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GMCA GREATER MANCHESTER COMBINED AUTHORITY

GREATER MANCHESTER

JOINT CLEAN AIR SCRUTINY COMMITTEE

DATE: **Thursday, 26th September, 2024**

TIME: **10.00 am**

VENUE: **GMCA, Broadhurst House, Tootal Buildings, 56 Oxford Street, Manchester. M1 6EU**

Annual Meeting Agenda

1. Apologies for Absence

2. Appointment of Chair of the Committee for 2024-2025

To seek nominations for the appointment of Chair of the Committee for the 2024/2025 municipal year.

3. Chair's Announcements and Urgent Business

4. Membership of the Committee 2024-2025

To note the membership of the Committee for the Municipal Year 2024-2025 as follows:-

BOLTON	**MANCHESTER**	**ROCHDALE**	**STOCKPORT**	**TRAFFORD**
BURY	**OLDHAM**	**SALFORD**	**TAMESIDE**	**WIGAN**

Please note that this meeting will be livestreamed via www.greatermanchester-ca.gov.uk, please speak to a Governance Officer before the meeting should you not wish to consent to being included in this recording.

Authority	Member	Substitute Member
Bolton	Councillor Martin Donaghy (Labour)	Councillor Shafaqat Shaikh (Labour)
Bury	Councillor Elliot Moss (Labour)	To be advised
Manchester	Councillor Mandie Shilton Godwin (Labour)	To be advised
Oldham	Councillor Graham Shuttleworth (Labour)	Councillor Junaid Hussain (Labour)
Rochdale	Councillor Tom Besford (Labour)	To be advised
Salford	Councillor John Mullen (Labour)	Councillor Stuart Dickman (Labour)
Stockport	Councillor Jake Austin (Lib Dem)	Councillor Jeremy Meal (Lib Dem)
Tameside	Councillor Claire Reid (Labour)	To be advised
Trafford	Councillor Jill Axford (Labour)	To be advised
Wigan	Councillor Christine Roberts (Labour)	Councillor Samantha Brown (Labour)

5. Greater Manchester Joint Clean Air Scrutiny Committee Terms of Reference 1 - 4

To note the Terms of Reference for the Greater Manchester Joint Clean Air Scrutiny Committee.

6. Declarations of Interest 5 - 8

To receive declarations of interest in any item for discussion at the meeting. A blank form for declaring interests has been circulated with the agenda; please ensure that this is returned to the Governance & Scrutiny Officer at least 48 hours in advance of the meeting.

7.	**Minutes**	9 - 22

To consider the approval of the minutes of the previous meeting held on 18th December 2023.

8.	**GM Clean Air Plan - September 2024 Update**	23 - 24

To consider a report of Caroline Simpson, Group Chief Executive, GMCA, GMFRS & TfGM.

8.A	**Appendix A Air Quality Admin Committee GM CAP Update October 24**	25 - 56
8.B	**Appendix 1 Air Quality Modelling Assurance Report**	57 - 74
8.C	**Appendix 2 Appraisal Report**	75 - 204
8.D	**Appendix 4 Supplementary Appraisal Report**	205 - 246

For copies of papers and further information on this meeting please refer to the website www.greatermanchester-ca.gov.uk. Alternatively, contact the following Governance & Scrutiny Officer: paul.harris@greatermanchester-ca.gov.uk

This agenda was issued on Wednesday 18th September 2024 on behalf of Julie Connor, Secretary to the Greater Manchester Combined Authority, Broadhurst House, 56 Oxford Street, Manchester M1 6EU

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Terms of Reference Greater Manchester Joint Clean Air Scrutiny

Portfolio	**Clean Air**
Function/Purpose	The Joint Clean Air Scrutiny Committee ("the Scrutiny Committee") is a joint committee created by the ten Greater Manchester local authorities ("the Constituent Authorities") under section 101(5) of the Local Government Act 1972. The Scrutiny Committee's role and function is as follows: 1. To review or scrutinise decisions made, or other actions taken by the Clean Air Charging Authorities Committee, including decisions delegated by it to officers and sub-committees; 2. To review or scrutinise decisions made, or other actions taken, in relation to the Constituent Authorities' functions, exercised by the Air Quality Administration Committee, including decisions delegated by it to officers and sub-committees; 3. To make reports or recommendations to the Clean Air Charging Authorities Committee or the Air Quality Administration Committee concerning the discharge of their functions;

	4. To Call-In decisions made by the Clean Air Charging Authorities Committee, including decisions delegated by it to officers and sub-committees; 5. To Call-In decisions made, in relation to the Constituent Authorities' functions, exercised by the Air Quality Administration Committee, including decisions delegated by it to officers and sub-committees; 6. To establish formal sub committees or informal task and finish groups if they wish. 7. People who could be called to report to Committee as required: • Members of the Clean Air Charging Authorities Committee or the Air Quality Administration Committee; • Officers exercising delegated functions of the Clean Air Charging Authorities Committee or the Air Quality Administration Committee; must attend meetings of the Scrutiny Committee, if invited, to answer questions. 8. Other people may be invited to attend meetings of the Scrutiny Committee but are not obliged to attend.

Delegations	The Committee shall have power to scrutinise the decisions of the Constituent Authorities (as charging authorities) that must be taken jointly under Part 3 of, and Schedule 12 to, the Transport Act 2000 and any regulations made thereunder, as discharged to the Air Quality Administration Committee and Clean Air Charging Authorities Committee.
Accountability	To make recommendations and/or report to the Air Quality Administration Committee and Clean Air Charging Authorities Committee.
Statutory/Decision Making/Informal/Non-statutory	Non-statutory Any three members of the Scrutiny Committee can call in a decision of the Clean Air Charging Authorities Committee or the Air Quality Administration Committee. If the Scrutiny Committee does Call-In a decision it can: (a) Direct that a decision is not to be implemented while it is under review or scrutiny by the Scrutiny Committee; and (b) Recommend that the decision be reconsidered.
Membership	The membership of the Scrutiny Committee shall be ten, consisting of one member appointed by each of the Constituent Authorities and one member of the Greater Manchester Combined Authority. The Constituent Authorities shall also each nominate a substitute member to attend

	and vote in their stead. Membership must reflect (as far as reasonably practicable) the political balance of the whole GM area.
Appointment of Chair (and Vice Chair)	To be appointed from within its membership at the first meeting.
Quoracy	The quorum shall be two thirds (7 of 10).
Voting	Each member shall have one vote and the Chair shall NOT have a casting vote. Decisions will be taken by a simple majority.
Meeting arrangements	Meetings shall be arranged as required.
Lead contact	Nicola Ward, Statutory Scrutiny Officer, GMCA
Date TOR were approved	18th December 2023

GM Joint Clean Air Scrutiny Committee – 26 September 2024

Declaration of Member's Interests in items appearing on the agenda

NAME: _____

DATE: _____

Minute Item No. / Agenda Item No.	Nature of Interest	Type of Interest
		Personal / Prejudicial / Disclosable Pecuniary
		Personal / Prejudicial / Disclosable Pecuniary
		Personal / Prejudicial / Disclosable Pecuniary
		Personal / Prejudicial / Disclosable Pecuniary
		Personal / Prejudicial / Disclosable Pecuniary
		Personal / Prejudicial / Disclosable Pecuniary

Please see overleaf for a quick guide to declaring interests at GMCA meetings.

QUICK GUIDE TO DECLARING INTERESTS AT GMCA MEETINGS

This is a summary of the rules around declaring interests at meetings. It does not replace the Member's Code of Conduct, the full description can be found in the GMCA's constitution Part 7A.

Your personal interests must be registered on the GMCA's Annual Register within 28 days of your appointment onto a GMCA committee and any changes to these interests must notified within 28 days. Personal interests that should be on the register include:

- Bodies to which you have been appointed by the GMCA
- Your membership of bodies exercising functions of a public nature, including charities, societies, political parties or trade unions.

You are also legally bound to disclose the following information called DISCLOSABLE PERSONAL INTERESTS which includes:

- You, and your partner's business interests (eg employment, trade, profession, contracts, or any company with which you are associated)
- You and your partner's wider financial interests (eg trust funds, investments, and assets including land and property).
- Any sponsorship you receive.

FAILURE TO DISCLOSE THIS INFORMATION IS A CRIMINAL OFFENCE

STEP ONE: ESTABLISH WHETHER YOU HAVE AN INTEREST IN THE BUSINESS OF THE AGENDA

If the answer to that question is 'No' – then that is the end of the matter. If the answer is 'Yes' or Very Likely' then you must go on to consider if that personal interest can be construed as being a prejudicial interest.

STEP TWO: DETERMINING IF YOUR INTEREST PREJUDICIAL?

A personal interest becomes a prejudicial interest:

- where the well being, or financial position of you, your partner, members of your family, or people with whom you have a close association (people who are more than just an acquaintance) are likely to be affected by the business of the meeting more than it would affect most people in the area.
- the interest is one which a member of the public with knowledge of the relevant facts would reasonably regard as so significant that it is likely to prejudice your judgement of the public interest.

FOR A NON PREJUDICIAL INTEREST	FOR PREJUDICIAL INTERESTS
YOU MUST • Notify the governance officer for the meeting as soon as you realise you have an interest	**YOU MUST** • Notify the governance officer for the meeting as soon as you realise you have a prejudicial interest (before or during the meeting)

• Inform the meeting that you have a personal interest and the nature of the interest • Fill in the declarations of interest form **TO NOTE:** • You may remain in the room and speak and vote on the matter • If your interest relates to a body to which the GMCA has appointed you to you only have to inform the meeting of that interest if you speak on the matter.	• Inform the meeting that you have a prejudicial interest and the nature of the interest • Fill in the declarations of interest form • Leave the meeting while that item of business is discussed • Make sure the interest is recorded on your annual register of interests form if it relates to you or your partner's business or financial affairs. If it is not on the Register update it within 28 days of the interest becoming apparent. **YOU MUST NOT**: • participate in any discussion of the business at the meeting, or if you become aware of your disclosable pecuniary interest during the meeting participate further in any discussion of the business, • participate in any vote or further vote taken on the matter at the meeting

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MINUTES OF THE MEETING OF THE GREATER MANCHESTER JOINT CLEAN AIR SCRUTINY COMMITTEE HELD ON 18 DECEMBER 2023, GMCA, BOARDROOM, 56 OXFORD STREET, MANCHESTER M1 6EU

PRESENT:

Councillor Claire Reid	Tameside Council (Chair)
Councillor Kate Taylor	Bolton Council
Councillor Elliot Moss	Bury Council
Councillor Mandie Shilton-Godwin	Manchester City Council
Councillor Graham Shuttleworth	Oldham Council
Councillor Mohammed Arshad	Rochdale Council
Councillor Lisa Smart	Stockport Council
Councillor Ged Carter	Trafford Council
Councillor Christine Roberts	Wigan Council

OFFICERS IN ATTENDANCE:

Eamonn Boylan	Chief Executive, GMCA & Transport for Greater Manchester (TfGM)
Megan Black	Head of Logistics & Environment, TfGM
Gillian Duckworth	GMCA Solicitor and Monitoring Officer
Oliver Fenton	Assistant Governance Officer, GMCA
Jenny Hollamby	Governance & Scrutiny Officer, GMCA
Kate Jackson	Senior Legal Officer, TfGM
Martin Lax	Transport Strategy Director, TfGM
Frank Tudor	Deputy Director Corporate Services, TfGM
Nicola Ward	Statutory Scrutiny Officer, GMCA

OTHERS IN ATTENDANCE:

Councillor Eamonn O'Brien	GMCA Portfolio Holder for Technical Education & Skills and Clean Air
Nigel Bellamy	Technical Director, Air Quality Consultants

JCAS/1/23 WELCOME AND APOLOGIES FOR ABSENCE

Apologies were received and noted from Councillor Martin Donaghy, Councillor John Mullen, and Councillor Jill Axford.

JCAS/2/23 APPOINTMENT OF CHAIR

RESOLVED/-

That Councillor Claire Reid (Tameside Council) be appointed as Chair for the 2023/24 municipal year.

JCAS/3/23 MEMBERSHIP FOR THE 2023/24 MUNICIPAL YEAR

RESOLVED/-

That the Membership for the 2023/24 municipal year be noted as below:

Authority	Member	Substitute Member
Bolton	Councillor Martin Donaghy (Labour)	Councillor Kate Taylor (Labour)
Bury	Councillor Elliot Moss (Labour)	To be advised
Manchester	Councillor Mandie Shilton Godwin (Labour)	To be advised
Oldham	Councillor Graham Shuttleworth (Labour)	Councillor Colin McLaren (Labour)
Rochdale	Councillor Mohammed Arshad (Labour)	Councillor Faisal Rana (Labour)
Salford	Councillor John Mullen (Labour)	Councillor Stuart Dickman (Labour)

Stockport	Councillor Lisa Smart (Liberal Democrat)	Councillor Jeremy Meal (Liberal Democrat)
Tameside	Councillor Claire Reid (Labour)	Councillor Shibley Alam (Labour)
Trafford	Councillor Jill Axford (Labour)	Councillor Ged Carter (Labour)
Wigan	Councillor Christine Roberts (Labour)	Councillor Samantha Brown (Labour)

JCAS/4/23 MEMBERS CODE OF CONDUCT AND ANNUAL DECLARATION FORM

RESOLVED/-

1. That the GMCA's Code of Conduct be noted.
2. That it be noted that all Members be requested to complete an annual register of interest form and return it to the Governance Officer.

JCAS/5/23 TERMS OF REFERENCE AND RULES OF PROCEDURE

Members considered the committee's Terms of Reference and Rules of Procedure, which had been approved by Districts.

In response to a Member's question, it was confirmed that officers would endeavour to ensure that meeting papers were published a week prior to the meeting.

RESOLVED/-

That the committee's Terms of Reference be noted.

JCAS/6/23 CHAIR'S ANNOUNCEMENTS AND URGENT BUSINESS

There were no Chair's announcements or urgent business.

JCAS/7/23 DECLARATIONS OF INTEREST

No declarations of interest were received in relation to any item on the agenda.

JCAS/8/23 SUBMISSION REGARDING THE CLEAN AIR PLAN

Consideration was given to a report, presented by Megan Black, Head of Logistics and Environment, Transport for Greater Manchester (TfGM), which provided an update on the case for a new Greater Manchester Clean Air Plan (the Plan) and confirmed that an appraisal of Greater Manchester's proposed investment-led Plan had been undertaken against a benchmark charging Clean Air Zone (CAZ) in the centre of Manchester and Salford.

Eamonn Boylan, Chief Executive, GMCA & TfGM, thanked the Team for their work to provide a Plan that was fairer for the conurbation and would clean the air, in the shortest possible time (ahead of 2026), through a non-charging investment-led approach. Attention was drawn to the impacts of poor air quality on health, which was the largest environment risk to public health in the UK and how important it was to meet the challenges to improve lives in Greater Manchester. The Plan built upon the Bee Network and the ability to design a system that also delivered quality public transport. Eamonn Boylan, Chief Executive, GMCA & TfGM asked for the committee's comments and questions that would be fed back to the Air Quality Administration Committee, which was the decision-making body at its meeting on 20 December 2023.

The poor air quality in Greater Manchester undeniably exerted a significant impact on the health and wellbeing of its residents and a Member asked why there was no population health assessment and that the population health need for cleaner air be first and foremost. The Member also highlighted that whilst covering the entire region, the Plan had a stronger focus on addressing exceedance sites within the city of Manchester itself, therefore city-centre residents would experience the greatest impact. Officers agreed that prioritising the population's health need for cleaner air was absolutely crucial. The negative impacts of air pollution on public health were

undisputable, ranging from respiratory illnesses and cardiovascular problems to cognitive decline. Moreover, there was a morale duty to clean up the air and to improve lives for some of the poorest communities, who were more exposed to the impacts in Greater Manchester. The equality impact assessment had been considered and been reflected in the Plan, but Officers agreed there could be a stronger emphasis.

A key feature of the Plan to improve air quality was the development of the Bee Network but it was questioned how that was a viable public transport option, which was to inspire behavioural change, when there was so much congestion. Concerns were acknowledged about the role of the Bee Network in tackling congestion and air quality, particularly around Deansgate. The Bee Network aimed to provide a comprehensive, integrated, and reliable transport network across Greater Manchester. Its features like frequency, affordability, and accessible routes had the potential to attract many car users and reduce overall traffic volume. However, congestion remained a complex challenge, working together with Local Authorities (LAs) and advocating for well-rounded solutions would ensure the Plan benefited both public health and the overall wellbeing of the region. The Plan relied heavily on modelling to assess its potential impact on air quality, which further relied on assumptions and data, which might not always perfectly reflect reality. Combining it with evidence, ongoing monitoring and adaptation was crucial for refining the Plan and ensuring its effectiveness in improving air quality for all residents of Greater Manchester.

Members discussed local traffic issues, congestion, and short car journeys that were undoubtedly interconnected topics impacting Greater Manchester and agreed more work was needed. Concerns existed about the accuracy of the modelling, particularly its prediction of localised impacts around specific exceedance points. Congestion around Deansgate and Quay Street in Greater Manchester was a reality and was a complex issue with several facets such as construction and roadworks. A holistic view was being taken and a comprehensive approach was being developed to address congestion in Greater Manchester. Members were assured that a congestion charge would not be proposed. Members asked that continued efforts were required to address the congestion caused by roadworks across Greater

Manchester, whilst also recognising that local measures should also be considered to address the number of short journeys taken by car.

A Member further questioned the modelling, which concentrated on the 12 exceedance sites and whether a forward projection would identify further sites outside the maximum. Attention was also drawn to the A56 in Prestwich, which was a congested area and how it fitted in with exceedances. Modelling had identified further sites and recognised the A56 as a problem area. The Appraisal Report set out what was to be achieved through the wider bus strategy. Ambitions included converting 50% of the bus fleet to zero emission by 2027 and the rest of the fleet by 2032.

Clarity was sought around the bus retrofit programme, given the cost, a Member suggested a more significant impact was achievable if the whole vehicle fleet was retrofitted. Whilst that route was considered, Government had advised that benefit assumptions could not be made meaning, a whole fleet retrofit was not possible at this stage.

The concern raised by a Member regarding the coverage the Plan's taxi initiatives as many were licensed outside of GM was highlighted a longstanding problem. The issue of incentivising cleaner taxis in the Plan was crucial for its success. It was a serious issue for LAs and thought should be given to how support could be provided, and reflection take place on the services offered. However, it was reassuring that the modelled figure said that already 59% of the fleet were registered within Greater Manchester this figure also included Uber drivers.

A Member asked about plans for encompassing other vehicle types such as goods vehicles. Government was reluctant to provide funding to support this vehicular group without a charging zone and Officers would seek further negotiation should it be necessary. Evidence showed that compliance could be achieved without upgrading the HGV fleet at this point. Tackling air pollution necessitated a multi-pronged approach that included addressing emissions from all types of vehicles. However, currently it was about prioritising what would give the biggest impact in the shortest time. In comparison with other polluters, heavy goods vehicles (HGVs)

compared to buses and taxis, were small. Retrofit was unavailable as an effective emissions reduction measure for HGVs.

Addressing modelling uncertainty was crucial for building trust and ensuring the Plan's effectiveness. Air quality modelling inherently involved complexities and uncertainties. Members sought assurances that the modelling undertaken had been done so far through the best currently available data. However, recognised there remained a number of variable factors in relation to behaviour change so there would always be some uncertainty regarding a forecasted position.

A Member asked if park and ride with free public transport to the city-centre could be used in certain areas such as A602 to M60, A580 and Regent Road to address traffic congestion and to avoid longer journeys for passengers at rush hour. Motorways were exempt from Clean Air Plans but acknowledged the impact of emissions from motorways and were actively seeking collaboration with National Highways on innovative interventions such as park and ride and speed limit controls to tackle air pollution holistically.

A significant concern was expressed that the motorway network remained out of scope for data collection and resulting air quality interventions.

It was suggested that there was not enough EV charging infrastructure especially for high-speed charging points. Installation of rapid charging points had been challenging due to cost and grid connectivity issues, which would include roadworks therefore causing disruption. Whilst, expanding the rapid charging infrastructure, focus had been on increasing EV charging in especially in the city-centre core and for taxi operators. Again, it was a question of priorities and resulting in the most significant impacts.

A Member asked about the Automatic Number Plate Recognition (ANPR) cameras, how many there were in total, and whether any impact to civil liberties be considered should the Plan be accepted. It was clarified that in 2021, 870 cameras were planned across Greater Manchester, and in January 2022 when the scheme was put under review, 462 of those cameras had been installed and remained on pause. The

cameras were there to monitor air quality primarily and were already feeding into assumptions and modelling. If the Government's proposed charging plan was not implemented, those cameras that could be removed would, and if they could be repurposed, discussions would take place with government and the police. A public consultation would be needed, and civil liberties addressed at the relevant stage. The Member further asked how many cameras there would be, if the Investment-led Plan was accepted, it was clarified that circa 70 cameras would be needed.

The Member suggested and the committee agreed that a further recommendation be added to the report that an independent review into the lessons learnt from the CAZ (Clean Air Zone) process take place in due course, with a focus on how LAs, the GMCA and government could work more effectively together.

A Member highlighted that the Investment-led Plan would require an additional £22.9 million and if that was not provided by Government, where would it come from. The Plan proposed offered government a valuable opportunity to address air quality concerns quickly, at less cost, and improve the overall wellbeing of residents in Greater Manchester and beyond. Members agreed that the GMCA should be clear with the public of the overall cost of developing, implementing, and decommissioning the CAZ from the outset in order to build public trust for the proposed investment-led approach.

Members discussed the role of enforcement on speed-limited highways and agreed that the GMCA should continue to lobby for additional powers to enforce antisocial behaviour, dangerous driving, and speed exceedances on Greater Manchester's road network in support of the proposed city-centre interventions. There was a clear role for Greater Manchester's Bee Network to continue to engage with GMP and lobby the Department for Transport for additional enforcement powers.

In response to a question about confidence in the Plan to deliver and lessons learned from the bus retrofit programme it was essential to consider the Plan's multifaceted approach and potential for significant improvements. Whilst there were other types of bus technologies available, electric was seen as the future in Greater Manchester given its proven reliability. Zero emission was the ambition and

reference was made to the investment at Stockport Interchange, which aligned with the ambition to electrify public transport and upgrading the depot infrastructure to accommodate electric buses, including charging facilities. Also seen as important and as part of the multifaceted approach (along with bus reform) was the Clean Taxi Fund and local road measures addressing traffic hotspots and congestion. The success of the Plan hinged on the effective implementation of all its solutions working in synergy.

To send a clear message to residents to show their voice had been heard, it was suggested that the CAZ signage be removed. However, this was dependent on when government responded to GM's proposal.

A Member was concerned that the Plan's measures for cleaner taxis might not be sufficient. A number of scenarios had been modelled, the offer was attractive and helped people make changes. It was acknowledged that taxis were a business and financial feasibility was crucial for designing practical and sustainable solutions. The Plan's intention was to offer the most possible support for taxi operators in transitioning to cleaner options, which would need collaboration and trust.

It was suggested that partners could leverage the power of collaboration to address construction work and roadworks in a way that minimised disruption, optimised efficiency, and contributed to a smoother and more sustainable transportation system for Greater Manchester. TfGM was looking at lane rental power should they be granted, and it was acknowledged that co-ordination between partners could be improved. However, unplanned roadworks would always be challenging.

A Member asked that construction and roadwork issues were addressed from a Greater Manchester perspective and all partners work together.

It was suggested and Members agreed that the Greater Manchester Joint Clean Air Scrutiny Committee continued to keep a watching brief on this agenda as it moved forward.

RESOLVED/-

1. That it be noted that the Greater Manchester Joint Clean Air Scrutiny Committee considered and commented on the report and noted the recommendations which would be considered by the Air Quality Administration Committee at its meeting on 20 December 2023:
   a) Note the latest position with the government's National Bus Retrofit.
   b) Note modelling results now evidence that Greater Manchester's proposed investment-led Plan (the Investment-led Plan) can achieve compliance with legal limits of NO_2 concentrations in 2025 and that compliance is not achieved in either 2025 or 2026 under a benchmark charging CAZ C in the centre of Manchester and Salford.
   c) Note whilst it is for the government to determine what measures Greater Manchester is to implement, the appraisal shows that only the Investment-led Plan complies with the requirement placed on the 10 Greater Manchester Authorities to deliver compliance in the shortest possible time and by 2026 at the latest.
   d) Note bus measures represent the most important mechanism for reducing exceedances under the Investment-led Plan and are grounded in the ability of Greater Manchester to control the emissions standards of vehicles operating on key routes having introduced a bus franchising scheme.
   e) Note the Investment-led Plan seeks to use £51.2 million of funds already awarded to purchase 64 Zero Emission Buses (ZEBs) and to fund the costs for the electrification required on Piccadilly Approach, and at Bolton, Queens Road, and Middleton depots.
   f) Note taxi measures represent an important mechanism for reducing exceedances under the Investment-led Plan and Greater Manchester wants to offer £30.5 million of already awarded funding to support upgrades to help the Greater Manchester licensed hackney carriage and private hire trade upgrade to cleaner vehicles (the Clean Taxi Fund).
   g) Note that an emissions standard, requiring licensed hackney carriages (hackneys) and private hire vehicles (PHVs) to be a minimum of Euro 6

(diesel) or Euro 4 (petrol) by 31st December 2025, needs to have been adopted by all Greater Manchester Authorities to secure compliance with legal limits in 2025.

h) Recommend that each Greater Manchester Authority puts appropriate arrangements in place to facilitate a transitional start date for the implementation of emission standards by the 1 January 2025 with the end transition date being the 31 December 2025.

i) Note that the Investment-led Plan proposes taxi funding being issued directly to applicants, subject to meeting the relevant criteria and production of relevant evidence.

j) Note the Investment-led Plan seeks to use £5 million of funds already awarded to deliver targeted local measures to reduce NO_2 exceedance concentrations at Regent Road (Salford), Quay Street and Great Bridgewater Street (Manchester) sites.

k) Note that funding awarded by government to help van, minibus, coach, HGV owners upgrade and mitigate against the economic impact of a Greater Manchester-wide Category C charging CAZ that has not been committed would be redistributed under Greater Manchester's Investment-led Plan.

l) Agree that the funding for HGVs should be closed to new applicants and applicants that have an existing funding award should be given to 1st January 2025 to spend the committed funding.

m) Note that from an equality impacts perspective, the Investment-led Plan would deliver an air quality improvement that benefits individuals with protected characteristics. An air quality improvement is likely to be faster for the Investment-led Plan than a benchmark CAZ due to the former achieving compliance earlier.

n) Request that the government gives urgent consideration to agreement to the removal of the 1309 signs installed for a Greater Manchester-wide category C charging CAZ across Greater Manchester and its boundary Authorities, as the appraisal shows that only the Investment-led Plan meets the legal requirement to deliver compliance in the shortest possible time and by 2026 at the latest and therefore the signs are no longer required.

o) Note the Investment-led Plan would require an additional £22.9m of funding versus £56m for a benchmark CAZ when considering whole life costs.

p) Agree a delegation is made to the Chief Executive, GMCA and TfGM, in consultation with the Greater Manchester Clean Air Lead to approve the final submission of material to the government's Joint Air Quality Unit and deal with any supplementary requests from the Joint Air Quality Unit in support of the appraisal.

2. That it be noted that the population health need for cleaner air be first and foremost.
3. That it be noted that Members sought assurances that the modelling undertaken had been done so far through the best currently available data. However, there remained a number of variable factors in relation to behaviour change so there would always be some uncertainty regarding a forecasted position.
4. That it be noted that continued efforts were required to address the congestion caused by roadworks across Greater Manchester whilst also recognising that local measures should also be considered to address the number of short journeys taken by car.
5. That it be noted that the GMCA should continue to lobby government for additional powers to enforce antisocial behaviour, dangerous driving, and speed exceedances on the Greater Manchester road network in support of the proposed city-centre interventions.
6. That it be noted that the GMCA should be clear with the public of the overall cost of developing, implementing, and decommissioning the Plan from the outset in order to build public trust for the proposed investment-led approach.
7. That an independent review into the lessons learnt from the CAZ process take place in due course, with a focus on how LAs, the GMCA and government could work more effectively together.
8. That the Greater Manchester Clean Air Scrutiny Committee continue to keep a watching brief on this agenda as it moved forward.

JCAS/9/23 GREATER MANCHESTER CLEAN AIR PLAN – EXPENDITURE UPDATE

A report was presented by Megan Black, Head of Logistics and Environment, TfGM, which provided an update on the funding received from government, the expenditure made and the funding requirements that have emerged as the new Plan was developed to the end of November 2023.

RESOLVED/-

1. The Greater Manchester Joint Clean Air Scrutiny Committee is requested to consider and comment on the report and note the recommendations which will be considered by the Quality Administration Committee at their meeting on the 20 December 2023:
   a) Note this paper provides further details on the aggregate spend following on from the "GM Clean Air Plan – Expenditure Update" dated 26 October 2022 which provided spend to the end of September 2022;
   b) Note the funding received from Government, the expenditure made and the funding requirements that have emerged as the Greater Manchester Clean Air Plan has been developed;
   c) Note an additional £8.2 million of forecast expenditure, for the FY 2023/24, requires funding from JAQU and is subject of an additional funding request to cover the ongoing case development work as well as the operational costs for the Clean Air Zone and Financial Support Scheme;
   d) Note that TfGM and JAQU reached an agreement in Q4 2022/23 over the funding required to fund the continued development of the Greater Manchester Clean Air Plan to fill the gap that would have been covered by the CAZ revenues and £12.2 million was provided to fund that shortfall and covered the period up to 31st March 2023.

e) Note that TfGM is unable to materially change or terminate the contracts that have been put in place for the delivery of a charging Clean Air Zone or the delivery of the Financial Support Scheme, until a formal decision is received from the government.

JCAS/10/23 DATE AND TIME OF FUTURE MEETINGS

The Chair thanked Members and Officers for the contributions at today's meeting. The Chair would report Members feedback to the Clean Air Administration Committee on 20 December 2023.

RESOLVED/-

To be arranged as and when required in accordance with the committee's Terms of Reference and Rules of Procedure.

GMCA GREATER MANCHESTER COMBINED AUTHORITY

GM Clean Air Scrutiny Committee

Date: 26th September 2024

Subject: Greater Manchester Clean Air Plan – September 2024

Report of: Caroline Simpson, Group Chief Executive, GMCA, GMFRS & TfGM

PURPOSE OF REPORT:

The Air Quality Administration Committee will consider a report at its meeting on 1 October 2024.

The AQAC Report – September 2024 Update – provides an update on the Case for a new Greater Manchester Clean Air Plan and confirms that an updated appraisal of GM's proposed Investment-led Plan has been undertaken against a benchmark charging Clean Air Zone (CAZ) in the centre of Manchester and Salford.

To support the Scrutiny Committee there will be a summary presentation at the meeting to take them through the detail of the material.

RECOMMENDATIONS:

Members are asked to:

1. To review the report prior to consideration by the Air Quality Administration Committee.

CONTACT OFFICERS:

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GM Air Quality Administration Committee

Date: 1 October 2024

Subject: GM Clean Air Plan – September 2024 Update

Report of: Cllr Eamonn O'Brien – GM Clean Air Lead

Purpose of Report

This report provides an update on the Case for a new Greater Manchester Clean Air Plan and confirms that an updated appraisal of GM's proposed Investment-led Plan has been undertaken against a benchmark charging Clean Air Zone (CAZ) in the centre of Manchester and Salford.

Recommendations:

The Air Quality Administration Committee is requested to:

1. Note the factors which have resulted in material updates to baseline modelling scenarios and the need to re-submit an appraisal of GM Investment-led Clean Air Plan.
2. Note the update to the modelling does not alter the conclusion of GM's December 2023 Submission that GM's Investment-led Plan performs better than the CAZ Benchmark.
3. Note that the revised Investment-led Plan, given the delay to the electrification of Queens Road depot and the removal of the temporary speed limit on the M602, will deliver compliance in the shortest possible time and by 2026 at the latest.
4. Note the update to GM's proposed bus measures that are grounded in the ability of GM to control the emissions standards of vehicles operating on key routes having introduced a bus franchising scheme.
5. Note that taxi measures remain unchanged.
6. Note the progress to put an emission standard in place for licensed taxis.
7. Note the progress to determine highway measures to ensure compliance at Regent Road and Quay Street.

8. Note that from an equality impacts perspective, the Investment-led Plan would deliver an air quality improvement that benefits individuals with protected characteristics. An air quality improvement is likely to be faster for the Investment-led Plan than a CAZ Benchmark due to the former achieving compliance earlier.
9. Request that the government gives urgent consideration to agreement to the removal of the 1309 signs installed for a GM-wide category C charging Clean Air Zone across GM and its boundary Authorities, as the appraisal shows that only the Investment-led Plan meets the legal requirement to deliver compliance in the shortest possible time and by 2026 at the latest and therefore the signs are no longer required.
10. Note the Investment-led Plan would require an estimated additional £15.2 million of funding versus £61.9 million for a CAZ Benchmark when considering whole life costs.
11. Note that Local Partnerships have been asked by JAQU to review the Investment-led Plan aspects of the GM Appraisal Report (and relevant annexes), focusing on the commercial, financial and management elements.
12. Agree a delegation is made to the Group Chief Executive, GMCA, GMFRS and TfGM, in consultation with the GM Clean Air Lead to approve the final submission of material to the Government's Joint Air Quality Unit and deal with any supplementary requests from the Joint Air Quality Unit in support of the appraisal.
13. Note the 2023 GM Clean Air Plan monitoring data indicates that nitrogen dioxide air pollution has seen an overall reduction in nitrogen dioxide exceedances compared to 2022, and a significant improvement to 2019 levels.

Contact Officers

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Equalities Impact, Carbon and Sustainability Assessment:

The GM Clean Air Plan is a place-based solution to tackle roadside NO_2 which will have a positive impact on carbon.

Risk Management

Risks as set out in sections 5.8 and 6.6 of Appendix Two – Appraisal Report.

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 NO_2 is achieved in the shortest possible time and by no later than 2026; and
- exposure to levels above the legal limit for NO_2 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 NO_2 in the shortest possible time and by 2024 at the latest.

Financial Consequences – Revenue

Financial consequences set out in section 8 of this report and sections 5.6 and 6.4 of Appendix Two – Appraisal Report, with all development and delivery costs to be covered by central government.

Financial Consequences – Capital

Financial consequences set out in section 8 of this report and sections 5.6 and 6.4 of Appendix Two – Appraisal Report, 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

- 20 December 2023, Report to AQAC: GM Clean Air Plan – December 2023 Update
- 20 December 2023: Report to AQAC: GM Clean Air Plan – Expenditure Update
- 13 July 2023, Report to AQAC: GM Clean Air Plan – July 2023 Update
- 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 2021, report to AQAC: GM Clean Air Plan – Clean Air Zone: Camera and Sign Installation
- 21 September 2021, 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 July 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

GM Clean Air Scrutiny Committee – To be considered at meeting on 26 September 2024, Scrutiny committee comments will be provided by a verbal update.

1 Background

1.1 The government has instructed many local authorities across the UK to take quick action to reduce harmful Nitrogen Dioxide (NO_2) 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 NO_2 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 test[1].

1.3 The GM CAP is a package of measures to deliver NO_2 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
- A clear instruction to Highways England[2] to implement measures which deliver compliance with legal limits for NO_2 on the strategic road network, for which they are responsible, in the shortest possible time[3].

1.5 The GMCA Clean Air Update report of 29 May 2020[2] 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

[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)
[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.

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 2021[4] 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 was 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.

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.

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

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 suggested that with the approved 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 NO_2 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.

1.19 On 13 July 2023, the Air Quality Administration Committee noted the developments in relation to the government's National Bus Retrofit Programme and that government had commenced a six-month focused research programme to quickly investigate the causes of poor bus retrofit performance and scope how performance can be improved. The committee agreed 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 and the implications for the GM CAP. They also heard that GM CAP monitoring data indicated that air pollution had increased compared with 2021 but was below levels recorded pre-pandemic in 2019. Analysis of the factors influencing pollution emissions and air quality indicated that the concentrations had been affected by performance of the bus Retrofit Programme.

1.20 On 20 December 2023, the Air Quality Administration Committee agreed a delegation for the Chief Executive, GMCA and TfGM to submit the Case for a new Greater Manchester Clean Air Plan to the Secretary of State and confirming that an appraisal of GM's proposed Investment-led Plan had been undertaken against a benchmark charging CAZ in the centre of Manchester and Salford. GM's evidence showed that the investment-led, non-charging plan could achieve compliance in 2025. The committee further requested that government give urgent consideration to agreement to the removal of the 1309 signs installed for a GM-wide category C charging Clean Air Zone across GM and its boundary Authorities, as the appraisal showed that only the Investment-led Plan met the legal requirement to deliver compliance in the shortest possible time and by 2026 at the latest and therefore the signs were no longer required.

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 NO_2 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 NO_2 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 NO_2 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's[5] core objectives.

2.3 The 'Case for a new Greater Manchester Clean Air Plan' therefore proposed using the £123 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.

3 National Bus Retrofit Programme Update

3.1 In April 2023 the government advised that it was to pause any new spending on bus retrofit as they had evidence that bus retrofit solutions that have been fitted have poor and highly variable performance in real world conditions. Government commenced a research programme to investigate the causes of this poor performance and scope how performance can be improved.

3.2 The findings of that investigation were published on 12 September in 'The effectiveness of retrofitting selective catalytic reduction technology on to buses' report [6].

3.3 This report confirms the early findings that bus retrofit performance is highly variable and is not overall delivering the anticipated emissions improvements, but there are opportunities to improve performance via better maintenance.

3.4 Government have confirmed that the earlier pause to further central Government funding for bus retrofit will become permanent and closure of clean vehicle retrofit accreditation scheme to new technology. For those with active charging clean air zones, advice has been issued regarding provision of valid telematics data to remain on the accreditation list that allows free entry into Clean Air Zones.

3.5 The release of the report does not affect the Greater Manchester Clean Air Plan submission outlined in this report, as the modelling baseline has been revised in line with the JAQU guidance issued in May 2023[7], which was to assume no air quality benefit from a retrofitted bus.

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[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.

[6] The effectiveness of retrofitting selective catalytic reduction technology on to buses - GOV.UK (www.gov.uk)

[7] JAQU, Bus Retrofit Update - Technical Guidance for Local Authorities, May 2023

4 Key Developments Since December 2023 Submission

4.1 Having submitted the Case for a New Clean Air Plan in December 2023, GM has been in dialogue with the Joint Air Quality Unit (JAQU) to explain the need to update the submission. The update is in response to some issues that have emerged since the December 2023 submission.

4.2 Firstly, it was assumed in December 2023 that the new Stockport depot would operate Zero Emission Buses from Autumn 2025 as part of the Zero Emission Bus Regional Areas (ZEBRA) 1 project, and we noted a risk of non-compliance if the project was delayed.

4.3 Construction of the new Stockport all-electric bus depot has been delayed, but GMCA/TfGM are committed to having an all-electric bus depot / fleet in Stockport. Stockport and TfGM officers continue to work closely to deliver the new Zero Emission Bus fleet / depot in Stockport.

4.4 Also, when preparing for the sensitivity testing of the modelling results, TfGM found an issue in emissions modelling which has now been corrected. A formula in the modelling tool had not been updated to reflect the government's changed guidance on the performance of its bus retrofit programme. This means that the model outputs underestimated the amount of primary nitrogen dioxide and therefore the predicted NO_2 concentrations that we reported in the December 2023 submission.

4.5 TfGM has reviewed the modelling processes, to consider any weaknesses in the process, to strengthen the Quality Assurance process for these steps and to identify the checking/reviewing process. TfGM's Audit & Assurance Team have also audited the quality assurance process in place for producing the Clean Air Plan modelling outputs. Further details are provided in Appendix One.

4.6 The baseline position for modelling has been updated to ensure that it is consistent with the latest operational bus deployment patterns, service requirements and objectives of the bus franchising scheme. A strategy has been developed to place the 170 ZEBRA vehicles, planned for the Stockport all-electric bus depot, at other Bus Franchising depots to allow TfGM and GM to use the ZEBRA fleet as soon as possible, along with including new OEM Euro VI vehicles ordered to meet Tranche 3 operational needs, that were not assumed in the December 2023 submission.

4.7 This showed that to reach compliance in 2025, GM needed to change the operational fleet deployment to make sure OEM Euro VI or Zero Emission Buses are used in the areas where the modelled limits are exceeded. TfGM reran the modelling for the Investment-led Plan which showed that compliance could be achieved in 2025. Subsequent developments have demonstrated that compliance is now not likely to be delivered until 2026, and these issues are summarised in section 8.

4.8 This report sets out below the revised Do Minimum air quality position and summarises the updates made to the appraisal of the Investment-led Plan and the CAZ Benchmark in their ability to deliver compliance with the legal limit value in the shortest possible time.

5 The Do Minimum Position

5.1 The GM CAP is underpinned by an evidence base derived from data collection, research, analysis and modelling. Throughout the technical development process from 2017 to date, GM has used best practice methodology and assumptions and worked closely with Government, including, for example, by delivering updates to incorporate the impacts of Covid-19 to the GM CAP in accordance with national guidance.

5.2 The GM modelling approach has been developed and agreed with JAQU. The purpose of the modelling process is to quantify the impact of traffic by vehicle type on emissions and consequently on concentrations of NO_2 at the roadside in GM.

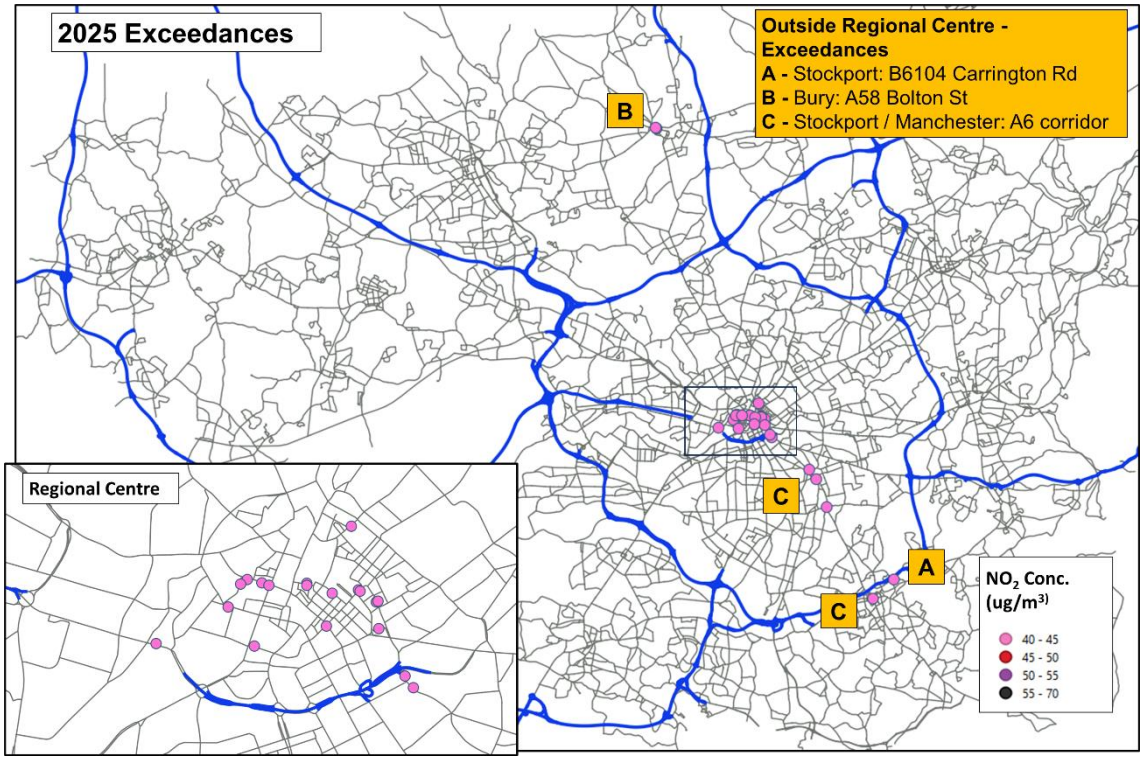
5.3 The Do Minimum air quality assessment determines the revised air quality position forecast in 2025 and 2026 following changes to the Do Minimum in line with relevant guidance and assumptions agreed with Government.

5.4 The Do Minimum modelling baseline has been updated. The following changes have been made to the Do Minimum modelling since December 2023 – further detail of these changes are set out in section 3 of Appendix One:

- Changes to fleet electrification;
- Changes to bus retrofit assumptions and programme;
- Changes to ZEBRA scheme (Stockport);
- Changes to bus service patterns;
- Updates to CCTS schemes; and
- Correction to modelling emission values.

5.5 There are 26 NO_2 exceedance sites modelled to remain without action in the updated Do Minimum in 2025. Spatially there is a grouping of exceedances in the regional centre. Outside the regional centre, 2 exceedance points are located at the A58 Bolton Road, Bury, four are located along the 192 bus corridor on the A6 between Stockport and the Regional Centre, with 1 site at the B6104 Carrington Rd, Stockport on the 325 route.

5.6 The figure below shows the spatial distribution of the 26 NO_2 exceedance sites modelled to remain without action in the updated Do Minimum in 2025.



5.7 The revised Do Minimum baseline position shows that the 26 exceedance sites predicted in 2025 without action reduces to 17 in 2026. The spatial distribution of these exceedance sites is consistent with earlier iterations of the modelling with a high concentration of sites within the Regional Centre as well as 192 bus corridor on the A6 between Stockport and the Regional Centre, with 1 site at the B6104 Carrington Rd, Stockport on the 325 route, due to the Stockport depot delay.

6 The Investment-led Plan

6.1 The Investment-led Plan was developed to target action at the 26 exceedance sites predicted in 2025.

6.2 In the light of the issues that have emerged since December 2023, targeted investment in zero-emission buses and taxis remains the most effective means to achieve compliance under an investment-led scenario. This will be supplemented by local highway-based measures at known persistent exceedance locations at Regent Road and around Quay Street.

6.3 **Bus investment** still represents the most important mechanism for reducing exceedances under the Investment-led Plan and is grounded in the ability of TfGM to operate a bus franchising scheme. TfGM is responsible for operating bus franchising on behalf of the GMCA and has the authority to manage franchise agreements in respect of local services, including the specification of fleet requirements and deployment.

6.4 The delivery of bus franchising is underway with the first phase (Tranche one) live as of September 2023 and the second phase (Tranche two) live as of March 2024. The implementation of bus funding across the region is being delivered in three tranches:

- Tranche one (24th September 2023) – covering Bolton, Wigan and parts of Salford and Bury.
- Tranche two (24th March 2024) – covering Oldham, Rochdale and parts of Bury, Salford and north Manchester.
- Tranche three (5th January 2025) – covering Stockport, Tameside, Trafford and the remaining parts of Manchester and Salford.

6.5 Based on the level of exceedance at each GM site in 2025 and the frequency of bus services that pass the exceedance sites, the proportion of Original Equipment Manufacturer (OEM) Euro VIs and ZEBs required to achieve compliance was recalculated. Deployment of sufficient existing OEM Euro VI and ZEBs at the 26 exceedance locations predicted in 2025 would result in 3 remaining exceedance sites in 2025: A57 Regent Road (Salford), A34 Quay Street and Great Bridgewater Street (Manchester).

6.6 Planned and operational changes from franchise operators were reviewed and incorporated, along with deployment patterns, service requirements and TfGM's depot electrification programme. Based on the vehicle requirement to operate services past exceedance sites, a further 40 buses operating from Bolton depot would have to be upgraded to ZEBs, along with the depot electric charging infrastructure. 73 ZEBs are required to operate from Queens Road depot. Funding is not required for the ZEBs at Queens Road as they will be provided by the committed franchising funding from CRSTS, however funding is required for the depot electric charging infrastructure. These upgrades are in addition to the ZEBs which have been committed as part of the bus franchising scheme.

6.7 From a deliverability perspective, the ability to operate the ZEBs is dependent on there being adequate supporting electric vehicle charging infrastructure at depots to operate these services. GM has undertaken analysis to determine this requirement which is summarised below.

6.8 To meet the ZEB service requirements at exceedance sites, depot upgrades are required to support the higher provision of electric vehicles across 3 sites. They are: Bolton, Queens Road, and Manchester Piccadilly. The scale of upgrade varies by depot based on the current provision of electric charging infrastructure to support the existing franchised operation.

6.9 It has been determined that there are a number of exceedance sites located in the Regional Centre and along the A6 corridor to Stockport, as well as B6104 Carrington Road (Stockport) which can achieve compliance through 77 buses upgraded to OEM Euro VI.

6.10 In summary, the Investment-led Plan involves bus investment of £51.1 million, comprising:

- £23.76 million to purchase 40 ZEBs; and
- £17.84 million for the electrification required on Piccadilly Approach, and at Bolton and Queens Road depots.
- £8.4 million for the franchising costs for 77 OEM Euro VI buses; and
- £1.13 million for the operational costs for moving services out of Bolton.

6.11 **Taxi measures** represent an important mechanism for reducing exceedances under the Investment-led Plan and are grounded in the ability of the GM authorities to reduce emissions through licensing conditions.

6.12 **There is no change to the Taxi measures set out in the December 2023 submission.**

6.13 The appraisal of the Investment-led Plan has been developed on the basis that an emissions standard, requiring licensed hackneys and PHVs to be a minimum of Euro 6 (diesel) or Euro 4 (petrol) by 31st December 2025, will have been adopted by all GM Authorities. A transitional start date for the implementation of emission standards by the 1st January 2025 is assumed and, recognising that taxi licensing renewals occur annually across the calendar year, it is assumed that the end transition date for the implementation of emission standards across the 10 local authorities will be the 31st December 2025.

6.14 By 2026, it is therefore assumed that 100% of the GM taxi fleet[8] will be compliant with the emission standards. It is intended that the Clean Taxi Fund will support this by opening before 2025 enabling earlier upgrades, and helping to mitigate against the risk of taxis re-licensing with another authority that does not have the same emission standard.

6.15 A Clean Taxi Fund (CTF) of £30.5m is proposed to offer funding to support upgrades of taxis to cleaner vehicles through two routes. These are:

- Core Taxi Fund of £22.5m – based on the 2021 GM CAP Policy, the funding is eligible to non-compliant, GM-licensed hackneys and PHVs. The financial support has been uplifted with inflation, with an associated air quality benefit derived from minimum emission standards across the 10 GM Authorities.

[8] There are currently approximately 13,750 GM Licensed taxis (hackneys/PHVs) based in GM. For non-compliant Hackneys, 96% are Wheelchair Accessible Vehicles (WAV) compared to 6% WAVs for PHVs; and in addition to the GM licensed fleet, there are approximately 41% out-of-area PHVs licensed to an authority outside of GM, though with a resident address in GM. The majority are licensed to Wolverhampton.

- Electric Hackney Upgrade Fund of £7.9m – based on the Bradford scheme[9] and feedback received during GM's Participatory Policy Development[10], the funding is available to compliant Internal Combustion Engine (ICE) hackneys and seeks to support upgrades to the cleanest vehicle type whilst taking into account feedback from the Participatory Policy Development approach (PPD), conducted between August and November 2022[11].

6.16 The taxi measures set out above are required to achieve compliance at the A57 Regent Road in 2025, because the bus and traffic management measures are not sufficient. Taxi upgrades also provide additional resilience to the GM CAP at the last points of modelled exceedance, on roads where poor air quality could occur and future additional refinements to buses services and fleet are not an option in the performance management phase. The opening of the taxi funds in 2024 would also enable early upgrade of taxi fleet, reducing exposure as quickly as possible.

6.17 The proposed funding levels and eligibility criteria for hackneys and PHVs are outlined in section 5.3 of Appendix Two. Note: The date of eligibility to access the proposed fund aligns to the date of this report – 1 October 2024.

6.18 The latest position on the adoption of an emission standard is: Eight of the ten GM Authorities have already taken the necessary steps to adopt the aligned taxi emission standards with governance routes agreed for the two remaining authorities (Bolton and Rochdale).

6.19 **Targeted Local Traffic Management Measures** – a series of targeted local traffic management measures are proposed to reduce NO_2 exceedance concentrations at Regent Road (Salford) and Quay Street (Manchester) sites. These locations were identified during GM's prior work to develop the investment-led measures, based on the modelling undertaken, which forecast that there would be two remaining exceedance sites at Regent Road and Quay Street.

6.20 Whilst the modelling baseline has been updated, including the application of the JAQU standard guidance to assume no air quality benefit from a retrofitted bus, the local measures at Regent Road and Quay Street were modelled to be effective and necessary for reducing NO_2 concentrations at these locations and therefore considered appropriate to include as part of the Investment-led Plan.

6.21 The £5m package of targeted local measures can be summarised into two schemes:

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[9] Bradford Council, who operate a Category C charging Clean Air Zone, have launched an additional fund to support Bradford-licensed Hackneys to upgrade to fully electric. The fund is open to owners of Bradford which are already classed as compliant with minimum emissions standards.

[10] Participatory Policy Development - Summary of Stakeholder Engagement Report Page 14, point 8

[11] GM leaders committed to a participatory approach to the development of the new Plan to ensure that GM's proposals are well-grounded in evidence in terms of the circumstances of affected groups and possible impacts of the Plan on them, and therefore the deliverability and effectiveness of that Plan – outputs reported to AQAC February 2023.

6.22 Regent Road – A57

- Signal optimisation at A57 Regent Road and adjacent parallel routes - Signal timing adjustment to A57 Regent Road green times applied at the junctions of A57 Regent Road / Oldfield Road and M602 J3 West arm approach to the junction. Supplementary adjustments are to be applied to parallel routes, namely: Oldfield Road / Middlewood Street, Ordsall Lane / Middlewood Street / Hampson Street and Hampson Street / Trinity Way. These adjustments will improve the flow of traffic to reduce the level of congestion and therefore improve emissions.
- Speed reductions on A57 Regent Road with supporting enforcement measures - Implementation of a speed reduction from 40mph to 30mph on A57 Regent Road between Oldfield Road and M602 - By implementing these speed reductions, traffic flow will become steadier as a result of reducing unnecessary accelerations and decelerations, leading to a reduction of emissions.
- Yellow box enforcement along the A57 Regent Road corridor - Implementation of enforcement measures for incursions into existing yellow box junctions along the A57 Regent Road corridor are planned as a supporting measure to achieve compliance in 2025.

