

GREATER MANCHESTER LOW-EMISSION STRATEGY AND AIR QUALITY ACTION PLAN

PUBLIC CONSULTATION



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INTRODUCTION

Air quality and carbon emissions are two of the key challenges facing Greater Manchester. There is strong evidence that air pollution and greenhouse gases, in particular carbon dioxide (CO₂), cause significant harm to the environment and to the health of our communities, and can damage our economy.

Both short- and long-term exposure to air pollutants can affect people's health, with poor air quality a contributory factor in respiratory illness, cardiovascular disease and some cancers. Climate change is one of the most important issues on the world agenda; while national governments reached an agreement in Paris in December 2015 on limiting climate change, regional and local government – along with a wide range of public and private sector organisations – have a responsibility to tackle carbon emissions.

Nitrogen oxides (NO_x), specifically nitrogen dioxide (NO₂), and particulates (PM) are the air pollutants causing most concern. The UK Government accepts that many urban areas, including Greater Manchester, will not meet EU legal limits for airborne NO₂ levels until 2020 under current air quality plans. Greater Manchester also aims to develop a leading UK low carbon economy and set demanding carbon reduction targets in the Greater Manchester Strategy 2013-2020.

Greater Manchester already has an Air Quality Strategy and Action Plan and Climate Change Strategy and progress has been made in reducing emissions and improving air quality. NO₂ levels and carbon emissions in Greater Manchester are falling and are forecasted to continue to fall but, without additional action, they will not meet the necessary limits and targets in the near future and will continue to pose serious health, environmental and economic challenges for the city region.

Public consultation on the Greater Manchester Combined Authority's (GMCA) new Climate Change Implementation Plan was completed late in 2015. It focuses on measures to reduce energy usage to help meet Greater Manchester's target of reducing carbon emissions to 48% of 1990 levels by 2020.

GMCA is now consulting on its draft new Low-Emission Strategy and Air Quality Action Plan which complement the Climate Change Strategy and Implementation Plan.

Greater Manchester road transport accounts for 75% of NO_x and 81% of PM emissions, along with 32% of CO₂ emissions. In this context, the Greater Manchester

Low-Emission Strategy and Air Quality Action Plan concentrate on programmes and initiatives to address emissions from road transport in order to improve air quality and to contribute to a reduction in CO₂ emissions in line with the Climate Change Strategy and Implementation Plan.

Consultation workshops were held in 2015 with major stakeholders including Greater Manchester's 10 local authorities, Transport for Greater Manchester, Highways England and Public Health England to help develop ideas and gain feedback on the initial draft of the Low-Emission Strategy and Air Quality Action Plan.

The following strategy and plan documents propose a range of policies and measures to reduce air pollution as a contributor to ill-health in Greater Manchester; support the UK Government in meeting EU air quality thresholds; contribute to a reduction in Greater Manchester's carbon footprint; and encourage low-emission behaviours in the culture and lifestyles of the city region.

As Greater Manchester's economy and population grow there is increased demand for public and private transport and for movement of goods. The need to achieve tough targets for air quality improvement and carbon reduction in these circumstances will require the collective commitment from a range of organisations and potentially radical solutions to support Greater Manchester's wider economic, social and environmental ambitions, and ensure its continued development as one of the UK's foremost city regions.

As the lead organisation for the consultation, Transport for Greater Manchester is now seeking the views of partners, stakeholders and the public on the draft Low-Emission Strategy and Air Quality Action Plan.

Feedback can be given using the online form at www.tfgm.com/GMLES.

The consultation opens 4 March 2016 and closes on 29 April 2016 and comments will be taken into consideration before the Greater Manchester Low-Emission Strategy and Air Quality Action Plan are finalised later in 2016.

For further information on the draft strategy and plan, please contact GMLES@tfgm.com.

GREATER MANCHESTER LOW-EMISSION STRATEGY



1 INTRODUCTION

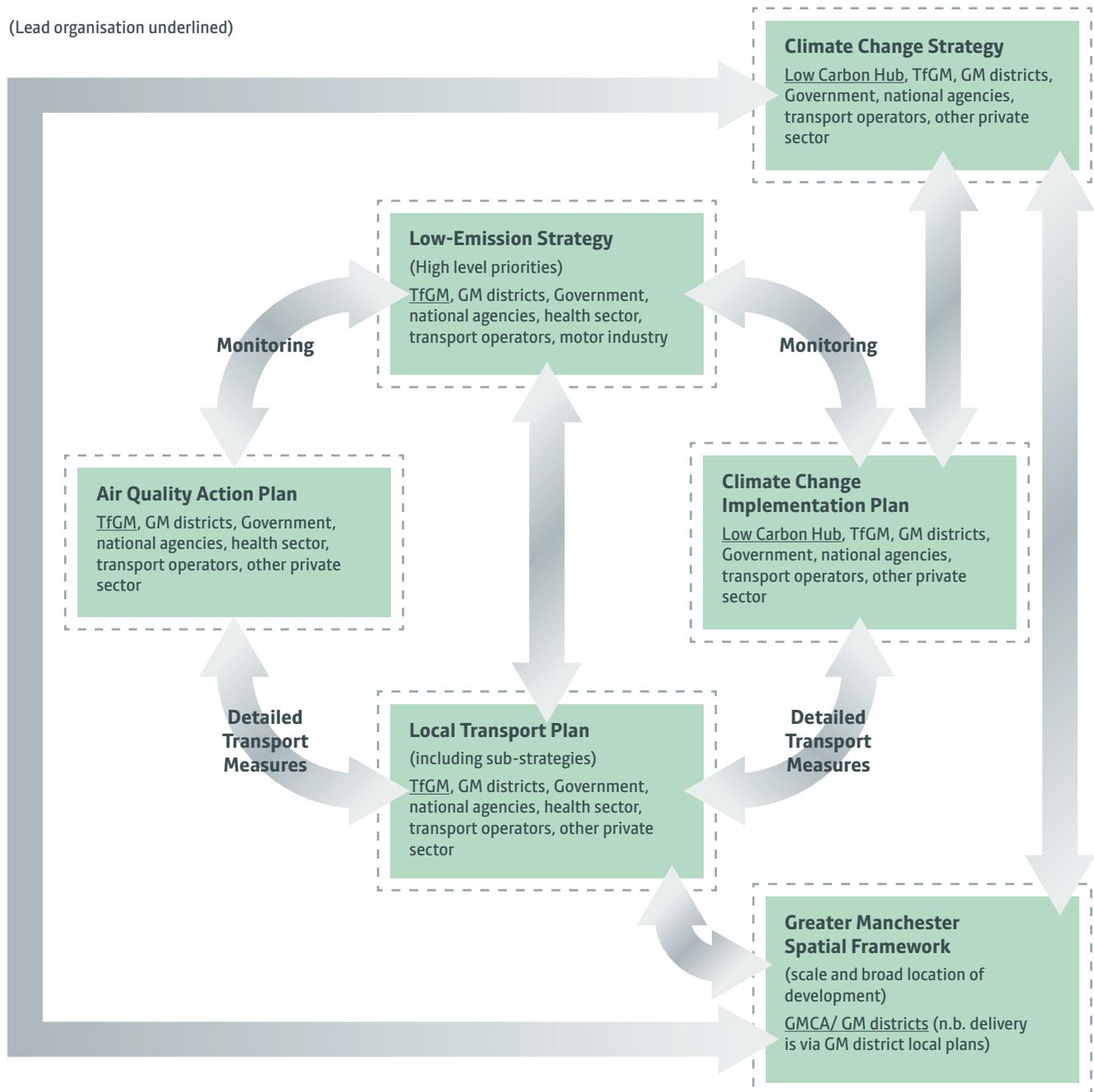
- 1.1 Greater Manchester already has both a Climate Change Strategy, aimed at tackling carbon emissions, and an Air Quality Strategy and Action Plan aimed at reducing major pollutants. Since both problems relate largely to the burning of fossil fuels, solutions to both are interlinked, particularly as transport is the major source of air pollution and a major contributor to carbon emissions.
- 1.2 While both strategies have made progress in reducing emissions, much more needs to be done. To meet our stringent targets we need to prioritise investment in the policies and actions that will have the greatest impact, both in the long and short term. We also need to avoid actions which improve one type of emission at the expense of others. For example, diesel cars, with their lower fuel consumption, were promoted as beneficial for carbon but have proved detrimental to air quality. Conversely, some types of particulate filters are effective in improving air quality but increase fuel consumption and therefore carbon emissions.
- 1.3 This 'Low-Emission Strategy' takes a long-term integrated approach to carbon emissions and air quality in the period up to 2040, allowing us to focus investment to greatest effect. It establishes a framework within which we will develop detailed action plans to reduce carbon emissions and improve air quality.
- 1.4 **The aims of this strategy are to:**
- Support the UK Government in meeting all EU thresholds for key pollutants at the earliest date;
 - Contribute to reducing Greater Manchester's carbon footprint, in line with the Greater Manchester Climate Change Strategy and Implementation Plan; and
 - Reduce air pollution as a contributor to ill-health in Greater Manchester.

Relationship with Other Strategies

- 1.5 Greater Manchester's well-established Climate Change Strategy focuses on reducing usage, rather than emissions, through improving the energy efficiency of buildings, maximising opportunities for renewable energy, changing lifestyles, patterns of production and consumption and using energy and resources more efficiently in the production of goods and services. These measures are not repeated here. **This Low-Emission Strategy aims to focus on those aspects of carbon reduction which have the greatest synergy with improving air quality, namely emissions from transport.**
- 1.6 The Low-Emission Strategy aims to identify priority actions which can be developed in more detail and included not only in the Climate Change Implementation Plan and the Air Quality Action Plan but in the Local Transport Plan (LTP), draft Freight and Logistics Strategy and any accompanying sub-strategies. Given transport's contribution to emissions, the solutions need to be embedded in, and shape the direction of, our long-term transport strategy to 2040 and be cognisant of Greater Manchester's climate change targets. The transport strategy will itself influence, and be influenced by, the scale and location of new development set out in the Greater Manchester Spatial Framework. This is shown diagrammatically in Figure 1, which also shows the range of organisations that will need to be involved in delivery and highlights the lead responsibility.

Figure 1: Relationship with Other Strategies

(Lead organisation underlined)



2 BACKGROUND

- 2.1 Air pollution and carbon emissions cause significant harm to health and the environment and, as a result, have an adverse impact on the economy. Climate change is one of the greatest challenges facing the world today and there is strong evidence that man-made emissions of greenhouse gases, particularly CO₂, are the main cause. The predicted impact of climate change is well understood: North West England can expect to experience warmer, drier summers impacting on water supply and soil shrinkage/subsidence, and warmer, wetter winters with increased flood risk from rivers and surface runoff. More extreme weather patterns are likely, with more intense rainstorms, heatwaves and droughts. In addition, climate change will impact on the behaviour and distribution of species and may encourage the spread of invasive species. It is also expected to change patterns of human settlement and travels.

Health Impacts

- 2.2 Poor air quality has a real and significant effect on people's lives, contributing to bronchitis, asthma and other respiratory illness, as well as cardiovascular problems and cancer. Long-term exposure to air pollution is understood to be a contributory factor in deaths from respiratory and cardiovascular disease. It is likely that air pollution contributes a small amount to the deaths of a large number of people, rather than being the sole cause of the death of individuals. This health burden is estimated as an effect on annual mortality in the UK equivalent to around 29,000 deaths (2008 figures), with the estimate for Greater Manchester being over 1,000¹. This mortality effect of air pollution is now included as an indicator in the national Public Health Outcomes Framework².
- 2.3 Short-term exposure to poor air quality can also have health effects. Some groups are at greater risk of symptoms, particularly adults and children with heart or lung problems, and public health advice is now included with the national Daily Air Quality Index³.
- 2.4 As a result of climate change, heat-related deaths are forecast to increase steeply in the UK, with the elderly population particularly vulnerable⁴. The impact of climate change will therefore be amplified by the ageing population. Levels of ozone, which is a respiratory irritant, will also increase, while changes in the seasons, temperature and weather patterns may also have an impact on exposure to pollen, therefore increasing allergies.

Economic Impacts

- 2.5 As well as the human cost of emissions, there is an indirect impact on the economy as a whole: health problems affect the ability to work and contribute to low productivity. The National Air Quality Strategy (DEFRA 2007) stated that poor air quality costs society between £8.5 billion and £20.2 billion a year. This impact is seen as comparable to those relating to physical inactivity at £10.7 billion and alcohol misuse at £12-£18 billion (Commons Select Committee 2010). Air pollution also has wide-ranging environmental impacts, including loss of biodiversity and reduced crop yields.

1 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/332854/PHE_CRCE_010.pdf

2 PHOF indicator 3.1: Fraction of all-cause adult mortality attributable to long-term exposure to current levels of anthropogenic particulate air pollution'. <https://www.gov.uk/government/collections/public-health-outcomes-framework>

3 <http://uk-air.defra.gov.uk/>

4 Health impacts of Climate Change in the UK, Health Protection Agency, 2012

- 2.6 The 'Mini-Stern' review for Manchester⁵ concluded that, by not exploiting opportunities and mitigating effectively against climate change, the Greater Manchester economy could lose £20 billion by 2020. This would mean Greater Manchester falling short of its economic and regeneration goals.

National Policy

- 2.7 The European Ambient Air Quality Directive 2008 (2008/50/EC) sets legally binding limits for key pollutants in the air we breathe outdoors, based on World Health Organisation recommendations. Countries that are part of the EU must meet these limit values by a given date and the UK Government has therefore set national standards which local authorities must work to achieve. Local Authorities therefore have a statutory duty, under the provisions of the Environment Act 1995, the National Air Quality Strategy 2000 and Air Quality Regulations, to review and assess air quality against these standards.
- 2.8 The main pollutants of concern in the UK are oxides of nitrogen, principally nitrogen dioxide (NO₂), and particulates (PM). The UK accepts that, under its current air quality plans, most major urban areas, including Greater Manchester, will not meet legal limits for NO₂ pollution until 2020. As a result, the EC has formally launched legal proceedings against the UK, which could result in fines, potentially costing millions of pounds. This process may take several years to complete and all parties are working together to try to ensure compliance as soon as possible. To this end the Commission has stated that it would like "...to achieve full compliance with existing air quality standards by 2020 at the latest".
- 2.9 There is a similar policy commitment to reduce carbon emissions in response to concerns about climate change. In line with international frameworks and targets, including the UNFCC Kyoto Protocol, the EU has committed to reduce carbon emissions by 20% (relative to 1990) by 2020. At the national level, the UK's Climate Change Act 2008 included the obligation to reduce national greenhouse gas emissions by 80%, relative to 1990, by 2050. It also sets legally binding carbon budgets between now and 2020.

Greater Manchester Policy

- 2.10 The Greater Manchester Strategy sets out a vision for achieving the considerable growth potential of the conurbation and enabling its residents to access the opportunities that growth presents. This is vital both in terms of increasing our contribution to the UK economic recovery and reducing the inequality which holds back productivity locally through higher than average levels of worklessness and low levels of economic activity.
- 2.11 Greater Manchester's population is growing rapidly and is expected to grow from 2.7 million people to at least 3 million by 2040. The Greater Manchester Spatial Framework is currently in development, and will set the scale and distribution of housing and employment growth across Greater Manchester to support delivery of significant levels of growth over the next 20 years. GMSF is currently considering a range of growth options. However, it is expected that in the period to 2035, Greater Manchester will need at least 210,000 new homes, at least 2,400,000m² of additional office space and at least 3,450,000m² of additional industrial and warehousing space.
- 2.12 This increased activity will inevitably increase the demand for travel, particularly with better transport links proposed across the north of England, to support the 'Northern Powerhouse'.
- 2.13 Greater Manchester aspires to lead the way in developing a low-carbon economy, and has therefore set an ambitious carbon reduction target in the Greater Manchester Strategy of a 48% reduction of 1990 levels by 2020 (this requires a 41% reduction from 2005 levels). There is also a commitment to improving air quality, with the declaration of an Air Quality Management Area in 2006. Both NO₂ and CO₂ levels are key performance indicators in the Local Transport Plan.

5 Assessing the economic impact of EU and UK climate change legislation on Manchester City region and the North West, Deloitte, 2008

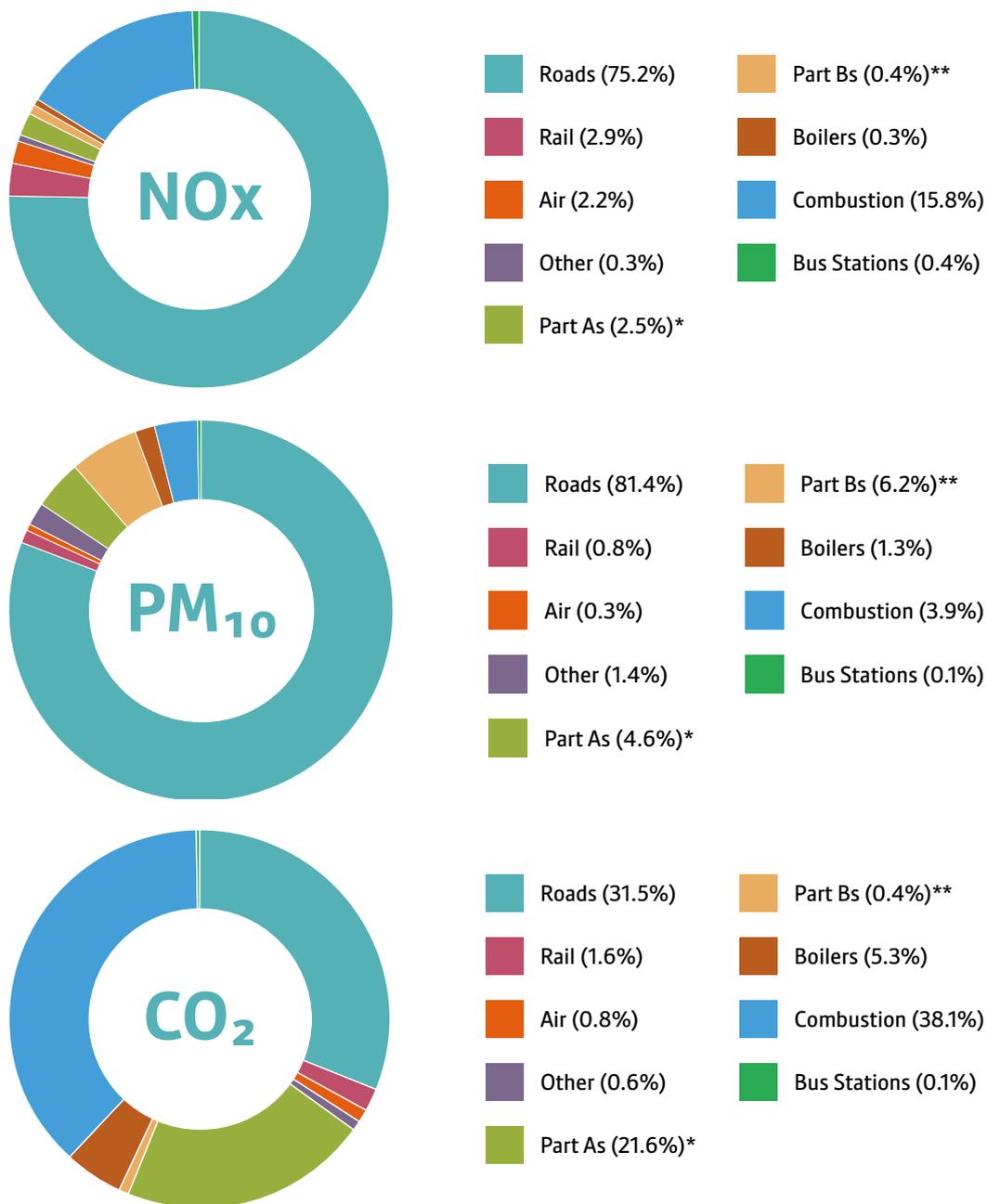
- 2.14 There is a particular need to improve health in the conurbation, which has some of the lowest life expectancy at birth in England for both men and women. In 2012, 150,000 people in Greater Manchester were claiming either Incapacity Benefit or its successor, Employment and Support Allowance. The inability to work not only impacts on those individuals' life chances, but also reduces Greater Manchester's productivity and increases the public cost of benefits.
- 2.15 Concentration of growth in urban areas like Greater Manchester is likely to be the most sustainable option, because they can support extensive public transport networks and, with facilities located relatively close to home, they offer the potential to make many essential trips by bike or on foot. However, this concentration of activity can also expose more people to poor air quality.
- 2.16 **The need to achieve very challenging targets for both carbon and NO₂ in the context of a growing economy means that a concerted effort, potentially requiring radical actions, is needed by all parties to reduce emissions.**

3 EMISSIONS IN GREATER MANCHESTER

Source of the Problem

3.1 In Greater Manchester road transport contributes 75% of emissions of nitrogen oxides and 81% of particulates. It also accounts for 32% of carbon dioxide emissions. The proportions of emissions from all sources are shown in Figure 2.

Figure 2: Emissions in Greater Manchester, 2010. Source: Emissions Inventory for Greater Manchester (EMIGMA)



*Part As - Installations regulated by Environment Agency

**Part Bs - Installations regulated by local authorities

- 3.2 As might be expected from the volumes of traffic carried, Table 1 below shows that major roads are the largest source of transport emissions in Greater Manchester, although motorways are also very significant, particularly for NO_x. The Emissions Inventory from which the figures are taken is based on national fleet composition, so there may be local differences, for example, particulate emissions in Greater Manchester are higher than national data.

Table 1: Road Transport Sources (Tonnes/Year), 2010 (Emissions Inventory for Greater Manchester - EMIGMA)

Pollutant	Motorways	Other Major Roads	Minor Roads	Other*	Total
Carbon	385,231	574,877	35,083	21,843	1,017,034
NO _x	5,039	6,852	364	621	12,876
PM ₁₀	558	788	54	66	1467

* includes extra emissions from starting up/cooling down engines and combustion of waste lubricants

- 3.3 Tables 2 and 3 below show how different road vehicles contribute to each type of emission. On both motorways and major roads, OGVs (all large goods vehicles) contribute the greatest proportion of the NO_x emissions, followed by cars. However, OGVs represent only about 11% of the vehicle kilometres travelled on motorways and 4% on other major roads, which means that their contribution to NO_x emissions is disproportionately large. This is also true of buses on major roads.

Table 2: Motorway Emissions by Vehicle Type 2010 (EMIGMA)

Emission Type	Cars		LGVs		OGVs		Buses	
	% of total emissions	% of total traffic	% of total emissions	% of total traffic	% of total emissions	% of total traffic	% of total emissions	% of total traffic
NO _x	33	75	13	13	52	11	1	<1
PM ₁₀	59		16		24		<1	
Carbon	49		13		37		<1	

Table 3: Major Road Emissions by Vehicle Type 2010 (EMIGMA)

Emission Type	Cars		LGVs		OGVs		Buses	
	% of total emissions	% of total traffic	% of total emissions	% of total traffic	% of total emissions	% of total traffic	% of total emissions	% of total traffic
NO _x	37	83	14	12	38	4	11	1
PM ₁₀	66		15		15		3	
Carbon	60		13		22		4	

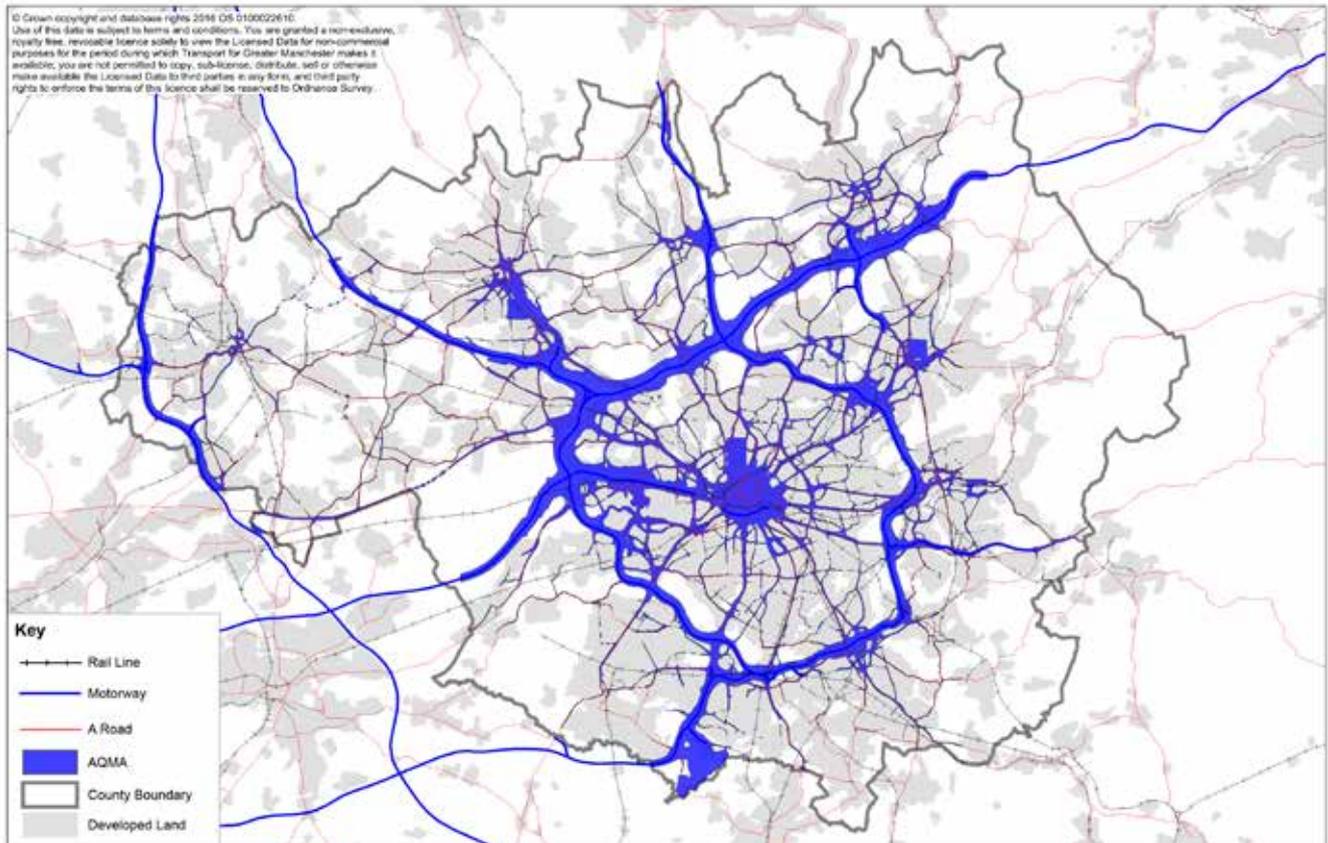
- 3.4 For carbon and particulates, cars are the main source of emissions. Goods vehicles are also significant, but buses make a relatively small contribution overall.

- 3.5 **Transport is by far the biggest source of NO₂ and PM₁₀ emissions and is a major contributor to carbon emissions. Goods vehicles and buses make a disproportionate contribution to NO₂ emissions.**

Scale of the Problem

- 3.6 Greater Manchester is one of a number of major UK conurbations where NO₂ limits are exceeded. The current AQMA, for areas where NO₂ limits are exceeded, is shown below in Figure 3.

Figure 3: Greater Manchester Air Quality Management Area



- 3.7 Given the contribution of transport to emissions, it is not surprising that the AQMA reflects the location of the motorways, major roads and urban areas. In terms of the effect on people, this is greatest where high density residential areas coincide with major highways.
- 3.8 Recent modelling⁶ shows that this AQMA is reducing in size due to falling NO_x emissions, but measurements in some areas, particularly those close to the M60, show that concentrations of NO₂ experienced at the roadside have not gone down as expected. This is thought to be largely due to diesel cars having higher emissions 'in the real world' than was anticipated and the fact that there are now more of them on the road.
- 3.9 NO_x emissions are expected to decline sharply in the UK in the period up to 2020, as more Euro VI engines enter fleets. Table 4 below shows that:
- Petrol engines will contribute very little to NO_x emissions after 2015
 - The performance of diesel cars will only improve slightly over the period
 - Emissions from HGVs will fall dramatically by 2020, as haulage and logistics companies replace their vehicles every 5-7 years.
- 3.10 However, this will not be sufficient to meet EU limits. As with other major urban areas in the UK, Greater Manchester is not forecast to comply until 2020 unless additional action is taken.

6 The Greater Manchester Emissions Inventory 2010 Update, HFAS Report 1750, June 2013

3.11 Table 4: Fleet-weighted emission factors* on all UK roads for NO_x, (2005-2030)g km⁻¹
 (Source: derived from Defra emission factors by Clean Air Thinking, 2014)

Vehicle class	2005	2010	2015	2020	2025	2030
Artic HGVs	7.10	4.50	1.51	0.35	0.24	0.23
Rigid HGVs	5.08	3.88	2.07	0.63	0.27	0.23
Diesel LGVs	1.14	0.94	0.96	0.57	0.43	0.38
Diesel cars	0.77	0.68	0.67	0.63	0.45	0.42
Petrol cars	0.66	0.25	0.10	0.06	0.06	0.06

*Fleet-weighted emission factors accounts for the composition of a given vehicle class according to the assumed proportions of the various Euro standard compliant vehicles across the national fleet.

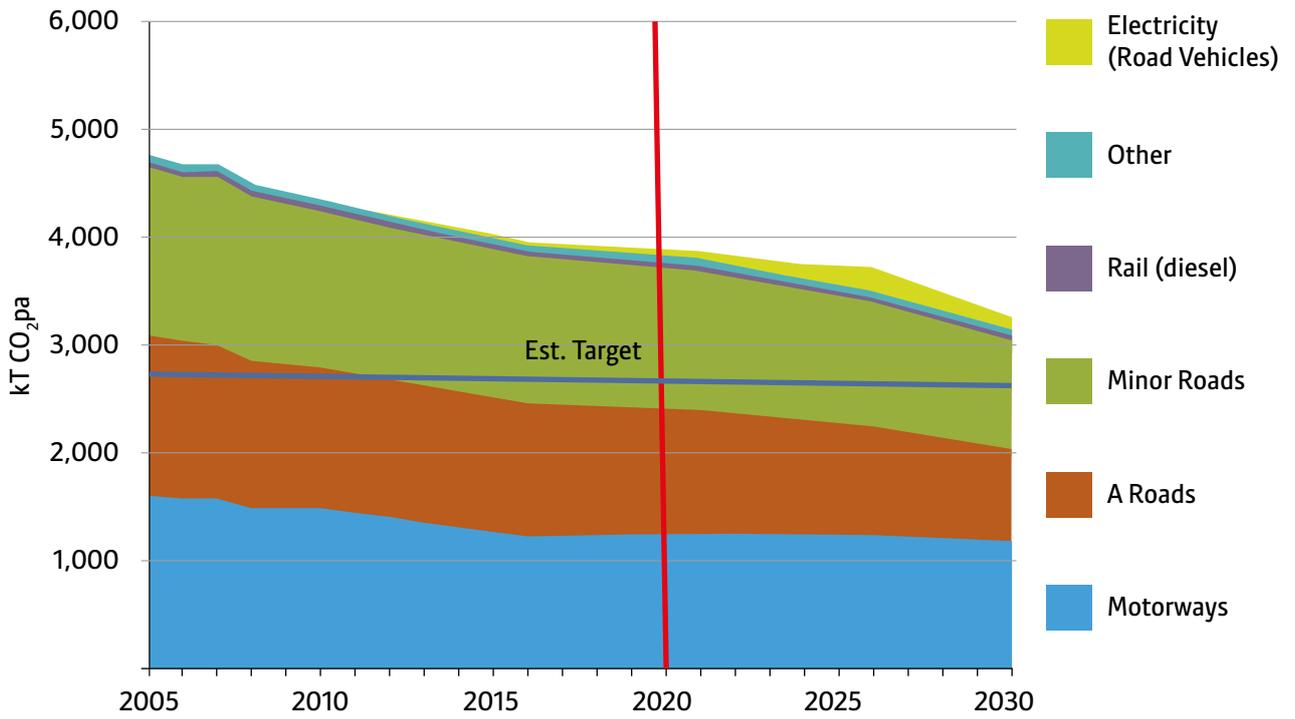
3.12 Levels of particulates have fallen but have been stable over recent years. Although EU limits for particulates are currently being met, there is an ongoing significant health impact even at lower levels. To improve the health of the population, the EU has also set a target of a 20% reduction in urban background concentrations of PM_{2.5} between 2010 and 2020. It should be noted that the direct emission of particulates from vehicle exhausts is not the only source. Significant contributions are also made by tyre and brake wear, road surface wear and the re-suspension of particles. These sources will not be improved by Euro engine standards.

