

# Annual Progress Report (APR)



2023 Air Quality Annual Progress Report (APR) for Glasgow City Council

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

Local Air Quality Management

September 2023

**OFFICIAL**

**Glasgow City Council**

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## Executive Summary: Air Quality in Our Area

### Air Quality in Glasgow

During 2022, Glasgow City Council measured concentrations of Nitrogen Dioxide (NO<sub>2</sub>) below the Annual Mean Objective at all automatic monitoring stations in the city, including those within the City Centre Air Quality Management Area (AQMA). This was the first time levels of NO<sub>2</sub> at the automatic monitoring stations were within the objective levels since the heavily pandemic affected year of 2020. However, it should be noted that the compliance recorded at Glasgow Kerbside was marginal, recording an annual mean of 39.1ug/m<sup>3</sup> against an objective level of 40ug/m<sup>3</sup>.

Levels of NO<sub>2</sub> pollution have been on a downward trend in recent years, as a result of improvements in vehicle emissions and the phased introduction of the Glasgow Low Emission Zone (LEZ) for scheduled bus services since 2018. As discussed, NO<sub>2</sub> levels dropped significantly in 2020 as a result of the pandemic restrictions, before increasing in 2021 as these restrictions lessened. However, most automatic stations recorded a slight decrease in NO<sub>2</sub> levels between 2021 and 2022, maintaining a significant decrease on the pre-pandemic levels.

NO<sub>2</sub> levels are also recorded by diffusion tubes across Glasgow and in 2020, all monitoring was within the objective except for one marginal exceedance which was within the margin for error of this form of monitoring. In 2021, this had increased to exceedances at two locations in the city centre, with a further four locations within 10% of the objective, reflecting the general increase recorded for this year at the automatic monitoring stations.

In 2022 the NO<sub>2</sub> Annual Mean objective recorded by diffusion tubes was exceeded at four locations within the city centre, with a further four locations within 10% of the Annual Mean Objective, indicating the potential for exceedances.

The NO<sub>2</sub> Hourly Mean Objective was not exceeded at any of the automatic monitoring stations in 2022. This was consistent with measurements from previous years.

Levels of PM<sub>10</sub> recorded across the city in 2022 were satisfactory with both the daily mean and annual mean objectives being met at all monitoring locations. This continued the trend of compliance in respect of this pollutant which has been observed for several years. It should be noted that the Scottish objective for this pollutant is set at just under half that of the UK and EU limits. The city is therefore doing relatively well in this area.

For Scottish Local Authorities particulates at PM<sub>2.5</sub> have now been prescribed in regulations with an annual mean objective of 10µg/m<sup>3</sup> to be achieved by 2020. This objective was not exceeded at any monitoring location in Glasgow during 2022.

Whilst the Byres Rd / Dumbarton Rd AQMA remains in effect in respect of the annual mean objective for NO<sub>2</sub>, continued monitoring has shown no exceedances of this objective since 2017. This APR therefore proposes that the Byres Rd / Dumbarton Rd AQMA be revoked in terms of this objective.

## **Actions to Improve Air Quality**

### **Air Quality Action Plans**

In response to the implementation of the AQMA's in the city, Glasgow City Council produced Air Quality Action Plans (AQAP) in 2004 and 2009 introducing a range of measures aimed at reducing pollution in the city. The AQAP is an evolving project with several measures such as vehicle idling enforcement, vehicle emission testing and initiatives towards cleaner vehicles ongoing. Other measures, such as the city car club and electric vehicle charging infrastructure, have been implemented and continue to be actioned.

A new AQAP has been prepared and is in draft form. This draft will be reviewed and updated in consideration of the recommendations from Environmental Standards Scotland's report on their investigation into air quality, and the updated guidance and templates arising from this.

## **Low Emission Zone**

The Scottish Programme for Government announced in 2017 that there would be Low Emission Zones (LEZ's) in 4 cities in Scotland. Glasgow City Council introduced Scotland's first LEZ in an area broadly equivalent to the city centre AQMA at the end of 2018.

The LEZ has been introduced in two phases, with the first phase targeting improvements in emissions arising from scheduled bus journeys through the city centre. From December 2018 the LEZ required that 20% of bus journeys through the city centre meet the Euro VI emission standard. This target was increased by 20% each year, until 100% of buses were compliant by end of December 2022. This target was achieved within the reporting period of this APR.

Public and stakeholder consultation on possible LEZ phase 2 options took place in February and March of 2020. The results of this were used, along with extensive option modelling, to identify the preferred LEZ scheme for non-bus traffic.

The second phase of the LEZ received Ministerial approval and came into effect on 31 May 2022. This began a statutory one-year grace period before general enforcement began on 1 June 2023. A further year grace period for vehicles registered to residential properties within the zone means enforcement for these vehicles will begin on 1 June 2024. The Glasgow LEZ will apply to all vehicle types with the exception of motorcycles and mopeds.

The objectives of the Glasgow Low Emission Zone are as follows:

- Improve public health of residents of and visitors to, the City of Glasgow by contributing towards meeting the air quality objectives prescribed under section 87(1) of the Environment Act 1999.
- Contribute towards the emissions reduction targets set out in Part 1 of the Climate Change (Scotland) Act 2009 through the promotion of low and zero emissions vehicles and the promotion of public and sustainable transport options.

- Improve the amenity of Glasgow through the promotion of the Glasgow City Council Strategic Themes of A Vibrant City, A Healthier City and a Sustainable and Low Carbon City.



Link to Glasgow's LEZ.

<https://www.glasgow.gov.uk/LEZ>

Enforcement of phase 2 of the Glasgow LEZ began on 1 June 2023 and statutory reporting of the impact and effectiveness of the LEZ will be incorporated into future APRs.

### **Glasgow's Climate Plan**

In 2019, Glasgow City Council set up a Climate Emergency Working Group, subsequently declaring a Climate Emergency in the city. In response to this, a Climate Plan has been prepared detailing a list of actions which the Council, its partners and stakeholders will take to ensure a just transition to a low carbon and resilient city. Many of the actions to move to a low carbon city have co-benefits for air quality pollutants with development of

the LEZ directly addressing actions 22 and 53 of the Glasgow Climate Plan. Expected improvements in LAQM pollutant emissions are a co-benefit of actions 26, 33, 54, 55 and 56. The AQAP and LEZ complements those actions seeking to reduce carbon emissions from traffic such as reducing private car use, improve public transport provision and transition of the fleet to cleaner forms of transport.

Link to Glasgow's Climate Plan

<https://www.glasgow.gov.uk/CHttpHandler.ashx?id=50623&p=0>



### Glasgow Transport Strategy

The Glasgow Transport Strategy is a new local transport strategy which is city-wide and provides a framework for investment and decision-making on transport issues up to 2030. Part 1 of the Glasgow Transport Strategy, a Policy Framework, has been produced and

approved by the Council. Part 2, a Spatial Delivery Framework, has been developed and will be subject to public consultation until October 2023.

Link to Glasgow's transport Strategy

<https://www.glasgow.gov.uk/transportstrategy>

There are other separate but related transport strategies, all of which complement the LEZ – the Active Travel Strategy, Liveable Neighbourhoods Plan and City Centre Transformation Plan.

### **City Centre Transformation Plan**

The City Centre Transformation Plan (CCTP) is particularly aligned with the development of the LEZ, given the overlap with the aims of the CCTP and the geographical area covered by the plan. Key aims of the CCTP which have the potential to improve air quality include:

- Re-allocate road space in Glasgow City Centre for active travel and green infrastructure;
- Deliver improved public transport and support/encourage a shift to more sustainable modes, particularly walking, cycling and public transport;
- Improve access for the mobility impaired;
- Achieve a 30-40% reduction in peak-hour private car traffic in Glasgow City Centre by 2030;
- Deliver improvements for servicing (e.g. goods, deliveries and waste collection) to improve the vitality of Glasgow City Centre;
- Support a doubling of Glasgow City Centre's population by 2035; and
- Support Glasgow's aim to be carbon neutral by 2030
- The CCTP will help to deliver a transformation of the centre and ensure the city makes a full contribution to our climate change commitments and transition to net zero carbon.

As part of the CCTP, several Area Based Catalysts for Change have been identified to deliver the transformational changes set out in the plan objectives. One of these is the



'People First Zone'. The 'People First Zone' is proposed to be a central area where vehicular access would be limited to essential users only such as people with disabilities, buses, taxis, emergency services etc. This intervention would greatly reduce vehicle numbers in the core of the city centre and create opportunities to reallocate road space for active travel, public realm and greenery. On street parking would also be significantly reduced. The People First Zone coincides with a central area within the LEZ where air pollution levels are at their highest. It also complements the ongoing 'Avenues project'.

The CCTP Final Report was approved at Committee on 1 December 2022.

Link to the City Centre transport plan.

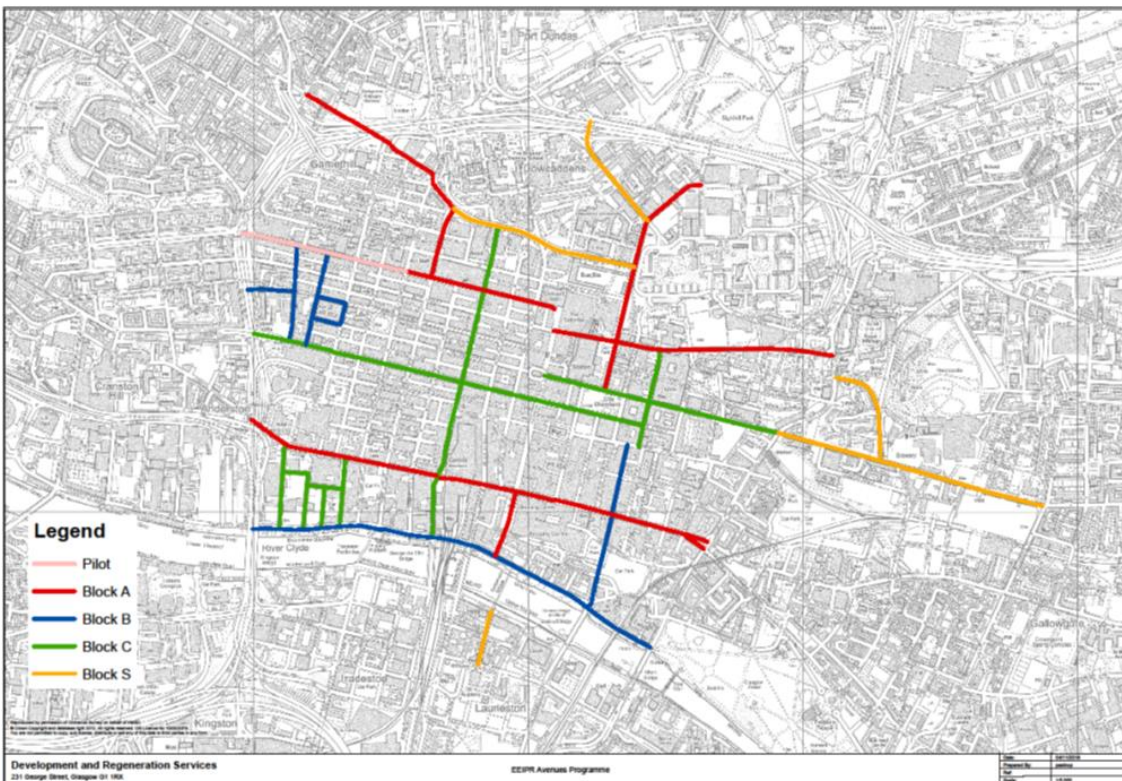
<https://www.glasgow.gov.uk/index.aspx?articleid=27557>

### **EIIPR Avenues Programme**

Included in the Glasgow City Region City Deal funding, Glasgow City Council is investing approximately £115 million within the city centre to deliver on the Enabling Infrastructure - Integrated Public Realm (EIIPR) programme. More commonly known as the Avenues programme, this will see streetscape improvements made to the public realm, supporting a key strategic objective of the City Centre Strategy and Action Plan 2014-19: the establishment of principal Avenues throughout the city centre to form an integrated network of continuous pedestrian and cycle priority routes.



Sauchiehall St on completion of Sauchiehall St West



## Active Travel Strategy

Glasgow City Council is delivering an Active Travel Strategy to supersede the existing Strategic Plan for Cycling 2016-2025 and designed to achieve significant modal shift across the city to walking, wheeling and cycling. The strategy is a recognition of the positive impact that transport, and active travel in particular, can make towards city's wider policy objectives on Climate and the Environment, Health and Wellbeing, Inclusion and Equality and Wealth and Inclusive Growth.

The Council adopted Glasgow's Active Travel Strategy 2022-2031 at the City Administration Committee on 24<sup>th</sup> February 2022.

The strategy is framed by three policy and action areas:

- **Connectivity: people and place:** rebalancing our streets and spaces - with a focus on networks and infrastructure in our street environments.
- **Unlocking Change:** enabling everyone to walk, wheel or cycle - focussing on training and education and working collaboratively.
- **Thinking Differently:** encouraging, motivating and sustaining change - focussing on communication and promotion and inspiring people through larger events and other activities.

A key output from the strategy will be the City Network, which will provide an accessible, safe, coherent and direct active travel network across Glasgow. To be delivered by 2030, the City Network will connect key amenities and drivers of travel such as education, business, retail and culture. There will also be development of the Neighbourhood Network with a focus on walking and wheeling. This Neighbourhood Network will enable easy everyday active journeys within and between neighbourhoods.

