2015 Air Quality Annual Status Report (ASR) for Greater Manchester

In fulfilment of Part IV of the
Environment Act 1995
Local Air Quality Management

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Executive Summary: Air Quality in Our Area

Air Quality in Greater Manchester

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas.

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[1].

The Greater Manchester regional pollution group lead by Transport for Greater Manchester (TfGM) represents the ten authorities that constitute the Greater Manchester Combined Authority (GMCA). These authorities are Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Stockport, Tameside, Trafford, and Wigan. These are also the main members of the Association of Greater Manchester Authorities (AGMA). The Combined Authority, shares the same statutory powers for Local Air Quality Management (LAQM) Sections 82 to 84 of the Environment Act 1995 as the districts.

Greater Manchester has a population of over 2.7 million residents over an area of approximately 500 square miles. Within the conurbation there is a mix of high-density urban areas, suburbs, semi-rural and rural locations, and the area is characterised by the strong regional centre of Manchester, The Quays and Trafford Park.

Long term trends show that there has been an improvement in air quality but areas still remain above the air quality objective for the annual mean NO2 (NO_2).

The assessment of monitoring data shows that real time monitoring data for the NO_2 annual mean objective broadly confirms the new AQMA boundaries. Exceedences were noted at several roadside monitoring sites. Recent modelling showed that the old AQMAs reduced in size due to falling NO_2 emissions, but measurements in some

[1] Defra. Abatement cost guidance for valuing changes in air quality, May 2013

areas, particularly those close to the M60, show that concentrations of NO_2 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. The new single AQMA (http://www.gmtu.gov.uk/gam_maps/) was designated on the 1st May 2016 for the whole of Greater Manchester and 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.

4 automatic sites out of the 16 in Greater Manchester exceeded the NO_2 annual mean objective of 40µg/m^3. These 4 sites were Salford M60, Manchester Oxford Road, Bury Prestwich and Tameside Mottram Moor. One site (Manchester Oxford Road) had more than 18 occurrences of the hourly NO_2 objective at Manchester Oxford Road (total of 60 occurrences). This exceedence in being investigated and a response will be submitted to Defra in due course. Measurements from the Greater Manchester's diffusion tube network confirms there are locations that continue to be above the annual mean NO_2.

Real time monitoring data for particulate matter (less than 10 microns) shows that annual average objectives are not exceeded and are following a downward trend. No sites had more than 35 occurrences of the daily mean particulate objective and therefore this objective is met.

Sulphur dioxide monitoring was carried out at 2 sites, with no exceedences in the objectives.

Reporting of pollutants, carbon monoxide and benzene, has been discontinued as previous assessments, indicated no exceedences.

A new Low Emission Strategy (LES) and Air Quality Action Plan (AQAP) has been out to public consultation (May 2016), and the responses are being considered before publication later in the year. The LES & AQAP propose a range of measures to improve air quality and reduce ill-health across Greater Manchester, focusing on 'key priority areas' in urban centres and near major roads which currently fail to meet UK Government and EU air quality objectives. The LES & AQAP is being led by TfGM on

behalf of the GMCA, and includes close working with Highways, England, Public Health England, The Environment Agency, Greater Manchester Police, and charitable organisations to ensure the best outcome can be achieved.

Actions to Improve Air Quality

The draft AQAP has been produced following a programme of consultation and workshops with key stakeholders, including the Greater Manchester local authorities, Public Health England, TfGM and Highways England, to obtain feedback on the new measures proposed. The AQAP has been out to public consultation and is expected to be published later in 2016

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

- **Development management and planning regulation:** including standardisation of regulation and policy across the Greater Manchester region.
- **Freight and HGVs:** there are several opportunities to reduce emissions associated with the movement of freight and goods by road.
- **Buses:** Buses have a vital role to play in transporting the public and give opportunities to improve air quality. New legislative developments and the creation of the future Greater Manchester bus strategy will assist in growing bus usage and improving vehicle standards.
- **Cycling:** Existing strategies and initiatives encourage cycling.
- **Travel Choices:** Encouraging the public and businesses to make sustainable travel choices is essential in realising lasting air quality benefits.
- **Cars:** Measures to reduce emissions from cars and reduce the number of vehicle trips can deliver real improvements.

- **Information and resources:** Education and the provision of information to the public, businesses and policy makers is seen as vital in bringing air quality improvements.

Work is currently underway on a Clean Air Zone feasibility study which has been funded through the Defra Air Quality Grant Fund 2015, and is expected to be completed by April 2017.

Part of a Clean Air Zone (CAZ), would look to reduce the number of polluting vehicles that can enter a specific area, as a potential tool for improving air quality. Any proposal would require careful research to identify the positive and negative economic, social and environmental impacts.

The study to date has looked at the scenario for business as usual for 2020, and scoped 3 geographical areas to study the outcomes of implementing a CAZ. The next stage would then take 1 or 2 of these geographical areas and complete a more in depth analysis to give a preferred area and vehicle class options.

Local Priorities and Challenges

Given the need to meet EU limits for NO_2 as soon as possible, the short-term focus will need to be on NO_2. 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. Key challenges will be obtaining funding to enable the Local Authorities to carry out some of the actions in the plan.

How to Get Involved

www.greatairmanchester.org has information and links to air quality and how to play a part. The main considerations would be to think about how you travel, reducing single occupancy car use, use carpooling, changing to cleaner alternative fuels, and using public transport, cycling and walking. Other considerations could include avoiding excessive idling of your vehicle, or even considering where the products you buy are coming from.

The GMCA are investigating the potential to introduce Clean Air Days/Weeks, which would raise awareness and help people understand what they can do. These days would also look to carry out events at schools, hospitals and workplaces and training up local volunteers to empower local residents to raise the profile and tackle drivers idling, etc.

TfGM are also looking into improving the website to include more information which would also include getting messages out to vulnerable people by text, email or call.

Air Quality Initiatives

Cycling Hubs

TfGM have opened a number of cycling hubs across Greater Manchester. These hubs located near public transport centres, are the ideal place to park your bike with confidence. The Hubs provide secure and sheltered bicycle parking, protected by CCTV and swipe card entry and have been set up to encourage users to leave the car at home as part of the active travel campaign.

Guided Busway

Covering 4.5 miles, the bus-only guided section connects Leigh and Ellenbrook before joining with the East Lancs Road and running along a prioritised route. Alongside the 4.5 mile track there's a shared path that's designed specifically for use by walkers, cyclists and horse riders.

The guided busway provides reliable and traffic-free journeys for bus passengers while at the same time ensuring a level of ride quality not possible on normal roads. The smooth journey quality, coupled with exceptionally high quality buses, combine to provide passengers with quicker and more punctual journeys between Leigh, Atherton, Salford and Manchester.

The busway service – branded Vantage by operator First – sees up to eight state-of-the-art hybrid buses an hour joining communities and business centres along the route,

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1 Local Air Quality Management

This report provides an overview of air quality in Greater Manchester during 2015. Transport for Greater Manchester (TfGM) represents the ten authorities that constitute the Greater Manchester Combined Authority (GMCA). These authorities are Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Stockport, Tameside, Trafford, and Wigan. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by the 10 Greater Manchester Local Authorities to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England can be found in Appendix E.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of the objectives.

A summary of the AQMA declared by The Greater Manchester Combined Authority can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at http://www.gmtu.gov.uk/gam_maps/. The current AQMA was declared on the 1st May 2016 following the 2014 detailed assessment.

Table 2.1 - Declared Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City / Town	One Line Description	Action Plan
AQMA Greater Manchester	• NO_2 annual mean	Greater Manchester	An area covering the 10 districts of Greater Manchester, including arterial routes, district centres and airport.	Greater Manchester Air Quality Action Plan

2.2 Progress and Impact of Measures to address Air Quality in Greater Manchester

Greater Manchester has taken forward a number of measures during the current reporting year of 2015 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

More detail on these measures can be found in their respective Action Plans (Greater Manchester Air Quality Action Plan). Key completed measures are:

Bus Priority Packages

- The Bus Priority Package enables cross-city bus services to run directly through the heart of Manchester city centre – free from other traffic.
- The North West's first guided busway from Leigh to Ellenbrook opened.
- New hybrid buses used on route.
- Alongside the guided busway dedicated walking and cycling route which runs the full 4.5 miles have been created, with improvements to shorter sections of the existing shared use pedestrian and cycle route alongside the A580.
- Three new park and ride sites

Electric Vehicles

- 13 hybrid taxis licensed in Bury. 38 hybrid taxis in Wigan (1 plug in). 1 hybrid in Rochdale
- Salford City Council currently waives licensing and testing fees for Private Hire Drivers with an Electric Vehicle, to encourage take up of EV's amongst the trade.
- From 1/1/15 to 31/12/15 electric vehicle charging points hosted 28,589 charging sessions which used 260,029kWh of electricity which represents a 206% increase on the charging demand for the same time period in the previous year. The electric consumed at Greater Manchester charging points have allowed electric vehicles to cover approximately 780,000 miles (1kWh provides roughly 3 miles of travel)

Cycle works/initiatives

- Elizabethan Way Cycle/Pedestrian Route & Toucan – Total Scheme Cost £400, 982.05

  Outputs and benefits of scheme - Within Milnrow the main barrier to active travel is created by Elizabethan Way. An existing pedestrian crossing facility links with existing pedestrian/ cycle routes to the Metrolink station via Harbour Lane North, upgrading to a Toucan will supported cycle use. This crossing is available to pedestrians and cyclist accessing the station from the west of Milnrow, which created a formalised route to the Kingsway Business Park.