3.13 Carbon emissions have fallen and this is forecast to continue due to Euro engine standards and the use of biofuels. However, as Figure 4 shows, relying on these national actions alone means we will still fall some way short of our carbon reduction target. Given the level of growth forecast, achieving greater reductions through transport will be challenging and more of the required reduction may need to come from non-transport sectors such as domestic heating and power generation. An integrated approach across transport, domestic and commercial activities will be needed to ensure the target is met.

3.14 **Although progress has been made, further measures will be needed in order to achieve our aims of meeting carbon reduction targets, complying with EU standards and reducing exposure to harmful pollution.**

Figure 4: Forecast 'Business as Usual' emissions (kT CO₂ pa) with national action

Source: Ticket to Kyoto Final Report 2014, Atkins for TfGM



4 THE WAY FORWARD

4.1 There are a large number of potential measures that will have some impact on both carbon emissions and air quality. These fall into the themes of:

- Changing travel behaviour;
- Managing emissions;
- Greening vehicle fleets; and
- Awareness-raising.

4.2 As Table 5 shows, we have made progress in introducing many of these since 2011. However, these measures have been less effective than hoped in tackling emissions, partly because their impact is dispersed across the conurbation, rather than focused on problem locations, but largely because the Euro IV and V engines have not delivered as big a reduction in emissions ‘on the road’ as was predicted in the laboratory. This is a problem for the whole of the UK. There is much greater confidence that newer Euro VI engines will deliver improvements.

Table 5: Existing Transport Measures

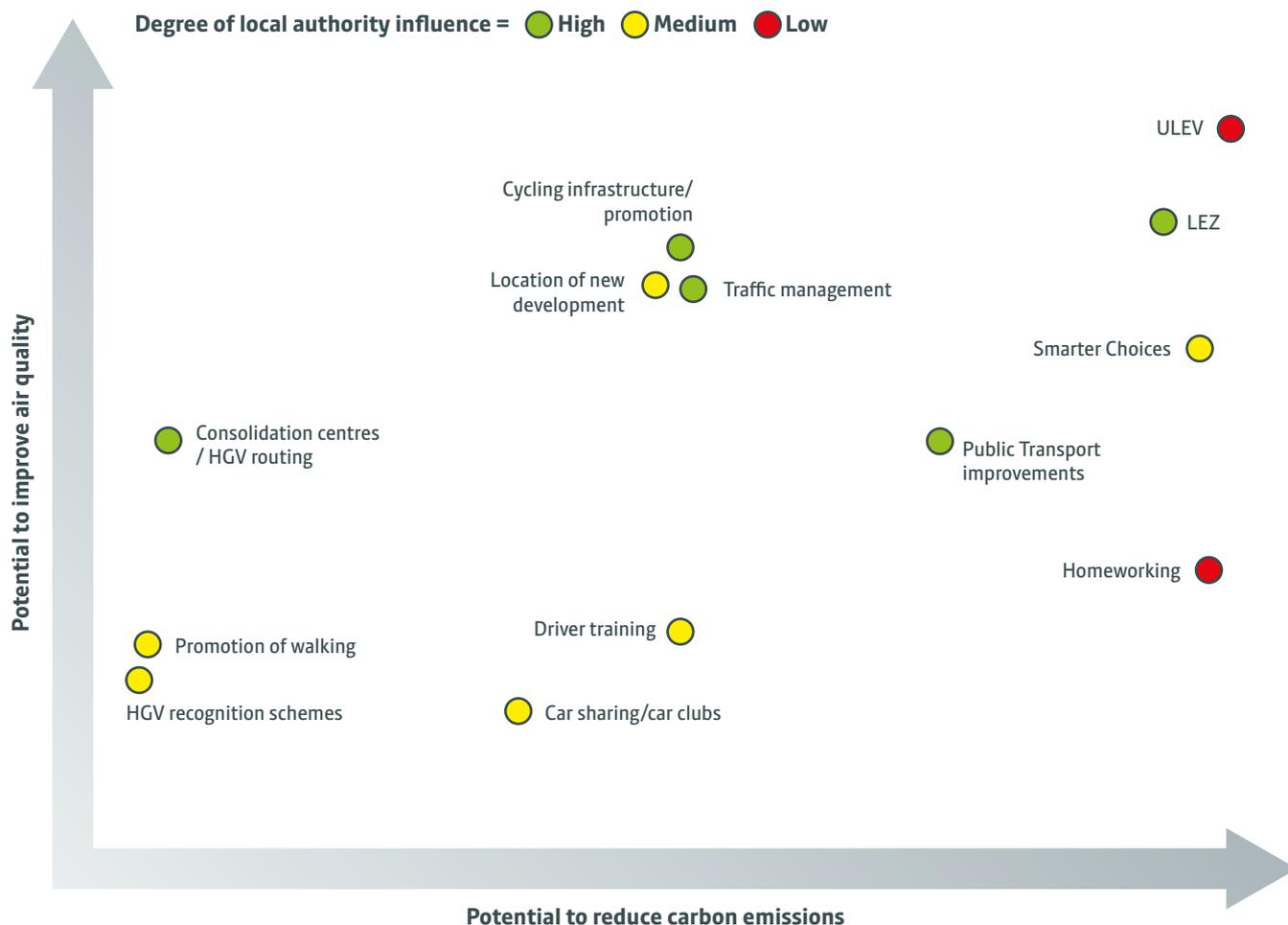
Type of Measure	Progress
Changing travel behaviour	<p>Encouraging sustainable travel through:</p> <ul style="list-style-type: none"> • A major programme to triple the size of the Metrolink network, which is zero emission at the point of use. Extensions to Oldham/Rochdale, Ashton-under-Lyne, East Didsbury and Manchester Airport are now complete, and a second line across the city centre is under construction. Consultation is underway on an extension to Trafford Park. • A very significant bus priority programme, with Cross-city Bus and the Leigh-Salford-Manchester Busway under construction (building on an earlier network of Quality Bus Corridors) and future plans for the Bolton-Manchester corridor • New interchanges, with better passenger facilities, in a number of town centres • Investment by Network Rail in electrification and the Northern Hub (increase in capacity) • An extensive cycling programme (through the Local Sustainable Transport Fund and Cycle City Ambition Grant) • Travel Choices interventions, focused on the journey to work and school • Promotion of the health benefits of walking
Managing emissions	<p>Improving network efficiency through:</p> <ul style="list-style-type: none"> • Installing Bluetooth sensors to monitor flows on key routes and enable proactive management of traffic lights to smooth flows and give priority to buses • Introducing a roadworks permit system (GMRPS) to reduce congestion • Air quality assessment of planning applications and highway schemes • Promotion of good practice in relation to highways, procurement, vehicle fleet operations, taxi licensing etc. • Bus idling enforcement in Manchester city centre

Type of Measure	Progress
Greening vehicle fleets	<p>Reducing pollution from vehicles through:</p> <ul style="list-style-type: none"> • Purchase of new low-emission vehicles through bids to Green Bus Fund/Clean Bus Technology Fund • Introduction of 200 electric vehicle charging points through 'Plugged in Places' • Specifying emission standards in bus contracts and partnership agreements
Awareness-raising	<ul style="list-style-type: none"> • Cleaner vehicles campaigns • 'Great Air Manchester' website

High Impact Measures

- 4.3 Many of the existing measures were originally developed for other reasons, e.g. reducing congestion, and will continue to be priorities within the Local Transport Plan. However, a Low-Emission Strategy needs to identify those measures which will have maximum impact on both carbon and air quality, bearing in mind the specific nature of the problem in Greater Manchester (i.e. where the problems are, which vehicles are contributing to them and how many people are affected).
- 4.4 Two sources have been used to gauge the likely impact of various measures:
- The recent pteg publication 'Air Quality in the City Regions: A Transport Toolkit', which assesses various transport measures in term of their cost, effectiveness and timescales for implementation.
 - The GM Low Carbon Metrics Study, 2014, which highlights the 11 priority projects to best reduce carbon emissions, and their public sector cost.
- 4.5 Of the measures which benefit both types of emission, we can identify a subset which is likely to have the greatest impact on both carbon and air quality. Some of these will be measures that can be taken by TfGM and the Local Authorities, but others will require action from a range of partners. Figure 5 gives a high-level indication of the relative impact of different types of measure. The impact of measures will, of course, depend on their geographical distribution and on the level of investment made. This is particularly true of behaviour change measures, which only become very effective when a significant number of people adopt them.
- 4.6 Figure 5 suggests that the most effective measures to tackle both carbon and air pollution could be Ultra-Low-Emission Vehicles, Low-Emission Zones and intensive travel choices interventions to persuade people to travel more sustainably. However, improved public transport and facilities for walking and cycling will be essential if people are to be persuaded to use these modes.
- 4.7 Planned changes to public transport, incentives to change behaviour and action to encourage cycling and walking will not decrease private car usage at the rate needed to meet carbon reduction targets. A recent analysis indicates that even if all currently proposed measures are delivered, there is still a shortfall of over 1.68 million tonnes in achieving the 2020 target. Therefore, Greater Manchester needs to rapidly deploy additional measures to decarbonise private cars to meet the shortfall.

Figure 5: Relative Impact of Measures



4.8 Public transport is a relatively efficient means of transport. Analysis by TfGM suggests that emissions per passenger kilometre in the Greater Manchester area are less than 60g CO₂/km for Metrolink, rail and buses in quality corridors (which benefit from improved flow, newer vehicles and more patronage relative to less efficient standard buses). This emission rate equates to less than half the emissions per kilometre for car travel on average.

4.9 However, the volumes of public transport passenger trips are relatively low, in line with national trends, and public transport journeys (particularly bus and Metrolink) are often relatively short. This means that the proportion of total travel accounted for by public transport is limited. This implies a limit to the scope for public transport to reduce overall transport emissions through mode switch. Even if public transport patronage doubled, abstracting all new patronage from car travel (driver and passenger), it would achieve approximately a 10% reduction in total car emissions (assuming similar average trip lengths and occupancies to those currently observed), which in turn only accounts for approximately 70% of road transport emissions. Similarly, while walking and cycling are zero-emission modes, they are mainly chosen for short trips, which means that the impact on total emissions will be relatively small.

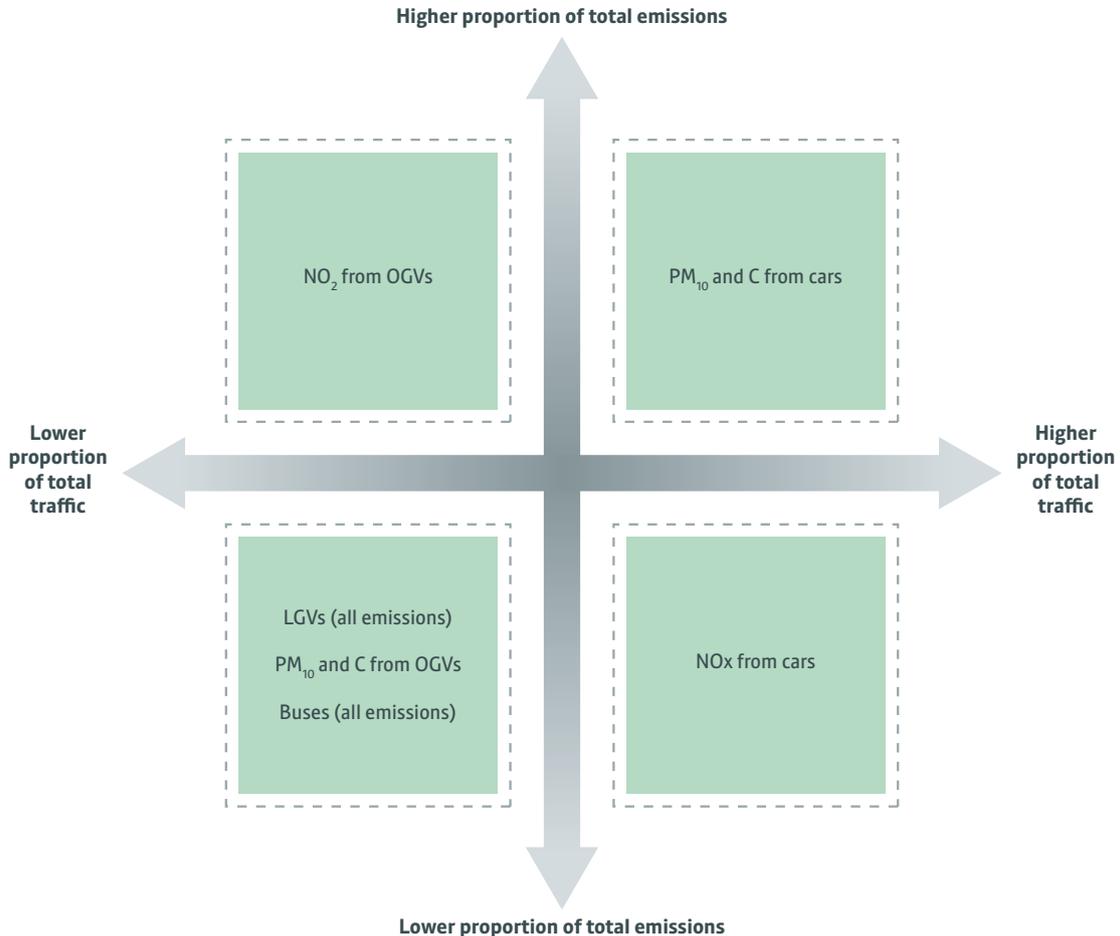
4.10 **While a mode shift to public transport, walking and cycling will reduce emissions, this will not be sufficient to meet targets without radical action to clean up vehicle engines.**

4.11 However, while cleaner vehicles are essential for significantly reduced emissions, this will require working with national bodies, vehicle manufacturers to encourage the development of cleaner engines, alternative fuels and supporting infrastructure. The role of Greater Manchester authorities will be to encourage the uptake of cleaner vehicles as they become available, through planning and traffic management policies (which can be designed to favour these vehicles) and through their own contracts.

Future Focus

- 4.12 **Given the need to meet EU limits for NO₂ as soon as possible, the short-term focus will need to be on NO₂.** Many of the measures that will help achieve this will also be of some benefit in reducing carbon and particulates, which will be the focus over the longer-term.
- 4.13 Section 3 described the contribution that different vehicle types make to each emission on motorways and major roads in Greater Manchester. This can be summarised as in Figure 6 below.
- 4.14 This shows that while OGVs make up a smaller proportion of total traffic, their contribution to emissions is proportionately higher, i.e. tackling emissions in a relatively small number of vehicles could be highly effective. While buses contribute a lower proportion of emissions and make up a small proportion of total traffic, services are concentrated on congested urban routes, particularly radials into the main centres where there is high population exposure. This means that there could be a significant benefit in tackling bus emissions in these areas.
- 4.15 The conclusion is that **while the sheer volume of car traffic means that these emissions must be tackled over the long-term, the greatest short-term impact of measures would be felt by focusing on heavy goods vehicles and on buses on key routes into town and city centres.**

Figure 6: Contribution of Vehicle Types to Emissions



5 THE STRATEGY

- 5.1 Based on the analysis in section 4, we have identified the types of measure that we believe will have the biggest impact on emissions. More work will need to be done to assess the likely scale of emissions reduction from individual measures and to develop programmes of investment for inclusion in action plans.
- 5.2 Delivery of the measures will require commitment from a range of organisations: TfGM, the Greater Manchester district councils, the health sector, Highways England, public transport and fleet operators, the Government, motor manufacturers and other private sector organisations. Given the current financial challenges facing public authorities, the level of investment that will be available is uncertain and there will need to be a sound business case for schemes before they can go forward.
- 5.3 Priority areas for future investment are as described below.

Stimulating the uptake of Ultra-Low-Emission Vehicles

- 5.4 The greatest impact on emissions will be from accelerating the replacement of older vehicles, either by offering incentives such as scrappage schemes or restricting access to sensitive areas unless vehicles comply with particular standards (see Low-Emission Zones below). However, the scale of funding that would be needed to compensate vehicle owners and operators would require a central government programme. We will need to work with other city regions to make a case to government for action in this area.
- 5.5 One barrier to buying low or ultra-low-emission vehicles is their cost, and this can only be addressed by vehicle manufacturers and the government. However, further barriers are 'range anxiety' for electric vehicles, i.e. concern about the distance that can be covered in between charging unfamiliarity with a new product and lack of fuelling infrastructure for LPG and hydrogen.
- 5.6 We can help to address this in a number of ways. Firstly, we need a major increase in the number of electric vehicle charging points. There are currently 200 publicly available points in the conurbation but a study of Lyon, which is similar in terms of size and population density, suggests that a network of some 700 publicly available points would be effective. The number of charging points in homes and businesses can also be increased through planning conditions (see below).
- 5.7 Secondly, we can increase the number of ultra-low-emission vehicles (ULEVs) in fleets where the public sector has some control. This means using joint-procurement to reduce the cost of introducing them to public sector fleets and also specifying ULEVs when car clubs are established (or existing contracts are renewed). Setting higher emission standards for hackney carriages would also be beneficial. These measures will increase the number of vehicles seen out on the street and therefore increase familiarity with them. If integrated with public transport and cycle hubs and supported by a single smart payment system, low-emission car clubs could offer an attractive alternative to car use for many people.
- 5.8 Discussions with major developers and planning condition requirements could be used to develop an alternative fuelling infrastructure network. This would be integrated with work with vehicle manufacturers and fuel suppliers to ensure both vehicle supply and fuel are available.

5.9 We will:

- Make the case to central Government for national funding to accelerate the uptake of ULEVs and submit bids where funding is available
- Work with local authorities to set stricter emission standards for taxis

- Specify low-emission vehicles in all future car club contracts
- Investigate the potential to introduce joint procurement for low-emission vehicles in the public sector
- Work with national agencies, vehicle manufacturers, fuel suppliers and developers to promote and facilitate the use of lower-emission and alternatively-fuelled vehicles.

Reducing Emissions from Heavy Goods Vehicles

- 5.10 Shifting freight from road to rail or water will reduce emissions at the national or regional level, but the final leg of the journey from the distribution centre will need to be by road. Multi-modal distribution centres may therefore increase emissions locally despite their overall benefits.
- 5.11 Fleet recognition schemes can offer an incentive to operators to improve both safety and environmental standards (through vehicle quality or through 'eco driving' training). Operators can benefit both through enhanced reputation and potentially through reduced fuel consumption. There are currently two different schemes in operation in different parts of the UK, and there is a need to evaluate these and agree a common approach with neighbouring areas, given the cross-boundary nature of most fleet movements.
- 5.12 Urban Distribution Centres (UDCs) are large-scale warehouses located at the edge of the urban area. One centre would be used by several suppliers and customers. They are used to intercept HGVs on the edge of an urban area and allow loads to be broken down for final delivery by low-emission vehicles. UDCs will not be suitable for all deliveries, as many large retail businesses, such as supermarkets, use their own lorries to deliver in bulk to stores from their national or regional distribution centres. A smaller-scale alternative is the Urban Consolidation Centre (UCC). Construction or office supplies consolidation models can be more realistic to develop whilst delivering real changes. The Oxford Road corridor in Manchester offers potential for consolidation, as it houses a concentration of higher education and medical facilities in close proximity to one another. This area has one of the highest concentrations of NO₂ and exposure of population, so the potential benefits of reducing emissions here are significant.
- 5.13 Planning conditions can be used to specify minimum standards for freight vehicles serving major new developments (see below). They can also specify the requirement for delivery and servicing plans for any new development as well as construction logistics plans to minimise impact during the construction period.
- 5.14 Given that freight is carried across local authority boundaries, it will be important to agree joint policies with neighbouring areas. For example, the M62 in Greater Manchester carries freight between Liverpool and Hull and many of the vehicles are based outside the area.

5.15 We will:

- Investigate the potential benefits of a fleet recognition scheme
- Support new rail or canal-served distribution centres subject to planning conditions
- Identify and promote the development of consolidation models at various spatial levels
- Seek to develop a common approach to freight emissions with neighbouring authorities
- Work with the industry and customers to raise awareness and actively promote sustainable distribution
- Develop toolkits and guidance to assist businesses in improving the activities of their supply chain with the aim of reducing emissions
- Work closely with other agencies such as the Driver and Vehicle Standards Agency (DVSA), the EU, universities and the Police to develop interventions which encourage safe and sustainable distribution
- Reduce congestion and improve journey-time reliability on the Key Route Network.

Reducing Emissions from Buses on Key Urban Corridors

- 5.16 As with HGVs, the greatest impact will be from replacing older buses (particularly those with Euro III or older engines) with newer vehicles, but since the lowest-emission buses are more expensive, the benefits to operators in terms of fuel savings may not be sufficient to justify the cost. Government funding support (e.g. grants through the Low-Emission Bus Scheme) is therefore required.
- 5.17 Local authorities can only fund socially necessary bus services where these would not be commercially viable. In Greater Manchester, around 19% of bus mileage is wholly or partly subsidised in this way, with services operated under contract. The service specifications include a maximum age for vehicles, which ensures that they are at least Euro III standard.
- 5.18 In addition, TfGM has introduced a voluntary bus operator's code of conduct, which all the major operators have signed and which includes targets for improving engine emission standards. This, in conjunction with previous central Government vehicle funding competitions, has contributed to a significant improvement in the fleet age profile over recent years.
- 5.19 Where bus infrastructure has improved and therefore benefits bus operators, Statutory Quality Partnerships can be agreed whereby they commit to make improvements in return. The Quality Partnership for the bus A6 corridor between Manchester and Hazel Grove set a standard for the 192 service to be Euro V and above by 1 Jan 2014. In 2013-14, 93% of observed vehicles were hybrid electric diesels, with an average age of 1.8 years. Partly as a result of all these measures, 72% of buses observed in Greater Manchester in 2013-14 were Euro IV and above, with the major operators (who run 84% of mileage) having 45% of their fleets Euro VI or hybrid.
- 5.20 However, Statutory Quality Partnerships are limited in their ability to create consistent improvements across the bus network as they are dependent upon new bus infrastructure and the commitment from bus operators to abide by specific requirements relating to frequencies, timings, fares and quality standards which include set emissions criteria. The combination of these obligations and the often disjointed nature of the current bus network in Greater Manchester means that Statutory Quality Partnerships agreements between local authorities and commercial bus operators cannot always be reached, creating uneven and inconsistent quality standards across the Greater Manchester network. The Government has committed to a Buses Bill and this legislation will increase the options available to Greater Manchester to assist with the integration and harmonisation of standards across the network. The new legislative options will include the ability for mayoral combined authorities to implement bus franchising which would allow Greater Manchester to enforce a new uniformity of standards across the bus network.

5.21 We will:

- Continue to specify minimum standards for bus vehicles used on TfGM contracts
- Set minimum standards for bus vehicles using the Cross-city Bus infrastructure and future bus priority schemes
- Utilise the Government's forthcoming bus legislation to establish consistent standards across Greater Manchester
- Identify cost-effective ways of accelerating the replacement of pre Euro IV buses.

Changing Travel Behaviour

- 5.22 Changing travel behaviour includes both moving away from car use (particularly 'driver only' trips) and reducing the number and length of journeys made by car.
- 5.23 For people to move away from car use, they need to have access to realistic alternatives. This means public transport that is integrated, affordable and takes them to where they want to go at the time they need to travel. It also means safe routes for walking and cycling, secure cycle parking and changing/showering facilities at major destinations. Where there is no realistic alternative, people need to be encouraged to car share where possible.
- 5.24 There has been major investment in public transport since 2011 (as shown in Table 5) and improvements to bus, tram and rail networks will continue. However, for many people a significant barrier to using public transport is the lack of integration, with buses, trams and trains operating as independent networks. As well as having services that provide a timely connection with other modes, we need to create a network that can be understood and used as a single facility. This will enable people to reach a wider range of destinations more easily by public transport.
- 5.25 A simple, integrated cashless payment system that can be used across all modes and will automatically calculate the best value fare for the journey will be an essential part of this. The 'get me there' smartphone app and smart card have been launched, initially for Metrolink and multi-operator bus respectively. Get me there smart ticketing solutions will continue to be developed to provide cashless payment across all three modes. Competition law restricts the extent to which commercial operators can coordinate and integrate their fare structures. The Government's forthcoming buses legislation seeks to provide new legislative options, including bus franchising, which intend to encourage simpler, integrated ticketing opportunities across the bus network.
- 5.26 Making information available, not only when planning a journey but during the journey itself, is also crucial and real-time information is being made available via smartphone apps. Knowing when a service is likely to arrive and when it is approaching the required destination will help to build people's confidence in using public transport.
- 5.27 Walking and cycling can be alternatives for short journeys, and cycling in particular is increasing in popularity, but safety concerns deter many people. Significant investment is being made in segregated, or protected, cycle routes as part of the 'Cycle City' programme and this will need to continue into the future to make cycling a natural choice for local journeys or as the first part of a longer public transport journey.
- 5.28 Homeworking is one way of reducing the number of commuter journeys made and becomes more feasible as broadband connections improve. Many employers allow some homeworking as a way of using office space more efficiently, as well as reducing carbon emissions, and local authorities can take a lead in this. Planning policies can reduce the need to travel, e.g. by ensuring that new housing is within easy reach of facilities like shops, schools, surgeries and employment.
- 5.29 There is also scope to reduce the number of deliveries, through businesses having better procurement strategies and creating parcel collection points e.g. at local shops to reduce the number of failed deliveries to households.
- 5.30 Once the alternatives are in place, 'Travel Choices' promotional measures have been shown to be effective in persuading people to change their travel behaviour. A major programme from 2012-2016 was funded through the Local Sustainable Transport Fund, covering:
- Businesses (a tailored travel advice service, travel planning and access to grants and incentives such as loan bikes, cycle training and an online car sharing service);
 - Jobseekers (travel advice, free and discounted travel to interviews and to the new workplace, access to free refurbished bikes and equipment); and
 - Residents (information about travel options, targeted in areas where infrastructure has been improved).
- 5.31 This important work needs to be continued, with increased emphasis placed on servicing and delivery plans for businesses.

5.32 We will:

- Continue to improve public transport and facilities for cycling and walking
- Introduce smart ticketing across all modes
- Explore new legislative opportunities for introducing integrated fares systems across all modes in Greater Manchester
- Continue to offer an extensive Travel Choices programme, to encourage people to switch more of their journeys to sustainable transport and businesses to better manage deliveries.

Investigation of Clean Air Zones

- 5.33 Clean Air Zones (CAZs) are seen by central Government as a key measure to improve air quality in major urban areas. In a CAZ, vehicles that do not meet specified minimum emissions standards are charged for entering the area. This can be targeted at the types of vehicle that are seen as the major problem, such as buses and HGVs. The charge for non-compliant vehicles provides an incentive for operators to upgrade their fleets.
- 5.34 The most suitable location for a CAZ would be one based around the centre of the conurbation, but because there are both pros and cons, careful investigation is required of the impact this may have on behaviours and the wider area. If the measure was found to be beneficial, it could potentially be extended to other areas.
- 5.35 A major concern about introducing a CAZ is the impact on the economy, i.e. whether it would drive business and visitors away from the city. It would certainly be necessary to offer support to fleet operators by giving either grants to help them upgrade their vehicles or a period of several years notice to give them time to comply. The other side of the argument is that there would be economic advantages in Greater Manchester being seen to take a progressive stance on environmental issues and offering a clean environment to residents, workers and visitors.
- 5.36 Emissions within the zone would be reduced but a study will need to assess whether this reduction will be great enough to justify the cost of introducing and operating the CAZ, given that natural fleet replacement will reduce emissions to some extent without any further action. A CAZ would be unlikely to generate excess revenue, as its income will reduce over time as more and more vehicles comply with standards.
- 5.37 A further issue is that introducing a CAZ in one area may mean that older vehicles will be displaced to other parts of Greater Manchester, or elsewhere. However, Manchester is the hub of the bus network, so setting a standard for the city centre would also raise standards in the areas served by the services that start/terminate there. For goods vehicles the risk of displacement would be greater.

5.38 We will:

- Carry out a technical feasibility study into the potential impact of a Clean Air Zone in the centre of the conurbation.

New Development

- 5.39 The location and design of new development can help to reduce the problem of transport emissions in two ways: by maximising the use of sustainable travel modes to/from the development and by minimising people's exposure to those emissions.
- 5.40 The National Planning Policy Framework (NPPF) supports the need to reduce emissions. It makes clear that:
- “To support the move to a low carbon future, local planning authorities should plan for new development in locations and ways which reduce greenhouse gas emissions.”

It also makes clear that:

“Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas.”

- 5.41 However, planning authorities are also obliged to make provision for sufficient new residential and commercial development to meet future needs. Meeting these needs in Greater Manchester is challenging, with at least 10,000 new homes needed each year up to 2035. From a carbon perspective, locating development within urban areas where there is good access to public transport, and where a range of facilities is available within walking distance, is the most sustainable option. However, where the available urban land is close to major highways, exposure to air pollution will be increased. The challenge for the Greater Manchester Spatial Framework and the Local Transport Plan will be to locate development where sustainable travel can be maximised and to put in place measures to encourage a mode shift away from car travel.
- 5.42 The NPPF contains the presumption that planning permission will be granted for sustainable development, but the interpretation of what constitutes ‘sustainable’ is left to individual planning authorities. This leads to an inconsistent approach to the mitigation required for similar types of development in different areas and may mean that more could be achieved in some instances.
- 5.43 We need to agree common guidance across the 10 planning authorities of Greater Manchester and/or develop a toolkit to help them assess development proposals and identify the mitigation needed. This would include, for example: the appropriate number of charging points for electric vehicles; sufficient cycle parking; access to public transport; detailed delivery and servicing plans which encourage activities outside of peak times; travel plan incentives to encourage the use of low-emission vehicles and sustainable transport; and guidance on setting back or screening residential development from major highways where air quality is an issue.