Link to Active Travel Strategy

<https://www.glasgow.gov.uk/activetravel>

## **Glasgow Bus Partnership**

Glasgow Bus Partnership brings together the eight Glasgow City Region local authorities, Strathclyde Partnership for Transport, bus operators (through their new alliance, GlasGo) and bus passenger representative groups as a voluntary partnership to address current challenges to bus travel and to improve the passenger experience for communities across the Region. The vision of the Glasgow Bus Partnership is of a City Region where bus services form part of a network of connectivity, enhancing the opportunities and wellbeing of those who live or visit here - providing safe, affordable, enjoyable connections and reducing road congestion, noise and air pollution. Aims of the GBP include:

- Improving bus priority mechanisms and reducing congestion to improve bus journey times and reliability
- Ensuring buses are given higher priority in any future city planning
- Improving the accuracy of real time passenger information and exploring options to introduce an integrated ticketing system

The GBP also supports the delivery of Glasgow's Low Emission Zone and brings together key partners to develop bus priority funding bids to Transport Scotland's Bus Partnership Fund. The work of the GBP seeks to positively impact upon the affordability and accessibility of the bus network and assist with creating the conditions that will increase bus patronage. A faster, cheaper, and better-connected bus network will benefit all bus passengers across the City Region as well as the environment.

Link to Glasgow Bus Partnership

<https://www.glasgow.gov.uk/glasgowbuspartnership>

## **STPR2**

On 20 January 2022, the Scottish Government published the Strategic Transport Projects Review STPR2 Phase 2 - a key document which outlined 45 long term transport investment recommendations that seek to make transport in Scotland more sustainable, and support people to make better, more informed choices on how they travel. One of the standout recommendations was the inclusion of Clyde Metro - described as a multi-billion

pound investment which, when complete, could better connect over 1.5 million people to employment, education, and health services in and around the Glasgow City Region:

- A metro transport system that transforms connectivity in the Glasgow City Region up to around 15km from the city centre. It would target areas where connections are currently poor, including places where there is deprivation.
- Metro transport systems include one of or a combination of bus rapid transit, light rail and metro rail. These options would complement the service provided by traditional railways and may include the conversion from existing railways to light rail or metro rail.
- Improving access across the city region supports Scottish Government policies aimed at tackling deprivation and health issues. Connecting Clyde Metro with active travel and existing transport networks would remove shorter distance trips from the heavy rail network and free up additional rail capacity for longer journeys.

The system would help to deliver environmental benefits and improve public transport journey times and journey time reliability, making sustainable travel options more attractive.

Link to SPTR2

<https://www.transport.gov.scot/our-approach/strategy/strategic-transport-projects-review-2/>

Link to Clyde Metro

<https://www.glasgow.gov.uk/index.aspx?articleid=26965>

### **Glasgow City Council Fleet Strategy**

As a Local Authority, GCC operates a large vehicle fleet to support all aspects of Council services with over 1,300 vehicles in the fleet across the council “family”. The GCC Fleet Strategy for 2020 to 2030 sets out to minimise the Council’s carbon footprint and lead on our carbon neutrality and net zero commitments. Successful delivery of the fleet strategy will see alternative fuel solutions powering our fleet to support our operational objectives, significantly reducing our carbon footprint and advancing the Council’s drive towards net zero emissions.

Link to Glasgow Fleet Strategy

<https://www.glasgow.gov.uk/councillorsandcommittees/viewSelectedDocument.asp?c=P62AFQDN0GZL81ZLDN>

Other initiatives such as the provision, and promotion of, electric vehicle charge points, car clubs and cycle hire schemes, all serve to promote sustainable and low emission transport options. The LEZ can support the travel aspirations of Glasgow by encouraging modal shift, especially if delivered in tandem with active travel and bus priority improvements.

### **Clean Air Day**

Glasgow City Council continues to support Clean Air Day, organised by Environmental Protection Scotland on behalf of the Scottish Government. Taking place on 16 June 2022, Clean Air Day focussed on education and promotion of learning activities related to air pollution and transport choices to school children. Pupils from St Joseph's and St Monica's primaries in Glasgow participated in two events organised by Environmental Protection Scotland. Youngsters from St Joseph's clambered aboard a First Glasgow electric double decker bus and met the City Council's Environment and Sustainability Convener. At St Monica's in Pollok, pupils queued up to get behind the wheel of a Co Wheels electric vehicle after the car was driven into the playground by an EPS Policy Officer.



## Local Priorities and Challenges

Glasgow’s Low Emission Zone (LEZ) is an intervention directed at protecting and improving public health. While the concept was first introduced in the 2009 Action Plan it is also now part of a broader approach to enhancing the amenity and attractiveness of the city centre through providing cleaner air.

The LEZ scheme design was approved by the City Administration Committee of Glasgow City Council and by Scottish Ministers and came into effect on 31<sup>st</sup> May 2022. This began the mandatory grace period before general enforcement began on 1<sup>st</sup> June 2023. An additional grace period applies to vehicles registered to a residential address within the LEZ and enforcement for these vehicles will begin on 1<sup>st</sup> June 2024.

The priorities for 2023 / 2024 includes the continuing enforcement of the LEZ, including ongoing communications and engagement to reduce non-compliance rates. Engagement will also focus on those vehicle types for which enforcement will begin on 1<sup>st</sup> June 2024 – residents / expiring exemptions. Statutory reporting of the impact and effectiveness of the LEZ will be incorporated into future APRs.



Other priorities include:

- Proceeding with the implementation of actions within Glasgow's Climate Plan with a focus on those actions with local air quality co-benefits.
- Continuing to progress actions within the Air Quality Action Plans as well as to consult on and implement the new AQAP.
- Proceeding with the revocation of the Byres Rd / Dumbarton Rd AQMA
- Continuing to develop the Glasgow Transport Strategy and its related parts, the City Centre Transformation Plan, the Liveable Neighbourhoods Plan and the Active Travel Strategy.

## How to Get Involved

Information relating to the LEZ, Local Air Quality Management (LAQM) and AQMA's in Glasgow is available via the Glasgow City Council website. This information includes Air Quality Action Plans, Progress Reports and Detailed Assessments.



Link to LAQM website

<https://www.glasgow.gov.uk/index.aspx?articleid=18863>

The website also contains links to the national Air Quality in Scotland webpage where the public can access both real time and historical monitoring data in addition to registering to receive text/email alerts where poor air quality is forecast.

Link to Scottish Air Quality website

<http://www.scottishairquality.co.uk/>

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# 1 Local Air Quality Management

This report provides an overview of air quality in Glasgow during 2022. 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 Glasgow 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 <sub>2</sub> )	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
Nitrogen dioxide (NO <sub>2</sub> )	40 µg/m <sup>3</sup>	Annual mean	31.12.2005
Particulate Matter (PM <sub>10</sub> )	50 µg/m <sup>3</sup> , not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
Particulate Matter (PM <sub>10</sub> )	18 µg/m <sup>3</sup>	Annual mean	31.12.2010
Particulate Matter (PM <sub>2.5</sub> )	10 µg/m <sup>3</sup>	Annual mean	31.12.2021
Sulphur dioxide (SO <sub>2</sub> )	350 µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
Sulphur dioxide (SO <sub>2</sub> )	125 µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
Sulphur dioxide (SO <sub>2</sub> )	266 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005
Benzene	3.25 µg/m <sup>3</sup>	Running annual mean	31.12.2010

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<b>Pollutant</b>	<b>Air Quality Objective Concentration</b>	<b>Air Quality Objective Measured as</b>	<b>Date to be Achieved by</b>
1,3 Butadiene	2.25 µg/m <sup>3</sup>	Running annual mean	31.12.2003
Carbon Monoxide	10.0 mg/m <sup>3</sup>	Running 8-Hour mean	31.12.2003

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## 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 Glasgow 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://www.glasgow.gov.uk/localairqualitymanagement> [AQMA webpage](#).

We propose to revoke Byres Road and Dumbarton Road AQMA. (see monitoring section).



Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City / Town	Description	Action Plan
City Centre AQMA	NO <sub>2</sub> annual mean  PM <sub>10</sub> annual mean  NO <sub>2</sub> hourly mean	Glasgow	<p>The city centre AQMA is loosely bound by the M8 motorway to the west and north (with slight protrusions at North Street and Royston Road), by High Street and Saltmarket to the east and by the river Clyde to the south.</p> <p>This area was declared an AQMA in 2004 in respect of the annual mean NO<sub>2</sub> Objective.</p> <p>In 2007 the area covered by this AQMA was extended and declared in respect of the annual mean PM<sub>10</sub> Objective.</p> <p>In 2012 a further extension of the AQMA was declared and the order amended in respect of the hourly mean NO<sub>2</sub> Objective.</p>	<p>Glasgow City Council Air Quality Action Plan 2009</p> <p><a href="https://www.glasgow.gov.uk/CHttpHandler.ashx?id=32447&amp;p=0">https://www.glasgow.gov.uk/CHttpHandler.ashx?id=32447&amp;p=0</a></p>

AQMA Name	Pollutants and Air Quality Objectives	City / Town	Description	Action Plan
Byres Road and Dumbarton Road AQMA	NO <sub>2</sub> annual mean	Glasgow	<p>This AQMA extends from the junction of Byres Road and Great Western Road, south to Dumbarton Road and west along Dumbarton Road as far as Thornwood Drive roundabout.</p> <p>This area was declared an AQMA in 2007 in respect of the annual mean NO<sub>2</sub> Objective.</p> <p>In 2012 the area covered by this AQMA was extended northwards along Queen Margaret Drive to the junction with Oban Drive.</p> <p>In 2016 this AQMA was amended in respect of the annual mean PM<sub>10</sub> Objective.</p> <p>In 2021 this AQMA was amended to revoke the annual mean PM<sub>10</sub> designation.</p>	<p>Glasgow City Council Air Quality Action Plan 2009</p> <p><a href="https://www.glasgow.gov.uk/CHttpHandler.ashx?id=32447&amp;p=0">https://www.glasgow.gov.uk/CHttpHandler.ashx?id=32447&amp;p=0</a></p>

## 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 Glasgow 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.

Glasgow City Council has worked to ensure that air quality is embedded in Council policies going forward. It is a core consideration within the Glasgow Transport Strategy, the City Centre Transformation Plan, the Liveable Neighbourhoods Plan and the Active Travel Strategy. The LEZ was incorporated into the Strategic Environmental Assessment of the overarching Glasgow Transport Strategy.

Cross departmental working within Glasgow City Council has been enhanced by the actions within CAFS2, with greater interaction and consultation between departments responsible for environment, sustainability, transport, planning and design.

### **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.

Glasgow City Council introduced phase 2 of the LEZ on 31<sup>st</sup> May 2022 with general enforcement beginning on 1<sup>st</sup> June 2023. GCC continues to work with partners at SEPA to build on the traffic emissions modelling work undertaken as part of the National Modelling

Framework (NMF) to develop carbon emissions inventories from city centre transport sources. This work will build on the existing assessment completed by SEPA – [Consideration of Carbon Dioxide emissions within an LEZ scheme: Glasgow](#). Glasgow City Council will continue to work with SEPA in the data gathering for, and reporting of, the effectiveness of the Glasgow LEZ for incorporation into future APRs.

The Glasgow Transport Strategy has an ambitious target of reducing peak hour traffic in Glasgow City Centre by 30% by 2030. The transport and emissions models developed by SEPA will be updated and adapted to provide decision making evidence for actions within the GTS and CCTP such as the “People First Zone” – a low traffic area encompassing much of the city centre, including those areas where existing air pollution exceeds the objectives.

## **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. Glasgow City Council has taken forward a number of measures within the action plan during the current reporting year of 2022 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.** More detail on these measures can be found in the air quality Action Plan relating to each AQMA. Key completed measures for this reporting year are:

- By the end of 2021 >80% of the scheduled service bus fleet were compliant with the LEZ standards. This rose to 100% by 31<sup>st</sup> December 2022.
- LEZ preferred scheme design was completed and subject to public comment / objection. This resulted in the development of the LEZ final scheme design which was formally introduced on 31<sup>st</sup> May 2022, beginning the one year grace period before enforcement.
- Billboard and bus advertising campaign to raise awareness of and reduce unnecessary vehicle idling.

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- A retrofit fund for taxis was continued and promoted, providing exhaust treatment or engine replacement to LEZ standards for older vehicles.
- A GCC hybrid working system continued, thus reducing the need for travel.
- As at the end of June 2023, the council had deployed 321 charge points across 168 units for public use in the city, more than any other Scottish Local Authority, including a significant number of 'Rapid' units that will charge most vehicles 80% in approximately 30 minutes.
- The Glasgow EcoStars scheme continued to expand with 298 members and 11,653 vehicles part of the scheme.

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

- Further develop the enforcement system for the Glasgow LEZ.
- Implement a 1-year grace period until June 2024 for non-compliant vehicles registered to residential properties within the LEZ to meet requirements.
- Implement time limited temporary LEZ exemptions under circumstances where a non-compliant vehicle is required for a specific purpose not considered within legislation or regulations.
- Continue with progress on the Avenues project.
- Expand the walking and cycling network and associated infrastructure.
- Introduce charging for the EV charging network to allow electricity costs to be recouped and provide funding for network expansion and ongoing maintenance.
- Continue the Council fleet transition to zero emissions vehicles.
- Continue to work on the business case for and assess the feasibility of a Workplace Parking Levy.
- Continue to develop options for the city centre "People First Zone".
- Further develop and consult on the draft AQAP before adoption. This AQAP will consider both the relevant Scottish objectives and the revised World Health Organisation guidelines.