  To the North of Milnrow the main direct access to the Metrolink station was initially is along Harbour Lane North. However during the evening and night time this route would not have natural passing/frontage observation due to the industrial nature of the area. However Elizabethan Way is at a raised profile and does not overlook this route. The section of Harbour Lane that bridges the Metrolink track provides a direct link to the pedestrian crossing on Elizabethan Way and the housing estate beyond that.

  The scheme provided a mixture of shared use and off highway cycle lanes in the vicinity of Elizabethan Way, providing a new segregated cycle and walking link from Milnrow to Newhey, including access to Kingsway Business Park.

- Burnside Road Toucan/Cycle Link – Total Scheme Cost £91, 269.83

  Outputs and benefits of scheme - National Cycle route number 66 runs along the canal towpath through the Newbold area and this can be accessed via Burnside Road. The scheme provided a direct part segregated cycle link from the Metrolink station to the existing Route 66 along Burnside Road via introducing a Toucan crossing facility at this existing signalised junction.

  Part of this pedestrian link required the installation of a build out to create an extension to the existing pedestrian island to safely provide the Toucan crossing.

Campaigns

- I Will If You Will Team working with TfGM on the following:-Road Rider Ready and Learn to Ride sessions at Clarence Park, Women on Wheels (WOW) projects including family cycling activities, Breeze led rides.
- Cycle City Ambition Grant to fund: the upgrade of the canal towpath from School Street to Farnworth and new route through the town centre from School Street to Coney Green – and the upgrade of cycle parking at the station.
- The Growth Fund active travel fund is funding Radcliffe East cycleway, which should complete an off road/quiet road route from Bury to Bolton, partly on the line of the former railway.
- Growth Fund allocation to improve the Angouleme Way/Market Street junction for pedestrians
- I Will if You Will are operating a Walking for Health programme with groups in Summerseat, Prestwich, Greenmount and MacMillan Cancer Support Walk, Walk leader training course delivered March creating 9 new leaders.
- 55 schools registered as Eco Schools. Seven of these have achieved the highest Green Flag standard with two gaining their second Green Flag.
- 2309 LED streetlights installed in Bury 2015/16
- 484 NIBE units (exhaust air heat pumps) have been installed in Pendleton.

Dirty Diesel Campaign:

- Encouraging the public to report smoky, grossly polluting vehicles, leading to a reduction in vehicle emissions.
- The campaign began in November 2004 and is still publicised via the website: www.cleanervehicles.org.uk.
- Individual buses with excessive bus emissions can be reported via TfGM as per their website: http://www.tfgm.com/Corporate/environment/Pages/environment_faq.aspx. Other commercial vehicles in addition to buses can also be reported via the DVSA website: https://www.gov.uk/report-smoky-vehicle. Taxis can be

reported to the local authority issuing the licence. Privately owned vehicles can be reported to the local authority in whose area the vehicle was observed.

- The total number of vehicles reported in Manchester between 1/04/15 to 31/03/16 was 25.

Solar panels & Electric vehicle:

- Project to use an electric vehicle for MCC staff and make the vehicle effectively 'emission free' by offsetting emissions produced from the charging of the vehicle using solar power.
- Total CO2, NOX and PM10 emissions were reduced by 118%, 127% and 50% respectively over the study period. This resulted in savings of 1.69 tonnes of CO2, 2.54 kg NOX and 0.13 kg PM10.
- The vehicle continues to be used by Council staff in replacement of their own vehicles to carry out their duties.

Low emission taxi scheme:

- Manchester CC - Implementation of a 12-year maximum age limit policy on all hackney carriages, and 7-year age limit an all private hire vehicles.
- Salford City Council licensing rules state that any new Private Hire registrations need to have a vehicle of less than 4 years old.
- Emissions tests carried out on all hackney carriage and private hire vehicles at four monthly mechanical inspection tests.

Future Measures

Greater Manchester expects the following measures to be completed over the course of the next reporting year:

- Clean Air Zone Feasibility Study: TfGM will undertake an appraisal of the effects of Clean Air Zones (CAZs).
- Plugged-in Places EV Charging Network: Continue to increase the number of EV charging points.
- Further improvements on Bus Priority Programme (Oxford Road Corridor).

- Engine Idling: promotion of anti-idling policies with freight transport companies.
- Alternative Fuels: Investigate the potential of alternative fuels and carry out trials using different vehicle types.
- 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.
- Encouraging Travel Planning: TfGM will work with the local authorities to encourage travel planning measures in businesses and individuals to affect a significant modal shift.
- Green Infrastructure: Investigate the potential of green infrastructure in improving air quality.
- Cycle Programmes: Improve the cycle infrastructure and provide practical support to reduce vehicle movements in the Key Priority Areas.
- Public Cycle Hire: Explore the feasibility of public cycle hire facilities.
- Cycle Logistics: Encourage and promote a logistics programme to use cycle or electrically-assisted cycles for short distance deliveries and distribution in urban centres.
- 2040: Undertake further work to better understand the more innovative options available to further promote cycling and walking, and to set out a clear delivery plan in line with the 2040 transport strategy.
- Local Authority Parking Charges: Work with local authorities to review the introduction of parking charges at local authority offices to discourage private car use.
- School Travel: TfGM will appraise opportunities to reduce air quality impacts from school car travel.
- Awareness Raising: Air quality awareness programmes to encourage people to take action against air pollution.
- Salford City Council, Manchester City Council and Transport for Greater Manchester (TfGM) have jointly funded a feasibility study to identify

opportunities to develop the use of EV's within the Private Hire and Hackney fleets. This study has been completed and will be used to develop a forthcoming bid to OLEV for funding Private Hire / Taxi EV infrastructure.

- Salford City Council implemented a car club in the city in May 2016. The first phase covered two locations, primarily based around the Civic Campus in Swinton, with another site in the Regional Centre. The first phase of the car club is primarily intended to meet the needs of staff business travel from the Civic Campus, 22 vehicles are available including 4 electric Vehicles. The car club is part of a wider 'Green Wheels' programme aimed at encouraging staff to travel more sustainably, both on the journey to / from work and during the business day. Car sharing bays, bike hire and travel ticketing incentives have been offered to staff as part of the Green Wheels programme.
- Phase two of the car club in Salford will be rolled out in the autumn of 2016, this includes additional on street car club bays for public use throughout the city, and a doubling of the EV fleet. 22kw Semi rapid charging facilities will be provided at the civic to meet demand for vehicle charging.
- Greater Manchester delivered phase 1 of the Cycle City Ambition Grant (CCAH) programme in March 2016 to encourage a step change in cycling, and work towards the GM cycling strategy target of a 10% cycling mode share by 2025. Within Salford the highlight of this programme was a 2.0km light segregation cycleway, the longest scheme of this type in the country. Early results show that cycling in the peak commuting periods has doubled on the corridor, since the introduction of light segregation. Several other high profile cycling projects in Salford were completed that will encourage more cycle trips, and reduce poor air quality. Including the final section of the Roe Green loopline, with this, the 7.5km traffic free route from Bolton to Monton Green is now open, providing an excellent commuter route and direct traffic free access to 7 schools along the route to encourage cycling to school and a reduction on car trips during the 'school run'.

Table 2.2 - Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
1	Delivery of SEMMMS Relief Road	Transport Planning and Infrastructure	Other	Stockport (with TfGM, Manchester, Cheshire)		2015		Emissions will be displaced away from receptor points within the AQMA along the A6 in the south of Stockport. Including removal of some freight off local road network.	Since publication of SEMMMS strategy working towards delivery of road and related cycle route.	2017	
2	Walking promotion	Public Information	Other	Stockport		2008		<0.5%	Development of Green A to Z local walking map. Development of Walk a Day lead walks project. Improvements to way finding in district and local centres. Promotion of walking routes in the borough on line.	2030	

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
3	Promotion of uptake of cleaner fuels: Emission standards through A6 Quality Bus Partnership	Transport Planning and Infrastructure	Bus route improvements	Stockport		2012		29% reduction in NOx and 44% reduction in primary NO2 emissions from 192 and 191 bus services. This takes account of sampled bus speeds at ATC sites. This is equivalent to approx. 6.4% and 6.8% reduction in total road traffic emissions of NOx and primary NO2 respectively.	A6 Quality Bus Partnership has been agreed and is in progress from April 2012. This contains targets to achieve 100% of the high frequency 192 service on the A6 corridor to be of Euro 5 standard by January 2014. Targets will be phased for services operating only part of their routes on the A6. Stagecoach introduced 40 new hybrid vehicles mid-march 2013.QPS standard changed to 80 - 100% vehicles to be Euro 5 or above.		

