

GM AIR QUALITY ADMINISTRATION COMMITTEE

Date: 13 July 2023
Subject: GM Clean Air Plan – July 2023 Update
Report of: Councillor Eamonn O’Brien, Portfolio Lead for Clean Air

Purpose of Report

This report provides an update on the Case for a new Greater Manchester Clean Air Plan.

Recommendations:

The Air Quality Administration Committee is requested to:

1. Note the latest position with the government’s National Bus Retrofit Programme and the implications for the GM Clean Air Plan.
2. Note that government has commenced a six-month focused research programme to quickly investigate the causes of poor bus retrofit performance and scope how performance can be improved, anticipated to be reporting in the Autumn.
3. Write to the Secretary of State setting out the Authorities’ desire to align the reporting of GM’s programme of work with the government’s given their interdependency to deal with this unprecedented issue.
4. Agree to allow GM CAP funded bus retrofits to proceed where an operator has made a financial commitment but where an operator has not made a financial commitment, to pause any new bus retrofit applications.
5. Note the 2022 GM CAP monitoring data indicates that nitrogen dioxide air pollution has increased compared with 2021 but is below levels recorded pre-pandemic in 2019. Analysis of the factors influencing pollution emissions and air quality indicate that the concentrations have been affected by:
 - An increase in car traffic compared with 2021, and associated congestion although traffic is still below 2019;
 - Differing weather conditions in 2022 compared with 2021, reducing dispersion of pollutants – likely driven by warmer sunnier conditions over the year; and

- Bus fleet emissions as a result of the impact of the variable performance of the government's bus retrofit programme, as set out in section 5.

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Equalities Impact, Carbon and Sustainability Assessment:

The GM CAP is a place-based solution to tackle roadside NO₂ which will have a positive impact on carbon.

Risk Management

Initial risk register set out in Clean Air Plan OBC (March 2019).

Legal Considerations

On 8th February 2022 *The Environment Act 1995 (Greater Manchester) Air Quality Direction 2022* (the Direction) was issued. The Direction requires that the GM local authorities:

- review the measures specified in the existing Plan; and
- determine whether to propose any changes to the detailed design of those measures, or any additional measures.

The GM authorities must ensure that the Plan with any proposed changes will secure that:

- compliance with the legal limit value for NO₂ is achieved in the shortest possible time and by no later than 2026; and
- exposure to levels above the legal limit for NO₂ is reduced as quickly as possible.

This Direction revoked the Direction dated March 2020 which required the ten Greater Manchester Local Authorities to implement a Category C Clean Air Zone to achieve compliance with the legal limit value for NO₂ in the shortest possible time and by 2024 at the latest.

Financial Consequences – Revenue

Initial Financial Case set out in Clean Air Plan OBC (March 2019), with all development and delivery costs to be covered by central government.

Financial Consequences – Capital

Initial Financial Case set out in Clean Air Plan OBC (March 2019), with all development and delivery costs to be covered by central government.

Number of attachments to the report: **three**

Comments/recommendations from Overview & Scrutiny Committee

Not applicable.

Background Papers

- 27 February 2023, Report to AQAC: GM Clean Air Plan – February 2023 Update
- 26 October 2022, Report to AQAC: GM Clean Air Plan – Expenditure Update
- 26 October 2022, Report to AQAC: GM Clean Air Plan – October 2022 Update
- 17 August 2022, Report to AQAC: GM Clean Air Plan – August 2022 Update
- 1 July 2022, Report to AQAC: GM Clean Air Plan – July 22 Update
- 23 March 2022, Report to AQAC: GM Clean Air Plan – March 22 Update
- 28 February 2022, Report to AQAC: GM Clean Air Plan – February 22 Update
- 2 February 2022, report to CACC: GM Clean Air Plan – update to the temporary exemption qualification date for GM-licensed hackney carriages and private hire vehicles
- 20 January 2022, report to AQAC: GM Clean Air Plan – A628/A57, Tameside – Trunk Road Charging Scheme update
- 20 January 2022, report to AQAC: GM Clean Air Plan – Financial Support Scheme Jan 22 Update
- 20 January 2022, report to AQAC: GM Clean Air Plan – Clean Air Zone Discount & Exemptions Applications
- 18 November 2021, report to AQAC: GM Clean Air Plan – GM Clean Air Funds assessment mechanism
- 18 November 2021, report to CACC: GM Clean Air Plan – GM Clean Air Plan Policy updates
- 13 October 2021, report to AQAC: GM Clean Air Plan – Operational Agreement for the Central Clean Air Service
- 13 October 2021, report to CACC: GM Clean Air Plan – Showmen’s Vehicle Exemption
- 13 October 2021, report to CACC: GM Clean Air Plan – Clean Air Zone daily charge refund policy
- 13 October 2021, report to CACC: GM Clean Air Plan – A628/A57, Tameside – Trunk Road Charging Scheme
- 21 September, report to AQAC: GM Clean Air Plan – Clean Air Zone: Camera and Sign Installation
- 21 September, report to AQAC: GM Clean Air Plan – Bus Replacement Funds
- 25 June 2021, report to GMCA: GM Clean Air Final Plan
- 31 January 2021, report to GMCA: GM Clean Air Plan: Consultation

- 31 July 2020, report to GMCA: Clean Air Plan Update
- 29 May 2020, report to GMCA: Clean Air Plan Update
- 31 January 2020, report to GMCA: Clean Air Plan Update
- 26 Jul 2019, report to GMCA: Clean Air Plan Update
- 1 March 2019, report to GMCA: Greater Manchester's Clean Air Plan – Tackling Nitrogen Dioxide Exceedances at the Roadside - Outline Business Case
- 11 January 2019, report to GMCA/AGMA: Clean Air Update
- 14 December 2018, report to GMCA: Clean Air Update
- 30 November 2018, report to GMCA: Clean Air Plan Update
- 15 November 2018, report to HPEOS Committee: Clean Air Update
- 26 October 2018, report to GMCA: GM Clean Air Plan Update on Local Air Quality Monitoring
- 16 August 2018, report to HPEOS Committee: GM Clean Air Plan Update
- UK plan for tackling roadside nitrogen dioxide concentrations, Defra and DfT, July 2017.