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**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	Vehicle Idling Council will expand program of vehicle idling enforcement	Public Information	Ongoing	In Progress	Fully Funded Yearly	Idling Enforcement focussed on education around schools  No of interventions by officers  No of vehicle Idling complaints	Council continues to promote awareness and benefits in regard to reduction of vehicle idling via billboards and advertising campaign on PSV vehicles, around schools and bus stops.  Enforcement patrols serve notice or information to drivers idling.	AQAP grant funding availability
2	Vehicle Emission Testing	Vehicle fleet efficiency	Ongoing although Emission Testing now only takes place during Multi Agency Days of action	Ongoing in a limited capacity	Partially funded Yearly	Number of vehicles tested	Emission testing continues in a reduced capacity. 40,000+ vehicles tested to date.	Reduction or cessation of multi-agency days of action
3	Low Emission Zone	Promoting low emission transport	Phase 1 - end 2022  Phase 2 - 2023/4	In Progress	Fully Funded	Phase 1 – 80% bus compliance with emission limits. Completed by 2021.	Phase 2 final scheme design developed and received Committee and Ministerial approval. Phase	Reduction or loss of funding  Operating systems delayed

						<p>100% of bus journeys are compliant by December 2022.</p> <p>Phase 2 final scheme design developed and received Committee and Ministerial approval. Phase 2 came into effect on 31 May 2022.</p> <p>Enforcement of phase 2 for general traffic – 1<sup>st</sup> June 2023.</p>	<p>2 came into effect on 31 May 2022.</p> <p>Phase 2 of the LEZ will apply to all vehicle types and will be enforced from June 2023. It will require a minimum emission standard of Euro VI/6 for diesel vehicles and Euro IV/4 for petrol vehicles.</p>	<p>Legal challenges</p>
4	Cleaner Taxis	Promoting low emission transport	Ongoing	In Progress	<u>LEZ Support Fund</u>	<p>Proportion of taxis / private hire vehicles meeting LEZ emissions standards</p>	<p>GCC have adopted licensing conditions in line with the introduction of the LEZ enforcement.</p> <p>GCC have removed the five year age policy for taxi applications to facilitate the replacement of vehicles with a newer taxi which meets the required emission standard.</p> <p>GCC have reduced testing frequency for newer vehicles and increased testing frequency for older vehicles.</p>	<p>Resistance and opposition from taxi operators and trade union</p>

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							<p>GCC have committed to all private hire fleet vehicles being zero emissions by 2030.</p> <p>Increased proportion of fleet meeting LEZ standards.</p>	
5	Council Workplace Travel Plan	Promoting travel alternatives	Ongoing	In Progress	Funded	<p>Proportion of staff using public /sustainable transport options</p> <p>Proportion of work related journeys reduced.</p> <p>Hybrid Working pattern established reducing need for travel to the office.</p>	<p>GCC continues to support active and sustainable transport to places of work. This includes the refresh of the cycle to work scheme with an increase in the level of funding available being investigated to make e-bikes more attainable under the scheme. Repayment period is currently 18 months to improve accessibility of the scheme. Claims for cycle mileage for business travel have been clarified and clearer information provided.</p> <p>Staff travel survey will be updated.</p>	Availability of various funding sources.
6	Car Clubs	Alternatives to private vehicle use	Ongoing	In Progress	Funded	Car Club Membership	<p>Glasgow City Council has successfully provided a car club for use by residents and businesses for twelve years and requested funding of £15,000 to augment the feasibility and soft market testing of new operational models that would incorporate</p>	

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							<p>innovative technologies to remove the requirement for dedicated bays, providing a more customer friendly operational model and introduce a substantially cleaner fleet through the introduction and an all EV fleet where possible.</p> <p>The scheme has been shown to reduce ownership of aging, more environmentally hazardous cars and negate the requirement for personal car ownership in an urban environment.</p> <p>Benefits include greater accessibility to the initiative through flexible with a reduction in dependency on carbon based fuels and the subsequent carbon and pollution reduction.</p>	
7	Air Quality Information	Public Information	Ongoing	In progress	Funded		<p>GCC continues to publish air quality information on the main website and promote the use of the Scottish Air Quality Database “Know &amp; Respond” information service.</p> <p>Ongoing engagement in relation to LEZ and vehicle idling highlights the air quality benefits.</p>	

8	Cycling Strategy	Promoting travel alternatives	Ongoing	In progress	Funded	<p>Early in 2022 the City adopted <u>Glasgow's Active Travel Strategy 2022-2031</u> (ATS) which aims for walking, cycling and wheeling to be the first and natural choice for everyday journeys. The strategy details proposed changes to our street environments alongside a range of behaviour change interventions, to be delivered in collaboration with community and other external organisations, to support and enable active journeys. The strategy also outlines proposals for the <u>City Network</u>, a functional and high density network of protected cycle lanes connecting all areas of the city and linking to key trip generators, deliverable by 2030.</p>	<p>Various on street and school cycle provision infrastructure installed in 2021/22.</p> <p>Infrastructure at further tower blocks to be progressed.</p>	
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						Working closely alongside the <u>Liveable Neighbourhoods</u> programme in particular, the ATS contributes to the outcomes for the city from transport, as detailed within the <u>Glasgow Transport Strategy</u> , which includes a “successful and just transition to a net-zero carbon, clean and sustainable city.		
9	Promote Greener Vehicles	Promoting low emission transport	Ongoing	In progress	Funded	No of EV charging points	292 charge points across 151 units, including significant numbers of rapid chargers, provided by GCC deployed for public use in the city	Funding / Private sector involvement
10	Leading by Example	Promoting low emission transport	Ongoing	In progress	Funded	Proportion of fleet with zero emissions	GCC have committed to decarbonising the entire fleet by 2030. Additional fleet improvement plans have been put in place to ensure all GCC vehicles accessing the LEZ meet the emissions standards by time of enforcement.	Continued funding
11	Leading by Example	Promoting low emission transport	ongoing	in progress	Funded	Membership of the Glasgow ECO Stars scheme	The fleet recognition scheme has been operating since September 2014 and has currently recruited 298 members encompassing approximately 11,653 fleet	

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							vehicles including three of the largest bus companies operating within Glasgow. Glasgow Taxi's group also joined the Glasgow Eco Stars scheme in 2018.	
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## 3 Air Quality Monitoring Data and Comparison with Air Quality Objectives

### 3.1 Summary of Monitoring Undertaken

#### 3.1.1 Automatic Monitoring Sites

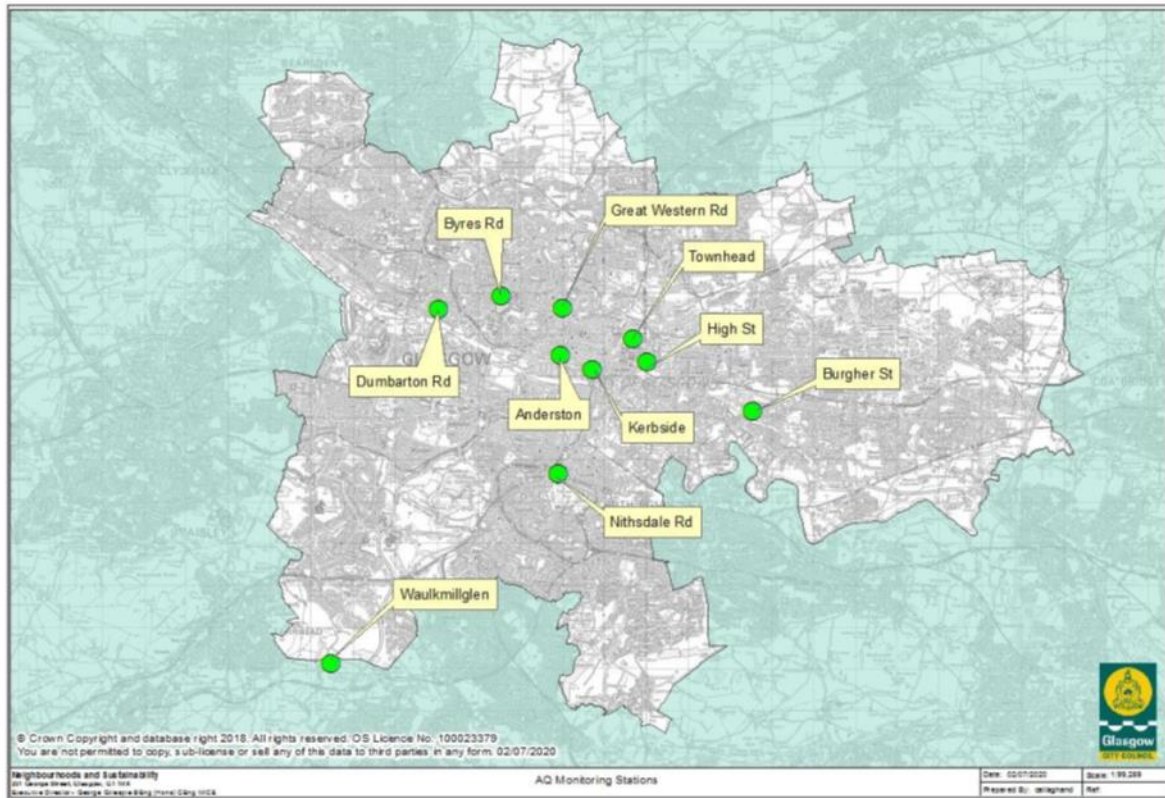
This section sets out what monitoring has taken place and how local concentrations of the main air pollutants compare with the objectives.

Glasgow City Council undertook automatic (continuous) monitoring at 10 sites during 2022. Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at <http://www.scottishairquality.scot/>

Maps showing the location of the monitoring sites are provided in Figure 3.1 below.

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

Figure 3.1 - Location of Automatic Monitoring Sites

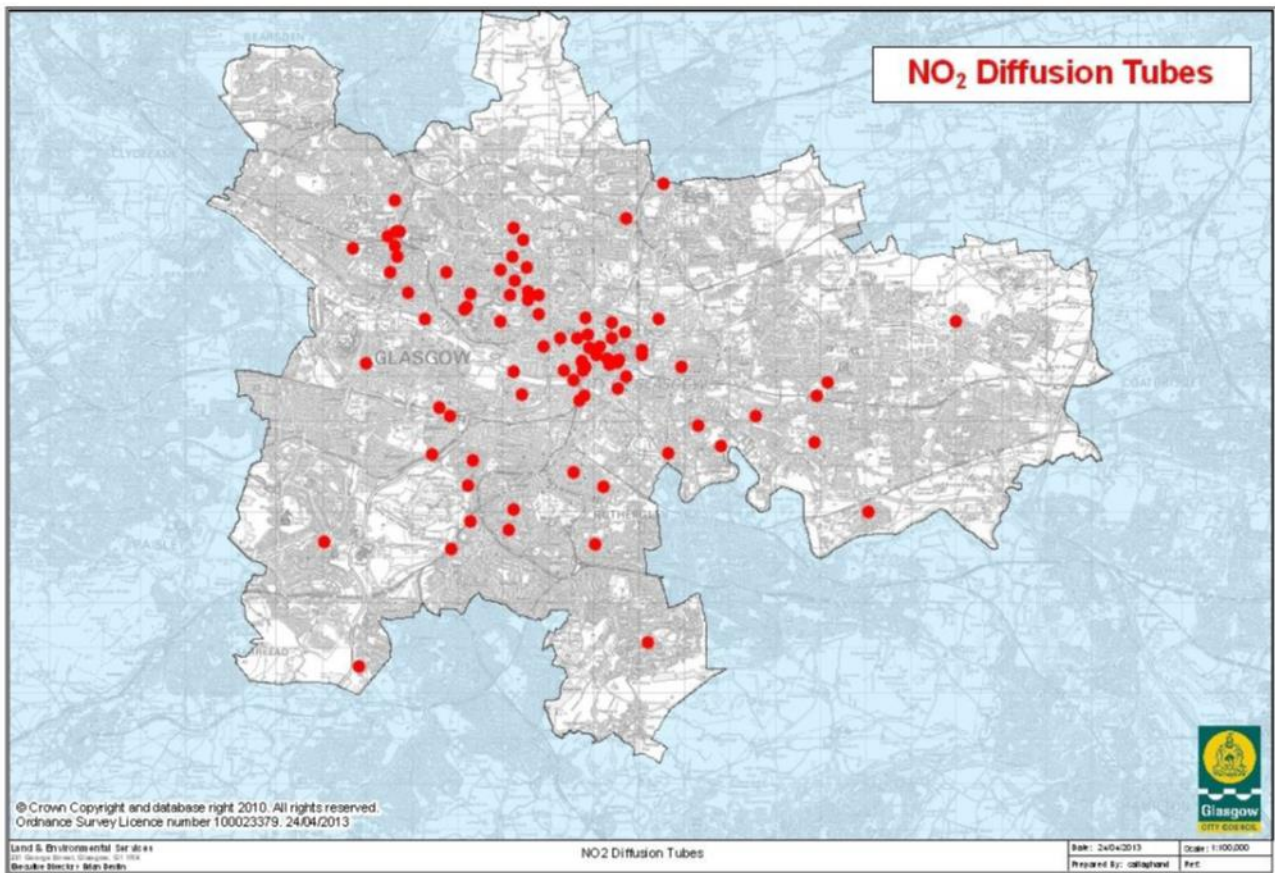


### 3.1.2 Non-Automatic Monitoring Sites

Glasgow City Council undertook non- automatic (passive) monitoring of NO<sub>2</sub> at 102 sites during 2022. Table A.2 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Figure 3.2 below. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

Figure 3.2 - Location of Nitrogen Dioxide (NO<sub>2</sub>) Diffusion Tubes



### 3.1.3 Other Monitoring Activities

Glasgow City Council undertook non- automatic (passive) monitoring of Benzene (C<sub>6</sub>H<sub>6</sub>) at 4 sites during 2021. Table A.2 in Appendix A shows the details of the sites.

## 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<sub>2</sub>)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO<sub>2</sub> annual mean concentrations for the past five years with the air quality objective of 40 µg/m<sup>3</sup>.