5.44 We will:

- Develop Greater Manchester-wide guidance on reducing emissions from new development
- Develop a toolkit to assist planning officers in identifying requirements for mitigating the impact of emissions in new development

Focus Areas

- 5.45 While emissions need to be reduced universally to meet carbon targets, we will achieve the greatest impact on air quality and health by focusing some actions geographically. To meet EU limits for NO₂ we need to focus on the Air Quality Management Area. However, more widely we will secure the greatest health benefits by concentrating on areas where people are most exposed to pollution, because they live or work close to affected routes. We have therefore identified a number of focus areas which we can use to test the effectiveness of measures before rolling them out more widely. These are described below.

Manchester city centre

- 5.46 The regional centre, which includes part of Salford, has the greatest concentration of economic activity in Greater Manchester and is the hub of the public transport network. This concentration of activity makes it a major source of transport emissions. A growing number of people are choosing to live in the centre, with around 20,000 residents and plans for 16,000 new homes included in the Local Plan. This resident population, combined with the workers and visitors, means that a large number of people are being exposed to poor air quality.

Focus Area	Key Measures
Manchester city centre	<ul style="list-style-type: none"> Mode shift to sustainable transport Bus vehicle renewal/retrofit Taxi standards Low-emission car club vehicles Electric vehicle charging points Urban Consolidation Centres Low-Emission Zone Study

M60/M62 corridor

- 5.47 Motorways are a major source of emissions, and the whole network in Greater Manchester falls within the Air Quality Management Area. Parts of the network are already congested, and forecast growth in Greater Manchester means that it will need to carry more traffic in future. Highways England had planned to introduce a Smart Motorway scheme, including all-lane running (i.e. using the hard shoulder) between J8 of the M60 and J20 of the M62 to increase capacity. This was found to have a significant negative impact on air quality and could not therefore proceed. Instead a 'controlled motorway' scheme, which manages traffic flow but does not involve an additional lane, is being introduced on the M60 J8 to the M62 J18, with just a short section of all-lane running on the M62 J18-20. The original scheme, and the extra capacity it would bring, will not be able to proceed unless emissions can be reduced.
- 5.48 Since there are a number of key development areas close to the north-western part of the motorway network, reducing congestion in this area is seen as crucial to Greater Manchester's growth ambitions. The M60/M62 corridor is therefore an important initial focus area for emissions reduction. Any initiatives will, however, be more effective if brought forward jointly with neighbouring areas, as much of the traffic is long-distance.

Focus Area	Key Measures
M60/M62 corridor	<ul style="list-style-type: none"> Agreeing a common approach with neighbouring authorities to reducing freight emissions HGV vehicle renewal Freight Operator Recognition scheme Mitigation measures for new developments close to motorway Urban Distribution Centre Mode shift to sustainable transport

Major routes into town centres

- 5.49 The major non-motorway roads in Greater Manchester radiate from the main town and city centres and carry heavy volumes of traffic into and through those centres, with significant environmental impact. These roads often pass through areas of inner urban housing, exposing residents to air pollution.
- 5.50 Our key town centres of Altrincham, Ashton, Bolton, Bury, Oldham, Rochdale, Stockport and Wigan have been suffering from the impact of changing shopping habits, particularly e-commerce, and all have plans to introduce new non-retail uses and to increase the attractiveness of their 'offer'. Reducing the impact of traffic is an important element of this.

Focus Area	Key Measures
Radial routes	<ul style="list-style-type: none"> Mode shift to sustainable transport Bus vehicle renewal/retrofit Traffic management

Major new developments

- 5.51 Major new developments need to be a focus for two reasons: because they generate additional traffic and because they can provide an opportunity to change travel behaviour if suitable alternatives to the car are provided. The Greater Manchester Spatial Framework is currently in development, and will set the scale and distribution of housing and employment growth across Greater Manchester to support delivery of significant levels of growth over the next twenty years. GMSF is currently considering a range of growth options. However, it is expected that in the period to 2035, Greater Manchester will need at least 210,000 new homes, at least 2,400,000m² of additional office space and at least 3,450,000m² of additional industrial and warehousing space.

Focus Area	Key Measures
Major new developments	<ul style="list-style-type: none"> GM low-emission guidance and toolkit Vehicle standards for major freight-generating developments Measures to encourage use of sustainable transport

6 MONITORING AND REVIEW

- 6.1 This strategy sets a framework for the strategies and action plans shown in Figure 1, which will include detailed measures. It is important that the impact of the measures introduced (either through the LTP, Air Quality Action Plan or Climate Change Implementation Plan) is monitored and the results used to inform a future review of this strategy. This should be done at least every five years.
- 6.2 A number of relevant indicators are already monitored and reported to the GM Combined Authority on an annual basis through the LTP Report or the Network Performance Report, namely:
- CO₂ emissions from vehicles on major roads
 - Emission of NO_x from road traffic
 - Mode split for travel to work
 - Cycling levels
 - Walk trips
 - Bus fleet emission standards.
- 6.3 This monitoring will continue, but we will also need to include further indicators as follows:
- Background PM_{2.5} levels
 - Fraction of mortality attributable to particulate air pollution
- 6.4 More detailed monitoring of the impacts of particular schemes will be via the Air Quality Action Plan and the Climate Change Implementation Plan, but will also need to be fed back to this strategy. The carbon benefits of major transport schemes are routinely assessed, but air quality impacts are not always quantified. This will now need to be done for all major schemes where an impact is likely.

7 CONCLUSION

- 7.1 There is scientific evidence that the effects of emissions on our health and environment, as well as the economic impacts, are significant. Without radical intervention, predicted population growth and increased levels of activity will exacerbate this problem.
- 7.2 The UK as a whole, and specifically urban areas such as Greater Manchester, have challenging targets both in terms of greenhouse gas emission reductions and air quality improvements. Demonstrable progress has already been made; however, prioritised investment and radical actions are required if we are going to deliver on these targets.
- 7.3 Whilst all sources and types of emissions must be considered for a fully-integrated approach, NO₂ emissions from transport sources are currently the biggest challenge for the region.
- 7.4 Quite simply, a significant reduction in the number and length of journeys made by diesel and petrol-fuelled vehicles (especially those with EURO V or older engines), within Greater Manchester is required in order to achieve the necessary reductions in emissions.
- 7.5 The package of interventions is set out in the Air Quality Action Plan and GM Climate Change Implementation Plan. A consistent regional approach is required and it is vital that all policies and actions are aligned with the strategy and plans, especially on the priority routes identified in the AQMA.

EXECUTIVE SUMMARY

Preparation of this Air Quality Action Plan (AQAP) for Greater Manchester has involved a review of the strategies, policies and plans which tackle or are in some way related to air quality, to develop a clear, robust and meaningful set of actions which will deliver real changes in terms of air quality, whilst supporting the sustainable economic growth of the region.

The primary objectives of this Plan are to improve air quality across Greater Manchester and to embed low-emission behaviours into the culture of our organisations and lifestyles by 2025, whilst supporting the UK Government in meeting all EU thresholds for key air pollutants at the earliest date to reduce ill-health in Greater Manchester.

In this Plan 'Key Priority Areas' have been identified; these are generally locations near to major roads and heavily trafficked areas in Manchester city centre, and other major urban centres across the other nine districts, where air quality is poor and where people live. Most effort and resources to improve air quality should be focused on these areas.

Key Performance Indicators (KPIs) have been defined to help categorise improvement actions according to the means by which they could improve air quality, namely:

1. **Reduce Traffic** – for instance by encouraging modal shift from private vehicle use to public transport, cycling and walking.
2. **Increase Efficiency** – of traffic movement by reducing congestion and stop-start travel to achieve a smoother emission profile and overall lower emissions, which may be particularly significant at peak hours,
3. **Improve Fleet** – by incentivising the replacement of older, more polluting vehicles with newer, smaller, cleaner, lower emission vehicles.

Consultation workshops were held with key stakeholders including the Greater Manchester local authorities, Public Health England, Transport for Greater Manchester and Highways England, to provide an opportunity for open discussion to generate new ideas and obtain feedback on the measures proposed, and to ensure that there is appropriate 'buy-in' to the proposed actions to ensure that they can be implemented.

Policies and interventions were subsequently identified and divided into the following broad subjects, based on the area and type of effects that may be achieved:

1. **Development Management and Planning Regulation** – including standardisation of regulation and policy across the Greater Manchester (GM) region.
2. **Freight & Heavy Goods Vehicles** – there are several opportunities to reduce emissions associated with the movement of freight and goods by road.
3. **Buses** – buses have a vital role to play in transporting the public and provide opportunities to improve air quality. New legislative developments and the development of the future Greater Manchester bus strategy will assist to support bus patronage and improve vehicle standards.
4. **Cycling** – existing strategies and initiatives encourage cycling.
5. **Travel Choices** – encouraging the public and business to make sustainable travel choices is essential to realising lasting air quality benefits.
6. **Cars** – measures to reduce emissions from cars and reduce the number of vehicle trips can deliver real improvements.
7. **Information & Resources** – education and the provision of information to the public, business and policy makers are seen as vital to realising air quality improvements.

The following table summarises the actions to be implemented to improve air quality. It is only intended to be a summary; a more detailed version of the table with greater depth of information is provided in the final section of the report.

Action Summary Table

Development Control and Planning Regulation	
1.1.	Construction Management Guidance: Greater Manchester (GM) councils to adopt the IAQM Guidance on the Assessment of Dust from Demolition and Construction sites – to ensure appropriate mitigation controls are conditioned.
1.2.	Development Planning Guidance: GM councils to adopt the most recent IAQM air quality planning guidance, to help ensure that planning applications consider impacts consistently, and opportunities to improve air quality are realised.
1.3.	Cumulative Development Database: A centralised database of planning applications and air quality assessments will be managed by TfGM, to better understand and manage the cumulative effects of several developments.
1.4.	Clean Air Zone Appraisals: TfGM will undertake an appraisal of the effects of Clean Air Zones (CAZs).
1.5.	20mph Zones: Review the effects of 20mph zones on air quality.
1.6.	Encouraging Travel Planning: Investigate the potential of additional demand management measures to effect a significant mode shift and to stimulate the uptake of low-emission vehicles.
1.7.	Taxi & Private Hire Licensing: Seek to standardise the minimum emission requirements for taxis.
Freight & Heavy Good Vehicles	
2.1	TfGM Delivery and Servicing Plan (DSP) Toolkit: Air quality considerations will be incorporated into the DSP toolkit to reduce HGV movements, and hence emissions, in the Key Priority Areas
2.2	Urban Distribution Centres: Locations for potential centres will be identified in the Greater Manchester Spatial Framework, using travel planning to ensure that local air quality benefits are realised.
2.3	Urban Distribution and Consolidation Centres: The GM councils and TfGM will implement a policy to encourage and facilitate distribution and consolidation centres for freight deliveries and waste collection, with air quality being a prime consideration.
2.4	Access for Freight to Key Economic Centres and Sub-regional Freight Facilities: New and existing freight facilities to consider maximising air quality benefits by reducing HGV movements.
2.5	Freight Information Channels: TfGM will identify where mobile, digital and live information channels can be used to improve the efficiency of freight transport by providing accurate and up-to-date information to operators and drivers.
Buses	
3.1	Bus Priority Programmes: TfGM to ensure that new bus priority programmes are conceived with air quality considerations prioritised.
3.2	Bus Improvements: Identify opportunities to retrofit vehicles, when appropriate.
3.3	Hybrid Bus Improvements: Includes several actions to maximise the benefits of hybrid buses.
3.4	Trial of Low-Emission Vehicles: Identify opportunities for trial of a range-extender bus or other Ultra-Low-Emission Vehicles.
Cycling	
4.1	Cycle Programmes: Improvements to the cycle networks to reduce vehicle movements in the Key Priority Areas.
4.2	Public Cycle Hire: Explore the feasibility of public cycle hire facilities in urban centres, with hire points located near transport hubs and major journey destinations.
4.3	Cycle Logistics: TfGM will encourage and promote a logistics programme to use cycle or electrically-assisted cycles for short distance deliveries and distribution in urban centres.

Travel Choices

- 5.1 **Car Clubs:** Appraise the effects of the car clubs that are already in operation, with consideration to new clubs; and a requirement to operate a high proportion of Electric Vehicles (EVs).
- 5.2 **Dynamic Road Network Efficiency and Travel Information System:** Travel information systems will be used to promote alternative travel choices and to warn people vulnerable to high pollution to make appropriate choices.
- 5.3 **LTP3 Programmes:** The third Local Transport Plan 'Travel Choices' programme encompasses a range of travel information and accessibility tools. The TfGM air quality team will consult with each of the programme teams to ensure that air quality considerations are prioritised.

Cars

- 6.1 **Plugged-in Places EV Charging Network:** Continue to increase the number of EV charging points.
- 6.2 **Car Use Allowance:** Work with local authorities to review car business mileage allowances and sustainable travel.
- 6.3 **Local Authority Parking Charges:** Work with local authorities to review the introduction of parking charges at local authority offices to discourage private car use.
- 6.4 **School Travel:** TfGM will appraise opportunities to reduce air quality impacts from school car travel.

Information & Resources

- 7.1 **Website and Online Resources:** The GreatAir Manchester website will help to raise awareness and educate.
- 7.2 **Online Route Finding:** Major providers of online mapping and travel information will be contacted to ensure that the best available online data is being used and updated frequently in order to promote alternative travel choices.
- 7.3 **Pollution Alert:** Email/text alert service to warn about pollution events and promote alternative travel choices.
- 7.4 **Health Impact Assessment (HIA):** to be undertaken to provide evidence of the need to improve air quality, and justify spending.
- 7.5 **Contingency Response Plan:** to be prepared with Greater Manchester Resilience Forum (GMRF) to ensure adequate procedures are in place to cope in the event of high pollution episodes.
- 7.6 **TfGM Air Quality Team:** TfGM will provide staff resource to support partners in implementing this Plan and to provide support for key local authority roles.
- 7.7 **Air Quality Monitoring Database:** to be maintained to ensure that air quality information is collated and can be used.
- 7.8 **Traffic Data:** Better data required to understand the composition of the vehicle fleet and better understand the air quality problem and better monitor the effects of this Plan in the future.

MEMORIAL TO GED STEADMAN



Ged was a dedicated well respected colleague and friend, which was reflected in the number of people he knew when it came to air quality. He would spend hours looking at monitoring results and know at an instant if there was a problem with one of the air quality monitors, ensuring that it was fixed before irreparable damage was done. He was an active member of the Greater Manchester Air Quality Group, working closely with the nine other Greater Manchester authorities to produce the first Greater Manchester Air Quality Action Plan, a group for which he was to become the undisputed lead in more recent times. He was very much a team player and willingly took on the role of bidding, on behalf of the Greater Manchester authorities, to fund essential work such as air quality modelling across the conurbation. His efforts resulted in the first Air Quality Management Area. He also appeared on BBC Radio Manchester's Breakfast show hosted by Alan Beswick, when he cycled into central Manchester to take part in a live radio interview on air quality in the conurbation.

Ged worked hard to protect the people of Salford, where he had worked since 22 April 1991. Part of his role was to respond to planning consultations. He would read consultants' reports, submitted with planning applications, and recommend conditions to ensure that the best possible air quality outcomes were realised. He was not a shy person; on several occasions he was known to challenge large organisations to ensure that emissions would not affect people in Greater Manchester.

Ged took pride in his work but he was also a realistic man and knew that there was a balance between good air quality and economic growth, as without growth the city would not prosper. He knew that the dramatic improvements needed in air quality would only come from a change in behaviour when choosing means of transport and the move away from fossil fuels. Ged played his part in this and would cycle to and from work every day; however he did have cause to comment about the dangers of the tram tracks whilst cycling.

Ged died on 31 May 2015, aged 59. He is sadly missed and was taken too soon; however, we are all the richer for knowing him.

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GLOSSARY

AQAP:	Air Quality Action Plan
AQMA:	Air Quality Management Area
DPF:	Diesel Particulate Filter, fine particulates emissions-reduction technology
DSP	Delivery and Servicing Plan
EFT:	Emission Factor Toolkit, Defra vehicle emission model used in this study
EGR:	Exhaust Gas Recirculation, emissions reduction technology
EV:	Electric-engine Vehicle, typically using battery as the main power source instead of an internal combustion engine
Euro 1 to 6:	Engine emission standards for cars, labelled as number digits
Euro I to VI:	Engine emission standards for buses and HGVs, labelled as Roman numerals
GMCA:	Greater Manchester Combined Authority
HGV:	Heavy Goods Vehicle weighing over 3.5 tonnes
HDV:	Heavy Duty Vehicle over 3.5 tonnes, including buses and HGVs
HIA:	Health Impact Assessment
LAQM:	Local Air Quality Management
LDV:	Light Duty Vehicle weighing less than 3.5 tonnes, such as light vans
LSFT:	Local Sustainable Transport Fund
LTP:	Local Transport Plan
NO ₂ :	Nitrogen dioxide, the key pollutant in this study due to high levels of exposure in some parts of the region
NOX:	Oxides of nitrogen, modelled as emissions in this study
PM ₁₀ :	Fine particulate matter; particles of below 10µm in diameter.
PSV:	Public Service Vehicle such as buses
QBC:	Quality Bus Corridor
SCR:	Selective Catalytic Reduction, emissions reduction technology
TfGM:	Transport for Greater Manchester
UTMC:	Urban Traffic Management Control

1 INTRODUCTION

Greater Manchester, like many urbanised regions of the UK, contains areas that suffer from poor air quality. This Air Quality Action Plan aims to bring together a robust and meaningful set of actions and measures that will bring about an improvement in air quality, to benefit the health of the population.

This document is the draft Air Quality Action Plan (AQAP) for Greater Manchester. Preparation of the draft AQAP has involved a review of the strategies, policies and plans which tackle or are in some way related to air quality, to develop a clear, robust and meaningful set of actions which will deliver real changes in terms of air quality. These actions focus on road transport as it is the major contributor to poor air quality in the region.

Greater Manchester Combined Authority (GMCA) has an established Climate Change Strategy and associated Implementation Plan. However, air quality activity has not developed at the same rate and there is a requirement to raise the profile of this agenda and increase the pace of progress.

TfGM and GMCA are implementing a number of policies and programmes to improve the urban environment, including the efficiency of the transport network and access to travel. Therefore, many of the Actions have been developed around this existing framework to achieve the greatest possible local air quality benefits.

This draft AQAP comprises a single document including actions that will be ratified by TfGM and district authorities to tackle air quality in Key Priority Areas, whilst supporting the sustainable economic growth of the region. This plan will allow councils to carry out their statutory duties under Part IV of the Environment Act 1995, as its implementation will help mandatory EU Limit Values to be met.

1.1 Action Plan Objectives

The key objectives of this Plan are that:

- Air quality across Greater Manchester will improve
- Low-emission behaviours will have become embedded into the culture of our organisations and lifestyles by 2025
- We will support the UK Government in meeting and maintaining all EU thresholds for key air pollutants at the earliest date to reduce ill-health in Greater Manchester.

1.2 Consultation

This AQAP documents a programme of consultation and workshops for key stakeholders including the Greater Manchester local authorities, Public Health England, TfGM and Highways England, to provide an opportunity for open discussion to generate new ideas and obtain feedback on the measures proposed, and to make sure that there is appropriate 'buy-in' to the proposed actions to ensure that they can be implemented.

The existing policies, programmes and schemes being undertaken by TfGM and district authorities were reviewed and opportunities to incorporate air quality interventions have been identified. These provisional interventions were presented to the consultees in order to identify whether an action may be created.

An understanding of the baseline conditions and progress on existing air quality interventions were also used to identify other actions that should be included in this Plan.

1.3 The Existing Greater Manchester Air Quality Strategy and Air Quality Action Plan

The first Greater Manchester Air Quality Strategy was set out in 2002 with the Greater Manchester Air Quality Management Strategy 'Clearing the Air'.

The Greater Manchester Air Quality Strategy and Action Plan (2006) which followed set out a package of measures to address air pollution from road transport, with a particular focus on meeting EU Limit Values for nitrogen dioxide (NO₂) in 2010. The Plan was developed jointly with the Local Transport Plan 2 (LTP2) due to road traffic being a major contributor to pollution.

The key air quality objectives from the 2006 AQAP were transposed into Local Transport Plan 2011-2016 (LTP3), which incorporates Air Quality Local Transport and Implementation.

The updated Greater Manchester Low-Emission Strategy will provide the strategic framework to support the implementation of the Actions in this Plan.

1.4 Draft Low-Emission Strategy for Greater Manchester

The Low-Emission Strategy is published alongside this Action Plan and presents a long-term, integrated approach to carbon emissions and air quality in the period up to 2040. The Strategy is intended to establish a framework to develop detailed plans to reduce carbon emissions and improve air quality.

The key aims of the strategy are to:

- Support the UK Government in meeting all EU thresholds for key pollutants at the earliest date;
- Contribute to reducing Greater Manchester's carbon footprint, in line with the Greater Manchester Climate Change Strategy; and
- Reduce air pollution as a contributor to ill-health in Greater Manchester.

1.5 Greater Manchester Spatial Framework (GMSF)

The 10 Greater Manchester local authorities increasingly operate as a single economic area, with a single labour market and interdependent towns and cities, transport, culture, education and public services. Therefore, the Greater Manchester Spatial Framework (GMSF) is intended to reflect the role of Greater Manchester as a regional capital by defining the extents and requirements of future housing and development for the next 20 years, which will be coordinated with the 10 Local Plans.

The GMSF was open to consultation for the initial evidence base, and options are being developed for the draft document, with further public consultation planned for 2016, and final publication in 2018.

1.6 2040 Transport Strategy

In July 2015, TfGM published 'The Greater Manchester Transport Strategy 2040: Our Vision', on behalf of GMCA and GM Local Enterprise Partnership. This document provides a vision of what a successful transport system might look like in 2040, to support Greater Manchester's wider economic, social and environmental ambitions. In order to support these ambitions, the following outcomes were identified as necessary.

To support sustainable economic growth, we need:

- Less congested roads and public transport;
- Better access to skills and markets;
- More reliable journey times;
- A resilient and well-maintained network; and
- A transport system fit for a major European city, which is viewed as a great place to visit and invest.

To improve the quality of life for residents, we need:

- Better access to jobs and training, and to healthcare and other essential services;
- A transport network that makes it easier to stay healthy through regular walking and cycling;
- Improved road safety and reduced crime; and
- Local environments that are not dominated by traffic, noise and pollution.

To help protect our environment, we need:

- More people to travel by public transport, on foot and by bike;
- A reduction in harmful emissions from vehicles;
- To make the best use of our existing transport infrastructure; and
- A reduction in the damage that transport can do to natural environments.

Following a public consultation exercise, the views expressed on the vision will feed into the development of a full draft Transport Strategy and Delivery Plan, which are due to be published in 2016. Taken together, the Transport Strategy and Delivery Plan will constitute the new Greater Manchester Local Transport Plan (LTP4).

2 AIR QUALITY LEGISLATION

The legislative framework essentially places the onus on regions such as Greater Manchester to maintain good air quality or improve air quality where required, so as to meet mandatory limits.

Air quality legislation in the UK is derived from European legislation whereby mandatory limit values must be met for several air pollutants. The two pollutants of most concern for the majority of areas of the UK where air quality is a problem are NO₂ and PM, derived from gasoline. Road vehicles are the predominant sources. This section describes the legislative framework.

2.1 European Air Quality Directives

The Air Quality Framework Directive (96/62/EC) on ambient air quality assessment and management defines the policy framework for 12 air pollutants known to have a harmful effect on human health and the environment. The limit values for the specific pollutants are set through a series of daughter directives.

Following the above directives, Council Directive 2008/50/EC on ambient air quality and cleaner air for Europe came into force in 2008, and was transposed into national legislation in 2010 (The Air Quality Standards Regulations 2010).

2.2 National Air Quality Legislation

2.2.1 UK Air Quality Strategy

The UK Air Quality Strategy (AQS) (Defra, 2007) sets out air quality objectives and policy options to improve air quality and offers options for further consideration to reduce the risk to human health and the environment from air pollution.

The AQS identifies nine ambient air pollutants that have the potential to cause harm to human health. These pollutants are associated with local air quality problems, with the exception of ozone, which is instead considered to be a regional problem. Similarly, the Air Quality Regulations set objectives, but for just seven of the pollutants that are associated with local air quality.

2.2.2 Air Quality Objectives and Limit Values

The provisions of Part IV of the Environment Act 1995 establish a national framework for air quality management, which requires all local authorities in England, Northern Ireland, Scotland and Wales to conduct local air quality reviews. Section 82(1) of the Act requires these reviews to include an assessment of the current air quality in the area and the predicted air quality in future years. Should the reviews indicate that the objectives prescribed in the UK Air Quality Strategy (Defra, 2007) and the Air Quality (England) Regulations 2010 (Defra, 2010) (henceforth referred to as the 'Air Quality Regulations') will not be met, the local authority is required to designate an Air Quality Management Area (AQMA). Action must then be taken at a local level to ensure that air quality in the area improves.

The air quality objectives and limit values currently applicable to the UK can therefore be split into two groups. Each has a different legal status and is therefore handled differently within the framework of UK air quality policy. These are:

- UK air quality objectives set down in regulations for the purposes of local air quality management; and
- European Union (EU) limit values transcribed into UK legislation for which compliance is mandatory.

2.3 2015 Supreme Court Ruling

In April 2015 the Supreme Court issued a final judgement on the case brought by the NGO ClientEarth, ordering the Government to end breaches of EU limits on nitrogen dioxide (NO₂).

The legal challenge was prompted by the failure for the past five years (since 2010) of London and several other regions to meet EU limit values for NO₂. The court ruled that the government must take action to cut air pollution, with a national plan to be published by the end of December 2015.

Greater Manchester urban area represents one of the 38 non-compliant zones in the UK¹, due to exceedences of the annual mean NO₂ limit value. Greater Manchester is not projected to achieve compliance until 2020 without intervention; therefore considerable and far-reaching action is required to achieve compliance, with bodies such as TfGM providing essential support.

2.4 Air Quality Action Plans

This AQAP will be published and its implementation driven by TfGM, in conjunction with the local authorities. The Department for Environment, Food and Rural Affairs (Defra) local air quality policy guidance, LAQM.PG(09) (Defra, 2009), recommends that AQAPs should include:

- i. Quantification of the source contributions to the predicted exceedences of the relevant objectives; this will allow the Action Plan measures to be effectively targeted;
- ii. Evidence that all available options have been considered;
- iii. How the local authority will use its powers and also work in conjunction with other organisations in pursuit of the air quality objectives;
- iv. Clear timescales in which the authority and other organisations and agencies propose to implement the measures within its plan;
- v. Where possible, quantification of the expected impacts of the proposed measures and an indication as to whether the measures will be sufficient to meet the air quality objectives. Where feasible, data on emissions could be included as well as data on concentrations where possible; and
- vi. How the local authority intends to monitor and evaluate the effectiveness of the Plan.

This Plan considers items ii, iii, iv and vi.

Items i and v will be considered through the Implementation Plan (see Section 13.1).

¹ http://uk-air.defra.gov.uk/assets/documents/no2ten/140708_N02_projection_tables_FINAL.pdf

3 UNDERSTANDING THE PROBLEM

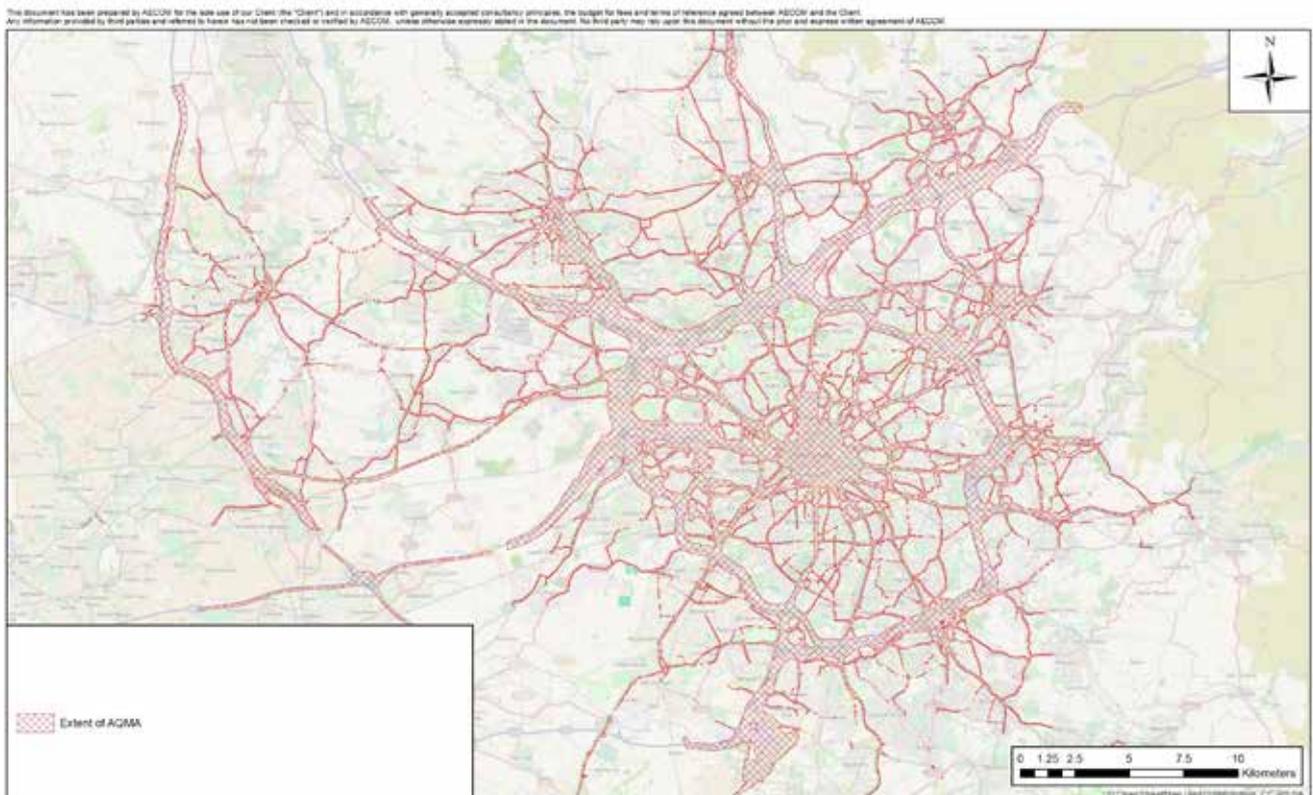
The air quality problem in Greater Manchester is fairly similar in nature to other urban areas in the UK and Europe. This section identifies the areas on which actions in this Plan should focus.

3.1 Air Quality Management Area

Air Quality Management Areas (AQMAs) for the administrative areas in the Greater Manchester region were originally declared in 2001-2002 for both annual mean NO₂ and PM₁₀. The AQMAs were amended between 2004-2006 and they were also revoked for PM₁₀. 10 AQMAs were subsequently declared between 2005-2006 for the whole of Greater Manchester based on the modelled 35µg/m³ isopleths for annual mean NO₂, which, considering the EU Limit is 40µg/m³, acknowledged the uncertainties of modelling and could be viewed as being cautious. The extent of the AQMA is show in Figure 1.

The Greater Manchester councils have recently completed a substantial modelling study for the whole urban area, and an amendment to the AQMA is expected to be submitted to Defra for approval with reference to this modelling later in 2016.

