required?	SEPA Comments
Michelin Tyre Plant, Dundee	Chapter 6: Other Activities surface treatment of rubber with organic solvents also Chapter 7	6.4.b	No	No	No	No, previously assessed	No	No	Plant was still operating in 2019 but since has ceased operating
Michelin Tyre Plant, Dundee	Chapter 1: Energy Industries, Combustion	1.1.a	No	No	No	No, previously assessed	No	No	Plant was still operating in 2019 but since has ceased operating.
D C Thomson Printers, Dundee	Chapter 6: Other Activities printing process	6.4.b	No	No	No	No	No	No	Not operating but still permitted.
Day International Ltd, Balgray St, Dundee	Chapter 6: Other Activities surface treatment of rubber with organic solvents	6.4.b	No	No	No	No, previously assessed	No	No	Not operating at present.
RMC Readymix Ltd, Dundee	Chapter 3: Mineral Industries, Cement Batching	3.1.a.(ii)	No	No	No	No	No	No	No change
Brown & Tawse Steelstock Ltd, Fowler RD West Pitkerro - Dundee	Chapter 6: Other Activities, paint spraying	6.4.a	No	No	No	No	No	No	No Change
Tesco Stores Ltd, Kingsway Retail Park Dundee	Chapter 1: Energy Industries, Petrol Station	1.2.c.(ii)	No	No	No	No	No	No	No Change
Joinery and Timber Creations (65) Ltd,	Chapter 6: Other Activities, Timber Process	6.6.(i)	No	No	No	No, previously assessed	No	No	Waste wood boiler-permitted but not operating.

Process Name/Address	Process Type	PPC Sector	New source since APR 2023?	Existing process with new exposure?	Is change substantial (>30%)?	Process Potentially Requiring Review & Assessment~	Nomogram screening assessment required?	Detailed assessment Required?	SEPA Comments
Ethiebeaton Quarry	Chapter 3 Mineral Activities - cement batching process 3.1a(ii), roadstone coating 3.5e, crushing and grinding 3.5c	3.1a(ii), 3.5e, 3.5c	No	No	No	No, previously assessed	No	No	No change
Health Care Environmental Services, Nobel Road, Wester Gourdie Ind. Estate	Chapter 5 Waste Management Part A Treatment of Clinical waste	5.3a	No	No	No	No, previously assessed	No	No	Site still permitted but facility closed.
Petrol Filling Station, Asda, Myrekirk Road	Chapter 1: Energy Industries, Petrol Station	1.2.c.(ii)	No	No	No	Yes, but no relevant receptors	No	No	No change
ASKA Energy, 3B Edison Place, Dundee	Chapter 4. Chemical Industry, Part A, Producing organic chemicals (biodiesel)	Section 4, Part A, sub-section b	No	No	No	No (Emissions are not LAQM pollutants)	No	No	Permit surrender received December 2017. Permit surrendered
Sherburn Cement, Shed 1, Eastern Wharf, Port of Dundee, DD1 3LZ	Chapter 3, Part B, section 3.1 (a)(i) Bulk Storage of Cement	PG 3/01(12)	No	No	No	Yes (possible fugitive emissions of particulates)	No	No	Site permitted 2016 and operating PPC/B/1142921 No change
Crown Timber King George V Wharf Road, Dundee Harbour, Dundee, DD1 3LU	Section 6.6 Part A Wood Products Preservation with. Chemicals	Sector Guidance Note SG11 (draft status at issue)	No	No	No	No (No LAQM pollutants or fugitive emissions)	No	No	Existing process has come into the PPC regime (SEPA reference PPC/A/1132892) as part of the Industrial Emissions Directive. No change

Process Name/Address	Process Type	PPC Sector	New source since APR 2023?	Existing process with new exposure?	Is change substantial (>30%)?	Process Potentially Requiring Review & Assessment~	Nomogram screening assessment required?	Detailed assessment Required?	SEPA Comments
Vericore Ltd, Kinnoull Road, Kingsway West, Dundee, DD2 3XR	Schedule 2 (PPC 2012) SED Part B Production of Veterinary Pharmaceuticals		No	No	No	Yes (possible fugitive emissions of particulates)	No	No	Site permitted 2016 and operating – PPC/B/1141206 No change
Augean North Sea Services, Riverside Works, Princess Alexandra Wharf, Stannergate Road, Dundee, DD1 3LU	Chapter 5.3 Part A (b) (ii), (iii), (iv), (vi), (x)		No	No	No	Yes (possible fugitive emissions of particulates)	No	No	PPC/A/1151594 status "Granted" date May 2022 as "Full transfer". Site permitted 2017– started operating May 2018 PPC/A/1151594 substantial variation received Dec 2018 has since been withdrawn at request of applicant.
Scotscreed Limited, Fishdock Road, Stannergate, Dundee, DD1 3LU	Chapter 3; Section 3.1 Part B (a) (ii)		No	No	No	Yes (possible fugitive emissions of particulates)	No	No	Site permitted 2017 and operating PPC/B/1155960 No change
Dover Fuelling Solutions, West Pitkerro Industrial Estate, 3, Baker Rd, Dundee DD5 3RT	Chapter 6; Section 6.4 Part B (a) coating and paint process		No	No	No	No	No	No	Existing process has come into PPC regime due to threshold change. Emissions contained. PPC/B/1180866 (2)