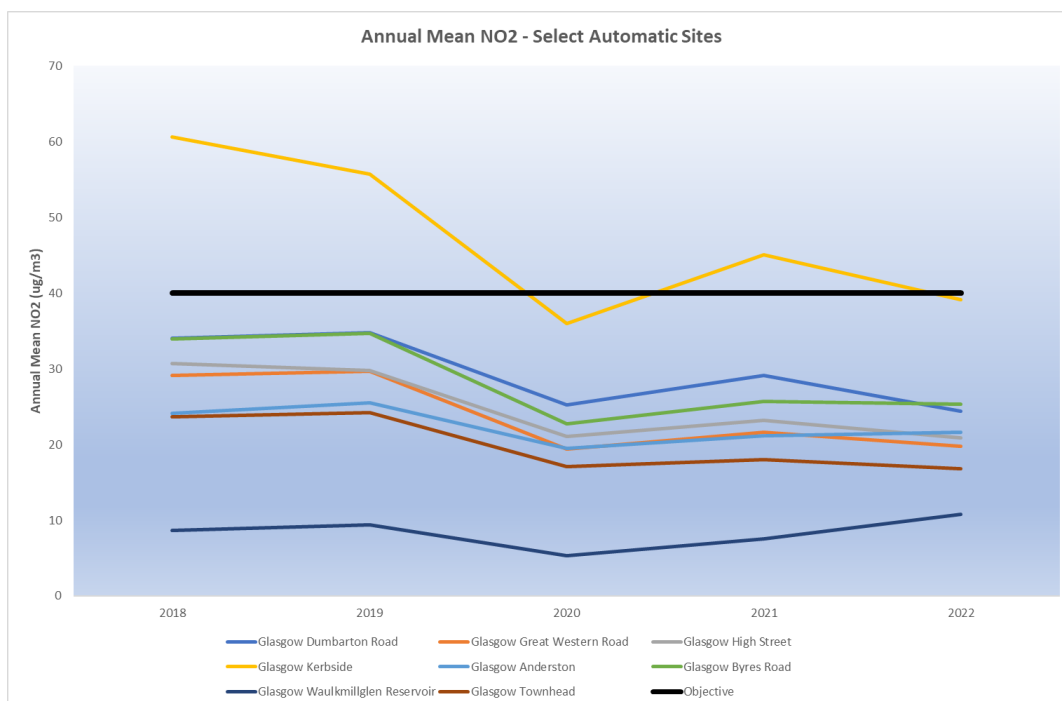
For diffusion tubes, the full 2022 dataset of monthly mean values is provided in Appendix B.

Table A.4 in Appendix A compares the ratified continuous monitored NO<sub>2</sub> hourly mean concentrations for the past five years with the air quality objective of 200µg/m<sup>3</sup>, not to be exceeded more than 18 times per year.

Levels of NO<sub>2</sub> in 2022 at all automatic monitoring stations were within the annual mean objective levels for the first time since the heavily pandemic affected year of 2020. However, it should be noted that the compliance recorded at Glasgow Kerbside was marginal, recording an annual mean of 39.1ug/m<sup>3</sup> against an objective level of 40ug/m<sup>3</sup>.

Levels of NO<sub>2</sub> pollution have been on a downward trend in recent years, as a result of improvements in vehicle emissions and the phased introduction of the Glasgow LEZ for scheduled bus services since 2018. NO<sub>2</sub> levels dropped significantly in 2020 as a result of the pandemic restrictions, before increasing in 2021 as these restrictions lessened. However, most automatic stations recorded a slight decrease in NO<sub>2</sub> levels between 2021 and 2022, maintaining a significant decrease on the pre-pandemic levels. Figure 3.3 below shows the trend at automatic stations between 2018 and 2022.

**Figure 3.3: Trends in annual mean NO<sub>2</sub> at selected automatic monitoring stations**





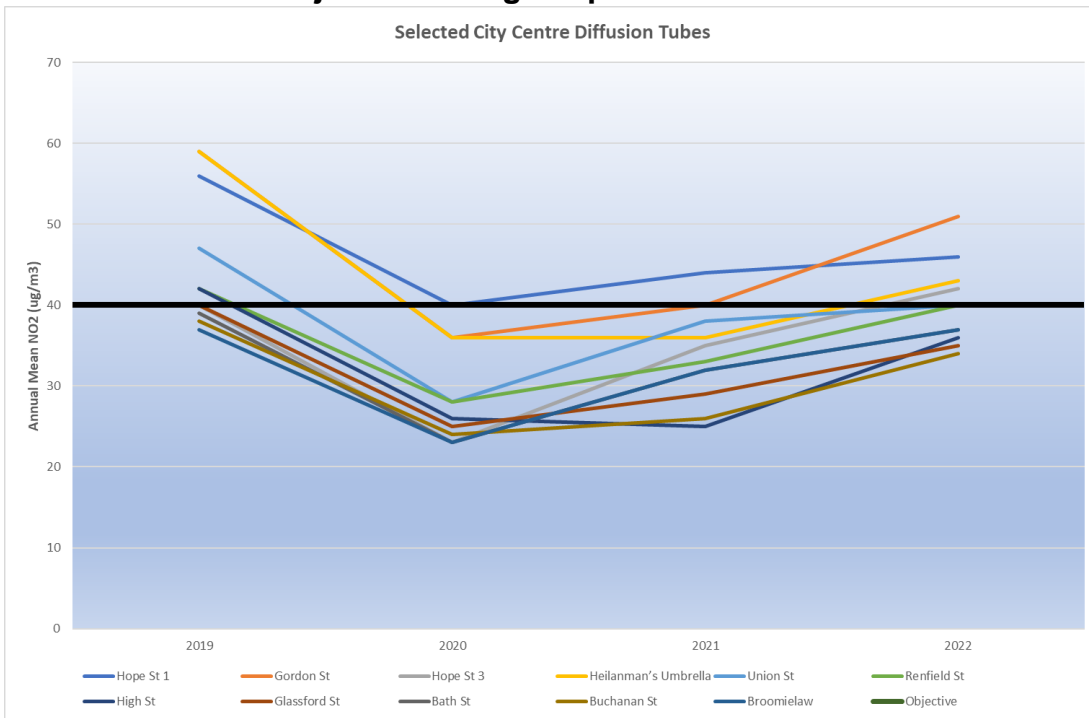
Results from the city centre monitoring using NO<sub>2</sub> diffusion tubes have been on a generally downward trend, and this accelerated significantly in the pandemic affected year of 2020, where all but one location recorded levels below the annual mean objective. As pandemic restrictions eased in 2021, all but three locations recorded rising levels of NO<sub>2</sub>, with two locations exceeding the objective level for this year.

As pandemic restrictions eased further in 2022, a significant rise in NO<sub>2</sub> levels was recorded at almost all city centre locations monitored by diffusion tube, with annual mean NO<sub>2</sub> rising by between 4 and 44% across the 27 city centre monitoring locations. The average rise in recorded NO<sub>2</sub> levels by city centre diffusion tubes between 2021 and 2022 was 20%. The number of locations recording exceedances of the annual mean NO<sub>2</sub> by diffusion tube in Glasgow city centre rose to four with one location exceeding the objective by 28% (CC14 – Gordon St).

Exceedances of the annual mean objective were recorded in monitoring conducted by diffusion tube at four monitoring locations. A further two locations sit at the objective (40ug/m<sup>3</sup> rounded to nearest whole number), and 4 locations lie within 10% of the objective (including the Kerbside automatic station).

Figure 3.4 below shows those monitoring locations which were exceeding, or within 10% of the annual mean objective in the last full pre-pandemic year of 2019, and the results for these locations in the subsequent years. Diffusion tube results show a clear upward trend since the pandemic affected year of 2020 with all locations showing increases between 2021 and 2022.

**Figure 3.4: Selected monitoring results from city centre locations exceeding or within 10% of the objective during the period 2019 – 2022**



The NO<sub>2</sub> Hourly Mean Objective was not exceeded at any of the automatic monitoring stations.

### 3.2.2 Particulate Matter (PM<sub>10</sub>)

Table A.5 in Appendix A compares the ratified monitored PM<sub>10</sub> annual mean concentrations for the past five years with the air quality objective of 18µg/m<sup>3</sup>.

Table A.6 in Appendix A compares the ratified monitored PM<sub>10</sub> daily mean concentrations for the past five years with the air quality objective of 50µg/m<sup>3</sup>, not to be exceeded more than seven times per year.

Levels of PM<sub>10</sub> recorded across the city in 2022 were satisfactory with both the daily mean and annual mean objectives being met at all monitoring locations. This continued the trend of compliance in respect of this pollutant which has been observed for several years.

### **3.2.3 Particulate Matter (PM<sub>2.5</sub>)**

Table A.7 in Appendix A compares the ratified monitored PM<sub>2.5</sub> annual mean concentrations for the past five years with the air quality objective of 10µg/m<sup>3</sup>. This objective was not exceeded at any monitoring location during 2022.

### **3.2.4 Sulphur Dioxide (SO<sub>2</sub>)**

Sulphur dioxide monitoring has been discontinued in Glasgow following a long period of compliance with the relevant Objectives.

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

Monitoring of these pollutants has been discontinued in Glasgow following a long period of compliance with the relevant Objectives.

### **3.1.6 Benzene**

Table A.8 in Appendix A shows the monitored C<sub>6</sub>H<sub>6</sub> annual mean concentrations with the air quality objective of 3.25µg/m<sup>3</sup>. The Annual Mean Objective was not exceeded at any monitoring location during 2022.

## **4 New Local Developments**

### **4.1 Road Traffic Sources**

Road traffic levels on surrounding roads is likely to be affected by the continuing works on the Woodside Viaduct part of the M8 motorway, with increases expected due to periods where diversions are in place. Whilst not expected to lead to new exceedances of the air quality objectives, monitoring will continue on applicable routes to verify this. Diversions are also likely to have an impact on the operation of the Glasgow LEZ.

### **4.2 Other Transport Sources**

No significant new transport sources have been identified which require consideration in this report.

### **4.3 Industrial Sources**

No significant new industrial sources have been identified which require consideration in this report.

### **4.4 Commercial and Domestic Sources**

No significant new commercial and domestic sources have been identified which require consideration in this report.

### **4.5 New Developments with Fugitive or Uncontrolled Sources**

No significant new developments with fugitive or uncontrolled sources have been identified which require consideration in this report.

## 5 Planning Applications

There have been several planning applications for residential and commercial developments within the last year which required air quality assessments due to the introduction of new receptors or increased emissions due to additional vehicle movements. No assessments resulted in predictions of significant adverse impacts on air quality.

## 6 Conclusions and Proposed Actions

### 6.1 Conclusions from New Monitoring Data

Monitoring results for NO<sub>2</sub> from 2022 show a mixed picture with results from automatic monitoring stations across the city showing a general small reduction from 2021. However, monitoring within the city centre conducted by diffusion tubes show a significant (20%) increase on 2021 figures.

The number of locations showing exceedances of the annual mean NO<sub>2</sub> objective has increased year on year from the pandemic-affected low of 2020. Four locations show exceedances for 2022, with a further four within 10%, indicating potential exceedances.

Table 6.1 below shows those monitoring locations which were exceeding, or within 10% of, the annual mean objective in the last full pre-pandemic year of 2019 and the results for these locations in the subsequent years. Diffusion tube results show a clear upward trend since the pandemic affected year of 2020 with all locations showing increases between 2021 and 2022.

**Table 6.1: Selected monitoring results from city centre locations exceeding or within 10% of the objective during the period 2019 – 2022**

Site ID	Site Name	Location Description	Annual Mean NO <sub>2</sub> (µg/m <sup>3</sup> )			
			2019	2020	2021	2022
CC13	Hope St 1	Road canyon – next to taxi rank	<b>56</b>	<b>40</b>	<b>44</b>	<b>45</b>
CC14	Gordon St	Road canyon – next to taxi rank	<b>59</b>	<b>36</b>	<b>40</b>	<b>50</b>
CC07	Hope St 3	Road canyon – general traffic	<b>40</b>	23	35	<b>40</b>
CC15	Heilanman's Umbrella	Sheltered location – poor dispersion	<b>59</b>	<b>36</b>	<b>36</b>	<b>42</b>
CC02	Union St	Bus gate – buses and commercial traffic	<b>47</b>	28	<b>38</b>	<b>38</b>
CC10	Renfield St	Road canyon – general traffic	<b>42</b>	28	33	<b>39</b>
CC17	High St	General traffic	<b>42</b>	26	25	35
CC04	Glassford St	General traffic	<b>40</b>	25	29	34
CC03	Bath St	General traffic	<b>39</b>	23	32	<b>36</b>
CC05	Buchanan St	Bus gate – buses and taxis	<b>38</b>	24	26	33
CC24	Broomielaw	General traffic	<b>37</b>	23	32	<b>36</b>

\*All figures rounded to nearest whole number (40ug/m<sup>3</sup> may be a technical exceedance or compliance based on rounding)

\*\*Exceedances of annual mean shown in bold and red. Monitoring within 10% of objective shown in bold.

Continued interventions to improve air quality, such that revocation of the city centre AQMA becomes possible, are required. This includes the implementation of phase 2 of the Glasgow LEZ and the adoption of the revised Air Quality Action Plan. Monitoring will continue to assess ongoing pollution trends and the impact of the introduction of phase 2 of the Glasgow LEZ.

Whilst the Byres Rd / Dumbarton Rd AQMA remains in effect in respect of the annual mean objective for NO<sub>2</sub>, continued monitoring has shown no exceedances of this objective since 2017. This APR therefore proposes that the Byres Rd / Dumbarton Rd AQMA be revoked in terms of this objective.

## **6.2 Conclusions relating to New Local Developments**

No new local developments have been identified which are expected to have significant impacts on air quality in the city.