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
4	Cycling promotion	Public Information	via leaflets	Stockport		2008		<0.5%	Annul Bike week including biker's breakfast. Greater Manchester Cycle map in paper copy and on line which is updated regularly. New bridge to create important cycle link between Marple and Stockport including signing and crossings completed in 2012		LTP2 achieved a 17% increase in cycling between 2005 and 2010 (Greater Manchester figure).
5	Review of Stockport Sustainable Travel Plan	Promoting Travel Alternatives	Workplace Travel Planning	Stockport		2007		Action will have a positive effect on air quality but it is difficult to measure or there is no data	Travel plan 2007-2010 achieved 8% reduction in SOV use for journeys to work.2014 review of staff travel plan and staff travel survey undertaken. SOV levels dropped below %50 for first time according to initial survey results. Undertook council wide Personalised Travel planning exercise.	2017	

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
6	School Travel Plans	Promoting Travel Alternatives	School Travel Plans	Stockport		2008		<0.5%However, localised air quality improvements at school entrances will be significant	2011 figures show an increase in walking to 55.3% of journeys to school from a base of 41.8% in 2007... We have carried out cycle training across Stockport		
7	Enforcement of Part A and B Industrial processes.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Stockport		2008		Action will have a positive effect on air quality but it is difficult to measure or there is no data	Inspection programme completed and all processes are compliant		

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
8	Promotion of uptake of cleaner fuels: Plugged in Places	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	Consortium of GM Authorities/ Private Sector		2013		Market forecasts suggest that there will be no measurable reductions from electric vehicle promotion in the short term. However, this is a fundamental stage in the long term strategy to enable a shift away from Internal Combustion Engine based technology, and ultimately decarbonisation of road transport	Stockport is a partner in the GM Consortium Bid for Plugged in Places (charging infrastructure). On-going increase in hybrid buses on a number of routes through Stockport. Taxi licencing has encouraged/enforced move to lower emission vehicles.		Metroshuttles should save 30 tonnes of carbon a year.
9	Integrated Transport Corridors (ITC)	Transport Planning and Infrastructure	Bus route improvements	TfGM and Stockport		2008			All works planned as part of the ITC programme have now been completed on a total of 9 corridors.	2011	

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
10	Use of cleaner and alternative fuels by council fleet.	Vehicle Fleet Efficiency	Driver training and ECO driving aids	Stockport		2008			The fleet carbon footprint for 2008/09 is 1215 tonnes of CO2 which is a reduction of 5% from 2006/07, although 2.4% of this reduction is attributable to Council initiatives. 2011 - Council working through the Energy Saving Trust Motorvate Scheme to consider options and establish challenging targets for the Council fleet. A total of 152 drivers in the Council and partner fleets have received SAFED training and have achieved a reduction of 9% in fuel usage.	2030	

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
11	Implement Travel Plans and Smarter Choice Initiatives	Promoting Low Emission Transport	Other	Stockport		2008			A total of 65 WP travel plans were completed between April 2006 and 2010, although these include a number of updated TPs for companies with existing TPs.	2030	
12	Tree management strategy to be developed for Mar 2009.	Policy Guidance and Development Control	Other policy	Stockport		2009	Tree cover has not declined in the Borough and is deemed to be at an adequate level.		Tree Management Strategy Developed 2009.		

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
13	Safer Routes to School (20mph speed limit zones)	Traffic Management	Reduction of speed limits, 20mph zones	Stockport		2008			2006/07 - Broadstone Hall Primary, Heaton Chapel, All Saints Primary School, Heaton Norris. 2007/08 - Tithe Barn Primary, Heaton Mersey. St. Mary's RC Primary, Heaton Norris. Lisburne SEN, Offerton Nursery, Dial Park Primary, St. Philips Primary 2009 - 20 mph zone completed around St Anne's RC School, Heaton Chapel		

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
14	Environmental Protection (AQ14)	Policy Guidance and Development Control	Other policy	Stockport		2008		Not known but air quality improvements are expected.	Pollution Officers responded to domestic and industrial burning complaints. The 'Don't Burn It' leaflet is included with correspondence. Smoke control maps request from DEFRA.	2030	The 'Don't Burn It' leaflet is included with correspondence. Uncontrolled emissions have a disproportionate effect on local environment causing poor air quality and health problems
15	Industrial Controls (AQ15)	Environmental Permits	Other	Stockport		2008	Completion of inspections	Air quality improvements	Ensure Part A2 and B installations control emissions to the Best Available Techniques. Part A applications are assessed for air quality impacts.	2030	Local improvement in air quality contributing lower UK emissions.

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
16	Sustainable Transport Supplementary Planning Document	Policy Guidance and Development Control	Other policy	Stockport		2008			Sustainable Transport SPD was adopted in December 2007. The document provides further support to developers in assessment and identification of measures to minimise, mitigate or improve the impacts of the development on local traffic congestion and its effects on local health and environment.		

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
17	Rights of Way Improvement Plan	Policy Guidance and Development Control	Other policy	Stockport		2007			The Rights of Way Improvement Plan was adopted in November 2007. Alongside prioritising actions to promote functional trips on the Rights of Way network, the plan also recognises the need to promote walking and cycling for leisure purposes to facilitate behavioural change and promote sustainable leisure alternatives.	2017	
18	Stockport Interchange	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	Stockport		2014	Increased bus patronage			2018	

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
19	Increased pedestrianiseation of Town Centre Core	Promoting Travel Alternatives	Promotion of walking	Stockport		2014				2017	
20	Improved walking and cycling opportunities in the Borough	Transport Planning and Infrastructure	Cycle network	Stockport		2008		Increased number of walking and cycling users of the network.	Wide range of improvements including, Connect 2 route, TPT improvements, Middlewood way Improvements, Cycle route to Manchester Airport.	2030	
21	Encouraging Employment opportunities near public transport corridors.	Policy Guidance and Development Control	Other policy	Stockport				Increased public transport use	Delivered initial phase of Stockport Exchange Scheme near Stockport Train Station	2018	2013 increase in non-car modal share to Town centre from 38 to 42 %

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
22	Station Travel Planning and investment via planning	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	Stockport		2007		Increased number of walking and cycling users of the network.	Hazel grove station travel plan developed and implemented. Planning funds used to improve walking and cycling routes to stations and station based cycle storage. 10 Stations have had travel plans developed	2018	Rail increased since 1990s
23	Improvements to District and Local Centres to encourage people to Shop Local/ Access them by Walking and Cycling	Transport Planning and Infrastructure	Other	Stockport		2007		Increased number of walking and cycling users of the network. Increase local centre footfall.	Since 2008 there has been an on-going programme of Local and District centre (retail centre) improvement with regards to transport/ highway. Cheadle District Centre and Great Moor Local Centre improvement schemes for Transport and highway.		

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
24	Air Quality Info on Website, publish AQ Action Plan on web with links to Aq sites and include other service info	Public Information	via the Internet	GM	on-going	on-going		AQMA on the web	Reports submitted to Defra via GM Combined Authority	2015	
25	Review Current Monitoring	Public Information	via the Internet	GM	on-going	on-going		Combined Authority producing a joint monitoring program for real-time AQ to ensure monitoring location representative of the region		2014	

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
26	Pedestrianisation	Public Information	Other	GM	complete	complete		Extensive public relm pavement improvement throughout town improving pedestrian areas and footpaths. Schemes include Blackhorse St	Now Greater Manchester real time monitoring network with real time information published on the web		National funding cuts and a prioritisation of major schemes at the greater Manchester level as well as a now down in economic growth and therefore a reduction in s 106 funding will delay any further pedestrianisation of the town centre,

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
27	Improved cycling and walking facilities	Promoting Travel Alternatives	Promotion of walking	GM/Bolton				Much activity on small (DDA) schemes across the town. Bolton to Bury cycle route on railway lines forms part of the GM Local Sustainable Transport Fund Bid. Cycle forum is established and active. Middlebrook to Bolton cycle route in operation. Off road route to Hospital completed.	Extensive public relm pavement improvements schemes implemented across the town centre		
28	Taxi Controls Encourage use of LPG and regulation of Taxi emissions			Bolton / tfgm				25 cars operate on LPG. 100% Taxis tested twice per year	Work started on the Bolton Bury off road cycle route. Cycle point in town centre complete 2014		Age of vehicle policy to be considered

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
29	Use of Cleaner and alternative fuels. Continuing the fitting of Particle traps as part of the annual replacement program for the Council fleet. Trail alternative			Bolton				Continual improvement in emission standards of new vehicles 5%bio diesel in use for entire fleet			
30	Quality Bus Partnership	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	Bolton	on-going	on-going		Bolton part of the Quality Partnership scheme with TfGM and bus operators on the existing quality bus corridor between Bolton and Leigh. Planning permission granted for new bus station in the town centre	Fleet size reduced now operates 300 vehicles. 30 welfare buses replaced with euro 6. Tender out to replace the 21 refuse vehicles with Euro 6 over next 2 yrs.		