Tracking/ Process

Does this report relate to a major strategic decision, as set out in the GMCA Constitution

No

Exemption from call in

Are there any aspects in this report which means it should be considered exempt from call in by the relevant Scrutiny Committee on the grounds of urgency? No

GM Transport Committee – Not applicable

Overview and Scrutiny Committee – Not applicable

1 Background

- 1.1 The government has instructed many local authorities across the UK to take quick action to reduce harmful Nitrogen Dioxide (NO₂) levels following the Secretary of State (SoS) issuing a Direction under the Environment Act 1995. In Greater Manchester, the 10 local authorities, the Greater Manchester Combined Authority (GMCA) and Transport for Greater Manchester (TfGM) are working together to develop a Clean Air Plan to tackle NO₂ exceedances at the roadside, herein known as Greater Manchester Clean Air Plan (GM CAP).
- 1.2 The development of the GM CAP is funded by government and is overseen by Joint Air Quality Unit (JAQU), the joint DEFRA and DfT unit established to deliver national plans to improve air quality and meet legal limits. The costs related to the business case, implementation and operation of the GM CAP are either directly funded or underwritten by government acting through JAQU and any net deficit over the life of the GM CAP will be covered by the New Burdens Doctrine, subject to a reasonableness test¹.
- 1.3 The GM CAP is a package of measures to deliver NO₂ reductions to within legal limits within the shortest possible time and by 2026 at the latest.
- 1.4 Throughout the development of the GM CAP the ten GM local Authorities have made clear the expectation that the UK government would support the plans through:
 - Clear arrangements and funding to develop workable, local vehicle scrappage / upgrade measures;
 - Short term effective interventions in vehicle and technology manufacturing and distribution, led by national government;
 - Replacement of non-compliant buses; and

¹ The new burdens doctrine is part of a suite of measures to ensure Council Tax payers do not face excessive increases. [New burdens doctrine: guidance for government departments - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/guidance/new-burdens-doctrine)

- A clear instruction to Highways England² to implement measures which deliver compliance with legal limits for NO₂ on the strategic road network, for which they are responsible, in the shortest possible time³.
- 1.5 The GMCA Clean Air Update report of 29 May 2020² detailed that in March 2020 the government provided initial funding of £41m for clean vehicle funds to award grants or loans to eligible businesses: £15.4m for bus retrofit, £10.7m for Private Hire Vehicles, £8m for HGVs, £4.6m for coaches and £2.1m for minibuses. These figures include Joint Air Quality Unit (JAQU) estimated delivery costs at 5%.
 - 1.6 The GMCA – Clean Air Final Plan report detailed that GM had been awarded £14.11m for Hackney Carriages and £73.5m for Light Goods Vehicles. The Hackney Carriage award comprises £10.61m to support grants and loans to upgrade vehicles. These figures include JAQU estimated delivery costs at 5%.
 - 1.7 The GMCA – Clean Air Final Plan report on 25 June 2021⁴ endorsed the GM Final Clean Air Plan and policy following a review of all of the information gathered through the GM CAP consultation and wider data, evidence and modelling work. This included the GM Clean Air Plan Policy, that outlined the boundary, discounts, exemptions, daily charges of the formerly proposed Clean Air Zone (CAZ) as well as the financial support packages offered towards upgrading to a compliant vehicle, including the eligibility criteria to be applied. The aim of the funding is to support an upgrade to a compliant vehicle and to mitigate the negative socio-economic effects of the former GM CAZ.
 - 1.8 The 25 June 2021 GMCA report set out that the Air Quality Administration Committee has the authority to establish and distribute the funds set out in the agreed GM Clean Air Plan policy.
 - 1.9 On 21 September 2021 the Air Quality Administration Committee approved the establishment and distribution of the agreed bus replacement funds.

² On 19 August 2021 it was announced that Highways England changed its name to 'National Highways' reflecting the new focus the company has on delivering the government's £27bn strategic roads investment programme, while also continuing to set highways standards for the whole UK.

³ GM Authorities are directed to take action on the local road network. Those roads managed by National Highways, such as motorways and trunk roads are excluded from the Clean Air Plan.

⁴ Also considered by the GM authorities through their own constitutional decision-making arrangements.