## **6.3 Proposed Actions**

Following the formal introduction of phase 2 of the LEZ on 31 May 2022 and general enforcement beginning on 1<sup>st</sup> June 2023, Glasgow City Council will continue to work with partners in the Scottish Government, Transport Scotland and the Scottish Environment Protection Agency to evaluate the operation and effectiveness of the operation of the LEZ. Statutory reporting of this will be incorporated into future APRs.

The draft update of the Air Quality Action Plan will be developed and subject to consultation before official adoption. The AQAP will consider both the relevant Scottish objective levels and the revised World Health Organisation guidelines.

Actions within the current AQAP will continue to be progressed.

The Byres Rd / Dumbarton Rd AQMA will be formally revoked.

The next Air Quality Progress Report will be produced and submitted in 2023.

## Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Inlet Height (m)
GLA4	Glasgow Kerbside	Kerbside	258708	665200	NO <sub>2</sub>	City Centre	Chemiluminescent	0	1	3
GLKP	Glasgow Townhead	Urban Background	259675	665900	NO <sub>2</sub> PM <sub>10</sub> PM <sub>2.5</sub> O <sub>3</sub>	City Centre	Chemiluminescent FIDAS UV Photometric	0	120	3
GGWR	Glasgow Great Western Road	Roadside	258007	666649	NO <sub>2</sub>	No	Chemiluminescent	0	5	2
GHSR	Glasgow High Street	Roadside	260013	665346	NO <sub>2</sub> PM <sub>10</sub> PM <sub>2.5</sub>	City Centre	Chemiluminescent FIDAS	0	3	3
GLA5	Glasgow Anderston	Urban Background	257925	665487	NO <sub>2</sub> PM <sub>10</sub> PM <sub>2.5</sub>	City Centre	Chemiluminescent FIDAS	0	40	3
GLA6	Glasgow Byres Road	Roadside	256526	666933	NO <sub>2</sub> PM <sub>10</sub> PM <sub>2.5</sub>	Byres Rd Dumbarton Rd	Chemiluminescent FIDAS	0	3	3
GL9	Glasgow Dumbarton Road	Roadside	255030	666608	NO <sub>2</sub> PM <sub>10</sub> PM <sub>2.5</sub>	Byres Rd Dumbarton Rd	Chemiluminescent FIDAS	0	3	2
GL2 <sup>(3)</sup>	Glasgow Nithsdale Road	Roadside	257883	662673	NO <sub>2</sub> PM <sub>10</sub> PM <sub>2.5</sub>	No	Chemiluminescent FIDAS	0	3	2
GLA7	Glasgow Waulkmillglen Reservoir	Rural	252461	658154	NO <sub>2</sub> PM <sub>10</sub> PM <sub>2.5</sub> O <sub>3</sub>	No	Chemiluminescent FIDAS UV Photometric	N/A	N/A	3



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Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Inlet Height (m)
GL3	Glasgow Broomhill	Roadside	255030	667195	PM <sub>10</sub> PM <sub>2.5</sub>	No	FIDAS	0	3	2

**Notes:**

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

(2) N/A if not applicable.

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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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube co-located with a Continuous Analyser?	Tube Height (m)
CC01	George Square	Urban Background	259296	665389	NO <sub>2</sub>	Yes	N/A	30	No	3
CC02	Union Street	Roadside	258828	665204	NO <sub>2</sub>	Yes	0	3	No	3
CC03	Bath Street	Roadside	258374	665826	NO <sub>2</sub>	Yes	3	3	No	2.5
CC04	Glassford Street	Roadside	259361	665252	NO <sub>2</sub>	Yes	0	3	No	2.5
CC05	Buchanan Street	Roadside	259055	665468	NO <sub>2</sub>	Yes	0	3	No	2.5
CC06	Castle Street	Roadside	260068	665589	NO <sub>2</sub>	Yes	0	3	No	2.5
CC07	Hope Street3	Kerbside	258856	665940	NO <sub>2</sub>	Yes	N/A	1	No	2.5
CC08	Montrose Street	Roadside	259536	665313	NO <sub>2</sub>	Yes	0	3	No	2.5
CC09	Cochrane Street	Roadside	259430	665316	NO <sub>2</sub>	Yes	0	3	No	2.5
CC10	Renfield Street	Roadside	258896	665637	NO <sub>2</sub>	Yes	0	3	No	2.5
CC11	George Street	Kerbside	259551	665380	NO <sub>2</sub>	Yes	N/A	1	No	2.5
CC12	North Street	Roadside	257906	665675	NO <sub>2</sub>	Yes	N/A	3	No	2.5
CC13	Hope Street1	Roadside	258730	665322	NO <sub>2</sub>	Yes	0	3	No	3
CC14	Gordon Street	Roadside	258756	665346	NO <sub>2</sub>	Yes	N/A	3	No	3

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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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube co-located with a Continuous Analyser?	Tube Height (m)
CC15	Heilanmans Umbrella North	Roadside	258770	665120	NO <sub>2</sub>	Yes	0	3	No	3
CC16	Saltmarket	Roadside	259545	664739	NO <sub>2</sub>	Yes	0	3	No	2.5
CC17	High Street	Roadside	259732	664991	NO <sub>2</sub>	Yes	0	3	No	2.5
CC18	DobbiesLoan	Urban Background	259415	666194	NO <sub>2</sub>	Yes	0	3	No	2.5
CC20	Dundasvale Street	Urban Background	258820	666306	NO <sub>2</sub>	Yes	0	15	No	2.5
CC21	RoystonRoad	Roadside	260429	666264	NO <sub>2</sub>	Yes	5	3	No	2.5
CC22	St Mungo Avenue	Urban Background	259392	665866	NO <sub>2</sub>	Yes	0	5	No	2.5
CC23	Brown Street	Roadside	258336	665122	NO <sub>2</sub>	Yes	0	3	No	2.5
CC24	Broomielaw	Roadside	258562	664933	NO <sub>2</sub>	Yes	N/A	3	No	2.5
CC25	McLeod Street	Urban Background	260077	665481	NO <sub>2</sub>	Yes	0	8	No	2.5
CC26	Sauchiehall Street	Urban Background	258639	665852	NO <sub>2</sub>	Yes	N/A	N/A	No	3
CC28	St Mungo's PS	Roadside	259983	665834	NO <sub>2</sub>	Yes	10	1	No	2.5
CC29	Garnetbank PS	Roadside	258240	666033	NO <sub>2</sub>	Yes	5	1	No	2.5
GE01	Westmuir	Roadside			NO <sub>2</sub>	Yes	0	3	No	2.5

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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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube co-located with a Continuous Analyser?	Tube Height (m)
	Street		262589	664139						
GE02	Hillcrest Road	Roadside	265075	662001	NO <sub>2</sub>	No	5	3	No	2.5
GE03	Main Street (Bridgeton)	Roadside	260650	663319	NO <sub>2</sub>	No	0	5	No	2.5
GE04	Westercraigs	Urban Background	260942	665226	NO <sub>2</sub>	No	0	15	No	2.5
GE06	Sacone SW	Urban background	263920	664569	NO <sub>2</sub>	No	0	20	No	2.5
GE07	Easterhouse	Roadside	267005	666217	NO <sub>2</sub>	No	0	5	No	2.5
GE10	Tollcross Park	Roadside	263864	663544	NO <sub>2</sub>	No	0	3	No	2.5
GE14	St Michaels Lane	Roadside	262472	664214	NO <sub>2</sub>	Yes	0	3	No	2.5
GE16	Ellismuir Road	Roadside	268413	663872	NO <sub>2</sub>	No	9	1	No	2.5
GE17	Carmyle Avenue	Roadside	264792	662418	NO <sub>2</sub>	No	0	7	No	2.5
GE18	Barrowfield Street	Roadside	261705	663993	NO <sub>2</sub>	No	3	1	No	2.5
GE19	Dalmarnock Station	Roadside	261013	663169	NO <sub>2</sub>	No	N/A	1	No	2.5
GN01	Springburn Road	Roadside	260541	669268	NO <sub>2</sub>	No	0	6	No	2.5
GN02	Kippen Street	Urban Background	259731	668488	NO <sub>2</sub>	No	5	3	No	2.5

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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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube co-located with a Continuous Analyser?	Tube Height (m)
GN03	Ryeside Road	Roadside	261778	668122	NO <sub>2</sub>	No	10	1	No	2.5
GS02	Bridge Street	Roadside	258702	664480	NO <sub>2</sub>	Yes	3	3	No	2.5
GS04	Haggs Road	Roadside	256295	661792	NO <sub>2</sub>	No	0	3	No	2.5
GS06	Oxford Street	Roadside	258798	664570	NO <sub>2</sub>	No	0	3	No	2.5
GS07	Dougrie Road	Roadside	260203	659128	NO <sub>2</sub>	No	N/A	3	No	2.5
GS08	Aikenhead Road	Roadside	259225	662579	NO <sub>2</sub>	No	0	6	No	2.5
GS09	Langside Primary School	Roadside	257138	661617	NO <sub>2</sub>	No	5	3	No	3
GS10	Paisley Road West	Roadside	255599	664313	NO <sub>2</sub>	No	0	3	No	2.5
GS11	Sutherland Avenue	Urban Background	256343	663153	NO <sub>2</sub>	No	10	5	No	2.5
GS12	Mallaig Place	Urban background	253989	665298	NO <sub>2</sub>	No	20	6	No	2.5
GS13	Govanhill Street	Roadside	258678	662901	NO <sub>2</sub>	No	3	3	No	3
GS14	Invergarrie Road	Urban Background	253821	658590	NO <sub>2</sub>	No	5	3	No	2.5
GS16	Silverburn	Roadside	253047	661349	NO <sub>2</sub>	No	0	5	No	2.5
GS18	Paisley Rd West 2	Roadside	257415	664616	NO <sub>2</sub>	No	0	3	No	2.5

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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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube co-located with a Continuous Analyser?	Tube Height (m)
GS19	Hampden	Urban Background	259038	661285	NO <sub>2</sub>	No	0	3	No	2.5
GS20	45 Clifford Street	Roadside	256262	664308	NO <sub>2</sub>	No	0	3	No	2.5
GS21	608 Scotland Street West	Roadside	256948	664270	NO <sub>2</sub>	No	0	1	No	2.5
GS22	17 Kilbride Street	Roadside	259732	663032	NO <sub>2</sub>	No	0	3	No	2.5
GS23	2 Myrtle Drive	Roadside	259246	661979	NO <sub>2</sub>	No	0	3	No	2.5
GS24	183 Crossloan Road	Roadside	254724	665407	NO <sub>2</sub>	No	0	3	No	2.5
GS25	234 Berryknowes Road	Urban Background	253542	664443	NO <sub>2</sub>	No	0	15	No	2.5
GS27	Battlefield Road	Roadside	258084	661642	NO <sub>2</sub>	No	0	3	No	2.5
GS28	128 Menock Road	Roadside	259871	660618	NO <sub>2</sub>	No	0	3	No	2.5
GS30	Govan Road	Roadside	254021	665943	NO <sub>2</sub>	No	0	2	No	3
GS31	Govan Road (Hospital)	Roadside	253865	666006	NO <sub>2</sub>	No	2	2	No	2.5
GS34	1220 Govan Road	Roadside	254372	665902	NO <sub>2</sub>	No	0	2	No	3

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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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube co-located with a Continuous Analyser?	Tube Height (m)
GS35	Shieldhall Road	Roadside	253554	665176	NO <sub>2</sub>	No	0	3	No	2.5
GS36	Wallace Street	Roadside	258108	664514	NO <sub>2</sub>	No	0	3	No	2.5
GS37	Dumbreck Road	Roadside	255477	663644	NO <sub>2</sub>	No	7	1	No	2.5
GS45	Ben Glas Place	Urban Background	253609	659958	NO <sub>2</sub>	No	5	1	No	2.5
GS46	Kirriemuir Avenue	Roadside	253471	663587	NO <sub>2</sub>	No	20	1	No	2.5
GS47	1214 Paisley Road West	Roadside	254818	664109	NO <sub>2</sub>	No	10	1	No	2.5
GW01	Dumbarton Road	Roadside	256209	666525	NO <sub>2</sub>	Yes	3	3	No	2.5
GW02	Lawrence Street	Roadside	256295	666816	NO <sub>2</sub>	Yes	5	2	No	3
GW04	Finnieston Street	Roadside	257235	665108	NO <sub>2</sub>	No	N/A	3	No	2.5
GW06	Napiershall Street	Roadside	257790	666791	NO <sub>2</sub>	No	0	4	No	2.5
GW07	Queen Margaret Drive 2	Roadside	257216	667639	NO <sub>2</sub>	Yes	0	3	No	3
GW08	Queen Margaret Drive 3	Roadside	257012	667433	NO <sub>2</sub>	Yes	0	3	No	3
GW09	Anniesland	Roadside			NO <sub>2</sub>	No	0	15	No	2.5

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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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube co-located with a Continuous Analyser?	Tube Height (m)
	Cross		254613	668886						
GW10	Balshagray Avenue	Roadside	254498	667291	NO <sub>2</sub>	No	0	10	No	2.5
GW11	Thornwood Drive	Roadside	254903	666855	NO <sub>2</sub>	No	0	3	No	2.5
GW12	Belmont Street	Roadside	257533	667418	NO <sub>2</sub>	No	N/A	3	No	2.5
GW13	Glasgow Harbour	Urban Background	255287	666276	NO <sub>2</sub>	No	0	30	No	3
GW14	Crow Road	Roadside	254640	668203	NO <sub>2</sub>	No	0	3	No	2.5
GW15	Hyndland Road	Roadside	255764	667297	NO <sub>2</sub>	No	0	4	No	2.5
GW16	Park Road	Roadside	257555	666896	NO <sub>2</sub>	No	0	3	No	2.5
GW18	Maryhill Road	Roadside	257243	668285	NO <sub>2</sub>	No	0	3	No	3
GW19	Scotstoun	Urban Background	253592	667771	NO <sub>2</sub>	No	0	>10	No	2.5
GW21	Milner Road	Roadside	254456	668108	NO <sub>2</sub>	No	0	3	No	2.5
GW22	Gibson St	Roadside	257166	666787	NO <sub>2</sub>	No	0	2	No	2.5
GW26	Great Western Road	Roadside	257255	667112	NO <sub>2</sub>	No	0	3	No	2.5
GW30	South Street	Roadside	253193	667219	NO <sub>2</sub>	No	0	2	No	2.5
GW31	Great George		256663	667100	NO <sub>2</sub>					2.5