6.23 St John's Area, Manchester

- Implementing measures to reduce through traffic on Gartside Street, Lower Byrom Street, Great John Street and Atherton Street will reduce through and turning traffic on Quay Street.

6.24 Further information on GM's Investment-led Plan local traffic measures at the exceedance site located at A57 Regent Road, can be found in section 5.4 of the Appraisal report in Appendix Two.

6.25 Following the December 2023 submission, GM has worked closely with Manchester City Council, taking into account wider highway improvement works associated with the City Centre Transport Strategy[12], to identify a locally-deliverable scheme which would replicate the modelled test in emissions terms and achieve forecast compliance. A scheme has been identified which complements the objectives of the wider City Centre Transport Strategy (CCTS) and local plans for the regional centre[13], subject to consultation.

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12 https://assets.ctfassets.net/nv7y93idf4jq/6HANAC6XKWnyvZ508tbVfq/f661cc31bad890a4f388de49e79c1826/CCTS_Full_Document_Final_170321.pdf

13 The primary aim of the CCTS is for 90% of all trips to the Regional Centre in the morning peak to be made on foot, by cycle or on public transport before 2040. The strategy sets out proposals to further improve the Regional Centre's public transport and active travel networks and reduce car-based trips over the longer term.

6.26 The scheme includes traffic management measures in the St John's area of Manchester City Centre, reducing movements for general traffic whilst supporting movement for bus and local residents. Further information can be found in section 5.4 of the Appraisal report at Appendix Two.

6.27 The modelled air quality impact of the package of measures including bus, taxi and targeted local traffic management measures outlined above shows that the Investment-led Plan would achieve compliance at these locations and therefore reduce the number of exceedances from 26 in 2025 to 0.

7 CAZ Benchmark

7.1 The government has asked GM to: "*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 and set out how the measures you have proposed will be modelled and evidenced overall*".

7.2 Government have asked for this as they want to understand how Greater Manchester's case for an investment-led, non-charging Clean Air Plan, performs (in terms of delivering compliance) against the 'benchmark' of a charging Clean Air Zone as required by JAQU guidance.

7.3 The parameters of the CAZ Benchmark have been developed in conjunction with JAQU and modelled as:

Spatial coverage of a CAZ Benchmark (boundary over which charges apply)	Area within the Inner Relief Route - the Inner Relief Route (IRR) forms a natural boundary to the central area, and aligns with the City Centre Transport Strategy. Modelling a CAZ Benchmark within the IRR would minimise wider traffic reassignment impacts by non-compliant vehicles, and would primarily model those journeys with an origin or destination within the Regional Centre
Type of CAZ Benchmark i.e. which vehicle types may be subject to charging	Category C – Bus/Coach/Taxi/PHV/HGV/Minibus/Van
Level of charge to be applied by vehicle type	Charges as set out within the original plan
First year from which a CAZ Benchmark would be modelled for operation and whether that is consistent across all vehicle types	2025 / 2026
Level and nature of any funding support for users / vehicles	Grant values as set out within the original plan inflated by 25.6% (as set out in Appendix Three)
Exemptions from charges	Exemptions as set out within the original plan

7.4 In terms of air quality impact, the modelled results shown that the anticipated number of exceedance sites above the legal limit values in 2025 are modelled to reduce from 26 to 21 sites under a CAZ Benchmark.

7.5 The number of exceedance sites above the legal limit values in 2026 are modelled to reduce further to 16 sites meaning compliance with the Direction is not achieved in the assessment years under the CAZ Benchmark.

8 Developments following Summer 2024 modelling

8.1 In the process of preparing an updated Appraisal Report and supporting material reflecting the position set out above, two additional issues have arisen.

8.2 A risk identified in the December 2023 submission “Delays to bus depot electrification” has materialised and there is now a delivery delay to the electrification of Queens Road depot, which was due to take place by January 2025, and which was the assumed delivery date in the modelling of the Investment-led Plan.

8.3 This poses a significant challenge to achieving compliance in 2025, as 73 ZEBs are to be operated out of Queens Road depot. The issue affects 12 bus services, which run through 17 forecast 'Do Minimum' exceedance sites in 2025.

8.4 Queens Road depot is a Grade 2 listed building serving as an operational bus facility. Major works are required to install the charging infrastructure, as well as make necessary repairs to the structure and maintain historical features. Since it became apparent that this risk was likely to materialise, TfGM have been exploring alternative solutions to Queens Road depot electrification to enable the GM Authorities to deliver compliance in 2025. GM has now completed a high-level review of alternative options to deliver the required air quality improvements at the exceedance sites where the 73 ZEBs were planned to operate in the absence of Queens Road depot.

8.5 The high-level review identified that none of these options are likely to deliver compliance in 2025 due to deliverability issues, or insufficient air quality benefits and therefore compliance is now no longer likely to be delivered until 2026. The approach that is most likely to achieve compliance as soon as possible is to continue with the electrification of the Queens Road depot as quickly as possible.

8.6 In addition, in July 2024 National Highways also advised TfGM that the temporary speed limit on the M602 junctions 1 to 3 Eccles is to be removed. They have been trialling 60mph speed limits on short sections of the strategic road / motorway network, to assess whether reducing the speed limit reduces NO_2 levels, this included M602 junctions 1 to 3 Eccles.

8.7 National Highways have been monitoring this area and they have notified Greater Manchester that the speed limit trial is now complete, after advising that their monitoring data showed that air quality at these locations has improved and is now compliant.

8.8 The M602 temporary speed limit is assumed to be in place in the Investment-led Plan modelling assumptions.

8.9 In agreement with JAQU both scenarios have been tested through the current modelling to understand the implications to the Investment-led Plan.

8.10 The implications of these two issues are addressed in the Supplementary Appraisal Report, attached as Appendix Four. In summary:

- revised modelling demonstrates that the Investment-led Plan, even with the delay to the electrification of Queens Road depot and the removal of the M602 temporary speed limit, achieves compliance in 2026; and
- a revised comparative appraisal of the Investment-led Plan (taking into account the matters outlined above) and the CAZ Benchmark, against a revised forecast year of compliance of 2026, demonstrates that only the Investment-led Plan meets the Determining Success Factor of achieving compliance in the shortest possible time.

9 Cost

9.1 The section below outlines the funding awarded by the government to date; expenditure to date funded by the grants; future committed costs until a decision is made and a forecast for the Investment-led Plan, on the basis it is approved, as well as the CAZ Benchmark.

Upgrade of non-compliant vehicles

9.2 Clean Air Funding was awarded by the Government to help owners upgrade non-compliant vehicles (Buses, Coaches, HGVs, LGVs and Taxis) and mitigate against the negative socio-economic impact of a GM Wide Category C charging Clean Air Zone.

9.3 The GM Clean Air Plan Policy, agreed in Summer 2021, set the funding amounts per vehicles and eligibility criteria. The various vehicle types approved for funding opened as follows:

- May 2020 for bus retrofit applications (as a continuation of the government's Clean Bus Technology Fund);
- September 2021 for bus replacement applications; and
- November 2021 for HGV upgrade applications.

9.4 As set out in the table below, the value of funding spent and committed to the end of July 2024 is £19.1 million. GM's Investment-led Plan focuses on investment in buses, taxis and local traffic management measures to deliver compliance with legal limits and therefore non-committed funds would be redistributed under an investment-led scenario.

9.5 As agreed in December 2023, the HGVs fund is closed to new applicants and those who have existing funding awards, but not yet claimed, have been given to 1st January 2025 to spend the committed monies.

9.6 On this basis, as at the end of July 2024, £20.2 million will still be allocated for taxis (PHV and hackney) and the remaining uncommitted funds of £83.8 million reallocated as part of the Investment-led Plan.

Purpose	**Value of Grant** (net of Admin costs) **£m**	**Value Committed** [14] **£m**	**Vehicles Upgraded**	**Recommendation**
Heavy Goods Vehicles	7.6	2.6	227	Close to new applications
Private Hire Vehicles	10.2	0.02	7	retain allocation
Coaches	4.4	-	0	reallocate
Minibus	2.0	0.01	1	reallocate
Light Goods Vehicles	70.0	0.1	14	reallocate
Hackney	10.1	0.1	20	retain allocation
Bus Retrofit	15.4	15.1	959	reallocate
Bus Replacement	3.2	1.2	69	reallocate
Total	**123.1**	**19.1**	**1,297**	

Overall Funding Position

9.7 The costs related to the business case, implementation and operation of the GM CAP are either directly funded or underwritten by the 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 test[15].

9.8 GM has been awarded a total of £204.4 million (excluding electric vehicle charging infrastructure) in respect of the GM CAP. Government grants have been awarded to fund the following areas:

Grant	**£m**
Clean Air Plan Development Phase	33.3
Clean Air Zone & Funds Implementation	31.4
Clean Air Zone & Funds Operation	16.6
Vehicle Funds (including Bus)	123.1
Total	**204.4**

9.9 Expenditure to July 2024 (including committed grant awards) against the £204.4 million awarded by Government is summarised in the table below:

[14] Value Committed is the value of the total number of applicants who have applied and have been awarded a grant. At the end of November 2023, 162 Applicants have been awarded funding but are yet to upgrade.
[15] 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)

Area of Expenditure	Spend/Committed to July 2024 £m
Clean Air Plan Development Phase	33.9
Clean Air Zone & Funds Implementation	24.8
Clean Air Zone & Funds Operation	18.1
Vehicle Funds (including Bus)	19.1
Grand Total	**95.9**
Grant Remaining	**108.5**

9.10 GM proposes that the grant value remaining should be repurposed to contribute to the future funding required for the Investment-led Plan.

9.11 The GM Authorities have calculated the whole life costs for the Investment-led Plan and the CAZ Benchmark. The figures have been developed using high level assumptions and based on previous costs.

9.12 There is a degree of financial risk in the Investment-led Plan as discussion with key suppliers about the termination and re-design of the Investment-led Plan have not taken place.

9.13 Once the Greater Manchester Authorities are given a clear steer from government and a direction under the Environment Act 1995, conversations can take place with suppliers, contingency costs can be reviewed and a final view on the deliverability of the scheme within the funding envelope can be taken.

9.14 The following table outlines the whole life costs for the Investment-led Plan compared to the CAZ Benchmark. The Investment-led Plan would require an additional £15.2 million of funding compared to an additional £61.9 million for a CAZ Benchmark.

	CAZ Benchmark	Investment-led-Plan
Early Termination of CAZ Services	N/A	(£1.8m)
Vehicle Upgrade Funding and Administration	(£107.2m)	(£73.0m)
Development and Implementation	(£13.1m)	(£11.5m)
Net Surplus / (Deficit) from Operation and Decommissioning	(£50.1m)	(£37.4m)
Whole Life Total Cost	**(£170.4m)**	**(£123.7m)**
Available Funding	**£108.5m**	
Additional Government Funding (or Mitigation) Required	**£61.9m**	**£15.2m**

9.15 A summary breakdown of the Investment-led Plan costs is set out in the following table. Further information on these costs can be found in the Appraisal Report in Appendix Two (Investment Led Plan section 5.6 and CAZ Benchmark section 6.4.)

Bus Investment	£51.1m
Taxi Investment (Clean Taxi Fund)	£30.5m
Local measures	£5.0m
Development, Administration, Risk & Contingency	£37.1m
Investment Led Plan Total	**£123.7m**

10Equalities

10.1 A high-level assessment has been conducted on both the Investment-led Plan and the CAZ Benchmark scenarios to understand the likely impacts. On individuals with protected characteristics impacts can be consolidated into three key themes. They are:

- Air quality – certain protected characteristics groups are likely to benefit disproportionately from improvements to air quality (age, disability, ethnicity, faith, pregnancy/maternity).
- Affordability – disproportionate impacts identified for those in certain age groups, sex, ethnicity, religion/faith & low-income groups.
- Wider impacts – disproportionate impact identified for individuals with disabilities, young and older people and individuals from ethnic minority background. E.g. potential impact of the CAZ on using public transport or taxi services.

10.2 From an equality perspective, the Investment-led Plan would deliver an air quality improvement that benefits individuals with protected characteristics. An air quality improvement is likely to be faster for the Investment-led Plan than the CAZ Benchmark due to the former achieving compliance earlier and being able to implement the Plan earlier.

10.3 Under the Investment-led Plan, the adverse financial impact on protected characteristic groups is to a lesser extent than the CAZ Benchmark.

10.4 The Investment-led Plan reduces the risk to health, jobs, livelihoods and businesses compared to a CAZ Benchmark.

10.5 Whilst the delay to the electrification of the Queens Road depot would result in the Investment-led Plan delivering air quality improvements later than original planned, it remains ahead of a CAZ Benchmark and does not change the equality impacts assessment as set out above.

11Summary

11.1 The Investment-led Plan is the only option tested which meets the legal requirement placed on the 10 GM Authorities to deliver compliance in the shortest possible time and by 2026 at the latest.

11.2 It is a better strategic fit in terms of air quality and climate change (delivering greater air quality benefits), transport (providing additional cleaner buses that will continue to give benefits after compliance is achieved), growth and economy (by not imposing charges on users it removes the risk of restricting growth or damaging businesses). It is better VfM than the CAZ Benchmark, delivering better air quality benefits at a lower cost, and its distributional health benefits, affordability for users and quality of life impacts are preferable to the CAZ Benchmark. Finally, the Investment-led Plan is considered more affordable and therefore more deliverable than the CAZ Benchmark.

12Delivery Confidence

12.1 The Government's Joint Air Quality Unit have commissioned Local Partnerships to review the commercial, financial and management elements of GM's Appraisal Report (and relevant annexes), focusing on how they have been developed and would be taken forward, including:

- the approach to delivery;
- the timeline/programme for delivery;
- governance arrangements;
- financial assumptions/estimates; and
- risks to delivery and mitigations.

12.2 Local Partnerships have been asked by JAQU to identify any areas of risk and to make any observations or recommendations on aspects that may need further attention or mitigation.

12.3 It is for Government to decide on the measures included in Greater Manchester's new Clean Air Plan, the outputs of this review will feed into the government's considerations.

13Nitrogen Dioxide (NO_2) Monitoring Results 2023

13.1 Greater Manchester publishes its Air Quality data annually in June each year via the Air Quality Annual Status Report, submitted to DEFRA.

13.2 Since 2018, the Greater Manchester Clean Air Plan has been using diffusion tube monitoring equipment to measure roadside levels of NO_2.

13.3 Additional monitoring sites have gradually been added to the diffusion tube network used in the development of the Clean Air Plan, helping to provide a clearer picture of NO_2 levels in Greater Manchester.

13.4 In 2023, 248 roadside monitoring locations showed that there were 64 sites of exceedance, a further 78 locations were at risk of exceedance, and this was consistent with the air quality modelling that was used to inform the location of monitoring. The GM CAP monitoring data indicates that air pollution has generally decreased compared with 2022. 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 2022, but also a cleaner vehicle fleet as a result of natural churn as older cars are replaced by newer cleaner models.
- The launch of locally controlled Bee Network bus services, and introduction of new electric buses.
- The operations of retrofit Euro V buses, which are known to exhibit variable emissions performance under real-world conditions.

13.5 Full results can be found in Appendix Five.

14Recommendations

14.1 The recommendations are set out at the front of the report.

15Appendix One – Air Quality Modelling Assurance Report

15.1 Attached as a supplementary paper.

16Appendix Two – Appraisal Report

16.1 Attached as a supplementary paper.

17Appendix Three – Taxi Measures

17.1 The funding offers are split into funding for upgrade to wheelchair accessible vehicles and funding for upgrade to non-wheelchair accessible vehicles.

17.2 The Investment-led Plan proposes taxi funding being issued directly to applicants, subject to meeting the relevant criteria and production of relevant evidence. This reflects feedback received during the PPD process that there were a limited number of dealerships to upgrade with and that funding should be paid directly to the applicant. Previously, financial support was issued directly to suppliers of vehicle upgrade options, meaning all vehicle upgrades had to go via an approved dealership. The proposed approach offers greater flexibility to the taxi trade in terms of upgrade options and requires less resource to operate the CTF.

17.3 Funding amounts take into account inflationary increases in the economy since the finalisation of the previous CAP policy in 2021 to the anticipated opening of the Investment-led Plan funds in 2024. The inflationary uplift has been calculated based on its cumulative total of inflation based on Q4 values from the Bank of England's Monetary Policy Committee Report, published in November 2023[16], The uplift provides an equitable increase for both hackneys and PHV owners and operators and responds to the increases in the cost of new and second hand vehicles since the development of the Previous GM CAP.

Vehicle type (upgrade to)		Offer available (per vehicle)	Change from previous policy funding amount (2021)
Purpose-built Wheelchair Accessible Vehicle	**Zero Emission Capable (ZEC)**	Up to £12,560 towards the running costs of the replacement vehicle (or vehicle finance).	↑ **Increase of £2,560**
	Second-hand ZEC	Up to £12,560 towards the cost of the replacement vehicle.	↑ **Increase of £2,560**
	Compliant Vehicle (Euro 4 petrol or Euro 6 diesel or better)	Up to £6,280 towards the cost of the replacement vehicle.	↑ **Increase of £1,280**
	Compliant Vehicle (Retrofit)	No retrofit option to be offered given Government's evidence on efficacy of retrofit technology.	✕ **Removed**
Non-Wheelchair Accessible Vehicle	**ZEC**	Up to £7,530 towards the running costs of the replacement vehicle (or vehicle finance).	↑ **Increase of £1,530**
	Second-hand ZEC	Up to £7,530 towards the cost of the replacement vehicle (vehicle finance).	↑ **Increase of £1,530**
	Compliant Vehicle 6+ seater (Euro 4 petrol or Euro 6 diesel or better)	Up to £6,280 towards the cost of the replacement vehicle (grant or vehicle finance).	↑ **Increase of £1,280**
	Compliant Vehicle (Euro 4 petrol or Euro 6 diesel or better)	Up to £3,770 towards the cost of the replacement vehicle (grant or vehicle finance).	↑ **Increase of £770**

[16] https://www.bankofengland.co.uk/monetary-policy-report/2023/november-2023?ref=pmp-magazine.com

Vehicle type (upgrade to)		Offer available (per vehicle)	Change from previous policy funding amount (2021)
	Compliant Vehicle (Retrofit)	No retrofit option to be offered given Governments evidence on efficacy of retrofit technology.	✕ **Removed**

18 Appendix Four – Supplementary Appraisal Report

18.1 Attached as a supplementary paper.

19 Appendix Five – Nitrogen Dioxide (NO_2) Monitoring Results 2023

19.1 **Why does Greater Manchester monitor Nitrogen Dioxide?**

19.2 Greater Manchester undertakes NO_2 monitoring to determine compliance with NO_2 legal limit values in accordance with GM CAP and government Direction and the 10 districts also monitor NO_2 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.

19.3 **What are the legal limit values for Nitrogen Dioxide?**

19.4 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 exposure[17] where the Air Quality Objectives apply, which can include the roadside but only in exceptional circumstances. LAQM monitoring also includes measurements at background[18] and industrial locations and is not limited to road traffic sources.

[17] 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)

[18] 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.

19.5 Additionally, the two regimes have different values by which they determine an exceedance. LAQM determines that the legal limit of 40µg/m^3 has been exceeded by any result over 39.9µg/m^3 [19], whereas for the GM CAP, JAQU determine anything over 40.4µg/m^3 to be an exceedance[20]. 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 200µg/m3 (not to be exceeded more than 18 times a calendar year).
- The long-term annual average limit of 40µg/m3.

19.6 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 µg/m3.

19.7 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 (40µg/m3).

19.8 **How do we monitor Nitrogen Dioxide?**

19.9 The GM local authorities carry out air quality monitoring for NO_2 using a combination of:

- Continuous automatic monitoring sites: There are currently 24 continuous air quality monitoring stations, 14 of which are located at the roadside.
- Diffusion tubes: 356 sites are set up for local air quality management (LAQM) purposes. In addition, approximately 248 sites are set up for GM Clean Air Plan monitoring and evaluation purposes.

[19] 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

[20] 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 40.4ug/m3 is rounded down to 40ug/m3 and is not exceeding. https://ec.europa.eu/environment/air/quality/legislation/pdf/IPR_guidance1.pdf

19.10 Monitoring for NO_2 for GM Clean Air Plan purposes uses diffusion tubes at sites where "target determination"[21] modelling predicted illegally high levels of NO_2 for 2021. Three new continuous automatic air quality monitoring stations were in 2022.

19.11 **What are the results for Nitrogen Dioxide in 2023?**

19.12 Table 1 below summarises NO_2 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 2023.

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

Table 1 Summary of LAQM NO_2 monitoring in GM in 2023

Authority	Automatic sites (with valid data capture 2023)[22]	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	**40.4** - 8.9	1	-	+1
Bury MBC	3	20	38.7 - 18.8	-	-	-1
Manchester CC	3	40	**49.6** - 14.2	2	-	-2
Oldham MBC	1	27	**45.0** - 15.8	2	-	-1
Rochdale MBC	1	28	32.6 - 11.6	-	-	0
Salford CC	3	48	**43.2** - 10.8	1	1	-2
Stockport MBC	2	30	34.3 - 5.7	-	-	0
Tameside MBC	2	53	**45.2** – 9.6	3	-	0
Trafford MBC	3	15	29.8 - 11.3	-	-	0
Wigan MBC	2	48	**43.8** - 13.9	1	1	+1
Total	**24**	**356**	**49.6** – 5.7	**10**	**2**	**-4**

[21] 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 NO_2 problem Greater Manchester must resolve ("target determination") and the basis for the Greater Manchester Clean Air Plan.

[22] >25% (3 months or more) data capture.

19.14 Table 2 shows the number of diffusion tube monitoring sites.

Table 2 Number of GM CAP Monitoring Sites

	Number of monitoring Sites					
Authority	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Bolton	5	14	14	14	32	19
Bury	5	16	16	16	36	19
Manchester	20	91	91	91	160	109
Oldham	0	9	9	9	19	13
Rochdale	0	12	12	12	15	6
Salford	5	27	27	27	60	32
Stockport	10	19	19	19	47	24
Tameside	5	14	14	14	32	19
Trafford	5	14	14	14	18	4
Wigan	0	6	6	6	13	3
Total	**55**	**222**	**222**	**222**	**432**	**248**

19.15 Table 3 below summarises NO_2 concentrations and exceedances of the annual mean across sites set up for GM CAP purposes between 2018 and 2023. 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/m^3)					
Authority	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Bolton	1	4	1	2	4	2
Bury	2	10	0	2	6	3
Manchester	14	65	8	25	49	39
Oldham	0	5	0	1	5	1
Rochdale	0	4	1	1	1	0
Salford	1	16	0	7	13	4
Stockport	6	15	2	3	8	7
Tameside	4	6	4	4	8	7
Trafford	1	3	0	0	0	0
Wigan	0	1	0	0	1	1
Total	**29**	**129**	**16**	**45**	**95**	**64**

Greater Manchester's Clean Air Plan to tackle Nitrogen Dioxide Exceedances at the Roadside

Evidence Submission for a new GM Clean Air Plan

Air Quality Modelling Assurance Report

Warning: Printed copies of this document are uncontrolled

Version Status:	DRAFT FOR APPROVAL	**Prepared by:**	Transport for Greater Manchester on behalf of the 10 Local Authorities of Greater Manchester
Date:	September 2024		

Contents

1 Introduction

1.1 Background to the Clean Air Plan

1.1.1 The government has instructed many local authorities across the UK to take quick action to reduce harmful roadside levels of Nitrogen Dioxide (NO_2) with the Secretary of State (SoS) for Environment, Food and Rural Affairs issuing Directions under the Environment Act 1995 in 2017 requiring them to undertake feasibility studies to identify measures for reducing NO_2 concentrations to within legal limit values, defined as the long-term annual mean legal limit of 40 µg/m3 for NO_2. In Greater Manchester (GM), the ten 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 NO_2 exceedances at the roadside, herein known as Greater Manchester Clean Air Plan (GM CAP).

1.1.2 In March 2019, the 10 GM Authorities agreed the submission of the Outline Business Case (OBC) [1] that proposed a package of measures that was considered would deliver compliance in GM in the shortest possible time and by 2024 at the latest. This involved a Charging Clean Air Zone (CAZ) Class C with additional measures.

1.1.3 In July 2019, the SoS issued a Direction under section 85 of the Environment Act 1995 requiring the 10 GM Authorities to implement the local plan for NO_2 compliance for the areas for which they were responsible, including a Charging CAZ Class C with additional measures. There was also an obligation to provide further scenarios appraisal information to demonstrate the applicable Class of Charging CAZ and other matters to provide assurance that the local plan would deliver compliance in the shortest possible time and by 2024 at the latest.

1.1.4 The SoS subsequently issued a Direction to the 10 GM Authorities in March 2020 that required them to take steps to implement that local plan for NO_2 compliance so that compliance with the legal limit for NO_2 is achieved in the shortest possible time, and by 2024 at the latest, and so that exposure to levels above the legal limit for NO_2 is reduced as quickly as possible.

1.1.5 A statutory consultation on the proposals took place in Autumn 2020.

1.1.6 In September 2020, the Air Quality Administration Committee (AQAC) approved the establishment and distribution of the bus replacement funds. The following month, AQAC agreed that applications for funding would open for HGVs in November 2021 and that in January 2022, applications for funding would open for PHVs, Hackney Carriages, coaches, minibuses and LGVs.

[1] https://cleanairgm.com/technical-documents/#outline-business-case

1.1.7 The GMCA - Clean Air Final Plan report[2] on 25th June 2021 endorsed GM's Final CAP and policy in compliance with this direction, following a review of all of the information gathered through the GM CAP consultation and wider data, evidence and modelling work. Throughout the development of the previous Plan, the Joint Air Quality Unit (JAQU) reviewed and approved all technical and delivery submissions. The Plan was agreed by the ten GM Authorities. Within this document, this is referred to as the Previous GM CAP.

1.2 The Previous GM CAP and the impacts of Covid-19

1.2.1 Under the Previous GM CAP, GM was awarded £123 million by government to deliver the proposals following consultation that comprised of a GM-wide CAZ and supporting vehicle upgrade funds aimed at encouraging vehicles upgrades to secure compliance and mitigating the impacts of the CAZ. The funds included measures addressing buses, Private Hire Vehicles (PHVs), Hackney Carriages, coaches, minibuses, Heavy Goods Vehicles (HGVs) and Light Goods Vehicles (LGVs).

1.2.2 On 20th January 2022, AQAC considered the findings of an initial review of conditions within the supply chain of LGVs in particular following Covid-19 related impacts, which were impacting the availability of compliant vehicles and supply-side constraints resulting in price increases, particularly in the second-hand market[3]. The AQAC agreed that a request should be made to the SoS to pause opening of the next phase of Clean Air Funds. This was to allow an urgent and fundamental joint policy review with government, to identify how a revised policy could be agreed to deal with the supply issues and local businesses' ability to comply with the GM CAP.

1.2.3 On 8th February 2022, the AQAC noted the submission of a report "Issues Leading to Delayed Compliance Based on the Approved GM CAP Assumptions". The report concluded that on balance, the latest emerging evidence suggested that with the approved plan in place, it was no longer likely that compliance would be achieved in 2024. Government subsequently issued a new Direction[4] which confirmed that the March 2020 Direction had been revoked and required that by 1st July 2022 the GM authorities should:

- Review the measures specified in the local plan for NO_2 compliance and associated mitigation measures; and
- Determine whether to propose any changes to the detailed design of those measures, or any additional measures.

[2] https://democracy.greatermanchester-ca.gov.uk/documents/s15281/GMCA%20210621%20Report%20Clean%20Air%20Plan%20-%20FINAL%20FINAL.pdf

[3] https://democracy.greatermanchester-ca.gov.uk/documents/s18685/ARUP%20Technical%20Note.pdf

[4] The Environment Act 1995 (Greater Manchester) Air Quality Direction 2022 (publishing.service.gov.uk)

1.2.4 This Direction ('the Direction') also states that the local plan for NO_2 compliance, with any proposed changes, must ensure the achievement of NO_2 compliance in the shortest possible time and by 2026 at the latest. It should also ensure that human exposure to concentrations of NO_2 above the legal limit is reduced as quickly as possible.

1.3 The Case for a new GM CAP

1.3.1 On 1st July 2022, AQAC noted that the 'Case for a new Greater Manchester Clean Air Plan[5] document and associated appendices would be submitted to the SoS as a draft document subject to any comments of GM Authorities.

1.3.2 On 17th August 2022, the AQAC agreed to submit the 'Case for a new Greater Manchester Clean Air Plan' to the SoS as a final version and approved the Case for a New Plan - Air Quality Modelling Report for submission to JAQU.

1.3.3 The 'Case for a new Greater Manchester Clean Air Plan' set out that challenging economic conditions, rising vehicle prices and ongoing pandemic impacts meant that the original plan of a city-region charging CAZ was no longer the right solution to achieve compliance, instead proposing an investment-led, non-charging GM CAP.

1.3.4 The primary focus of the 'Case for a new Greater Manchester Clean Air Plan' was to identify a plan to achieve compliance with the legal limit value for NO_2 in a way that considered the cost-of-living crisis and associated economic challenges faced by businesses and residents. This would be achieved through an investment-led approach combined with wider measures that the GM Authorities are implementing and aimed to reduce NO_2 emissions to within legal limits, in the shortest possible time and at the latest by 2026.

1.3.5 The 'Case for a new Greater Manchester Clean Air Plan' proposed using the remaining funding that the government has awarded to GM for the Previous GM CAP to deliver an investment-led approach to invest in vehicle upgrades, rather than imposing daily charges, and deliver new Zero Emission Buses (ZEBs) as part of the Bee Network[6] (a London-style integrated transport network for GM). The new plan would ensure that the reduction of harmful emissions would be at the centre of GM's wider objectives. Within this document, this plan is referred to as the 'Investment-led Plan'.

[5] https://assets.ctfassets.net/tlpgbvy1k6h2/7jtkDc5AODypDQIw0cYwsl/67091a85f26e7c503a19ec7aeb2e8137/Appendix_1_-_Case_for_a_new_Greater_Manchester_Clean_Air_Plan.pdf

[6] The Bee Network is Greater Manchester integrated transport system joining together bus, Metrolink, rail and active travel https://tfgm.com/corporate/business-plan/case-studies/bee-network

1.3.6 The GM Authorities committed to a participatory approach to the development of the new plan to ensure that the GM Authorities' proposals would be well-grounded in evidence in terms of the circumstances of affected groups and possible impacts of the new plan on them, and therefore the deliverability and effectiveness of that plan.

1.3.7 Between August and November 2022, the GM Authorities carried out engagement and research with key stakeholders - vehicle-owning groups and representatives of other impacted individuals, such as community, business, environment and equality-based groups. This activity included targeted engagement sessions with all groups, and an online survey and supporting qualitative research activity with vehicle-owning groups.

1.3.8 Input from those engaged informed the ongoing policy development process as the GM Authorities developed the package of measures forming the Investment-led Plan.

1.4 The Investment-led Plan and the impact of bus retrofit issues

1.4.1 Having submitted the 'Case for a new Greater Manchester Clean Air Plan'[7] in July 2022, the GM Authorities were asked by government in January[8] 2023 to:

- *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.*
- *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.*
- *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.*

[7] https://assets.ctfassets.net/tlpgbvy1k6h2/7jtkDc5AODypDQIw0cYwsl/67091a85f26e7c503a19ec7aeb2e8137/Appendix_1_-_Case_for_a_new_Greater_Manchester_Clean_Air_Plan.pdf

[8] https://democracy.greatermanchester-ca.gov.uk/documents/s24937/Appendix%201.%20Ministerial%20Letter%20to%20GM%20with%20attachment.pdf

1.4.2 The GM Authorities undertook the work required to supply this further evidence and on 8th March 2023 submitted the report 'Approach to Address Persistent Exceedances Identified on the A58 Bolton Road, Bury[9]. GM Authorities also worked to address the remaining two requests from government by June 2023 on the basis of providing further information to support its Investment-led Plan and testing the proposal against a suitable benchmark CAZ, herein referred to as the 'CAZ Benchmark'. However, new evidence emerged from government in April 2023, as set out below, which would fundamentally change the number and spatial distribution of forecast modelled exceedances across GM.

1.4.3 In April 2023, government advised TfGM that it was to pause any new spending on bus retrofit as it had evidence that retrofitted buses have poor and highly variable performance in real-world conditions[10].

1.4.4 This followed a JAQU-funded study to quantify nitrogen oxide (NOx) and NO_2 emissions from buses under real-world driving conditions in three cities across the UK, including Manchester (monitoring took place in Manchester City Centre between 21st November and 12th December 2022). The monitoring indicated that retrofitted buses were not reducing emissions as expected, with significant variation in performance between bus models with retrofit technologies. Furthermore, emissions of primary-NO_2 (as opposed to NOx) were highly variable, potentially worsening roadside NO_2 concentrations despite an overall reduction in NOX emissions.

1.4.5 Government therefore commenced a six-month focused research programme to quickly investigate the causes of this poor performance and scope how it could be improved, which was anticipated to be reported in Autumn 2023.

1.4.6 In the light of government's new evidence, JAQU issued revised general guidance[11] to authorities producing CAPs nationwide. In summary, this required that air quality modelling should no longer assume any air quality benefits from a retrofitted bus.

1.4.7 GM has incorporated the revised guidance, as agreed with JAQU, into the modelling which underpins the development of its CAP to produce a report that appraises the ability of the Investment-led Plan and the CAZ Benchmark to deliver compliance with the legal limit value in the shortest possible time and by no later than 2026.

1.4.8 This was initially reflected in earlier version of the *Appraisal Report* and supporting documentation which was submitted in December 2023.

[9] https://democracy.greatermanchester-ca.gov.uk/documents/s24939/Appendix%203.%20GM%20CAP%20A58%20Bury%20Measure%20Report%20DRAFT%20for%20AQAC%20Approval%20Feb%2023.pdf

[10] https://democracy.greatermanchester-ca.gov.uk/documents/s27699/Appendix%201.%20Letter%20from%20DfT%20to%20Greater%20Manchester%20regarding%20Bus%20Retrofit%20Update.pdf

[11] Bus Retrofit Update - Technical Guidance for Local Authorities, JAQU Guidance, May 2023

1.4.9 Since the production of the Summer 2024 evidence submission, government published the 'Bus Retrofit Performance Report'[12] on the 12th September 2024. The key findings of this report include that the retrofit technology fitted onto retrofitted buses is not reducing NO_x emissions to the levels expected and retrofit performance is highly variable. These findings are consistent with the guidance issued in May 2023. Therefore, the publication of the study findings has no impact on the Investment-led Plan.

1.4.10 Since the submission of evidence to JAQU in December 2023 there have been a number of key developments, resulting in a need to update this report and supporting documentation. These updates do not change GM's conclusion that our preferred Investment-led, non-charging plan can deliver compliance in 2025 and performs better than a Clean Air Zone (CAZ) Benchmark.

1.4.11 This report and supporting documentation considers the following key developments:

- Delay to Stockport all-electric bus depot;
- Changes to bus fleets (operational and planned); and
- Correction to Euro V retrofit bus modelling emission values.

1.5 Delay to Queens Road depot and M602 speed limit

1.5.1 In the process of preparing the Appraisal Report and supporting material for these developments, two additional issues have arisen. A risk identified in the December 2023 submission "Delays to bus depot electrification" has materialised and there is now a delivery delay to the electrification of Queens Road depot. This was due to take place by January 2025, which was the assumed delivery date in the modelling of the Investment-led Plan.

1.5.2 This poses a significant challenge to achieving compliance in 2025, as 73 ZEBs are to be operated out of Queens Road depot. The issue affects 12 bus services, which run through 17 forecast 'Do Minimum' exceedance sites in 2025.

1.5.3 In addition, in July 2024 National Highways also advised TfGM that the temporary speed limit on the M602 is to be removed, as on this stretch of road legal limits with NO_2 have been achieved. The M602 temporary speed limit is assumed to be in place in the Investment-led plan modelling assumptions.

[12] https://assets.publishing.service.gov.uk/media/66e1ab11951c1776394a003c/bus-retrofit-performance-24.pdf

1.5.4 The implications of these two issues are addressed in the *Supplementary Appraisal Report*, included as part of this evidence submission documentation. Therefore, the *Appraisal Report* and associated documentation, including this report, should be read in conjunction with the *Supplementary Appraisal Report*.

1.6 Purpose of this Report

1.6.1 This document sets out how TfGM has reviewed the modelling processes, to consider any weaknesses in the process, to strengthen the quality assurance (QA) process for these steps and to document the checking/reviewing process.

1.6.2 It also reports the findings of TfGM's Audit & Assurance Team who have audited the updated QA process in place for producing the Clean Air Plan's modelling outputs, primarily in terms of:

- Whether the documented QA process has been applied correctly and in full; and
- Whether there are any obvious gaps or omissions in the QA process, such as lack of segregation of duties and appropriateness of sign-off.

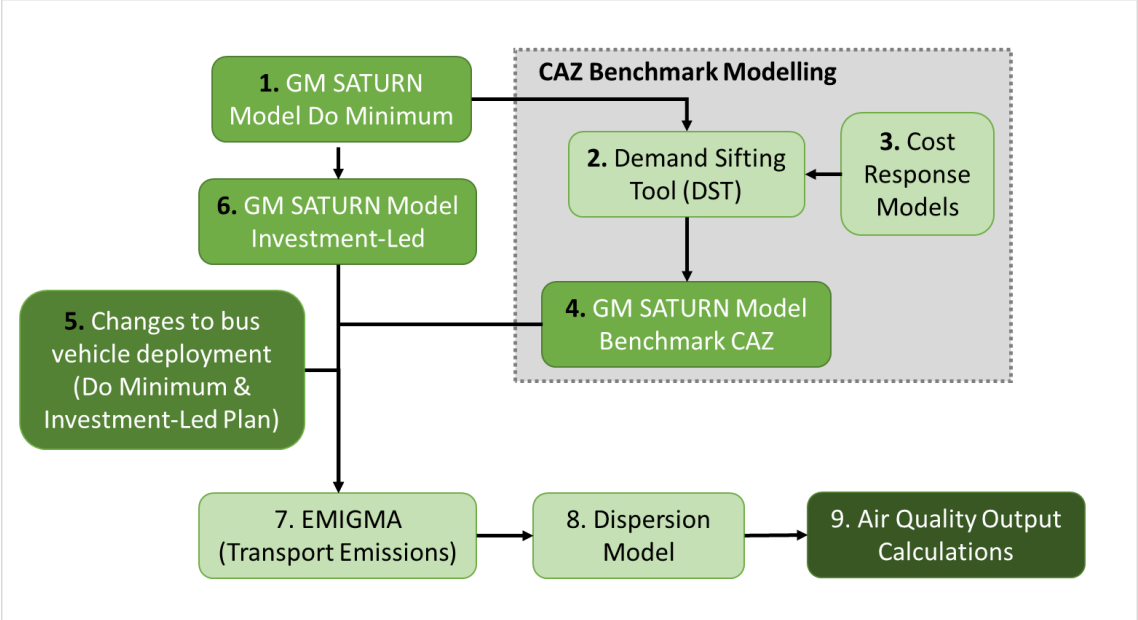
2 GM CAP Modelling

2.1 Modelling Process Context

2.1.1 Modelling processes are based upon input data, relationships and calibrated parameters that come together ‘as a model’ to produce forecast results. The GM CAP modelling process is a complex series of models that comprises the following components: Modelling processes are based upon input data, relationships and calibrated parameters that come together ‘as a model’ to produce forecast results. The GM CAP modelling process is a complex series of models. A summary of this process is set out in the figure below and consists of five components:

- **The Greater Manchester highway SATURN model (GMSM)**, which uses information about the road network and travel demand for different years and growth scenarios to estimate traffic flows and speeds for input to the emissions model. The SATURN model also outputs forecast for travel times, distances, and flows for input to the economic appraisal.
- **Cost Response models**, which are models developed to better understand commercial vehicles, taxi, and coach/minibus behavioural changes to the GM CAP. These have been developed by assembling available data on the known fleets and movements within GM (and have been primarily developed to assess the impacts of GM CAP in the context of a CAZ Benchmark).
- **The Demand Sifting Tool (DST)** has been developed to allow measures to be tested in a quick and efficient way prior to detailed assessments being undertaken using the highway and air quality models. The sifting tool uses fleet specific cost response models to determine behavioural responses to the GM CAP proposals (such as pay charge, upgrade vehicle, change mode, cancel trip etc.) The outputs comprise demand change factors which are applied to the Do Minimum SATURN matrices to create Do Something demands for assignment.
- **The emissions model**, which uses TfGM’s EMIGMA (Emissions Inventory for GM) software to combine information about traffic speeds and flows (from SATURN) with road traffic emission factors and fleet composition data from the Emission Factor Toolkit (EFT), providing estimates of annual mass emissions for a range of pollutants including oxides of nitrogen (NOx), primary-NO_2, particulate matter (PM_{10} and $PM_{2.5}$) and CO_2.
- **The dispersion model**, which uses ADMS-Urban software to combine information on mass emissions of pollution (from EMIGMA) with dispersion parameters such as meteorological data and topography to produce pollutant concentrations. The outputs of the dispersion model are processed to convert them to the verified air quality concentrations, using DEFRA tools and national background maps.

Figure 1 Overview of Modelling Suite



2.2 Modelling Correction Background

2.2.1 In preparation for undertaking sensitivity testing produced to support the GM Clean Air Plan December 2023 submission, an issue was found in the emissions modelling.

2.2.2 This has resulted in the amount of primary nitrogen dioxide (NO_2) being under-represented in the model outputs and therefore in the predicted NO_2 concentrations that have been reported in the December 2023 submission for both the with and without scheme scenarios.

2.2.3 Regrettably, within TfGM's emissions inventory tool (EMIGMA) a single formula in an Excel spreadsheet tool, that applies a static value for primary-NO_2 (the proportion of NO_x that are released as NO_2 from the tailpipe) in the bus emissions database had not been updated to reference the revised guidance on bus retrofit performance in April 2023 from JAQU (see Appendix 1), following their evidence that bus retrofit solutions from Euro V vehicles have poor and highly variable performance in real world conditions.

2.2.4 The issue in the December 2023 submission was that one of the parameters in the EMIGMA database was not updated in April 2023 when a series of revisions to the bus emission factors were made.

2.2.5 The original EMIGMA database was compiled by the London Research Centre and RSK Radian on behalf of the Department of the Environment, Transport and the Regions (DETR)[13] for their Air and Environment Quality Research Programme. Released in June 1997, it represented the second of a series of atmospheric emissions inventories covering many of the UK's major urban and industrial zones. TfGM, and predecessor Greater Manchester organisations, have continued to maintain the database and it has been used as part of the annual Local Air Quality Monitoring (LAQM) reporting. At the start of the process, EMIGMA was incorporated into the GM CAP modelling system following a review of the mechanics of the tool by Jacobs (the GM CAP's first Lead Advisor, superseded by ARUP/AECOM in 2019) with several amendments made to the process used to create inputs to the next stage of the process i.e. the ADMS Dispersion Model.

2.2.6 Within the development of the GM CAP programme, there are three elements to the application of the modelling system. Two of those elements have included changes which are:

- The data inputs as different scenarios are tested; and
- Occasionally to the calibrated parameters, as new guidance is issued.

2.2.7 The third element of the system, the modelling relationships, has not been changed.

[13] The UK government department that included what is now known as the Department for Transport

2.2.8 The standard QA of the GM CAP forecast data for any given test has been to review the inputs and outputs at each stage of the modelling system to ensure each part of the process has been checked.

2.2.9 Checking for changes to calibrated parameters, such as incorporating updates from new versions to Defra's Emission Factor Toolkit, has been undertaken by running external calculations to mirror the input and output emission rates by vehicle type produced by the EMIGMA tool to demonstrate that the tool is functioning as expected. A number of such changes have been made and accurately incorporated into the EMIGMA database. These checks have focused on NO_x emissions and NO_2 concentration outputs following the dispersion modelling step. Knowledge of the change in inputs of a scenario can be used to predict how the scenario outputs should differ from a reference scenario (e.g. the Do minimum) both spatially and by vehicle type due to the revised parameters. The patterns of impacts are reviewed to determine whether the expected impacts had occurred. Occasional issues have been correctly identified using this checking method at various points during the CAP programme and have been corrected.

2.2.10 It was this part of the QA process that was not completed accurately enough that has caused the issue in the December 2023 submission.

2.2.11 Up to April 2023, retrofit buses (Euro IV or V) in the GM fleet were represented in the EMIGMA database as Euro VI buses as per Defra/JAQU guidance i.e. retrofitting technology assumed to improve vehicle emissions to meet the Euro VI standards. This was the standard practice recommended by Defra/JAQU.

2.2.12 The revised JAQU guidance issued in April 2023 (see Appendix 1) altered two factors. The guidance stated:

- Firstly, that there are no improvements to NO_x emissions to be expected from retrofitted buses, and so NO_x emissions should be those for a relevant pre-retrofit Euro standard of bus; and
- Secondly, that the primary-NO_2 fraction should be increased from the NAEI value of 8% to 35.8%.

2.2.13 While issuing the revised guidance, JAQU informed that they had commissioned a further research programme to improve the underpinning evidence base for the new guidance, which would report in six months, with the expectation that this further research may alter the guidance again.

2.2.14 The GM CAP team undertook to make the changes to alter the two factors, and, once these changes were believed to have been implemented, the usual checks were run. These checks showed that the increase in NO_x emissions from buses were as to be expected for a change from a Euro VI standard to a Euro V standard, and the differential spatial pattern could be observed where known electric buses were operating (the 43 and 111 services). However, because the aggregate NO_x emissions had increased, this result masked the effect on the final NO_2 concentrations. While the NO_2 concentrations had as expected also increased, the increase was not by as much as it should have been if the proportion of primary NO_2 had also been increased. This was the correction which has now been resolved.

2.2.15 The context for this was that the updated JAQU guidance on bus retrofit was received at a point in the CAP programme when GM were due to submit their 'final plan' approval. The new guidance on retrofit performance required the GM CAP team to undertake a rapid assessment of the implications of the updated guidance on the outcomes of the 'final plan' to inform whether the submission needed to be postponed.

2.2.16 The rapid assessment involved:

- Making revisions to the model parameters as per the new April 2023 guidance and running the usual checks – where the failure to revise the NO_2 parameter was not identified;
- A review of the evidence underpinning new JAQU guidance, particularly given the knowledge that further research was underway that was likely to change the guidance again;
- The development of a proposal that GM should produce its own guidance on parameters based on new analysis of the raw research dataset, which was subsequently formally offered and proposed by JAQU; and
- Re-running the full model system to re-test the 'final plan' and the commissioning of technical work required to revise the plan.

2.2.17 In hindsight, the GM CAP technical team's focus on the latter three tasks contributed to an oversight in checking the revisions to the EMIGMA database. In context that the following factors occurred in tandem:

- High workloads as a result of the updates to the GM CAP programme;
- Uncertainty on the finality of the guidance itself; and
- The standard QA process showing plausible results at a high-level.

2.2.18 The factors meant that appropriate time was not taken to pause to reflect on the nature of the changes that needed to be applied into the EMIGMA database. On reflection, the error highlighted the need to strengthen the QA process to revise the external calculations of the EMIGMA NO_2 emissions outputs.

3 Revised Assurance Process

3.1.1 TfGM has identified that a revised assurance process is required for the GM CAP modelling and appraisal, with the steps undertaken set out below.

3.1.2 The Data Evidence and Modelling (DEM) Team have, with TfGM's Head of Modelling & Analysis, reviewed their QA processes, identifying gaps/weaknesses and then have set out a workflow process, which identifies the data sources, modelling steps, data transfers between internal/external teams and outputs. Each of these steps has been reviewed to consider any weaknesses in the process, to formally describe the QA process for these steps and to document the checking/reviewing process.

3.1.3 As part of this review process, it has been noted that the project has altered over time, as the focus of the likely intervention or measures have changed from CAZ-based options, to the appraisal of investment-led options (bus, taxi and local traffic management), alongside updating of reference data sources such as ANPR data and bus fleet information.

3.1.4 Prior to the discovery of the modelling error, the QA processes have been undertaken and documented internally within consultant/TfGM teams on a scenario-by-scenario basis. Following the assurance review, a centralized log of checks and reviews have been developed for each modelled scenario. Currently, the modelling run log containing the test scenario assumptions/inputs. This will be extended to include the QA record sign-off and date, to enable a more readily auditable start to finish process before results are approved to be shared beyond DEM/TfGM.

3.1.5 At each point or scenario where a modelling tool needs to be updated, the QA process and log will be reviewed, to ensure that necessary checks and procedures are applied.

3.1.6 TfGM's Audit & Assurance Team have audited the completeness of the QA process of the modelling analysis that underpins the Clean Air Plan submission. Review of documentation has been completed as per the documented QA process.

4 Internal Assurance Team Report Findings

4.1.1 TfGM's Audit & Assurance Team's findings were as follows:

Discussions and walk-through with members of the DEM team confirmed their understanding of the source of the original error and why this had occurred. Positively, the DEM team were able to demonstrate that this had been corrected in the latest models.

The key control document that evidences the agreed assurance approach and checks undertaken by the DEM team for the required five separate scenarios is the 'QA Process Checks' Technical Note. We found the document to be fit for purpose; for each step of each stage, there is a narrative description of the checks carried out with a link to the relevant spreadsheet or output. The document records who performed the initial check and who acted as the approver / technical check. In addition, there is also a column for a separate non-technical verifier to record their separate, independent check thus providing a segregation of duties control.

Our review of the use of 'QA Process Checks' Technical Note by the DEM team found that it was properly completed by them, with two people involved in checking each step in the iterative modelling process, including an 'originator' and an 'approver (technical checks)'. In addition, a 'verifier (non-technical)' had signed off on each step. Lastly, the header of the document showed overall approval by TfGM's Head of Modelling & Analysis.

We also reviewed the 'Key Metrics Check' document which summarises the key inputs, assumptions, and outputs for each stage of the modelling process for each of the five scenarios. This document provides a simple audit trail of the evolution of the models, showing how the outputs from one stage become the inputs of the next. Against each entry, a member of the DEM team who has acted as the 'checker' has added brief comments to point to the source of the data, to highlight where results are consistent with expectations, or to explain the reasons for any small variations. Similar to the above, this document has a 'sign off' box which indicates that the AECOM Regional Director has 'verified' the figures, followed by approval by TfGM's Head of Modelling & Analysis.

Together with the relevant member of the DEM team, we sample tested at least one scenario for each step/stage from this document, tracing the figures provided back to the source documents. All sampled figures reconciled with the source files.

We were also shown how key model outputs are tracked in the 'GMCAPModelRunLog', which records each test/scenario code, a brief description, and total emissions. The purpose of this is to track changes between each run and also act as a 'sense check' – i.e. ensuring that a change to one individual parameter results in an expected impact on emissions.

Based on our work undertaken, as described above, we are able to provide assurance that the QA process for the Clean Air Plan Modelling work has been completed in full and documented. Segregation of duties was evidenced by at least two members of the team involved in the process, as well as a 'Verifier (Non-technical)'checker and final sign-off.

An important caveat to note is that our work cannot be taken as assurance over the accuracy or correctness of the modelling itself, as this is beyond our remit and expertise. In addition, though we were able to trace key figures back to source documents, we cannot with certainty confirm that these are the correct source documents given the scale of the project and large number of distinct modelling runs. Rather, we place reliance on the QA process wherein the team have collectively checked, verified, and signed off on the figures.

Appendix 1: Primary Nitrogen Dioxide and Bus Retrofit

In 2022, JAQU funded a study to quantify NO_x and NO_2 emissions from buses under real-world driving conditions in three cities across the UK, including Manchester, with monitoring taking place in Manchester City Centre between 21 November and 12 December 2022. This survey concluded that:

- genuine (i.e. non-retrofit) Euro V and Euro VI buses were producing emission rates that are consistent with known emissions performance, with relatively low variability between vehicle type (such as manufacturer and vehicle size)[14].
- the retrofitted buses were not reducing emissions as expected, with significant variation in performance between different bus models with different types of retrofit technologies, with, emissions of primary NO_2 (as opposed to NO_x) being highly variable, potentially worsening roadside NO_2 concentrations despite an overall reduction in NO_x emissions.
- emissions from retrofit vehicles varied significantly between vehicles - on average retrofit buses produced a small reduction in emissions compared to an average Euro VI, but the variation in measured emissions from retrofit buses was very high ranging from almost Euro VI performance to worse than the average Euro V results; and
- the proportion of primary NO_2 emitted is much greater from retrofitted vehicles and f-NO_2 of 35.8% for emissions from retrofitted buses should be assumed.

In April 2023 the government advised TfGM that it was to pause any new spending on bus retrofit as they now had evidence that bus retrofit solutions, which had already been fitted, were having poor and highly variable performance in real world conditions.

The 'Bus Retrofit Performance Report'[15] was published by the Department of Transport in September 2024 which states the following:

"Overall, the monitoring campaigns in Manchester and Sheffield suggest that the SCR technology on retrofitted buses is not, in the sample studied, reducing NO_X emissions to the levels expected. The variation in median emissions and the interquartile ranges show that retrofit performance is highly variable".

[14] A Euro VI bus reduces NOx emissions by c90% compared to a Euro V. Both Euro V and Euro VI buses have low proportions of NOx emitted as NO_2 (or primary NO_2). Primary NO_2 is important because an increase leads to a greater NO_2 concentration at roadside where air quality standards are measured and apply.