- 1.10 On 13 October 2021 the Air Quality Administration Committee agreed the distribution of Clean Air funds set out in the agreed GM Clean Air Plan policy as follows:
- From 30 November 2021 applications for funding would open for HGVs.
 - Opened the funds to applications from LGV, Hackney, PHV and Minibus owners who were detrimentally impacted by the decision to defer the wider opening of the Financial Support Scheme.
- 1.11 On 18 November 2021 the Air Quality Administration Committee agreed the assessment mechanism to allow for Clean Air Funds to be adapted, if necessary (including a process for considering whether additional funding is required), if the impacts of the Clean Air Zone prove to be more severe than forecast once opened.
- 1.12 On 20 January 2022 the Air Quality Administration Committee considered the findings of an initial review of conditions within the supply chain of Light Good Vehicles which is impacting the availability of compliant vehicles. The Committee agreed that a request should be made to the Secretary of State (SoS) for Environment, Food and Rural Affairs to agree to pause the opening of the next phase of Clean Air Funds to enable an urgent and fundamental joint policy review with government to identify how a revised policy can be agreed to deal with the supply issues and local businesses' ability to comply with the GM CAP.
- 1.13 On 28 February 2022 the Air Quality Administration Committee noted the submission of a report "*Issues Leading to Delayed Compliance Based on the Approved GM CAP Assumptions*", attached as Appendix 3. The report concluded that on balance, the latest emerging evidence suggests that with the Approved Plan [Summer 2021 Clean Air Plan] in place, it was no longer more likely than not that compliance would be achieved in 2024. The government subsequently issued a new Direction which stated that proposals for a revised plan were required to be submitted to the SoS by 1st of July, requiring the revised plan to achieve compliance with the legal limit value for NO₂ in the shortest possible time and by no later than 2026. The committee also noted the interim arrangements for delivery arrangements for the Clean Air Zone in the meantime, including signage, funding and discount/exemption applications.
- 1.14 On 23 March 2022 the Air Quality Administration Committee noted the scope of the review of the Clean Air Plan and the participatory policy development approach, as well as delivery arrangements, including signage and funding.

- 1.15 On 1 July 2022 the Air Quality Administration Committee noted the 'Case for a new Greater Manchester Clean Air Plan' document and associated appendices would be submitted to the Secretary of State on the 1 July as a draft document subject to any comments of Greater Manchester local authorities.
- 1.16 On 17 August 2022 the Air Quality Administration Committee agreed to submit the 'Case for a new Greater Manchester Clean Air Plan' to the Secretary of State as a final Case for a new Greater Manchester Clean Air Plan and Approved the Case for a New Plan - Air Quality Modelling Report for submission to the government's Joint Air Quality Unit.
- 1.17 On 26 October 2022 the Air Quality Administration Committee noted the non-compliant vehicles that have been upgraded through Clean Air Funds; the targeted engagement being undertaken with key stakeholders to inform the policy development process, that Greater Manchester Police have advised that the disclosure requests from the Clean Air Zone ANPR cameras have been very useful in detecting crime and the update on the funding received from government, the expenditure made and the funding requirements that have emerged as the new Greater Manchester Clean Air Plan is developed.
- 1.18 On 27 February 2023, the Air Quality Administration Committee agreed to submit the report 'Greater Manchester's approach to address persistent exceedances of nitrogen dioxide identified on the A58 Bolton Road, Bury' to the Secretary of State; noted the parameters of a Central Manchester CAZ benchmark scenario, the Clean Air funding distribution to end January 2023 by Local Authority, the headlines from targeted engagement and research that was undertaken as part of the Participatory Policy Development activity and the update to deliver EV charge points funded by the GM CAP.

2 Overview

2.1 The primary focus of the 'Case for a new Greater Manchester Clean Air Plan' is to identify a plan to achieve compliance with the legal limit value for NO₂ in a way that considers the current cost of living crisis and associated economic challenge faced by businesses and residents. This would be achieved through an investment-led approach combined with all the wider measures that GM is implementing and aims to reduce NO₂ emissions to within legal limits, in the shortest possible time and at the latest by 2026. Unlike the previous charging-led scheme defined by government guidance, the investment-led scheme seeks to factor in the cost-of-living crisis, actively considers the impacts of the pandemic and wider global economic instability on supply chains, can be delivered more quickly, and crucially considers the significant beneficial effects that the delivery of electric buses can have along key routes. In particular:

- The **cost-of-living crisis** means that businesses are less able to afford to invest in vehicle upgrades, whilst households are less able to absorb any costs that may be passed on to them.
- This is exacerbated by **rising vehicle prices** and – for some vehicle types – lower residual values of non-compliant vehicles. There is evidence that illustrates the demand for new and compliant second-hand vehicles is exceeding supply, leading to longer wait times and rising prices.
- A charging Clean Air Zone could therefore cause **unacceptable financial hardship** and contribute to business failures.
- In addition, **new opportunities have arisen** – via the approval of bus franchising and new funding for electric buses – this means that GM has the opportunity to tackle emissions in a different way.
- The exceedances become more localised in 2025 and 2026, therefore **action can be targeted** at those locations suffering the worst air quality.
- It is clear that the GM-wide Clean Air Zone category C as approved in summer 2021 could lead to hardship in GM and that implementing a materially revised charging CAZ, for example with a different boundary, vehicles in scope or discounts and exemptions, would take time to design and consult upon and then implement.

2.2 The core objectives of the New GM CAP are:

- To reduce NO₂ concentrations to below the legal limits in the shortest possible time and by 2026 at the latest;

- To achieve compliance in a way that is fair to businesses and residents, and does not damage business or cause financial hardship to people in GM; and
- To ensure the reduction of harmful emissions is at the centre of GM's wider objective for delivering the Bee Network's⁵ core objectives.