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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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube co-located with a Continuous Analyser?	Tube Height (m)
	Street	Roadside				No	0	3	No	
GW32	Blairdardie Road	Roadside	253080	670199	NO <sub>2</sub>	No	8	1	No	2.5
GW33	Cadder Road	Roadside	257373	669164	NO <sub>2</sub>	No	10	1	No	2.5
GW34	New City Road	Urban Background	258309	666457	NO <sub>2</sub>	No	N/A	1	No	2.5
GW35	676 Dumbarton Road	Roadside	254946	666612	NO <sub>2</sub>	No	0	1	No	2.5
GW36	1545 Dumbarton Road	Roadside	252993	667615	NO <sub>2</sub>	No	0	3	No	2.5
GW37	Primrose Court	Roadside	253475	667289	NO <sub>2</sub>	No	0	13	No	2.5
GW38	1545 Dumbarton Rd	Roadside	252981	667648	NO <sub>2</sub>	Yes	0	2	No	2.5
GW39	Primrose Ct	Roadside	252815	667642	NO <sub>2</sub>	No	0	2	No	2.5
GW40	Harland Street	Roadside	253139	667333	NO <sub>2</sub>	No	2	3	No	2.5
GW41	Partick Bus Station	Roadside	255692	667338	NO <sub>2</sub>	Yes	0	2	No	2.5
CCB1	Heilanman's Umbrella north	Roadside	258770	665121	C6H6	No	0	3	No	2.5
CCB2	Hope Street	Kerbside	258738	665167	C6H6	No	3	1	No	3.5

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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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube co-located with a Continuous Analyser?	Tube Height (m)
GWB1	Ochiltree Avenue	Roadside	254839	669295	C6H6	No	3	5	No	3
GSB1	Pollokshaws Road	Roadside	255869	661185	C6H6	No	3	3	No	2.5

**Notes:**

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

(2) N/A if not applicable.

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Table A.3 – Annual Mean NO<sub>2</sub> Monitoring Results (µg/m<sup>3</sup>)

Site ID	Site Name	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
GLA4	Kerbside (Kerbside)	Automatic	99	99	61	56	36	45	39
GLKP	Townhead (U Background)	Automatic	99	99	24	24	17	18	17
GGWR	Gt. Western Rd (Roadside)	Automatic	96	96	29	30	19	22	20
GHSR	High St. (Roadside)	Automatic	95	95	31	30	21	23	21
GLA5	Anderston (U Background)	Automatic	99	99	24	26	20	22	22
GLA6	Byres Rd. (Roadside)	Automatic	100	100	34	35	23	26	25
GL9	Dumbarton Rd. (Roadside)	Automatic	82	82	34	35	25	29	24
GL2	Nithsdale Rd. (Roadside)	Automatic	100	100	32	31	-	24	22
GLA7	Waulkmillglen (Rural)	Automatic	29	29	9	9	5	7	11
CC01	George Square	Diffusion Tube	67	67	35	32	19	25	29
CC02	Union Street	Diffusion Tube	100	100	47	47	28	38	38
CC03	Bath Street	Diffusion Tube	100	100	41	39	23	32	36
CC04	Glassford Street	Diffusion Tube	100	100	40	40	25	29	34
CC05	Buchanan Street	Diffusion Tube	100	100	41	38	24	26	33
CC06	Castle Street	Diffusion Tube	100	100	31	29	20	24	28
CC07	Hope Street 3	Diffusion Tube	92	92	40	40	23	35	40
CC08	Montrose Street	Diffusion Tube	100	100	29	28	19	22	27
CC09	Cochrane Street	Diffusion Tube	83	83	35	35	22	26	30
CC10	Renfield Street	Diffusion Tube	75	75	45	42	28	33	39
CC11	George Street	Diffusion Tube	67	67	39	32	20	25	28
CC12	North Street	Diffusion Tube	100	100	30	27	21	19	23
CC13	Hope Street 1	Diffusion Tube	100	100	63	56	40	44	45

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Site ID	Site Name	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
CC14	Gordon Street	Diffusion Tube	75	75	60	59	36	40	50
CC15	Heilmans Umbrella North	Diffusion Tube	92	92	60	59	36	36	42
CC16	Saltmarket	Diffusion Tube	100	100	27	31	23	26	32
CC17	High Street	Diffusion Tube	83	83	40	42	26	25	35
CC18	Dobbies Loan	Diffusion Tube	100	100	27	23	19	22	24
CC20	Dundasvale Street	Diffusion Tube	100	100	30	28	21	24	25
CC21	Royston Road	Diffusion Tube	92	92	29	29	21	24	29
CC22	St Mungo Avenue	Diffusion Tube	100	100	27	26	20	21	24
CC23	Brown Street	Diffusion Tube	100	100	29	24	17	19	21
CC24	Broomielaw	Diffusion Tube	75	75	39	37	23	32	36
CC25	McLeod Street	Diffusion Tube	100	100	31	30	22	22	29
CC26	Sauchiehall Street	Diffusion Tube	100	100	31	32	21	24	29
CC28	St Mungo's PS	Diffusion Tube	100	100	26	24	19	15	19
CC29	Garnetbank PS	Diffusion Tube	100	100	31	29	21	22	23
GE02	Hillcrest Road	Diffusion Tube	100	100	16	16	13	13	14
GE03	Main Street (Bridgeton)	Diffusion Tube	100	100	22	20	13	16	20
GE04	Westercraigs	Diffusion Tube	100	100	21	19	20	18	16
GE06	Sacone SW	Diffusion Tube	100	100	20	16	14	15	16
GE07	Easterhouse	Diffusion Tube	100	100	16	15	12	12	13
GE10	Tollicross Park	Diffusion Tube	100	100	22	21	14	11	12
GE14	St Michaels Lane	Diffusion Tube	92	92	35	36	29	27	21
GE16	Ellismuir Road	Diffusion Tube	100	100	19	19	13	13	12
GE17	Carmyle Avenue	Diffusion Tube	100	100	32	26	19	19	20

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Site ID	Site Name	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
GE18	Barrowfield Street	Diffusion Tube	75	75	20	15	13	24	16
GE19	Dalmarnock Station	Diffusion Tube	92	92	20	19	13	14	12
GN01	Springburn Road	Diffusion Tube	100	100	23	19	16	15	17
GN03	Ryeside Road	Diffusion Tube	100	100	19	19	15	14	13
GS02	Bridge Street	Diffusion Tube	100	100	30	34	27	28	32
GS04	Haggs Road	Diffusion Tube	92	92	27	26	18	19	21
GS06	Oxford Street	Diffusion Tube	100	100	27	25	19	21	24
GS07	Dougrie Road	Diffusion Tube	100	100	18	16	14	15	14
GS08	Aikenhead Road	Diffusion Tube	100	100	21	24	16	21	23
GS09	Langside Primary School	Diffusion Tube	92	92	17	16	13	12	14
GS10	Paisley Road West	Diffusion Tube	100	100	26	28	21	21	23
GS11	Sutherland Avenue	Diffusion Tube	100	100	16	13	10	12	11
GS12	Mallaig Place	Diffusion Tube	100	100	20	18	14	14	14
GS13	Govanhill Street	Diffusion Tube	50	50	21	23	16	20	23
GS14	Invergarrie Road	Diffusion Tube	100	100	13	14	12	10	12
GS18	Paisley Rd West 2	Diffusion Tube	92	92	36	36	23	22	18
GS19	Hampden	Diffusion Tube	92	92	19	17	12	10	8
GS20	45 Clifford Street	Diffusion Tube	100	100	29	33	19	19	19
GS21	608 Scotland Street West	Diffusion Tube	100	100	29	27	19	19	19

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Site ID	Site Name	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
GS22	17 Kilbride Street	Diffusion Tube	100	100	25	22	13	15	16
GS23	2 Myrtle Drive	Diffusion Tube	92	92	20	17	12	10	12
GS24	183 Crossloan Road	Diffusion Tube	92	92	23	22	16	14	13
GS25	234 Berryknowes Rd	Diffusion Tube	100	100	24	22	15	13	14
GS28	128 Mennock Road	Diffusion Tube	100	100	24	21	13	13	12
GS30	Govan Road	Diffusion Tube	100	100	31	30	21	19	19
GS31	Govan Road (Hospital)	Diffusion Tube	100	100	32	30	22	23	21
GS34	1220 Govan Road	Diffusion Tube	92	92	24	23	17	15	16
GS35	Shieldhall Road	Diffusion Tube	100	100	23	24	14	14	13
GS36	Wallace Street	Diffusion Tube	83	83	36	33	21	24	26
GS37	Dumbreck Road	Diffusion Tube	92	92	27	23	16	16	16
GS45	Ben Glas Place	Diffusion Tube	100	100	15	14	10	11	9
GS46	Kirriemuir Avenue	Diffusion Tube	100	100	16 *	14	10	10	9
GS47	1214 Paisley Road West	Diffusion Tube	100	100	23	22	18	15	16
GW01	Dumbarton Rd	Diffusion Tube	100	100	34	35	25	29	25
GW02	Lawrence Street	Diffusion Tube	100	100	24	20	17	18	20

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Site ID	Site Name	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
GW04	Finnieston Street	Diffusion Tube	67	67	29	26	17	21	23
GW06	Napiershall Street	Diffusion Tube	100	100	26	27	20	20	23
GW07	Queen Margaret Drive 2	Diffusion Tube	92	92	29	24	22	24	26
GW08	Queen Margaret Drive 3	Diffusion Tube	92	92	32	27	21	25	30
GW09	Anniesland Cross	Diffusion Tube	83	83	23	26	17	22	21
GW10	Balshagray Avenue	Diffusion Tube	100	100	28	26	19	20	24
GW11	Thornwood Drive	Diffusion Tube	100	100	17	16	13	13	17
GW12	Belmont Street	Diffusion Tube	100	100	19	16	16	14	17
GW13	Glasgow Harbour	Diffusion Tube	92	92	23	19	16	17	21
GW14	Crow Road	Diffusion Tube	100	100	32	32	21	21	22
GW15	Hyndland Road	Diffusion Tube	100	100	24	23	16	15	16
GW16	Park Road	Diffusion Tube	100	100	29	28	19	19	18
GW18	Maryhill Road	Diffusion Tube	92	92	31	30	19	20	22
GW19	Scotstoun	Diffusion Tube	92	92	22	18	14	11	14
GW21	Milner Road	Diffusion Tube	100	100	19	18	12	10	10
GW22	Gibson Street	Diffusion Tube	100	100	27	28	16	17	20
GW26	Great Western Road	Diffusion Tube	92	92	30	31	18	16	18
GW30	South Street	Diffusion Tube	100	100	24	22	16	18	18
GW31	Harland Street	Diffusion Tube	100	100	25	22	15	15	18
GW32	Partick Bus Station	Diffusion Tube	100	100	26	22	16	17	19

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Site ID	Site Name	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
GW33	Great George Street	Diffusion Tube	92	92	25	26	20	17	14
GW34	Blairdardie Road	Diffusion Tube	100	100	15	14	12	10	10
GW35	Cadder Road	Diffusion Tube	100	100	19	17	14	12	14
GW36	New City Road	Diffusion Tube	100	100	31	29	23	23	21
GW37	676 Dumbarton Road	Diffusion Tube	100	100	36	32	31	32	28
GW38	1545 Dumbarton Road	Diffusion Tube	100	100	29	30	25	29	28
GW39	Primrose Court	Diffusion Tube	100	100	22	21	18	21	23

**Notes:**

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in bold.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 1-hour mean objective are shown in **bold and underlined**.

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

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

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

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Table A.4 – 1-Hour Mean NO<sub>2</sub> Monitoring Results, Number of 1-Hour Means > 200µg/m<sup>3</sup>

Site ID	Site Name	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2022 (%) <sup>(2)</sup>	2018	2019	2020	2021	2022
GLA4	Kerbside (Kerbside)	Automatic	99	99	2	3	0	0	0
GLKP	Townhead (U Background)	Automatic	99	99	0	0	0	0	0
GGWR	Gt. Western Rd (Roadside)	Automatic	96	96	0	0	0	0	0
GHSR	High St. (Roadside)	Automatic	95	95	0	0	0	0	0
GLA5	Anderston (U Background)	Automatic	99	99	0(93)	0	0	0(82)	0
GLA6	Byres Rd. (Roadside)	Automatic	100	100	0	0	0	0	0
GL9	Dumbarton Rd. (Roadside)	Automatic	82	82	0	0	0	0	0
GL2	Nithsdale Rd. (Roadside)	Automatic	100	100	0	0	-	0	0
GLA7	Waulkmillglen (Rural)	Automatic	29	29	0	0	0	0	0

**Notes:**

Exceedances of the NO<sub>2</sub> 1-hour mean objective (200 µg/m<sup>3</sup> not to be exceeded more than 18 times/year) are shown in bold.