[15] https://assets.publishing.service.gov.uk/media/66e1ab11951c1776394a003c/bus-retrofit-performance-24.pdf

Greater Manchester's Clean Air Plan to tackle Nitrogen Dioxide Exceedances at the Roadside

Evidence Submission for a new GM Clean Air Plan

Appraisal Report

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Version Status:	DRAFT FOR APPROVAL	**Prepared by:**	Transport for Greater Manchester on behalf of the 10 local authorities of Greater Manchester
Version Number:	Version 2		
Date:	September 2024		

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1 Preface

1.1.1 Since the submission of evidence to JAQU in December 2023 GM has been undertaking work to adapt its submission for a new GM Clean Air Plan by taking into account a number of key developments, which together required an update to this Appraisal Report and supporting documentation. These developments can be summarised as follows:

- Delay to Stockport all-electric bus depot;
- Changes to bus fleets (operational and planned); and
- Correction to Euro V retrofit bus modelling emission values.

1.1.2 This report and supporting documentation have been updated to take account of these developments and these updates do not change GM's conclusion that its Investment-led, non-charging plan can deliver compliance in 2025 and performs better than a Clean Air Zone (CAZ) Benchmark.

1.1.3 However, in the process of preparing this report and supporting material for these developments, an additional issue has arisen. A risk identified in the December 2023 submission "Delays to bus depot electrification" has materialised and there is now a delivery delay to the electrification of Queens Road depot. This was due to take place by January 2025, which was the assumed delivery date in the modelling of the Investment-led Plan.

1.1.4 This poses a significant challenge to achieving compliance in 2025, as 73 ZEBs are to be operated out of Queens Road depot. The issue affects 12 bus services, which run through 17 forecast 'Do Minimum' exceedance sites in 2025.

1.1.5 In addition, in July 2024 National Highways also advised TfGM that the temporary speed limit on the M602 is to be removed, as on this stretch of road legal limits with NO_2 have been achieved. The M602 temporary speed limit is assumed to be in place in the Investment-led plan modelling assumptions.

1.1.6 The implications of these two issues are addressed in the *Supplementary Appraisal Report*, included as part of this evidence submission documentation. Therefore, this report and associated documentation should be read in conjunction with the *Supplementary Appraisal Report*.

1.1.7 In particular, the Supplementary Appraisal Report contains:

- Further details as to the implications of the delay to the electrification of Queens Road and the removal of the M602 temporary speed limit depot including:
    - Why this means compliance in 2025 is no longer likely; and
    - Why 2026 is the earliest likely year of compliance;

- Details of revised modelling demonstrating that the Investment-led Plan, even with the delay to the electrification of Queens Road depot and the removal of the M602 temporary speed limit, achieves compliance in 2026; and
- A revised comparative appraisal of the Investment-led Plan (taking into account the matters outlined above) and the CAZ Benchmark, against a revised forecast year of compliance of 2026, demonstrating that only the Investment-led Plan meets the Determining Success Factor of achieving compliance in the shortest possible time.

1.1.8 In addition to providing an updated position on the electrification of Queens Road and the revised modelling and comparative appraisal referred to above (which effectively supersedes these aspects of this Appraisal Report), the *Supplementary Appraisal Report* also indicates where the assessment of other matters including equalities impact and value for money are materially altered for the Investment-led Plan. This is due to the delay to the electrification of the Queens Road depot and a compliance year of 2026, as compared to the assessment in this Appraisal Report on the basis of a compliance year of 2025.

1.1.9 The remainder of this report considers the Investment-led Plan taking into account the developments set out in paragraph 1.1.1 (delay to Stockport all-electric bus depot, changes to bus fleets and correction to Euro V retrofit bus modelling emission values) without addressing the implications of the delay to the electrification of the Queens Road depot or the M602 issue, which are addressed in the *Supplementary Appraisal Report*.

2 Introduction

2.1 Background

2.1.1 The government has instructed many local authorities across the UK to take quick action to reduce harmful roadside levels of Nitrogen Dioxide (NO_2) with the Secretary of State (SoS) for Environment, Food and Rural Affairs issuing Directions under the Environment Act 1995 in 2017 requiring them to undertake feasibility studies to identify measures for reducing NO_2 concentrations to within legal limit values, defined as the long-term annual mean legal limit of 40 µg/m^3 for NO_2. In Greater Manchester, the ten 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 NO_2 exceedances at the roadside, herein known as Greater Manchester Clean Air Plan (GM CAP).

2.1.2 In March 2019, the 10 GM Authorities agreed the submission of the Outline Business Case (OBC)[1] that proposed a package of measures that was considered would deliver compliance in GM in the shortest possible time and by 2024 at the latest. This involved a Charging Clean Air Zone (CAZ) Class C with additional measures.

2.1.3 In July 2019, the SoS issued a Direction under section 85 of the Environment Act 1995 requiring the 10 GM Authorities to implement the local plan for NO_2 compliance for the areas for which they were responsible, including a Charging CAZ Class C with additional measures. There was also an obligation to provide further scenarios appraisal information to demonstrate the applicable Class of Charging CAZ and other matters to provide assurance that the local plan would deliver compliance in the shortest possible time and by 2024 at the latest.

2.1.4 The SoS subsequently issued a Direction to the 10 GM Authorities in March 2020 that required them to take steps to implement that local plan for NO_2 compliance so that compliance with the legal limit for NO_2 is achieved in the shortest possible time, and by 2024 at the latest, and so that exposure to levels above the legal limit for NO_2 is reduced as quickly as possible.

2.1.5 A statutory consultation on the proposals took place in Autumn 2020.

2.1.6 In September 2020, the Air Quality Administration Committee (AQAC) approved the establishment and distribution of the bus replacement funds. The following month, AQAC agreed that applications for funding would open for HGVs in November 2021 and that in January 2022, applications for funding would open for PHVs, Hackney Carriages, coaches, minibuses and LGVs.

[1] https://cleanairgm.com/technical-documents/#outline-business-case

2.1.7 The GMCA – Clean Air Final Plan report on 25th June 2021[2] endorsed Greater Manchester's Final CAP and policy in compliance with this direction, following a review of the information gathered through the GM CAP consultation and wider data, evidence and modelling work. Throughout the development of the previous Plan, the Joint Air Quality Unit (JAQU) reviewed and approved all technical and delivery submissions. The Plan was agreed by the ten Greater Manchester local authorities. Within this document, this is referred to as the Previous GM CAP.

2.1.8 Under the Previous GM CAP, GM was awarded £123 million by government to deliver the proposals following consultation that comprised of a GM-wide CAZ and supporting vehicle upgrade funds aimed at encouraging vehicles upgrades to secure compliance and mitigating the impacts of the CAZ. The funds included measures addressing buses, Private Hire Vehicles (PHVs), Hackney Carriages, coaches, minibuses, Heavy Goods Vehicles (HGVs) and Light Goods Vehicles (LGVs).

2.1.9 On 20th January 2022, AQAC considered the findings of an initial review of conditions within the supply chain of LGVs in particular following Covid-19 related impacts, which were impacting the availability of compliant vehicles and supply-side constraints resulting in price increases, particularly in the second-hand market[3]. The AQAC agreed that a request should be made to the SoS to pause opening of the next phase of Clean Air Funds. This was to allow an urgent and fundamental joint policy review with government, to identify how a revised policy could be agreed to deal with the supply issues and local businesses' ability to comply with the GM CAP.

2.1.10 On 8th February 2022, the AQAC noted the submission of a report "Issues Leading to Delayed Compliance Based on the Approved GM CAP Assumptions". The report concluded that on balance, the latest emerging evidence suggested that with the approved plan in place, it was no longer likely that compliance would be achieved in 2024. Government subsequently issued a new Direction[4] which confirmed that the March 2020 Direction had been revoked and required that by 1st July 2022 the GM authorities should:

- Review the measures specified in the local plan for NO_2 compliance and associated mitigation measures; and
- Determine whether to propose any changes to the detailed design of those measures, or any additional measures.

2.1.11 This Direction ('the Direction') also states that the local plan for NO_2 compliance, with any proposed changes, must ensure the achievement of NO_2 compliance in the shortest possible time and by 2026 at the latest. It should also ensure that human exposure to concentrations of NO_2 above the legal limit is reduced as quickly as possible.

[2] https://democracy.greatermanchester-ca.gov.uk/documents/s15281/GMCA%20210621%20Report%20Clean%20Air%20Plan%20-%20FINAL%20FINAL.pdf

[3] https://democracy.greatermanchester-ca.gov.uk/documents/s18685/ARUP%20Technical%20Note.pdf

[4] The Environment Act 1995 (Greater Manchester) Air Quality Direction 2022 (publishing.service.gov.uk)

2.1.12 On 1st July 2022, AQAC noted that the 'Case for a new Greater Manchester Clean Air Plan'[5] document and associated appendices would be submitted to the SoS as a draft document subject to any comments of GM Authorities.

2.1.13 On 17th August 2022, the AQAC agreed to submit the 'Case for a new Greater Manchester Clean Air Plan' to the SoS as a final version and approved the Case for a New Plan - Air Quality Modelling Report for submission to JAQU.

2.1.14 The 'Case for a new Greater Manchester Clean Air Plan' set out that challenging economic conditions, rising vehicle prices and ongoing pandemic impacts meant that the original plan of a city-region charging CAZ was no longer the right solution to achieve compliance, instead proposing an investment-led, non-charging GM CAP.

2.1.15 The primary focus of the 'Case for a new Greater Manchester Clean Air Plan' was to identify a plan to achieve compliance with the legal limit value for NO_2 in a way that considered the cost–of-living crisis and associated economic challenges faced by businesses and residents. This would be achieved through an investment-led approach combined with wider measures that the GM Authorities are implementing and aimed to reduce NO_2 emissions to within legal limits, in the shortest possible time and at the latest by 2026.

2.1.16 The 'Case for a new Greater Manchester Clean Air Plan' proposed using the remaining funding that the government has awarded to GM for the Previous GM CAP to deliver an investment-led approach to invest in vehicle upgrades, rather than imposing daily charges, and deliver new Zero Emission Buses (ZEBs) as part of the Bee Network[6] (a London-style integrated transport network for Greater Manchester). The new plan would ensure that the reduction of harmful emissions would be at the centre of GM's wider objectives. Within this document, this plan is referred to as the 'Investment-led Plan'.

2.1.17 The GM Authorities committed to a participatory approach to the development of the new plan to ensure that the GM Authorities' proposals would be well-grounded in evidence in terms of the circumstances of affected groups and possible impacts of the new plan on them, and therefore the deliverability and effectiveness of that plan.

2.1.18 Between August and November 2022, the GM Authorities carried out engagement and research with key stakeholders – vehicle-owning groups and representatives of other impacted individuals, such as community, business, environment and equality-based groups. This activity included targeted engagement sessions with all groups, and an online survey and supporting qualitative research activity with vehicle-owning groups.

[5] https://assets.ctfassets.net/tlpqbvy1k6h2/7jtkDc5AODypDQIw0cYwsl/67091a85f26e7c503a19ec7aeb2e8137/Appendix_1_-_Case_for_a_new_Greater_Manchester_Clean_Air_Plan.pdf

[6] The Bee Network is Greater Manchester integrated transport system joining together bus, Metrolink, rail and active travel https://tfgm.com/corporate/business-plan/case-studies/bee-network

2.1.19 Input from those engaged informed the ongoing policy development process as the GM Authorities developed the package of measures forming the Investment-led Plan.

2.1.20 Having submitted the 'Case for a new Greater Manchester Clean Air Plan'[7] in July 2022, the GM Authorities were asked by government in January 2023[8] to:

- 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.
- 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.
- 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.

2.1.21 The GM Authorities undertook the work required to supply this further evidence and on 8th March 2023 submitted the report 'Approach to Address Persistent Exceedances Identified on the A58 Bolton Road, Bury'[9]. GM Authorities also worked to address the remaining two requests from government by June 2023 on the basis of providing further information to support its Investment-led Plan and testing the proposal against a suitable benchmark CAZ, herein referred to as the 'CAZ Benchmark'. However, new evidence emerged from government in April 2023, as set out below, which would fundamentally change the number and spatial distribution of forecast modelled exceedances across GM.

2.1.22 In April 2023, government advised TfGM that it was to pause any new spending on bus retrofit as it had evidence that retrofitted buses have poor and highly variable performance in real-world conditions[10].

[7] https://assets.ctfassets.net/tlpgbvy1k6h2/7jtkDc5AODypDQIw0cYwsl/67091a85f26e7c503a19ec7aeb2e8137/Appendix_1_-_Case_for_a_new_Greater_Manchester_Clean_Air_Plan.pdf

[8] https://democracy.greatermanchester-ca.gov.uk/documents/s24937/Appendix%201.%20Ministerial%20Letter%20to%20GM%20with%20attachment.pdf

[9] https://democracy.greatermanchester-ca.gov.uk/documents/s24939/Appendix%203.%20GM%20CAP%20A58%20Bury%20Measure%20Report%20DRAFT%20for%20AQAC%20Approval%20Feb%2023.pdf

[10] https://democracy.greatermanchester-ca.gov.uk/documents/s27699/Appendix%201.%20Letter%20from%20DfT%20to%20Greater%20Manchester%20regarding%20Bus%20Retrofit%20Update.pdf

2.1.23 This followed a JAQU-funded study to quantify nitrogen oxide (NO_X) and NO_2 emissions from buses under real-world driving conditions in three cities across the UK, including Manchester (monitoring took place in Manchester City Centre between 21st November and 12th December 2022). The monitoring indicated that retrofitted buses were not reducing emissions as expected, with significant variation in performance between bus models with retrofit technologies. Furthermore, emissions of primary-NO_2 (as opposed to NO_X) were highly variable, potentially worsening roadside NO_2 concentrations despite an overall reduction in NO_X emissions.

2.1.24 Government therefore commenced a six-month focused research programme to quickly investigate the causes of this poor performance and scope how it could be improved, which was anticipated to be reported in Autumn 2023.

2.1.25 In the light of government's new evidence, JAQU issued revised general guidance to authorities producing CAPs nationwide. In summary, this required that air quality modelling should no longer assume any air quality benefits from a retrofitted bus.

2.1.26 GM has incorporated the revised guidance, as agreed with JAQU, into the modelling which underpins the development of its CAP to produce a report that appraises the ability of the Investment-led Plan and the CAZ Benchmark to deliver compliance with the legal limit value in the shortest possible time and by no later than 2026.

2.1.27 This was initially reflected in earlier version of this Appraisal Report and supporting documentation which was submitted in December 2023.

2.1.28 Since the production of the Summer 2024 evidence submission, government published the Bus Retrofit Performance Report[11] on the 12th September 2024. The key findings of this report include that the retrofit technology fitted onto retrofitted buses is not reducing NOx emissions to the levels expected and retrofit performance is highly variable. These findings are consistent with the guidance issued in May 2023. Therefore, the publication of the study findings has no impact on the Investment-led Plan.

2.1.29 There have been a number of key developments, resulting in a need to update this Appraisal Report and supporting documentation. These updates do not change GM's conclusion that our preferred Investment-led, non-charging plan can deliver compliance in 2025 and performs better than a Clean Air Zone (CAZ) Benchmark.

2.1.30 This report and supporting documentation have been updated to take account of these key developments that can be summarised as follows:

- Delay to Stockport all-electric bus depot;
- Changes to bus fleets (operational and planned); and

[11] https://assets.publishing.service.gov.uk/media/66e1ab11951c1776394a003c/bus-retrofit-performance-24.pdf

- Correction to Euro V retrofit bus modelling emission values.

2.1.31 The delay to the new Stockport all-electric bus depot, updates to bus service deployment patterns and fleet changes and the correction to the Euro V bus modelling emission values requires changes to the Do Minimum, reported in **Section 3.3** of this updated Appraisal Report. The Investment-led Plan and CAZ Benchmark are both influenced by the updated Do Minimum position and the changes to these scenarios, either in scheme detail or compliance results, are reported in **Sections 5** and **6**.

2.2 Purpose of Document

2.2.1 This document sets out the Do Minimum air quality position and appraises the Investment-led Plan and CAZ Benchmark to deliver compliance with the legal limit value in the shortest possible time and by no later than 2026.

2.2.2 This document is also supported by a series of technical reports, as listed below, which have been produced to summarise the latest position in terms of the modelling outputs and air quality monitoring:

- AQ1: Local Plan Air Quality Modelling Tracking Table (AQ1);
- AQ2: Local Plan Air Quality Modelling Methodology Report (AQ2);
- AQ3: Local Plan Air Quality Modelling Report (AQ3);
- T1: Local Plan Transport Modelling Tracking Table (T1);
- T2: Local Plan Transport Model Validation Report (T2);
- T3: Local Plan Transport Modelling Methodology Report (T3);
- T4: Local Plan Transport Model Forecasting Report (T4);
- Sensitivity Testing Report; and
- Analytical Assurance Statement (AAS).

2.2.3 In addition to the above, separate notes have been produced as part of the Summer 2024 evidence submission following discussions with JAQU including local measure notes and the *Value for Money Note*.

2.3 Core Objectives for the Investment-led Plan

2.3.1 The Investment-led Plan has been developed in accordance with the following core objectives set out in the 'Case for a new Greater Manchester Clean Air Plan':

- To reduce NO_2 concentrations to below the legal limits in the shortest possible time and by 2026 at the latest;
- 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

- Ensure the reduction of harmful emissions is at the centre of GM's wider aim for delivering the Bee Network's core objectives.

2.3.2 The core objectives align with the Critical Success Factor (CSF) criteria, set out in JAQU guidance, which have been applied to the appraisal of an Investment-led Plan against a Regional Centre[12] charging CAZ Benchmark and set out in **Section 9**.

[12] The 'Regional Centre' is defined as the area covering Manchester and Salford city centres in Greater Manchester. For the purpose of the CAZ Benchmark, the Regional Centre boundary is formed on the inside of the Manchester and Salford Inner Relief Route.

3 Air Quality Position in Greater Manchester

3.1 Introduction

3.1.1 This chapter outlines the Do Minimum air quality assessment methodology and results. Air quality in GM has been modelled as part of the GM CAP, and areas of exceedance of the legal limit values identified. The Do Minimum in context of the GM CAP refers to the air quality position in 2025 and 2026 without any associated GM CAP measures that have not already been funded and implemented. This takes into account that government provided the GM Authorities with £123 million of funding for the Previous GM CAP, £17.5 million of which has been spent and implemented – of this, £16 million has been spent on upgrading the bus fleet.

3.1.2 The GM CAP is underpinned by an evidence base derived from data collection, research, analysis and modelling. Throughout the technical development process from 2017 to date, the GM Authorities have used best practice methodology and assumptions and worked closely with government, including, for example, by delivering updates to incorporate the impacts of Covid-19 to the GM CAP in accordance with national guidance.

3.1.3 The modelling approach has been developed in line with JAQU guidance. The purpose of the modelling process is to quantify the impact of traffic by vehicle type on emissions and consequently on concentrations of NO_2 at the roadside in GM.

3.1.4 The air quality problem for GM is assessed with reference to the Do Minimum forecast, which takes into account other investment/interventions that are planned, funded and committed, where they have an impact on travel, traffic or the road network. This includes Previous GM CAP committed and spent funds, as referenced above, as these vehicles have been upgraded and are now in operation on GM's roads. The forecast appraisal years were developed for the Previous GM CAP commencement date for the GM CAP (2021 – not updated), the current expected Investment-led Plan commencement date (2025) and a further year to inform the trajectory of improvement to compliance with the limit values (2026) and also earliest likely full opening year for the CAZ Benchmark.

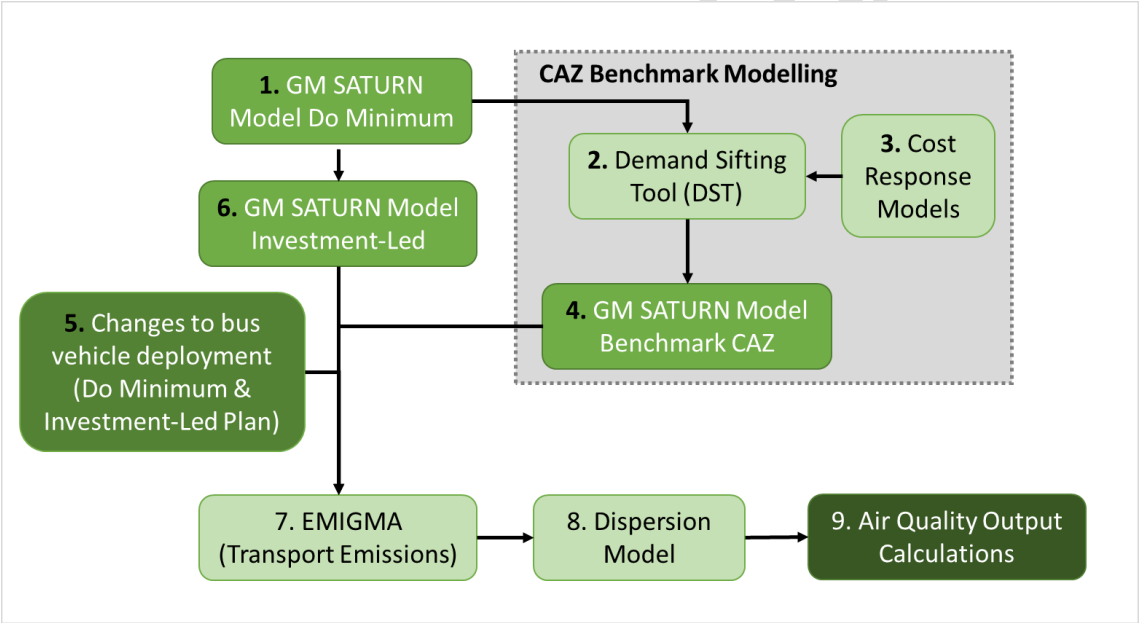
3.2 Methodology

3.2.1 The overall modelling process has remained consistent throughout the development of the GM CAP, whilst updates have been made at relevant stages to take account of a number of factors including reflecting changes to revised vehicle fleet age assumptions (due to Covid-19) or as a response to policy refinements as a result of public consultations.

3.2.2 Throughout the development of the GM CAP, GM has worked closely with JAQU to meet the stated requirements and undertake proportionate analysis, as agreed with JAQU, and updates to the Plan to reflect external factors influence in complying with the legal direction[13]. GM has sought to undertake updates to the Plan to provide an accurate representation of modelled forecast conditions whilst recognising the need to act in the shortest possible time and that exposure to levels above the legal limit for nitrogen dioxide is reduced as quickly as possible.

3.2.3 An overview of the modelling process feeding into the appraisal is presented in **Figure 1**. For a full description of the modelling methodology, please see the associated Technical Reports T1-4 and AQ1-3.

Figure 1 Overview of the Modelling Process



3.3 Do Minimum Position

3.3.1 The Do Minimum modelling baseline has been updated since the Summer 2022 position and subsequently as part of the work to underpin the 'Approach to address persistent exceedances identified on the A58 Bolton Road, Bury' report, submitted in March 2023.

[13] https://assets.publishing.service.gov.uk/media/620b9b578fa8f549097b865f/Environment_Act_1995_Greater_Manchester_Air_Quality_Direction_2022.pdf

3.3.2 The Do Minimum position in 2025 and 2026 takes into account committed schemes outside of the GM CAP such as schemes associated with the City Centre Transport Strategy (CCTS), buses procured to support new franchising operations[14] and vehicle upgrades from other funding sources such as the Zero Emission Bus Regional Area (ZEBRA) fund. This builds on the Do Minimum developed as part of the Previous GM CAP and refined as part of the modelling to support the 'Case for a new Greater Manchester Clean Air Plan' in Summer 2022.

3.3.3 The following changes were made to the Do Minimum modelling from January 2023:

- Transport Appraisal Guidance (TAG)[15] updates including vehicle electrification updates;
- Changes to bus retrofit assumptions and programme;
- Delay to Stockport all-electric bus depot;
- Changes to bus service patterns (including updated routing and frequencies); and
- Updates to CCTS schemes.

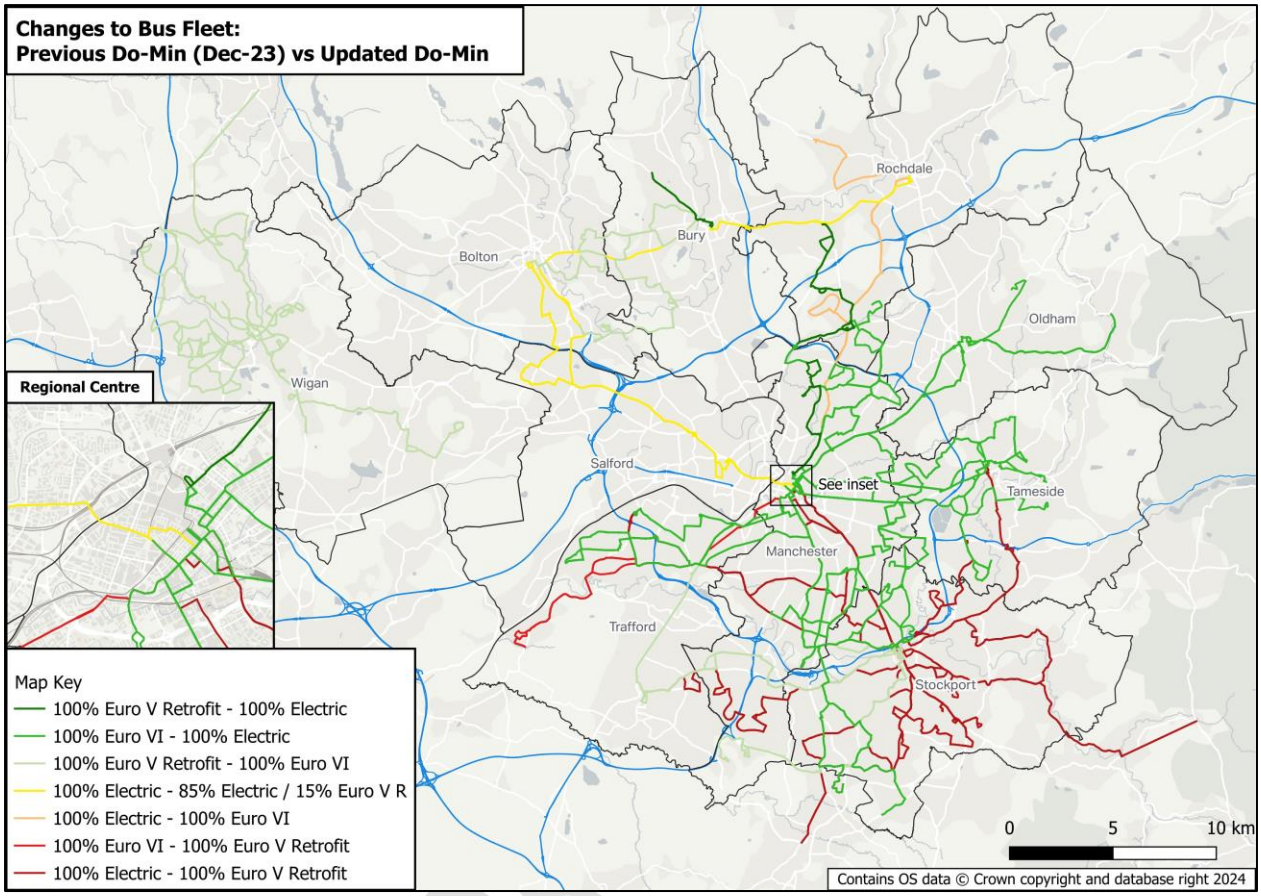
3.3.4 Subsequently, further updates have been made to the Do Minimum modelling since the December 2023 submission:

- Transport Appraisal Guidance (TAG)[16] updates including vehicle electrification updates;
- Changes to bus retrofit assumptions and programme;
- Delay to Stockport all-electric bus depot;
- Changes to bus fleets and service patterns (including updated routings and frequencies);
- Correction to modelling emission values; and
- Updates to CCTS schemes.

3.3.5 The Do Minimum modelling baseline has been updated since the Summer 2022 position and the changes have been summarised above and discussed in further detail in the following sections. Some of these changes have been updated since the production of the December 2023 evidence submission to government. These additional changes are wholly limited to bus-related issues, and are listed in paragraph 2.1.30. **Figure 2** sets out how the key developments since December 2023 have impacted the distribution of bus fleet across Greater Manchester.

[14] GMCA are delivering a bus franchising scheme for local services across the 10 districts in GM with the first two of three tranches now implemented. Further information on bus franchising in GM is contained in Section 4.2.
[15] https://www.gov.uk/guidance/transport-analysis-guidance-tag
[16] https://www.gov.uk/guidance/transport-analysis-guidance-tag

Figure 2 Bus Fleet Changes since December 2023 evidence submission



3.3.6 The updates to the Do Minimum baseline since December 2023 demonstrate that bus services forecast to operate in 2025 have resulted in a higher proportion of Euro V retrofit buses operating in Stockport due to the delays to the Stockport all-electric bus depot and benefit being seen in the areas of redeployment notably Hyde Road, Middleton and Tameside where there is planned electric charging capacity.

3.3.7 The following narrative sets out a summary of changes to the Do Minimum that have been updated since January 2023.

TAG guidance updates including vehicle electrification updates

3.3.8 The TAG Data Book provides transport data and parameter values for input to highway models and appraisals. This includes values of time and vehicle operating costs for assignment modelling, plus forecast proportions of car, LGV and other vehicle kilometres using petrol, diesel and electric propulsion.

3.3.9 An updated version of the TAG Data Book was published in May 2023 (V1.21). The Do Minimum modelling was updated to reflect this revision which has been used to conduct the modelling undertaken to support the December 2023 evidence submission and this submission. Further details can be found in the *AQ3 report*.

3.3.10 Since the publication of the TAG Data Book (V1.21) in May 2023, there have been further releases; V1.22 in November 2023 and V1.23 in May 2024. The updates to TAG include changes to parameters including GDP base year, fuel and electricity prices, population and inflation. However, through previous TAG-related updates, it is expected that changes to the modelling outputs will be minor and it is therefore considered reasonable to maintain the existing version of TAG which was used for the December 2023 evidence submission.

Changes to bus retrofit assumptions and programme

3.3.11 In 2022, JAQU funded a study to quantify NO_X and NO_2 emissions from Clean Vehicle Retrofit Accreditation Scheme (CVRAS)[17] retrofitted buses under real-world driving conditions in three cities across the UK, including Manchester. Monitoring took place in Manchester City Centre between 21st November and 12th December 2022.

3.3.12 The monitoring indicated that retrofitted buses were not reducing emissions as expected, with significant variation in performance between bus models with retrofit technologies. Furthermore, emissions of primary-NO_2 were highly variable, potentially worsening roadside NO_2 concentrations despite an overall reduction in NO_X emissions.

3.3.13 At this stage, government is not proposing any changes to the CAZ compliance status of buses that have already been retrofitted with Selective Catalytic Reduction (SCR) technology whilst they carry out further studies. However, they do not recommend any further retrofit purchases are made until this research is completed.

3.3.14 Between 2015 and 2019, TfGM awarded £3.1m of Clean Bus Technology Fund (CBTF) funding to retrofit 170 buses. In 2020, as part of the GM CAP, government awarded a further £14.7m to retrofit all remaining retrofittable buses. As of June 2024:

- £15.44m has been awarded to retrofit buses across GM;
- £14.97m has been paid out (for 959 retrofitted vehicles); and
- 1 vehicle was in the process of being retrofitted.

3.3.15 Given government's recommendation to pause any further retrofit purchases, TfGM has contacted those operators with vehicles in the process of being retrofitted. Whilst the retrofit option was closed to new applicants, operators have made a financial commitment, for example, by placing a deposit that is non-refundable and therefore are committed to completion of the retrofit of their vehicle.

[17] The government developed the 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 CAZ as accredited under this scheme will be exempt from a charge. Clean air zone framework - GOV.UK (www.gov.uk)

3.3.16 In light of government's new evidence, JAQU issued revised general guidance applicable to CAZ authorities nationwide, along with GM-specific guidance. The general guidance requires that air quality modelling should not assume any benefits from a retrofitted bus. The GM-specific guidance gave the GM Authorities the option to develop a bespoke process to model emissions from retrofitted buses which utilises the available monitoring data. Upon review of remote sensing survey data provided by JAQU, it was determined that it would not be possible to produce a robust and defensible bespoke GM fleet methodology due to sample sizes of specific buses and the scale of variability. Therefore, to enable the GM Authorities to develop the Investment-led Plan as quickly as possible, the GM Authorities progressed with applying the JAQU standard guidance for bus retrofits.

3.3.17 Incorporating this revised guidance into the modelling for the GM CAP has impacted the Do Minimum scenario underlying all of the GM Authorities' modelling work and scheme development to date and, given the large number of retrofitted buses in the region, the impact is significant with modelling shown to result in additional exceedances forecast across the City Region in 2025 and 2026 in the Do Minimum.

Delay to Stockport all-electric bus depot

3.3.18 £35.8 million has been awarded to the GM after a joint bid to DfT's ZEBRA Scheme. Submitted by GMCA, TfGM, Stockport Council and Stagecoach Group PLC this scheme will see the construction of a new purpose-built electric bus depot in Stockport and replace 170 diesel buses that operate from Stockport Bus Depot with Zero Emission technology.

3.3.19 The ZEBRA scheme would convert approximately 10% of the GM bus fleet to Zero Emission technology and result in a reduction of carbon dioxide equivalent (CO_2e) emission from the bus fleet of approximately 100,000 tCO2e by 2038[18].

3.3.20 The Stockport ZEBRA scheme was previously assumed to be delivered within the 2025 Do Minimum. However, construction of the new Stockport all-electric bus depot has been delayed. This is due to challenges with site availability associated with United Utilities works on the sewer assets within the site boundary and the need to adapt the site design to fit within the available footprint.

3.3.21 As a result, the ZEB services operating from Stockport depot have been removed from the Do Minimum modelling.

3.3.22 The 170 ZEBs that were due to operate out of the Stockport depot in 2025 are planned to be redeployed to other GM bus depots including Hyde Road, Middleton and Tameside to operate on other services where there is planned electric charging capacity.

[18] https://democracy.greatermanchester-ca.gov.uk/documents/s18864/15%20GMCA%2020220128%20Zero%20Emission%20Bus%20Regional%20Areas%20ZEBRA%20Fund%20Bid.pdf

3.3.23 The redeployment of these buses allows GM to benefit from the ZEBRA fleet as soon as possible. The Do Minimum has subsequently been updated to reflect the redeployment of ZEB buses onto other services operating out of the depots specified above with Euro V retrofits modelled to operate from this depot as an interim fleet.

Changes to bus fleets and service patterns

3.3.24 The Do Minimum modelled bus services data have been updated to include up-to-date information for routings, frequencies and vehicle deployment based on 2023 services. This reflects changes to service patterns between 2019 and 2023 following the impact of the Covid-19 pandemic and investment into cleaner bus fleets in GM. This also takes into account operator-related changes implemented as part of the rollout of bus franchising.

3.3.25 The Do Minimum modelling has been updated to reflect the inclusion of a fleet of ZEBs which have been deployed on routes into the Regional Centre. This includes further ZEBs that are already funded and are planned to be in operation from 2024.

3.3.26 Since the publication of the December 2023 evidence submission, further updates have been made to the Do Minimum to reflect a 2024 position. These services include:

- Allocation of 73 ZEBs to Queens Road depot, funded through the City Region Sustainable Transport Settlement to enable cascade of fleet into Tranche 3;
- Redeployment of 170 ZEBs that were due to operate out of the Stockport depot, to other GM bus depots including Hyde Road, Middleton and Tameside; and
- Upgrade of fleet to Original Equipment Manufacturer (OEM) Euro VI vehicles on numerous services across all Tranches due to higher specification standards or franchisee upgrade. For example, operator upgrade of 511 and 512 service to OEM Euro VIs (and as a result this upgrade has been removed from the Investment-led Plan).

3.3.27 Further details in relation to changes in specific services can be found in *T3 Report.*

Correction to modelling emission values

3.3.28 As part of updating the emissions modelling tool to prepare for the sensitivity testing on the impacts of bus retrofit performance, an issue was found in the emissions modelling. It was identified that the amount of primary nitrogen dioxide has been underrepresented in the model outputs and therefore in the predicted NO_2 concentrations that have been reported in the December 2023 submission for both the with and without scheme scenarios.

3.3.29 The GM CAP modelling process is a complex series of models that links vehicle travel demand, the dispersal of these emissions into the atmosphere and in the emissions modelling. When a series of revisions to the bus emission factors were made (following evidence from JAQU that bus retrofit solutions from Euro V vehicles have poor and highly variable performance in real world conditions) one of the calibrated parameters (a single standard formula in an Excel spreadsheet tool, that applies a static value for primary nitrogen dioxide in the bus emissions database) was not updated.

3.3.30 Following this issue being identified and to ensure the robustness of modelling going forward, TfGM's Head of Modelling & Analysis has reviewed the modelling processes, to consider any weaknesses in the process, to strengthen the Quality Assurance process for these steps and to identify the checking/reviewing process.

3.3.31 TfGM's Audit & Assurance Team have audited the modelling analysis that underpins the Clean Air Plan submission and reviewed the documentation of the analysis to assure that it has been completed as per the documented QA process. Further information is provided in the *Air Quality Modelling Assurance Report,* included as part of this evidence submission documentation.

3.3.32 Following the modelling correction, the Do Minimum, the Investment-led Plan and CAZ Benchmark have been re-run with the updated results presented in this report and associated technical reports since the production of materials in the December 2023 evidence submission.

Updates to CCTS schemes

3.3.33 There have been substantial changes to transport measures within the Regional Centre in recent years, with further planned changes into the future as part of the CCTS[19].

3.3.34 The CCTS was developed by TfGM, Manchester City Council and Salford City Council and provides a strategy to guide how transport is improved across the Regional Centre over the next two decades. The strategy is a sub-strategy to the GM Transport Strategy 2040 and was published in 2021 following consultation in 2020.

3.3.35 The primary aim of the CCTS is for 90% of all trips to the Regional Centre in the morning peak to be made on foot, by cycle or on public transport before 2040. The strategy sets out proposals to further improve the Regional Centre's public transport and active travel networks and reduce car-based trips over the longer term. Within this, there are a number of planned interventions identified in the context of the GM CAP, in particular those schemes which will be delivered prior to 2025.

[19] City Centre Transport Strategy | Bee Network | Powered by TfGM

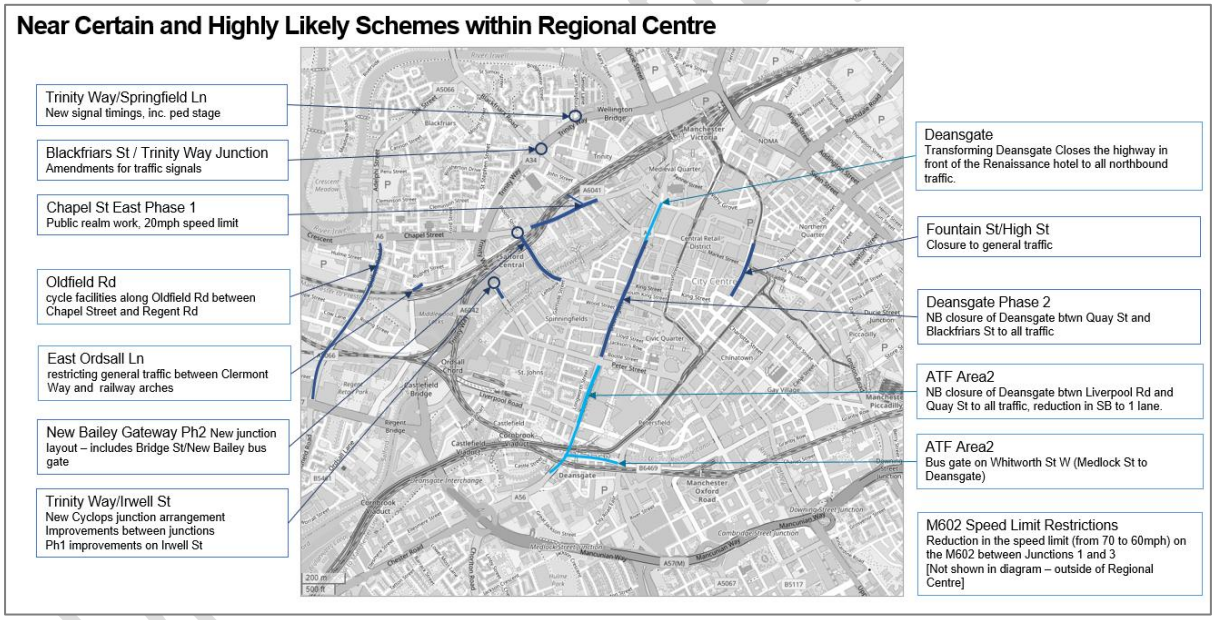
3.3.36 A detailed review of the completed and planned schemes within the Regional Centre has been undertaken to identify the measures required for inclusion within the Do Minimum modelling. This includes:

- Recently completed and built schemes within the Regional Centre comprising bus priority, active travel and traffic restriction; and
- Near certain and highly likely schemes included within CCTS which will be delivered by 2025 and should therefore be incorporated within the Do Minimum model.

3.3.37 The Regional Centre schemes mainly comprise management and small-scale road and junction improvement schemes, including road closures for through traffic, to improve conditions for public transport, walking and cycling. The network impacts of these infrastructure interventions, such as rerouting, are reflected within the current modelling for the GM CAP.

3.3.38 A summary of the committed and planned schemes to be delivered by 2025 is shown in **Figure 3**.

Figure 3 Committed and Planned CCTS Schemes for Delivery by 2025



3.3.39 To ensure consistency of modelling and to reflect appropriate timescales for delivery, the 2026 modelling also retains the same CCTS schemes as represented in the 2025 modelling. The demand impacts associated with the implementation of the CCTS schemes have also been incorporated into the updated Do Minimum. These are unchanged from the evidence submission in December 2023. Further information on the CCTS schemes and related impacts can be viewed in *T3 Appendix A*.

3.4 Updated Air Quality Position

3.4.1 This section summarises the updated Do Minimum air quality position forecast in 2025 and 2026 following changes made since January 2023 and subsequent updates made since the December 2023 submission. Further information on the updated air quality position is reported in the *AQ3 Report.*

3.4.2 **Table 1** shows the distribution of non-compliant sites across GM, both by spatial type and also in terms of how close they are to compliance. By 2025, the first full opening year of the Investment-led Plan, the transition towards cleaner vehicles that would be expected without further action for GM CAP, as well as a reduction in background concentrations, would lead to a substantial reduction in the number of sites in exceedance of the limit value. It is anticipated that 26 sites would be non-compliant, with no sites predicted to experience annual mean concentrations greater than 50 µg/m^3. A further 95 sites would be compliant but experience annual mean concentrations close to but below the limit value. In 2026, the number of forecast exceedances reduces from 26 sites to 17 sites.

3.4.3 Extrapolation of the concentrations beyond 2025/26 is likely to be pessimistic due to the assumptions made about the GM bus fleet for the Do Minimum scenario modelling. The modelled scenarios based on the 2025 bus fleet indicates that GM is not predicted to become fully compliant with the legal limit for NO2 until after 2029 but, in reality, compliance would occur once the Stockpot is electrified and operation with electric buses are serving the A6 corridor to Piccadilly bus station.

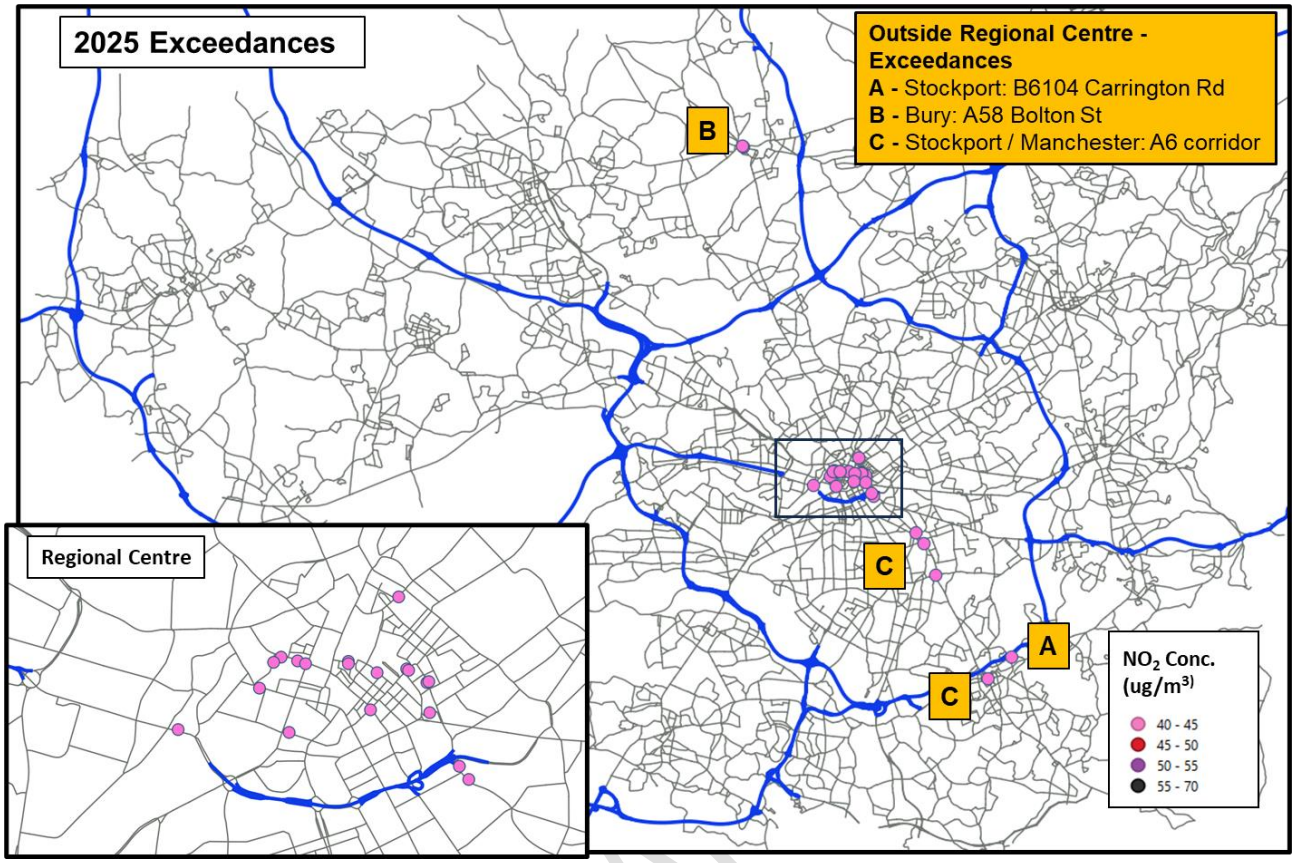
Table 1 Predicted annual mean NO_2 concentrations at points on the GM road network – 2025, 2026 Updated Do Minimum (without the GM CAP)

Road classification[20]	Compliant sites		Non-compliant sites			
	Very compliant (Below 35 µg/m^3)	Compliant but marginal (35 to 40 µg/m^3)	Non-compliant (>40 to 45 µg/m^3)	Very non-compliant (>45 to 50 µg/m^3)	Extremely non-compliant (>50 µg/m^3)	Total non-compliant (>40 µg/m^3)
2025						
Inside IRR	235	22	9	7	0	16
Other urban centres	225	12	0	0	0	0
Other locations	1959	61	10	0	0	10
Total	**2419**	**95**	**19**	**7**	**0**	**26**
2026						
Inside IRR	241	21	6	5	0	11
Urban centres	233	4	0	0	0	0
Other locations	1993	31	6	0	0	6
Total	**2467**	**56**	**12**	**5**	**0**	**17**

3.4.4 **Figure 4** shows the spatial distribution of the 26 NO_2 exceedance sites across GM modelled to remain without action in the updated Do Minimum in 2025. Spatially, there is a grouping of exceedances located in the Regional Centre. There are 5 sites forecast to be in exceedance in 2025 located south of the Regional Centre along the A6 corridor through Manchester and Stockport which is associated with the delays to the ZEBRA electrification of services operating out of the Stockport depot and the use of an interim Euro V retrofit fleet. These exceedances were not present in the Do Minimum modelling presented in the December 2023 evidence submission. There are 2 sites on the A58 Bolton Street in Bury forecast to be in exceedance in 2025 which has been a persistent exceedance site and present in earlier model runs conducted.

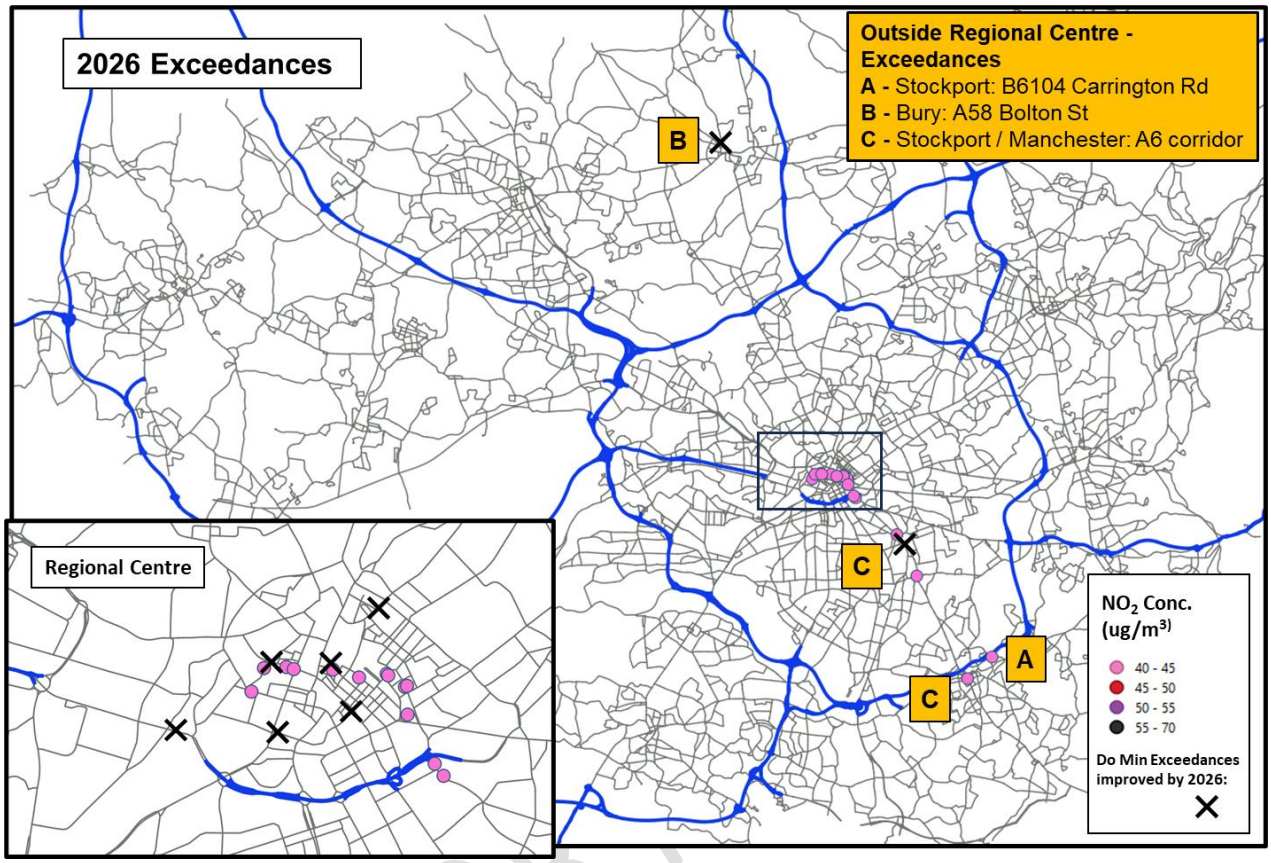
Figure 4 Spatial distribution of predicted annual mean NO_2 exceedance sites – 2025 Updated Do Minimum (without the GM CAP)

[20] "Inside Inner Relief Route" is the area encircled by the IRR. "Urban centres" are areas that met a definition used for the purposes of air quality modelling for OBC Option testing. "Other locations" are roads outside of Urban centres and the IRR.



3.4.5 As shown in **Figure 5**, there are 17 sites predicted to remain in exceedance in 2026, as concentrations reduce with the natural replacement of vehicle fleet with cleaner models. 13 sites are forecast to remain in exceedance in the Regional Centre with 4 outlier sites (B6104 Carrington Road, A6 Stockport Road (2 sites) and A6 Wellington Road) remaining.

Figure 5 Spatial distribution of predicted annual mean NO_2 exceedance sites – 2026 Updated Do Minimum (without the GM CAP)



3.5 Summary

3.5.1 The GM CAP modelling process has remained consistent throughout the development of the plan whilst updates have been made at relevant stages to reflect the latest position as set out within this section.

3.5.2 The revised Do Minimum baseline position shows that there are 26 exceedance sites predicted in 2025 without action which reduces to 17 sites in 2026. The spatial distribution of these exceedance sites is largely consistent with earlier iterations of the modelling with a high proportion of sites remaining in the Regional Centre. The clustering of exceedances along the A6 corridor in Manchester and Stockport is associated with the redeployment of ZEB buses on Stockport services due to delays to the ZEBRA electrification scheme at Stockport depot. The modelling correction to the Euro V retrofit bus emissions calculation has also resulted in the interim fleet operating out of the Stockport depot modelled to worsen emissions along this corridor.

4 Appraisal Approach

4.1 Background

4.1.1 The GM Authorities have worked with government throughout the development of the GM CAP and progressed through optioneering at the OBC stage, including an appraisal report[21] prior to new evidence emerging over 2021/2022 that led the GM Authorities conclude that a charging scheme was no longer the right solution for GM.

4.1.2 This appraisal approach considers the GM Authorities' Investment-led Plan benchmarked against a Regional Centre Charging Class C CAZ (the CAZ Benchmark) using the government's CSFs.

4.1.3 This chapter provides an overview and hierarchy of each CSF. The Investment-led Plan and the CAZ Benchmark are appraised against these CSFs as set out in **Section 9**.

4.2 Success Factors – Overview

4.2.1 The GM Authorities' Investment-led Plan and the CAZ Benchmark have been assessed against the government's CSFs. The CSFs used to assess the two approaches are consistent with those used during the OBC stage and comprise of the following CSFs set out by JAQU.

4.3 Critical Success Factors

4.3.1 The primary objective of the GM CAP is to achieve compliance in the shortest possible time. This is considered to be the Determining Success Factor by which a programme is appraised.