2.3 The 'Case for a new Greater Manchester Clean Air Plan' therefore proposed using the £120 million of Clean Air funding that the government has awarded to Greater Manchester to deliver an investment led approach to invest in vehicle upgrades, rather than imposing daily charges and in particular through the delivery of zero emission buses in the Bee Network (a London-style integrated transport network). The new plan would ensure that the reduction of harmful emissions is at the centre of GM's wider objectives.

2.4 The Bee Network – a high volume, low fare, transport system – will be transformational for the city-region. It will make it much easier for people to travel more affordably and sustainably and it will help us to reduce all types of air pollution, not just nitrogen dioxide, but other pollutants such as fine particulate matter. It will also cut emissions of carbon dioxide. Progress to date includes:

- Introduction of new low bus fares - £2 adult single fares, £1 for a child/£5 adult daily fares, £2.50 for a child - which have contributed to a 12% increase in patronage already.
- Investment to upgrade the bus fleet, which includes orders for 270 electric buses, which will be zero emission at the tail pipe – with the first 50 hitting our streets in a little over two months' time.
- Operators running the first two phases of franchising have also committed to providing around 200 more electric buses. These will be coming onto our streets over the next two years, with funding secured for even more still and plans for a zero-emission bus fleet by 2032.
- Tranche 1 of bus franchising in Wigan and Bolton going live on 24 September 2023 will have a positive impact on many more boroughs, including Manchester city centre, given the routes those buses will take.

⁵ The Bee Network is a vision for GM to deliver an integrated London-style transport system. The transport system will see buses, trams, rail as well as cycling and walking being joined together to revolutionise travel across the city-region.

- Operators have also ordered cleaner new Euro VI compliant buses. This includes the purchase of 67 Euro VI buses by Rotala.
- To support the roll out of a new fleet of world-class, environmentally friendly buses, two state-of-the-art electric bus depots will be built in Stockport and Central Park in Manchester.
- Delivering the first fully connected cycle network in the UK, connecting every area and community in Greater Manchester with 1,800 miles of safe routes and 2,400 new crossing.
- Work to deliver the largest active travel network in the country also continues, making it easier for people to switch from car journeys to active travel for shorter journeys.
- Over £100m of schemes funded through the Mayor's Cycling and Walking Challenge Fund (MCF) now having Full Business Case Approval.
- Bee Network hire bikes and e-bikes are available in areas of Manchester, Salford and Trafford right now – with ridership recently surpassing 1 million kilometres cycled.
- Across the city-region, schools and colleges continued to receive Active Travel grants in 2022, with over £360,000 now spent on active travel grants across Greater Manchester schools delivering over 1,000 new and improved cycle parking spaces.
- 13 School Streets were delivered in Greater Manchester in 2022, providing cleaner and safer air for our children, and funding is allocated for the introduction of more schemes.
- A new £535K programme, funded through the Department for Transport and Active Travel England Capability and Ambition Fund, means businesses, community groups and other organisations in Greater Manchester can apply for grants to help get more people walking, cycling and wheeling, reducing lorry and van travel in urban areas.
- To support the move towards a cleaner taxi fleet, in 2023, 60 rapid charging points at 32 sites across Greater Manchester are being installed dedicated for EV private hire (PHV) and hackney vehicles licensed by a Greater Manchester Authority.

3 Latest Position

3.1 Having submitted the Case for a New Clean Air Plan in July 2022 GM was asked by government in January 2023 to:

(i) provide modelling results for a benchmark CAZ to address the persistent exceedances identified in central Manchester and Salford, in order for these to be compared against your proposals.

(ii) Identify a suitable approach to address persistent exceedances identified in your data on the A58 Bolton Road in Bury in 2025, and to propose a suitable benchmark.

(iii) Set out how the measures you have proposed will be modelled and evidenced overall, and to ensure that they are modelled without any unnecessary delay.

3.2 Since the last report in February 2023 the Greater Manchester Authorities have been undertaking the work required to supply this further evidence and on 8 March 2023 submitted *Approach to Address Persistent Exceedances Identified on the A58 Bolton Road, Bury*. In February, the GM Authorities anticipated that the remainder of this work would be concluded by end of June 2023.

3.3 On 19 April 2023 government advised TfGM, by a letter attached at Appendix One⁶, that it is to pause any new spending on bus retrofit as they now have evidence that bus retrofit solutions that have been fitted have poor and highly variable performance in real world conditions.

3.4 Government has commenced a six-month focused research programme to quickly investigate the causes of this poor performance and scope how performance can be improved, anticipated to be reporting in the Autumn. This issue is addressed in more detail in section 4.

⁶ The letter refers to a report summarising the results of the remote sensing monitoring and the data tables for the campaign undertaken in Manchester City Centre between 21 November and 12 December 2022. Government have marked this information as sensitive. JAQU have advised Transport for Greater Manchester that it will not be disclosing the information under Regulation 12(4)(d) - Material in the course of completion, unfinished documents, and incomplete data (Environmental Information Regulations 2004).