Figure 1: The Greater Manchester AQMA

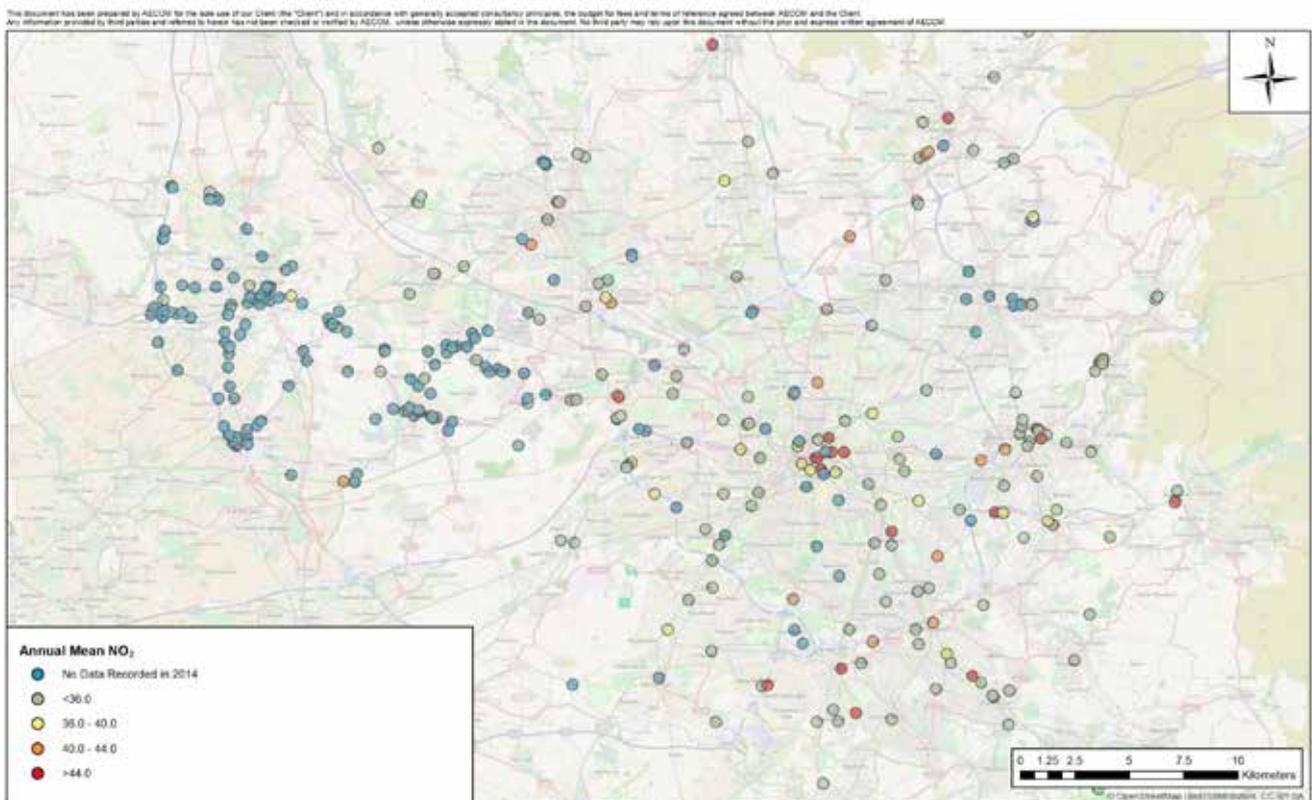


3.2 Monitored Concentrations

NO₂ is measured using both continuous and passive techniques. To provide an indication of the extent of monitoring that has been undertaken, annual mean NO₂ concentrations recorded by the Greater Manchester authorities' (passive) diffusion tube network in 2014 are indicated in Figure 2. Where locations are shown as having no data recorded in 2014 these sites are now closed, but these have been included to indicate the spatial distribution of the historical data set. Particulate Matter (PM₁₀ and PM_{2.5}) is also monitored, but at fewer locations.

The data show that there are many locations that have recorded values above or close to the annual mean NO₂ objective, although it should be noted that Figure 2 includes data from both kerbside/roadside locations and from urban background locations, so recorded concentrations can vary significantly in just a matter of metres from a road². Over recent years, annual mean concentrations of the order of 65µg/m³ have been measured, which gives some indication of the challenge that the region faces.

Figure 2: Air Quality Monitoring Locations in Greater Manchester, Annual Mean NO₂ Concentrations Recorded in 2014



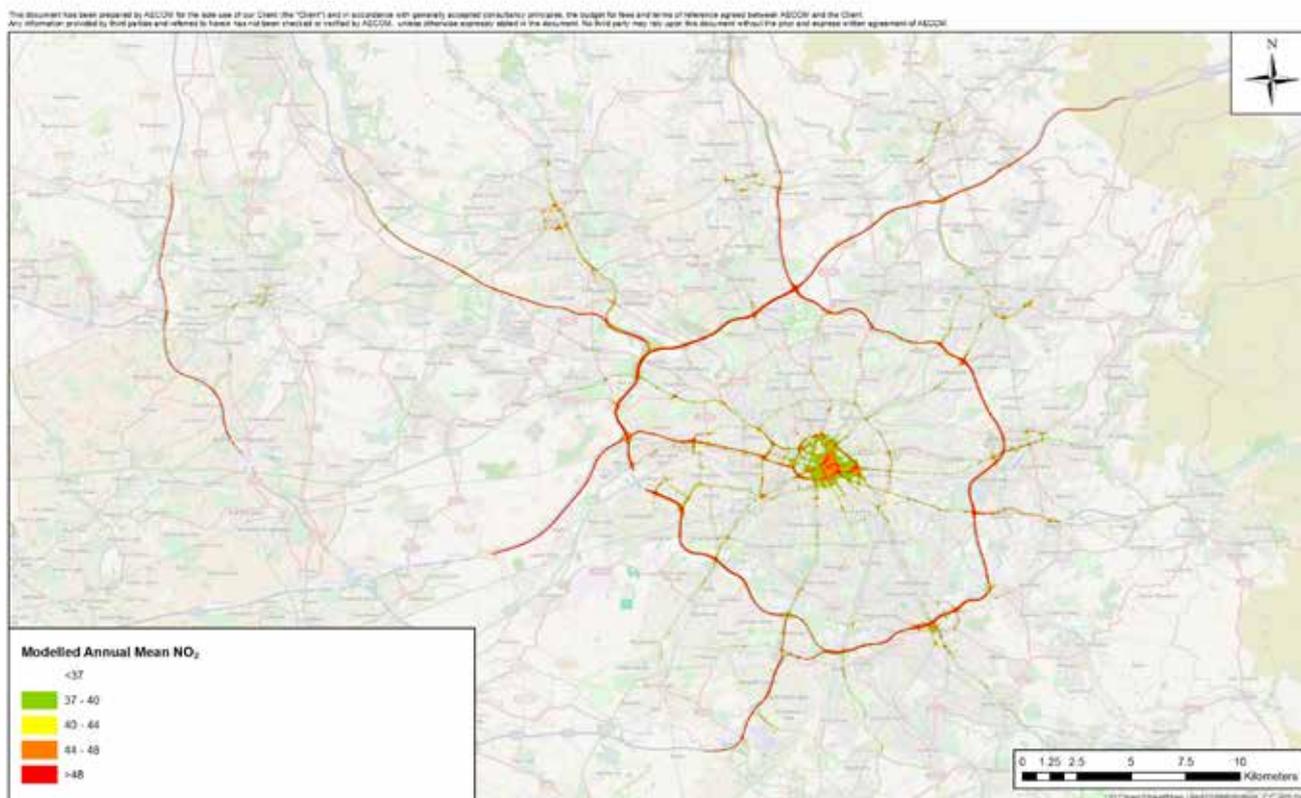
² To properly understand the distribution of concentrations the sites would need to be explored in greater detail. For such detail please refer to the most recent Greater Manchester Air Quality Progress Report (2014).

3.3 Modelled Areas of Exceedence

As discussed above, the Greater Manchester councils have undertaken a detailed dispersion modelling study (currently in draft) to identify the existing, and projected future, areas exceeding the annual mean objective for NO₂. The areas of exceedence may not directly delineate the designation of any amendments to the AQMA, but these will be an essential guide to any amendment that is proposed.

With regard to this AQAP, the areas exceeding the UK air quality objectives represent the 'Key Priority Areas'. These are areas of relevant exposure³ that tend to be adjacent to major roads and heavily trafficked areas in Manchester city centre, or other major urban centres, across the other nine districts, and areas near the M60 and other motorways.

Figure 3: Modelled Annual Mean NO₂ Concentrations in Greater Manchester



3 i.e. where members of the public are likely to be regularly present and are likely to be exposed to pollutants for a period of time appropriate to the averaging period of the objective. Concentrations in excess of the objectives where members of the public are unlikely to be exposed should not be considered to represent 'relevant exposure'.

3.4 Traffic Emissions

3.4.1 Fleet Contributions

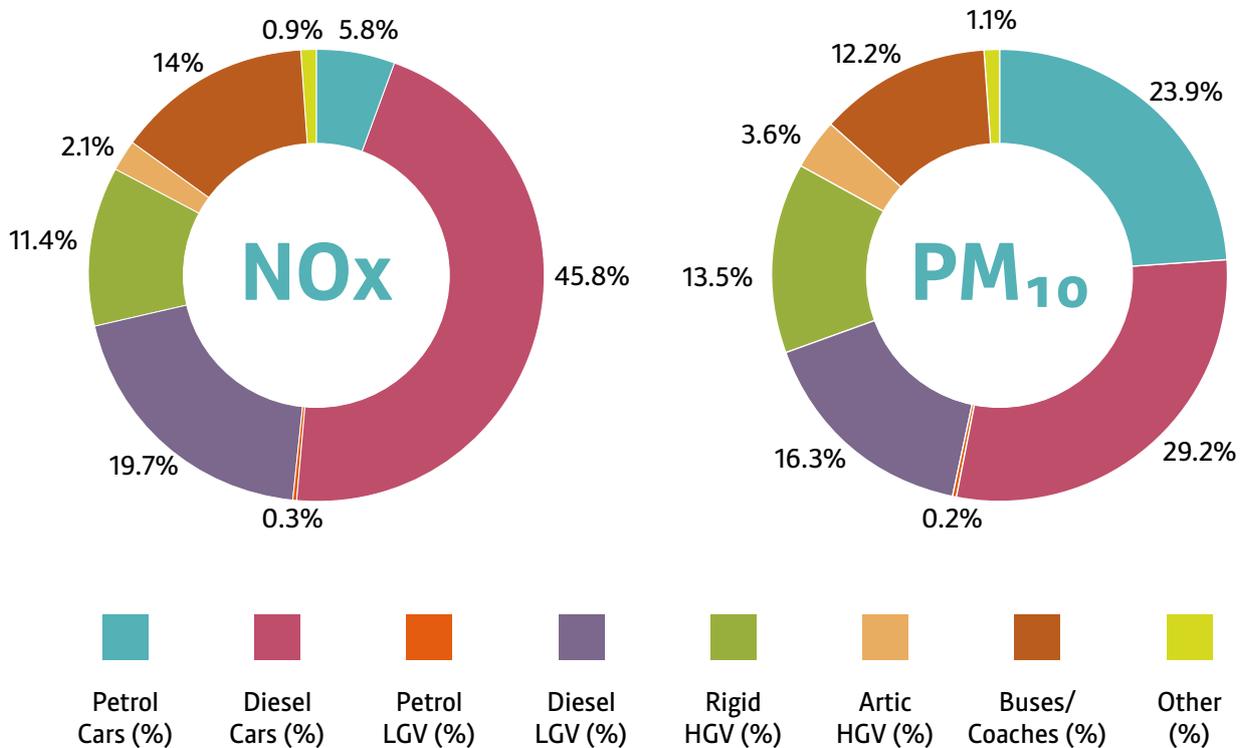
The Emission Factors Toolkit (EFT) is a calculation tool published by Defra designed to determine pollutant emissions from road vehicles for a specified year, road type, vehicle speed and fleet composition. The latest version (Version 6.0.2) was released in November 2014, and incorporates the most up-to-date vehicle emission factors and information on the current and projected future vehicle fleet. The vehicle emission factors are currently based on the European Environment Agency (EEA, 2013) COPERT 4 (v10) emission calculation tool, which includes data for all vehicle categories from Pre-Euro 1/I to Euro 6/VI type approval standard.

Figure 4 illustrates the contributions of different vehicle types to road traffic emissions of NOx and PM₁₀. The figures are based on national-average fleet compositions for 2015, assuming a nominal 10% of the fleet comprising HGVs (heavy goods vehicles >3.5 tonnes) and buses, travelling at 30mph. These data demonstrate that pollutant emissions from these vehicles are disproportionately high compared to the number of these vehicles. Emissions from buses are predicted to have similar emissions as goods vehicles, although public services vehicles (PSVs) are typically concentrated on congested urban corridors where a greater number of people may be exposed.

Emissions from cars account for the major part of road traffic NOx (based on cars representing 90% of the fleet for the purposes of this example), where most of the NOx emissions are attributable to diesel cars, which comprise 46% of the total emissions, compared to only 6% from petrol cars.

Emissions of PM₁₀ from diesel cars are 29%, compared to 24% from petrol cars, which in part reflects the current understanding that a significant proportion of fine particulate emissions are due to non-exhaust sources, such as tyre and brake wear, road abrasion and suspended material. Therefore, the difference in fuel type is of less significance for PM₁₀ emissions than for NOx emissions.

Figure 4: Proportions of NOx and PM₁₀ Emissions from Road Sources



Other: motorcycles and alternative fuel vehicles e.g. hybrid, electric, biogas

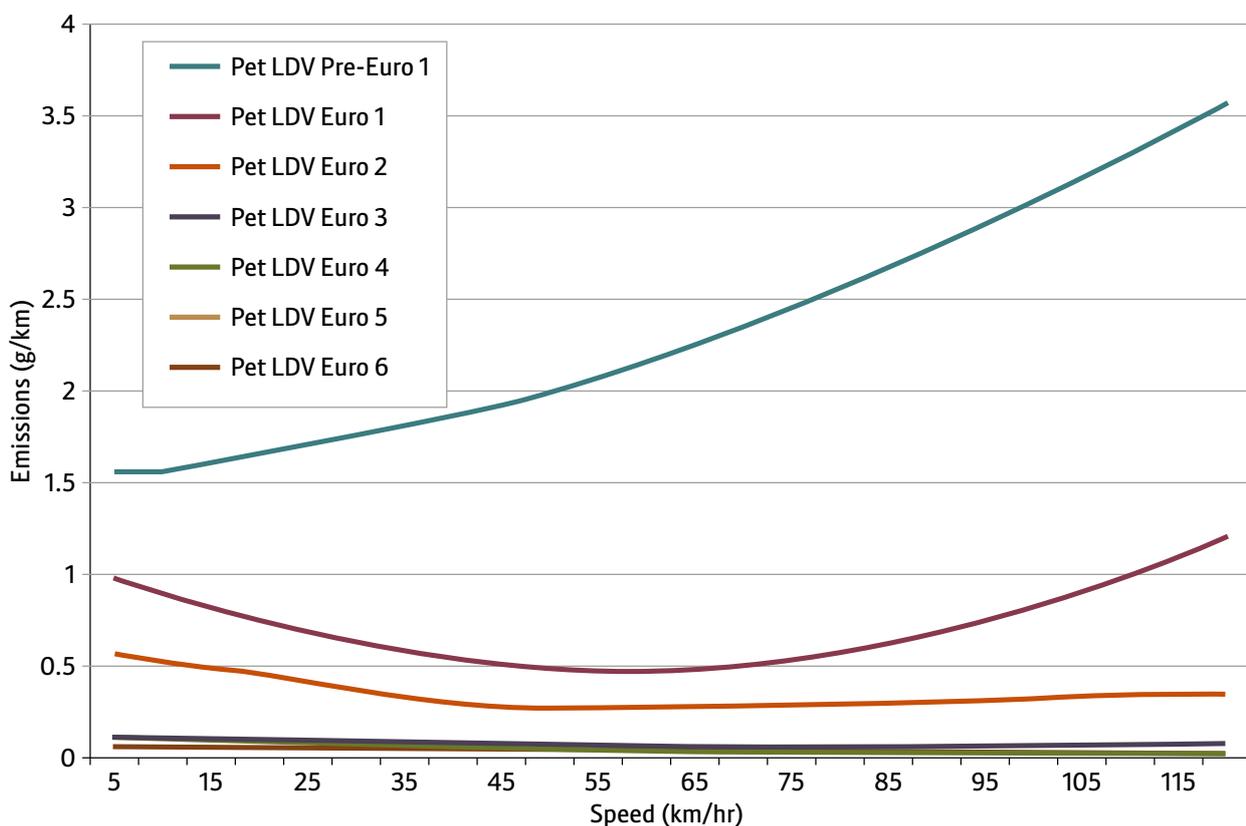
3.4.2 Euro-classification Emission Profiles

Emissions standards were introduced in Europe through the Euro-rating system in 1992 in order to limit the emissions of harmful pollutants in road vehicle exhaust. Emission profiles have been generated that relate pollutant emissions to vehicle speed for more than 200 vehicle type/fuel type/Euro Standard combinations. These speed versus emissions profiles are derived from the results of emissions testing and modelling of hundreds of vehicles over many years.

Examples of speed versus NOx emission profiles for HGVs, LGVs, buses and cars based on the projected 2017 vehicle fleet mix are provided in Figure 5 to Figure 8; the profiles demonstrate the differences in terms of NOx emissions of changing vehicle speed and Euro Standard. The emission profiles for LDVs are split into petrol and diesel. In general the higher the Euro Standard, the lower the pollutant exhaust emissions; however, the following points should be noted:

- For petrol cars, Euro 5 and 6⁴ are almost identical, and very similar to Euro 3 and 4. Emissions for Euro 2 vehicles and earlier were significantly higher.
- For HGVs, Euro IV vehicles have lower emissions than Euro V vehicles at speeds below 35km/hr.
- For diesel cars and LGVs, Euro 5 vehicles produce higher NOx emissions than Euro 4 vehicles at all speeds.
- For buses, a Euro V vehicle fitted with Selective Catalytic Reduction (SCR) has higher emissions than a Euro IV bus at speeds less than 40km/hr.

Figure 5: Speed / NOx Emission Profile for Petrol Cars/LDVs



⁴ Euro nomenclature for HDVs uses roman numerals, whilst LDVs use numbers. See Glossary.

Figure 6: Speed / NOx Emission Profile for Diesel Cars/LDVs

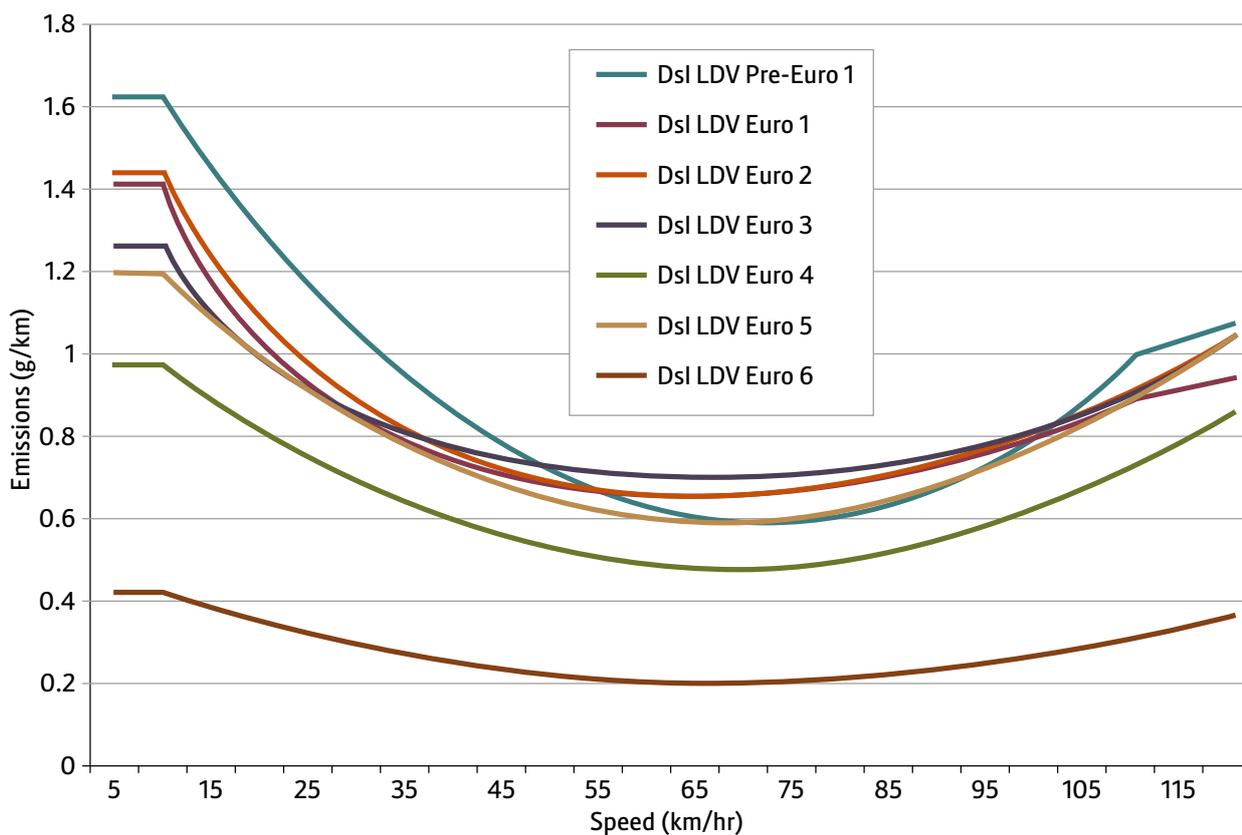


Figure 7: Speed / NOx Emission Profile for HDVs (HGVs and Buses)

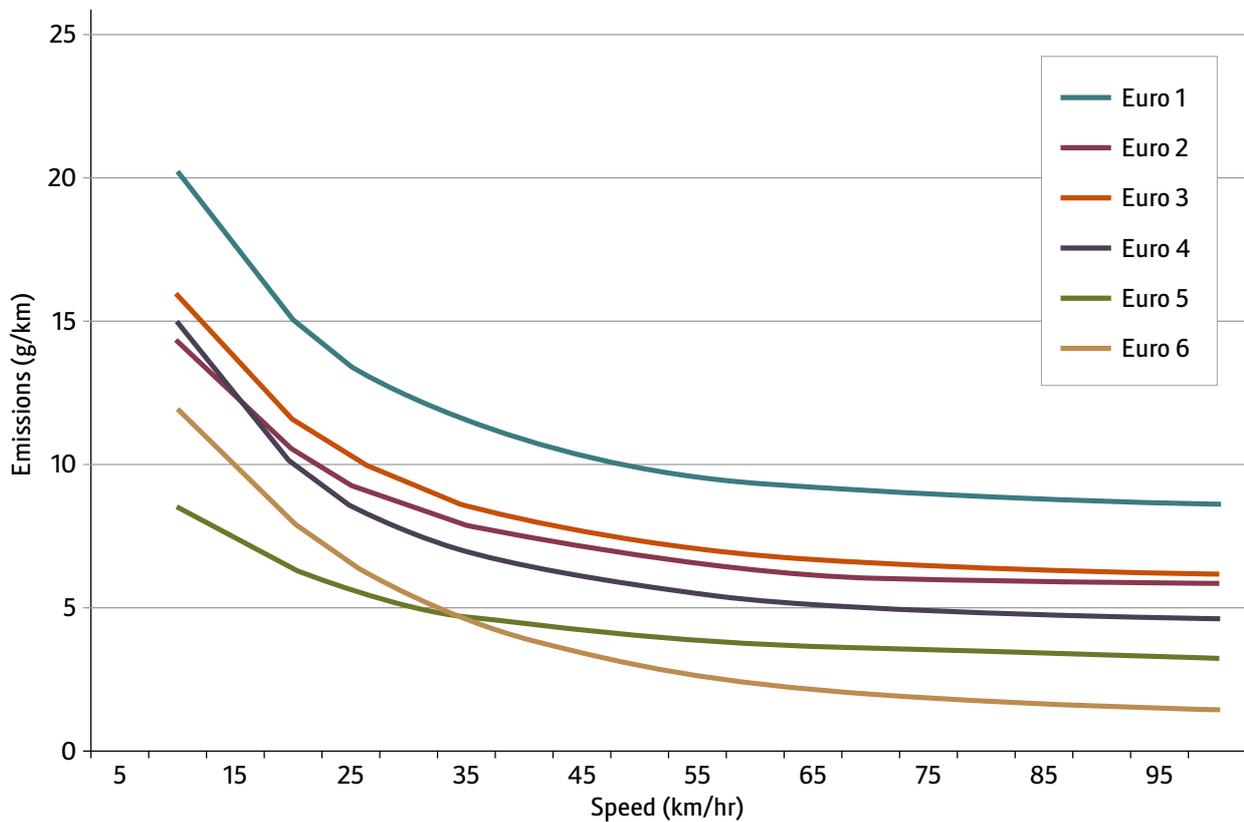
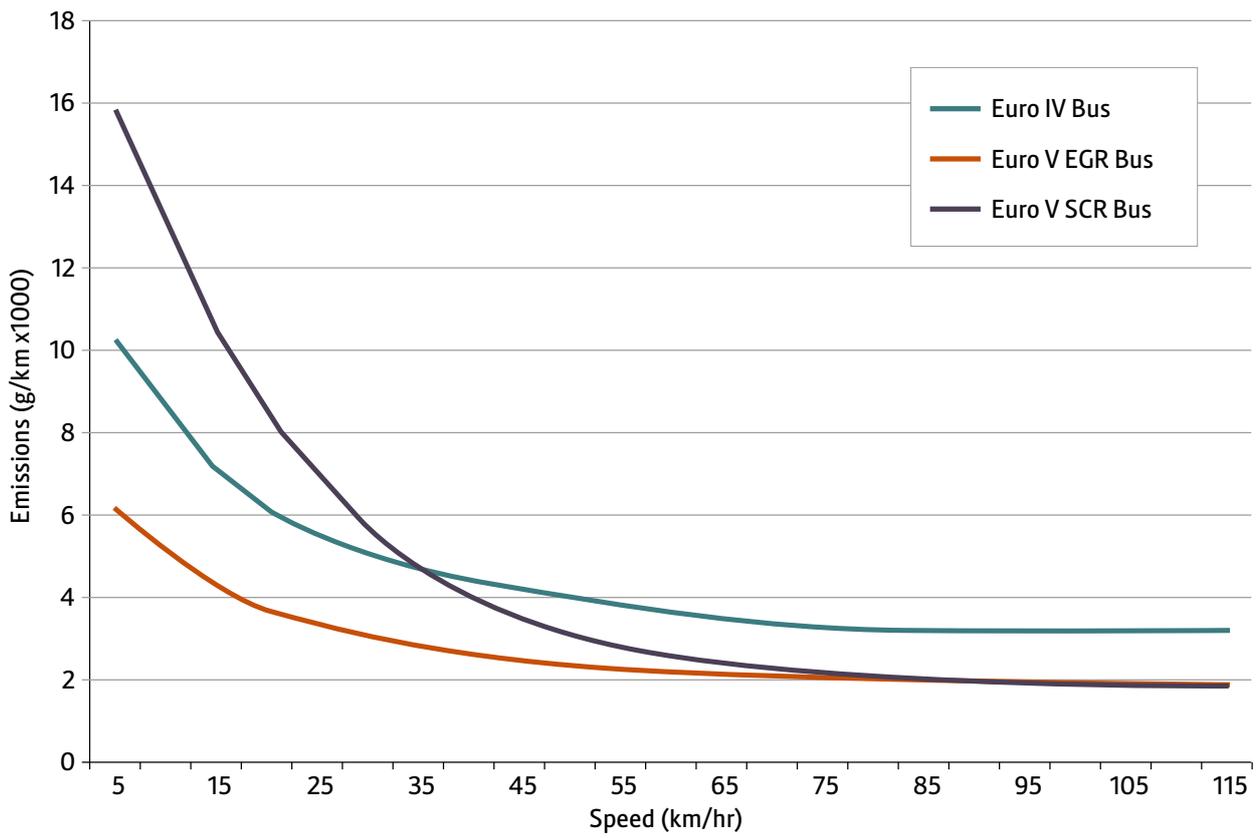


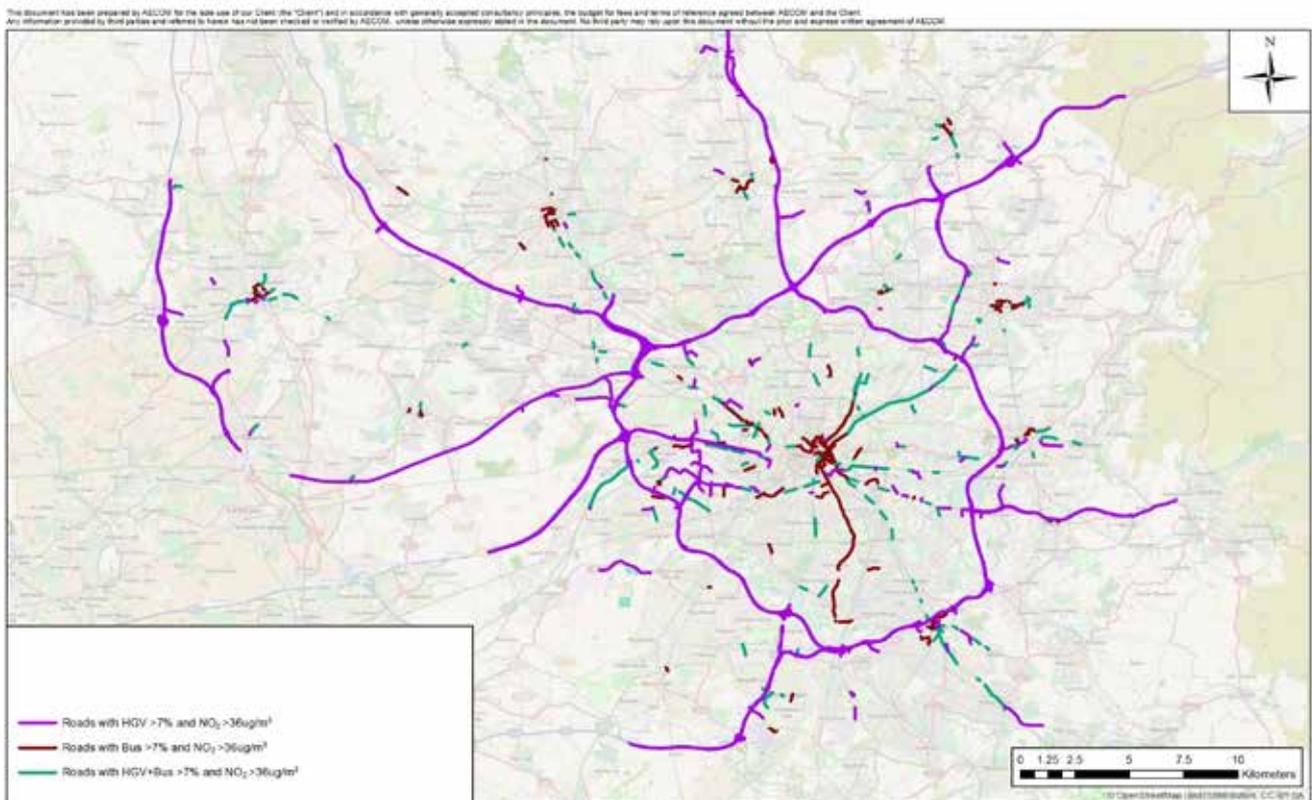
Figure 8: Comparison of Speed / NOx Emission Profile for Euro IV and Euro V Buses



3.5 Areas with High Bus and HGV Flows

The emissions apportionment discussion in Section 3.4.1 indicates that buses and HGVs may lead to disproportionately high emissions compared to their number within the vehicle fleet. However, the impacts due to these vehicles will not occur equally on all roads. This is illustrated in Figure 9, which highlights road sections with greater than 7% traffic flow of either buses or HGVs and where the modelled annual mean concentration of NO₂ exceeds 36µg/m³ ⁵. The concentration threshold used in this plot is below the EU limit value, but was considered to be cautious, and generally consistent with the approach used to designate the existing AQMA. High proportions of HGV movements are concentrated on the main radial routes, including the M60 and M62 motorways, whilst high proportions of bus movements tend to occur along relatively short sections of road within the main urban centres.