Primary Critical Success Factors

4.3.2 Primary CSFs (set out during the Strategic Outline Case (SOC) process to understand a wider range of impacts of different measures beyond those considered critical within the JAQU guidance and consistent with those used at OBC stage):

- Reduction in NO_2 emissions: the likelihood that the measure/scenario will contribute significantly to a reduction in NO_2 concentrations, enough to achieve compliance with the legal limit values[22] in the shortest possible time.

[21] https://assets.ctfassets.net/tlpqbvy1k6h2/uCbNfiDpTY49uAUTFEzVO/b3ae7ceb4e8be0dcb36008fba4939ce9/Options_Appraisal_Report.pdf

[22] The EU Ambient Air Quality Directive set the legal limit value of an annual mean of 40ug/m^3, which was transposed into UK legislation under the Air Quality Standards Regulations 2010. The requirement to meet compliance with the legal limit is set out by the Environment Act 1995 (Greater Manchester) Air Quality Direction 2022. Under this direction the GM Authorities are obliged to meet the legal limit.

- Feasibility: the likelihood of the measure being implemented in the shortest possible time to deliver the desired NO_2 reduction and achieve compliance.

Secondary Critical Success Factors

4.3.3 Secondary CSFs (developed during the OBC stage in discussion with JAQU):

- Strategic fit with local strategies and plans: ensuring the alignment of the scenario with longer term economic, social and environmental goals and that the risk of unintended consequences is minimised.
- Value for money: an indication of the costs and benefits of each scenario.
- Distributional impact: in order to understand the potential impacts, both positive and negative, on different locations and groups within society, with a particular focus on the most vulnerable individuals. It is of vital importance that the Plan does not result in significant economic or social impacts for the region or those living, working or doing business within it.
- Deliverability - A series of measures assessing the deliverability of the scenarios in terms of:
    - Affordability of the cost of implementation.
    - Supply-side capacity and capability.
    - Achievability of delivering the scenario.

5 Investment-led Plan

5.1 Overview / Background

5.1.1 The 'Case for a new Greater Manchester Clean Air Plan'[23] set out the GM Authorities' case for an investment-led, non-charging GM CAP to target action at the most polluted places. This could be delivered using a three-pillared approach including:

- Funding for electric buses;
- Funding to support vehicle upgrades; and
- Working in partnership with delivery bodies and other stakeholders to develop targeted solutions.

5.1.2 In light of government's evidence on bus retrofit and having incorporated the revised guidance from JAQU into the GM Authorities' modelling, it is considered that targeted investment into cleaner buses and taxis would provide the most effective means to achieve compliance under an Investment-led Plan. This would be supplemented by local highway-based measures at known persistent exceedance locations at A57 Regent Road and A34 Quay Street / Great Bridgewater St. A summary of the measures is shown in **Table 2**, with each measure then being set out in more detail below.

[23] https://assets.ctfassets.net/tlpgbvy1k6h2/7jtkDc5AODypDQlw0cYwsl/67091a85f26e7c503a19ec7aeb2e8137/Appendix_1_-_Case_for_a_new_Greater_Manchester_Clean_Air_Plan.pdf

Table 2 Investment-led Plan Summary of Measures

Investment-led Plan	Description
GM-Wide Measures	
Funding for Cleaner Buses	Funding will be allocated to purchase cleaner buses that operate on services that pass remaining exceedance sites in 2025 to achieve compliance in the shortest possible time and by 2026 at the latest. Funding to upgrade to ZEBs will be prioritised. Where this is not possible due to the inability to provide supporting infrastructure to operate ZEB services in 2025, funding will be allocated to OEM Euro VI vehicles. The funding allocated to this measure is £32.2 million for 117 cleaner buses. The funding is split into: - £23.8 million for the purchase of 40 ZEBs at Bolton - £8.4 million for the upgrade of 77 buses to OEM Euro VI at Stockport A further 73 ZEBs will be allocated to Queens Road depot on the services that pass remaining exceedance sites in 2025. Funding is not required for ZEBs at Queens Road (but is required for the depot electric charging infrastructure).
Bus Electric Charging Infrastructure	Funding to provide electric charging infrastructure to support the additional 40 ZEBs at Bolton, as well as the further 73 ZEBs at Queens Road (noting funding is not required for the buses at Queens Road). The ZEB services from these depots are required to operate on modelled exceedance routes to achieve compliance at these locations by 2025 alongside other investment-led measures. In addition, the Manchester City Centre Free Bus will have additional charging infrastructure at Manchester Piccadilly Approach. The funding will be used to increase the existing charging capacity at Bolton bus depot whilst providing new charging capacity at Queens Road and upgrade the infrastructure at Piccadilly Approach. The funding allocated to this measure is £17.8 million.
Bus Service Relocation	Funding will be allocated for the additional operational costs to move services from Bolton to Wigan depot, which in turn facilitate the additional ZEBs at Bolton. The relocation of services to Wigan enables the ZEBs to be operated from Bolton depot as a supporting measure to funding for cleaner buses. The funding allocated to this element is £1.1 million.
Taxi Measures	The taxi measures comprise of two components: • Funding for taxis; and • A GM-wide consistent emission standard **Funding for taxis** Taxi funding will be delivered in the form of a grant for the upgrade of Hackney Carriages and PHVs licensed in GM to cleaner vehicles. Eligible applicants will be offered a running cost grant towards the running costs of a new Zero Emissions Capable (ZEC) vehicle, or a contribution towards a replacement vehicle. There are two funding options proposed for taxis: • **Core Fund**: This fund will be available for GM-licensed, non-compliant Hackney Carriages and PHVs. The funding allocated to this measure is £22.5 million. • **EV Hackney Fund:** this fund will be available for GM-licensed, Internal Combustion Engine (ICE) compliant

Investment-led Plan	Description
	Hackney Carriages. The funding allocated to this measure is £7.9 million. The per-vehicle funding amounts are consistent across both funding options and have been uplifted by inflation accrued between the finalisation of the Previous GM CAP (2021) up to and including 2024. The per-vehicle funding amounts are split into funding for upgrade to wheelchair accessible vehicles (WAVs) and funding for upgrade to non-wheelchair accessible vehicles (non-WAVs), as follows: <u>Upgrade to WAV</u> • Up to £12,260 towards the running costs of a new purpose-built WAV ZEC replacement vehicle. This option is available when the compliant replacement vehicle acquired with GM CAP funds has also been eligible for a government plug-in grant; or • Up to £12,260 towards a second-hand purpose-built WAV ZEC replacement vehicle; or • Up to £6,280 towards a compliant purpose-built WAV replacement vehicle (Euro IV petrol or Euro VI diesel or better). <u>Upgrade to non-WAV</u> • Up to £7,530 towards the running costs of a new ZEC replacement vehicle; or • Up to £7,530 towards a second-hand ZEC replacement vehicle; or • Up to £3,770 towards a compliant replacement vehicle (Euro 4 petrol or Euro 6 diesel or better); or • Up to £6,280 towards a compliant replacement 6+ seater vehicle (Euro IV petrol or Euro VI diesel or better). All funding is subject to meeting eligibility criteria set out in the *Clean Taxi Fund – Eligibility Criteria & Funding Administration* note. **<u>GM-wide consistent taxi emission standard</u>** The majority of GM Authorities originally approved the implementation of vehicle emission standards as part of the conditions to license taxis with that particular authority however the dates for implementation were not consistent across GM and not all authorities have agreed to establish this standard to date. The Investment-led Plan includes proposals for a consistent emission standard (Euro 4 petrol, Euro 6 diesel) across the 10 GM local authorities to be implemented by 31st December 2025 following a transition start date on the 1st January 2025.
Local Measures	
A57 Regent Road – Local Measures	TfGM have worked closely with Salford City Council to develop a package of measures around the A57 Regent Road which are modelled to achieve compliance in the forecast year 2025. The local measures at this location comprise of the following: • Speed limit reduction from 40mph to 30mph • Speed limit enforcement through A57 Regent Road corridor • Signal timing adjustment on A57 Regent Road and adjacent parallels

Investment-led Plan	Description
	• Yellow box enforcement at junctions along the corridor.
A34 Quay Street / Great Bridgewater St – Local Measures	TfGM have been working closely with Manchester City Council to develop and test a number of locally deliverable options to implement in the St John's area of Manchester City Centre. The option development process has taken account of physical interventions, signal timing adjustments and supplementary measures to achieve forecast year 2025 compliance at this location. The identified preferred option which is modelled to achieve compliance in 2025 is traffic management measures in the St John's area.
Local Measures - Total	The funding allocated to the package of local measures at the A57 Regent Road and the A34 Quay Street area is £5.0 million.

5.1.3 **Table 3** provides a summary comparison of the Investment-led Plan measures between those identified in the December 2023 evidence submission and how they have been refined for this further evidence submission.

Table 3 Investment-led Plan – Summary of changes since December 2023

Investment-led Plan	Description	Status	Brief summary of update since December 2023 evidence submission
Funding for Cleaner Buses	Purchase of 40 ZEBs	**Change**	Number of ZEBs required funding has been revised down from 64 to 40. A further 73 ZEBs will be provided, but no funding required.
	Upgrade of 77 busses to OEM Euro VI	**Change**	New funding ask for upgrading 77 buses to OEM Euro VIs due to Stockport all-electric bus depot delay and variable NO_2 results from retrofitted buses.
Bus Electric Charging Infrastructure	Chargers at Bolton, Queens Road and Piccadilly Approach.	**Change**	Increase in dual chargers required at Bolton and Queens Road. No funding for chargers required for Middleton depot. No change in chargers for Piccadilly Approach.
Bus Service Relocation	Relocation of bus services	**Change**	New funding ask to relocate services from Bolton to Wigan depots to facilitate ZEBs at Bolton.
Taxi Measures	Funding for taxis – Core Fund & EV Hackney Fund	**No Change**	n/a
	GM-wide consistent emission standard	**No Change**	n/a
Local Measures	A57 Regent Road – Local Measures	**Change**	Speed and yellow box enforcement measures have been included.
	A34 Quay Street / Great Bridgewater Street	**Change**	Measure refined from 10mph test to a traffic management scheme on Lower Byrom Street – modelled air quality benefits both achieve compliance.

5.2 Bus Investment

5.2.1 Investment in cleaner buses represents the most important mechanism for reducing exceedances under the Investment-led Plan and is grounded in the ability now provided by GM operating a bus franchising scheme.

5.2.2 The GMCA is delivering a bus franchising scheme for local services across all 10 districts in GM. TfGM is responsible for operating the franchising scheme on behalf of the GMCA and has the authority to manage franchise agreements in respect of local services, including the specification of fleet requirements and deployment.

5.2.3 The implementation of bus franchising across the region is being delivered in three tranches:

- Tranche 1 (24th September 2023) – covering Bolton, Wigan and parts of Salford and Bury;
- Tranche 2 (24th March 2024) – covering Oldham, Rochdale and parts of Bury, Salford and north Manchester; and
- Tranche 3 (5th January 2025) – covering Stockport, Tameside, Trafford and the remaining parts of Manchester and Salford.

5.2.4 As part of bus franchising, GM has set out its vision for better buses for GM and how it wants to see the bus system develop to 2030 through its Bus Strategy[24]. GM wants its bus system to:

- Provide consistent and attractive car-free connectivity for all;
- Connect to other parts of the Bee Network and longer distance public transport;
- Support attractive urban places, including town centres and new developments;
- Have a positive impact on public health and the environment;
- Provide people with more travel options in the day and night; and
- Be accountable and a source of shared local pride.

[24] https://assets.ctfassets.net/nv7y93idf4jq/6c6HrEMbs6OJBmFa0P8HFo/bdd8114c64ae8acb26174ba864b72315/GM_Bus_Strategy_-_PUBLICATION.pdf

5.2.5 The GM Bus Strategy highlights that transport currently accounts for around a third of carbon emissions in GM. Local authorities have declared a Climate Emergency and the city-region aims to be completely carbon neutral by 2038. To achieve this, more people need to choose to travel by bus and other more sustainable forms of transport. TfGM's ambition is for the full electrification of GM's bus fleet (and supporting infrastructure) by 2032, with 50% of the fleet to be zero emission by 2027. As older, polluting vehicles are replaced with cleaner alternatives, the positive environmental difference that buses can make will grow.

5.2.6 Operationalising bus franchising across GM is a complex and challenging programme, both in terms of fleet deployment and depot acquisition and upgrades. The bus franchising programme is delivering investments in cleaner buses and supporting infrastructure upgrades which complement the GM CAP. One of these investments is being made at Stockport depot through the ZEBRA scheme following a joint bid by GMCA, TfGM, Stockport Council and Stagecoach Group PLC. It was previously envisaged that this depot electrification would be completed from Q3 of 2025 however following challenges to site availability, this has been delayed and as such has been removed from the Clean Air Plan Do Minimum modelling.

5.2.7 As of June 2024, the following ZEBs are in operation / planned:

- 32 electric buses funded by government's Ultra-low Emission Bus (ULEB) scheme. Manchester Airport, five hospitals and three universities. This fleet will be adopted into the franchise model at the commencement of Tranche 3 franchise operations.
- 100 electric buses funded from government's City Region Sustainable Transport Settlement (CRSTS):
    - 50 buses now operating out of Bolton depot and used for services in Tranche 1 of franchising – Bolton, Wigan, parts of Bury, Salford and Manchester.
    - 50 buses now operating out of Oldham depot and used in Tranche 2 of franchising - Bury, Rochdale and Oldham and parts of Manchester, Salford and Tameside.
- 170 electric buses to be deployed across GM from funding secured as part of the DfT's ZEBRA scheme bid. Due to the delays to Stockport all-electric bus depot[25], these buses have been redeployed across the network including to Hyde Road, Middleton and Tameside depots where there is planned electric charging infrastructure.
- Around 250 more buses to be delivered between 2024 and 2027 (committed franchising funded from CRSTS), drawing down funding from CRSTS.

[25] GMCA/TfGM are committed to an all-electric bus depot / fleet in Stockport. TfGM are working closely with Stockport Officers to find a suitable site. It is currently anticipated that the Zero Emission Bus Depot in Stockport would be delivered and operational for late 2028 / early 2029.

5.2.8 In addition to the deployment of ZEBs, GM has deployed new OEM Euro VIs as part of the rollout of bus franchising. A significant number of services across all three tranches are now to be operated with OEM Euro VIs.

5.2.9 Based on the forecast levels of exceedance at each GM site in 2025, and the proportion of buses that pass the exceedance sites, the proportion of ZEBs and OEM Euro VIs required to achieve compliance has been identified. Where possible, upgrade to ZEBs have been prioritised over OEM Euro VIs if there is sufficient depot charging capacity to operate services. This approach recognises that the updated exceedance position assumes no air quality benefits from retrofitted buses in accordance with the guidance set out by JAQU.

5.2.10 The funding for cleaner buses as part of the Investment-led Plan comprises of upgrade of buses to ZEBs and upgrade to OEM Euro VI standard. The funding requirement for upgrades are driven by two factors:

- ZEB upgrade: 40 ZEBs where it is modelled that compliance cannot be achieved through upgrade to OEM Euro VIs alone. The exceedance sites located on these bus corridors can be referred to as persistent exceedance sites forecast for 2025.
- OEM Euro VI upgrade: 77 vehicles modelled to be operated from the Stockport depot onto routes for clean air purposes where compliance can be achieved via a OEM Euro VI fleet.

5.2.11 In addition to the ZEBs that require funding, 73 ZEBs will be allocated to the Queens Road depot on the services that pass remaining exceedance sites in 2025. Funding is not required for the ZEBs at Queens Road as they will be provided by the committed franchising funding from CRSTS (but funding is required for the depot electric charging infrastructure).

ZEB upgrade

5.2.12 The Investment-led Plan targets deployment of ZEBs (40 from Bolton and 73 from Queens Road) at the following persistent exceedance locations based on the inability to achieve compliance at this location through OEM Euro VI upgrades alone:

- **A34 Bridge Street, Manchester** (3 locations) – Three bus services (36, 37 & X39) pass these exceedance locations that require upgrade to ZEBs using the GM CAP funds. Funding is not required for a further four services (1, 67, 67A &100) that require upgrade to ZEBs at these exceedance locations.
- **A34 Quay Street, Manchester / Gartside Street, Manchester** (2 locations) – Funding is not required for the one bus service (1 - the Manchester City Centre Free Bus 1) that requires upgrade to ZEBs at these exceedance locations.

- **A57 Regent Road, Salford / Great Bridgewater Street** (2 locations) – Funding is not required for the two bus services (33 & 33B) that require upgrade to ZEBs at these exceedance locations.
- **A58 Bolton Street, Bury** (2 locations) – Three bus services (471, 472 & 474) pass these exceedance locations that require upgrade to ZEBs using the GM CAP funds. Funding is not required for a further three services (98, 477 & 480) that require upgrade to ZEBs at these exceedance locations.
- **A6 Piccadilly, Manchester** (2 locations) – Funding is not required for the two bus services (1 & 2) that require upgrade to ZEBs at these exceedance locations. A further two services (192 & X92) that requires upgrade to OEM Euro VI pass these exceedance locations.
- **A664 Shudehill, Manchester** (1 location) – One bus service (163) passes this exceedance location that requires upgrade to ZEBs using the GM CAP funds.
- **King Street, Manchester** (2 locations) – Three bus services (36, 37 & X39) pass these exceedance locations that require upgrade to ZEBs using the GM CAP funds. Funding is not required for a further two services (1 & 2) that require upgrade to ZEBs at these exceedance locations.
- **New York Street, Manchester** (1 location) – Three bus services (36, 37 & X39) pass this exceedance location that require upgrade to ZEBs using the GM CAP funds. Funding is not required for a further one service (1) that requires upgrade to ZEBs at this exceedance location.
- **Portland Street, Manchester** (3 locations) – Two bus services (36 & 37) pass one of these exceedance locations that require upgrade to ZEBs using the GM CAP funds. Funding is not required for a further four services (1, 2, 33 & 33B) that require upgrade to ZEBs at these exceedance locations. A further two services (192 & X92) that require upgrade to OEM Euro VI pass two of these exceedance locations.

OEM Euro VI upgrade

5.2.13 The locations where additional OEM Euro VIs are required for clean air compliance are concentrated along the A6 Manchester/Stockport corridor and a single exceedance location in Stockport, located close to the M60 motorway (B1604 Carrington Road). The full list of exceedance sites is shown below:

- **A6 Ardwick Green, Manchester** (1 location) – Two bus services (192 & X92) pass this exceedance location that require upgrade to OEM Euro VIs using the GM CAP funds.
- **A6 London Road, Manchester** (1 location) – Two bus services (192 & X92) pass this exceedance location that require upgrade to OEM Euro VIs using the GM CAP funds.

- **A6 Piccadilly, Manchester** (2 locations) – Two bus services (192 & X92) pass these exceedance locations that require upgrade to OEM Euro VIs using the GM CAP funds. A further two services (1 & 2) that require upgrade to ZEBs pass these exceedance locations.
- **A6 Stockport Road, Manchester** (3 locations) – Two bus services (192 & X92) pass these exceedance locations that require upgrade to OEM Euro VIs using the GM CAP funds.
- **A6 Wellington Road South, Stockport** (1 location) – Four bus services (192, X92, 383 & 384) pass these exceedance locations that require upgrade to OEM Euro VIs using the GM CAP funds.
- **A6 Whitworth Street, Manchester** (1 location) – Two bus services (192 & X92) pass this exceedance location that require upgrade to OEM Euro VIs using the GM CAP funds.
- **B6104 Carrington Road, Stockport** (1 location) – Two bus services (325 & 330) pass this exceedance location that require upgrade to OEM Euro VIs using the GM CAP funds.
- **Portland Street, Manchester** (2 locations) – Two bus services (192 & X92) pass these exceedance locations that require upgrade to OEM Euro VIs using the GM CAP funds. A further six services 1, 2, 33, 33B, 36 & 37) that require upgrade to ZEBs pass these exceedance locations.

5.2.14 **Table 4** illustrates the changes to fleet type (ZEB / OEM Euro VI) that is required to deliver compliance in 2025. This assumes delivery of committed franchising service upgrades to ZEB and OEM Euro VI. Whilst the bus measures are modelled to be very effective across all exceedance locations, there are three exceedance sites which remain after the deployment of the bus measures; A57 Regent Road, A34 Quay Street and Great Bridgewater Street. The ability of the bus fleet investment to be deployed and be effective at the forecast 2025 exceedance sites are dependent on having sufficient ability of depot charging infrastructure which is captured in the following section (from paragraph 5.2.21).

Table 4 Summary of fleet requirements to achieve compliance

Route	Tranche	Depot	Bus Type	Vehicles *	Indicative Changes to Fleet Type	Exceedance
36	1	Bolton	ZEB	20	40 additional ZEBs required with depot electrification additional capacity (90 ZEBs required in total, with 50 currently operating).	A34 Bridge St, Manchester King St, Manchester New York St, Manchester Portland St, Manchester
37	1	Bolton	ZEB	20		
163	1	Bolton	ZEB	20		A664 Shudehill, Manchester
471	1	Bolton	ZEB	20		A58 Bolton St, Bury
472/ 474	1	Bolton	ZEB	10		
X39	1	Bolton	ZEB	0**		A34 Bridge St, Manchester King St, Manchester New York St, Manchester
1	2	Queens Road	ZEB	6	73 ZEBs required (no funding required for ZEBs) with depot electrification.	A6 Piccadilly, Manchester A34 Bridge St, Manchester A34 Quay St, Manchester Gartside St, Manchester King St, Manchester New York St, Manchester Portland St, Manchester
2	2	Queens Road	ZEB	3		A6 Piccadilly, Manchester King St, Manchester Portland St, Manchester
33/ 33B	2	Queens Road	ZEB	5		A57 Regent Rd, Salford Great Bridgewater St, Manchester Portland St, Manchester
67/ 67A	2	Queens Road	ZEB	12		A34 Bridge St, Manchester
97/ 98	2	Queens Road	ZEB	17		A58 Bolton St, Bury
100	2	Queens Road	ZEB	13		A34 Bridge St, Manchester
135	2	Queens Road	ZEB	14		Site of risk at Lever Street, Manchester (High NO2 monitored results recorded at this site)
477	2	Queens Road	ZEB	1		A58 Bolton St, Bury
480	2	Queens Road	ZEB	2		
192/ X92	3	Stockport	Euro VI	47	Upgrade of 77 buses to OEM Euro VI.	A6 Ardwick Green, Manchester A6 London Rd, Manchester A6 Piccadilly, Manchester A6 Stockport Rd, Manchester A6 Wellington Rd South, Stockport A6 Whitworth St, Manchester Portland St, Manchester
325	3	Stockport	Euro VI	5		B6104 Carrington Rd, Stockport
330	3	Stockport	Euro VI	16		
383/ 384	3	Stockport	Euro VI	9		A6 Wellington Rd South, Stockport

* This assumes delivery of committed franchising service upgrades to ZEB and OEM Euro VI.

** The X39 is operated with the fleet used for the 36, 37 & 471 services, therefore no additional ZEBs are required for this service.

5.2.15 From a review of bus services, the peak vehicle requirement to operate these services was identified (including spares). The depot the services operate out of and which tranche of bus franchising the services were allocated to was also noted.

5.2.16 40 buses operating from Bolton depot require upgrade to ZEBs to achieve compliance at A34 Bridge Street (Manchester), King Street (Manchester), New York Street (Manchester), Portland Street (Manchester), A664 Shudehill (Manchester) and A58 Bolton Street (Bury). The total fleet required to operate the services past these exceedance locations is 90 ZEBs and therefore with the 50 ZEBs that currently operate on these routes (as part of the bus franchising programme), the additional number of vehicles that require upgrade to ZEBs is 40.

5.2.17 73 buses operating from Queens Road depot require upgrade to ZEBs to achieve compliance at A6 Piccadilly (Manchester), A34 Bridge Street (Manchester), A34 Quay Street (Manchester), A57 Regent Road (Salford), A58 Bolton Street (Bury), Gartside Street (Manchester), Great Bridgewater Street (Manchester), King Street (Manchester), New York Street (Manchester) and Portland Street (Manchester). The total fleet required to operate the services past these exceedance locations is 73 ZEBs however funding is not required for the ZEBs at Queens Road as they will be provided by the committed franchising funding from CRSTS (but funding is required for the depot electric charging infrastructure).

5.2.18 It has been determined that there are a number of exceedance sites located in the Regional Centre and along the A6 corridor to Stockport, as well as B6104 Carrington Road (Stockport) which can achieve compliance through 77 buses upgraded to OEM Euro VI.

5.2.19 GM is taking action to address exceedance sites in the Regional Centre through purchase of ZEBs and OEM Euro VIs. This has resulted in targeted air quality improvement along bus corridors. However, based on changes to fleet and expected franchising deployment, three exceedance sites remain (A57 Regent Road, A34 Quay Street and Great Bridgewater Street) after the deployment of buses across the three tranches. This position is consistent with the results presented in the December 2023 evidence submission.

5.2.20 From a deliverability perspective, the requirement to operate the additional ZEBs is dependent on there being adequate supporting electric vehicle charging infrastructure at depots to operate these services. The GM Authorities have undertaken analysis to determine this requirement which is set out below.

Bus Electric Charging Infrastructure

5.2.21 To meet the ZEB service requirements at exceedance sites, depot upgrades are required to support the higher provision of electric vehicles across three sites: Bolton depot, Queens Road depot and Manchester Piccadilly. The scale of upgrade varies by depot based on the current provision of electric charging infrastructure to support the existing franchised operation.

5.2.22 A summary of the infrastructure requirements by depot are set out below:

- **Bolton**: Extension of existing electrification works undertaken in 2023. No additional electrical supply from the power network operator (Electricity North West) is required to facilitate the proposed capacity increases. High and low voltage supply and chargers, associated civils and systems are required. The provision of an additional 20 dual chargers will support an additional 40 ZEBs operating out of this location.
- **Queens Road**: There is a minimal charging infrastructure available to service three existing vehicles and therefore the depot requires extensive upgrades to accommodate the charging infrastructure for the 73 ZEBs. The depot requires incoming supply along with all charging infrastructure. Due to depot constraints (internal layout and age of structure), a gantry-based solution is required to minimise works footprint and impact on bus operations during construction. The requirement at Queens Road for CAP is for an additional 37 dual chargers to support the 73 ZEBs operating out of this location. To operate the required number of ZEBs out of this depot onto routes for clean air purposes, partial electrification of this depot is required and has been costed. It should be stated that the Queens Road depot would not be electrified if it was not for the implementation timescales required to meet clean air compliance, reflecting costs for electrification of the depot.
- **Manchester Piccadilly**: It is considered that one dual charger would provide sufficient charging infrastructure to support the operation of the 9 buses which operate the Regional Centre Free Bus. Whilst these buses depot in Queens Road, the nature of their operation requires enroute charging.

5.2.23 The work to electrify the Queens Road depot will also enable an identified site of risk at Lever Street to be mitigated through deployment of a ZEBs on the 135 service which passes a site which has high NO_2 concentrations through the 2023 monitoring data but falls within the modelled forecast compliance.

Bus Service Relocation

5.2.24 To facilitate an additional 40 ZEBs operating out of the Bolton depot, a review of current services has been conducted to determine whether any existing services could operate out of a different depot due to infrastructure constraints. Following this exercise, a number of services have been identified to operate out of Wigan depot with services moving across to facilitate the additional ZEB services operating out of Bolton depot for clean air purposes. The transfer of services to Wigan depot has resulted in additional operating costs for the affected services relating to increased bus mileage to/and from the depot and other associated costs.

Bus Measures Summary

5.2.25 Bus measures represent the most important mechanism for reducing exceedances under the Investment-led Plan and are grounded in the ability of TfGM to operate a bus franchising scheme. TfGM is responsible for operating the franchising scheme on behalf of the GMCA and has the authority to manage franchise agreements in respect of local services, including the specification of fleet requirements and deployment.

5.2.26 Based on the level of exceedance at each GM site in 2025 and the proportion of buses that pass the exceedance sites, the proportion of ZEBs and OEM Euro VIs required to achieve compliance has been identified. Deployment of sufficient ZEBs and OEM Euro VIs at the 26 exceedance locations predicted in 2025 would result in three remaining exceedances in 2025 (A57 Regent Road, Great Bridgewater Street and A34 Quay Street) which require additional measures to achieve compliance.

5.3 Taxi Measures

Background

5.3.1 The GM Authorities were awarded £20.3 million in Clean Air Funding as part of the Previous GM CAP to support the upgrades of non-compliant Hackney Carriages (£10.1m) and PHVs (£10.2 million) to mitigate against the impact of a Charging Class C CAZ. The funds have yet to be opened however there has been spend associated with the Early Financial Support scheme to reimburse those who evidenced that they upgraded their vehicle in response to the introduction to a CAZ. This amount totals £115,000 for Hackney Carriages and £23,000 for PHVs.

5.3.2 As set out in **Table 5**, there are approximately 13,750 GM taxis (Hackney Carriages and PHVs) licensed in GM recorded through the GM licensing database in June 2023. A summary of the GM-licensed Hackney Carriage and PHV statistics are summarised below:

- There are 1,181 non-compliant GM-licensed Hackney Carriages operating in GM. This equates to 62% of the total GM-licensed Hackney Carriages.
- There are 2,343 non-compliant GM-licensed PHVs operating in GM. This equates to 20% of the total GM-licensed PHVs given the larger number of total PHVs operating in the city region.
- From the non-compliant Hackney Carriages, 96% are WAV vehicles.
- Conversely, only 6% of non-compliant PHVs are WAV vehicles.

- Whilst the proportion of Hackney Carriages operating in GM but licensed to a non-GM local authority is small, 41% of PHVs operating in GM are licensed to an authority outside of the city region despite having a resident address in GM. This is associated with the ability of PHVs to operate freely outside of its licensed authorities and cheaper and quicker licensing applications associated with certain licensing authorities such as Wolverhampton. In contrast, Hackney Carriages can only pick-up fares in their own licensing authority area. For example, Hackney Carriages operating in Manchester City Centre picking up fares will be licensed to Manchester City Council and therefore the licensing authority has influence and control across their licensed fleet.

Table 5 GM Taxi Composition by Compliance Status (June 2023)

Type	GM Licensed Taxi fleet			GM Licensed Taxi fleet share		
	Compliant	Non-compliant	Total	Compliant	Non-compliant	Total
Hackney Carriage	709	1,181	1,890	38%	62%	100%
PHV	9,512	2,343	11,855	80%	20%	100%
Total	**10,221**	**3,524**	**13,745**	**74%**	**26%**	**100%**

5.3.3 The GM Authorities undertook a consultation in 2020 on the implementation of Minimum Licensing Standards (MLS) across the 10 GM local authorities. However, MLS did not progress to implementation as a consistent set of standards across the GM local authorities, with trade concerns about the additional financial burden to be compliant with the suite of more stringent driver and vehicle standards.

5.3.4 Two of the main vehicle standards associated with the MLS were regarding vehicle age and emissions:

- **Emissions:** To require licensed vehicles to be compliant with the minimum emission standards as set out in the government's CAZ Framework[26] (i.e. Euro IV petrol or Euro VI diesel), as follows:
    - For all new to licence vehicles – from the date policy is determined in district[27].
    - For existing fleets – to begin transitioning as soon as the policy is in place and to complete transitioning by 1st April 2024.
    - To note the strong ambition to move existing fleets to ZEC as soon as possible.
- **Vehicle Age:** Due to existing Euro standards for vehicle emissions, the age of the vehicle dictates what the maximum emissions are at the date of manufacture. Therefore, the following vehicles age policies were planned to be implemented:
    - PHV – under five years coming on to fleet and a maximum age limit of 10 years off.
    - PHV WAV – under seven years coming on to fleet and a maximum age limit of 15 years off.
    - Purpose built Hackney Vehicle Carriage (HVC) – under seven years coming on to fleet and a maximum age limit of 15 years off.

[26] The CAZ Framework sets out the principles for the operation of clean air zones in England. Accessed at: https://www.gov.uk/government/publications/air-quality-clean-air-zone-framework-for-england/clean-air-zone-framework
[27] Vehicles that have not been licensed with that local authority in the current year prior to renewal.

- Air quality metrics and impacts and testing data to be reviewed over the next 2-3 years by the Licensing Network and risks or proposed amendments brought back to Members as necessary.
- That the above policy be implemented for new to licence vehicles as soon as the policy takes effect. That existing fleets begin transitioning and are compliant with the policy by 1st April 2024.

5.3.5 Whilst both standards would bring forward vehicle upgrades, the emission standard provides strong alignment with the GM CAP.

5.3.6 The taxi measures represent an important mechanism for reducing exceedances under the Investment-led Plan and are grounded in the ability of the GM Authorities to reduce emissions through licensing conditions with supporting funding. The taxi measures comprise of two components:

- A GM-wide consistent emission standard; and
- Funding for taxis.

Taxi Measure: GM-wide consistent taxi emission standard

5.3.7 As part of the Investment-led Plan, the 10 GM local authorities have agreed to implement a consistent emission standard (Euro 4 petrol / Euro 6 diesel) in anticipation of supporting vehicle funding and governance arrangements. The GM Authorities are confident that governance arrangements to enable this can be delivered with most Authorities having already adopted the required standard for clean air purposes as set out in **Table 6**.

5.3.8 The scale of change on GM-licensed Hackney Carriage and PHV drivers is dependent on their licensed authorities' current position on emission standards for their fleet. To assume a robust air quality benefit from an emission standard, the implementation dates have been aligned to the requirements of the Direction on the 10 GM local authorities, to achieve compliance in the shortest possible time and by 2026 at the latest.

5.3.9 As vehicle owners will renew their licence over the course of a calendar year, linked to the date when they first licensed to the authority, a transitional date is to be implemented from the 1st January 2025 with a transitional end date for the 31st December 2025. This will require any vehicle owners relicensing their vehicles during 2025 to license a compliant vehicle (minimum of Euro VI diesel or Euro IV petrol). On this basis modelling has assumed that all GM-licensed vehicles in 2026 will be compliant vehicles.

5.3.10 The current and required implementation timescales of emission standards across the 10 GM local authorities is set out in **Table 6**. In the majority of authorities, the Investment-led Plan proposal requires the bringing forward of existing proposals by 3 months. The table also identifies those authorities that have already taken action to implement and approve the required emission standard for clean air purposes on the basis of the delivery of the full package of Investment-led Plan taxi measures.

Table 6 GM Emission Standards – Current position (Jul-24) and GM CAP requirements

GM Local Authority	Dec-23 Position on existing vehicles	GM CAP Measure – Emission Standard Requirements	Emission Standard Approved (Jul-24)
Bolton	Not yet approved	Agree emission standard 31 Dec 25	**In progress**
Bury	Approved for Apr 2026	Bring forward to Dec 25	✓
Manchester	Approved for Apr 2026	Bring forward to Dec 25	✓
Oldham	Approved for Dec 2025	n/a	✓
Rochdale	Not yet approved	Agree emission standard 31 Dec 25	**In progress**
Salford	Approved for Apr 2026	Bring forward to Dec 25	✓
Stockport	Not yet approved	Agree emission standard 31 Dec 25	✓
Tameside	Approved for Dec 2025	n/a	✓
Trafford	Approved for Apr 2026	Bring forward to Dec 25	✓
Wigan	Approved for Apr 2026	Bring forward to Dec 25	✓

Taxi Measure: Funding for taxis

5.3.11 To support vehicle upgrades to a cleaner taxi fleet, it is proposed that the Clean Taxi Fund (CTF) is retained and opened as part of the Investment-led Plan. A review of the taxi fleet operating in GM has been conducted alongside feedback from the trade gathered in 2022. Further information on the background research into taxis is shown in the *Hackney Carriage and PHV Evidence Note*.

5.3.12 Taxi funding will be delivered in the form of a grant for the upgrade of Hackney Carriages and PHVs licensed in GM to cleaner vehicles. Eligible applicants will be offered a running cost grant towards the running costs of a new ZEC vehicle, or a contribution towards a replacement vehicle.

5.3.13 The per-vehicle funding amounts are consistent across both funding options and have been uplifted by inflation accrued between the finalisation of the Previous GM CAP (2021) up to and including 2024. The per-vehicle funding amounts are split into funding for upgrade to WAVs and funding for upgrade to non-WAVs.

5.3.14 Following research and engagement, the GM Authorities have revised the financial support required for Hackney Carriages and PHVs. The Investment-led Plan responds to increases in new and second-hand vehicle prices and vehicle availability constraints in the taxi market, particularly for Hackney Carriages. Further information on taxi vehicle prices, vehicle availability and feedback received from the trade following engagement activities undertaken in 2022 are reported in the *Hackney Carriage and Private Hire Vehicle Evidence Note*.

5.3.15 The CTF is proposed to have two routes to funding as summarised below:

- **Core Taxi Fund:** Funding would be provided to GM-licensed, non-compliant Hackney Carriages and PHVs owners to upgrade to compliant vehicles. This funding route is consistent with the eligible vehicle population defined as part of the Previous GM CAP and targets vehicle upgrades for GM-licensed non-compliant vehicle owners.
- **Electric Hackney Fund:** Funding would be provided to GM-licensed compliant ICE (petrol/diesel) Hackney Carriages to upgrade to ZEC vehicles. This funding route has been developed based on feedback received from the trade in 2022 through engagement and research and taking account of other CAP city funding schemes such as Bradford City Council which provide a similar offer. The targeted funding route for Hackney Carriages recognises the vehicle supply issues for compliant petrol/diesel Hackney Carriages and the concentration of this taxi type within the Regional Centre, aligning with the spatial concentration of exceedances in GM. Provision of funding for compliant ICE vehicles to upgrade to an electric vehicle may lessen the Hackney Carriage supply chain issues by increasing availability of second-hand compliant Hackney Carriages for purchase.

5.3.16 The proposed funding levels for Hackney Carriages and PHVs across both funding routes are consistent and outlined below in **Table 7**. The funding offers are split into funding for upgrade to WAVs and funding for upgrade to non-WAVs.

5.3.17 Running cost grants are designed to be able to be taken up in conjunction with existing grants available from government's Office for Zero Emission Vehicles (OZEV) funds but cannot be used in conjunction with other GM CAP funding. GM CAP grants for replacement vehicles cannot be used in conjunction with government's OZEV Funds, which are principally for support during vehicle purchase.

5.3.18 The financial support for taxis takes into account inflationary increases in prices since the finalisation of the Previous GM CAP policy in 2021 up to the anticipated opening of the Investment-led Plan funds in 2024. The inflationary uplift has been calculated based on the cumulative total of inflation based on Q4 values from the Bank of England's Monetary Policy Committee Report, published in November 2023[28]. This uplift is considered to provide an equitable increase for both Hackney Carriage and PHV owners and operators and responds to the increases in the cost of new and second-hand vehicles since the development of the Previous GM CAP.

Table 7 Taxi Funding Offer

Vehicle type (upgrade to)		Offer available (per vehicle)	Change from previous policy funding amount (2021)
Purpose-built WAV	**Zero Emission Capable (ZEC)**	Up to £12,560 towards the running cost of the replacement vehicle.	↑ **Increase of £2,560**
	Second-hand ZEC	Up to £12,560 towards the cost of the replacement vehicle.	↑ **Increase of £2,560**
	Compliant Vehicle (Euro 4 petrol or Euro 6 diesel or better)	Up to £6,280 towards the cost of the replacement vehicle.	↑ **Increase of £1,280**
	Compliant Vehicle (Retrofit)	No retrofit option to be offered given government's evidence on efficacy of retrofit technology.	✗ **Removed**
Non-WAV	**ZEC**	Up to £7,530 towards the running costs of the replacement vehicle.	↑ **Increase of £1,530**
	Second-hand ZEC	Up to £7,530 towards the cost of the replacement vehicle.	↑ **Increase of £1,530**
	Compliant Vehicle 6+ seater (Euro 4 petrol or Euro 6 diesel or better)	Up to £6,280 towards the cost of the replacement vehicle.	↑ **Increase of £1,280**
	Compliant Vehicle (Euro 4 petrol or Euro 6 diesel or better)	Up to £3,770 towards the cost of the replacement vehicle.	↑ **Increase of £770**

[28] https://www.bankofengland.co.uk/monetary-policy-report/2023/november-2023?ref=pmp-magazine.com

Vehicle type (upgrade to)		Offer available (per vehicle)	Change from previous policy funding amount (2021)
	Compliant Vehicle (Retrofit)	No retrofit option to be offered given government's evidence on efficacy of retrofit technology.	✕ **Removed**

5.3.19 The retrofit option has been removed based on poor and highly variable performance from retrofit solutions on buses. Additionally, offering a retrofit option to taxis would likely increase the average age of the fleet and would potentially conflict with local authority age policies. Feedback has also been received by the trade in 2022 that funding towards vehicle replacement was preferred over a retrofit option.

5.3.20 The proposed eligibility criteria and administration of funds has been included in the *Clean Taxi Fund - Eligibility Criteria & Funding Administration Note*. Whilst the Investment-led Plan CTF seeks to retain the core elements of the Previous GM CAP CTF, the eligibility criteria considers the two proposed routes to funding and proposes to provide funding directly to applicants, in-line with other CAP cities, to remove unnecessary complexity from the fund administration, increasing the flexibility to applicants and taking onboard feedback from the trade.

5.3.21 The CTF as a standalone measure is not modelled to deliver a quantifiable air quality benefit, however, it helps to support earlier upgrades of taxis, to minimise the risk that GM-licensed PHVs will continue to operate their non-compliant vehicles with a non-GM local authority where the same standards do not apply, and provides mitigation against negative socio-economic consequences which could arise from bringing forward vehicle upgrades outside their natural upgrade cycle.

Taxi Measures Summary

5.3.22 The implementation of a consistent emission standard across the 10 GM local authorities by the 31st December 2025 coupled with supporting vehicle upgrade funding is modelled to contribute to achieve compliance at A57 Regent Road. However, achieving compliance at this location also requires the implementation of other Investment-led measures, namely bus vehicle upgrades and local measures.

5.3.23 In addition to the modelled air quality benefit at the A57 Regent Road, contributing to achieving compliance at this location in 2025, the taxi measures add resilience to the Investment-led Plan. The measures distribute additional air quality benefits across GM with a higher-than-average benefit in the Regional Centre. This is due to the nature of taxi operations in GM and operating restrictions, particularly for Hackney Carriages. The CTF supports the emission standard in delivering this by helping to support earlier upgrades of taxis and minimising the risk that non-compliant vehicles will be re-licensed with a non-GM local authority where the same standards do not apply.

5.3.24 Consistent with the Previous GM CAP, taxis are underrepresented within the highway model and thus it is expected that taxis will deliver a greater benefit to GM than assumed within the CAP modelling. A newer, cleaner fleet[29] will also bring operating and safety benefits to the fleet, delivering wider improvements to the City Region whilst adding resilience to the Investment-led Plan.

[29] For the purposes of the GM CAP, 'cleaner fleet' refers to vehicles that meet the minimum emission standards as set out in the UK Government's Clean Air Zone Framework.

5.4 Local Measures

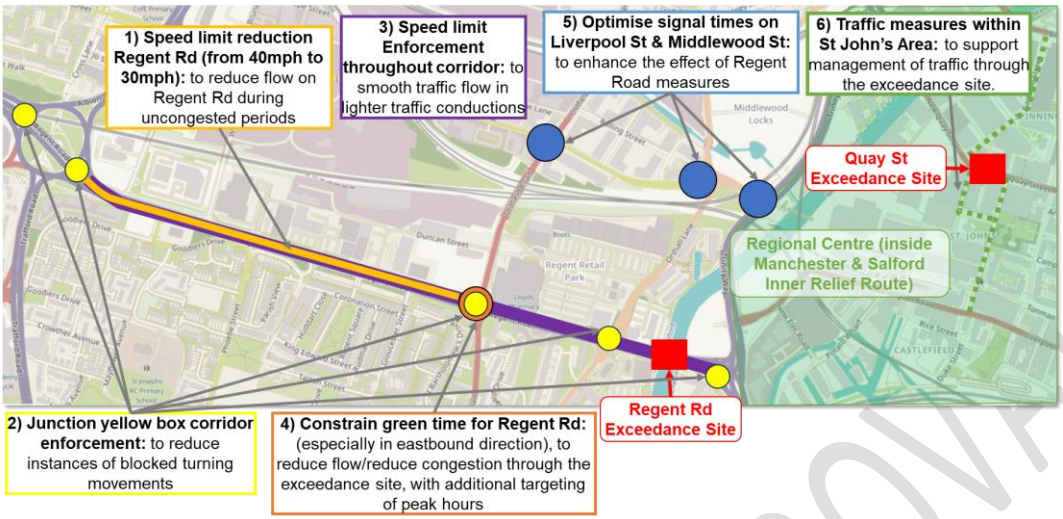
5.4.1 **Section 5.3** identified that there are three remaining exceedance sites after the deployment of bus and taxi measures. These sites are: A57 Regent Road, Great Bridgewater Street and A34 Quay Street. Whilst the deployment of ZEBs at these locations has been shown to be effective, there is not a sufficient number of buses that pass the A57 Regent Road, Great Bridgewater Street and A34 Quay Street to bring these locations into compliance in 2025. In addition, there are local conditions at the exceedance site location at A34 Quay Street and Great Bridgewater Street such as the canyoning effect of a road bridge which influence the NO_2 concentrations at this location. Taxi measures support reduction in NO_2 concentrations at each exceedance location, in addition providing a wider resilience benefit to those already achieving compliance, however the level of reduction is not sufficient to achieve compliance at the three exceedance sites. Therefore, a series of targeted local measures are proposed to reduce NO_2 exceedance concentrations at these sites.

5.4.2 The local measures at A57 Regent Road and St John's area (covering the A34 Quay Street and modelled to be effective on Great Bridgewater Street) summarised above have been shown by modelling to be effective in reducing NO_2 concentrations to compliant levels at these locations. Modelling undertaken to represent these local measures has also shown that the implementation of local measures for the A34 Quay Street site were also effective in achieving compliance at Great Bridgewater Street. Further information on the local measures is contained in the *A57 Regent Road and St John's Area Local Measure Notes* which provide further information on the measure description and the associated traffic and air quality outcomes.

5.4.3 The package of targeted local measures can be summarised into the following, as shown in **Figure 6**:

- Signal optimisation at A57 Regent Road and adjacent parallel routes;
- Speed restrictions on A57 Regent Road with supporting enforcement measures;
- Yellow box enforcement along the A57 Regent Road corridor; and
- Traffic management measures – St John's area.

Figure 6 Overview of local measures



5.4.4 The description of these measures and how they would be delivered are summarised below.

Signal optimisation at A57 Regent Road & adjacent parallel routes

5.4.5 Signal timing adjustments were applied within the modelling on A57 Regent Road, namely at the A57 Regent Road / Oldfield Road junction and the M602 J3 west arm approach. These adjustments would be supported by further adjustments to parallel routes at the junctions of Oldfield Road / Middlewood Street, Ordsall Lane / Middlewood Street / Hampson Street and Hampson Street / Trinity Way.

5.4.6 These adjustments would be conducted to improve average speeds through the exceedance site and constrain overall traffic flows travelling eastbound along Regent Road to increase capacity on parallel routes. Signal optimisation has been modelled to have a materially beneficial impact on compliance at the A57 Regent Road exceedance site by improving the flow of traffic, leading to a reduction in congestion and a resulting emission benefit.

5.4.7 The proposed changes to signal timings would be implemented through TfGM's Urban Traffic Control[30] team and agreement with Salford City Council and delivered by 31st December 2024, which allows sufficient time to capture the full year air quality benefit of this scheme being in place in 2025.

[30] Transport for Greater Manchester's Urban Traffic Control (UTC) team provides a high quality traffic signal control service to the 10 district councils of Greater Manchester and National Highways, using a range of technologies including optimised traffic signal control through SCOOT (Split Cycle Offset Optimisation Technique) and MOVA (Microprocessor Optimised Vehicle Actuation).

Speed reductions on A57 Regent Road with supporting enforcement measures

5.4.8 Multiple modelling scenarios were also undertaken for a speed reduction from 40mph to 30mph on the A57 Regent Road between Oldfield Road and the M602. The measure would reduce the number of vehicles travelling past the Regent Road exceedance sites with some displacement to nearby parallel routes, thus reducing the modelled NO_2 concentrations at this exceedance site. The displaced trips are being accommodated by the adjustments to signals at the junctions of Oldfield Road / Middlewood Street, Ordsall Lane / Middlewood Street / Hampson Street and Hampson Street / Trinity Way.

5.4.9 The implementation of the speed reduction would be delivered through a Traffic Regulation Order made by Salford City Council by 31st December 2024 which allows sufficient time to capture the full year air quality benefit of this scheme being in place in 2025.

5.4.10 GM is seeking to add robustness to this measure with Greater Manchester Police enforcing the speed limit change via average speed cameras along the A57 Regent Road corridor. It is proposed that average speed cameras are deployed to cover the route which will be operational seven days a week across a 24-hour period. This supporting measure will help to regulate the traffic flow travelling through the exceedance site, particularly out of the peak periods where higher average speeds are observed.

Yellow box enforcement along the A57 Regent Road corridor

5.4.11 The implementation of enforcement measures for incursions into existing yellow box junctions along the A57 Regent Road corridor are planned as a supporting measure to achieve compliance in 2025. There are currently yellow boxes present at the following junctions along the corridor:

- M602/A5063 Albion Way/A57 Regent Road/A6042 Trinity Way roundabout
- A57 Regent Road/ A5066 Oldfield Road
- A57 Regent Road/Ordsall Lane
- A57 Regent Road/A6042 Trinity Way

5.4.12 The strategic highway model (SATURN) used to assess the GM CAP assumes compliant driver behaviour at junctions and thus the model does not reflect instances where queueing traffic blocks turning movements at junctions along the A57 Regent Road corridor. The A57 Regent Road, as one of the main highway corridors in and out of the Regional Centre is subject to instances of incursions into the yellow boxes, predominately during the peak periods. The introduction of enforcement at junctions will provide added robustness to the local measures along the A57 Regent Road Corridor. The local highway authority, Salford City Council, will manage the implementation of yellow box enforcement along the corridor with the measure implemented to support compliance being achieved at the exceedance site in 2025.

Traffic Management Measures – St John's area

5.4.13 In the December 2023 submission GM outlined that based on the modelling undertaken, the A34 Quay Street area was forecast to be one of the final exceedance sites and local measures would be needed to manage the flow of traffic on some roads to reduce nitrogen dioxide concentrations.

5.4.14 Manchester City Council and TfGM have considered several possible options and have identified a scheme which complements the objectives of the wider City Centre Transport Strategy (CCTS) and local plans for the regional centre[31].

5.4.15 The scheme includes traffic management measures in the St John's area of Manchester City Centre, reducing movements for general traffic whilst supporting movement for bus and local residents. Further information on this measure is contained within the *A57 Regent Road – Local Measures Note*.

5.4.16 This scheme models a reduction in turning movements onto the A34 Quay Street from Lower Byrom Street and achieves a sufficient reduction in traffic flow past one of the final exceedance sites to bring it into compliance in 2025.

5.4.17 The next step is to develop a detailed design along with an assessment of the costs and an implementation plan that identifies any risks. The final design, costs and timescales will be submitted to JAQU as part of the Investment-led Clean Air Plan. Further information on this measure is contained within the *St John's Area Local Measures Note*.

5.5 Air Quality Impact

[31] The primary aim of the CCTS is for 90% of all trips to the Regional Centre in the morning peak to be made on foot, by cycle or on public transport before 2040. The strategy sets out proposals to further improve the Regional Centre's public transport and active travel networks and reduce car-based trips over the longer term.

5.5.1 This section provides an overview of the modelled impact from an Investment-led Plan on the remaining points of exceedance in 2025. This includes the reduction in NO_2 concentrations at each exceedance site in addition to the total number of remaining exceedance sites. Further information on the air quality impact of the Investment-led Plan is reported in the *AQ3 Report*.

5.5.2 **Table 8** shows the distribution of non-compliant sites across GM in terms of how close they are to compliance based on the implementation of an Investment-led Plan. The results presented show the modelled impact of the package of measures including bus, taxi and targeted local highway measures.

5.5.3 The results show that there are no exceedance sites above the legal limit values in 2025 under the Investment-led Plan. The Plan reduces the number of exceedances from 26 to zero in 2025. The results also show that the number of sites close to exceedance reduces as a result of the Plan. Health benefits continue to be delivered by reductions in NO_2 concentrations, even below the limit values.

Table 8 Predicted annual mean NO_2 concentrations at points on the GM road network – 2025 Investment-led Plan (with GM CAP)

Scenario	Compliant sites		Non-compliant sites			
	Very compliant (Below 35 µg/m^3)	**Compliant but marginal (35 to 40 µg/m^3)**	**Non-compliant (>40 to 45 µg/m^3)**	**Very non-compliant (>45 to 50 µg/m^3)**	**Extremely non-compliant (>50 µg/m^3)**	**Total non-compliant (>40 µg/m^3)**
2025						
Do Minimum	2419	95	19	7	0	**26**
Investment-led Plan	2470	70	0	0	0	**0**

5.5.4 **Figure 7** and **Table 9** shows the incremental contribution of the three main components of the Investment-led Plan (bus, taxi and local highway measures). The results demonstrate that of the 26 remaining sites modelled to be in exceedance in 2025, bus measures are predicted to deliver compliance at 23 of the 26 sites.

5.5.5 Taxi measures are required to achieve compliance at the A57 Regent Road, however, compliance cannot be achieved without supporting bus and local measures. Due to the concentration of taxis operating in the Regional Centre, particularly Hackney Carriages based on their operating conditions/restrictions, the taxi measures also provide strong resilience to the GM CAP, both in terms of the alignment of their operation with the spatial distribution of exceedances and also accounting for the known under-representation of taxi trips within the CAP modelling suite.

5.5.6 The proposed local traffic management measures are shown to be an effective targeted intervention at the A34 Quay Street, Great Bridgewater Street and the A57 Regent Road. Due to the close proximity, interaction between locations and relative scale of the required air quality improvements, measures targeted to achieve compliance at the A34 Quay Street are also effective at Great Bridgewater Street.