4 Bus Retrofit Issue – DfT Programme Update

- 4.1 In 2022 JAQU funded a study to quantify NO_x and NO₂ emissions from buses under real-world driving conditions in three cities across the UK, including Manchester, (monitoring took place in Manchester City Centre between 21 November and 12 December 2022).
- 4.2 The monitoring indicated the retrofitted buses were not reducing emissions as expected, with significant variation in performance between bus models with different retrofit technologies. Furthermore, emissions of primary-NO₂ (as opposed to NO_x) were highly variable, potentially worsening roadside NO₂ concentrations despite an overall reduction in NO_x emissions. Further details are summarised in Appendix Two.
- 4.3 Government is not at this stage proposing any changes to the Clean Air Zone (CAZ) compliance status of buses that have already been retrofitted with Selective Catalytic Reduction (SCR) technology whilst they carry out further studies.
- 4.4 However, they do not recommend any further retrofit purchases are made until this research has been completed.
- 4.5 DfT have advised a limited number of Bus Companies through their regular liaison meetings.
- 4.6 The apparent impact of the variable performance of the government's bus retrofit programme may be reflected in the 2022 GM CAP monitoring data, set out in section 7, which shows that air pollution has increased compared with 2021 but is below levels recorded pre-pandemic in 2019. Analysis of the factors influencing pollution emissions and air quality indicate that the concentrations have been affected by:
 - An increase in car traffic compared with 2021, and associated congestion although traffic is still below 2019;
 - Differing weather conditions in 2022 compared with 2021, reducing dispersion of pollutants – likely driven by unusually warm conditions over the year; and
 - Bus emissions as a result of the impact of the poor performance of the government's bus retrofit programme.

5 GM's Bus Retrofit Programme – Latest position

- 5.1 Between 2015 – 2019 TfGM awarded £3.1m of Clean Bus Technology Fund⁷ (CBTF) funding to retrofit 170 buses. In 2020 as part of the GM CAP government awarded a further £14.7m to retrofit all remaining retrofitable buses. The GM CAP funding was considered a continuation of the CBTF and it opened to applications in December 2020.
- 5.2 GM developed a robust retrofit programme based on grants of up to £16,000 towards retrofit to a compliant standard via a Clean Vehicle Retrofit Accreditation Scheme (CVRAS) certified system.
- 5.3 Grants have been issued in accordance with standard grant agreements, which require that operators use approved suppliers and install accredited emissions abatement systems. In addition, operators must supply TfGM with a 'completion certificate' for each system installed (this is a condition of payment of 75% of the £16,000 per-vehicle grant) post-installation the buses have operated in accordance with any supplier recommendations.
- 5.4 As of May 2023:
- 972 individual vehicles awarded grants (£15.137m)
 - 931 vehicles completed and fully retrofitted (52 of these vehicles are owned by TfGM.)
 - 926 vehicles paid out (£14.477m)
 - 41 vehicles left to be completed and are in process (TfGM have paid £4k deposits for 14 vehicles although the remaining vehicle operators could have paid their own deposits).
- 5.5 Given the government's position is to not recommend any further retrofit purchases are made until their research has been completed TfGM has contacted those operators with vehicles in the process of being retrofitted. Many operators have made a financial commitment, e.g. placed a deposit that is non-refundable and wish to complete the retrofit of their vehicle.

⁷ The DfT launched the Clean Bus Technology Fund (CBTF) in September 2015 it is a nationally funded programme to apply Selective Catalytic Reduction technology to reduce Euro V levels of NO₂ emissions to Euro VI Standards (i.e. NO₂ reductions from 2g/kWh to 0.4 g/kWh)

5.6 Given that bus operators have retrofitted their vehicles in good faith in reliance on CVRAS, it would seem unfair for those operators to be penalised due to government's decision to suspend the bus retrofit programme. It is therefore recommended to allow retrofits to proceed where an operator has made a financial commitment, e.g. placed a deposit that is non-refundable and where an operator has not made a financial commitment, to pause any new bus retrofit applications in relation to GM funding at this time.

6 Implications for the GM CAP

- 6.1 Buses are an essential component of the public transport offer in Greater Manchester, and in many parts of the region are the only public transport available. When GM submitted its Outline Business Case in 2018 it was made clear that it is vital that action to clean up the bus fleet does not have the unintended consequence of reducing the number or frequency of bus services in the region.
- 6.2 In March 2023 and prior to government's notification, nearly 90% of GM's Bus Fleet complied with the emissions standards set by the Clean Air Zone Framework⁸, compared with around 10% prior to GM's retrofit programme commenced in 2018. 1,153 of the 2,063 buses operating in Greater Manchester have been retrofitted to meet the minimum emissions standards.
- 6.3 Given the scale of upgrade required in GM's bus fleet the retrofit of buses was considered a relatively inexpensive way to deliver compliance, using the government's accredited scheme. The government's Clean Air Zone Framework⁹ states that:

“Retrofitting a vehicle can provide an alternative to buying a new vehicle to meet the standards for a clean air zone. There are a range of existing and emerging retrofitting options for vehicles and it can be difficult for purchasers and local authorities to know whether a particular technology is credible.”

⁸ Made possible due to financial support from the GM Clean Air Bus fund to support the retrofit or replacement of non-compliant vehicles.

⁹ [Clean air zone framework - GOV.UK \(www.gov.uk\)](https://www.gov.uk/clean-air-zone-framework)

“The government has developed the Clean Vehicle Retrofit Accreditation Scheme (CVRAS) to provide independent evidence that a vehicle retrofit technology will deliver the expected pollutant emissions reductions and air quality benefits. The scheme enables drivers, technology manufacturers, businesses and local authorities to be confident that the retrofit technologies being used provide the appropriate emissions reductions for free entry to a clean air zone. Retrofitted vehicles which meet the requirements of a clean air zone as accredited under this scheme will be exempt from a charge.”