Figure 9: Roads with High Proportions of Bus or HGV Movements and High Annual Mean NO₂ Concentration



5 The existing AQMA was declared based on the 35 µg/m³ contour from modelling undertaken in 2005

3.6 Key Priority Areas for Air Quality Action Planning

The term, 'Key Priority Areas' is introduced in Section 3.3. These are areas of relevant exposure identified in this Plan that tend to be adjacent to major roads and heavily trafficked or congested areas with poor air quality, where improvement actions would achieve the greatest effects. Specific areas which are subject to worsening air quality from cumulative impacts from development and traffic should be the focus of priority action to mitigate public health concerns.

3.6.1 HGVs and Buses

In order to identify the Key Priority Areas for HGVs and buses, the plan must also consider the locations where the public are exposed to high pollutant concentrations due to HGV and bus emissions. Figure 10 and Figure 11 show the areas with high proportions (>7%) of bus and HGV movements, where the modelled annual mean concentration of NO₂ exceeds the 35µg/m³ target, and also where the road is within 50m of a property.

Based on this analysis, the priority roads for HGVs and buses are indicated in Table 1 and Table 2 respectively, along with monitored annual mean NO₂ concentrations at locations considered representative of air quality along that route and the basic vehicle fleet split on each road.

Area/Road	Monitored Annual Mean NO ₂ ^A			Traffic Composition			
	Site ID	2013	2014	Petrol Cars	Diesel Cars	HGV	Bus
M60 South	ST18	42.8	40.5	39%	38%	10%	<1%
	ST20	42.8	41.8	38%	37%	10%	<1%
M60 West	TR23	38.9	38.6	38%	37%	10%	<1%
	SA32	36.0	-	38%	37%	10%	<1%
	SA20	50.1	47.8	38%	37%	10%	<1%
M62	RO6A	38.2	43.1	38%	37%	10%	<1%
	RO2A	37.1	40.7	38%	37%	10%	<1%
M56	MA13	48.9	51.2	38%	37%	10%	<1%
M66	BU7	25.8	26.7	39%	38%	11%	<1%
M67	TA18	44.6	46.8	38%	37%	10%	<1%
	TA21	50.4	50.6	47%	30%	10%	1%
M602	SA44	36.2	38.0	38%	37%	10%	<1%
A580 East Lancashire Road	WI52	27.0	42.1	45%	28%	<11%	1%
	SA35	29.8	-	38%	37%	10%	<1%
A5081 Park Way	-	-	-	40%	25%	16%	<1%
A6 Hazel Grove / High Lane	ST7	51.0	46.4	46%	29%	9%	1%
A628 Mottram	TA21	50.4	50.6	44%	27%	11%	<1%
A57 Manchester Road	TA24	33.8	36	44%	27%	11%	1%
A57(M) Mancunian Way	MA72	35.2	36.1	41%	40%	7%	<1%
A572 Leigh Road	SA33	31.3	30.7	48%	30%	8%	1%
A575 Walkden Road	-	-	-	48%	30%	8%	<1%
A635 Manchester Road	TA13	39.3	42.3	31%	19%	15%	<1%

Note: ^A Example of recorded data on, or near, this road
Traffic flow composition data from the EMIGMA Greater Manchester Emissions Inventory database.

Figure 10: Roads with High Proportions of Bus Movements and High Annual Mean NO₂ Concentration near Properties

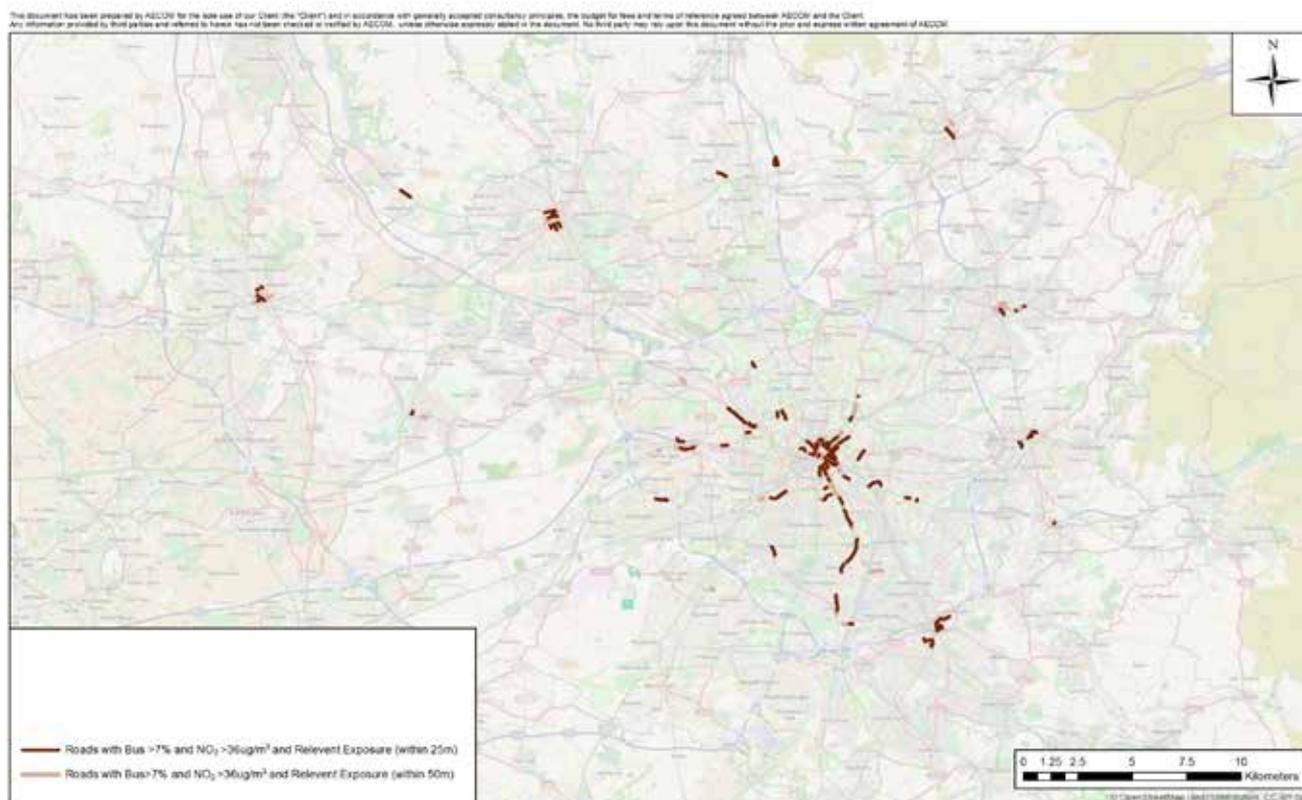


Table 2: Key Priority Areas for Bus Interventions

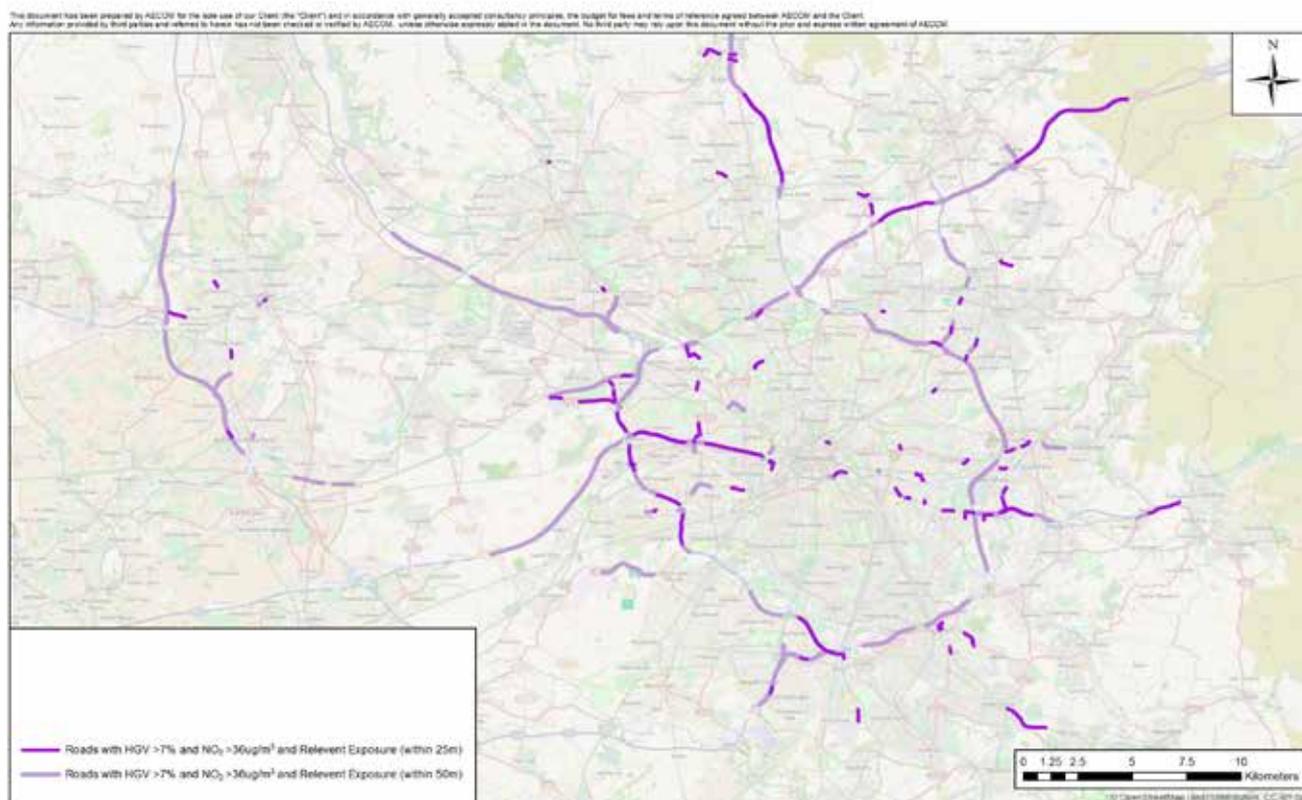
Area/Road	Monitored Annual Mean NO ₂ ^A			Traffic Composition			
	Site ID	2013	2014	Petrol Cars	Diesel Cars	HGV	Bus
B5117 Oxford Road	MA82	60.2	63.0	39%	25%	1%	26%
A6 Broad Street	-	-	-	49%	30%	1%	10%
A664 Rochdale Road	MA85	42.9	53.5	45%	28%	3%	13%
Manchester city centre ^{BC}	MA24	46.9	50.3	0%	0%	0%	100%
Oldham town centre ^B	-	-	-	17%	11%	0%	66%
Rochdale town centre ^B	RO11A	49.3	45.7	49%	31%	1%	11%
Bury town centre ^B				48%	30%	1%	12%
Bolton town centre ^B	BO8	-	33.3	40%	25%	2%	26%
Wigan town centre ^B	-	-	-	40%	26%	1%	21%
Stockport town centre ^{BC}	ST18	42.8	40.5	0%	0%	0%	100%

Note: ^A Example of recorded data on, or near, this road

^B Example of road in the town centre used to demonstrate an example of a road with high bus flow in this area
Traffic flow composition data from the EMIGMA model.

^C Bus-only routes

Figure 11: Roads with High Proportions of HGV Movements and High Annual Mean NO₂ Concentration near Properties



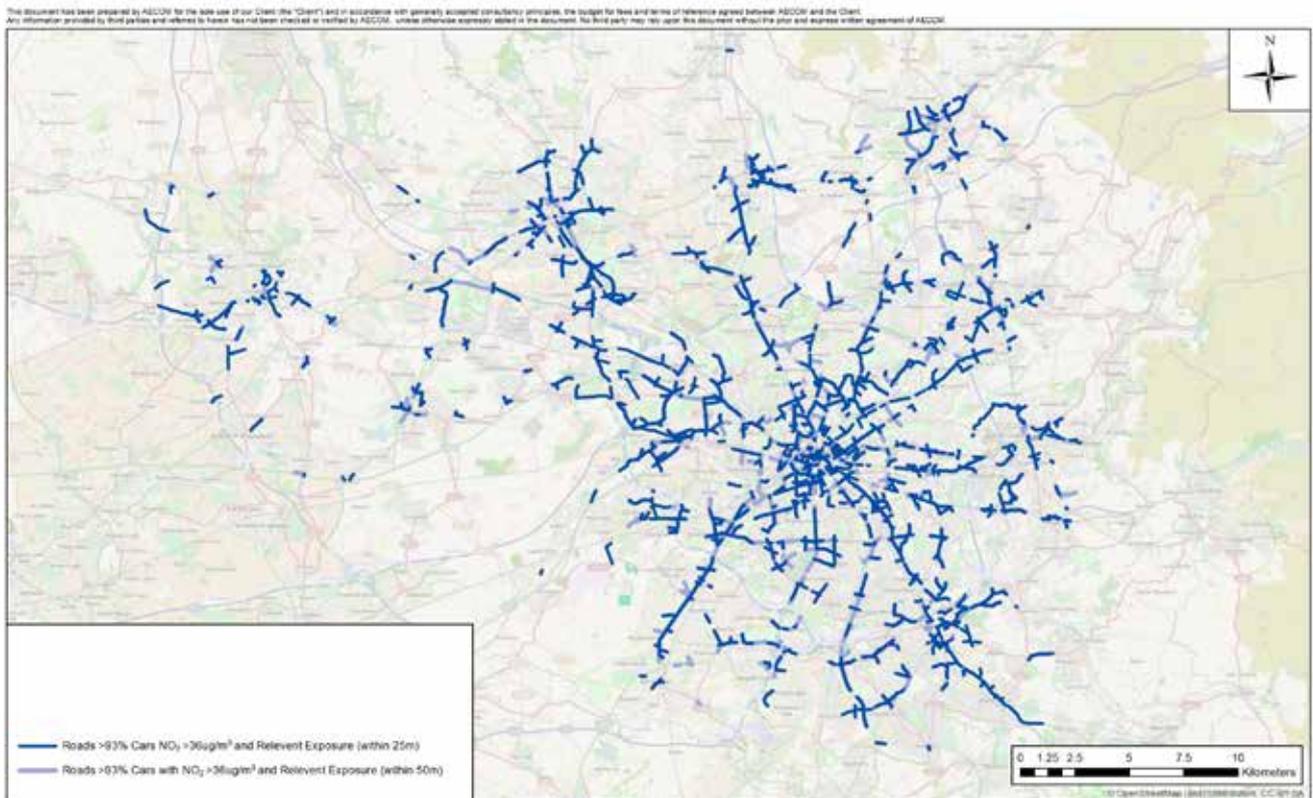
3.6.2 Cars

Private cars typically represents >70% of the vehicle movements on most roads, and so the influence of cars is significant in most areas where high pollutant concentrations have been identified. Furthermore, the large proportion of cars also influences areas of congestion due to the road space taken up by the vehicles.

Figure 12 shows the roads with high car traffic volumes in areas of high pollutant concentrations and within 25m of properties, and shows that these roads are distributed throughout the region, and are not focused on main routes or urban centres. Therefore, actions to reduce emissions from private cars should target the whole fleet with less focus on the Key Priority Areas identified for HGVs and buses, and the Key Priority Areas for cars, should include all roads where the pollutant concentrations exceed 35µg/m³ and have properties within 25m.

Detailed information about the car fleet composition will be required to properly understand the emissions arising from this component of the fleet, as the age, fuel-type and typical journey length will determine the emissions profile. This in turn will ensure that effective control measures can be considered, such as targeting older vehicles in some areas, or specific fuel types in other areas.

Figure 12: Roads with High Proportions of Car Movements and High Annual Mean NO₂ Concentration near Properties



3.6.3 Summary of Key Priority Areas

This analysis indicates where targeted Actions should be implemented, although the relationship between different effects should also be recognised. For example, bus interventions may affect car use due to the modal shift between travel types, whereas public/private transport interventions are unlikely to affect HGV or other freight movements due to the type of journey.

The population data used to identify the Key Priority Areas do not include socio-economic data, where people living in economically deprived areas may be more sensitive to poor air quality and should, therefore, be prioritised. This has been considered within the actions and will be incorporated within the Health Impact Assessment (action 7.4).

4 CURRENT AIR QUALITY IMPROVEMENT INITIATIVES

Significant effort has been made over the last decade to improve air quality across Greater Manchester. This section does not set out to document the progress made in detail, but it does highlight the key initiatives.

4.1 Greater Manchester Air Quality Strategy and Air Quality Action Plan

The Greater Manchester Air Quality Strategy and Action Plan (AGMA, 2006) sets out a wide-reaching package of measures to address air pollution from road transport, with a particular focus on achieving EU limits for NO₂ by 2010. Actions included in the Plan were divided into the following categories:

- Physical improvements to the transport network to give priority to passenger transport and cycling
- Regulation and enforcement to improve co-ordination between various agencies to reduce pollution, for example, from poorly tuned engines or through idling vehicles
- Smarter choices to make it easier for residents, businesses and visitors in Greater Manchester to contribute to reducing pollution and carbon emissions through their own actions
- Planning policy and development
- Cleaner technology, fuels and practices
- Improved partnership working with other organisations.

Key air quality objectives from the Strategy and Action Plan were also transposed into Local Transport Plan 2011-2016 (LTP3), which incorporated the Air Quality Local Transport and Implementation Plan. The overall strategy for improving air quality in Greater Manchester defined in the Implementation Plan was focused on:

- Increasing travel by sustainable modes
- Reducing acute pollution incidents from traffic
- Improving vehicle efficiency, including vehicle and fuel technology and efficient driving techniques
- Encouraging smarter travel through improved fares, ticketing and information, management of demand for car travel and promotional campaigns
- Better integration of transport and new development
- Reducing trips by motor vehicles by improvements to public transport and to infrastructure for walking and cycling
- Improving network efficiency.

4.1.1 Air Quality Strategy and Action Plan Progress

Progress on the Action Plan was reported in the LTP3 Progress Report 2014 (GMCA, 2014). In the short term, options to reduce acute pollution incidents from traffic and to improve vehicle efficiency included:

- An annual programme of vehicle emissions testing on major transport corridors;
- Extending the enforcement of idling vehicles, which is already carried out in the regional centre, to town and district centres;

- Targeted renewal of buses on routes into the regional centre and in adjacent areas where permitted levels of pollutants are exceeded;
- Supporting/lobbying central Government for a national HGV scrappage scheme and working with the Government on complementary regulation measures; and
- Co-ordinating the uptake of Safe and Fuel Efficient Driving (SAFED) training for smaller freight and bus operators and promoting continued updates to driving skills through a best-practice scheme.

However, the Action Plan has not achieved the improvements that were hoped for, since the impact of the individual measures often reduced overall emissions across the conurbation whilst changes on individual roads were imperceptible. Therefore, future actions are proposed to be focused on the most beneficial options within specific geographic areas, such as the roads within the AQMA and, in the context of this plan, the Key Priority Areas.

4.2 Local Transport Plan Strategy 2011/12-2015/16, LTP3

The Greater Manchester's third Local Transport Plan (LTP3) was published by TfGM in April 2011.

The LTP3 was designed around the key transport issues facing the region, and was focused on achieving a high quality, targeted investment in public transport and other sustainable modes, alongside measures to maximise the efficiency across road and public transport systems.

Further details of the LTP3 are provided in Appendix A: Local and Regional Policies.

4.2.1 LTP3 Progress Report (2014)

The LTP3 included a number of proposed actions for further investigation, which was expected to be concluded in 2011/2012. However, the Greater Manchester Local Transport Plan 3: Progress Report was published in 2014, which recognised that emissions had been reduced, but had not translated into any significant reduction of pollutant concentrations, and failure to achieve the key air quality strategy objectives. The following significant challenges were identified in the LTP3 that have contributed to continued high pollution concentrations in some parts of the region:

- The total number of vehicle kilometres on the local motorway system increased by 25% from 2000 (the year in which the M60 motorway ring was completed) up to 2011 LTP3, with average speeds of 34mph across the motorway system in the morning peak period indicating that there are still areas of congestion on the regional network.
- 80% of cars on key commuting routes in the morning peak have just the driver on board.
- There are some areas of the conurbation where congestion causes serious issues for local communities.
- Much of the capacity on public transport, particularly on rail and Metrolink systems, into Manchester city centre has now been taken up.
- Car trips still account for nearly 60% of all commuting trips into the other key Greater Manchester centres outside Manchester city centre.
- Emissions from road traffic accounted for over 60% of all NO₂ and PM₁₀ (particulate) emissions in Greater Manchester in 2006-11.

Recent modelling presented in the draft Low-Emission Strategy (see Appendix A) has also reported that NO_x emissions have generally decreased, although in some areas, particularly those close to the M60, concentrations of NO₂ experienced at the roadside have not fallen as expected. This is thought to be largely due to the increased shift towards diesel cars and higher real-world emissions than were anticipated from vehicles compared to laboratory drive cycle tests.

5 ADDITIONAL CONSIDERATIONS IN DRAWING UP THIS AQAP

Air quality improvements can be achieved in many ways, relying on interventions that can complement one another and can take effect over months and years.

5.1 Key Performance Indicators

Actions to improve local air quality by reducing emissions from road vehicles may focus upon reducing the total number of vehicle movements or target a specific component of the vehicle fleet, such as buses or HGVs, to achieve an improved emission performance.

The Air Quality Strategy and Action Plan (GMCA, 2006) and the 2013/2014 Air Quality Progress Report (GMCA, 2014) included a range of transport-related measures that were intended to focus on the following objectives:

- Reducing trips by motor vehicles.
- Improving vehicle efficiency through vehicle and fuel technology and efficient driving techniques.

The objectives from the 2006 Plan were used to inform the Key Performance Indicators (KPI) in this Action Plan for changes to the fleet that may lead to local air quality effects, as shown in Table 3 along with examples. These KPIs are used to show how each of the actions may improve local air quality.

The KPIs are colour-coded throughout this document so as to easily see how each action may improve air quality.

In addition to these KPIs, it may also be possible to reduce exposure by redistributing traffic away from the Key Priority Areas, or to avoid introducing new developments in these areas. However, these options will not necessarily lead to long-term local air quality improvements and may lead to a redistribution of the areas of high pollutant concentration, and so this is not considered to be a sustainable KPI.

Table 3: Key Performance Indicators for local air quality

KPI	Example
Reduce Traffic	Reduce the number of vehicle movements, either during peak hours or more generally. This may affect the whole fleet or only part of it. E.g. reduce the number of private cars by redistribution onto public transport.
Increase Efficiency	Improve the traffic flow to reduce congestion and achieve lower emissions from the existing fleet. E.g. changing speeds to achieve less stop-start movement or more efficient driving profiles, such as through variable speed limits, traffic light timing or driver education.
Improve Fleet	Change the composition of the existing fleet to increase the proportion of low-emission vehicles. E.g. displace older vehicles in favour of newer vehicles that achieve a high Euro engine emission standard or have ultra-low-emissions, such as Electric Vehicles (EVs).

5.2 Existing Programmes

The existing policies, programmes and schemes being undertaken by TfGM and district authorities were reviewed to identify where they include air quality as a consideration. However, many of these policies do not explicitly define how they will be implemented, or what the magnitude and extent of the air quality effects will be. Therefore, the actions in this Plan build on a number of the existing programmes outlined in the following sections:

- Local and regional policies, which outline the regional strategies, are discussed in Appendix A. Where an action is intrinsically linked to an existing policy or fund, this has been identified within the relevant action.
- Infrastructure improvement schemes, which will may have discrete local air quality effects due to changes to traffic flow or travel behaviour, are identified in Appendix B.

5.3 Responsibility and Resources

The Action Plan will be lead and coordinated by TfGM, whilst the commitment to implement the actions is undertaken jointly by TfGM and the regional stakeholders, such as local authorities. Where financial or staff resources are required, TfGM will coordinate the requirements and resources with the aim of achieving the action.

A detailed implementation plan to appraise the actions and to define how they will be undertaken will be created after the actions have been adopted. The components of the implementation plan are outlined in Section 13.1.

5.4 Structure of Actions

The types of policies and interventions that make up the actions have been divided into the following broad subjects, based on the area and type of effects that may be achieved:

- Section 6, Actions for Development Control and Planning Regulation
- Section 7, Actions for Freight and Heavy Goods Vehicles
- Section 8, Actions for Buses, including route management
- Section 9, Actions for Cycling
- Section 10, Actions for Travel Choices
- Section 11, Actions for Cars
- Section 12, Actions for Information and Resources, such as websites.

5.5 Measuring Effects

The local air quality effects of discrete programmes, schemes and interventions may not be measurable (by measuring air quality) due to the cumulative effects of different schemes and other factors. Previous efforts to improve air quality in the region also did not necessarily consider the measurability of the actions where it was assumed improvements would occur, whilst tangible beneficial effects were not always achieved and could not be attributed to individual actions.

Therefore, although air quality will continue to be measured, it will not always represent the level of success for the defined actions. Whilst air quality improvements are the goal of this Plan, it is often more appropriate to measure another parameter that should directly or indirectly affect air quality. Such a parameter could be bus patronage, or proportion of electric vehicles registered. Appropriate means of measuring effects for each action will be identified in the Implementation Plan, and will be linked to the KPI for each action.

Where possible, air quality effects will be measured for discrete schemes, although this will likely be possible only for significant infrastructure projects, such as new roads, where a pre and post-development monitoring campaign would be used to measure changes in air quality.

5.6 Timescales

The actions have been attributed approximate timescales for the effect on local air quality to take place, and which will be outlined in greater detail in the Implementation Plan (see Section 13.1). Timescales for the various actions that will be implemented to improve local air quality may be impacted by new Government legislation.

Long-term actions are essential to create the groundwork to achieve an integrated low-emission transport infrastructure within the 25-year timescale of the 2040 Transport Strategy. These Actions include large-scale infrastructure projects, such as electric charging points and cycle-ways.

Medium-term actions are intended to have an effect over the three-to-four years following the initial adoption of the Action Plan. These include: drivers, incentives and penalties to change people's behaviour through education and opportunities for alternative modes of travel. These actions will also increase the rate of the fleet turnover, in order to achieve a low-emission fleet sooner than may otherwise be achieved. They include policies that will have increasing effect over time, but also transport infrastructure and regulation that will have an abrupt effect following implementation.

Short-term actions may be implemented within a matter of months, and are intended to achieve local air quality benefits in the Key Priority Areas through travel planning and development control.

5.7 Priority Actions

The Low-Emission Strategy came to the conclusions about which types of action would be most effective. At this stage, the actions have not been ranked in order of priority, although they will each achieve different air quality effects within different timescales and financial budgets. The prioritisation of individual actions will be outlined in the Implementation Plan, with thorough consideration of factors such as cost, benefit and timescale.

Where the implementation of an action is dependent on another action going ahead, this has been identified.

5.8 Complementary Effects

Many actions may have complementary effects on the following:

- **Noise:** Increased uptake of new vehicle technology such as electric vehicles and reduced traffic conditions will generally contribute to reduced noise.
- **Climate change and carbon emissions:** It has recently become more apparent that programmes and policies to reduce carbon emissions have occasionally led to deterioration in local air quality, such as the promotion of the diesel car fleet. Therefore, the potential effects on climate change have been considered in the actions to ensure that complementary effects are achieved.
- **Social inclusion:** It is essential that the actions do not adversely affect the most vulnerable social groups in the region, where the poorest social groups are often most susceptible to changes in air quality, and are also most likely to be reliant on public transport.

5.9 Strategic Road Network

The Strategic Road Network (SRN) is managed by Highways England (HE), rather than the local authorities or regional transport authority, and this includes the motorway network around Manchester. The M60, in particular, is a major peripheral route through the region that is used to access the major urban centres.

Where actions are proposed that may lead to an impact on the SRN, such as a redistribution of freight traffic, this would need to be discussed with HE to ensure that sufficient road capacity is available to accommodate it.

5.10 Industrial Emission Sources

The main source of emissions in the region leading to the designation of the AQMA is road traffic. Therefore, the majority of actions presented in this report are targeted towards vehicles.

Industrial sources, such as boilers or large stationary engines, have been recognised as contributing to total pollutant concentrations. However, these sources are regulated through the Environmental Permitting Regulations (EPR) regime and the Industrial Emissions Directive by the local authority and the Environment Agency, depending on the size and type of the process, and so these industrial sources are not covered in this Plan.

6 ACTIONS FOR MANAGING NEW DEVELOPMENT

Coordinated controls to regulate new development area essential to ensure that the potential local air quality effects from individual schemes, and cumulative impacts from multiple sites, are properly quantified and reviewed in the context of the Low-Emission Strategy.

Strategic growth is a key objective of the Greater Manchester Spatial Framework (GMSF); effective planning polices will ensure that detrimental impacts are minimised, whilst increasing the opportunity for beneficial effects to be achieved.

6.1 Construction Management Guidance

Emissions associated with construction sites include dust and particulates due to site preparation, demolition and construction, and exhaust emissions from non-road mobile machinery and generators or other static plant. Impacts may also occur where there are a large number of HGV movements to and from a site, and disruption to normal traffic flows due to road closures, etc.

Therefore, the Institute of Air Quality Management (2014) Guidance on the Assessment of Dust from Demolition and Construction⁶ will be adopted as guidance to be used by all Greater Manchester councils in order to properly assess potential impacts from construction activity and implement appropriate mitigation controls consistently.

This action would complement:

- Action 2.1 Delivery and Servicing Plan Toolkit, which would be used to create a construction vehicle routing plan.

Action 1.1		
Reduce Traffic	Increase Efficiency	Improve Fleet
Greater Manchester councils to adopt the most recent IAQM Guidance on the Assessment of Dust from Demolition and Construction as current best practice to assess and mitigate emissions from construction sites.		
i. Where a key priority area is affected by a proposed scheme, a high level of mitigation control will be requested		

6.2 Development Planning Guidance

Emissions associated with sites (once operational) may be assessed for planning purposes on an individual basis. Whilst the GMSF identifies the broad policy and planning approach that will be used by local authorities in potential development areas, it is typically the responsibility of the developers to demonstrate that environmental impacts are acceptable.

Therefore, to ensure consistency in the requirements for assessments to be undertaken throughout the region, the Greater Manchester councils will adopt as best practice the most recent development and planning control guidance published jointly by the Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK), and subsequent updates.