Figure 7 Spatial distribution of predicted annual mean NO_2 exceedance sites – 2025 Investment-led Plan (with GM CAP)

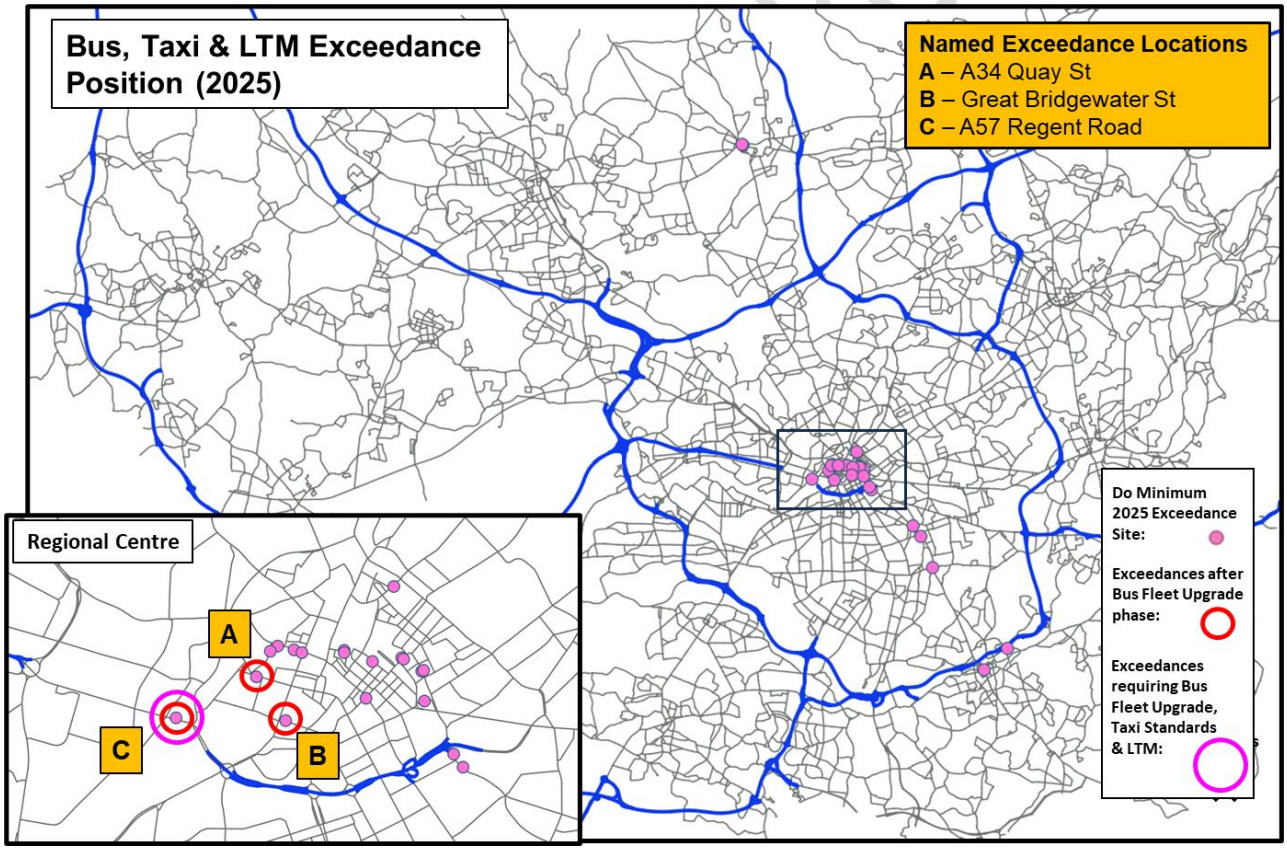


Table 9 Investment-led Plan (2025) Exceedance Sites by NO_2 Concentrations

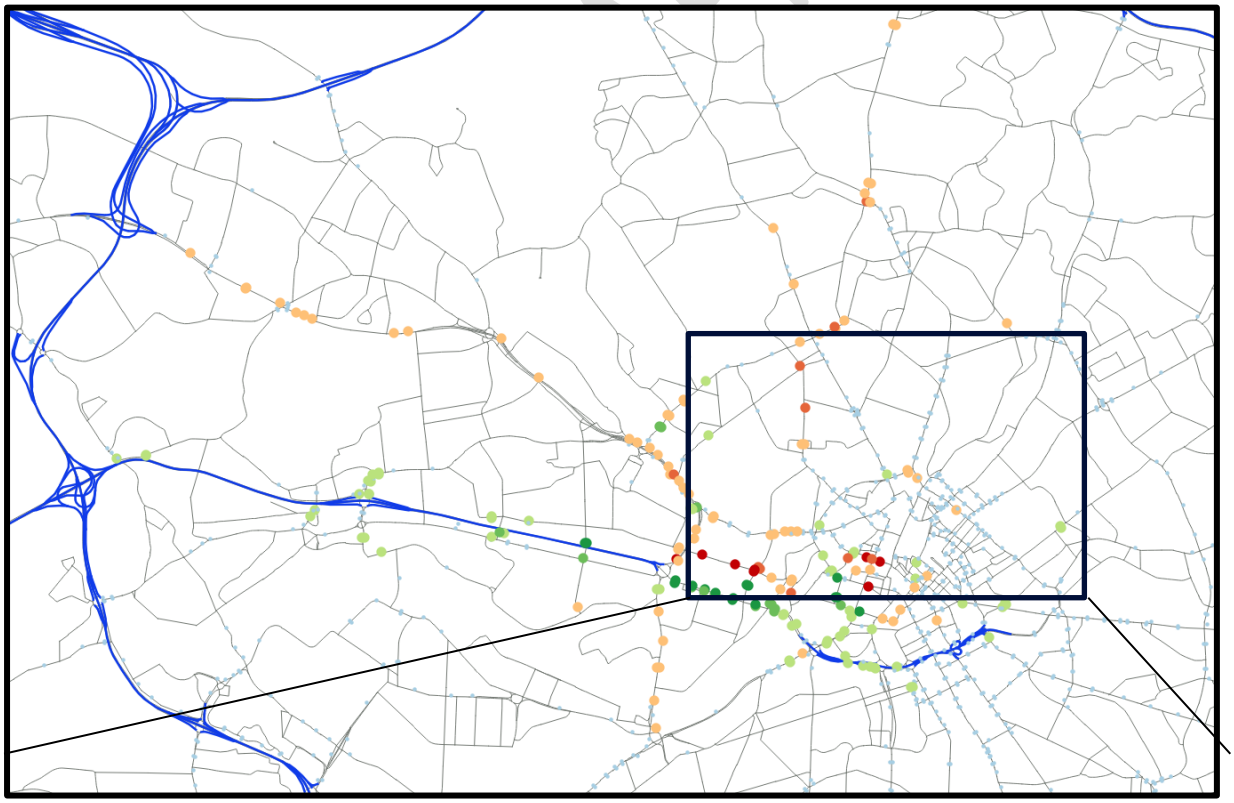
Point ID	Road name	Local Authority	Do Min (µg/m^3)	With Bus Measure (µg/m^3)	With Bus & Taxi Measure (µg/m^3)	With Bus & Taxi & Local Traffic Measure (LTM) (µg/m^3)	Total ILP Change in NO_2 conc. (µg/m^3)
2237_3790_DW	A58 Bolton St	Bury	**42.4**	40.3	40.1	40.2	-2.2
3790_3652	A58 Bolton St	Bury	**40.7**	38.8	38.6	38.6	-2.1
3016_6022_DW	A6 Whitworth St	Manchester	**49.5**	37.1	37.1	37.1	-12.4
1322_3273	A34 Quay St	Manchester	**48.2**	**41.2**	**41.0**	38.0	-10.2
1261_6042	Portland St	Manchester	**48.2**	32.9	32.8	32.9	-15.3
1261_6042_DW	Portland St	Manchester	**47.8**	32.8	32.7	32.7	-15.1
1286_15128	A6 Piccadilly	Manchester	**47.7**	32.4	32.4	32.4	-15.3
3272_8542_DW	Gartside St	Manchester	**46.2**	36.8	36.7	37.3	-8.9
8547_47130	King St	Manchester	**45.7**	40.2	40.1	40.1	-5.6
1263_5429	New York St	Manchester	**45.3**	39.6	39.5	39.5	-5.8
1286_15128_DW	A6 Piccadilly	Manchester	**44.9**	31.4	31.4	31.4	-13.5
1469_3669_DW	A6 Stockport Rd	Manchester	**44.1**	34.0	33.8	33.9	-10.2
1268_1269	A34 Bridge St	Manchester	**43.7**	38.2	38.1	39.2	-4.5
2607_3056_DW	A6 Ardwick Green	Manchester	**43.0**	37.1	37.0	37.0	-6.0
3056_3842_DW	A6 London Rd	Manchester	**42.9**	37.4	37.3	37.2	-5.7
1685_1686_DW	A6 Stockport Rd	Manchester	**42.8**	33.7	33.6	33.6	-9.2
NonPCM_207	A34 Bridge St	Manchester	**42.1**	37.1	36.9	37.9	-4.2
1324_3276_DW	Great Bridgewater St	Manchester	**41.8**	**40.7**	**40.6**	37.5	-4.3
8547_47130_DW	King St	Manchester	**41.7**	37.1	37.0	37.0	-4.7
8546_14050	A664 Shudehill	Manchester	**41.6**	37.3	37.2	37.2	-4.4
1466_3383_DW	A6 Stockport Rd	Manchester	**41.2**	32.0	31.9	32.0	-9.2
Jct262	Portland St	Manchester	**40.7**	39.2	39.2	39.3	-1.4
1269_3272	A34 Bridge St	Manchester	**40.6**	35.9	35.8	35.6	-5.0
1349_2993_DW	A57 Regent Rd	Salford	**41.2**	**41.1**	**40.9**	40.4	-0.8

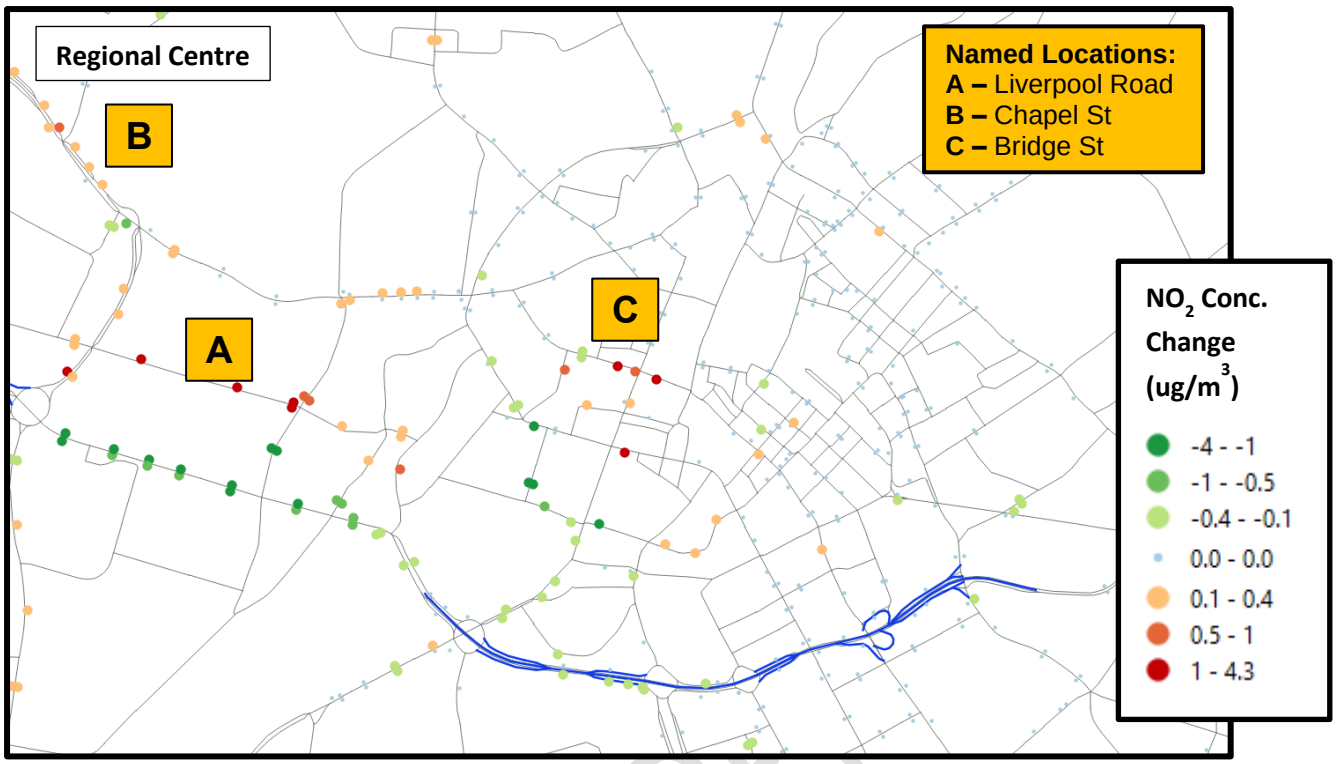
Jct355	A6 Wellington Rd South	Stockport	**44.9**	38.8	38.7	38.8	-6.1
2663_5015_DW	B6104 Carrington Rd	Stockport	**43.8**	37.6	37.5	37.5	-6.3

5.5.7 Following previous discussions with the JAQU technical team, the potential for rerouting from the local traffic measures was highlighted for consideration. **Figure 8** shows the spatial distribution of the local traffic measures which includes roads on which traffic flows are re-routed and which therefore experience local air quality disbenefits.

5.5.8 There are two main corridors related to the A57 Regent Road measures where traffic flows increase and emissions are worsened, which are Liverpool Road (up to +4.3 µg/m^3) and A6 Chapel St (up to +0.7 µg/m^3), in Salford. The A34 Quay St area measures lead to disbenefit primarily along the A34 Bridge St, Manchester (up to +1.1 µg/m^3). However, none of these increases leads to an exceedance.

Figure 8 Local Traffic Management Measure – Incremental Change in NO2 Concentrations (2025)





5.6 Costs

Overall funding position

5.6.1 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 test[32].

5.6.2 The GM Authorities have been awarded a total of £204.4 million (excluding electric vehicle charging infrastructure) in respect of the GM CAP. The government grants have been awarded as set out in **Table 10**.

Table 10 GM Authorities CAP funding awarded by government

Grant	£m
CAP Development Phase	33.3
CAZ and Vehicle Funds Implementation	31.4
CAZ and Vehicle Funds Operation	16.6
Vehicle Funds (including Bus)	123.1
Total	**204.4**

5.6.3 Expenditure to July 2024 (including committed grant awards) against the £204.4 million grants awarded by government is summarised in **Table 11**.

Table 11 Existing and forecast GM CAP expenditure

Area of Expenditure	Spend to date £m
CAP Development Phase	33.9
CAZ and Vehicle Funds Implementation	24.8
CAZ and Vehicle Funds Operation	18.1
Vehicle Funds (including Bus)	19.1
Grand Total	**95.9**
Grant Remaining	**108.5**

5.6.4 The GM Authorities propose that the grant value remaining should be repurposed to contribute to the future funding required for the Investment-led Plan.

Upgrade of non-compliant vehicles

[32] The New Burdens Doctrine is part of a suite of measures to ensure council taxpayers do not face excessive increases. https://www.gov.uk/government/publications/new-burdens-doctrine-guidance-for-government-departments

5.6.5 Clean Air Funding was awarded by government to help owners upgrade non-compliant vehicles (buses, coaches, HGVs, LGVs and taxis) and mitigate against the negative socio-economic impact of a GM-wide Class C charging CAZ.

5.6.6 The Previous GM CAP, agreed in Summer 2021, set the funding amounts per vehicles and eligibility criteria. Funds opened in:

- May 2020 for bus retrofit applications (as a continuation of government's CBTF)
- September 2021 for bus replacement applications
- November 2021 for HGV upgrade applications

5.6.7 As set out in **Table 12**, the value of funding committed to the end of July 2024 is £19.1 million. The GM Authorities' proposed Investment-led Plan focuses on buses, taxis and local traffic management measures to deliver compliance with the annual legal limit value for NO_2 and therefore under the GM Authorities' proposal non-committed funds would be redistributed.

5.6.8 In this scenario funding for HGVs will be closed to new applicants. Applicants that have an existing funding award will be given to 1st January 2025 to spend the committed monies.

5.6.9 On this basis, to the end of July 2024 this would mean retaining £20.2 million for taxis (PHV and Hackney Carriages), with £83.8 million to reallocate as shown in **Table 12**.

Table 12 The GM CAP existing grant payments and funding reallocations

Purpose	Value of Grant (net of Admin costs) £m	Value Committed [33] £m	Vehicles Upgraded	Recommendation
HGVs	7.6	2.6	227	close to new
PHVs	10.2	0.02	7	retain allocation
Coaches	4.4	0.00	0	reallocate funding
Minibus	2.0	0.01	1	reallocate funding
LGVs	70.0	0.1	14	reallocate funding
Hackney Carriages	10.1	0.1	20	retain allocation
Bus Retrofit	15.4	15.1	959	reallocate funding
Bus Replacement	3.2	1.2	69	reallocate funding
Total	**123.1**	**19.1**	**1,297**	

Investment-led Plan Costs

5.6.10 The whole life costs of the Investment-led Plan and the CAZ Benchmark have been estimated. The figures have been developed using high level assumptions and based on previous costs.

5.6.11 A high level of contingency has been applied and it should be noted that no commercial discussions have been held with suppliers.

5.6.12 This section sets out a summary of the proposed funding allocations required to deliver the Investment-led Plan. The funding allocations cover the three main components including bus, taxi and targeted local measures investment in addition to termination costs associated with the CAZ forming part of the Previous GM CAP, implementation and operating costs and the development costs to deliver the Investment-led Plan.

5.6.13 The costs related to bus, taxi and local highway measures are:

- Bus Investment – £51.1 million
  - £23.8 million to purchase 40 ZEBs;
  - £17.8 million for the electrification required on Piccadilly Approach and at Bolton and Queens Road depots;
  - £8.4 million for the upgrade of 77 buses to OEM Euro VI; and
  - £1.1 million for bus service relocation.
- Taxi Investment – £30.5 million

[33] Value Committed is the value of the total number of applicants who have applied and have been awarded a grant.

- Funding requirement is derived from the total eligible vehicle population on the basis that every taxi owner will take-up the grant – the GM Authorities' proposal is to fund every eligible vehicle.
- £22.6 million CTF for non-compliant, GM-licensed Hackney Carriages and PHVs.
  - £7.9 million Electric Hackney Upgrade Fund for GM-licensed Hackney Carriages to upgrade to a ZEC vehicle.

- Local Traffic Management – £5.0 million (current allocation – cost estimates to be confirmed following further scheme design development).

Overall Investment-led Plan Costs

5.6.14 A summary of the costs for the Investment-led Plan is shown in **Table 13**.

Table 13 Summary of Investment-led Plan Costs

Area	Cost
Early termination of CAZ services	(£1.8m)
Vehicle upgrade funding and administration	(£73.0m)
Development and implementation	(£11.5m)
Net surplus / (deficit) from operation and decommissioning	(£37.4m)
Total cost	**(£123.7m)**

5.6.15 A high-level breakdown of each of the areas, and some of the associated key assumptions are provided as follows.

Early Termination of CAZ Services

5.6.16 Under the agreement with Egis Projects SA, TfGM secured the right to terminate either in full or in part the contract for the GM CAZ Service. As any termination would be under the Termination for Convenience clause, TfGM would serve a 90 day notice. As the notice would be served less than 60 months after the commencement of the contract in July 2021, an Early Termination Payment would become payable to Egis Projects SA. The Early Termination Payment for termination (at any point between September 2024 and August 2025) is £1.8 million.

Vehicle Upgrade Funding and Administration

5.6.17 **Table 14** details the costs related to the ZEB bus and taxi measures, as well as the associated development, implementation and operational costs.

5.6.18 Some of the key assumptions are provided in the table. No general contingency has been applied to the costs in the table.

Table 14 Investment-led Plan - Vehicle Upgrade Funding and Administration Costs

Area	Cost	Key Assumptions
Fund implementation costs	£0.1m	Estimated cost of mobilising and implementing fund solution (costings derived based on scale of potential funding applications).
Zero Emission Busses	£23.8m	-
Depot electrification	£17.8m	-
HGV fund	-	-
LGV fund	-	-
Coach & minibus fund	-	-
Taxi Core Fund	£22.6m	-
Taxi Electric Hackney Upgrade Fund	£7.9m	-
Fund operational costs	£0.8m	Assumes cost of £500k per annum (operating over 18 months) to reflect 8 staff members @ £60k pa (fully loaded staff costs).
General contingency	£0m	No contingency has been applied against fund costs.
Total cost	**£73.0m**	-

Development and Implementation Costs

5.6.19 **Table 15** details the costs related to decommissioning and removal of the existing CAZ infrastructure, the provision of the local highway measures, the costs associated with the broad engagement exercise, as well as the associated development and implementation costs.

5.6.20 Under the Investment-led Plan there is no requirement for the CAZ signage and therefore all existing signs will be removed. ANPR cameras not required for monitoring and evaluation can also be removed; however it is assumed that 75 cameras will be relocated for the purpose of monitoring and evaluation. It is assumed that elements of the CAZ Office Service and Operating Body (TfGM) will be required to collect, process and maintain the ANPR data, and manage the contract, related to the cameras required for monitoring and evaluation. Costs have been developed based on existing contractual costs, however it is possible that further savings related to the cameras and associated back-office costs could be identified when the requirements for the ANPR cameras are confirmed at the next stage.

5.6.21 Some of the key assumptions are provided in the table and a general contingency of 20% has been applied to the costs in the table to reflect rough order of magnitude of costings at this stage.

Table 15 Investment-led Plan – Development and Implementation Costs

Area	Cost	Key Assumptions
Signage update	£0.3m	Costs based on all existing signs being decommissioned - no new signs are required.
Camera update	£1.3m	Costs based on all existing cameras being decommissioned, and cameras relocated. 75 cameras are required. No additional savings assumed from excess camera sales.
Mobilisation costs	£0.3m	Mobilisation cost based on % assumption of the original mobilisation cost for the Previous GM CAP.
CAZ Office Service / Operating Body (TfGM)	£2.2m	Establishment of Operating Body cost based on % assumption of the original Operating Body for the Previous GM CAP.
Penalty Enforcement Service	-	-
Marketing, engagement/consultation & comms	£0.5m	Marketing costs taken as a % of the original marketing costs assumed for the Previous GM CAP
Highways measures	£5.0m	Based on initial estimates for implementing the Highways Measures.
General contingency	£1.9m	Contingency has been assumed at 20% of all costs to reflect rough order of magnitude of costings at this stage.
Total cost	**£11.5m**	

Revenue, Operational and Decommissioning Costs

5.6.22 **Table 16** details the costs related to the upgrade of buses to OEM Euro VI, bus service relocation, and the operation and decommissioning of the Investment-led Plan. Unlike the CAZ Benchmark, there is no revenue / income generated from the Investment-led Plan. The decommissioning relates to the demobilisation and decommissioning of all elements of the Investment-led Plan after compliance has been evidenced (and does not include any costs relating to the existing CAZ infrastructure, which are included in the development and implementation costs identified in **Table 15** above).

5.6.23 As noted in the development and implementation section above, it is assumed that 75 cameras will be relocated for the purpose of monitoring and evaluation and it is assumed that elements of the CAZ Office Service and Operating Body (TfGM) will be required related to this. The associated costs have been developed based on existing contractual costs (using a pro-rata percentage of the expected quantity of work compared to the previous GM-wide CAZ). As noted in the development and implementation section above, it is possible that further savings to the cameras and associated back-office costs could be identified when the requirements for the ANPR cameras are confirmed at the next stage.

5.6.24 Some of the key assumptions are provided in the table and a general contingency of 20% has been applied to the costs in the table to reflect rough order of magnitude of costings at this stage.

Table 16 Investment-led Plan - Revenue, operational and decommissioning costs

Area	Cost	Key Assumptions
Total CAZ income (incl. penalty revenue & JAQU processing costs)	N/A	-
Existing contract costs	(£7.7m)	Reflects costs incurred through to July 25 before 'new plan' comes into effect.
CAZ Office Service costs	(£5.7m)	CAZ Office Service cost based on % assumption of the original CAZ Office Service for the Previous GM CAP.
Field equipment costs	(£1.7m)	Field Equipment cost based on % assumption of the Field Equipment Cost for the Previous GM CAP.
Operating Body (TfGM)	(£2.8m)	Operating Body cost based on % assumption of the original Operating Body for the Previous GM CAP.
Signage costs	-	-
Monitoring & evaluation costs	(£2.3m)	Monitoring & Evaluation costs are unchanged from the Previous GM CAP assumptions (difference due to timing of monitoring)
Penalty Enforcement Service	-	-
Other costs	(£1.4m)	Costs include opex relating to electricity, highways measures opex, security of employment costs and merchant costs.
OEM Euro VI Upgrade	(£8.4m)	-
Bus Service Relocation	(£1.1m)	-
Decommissioning costs (at close)	(£0.1m)	Decommissioning costs have been apportioned according to the volume of cameras and signage in service against the original decommissioning costs for the Previous GM CAP.
Operational contingency	(£6.2m)	Contingency at 20% of total operational costs
Net surplus / (deficit)	**(£37.4m)**	

5.6.25 As set out in **Table 17**, when considering whole life costs, the Investment-led Plan is estimated to require an additional £15.2m of funding.

Table 17 Investment-led Plan - Whole life costs including additional funding requirement

	Cost
Early termination of CAZ services	(£1.8m)
Vehicle upgrade funding and administration	(£73.0m)
Development and implementation	(£11.5m)
Net surplus / (deficit) from operation and decommissioning	(£37.4m)
Whole life total cost	**(£123.7m)**
Available funding	**£108.5m**
Additional government funding (or mitigation) required	**£15.2m**

5.7 Delivery Schedule

5.7.1 The GM Authorities have developed an indicative, high level delivery schedule for delivering both the Investment-led Plan and the CAZ Benchmark. The Investment-led Plan delivery schedule has been informed by recent procurement undertaken as part of bus franchising, intelligence gathered from funding activities associated with the Previous GM CAP and similar highway schemes undertaken by Manchester and Salford local authorities in respect of the local highway measures.

5.7.2 Based on this delivery schedule, the GM Authorities have commenced implementation in February 2024, starting with bus fleet upgrades. Funding associated with the CTF is anticipated to go-live in March 2025 and to remain open to new applicants until the end of 2025. The schedule assumes a timely response from government following the GM Authorities' submission, with a possible consultation on the directed scenario scheduled to commence in October 2024.

5.7.3 **Table 18** sets out the proposed timescales for the implementation of the Investment-led Plan.

Table 18 Investment-led Plan - Delivery Schedule

Theme	Task	Proposed Start	Proposed End
Policy development	Development pre-consultation	Jun-24	Aug-24
	Update post-consultation	Jan-25	Feb-25
Data, evidence and modelling	Generic modelling, bus and location measures	Jul-23	Jun-24
	Package modelling (pre-consultation)	Jul-24	Sep-24
	Package modelling (post-consultation)	Dec-24	Dec-24
Consultation, if required	Consultation preparation	Jul-24	Sep-24
	Consultation (6 weeks)	Oct-24	Nov-24
	Consultation analysis	Nov-24	Dec-24
Governance	Governance (evidence submission to JAQU)	Jun-24	Sep-24
	JAQU review and Direction	Aug-24	Sep-24
	Governance (final plan)	Feb-25	Feb-25
Implementation	Implementation of changes to bus fleet	Feb-24	Dec-24
	Implementation of highway infrastructure changes	Feb-24	Aug-25
	Regent Road Go live	Dec-24	Dec-24
	Quay Street Go live	Sep-25	Sep-25
	CTF Mobilisation and contractual agreements	Sep-24	Dec-24
	CTF design	Nov-24	Dec-24
	CTF development / implementation	Dec-24	Feb-25
	CTF go live	Mar-25	Mar-25
	Taxi Emission Standard implemented	Jan-25	Dec-25

Schedule Assumptions

5.7.4 The delivery schedule for the Investment-led Plan has been informed and developed from a wide range of sources and considers the work undertaken on the Previous GM CAP, as well as the recent procurement activities and depot electrification undertaken as part of bus franchising, and experience from highway schemes undertaken by the local authorities in respect of the local highway measures.

5.7.5 GM Authorities have updated the schedule set out in the December 2023 submission by adding seven months to relevant tasks where there is a dependency on receiving a government direction on the preferred scheme.

5.7.6 There are a number of assumptions that need to be made with the development of the schedule, some of which apply to both the Investment-led Plan and the CAZ Benchmark, and others specific to one or the other. The key assumptions are set out below:

- It is assumed that the same workstreams and methodologies will be applied as with the Previous GM CAP, such as policy development, data, evidence and modelling (DEM), consultation, governance and implementation. However, it is assumed that no further stakeholder engagement and research will be required to provide further evidence to the DEM or policy workstreams. If this is subsequently required, following feedback from government, there could be a delay to a number of activities which could affect the go-live dates.
- Both the Investment-led Plan and the CAZ Benchmark schedules use the decision by government as the start point for the further activities in the schedule. The updated assumption is that government will provide a response in September 2024 that gives a clear instruction to enable the GM Authorities to mobilise the teams required for the next stage of the GM CAP. A delay in the response by government affects the Investment-led Plan and the CAZ Benchmark differently.
- For the Investment-led Plan, a delay in the response by government will cause a direct equivalent delay to the activities associated with the taxi funding (through the CTF).
- For the Investment-led Plan, the schedule allows for a broad engagement exercise / consultation, but it this is not a statutory requirement. The public engagement exercise / consultation would, if required focus on the funding for taxis and is assumed to be for a period of 6 weeks.
- The start of consultation is directly linked to the response by government. There would be flexibility to move the start of the consultation and this would not affect the go-live dates for the bus and local highway measures, but it would have a direct effect on the go-live date for the taxi funding. Whilst this does not affect the compliance date (as this is driven by the implementation of the emission standards) this could prejudice the potential early upgrades of taxis and the associated air quality benefits.

- Bus franchising is delivering to the timescales noted previously (Tranche 1: September 2023, Tranche 2: March 2024 and Tranche 3: January 2025) and therefore the bus measures are generally not driven by other activities in the schedule.

5.8 Risks

5.8.1 The GM Authorities' approach to risk management is proactive and focuses on avoidance, transfer or taking mitigating action, rather than solely making financial provision for risk impacts. Risks have and will continue to be actively reviewed and managed as part of the GM Authorities' Performance Management Plan (PMP), as referenced in **Section 5.9**, so that the GM Authorities have the mechanisms in place to monitor the effectiveness of the measures implemented as part of the Investment-led Plan. **Table 19** illustrates some of the main implementation and operational risks associated with the Investment-led Plan.

5.8.2 As part of managing risk the GM Authorities have sought to apply pessimistic modelling assumptions to represent bus and taxi changes associated with the Investment-led Plan, which are set out in detail in the AQ3 report, adding resilience to the Plan's modelling compliance in 2025. These include:

- for roads where exceedances are not forecast, a high proportion of retrofitted Euro V buses have been assumed because available OEM Euro VI and ZEB have been deployed based on known available fleet. This is particularly the case for the Bus Franchising Tranche 3 and the Stockport depot where the ZEBRA funding of the depot electrification has been delayed. This means that extrapolation of concentrations beyond 2025/2026 is likely to over-predict bus emissions and under-predict the rate of improvement because further fleet improvements beyond the 2025 scenario are not incorporated;
- there is no allowance for compliant hackney carriages to upgrade to ZEC models despite funding being available; and
- taxi emissions are modelled based on the GM-wide average fraction of taxi flow of 7% as a proportion of total car trip demand, based on the evidence from ANPR data used for Target Determination. However, whilst ANPR evidence indicates that this continues to be representative of the majority of GM, the prevalence of taxi movements is greater in the Regional Centre. Inside the IRR taxi movements can be up to 25% of car traffic in 2023. The modelled impact of the Investment-led Plan will therefore underestimate the effect of the taxi upgrade.

Table 19 Investment-led Plan - Summary of Key Risks

Risk Name / Description	Risk Minimisation / Mitigation
Shortage of available cleaner buses to deploy on modelled exceedance routes	• Consider options to secure or redeploy cleaner buses from other tranches, from the operators, or further new cleaner buses. • Review and monitor performance of taxi measures to understand whether the underrepresentation of taxis is resulting in a material impact to compliance based on the shortfall of ZEBs. • Review opportunities to deploy local measures at the sites which remain in exceedance based on the shortfall of ZEBs.
Delays to bus depot electrification	• Consider options to base new ZEBs at other depots where there is sufficient charging capacity. • Consider use of temporary charging infrastructure which does not require grid connections. • Regular briefings between GM CAP and bus franchising teams to monitor progress of depot electrification. • Prioritisation of cleaner bus requirement based on most persistent exceedance sites forecast in 2025.
GM-licensed, non-compliant taxis/PHVs re-license to a non-GM local authority to avoid the upgrade requirement to be compliant with the proposed emission standard requirement.	• The provision of supporting funding through the CTF, coupled with the relatively low cost to upgrade to a second-hand, compliant PHV will help to mitigate the risk of owners re-licensing to a non-GM local authority.
Impediments to the implementation of Local Highway Measures at A34 Quay Street / A57 Regent Road	• Determine whether an incremental benefit from the local highway measures at these locations would be sufficient to achieve compliance alongside with the full implementation of the bus and taxi measures. • Investigate alternative local measures to deliver a similar air quality benefit at this location.
The modelled air quality benefit from the Local Highway Measures is not achieved	• Consider whether further benefits can be secured / assumed from delivered bus and taxi measures. • Consider short-term scheme design changes at the relevant locations. • Investigate alternative local measures to deliver a similar air quality benefit at this location.
Modelling uncertainties	• Throughout the technical development process from 2017 to date, the GM Authorities have used best practice methodology and assumptions and worked closely with government. Where there is modelling uncertainty, pessimistic assumptions have been applied to add resilience into the assumed modelled outcomes. • Sensitivity testing conducted and provided to government as referenced below. • Any changes will be managed via the Investment-led Plan PMP and associated adaptive planning process.

Risk Name / Description	Risk Minimisation / Mitigation
	• Outcome of government review into bus retrofit performance will be reviewed and monitored with the assumptions used to underpin both scenarios.
Implementation of the Investment-led Plan does not reduce NO_2 to levels predicted within the model	• Pessimistic assumptions have been applied, where applicable, to add robustness in the modelled air quality outcomes of this scenario. • Engagement with partner organisations such as National Highways and Public Health England and alignment with other relevant areas of work. • Implement appropriate monitoring for compliance and evaluation, captured through the preferred scenario's PMP. Feedback should inform the effectiveness of the solutions implemented and give an opportunity to address / adapt the plan within the operational phase. • Consider flexibility or sufficient sensitivity ranges to improve effectiveness. • Consideration may be given to including further projects / measures within the programme if compliance is not achieved. • Consider the commissioning of ongoing research in advance of implementation.
Challenging timescales for Investment-led Plan implementation affecting staff wellbeing and causing delay to implementation	• Continually monitor resources at a programme level with Sponsors in order to ensure levels are appropriate for the projects and if not, work to recruit to the appropriate level. • Ensure 1-2-1s with line managers are taking place for all staff and any issues raised immediately with Programme Manager and Sponsors. • Follow procedures for staff with regards to sickness and return to work. • Ensure the wellbeing site is highlighted to all working on the programme and utilised if needed (EAP for staff).
Legal challenge against the Investment-led Plan	• Ongoing monitoring and evaluation into effectiveness of the measures in complying with the Direction, ongoing review of legal risks.
Operational resources underestimated	• Develop operating model based on estimated volumes of work and validate with similar activities / authorities where possible. • Closely monitor capacity and demand. • Recruit additional roles.
Unforeseen economic effects	• Review through Benefits Realisation Plan. • Any changes will be managed via the PMP and associated adaptive planning process.
Unavailability of compliant vehicles	• Monitor taxi funding take up during operations and procurement of cleaner buses. • Collect and consider feedback from affected owners as part of the application process. • Consider alternative approaches through PMP process.
Unable to assess full impact of the Investment-led Plan due to unforeseen	• Continual monitoring of the data, feeding into the Benefits Realisation Plan at regular intervals. • Ensure ability to be flexible to respond to unanticipated changes to the projects.

Risk Name / Description	Risk Minimisation / Mitigation
changes to economic / non-economic circumstances	• Close liaison with the project team for early assessment of potential impact of any changes identified.
System integration, issues or a change to the proposals for grants/finance, delaying the go live	• The CTF is proposed to be administered via the Flexigrant payment system which has been used for the administration of bus funding. • The distribution of funding will be monitored on an ongoing basis.
Approval of the Investment-led Plan and specifically the Clean Taxi Fund is delayed from government leading to a greater risk of affordability challenges for taxi drivers to upgrade their non-compliant vehicles.	• Funding to be provided via payment in arears in respect to the Clean Taxi Fund and therefore non-compliant taxi drivers will need to respond to emission standards prior to receipt of funds. • Exploration of time-limited (less than 1 year) license renewals to allow taxi owners to continue to operate in GM with their existing vehicle until the Clean Taxi Fund is open. • Progression of the implementation of bus and local measures ahead of government approval of the Investment-led Plan. GM Authorities are also progressing the approval of dates for emission standard implementation which align with the CAP. • Work with the taxi licensing group across each of the 10 GM authorities to monitor and review feedback from the taxi trade on the adoption of emission standards.
Errors arising from complexity of GM CAP modelling process.	• Use a consistent modelling approach which has been reviewed and approved by JAQU and JAQU's Technical Independent Review Panel as part of the Previous GM CAP. • Review and update the assurance processes and maintain a Quality Assurance log of checks and approvals through the modelling process.

5.8.3 Some of the main identified risks associated with the Investment-led Plan, and proposed approaches to risk mitigation and minimisation are set out below. The GM Authorities would address these through its PMP, summarised below.

5.8.4 A series of sensitivity tests are being conducted and reported as part of this evidence submission which would provide confidence on the level of risks assumed under each scenario and the materiality of the risk to achieving the requirements of the Direction.

5.9 Performance Management

5.9.1 As part of the Investment-led Plan, the GM Authorities would monitor the measures implemented to ensure they are successful in achieving compliance in the shortest possible time.

5.9.2 The PMP would be supported by a Monitoring and Evaluation Plan and a Benefits Realisation Plan – these plans would be completed if an Investment-led Plan was directed by the government. The following section provides a high-level overview of the approach to monitoring for the Investment-led Plan and the benefit realisation process.

5.10 Monitoring and Evaluation

5.10.1 Monitoring will be required to ensure that the Investment-led Plan measures remain appropriate throughout the lifetime of the interventions. Therefore, the GM Authorities will conduct local monitoring and evaluation in order to:

- Provide accountability to the 10 GM local authorities, JAQU and the general public in showing that objectives have been met;
- Adapt the programme if it is not delivered as planned or has unexpected impacts;
- Understand the efficacy of the interventions; and
- Build an evidence base for future projects.

5.10.2 The Monitoring and Evaluation Plan will include monitoring of the outputs and outcomes of the scheme, including what is delivered, how it performs, and the wider impacts of those measures. Specifically, the monitoring will consider:

- Outputs of the Investment-led Plan in terms of what has been delivered and when;
- The taxi compliance rate and taxi fund uptake (and any reasons for non-uptake, e.g. affordability issues);
- The fleet age mix in the forecasts vs. the GM ANPR data sets and the TAG Data Book forecast for uptake of EVs;
- The performance of local traffic interventions covering speeds and flows;
- The outcomes of the JAQU funded study to quantify NO_X and NO_2 emissions from retrofit buses under real-world driving conditions;
- Bus service deployment to ensure that lower emitting buses are deployed on routes that target the remaining exceedance sites; and
- Results of NO_2 monitoring against the long-term annual mean legal limit of 40µg/m^3.

5.11 Benefits Realisation

5.11.1 The Benefits Realisation Plan would set out the review process that has been put in place to ensure that benefits of the Investment-led Plan are realised and dis-benefits minimised. This review process would investigate the following questions:

- Has the Investment-led Plan been delivered as expected to date and is it on track for delivery of future elements?
- Is the Investment-led Plan performing as expected?
- Are the outcomes of the Investment-led Plan as expected?
- Have there been changes in wider factors to which the Investment-led Plan is sensitive?

6 CAZ Benchmark

6.1 Background

6.1.1 The development and testing of the CAZ Benchmark have been undertaken by the GM Authorities in accordance with a request received by a letter[34] from government in December 2022 in response to the 'Case for a new Greater Manchester Clean Air Plan' submission in July 2022[35]. No changes have been made to the CAZ Benchmark scheme following updates to the Do Minimum and Investment-led Plan since December 2023. However, this section does contain updated air quality outputs forecast for 2025 and 2026 which reflects an updated air quality baseline from which the CAZ Benchmark is tested.

6.1.2 Government stated in their response to the GM Authorities' approach to a non-charging scheme that they require a comparison, in line with government's agreed standard approach with all local authority NO_2 plans, against a suitable CAZ Benchmark to demonstrate it is as effective in reaching compliance in the shortest possible time.

6.1.3 The Minister for Environmental Quality and Resilience wrote to the GM Authorities in January 2023 following a meeting with the GM Mayor and the Clean Air Portfolio Lead. The Minister's letter included the following request which was consistent with JAQU correspondence in December 2022. The following requests were made:

- Provide modelling results for a CAZ Benchmark to address the persistent exceedances identified in central Manchester and Salford, in order for these to be compared against your proposals.
- 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.
- 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.

6.1.4 The development and testing of the CAZ Benchmark responds to the first of the above requests from government. The GM Authorities submitted evidence to government in March 2023[36] that identifies a suitable approach to address persistent exceedances identified on the A58 Bolton Road in Bury.

[34] https://assets.ctfassets.net/tlpgbvy1k6h2/3EZ3zDp9wNKC8H66OiwPDY/3fe5db47f3c945387dee716669ca4559/Minister_for_Environmental_Quality_and_Resilience_to_GM_Mayor_and_Clean_Air_Portfolio_Lead.pdf

[35] https://assets.ctfassets.net/tlpgbvy1k6h2/7jtkDc5AODypDQIw0cYwsl/67091a85f26e7c503a19ec7aeb2e8137/Appendix_1_-_Case_for_a_new_Greater_Manchester_Clean_Air_Plan.pdf

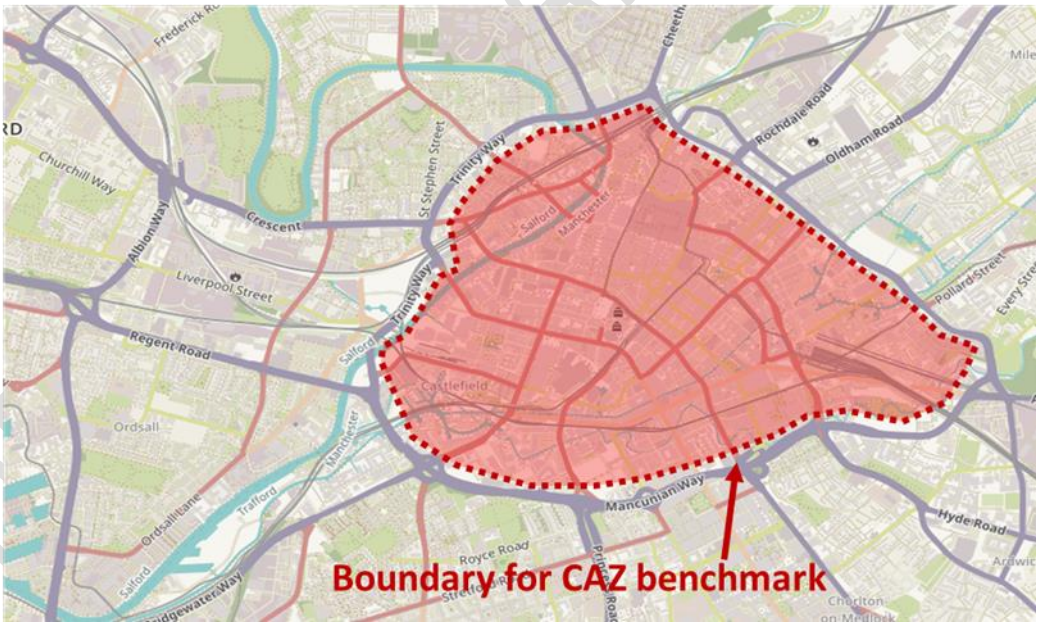
[36] https://assets.ctfassets.net/tlpgbvy1k6h2/6ZLaE1x4Sq125zSDIEgroJ/566f9f8bc8894b9545c5c75eb6b491b4/GM_Mayor_and_Clean_Air_Portfolio_Lead_to_Minister_for_Environmental_Quality_and_Resilience.pdf

6.1.5 Through discussions with government, the CAZ Benchmark based on the Regional Centre was identified and agreed with government, by letter to the GM Authorities in December 2022[37]. Government noted that that a CAZ Benchmark would be expected to include all city centre locations predicted to be non-compliant in 2025. The CAZ Benchmark boundary was therefore developed, as shown in **Figure 9**, and uses the inside of the Manchester and Salford IRR.

6.1.6 Most other CAZ schemes are focused on a relatively small area – typically the Central Business District or similar. In the Regional Centre the IRR forms a natural boundary to the central area, aligns with City Centre Transport Strategy modelling within the IRR would minimise wider traffic reassignment impacts by non-compliant vehicles, and would primarily model those journeys with an origin or destination within the Regional Centre.

6.1.7 Although the A57 Regent Road, as a persistent exceedance site, is located outside the CAZ boundary it is impacted by Regional Centre flows as a key radial to/and from the Regional Centre thus benefitting from any Regional Centre air quality improvements. Further information regarding the modelled assumptions for the CAZ Benchmark are set out in *T4 Report Appendix A.*

Figure 9 CAZ Benchmark Boundary



[37] https://assets.ctfassets.net/tlpgbvy1k6h2/3EZ3zDp9wNKC8H66OiwPDY/3fe5db47f3c945387dee716669ca4559/Minister_for_Environmental_Quality_and_Resilience_to_GM_Mayor_and_Clean_Air_Portfolio_Lead.pdf

6.1.8 The GM Authorities have continued to work closely with JAQU officials to agree the CAZ Benchmark criteria. This includes the Class of CAZ which forms part of the Benchmark test. The GM Authorities agreed that a Class B (buses, coaches, Hackney Carriages, PHVs and HGVs) and Class C (buses, coaches, Hackney Carriages, PHVs, HGVs, LGVs and minibuses) would be tested on the basis of which CAZ better achieves compliance with the GM Authorities' legal Direction. As part of the CAZ Benchmark model runs, a Class C CAZ was modelled initially to determine whether it would achieve compliance and therefore determine the requirement to run the CAZ B test.

6.1.9 Under the CAZ Benchmark vehicles within the relevant vehicle classes that do not meet the minimum emissions standards would be charged to drive within the zone. A summary of the relevant CAZ parameters and associated measures covered in the CAZ Benchmark as developed in conjunction with JAQU, can be viewed in **Table 20**.

6.1.10 As part of the testing of the CAZ Benchmark, the GM Authorities have assumed supporting mitigation funds in addition to a charging CAZ C based on the GM Regional Centre as per the Previous GM CAP. The supporting mitigation funds have been uplifted in-line with inflation, taking into account inflationary rises from 2021 (finalisation of the Previous GM CAP) up to and including 2024. This uplift is consistent with the uplift in taxi funding proposed as part of the Investment-led Plan.

Table 20 Benchmark Regional Centre CAZ Summary of Measures

The CAZ Benchmark scheme	Description
Key Characteristics	
Boundary	Covers all local roads within the GM Regional Centre (inside the Manchester and Salford IRR as shown in **Figure 9**).
Times of operation	24 hours a day, 7 days a week.
Vehicles affected	The following vehicles in-scope have been derived based on a Class C CAZ: • Buses[38] • Coaches • HGVs • LGVs • Minibuses • Licensed Hackney Carriages • Licensed PHVs
Daily charges	Daily charges would apply for each day a non-compliant vehicle is used within the GM CAZ boundary with one charge imposed per vehicle, per 'Charging Day' (midnight to midnight). • Buses[39] - £60 per 'Charging Day' • Coaches - £60 per 'Charging Day' • HGVs - £60 per 'Charging Day' • LGVs - £10 per 'Charging Day' • Minibuses - £10 per 'Charging Day' • Licensed Hackney Carriages - £7.50 per 'Charging Day' • Licensed PHVs - £7.50 per 'Charging Day'
Penalty for non/late payment of daily charge	£120 (in addition to the daily charge) would be applied to all relevant vehicles (reduced to £60 plus the daily charge if paid within 14 days of the Penalty Charge Notice being issued).
Funding for commercial vehicles	The Clean Commercial Vehicle Fund (CCVF) would provide funding for the upgrade of LGVs, HGVs, minibuses and coaches through the provision of grants or vehicle finance contributions. Funding is targeted to support eligible small and micro businesses, sole traders, self-employed, charities, social enterprises and individuals in GM that travel to/and from the Regional Centre. For the purposes of this benchmark test, GM registered businesses naturally planning to upgrade their vehicles by 2026 have been assumed to also take up funding. Eligible applicants would be offered a grant towards a replacement vehicle, which may be taken as a lump sum grant or access to vehicle finance. The funding levels are as follows: • HGVs: up to £15,070 towards replacement depending on vehicle size.

[38] It should be noted that a bus which has been retrofitted in accordance with the government CVRAS accredited bus retrofit scheme is considered to be a compliant vehicle, based on the approach set out by JAQU and other CAZ cities, and thus are not subject to a CAZ charge.

[39] Government have confirmed that a CVRAS-accredited retrofitted bus should be treated as a compliant vehicle with a CAZ.

The CAZ Benchmark scheme	Description
	• LGVs: up to £5,650 towards replacement depending on vehicle size. • Coaches: up to £40,180 towards replacement. • Minibuses: up to £6,280 towards replacement. Funding levels have been uplifted since the Previous GM CAP to reflect changes in inflation.
Funding for taxis	The CTF would provide funding in the form of a grant or vehicle finance contributions for the upgrade of non-compliant Hackney Carriages and PHVs licensed in GM. Eligible applicants would be offered a running cost grant towards the running costs of a new ZEC vehicle or a contribution towards a replacement vehicle, which may be taken as a lump sum grant or access to vehicle finance. The funding offers are split into funding for upgrade to WAVs and funding for upgrade to non-WAVs, as follows: <u>Upgrade to WAV</u> • Up to £12,560 towards the running costs of a new purpose-built WAV ZEC replacement vehicle. This option is available when the compliant replacement vehicle acquired with GM CAP funds has also been eligible for a government plug-in grant; or • Up to £12,560 towards a second-hand purpose-built WAV ZEC replacement vehicle; or • Up to £6,280 towards a compliant purpose-built WAV replacement vehicle (Euro 4 petrol or Euro 6 diesel or better). <u>Upgrade to Non-WAV</u> • Up to £7,530 towards the running costs of a new ZEC replacement vehicle; or • Up to £7,530 towards a second-hand ZEC replacement vehicle; or • Up to £3,770 towards a compliant replacement vehicle (Euro 4 petrol or Euro 6 diesel or better); or • Up to £6,280 towards a compliant replacement 6+ seater vehicle (Euro 4 petrol or Euro 6 diesel or better). Funding levels have been uplifted since the Previous GM CAP to reflect changes in inflation.
Exemptions	
National permanent exemptions	Government's CAZ Framework sets out a list of permanent exemptions for all CAZs. Vehicle types covered here are: • Historic vehicles • Military vehicles • Disabled passenger vehicles • Specialist emergency service vehicles

The CAZ Benchmark scheme	Description
Permanent local exemptions by GM	The list of vehicle types proposed to be eligible for a permanent exemption, consistent with those forming part of the Previous GM CAP, are shown below for completeness: • Specialist HGVs • Non-road-going vehicles • Vehicles used by emergency services • Community minibuses • Showmen's vehicles • Driving within the zone because of a road diversion • Disabled tax class vehicles • LGVs and minibuses adapted for a disabled user • Driver training buses • Heritage buses not used for hire or reward
Permanent local discount by GM	The list of vehicle types which are proposed to be eligible for a permanent local discount, consistent with those forming part of the Previous GM CAP, are shown below for completeness: Owners or registered keepers' vehicles in the DVLA Private HGV Task Class and meeting the definition of a "special vehicle" in paragraph 4(2)(bb) of Schedule 2 to the Vehicle Exercise and Registration Act (VERA) would be subject to the LGV daily charge of £10 a day, rather than the HGV daily charge of £60 a day.

6.1.11 The CAZ Benchmark would cover all local roads within the Regional Centre and would operate 24 hours a day, seven days a week. Stationary vehicles would not be charged.

6.1.12 Daily charges would apply for each day a non-compliant vehicle is used within the GM Regional Centre CAZ, with one charge imposed per vehicle, per 'Charging Day' (midnight to midnight), regardless of how much the vehicle travels within the GM Regional Centre CAZ in that 24-hour period. The GM Regional Centre CAZ charges for non-compliant vehicles would be as follows:

- Buses - £60 per 'Charging Day'.
- Coaches - £60 per 'Charging Day'.
- HGVs - £60 per 'Charging Day'.
- LGVs - £10 per 'Charging Day'.
- Minibuses - £10 per 'Charging Day'.
- Licensed Hackney Carriages - £7.50 per 'Charging Day'.
- Licensed PHVs - £7.50 per 'Charging Day'.

6.1.13 The relevant charge for non-compliant vehicles used within the GM CAZ would be paid via a Central Government Payment Portal. The government portal would allow a user to pay six days before the day of travel (Charging Day), any time on the Charging Day or six days following the Charging Day.

6.1.14 The penalty for no or late payment would be £120 in addition to the daily charge. This would be applied to all relevant vehicles and reduced to £60 (plus the daily charge) if paid within 14 days of the Penalty Charge Notice being issued.

6.1.15 Private cars and motorcycles would not be included. Vehicles travelling through GM on the National Highways Strategic Road Network (SRN) would also be excluded.