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

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

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

Table A.5 – Annual Mean PM<sub>10</sub> Monitoring Results (µg/m<sup>3</sup>)

Site ID	Site Name	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2022 (%) <sup>(2)</sup>	2018	2019	2020	2021	2022
GLA4	Kerbside (Kerbside)	Automatic	100	-	-	11	13	12
GLKP	Townhead (U Background)	Automatic	99	11	11	9	9	10
GHSR	High St. (Roadside)	Automatic	100	14	11	9	10	11
GLA5	Anderston (U Background)	Automatic	98	12	12	9	11	12
GLA6	Byres Rd. (Roadside)	Automatic	80	14	15	11	11	11
GL9	Dumbarton Rd. (Roadside)	Automatic	71	14	13	10	12	13
GL2	Nithsdale Rd. (Roadside)	Automatic	100	14	15	7	9	11
GLA7	Waulkmillglen (Rural)	Automatic	96	9	9	4	7	8
GL3	Broomhill (Roadside)	Automatic	100	-	13	10	10	11

**Notes:**

Exceedances of the PM<sub>10</sub> annual mean objective of 18 µg/m<sup>3</sup> are shown in bold.

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

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

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

Table A.6 – 24-Hour Mean PM<sub>10</sub> Monitoring Results, Number of PM<sub>10</sub> 24-Hour Means > 50µg/m<sup>3</sup>

Site ID	Site Name	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2022 (%) <sup>(2)</sup>	2018	2019	2020	2021	2022
GLA4	Kerbside (Kerbside)	Automatic	100	-	-	0	0	2
GLKP	Townhead (U Background)	Automatic	99	0	4	0	0	2
GHSR	High St. (Roadside)	Automatic	100	0	1	0	0	1
GLA5	Anderston (U Background)	Automatic	98	0(29)	2	0 (24)	0	2
GLA6	Byres Rd. (Roadside)	Automatic	80	0	6	0	0	2(40)
GL9	Dumbarton Rd. (Roadside)	Automatic	71	0	4	0	0(27)	2(45)
GL2	Nithsdale Rd. (Roadside)	Automatic	100	1	5	N/A <sup>(3)</sup>	0	0
GLA7	Waulkmillglen (Rural)	Automatic	96	0	1	0	0	0
GL3	Broomhill (Roadside)	Automatic	100	0	4	0	0	1

**Notes:**

Exceedances of the PM<sub>10</sub> 24-hour mean objective (50 µg/m<sup>3</sup> not to be exceeded more than seven times/year) are shown in bold.

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

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

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

Table A.7 – Annual Mean PM<sub>2.5</sub> Monitoring Results (µg/m<sup>3</sup>)

Site ID	Site Name	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2022 (%) <sup>(2)</sup>	2018	2019	2020	2021	2022
GLA4	Kerbside (Kerbside)	Automatic	100	-	-	6	7	7
GLKP	Townhead (U Background)	Automatic	99	7	7	5	5	6
GHSR	High St. (Roadside)	Automatic	100	8	6	5	6	6
GLA5	Anderston (U Background)	Automatic	98	7	7	5	6	7
GLA6	Byres Rd. (Roadside)	Automatic	80	8	9	6	6	6
GL9	Dumbarton Rd. (Roadside)	Automatic	71	7	7	5	6	7
GL2	Nithsdale Rd. (Roadside)	Automatic	100	8	9	7	5	6
GLA7	Waulkmillglen (Rural)	Automatic	96	5	6	4	4	5
GL3	Broomhill (Roadside)	Automatic	100	-	8	5	6	6

**Notes:**

Exceedances of the PM<sub>2.5</sub> annual mean objective of 10 µg/m<sup>3</sup> are shown in bold.

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

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

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

Table A.8 – Benzene 2022 Monitoring Results

Site ID	Site Name	Valid Data Capture for monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2022 (%) <sup>(2)</sup>	C6H6 Annual Mean Concentration µg/m <sup>3</sup>
CCB1	Heilanman's Umbrella North (Roadside)	75%	75%	0.38
CCB2	Hope St (Kerbside)	75%	75%	0.39
GWB1	Ochiltree Avenue (Roadside)	67%	67%	0.44
GSB1	Pollokshaws Rd (Roadside)	67%	67%	0.41

**Notes:**

Exceedances of the Benzene objectives are shown in bold (3.25µg/m<sup>3</sup> running annual mean)

## Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1 – NO<sub>2</sub> 2022 Monthly Diffusion Tube Results (µg/m<sup>3</sup>)

Site ID	Site Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted <sup>(1)</sup>
CC01	GeorgeSquare	24.9	27.4	35.1	26.2	-	18.6	-	23.6	27.7	-	34.2	-	27.2	28.9
CC02	Union Street	45.6	24.1	45.4	34.9	26.5	27.4	29	30.5	33.5	34.2	42.1	46	34.9	38.4
CC03	Bath Street	22.7	29.3	43.9	33.6	27.8	23.3	24.3	32.4	32.7	33.1	46.2	46	32.9	36.2
CC04	Glassford Street	43.2	36.8	45.4	32	29.9	24.9	22.9	24.4	19.3	20.4	28.8	46.5	31.2	34.3
CC05	Buchanan Street	32.1	31.4	37.5	27.3	23.2	19.6	20.8	27.2	26.1	30.2	37.7	44.1	29.8	32.7
CC06	Castle Street	26.8	28.4	30.7	26.2	19.3	15.8	12	23.5	25.5	25.1	29.1	37.6	25	27.5
CC07	Hope Street3	39.6	34.5	44.2	33.2	28.7	27.9	30.9	34.4	35.2	-	43.4	51.6	36.7	<b>40.4</b>
CC08	Montrose Street	30.1	28	30.1	22.9	19.6	15	12	21.4	23.3	25	29.7	37	24.5	27.0
CC09	Cochrane Street	29.2	27.7	-	27.9	21.5	15.4	-	23.2	29.7	26.3	27.2	43.4	27.1	29.9
CC10	RenfieldStreet	43.4	30.4	38.8	-	-	23	29.9	-	36.3	34	36.3	43.6	35.1	38.6
CC11	GeorgeStreet	20.9	34.5	32.7	23.7	20.4	20.3	-	24.3	-	-	-	38.9	27	27.9
CC12	North Street	16.4	16.7	34.4	23.3	17.9	10.5	12.2	13.2	23	11.6	29.9	39.4	20.7	22.8
CC13	Hope Street1	55.9	50.2	64.7	49.2	43.7	18.6	32.5	11.9	9.3	43	53.3	57.6	40.8	<b>44.9</b>
CC14	GordonStreet	49	47.7	55	-	-	36.7	34.7	37.2	41.7	-	43.2	63.5	45.4	<b>50.0</b>
CC15	Heilanmans Umbrella North	45	28.9	52.6	36.9	-	32	35.2	35.8	31.3	37	38.5	49.6	38.4	<b>42.3</b>
CC16	Saltmarket	31.7	33.5	35.4	28.2	21.9	20.3	25	26.5	24.7	24.9	31.4	43.8	28.9	31.8
CC17	High Street	36.6	33.3	-	-	29.1	25.7	29.2	20.4	33.3	36.2	26.3	46	31.6	34.8
CC18	DobbiesLoan	14.1	14.7	26.8	20.3	15.8	14	12.7	16.6	20.9	41	29	32	21.5	23.6

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Site ID	Site Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted <sup>(1)</sup>
CC20	Dundasvale Street	22.9	22.6	31.5	21.4	17	13.5	11.8	16.5	18.4	23.9	27.4	40	22.2	24.5
CC21	RoystonRoad	36.5	33.1	29.9	23.3	17.5	20.7	18.3	20	-	22.6	30.3	35.8	26.2	28.8
CC22	St Mungo Avenue	19.1	24.1	25.1	21.2	16.9	12.1	18.2	16.2	22.1	21.8	25.4	36.2	21.5	23.7
CC23	Brown Street	19.2	17.3	30.2	20.4	15	6.2	12.5	8	23.1	18.1	29.2	30.3	19.1	21.0
CC24	Broomielaw	38.4	30.1	44.3	29.9	26.6	-	23.2	24.6	34.4	-	-	44.6	32.9	36.2
CC25	McLeodStreet	28.1	35.4	37.9	24.2	18.6	16.8	17	18.9	23.8	27.2	33.1	38.7	26.6	29.3
CC26	Sauchiehall Street	27.5	20.3	35.4	25.9	21.6	17.2	12.3	21.5	25.6	27.1	31.7	44.4	25.9	28.5
CC28	St Mungo'sPS	25.1	21.2	33.8	19.7	6.5	8	12.4	6.7	15.3	19.3	21.9	19.2	17.4	19.2
CC29	GarnetbankPS	23.3	24.8	29.8	21.1	11.3	13.4	17.1	12.8	16.2	25.4	32.1	24.3	21	23.1
GE01	Westmuir Street	38.8	32.1	33.1	25.8	22.7	22.7	23.4	18.3	22.5	24.9	31.6	38.1	27.8	30.6
GE02	Hillcrest Road	14.4	14.9	21.9	13.9	6.4	4.6	5.9	7.5	14.5	11.6	17.5	17.3	12.5	13.8
GE03	Main Street (Bridgeton)	17.4	17.6	28.8	14.9	11.9	11.1	12.1	14.9	19.1	16	22.4	28.8	17.9	19.7
GE04	Westercraigs	19	16.3	20.3	11.5	9	5	7.7	10.9	13.4	13.5	23	27.8	14.8	16.3
GE06	Sacone SW	22.5	19.7	16.6	11.5	7.4	8.3	6.8	10.9	12.3	12.7	15.8	25.8	14.2	15.6
GE07	Easterhouse	14.9	11.8	17.3	11	7.4	7.5	5.1	9.6	11.6	11.3	15.1	22.9	12.1	13.3
GE10	TollcrossPark	11.2	10.6	15.2	10.4	6.5	4.1	2.2	5.8	15.6	12.7	19	18.5	11	12.1
GE14	St Michaels Lane	21	19.1	11.7	16.5	10.7	13.1	19	19.7	-	24	23	32.2	19.1	21.0
GE16	EllismuirRoad	12.4	16.1	18.5	9.3	5.9	3.7	2.9	6.4	9.8	13	20.3	16.6	11.2	12.4
GE17	Carmyle Avenue	13.8	24.9	20	14.1	13	8.1	8.7	21.4	22	22.7	26.7	25.3	18.4	20.2
GE18	Barrowfield Street	12.7	16.3	12.8	-	-	4.5	4.8	-	14.5	16.4	22.2	23	14.1	15.5

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Site ID	Site Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted <sup>(1)</sup>
GE19	Dalmarnock Station	8.5	11.9	10	8.1	10.7	6.8	6.3	12.7	15.1	14.7	-	17.4	11.1	12.2
GN01	Springburn Road	17.5	13.4	22.9	12.8	12	7.6	9.2	15.7	14.6	13.4	22.7	25.7	15.6	17.2
GN02	KippenStreet	11.5	15.9	21.5	14.9	10.4	6.9	10.6	13.7	15.1	15.4	17.5	26.2	15	16.5
GN03	RyesideRoad	15.6	10.3	13.9	6.3	7.5	3.1	6.7	7	11.4	12.7	30.8	20.5	12.2	13.4
GS02	Bridge Street	27.3	23.1	35.7	33.2	24.8	18.6	25.3	24.1	31.1	24.4	29	48.2	28.7	31.6
GS04	Haggs Road	18.2	17.7	-	19.9	13	12.8	11.6	14.1	19.6	20.7	26.5	36	19.1	21.0
GS06	OxfordStreet	26.5	21.5	30.4	22.8	17.3	15.8	13.5	18.6	18	14.7	23.7	38.3	21.8	23.9
GS07	DougieRoad	10.9	11.6	16.4	14.2	8.2	8.1	9	10.6	11.3	11.4	14.1	23.8	12.5	13.7
GS08	Aikenhead Road	18.6	17.7	30	24.3	15.8	9.5	11.8	17.5	21.8	19.4	21	39.2	20.6	22.6
GS09	Langside Primary School	13.1	11	18.1	-	9.1	6.5	6.6	9.2	10.9	11.2	17.2	27.9	12.8	14.1
GS10	Paisley Road West	15.1	18.2	18.5	22.8	17.7	13.2	17.2	13.3	26.9	22	27.7	41.7	21.2	23.3
GS11	Sutherland Avenue	11	8.3	17	9.7	5.7	5.4	4.5	5.3	9.7	8.3	14.9	23.7	10.3	11.3
GS12	MallaigPlace	15.5	10.5	20.2	13.2	9.1	7	4.4	9.2	13.4	3.4	21.2	27.4	12.9	14.2
GS13	Govanhill Street	23.4	18.7	30.6	20.3	15.1	16.2	-	-	-	-	-	-	20.7	22.9
GS14	Invergarrie Road	12.4	9.3	16.2	10.2	7.4	4.8	4	8.6	8.2	8.8	13.8	23.6	10.6	11.7
GS16	Silverburn	8.3	6.5	13.3	8	8.2	3.1	3.4	5.1	13.9	14.5	19.1	29.6	11.1	12.2
GS18	Paisley Rd West 2	21.6	9.5	16	15.2	11.5	11.7	8.6	19.8	15.4	26.6	22.9	-	16.3	17.9
GS19	Hampden	6	5.1	5.8	6.1	5.3	3.4	2.4	5.4	-	9.9	14.6	19	7.5	8.3