⁶ and future updates

The IAQM/EPUK guidance outlines the criteria that may trigger an air quality assessment, with regard to existing conditions and the predicted changes in traffic flows, car parking or industrial emissions. The detail required in an assessment would be proportionate to the proposed development to demonstrate suitable evidence of the potential local air quality impacts, ranging from a simple letter, to a detailed dispersion modelling assessment, which may also entail scheme-specific local air quality monitoring in situations where no suitable data is otherwise available.

The objective of using the guidance as an action is to ensure that potential local air quality effects are not overlooked, and is not intended to introduce a burden on developers or local authorities to undertake unnecessary work.

The guidance will also be used to determine where additional mitigation controls may be required to reduce air quality impacts in Key Priority Areas, and to monitor potential cumulative impacts from multiple developments.

This action would complement:

- 1.3 Cumulative Development Database
- 2.1 Delivery and Servicing Plan Toolkit, but implementing a travel plan to minimise the number of journeys and to route vehicle to avoid the Key Priority Areas
- 5 Travel Choices, to provide access to alternative travel options for users of new developments
- 7.7 Air Quality Monitoring Database.

Action 1.2		
Reduce Traffic	Increase Efficiency	Improve Fleet
<p>GM local authorities will adopt the most recent IAQM/EPUK guidance for air quality assessment as current best practice, to help ensure that planning applications consider potential local air quality impacts and opportunities to improve air quality are realised.</p> <p>i. Where a Key Priority Area is significantly adversely affected by a proposed scheme, a high level of mitigation control will be requested.</p> <p>ii. The IAQM/EPUK guidance will also be used to screen and assess industrial sources, such as boilers or large stationary engines.</p> <p>GM local authorities to recommend mitigation controls in accordance with the most recent guidance and the other actions in this document for new developments that contribute to a deterioration of air quality in Air Quality Management Areas (AQMA's).</p> <p>Where an air quality assessment is triggered, it should include a review of monitoring data. Where monitoring is not currently undertaken, it may be requested to inform the application or to confirm the effects.</p>		

6.3 Cumulative Development Database

A key issue of concern that has affected air quality in regions throughout the UK has been the effect of development-creep, whereby numerous small developments have been approved in isolation, leading to a potentially significant cumulative impact.

All planning applications should incorporate a review of other local applications (either pending or approved) and incorporate the combined effects into the assessment scenarios. Therefore, air quality assessments for significant new developments (triggered by the IAQM/EPUK guidance) will be recorded on a Geographic Information System (GIS) by TfGM, which may be accessed by local authority air quality officers and used by local authorities or developers to appraise potential effects that may arise due to multiple developments in proximity to each other.

It is not the intention that TfGM will take on any responsibility for planning regulation, but will provide the database resource for use by other parties.

This action would complement:

- 1.2 Development Planning Guidance
- 2.1 Delivery and Servicing Plan Toolkit, to coordinate the effects of increased traffic flows.

The support roles provided by TfGM are discussed in Section 12.6.

Action 1.3		
Reduce Traffic	Increase Efficiency	Improve Fleet
A centralised database of significant planning applications and air quality assessments will be managed by TfGM, as a record of the cumulative effects of multiple developments and thereby facilitate combined approaches to minimising emissions.		

6.4 Clean Air Zones

A Clean Air Zone (CAZ) is a form of access restriction which is implemented with the objective of reducing the number of polluting vehicles using a particular geographical area and encouraging the uptake of alternatives. One type of CAZ could be a Low-Emission Zone (LEZ). The impact can be likened to an acceleration of fleet turnover, by reducing vehicular emissions sooner, due to improved emissions technology. In Europe there are approximately 200 LEZs in operation, or at an advanced planning stage, across 11 countries.

A LEZ can be set up in various ways, including through a Traffic Regulation Order under s1-4 of the Road Traffic Regulations Act 1984, the scope for which was widened by the Environment Act 1995 (s36 Schedule 22) which states that they can be used 'with respect to the assessment or management of the quality of air'.

The establishment of a LEZ has been recognised as a possible tool for improving local air quality, which would require careful research to identify the economic, social and environmental impacts (positive and negative) of establishing a LEZ. Such analysis would need to consider geographic and vehicular scope, the level of charge to both drive change and to cover operational costs of the scheme and what exemptions would be allowed. It is also essential that the appraisal should identify the resultant human health and economic impacts.

As discussed in Section 5.9, the SRN incorporates the M60, which is a major peripheral route through the region operated by Highways England. The SRN may be affected by traffic redistributed due to a LEZ, and so the effects of this must be identified and discussed with the HE as part of the appraisal.

The LEZ/CAZ may complement and affect most of the actions in the Plan, as it will alter the baseline against which the effects of the actions would be compared, whilst the implementation of other actions and programmes will affect how the LEZ/CAZ may be operated.

Action 1.4

Reduce Traffic

Increase Efficiency

Improve Fleet

TfGM will undertake an appraisal of the effects of CAZs to incorporate the following:

- i. Determine the possible appraisal scenarios, considering geographic scope, implementation timeline, political and public acceptability enforcement, and existing/projected vehicle fleet.
- ii. Local air quality assessment.
- iii. Health impact assessment.
- iv. Economic and cost/benefit appraisal.

The appraisal will also consider the cumulative and knock-on effects of a CAZ on other areas, such as the potential redistribution of significant components of the fleet into areas outside the controlled zone.

It will also be essential to consider the other actions in this Plan, as many could alter the baseline against which the effects of the CAZ would be compared, and many could also affect the implementation of a CAZ directly.

6.5 20mph Zones

Emissions from vehicles are highly dependent on speed profiles, whereby very low and very high speeds or hard acceleration typically result in the highest emissions, as the engine is operating outside the most efficient range. The speed/emission profiles in Section 3.4 demonstrate how vehicle emissions generally increase at lower speeds, whilst lowest emissions occur at ~50-70km/hr (~30-50mph).

The implementation of 20mph zones in urban areas has been cited as having the potential to benefit local air quality through smoother vehicle flow through junctions and reduced acceleration and braking, as well as having potential for additional benefits from encouraging modal shift from driving to walking or cycling. Whilst average-speed emissions models suggest that vehicle emissions at 20mph are greater than at 30mph it is thought that the influence on driving styles of 20 mph zones is smoother with less aggressive accelerations and decelerations and more time spent driving in the cruise phase, which results in lower exhaust emissions overall. However, research carried out to date has shown mixed results for different pollutants and different vehicle types.

Recent studies carried out in the City of London indicated that NO_x and CO₂ emissions of light-duty petrol vehicles were higher for 20mph roads than 30mph road sections, whilst for light-duty diesels lower NO_x and CO₂ emissions were observed for 20mph roads. Emissions of PM for both petrol and diesel light-duty vehicles were estimated to be lower in 20mph zones than 30mph zones, which may be attributable to lower non-exhaust PM emissions at lower speeds (e.g. brake and tyre wear, resuspension of road dust). Overall, it was concluded that it would be “incorrect to assume a 20mph speed restriction would be detrimental to ambient local air quality, as the effects on vehicle emissions are mixed”⁷.

In Salford, Chapel Street has been transformed into a pedestrian-friendly city centre environment, while still retaining its function as a principal public transport corridor. Peak time traffic volumes have been reduced from 1,800 to 1,200 vehicles per hour, with speeds reduced from 30mph to 20mph. This will have a beneficial effect due to reduced traffic flows, whilst it should also improve traffic flow and reduce ‘stop-start’ movements.

⁷ <http://www.cityoflondon.gov.uk/business/environmental-health/environmental-protection/air-quality/Documents/speed-restriction-air-quality-report-2013-for-web.pdf>

Action 1.5

Increase Efficiency

Review the effects of 20mph zones on air quality and incorporate this when scoping proposals for such zones in GM.

- i. Review assessment reports and studies from other regions to determine the potential effects of 20mph zones may have on vehicle emissions in different road conditions.
- ii. Undertake air quality monitoring in areas where speed restrictions may be implemented to provide an additional local dataset before and after a scheme is implemented.

Identify route corridors in the Greater Manchester region where 20mph zones may be enforced, and where it may have beneficial effects on emissions, with regard to the existing fleet composition and the traffic flow patterns.

6.6 Encouraging Travel Planning

Companies are encouraged to look at travel planning measures, and to investigate the potential of additional demand management measures to effect a significant mode shift and to stimulate the uptake of low-emission vehicles.

Those companies that do not agree to implement a travel planning scheme may be financially penalised based on the number of employee parking spaces they provide. Therefore, whilst there should be no unreasonable detrimental effects from implementing travel choice schemes, the financial penalty to employers should ensure that it is well-supported.

This action is dependent on the following actions being implemented:

- 2.1 Delivery and Servicing Plan Toolkit, where use of the Toolkit would be sufficient evidence for users to avoid paying the levy
- 5 Travel Choices, which may be used for workplace travel planning.
- 1.4 Clean Air Zone, where the effects of a levy may be included as an appraisal scenario.

Action 1.6

Reduce Traffic

Increase Efficiency

Improve Fleet

Investigate the potential of additional demand management measures to effect a significant mode shift and to stimulate the uptake of low-emission vehicles.

6.7 Taxi and Private Hire Quality Controls to Prioritise Low-Emission Vehicles

Taxis and private hire vehicles represent a relatively small proportion of the fleet, but they may be disproportionately significant due to the high number of journeys undertaken and vehicle km driven within relatively small areas by a fixed number of vehicles.

Therefore, by ensuring that these vehicles achieve a low-emission profile, it should have a direct and measurable effect on local air quality.

This action would complement:

- 1.4 Low-Emission Zones, where taxis are a key part of the local fleet
- 6.1 Plugged-in Places EV Charging Network, where EV taxis would increase the demand for the charging points.

Action 1.7	
Reduce Traffic	Increase Efficiency
TfGM will work with licensing authorities and seek to standardise the minimum emission requirements (i.e. age) of the vehicles that are allowed to operate.	
The minimum emission standards will be progressively increased in future years to ensure a very low emission limit will be achieved within a defined timescale.	

7 ACTIONS FOR FREIGHT AND GOODS VEHICLES

Emissions from HGVs are disproportionately higher than from cars and other small vehicles, and in areas with large numbers of freight journeys they typically contribute a significant proportion of the total emissions. A number of Key Priority Areas were identified with a high proportion of HGV journeys where reduced HGV emissions would achieve tangible local air quality benefits. The actions below will complement the draft Greater Manchester Freight and Logistics Strategy. The purpose of this strategy is to consider current Greater Manchester delivery, servicing and logistics activities and set out the ambitions for the region beyond 2025.

7.1 Delivery and Servicing Plan Toolkit

TfGM is developing a Delivery and Servicing Plan Toolkit (DSP) to be used by private and public organisations in coordination with the TfGM Logistics and Environment Team and the Travel Choices team.

The toolkit will be accessible online and will help businesses to identify opportunities to better manage deliveries to ensure supplies are delivered when they are needed in order to save time and costs. The DSP will also help to reduce the negative impacts of delivery-related activities such as harmful emissions, congestion and collisions, including displacing freight from HGVs onto alternative low-emission vehicles. The toolkit will specifically target deliveries into the congested areas such as city and town centres as well as key radial routes.

The toolkit has received Local Sustainable Transport project funding, and is now ready for use.

Many components of the DSP may correlate with air quality improvement and emissions reduction, which will improve local air quality. Therefore, the outcomes from the DSP will be integrated into the AQAP to ensure that the greatest possible synergy is achieved.

This programme will complement other actions:

- 1.2 Development Planning Guidance, which is essential to ensure that sites are properly appraised for local air quality impacts
- 2.3 Urban Consolidation Centres, where travel planning is an essential component required to fully realise the local air quality benefits
- 4.3 Cycle Logistics.

Action 2.1		
Reduce Traffic	Increase Efficiency	Improve Fleet
<p>Air quality considerations will be incorporated into the DSP Toolkit to reduce HGV/LGV movements, and hence emissions, in the key priority areas. The toolkit is designed to help private and public organisations better manage deliveries.</p> <ol style="list-style-type: none">i. All GM councils will implement the DSP Toolkit at their own sites.ii. The Key Priority Areas for air quality due to HGV emissions will be included in the toolkit, to encourage more efficient practices.iii. TfGM will support the use of the DSP Toolkit as best practice at all new development sites.		

7.2 Urban Distribution Centres

TfGM is investigating opportunities to create new local freight distribution centres on the outskirts of the city centre and other key areas with high volumes of HGVs, which would be integrated with key national and regional HGV routes (e.g. motorways), as well as alternative transport options, such as water and rail.

It will be important to ensure that new distribution centres utilise low-emission, or ultra-low-emission vehicles, such as EV LGVs, to complete the last stage of delivery into the city centre or other ultimate destination. Travel planning should also be used to ensure that the greatest local air quality benefits can be achieved during the operation of a new centre.

This programme will complement other actions:

- 2.1 Delivery and Servicing Plan Toolkit, which is an essential component to ensure that a distribution centre achieves the greatest possible local air quality benefits
- 2.3 Urban Consolidation Centres, where local distribution can be integrated into the overall operation of the site
- 4.3 Cycle Logistics.

It will also interact with the Development Management Guidance discussed in Section 6, which considers the effects of new development and the implementation of mitigation controls:

- 1.2 Development Planning Guidance, which is essential to ensure that site is properly appraised for local air quality impacts.

Action 2.2		
Reduce Traffic	Increase Efficiency	Improve Fleet
Locations for potential distribution centres will be identified in the Greater Manchester Spatial Framework, and where these are proposed to be constructed, they will use travel planning to ensure that local air quality benefits are realised.		
i. Low-emission, or ultra-low-emission vehicles, such as EV LGVs, will be used to complete the first/last stage of delivery.		

7.3 Urban Consolidation Centres

TfGM is investigating opportunities to create new local consolidation centres in the city centre and other key areas with high volumes of goods vehicles. It is intended that these would be used as shared local distribution centres for delivery of goods and collection of waste, which would reduce the number of HGV/LGV journeys to individual customers.

Local distribution to and from the consolidation centres will be undertaken with cycle or ULEV by coordinating the scheme with other Actions:

- 2.1 Delivery and Servicing Plan Toolkit, which is an essential component to ensure that a distribution centre achieves the greatest possible local air quality benefits
- 4.3 Cycle Logistics.

'White van' courier and small parcel deliveries have been recognised as a potential concern in the region, with deliveries from multiple delivery providers often visiting the same premises. Therefore, the consolidation centres will also be used as small parcel delivery centres, so packages can be delivered to a central point for later collection or local delivery with bicycle courier or EV, whilst small parcel consolidation centres will also be introduced at, or near, key public transport interchanges to reduce delivery journeys.

In areas where any consolidation centres are operating, including privately operated sites, all GM councils will stop personal workplace deliveries to council offices to reduce the number of 'white van' courier journeys and to support the operation of small parcel consolidation centres

This programme will complement other actions:

- 1.2 Development Control Policies, which consider the effects of new development and the implementation of mitigation controls.

Action 2.3		
Reduce Traffic	Increase Efficiency	Improve Fleet
<p>The GM councils and TfGM will implement a policy to actively encourage and facilitate consolidation centres for freight deliveries and waste collection,</p> <ol style="list-style-type: none"> i. Integrate these into the operators' travel plans and existing low-emission infrastructure, such as EV charging. ii. The introduction of consolidation centres in new developments will be incentivised through travel planning. iii. The local deliveries from the consolidation centre should be by foot, cycle or EV. iv. All GM councils will stop personal workplace deliveries to council offices to reduce the number of 'white van' courier journeys and to support the operation of small parcel consolidation centres. 		

7.4 LTP Access for Freight to Key Economic Centres and Sub-regional Freight Facilities

TfGM recognises the importance of moving more freight by rail and water, thereby reducing the number of HGVs on the roads. Whilst the movement of freight by rail and water still involves emissions to air, typically the emissions would be moved away from the priority areas.

The Northern Hub rail proposals will enable more freight trains to be operated on existing routes and provide the stimulus for further commercial investment in rail freight facilities. Alongside this, significant commercial proposals are now being developed for much greater use of the Manchester Ship Canal for freight, including the planned development of a multi-modal freight interchange at Port Salford.

This programme will complement other actions:

- 2.1 Delivery and Servicing Plan Toolkit
- 2.2 Urban Distribution Centres
- 2.3 Urban Consolidation Centres
- 2.5 Freight Information Channels.

Action 2.4	
Reduce Traffic	Increase Efficiency
<p>Where areas for freight facilities are identified in the GMSF or any local plans, they can be integrated with rail and water routes in order to reduce the numbers of road HGV movements.</p> <p>i. Where these facilities are proposed to be constructed they will use travel planning tools (see Action 5.3) to ensure that local air quality benefits are realised.</p>	

7.5 Freight Information Channels

TfGM will explore how active information channels (satellite navigation, smartphones etc.) can be better used for the benefit of freight and other commercial traffic to give access to information on network disruptions.

This programme will complement other actions:

- 2.1 Delivery and Servicing Plan Toolkit.

Action 2.5	
Reduce Traffic	Increase Efficiency
<p>TfGM will identify where mobile, digital and live information channels can be used to improve the efficiency of freight transport by providing accurate and up-to-date information to operators and drivers.</p>	

8 ACTIONS FOR BUSES

Buses represent a significant proportion of the total traffic flow in many urban centres throughout Greater Manchester. Whilst buses are an important component of total emissions, this Plan and other various strategies seek to encourage an increase in bus patronage. Therefore measures to target these vehicles are essential to achieve the Action Plan objectives.

8.1 Bus Priority Programmes

Bus priority programmes are designed to make bus services more reliable and punctual, passenger waiting facilities more accessible, and improve conditions for pedestrians and cyclists.

8.1.1 Progress

Since 1999/2000, £88m has been invested in Quality Bus Corridor (QBC) routes in Greater Manchester and the network now covers over 172 miles of bus routes throughout the region. The programme was developed in partnership with local authorities and bus operators. Greater Manchester Passenger Transport Authority provided programme governance and Transport for Greater Manchester provided programme and project management services. Aligned to this, bus operators have focused their fleet renewal programmes on these strategic routes, including modern low-emission vehicles and enhanced driver training programmes. The Government is in the process of drafting new bus legislation to encourage greater integration and coordination of bus networks and these new powers will be managed by regional combined authorities. Greater Manchester will be able to utilise these new legislative powers and options as part of its future bus strategy in order to expand upon the network progress that has already been achieved.

More recently, specific large-scale projects include the improved bus connections between Leigh, Salford and Manchester, including 7km of guided busway, with a further 14km of dedicated bus lanes and enhanced priority at junctions. The guided section incorporates a dedicated path for walkers, cyclists and horses, and park and ride facilities at Leigh, Tyldesley and Worsley (see Appendix B). This route includes a Key Priority Area on the A580 East Lancashire Road.

Action 3.1	
Reduce Traffic	Increase Efficiency
TfGM is currently working with its partners to identify what improvements might be included within the next GM Local Transport Plan to maintain passenger numbers and continue to grow the customer base. TfGM's future bus strategy for Greater Manchester will seek to explore how air quality considerations can be prioritised	
i. Where the permitting environment allows it, ensure appropriate vehicles are used on specific routes, so buses with the lowest emissions profile will be routed through the areas suffering the highest pollutant concentrations.	

8.2 Bus Improvements

Significant improvements have been made to the profile of the fleet in Greater Manchester over recent years by working jointly with operators and utilising government funding. The Greater Manchester Bus Partnership Code of Conduct is a voluntary agreement setting out commitments and standards for local bus services, with the aim of enhancing the experience of bus travel, and seeks to support further ongoing investment in new buses within the region. This action plan seeks to support the continuation of the current trend in vehicle investment (based on observed fleet) which indicates that over the next 10 years there will only be a very small proportion of vehicles older than Euro V remaining in the Greater Manchester fleet.

8.2.1 Green Bus Fund

The Green Bus fund (<https://www.gov.uk/government/collections/background-to-the-green-bus-fund>) was a central government initiative intended to support operators and local authorities in England to buy new low-carbon buses.

Through successful bids to this competition since 2009, a total of 298 low-emission vehicles for Greater Manchester have been part-funded by DfT, as follows:

Funded and Purchased by	Single-deck	Double-deck
Transport for Greater Manchester	101 diesel-electric hybrid 3 fully electric	
Commercial Operators	28 diesel-electric hybrid	166 diesel-electric hybrid

This initiative should continue to benefit local air quality, although as discussed in Section 3.4.2, careful engine tuning should be used to ensure that emission profiles suit the local conditions and local air quality benefits should not be assumed with all new vehicles. Furthermore, a Low-Emission Bus Scheme was launched by the Office of Low-Emission Vehicles in spring 2015, with submissions in October 2015, offering a new funding stream to promote the update of low and ultra-low-emission buses, and associated charging infrastructure, over a three-year period from April 2016-19, which operators in Greater Manchester have been encouraged to take advantage of.

8.2.2 Clean Bus Technology Fund

TfGM has utilised DfT's Clean Bus Technology Fund to fund the installation of pollution control equipment on the older diesel buses within its 'Yellow School Bus' (YSB) fleet, which disproportionately affect children due to operation in the vicinity of schools. 33 Euro III YSB vehicles have been upgraded since 2013, achieving up to 90% reduction in nitrogen oxides, and funding has now been secured to retrofit the remaining seven Euro IV YSBs, which will complete the upgrade of the whole diesel YSB fleet. These are the only vehicles for which a retrofit programme is deemed preferable to renewal, given the limited mileage of their operation is expected to enable an extended vehicle life

These programmes will complement other actions:

■ 3.1 Quality Bus Corridors.

Action 3.2

Improve Fleet

The following bus improvement actions will be considered for bus improvements:

- i. Utilise new transport legislation to support the adoption and compliance of an appropriate set of standards across the bus network in Greater Manchester.
- ii. Emission testing for new vehicles to ensure they achieve the required emissions standard in real-world conditions.

8.3 Hybrid Bus Improvements

The bus fleet operating in the Greater Manchester region includes a significant number of hybrid diesel-electric vehicles (acquired through the Green Bus Fund and operator self-financing), which use a combination of electric and diesel engines to drive the wheels. This achieves high efficiency and low emissions compared to many traditional pure-diesel vehicles. However, these vehicles cannot be driven in the same way as diesel engine vehicles, as the diesel engine will supplement the electric drive under heavy load (i.e. accelerating or at high speed).

Driver training is essential to ensure that the buses are operated in such a way that achieves the lowest emissions, with the minimum reliance on the diesel engines. This may be supplemented by geofencing control systems that will automatically use the electric drive preferentially within defined areas, such as the key air quality priority areas.

Action 3.3

Increase Efficiency

The following bus improvement actions will be considered for hybrid buses:

- i. Consider the potential of new technologies, such as geofencing and exhaust abatement technology, helping to ensure that benefits are maximised, and where appropriate influence operators accordingly. Seek to establish the level to which operators currently deliver eco-driving training and promote its further roll-out where appropriate, specifically training for drivers of hybrid vehicles, to ensure that the buses are operated in such a way that achieves the lowest emissions.

8.4 Trial of Low-Emission Vehicles

Currently, the technologies for buses achieving the lowest emissions are considered to be either pure-EV or range-extenders such as the new London Routemaster vehicles, which uses an electric drivetrain with an on-board diesel generator.

Pure-EV will require significant infrastructure using dedicated charging points or inductive charging equipment in key locations, such as long-duration stops or terminals, and may also offer limited flexibility for use on other routes. However, they have been proven to be suitable for specific situations such as the Metroshuttle in Manchester city centre, which provides a free service from Piccadilly, Victoria, Oxford Road and Salford Central rail stations and can carry up to 57 passengers. With the successful uptake of this technology for small-scale schemes, it will increase the opportunities to introduce additional routes across a wider geographical area.

The range-extender buses are still a very new technology, and are not widely used outside London. However, they do not require the introduction of a significant amount of new infrastructure, and from a passenger perspective they are no different from existing vehicles.

TfGM will follow the development of this technology trial in London and identify any opportunities for its application in Greater Manchester

Action 3.4

Improve Fleet

TfGM will consider opportunities for trial of a range-extender bus or other Ultra-Low-Emission Vehicle:

- i. Investigate the relevance and potential for application of new technology and work with operators to seek funding opportunities to support trials of new vehicles.
- ii. TfGM will seek to develop its bus strategy so that use of these types of vehicles will be increased throughout the Greater Manchester bus network.

9 ACTIONS FOR CYCLING

Encouraging more people to make journeys and commute more regularly by bicycle will have significant health effects whilst representing a major component of the overall programme to promote a modal shift away from private cars. The actions are primarily targeted towards supporting existing schemes in order to identify and enhance the local air quality benefits.

9.1 Minor Cycle Infrastructure Funds

The following grants relate to cycle infrastructure, which support the key objectives to increase cycling in the region outlined in the Greater Manchester Cycling Strategy:

Local Sustainable Transport Fund (LSTF) Key Component

LSTF supports the key goals of the Cycling Strategy by providing the essential infrastructure for an integrated cycling and public transport network comprising:

- secure parking in town centre cycle hubs
- adult cycle training
- cycle maintenance classes.

Local Sustainable Transport Fund (LSTF) Large Project

The large projects comprise a package of schemes to improve sustainable access to work and reduce congestion through active travel, which support the ongoing major projects for Community Transport, Smart Technology and Travel Choices.

Cycle Safety Fund

Provides safety improvements at local accident hotspots and key junctions through a discrete funding package that is separate from the other schemes being undertaken to promote cycling in the region.

Connect 2

The Greater Manchester Cycling Strategy and the introduction of cycleways are key programmes and policies that are leading the improved cycle network in Greater Manchester. The capital programme for small schemes will ensure that the ongoing maintenance and improvements of the network continues to go ahead independently of the headline projects.

9.2 Cycle City Ambition Grant (CCAG)

The Greater Manchester Cycling Strategy (TfGM, July 2014) builds on the previous Local Transport Plan policy and the investment secured through the LSTF and the CCAG.

The CCAG provides ring-fenced funding for a network of strategic cycle routes within the M60 ring, including 'cycle and ride' stations/stops and cycle promotion. This is a discrete funding package that is separate from the other schemes being undertaken to promote cycling in the region.

9.2.1 Progress

TfGM is delivering a £20million programme of investment as part of the CCAG work package 1 (CCAG1) which includes new cycleways, development of cycle and ride stations and cycling promotion programme, targeting schools and colleges. Work is ongoing to deliver the programme of works.

Subsequently a second application for £22 million of funding for CCAG work package 2 (CCAG2) was successful in 2015, extending work on cycleways, stations and schools and adding an additional theme of Cycle Friendly District Centres. TfGM is currently mobilising for delivery with implementation over the next three years.

There are also a number of cycling schemes that have been delivered as part of the Local Sustainable Transport Fund (LSTF) programme, including a network of 14 cycle hubs across Greater Manchester.

LSTF work has also included delivery of behavioural change and training initiatives to promote cycling.

9.3 Cycleways

Improved cycle provision in Greater Manchester is a core theme to the transport infrastructure and policy development.

The Greater Manchester Cycling Strategy builds on the previous LTP policy and the investment secured through the LSTF and the CCAG. It sets out a regional approach to prioritise future investment in capital and revenue spend on cycling, and challenges policy makers to ensure that programmes are in place to influence, enable and encourage individuals, families and communities to take part in physical activity and adopt active travel choices.

TfGM is working with partners to develop action plans to deliver a sustained and strategic programme of investment in cycling from both the public and private sectors. Within a generation, we are aiming to make cycling a mainstream, every-day and aspirational form of transport for all, regardless of age, ability or background.

The ambition is to increase the number of trips made by bicycle from approximately 2% to 10% by 2025.

9.4 LTP Network of Safe Cycle Routes

The Greater Manchester Cycling Strategy outlines the key objectives that will create a pro-cycling culture by providing safer cycle routes, more parking and training and traffic management that reduces speeds and gives greater priority to cyclists. It prioritises cycle access to Manchester city centre, town centres and public transport interchanges, supported by improved cycle parking at these locations.

Clear objectives that reach out across all districts will be delivered, to improve connectivity between residential areas, key destinations, employment areas, rail and Metrolink stations and interchanges.

9.5 Consolidated Cycle Actions

The overall cycling strategy and network infrastructure improvements are intended to encourage the uptake of cycling in the region, and support the overall programme of travel choices.

Therefore, the actions will apply to the overall cycling programme, rather than an individual programme or scheme.

Action 4.1

Reduce Traffic

Improvements to cycle networks will focus on providing routes that are suitable alternatives in order to reduce the number of vehicle movements in the key priority areas. TfGM will implement a programme of advice/support for users to promote the network.

9.6 Public Cycle Hire

Existing public cycling facilities include secure parking centres and basic racks provided by GM authorities, as well as privately operated hire companies. However, funding opportunities are being investigated in order to install unmanned bike hire stations, based on the London model, whereby users can pay an annual subscription or individual payments to collect a bike from one hire station and leave it at another. The bikes do not need to be booked, and can be used as required.

In Greater Manchester, the cycle stations could be located near major public transport interchanges in the urban centres so that passengers could complete the last stage of a journey.

Action 4.2

Reduce Traffic

Explore the feasibility of public cycle hire facilities in urban centres, with hire points located near transport hubs and major journey destinations.

9.7 Cycle Logistics

This Action Plan incorporates a number of travel freight distribution and logistics actions. A logistics scheme will be implemented to identify funding opportunities or partners to provide cycle courier services as an alternative to EV or white vans. The services would deliver small parcels to the ultimate recipient from the urban consolidation centres.

This programme will complement other actions:

- 2.1 Delivery and Servicing Plan Toolkit
- 2.3 Urban Consolidation Centres.

Action 4.3

Reduce Traffic

TfGM will encourage and promote a logistics programme to use cycle or electrically-assisted cycles for short distance deliveries and distribution in urban centres.

10 ACTIONS FOR TRAVEL CHOICES

Greater Manchester provides excellent public transport facilities, including substantial tram, bus, rail and cycle networks, with well-serviced interchanges. The Travel Choices programme further improves accessibility, information and ticketing to ensure that travellers have the greatest possible access to the most suitable form of travel for each journey.

10.1 Car Clubs

Car clubs provide access to a fleet of cars or LGVs for members who contribute a subscription fee, along with a pay-as-you-go contribution based on mileage. The fleet cars are typically distributed in allocated on-street parking spaces and accessed by members with a smart card through an online booking system.

The vehicles used by car clubs are typically new, small petrol engine vehicles that are well maintained, with a proportion of the fleet being EVs. These types of vehicle are more suitable for short journeys in an urban environment than diesel engine cars, and will often achieve relatively lower emissions than the majority of the private vehicle fleet.

10.1.1 Progress

Car clubs are in the early stages of development across Greater Manchester and currently only Manchester and Salford have implemented such schemes:

- 'City Car Club' currently operates in Manchester city centre (and the immediate surroundings), providing on average a fleet of 42 vehicles comprising around 28 standard low-emission vehicles, 11 hybrid vehicles and three vans. In terms of utilisation there are currently 956 members (156 corporate and 799 personal accounts), although there can be multiple drivers registered under an account, and many members rarely use it.
- City Car Club is running a car club trial at MediaCityUK, which began in September 2014. MediaCityUK benefits from strong sustainable transport links and the response from residents to the car club as a further option within MediaCityUK has been positive. This may in part be influenced by the limited availability of parking options for some residential developments in the area with the car club providing a flexible option to suit changing needs whilst complementing sustainable transport options in the area. Although resident take-up has been good, as it's still a recently introduced trial more could be done to help develop and grow the business market for car clubs at MediaCityUK.
- 'Co-Wheels' is a not-for-profit social enterprise that has been appointed to operate the Salford City Council (SCC) Car Club. The scheme includes block-booking for SCC staff during core working hours (400 essential car users and 800 casual car users will be transferred into the scheme offering significant savings) with the scheme available to businesses and residents at all other times. The Salford Car Club scheme initially provides 10 vehicles but both client and operator have indicated that there may be room to expand the fleet mix could be altered where necessary. Salford issued its contract specifying a target of 20% EV or hybrid within the car club fleet, where installation of additional EV charging posts would permit a greater number of EVs to be introduced bringing potentially greater benefits to the scheme.