6.1.16 As part of the development of the CAZ Benchmark, the list of national and local exemptions and discounts is consistent with the Previous GM CAP. Further information can be found in GM Air Plan Policy following Consultation[40] (2021).

6.2 CAZ Benchmark – Clean Commercial Vehicles Fund

6.2.1 The CCVF would provide financial support to eligible applicants for the upgrade of non-compliant HGVs, LGVs, coaches and minibuses through the provision of grants and vehicle finance contributions. The CCVF would be targeted at small and micro businesses, sole traders, the self-employed, charities, social enterprises and individuals in GM that travel to/and from the Regional Centre. For the purposes of the benchmark test, GM registered businesses with LGVs and HGVs who have naturally planned to upgrade their vehicles by 2026 have been assumed to be eligible for funding.

6.2.2 Eligible applicants would be offered a contribution towards a replacement vehicle which may be taken as a lump sum grant or access to vehicle finance. CCVF can be comprised of grant-only, grant plus vehicle finance or vehicle finance-only with a total capped amount. The funding structure of the CCVF is consistent with the Previous GM CAP CCVF with the funding offer for HGV and LGV split by weight class.

HGV and LGV Support

6.2.3 The funding levels for HGVs and LGVs are outlined in Table 21.

Table 21 CAZ – CCVF HGV and LGV Funding Offer

Vehicle	Offer available (per vehicle)
HGV	Up to £15,070 towards a compliant replacement vehicle, dependent on the size of non-compliant vehicle for replacement, as follows: • 44t HGV (up to 44t HGV) – up to £8,160 • 32t rigid HGV (over 26t and up to 32t rigid HGV) – up to £15,070

[40] https://assets.ctfassets.net/tlpgbvy1k6h2/2VNncClzejAvGh3CrVn0oo/d45528de22e593c9be285ddf5b26373b/Appendix_1_-_GM_Clean_Air_Plan_Policy_following_Consultation.pdf

Vehicle	Offer available (per vehicle)
	• 26t rigid HGV (over 18t and up to 26t rigid HGV) – up to £11,300 • 18t rigid HGV (over 7.5t and up to 18t rigid HGV) – up to £8,790 • Up to 7.5t rigid HGV (over 3.5t and up to 7.5t rigid HGV) – up to £6,280
LGV	Up to £5,650 towards a compliant replacement vehicle, dependent on the size of non-compliant vehicle for replacement, as follows: • under 1.6t LGV – up to £4,400 • over 1.6t and up to 3.5t LGV – up to £5,650

6.2.4 The previous funding award from JAQU covering grants and vehicle finance contributions was £70m for LGVs and £7.6m for HGVs. This included JAQU estimated delivery costs of 5% and excluded operating and Quantified Risk Assessment (QRA) costs.

6.2.5 The eligible vehicle population for HGVs and LGVs that are assumed to take-up the funding, based on a Regional Centre CAZ, have been derived through identifying:

- Vehicles that travel to/and from the Regional Centre based on the GM CAP transport model outputs; and
- Vehicles that are forecast to naturally upgrade up to and including 2026 which aligns with the anticipated 'go-live' date for the CAZ.

6.2.6 A summary of the HGV and LGV eligible vehicle population for funding is shown in **Table 22** below.

Table 22 Eligible HGV and LGV population

Type	Vehicle Served	Funding Amount
LGV (2026)	12,695	£68,164,290
HGV (2026)	1,174	£12,748,544

6.2.7 Further information regarding the splits between vehicle volumes travelling to/and from the Regional Centre with those upgrading naturally is included within *T4 Appendix B*.

6.2.8 Financial support via the provision of grants and vehicle finance contributions would be available prior to the introduction of the CAZ Benchmark.

Coach and Minibus Support

6.2.9 The funding levels for coach and minibus are outlined in **Table 23**.

Table 23 CAZ - CCVF Coach and Minibus funding offer

Vehicle	Offer available (per vehicle)
Coach	Up to £40,180 per vehicle (where retrofit is not available)
Minibus	Up to £6,280 per vehicle

6.2.10 JAQU has awarded £4.2m of funding towards the upgrade of coaches and £1.9m towards the upgrade of minibuses (which are not a licensed Hackney Carriage or PHV or used on a GM registered bus service). This includes JAQU estimated delivery costs of 5% and excludes operating and QRA costs.

6.2.11 The eligible vehicle population for coaches and minibuses that are assumed to take-up the funding, based on a Regional Centre CAZ, have been derived through identifying vehicles that travel to/and from the Regional Centre based on the GM CAP transport model outputs. This is set out in **Table 24** alongside the required supporting funding for these vehicle types in the CAZ Benchmark test.

Table 24 Eligible Coach and Minibus populations for funding

Type	Vehicle Served	Funding Amount
Coaches (2026)	35	£1,398,682
Minibuses (2026)	243	£1,527,296

6.2.12 Based on research conducted in preparation for the Previous GM CAP, coach upgrades are very expensive, reaching up to £280,000 for a new vehicle or £142,000 - £180,000 for a second-hand compliant vehicle. The coach upgrade grant will cover 20% of the estimated cost for a second-hand compliant coach at the mid-value of £160,000. When taken as vehicle finance, the higher value will also increase the opportunity for operators to secure a finance agreement. This value will also facilitate access to vehicle finance if required.

6.2.13 Under the Previous GM CAP, it was identified that the upgrade to a new minibus would typically cost approximately £40,000. It is anticipated that the availability of second-hand minibuses would be limited, meaning that it is likely that owners and operators would have to upgrade to a new vehicle. The proposed contribution of £5,000 seeks to mitigate the cost burden on minibus owners by providing over 10% of the upgrade cost.

6.2.14 The coach and minibus figures highlighted above have not been adjusted for inflation since the Previous GM CAP was developed. It is likely that vehicles are now more expensive and the uplifted funding offer, based on inflation, will ensure that a similar proportion of the upgrade cost is covered.

Taxi support

6.2.15 The CTF would offer funding through grant or vehicle finance contributions towards the upgrade of non-compliant Hackney Carriages and PHVs licensed with one of the 10 GM local authorities.

6.2.16 Eligible applicants would be offered a contribution towards a replacement vehicle that can be taken as a lump sum grant or access to vehicle finance.

6.2.17 Financial support via the provision of grants and vehicle finance contributions would be available prior to the introduction of the CAZ Benchmark.

6.2.18 The funding levels for Hackney Carriages and PHVs is outlined in **Table 25**. The funding offers are split into funding for upgrade to WAVs and funding for upgrade to non-WAVs. The funding structure of the CTF is consistent with the Previous GM CAP CTF with the funding offer split by WAV and fuel type.

Table 25 CAZ CTF – taxi funding offer

Vehicle type (upgrade to)		Offer available (per vehicle)
Purpose-built WAV	**New ZEC**	Up to £12,560 towards the running costs of the replacement vehicle.
	Second-hand ZEC	Up to £12,560 towards the cost of the replacement vehicle.
	Compliant Vehicle (Euro 4 petrol or Euro 6 diesel or better)	Up to £6,280 towards the cost of the replacement vehicle.
Non-WAV	**New ZEC**	Up to £7,530 towards the running costs of the replacement vehicle.
	Second-hand ZEC	Up to £7,530 towards the cost of the replacement vehicle.
	Compliant Vehicle 6+ seater (Euro 4 petrol or Euro 6 diesel or better)	Up to £6,280 towards the cost of the replacement vehicle.
	Compliant Vehicle (Euro 4 petrol or Euro 6 diesel or better)	Up to £3,770 towards the cost of the replacement vehicle.

6.2.19 Running cost grants and vehicle finance contributions are designed to be able to be taken up in conjunction with existing grants available from government's OZEV Funds but cannot be used in conjunction with other GM CAP funding. GM CAP grants for replacement vehicles cannot be used in conjunction with government's OZEV Funds.

6.2.20 The core funding award from JAQU of £20.3m (including JAQU estimated delivery costs of 5%) includes £14m for the PHV grant and vehicle finance package and £6.3m for the Hackney Carriage grant and vehicle finance package.

6.2.21 The eligible vehicle population for Hackney Carriages and PHV that are assumed to take-up the funding, based on a Regional Centre CAZ Benchmark, have been derived through identifying vehicles that travel to/and from the Regional Centre based on the CAP transport model outputs. This is set out in **Table 26** alongside the required supporting funding for these vehicle types in the CAZ Benchmark test.

Table 26 Eligible Hackney Carriage and PHV populations for funding

Type	Vehicle Served	Funding Amount
Hackney Carriage (2026)	617	£5,485,646
PHV (2026)	1,401	£7,248,376

6.3 Air Quality Impact

6.3.1 This section provides an overview of the modelled impact from the CAZ Benchmark on the remaining points of exceedance in 2025 and 2026. This includes the reduction in NO_2 concentrations at each exceedance site in addition to the total number of remaining exceedance sites. Further information on the air quality impact of the CAZ Benchmark is reported in the *AQ3 Report*.

6.3.2 This section of the report takes account of key bus developments since the December 2023 evidence submission which have impacted the Do Minimum that this CAZ Benchmark test is appraised against.

6.3.3 **Table 27** shows the distribution of non-compliant sites across GM, both by spatial type and also in terms of how close they are to compliance based on the implementation of the CAZ Benchmark.

6.3.4 The results shown that the anticipated number of exceedance sites below the legal limit values in 2025 are modelled to reduce from 26 to 21 sites under the CAZ Benchmark. There is also an increase in the number of sites predicted to have concentrations of less than 35 µg/m^3.

6.3.5 The number of exceedance sites below the legal limit values in 2026 is modelled to reduce further to 16 sites. Compliance with the Direction is not achieved in the assessment years under a CAZ Benchmark.

Table 27 Predicted annual mean NO_2 concentrations at points on the GM road network – 2025 and 2026 CAZ Benchmark

Road classification[41]	Compliant sites		Non-compliant sites			
	Very compliant (Below 35 µg/m^3)	Compliant but marginal (35 to 40 µg/m^3)	Non-compliant (>40 to 45 µg/m^3)	Very non-compliant (>45 to 50 µg/m^3)	Extremely non-compliant (>50 µg/m^3)	Total non-compliant (>40 µg/m^3)
2025						
Do minimum	2419	95	19	7	0	**26**
CAZ Benchmark	2426	93	16	5	0	**21**
2026						
Do Minimum	2467	56	12	5	0	**17**
CAZ Benchmark	2473	51	12	4	0	**16**

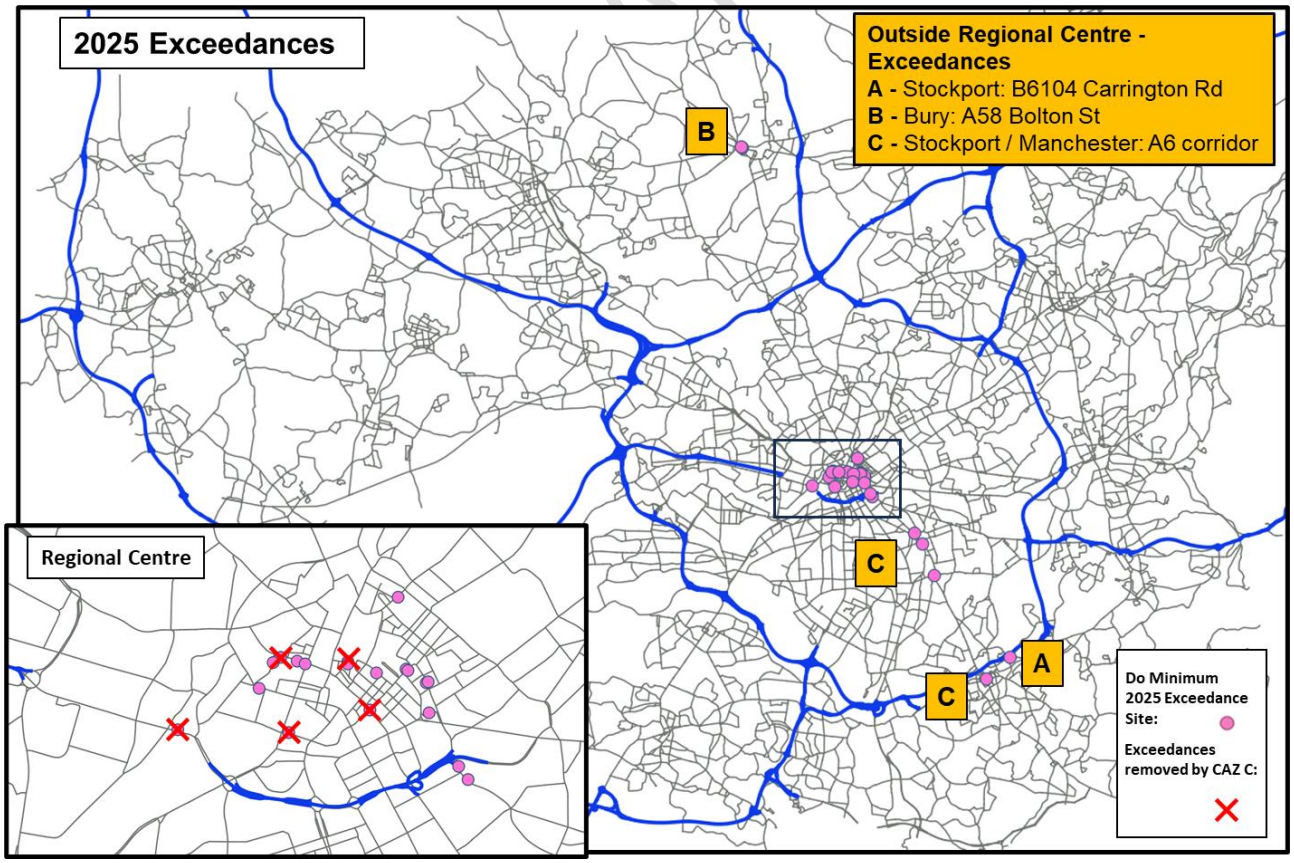
41 "Inside Inner Relief Route" is the area encircled by the IRR. "Urban centres" are areas that met a definition used for the purposes of air quality modelling for OBC Option testing. "Other locations" are roads outside of Urban centres and the IRR.

6.3.6 **Figure 10** shows the spatial distribution of the 21 NO_2 exceedance sites modelled to remain with a Regional Centre CAZ C in 2025. The spatial concentration of exceedances is unchanged from the Do Minimum, clustered in the Regional Centre with 13 out of the 21 sites located in the city centre. There are 6 outlier exceedance sites: 2 exceedance sites located at the A58 Bolton Street, Bury, 3 sites along the A6 corridor from Manchester City Centre to Stockport and 1 site at the B6104 Carrington Road (also in Stockport).

6.3.7 Of the total change in emissions due to the Benchmark CAZ, typically c55% of the NOx reduction came from LGVs upgrading to become compliant (130 to 450veh/day), and c35% from HGVs upgrading to become compliant (10 to 35 veh/day), with the remainder of taxi upgrades and some minor changes to overall vehicle flows.

6.3.8 The greatest improvements are forecast at Great Bridgewater St with -2.2 µg/m^3, which is one of the sites that becomes compliant due to the CAZ Benchmark 2025 test. The maximum concentration is located at Portland St, where retrofit buses would still be operating, with a concentration of 48.1 µg/m^3.

Figure 10 Spatial distribution of predicted annual mean NO_2 exceedance sites – 2025 CAZ Benchmark (with GM CAP)



6.3.9 **Figure 11** shows the spatial distribution of the 16 NO_2 exceedance sites modelled to remain with a Regional Centre CAZ C in 2026. Most of the exceedance sites remain inside the GM Regional Centre with 4 sites located outside of the Regional Centre.

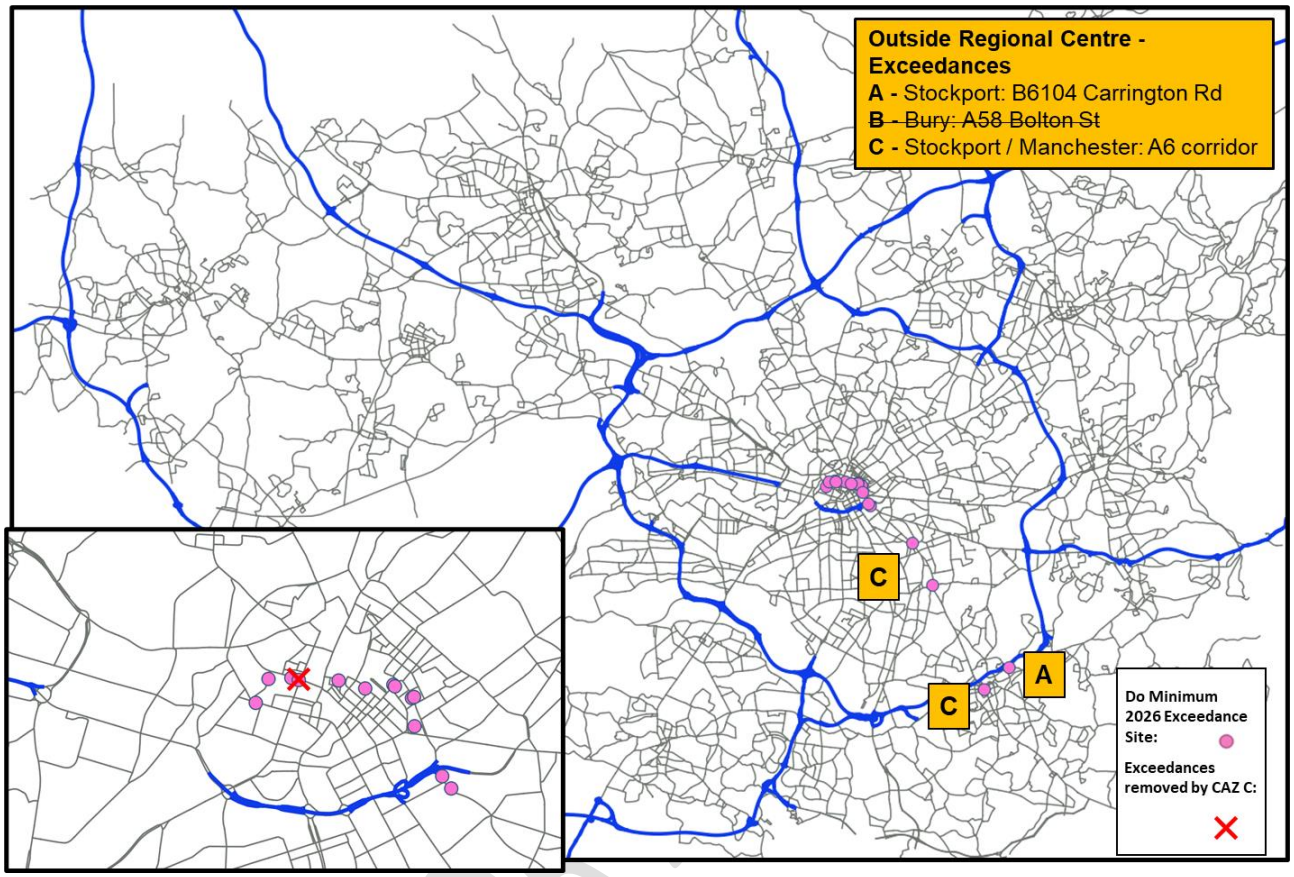
6.3.10 The CAZ Benchmark tests for 2026 results in the following change in NO2 concentrations at known sites of interest / exceedance:

- **A34 Bridge Street** – NO_2 concentrations are forecast to decrease by -0.7 µg/m^3;
- **A34 Quay Street** – NO_2 concentrations are forecast to decrease by -1.3 µg/m3 but this is not sufficient to bring these locations under the legal limits; and
- **Portland Street** – This location features the maximum NO_2 concentration where retrofit buses would still be operating with a concentration of 47.6 µg/m3.

6.3.11 Of the total change in emissions due to the Benchmark CAZ, typically c60% of the NOx reduction came from LGVs upgrading to become compliant (100 to 360veh/day), and c35% from HGVs upgrading to become compliant (10 to 25 veh/day), with the remainder of taxi upgrades and some minor changes to overall vehicle flows.

6.3.12 Both the 2025 and 2026 CAZ Benchmark scenarios have been modelled as operational for the full year, so the modelled impact on NO_2 in 2025 is greater because there are less non-compliant vehicles forecast to be in the fleet in 2026 as a result of natural year-on-year fleet turnover. However, the viable CAZ opening date is not likely to be until 2026, and therefore the impacts are likely overstated.

Figure 11 Spatial distribution of predicted annual mean NO_2 exceedance sites – 2026 CAZ Benchmark (with GM CAP)



6.3.13 **Table 28** shows the modelled impact of a Regional Centre Class C CAZ on the remaining 16 sites modelled to be in exceedance based on the Do Minimum in 2026. The results are shown for 2026 only as compliance is not modelled to be achieved in this earlier forecast year.

Table 28 CAZ Benchmark (2026) Exceedance Sites by NO_2 Concentrations

Point ID	Road name	Local Authority	Do Minimum NO_2 conc ($\mu g/m^3$)	CAZ Benchmark NO_2 conc ($\mu g/m^3$)	Change in Annual mean NO_2 conc ($\mu g/m^3$)
3016_6022_DW	A6 Whitworth St	Manchester	**47.4**	**47.0**	-0.4
1322_3273	A34 Quay St	Manchester	**46.2**	**44.9**	-1.3
1261_6042	Portland St	Manchester	**47.6**	**47.6**	0.0
1261_6042_DW	Portland St	Manchester	**47.2**	**47.2**	0.0
1286_15128	A6 Piccadilly	Manchester	**46.9**	**46.7**	-0.2
3272_8542_DW	Gartside St	Manchester	**44.4**	**43.4**	-1.0
8547_47130	King St	Manchester	**43.7**	**42.4**	-1.3
1263_5429	New York St	Manchester	**43.4**	**42.2**	-1.2
1286_15128_DW	A6 Piccadilly	Manchester	**44.1**	**43.9**	-0.2
1469_3669_DW	A6 Stockport Rd	Manchester	**42.6**	**42.4**	-0.2
1268_1269	A34 Bridge St	Manchester	**42.3**	**41.6**	-0.7
2607_3056_DW	A6 Ardwick Green	Manchester	**41.3**	**41.0**	-0.3
3056_3842_DW	A6 London Rd	Manchester	**41.1**	**40.7**	-0.4
1685_1686_DW	A6 Stockport Rd	Manchester	**41.3**	**41.2**	-0.1
NonPCM_207	A34 Bridge St	Manchester	**40.8**	40.1	-0.7
Jct355	A6 Wellington Rd South	Stockport	**43.5**	**43.5**	0.0
2663_5015_DW	B6104 Carrington Rd	Stockport	**42.1**	**41.6**	-0.5

6.4 Costs

6.4.1 Overall Funding Position

6.4.2 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[42], subject to a reasonableness test.

6.4.3 The GM Authorities have been awarded a total of £204.4 million (excluding electric vehicle charging infrastructure) based on the Previous GM CAP scheme. The government grants have been awarded as set out in **Table 29**.

Table 29 GM Authorities CAP funding award by government

Grant	£m
CAP Development Phase	33.3
CAZ and Vehicle Funds Implementation	31.4
CAZ and Vehicle Funds Operation	16.6
Vehicle funds (including bus)	123.1
Total	**204.4**

6.4.4 Expenditure to July 2024 (including committed grant awards) against the £204.4 million grants awarded by government is summarised in **Table 30**.

Table 30 Existing and forecast GM CAP expenditure

Area of Expenditure	Spend to date £m
CAP Development Phase	33.9
CAZ and Vehicle Funds Implementation	24.8
CAZ and Vehicle Funds Operation	18.1
Vehicle Funds (including Bus)	19.1
Grand total	**95.9**
Grant remaining	**108.5**

6.4.5 The GM Authorities have assumed that the grant value remaining would be repurposed to contribute to the future funding required for the CAZ Benchmark.

CAZ Benchmark Costs

6.4.6 The whole life costs of the Investment-led Plan and a CAZ Benchmark have been estimated. The figures have been developed using high level assumptions and based on previous costs.

[42] The New Burdens Doctrine is part of a suite of measures to ensure Council Taxpayers do not face excessive increases. New burdens doctrine: guidance for government departments - GOV.UK (www.gov.uk)

6.4.7 A high level of contingency has been applied and it should be noted that no commercial discussions have been held with suppliers.

6.4.8 This section sets out a summary of the proposed funding allocations required for a CAZ Benchmark. Even though a GM-wide CAZ has already been fully designed and substantially implemented, the vast majority of this work cannot be re-used. The funding allocations cover the development, implementation and operating costs to deliver the CAZ Benchmark.

6.4.9 A summary of the costs for the CAZ Benchmark is set out in **Table 31**.

Table 31 Summary of CAZ Benchmark Costs

Area	Cost
Early Termination of CAZ Services	N/A
Vehicle Upgrade Funding and Administration	(£107.2m)
Development and Implementation	(£13.1m)
Net Surplus / (Deficit) from Operation and Decommissioning	(£50.1m)
Total Cost	**(£170.4m)**

6.4.10 A high-level breakdown of each of the areas, and some of the associated key assumptions are provided as follows:

Early Termination of CAZ Services

6.4.11 It is assumed that under the CAZ Benchmark, the CAZ services would be largely retained and therefore no termination right, or costs, are triggered.

Vehicle Upgrade Funding and Administration

6.4.12 The following table details the costs related to the funding that would be provided to help owners upgrade non-compliant coaches, HGVs, LGVs and taxis and to mitigate against the economic impact of a CAZ Benchmark, as well as the associated development, implementation and operational costs. It is assumed that no funding would be required to upgrade buses and the upgrades completed for the Previous GM CAP will be sufficient.

6.4.13 Some of the key assumptions are provided in **Table 32** and a general contingency of 5% has been applied to the costs in the table.

Table 32 CAZ Benchmark - Vehicle Upgrade Funding and Administration Costs

Area	Cost	Key Assumptions
Fund Implementation Costs	£0.5m	Estimated cost of mobilising and implementing fund solution (costings derived based on scale of potential funding applications).
Zero Emission Buses	-	-
Depot Electrification	-	-
HGV Fund	£12.7m	-
LGV Fund	£68.2m	-
Coach & Minibus Fund	£2.9m	-
Taxi Core Fund	£12.7m	-
Taxi Electric Hackney Upgrade Fund	-	-
Fund Operational Costs	£5.0m	Proportioned by expected volumes against forecast cost and volume for the previously developed GM-wide CAZ.
General Contingency	£5.1m	A contingency of 5% has been applied against fund costs.
Total Cost	**£107.2m**	

Development and Implementation

6.4.14 **Table 33** shows the costs related to decommissioning and removal of the existing CAZ infrastructure, the costs for the installation of the CAZ Benchmark infrastructure, the costs associated with the consultation, as well as the associated development and implementation costs.

6.4.15 All of the existing signage would need to be removed and new design undertaken, with new signs installed for the CAZ Benchmark. It is assumed for the costings that the majority of the ANPR camera locations would need to be re-designed and estimated 150 cameras re-located onto new poles, and all the other cameras removed.

6.4.16 75 cameras would be required to enforce the CAZ Benchmark with a further 75 cameras relocated for the purpose of monitoring and evaluation. It is assumed that the same CAZ Office Service and Operating Body (TfGM) would be required that was developed for the previous GM-wide CAZ. Costs have been developed based on existing contractual costs (using a pro-rata percentage of the expected quantity of work).

6.4.17 Some of the key assumptions are provided in the table below and a general contingency of 20% has been applied to the costs in the table to reflect rough order of magnitude of costings at this stage.

Table 33 CAZ Benchmark – Development and Implementation Costs

Area	Cost	Key Assumptions
Signage update	£0.8m	Costs based on all existing signs being decommissioned, and 570 new signs being provided.
Camera update	£1.6m	Costs based on all existing cameras being decommissioned, and cameras relocated. 150 cameras are required. No additional savings assumed from excess camera sales.
Mobilisation costs	£0.5m	Mobilisation cost based on % assumption of the original mobilisation cost for the previously developed GM-wide CAZ.
CAZ Office Service / Operating Body (TfGM)	£6.8m	Operating Body cost based on % assumption of the original Operating Body for the previously developed GM-wide CAZ.
Penalty Enforcement Service	£0.2m	-
Marketing, engagement/consultation & comms	£1.0m	Marketing costs taken as a % of the original marketing costs assumed for the previously developed GM-wide CAZ.
Highways measures	-	-
General contingency	£2.2m	Contingency has been assumed at 20% of all costs to reflect rough order of magnitude of costings at this stage.
Total cost	**£13.1m**	

Revenue, Operational and Decommissioning Costs

6.4.18 **Table 34** details the costs related to the operation and decommissioning of the CAZ Benchmark. Revenue / income is generated from the CAZ Benchmark, unlike the Investment-led Plan where there is no revenue / income. The decommissioning relates to the demobilisation and decommissioning of all elements of the CAZ Benchmark after compliance has been evidenced (and does not include any costs relating to the existing CAZ infrastructure, which are included in the development and implementation costs identified in **Table 33** above).

6.4.19 The costs have been developed based on existing contractual costs (using a pro-rata percentage of the expected quantity of work compared to the Previous GM CAP).

6.4.20 Some of the key assumptions are provided in the table and a general contingency of 20% has been applied to the costs in the table to reflect rough order of magnitude of costings at this stage.

Table 34 CAZ Benchmark - Revenue, Operating and Decommissioning Costs

Area	Cost	Key Assumptions
Total CAZ income (incl. penalty revenue & JAQU processing costs)	£20.8m	Based on updated traffic journey volumes under a CAZ Benchmark. All penalty assumptions remain in line with the Previous GM CAP.
Existing contract costs	(£7.7m)	Reflects costs incurred through to July 25 before 'new plan' comes into effect.
CAZ Office Service costs	(£19.5m)	CAZ Office Service cost based on % assumption of the original previously developed CAZ Office Service.
Field equipment costs	(£2.9m)	Field Equipment cost based on % assumption of the Field Equipment Cost for the Previous GM CAP.
Operating Body (TfGM)	(£19.2m)	Operating Body cost based on % assumption of the original Operating Body for the Previous GM CAP.
Signage costs	(£0.1m)	Signage opex has been proportioned based on volume of signs versus contracted signage opex for the original signage contract volume.
Monitoring & evaluation costs	(£3.8m)	Monitoring & Evaluation costs are unchanged from the Previous GM CAP assumptions (difference due to timing of monitoring).
Penalty Enforcement Service	(£1.0m)	Costs driven by forecast volume of penalty notices issued and associated administration.
Other costs	(£4.6m)	Costs include opex relating to electricity, highways measures opex, security of employment costs, merchant costs and KADOE[43].
OEM Euro VI Upgrade	-	-
Bus Service Relocation	-	-
Decommissioning costs (at close)	(£0.3m)	Decommissioning costs have been apportioned according to the volume of cameras and signage in service against the original decommissioning costs for the Previous GM CAP.
Operational contingency	(£11.8m)	Contingency at 20% of total operational costs.
Net surplus / (deficit)	**(£50.1m)**	

6.4.21 As set out in **Table 35**, when considering whole life costs, the CAZ Benchmark would require an estimated additional £91.9m of funding.

Table 35 CAZ Benchmark - Whole life costs including additional funding requirement

	Cost
Early termination of CAZ services	N/A
Vehicle upgrade funding and administration	(£107.2m)
Development and implementation	(£13.1m)
Net surplus / (deficit) from operation and decommissioning	(£50.1m)
Whole life total cost	**(£170.4m)**
Available funding	**108.5m**
Additional government funding (or mitigation) required	**£61.9m**

6.5 Delivery Schedule

6.5.1 The GM Authorities have developed an indicative high level delivery schedule for the CAZ Benchmark, which has been informed by intelligence gathered from the procurement of services, agreement of contracts and associated infrastructure delivery as part of the Previous GM CAP. However, timescales have been adapted based on the CAZ Benchmark relating to the Regional Centre, as opposed to GM-wide, where efficiencies can be sought based on a smaller geographical zone or more effective processes, and governance can be adopted given the GM Authorities' work to date.

6.5.2 Based on this delivery schedule, the GM Authorities would anticipate to commencing mobilisation for the teams from September 2024 to develop and implement the CAZ, if it was selected by government as the preferred scenario, with 'go-live' potentially in July 2026. The supporting mitigation vehicle funds would be opened, prior to the CAZ, in January 2026. The schedule assumes a timely response from government following the GM Authorities' submission of evidence with a possible consultation on the CAZ Benchmark scheduled to commence in October 2024.

6.5.3 **Table 36** sets out the proposed timescales for the implementation of a CAZ Benchmark.

[43] KADOE (Keeper of a Vehicle at the Date of an Event) is a service that provides access to the DVLA's Vehicle Keeper data, which is required for a CAZ.

Table 36 CAZ - Delivery Schedule

Theme	Task	Proposed Start	Proposed End
Policy development	Development pre-consultation	Jun-24	Sep-24
	Update post-consultation	Feb-25	Mar-25
Data, evidence and modelling	Generic modelling, CAZ and location measures	Jul-23	Jul-24
	CAZ modelling and reporting	May-24	Sep-24
	Package modelling, economic modelling and sensitivity testing (pre-consultation)	Jun-24	Oct-24
	Package modelling, economic modelling and sensitivity testing (post-consultation)	Jan-25	Mar-25
Consultation	Consultation preparation	Aug-24	Oct-24
	Consultation (8 weeks)	Oct-24	Dec-24
	Consultation analysis	Dec-24	Feb-25
Governance	Governance (evidence submission to JAQU)	Jun-24	Jul-24
	JAQU review and Direction	Aug-24	Sep-24
	Governance (final plan)	Apr-25	May-25
Implementation	CAZ & Financial Support Scheme (FSS) Mobilisation and contractual agreements	Sep-24	Jan-25
	CAZ design	Jan-25	Oct-25
	CAZ works	Oct-25	Jul-26
	FSS design	Jan-25	Jul-25
	FSS development / implementation	Jul-25	Jan-26
	FSS go live	Jan-26	Jan-26
	Discounts and exemptions go live	Apr-26	Apr-26
	CAZ go live	Jul-26	Jul-26

Schedule Assumptions

6.5.4 The delivery schedule for the CAZ Benchmark has been informed and developed from the work undertaken on the Previous GM CAP.

6.5.5 GM Authorities have updated the schedule, set out in the December 2023 submission, by adding seven months to relevant tasks where there is a dependency on receiving a government direction on the preferred scheme.

There are however a number of assumptions that need to be made with the development of the schedule, some of which apply to both the Investment-led Plan and the CAZ Benchmark, and others specific to one or the other. The key assumptions are set out below:

- It is assumed that the same workstreams and methodologies would be applied as with the Previous GM CAP, such as policy development, DEM, consultation, governance and implementation. However, it is assumed that no further stakeholder engagement and research would be required to provide further evidence to the DEM or policy workstreams. If this is subsequently required, following feedback from government, there could be a delay to a number of activities which could affect the go-live dates. With the CAZ Benchmark there is also the possibility that further stakeholder engagement and research could be required as a result of the policy development work, or from the consultation feedback, which again presents a risk to the go-live dates.
- Both the Investment-led Plan and the CAZ Benchmark schedules use the decision by government as the start point for the further activities in the schedule. The updated assumption is that government will provide a response in September 2024 that gives a clear instruction to enable the GM Authorities to mobilise the teams required for the next stage of the GM CAP. A delay in the response by government affects the Investment-led Plan and the CAZ Benchmark differently.
- For the CAZ Benchmark, a delay in the response by government would cause a direct equivalent delay to the critical path activities in the schedule, therefore if a response was provided by government in September 2024, all the critical path activities in the schedule, and hence the go-live date for the CAZ Benchmark, would be one month later.
- Consultation would be held, which for the CAZ Benchmark is a statutory requirement. It is assumed the consultation would be for a period of eight weeks, which is the same duration as the previous consultation for the GM-wide CAZ.
- The start of consultation is directly linked to the response by government. There would be flexibility to move the start of the consultation and this would not affect the go-live dates for the FSS or CAZ Benchmark as the consultation is not on the critical path.

- Further policy development work is required for the CAZ Benchmark to determine the policy requirements for allocation of the mitigation funding. The outcomes from the consultation may also lead to further policy development and therefore there are timescale risks associated with this.
- Even though a GM-wide CAZ has already been fully designed and substantially implemented, the vast majority of this work cannot be re-used, with the exception of most of the standard details. All of the signage locations, and the majority of the ANPR camera locations would need to be re-designed. The design and implementation teams have been fully demobilised, and it may not be possible to get any of the previous expertise back on the project.
- With the CAZ Benchmark, there are significantly more activities and a higher number of activities on the critical path (compared to the Investment-led Plan) and therefore this brings greater risks to the ability to forecast and achieve the schedule. The schedule has been developed using the previous timescales and logic, however this work has not involved any of the suppliers and therefore the timescales could be significantly different from those assumed.

6.5.6 Overall, there is a lower degree of confidence that the timescales of the CAZ Benchmark can be achieved and as a result the 'realistic' scenario has been provided in the table above. Changing any of the assumptions has an impact on the schedule, but this central case is relatively realistic as the timescales would help manage additional items that aren't scheduled, and any risks or delays that occur.

6.5.7 With an 'optimistic' schedule it could be possible to bring the schedule forward by seven months so that the go-live would be in December 2025, however with a 'pessimistic' schedule there are a number of risks that could push the schedule back by a few months, or to over a year beyond the 'realistic' go-live date of December 2025. Some of the assumptions related to the 'optimistic' and 'pessimistic' schedules are detailed below.

6.5.8 It should be noted that all assumptions and durations would need to be agreed with the design and installation teams before any of the schedule could be confirmed.

'Optimistic' schedule

6.5.9 Signage and ANPR design could be reduced by three months and commence part way through the mobilisation, rather than at the end mobilisation, which would save over one month further. This however has a higher degree of risk and the duration of the activity may subsequently be increased if sufficient resources from the design team are not mobilised in time. The design period is also extremely short and would need verification from the design team.

6.5.10 Contractual arrangements with CAZ suppliers could commence part way through the mobilisation period for the TfGM staff and the lead advisor (assuming there is sufficient staff to do this). This would also be ahead of any design being undertake so could result in the need further subsequent commercial discussions.

6.5.11 Mobilisation of the CAZ suppliers could commence part way through the commercial discussions to enable the teams to be mobilised part way through the development of the design and ready to commence works as soon as the design completed. Though again this increases the risk of further commercial discussions and rework.

6.5.12 It is assumed that no new lighting columns are required for the ANPR cameras and all ANPR cameras are installed on new poles by the CAZ suppliers. However, if this is not possible and new lighting columns are required, the installation durations could increase.

'Pessimistic' schedule

6.5.13 The 'realistic' and 'optimistic' schedules assume that the CAZ suppliers wish to continue with a CAZ Benchmark and that terms can be negotiated. If this isn't the case, re-procurements would be required. It is expected that the equivalent of the previous Competitive Dialogue process wouldn't be required for the overall CAZ service, however, as an example, the total duration for the signage procurement previously was one year, so to reprocure the signage, ANPR / CAZ Service and debt recovery contracts, could add another nine months to one year to the 'realistic' schedule.

6.5.14 The duration in the 'realistic' schedule from completion of the installations, to go-live is relatively short, and these activities haven't been undertaken previously in GM. There are technical dependencies for CAZ delivery such as integration and set up with Central JAQU Service; including onboarding processes and shaping the service design/ architecture. This also covers integration with Gov.Pay, DVLA, and any other providers; and service integration to a customer contact centre including charge payment via Gov.Pay and Go Cardless, and payment service provider. There is therefore a risk that these durations could significantly increase.

6.6 Risks

6.6.1 The GM Authorities' approach to risk management is proactive and focuses on avoidance, transfer or taking mitigating action, rather than solely making financial provision for risk impacts. Risks have and will continue to be actively reviewed and managed as part of the GM Authorities' PMP. **Table 37** illustrates the some of the main implementation and operational risks associated with the CAZ Benchmark and potential ways to mitigate/minimise those risks.

Table 37 CAZ Benchmark - Summary of Key Risks

Risk Name / Description	*Risk Minimisation / Mitigation*
Local public acceptability	• A full public consultation and stakeholder engagement process would be run in 2024 to inform locals of potential CAZ impacts. • Adequate signage and marketing provided to alert Regional Centre road users of the need to ensure their vehicles are compliant. Where vehicles are not compliant, funding will be offered to support upgrade. • Engagement and research conducted with local political groups and stakeholders to ensure the CAZ Benchmark is reflective of local economic conditions.
Requirement for supporting infrastructure (signage and ANPR cameras)	• Signage and cameras to be repurposed, where possible, based on a Regional Centre Zone. • Proportion of funding allocation to be ring-fenced for use in providing supporting infrastructure.
Interface with changes to bus retrofit	• CVRAS-accredited retrofitted buses upgraded to Euro VI standard considered to be 'compliant' with a CAZ and therefore unaffected by CAZ charges.
Modelling uncertainties	• Throughout the technical development process from 2017 to date, the GM Authorities have used best practice methodology and assumptions and worked closely with government. • Sensitivity testing to be conducted and produced to government following this submission of evidence. • Any changes will be managed via the PMP and associated adaptive planning process. • Outcome of government review into bus retrofit performance will be reviewed and monitored with the assumptions used to underpin both scenarios.
Implementation of the CAZ Benchmark does not reduce NO_2 to levels predicted within the model	• Ensure the modelling design process is robust with adequate assurance during implementation. • Engagement with partner organisations such as National Highways and Public Health England and alignment with other relevant areas of work. • Implement appropriate monitoring for compliance and evaluation, captured through the preferred scenario's PMP. Feedback should inform the effectiveness of the solutions implemented and give an opportunity to address / adapt the plan within the operational phase. • Consider flexibility or sufficient sensitivity ranges to improve effectiveness. • Consideration may be given to including further projects / measures within the programme if compliance is not achieved. • Consider the commissioning of ongoing research in advance of implementation.
Challenging timescales for CAZ Benchmark implementation affecting staff wellbeing and causing delay to implementation	• Continually monitor resources at a programme level with Sponsors in order to ensure levels are appropriate for the projects and if not, work to recruit to the appropriate level. • Ensure 1-2-1s with line managers are taking place for all staff and any issues raised immediately with Programme Manager and Sponsors. • Follow procedures for staff with regards to sickness and return to work. • Ensure the wellbeing site is highlighted to all working on the CAZ Benchmark and utilised if needed (EAP for staff).

Legal challenge against the CAZ Benchmark	• Ongoing monitoring and evaluation into effectiveness of the measures in complying with the Direction, ongoing review of legal risks.
Operational resources underestimated	• Develop operating model based on estimated volumes of work and validate with similar activities / authorities where possible. • Closely monitor capacity and demand. • Recruit additional roles.
Unforeseen economic effects	• Review through Monitoring and Evaluation. • Any changes will be managed via the Investment-led Plan PMP and associated adaptive planning process.
Unavailability of compliant vehicles	• Monitor funding take up during operations. • Collect and consider feedback from affected owners as part of the application process.
Unable to assess full impact of the GM CAP given unforeseen changes to economic / non-economic circumstances	• Continual monitoring of the data, feeding into the benefits realisation plan at regular intervals. • Ensure ability to be flexible to respond to unanticipated changes to the projects. • Close liaison with the project team for early assessment of potential impact of any changes identified.
Third party agreements (JAQU, data sharing; Gov.pay, PSP, Go Cardless, TEC, etc.) are not finalised in time, causing detrimental impact for meeting critical implementation milestones	• Proactive dependency management and project planning activities. • Early commencement of agreement drafting/reviews/ approvals.
Limited local authority resource availability on lighting column installations	Team to engage with Local Authorities to understand their resource capacity and optioneering for alternative procurement.
Penalty charge notices are unpaid	Analyse and understand reasons for unpaid penalty charge notices and amend policy and process to improve collection rate and/or reduce debt registration issued.
Operating body requires a greater level of resource to support the operation of the scheme	Regular resource planning reviews and lessons learnt from other CAZ schemes.
New service enhancements are introduced (e.g., payment channels)	Liaison with JAQU and legal to mitigate against the need for new payment channels and other change requests.
If there are issues down to system integration, issues or a change to the proposals for grants/finance, this will delay the go live	Change requests to be prioritised and discussed as necessary and request suppliers to provide formal impact assessment of any change requests to understand potential mitigation.
As a result of post contract change, the implementation costs of CAZ Office System (e.g., additional software and system build requirements) are higher than the contract agreed values. Capital cost of developing CAZ Office System is underestimated	Monitoring cost of the contacts.

CAZ is unable to recruit staff and have to use contract roles during the implementation phase.	Active recruitment campaign.
Errors arising from complexity of GM CAP modelling process.	• Use a consistent modelling approach which has been reviewed and approved by JAQU and JAQU's Technical Independent Review Panel as part of the Previous GM CAP. • Review and update the assurance processes and maintain a Quality Assurance log of checks and approvals through the modelling process.

6.7 Performance Management

6.7.1 The PMP would be supported by a Monitoring and Evaluation Plan and a Benefits Realisation process, to be completed if the GM Authorities are directed to implement a CAZ by government. The following provides a high-level overview of the approach to monitoring and evaluation and benefits realisation.

6.8 Monitoring and Evaluation

6.8.1 Monitoring will be required to ensure that the policy contained in the GM CAP remains appropriate throughout the lifetime of the interventions. Therefore, the GM Authorities will conduct local monitoring and evaluation in order to:

- Provide accountability to the 10 GM local authorities, JAQU and the general public in showing that objectives have been met;
- Adapt the programme if it is not delivered as planned or has unexpected impacts;
- Understand the efficacy of the interventions; and
- Build an evidence base for future projects.

6.8.2 The Monitoring and Evaluation Plan will include monitoring of the outputs and outcomes of the scheme, in other words, of what is delivered, how it performs, and the wider impacts of those measures. Specifically, the Monitoring and Evaluation Plan will consider:

- Outputs of the GM CAP in terms of what has been delivered and when;
- Impact of the CAZ, in terms of behavioural responses to the scheme, and uptake of the Funds;
- Impact on traffic volumes and composition, including the profile of the vehicle fleet;
- Impact on traffic emissions and air quality, including the number of locations in exceedance of legal limits of NO_2 concentrations and impact on other pollutants;
- Impacts on vehicle owners in scope for the scheme and other vulnerable groups; and
- Other research as required to understand the explanations or causes for the results that emerge.

6.9 Benefits Realisation

6.9.1 The Benefits Realisation Plan will detail the benefits and disbenefits that have been identified and sets out the review process that has been put in place to ensure that those benefits are realised and dis-benefits are minimised. This review process involves a quarterly review, that will investigate the following questions:

- Has the GM CAP been delivered as expected to date and is it on track for delivery of future elements?
- Is the GM CAP performing as expected?
- Are the outcomes of the GM CAP as expected?
- Have there been changes in wider factors to which the GM CAP is sensitive?

7 Value for Money

7.1 Value for Money Approach

7.1.1 This section describes the approach taken to assess the Value for Money (VfM) of the Investment-led Plan and the CAZ Benchmark scenarios. This section captures the pragmatic and proportionate assessment that has been undertaken on the GM CAP, setting out the main appraisal criteria. The assessment retains the relative assessment of cost-effectiveness between each scenario in meeting the CAP objectives. Further information and the full quantified method which has been applied to the Investment-led Plan and CAZ Benchmark is set out in the *Value for Money Note*.

7.1.2 VfM is normally assessed by considering the extent to which the monetised benefits (and unquantified benefits) outweigh the costs. The key decision in most cases is whether action is preferable to inaction i.e., is this scheme worth doing? Inaction is not an option in this instance. There is a legal imperative to act, and this action must be sufficient to achieve compliance in the shortest possible time. Therefore, the question is not 'is it worthwhile to act?' but 'is this the best course of action, of the scenarios available to achieve a set objective?'.

7.1.3 The VfM assessment for each scenario has been undertaken in context of the GM Authorities' appraisal via the CSFs, as shown in **Section 9** and therefore a proportionate approach has been taken based on the classification of VfM as a Secondary Success Factor. The GM Authorities' appraisal approach is based on guidance set out by HMT[44], JAQU and DfT.

7.1.4 The Green Book states that shortlisted scenarios, which deliver on the SMART Objectives, should be assessed by either Cost Benefit Analysis (CBA) or Cost Effectiveness Analysis. As the benefits that any scenario for the GM CAP needs to deliver are fixed (i.e. meeting compliance), Cost Effectiveness Analysis is considered the most appropriate approach to analysing VfM for this programme.

7.1.5 This Appraisal Report provides a high-level VfM assessment to assess the standard set of metrics covering transport policy investment as set out in **Table 38**. The potential impact has been considered for both scenarios to determine what assessment type is appropriate to conduct on each case. A pragmatic approach cost benefit analysis of both the Investment-led Plan and the CAZ Benchmark, to include a calculation on net present value and a Benefit Cost Ratio (BCR) has been undertaken and reported separately in the *Value for Money Note*.

[44] https://assets.publishing.service.gov.uk/media/623d99f5e90e075f14254676/Green_Book_2022.pdf

Table 38 Summary of VfM impacts

Impact	Magnitude of Impact	VfM – Assessment Type
Economy		
Business travel times and reliability	Low	Qualitative
Business costs and revenues	Medium	Quantified via financial analysis
Wider Economic Impacts	Very Low	Not included
Social		
Commuter / other travel times and reliability	Low	Qualitative
Amenity benefits	Low	Qualitative
Accidents, Physical, Landscape, Option Values, Severance	Very Low	Not included
Environment		
Carbon emissions	Medium - High	Quantified, via EMIGMA (emissions model)
Local air quality emissions	Medium - High	Quantified, via EMIGMA
Noise	Low	Qualitative
Public Accounts		
Capital costs	Medium	Quantified
Operating costs	Medium	Quantified

7.2 Value for Money Assessment

7.2.1 **Table 39** sets out the assessment of VfM impact, based on the identified metrics and proposed assessment type, for the Investment-led Plan and the CAZ Benchmark.

Table 39 Assessment of VfM impacts

Impact	Assessment
Economy	
Business travel times and reliability	• Both GM CAP scenarios would result in businesses upgrading to newer vehicles, meaning that they are less likely to be affected by reliability issues. These vehicles are also more likely to be fuel efficient, improving travel times and costs. The relative scale of benefits from vehicle upgrades is higher in the CAZ Benchmark scenario compared to Investment-led Plan as the latter is constrained to provision of funds for taxis only. • The Investment-led Plan proposes to provide additional funding to support the upgrade of retrofitted buses to OEM Euro VI or ZEB, whereas there is no such assumed investment as part of the CAZ Benchmark scenario due to the funding already invested through the CBF on retrofitted and replaced buses. The newer bus fleet may incentivise a higher public transport use under the Investment-led Plan scenario; however, the likely trip transfer is assumed to be low. • The introduction of a charging zone under the CAZ Benchmark could have travel time disbenefits for businesses. Businesses operating with non-compliant vehicles will be faced with a choice: pay the daily charge and use the most efficient route in the Regional Centre or avoid the daily charge and re-route around the Regional Centre. Although the assumed number of trips are low, those who select the latter option may experience an increase in journey times. • Overall, it is concluded that the CAZ Benchmark is likely to have a relative higher adverse impact compared to the Investment-led Plan on the basis that the potential trip rerouting impact is more widespread albeit in both scenarios' impacts are considered to be low.
Business costs and revenues	• The CAZ Benchmark scenario has the potential to result in higher business costs compared to the Investment-led scenario. Under a Regional Centre Class C CAZ, businesses that operate within the Regional Centre are likely to be disproportionately adversely impacted by the CAZ. This may be directly or indirectly in the case that customers or the supplier chain are impacted by operating non-compliant buses. Whilst the provision of financial support for affected vehicles is expected to reduce the adverse impact, it does not eliminate the adverse impact on non-compliant vehicles that are travelling to/and from the Regional Centre. • There is anticipated to be a limited adverse impact from the Investment-led Plan on taxis, associated with the alignment of a consistent emission standard across the 10 GM local authorities by 31st December 2025, which may require taxi owners / operators to upgrade their vehicle earlier than they otherwise would have done so. However, this is likely to be outweighed in most cases by the provision of financial support to non-compliant, GM-licensed taxis. There is also financial support proposed for ICE compliant, GM-licensed Hackney Carriages to upgrade to a ZEC Hackney Carriage. It should be stated that the impact of implementation of a consistent emission standard is not equal across the 10 GM local authorities based on their current status of emission standards; however, for five of the 10 GM local authorities, it will result in bringing forward the emission standard date by approximately three months. • Overall, it is concluded that the Investment-led Plan would provide a low positive impact on business costs on revenues on the basis of provision of funds to support bus upgrades and upgrade of compliant taxis to ZEC vehicles, which therefore goes beyond the population that would be

Impact	Assessment
	affected by the implementation of a consistent emission standard. By comparison, the charge associated with the CAZ Benchmark would potentially adversely impact all non-compliant vehicle types under a Class C and whilst the supporting mitigation funding would lessen the cost of upgrade.
• **Social**	
Commuter / other travel times and reliability	• Modelling identifies limited changes to travel time in both scenarios due to local re-routing associated with the Regional Centre CAZ and the local highway measures associated with the Investment-led Plan. • There are a number of cancelled trips as a result of the CAZ Benchmark scenario. However, the number is low and so this is not expected to have a material impact on travel times / reliability. • Consistent with the 'economy' assessment, the CAZ Benchmark is likely to have a relative higher adverse impact compared to the Investment-led Plan on the basis that the potential trip rerouting impact is more widespread albeit both scenario impacts are considered to be low.
Amenity benefits	• Both scenarios incentivise upgrades to newer vehicle fleets. The CAZ Benchmark scenario is estimated to fund a higher number of vehicles compared to the Investment-led Plan, although albeit these will be largely private commercial vehicles. • The Investment-led Plan focuses fleet upgrades on new buses and on new and second-hand taxis. • In both scenarios, the amenity benefits are likely to be low, albeit upgrades to newer buses and taxis provider wider benefits to passengers. • The CAZ Benchmark is expected to provide a wider amenity benefit to different vehicle owners from the upgrades of eligible vehicles that are captured as part of CAZ Class C, albeit the level of benefit is low. However, the Investment-led Plan is likely to achieve a higher amenity benefit from buses and taxis, compared to these vehicles under a CAZ Benchmark.
• **Environment**	
Carbon emissions	• Both scenarios deliver a reduction in carbon emissions and associated benefits from investment in newer fleets and local highway measures associated with the Investment-led Plan. It is modelled that both scenarios deliver a higher emissions reduction in the Regional Centre than elsewhere in GM due to the extent of the CAZ boundary and the emissions benefit derived from buses and taxis, which have higher volumes operating in the Regional Centre. • The carbon emissions reduction from the Investment-led Plan is modelled to be higher than the CAZ Benchmark, although the spatial distribution of benefits is broadly similar between the two scenarios with a higher concentration of benefits located in the Regional Centre.
Local air quality emissions	• Similar to the carbon emissions benefits, both scenarios deliver a reduction in local air quality emission and associated benefits from investment in newer fleets and local highway measures associated with the Investment-led Plan. It is modelled that both scenarios deliver a higher emissions reduction in the Regional Centre than elsewhere in GM due to the extent of the CAZ boundary and the emissions benefit derived from buses and taxis which have higher volumes operating in the Regional Centre. • The local air quality emissions reduction from the Investment-led Plan is modelled to be higher than the CAZ Benchmark, although the spatial

Impact	Assessment
	distribution of benefits is broadly similar between the two scenarios with a higher concentration of benefits located in the Regional Centre.
Noise	• In both scenarios, there is expected to be a low positive noise impact from the GM CAP measures. The upgrade to newer and quieter vehicles, particularly zero emission buses, taxis and hybrid taxis, is expected to result in some low positive localised impacts. The spatial distribution of these impacts is expected to be experienced in the Regional Centre and the most in both scenarios, aligning with the distribution of bus and taxi operations in addition to affected vehicles associated with the Regional Centre CAZ. • Similar to the 'amenity' benefit scoring, the anticipated benefit from both scenarios is expected to be small.
• **Public Accounts**	
Capital costs	• The capital cost for both scenarios cover the development and implementation costs associated with the proposals in addition to the cost to deliver the measures. The CAZ Benchmark consists mostly of supporting vehicle mitigation funding whereas the Investment-led also provides funding for local highway measures and new cleaner buses and supporting infrastructure. • As the costs have been used to inform the scenario cost effectiveness, and not compared against monetised benefits in this submission, the costs have not been discounted to 2010 prices. The costs presented in this submission reflect current (2024) prices. • The capital cost for the Investment-led Plan (£84.5 million) is less than the CAZ Benchmark costs (£120.3 million) These figures are also inclusive of a 5% contingency allowance across the total cost of each scenario.
Operating costs	• The operating costs for each scenario comprise of costs to operate the vehicle fund, decommissioning costs, CAZ revenues (where relevant) and CAZ service termination fees (where relevant). Whilst the CAZ Benchmark is forecast to deliver an income through daily charge and penalty revenues, the income is outweighed by the operating cost expenditure to manage the operating body for the zone, CAZ office service costs, penalty enforcement costs, signage costs etc. • As the costs have been used to inform the scenario cost effectiveness, and not compared against monetised benefits in this submission, the costs have not been discounted to 2010 prices. The costs presented in this submission reflect current (2024) prices. • The operating cost for the Investment-led Plan, consistent with the capital costs, are expected to be less (£39.2 million) compared to the CAZ Benchmark scenario (£50.1 million)

7.3 Value for Money Summary

7.3.1 Crucially, the Green Book states that only scenarios that deliver on the SMART Objectives should be considered as representing VfM. For the GM CAP, the SMART Objectives are taken as the Determining and Primary Success Factors, in terms of NO_2 compliance. The first step in demonstrating VfM for any scenario is therefore to demonstrate the achievement of compliance in the shortest possible time. The Investment-led Plan, as demonstrated in **Section 5.5**, passes this test and responds directly to the Direction placed on the 10 GM local authorities. The CAZ Benchmark, however, fails to meet this test and is not modelled to achieve compliance in the shortest possible time and by 2026 at the latest with 16 exceedance sites modelled to remain in 2026.