Process Name/Address	Process Type	PPC Sector	New source since APR 2023?	Existing process with new exposure?	Is change substantial (>30%)?	Process Potentially Requiring Review & Assessment~	Nomogram screening assessment required?	Detailed assessment Required?	SEPA Comments
Vitali Energi Solutions Ltd, Ninewells Hospital Energy Centre, Ninewells Hospital, Dundee, DD1 9SY	PPC(B) - Combustion of Fuels – Medium Combustion Plant	Schedule 1, Part 1, Chapter 1, Section 1.1, Part B (d)	No	No	No	No	No	No	PPC/B/5005657 MCP that was put into operation before 20/12/2018 with rated thermal inputs of greater than 5MW up to and including 20MW.

Notes: Entries shaded grey are changes / additions for 2024 Annual Progress Report based on spreadsheet provided by SEPA dated 06/03/2024.

Glossary of Terms

Abbreviation	Description
AADT	Annual Average Daily Traffic flow
ADMS	An atmospheric air pollution dispersion model
AEA	AEA Energy & Environment
Annualise	the means of estimating an annual mean from a shorter study period mean by comparison with full datasets from background AURN sites
AQ Archive	UK Air Quality Archive
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the LA intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
APR	Annual Progress Report
AQO	Air Quality Objective
AQS	Air Quality Strategy
ATC	Automatic Traffic Count
AURN	Automatic Urban and Rural Network (UK air quality monitoring network)
Borderline	A concentration that is a potential exceedance (e.g. sites above 36µg/m^3 for NO_2 or 16.2µg/m^3 for PM_{10} annual mean)
CAFS	'Cleaner Air for Scotland - The Road to a Healthier Future', was Scotland's first air quality strategy, published in 2015
CAFS2	'Cleaner Air for Scotland 2 - Towards a Better Place for Everyone', is Scotland's second air quality strategy, published in 2021
CHP	Combined Heat and Power
CO	Carbon Monoxide
DCC	Dundee City Council
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EC	European Community
EPA	The Environmental Protection Act 1990
EPAQS	Expert Panel on Air Quality Standards
EU	European Union
FDMS	Filter Dynamics Measurement System
GF	Ground floor

GIS	Geographical Information System
HDV	Heavy goods vehicles and buses
HFO	Heavy Fuel Oil
HGV	Heavy Goods Vehicle
HSL	Health & Safety Laboratory
IPC	Integrated Pollution Control
kerbside	0 to 1 metre from the kerb
LAQM	Local Air Quality Management
LAQM, PG(S)(23)	Local Air Quality Management: Policy Guidance (Scotland) (2023)
LAQM.TG(03)	Local Air Quality Management: Technical Guidance (2003)
LAQM.TG(09)	Local Air Quality Management: Technical Guidance (2009)
LAQM.TG(16)	Local Air Quality Management: Technical Guidance (2016) updated February 2018
LAQM.TG(22)	Local Air Quality Management: Technical Guidance (2022) updated August 2022
LDP	Local Development Plan
LEZ	Low Emission Zone
Limit Value	An EU definition for a mandatory air quality standard of a pollutant listed in the air quality directives
MW	Mega Watts
mg/kg	Milligrams per Kilogram
mg/m^3	Milligrams per cubic metre
NAEI	National Atmospheric Emission Inventory
NAQS	National Air Quality Standard
NLEF	National Low Emission Framework (part of CAFS)
NMF	National Modelling Framework (part of CAFS)
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
ng/m^3	Nanograms per cubic metre
NPL	National Physical Laboratory
NRS	National Registers of Scotland
NRTF	National Road Traffic Forecast
OLEV	Office of Low Emission Vehicles
OSIRIS	the brand name given by Turnkey Instruments Ltd. to their particle measuring nephelometer
PDT	Passive Diffusion Tube
PHV	Private Hire Vehicles
PPC	Pollution Prevention and Control Regulations

P&T	Planning and Transportation
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
Pb	Lead
percentile	The percentage of results below a given value
ppb	Parts per billion
ppm	Parts per million
QA/QC	Quality Assurance and Quality Control
REAE	Ricardo Energy and Environment
receptor	In this study, the relevant location where air quality is assessed or predicted (for example, houses, hospitals and schools)
roadside	1 to 5 m from the kerb
SCA	Smoke Control Area
SED	Solvent Emissions Directive
SEPA	Scottish Environment Protection Agency
SO_2	Sulphur Dioxide
SPG	Supplementary Planning Guidance
Street Canyon	A relatively narrow street with buildings on both sides, where the height of the buildings is generally greater than the width of the road
SULP	Sustainable Urban Logistics Plan
TACTRAN	Tayside and Central Scotland Transport Partnership
TEA	Triethanolamine
TEOM	Tapered Element Oscillating Microbalance
UKAS	United Kingdom Accreditation Service
ULEV	Ultra-Low Emission Vehicle
USA	Updating and Screening Assessment
mg/m^3	Micrograms per cubic metre
VCM	Volatile Correction Method
VOC	Volatile Organic Compound
vpd	Vehicles per day
WASP	Workplace Analysis Scheme for Proficiency

References

This report includes references where appropriate throughout the text as footnotes.