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
31	Travel Plans - BMBC Key areas			GM				Car Share scheme implemented. Additional cycle parking to Wellsprings and Town Hall sites	Quality Bus Partnership Operational. Work commenced on new town centre bus station		
32	Work in partnership with local businesses to produce travel plans							GMLTP through LSTF funding are working with Bolton employers to promote travel plans and travel incentives			
33	Walk to school plans etc.	Promoting Travel Alternatives	Workplace Travel Planning	Bolton - Local	on going	on going		School travel plan coordinator post cut in 2011. Training for schools however is still available			
34	Industrial Emissions							All premises permitted inspected according to their risk rating			
35	Domestic smoke emissions publicise and enforce	Environmental Permits	Other	Bolton - Local	on going	on going		All complaints of domestic emissions are investigated	Annual inspection program maintained		

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
36	Affordable warmth strategy	Public Information	Other	Bolton - Local	annually	annually			Procedure reviewed. Proactive survey and advisory letters sent to 35 properties	2016	
31				GM					600 private sector properties improved since 2012	2016	
32	Awareness campaigns	Public Information	via other mechanisms	Rochdale MBC	2006	Other	N/A	N/A	On-going	2030	Not quantified but educating should increase uses of public transport / cycling etc.
33	Home energy efficiency and renewable energy	Public Information	via other mechanisms	Rochdale MBC	2006	Other	N/A	N/A	On-going campaign covering all Borough	2030	Reduction in energy consumption/ reduction in Nox emissions, creating a more sustainable attitude towards energy use.

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
34	School travels plans	Promoting Travel Alternatives	School Travel Plans	Rochdale MBC	2004	Evaluation	N/A	N/A		2011	Reduction in vehicle journeys to schools within borough, reduction in traffic in surrounding areas
35	Congestion management programme	Traffic Management	UTC, Congestion management, traffic reduction	Rochdale MBC	2011	Implementation	N/A	N/A	On-going	2015	
36	Reduction of speed limits	Traffic Management	Reduction of speed limits, 20mph zones	Rochdale MBC	2009	Evaluation	N/A	N/A		2014	

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
37	Metrolink expansion	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, inc Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	TfGM/Rochdale MBC	2011	Implementation	N/A	N/A	Final stage completed November 2014	2014	
38	Workplace travel planning	Promoting Travel Alternatives	Workplace Travel Planning	TfGM/Rochdale MBC / AGMA	2013	Implementation	N/A	N/A	Development and implementation of Travel Plan toolkit	2015	

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
39	Kingsway Business Park Travel Plan	Promoting Travel Alternatives	Workplace Travel Planning	Rochdale MBC	2005	Implementation	N/A	N/A	Including introduction of Metrolink stop to area in 2014	2020	Reduce numbers of cars and increases use of public transport
40	Home-working initiatives	Promoting Travel Alternatives	Encourage / Facilitate home-working	Rochdale MBC	2008	Implementation	N/A	N/A	Introduction of secure network usage allowing all staff to access all systems remotely whilst ensuring security measures in place	2020	This should reduce emissions from vehicles during the rush hour period and help reduce congestion in the town centre.
41	Promotion of cycling	Promoting Travel Alternatives	Promotion of cycling	TfGM/ Rochdale MBC	2010	Implementation	N/A	N/A	Stage of 2014 Tour de France came into the Borough and cycling was actively promoted as part of the publicity and Rochdale Town centre has a history of hosting UK professional cycle races	2020	

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
42	Promoting walking	Promoting Travel Alternatives	Promotion of walking	Rochdale MBC	2011	Implementation	N/A	N/A		2020	Promoting active lifestyle will encourage residents to take a generally more active lifestyle opting to walk rather than use transport.
43	Promoting cycling	Promoting Travel Alternatives	Promotion of cycling	Rochdale MBC	2007	Evaluation	N/A	N/A	None	2012	increasing numbers cycling to work will decrease congestion within the borough at peak times
44	Promotion of rail use	Promoting Travel Alternatives	Promote use of rail and inland waterways	TfGM / Rochdale MBC	2010	Implementation	N/A	N/A		2020	
45	Increase use of canal ways	Promoting Travel Alternatives	Promote use of rail and inland waterways	Rochdale MBC	2007	Implementation	N/A	N/A	On-going	2020	

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
46	Promotion of travel information - Via internet	Public Information	via the Internet	Rochdale MBC	2009	Other	N/A	N/A	Information on planned highways works provided by the Council including work by statutory undertakers. Internet alerts are sent and are available to passengers on unforeseen incidents when they occur.	2025	
47	Promotion of travel information - Via leaflets	Public Information	via leaflets	Rochdale MBC	2006	Implementation	N/A	N/A	Substantial work to promote cycling as part of the Tour de France	2025	

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
48	Promotion of travel information - via media, including social media	Public Information	via other mechanisms	Rochdale MBC	2009	Implementation	N/A	N/A	Progressing use of Social media including Twitter and Facebook to keep staff and public informed	2025	By providing information on traffic issues and road closures it allows people to make informed decisions to avoid congestion / roadwork's etc.

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
49	Public transport improvements	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	TfGM / Rochdale MBC	2011	Implementation	N/A	N/A	Rochdale Free Town centre Bus service - 3rd February 2014. Cross City Bus Priority Corridor section continues through city centre to Oxford Road - Completed Autumn 2014. Littleborough Railway Station - major step free access improvements. Rochdale station underpass reopening - underway started Feb 2015. Northern Hub - Rochdale railway station capacity improvement - start late 2015, completion date December 2016	2016	All measures have long term potential to increase use of public transport and reduce congestion on roads at peak times.
50	Bicycle hire	Transport Planning and Infrastructure	Public cycle hire scheme	Northern Rail / RMBC	2014	Implementation	N/A	N/A	Promotion of scheme, other works on-going	2025	

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
51	Increase cycling within Borough	Transport Planning and Infrastructure	Cycle network	Partners and RMBC	2007	Implementation	N/A	N/A	Healey Dell Cycleway - Rochdale Town centre to Rossendale Cycle Network (Completed 2014). Rochdale Health Centre / Station / Metrolink Cycle Hub completed July 2014.	2020	
52	Increasing use of Cycle Network	Transport Planning and Infrastructure	Cycle network	TfGM / Rochdale MBC	2007	Implementation	N/A	N/A	Town Centre Cycle Hub Programmed for construction to Interchange with New Bus Station and Metrolink Stop - to be completed 2015	2015	

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
53	Increasing use of Public transport	Transport Planning and Infrastructure	Bus route improvements	TfGM / Rochdale MBC	2010	Implementation	N/A	N/A	On-going	2016	Reducing bus services in areas where there is little or no demand and developing strategic solutions will reduce buses running with no passengers etc.
54	Increasing use of Public transport	Transport Planning and Infrastructure	Other	TfGM	2013	Evaluation	N/A	N/A	On-going	2014	Increasing use of metrolink as a viable alternative to cars / bus and rail.
55	Park and Ride Scheme	Alternatives to private vehicle use	Rail based Park & Ride	Rochdale MBC	2012	Implementation	N/A	N/A	Castleton Railway station additional provision of 37 spaces programmed for 2015	2015	Reducing car use by providing better options to commuters, reduction in peak time traffic congestion

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
56	Car share Scheme	Alternatives to private vehicle use	Car & lift sharing schemes	TfGM / Rochdale MBC	2010	Implementation	N/A	N/A	Promotion of scheme, other works on-going	2020	Reducing numbers of cars on roads at peak times will reduce congestion
57	GM Air Quality group	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	GM Authorities	2001	Implementation	N/A	N/A	On-going work to update policies and develop a unified strategy for Greater Manchester	2030	Works to identify AQMA's and develop strategies that are unified and workable.
58	Planning and policy development	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Rochdale MBC	2007	Implementation	N/A	N/A	On-going	2030	Undetermined but will have a positive impact to reduce emissions

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
59	Low Emissions strategy	Policy Guidance and Development Control	Low Emissions Strategy	Rochdale MBC	2012	Implementation	N/A	N/A	On-going	2020	Undetermined but will have a positive impact to reduce emissions
69	Smart Motorway scheme	Traffic Management	UTC, Congestion management, traffic reduction	Highways Agency	2010	Implementation	N/A	N/A	On-going work	2020	Following a revised strategy this programme will be air quality neutral
61	Greener Vehicles	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	Rochdale MBC	2013	Evaluation	N/A	N/A	All vehicles checked, this is to be an on-going programme	2015	Reducing fuel consumption and therefore emissions
62	Promoting Low Emission Public Transport	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	TfGM	2010	Implementation	N/A	N/A	On-going work	2020	Reducing emissions from buses

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
63	Enigma	Policy Guidance and Development Control	Other policy	TfGM and GM Authorities	2005	Implementation	N/A	N/A	Reassessing the data and ensuring it is up to date - on-going	2030	Enables links to be identified in areas of poor air quality and enables RMBC to enforce conditions where required.

2.3 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and or Concentrations

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

The EU has also set a target of a 20% reduction in urban background concentrations of $PM_{2.5}$ between 2010 and 2020. Greater Manchester currently has 4 sites that monitor $PM_{2.5}$. All of these sites have showed a significant downward trend over the last year.

Given the need to meet EU limits for NO_2 as soon as possible, and the downward trend of particulate matter, the short-term focus will need to be on NO_2. 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.