7.3.2 Based on scenario costs, the Investment-led Plan is forecast to be delivered at a lower cost (£123.7 million) compared to the CAZ Benchmark (£170.4 million) with higher vehicle upgrade funding and administration costs, development and implementation costs, and operational and decommissioning costs associated with the CAZ Benchmark scenario.

7.3.3 Both scenarios are anticipated to generate low journey time performance and amenity benefits. Both scenarios comprise provision of financial support to upgrade to a newer fleet and is modelled to result in some minor, localised re-routing, with the Investment-led Plan re-routing associated with local measures. Across the qualitative assessment, the Investment-led Plan is considered to score either similar or better compared to the CAZ Benchmark. There are no instances where the CAZ Benchmark is shown to score higher compared to the Investment-led Plan.

7.3.4 Taking account of the primary CSFs in the context of the expected scenario benefits in addition to anticipated economy, social and environmental benefits from an Investment-led Plan and the CAZ Benchmark weighed against the forecast costs of both scenarios, the Investment-led Plan would deliver a higher VfM relative to the CAZ Benchmark scenario. Given that the Investment-led Plan delivers the primary aim of achieving air quality compliance in the shortest possible time and has been previously identified as the lowest cost scenario to do so, it is therefore considered to represent VfM.

8 Equality Impacts

8.1 Equality Impacts Approach

8.1.1 The GM Authorities have undertaken a high-level assessment to understand the likely equality impacts from the Investment-led Plan and CAZ Benchmark scenarios appraised as part of this submission. The assessment draws on findings of previous iterations of Equality Impact Assessment (EqIA) and uses data, insights and findings from the Previous GM CAP consultation and engagement activity.

8.1.2 The assessment was carried out to enrich the submission of additional evidence with consideration of the likely disproportionate or differential impacts of each scenario. These impacts can be classed as positive or negative. This exercise has not been undertaken as part of the requirements of a formal EqIA which will be carried out on the implemented scheme, subject to government feedback, as part of the materials to be prepared for a public consultation, if required.

8.1.3 The assessment considers the impact on the nine protected characteristics identified by the Equality Act 2010, including: age, disability, sex, gender reassignment, race / ethnicity, married / civil partnership, pregnancy and maternity, religion / belief, and sexual orientation. In addition, the majority of the 10 GM local authorities also consider additional characteristics within their agreed approach to the EqIA process. These are: low-income households, carers, veterans and homeless. These groups have been considered in this high-level assessment.

8.2 Equality Impacts Assessment

8.2.1 The EqIA finds that individuals with the following protected characteristics are likely to be differentially or disproportionately impacted by either scheme scenario:

- Age – very young children, young people and older people.
- Disability – those with mobility, communication or learning impairments, individuals with long-term health conditions, particularly those related to respiratory problems or stamina/breathing/fatigue.
- Sex – males likely to be disproportionately affected by both scheme scenarios.
- Race – individuals from a minority ethnic background are likely to be directly, indirectly and disproportionately impacted by both scheme scenarios.
- Religion/belief – individuals of Hindu, Muslim and Sikh faith are likely to be indirectly but disproportionately impacted by both scheme scenarios. This is as a result of intersecting identity with race/ethnicity.
- Pregnancy/maternity – expectant mothers likely to be disproportionately impacted by both scheme scenarios.

- Further characteristics – it has been identified that people in low-income households and carers are highly likely to be disproportionately impacted by both GM CAP scenarios.

8.2.2 **Table 40** and **Table 41** consider the impacts of each scenario on the protected characteristic groups in addition to those which have been identified as likely to be disproportionately impacted by the GM CAP (low-income households and carers).

Table 40 Investment-led Plan Impacts

Protected Characteristic	Positive Impact	Adverse Impact	Comment
Age	Yes	Yes	Prevalence of taxi trade in 55+ category. Risk to affordability posed by cost gap between funds and vehicle price. Older people and young children disproportionately benefit from improvements to air quality.
Sex	Yes	Yes	Majority of individuals in scope for funds likely to be male. Benefit from funds but face impacts to affordability by cost gap.
Disability	Yes	None	People with certain disabilities (particularly if these relate to respiratory problems) are likely to be more sensitive to changes in air quality and will benefit more quickly from improvements in air quality. Investment-led Plan can be delivered sooner than CAZ Benchmark, reducing exposure to harmful pollutants.
Ethnicity	Yes	Yes	Areas of poor air quality in GM often correlate with low-income communities. These communities often have greater populations of people from minority ethnic backgrounds[45]. Prevalence of ethnic minority background among taxi trade. Benefit from funds but face impacts to affordability by cost gap.
Religion / faith	Yes	Yes	Intersectionality with ethnicity. Individuals of Sikh, Muslim and Hindu faiths face similar impacts.
Pregnancy / maternity	Yes	None	Expectant parents benefit disproportionately from improvements in air quality.
Low-income	Yes	Yes	Link between low-income households and living in areas of poor air quality. Disproportionate benefit from improvements to air quality. Low-income vehicle owners face additional difficulty upgrading vehicles.
Carers	Yes	None	Carers likely to be older – disproportionate benefit from improvements in air quality. Likely to be low-income and reliant on public transport and taxi.

[45] The Next Level: Good Lives for All in Greater Manchester (greatermanchester-ca.gov.uk) Figure 5: Overlapping geographical inequalities in GM shows correlation between deprived communities and higher concentrations of residents from an ethnic minority background.

Table 41 CAZ Benchmark Impacts

Protected Characteristic	Positive Impact	Adverse Impact	Comment
Age	Yes	Yes	Older people and young children disproportionately benefit from improvements to air quality. Prevalence of taxi trade in 55+ category – disproportionate financial impact of charging and the cost of upgrade.
Sex	Yes	Yes	Majority of individuals in scope for funds likely to be male. Benefit from funds but face impacts to affordability by cost gap.
Disability	Yes	Yes	People with certain disabilities (particularly if these relate to respiratory problems) are likely to be more sensitive to changes in air quality and will benefit more quickly from improvements in air quality. Likely to be reliant on public transport, taxi and community transport. Also at risk of being impacted by costs of travel incurred by CAZ Benchmark.
Ethnicity	Yes	Yes	Areas of poor air quality in GM often correlate with low-income communities. These communities often have greater populations of people from minority ethnic backgrounds[46]. However, CAZ Benchmark likely to be delivered later than Investment-led Plan. Prevalence of ethnic minorities among taxi trade. Ethnic minorities likely to rely on public transport – additional cost to customer passed down from CAZ Benchmark will disproportionately impact this group.
Religion / faith	Yes	Yes	Intersectionality with ethnicity. Individuals of Sikh, Muslim and Hindu faiths face similar impacts.
Pregnancy / maternity	Yes	None	Expectant parents benefit disproportionately from improvements in air quality. However, CAZ Benchmark delivered later than Investment-led Plan, exposing individuals to pollutants for longer.
Low-income	Yes	Yes	Low-income households likely to live in areas of poor air quality and disproportionately benefit from improvements. However, CAZ Benchmark scheduled for later delivery. Low-income owners of non-compliant vehicles face additional financial impact from charging and cost gap.
Carers	Yes	Yes	Carers likely to be older – disproportionate benefit from improvements in air quality. Individuals likely to be low-income and reliant on public transport and taxi. At risk of costs incurred as a result of the CAZ Benchmark.

[46] The Next Level: Good Lives for All in Greater Manchester (greatermanchester-ca.gov.uk) Figure 5: Overlapping geographical inequalities in GM shows correlation between deprived communities and higher concentrations of residents from an ethnic minority background.

8.3 Equalities Impacts Summary

8.3.1 Based on the high-level assessment conducted on both scenarios, the impact on individuals with protected characteristics can be consolidated into three key themes. They are:

- Air quality – certain protected characteristics groups are likely to benefit disproportionately from improvements to air quality (age, disability, ethnicity, faith, pregnancy/maternity).
- Affordability – disproportionate impacts identified for those in certain age groups, sex, ethnicity, religion/faith & low-income groups.
- Wider impacts – disproportionate impact identified for individuals with disabilities, young and older people and individuals from ethnic minority background. E.g. potential impact of the CAZ on using public transport or taxi services.

8.3.2 From an equality perspective, the Investment-led Plan would deliver an air quality improvement that benefits individuals with protected characteristics. An air quality improvement is likely to be faster for the Investment-led Plan than the CAZ Benchmark due to the former achieving compliance earlier and being able to implement the Plan earlier.

8.3.3 Under the Investment-led Plan, the adverse financial impact on protected characteristic groups is to a lesser extent than the CAZ Benchmark.

8.3.4 The Investment-led Plan reduces the risk to health, jobs, livelihoods and businesses compared to a CAZ Benchmark.

9 Comparative Appraisal Summary

9.1 Appraisal Approach

9.1.1 As set out in **Section 4**, the appraisal approach has considered: an Investment-led Plan and the CAZ Benchmark, using government's CSFs.

9.1.2 **Section 5** sets out the measures which underpin the Investment-led Plan including the Plan's appraisal against the CSFs. **Section 6** outlines the CAZ Benchmark with the associated CSF appraisal. This section provides a comparative appraisal between the two scenarios and provides JAQU with a clear framework to provide the GM Authorities with an instruction to proceed to implement either scenario.

9.2 Appraisal Findings

9.2.1 For consistency, the below CSF appraisal, as shown in **Table 42**, has been conducted based on scoring of each scenario, based on professional judgement, against the scale criteria as set out by JAQU Option Appraisal Guidance and consists of the following two criteria:

- Determining Success Factor: Scored based on a Pass/Fail criteria.
- Primary & Secondary Success Factor: Scored based on a four-point scale as follows:

✓✓ Excellent

✓ Good

\- Satisfactory or no score

× Poor

Table 42 CSF Appraisal Summary

Success Factor	Code	ILP	CAZ	Summary
Determining Success Factor				
Compliance in the shortest possible time Which scenario reduces to zero the number of locations predicted to be in exceedance of the legal limits of NO_2 concentrations in the shortest time?	C1	Pass	Fail	The Investment-led Plan is modelled to deliver compliance in 2025, considered to be the shortest possible time for achieving compliance in GM. The CAZ Benchmark is modelled to not achieve compliance in 2025 or 2026 with 16 sites modelled to remain in exceedance with the legal limits of NO_2 concentrations in 2026.
Primary Success Factors				
Reduction in NO_2 emissions Which scenario delivers… The greatest reduction in the number of locations in exceedance (presumed to represent human exposure) in each year?	N1	✓✓	✓	The Investment-led Plan is modelled to deliver significant reductions in the number of locations in exceedance with no sites modelled to remain in exceedance in 2025 compared to 26 in the Do Minimum (without scheme). The CAZ Benchmark is modelled to reduce the number of exceedance sites in 2026 from 17 to 16 with compliance not achieved across all sites and the estimated realistic 'go-live' date is not until 2026, limiting potential reductions in human exposure.
The greatest reduction In NO_2 concentrations at the roadside in each year prior to compliance being achieved?	N2	✓	×	AQ benefits from the deployment of cleaner (OEM Euro VI and zero emission) buses are planned to be delivered incrementally prior to 2025 which captures benefits ahead of the modelled full year compliance in 2025 for the Investment-led Plan. The different components of the local measures will deliver benefits ahead of 2025 alongside funding for taxis. The CAZ Benchmark 's realistic programme assumption to open the funds in November 2025 and 'go-live' with the zone in May 2026 will delay air quality benefits from this scenario beyond those accrued under an Investment-led Plan.
Compliance without putting other sites closer to exceedance (defined as concentrations of 38-40 $\mu g/m^3$) than without action?	N3	✓	✓	The Investment-led Plan is modelled to deliver compliance without putting other sites into exceedance. The implementation of cleaner buses on routes past remaining exceedance sites are new to purchase and are not being redeployed from existing services elsewhere in GM. There is some local re-routing associated with the implementation of the local highway measures which inherently are modelled to cause some rerouting to reduce flow and speeds past the areas of remaining exceedance. The CAZ Benchmark is modelled to result in some minor rerouting for trips through the Regional Centre albeit the volumes are modelled to be minor.

Success Factor	Code	ILP	CAZ	Summary
Feasibility Are the Measures proposed within the legal powers of the GM Authorities?	F1	✓✓	✓✓	The GM Authorities have the relevant legal powers to implement either scenario.
Can a governance route be developed to enable timely local government joint working as required for delivery?	F2	✓	✓	The GM Authorities have proposed a governance route that facilitates the local government co-operation required for delivery of both scenarios. Bus franchising is being rolled out across GM from September 2023 and the necessary governance arrangements are in place and live for the deployment of Euro VI and ZEB based on GM's requirements.
What is the likelihood of the Measures being effective?	F3	✓✓	×	Only the Investment-led Plan measures are modelled to be effective and achieve compliance in the shortest possible time and by 2026 at the latest. Certainty of modelled compliance is being provided through GM's ability to specify particular buses on remaining exceedance locations through bus franchising. The GM Authorities are to implement targeted local highway measures and implementation of a consistent emission standard for GM-licensed taxis. Conversely, the modelled results for the CAZ Benchmark show that this scenario is not effective in achieving the requirements of the Direction.
Is delivery of the scenario subject to significant risks that make achieving compliance in the shortest possible time less likely?	F4	✓	×	The Investment-led Plan is aligned with GM strategic politically endorsed plans. There are risks associated with the delivery of electrification of depots, availability of cleaner buses, local measure delivery at A57 Regent Road and A34 Quay Street and modelling uncertainties. These are set out in **Section 5.8** and supporting mitigation and risk minimisation strategies have been identified. The CAZ Benchmark test has failed to produce modelled compliance by 2026. It is considered that the CAZ Benchmark cannot realistically be operational until May 2026 and does not achieve compliance.
Secondary Success Factors				
Strategic fit with local strategies and plans Air quality and climate change	S1	✓✓	✓	Both the Investment-led Plan and the CAZ Benchmark are modelled to deliver improvements in NO_2 concentrations, and also reduce PM and greenhouse gas emissions. However, the CAZ Benchmark fails to deliver the requirements of the Direction.
Transport	S2	✓✓	-	The Investment-led Plan acts to promote sustainable travel and will deliver a cleaner, newer bus and taxi fleet for GM passengers.

Success Factor	Code	ILP	CAZ	Summary
				The CAZ Benchmark acts to promote more environmentally friendly travel and will deliver incentives to upgrade HGVs, LGVs, taxis, coaches and minibuses that would otherwise be subject to a Daily Charge albeit the impact of the Daily Charge on impacted vehicles is not fully mitigated by the supporting funding.
Growth	S3	✓	-	The Investment-led Plan does not seek to impose charges on users which could restrict growth being brought forward by nine of the 10 GM local authorities via the Places for Everyone Joint Development Plan and Stockport's Local Plan. There is a risk that investment is deterred in the Regional Centre under the CAZ Benchmark associated with the impact of a charge for non-compliant vehicles.
Economy	S4	✓	-	The Investment-led Plan is not considered to have a negative impact on the economy. The implementation of a consistent emission standard across the 10 GM local authorities would require taxi owners and operators to respond to continue operating in GM, licensed to a GM local authority. However, the CTF measure does provide financial support for those upgrading to compliant vehicles. There is a risk that the CAZ Benchmark could affect economic performance by adding an additional financial burden for some businesses.
Value for money Estimated value for money of the scenario compared to the risk of inaction	V1	-	×	It would be more cost effective to not provide financial support to buses and taxis and defer to natural upgrade cycles however this would result in GM not meeting the requirements of the Direction. The Investment-led Plan scenario achieves compliance in 2025 unlike the CAZ Benchmark scenario which fails to achieve compliance in 2025 or 2026. The CAZ Benchmark would generate revenues through daily charges on non-compliant vehicles travelling through the Regional Centre however this is expected to be outweighed by the costs to implement and operate this scenario. Costs to implement and manage both scenarios are higher than the expected quantifiable benefits however this is not the determining factor compared to the risk of inaction.
Distributional impact Health benefits	Q1	✓✓	✓	All groups will experience health benefits from the scenarios. Those living in areas with the worst air quality and those most vulnerable to the effects of poor air quality will benefit the most. The health benefits of the Investment-led Plan are likely to be more spatially distributed across the 10 Authority areas compared to the CAZ which is believed to concentrate the air quality benefits within the Regional Centre, aligned to the scenario's boundary.

Success Factor	Code	ILP	CAZ	Summary
				Under the Investment-led Plan, there is also expected to be a disproportionately higher benefit from those living in the Regional Centre through the operating patterns of buses and taxis.
Accessibility (in terms of journey time and connectivity to opportunities and services)	Q2	-	-	The Investment-led Plan does not have a material impact in relation to accessibility. At a local level, accessibility for residents in and around the Regent Road and Quay St areas could be impacted, depending upon design solution taken forward. The CAZ Benchmark is modelled to have limited rerouting for trips passing through the Regional Centre. However, this has been minimised based on the CAZ boundary to border the insider of the Manchester and Salford Inner Ring Road.
Affordability (for users)	Q3	✓	×	The Investment-led Plan does not impose charges on users and is therefore considered to not have an adverse affordability impact. There is a small adverse impact on non-compliant taxi owners and operators as a result of the proposed consistent emission standards, however, this is expected to be balanced by the provision of funding to support upgrades to all affected vehicles and additional funding to support compliant ICE Hackney Carriages to upgrade to cleaner, ZEC vehicles. The CAZ Benchmark would include a Daily Charge on non-compliant vehicles in the Regional Centre and therefore has an adverse impact on user affordability as supporting mitigation funding does not fully cover the impact of upgrading to a compliant vehicle.
Impact on the local economy – considering low income workers, small businesses, town centres and key sectors	Q4	✓	×	The Investment-led Plan does not impose charges on users and is therefore considered to not have an adverse impact on the local economy, workers and users. The CAZ Benchmark includes a Daily Charge which is likely to disproportionately impact low income workers and small businesses, particularly those who require vehicle access to the Regional Centre on a frequent basis.
Impact on the quality of life of local residents and on equalities	Q5	✓	-	Both scenarios are modelled to provide air quality benefits and reduce human exposure to NO_2, leading to improvements in physical health. The CAZ Benchmark disproportionately benefits the Regional Centre whilst having a negligible impact to outer sites. Conversely, the Investment-led Plan is anticipated to have a more dispersed impact across GM albeit retaining a higher Regional Centre benefit associated with the operating patterns of taxis and buses. The Investment-led Plan is modelled to deliver compliance with the Direction in 2025 and thus has a higher beneficial impact on the quality of life of local residents and equalities compared to the CAZ Benchmark which fails to achieve compliance by 2026.

Success Factor	Code	ILP	CAZ	Summary
Deliverability The Affordability of the cost of implementation (for the public sector)	D1	-	×	Whilst the Investment-led Plan is modelled to achieve the core objectives, it is estimated that £15.2m of additional funding will be required from government based on the previously awarded funding amount. The CAZ Benchmark would include revenues from the CAZ which would contribute towards the operating costs of the CAZ. The CAZ boundary is based on a different geography (Regional Centre as opposed to GM-wide) to the Previous GM CAP and thus, there are additional signage and camera requirements which cannot be utilised from the Previous GM CAP. It is estimated that £61.9m of additional funding will be required from government based on the previously awarded funding. Whilst the costs of each scenario are above the total of the previous funding award by JAQU, minus the committed funding, the Investment-led Plan is cheaper than the CAZ Benchmark.
The Supply-side capacity and capability to deliver the Measures outlined in the scenario	D2	-	-	There are some concerns about supply-side capacity within the taxi sector, particularly on the availability of second-hand Hackney Carriages which impacts both the Investment-led Plan and CAZ Benchmark. The GM Authorities have certainty on the ability to procure cleaner buses to operate at remaining exceedance locations however there is an availability risk around the quantify of vehicles that the GM Authorities are seeking to procure.
The Achievability of delivering the scenario, considering issues such as difficulty with scale or obtaining resources to implement and operate a Measure/ scenario	D3	✓	-	The Investment-led Plan comprises of three core measures. They are: bus measures, taxi measures and local highway measures. • The bus measures form part of the implementation of bus franchising across the city-region and it is considered that the number and distribution of ZEBs and OEM Euro VIs required can be delivered within the required timescales. However, delivery of cleaner buses is contingent on the availability of a sufficient number of vehicles and ZEB specifically, the electrification of depots to provide the necessary EV charging infrastructure. • The taxi measures comprise of provision of financial support to non-compliant, GM-licensed vehicle owners and the implementation of a consistent emissions standard across the 10 GM local authorities for all vehicles by the 31st December 2025. There is a risk that non-compliant taxis, licensed to a GM local authority, could re-license to a non-GM local authority to continue to operate their non-compliant vehicle. This risk is only associated to PHVs which have the ability to operate outside of their licensed authority. However, the provision of financial support to help non-compliant taxi owners upgrade provides mitigation and the incentive is likely to be attractive for vehicle owners to potentially bring forward their vehicle upgrade outside of their natural upgrade cycle.

Success Factor	Code	ILP	CAZ	Summary
				• The local highway measures comprise of changes to speed limits, junction signals and measures to reduce through traffic. These measures are being delivered by Manchester and Salford Local Authorities and TfGM. A delivery programme is being confirmed with the lead parties and there is an associated delivery risk with this. The CAZ Benchmark is considered to be deliverable on the basis of the GM Authorities' prior knowledge of the scheme and ability to procure the necessary services/agree contracts. However, fundamentally, the CAZ Benchmark does not achieve compliance with the Direction. Furthermore, based on schedule estimates, the CAZ Benchmark cannot realistically be implemented until May 2026.

9.3 Appraisal Summary

9.3.1 The Investment-led Plan is the only option tested which passes the legal requirement placed on the 10 GM Authorities to deliver compliance in the shortest possible time and by 2026 at the latest.

9.3.2 The appraisal demonstrates that the Investment-led Plan performs better against the CSFs than the CAZ Benchmark. Fundamentally, the Investment-led Plan meets the requirements of the Determining CSF:- compliance in the shortest possible time- by delivering compliance in 2025. By contrast, modelled compliance is not achieved in either 2025 or 2026 under the CAZ Benchmark which thus fails against the Determining CSF.

9.3.3 The Investment-led Plan performs better than the CAZ Benchmark against the Primary CSFs in that it delivers greater reductions in NO_2 exceedances in each year, and does so earlier than the CAZ Benchmark. However, both the Investment-led Plan and the CAZ Benchmark are considered to be feasible on the basis that the GM Authorities have the relevant legal powers and a clear governance route to implement either scenario (drawing on prior knowledge, in respect of the CAZ and the vehicle funds, assembled from the development activity undertaken on the Previous GM CAP).

9.3.4 The Investment-led Plan also performs better than the CAZ Benchmark against the Secondary CSFs. It is a better strategic fit in terms of air quality and climate change (delivering greater air quality benefits), transport (providing additional cleaner buses that will continue to give benefits after compliance is achieved), growth and economy (by not imposing charges on users it removes the risk of restricting growth or damaging businesses). It is better VfM than the CAZ Benchmark, delivering better air quality benefits at a lower cost, and its distributional health benefits, affordability for users and quality of life impacts are preferable to the CAZ Benchmark. Finally, the Investment-led Plan is considered more affordable and therefore more deliverable than the CAZ Benchmark.

9.3.5 As set out in the Preface to this report, in the process of preparing the appraisal report and supporting material, a risk identified in the December 2023 submission “Delays to bus depot electrification” has materialised and there is now a delivery delay in the electrification of Queens Road depot. This was due to take place by January 2025, which was the assumed delivery date in the modelling of the Investment-led Plan.

9.3.6 In addition, National Highways also advised that the temporary speed limit on the M602 (which forms part of the Strategic Route Network) also in the Investment led plan modelling assumptions is to be removed.

9.3.7 The implications of these issues are addressed in the *Supplementary Appraisal Report*, included as part of this evidence submission documentation. Therefore, this report and associated documentation should be read in conjunction with the *Supplementary Appraisal Report*.

9.3.8 The *Supplementary Appraisal Report* considers the implications on the date of compliance associated with these matters and provides a comparative appraisal of the Investment-led plan and the CAZ Benchmark.

9.3.9 The *Supplementary Appraisal Report* also concludes that Investment-led Plan is the only option tested which passes the legal requirement placed on the 10 GM Authorities to deliver compliance in the shortest possible time and by 2026 at the latest.

10 Next Steps

10.1.1 The next public-facing step in implementing the GM CAP is likely to be public consultation or engagement. In this regard the GM Authorities will not conduct any public consultation until they have received government feedback. The 10 GM local authorities will work to develop the supporting material required for any consultation or engagement activity on the plan if considered appropriate depending on government feedback.

10.1.2 The requirement for statutory consultation on the Previous GM CAP arose as a consequence of the use of Transport Act 2000 powers for road user charging and should government direct that a CAZ is required as part of the GM CAP a further consultation would be required on that proposal. The Investment-led Plan is not subject to the same legal requirements and does not *require* statutory consultation. However, in line with the principles for the review outlined by the GM Authorities in July 2022[47] to take account of views on elements of the GM Authorities' proposals, it is proposed that broad public engagement on the Investment-led Plan will be undertaken in line with good local authority practice, to ensure impacts are understood, and in particular to inform the ongoing equality impact analysis.

10.1.3 To implement the directed plan, the GM Authorities recognise that they will need to work closely with government to agree the requirements to monitor the effectiveness of the measures, defined in a PMP, Monitoring and Evaluation Plan and an adaptive planning process if alterations to the directed plan post-implementation are required.

10.1.4 Under an Investment-led Plan, some of the ANPR cameras procured as part of the Previous GM CAP would be used to monitor and evaluate the effectiveness of the scheme. GM wants to work with government to agree the use of the cameras for potential law enforcement activity related to the detection of crime, subject to the consideration of the outcome of public consultation.

[47] https://democracy.greatermanchester-ca.gov.uk/documents/b13130/GM%20Air%20Quality%20Administration%20Committee%20-%20Complete%20Pack%2001st-Jul-2022%2012.00%20Greater%20Manchester%20Air.pdf?T=9

Greater Manchester's Clean Air Plan to tackle Nitrogen Dioxide Exceedances at the Roadside

Evidence Submission for a new GM Clean Air Plan

Supplementary Appraisal Report

Warning: Printed copies of this document are uncontrolled

Version Status:	DRAFT FOR APPROVAL	**Prepared by:**	Transport for Greater Manchester on behalf of the 10 Local Authorities of Greater Manchester
Date:	September 2024		

Contents

1 Overview & Introduction

1.1.1 Since the submission of evidence to JAQU in December 2023 there have been a number of key developments, resulting in a need to update the *Appraisal Report* and supporting documentation for Greater Manchester's Investment-led Clean Air Plan (GM CAP).

1.1.2 In the process of preparing the updated *Appraisal Report* and supporting material for these developments, an identified risk ("Delays to bus depot electrification") has materialised and there is now a delivery delay to the electrification of Queens Road depot. This was due to take place by January 2025, which was the assumed delivery date in the modelling of the Investment-led Plan.

1.1.3 This poses a significant challenge to achieving compliance in 2025, as 73 ZEBs are to be operated out of Queens Road depot. The issue affects 12 bus services, which run through 17 forecast DM exceedance sites in 2025.

1.1.4 In July 2024, National Highways also advised that the temporary speed limit on the M602 is to be removed, as on this stretch of road legal limits with NO_2 have been achieved. The M602 speed limit is also in the Investment-led plan modelling assumptions.

1.1.5 This supplementary document considers the implications on the date of compliance associated with these matters and provides a comparative appraisal of the Investment-led Plan and the CAZ Benchmark taking these matters into account.

2 Queens Road Depot Electrification Delay

2.1.1 As set out in Section 4.2 of the *Appraisal Report*, investment in cleaner buses represents the most important mechanism for reducing exceedances under the Investment-led Plan and is grounded in the ability now provided by GM operating a bus franchising scheme.

2.1.2 The GMCA is delivering a bus franchising scheme for local services across all 10 districts in GM. TfGM is responsible for operating the franchising scheme on behalf of the GMCA and has the authority to manage franchise agreements in respect of local services, including the specification of fleet requirements and deployment.

2.1.3 The implementation of bus franchising across the region is being delivered in three tranches:

- Tranche 1 (24th September 2023) – covering Bolton, Wigan and parts of Salford and Bury;
- Tranche 2 (24th March 2024) – covering Oldham, Rochdale and parts of Bury, Salford and north Manchester; and
- Tranche 3 (5th January 2025) – covering Stockport, Tameside, Trafford and the remaining parts of Manchester and Salford.

2.1.4 Control of the bus network along with the electrification of the bus fleet means TfGM can target electric buses and compliant OEM Euro VI Vehicles to the areas where modelling indicates that NO_2 limits are exceeded.

2.1.5 To achieve this, TfGM have delivered a major programme of works to an unprecedented schedule over 12 months, delivering Tranches 1 and 2 as well as having electrified Bolton and Oldham depots. Currently they are in the process of mobilisation of Tranche 3 and are progressing with the electrification of another 4 depots at Middleton, Hyde Road, Ashton and Queens Road, and adding more charging units to Bolton depot.

2.1.6 However, the TfGM Bus Team have advised that following a delivery review they are no longer able to electrify Queens Road depot in the time frame required for the Investment-led Plan to deliver compliance by 2025.

2.1.7 This delivery risk was identified following an internal review of Queens Road depot as part of the wider depot electrification programme. Queens Road depot is a Grade 2 listed building serving as an operational bus facility. Major works are required to maintain historical features, make necessary repairs to the structure as well as install the charging infrastructure.

2.1.8 Whilst depot electrification has always been an identified risk to the deliverability of the GM CAP (and was identified in the 'Summary of Key Risks' in the *Appraisal Report*), it has now become apparent that this risk has materialised.

2.1.9 Delivery of Queens Road depot is fundamental to the Investment-led Plan as set out in the *Appraisal Report* as 73 Zero Emission Buses (ZEBs) are to be operated from this depot across 12 services. These services run through 17 forecast exceedance sites in the 2025 Do-Minimum. The location of these exceedances are concentrated in the Regional Centre, as well as the A57 Regent Road and the A58 Bolton Street Bury (2 exceedance points at this location).

2.1.10 Since it became apparent that this risk was likely to materialise, TfGM have been exploring alternative solutions to Queens Road depot electrification to enable the GM Authorities to deliver compliance in 2025. GM has completed a high-level review of alternative options to deliver the required air quality improvements at the exceedance sites where the 73 ZEBs were planned to operate in the absence of Queens Road depot which is summarised in **Table 1**.

Table 1 Queens Road Depot – Alternate Options Considered

Option	Key Considerations		Commentary
	Deliverable by beginning of 2025?	Sufficient Air Quality Benefits by 2025?	
Utilisation of other Investment-led Plan measures, namely local measures, to be deployed at the exceedance sites in 2025.	No	No	Further targeted local traffic measures have, to date, not been developed. To do so would require planning and assessment with respective Local Highway Authorities, could require numerous individual interventions and would take many months to develop, agree and then deliver, this process, even if appropriate local measures could be identified (which is unclear) is unlikely to result in deliverable schemes quickly enough to achieve the required air quality improvement to deliver compliance in 2025.
Redeployment of planned ZEB services from Queens Road to other depots in 2025 utilising existing infrastructure.	No	Yes	There is insufficient available charging capacity based on the number of ZEBs which would be required to serve existing routes from more remote depots. Therefore, this option is not deliverable within the required timescales. In addition, redeployment of planned services from Queens Road depot would involve significant additional operational costs associated with extra mileage from depots and renegotiation of contracts with bus franchisees.
Redeployment of planned ZEB services from Queens Road to other depots in 2025 with supporting additional infrastructure works to increase charging capacity.	No	Yes	This option is not deliverable within the required timescales as this does not allow sufficient time to increase charging capacity enough to support ZEB services operating from 2025. In addition, redeployment of planned services from Queens Road depot would involve significant additional operational costs associated with extra (dead) mileage from depots and renegotiation of contracts with bus franchisees.

Option	Key Considerations		Commentary
	Deliverable by beginning of 2025?	Sufficient Air Quality Benefits by 2025?	
Identification of new charging infrastructure locations based on bus routing as opposed to depot charging to support ZEBs on relevant routes required to achieve compliance in 2025.	No	Yes	There is insufficient time to deliver additional charging infrastructure at locations such as bus interchanges due to delivery issues including footprint and utility constraints, in addition to lead-in times associated with securing the necessary planning consents.
Replacement of planned ZEB services from Queens Road with OEM Euro VI vehicles.	Yes	No	As part of the development of the Investment-led Plan, GM assessed the air quality improvement required from bus at each individual forecast exceedance site. As part of this work, it has been calculated that compliance cannot be achieved at all remaining forecast exceedance sites in 2025 without ZEBs operating from Queens Road depot.

2.1.11 As summarised above, this high-level review concluded that none of the identified options are likely to deliver compliance in 2025. Additionally, on the basis that the electrification of Queens Road depot is deliverable by the end of 2025, none of these options are considered to achieve compliance in a shorter time and some may not achieve compliance by 2026 due to deliverability or timescale issues, or insufficient air quality benefits. There is confidence that the electrification of Queens Road depot is deliverable in this timeframe and will enable compliance to be achieved at the remaining exceedance sites, as part of the Investment-led Plan, due to this component forming part of the original scheme which was designed, modelled and submitted to JAQU.

2.1.12 Having considered the impacts, risk and delivery issues associated with the above options, it is considered that the approach that is most likely to achieve compliance as soon as possible and by 2026 at the latest is to continue with the electrification of the Queens Road depot as quickly as possible. Comparatively, the Investment-led Plan including the impact, risk and issues associated with the electrification of the Queens Road depot, still performs better than the CAZ Benchmark when compared to JAQU's Critical Success Factors and specifically, delivering a scheme in accordance with the Legal Direction.

3 M602 Speed Limit Removal

3.1.1 National Highways have been trialling 60mph speed limits on short sections of the strategic road / motorway network where action needs to be taken to reduce emissions and improve air quality.

3.1.2 Based on the findings of their research programme[1], there was an expectation there will be a reduction in NO_2 when traffic is reduced from 70 to 60mph in these locations.

3.1.3 National Highways have been trialling this approach on certain roads, to assess whether reducing the speed limit reduces NO_2 levels. This included M602 junctions 1 to 3 near Eccles. They have been monitoring this area and they have notified GM that the speed limit trial is now complete, after monitoring data showed that air quality at these locations has improved and is now compliant.

3.1.4 The M602 speed limit is an assumption in GM's modelling of both the Do-Minimum and Do-Something scenarios and leads directly onto Regent Road, one of the sites where local measures are proposed. Removal of the M602 temporary speed limit could influence traffic volumes on the M602 and the A57 Regent Road which has the potential to impact on NO_2 compliance at this site.

3.1.5 In agreement with JAQU, a scenario has been tested through the current modelling to understand the implications of the removal of the M602 temporary speed limit on the Investment-led Plan.

[1] TSC Word Report Template (highwaysengland.co.uk)

4 Assessment on Investment-led Plan Compliance Year

4.1 Queens Road

4.1.1 As noted above, following the materialisation of the Queens Road risk, modelling indicates that compliance in 2025 with the Investment-led Plan is no longer likely as considered in the *Appraisal Report* and none of the alternative options available are considered likely to deliver compliance in 2025. As such, 2026 is considered to be the earliest likely year of compliance, meaning an assessment of the Investment-led Plan capacity to deliver compliance in that year is required.

4.1.2 The evidence base that underpinned the Investment-led Plan, submitted to JAQU in December 2023, did not include a 2026 model year for the Investment-led Plan as the Plan was modelled to achieve compliance in 2025. However, a 2026 Do-Minimum position had been developed to support the testing of the CAZ Benchmark.

4.1.3 Following the materialisation of the Queens Road risk, a 2026 Do Something forecast year was developed for the Investment-led Plan, applying the measures which were developed to achieve compliance in 2025 as reported in Section 4.2. The Investment-led Plan has been modelled, based on a 2026 forecast year, to achieve compliance in 2026 with no exceedances present.

4.1.4 Assuming Queens Road depot is not electrified by January 2025 and therefore full compliance is not achieved in 2025, compliance is modelled to be achieved at most exceedance sites through the Investment-led Plan in 2025 with the remaining sites, associated with ZEBs operating out the Queens Road depot, forecast to be compliant in 2026. Based on a 2026 compliance year, the Investment-led Plan measures have greater headroom with added resilience at the 2025 forecast exceedances that the bus, taxi and local measures are seeking to address, in part due to air quality improvements associated with natural fleet upgrades.

4.1.5 It is considered that ZEBs will not be required to be operated from an electrified Queens Road depot for the full year of 2026, adding further resilience to the ability of the Investment-led Plan to achieve compliance in 2026.

4.2 Summary Results for the Investment-led Plan with Queens Road delay

4.2.1 **Table 2** shows the number of sites remaining in exceedance of legal limits in 2026 under the Do Minimum and the Investment-led Plan, by local authority. The updated Investment-led Plan scenario assumes the delivery of Queens Road depot electrification by the end of 2025. The location of the modelled exceedances is presented in **Figure 1**. The results show:

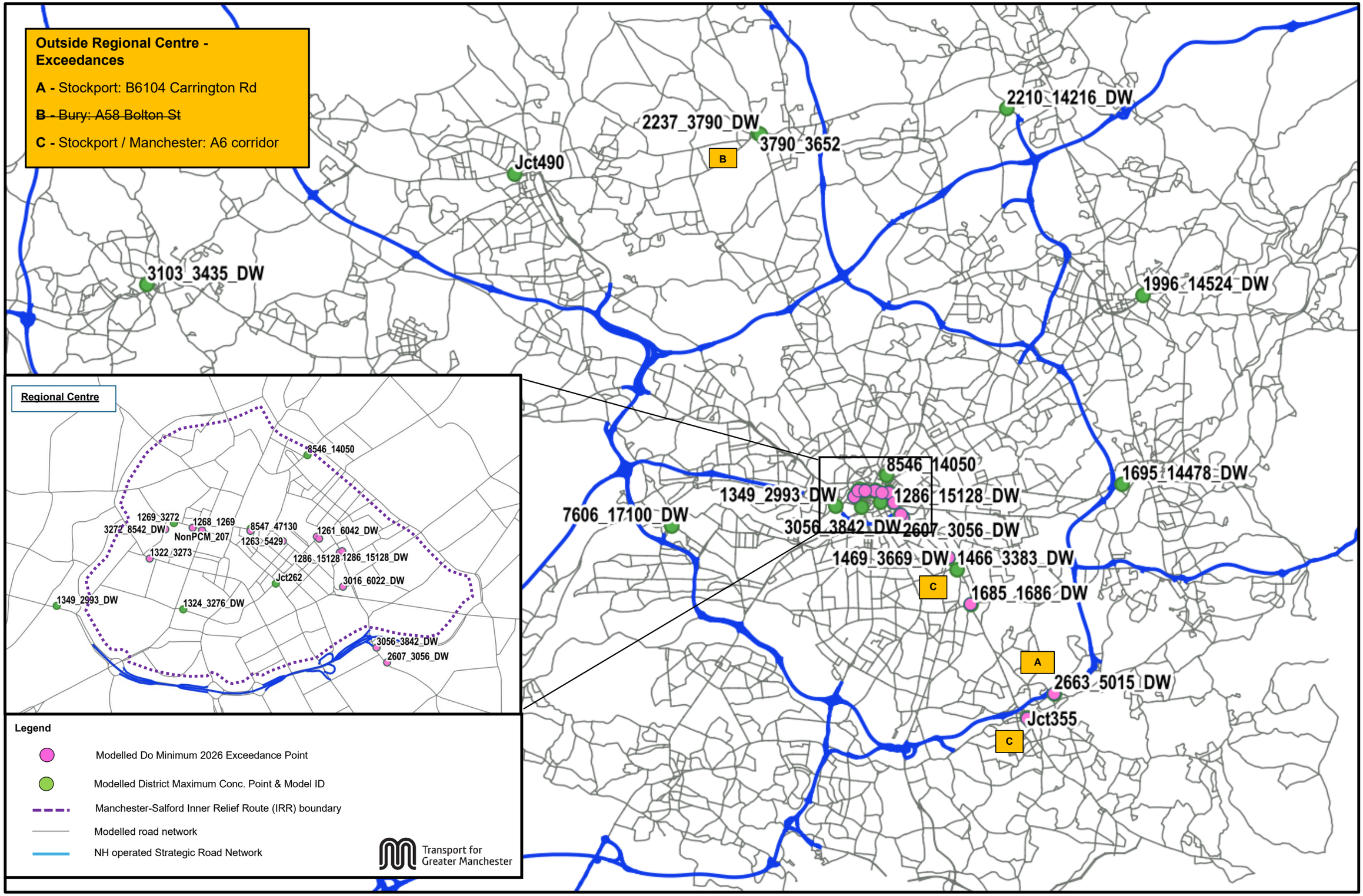
- without action, there are predicted to be 17 non-compliant sites across GM in 2026; and

- following the full operation of the Investment-led Plan in 2026 GM achieves compliance.

Table 2 Number of sites remaining in exceedance of legal limits for NO_2 concentrations in 2026, Greater Manchester, by local authority for each Investment-led Plan measure

District	2026	
	Do Min.	Investment-led Plan
Bolton	0	0
Bury	0	0
Manchester	15	0
Oldham	0	0
Rochdale	0	0
Salford	0	0
Stockport	2	0
Tameside	0	0
Trafford	0	0
Wigan	0	0
GM Total	17	0

Figure 1 Do Minimum 2026 Exceedance Points and Maximum Concentrations in GM



4.2.2 The Investment-led Plan aims to deliver compliance in the shortest possible time and to reduce human exposure to levels of NO_2 above the legal limit as quickly as possible. **Table 3** demonstrates the benefits being delivered in terms of reduced concentrations including at sites remaining in exceedance in 2026. This also shows that the number of sites close to exceedance reduces as a result of the Investment-led Plan. Health benefits continue to be delivered by reductions in NO_2 concentrations even below the legal limit.

4.2.3 With action, there are no sites that are non-compliant, and an increase in the number of sites predicted to have concentrations less than 35 µg/m^3.

Table 3 Number of modelled sites by scale of NO_2 exceedance by year, Greater Manchester

Scenario	Compliant sites		Non-compliant sites				Change in no. of sites in exceedance
	Very compliant (below 35 µg/m^3)	Compliant but close (35 to 40 µg/m^3)	Non-compliant (40 to 45 µg/m^3)	Very non-compliant (45 to 50 µg/m^3)	Extremely non-compliant (> 50 µg/m^3)	Total non-compliant (> 40 µg/m^3)	
2026							
Do minimum	2467	56	12	5	0	17	na
Investment-led Plan	2506	34	0	0	0	0	-26

4.3 Transport and Air Quality Impacts for the Investment-led Plan

4.3.1 In this section the impacts of the Investment-led Plan are discussed further with reference to the key exceedance points identified earlier, examining details relating to the changes to traffic and emissions by vehicle type.

4.3.2 **Table 4** shows the concentration with the Investment-led Plan, at the exceedances or the highest concentration site for each district in the Do Minimum 2026 scenario.

4.3.3 The air quality and source apportionment data for 2026 is provided in **Table 5**, whilst the impacts on the traffic flows are provided in **Table 6**.

4.3.4 With the Investment-led Plan in operation, there are predicted to be no exceedances remaining in 2026. The A58 Bolton St, Bury receives an improvement of -2.3 µg/m^3 as a result of the Investment-led Plan, this location would be compliant naturally in 2026, but the Investment-led Plan bus measures for this location could be implemented in 2025 and would deliver compliance in 2025.

4.3.5 On the A6 corridor between the Stockport depot and Piccadilly bus station in the Inner Relief Route (IRR), there are reductions of -15 µg/m^3 at A6 Piccadilly and Portland St, ranging down to -4.7 µg/m^3 at other exceedance points inside the IRR. Outside the IRR the reductions range from -10.3 µg/m^3 at A6 Stockport Road to -5.7 µg/m^3 at A6 London Rd. All exceedances on routes served by the Stockport depot are removed as a result of the bus measure.

4.3.6 At exceedances sites elsewhere in the IRR, the bus measure leads to reductions of between -8.8 µg/m^3 on Gartside St and -5.9 µg/m^3 on New York St.

4.3.7 The local traffic management (LTM) measures at the St John's Area around A34 Quay St delivered large improvements in the 2025 scenario of -3.0 µg/m^3, which would be required to deliver compliance in 2026. Great Bridgewater St is naturally compliant by 2026, as is the A57 Regent Road.