TfGM recently outlined a brief for further car club activity funded by the Local Sustainable Transport Fund (LSTF). This project includes development of an outline business case/guidance document on car clubs and a detailed business case for Oldham to investigate a shared-mobility solution:

- Phase 1 of the two-stage report will take the form of an outline business case, stating the benefits of car clubs for all GM local authorities who have yet to implement a car club, and also review opportunities for GM policy around shared mobility.

- Phase 2 of the report will require the production of a detailed business case for Oldham Council to define the optimum operational car club model to pursue. The Business Research Commission will take the form of an online survey targeted at businesses within MediaCityUK to promote the existing trial, understand the business market and the potential take up of car clubs.

The types of vehicles being used by the car clubs should achieve the most recent Euro emissions standards, or ultra-low-emission rating, in order to maximise the potential air quality benefits. The introduction of ultra-low-emission vehicles and EVs through car clubs and similar schemes may also promote their wider uptake in the local vehicle fleet. The car clubs programme will complement other actions, including:

- 6.1 Plugged-In Places.

Action 5.1	
Reduce Traffic	Improve Fleet
<p>Appraise the effects of the car clubs that are already in operation and determine how they are affecting pre-existing travel choices (i.e. effects on the modal shift):</p> <ol style="list-style-type: none"> Use this appraisal information to introduce new clubs, or expand the existing schemes to provide access in all districts. Car clubs will be required to operate a high proportion of EVs. 	

10.2 Dynamic Road Network Efficiency and Travel Information System

An Urban Traffic Management Control (UTMC) system is already operated by TfGM to control traffic signals and to regulate traffic flows at key junctions, to monitor and optimise journey times on local roads and motorways, and for the management of car parks.

10.2.1 Progress

A system of Variable Messaging Signs (VMS) is being integrated with the strategic management capability of the UTMC in order to identify abnormal journey times and to notify drivers of congestion. This Advanced Traffic Management system (AToM) along with the Optimised Public Transport Integration System (OPTIS) is currently being developed using funding from the Local Sustainable Transport Fund.

It utilises real-time information from buses to enable traffic signal timings to be adjusted to provide delayed services with priority through traffic signals, enabling greater bus service reliability, and will also provide real-time journey information via smart phones and VMS. It is intended that the system will also prioritise public transport and reduce congestion by promoting alternative travel choices and to integrate the air quality alert systems discussed in Section 12.3.

This will complement other actions, including:

- 2.5 Freight Information Channels
- 7.3 Pollution Alert
- 7.5 Contingency Response Plan.

Action 5.2

Increase Efficiency

The following travel information systems actions will be undertaken:

- i. Travel choice messages will be included on the VMS and messaging systems in order to promote alternative travel options.
- ii. Pollution events and health advice will be posted on the VMS and messaging systems so that vulnerable people will be able to make an informed decision about how they want to travel and to avoid options or routes that may exacerbate health effects.

10.3 LTP3 Programmes

Greater Manchester's current Local Transport Plan (LTP3) was published in March 2011 and includes a series of programmes which support the delivery of a more sustainable Greater Manchester transport system, helping to support modal shift away from single occupancy car use. A new Local Transport Plan is currently in development (the Greater Manchester Transport Strategy 2040). A key focus of this new Strategy will be delivering a transport system that supports a sustainable, low-emission city region, and air quality measures will be embedded into the new plan. Below is a summary of our current Local Transport commitments as set out in LTP3, which will be updated following preparation of the GM Transport Strategy 2040:

10.3.1 LTP3 Efficiency and Reliability of Current Networks

The network management policies will help to improve the efficiency and service reliability of the bus network. This supports the existing Quality Bus Corridors and the new Bus Code of Conduct and Quality Partnership Schemes. TfGM will explore the new legislative opportunities that the Government is introducing in order to use its bus strategy to improve the overall management of the bus network in Greater Manchester.

The TfGM proposals to support increased local cycling and walking levels will also support the more efficient use of road space and maximise the efficiency of local rail, bus and tram networks in accommodating the largest possible volume of journeys. However, resolution of the rolling stock capacity, station enhancements and Northern Hub network capacity issues are essential if the full potential of the rail network to support total transport network efficiency is to be achieved.

10.3.2 LTP3 Integrated Smarter Travel Choices Programmes to Promote Lower Carbon Travel Choices

The LTP3 aims to deliver an integrated 'smarter travel choices' strategy for Greater Manchester that promotes the benefits of travel by public transport, bike or walking. This will contribute benefits to the climate change objectives and to public health through increasing activity levels.

The LTP3 involves new partnerships working across all sectors to align a wide range of travel promotion activities, as well as developing innovative approaches to providing travel information and ticketing, such as new technologies, car sharing/car clubs and cycle training/hire schemes.

10.3.3 LTP3 Delivery of Lower Carbon Travel Options

The LTP3 recognises the need to promote a shift from single occupancy car use to walking, cycling, public transport and car sharing by improving the pedestrian environment, removing barriers to cycling, improving cycling infrastructure, enhancing the coverage, increasing the quality of public transport and managing the highway network.

This will help to encourage more car users to change the way they travel and also make it easier for people who do not have access to a car to travel to key facilities.

10.3.4 LTP3 Effective Management of Travel Demand to Minimise Carbon Emissions

Managing the demand for travel is central to achieving climate change objectives. Therefore, the LTP3 will also identify opportunities for demand management to improve the efficiency and reliability of the road network and complement investment in public transport, cycling and walking schemes, and travel promotion programmes.

Reducing CO₂ emissions has often been tackled independently from local air quality, which has led to contradictory policies, such as the promotion of diesel cars. However, a greater understanding of the issues and opportunities has increasingly aligned policies and tools to ensure a synergy between these two objectives.

10.3.5 LTP3 Reduced Harmful Emissions and Noise from Road Transport

The policies to promote increased walking, cycling and use of public transport will all reduce emissions on congested route corridors. TfGM will continue to work with the Government and freight and bus operators to accelerate the renewal of their fleets wherever possible.

TfGM will maintain network efficiencies and work with Government and the private sector to deliver the conditions needed for the widespread adoption of hybrid/electric vehicles. This programme is a general policy to reduce emissions.

10.3.6 LTP3 Rail Passenger Facilities

Stations need to provide a safe location for passengers to obtain information on services, purchase tickets and catch the train. The passenger's experience when using the station influences their perception of the rail service and their willingness to use it in future. Therefore improving facilities for rail passengers will encourage modal shift from private cars and so benefit air quality.

10.3.7 LTP3 Station Travel Planning

The TfGM LSTF Travel Choices Delivery team is developing a Station Travel Plan Toolkit and delivery of 21 Station Travel Plans (STPs) at priority tram and train station locations that sets out to meet the defined Station Travel Plan objectives (July 2014).

The project will involve a target of 700 surveys across five stations and 500 active Personal Travel Plan (PTP, see Section 10.3.10) participants. The overall objective will be to produce 21 STPs, each of which will promote sustainable travel to/from stations and provide detailed information on passenger facilities at those stations.

10.3.8 LTP3 Fares, Ticketing and Information

In addition to improving public transport services and promoting them, the simplification of fares and ticketing are an essential part of the 'smarter choices' programme.

TfGM is committed to working with transport operators and DfT to secure the most effective and deliverable integrated fares structure covering bus, tram and rail travel. This structure must be customer-focused, simple and affordable to achieve:

- Improve value for money for public transport customers;
- Simplify the promotion, purchase and use of public transport;
- Generate sufficient revenue for cost recovery, investment and profit; and
- Maintain a balance between generating revenue and avoiding damage to Greater Manchester's growth prospects through congestion and crowding.

10.3.9 LTP3 Smart Travel Information System

The Smart Travel Information system provides information to travellers specific to their needs, allowing them to take better informed travel decisions. This is being delivered via an online traveller information system and journey planner. The new system utilises real-time public transport and road network information and allow for trips to be planned using multiple modes including cars, park and ride, buses, Metrolink, cycling and walking.

10.3.10 LTP3 Travel Choice Personal Travel Planning

A key element of 'Travel Choices' is the delivery of a Personal Travel Planning (PTP) programme aimed at promoting more sustainable travel, and which will target communities located near new or improved transport infrastructure and services, with a particular focus on cycling.

The PTP programme will be rolled out to 10,000 households, with a fully operational system based on the findings from the initial stages. The PTP falls within the Travel Choices element of TfGM's LSTF programme.

Target areas were carefully selected based on an 'area selection matrix'. Pilot areas were selected based upon analysis of key employment and travel statistics and transport offer with consideration also given to existing and proposed transport investment from the LSTF and GMTF schemes.

10.3.11 LTP3 Travel Choice Access to Employment

To support businesses wishing to promote sustainable commuting and business travel, a toolkit has been developed, incorporating a series of webpages for businesses⁸, a travel survey tool, access to a sustainable travel grant of up to £10,000, a free commuter car-sharing tool and Personal Travel Planning for employees. A small team of business travel advisers also work individually with larger businesses to help them develop PTP action plans and deliver improvements as well as smaller businesses through workshops and self-help material.

To date through the Business PTP workstream, travel advice has been provided to over 11,000 employees across Greater Manchester and full PTPs delivered to more than 6,000 employees. The employment sites have been carefully selected to maximise potential for modal shift based on their willingness to be involved, their employee characteristics and the sustainable accessibility of the site. A further phase from May 2015 to July 2015 targeted engagement with an additional 3,000 individuals and at least 1,500 active PTP participants.

Surveys undertaken during the initial phases of delivery indicate an approximate 10% modal shift towards more sustainable modes of travel. Further modal shift and sustainable travel behaviour would be anticipated as more workplaces become equipped with Travel Plans and Action Plans.

The first sustainable transport grant has been awarded to Kellogg's to provide cycle access onto the Bridgewater Way in Stretford as part of an overall package of measures to encourage sustainable commuting to the site. In addition, nearly 30 businesses have expressed an interest in applying for grants, with more expected as further Action Plans are developed.

10.3.12 LTP3 Improved Environmental Performance across all Transport Fleets

Low-carbon transport technology offers potential to improve environmental performance.

The Government's 'Plugged in Places' programme has provided funding for a network of charging points for electric vehicles to complement Government consumer incentives to purchase electric vehicles. Private sector investment and expertise is critical to long term sustainability, so TfGM is committed to working with operators of public transport, freight and commercial vehicles and with taxi licensing authorities to increase the number of 'green' vehicles in fleets and promote 'eco-driving' techniques, as well as to seek funding to increase the number of 'green' buses in operation in Greater Manchester.

As discussed in Section 3.4, the effectiveness of exhaust emission abatement technology is highly dependent on the implementation and engine tuning. Therefore, the improvements to fleet vehicles will be carefully managed to ensure that any such technology in new or retrofitted vehicles is fit for purpose in 'real-world' situations.

10.3.13 LTP3 Actions

The Travel Choices programme encompasses a range of travel information and accessibility tools to encourage increased use of public transport, and reduced reliance on private car use. The components of the programme are all highly interrelated and tangible air quality benefits are most likely to be achieved where several items are implemented and coordinated together.

Therefore, to ensure that air quality is a key driver when implementing the measures, the implementation teams will be contacted by the TfGM air quality officers so that progress can be monitored and effects of each separate item can be measured and reported. The new LTP will be incorporated into this.

Action 5.3		
Reduce Traffic	Increase Efficiency	Improve Fleet
<p>The Travel Choices programme incorporated into the LTP3 encompasses a range of travel information and accessibility tools to encourage increased use of public transport:</p> <ul style="list-style-type: none">i. Air quality will be a key driver when implementing the LTP3 measures, and will be a key indicator of success, and so the TfGM air quality team will consult with each of the programme teams to ensure that air quality effects are effectively identified and progress is reported in the context of the AQAP. <p>The following Actions will be implemented to improve environmental performance across the fleet:</p> <ul style="list-style-type: none">ii. Seek to support eco-driving training to be offered to bus operators, major hauliers and taxi operators.iii. The regional benefits of an accreditation scheme for major fleets, such as taxi operators, based on driver and vehicle certification, will be evaluated.		

11 ACTIONS FOR CARS

There are more private cars on our roads than any other type of vehicle. Not only are emissions per person/passenger high, but cars also take up valuable road space, causing congestion and preventing the smooth operation of the road network. Therefore, reducing emissions from cars and reducing the number of car trips is essential to achieve the objectives of the Action Plan.

11.1 Plugged-in Places EV Charging Network

The Office for Low-Emission Vehicles (OLEV) offers centralised funding for electric/plugin vehicles and charging points. This funding is not specific to Greater Manchester but plays a role in improving the national and regional fleets and complementing local initiatives.

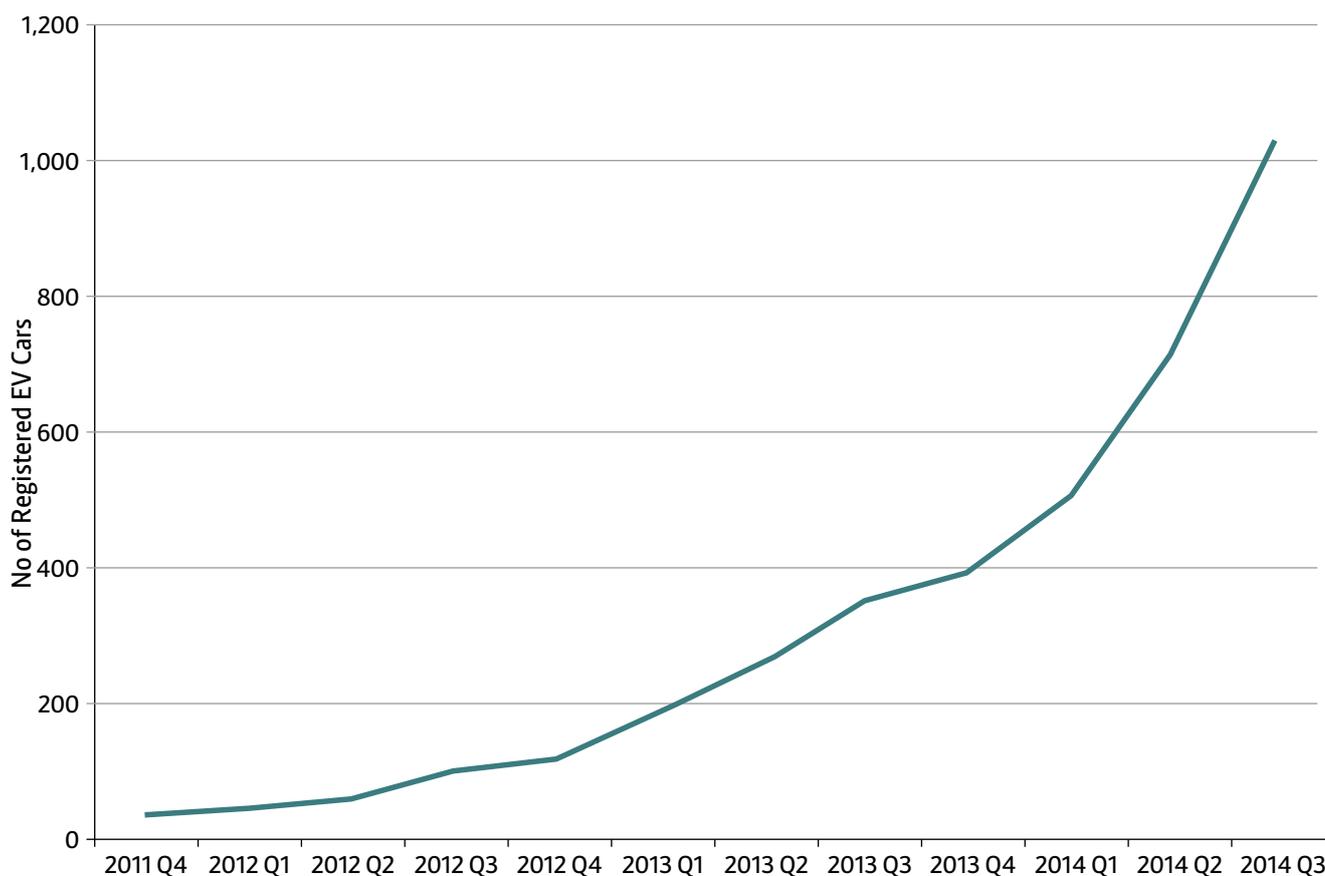
OLEV specifically supports the Plugged-in Places programme⁹, which offers match-funding to consortia of businesses and public sector partners to install electric vehicle charging points. This initiative is integrated with the online service at <https://www.zap-map.com>.

11.1.1 Progress

The network in Greater Manchester was initiated in 2011 and includes over 200 EV charging points (July 2015), with approximately one quarter in fleet depots and private car parks, with the remainder in public car parks and on-street parking bays. Figure 13 displays the number of registered electric cars in North West England from the final quarter of 2011 to the third quarter of 2014, highlighting the rapid uptake of EV cars in the past few years, although the number of registered EV cars only makes up a very small proportion of the total registered private cars in the region.

⁹ <https://www.gov.uk/government/publications/plugged-in-places>

Figure 13: Number of Registered EV Cars in the North West



In Q3 of 2014 there were 1,026 registered EVs in the North West, which represented an increase of around 70% compared to the same period of 2013. This is considered to be a significant growth rate, but must be sustained in order to ensure that EV cars remain an attractive and viable option, which will require a comprehensive network of charging infrastructure, where the capacity of which must satisfy and, ideally, exceed demand.

The Plugged-in Places scheme utilises a smart card or mobile phone app so that registered users can obtain preferential pre-paid charging rates. The registration ID card will be used to access Metrolink facilities, as well as the planned integration of rail and bus fare and ticketing.

Therefore, this programme will complement other actions:

- 1.2 Development Planning Guidance
- 5.1 Car Clubs
- 5.3 LTP3 Programmes.

Action 6.1

Improve Fleet

Continue to increase the number of EV charging points through the Plugged-in-Places programme:

- i. Additional national funding opportunities will be identified.
- ii. Provision of EV charging in residential and commercial developments will be encouraged through planning control and regulation as a means of mitigating local air quality effects and supporting the Low-Emission Strategy (see Section 6.2 Development Planning Guidance).

11.2 Car Use Allowance

The use of private cars by local authority officers is enabled with a car allowance based on recovering cost based on mileage. However, where pool cars, public transport and car club vehicles are a viable alternative means of travel, then the use of personal cars should be discouraged. A sustainable travel hierarchy will be implemented to support this.

Therefore, local authorities will no longer provide a mileage allowance for using private cars for work business outside of their district, except in specific circumstances, such as enforcement actions, or out of hours use when alternative means of travel may not be appropriate.

This programme will complement other actions:

- 1.6 Workplace Parking
- 3 Bus interventions
- 4 Cycling Initiatives
- 5 Travel Choices
- 6.1 Plugged-In Places.

Action 6.2

Reduce Traffic

Discourage the use of private cars for business use.

- i. Work with local authorities to review private car use for local authority staff business journeys, with a particular focus on those journeys outside of their district.
- ii. A sustainable travel hierarchy to be implemented to encourage alternatives to car travel.

11.3 Local Authority Parking Charges

Where local authorities provide parking facilities for staff, a parking charge will be introduced. The charge will be related to the availability of alternative parking facilities that may be nearby, as well as proximity to public transport services. This programme will complement other actions:

- 1.6 Workplace Parking
- 3 Bus Interventions
- 4 Cycling Initiatives
- 5 Travel Choices
- 6.1 Plugged-In Places.

Action 6.3

Reduce Traffic

Work with local authorities to review the introduction of parking charges at local authority offices to discourage private car use in favour of public transport.

11.4 School Travel

It is generally recognised that school travel can contribute significantly to local traffic, leading to congestion in some areas. Therefore, opportunities to minimise these effects will be appraised.

Potential means of reducing car journeys for school, or reducing the effects of the journeys, may include public transport subsidies or flexible school days that allow pupils to arrive earlier or later and avoid peak travel times.

Possible interventions will be identified in consultation with the local authorities, and targeted towards schools in, and near, the Key Priority Areas, where congestion may be a major cause of high pollution concentrations.

This programme will complement other actions:

- 3 Bus Interventions
- 5 Travel Choices.

Action 6.4	
Reduce Traffic	Increase Efficiency
TfGM and district authorities will work with children's services in local authorities and schools to undertake an appraisal to identify measures to reduce the impacts from school car travel.	

12 ACTIONS FOR INFORMATION AND RESOURCES

The provision of useful information will be essential to allow road users to plan journeys, select the best option for the mode of travel and to take into consideration travel conditions. By providing accessible, reliable and up-to-date information across a range of media, individuals and fleet managers can make informed decisions to manage, and react to, local air quality.

12.1 GreatAir Manchester Website

The Greater Manchester councils have used a centralised website at <http://www.greatairmanchester.org.uk> for publishing monitoring data and reports. However, due to budgetary and staff restraints, it may not be possible to continue the operation of the website. Therefore, TfGM will take over the responsibility for managing and curating the regional online air quality resources. This will complement the following actions:

- 5 Travel Choices
- 7.3 Pollution Alert.

Action 7.1		
Reduce Traffic	Increase Efficiency	Improve Fleet
<p>The GreatAir Manchester website will become the responsibility of TfGM due to Greater Manchester councils' budget constraints:</p> <ol style="list-style-type: none">i. TfGM will invest greater resources to improve the website to help support and publicise the air quality Actions.ii. Include education resources for users and schools, with links to travel planning and health responses (see Pollution Event Response Actions).		

12.2 Online Route Finding

The Travel Choices and **get me there** travel programmes are provided by TfGM to ensure good access to journey information. However, many users, including visitors and occasional travellers, in the region are also likely to use online route-finding tools, including those installed on mobile phones. Therefore, it is essential that the most up-to-date and accurate travel routes and service information is made available by these services, and used to promote public and alternative travel options rather than private car use.

This will complement the following actions:

- 5 Travel Choices
- 7.1 GreatAir Manchester Website
- 2.5 Freight Information Channels.

Action 7.2	
Reduce Traffic	Increase Efficiency
<p>The major providers of online mapping and travel information (e.g. Google, Bing) will be contacted to ensure that the best available data is being used and updated frequently in order to promote alternative travel choices in the region.</p>	

12.3 Pollution Alert

A number of existing services are provided on behalf of local authorities that send free messages direct to vulnerable people informing them about air pollution levels in their area. The system is joined voluntarily and is targeted towards vulnerable people with respiratory or pulmonary health issues who may be affected by air pollution events.

The alert system provides a text or email alert on or before the day that elevated air pollution is expected to occur, based on predictive modelling undertaken by the Met Office. The system has been proven to have a direct effect on individuals and has been implemented by a several local authorities and metropolitan areas in the UK.

This will complement the following actions:

- 2.5 Freight Information Channels
- 5 Travel Choices
- 7.1 GreatAir Manchester Website
- 7.4 Health Impact Assessment
- 7.5 Contingency Response Plan.

Action 7.3		
Reduce Traffic	Increase Efficiency	Improve Fleet
<p>Email and text alert service will be launched to warn the public about pollution events and provide advice regarding travel choices.</p> <p>i. The alerts will incorporate advice for individuals to minimise exposure, such as travel choices.</p>		

12.4 Evaluate the Health Impacts of Poor Air Quality

The health and associated economic effects of poor air quality in the region are not currently properly understood. Therefore, a detailed Health Impact Assessment (HIA) will be undertaken in partnership with Public Health England and the Greater Manchester NHS Trust to determine the direct and indirect effects of air quality across the whole of the Greater Manchester region. This will be used to quantify the direct health effects, and also the economic impacts resultant from direct healthcare requirements and the lost work days or productivity.

This will complement the following actions:

- 2.5 Freight Information Channels
- 5 Travel Choices
- 7.3 Pollution Alert
- 7.5 Contingency Response Plan.

Action 7.4		
Reduce Traffic	Increase Efficiency	Improve Fleet
<p>Undertake a HIA for Greater Manchester to quantify and understand the health effects of poor air quality.</p> <p>i. The HIA will be essential to provide good evidence of the need to improve air quality and ensure that public information and health advice is accurate and appropriate.</p>		

12.5 Contingency Response Plan

High levels of pollution over a short period of time may occur due to meteorological conditions, leading to an increase in hospital admissions for respiratory and pulmonary disorders. However, the level of public knowledge to respond appropriately to such an event is often insufficient, which may lead to individuals failing to change their actions in response to a notification.

Therefore, a contingency plan will be created in association with Greater Manchester Resilience Forum (GMRF), and integrated with the public messaging systems, so that vulnerable people will have a sufficient level of knowledge to respond appropriately to an event. The plan will also ensure that the hospitals, health centres and GPs are prepared for increased admissions and have sufficient equipment and resources available during these times.

The contingency plan will need to be integrated with the following actions:

- 2.5 Freight Information Channels
- 5 Travel Choices
- 7.1 GreatAir Manchester Website
- 7.3 Pollution Alert
- 7.4 Health Impact Assessment.

Action 7.5		
Reduce Traffic	Increase Efficiency	Improve Fleet
Publish a contingency plan for periods of high pollution episodes in partnership with the Greater Manchester Resilience Forum.		

12.6 TfGM Air Quality Team

The regional local authorities employ officers to undertake the local air quality management responsibilities, including reporting and monitoring local air quality. These officers also review planning applications and coordinate the planning and permitting regime for industrial sources, and so there is currently a significant workload leading to a staff resource shortage.

Therefore, TfGM will employ a dedicated resource to support the local authorities and to investigate the feasibility of transferring some air quality responsibilities along with some resources to drive the proactive delivery of the action plan, coordinate air quality improvement actions, and support the technical review of air quality assessments. The team will also coordinate a database of air quality assessments undertaken for significant planning applications in order to regulate development creep and ensure that the changing baseline conditions are monitored.

This will complement all of the actions in this Plan.

Action 7.6		
Reduce Traffic	Increase Efficiency	Improve Fleet
TfGM will employ staff resource with responsibility to provide support for key local authority roles, and to investigate the feasibility of transferring some air quality responsibilities along with some resources to drive the proactive delivery of the Action Plan.		

12.7 Air Quality Monitoring Database

Air quality monitoring data is recorded by most of the authorities in the region, as well as being undertaken by Highways England near the strategic road network, and by developers for specific project requirements. TfGM will create and curate a database of air quality monitoring data that may be used and reported by local authorities and consultants.

This will complement the following actions:

- 1.3 Cumulative Development database
- 7.1 GreatAir Manchester website.

Action 7.7		
Reduce Traffic	Increase Efficiency	Improve Fleet
TfGM will create a database of air quality monitoring data for Greater Manchester.		
i. Project-specific data reported for significant planning applications will be collated and included in the database.		
ii. Coordination of data sharing/planning with Highways England will be formalised to ensure that the monitoring near the Strategic Road Network is also collated.		

12.8 Traffic Flow Data

In order to properly appraise the effects of changes to the local fleet, it is essential that the current fleet, and projected future fleet are understood. This data will also be required for future baseline conditions in order to appraise the effects of major schemes in the region. TfGM will seek to obtain information from commercial operators to assist this analysis for the mutual benefit of seeking improvements to air quality across the bus network. This will include:

- Traffic flow composition (i.e. proportions of cars, buses, coaches, HGVs etc.) on all of the major routes in the AQMA
- Fleet information relating to the age/Euro composition for each individual district
- Projected car fleet to include committed Plugged-in Places project
- Projections for the future bus fleets, based on projected capital expenditure, relocation between regions, and retrofit upgrades to exhaust abatement technologies. This should also include the effects of funding grants.
- Changes to the future HGV fleet, which will likely be different for the M60 and the local roads.

It will also be essential to understand how the fleet composition varies in different districts in Greater Manchester and how journey types vary for different types of cars.

This data will be used in the appraisal of the LEZ and also to determine how actions should be implemented that may target specific components of the fleet. For example, actions to target older vehicles will be most effective in areas where these vehicles represent a significant proportion of the overall journeys. This data will also be necessary to appraise the effects of an LEZ where it is important to understand the composition of the existing and projected fleet in order to implement controls that will have a tangible benefit.

Therefore, Automatic Number Plate Recognition (ANPR) will be used to survey vehicles using the roads in the Key Priority Areas and which contribute to traffic in these areas.

Action 7.8

Reduce Traffic

Increase Efficiency

Improve Fleet

Undertake Automatic Number Plate Recognition (ANPR) measurements on roads in the Key Priority Areas to determine the composition of the existing vehicle fleet:

- i. Project the fleet composition forward to future baseline years.
- ii. Make the information available to local authorities and consultants so that accurate and consistent fleet projections are used when appraising new schemes.

13 NEXT STEPS AND SUMMARY OF ACTIONS

This Plan identifies a wide range of opportunities to improve air quality. The implementation of the actions in this Plan must be done in an organised and considerate way so as to realise the potential air quality benefits.

13.1 Implementation Plan

TfGM will take ownership for driving and coordinating the delivery, development and reporting of progress of this Plan with cooperation and support from stakeholders. TfGM and the Greater Manchester district authorities will ensure that sufficient resources are available for the actions to be implemented, and provide technical and logistical support to the local authorities to ensure that actions can be effectively put in place and managed. An Implementation Plan will be drafted in parallel with the final draft of the Action Plan, and will demonstrate how the actions will be undertaken, and attribute responsibility to individuals and teams.

13.2 Monitoring Progress

The air quality improvements will be documented and assessed on a yearly basis.

The progress made achieving the individual actions will be reported with regard to the definition of the action, whereby a specific measurable target may entail, for example, constructing a new facility, or increasing the length of a cycle path.

In addition to achieving each action, the Key Performance Indicators (see Section 5.1) will be used to report progress, such as changes in traffic flow.

13.3 Update and Reviews

The actions in this Plan will be reviewed and updated annually in a progress report. The update will include the following items:

- New funding opportunities, including successful and unsuccessful bids
- New major/minor infrastructure projects
- Updated air quality monitoring data
- Progress on achieving the actions
- Consideration of new transport legislation.

In addition to the updates based on this document, the progress report will include any changes to the actions that may be necessary. This may be due to changes to the funding opportunities, availability of new technology or situations changing so the original action is no longer appropriate.

In addition, there may be opportunity to introduce new actions where funding opportunities, public support, central Government policy or other key drivers make it possible.

13.4 Summary of Actions

The list of actions to be considered for inclusion in the finalised Implementation Plan is presented on the following pages.

There are a large number of actions, reflecting the range of opportunities available to improve air quality. Most of the actions complement one other, or several other actions. Whilst the implementation plan will consider more thoroughly the cost and benefits of the actions, it is likely that the required air quality improvements can only be achieved through a combination of actions, with different magnitudes of effects achieved in different locations.