- 6.4 In the light of the government’s new evidence the JAQU science team have issued revised general guidance applicable to CAZ authorities nationwide, along with GM-specific guidance reflecting the fact that GM-specific roadside monitoring data is available. JAQU’s general guidance, in summary, requires that Air Quality modelling should not assume any benefits from a retrofitted bus. JAQU’s GM-specific guidance gives GM the option to develop a bespoke process to model emissions from retrofitted buses which utilises the available monitoring data. GM is currently working with JAQU to develop and agree a bespoke modelling approach.
- 6.5 Incorporating this revised guidance into the modelling for the GM CAP will have an impact on the baseline scenario underlying all of GM’s modelling work and scheme development to date and, given the large number of retrofitted buses in the region, the impact is likely to be significant.
- 6.6 Notwithstanding these issues the GM authorities are committed to implementing an investment led plan that delivers compliance with the legal limit value in the shortest possible time and by no later than 2026, in accordance with the Direction.
- 6.7 In line with the core objectives of the New GM CAP, as set out at para 2.2, GM is therefore as a matter of priority determining how bus service deployment in 2025 can be targeted to direct lower emitting buses on routes with NO₂ exceedances, and to seek to incorporate this into its modelling.
- 6.8 This is possible as buses are being brought under local control and will be run by Transport for Greater Manchester (TfGM), on behalf of the Greater Manchester Combined Authority (GMCA), in the biggest change to public transport in the city-region in over 30 years.

- 6.9 Under franchising, GMCA will coordinate the bus network and contract bus companies to run the services. This will enable GMCA to develop an integrated, multimodal public transport network that can meet the demands of both passengers and the city-region's economy.
- 6.10 Critically for the GM CAP, it allows Greater Manchester to invest in buses with the confidence that they have control of the strategic delivery. Crucially, franchising allows TfGM to specify the vehicles to be used on the network, meaning lower emitting buses (OEM Euro VI¹⁰ and electric vehicles) may be specified to run on routes with NO₂ exceedances.
- 6.11 The Franchising Scheme applies to the entire Greater Manchester area, which has, in turn, been divided into three franchising scheme 'sub-areas' (namely Franchising Scheme Sub-Areas A, B & C) to allow the transition from the existing deregulated market to a franchised model to take place over a period of time.
- Tranche 1 (Sub-Area A) will principally cover the north-west of Greater Manchester (operational start date of 24 September 2023),
 - Tranche 2 (Sub-Area B) will principally cover the north-east of Greater Manchester (operational start date of no later than 24 March 2024), and
 - Tranche 3 (Sub-Area C) will principally cover the south of Greater Manchester (operational start date of 5 January 2025).
- 6.12 GM is now working to:
- incorporate the revised JAQU guidance into GM's models;
 - work closely with JAQU to develop a bespoke approach to modelling emissions from retrofitted buses, as per JAQU's "Bus Retrofit Update - Additional Technical Guidance for Greater Manchester." This is fundamental to the assessment of a benchmark charging Clean Air Zone scenario, GM's investment-led proposals and additional measures (e.g. locally targeted road traffic management); and
 - determine bus fleet composition and service deployment assumptions for 2025 to incorporate into modelling.

¹⁰ Original Equipment Manufacturer – Euro 6

- 6.13 These tasks will take a significant period of time to complete and means GM is no longer in a position to submit the further evidence it said it would be able to provide at the end of June 2023.
- 6.14 Given that government's programme of work to fully understand the cause(s) of variability on bus retrofit performance is ongoing and due to report in the Autumn¹¹ there is a risk that GM's modelling work or scheme proposals developed in the interim may be undermined by the outcome of that research. This could result in a change of government's understanding of the impacts and potential benefits of bus retrofit.
- 6.15 In addition, government has undertaken further roadside remote emissions of bus performance in Manchester to address their potential concerns about the original study being undertaken in November and December 2022 due to the cold weather conditions. Therefore, the outcomes of this research may materially change government's understanding of bus retrofit. This in turn could lead to additional work, and associated delays, to reflect the outcomes of the research or an increased risk of legal challenge if GM's proposals could be seen as founded on an evidence base that is not accurate or up-to-date.
- 6.16 The Committee is recommended to write to the Secretary of State, setting out the Authorities desire to align the reporting of GM's programme of work with the government's given their interdependency to deal with this unprecedented issue.
- 6.17 An update on progress will be provided at the September meeting of the Committee.

7 Nitrogen Dioxide (NO₂) Monitoring Results 2022

- 7.1 Greater Manchester publishes its Air Quality data annually in June each year via the Air Quality Annual Status Report submitted to DEFRA.
- 7.2 Since 2018, the Greater Manchester Clean Air Plan has been using diffusion tube monitoring equipment to measure roadside levels of NO₂.

¹¹ TfGM is working with the JAQU's science programme to assist in their study on the performance of retrofitted buses

- 7.3 Additional monitoring sites have gradually been added to the diffusion tube network used in the development of the plan, helping to provide a clearer picture of NO₂ levels in Greater Manchester – with almost twice as many monitoring sites in 2022 as there were in 2021.
- 7.4 In 2022, 432 roadside monitoring locations (210 more than in 2021), showed that there were 95 sites of exceedance, a further 108 locations were at risk of exceedance, and this was consistent with the air quality modelling that was used to inform the location of monitoring.
- 7.5 Analysis of the factors influencing pollution emissions and air quality indicate that the concentrations have been affected by:
- An increase in car traffic compared with 2021, and associated congestion although traffic is still below 2019;
 - Differing weather conditions in 2022 compared with 2021, reducing dispersion of pollutants – likely driven by warmer conditions over the year;
 - bus fleet emissions as a result of the impact of the variable performance of the government’s bus retrofit programme, as set out in section 4.
- 7.6 For comparison, of the diffusion tubes that were in place in both 2022 and 2021, the number of exceedances in 2022 was 50 up from 45 in 2021. Full results can be found in Appendix Three.