Air Quality impacts will need to be done for all major schemes where an impact is likely.

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how it compares with objectives.

Greater Manchester undertook automatic (continuous) monitoring at 16 sites during 2015. Table A.1 in Appendix A shows the details of the sites. NB. Local authorities do not have to report annually on the following pollutants: 1, 3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem.

Maps showing the location of the monitoring sites are provided in https://www.google.com/maps/d/edit?hl=en&hl=en&authuser=0&authuser=0&mid=16qq4gYdQtrL3Ct8h6Xp-5lyZUpM Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

Greater Manchester undertook non-automatic (passive) monitoring of NO_2 at 236 sites during 2015 Table A.2 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in https://www.google.com/maps/d/edit?hl=en&hl=en&authuser=0&authuser=0&mid=16qq4gYdQtrL3Ct8h6Xp-5lyZUpM. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for "annualisation" and bias. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

For diffusion tubes, the full 2015 dataset of monthly mean values is provided in the attached "tube results" document.

Table A.4 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

In 2015 the Greater Manchester Air Quality Network (GMAQN) operated 16 NO_2 chemiluminescence monitors. The annual mean NO_2 results are provided in Table A.3 which details the results from 2011 to 2015 and Figure 3.1 and Figure 3.2 show the trends.

The following stations were decommissioned during 2011/12:

- Bolton College, Oldham West End, Stockport Shaw Heath in 2011
- Wigan Leigh 2, Bury Roadside in 2012

The Bury roadside was decommissioned by DEFRA as if did not meet EU site criteria side, and was relocated in 2014 to the A56. No sites were closed in 2013-2015. Bury Radcliffe and Prestwich were re-commissioned in 2011. Bury Whitefield and Oldham Crompton way were commissioned in 2015 and 2014 respectively

Figure 3.1 and Figure 3.2 show a downward trend over the period with non roadside sites generally falling below the air quality objective of 40 µg/m^3. Nonetheless four locations are above the air quality objective in 2015 and one is just below it. All are in the AQMA. Manchester Oxford Road recorded the highest concentration at 66 µg/m^3 (92% data capture) and has remained fairly constant from 2011. Oxford Road is one of the main corridors from south Manchester in to the city centre with two major Universities, student accommodation and a teaching hospital making it one of the busiest commuter routes in Europe with a high proportion of buses. Salford M60 is the second highest site with 52µg/m^3; compared to 2014 there has been a fall of 8 µg/m^3 in the roadside levels. The air quality station is a motorway site with some of the highest traffic flows on the M60 carrying traffic between Liverpool and Hull.

Nine other automatic sites are in the AQMA with concentrations ranging between 19 µg/m^3 to 39µg/m^3. For sites outside the AQMA, concentrations range from 15 µg/m^3 to 20 µg/m^3.

Table A.4 shows the number of hourly exceedences above 200 µg/m^3 with 99.8 percentile in brackets for some years. The hourly air quality objective was exceeded at one site (Manchester Oxford Road) with 60 exceedences. This exceedence is being investigated and will be reported back to Defra.

The 99.8 percentile is a useful indicator to compare against the 200 µg/m^3 for sites with low data capture. If the 99.8 percentile is above 200 µg/m^3, then the hourly standard is likely to be exceeded. No sites have a 99.8 percentile above 200 µg/m^3 in 2015 supporting the above finding that the hourly standard is only exceeded at one site in Greater Manchester.

Measurements from the Greater Manchester's diffusion tube network confirms there are locations that continue to be above the annual mean nitrogen dioxide, but the overall trend at different site types is failing (Figure 3.3). Table 3.1 shows the number of tubes over the national objective of 40 µg/m^3 in each Local Authority.

Figure 3.1 - Trends in Annual Mean NO2 Concentrations Measured at Automatic Monitoring Sites Bury – Oldham.

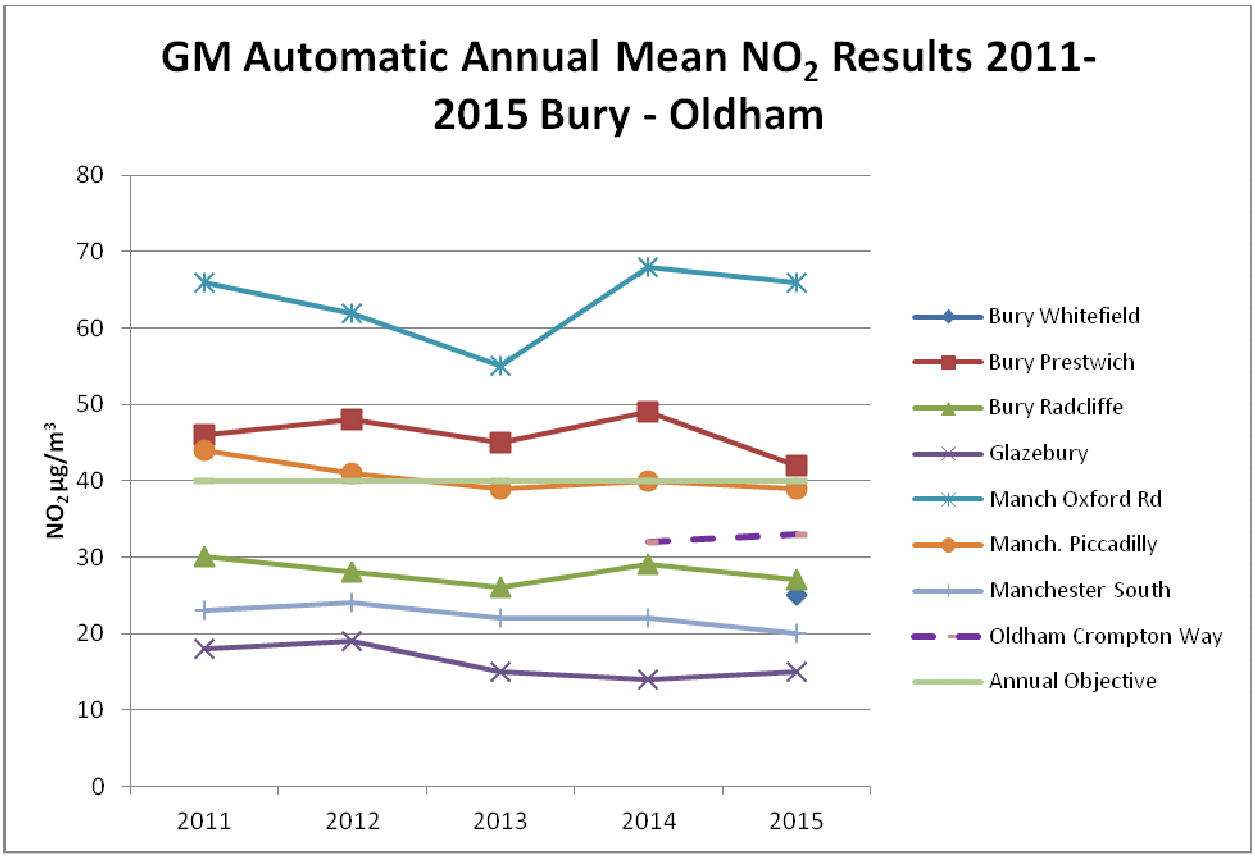
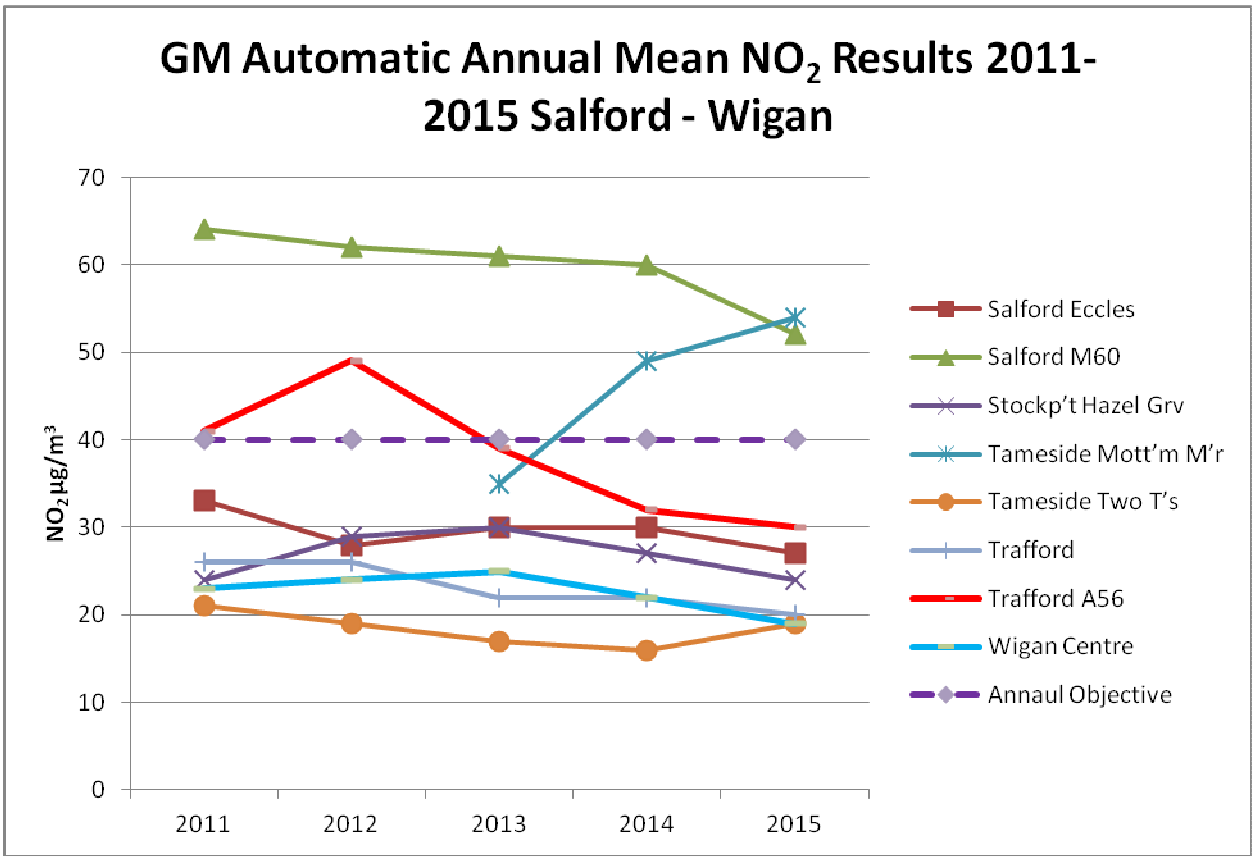