Table 4: Air Quality Actions

Key:

Reduce Traffic	Increase Efficiency	Improve Fleet
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Action Topic / Name		Action	Timescale for Effect	Owner
Development Control and Planning Regulation	Construction Management Guidance	 <p>1.1 Greater Manchester (GM) councils to adopt the most recent IAQM Guidance on the Assessment of Dust from Demolition and Construction as current best practice guidance to assess and mitigate emissions from construction sites.</p> <p>a. Where a Key Priority Area is affected by a proposed scheme, a high level of mitigation control will be requested.</p>	Short-term	Individual district authorities
	Development Planning Guidance	 <p>1.2 GM councils will adopt the most recent IAQM/EPUK guidance for air quality assessment as current best practice guidance, to help ensure that planning applications consider potential local air quality impacts, and opportunities to improve air quality are realised.</p> <p>a. Where a Key Priority Area is significantly adversely affected by a proposed scheme, a high level of mitigation control will be requested.</p> <p>GM councils to recommend mitigation controls in accordance with the most recent guidance and the other actions in this document for new developments that contribute to a deterioration of air quality in Key Priority Areas.</p> <p>Air quality monitoring data will be requested as a standard policy for proposed schemes that trigger an air quality assessment to inform the assessment or to confirm effects.</p>	Short-term	Individual district authorities
	Cumulative Development Database	 <p>1.3 A centralised database of planning applications and air quality assessments will be managed by TfGM as a record of cumulative effects of multiple developments and thereby facilitate combined approaches to minimising emissions.</p>	Short-term	TfGM and liaison with planning depts of GM councils
	CAZ Appraisal	 <p>1.4 TfGM will undertake an appraisal of the effects of CAZs (Clean Air Zones) to incorporate the following:</p> <p>a. Determine the possible appraisal scenarios, considering geographic scope, implementation and enforcement, existing/projected vehicle fleet</p> <p>b. Local air quality assessment</p> <p>c. Health impact assessment</p> <p>d. Economic and cost/benefit appraisal.</p> <p>The appraisal will consider the cumulative and knock-on effects of a CAZ on other areas, such as the potential redistribution of significant components of the fleet into areas outside the controlled zone. It will also consider the other actions in this Plan, as many could alter the baseline against which the effects of the CAZ would be compared, and many could also affect the implementation of a CAZ directly.</p>	Long-term, with implementation within ~5 years from initial appraisal	TfGM

Action Topic / Name		Action	Timescale for Effect	Owner
Development Control and Planning Regulation (cont.)	20mph Zones	 <p>1.5 Review the effects of 20mph zones on air quality and incorporate this when scoping proposals for such zones in GM:</p> <ul style="list-style-type: none"> a. Review assessment reports and studies from other regions to determine the potential effects of 20mph zones may have on vehicle emissions in different road conditions. b. Undertake air quality monitoring in areas where speed restrictions may be implemented to provide an additional local dataset before and after a scheme is implemented. c. Identify route corridors in the Greater Manchester region where 20mph zones may be enforced, and where it may have beneficial effects on emissions, with regard to the existing fleet composition and the traffic flow patterns. 	Medium, as work will be done immediately, but effect will take longer	TfGM
	Encouraging Travel Planning	   <p>1.6 Investigate the potential of additional demand management measures to effect a significant mode shift and to stimulate the uptake of low-emission vehicles</p>	Medium	TfGM and individual district authorities
	Taxi and Private Hire Licensing	  <p>1.7 TfGM will work with licensing authorities and seek to standardise the minimum emission requirements (i.e. age) of the vehicles that are allowed to operate.</p> <p>The minimum emission standards will be progressively increased in future years to ensure a very low emission limit will be achieved within a defined timescale.</p>	Medium, as the improvement to the fleet will be subject to a defined timescale	TfGM and individual district authorities

Action Topic / Name	Action	Timescale for Effect	Owner	
Freight Interventions	TfGM Delivery and Servicing Plan (DSP) Toolkit	 <p>2.1 Air quality considerations will be incorporated into the DSP Toolkit to reduce HGV movements, and hence emissions, in the Key Priority Areas. The toolkit is designed to help private and public organisations better manage deliveries.</p> <p>a. All GM councils will implement the DSP Toolkit at their own sites.</p> <p>b. The Key Priority Areas for air quality due to HGV emissions will be included in the toolkit, to encourage more efficient practices.</p> <p>c. TfGM and GM councils will support the use of the DSP Toolkit as best practice at all new development sites.</p>	Short to medium-term	TfGM and individual district authorities
	Urban Distribution Centres	 <p>2.2 Locations for potential distribution centres will be identified in the Greater Manchester Spatial Framework, and where these are proposed to be constructed they will use Travel Planning to ensure that local air quality benefits are realised.</p> <p>a. Low-emission, or ultra-low-emission vehicles, such as EV LGVs, will be used to complete the first/last stage of delivery.</p>	Long-term	TfGM and individual district authorities
	Urban Consolidation Centres	 <p>2.3 The GM councils and TfGM will implement a policy to actively encourage and facilitate consolidation centres for freight deliveries and waste collection.</p> <p>a. Integrate consolidation centres into travel plans and existing low-emission infrastructure, such as EV charging.</p> <p>b. The introduction of consolidation centres in new developments will be incentivised through travel planning.</p> <p>c. The local deliveries from the consolidation centre should be by foot, cycle or EV.</p> <p>d. All GM Councils will stop personal workplace deliveries to reduce the number of 'white van' courier journeys and to support the operation of small-parcel consolidation centres.</p>	Short to long-term	TfGM and individual district authorities
	Access for Freight to Key Economic Centres and Sub-regional Freight Facilities	 <p>2.4 Areas for freight facilities will be identified in the GMSF or any local plans where they can be integrated with rail and water routes in order to reduce the numbers of road HGV movements.</p> <p>a. Where these facilities are proposed to be constructed they will use travel planning to ensure that local air quality benefits are realised.</p>	Long-term	TfGM and individual district authorities
	Freight Information Channels	 <p>2.5 TfGM will identify where mobile, digital and live information channels can be used to improve the efficiency of freight transport by providing accurate and up-to-date information to operators and drivers.</p>	Short-term	TfGM

Action Topic / Name		Action	Timescale for Effect	Owner
Bus Interventions	Bus Priority Programmes	<p>3.1 TfGM is currently working with its partners to identify what improvements might be included within the next GM Local Transport Plan to maintain passenger numbers and continue to grow the customer base. TfGM's future bus strategy for Greater Manchester will seek to explore how air quality considerations can be prioritised.</p> <p>a. Where the permitting environment allows it, ensure appropriate vehicles are used on specific routes, so buses with the lowest emissions profile will be routed through the areas suffering the highest pollutant concentrations.</p>	Medium	TfGM
	Bus Improvement Funds	<p>3.2 The following bus improvement actions will be considered for bus improvements:</p> <p>a. Utilise new transport legislation to support the adoption and compliance of an appropriate set of standards across the bus network in Greater Manchester.</p> <p>b. Emission testing for new vehicles to ensure they achieve the required emissions standard in real-world conditions.</p>	Medium	TfGM
	Hybrid Bus Improvements	<p>3.3 The following bus improvement actions will be considered for hybrid buses:</p> <p>a. Consider the potential of new technologies, such as geofencing and exhaust abatement technology, helping to ensure that benefits are maximised, and where appropriate influence operators accordingly.</p> <p>b. Seek to establish the level to which operators currently deliver eco-driving training and promote its further roll-out where appropriate, specifically training for drivers of hybrid vehicles, so as to ensure that the buses are operated in such a way that achieves the lowest emissions.</p>	Medium / long-term	TfGM
	Trial of Low-Emission Vehicles	<p>3.4 Consider opportunities for trial of a range-extender bus or other Ultra-Low-Emission Vehicles.</p> <p>a. Investigate the relevance and potential for application of new technology and work with operators to seek funding opportunities to support trials of new vehicles.</p> <p>b. TfGM will seek to develop its bus strategy so that use of these types of vehicles will be increased throughout the Greater Manchester bus network.</p>	Medium	TfGM

Action Topic / Name		Action	Timescale for Effect	Owner
Cycling Initiatives	Cycle Programmes	4.1 Improvements to the cycle networks will focus on providing routes that are suitable alternatives in order to reduce the number of vehicle movements in the Key Priority Areas. TfGM will implement a programme of advice/support for users to promote the network.	Medium	TfGM
	Public Cycle Hire	4.2 Explore the feasibility of public cycle hire facilities in urban centres, with hire points located near transport hubs and major journey destinations.	Medium	TfGM
	Cycle Logistics	4.3 TfGM will encourage and promote a logistics programme to use cycle or electrically-assisted cycles for short distance deliveries and distribution in urban centres.	Medium	TfGM

Action Topic / Name		Action	Timescale for Effect	Owner
Travel Choices	Car Clubs	 <p>5.1 Appraise the effects of the car clubs that are already in operation and determine how they are affecting pre-existing travel choices (i.e. effects on the modal shift).</p> <p>a. Use this appraisal information to introduce new clubs or expand the existing schemes to provide access in all districts.</p> <p>b. The car clubs will be required to operate a high proportion of electric vehicles (EVs).</p>	Medium	TfGM
	Dynamic Road Network Efficiency and Travel Information System	 <p>5.2 The following travel information systems actions will be undertaken:</p> <p>a. Travel choice messages will be included on the VMS and messaging systems in order to promote alternative travel options.</p> <p>b. Pollution events and health advice will be posted on the VMS and messaging systems so that vulnerable people will be able to make an informed decision about how they want to travel and to avoid options or routes that may exacerbate health effects.</p>	Immediate	TfGM
	LTP3 Programmes	 <p>5.3 The Travel Choices programme incorporated into the LTP3 encompasses a range of travel information and accessibility tools to encourage increased use of public transport.</p> <p>a. Air quality will be a key driver when implementing the LTP3 measures, and will be a key indicator of success, and so the TfGM Air Quality team will consult with each of the programme teams to ensure that air quality effects are effectively identified and progress is reported in the context of the AQAP.</p> <p>The following actions will be implemented to improve environmental performance across the fleet:</p> <p>b. Seek to support eco-driving training to be offered to bus operators, major hauliers and taxi operators.</p> <p>c. The regional benefits of an accreditation scheme for major fleets, such as taxi operators, based on driver and vehicle certification will be evaluated.</p>	Medium	TfGM

Action Topic / Name		Action	Timescale for Effect	Owner
Car Interventions	Plugged-in Places EV Charging Network	<p>6.1 Continue to increase the number of EV charging points through the Plugged-in-Places programme.</p> <p>a. Additional national funding opportunities will be identified.</p> <p>b. Provision of EV charging in residential and commercial developments will be encouraged through planning control and regulation as a means of mitigating local air quality effects and supporting the low emission strategy (see Section 6.2 Development Planning Guidance).</p>	Ongoing and Medium	TfGM
	Car Use Allowance	<p>6.2 Discourage the use of private cars for business use.</p> <p>a. Work with local authorities to review private car use for local authority staff business journeys, with a particular focus on those journeys outside of their district.</p> <p>b. A sustainable travel hierarchy to be implemented to encourage alternatives to car travel.</p>	Short-term	Individual district authorities
	Local Authority Parking Charges	<p>6.3 Work with local authorities to review the introduction of parking charges at local authority offices to discourage private car use in favour of public transport.</p>	Short-term	Individual district authorities
	School Travel	<p>6.4 TfGM and district authorities will undertake an appraisal to identify measures to reduce the impacts from school car travel.</p>	Short-term	TfGM and districts

Action Topic / Name		Action	Timescale for Effect	Owner
Information & Resources	Website and Online Resources	 <p>7.1 The GreatAir Manchester website will become the responsibility of TfGM.</p> <p>a. TfGM will invest greater resources to improve the website to help support and publicise the air quality actions.</p> <p>b. Include education resources for users and schools, with links to travel planning and health responses (see Pollution Event Response Actions).</p>	Short-term	TfGM with support from GM councils' air quality officers
	Online Route Finding	 <p>7.2 The major providers of online mapping and travel information (e.g. Google, Bing) will be contacted to ensure that the best available data is being used and updated frequently in order to promote alternative travel choices in the region.</p>	Short-term	TfGM
	Pollution Alert	 <p>7.3 Email and text alert service will be launched to warn the public about pollution events and provide advice regarding travel choices.</p> <p>a. The alerts will incorporate advice for individuals to minimise exposure, such as travel choices.</p>	Medium	TfGM
	Health Impact Assessment	 <p>7.4 Undertake Health Impact Assessment for Greater Manchester to quantify effects of air quality.</p> <p>a. The HIA will be essential to provide good evidence of the need to improve air quality and ensure that public information and advice is accurate and appropriate.</p>	Short-term	Transport Strategy Team
	Contingency Response Plan	 <p>7.5 Publish a contingency response plan for periods of high pollution episodes in association with the Greater Manchester Resilience Forum (GMRF).</p>	Short-term	TfGM and GMRF
	TfGM Air Quality Team	 <p>7.6 TfGM will employ staff resource with responsibility to provide support for key local authority roles, and to investigate the feasibility of transferring some air quality responsibilities along with some resources to drive the proactive delivery of the Action Plan.</p>	Short-term	TfGM and districts
	Air Quality Monitoring Database	 <p>7.7 TfGM will create a database of air quality monitoring data for Greater Manchester.</p> <p>a. Project-specific data reported for planning applications will be collated and included in the database.</p> <p>b. Formalisation of coordination of data sharing/planning with Highways England to ensure that the monitoring near the Strategic Road Network is also collated.</p>	Short-term	TfGM
	Traffic Flow Data	 <p>7.8 Undertake Automatic Number Plate Recognition (ANPR) measurements on roads in the Key Priority Areas to determine the composition of the existing vehicle fleet.</p> <p>a. Project the fleet composition forward to future baseline years.</p> <p>b. Make the information available to local authorities and consultants so that accurate and consistent fleet projections are used when appraising new schemes.</p>	Short-term	TfGM

14 REFERENCES

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APPENDIX A: LOCAL AND REGIONAL POLICIES

The Greater Manchester councils and TfGM have published a number of policy documents that incorporate a consideration of local and regional air quality and climate change. The key documents that address local air quality are presented earlier in this report, in Section 4. However, it is important to recognise the following strategic policies:

- Local Transport Plan Strategy 2011/12-2015/16, LTP3
- Greater Manchester Climate Change Strategy
- Greater Manchester Strategy
- Growth and Reform Plan 2014
- GM Transport Vision 2040
- Draft Low Emission Strategy for Greater Manchester.

Further information on these documents is provided in the following sections.

Transport for Greater Manchester Air Quality Policies

TfGM operates the public transport network and so has a key role to play in reducing emissions in the region. The TfGM documentation and policies refer to the Greater Manchester LTP Air Quality Strategy and Action Plan, although TfGM has also published an interim document for 'Reducing the Impacts of Air Pollution from Transport on Health and Well-Being', which is intended to support the existing 2006 Air Quality Strategy and Action Plan. The interim objectives of the strategy are:

- To meet statutory limits for nitrogen dioxide and particulate pollution levels in all areas of Greater Manchester for 2015 and 2020
- To mitigate or minimise further negative impacts on air quality due to economic growth in the conurbation
- To aim for more ambitious reduction targets to 2020 and 2030 that are commensurate with Greater Manchester's aspiration for a low carbon economy.

With regard to the priority strategy measures and key objectives, these were defined as:

- Reducing acute pollution incidents from traffic
- Improving vehicle efficiency including vehicle and fuel technology and efficient driving techniques
- Reducing trips by motor vehicles
- Improving network efficiency.

Air quality improvements and reducing emissions is a constant theme throughout the TfGM policy and documentation, as it is intrinsically linked with reduction of traffic and fleet improvements.

Local Transport Plan Strategy 2011/12-2015/16, LTP3

The LTP3 was designed around the key transport issues facing the region and was focused on achieving a high quality, targeted investment in public transport and other sustainable modes, alongside measures to maximise the efficiency across road and public transport systems.

With regard to air quality, it was recognised that public health is a significant issue due to high level of deprivation, with poor air quality contributing to obesity, mental illness, diabetes, heart disease, asthma and respiratory disease, with the resulting cost to the UK economy of absenteeism, premature death and treatment between £8 billion and £10 billion per year. Many communities live alongside the roads with the heaviest traffic flows and highest levels of pollution. The impacts in terms of health and wellbeing, pollution related illnesses, road accidents and community severance are felt disproportionately by people in lower-income groups who tend to live in these areas.

With regard to climate change, at the time of writing the LTP3, Greater Manchester had a CO₂ emissions footprint of 15.8 million tonnes per annum. Measures to reduce carbon emissions from transport would be achieved by a combination of energy efficiency, alternative fuels and modal shift, either to active travel modes for short journeys or to public transport for longer ones. Effective measures include a reduction in the need to travel, improved pedestrian and cycle infrastructure, support for the take-up of low carbon vehicles and fuels, low carbon buses, driver training, improved energy efficiency of the highways networks through better network management (including stricter enforcement of speed limits), and targeted 'Smarter Choices' initiatives to bring about travel behaviour change.

A new LTP is currently under development. The first stage in the process was the publication of the Greater Manchester Transport Strategy 2040: Our Vision in June 2015. Following public consultation, the vision and desired outcomes will be taken forward into the Draft Greater Manchester 2040 Transport Strategy, which will be published in 2016.

The vision, of 'World class connections that support long-term, sustainable economic growth and access to opportunity for all' has four key elements, each of which has a number of desired outcomes.

Strategy Element	Desired Outcomes
Supporting sustainable economic growth	<ul style="list-style-type: none"> • Less congested roads and public transport • Better access to skills and markets • More reliable journey times • A resilient, well-maintained network • A transport system fit for a major European city, which is viewed as a great place to visit and invest.
Improving quality of life for all	<ul style="list-style-type: none"> • Better access to jobs and training, and to healthcare and other essential services • A transport network that makes it easier to stay healthy through regular walking and cycling • Improved road safety and reduced crime • Local environments that are not dominated by traffic, noise and pollution.
Protecting our environment	<ul style="list-style-type: none"> • More people to travel by public transport, on foot and by bike • A reduction in harmful emissions from vehicles • To make the best use of our existing transport infrastructure • A reduction in the damage that transport can do to natural environments.
Developing an innovative city region	<ul style="list-style-type: none"> • Enhance the capacity, efficiency, resilience and safety of our transport networks • Improve customer experience through easy to use, integrated payment systems and real-time information • Understand better the needs of our travelling customers through 'smarter' data collection, trend analysis and forecasts • Reduce environmental impacts through low-emission vehicle technology • Reduce the need to travel and transport goods through advances in digital communications.

Greater Manchester Climate Change Strategy

Greater Manchester's Climate Change Implementation Plan sets out the commitments, priorities and actions that Greater Manchester needs to undertake to establish the right path for the delivery of the climate change objectives. 'Manchester: A Certain Future' sets two headline objectives for the decade to 2020 - reducing carbon emissions and embedding 'low-carbon thinking' into the city.

Six key measures have also been implemented to reduce carbon emissions from transport through the LTP3. These include Metrolink, green buses, reducing the number of car journeys into the city, encouraging cycling, smart ticketing and encouraging the uptake of electric vehicles.

The Greater Manchester councils' objectives are to influence and integrate the air quality strategy with a parallel climate change strategy. Existing actions include:

- Setting targets for reducing carbon emissions from transport
- Reducing congestion
- Manage freight, including the introduction of consolidation centres
- Continue investment in bus, rail and Metrolink services to encourage modal shift and manage the impact of transport emissions from new developments
- Improving passenger information/communication regarding public transport along with pricing improvements to encourage large-scale behavioural change
- Introduce smart ticketing across Greater Manchester to encourage use of public transport
- Encourage flexible and homeworking policies to reduce the need to travel at peak times
- Support community initiatives that encourage behavioural change e.g. cycle training, cycle loan agreements and improved cycle infrastructure
- Establish Greater Manchester as a centre for car clubs and car sharing
- Market and promote cycling
- Partnership contracts with bus operators to improve performance, reliability, affordability and accessibility on the bus network
- Work with all Greater Manchester councils to tackle emissions relating to commuting into Manchester centre
- Develop new approaches to reduce emissions from freight, looking specifically at logistics, technology, driving styles and fuels
- Support the uptake of low carbon vehicles and fuels
- Utilise intelligent traffic management systems to relieve congestion and reduce emissions.

Greater Manchester Strategy

The main regional policy is the Greater Manchester Strategy. Whilst local air quality is not explicitly dealt with in the strategy, it was recognised as being relevant to the promotion of the following strategic objectives:

- Establishment of a low-carbon economy in Greater Manchester, including a target to cut annual carbon emissions from 16 million tonnes to 10 million tonnes by 2020 (nearly 40%).
- Tackling poor health in deprived areas. It was recognised that 86 out of the 362 areas that comprise the most deprived quintile within Greater Manchester fall at least in part within the Air Quality Management Area.

Greater Manchester Spatial Framework (GMSF)

The Greater Manchester Spatial Framework (GMSF) provides the overarching framework to manage the supply of land across the conurbation thus supporting sustainable growth over the next two decades. It will provide the basis to secure the strategically important sites which will drive future economic growth and bring forward the supply of land necessary to accelerate housing development to meet forecast housing requirements.

The purpose of the Spatial Framework is to:

- Provide the basis for an informed and integrated approach to spatial planning across the city region, through a clear understanding of the role of our places and the relationships and connections between them
- Identify and evidence the level and type of growth we should be planning for
- Identify the market requirements of our growth sectors and ensure we have an appropriate supply of land to meet these requirements
- Provide the context that districts need when developing their individual Local Plans.

Growth and Reform Plan 2014

The Greater Manchester Growth and Reform Plan (GMCA, 2014) was Greater Manchester's bid to the Local Growth Fund and is intended to coordinate the planned growth of the region between the local authorities, other public service providers and business leaders. By 2020 the Manchester city region will have pioneered a new model for sustainable economic growth based around a more connected, talented and greener city region, where all our residents are able to contribute to and benefit from sustained prosperity and a good quality of life.

With regard to the effects on, and of, air quality, the Plan recognises that the impact of cleaner vehicles, combined with the recession, saw levels of CO₂ and NO_x emissions generated from vehicles on Greater Manchester roads declining between 2005 and 2011.

However, the growth aspirations for Greater Manchester and the likely increasing demand for travel will make the reduction of emissions a greater challenge in the future and it will be essential to increase the proportion of trips by sustainable modes. The City Centre Transport Strategy 2010 forecast that an additional 50,000 new jobs would equate to 30,000 additional trips in the morning peak, with 20,000-23,000 of this increase to be by public transport and only 10,000 by car. This target would entail a significant mode shift by existing car commuters to public transport, cycling and walking and increased efficiency in the use of the highway network, particularly the Inner Relief Route.

APPENDIX B: INFRASTRUCTURE IMPROVEMENT SCHEMES

The Greater Manchester Growth and Reform Plan includes a number of major schemes for new infrastructure and improvements to existing infrastructure. These are not specifically intended to improve local air quality, but to increase existing transport capacity to support projected increased demand in key growth areas. Therefore, some schemes may have both beneficial and detrimental air quality impacts in different geographical areas or time periods.

Some schemes may have immediate beneficial effects in specific geographical areas, as they increase capacity and relieve pressure on the existing network by redistributing vehicles; however, there are also potential disadvantages where displacement of traffic may lead to air quality problems elsewhere, introduce new exposure to sources of air pollution or encourage increased development leading to additional traffic generation.

The following projects have been identified that are expected to achieve beneficial local air quality impacts, and which support one or more of the actions defined in this AQAP.

Major Infrastructure Improvement Schemes

LTP3 Metrolink Extension

Beyond the committed expansions to the Metrolink system, TfGM has two key longer-term priorities for extending the network:

- An extension through Trafford Park, connecting with the Trafford Centre, the new City of Salford Stadium and Port Salford
- An extension to Stockport town centre.

Work is under way to review design and alignment options for extensions to Trafford Park and Stockport, including connections to the Trafford Centre, the City of Salford Stadium and Port Salford. This extension will provide greatly improved public transport to the largest concentration of employment outside the regional centre and TfGM will work with partners to identify a delivery mechanism for the scheme. In the short term TfGM will work to improve local connectivity by other non-car modes. The Stockport connection will improve accessibility to the town centre and support the anticipated growth associated with the Stockport town centre masterplan.

A6 MARR

The A6 to Manchester Airport Relief Road (MARR) scheme will provide 10km of new two-lane dual carriageway on an east-west route from the A6 near Hazel Grove (South East Stockport), via the 4km of existing A555 to Manchester Airport and the link road to the M56. The scheme continues to be developed by Stockport Council working with its partners, Manchester City Council, Cheshire East Council and TfGM.

The scheme bypasses heavily-congested district and local centres, including Bramhall, Cheadle Hulme, Hazel Grove, Handforth, Poynton, Wythenshawe, Gatley and Heald Green, and will provide connectivity for key strategic routes into the North West and to Manchester Airport, including traffic from the A6, A523 and A34.

The segregated pedestrian and cycle route adjacent to the new road and the existing section of the A555 will provide a new link for the strategic cycle/pedestrian network, and will be fully integrated with the existing local cycle and pedestrian network to facilitate access to the new route.

Cross City Bus

The Cross City bus package is a £54.5m investment which will significantly improve bus travel into, and across, Manchester city centre. It will improve the speed and reliability of existing bus services from Middleton in the north, Parrs Wood in the south and Salford/Worsley in the west, as well as support the creation of new services along each of the corridors through the city centre. The scheme will also increase accessibility from areas along the A580 and A664 corridors to the city centre and the Oxford Road corridor.

Second City Crossing Metrolink line

Work to deliver a second Metrolink line through the heart of Manchester city centre is currently under way. The Second City Crossing (2CC) will increase the capacity, flexibility and reliability of all of the network's new lines and enable them to operate to their fullest.

The 2CC line will begin from Lower Mosley Street and run through St Peter's Square, before turning down Princess Street and then along Cross Street and Corporation Street to rejoin the existing Metrolink line just outside Victoria station. As part of the project, new stops will be built in Exchange Square and St Peter's Square.

This is part of a wider transformation of the city to improve the public transport system, which includes the new tram line, bus priority scheme and dedicated cycle lanes to accommodate the growth in the city. The work also supports the transformation of some of our public spaces and the new homes, offices and hotels that are being built.

Trafford Park Metrolink line

The proposed Trafford Park Metrolink line will be approximately 5.5km long and will include six new stops to serve businesses, retail and amenities along the route. It will leave the existing Metrolink network at Pomona, pass under the Trafford Road Bridge and follow Trafford Wharf Road, Warren Bruce Road, Village Way, Park Way and Barton Dock Road, terminating outside the Trafford Centre.

Leigh-Ellenbrook Guided Busway

The guided busway will provide a high quality, fast and reliable public transport link travelling along a 7km guided track on the old railway alignment between East Bond Street in Leigh and Newearth Road in Ellenbrook. Road services travelling on the A577 to/from Atherton will join the guided section at Astley Street in Tyldesley, continuing on towards Newearth Road in Ellenbrook.

Regent Road Capacity Improvement Scheme

The Regent Road/Water Street junction is a significant congested pinch point on the Manchester and Salford Inner Relief Route (MSIRR). It has been identified as a key constraint to all potential transport packages and strategies for road traffic to, from, and within Manchester city centre.

The aim of the scheme is to reduce the impact of congestion at the junction on its approaches and at adjacent junctions with a focus on improving capacity on the six main movements whilst also enhancing the performance of the wider MSIRR. This will include the adjacent junctions of Trinity Way/Irwell Street and Chapel Road and the merge from Chester Road roundabout which also suffers severe levels of congestion. Addressing traffic conditions at these locations will be essential to ensure that congestion does not constrain economic growth including plans for significant development in the surrounding area (e.g. Salford Central, Spinningfields, Middlewood Locks and the Granada site).

Manchester and Salford Inner Relief Route - Great Ancoats Street Capacity Improvement

The Great Ancoats Street section of the MSIRR divides the city centre from the residential areas to the north and east. The objective of the Capacity Improvement Scheme is to reduce the impact of Great Ancoats Street and improve routing of traffic around the North East side of the regional centre, including ensuring that traffic makes maximum use of Alan Turing Way where it offers a good alternative to Great Ancoats Street. A package of measures will also be introduced to reduce the separation caused by Great Ancoats Street, including improvements to pedestrian crossings.

Stockport Town Centre Access Package and Interchange

Replacement of the existing Stockport Interchange with a new facility will enhance the quality of passenger facilities, support the interchange between bus and rail and make provision for the future extension of Metrolink into Stockport town centre. The interchange will support the ongoing development of the town centre.

Bolton Salford Network Improvements

This scheme is focused on delivering sustainable economic growth in the Bolton, Farnworth/Walkden, Swinton and Manchester corridor by:

- Substantially improving the punctuality, regularity and reliability of bus services operating through the defined study area, and aim to increase bus speeds where possible
- Strengthening links within and links in and out of the area to key employment locations
- Supporting the amenity and economic vitality of the district centres of Farnworth, Walkden, Swinton and Pendleton
- Promoting active, healthy lifestyles and make active travel safer and easier to use and provide an attractive alternative to the private car.

This scheme will deliver a comprehensive package of sustainable transport improvements. The scheme will also include a range of on-highway and passenger waiting environment improvements designed to making walking, cycling and bus travel safer, quicker and more reliable.

Salford Central Rail Station

Improved passenger facilities and additional platforms to maximise the benefit of Northern Hub investment and serving increased demand in a key regeneration area of the Regional Centre.

City Centre Transport Strategy – Inner Relief Route improvements - Regent Road

Major reconfiguration at the western gateway to the regional centre to reduce delays on the most congested point of the Inner Relief Route, thus improving journey time reliability.

Wigan Gateway - Hub - Phase 1

A significant enhancement of the bus station to confirm its presence and sense of place, in order to support the wider delivery of commercial/economic development within Wigan town centre.

Tameside Interchange (Ashton-under-Lyne)

Development of a new interchange facility within Ashton-under-Lyne town centre replacing the current 'island' style waiting shelters with a single high quality interchange building, incorporating bus and Metrolink within one site to create an attractive public transport gateway.

Route 8 Bus Rapid Priority

A comprehensive package of bus priority measures on Bus Route 8 (Bolton to Manchester) to address constraints to bus commuting through this growth corridor to key destinations, including the regional centre, particularly from those areas with limited rail connectivity.

Metrolink Service Improvement Package

Fleet and infrastructure enhancements to support enhanced connectivity at the Greater Manchester level, improving access to jobs, leisure and services for residents and for businesses. A prioritised programme of smaller investment measures has been developed through a policy-driven exercise to establish a growth-led minor works programme. This programme is critical in ensuring a robust investment pipeline of smaller transport measures to provide the local infrastructure that is an essential component of locally driven growth.

Minor Infrastructure Improvement Schemes

The Local Growth Fund is also supporting a programme of minor works schemes, many of which are focused on improving facilities for pedestrians and cyclists, or improving access to public transport. In addition, successful bids to the Pinch Points Fund and the Congestion Performance Fund have also enabled schemes to be brought forward to reduce congestion and emissions by targeting key geographical locations or components of the fleet:

Pinch Points

Schemes to relieve 'pinch points' which either cause congestion or make a site more difficult to develop.

Congestion Performance Fund

Fund to identify the best traffic management interventions on the most congested routes to Greater Manchester's key economic centres.