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GS20	45 Clifford Street	17.1	12.1	16	16.4	10	9	10.9	12.6	21	26.1	24.8	28	17	18.7
GS21	608 Scotland Street West	17.2	15.5	15.1	13.6	9.8	11	10	13	20.9	25.5	23.1	33.9	17.4	19.1
GS22	17 Kilbride Street	12.7	18.5	10.4	11.5	7	8.2	5.3	8.5	16	17.1	25.9	27.9	14.1	15.5
GS23	2 Myrtle Drive	-	7.2	10.4	8.1	6.8	7	3.5	6.2	14.7	12.4	16	22.6	10.4	11.5
GS24	183 Crossloan Road	11.4	12.5	14.9	12.4	7.5	7.7	4.8	9.3	14.7	16.4	20.2	-	12	13.2
GS25	234 Berryknowes Road	11.2	13.5	13.6	9.1	8	5.9	6.8	10.4	11.5	11.1	16.3	32.5	12.5	13.7
GS27	Battlefield Road	16.1	16.3	14.3	13.6	9.8	7.9	8.4	15.2	12.1	20.7	20.4	32.2	15.6	17.1
GS28	128 Mennock Road	18	15.5	12.1	7.9	4.4	3.7	5.4	11.9	7.2	10.4	13.6	19.1	10.8	11.8
GS30	Govan Road	15.9	26.4	19.5	16.6	12.6	11	11	14.3	12.3	23.1	17.5	26.7	17.2	19.0
GS31	Govan Road (Hospital)	14.6	27.9	16.2	17.1	13.2	11.4	10.1	11.3	14.6	27.1	33.7	33.5	19.2	21.1
GS34	1220 Govan Road	18.8	12	13.6	10.2	-	6.6	13.3	14.1	10.6	18.5	13	27	14.3	15.8
GS35	Shieldhall Road	13.1	13.1	14.2	9.5	7.6	6.6	1	12	8.6	12.9	17.3	23.4	11.6	12.8
GS36	Wallace Street	14.6	26.8	16.4	22.2	17.5	-	13.6	30.9	18.6	33.6		41.6	23.6	25.9
GS37	Dumbreck Road	5.2	11.3	14.5	13.8	9	-	10.5	13.1	18.5	19.1	18.6	22.7	14.2	15.6

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Site ID	Site Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted <sup>(1)</sup>
GS45	Ben GlasPlace	3.4	6.3	12.4	7.8	3.1	2.1	4.4	8.2	7.6	10	14.5	16.4	8	8.8
GS46	Kirriemuir Avenue	4	6.4	17.8	8.5	2.4	2.1	2.8	8.8	8.9	9.3	13.9	15.4	8.4	9.2
GS47	1214 Paisley Road West	18.4	8.6	14.3	12.4	10	6.7	5.8	8.1	17.1	17.5	21.1	29.8	14.2	15.6
GW01	Dumbarton Road	23.5	19.8	34.9	21.6	16	12.8	8.2	17.6	23	24.2	29.5	42.5	22.8	25.1
GW02	Lawrence Street	17.2	17.1	27	16.6	11.2	9.3	9.8	14.3	14.3	18.6	26.1	34.9	18	19.8
GW04	Finnieston Street	20.5	18	35.4	21.4	-	12.7	15.2	17.4	-	21.6	-	-	20.3	22.3
GW06	Napiershall Street	17.9	9.4	30	21.7	16.5	13.8	10.3	17.6	18.6	24.5	33.7	35.6	20.8	22.9
GW07	Queen Margaret Drive 2	24.6	19.6	32.1	22.9	18.5	16.2	11.8	21	-	24.6	33.5	37.8	23.9	26.3
GW08	Queen Margaret Drive 3	-	27	40.1	24.5	21.9	20.5	19	19.6	22.9	29.4	32.8	40.5	27.1	29.8
GW09	Anniesland Cross	26.6	22.4	27.1	17.4	14.9	13.3	10.4	12.5	-	23.1	26.1	-	19.4	21.3
GW10	Balshagray Avenue	23.3	17.9	31.4	18.1	16.7	13.5	10.3	12.7	19.3	23.6	30.5	39.2	21.4	23.5
GW11	Thornwood Drive	14.5	12.2	27.5	11.1	8.3	9.6	7.3	8.3	12.3	19	20.6	30.3	15.1	16.6
GW12	Belmont Street	19.2	14.9	22.4	13.6	9.8	6.5	7.1	10.9	10.8	13.2	23.4	31.9	15.3	16.8
GW13	Glasgow Harbour	18.8	16.6	35.1	17.4	13	9.2	9.4	12.2	18.5	-	24.8	38.6	19.4	21.4
GW14	Crow Road	16.4	22.3	16.6	15	13.4	11.4	16.5	14.1	18.1	28.3	30.7	35.5	19.9	21.8
GW15	Hyndland Road	15.5	11.7	14	11.9	8.6	5.5	5.3	4.8	18.9	17.4	25.6	32.3	14.3	15.7

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Site ID	Site Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted <sup>(1)</sup>
GW16	Park Road	14.3	11.4	17.6	13.6	10.2	9.7	5.2	10	22.2	23.9	23.8	31.1	16.1	17.7
GW18	MaryhillRoad	22.3	27.2	-	14.8	10.8	9.2	8.4	13.4	25.4	21.2	22.9	41	19.7	21.7
GW19	Scotstoun	9.9	7.4	11.4	8.5	-	4.1	3.2	8.3	17.5	17.8	25.3	22.4	12.3	13.6
GW21	Milner Road	11	7.9	10.1	4.4	4.5	3	3.8	4.8	10	14.8	20.2	17.8	9.4	10.3
GW22	GibsonStreet	19.3	17.5	18	11.3	10.5	10.5	7.1	16.1	18.4	25.3	29.6	33.3	18.1	19.9
GW26	Great Western Road	15.1	20.9	22.9	13	10.4	8.5	6.4	12.6	24.1	19.4	30.2	-	16.7	18.4
GW30	South Street	16.3	21.3	12.6	13.1	8.7	9.4	16.5	8.9	12	21.7	14.4	38.6	16.1	17.7
GW31	HarlandStreet	12.7	17.6	13.5	10.6	9.1	14.4	8.2	15	16	20.8	26.4	28.7	16.1	17.7
GW32	Partick Bus Station	15	17.6	13.1	12	8	9.1	15.6	13.7	21.9	15.6	28.8	32.4	16.9	18.6
GW33	Great George Street	12.8	13.4	12.2	12.2	13.7	7.6	12.8	9.9	9.7	15.2	18.4	-	12.5	13.8
GW34	Blairdardie Road	4.4	10.4	13.4	6.3	2.4	2.1	2.9	5.5	8.6	11.7	18.4	21.6	9	9.9
GW35	CadderRoad	15.9	14.4	17.3	6.7	10.4	2.4	10.1	8.8	10.5	14.6	21.8	23.6	13	14.3
GW36	New CityRoad	28	28.9	30.3	11.4	10.9	5.6	7.4	17.1	11.3	21	20.1	36.7	19.1	21.0
GW37	676 Dumbarton Road	32.3	33.2	40.5	15.3	16.5	21.5	12.7	12.3	18.7	32.2	37.8	34.8	25.7	28.2
GW38	1545 Dumbarton Road	28.4	26	52	13.2	20.9	20.4	10.8	10.2	21.5	30.2	37.5	34.7	25.5	28.0
GW39	PrimroseCourt	22.7	23	26.6	13	12.1	11.5	12	28.5	17.5	20.8	27.2	32.9	20.7	22.7

**Notes:**

(1) See Appendix C for details on bias adjustment

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

### **New or Changed Sources Identified Within Glasgow During 2022**

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

### **Additional Air Quality Works Undertaken by Glasgow City Council During 2022**

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

### **QA/QC of Diffusion Tube Monitoring**

Diffusion tube monitoring is carried out in accordance with the procedures contained in the guidance 'Diffusion Tubes for Ambient NO<sub>2</sub> Monitoring: Practical Guidance for Laboratories and Users' and LAQM.TG22

Monitoring was conducted in adherence with the 2022 Diffusion Tube Monitoring Calendar.

For 2022 all NO<sub>2</sub> diffusion tubes were supplied and analysed by Glasgow Scientific Services. The preparation method was 20% tri-ethanolamine in water. Glasgow Scientific Services is UKAS accredited for the analysis of diffusion tubes, participating in the AIR-PT Scheme for NO<sub>2</sub> tube analysis and the Annual Field Inter-Comparison Exercise.

In the AIR-PT results available for 2022, AIR PT AR049 (January – February 2022) and AIR PT AR050 (May – June 2022) GSS scored 100%. The percentage score reflects the results deemed to be satisfactory based upon the z-score of  $< \pm 2$ .

### Diffusion Tube Annualisation

Annualisation was required for four diffusion tube sites, CC01, CC11, GS13 and GW04 due to low data collection. Annualisation was conducted in accordance with the annualization tool methodology and the results have been expressed in the main results table. The annualization method is shown in Table C.2

### Diffusion Tube Bias Adjustment Factors

Glasgow City Council have applied a local bias adjustment factor of 1.10 to the 2022 monitoring data. A summary of bias adjustment factors used by Glasgow City Council over the past five years is presented in Table C1 below.

Results from five local co-location studies were used to provide the local co-location factor. These were GLA4, GLA6, GLKP, GHSR and GGWR. Details of the co-location study can be found in Table C2.

It should be noted that the Glasgow local co-location studies were submitted for inclusion within the national bias adjustment spreadsheet, with Glasgow co-location studies the only ones submitted for the Glasgow Scientific Services laboratory. The national study noted the large spread in bias factors, with the Marylebone Rd intercomparison providing the lowest of the bias adjustments and urged caution in the use of the national spreadsheet. For this reason, a local factor was chosen which excluded the intercomparison study, ensuring that the bias adjustment only included local tubes subject to the same handling during exposure periods. Use of the national spreadsheet would have yielded a bias adjustment factor of 1.05 whilst the local co-location study yielded a bias adjustment factor of 1.10.

**Table C.1 – Bias Adjustment Factor**

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	Local	-	1.10
2021	National	03/22	1.12

2020	National	03/21	0.96
2019	National	03/20	0.85
2018	National	06/19	0.89

**Table C.2 – Local Bias Adjustment Information**

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4	Local Bias Adjustment Input 5
Periods used to calculate bias	12	12	12	12	11
Bias Factor A	0.94	0.87	1.19	1.33	1.32
Bias Factor B	7%	15%	-16%	-25%	-24%
Diffusion Tube Mean ( $\mu\text{g}/\text{m}^3$ )	41.3	30.5	14.0	16.0	14.3
Mean CV (Precision)	G	G	P	P	P
Automatic Mean ( $\mu\text{g}/\text{m}^3$ )	38.7	26.5	16.6	21.3	18.8
Data Capture	99%	100%	99%	94%	96%

**NO<sub>2</sub> Fall-off with Distance from the Road**

No automatic NO<sub>2</sub> monitoring locations within Glasgow required distance correction during 2022.

**QA/QC of Automatic Monitoring**

The 10 permanent monitoring stations in Glasgow form part of the Air Quality in Scotland monitoring network. Instruments are calibrated by the Local Site Operators (LSO) according to the specific site guidelines and audits are carried out every six months by Ricardo EAE. Glasgow City Council Public Health act as LSO for seven of the stations while Ricardo AEA act as LSO for the three stations operated as part of the UK network operated by DEFRA. These stations are GLA4, GLKP and GHSR.

All of the automatic air quality data gathered, both current and historical is independently ratified by Ricardo AEA and made available for viewing by the public at the Scottish Government funded air quality website at:

<http://www.scottishairquality.co.uk>

All data within this report has been fully ratified.

This webpage also provides access to the QA/QC information relevant to LAQM report requirements. The instrument UKAS calibration certification generated by the six-monthly audit programme for Glasgow's monitoring stations is available at:

<http://www.scottishairquality.co.uk/laqm/certificates-calibration>

### **PM<sub>10</sub> and PM<sub>2.5</sub> Monitoring Adjustment**

The type of PM<sub>10</sub>/PM<sub>2.5</sub> monitors utilised within Glasgow do not require the application of a correction factor.

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

Site ID	Annualisation Factor GLA5	Annualisation Factor GLA6	Annualisation Factor GHSR	Annualisation Factor GLA4	Average Annualisation Factor	Raw Data Annual Mean	Bias adjusted (1.10) & Annualised Annual Mean	Comments
CC01	0.9885	0.9967	0.9023	0.9760	0.9659	27.2	28.9	
CC11	0.9481	0.9569	0.8864	0.9647	0.9390	27.0	27.9	
GS13	1.0503	1.0351	0.9433	1.0022	1.0077	20.7	22.9	
GW04	1.1072	1.0708	0.9734	1.0361	1.0469	20.3	23.4	

Notes:

A combined local bias adjustment factor of 1.10 has been used to bias adjust the 2022 diffusion tube results.



## Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the LA intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
APR	Air quality Annual Progress Report
AURN	Automatic Urban and Rural Network (UK air quality monitoring network)
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM <sub>2.5</sub>	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO <sub>2</sub>	Sulphur Dioxide

## References

- Department of the Environment, Food and Rural Affairs (2000). Part IV The Environment Act 1995, Local Air Quality Management, Technical Guidance, LAQM.TG (16).
- Glasgow City Council (2004). Local Air Quality Action Plan.
- Glasgow City Council (2009). Local Air Quality Action Plan.
- Scottish Government (2016). 'Cleaner Air for Scotland - Road to a Healthier Future'.
- Scottish Government (2017). 'Cleaner Air for Scotland - The Road to a Healthier Future' - Annual Progress Report 2016.
- Scottish Government (2021) Cleaner Air for Scotland 2
- Glasgow's Climate Plan
- Glasgow Transport Strategy: Policy Framework
- Glasgow City Council City Development Plan 2017
- Glasgow City Council City Centre Strategy and Action Plan 2014-19
- Glasgow City Council Strategic Plan for Cycling 2016 – 2025
- Glasgow City Council City Centre Transport Strategy 2014 – 2024
- Glasgow City Council Energy and Carbon Masterplan
- Glasgow City Council Carbon Management Plan 2