Figure 3.2 -Trends in Annual Mean NO_2 Concentrations Measured at Automatic Monitoring Sites Salford - Wigan



The results of NO_2 2015 Diffusion Tubes and annual mean concentration adjusted for bias are reported in the "Tube results 2011-2015" document due to the large number of tubes in the data set. Table 2.6 shows that 40 locations exceeded the air quality standard, 37 of these were in the air quality management area. All districts except Oldham and Trafford recorded a location where the annual mean objective is exceeded.

Figure 3.3 - Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites

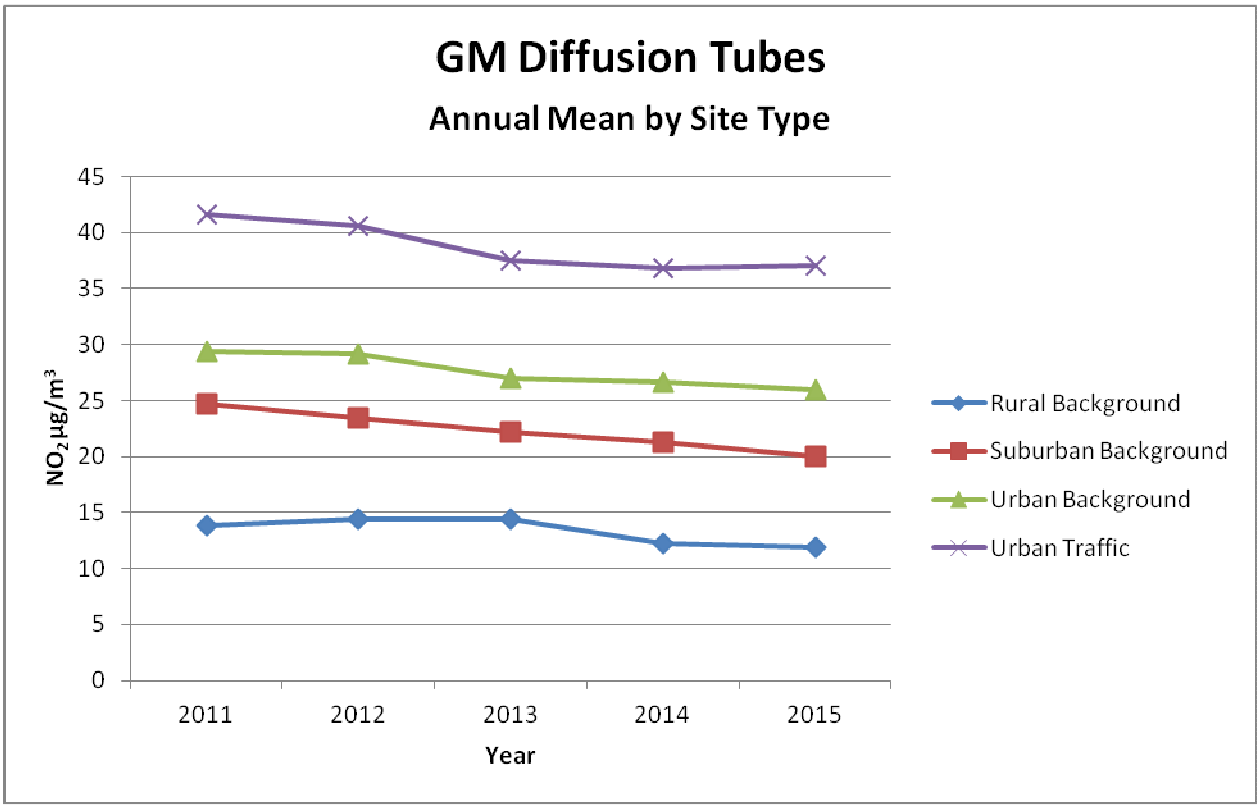


Table 3.1 - Number of NO2 Diffusion Tubes over 40 µg/m^3

Local Authority	2015
Bolton	3
Bury	3
MAN	15
Oldham	0
Rochdale	4
Salford	4
Stockport	5
Tameside	5
Trafford	0
Wigan	1
Total	**40**

3.2.2 Particulate Matter (PM_{10})

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

Table A.6 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

Table A.5 shows the annual mean PM_{10} for sites in Greater Manchester is well below the objective leavel, and as can be seen in Figure 3.4 and Figure 3.5 there have been long term improvements and concentration have mainly decreased since 2014. There are no sites that exceed the annual mean air quality objective.

As expected, the Urban Traffic sites remain higher than other sites in the network. The highest site recorded 28 µg/m^3 at Urban Traffic locations, compared with 14 µg/m^3 seen at the site with the lowest concentration.

Table A.6 summaries the results for the PM_{10} daily mean air quality objective; no site exceeds this objective.

Figure 3.4- Trends in Annual Mean PM10 Concentrations Measured at Automatic Monitoring Sites – Bury - Oldham