8 Recommendations

- 8.1 The recommendations are set out at the front of the report.

9 Appendix One – DfT letter to TfGM – 19 April 2023

- 9.1 Attached as a supplementary paper.

10 Appendix Two – Summary of JAQU Bus Emissions Testing

10.1 What testing was undertaken?

- 10.2 Vehicle emissions standards are set against specific driving cycles and test conditions, with an average emission rate to be achieved over the full test cycle (e.g. 15 minutes). This allows for the variation in emissions within this time period, e.g. under acceleration or stop-start conditions and free flowing phases. It is applied to a small group of specific vehicles under laboratory conditions sampling directly from the tailpipe.

- 10.3 The current testing reported by JAQU takes a different approach, by siting equipment at roadside and measuring concentrations from passing vehicles via light backscatter (reflection). This approach enables real-world testing, with a large sample of vehicles (approx. 30% of the GM bus fleet). However, it only captures a limited range of driving conditions occurring over time passing the measurement location.
- 10.4 **What does the testing show?**
- 10.5 This survey identified that genuine Euro V and Euro VI buses were producing emission rates that are consistent with known emissions performance, with relatively low variability between vehicle type (manufacturer, vehicle size). A Euro VI bus reduces NO_x emissions by c90% compared to a Euro V. Both Euro V and Euro VI buses have low proportions on NO_x emitted as NO₂ (or primary NO₂). Primary NO₂ is important because it leads to a greater NO₂ concentration at roadside where air quality standards are measured and apply.
- 10.6 However, emissions from retrofit vehicles varied significantly between vehicles. On average retrofit buses produced limited reduction in emissions from a Euro VI, but measured emissions from specific vehicles varied significantly with some approaching the expected the Euro VI performance, whereas others appear worse than the overall Euro V results. Furthermore, the proportion of primary NO₂ emitted is much greater from retrofitted vehicles.
- 10.7 **What does it mean for the result for GM?**
- 10.8 Over 90% of the non-compliant fleet in GM have been retrofitted as opposed to replaced by a new Euro VI vehicle. These vehicles were fitted and commenced operation during 2021 and 2022. Therefore, the expected improvements in air quality associated with a 90% reduction in bus emissions is unlikely to have occurred. Additionally, because the primary-NO₂ emissions are increased by a retrofit vehicle this could lead to a worsening of air quality despite the overall reduction in bus emissions.
- 10.9 Air quality monitoring for 2022 is consistent with this and has shown a general slight worsening compared to 2021. Whilst there are many factors which influence air pollution concentrations (traffic flows, fleet age/fuel, speeds, weather conditions), it would have been expected that if retrofit buses were performing as expected, improvements could be distinguished in the monitoring data.

11 Appendix Three – Nitrogen Dioxide (NO₂) Monitoring Results 2022

11.1 Why does Greater Manchester monitor Nitrogen Dioxide?

11.2 Greater Manchester undertakes NO₂ monitoring to determine compliance with NO₂ legal limit values in accordance with GM CAP and government Direction and the 10 districts also monitor NO₂ in accordance with the requirements of the Environment Act 1995 and associated statutory guidance, also called Local Air Quality Management or 'LAQM'. The two monitoring regimes have different siting criteria to assess exposure in different types of locations

11.3 What are the legal limit standards for Nitrogen Dioxide?

11.4 The GM CAP monitoring assesses exposure as defined by the Air Quality Standards Regulations (England) 2010 Limit Values, with roadside being typically worst-case and hence the focus for monitoring. The LAQM monitoring is concerned with exposure at locations of relevant public exposure¹² where the Air Quality Objectives apply, which can include the roadside but only in exceptional circumstances. LAQM monitoring also includes measurements at background¹³ and industrial locations and is not limited to road traffic sources.

¹² All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes etc. Kerbside locations are on the whole excluded, unless members of the public are likely to be exposed for longer than the time used to determine the legal limit for the pollutant concerned. Box 1.1 for TG16 give more detail [LAQM-TG16-April-21-v1.pdf \(defra.gov.uk\)](#)

¹³ Background sites are used to provide useful information such as long-term trends, general population exposure and an indication of reduction in pollution away from roadside sources, as opposed to measuring exceedances.

- 11.5 Additionally, the two regimes have different values by which they determine an exceedance. LAQM determines that the legal limit of $40\mu\text{g}/\text{m}^3$ has been exceeded by any result over $39.9\mu\text{g}/\text{m}^3$ ¹⁴, whereas for the GM CAP, JAQU (government's Joint Air Quality Unit,) determine anything over $40.4\mu\text{g}/\text{m}^3$ to be an exceedance¹⁵. These differences in definition should be taken into consideration when comparing the results from individual monitoring locations. There are two legal limits in relation to NO_2 :
- A short-term hourly limit of $200\mu\text{g}/\text{m}^3$ (not to be exceeded more than 18 times a calendar year).
 - The long-term annual average limit of $40\mu\text{g}/\text{m}^3$.
- 11.6 To determine compliance with the NO_2 1-hour mean Air Quality Limit Values, research undertaken on behalf of Defra and outlined in Technical Guidance Note LAQM.TG (16) (Defra, 2021) identified that road traffic emission related exceedances are unlikely to occur where the annual mean concentration is below $60\mu\text{g}/\text{m}^3$.
- 11.7 For the purpose of the GM CAP, the government has directed GM (and other areas) under the Environment Act 1995 to address NO_2 exceedances at the roadside in the shortest possible time. In GM this direction specifically focuses on the long-term annual average legal limit ($40\mu\text{g}/\text{m}^3$).
- 11.8 **How do we monitor Nitrogen Dioxide?**
- 11.9 The GM local authorities carry out air quality monitoring for NO_2 using a combination of:
- Continuous automatic monitoring sites: There are currently 21 continuous air quality monitoring stations, twelve of which are located at the roadside.
 - Diffusion tubes: 436 sites are set up for local air quality management (LAQM) purposes. In addition, approximately 460 sites are set up for GM Clean Air Plan monitoring and evaluation purposes.