Table 4 NO_2 concentration with Investment-led Plan at key compliance sites – 2026 (µg/m^3)

Point ID	Road name	Local Authority	Do Min.	With Investment-led Plan	Total ILP Change in NO_2 conc.
2237_3790_DW	A58 Bolton St	Bury	40.0	37.7	-2.3
3790_3652	A58 Bolton St	Bury	38.5	36.4	-2.1
3016_6022_DW	A6 Whitworth St	Manchester	47.4	36.1	-11.3
1322_3273	A34 Quay St	Manchester	46.2	36.0	-10.2
1261_6042	Portland St	Manchester	47.6	32.3	-15.3
1261_6042_DW	Portland St	Manchester	47.2	32.2	-15.0
1286_15128	A6 Piccadilly	Manchester	46.9	31.6	-15.3
3272_8542_DW	Gartside St	Manchester	44.4	35.6	-8.8
8547_47130	King St	Manchester	43.7	38.0	-5.7
1263_5429	New York St	Manchester	43.4	37.5	-5.9
1286_15128_DW	A6 Piccadilly	Manchester	44.1	30.6	-13.5
1469_3669_DW	A6 Stockport Rd	Manchester	42.6	32.3	-10.3
1268_1269	A34 Bridge St	Manchester	42.3	37.2	-5.1
2607_3056_DW	A6 Ardwick Green	Manchester	41.3	35.2	-6.1
3056_3842_DW	A6 London Rd	Manchester	41.1	35.4	-5.7
1685_1686_DW	A6 Stockport Rd	Manchester	41.3	32.1	-9.2

NonPCM_207	A34 Bridge St	Manchester	40.8	36.1	-4.7
1324_3276_DW	Great Bridgewater St	Manchester	39.4	35.6	-3.8
8547_47130_DW	King St	Manchester	40.0	35.2	-4.8
8546_14050	A664 Shudehill	Manchester	40.3	40.3	0.0
1466_3383_DW	A6 Stockport Rd	Manchester	39.8	30.5	-9.3
Jct262	Portland St	Manchester	40.0	38.6	-1.4
1269_3272	A34 Bridge St	Manchester	39.4	34.3	-5.1
1349_2993_DW	A57 Regent Rd	Salford	38.6	37.8	-0.8
Jct355	A6 Wellington Rd South	Stockport	43.5	37.3	-6.2
2663_5015_DW	B6104 Carrington Rd	Stockport	42.1	35.3	-6.8
Jct490	Vernon St	Bolton	38.0	37.9	-0.1
1996_14524_DW	A62 Bottom o' th' Moor	Oldham	38.3	38.2	-0.1
2210_14216_DW	A664 Edinburgh Way	Rochdale	37.2	37.0	-0.2
1695_14478_DW	A635 Manchester Rd	Tameside	35.4	35.3	-0.1
7606_17100_DW	B5214 Trafford Blvd	Trafford	37.0	36.5	-0.5
3103_3435_DW	King St West	Wigan	39.3	39.1	-0.2

Table 5 Predicted annual mean NO_2 concentrations and source apportionment at key compliance sites on the Greater Manchester road network – With Investment-led Plan including Bus, Taxi & LTM Measures 2026

Point ID	Census ID	Road name	Local Authority	Annual mean NO_2 conc ($\mu g/m^3$)	BG[2] NOx conc ($\mu g/m^3$)	BG NO_2 conc ($\mu g/m^3$)	Road NOx contrib ($\mu g/m^3$)	Road NO_2 contrib ($\mu g/m^3$)	Traffic Flow (veh per day)	NOx contribution by vehicle type (%)					Change in Annual mean NO_2 conc ($\mu g/m^3$)
										Bus	Taxi	HGV	LGV	Car	
2237_3790_DW	38354	A58 Bolton St	Bury	37.7	19.6	14.1	51.4	23.6	80,734	1%	6%	21%	28%	44%	-2.3
3790_3652	38354	A58 Bolton St	Bury	36.4	19.6	14.1	48.8	22.2	80,734	1%	6%	21%	28%	44%	-2.1
3016_6022_DW	46165	A6 Whitworth St	Manchester	36.1	29.4	19.9	40.5	16.2	6,870	68%	2%	4%	9%	17%	-11.3
1322_3273	27975	A34 Quay St	Manchester	36.0	32.5	21.7	32.1	14.3	13,178	0%	7%	11%	33%	49%	-10.2
1261_6042	77003	Portland St	Manchester	32.3	32.5	21.7	24.6	10.6	1,033	100%	0%	0%	0%	0%	-15.3
1261_6042_DW	77003	Portland St	Manchester	32.2	32.5	21.7	24.3	10.5	1,033	100%	0%	0%	0%	0%	-15.0
1286_15128	70158	A6 Piccadilly	Manchester	31.6	32.5	21.7	24.0	9.9	3,563	73%	2%	8%	7%	10%	-15.3
3272_8542_DW	N/A	Gartside St	Manchester	35.6	32.5	21.7	31.3	13.9	5,354	0%	8%	12%	27%	53%	-8.8
8547_47130	N/A	King St	Manchester	38.0	32.5	21.7	37.4	16.4	21,673	0%	7%	12%	28%	53%	-5.7
1263_5429	N/A	New York St	Manchester	37.5	32.5	21.7	35.4	15.8	9,753	0%	8%	7%	31%	55%	-5.9
1286_15128_DW	70158	A6 Piccadilly	Manchester	30.6	32.5	21.7	21.4	8.9	3,563	73%	2%	8%	7%	10%	-13.5
1469_3669_DW	28695	A6 Stockport Rd	Manchester	32.3	22.3	15.8	34.6	16.5	28,216	32%	5%	6%	18%	39%	-10.3
1268_1269	27974	A34 Bridge St	Manchester	37.2	32.5	21.7	36.4	15.5	12,524	36%	5%	6%	17%	36%	-5.1
2607_3056_DW	26157	A6 Ardwick Green	Manchester	35.2	29.4	19.9	31.6	15.3	33,093	17%	5%	5%	29%	43%	-6.1
3056_3842_DW	26157	A6 London Rd	Manchester	35.4	29.4	19.9	32.2	15.5	34,411	17%	6%	6%	28%	44%	-5.7
1685_1686_DW	73778	A6 Stockport Rd	Manchester	32.1	21.2	15.1	35.8	17.0	27,855	35%	4%	12%	18%	30%	-9.2
NonPCM_207	N/A	A34 Bridge St	Manchester	36.1	32.5	21.7	33.5	14.4	12,524	36%	5%	6%	17%	36%	-4.7
1324_3276_DW	N/A	Great Bridgewater St	Manchester	35.6	27.0	18.6	39.3	17.0	10,148	0%	6%	22%	28%	45%	-3.8
8547_47130_DW	N/A	King St	Manchester	35.2	32.5	21.7	30.5	13.6	21,673	0%	7%	12%	28%	53%	-4.8
8546_14050	57427	A664 Shudehill	Manchester	40.3	32.5	21.7	33.8	14.2	10,834	39%	5%	10%	15%	32%	0.0
1466_3383_DW	7946	A6 Stockport Rd	Manchester	30.5	22.3	15.8	29.6	14.7	25,127	28%	5%	7%	19%	40%	-9.3
Jct262	N/A	Portland St	Manchester	38.6	29.4	19.9	39.9	18.7	4,882	87%	1%	1%	6%	5%	-1.4
1269_3272	27974	A34 Bridge St	Manchester	34.3	32.5	21.7	30.8	12.7	12,064	45%	4%	10%	15%	26%	-5.1
1349_2993_DW	73792	A57 Regent Rd	Salford	37.8	22.7	16.0	47.0	21.8	55,130	0%	6%	18%	31%	45%	-0.8

[2] BG = Background

Jct355	N/A	A6 Wellington Rd South	Stockport	37.3	21.9	15.5	45.5	21.8	24,888	18%	5%	11%	26%	39%	-6.2
2663_5015_DW	N/A	B6104 Carrington Rd	Stockport	35.3	17.5	12.7	49.1	22.6	18,037	20%	3%	31%	25%	21%	-6.8
Jct490	N/A	Vernon St	Bolton	37.9	23.7	16.6	44.4	21.2	10,302	14%	5%	6%	34%	40%	-0.1
1996_14524_DW	36632	A62 Bottom o' th' Moor	Oldham	38.2	23.9	16.7	43.7	21.5	33,692	31%	4%	8%	22%	34%	-0.1
2210_14216_DW	17322	A664 Edinburgh Way	Rochdale	37.0	16.7	12.2	58.0	24.8	34,720	0%	4%	42%	26%	28%	-0.2
1695_14478_DW	99618	A635 Manchester Rd	Tameside	35.3	24.1	16.8	38.9	18.5	46,720	0%	6%	17%	34%	43%	-0.1
7606_17100_DW	N/A	B5214 Trafford Blvd	Trafford	36.5	17.9	13.0	49.1	23.5	28,942	37%	4%	19%	11%	30%	-0.5
3103_3435_DW	N/A	King St West	Wigan	39.1	27.2	18.6	45.6	20.6	7,194	79%	1%	8%	5%	7%	-0.2

Table 6 Predicted impact on traffic flows at key compliance sites on the Greater Manchester road network – With Investment-led Plan including Bus, Taxi & LTM Measures 2026

Point ID	Local Authority	Do Min : Total AADT Flows (no. veh per day)									ILP : Change in AADT Flows (no. veh per day) from Do Min.								
		All Vehicles	Taxi (comp)	Taxi (non-comp)	HGV (comp)	HGV (non-comp)	LGV (comp)	LGV (non-comp)	Car (comp)	Car (non-comp)	All Vehicles	Taxi (comp)	Taxi (non-comp)	HGV (comp)	HGV (non-comp)	LGV (comp)	LGV (non-comp)	Car (comp)	Car (non-comp)
2237_3790_DW	Bury	80,745	4,187	373	1,675	107	9,883	1,961	57,133	4,417	-11	374	-373	0	0	-19	-6	12	0
3790_3652	Bury	80,745	4,187	373	1,675	107	9,883	1,961	57,133	4,417	-11	374	-373	0	0	-19	-6	12	0
3016_6022_DW	Manchester	6,899	350	31	53	03	670	130	4,761	368	-29	25	-31	-3	0	-12	-2	-6	-2
1322_3273	Manchester	14,131	765	68	295	19	1,925	376	9,761	755	-953	-11	-68	-61	-4	-33	-3	-710	-59
1261_6042	Manchester	1,033	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1261_6042_DW	Manchester	1,033	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1286_15128	Manchester	3,610	194	21	56	04	364	71	1,946	172	-48	34	-21	0	0	1	0	-70	3
3272_8542_DW	Manchester	6,403	371	33	130	08	690	135	4,558	353	-1,049	-14	-33	-20	-1	-63	-12	-847	-52
8547_47130	Manchester	21,707	1,170	103	392	25	2,466	481	15,477	1,187	-34	100	-103	1	0	-22	-5	-4	1
1263_5429	Manchester	9,804	545	48	193	12	1,226	238	6,769	521	-51	42	-48	0	0	-17	-3	-21	-3
1286_15128_DW	Manchester	3,610	194	21	56	04	364	71	1,946	172	-48	34	-21	0	0	1	0	-70	3
1469_3669_DW	Manchester	28,281	1,476	131	465	30	3,150	615	20,044	1,551	-64	123	-131	11	1	-9	-2	-51	-6
1268_1269	Manchester	11,917	594	53	170	11	1,234	241	7,901	609	608	86	-53	15	1	58	11	452	33
2607_3056_DW	Manchester	33,383	1,585	139	568	36	4,792	935	22,431	1,730	-290	141	-139	1	0	8	1	-249	-53
3056_3842_DW	Manchester	34,685	1,652	145	575	37	4,774	932	23,584	1,810	-274	150	-145	1	0	30	6	-265	-50
1685_1686_DW	Manchester	27,873	1,458	131	515	33	3,303	646	19,351	1,505	-19	128	-131	-1	0	3	0	-20	2
NonPCM_207	Manchester	11,917	594	53	170	11	1,234	241	7,901	609	608	86	-53	15	1	58	11	452	33
1324_3276_DW	Manchester	10,726	598	55	328	21	1,605	313	7,118	571	-578	-16	-55	23	1	-187	-36	-275	-30
8547_47130_DW	Manchester	21,707	1,170	103	392	25	2,466	481	15,477	1,187	-34	100	-103	1	0	-22	-5	-4	1
8546_14050	Manchester	10,825	606	53	191	12	1,033	201	7,118	546	9	52	-53	0	0	-1	0	13	-1
1466_3383_DW	Manchester	25,107	1,332	118	516	33	2,823	551	17,509	1,369	20	121	-118	3	0	28	6	-20	0
Jct262	Manchester	4,638	181	18	90	6	705	138	1,661	163	244	21	-18	2	0	-28	-4	269	2
1269_3272	Manchester	12,669	669	60	200	13	1,307	255	8,413	650	-605	33	-60	-16	-1	-22	-4	-501	-30
1349_2993_DW	Salford	56,881	2,699	238	2,446	156	8,655	1,681	37,739	2,900	-1,752	162	-238	31	2	-280	-61	-1,251	-106
Jct355	Stockport	24,866	1,200	107	1,097	70	3,486	673	16,200	1,255	22	111	-107	-6	-1	23	5	-3	1

2663_5015_DW	Stockport	18,048	725	65	1,709	109	3,782	743	9,659	754	-11	66	-65	13	1	-19	-3	-3	0
Jct490	Bolton	10,314	497	44	160	10	1,815	354	6,747	521	-12	43	-44	1	0	-2	-1	-8	-1
1996_14524_DW	Oldham	33,692	1,653	148	934	60	4,907	959	22,747	1,736	0	144	-148	-1	0	34	6	-31	-3
2210_14216_DW	Rochdale	34,721	1,647	146	2,174	139	5,238	1,020	22,443	1,732	-1	144	-146	-2	0	-4	-1	8	-1
1695_14478_DW	Tameside	46,718	2,220	198	2,393	153	7,404	1,447	30,148	2,349	2	197	-198	-3	0	19	6	-11	-7
7606_17100_DW	Trafford	28,958	1,485	130	1,760	112	2,362	461	20,235	1,590	-16	133	-130	-13	-1	5	1	-11	0
3103_3435_DW	Wigan	7,198	316	29	330	21	855	167	3,985	319	-4	28	-29	0	0	-26	-5	28	1

4.3.8 The potential for rerouting from the LTM measures is described in the AQ3 report for 2025 and would be very similar in terms of impacts in 2026 with no material impact on compliance at other sites.

4.4 M602

4.4.1 The Do Minimum and Do Something forecast scenarios modelled for the Investment-led Plan assume that National Highways' reduced speed limit on the M602 (60mph) will remain in place through the forecast modelled years (2025 and 2026). As National Highways have now informed TfGM that they are planning to remove the reduced speed limit, it has been agreed with JAQU that a scenario is tested, based on modelling conducted to date, to understand the implications of this change to the Investment-led Plan.

4.4.2 The model test has been conducted to test the compliance impact on the Investment-led Plan. This test reverts to the original model coding of M602 operating with a 70mph speed limit, which involves an increase in the modelled free flow speed along M602 Junctions 1 to 3. The focus of this test is on the compliance impact at the A57 Regent Road exceedance site which is located to the east of the M602 and one of the main feeder roads downstream from the motorway.

4.4.3 The traffic results show flow changes on the M602 are typically less than 50 passenger car units (PCU) with small reassignment impacts from parallel routes. Flow changes at the A57 Regent Road exceedance site are less than 15 PCUs.

4.4.4 In air quality terms, there is some switching of traffic from the A580/A6 corridor onto the M602/A57 Regent Road corridor however this does not impact the number of exceedances in the Do Minimum.

4.4.5 In the Investment-led Plan scenario for 2025, whilst there are relatively low impacts across the network in part because the A57 Regent Road local measures add delays at the east end of the corridor, there is an increase of 0.1 ug/m^3 at the A57 Regent Road, Salford. In 2025 the change to the M602 speed limit could therefore impact on compliance. However, by 2026 the A57 concentration has reduced by approximately 2 ug/m^3, so this level of NO_2 impact due to alteration to the M602 would not be expected to delay compliance in 2026.

4.4.6 The change to the M602 speed limit would not have a material impact on the capacity of the Investment-led Plan to achieve compliance with in 2026.

4.5 Summary

4.5.1 The output of these scenarios mean that the earliest possible year of compliance is now 2026, and the remainder of this document assesses the Investment-led Plan and the CAZ Benchmark on this basis.

5 Updated Comparative Appraisal

5.1.1 This section provides a comparative appraisal between the Investment-led Plan and the CAZ Benchmark, as shown in **Table 7**, reflecting the impacts associated with a delay to the electrification of Queens Road depot. This means that the Investment-led Plan with Queens Road delay, and the CAZ Benchmark are each scored on the basis of 2026 being the earliest possible year of compliance. For ease of comparison the table below also includes the original scoring of the Investment-led Plan without any Queens Road delay, which was scored on the basis of compliance being delivered in 2025, including the level of certainty and risk associated with delivery in that compliance year.

5.1.2 National Highways' removal of the reduced speed limit on the M602, between Junctions 1 and 3, is not considered to have a material impact on the Investment-led Plan which incorporates the delivery issue at Queens Road and therefore this issue has not been directly addressed in commentary below. The term 'Investment-led Plan (QR delay)' refers to the Investment-led Plan which considers the delivery issue at Queens Road.

5.1.3 For consistency, the appraisal has been carried out in the same manner as the appraisal in the *Appraisal Report*, adopting the approach set out in Section 4 of that Report and adopting the same Critical Success Factors (CSFs), against the scale criteria as set out by JAQU Option Appraisal Guidance. This approach consists of an appraisal of the following CSFs:

- Determining Success Factor: Scored based on a Pass/Fail criteria.
- Primary & Secondary Success Factor: Scored based on a four-point scale as follows:

  ✓✓ Excellent

  ✓ Good

  - Satisfactory or no score

  × Poor

5.1.4 It should be noted that this appraisal has been scored in relative terms between each scenario based on the above four-point scale. Because of the nature of this scale if two options achieve the same score (e.g. "Good") this does not necessarily mean there is no absolute difference between each scenario but that, applying appropriate professional judgement, each option can be considered "Good" in relation to the relevant CSF. Where options achieve the same score but deliver materially different benefits or disbenefits or raise different issues this is noted in the final column of the table below.

5.1.5 It should also be noted that the Investment-led Plan without a delay to the Queens Road depot electrification delivered compliance in 2025 so inherently delivers benefits quicker than the Investment-led Plan with the delay to the Queens Road depot. This is not always reflected in the scoring since the Investment-led Plan was assessed against a compliance year of 2025 whereas the Investment-led Plan with Queens Road depot electrification is assessed against a compliance year of 2026.

5.1.6 The updated comparative appraisal summary demonstrates that the Investment-led Plan remains the only option tested which passes the Determining Success Factor and meets the obligation of the 10 GM Authorities to deliver compliance in the shortest possible time and by 2026 at the latest. Modelled compliance is not achieved in either 2025 or 2026 under the CAZ Benchmark which thus fails against the Determining Success Factor.

5.1.7 The appraisal also demonstrates that the Investment-led Plan performs better against other CSFs relative to the CAZ Benchmark. The Investment-led Plan, with a delay to the electrification of Queens Road depot to the end of 2025, performs better than the CAZ Benchmark against the Primary CSFs in that it delivers greater reductions in NO_2 exceedances in each year, and does so earlier than the CAZ Benchmark.

5.1.8 The Investment-led Plan also performs better than the CAZ Benchmark against the Secondary CSFs. It is a better strategic fit in terms of air quality and climate change (delivering greater air quality benefits), transport (providing additional cleaner buses that will continue to give benefits after compliance is achieved), growth and economy (by not imposing charges on users it removes the risk of restricting growth or damaging businesses). It remains better VfM than the CAZ Benchmark, delivering better air quality benefits at a lower cost, and its distributional health benefits, affordability for users and quality of life impacts are preferable to the CAZ Benchmark.

5.1.9 Fundamentally, the Investment-led Plan is considered more affordable and therefore more deliverable than the CAZ Benchmark.

Table 7 CSF Appraisal Summary - Updated

Success Factor	Code	ILP	ILP QR delay	CAZ	Summary
Determining Success Factor					
Compliance in the shortest possible time Which scenario reduces to zero the number of locations predicted to be in exceedance of the legal limits of NO_2 concentrations in the shortest time?	C1	**Pass**	**Pass**	**Fail**	The Investment-led Plan (QR delay)[3] is now forecast to achieve compliance in 2026 which is now considered to be the shortest possible time for achieving compliance in GM. The CAZ Benchmark is modelled to not achieve compliance in 2026 with 16 sites modelled to remain in exceedance. Therefore, the Investment-led Plan continues to 'pass' the determining success factor whereas the CAZ Benchmark 'fails' based on compliance in the shortest possible time.
Primary Success Factors					
Reduction in NO_2 emissions Which scenario delivers… The greatest reduction in the number of locations in exceedance (presumed to represent human exposure) in each year?	N1	✓✓	✓✓	✓	The Investment-led Plan (QR delay) is modelled to deliver significant reductions in the number of locations in exceedance with no sites forecast to remain in exceedance in 2026. The Investment-led Plan (QR delay) continues to deliver incremental air quality benefits in 2025 with the remaining air benefit provided by ZEBs operating out of Queens Road depot in 2026. The CAZ Benchmark is modelled to reduce the number of exceedance sites in 2026 from 17 to 16 with compliance not achieved across all sites and the estimated realistic 'go-live' date is not until July 2026, limiting potential reductions in human exposure.
The greatest reduction In NO_2 concentrations at the roadside in each year prior to compliance being achieved?	N2	✓	-	×	AQ benefits from the deployment of cleaner (OEM Euro VI and zero emission) buses are planned to be delivered incrementally prior to 2026 which captures benefits ahead of the modelled full year compliance in 2026 for the Investment-led Plan (QR delay). The different components of the local measures will deliver benefits ahead of 2026 alongside funding for taxis. However, on the basis that Queens Road is not operational by January 2025, the Investment-led Plan (QR delay) will not deliver compliance to all sites in 2025 and 2026 would be the first full year of compliance and therefore the Investment-led Plan (QR delay) scores lower than it did without that delay. The CAZ Benchmark's realistic programme assumption to open the funds in January 2026 and 'go-live' with the zone in July 2026 will delay air quality benefits from this scenario beyond those accrued under the Investment-led Plan (QR delay).

[3] The Investment-led Plan (QR delay) refers to the Investment-led Plan which incorporates the delivery issue at Queens Road which means that the earliest possible year of compliance is now 2026.

Success Factor	Code	ILP	ILP QR delay	CAZ	Summary
Compliance without putting other sites closer to exceedance (defined as concentrations of 38-40 µg/m^3) than without action?	N3	✓	✓	✓	The Investment-led Plan (QR delay) is modelled to deliver compliance without putting other sites into exceedance. The implementation of cleaner buses on routes past remaining exceedance sites are new to purchase and are not being redeployed from existing services elsewhere in GM. There is some local re-routing associated with the implementation of the local highway measures which inherently are modelled to cause some rerouting to reduce flow and speeds past the areas of remaining exceedance. The CAZ Benchmark is modelled to result in some minor rerouting for trips through the Regional Centre albeit the volumes are modelled to be minor.
Feasibility Are the Measures proposed within the legal powers of the GM Authorities?	F1	✓✓	✓✓	✓✓	The GM Authorities have the relevant legal powers to implement the Investment-led Plan or CAZ Benchmark.
Can a governance route be developed to enable timely local government joint working as required for delivery?	F2	✓	✓	✓	The GM Authorities have proposed a governance route that facilitates the local government co-operation required for delivery the Investment-led Plan and CAZ Benchmark. Bus franchising is being rolled out across GM from September 2023 and the necessary governance arrangements are in place and live for the deployment of Euro VI and ZEBs based on GM's requirements.
What is the likelihood of the Measures being effective?	F3	✓✓	✓✓	×	Only the Investment-led Plan measures are modelled to be effective and achieve compliance in the shortest possible time and by 2026 at the latest. Whilst the Queens Road delay means the Investment-led Plan's (QR delay) forecast year of compliance is now 2026, this is still ahead of the CAZ Benchmark and is now considered to represent the shortest possible time to deliver compliance. Certainty of modelled compliance being delivered can be provided through GM's ability to specify particular buses on remaining exceedance locations through bus franchising. The GM Authorities are also to implement targeted local highway measures and implementation of a consistent emission standard for GM-licensed taxis. Conversely, the modelled results for the CAZ Benchmark show that this scenario is not effective in achieving the requirements of the Direction.
Is delivery of the scenario subject to significant risks that make achieving	F4	✓	✓	×	The Investment-led Plan is aligned with GM strategic politically endorsed plans. There are risks associated with the delivery of electrification of depots, availability of cleaner buses, local measure delivery at A57 Regent Road and A34 Quay Street and modelling uncertainties. There is recognition that one of the identified risks at the Queens Road depot has materialised, with depot electrification

Success Factor	Code	ILP	ILP QR delay	CAZ	Summary
compliance in the shortest possible time less likely?					fundamental to achieving compliance in 2025 through the Investment-led Plan. However, the quantum and profile of risk associated with the Investment-led Plan with the Quens Road delay remains consistent. The CAZ Benchmark test has failed to produce modelled compliance by 2026. It is considered that the CAZ Benchmark cannot realistically be operational until July 2026 and does not achieve compliance with the requirements of the direction.
Secondary Success Factors					
Strategic fit with local strategies and plans Air quality and climate change	S1	✓✓	✓✓	✓	Both the Investment-led Plan and the CAZ Benchmark are modelled to deliver improvements in NO_2 concentrations, and also reduce PM and greenhouse gas emissions. However, the CAZ Benchmark fails to meet the requirements of the Direction.
Transport	S2	✓✓	✓✓	-	The Investment-led Plan acts to promote sustainable travel and will deliver a cleaner, newer bus and taxi fleet for GM passengers. The CAZ Benchmark acts to promote more environmentally friendly travel and will deliver incentives to upgrade HGVs, LGVs, taxis, coaches and minibuses that would otherwise be subject to a Daily Charge albeit the impact of the Daily Charge on impacted vehicles is not fully mitigated by the supporting funding.
Growth	S3	✓	✓	-	The Investment-led Plan does not seek to impose charges on users which could restrict growth being brought forward by nine of the 10 GM local authorities via the Places for Everyone Joint Development Plan and Stockport's Local Plan. There is a risk that investment is deterred in the Regional Centre under the CAZ Benchmark associated with the impact of a charge for non-compliant vehicles.
Economy	S4	✓	✓	-	The Investment-led Plan is not considered to have a negative impact on the economy. The implementation of a consistent emission standard across the 10 GM local authorities would require taxi owners and operators to respond to continue operating in GM, licensed to a GM local authority. However, the CTF measure does provide financial support for those upgrading to compliant vehicles. There is a risk that the CAZ Benchmark could affect economic performance by adding an additional financial burden for some businesses.
Value for money Estimated value for money of the scenario	V1	-	-	x	It would be more cost effective to not provide financial support to buses and taxis and defer to natural upgrade cycles however this would result in GM not meeting the requirements of the Direction. The Investment-led Plan (QR delay) is now forecast to achieve compliance in 2026 unlike the CAZ Benchmark scenario which fails to achieve compliance in 2026.

Success Factor	Code	ILP	ILP QR delay	CAZ	Summary
compared to the risk of inaction					The CAZ Benchmark would generate revenues through daily charges on non-compliant vehicles travelling through the Regional Centre however this is expected to be outweighed by the costs to implement and operate this scenario. Costs to implement and manage both scenarios are higher than the expected quantifiable benefits however this is not the determining factor compared to the risk of inaction.
Distributional impact Health benefits	Q1	✓✓	✓✓	✓	All groups will experience health benefits from the scenarios. Those living in areas with the worst air quality and those most vulnerable to the effects of poor air quality will benefit the most. The health benefits of the Investment-led Plan are likely to be more spatially distributed across the 10 Authority areas compared to the CAZ which is believed to concentrate the air quality benefits within the Regional Centre, aligned to the scenario's boundary. Under the Investment-led Plan, there is also expected to be a disproportionately higher benefit from those living in the Regional Centre through the operating patterns of buses and taxis. Whilst the Investment-led Plan (QR delay) delivers health benefits slightly later compared with the original Investment-led Plan (excluding QR delay) it is still considered to be 'Excellent' overall and comparatively better than a CAZ Benchmark.
Accessibility (in terms of journey time and connectivity to opportunities and services)	Q2	-	-	-	The Investment-led Plan does not have a material impact in relation to accessibility. At a local level, accessibility for residents in and around the Regent Road and Quay St areas could be impacted, depending upon design solution taken forward. The CAZ Benchmark is modelled to have limited rerouting for trips passing through the Regional Centre. However, this has been minimised based on the CAZ boundary to border the insider of the Manchester and Salford Inner Ring Road.
Affordability (for users)	Q3	✓	✓	x	The Investment-led Plan does not impose charges on users and is therefore considered to not have an adverse affordability impact. There is a small adverse impact on non-compliant taxi owners and operators as a result of the proposed consistent emission standards, however, this is expected to be balanced by the provision of funding to support upgrades to all affected vehicles and additional funding to support compliant ICE Hackney Carriages to upgrade to cleaner, ZEC vehicles.

Success Factor	Code	ILP	ILP QR delay	CAZ	Summary
					The CAZ Benchmark would include a Daily Charge on non-compliant vehicles in the Regional Centre and therefore has an adverse impact on user affordability as supporting mitigation funding does not fully cover the impact of upgrading to a compliant vehicle.
Impact on the local economy – considering low income workers, small businesses, town centres and key sectors	Q4	✓	✓	×	The Investment-led Plan does not impose charges on users and is therefore considered to not have an adverse impact on the local economy, workers and users. The CAZ Benchmark includes a Daily Charge which is likely to disproportionately impact low income workers and small businesses, particularly those who require vehicle access to the Regional Centre on a frequent basis.
Impact on the quality of life of local residents and on equalities	Q5	✓	✓	-	The Investment-led Plan and the CAZ Benchmark are modelled to provide air quality benefits and reduce human exposure to NO_2, leading to improvements in physical health. The CAZ Benchmark disproportionately benefits the Regional Centre whilst having a negligible impact to outer sites. Conversely, the Investment-led Plan is anticipated to have a more dispersed impact across GM albeit retaining a higher Regional Centre benefit associated with the operating patterns of taxis and buses. Both versions of the Investment-led Plan are forecast to deliver compliance sooner than a CAZ Benchmark and achieve the requirements of the Direction and thus has a higher beneficial impact on the quality of life of local residents and equalities compared to the CAZ Benchmark which fails to achieve compliance in the final forecast modelled year. Whilst the Investment-led Plan (QR delay) benefits slightly later compared with the original Investment-led Plan (excluding QR delay), it is still considered to be 'Good' overall and comparatively better than a CAZ Benchmark.
Deliverability The Affordability of the cost of implementation (for the public sector)	D1	-	-	×	Whilst the Investment-led Plan is modelled to achieve the core objectives, it is estimated that £15.2m of additional funding will be required from government based on the previously awarded funding amount. The CAZ Benchmark would include revenues from the CAZ which would contribute towards the operating costs of the CAZ. The CAZ boundary is based on a different geography (Regional Centre as opposed to GM-wide) to the Previous GM CAP and thus, there are additional signage and camera requirements which cannot be utilised from the Previous GM CAP. It is estimated that £61.9m of additional funding will be required from government based on the previously awarded funding. Whilst the costs of each scenario are above the total of the previous funding award by JAQU, minus the committed funding, the Investment-led Plan is cheaper than the CAZ Benchmark.

Success Factor	Code	ILP	ILP QR delay	CAZ	Summary
The Supply-side capacity and capability to deliver the Measures outlined in the scenario	D2	-	-	-	There are some concerns about supply-side capacity within the taxi sector, particularly on the availability of second-hand Hackney Carriages as the GM non-compliant vehicle population exceeds the number of available, compliant second-hand vehicles which impacts both the Investment-led Plan and CAZ Benchmark. The GM Authorities have certainty on the ability to procure cleaner buses to operate at remaining exceedance locations however there is an availability risk around the quantify of vehicles that the GM Authorities are seeking to procure.
The Achievability of delivering the scenario, considering issues such as difficulty with scale or obtaining resources to implement and operate a Measure/ scenario	D3	✓	✓	-	The Investment-led Plan comprises of three core measures. They are: bus measures, taxi measures and local highway measures. • The bus measures form part of the implementation of bus franchising across the city-region and it is considered that the number and distribution of ZEBs and OEM Euro VIs required can be delivered within the required timescales. However, delivery of cleaner buses is contingent on the availability of a sufficient number of vehicles and ZEB specifically, and the electrification of depots to provide the necessary EV charging infrastructure. • The taxi measures comprise of provision of financial support to non-compliant, GM-licensed vehicle owners and the implementation of a consistent emissions standard across the 10 GM local authorities for all vehicles by the 31st December 2025. There is a risk that non-compliant taxis, licensed to a GM local authority, could re-license to a non-GM local authority to continue to operate their non-compliant vehicle. This risk is only associated to PHVs which have the ability to operate outside of their licensed authority. However, the provision of financial support to help non-compliant taxi owners upgrade provides mitigation and the incentive is likely to be attractive for vehicle owners to potentially bring forward their vehicle upgrade outside of their natural upgrade cycle. • The local highway measures comprise of changes to speed limits, junction signals and measures to reduce through traffic. These measures are being delivered by Manchester and Salford Local Authorities and TfGM. A delivery programme is being confirmed with the lead parties and there is an associated delivery risk with this. The CAZ Benchmark is considered to be deliverable on the basis of the GM Authorities' prior knowledge of the scheme and ability to procure the necessary services/agree contracts. However, fundamentally, the CAZ Benchmark does not achieve compliance with the Direction. Furthermore, based on schedule estimates, the CAZ Benchmark cannot realistically be implemented until July 2026.

6 Cost Impact

6.1.1 The delay to the electrification of Queens Road depot has a minimal impact on the implementation costs set out in the *Appraisal Report*, submitted as part of the Summer 2024 evidence submission. Furthermore, there are no cost implications related to M602 reduced speed limit removal.

6.1.2 As the Investment-led Plan is modelled to achieve compliance in the shortest possible time and by 2026 at the latest considering the Queens Road depot electrification delay and M602 reduced speed limit removal, GM has concluded that there will be no significant operational, or whole life costs implications to the Investment-led Plan.

6.1.3 Therefore, GM's position is to not change any of the costs set out in Section 5.6 of the *Appraisal Report*.

7 Value for Money

7.1.1 This section provides a high-level summary of the approach taken to assess the Value for Money (VfM) of the Investment-led Plan (including the Queens Road delay) and the CAZ Benchmark scenarios and the materiality on VfM impacts arising from the Queens Road delay and M602 issues.

7.1.2 **Table 8** sets out the updated assessment of VfM impact for the Investment-led Plan, Investment-led Plan (QR delay) and CAZ Benchmark based on identified metrics and proposed assessment type as reported in the *Appraisal Report*. This Supplementary Appraisal Report does not include a full Cost Benefit Analysis which is included for the original Investment-led Plan as part of the *Value for Money Note*. Based on the pragmatic and proportionate approach adopted, reproducing an updated version of this analysis for an Investment-led Plan (QR delay) scenario is not considered necessary, since the quantified relative difference of the Investment-led Plan (QR delay) in VfM terms is considered to remain consistent with the analysis previously undertaken.

7.1.3 Consistent with the approach to assess the impact of the Investment-led Plan (QR delay) in other sections of this report, National Highways' removal of the reduced speed limit on the M602 does not have a material impact on the outcomes of the Investment-led Plan (QR delay) and therefore this issue has not been directly considered in the scoring of this scenario.

Table 8 Assessment of VfM impacts - updated

Impact	Assessment
Economy	
Business travel times and reliability	• Both GM CAP scenarios would result in businesses upgrading to newer vehicles, meaning that they are less likely to be affected by reliability issues. These vehicles are also more likely to be fuel efficient, improving travel times and costs. The relative scale of benefits from vehicle upgrades is higher in the CAZ Benchmark scenario compared to Investment-led Plan as the latter is constrained to provision of funds for taxis only. • The Investment-led Plan proposes to provide additional funding to support the upgrade of retrofitted buses to OEM Euro VI or ZEB, whereas there is no such assumed investment as part of the CAZ Benchmark scenario due to the funding already invested through the CBF on retrofitted and replaced buses. The newer bus fleet may incentivise a higher public transport use under the Investment-led Plan scenario; however, the likely trip transfer is assumed to be low. • The introduction of a charging zone under the CAZ Benchmark could have travel time disbenefits for businesses. Businesses operating with non-compliant vehicles will be faced with a choice: pay the daily charge and use the most efficient route in the Regional Centre or avoid the daily charge and re-route around the Regional Centre. Although the assumed number of trips are low, those who select the latter option may experience an increase in journey times. • Overall, it is concluded that the CAZ Benchmark is likely to have a relative higher adverse impact compared to the Investment-led Plan on the basis that the potential trip rerouting impact is more widespread albeit in both scenarios' impacts are considered to be low. • **Investment-led Plan (QR delay) Impact: There are no further business travel times and reliability impacts to the Investment-led Plan scenario as a result of the Queens Road issue.**
Business costs and revenues	• The CAZ Benchmark scenario has the potential to result in higher business costs compared to the Investment-led scenario. Under a Regional Centre Class C CAZ, businesses that operate within the Regional Centre are likely to be disproportionately adversely impacted by the CAZ. This may be directly or indirectly in the case that customers or the supplier chain are impacted by operating non-compliant buses. Whilst the provision of financial support for affected vehicles is expected to reduce the adverse impact, it does not eliminate the adverse impact on non-compliant vehicles that are travelling to/and from the Regional Centre. • There is anticipated to be a limited adverse impact from the Investment-led Plan on taxis, associated with the alignment of a consistent emission standard across the 10 GM local authorities by 31st December 2025, which may require taxi owners / operators to upgrade their vehicle earlier than they otherwise would have done so. However, this is likely to be outweighed in most cases by the provision of financial support to non-compliant, GM-licensed taxis. There is also financial support proposed for ICE compliant, GM-licensed Hackney Carriages to upgrade to a ZEC Hackney Carriage. It should be stated that the impact of implementation of a consistent emission standard is not equal across the 10 GM local authorities based on their current status of emission standards; however, for five of the 10 GM local authorities, it will result in bringing forward the emission standard date by approximately three months. • Overall, it is concluded that the Investment-led Plan would provide a low positive impact on business costs on revenues on the basis of provision of funds to support bus upgrades and upgrade of compliant taxis to ZEC vehicles, which therefore goes beyond the population that would be affected by the

Impact	Assessment
	implementation of a consistent emission standard. By comparison, the charge associated with the CAZ Benchmark would potentially adversely impact all non-compliant vehicle types under a Class C and whilst the supporting mitigation funding would lessen the cost of upgrade. • **Investment-led Plan (QR delay) Impact: There are no further business cost and revenue impacts to the Investment-led Plan scenario as a result of the Queens Road issue.**
Social	
Commuter / other travel times and reliability	• Modelling identifies limited changes to travel time in both scenarios due to local re-routing associated with the Regional Centre CAZ and the local highway measures associated with the Investment-led Plan. • There are a number of cancelled trips as a result of the CAZ Benchmark scenario. However, the number is low and so this is not expected to have a material impact on travel times / reliability. • Consistent with the 'economy' assessment, the CAZ Benchmark is likely to have a relative higher adverse impact compared to the Investment-led Plan on the basis that the potential trip rerouting impact is more widespread albeit both scenario impacts are considered to be low. • **Investment-led Plan (QR delay) Impact: There are some minor commuter / travel time benefits associated with National Highways' decision to remove the temporary reduced speed limit on the M602 however this is not considered to have a significant impact to travel times due to the lack of alternative routes over 60 mph. In any event, it is considered that the M602 speed limit change would impact the Investment-led Plan and the CAZ Benchmark in equal measure.**
Amenity benefits	• Both scenarios incentivise upgrades to newer vehicle fleets. The CAZ Benchmark scenario is estimated to fund a higher number of vehicles compared to the Investment-led Plan, although albeit these will be largely private commercial vehicles. • The Investment-led Plan focuses fleet upgrades on new buses and on new and second-hand taxis. • In both scenarios, the amenity benefits are likely to be low, albeit upgrades to newer buses and taxis provider wider benefits to passengers. • The CAZ Benchmark is expected to provide a wider amenity benefit to different vehicle owners from the upgrades of eligible vehicles that are captured as part of CAZ Class C, albeit the level of benefit is low. However, the Investment-led Plan is likely to achieve a higher amenity benefit from buses and taxis, compared to these vehicles under a CAZ Benchmark. • **Investment-led Plan (QR delay) Impact: There are no further material impacts on amenity benefit considered as part of this scenario. Although, there are fewer ZEBs compared to the original plan, there is an increase in the total number of new cleaner buses supported by 77 OEM Euro VI buses in addition to 40 new ZEBs. There are no changes to the number of taxis expecting to be upgraded.**
Environment	
Carbon emissions	• Both scenarios deliver a reduction in carbon emissions and associated benefits from investment in newer fleets and local highway measures associated with the Investment-led Plan. It is modelled that both scenarios deliver a higher emissions reduction in the Regional Centre than elsewhere in GM due to the extent of the CAZ boundary and the emissions benefit derived from buses and taxis, which have higher volumes operating in the Regional Centre. • The carbon emissions reduction from the Investment-led Plan is modelled to be higher than the CAZ Benchmark, although the spatial distribution of benefits

Impact	Assessment
	is broadly similar between the two scenarios with a higher concentration of benefits located in the Regional Centre. • **Investment-led Plan (QR delay) Impact: In this scenario the Investment-led Plan would still deliver greater and quicker carbon reduction benefits compared to a CAZ Benchmark albeit the emissions benefit associated with buses operating from Queens Road will likely be delayed/redistributed from 2025 to 2026.**
Local air quality emissions	• Similar to the carbon emissions benefits, both scenarios deliver a reduction in local air quality emission and associated benefits from investment in newer fleets and local highway measures associated with the Investment-led Plan. It is modelled that both scenarios deliver a higher emissions reduction in the Regional Centre than elsewhere in GM due to the extent of the CAZ boundary and the emissions benefit derived from buses and taxis which have higher volumes operating in the Regional Centre. • The local air quality emissions reduction from the Investment-led Plan is modelled to be higher than the CAZ Benchmark, although the spatial distribution of benefits is broadly similar between the two scenarios with a higher concentration of benefits located in the Regional Centre. • **Investment-led Plan (QR delay) Impact: Similar to the anticipated impact on carbon emissions, the Investment-led Plan in this scenario would still deliver greater and quicker local air quality benefits compared to a CAZ Benchmark albeit the emissions benefit associated with buses operating from Queens Road will likely be delayed/redistributed from 2025 to 2026.**
Noise	• In both scenarios, there is expected to be a low positive noise impact from the GM CAP measures. The upgrade to newer and quieter vehicles, particularly zero emission buses, taxis and hybrid taxis, is expected to result in some low positive localised impacts. The spatial distribution of these impacts is expected to be experienced in the Regional Centre and the most in both scenarios, aligning with the distribution of bus and taxi operations in addition to affected vehicles associated with the Regional Centre CAZ. • Similar to the 'amenity' benefit scoring, the anticipated benefit from both scenarios is expected to be small. • **Investment-led Plan (QR delay) Impact: There is anticipated to be no material impact to noise as a result of this scenario on the Investment-led Plan.**
Public Accounts	
Capital costs	• The capital cost for both scenarios cover the development and implementation costs associated with the proposals in addition to the cost to deliver the measures. The CAZ Benchmark consists mostly of supporting vehicle mitigation funding whereas the Investment-led also provides funding for local highway measures and new cleaner buses and supporting infrastructure. • As the costs have been used to inform the scenario cost effectiveness, and not compared against monetised benefits in this submission, the costs have not been discounted to 2010 prices. The costs presented in this submission reflect current (2024) prices. • The capital cost for the Investment-led Plan (£84.5 million) is less than the CAZ Benchmark costs (£120.3 million) These figures are also inclusive of a 5% contingency allowance across the total cost of each scenario. • **Investment-led Plan (QR delay) Impact: As set out in Section 6, there is no cost impact to the delay associated with Queens Road depot as the Investment-led Plan remains unchanged albeit the Queens Road depot is scheduled to be deliver later than planned.**

Impact	Assessment
Operating costs	• The operating costs for each scenario comprise of costs to operate the vehicle fund, decommissioning costs, CAZ revenues (where relevant) and CAZ service termination fees (where relevant). Whilst the CAZ Benchmark is forecast to deliver an income through daily charge and penalty revenues, the income is outweighed by the operating cost expenditure to manage the operating body for the zone, CAZ office service costs, penalty enforcement costs, signage costs etc. • As the costs have been used to inform the scenario cost effectiveness, and not compared against monetised benefits in this submission, the costs have not been discounted to 2010 prices. The costs presented in this submission reflect current (2024) prices. • The operating cost for the Investment-led Plan, consistent with the capital costs, are expected to be less (£39.2 million) compared to the CAZ Benchmark scenario (£50.1 million) • **Investment-led Plan (QR delay) Impact: As set out in Section 6, there is no cost impact to the delay associated with Queens Road depot as the Investment-led Plan remains unchanged albeit the Queens Road depot is scheduled to be deliver later than planned.**

8 Equality Impacts

8.1.1 The GM Authorities undertook a high-level assessment to understand the likely equality impacts from the Investment-led Plan and CAZ Benchmark as reported in the *Appraisal Report*. The assessment drew on findings of previous iterations of Equality Impact Assessment (EqIA) and used data, insights and findings from the Previous GM CAP consultation and engagement activity. This report builds on that assessment to consider the likely equality impacts of the Investment-led Plan taking into account the Queens Road delay.

8.1.2 As reported earlier, National Highways' removal of the reduced speed limit on the M602 does not have a material impact on the compliance date of the Investment-led Plan (QR delay) and therefore this issue has not been directly addressed in the commentary below.

8.1.3 The EqIA finds that individuals with the following protected characteristics are likely to be differentially or disproportionately impacted by either scheme scenario:

- Age – very young children, young people and older people are likely to be disproportionately impacted by both scheme scenarios.
- Disability – those with mobility, communication or learning impairments, individuals with long-term health conditions, particularly those related to respiratory problems or stamina/breathing/fatigue are likely to be disproportionately impacted by both scheme scenarios.
- Sex – males likely to be disproportionately affected by both scheme scenarios.
- Race – individuals from a minority ethnic background are likely to be directly, indirectly and disproportionately impacted by both scheme scenarios.
- Religion/belief – individuals of Hindu, Muslim and Sikh faith are likely to be indirectly but disproportionately impacted by both scheme scenarios. This is as a result of intersecting identity with race/ethnicity.
- Pregnancy/maternity – expectant mothers likely to be differentially impacted by both scheme scenarios.
- Further characteristics – it has been identified that people in low-income households and carers are highly likely to be disproportionately impacted by both GM CAP scenarios.

8.1.4 **Table 9** consider the impacts of each scenario on the protected characteristic groups in addition to those which have been identified as likely to be disproportionately impacted by the GM CAP (low-income households and carers).

Table 9 Equality Impacts - updated

	CAZ Benchmark		Investment-led Plan (QR delay)		Investment-led Plan		Comments
Protected Characteristic	**Positive Impact**	**Adverse Impact**	**Positive Impact**	**Adverse Impact**	**Positive Impact**	**Adverse Impact**	
Age	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	Older people and young children disproportionately benefit from improvements to air quality. Prevalence of taxi trade in 55+ years age category leads to a disproportionate financial impact of charging under the CAZ Benchmark and the cost of upgrade under the Investment-led Plan through the alignment of emission standards. The Investment -led Plan (QR delay) will result in the benefits and disbenefits occurring later (in 2026 instead of 2025) but no other changes will be experienced.
Sex	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	Majority of individuals in scope for funds likely to be male, related to prevalence of males in driving roles. Benefit from funds but face impacts to affordability by cost gap in relation to the taxi trade. Delays to the implementation of Queens Road would not have any additional equality impacts on this group.
Disability	**Yes**	**Yes**	**Yes**	**None**	**Yes**	**None**	People with certain disabilities or long-term health conditions (particularly if these relate to respiratory problems) are likely to be more sensitive to changes in air quality and will benefit more quickly from improvements in air quality. The Investment-led Plan can be delivered sooner than the CAZ Benchmark, reducing exposure to harmful pollutants albeit the Investment-led Plan (QR delay) delivers benefits later compared to the original Investment-led Plan. People with disabilities are more likely to be reliant on taxis and community transport which are at risk of costs incurred by a CAZ Benchmark.

	CAZ Benchmark		Investment-led Plan (QR delay)		Investment-led Plan		Comments
Protected Characteristic	**Positive Impact**	**Adverse Impact**	**Positive Impact**	**Adverse Impact**	**Positive Impact**	**Adverse Impact**	
Ethnicity	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	Areas of poor air quality in GM often correlate with low-income communities. These communities often have greater populations of people from minority ethnic backgrounds with poorer reported health outcomes. Prevalence of ethnic minority background among taxi trade. This group would benefit from Investment-led Plan Clean Taxi Fund but face impacts on affordability due to cost gap. These impacts would be unchanged in an Investment-led Plan (QR delay) scenario. Ethnic minorities are more likely to rely on public transport – any additional cost to customer passed down from CAZ Benchmark would therefore disproportionately impact this group. The Investment-led Plan can be delivered sooner than the CAZ Benchmark, reducing exposure to harmful pollutants albeit the Investment-led Plan (QR delay) delivers benefits later compared to the original Investment-led Plan.
Religion / faith	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	Intersectionality with ethnicity. Individuals of Sikh, Muslim and Hindu faiths face similar impacts as outlined above. The Investment-led Plan can be delivered sooner than the CAZ Benchmark, reducing exposure to harmful pollutants albeit the Investment-led Plan (QR delay) delivers benefits later compared to the original Investment-led Plan.
Pregnancy / maternity	**Yes**	**None**	**Yes**	**None**	**Yes**	**None**	Expectant parents and babies in utero benefit disproportionately from improvements in air quality. The Investment-led Plan can be delivered sooner than the CAZ Benchmark, reducing exposure to harmful pollutants albeit the Investment-led Plan (QR delay) delivers benefits later compared to the original Investment-led Plan.
Low-income	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	Low-income households likely to live in areas of poor air quality and disproportionately benefit from improvements. Low-income owners of non-compliant vehicles face additional financial impact from charging and cost gap. Low-income households are less likely to own a vehicle and therefore are more likely to rely on public

	CAZ Benchmark		Investment-led Plan (QR delay)		Investment-led Plan		Comments
Protected Characteristic	**Positive Impact**	**Adverse Impact**	**Positive Impact**	**Adverse Impact**	**Positive Impact**	**Adverse Impact**	
							transport – additional cost to customer passed down from CAZ Benchmark would also disproportionately impact this group. The Investment-led Plan can be delivered sooner than the CAZ Benchmark, reducing exposure to harmful pollutants albeit the Investment-led Plan (QR delay) delivers benefits later compared to the original Investment-led Plan.
Carers	**Yes**	**Yes**	**Yes**	**None**	**Yes**	**None**	Carers likely to be older – disproportionate benefit from improvements in air quality. Individuals likely to be low-income and reliant on public transport and taxi. At risk of costs incurred as a result of the CAZ Benchmark with potential for additional costs associated with vehicle modifications to support transit of patients. The Investment-led Plan can be delivered sooner than the CAZ Benchmark, reducing exposure to harmful pollutants albeit the Investment-led Plan (QR delay) delivers benefits later compared to the original Investment-led Plan.

8.1.5 As shown in **Table 9**, the Investment-led Plan (QR delay) does not materially alter the impacts on protected characteristic groups as compared to the original Investment-led Plan. Whilst it is recognised that air quality benefits associated with the Investment-led Plan (QR delay) will be delivered later than originally planned, this will still be in advance of a CAZ Benchmark, which is not considered likely to 'go-live' until July 2026.

9 Analytical Assurance

9.1.1 The Queens Road depot electrification delay and M602 speed limit removal does not impact the conclusions of the Analytical Assurance Statement (AAS) with reference to a 2026 compliance year, in terms of:

- reasonableness of the analysis / scope for challenge; or
- risk of error / robustness of the analysis.

9.1.2 This is due to the 2026 scenarios remaining unchanged, with the exception of the M602 speed limit removal which has been shown through modelling to have minimal impact, and the methods used to derive the modelled assessments remaining consistent with those presented in the Appraisal Report and supporting documentation.

9.1.3 The AAS also comments on the level of inherent uncertainty (i.e. at the beginning of the analysis) and whether the analysis has reduced the level of uncertainty (i.e. what is the level of residual uncertainty remaining at the end of the analysis).

9.1.4 Even with the delay to the electrification of Queens Road depot and the M602 speed limit removal, the Investment-led Plan is the only option tested which passes the legal direction that the 10 GM Authorities must comply with to deliver compliance in the shortest possible time and by 2026 at the latest.

9.1.5 Assured against a 2026 compliance year, the Investment-led Plan has less uncertainty of achieving compliance because the core elements are planned to be delivered ahead of 2026, reducing uncertainty associated with programme delivery risk.

9.1.6 Also, the Investment-led Plan, assessed against a 2026 compliance year, provides additional resilience because:

- There is increased headroom (between modelled concentrations and the legal limit) in 2026 at those locations which were the last points of exceedance to be resolved by the Investment-led Plan in 2025, due to air quality improvements associated with natural fleet upgrades; and
- ZEBs will not be required to be operated from an electrified Queens Road depot for the full year of 2026 to achieve compliance, adding delivery resilience to the ability of the Investment-led Plan to achieve compliance in 2026.

10 Risks and Mitigation – Queen Road Depot Electrification

10.1.1 An overview of risk management across the Investment-led Plan is reported in Section 5.8 of the *Appraisal Report*.

10.1.2 This section provides an overview of the high level risks identified to the electrification of Queens Road depot. The proposed approaches to risk mitigation are set out in **Table 10** below.

10.1.3 TfGM will be responsible for delivering the electrification of Queen Road depot. The comprehensive strategy to mitigate and manage these risks will be detailed as part of the Queens Road Depot project risk register.

Table 10 Queens Road Depot – Identified Risks and Mitigation

Risk	Description	Mitigation
Limited footprint within a listed building	Limited space restricts the available work area while keeping bus operations running.	Create a phasing plan to determine necessary working space and any additional area required, then look for appropriate sites. Establish provisional area designated for parking and / or storage throughout the construction phase.
	Electrification necessitates moving operational equipment like fuelling and washes, posing a challenge to sequence this while keeping operations running.	Develop phasing plan to agree working space needed and if temporary alternative facilities needed.
Condition of listed building / site	Hidden Structural Defects and unexpected conditions.	Additional surveys in Oct - Dec 24 to confirm.
	Current electrical systems are inadequate, and extra work will be necessary to meet the new supply requirements.	Further survey of existing electrical circuits to establish essential works to make satisfactory. Survey in Oct - Dec 24 to confirm.
Fire Risks	Extra measures required to detect, control, and minimize fire hazards.	Undertake Fire Risk Assessment and Mitigation. Additional survey in Oct - Dec 24
Listed building consents and approvals	Grade 2 Listed status might require a Planning Application, Listed Building Consent, and Building Control approval.	Early and ongoing liaison with local authority to determine if the work requires approval and ensure approval process commences promptly.

11 Summary

11.1.1 The *Appraisal Report* and supporting material for these developments considered GM proposals for an Investment-led Plan that could achieve compliance in 2025.

11.1.2 However, in the process of preparing the *Appraisal Report* and supporting material for these developments, an identified risk "Delays to bus depot electrification" materialised and there is now a delivery delay in the electrification of Queens Road depot. National Highways also advised that the temporary speed limit on the M602, also in the Investment-led Plan modelling assumptions, is to be removed.

11.1.3 This Supplementary Appraisal Report considers the implications on the date of compliance associated with these matters and provides a comparative appraisal of the Investment-led Plan and the CAZ Benchmark.

11.1.4 Taking into account the speed limit removal and the delay to the delivery of Queens Road depot electrification, the GM Authorities remain able to demonstrate, based on modelling conducted to date, that the Investment-led Plan will deliver compliance the shortest possible time and by 2026 at the latest. If the Queens Road depot is electrified earlier than currently assumed, then NO_2 benefits would be delivered ahead of 2026.

11.1.5 Any changes associated with the Queens Road depot delay and the M602 speed limit removal will not have a material impact on the modelling for the compliance of a CAZ Benchmark and modelling showing that the CAZ Benchmark does not achieve compliance in 2025 or 2026 remains valid.

11.1.6 The changes associated with the Queens Road depot delay and the M602 speed limit removal do not alter the VfM conclusion that, taking account of the primary CSFs in the context of the expected scenario benefits in addition to anticipated economy, social and environmental benefits from an Investment-led Plan and the CAZ Benchmark weighed against the forecast costs of both scenarios, the Investment-led Plan would deliver a higher VfM relative to the CAZ Benchmark scenario. Given that the Investment-led Plan delivers the primary aim of achieving air quality compliance in the shortest possible time and has been previously identified as the lowest cost scenario to do so, it is therefore considered to represent VfM.

11.1.7 From an equality perspective, the Investment-led Plan would continue to deliver an air quality improvement that benefits individuals with protected characteristics albeit the full benefit would be spread across 2025 and 2026. Comparatively, the air quality improvement would remain faster for the Investment-led Plan than the CAZ Benchmark due to the former achieving compliance earlier and being able to implement the Investment-led Plan earlier. The changes associated with the Queens Road depot delay and the M602 speed limit removal do not change the following equality conclusions:

- Under the Investment-led Plan, the adverse financial impact on protected characteristic groups is to a lesser extent than the CAZ Benchmark.

- The Investment-led Plan reduces the risk to health, jobs, livelihoods and businesses compared to a CAZ Benchmark

11.1.8 There is no anticipated cost impact as a result of the Queens Road depot electrification delay and the M602 issue on the Investment-led Plan and GM is confident it can deliver its Plan as set out in the *Appraisal Report*, subject to a decision from government.

11.1.9 GM therefore considers that the Investment-led Plan delivers compliance in the shortest possible time and ahead of a CAZ Benchmark and this is sufficiently evidenced in this submission documentation to proceed with the implementation of this proposal.

11.1.10 The supplementary comparative appraisal demonstrates that the Investment-led Plan performs better against the CSFs than the CAZ Benchmark. Fundamentally, the Investment-led Plan meets the requirements of the Determining CSF, delivering compliance in the shortest possible time and by 2026 at the latest. By contrast, modelled compliance is not achieved in either 2025 or 2026 under the CAZ Benchmark which thus fails against the Determining CSF.

11.1.11 The Investment-led Plan performs better than the CAZ Benchmark against the Primary CSFs in that it delivers greater reductions in NO2 exceedances in each year, and does so earlier than the CAZ Benchmark. However, both the Investment-led Plan and the CAZ Benchmark are considered to be feasible on the basis that the GM Authorities have the relevant legal powers and a clear governance route to implement either scenario (drawing on prior knowledge, in respect of the CAZ and the vehicle funds, assembled from the development activity undertaken on the Previous GM CAP).

11.1.12 The Investment-led Plan also performs better than the CAZ Benchmark against the Secondary CSFs. It is a better strategic fit in terms of air quality and climate change (delivering greater air quality benefits), transport (providing additional cleaner buses that will continue to give benefits after compliance is achieved), growth and economy (by not imposing charges on users it removes the risk of restricting growth or damaging businesses). It is better VfM than the CAZ Benchmark, delivering better air quality benefits at a lower cost, and its distributional health benefits, affordability for users and quality of life impacts are preferable to the CAZ Benchmark. Finally, the Investment-led Plan is considered more affordable and therefore more deliverable than the CAZ Benchmark.

11.1.13 The Investment-led Plan is the only option tested which passes the legal requirement placed on the 10 GM Authorities to deliver compliance in the shortest possible time and by 2026 at the latest.

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