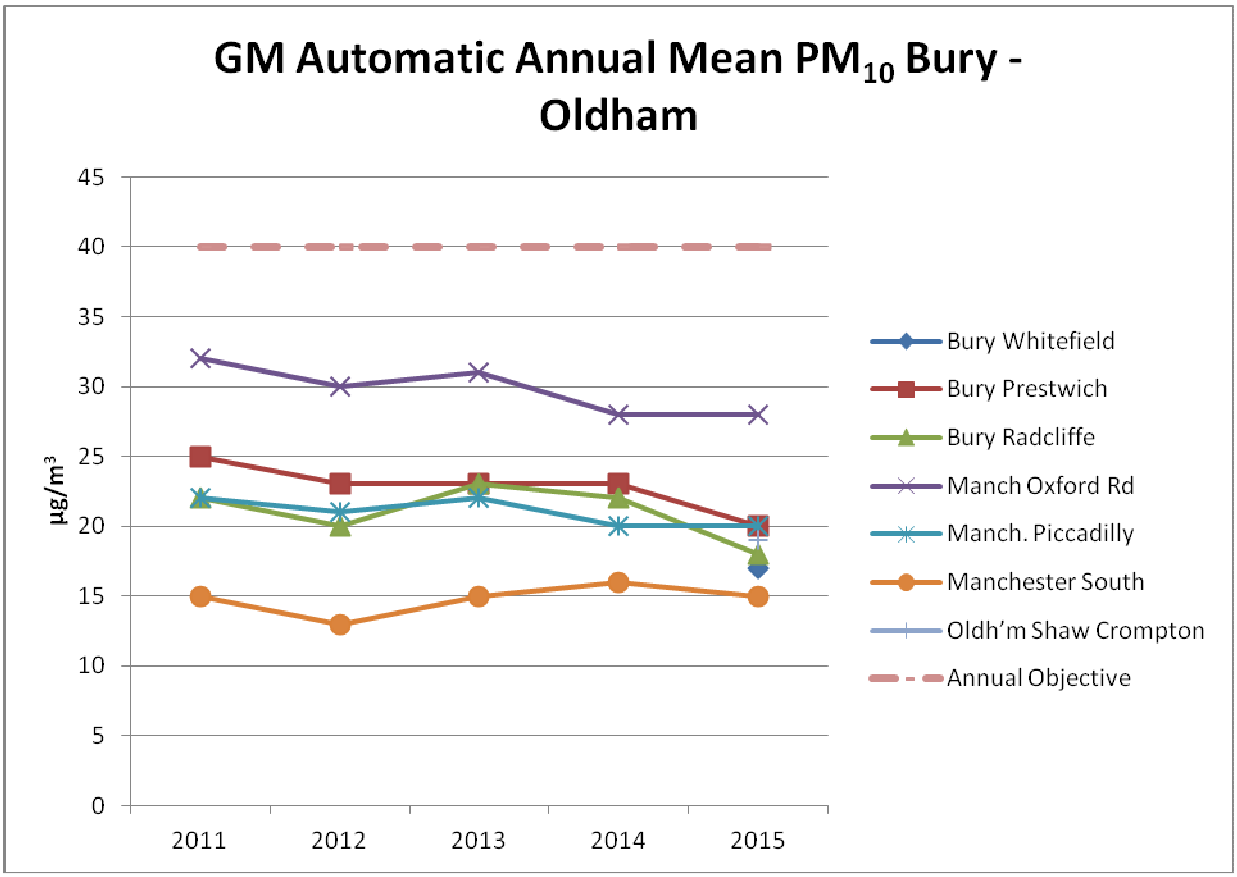
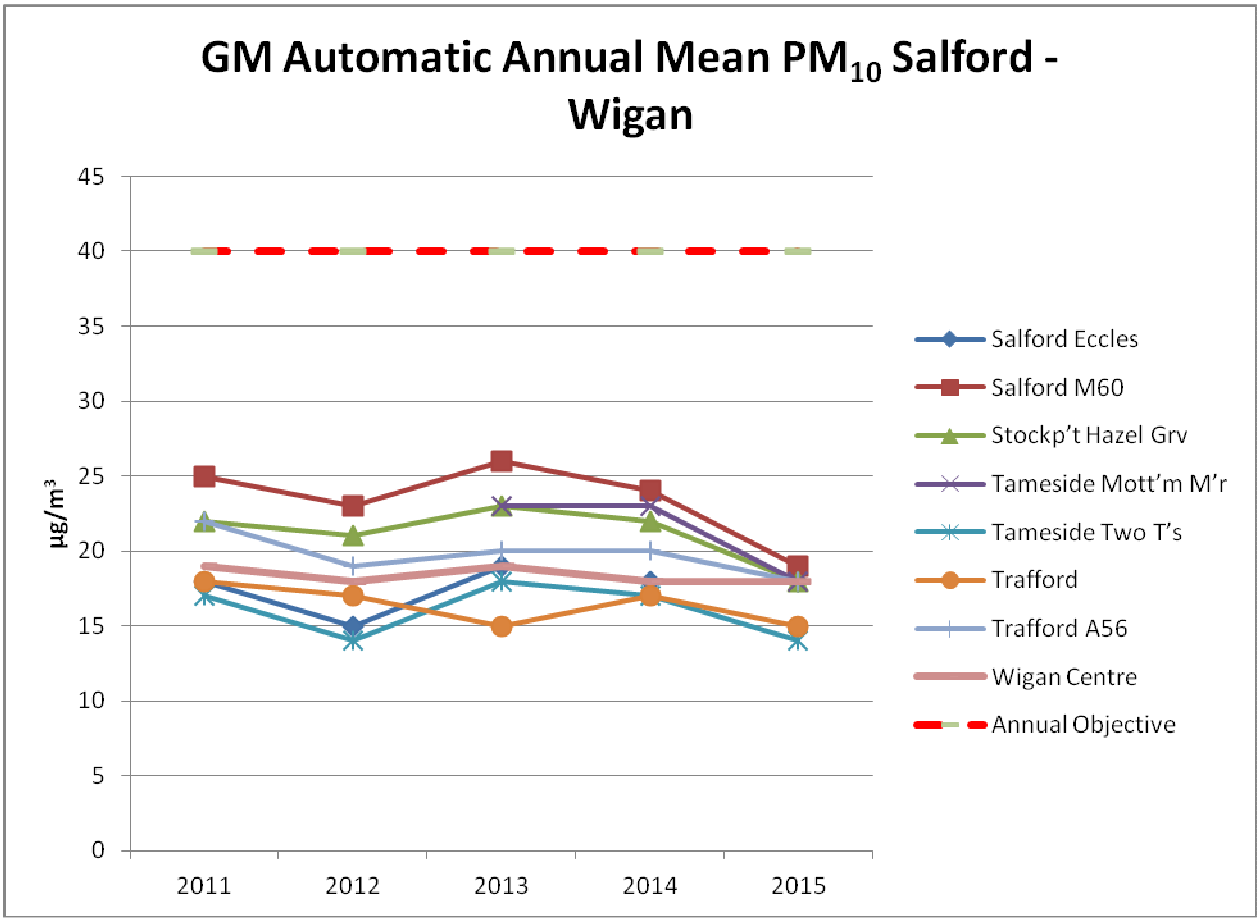


Figure 3.5 - Trends in Annual Mean PM10 Concentrations Measured at Automatic Monitoring Sites – Salford - Wigan

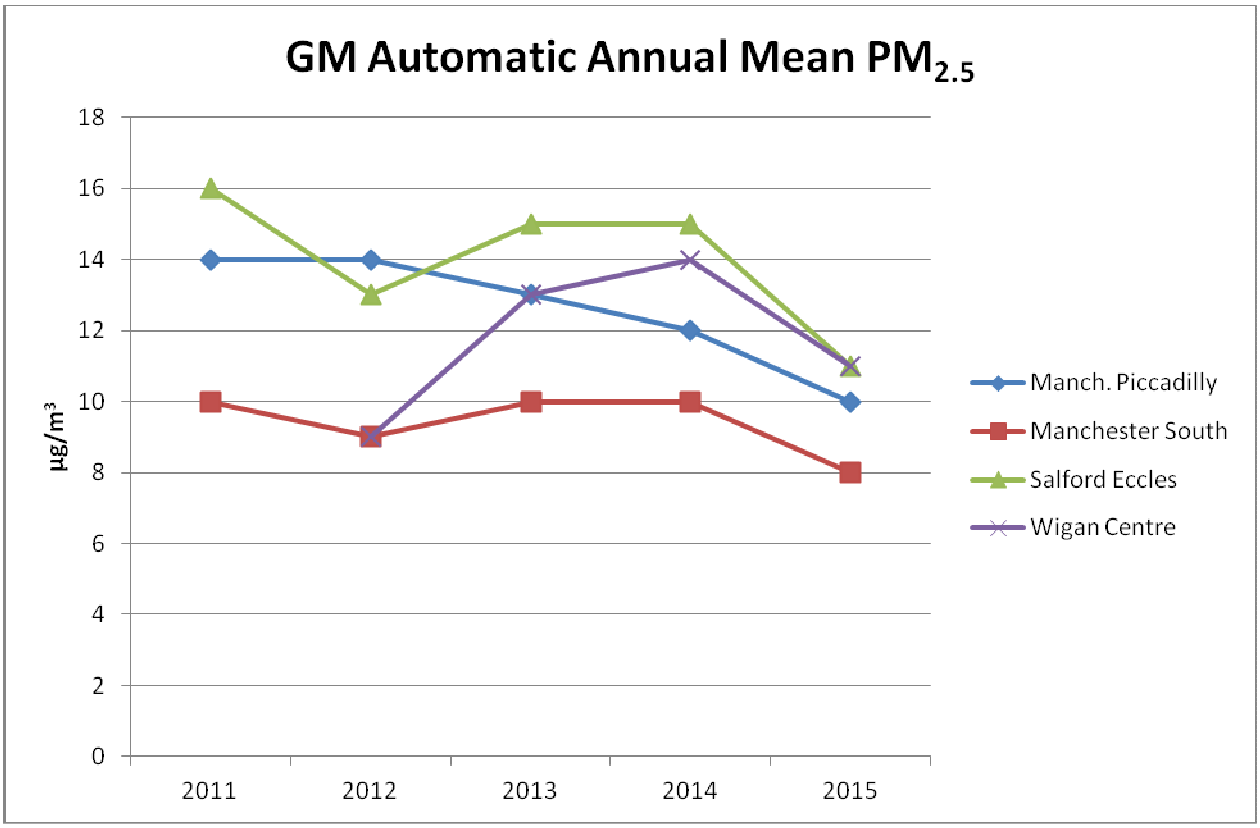


3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.7 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years.

$PM_{2.5}$ is monitored at 4 sites in Greater Manchester. All these sites have seen a significant downward trend in levels since 2014 (Figure 3.6)

Figure 3.6 - Trends in Annual Mean PM2.5 Concentrations Measured at Automatic Monitoring Sites



3.2.4 Sulphur Dioxide (SO_2)

Table A 8 in Appendix A compares the ratified continuous monitored SO_2 concentrations for year 2015 with the air quality objectives for SO_2.

SO_2 is monitored at 2 sites in Greater Manchester (Manchester Piccadilly and Manchester South). Neither of these sites failed any of the SO_2 objectives.