¹⁴ An exceedance defines a period of time during which the concentration of a pollutant is greater than, or equal to, the appropriate air quality criteria. For Air Quality Standards, an exceedance is a concentration greater than the Standard value. For Air Pollution Bandings, an exceedance is a concentration greater than, or equal to, the upper band threshold. <https://uk-air.defra.gov.uk/air-pollution/glossary#E>

¹⁵ The IPR guidance underpinning the Air Quality Standards Regulations 2010 stipulates that compliance should be assessed using data of 'the same numeric accuracy' as the limit value, therefore a value of $40.4\mu\text{g}/\text{m}^3$ is rounded down to $40\mu\text{g}/\text{m}^3$ and is not exceeding. https://ec.europa.eu/environment/air/quality/legislation/pdf/IPR_guidance1.pdf

11.10 Monitoring for NO₂ for GM Clean Air Plan purposes uses diffusion tubes at sites where “target determination”¹⁶ modelling predicted illegally high levels of NO₂ for 2021. Three new continuous automatic air quality monitoring stations were in 2022. The GM CAP monitoring campaign was expanded in 2022 to cover all modelled road links in exceedance, aiming to site three diffusion tubes along each road link.

11.11 **What are the results for Nitrogen Dioxide in 2022?**

11.12 Table 1 below summarises NO₂ concentrations and exceedances of the annual mean objective (AMO) across sites set up for local air quality management (LAQM) purposes (automatic and non-automatic) across GM in 2021.

11.13 Maps showing the location of the LAQM monitoring sites are provided on the CleanAirGM Data Hub.

¹⁶ The government’s Joint Air Quality Unit undertook a process called ‘target determination’, which involves comparing the outputs of the local and national modelling, verifying the local modelling methodology and then agreeing the forecast concentration assessment to be compared to the limit value for each exceedance. The outcome of this is an agreement of the NO₂ problem Greater Manchester must resolve (“target determination”) and the basis for the Greater Manchester Clean Air Plan.

Table 1 Summary of LAQM NO₂ monitoring in GM in 2022

Authority	Automatic sites (with valid data capture 2022) ¹⁷	Non-automatic sites	Concentration range (all sites) (µg/m ³)	Exceedances of NO ₂ Annual Mean (non-automatic sites)		Increase / Decrease of Exceedances on Year
				In AQMA	Outside AQMA	
Bolton MBC	1	47	39.7 - 10.7	-	-	-1
Bury MBC	3	20	40.5 - 20.9	1	-	0
Manchester CC	4	40	49.8 - 15.2	4	-	1
Oldham MBC	1	27	47 - 15.4	3	-	1
Rochdale MBC	1	26	36.4 - 12.9	-	-	0
Salford CC	3	49	45.2 - 11.9	3	1	1
Stockport MBC	2	30	36.0 - 6.8	-	-	0
Tameside MBC	2	52	45.9 - 9.8	3	-	1
Trafford MBC	3	18	31.7 - 11.5	-	-	0
Wigan MBC	2	127	45.3 - 12.9	-	1	0
Total	22	436	49.8 - 6.8	14	2	3

11.14 Table 2 shows how the diffusion tube survey has been extended, and new diffusion tube monitoring sites were installed along roads predicted to be in exceedance by the GM CAP target determination modelling process.

¹⁷ >25% (3 months or more) data capture.

Table 2 Number of GM CAP Monitoring Sites

	Number of monitoring Sites				
Authority	2018	2019	2020	2021	2022
Bolton	5	14	14	14	32
Bury	5	16	16	16	36
Manchester	20	91	91	91	160
Oldham	0	9	9	9	19
Rochdale	0	12	12	12	15
Salford	5	27	27	27	60
Stockport	10	19	19	19	47
Tameside	5	14	14	14	32
Trafford	5	14	14	14	18
Wigan	0	6	6	6	13
Total	55	222	222	222	432

11.15 Table 3 below summarises NO₂ concentrations and exceedances of the annual mean across sites set up for GM CAP purposes between 2018 and 2022. Maps showing the location of the GM CAP monitoring sites are provided on the CleanAirGM Data Hub.

Table 3 Number of GM CAP Exceedances

	Number of Exceedances (>40.4µg/m³)				
Authority	2018	2019	2020	2021	2022
Bolton	1	4	1	2	4
Bury	2	10	0	2	6
Manchester	14	65	8	25	49
Oldham	0	5	0	1	5
Rochdale	0	4	1	1	1
Salford	1	16	0	7	13
Stockport	6	15	2	3	8
Tameside	4	6	4	4	8
Trafford	1	3	0	0	0
Wigan	0	1	0	0	1
Total	29	129	16	45	95