Appendix A: Monitoring Results

Table A.1 - Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
BURY	Bury Whitefield	Urban Traffic	380637	406974	NO_2 PM_{10}	Y	Chemiluminescent & TEOM	24	7	3.5
BUR2	Bury Prestwich	Urban Traffic	381650	403222	NO_2 PM_{10}	Y	Chemiluminescent & TEOM	15	2.5	1.5
BUR1	Bury Radcliffe	Urban Traffic	378190	407480	NO_2 PM_{10}	Y	Chemiluminescent & TEOM	10	2.5	1.5
GLAZ	Glazebury	Rural Background	368759	396028	NO_2 O_3	N	Chemiluminescent & TEOM	70	100	3
MAN1	Manchester Oxford Rd	Urban Traffic	384233	397287	NO_2 PM_{10}	Y	Chemiluminescent & TEOM	1	1	2
MAN3	Manchester Piccadilly	Urban Background	384310	398337	NO_2 O_3 PM_{10} $PM_{2.5}$ SO_2	Y	Chemiluminescent & TEOM	2	30	4
MAN8	Manchester South	Suburban Background	383904	385818	NO_2 O_3 SO_2 PM_{10} $PM_{2.5}$	N	Chemiluminescent & TEOM	30	15	2
CW	Oldham Crompton Way	Urban Traffic	393887	409191	NO_2 PM_{10}	Y	Chemiluminescent & TEOM	10	1	1.5
ECCL	Salford Eccles	Urban Industrial	377926	398728	NO_2 O_3 PM_{10} $PM_{2.5}$	Y	Chemiluminescent & TEOM			

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
M60	Salford M60	Urban Traffic	374810	400855	CO NO_2 O_3 PM_{10}	Y	Chemiluminescent & TEOM			
STK5	Stockport Hazel Grv	Urban Traffic	391481	387637	NO_2 PM_{10}	Y	Chemiluminescent & TEOM	33	4	2
TAM1	Tameside Mottram M'r	Urban Traffic	399719	395804	NO_2 PM_{10}	Y	Chemiluminescent & TEOM			
TAME	Tameside Two Trees Sch	Urban Background	393454	394330	NO_2 O_3 PM_{10}	N	Chemiluminescent & TEOM			
TRAF	Trafford	Urban Background	378783	394726	NO_2 PM_{10} SO_2	N	Chemiluminescent & TEOM	60	98	2.5
TRF2	Trafford A56	Urban Traffic	379413	394014	NO_2 PM_{10}	Y	Chemiluminescent & TEOM	40	2	2.5
WIG5	Wigan Centre	Urban Background	357816	406024	NO_2 O_3 PM_{10}, $PM_{2.5}$	N	Chemiluminescent & TEOM	0	175	2.5

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

(2) N/A if not applicable.

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

The full list of the 236 non-automatic monitoring sites is detailed in the attached “GM Tube Results” file.

Table A.3 - Annual Mean NO_2 Monitoring Results

Site ID	Local Authority	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO2 Annual Mean Concentration (µg/m3) (3)				
						2011	2012	2013	2014	2015
Bury Whitefield	Bury	Urban Traffic	Automatic	N/A	72	-	-	-	-	25
Bury Prestwich	Bury	Urban Traffic	Automatic	N/A	96	**46**	**48**	**45**	**49**	**42**
Bury Radcliffe	Bury	Urban Traffic	Automatic	N/A	96	30	28	26	29	27
Glazebury	Salford	Rural Background	Automatic	N/A	92	18	19	15	14	15
Manch Oxford Rd	Manchester	Urban Traffic	Automatic	N/A	92	**66**	**62**	**55**	**68**	**66**
Manch. Piccadilly	Manchester	Urban Background	Automatic	N/A	98	**44**	**41**	39	**40**	39
Manchester South	Manchester	Suburban Background	Automatic	N/A	99	23	24	22	22	20
Oldham Crompton Way	Oldham	Urban Traffic	Automatic	N/A	80	-	-	-	32	33
Salford Eccles	Salford	Urban Industrial	Automatic	N/A	98	33	28	30	30	27
Salford M60	Salford	Urban Traffic	Automatic	N/A	89	**64**	**62**	**61**	**60**	**52**
Stockp't Hazel Grv	Stockport	Urban Traffic	Automatic	N/A	97	24	29	30	27	24

Site ID	Local Authority	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO2 Annual Mean Concentration (µg/m3) (3)				
						2011	2012	2013	2014	2015
Tameside Mott'm M'r	Tameside	Urban Traffic	Automatic	N/A	84	-	-	35	**49**	**54**
Tameside Two T's	Tameside	Urban Background	Automatic	N/A	94	21	19	17	16	19
Trafford	Trafford	Urban Background	Automatic	N/A	90	26	26	22	22	20
Trafford A56	Trafford	Urban Traffic	Automatic	N/A	89	41	49	39	32	30
Wigan Centre	Wigan	Urban Background	Automatic	N/A	96	23	24	25	22	19

Notes: The full list of the 236 non-automatic monitoring sites in detailed in the attached "GM Tube Results" file.

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

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

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

(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per Technical Guidance LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Table A.4 - 1-Hour Mean NO_2 Monitoring Results

Site ID	Local Authority	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO2 1-Hour Means > 200µg/m3 (3)				
						2011	2012	2013	2014	2015
Bury Whitefield	Bury	Roadside	Automatic	N/A	71.9	-	-	-	-	0
Bury Prestwich	Bury	Roadside	Automatic	N/A	96.47	-	0(151)	0(126)	0	0
Bury Radcliffe	Bury	Roadside	Automatic	N/A	95.83	-	0(131)	0(114)	0	0
Glazebury	Salford	Rural	Automatic	N/A	91.87	0(84)	0(71)	0	0	0
Manch Oxford Rd	Manchester	Kerbside	Automatic	N/A	92.44	5(166)	13 (181)	0(138)	14	**60**
Manch. Piccadilly	Manchester	Urban Centre	Automatic	N/A	98.44	0(109)	0(101)	0(97)	2	1
Manchester South	Manchester	Suburban	Automatic	N/A	98.7	0(101)	0(109)	0(95)	0	0
Oldh'm Shaw Crompton	Oldham	Roadside	Automatic	N/A	79.7	-	-	-	0(301)	0 (109)
Salford Eccles	Salford	Urban Industrial	Automatic	N/A	98.29	0(136)	2(151)	0(123)	0	0
Salford M60	Salford	Roadside	Automatic	N/A	89.44	13(195)	8(191)	4(187)	0	3
Stockp't Hazel Grv	Stockport	Roadside	Automatic	N/A	97.11	0(195)	0(111)	0(109)	0	0

Site ID	Local Authority	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO2 1-Hour Means > 200µg/m3 (3)				
						2011	2012	2013	2014	2015
Tameside Mott'm M'r	Tameside	Roadside	Automatic	N/A	84.02	-	-	0(141)	13(199)	8 (189)
Tameside Two T's	Tameside	Urban Background	Automatic	N/A	93.72	0(103)	0(78)	0(80)	0	0
Trafford	Trafford	Urban Background	Automatic	N/A	90	0(113)	0(117)	0(86)	0	0
Trafford A56	Trafford	Roadside	Automatic	N/A	89	0(132)	14(195)	7	0	0 (107)
Wigan Centre	Wigan	Urban Background	Automatic	N/A	96	0(82)	0(97)	0(86)	0	0

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

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

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

(3) If the period of valid data is less than 90%, the 99.8th percentile of 1-hour means is provided in brackets.

Table A.5 - Annual Mean PM_{10} Monitoring Results

Site ID	Local Authority	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	PM10 Annual Mean Concentration (µg/m3) (3)				
						2011	2012	2013	2014	2015
Bury Whitefield	Bury	Urban Traffic	Automatic	N/A	79.7	-	-	-	-	17
Bury Prestwich	Bury	Urban Traffic	Automatic	N/A	89.12	25	23	23	23	20
Bury Radcliffe	Bury	Urban Traffic	Automatic	N/A	98.89	22	20	23	22	18
Manch Oxford Rd	Manchester	Urban Traffic	Automatic	N/A	98.28	32	30	31	28	28
Manch. Piccadilly	Manchester	Urban Background	Automatic	N/A	96	22	21	22	20	20
Manchester South	Manchester	Suburban Background	Automatic	N/A	100	15	13	15	16	15
Oldh'm Shaw Crompton	Oldham	Urban Traffic	Automatic	N/A	77.1	-	-	-	-	19
Salford Eccles	Salford	Urban Industrial	Automatic	N/A	95.76	18	15	19	18	18
Salford M60	Salford	Urban Traffic	Automatic	N/A	94.83	25	23	26	24	19
Stockp't Hazel Grv	Stockport	Urban Traffic	Automatic	N/A	95.99	22	21	23	22	18
Tameside Mott'm M'r	Tameside	Urban Traffic	Automatic	N/A	81.24	-	-	23	23	18
Tameside Two T's	Tameside	Urban Background	Automatic	N/A	89.21	17	14	18	17	14

Site ID	Local Authority	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	PM10 Annual Mean Concentration (µg/m3) (3)				
						2011	2012	2013	2014	2015
Trafford	Trafford	Urban Background	Automatic	N/A	98	18	17	15	17	15
Trafford A56	Trafford	Urban Traffic	Automatic	N/A	99	22	19	20	20	18
Wigan Centre	Wigan	Urban Background	Automatic	N/A	88	19	18	19	18	18

Notes: Exceedances of the PM_{10} annual mean objective of 40µg/m^3 are shown in **bold.**

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

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

(3) All means have been "annualised" as per Technical Guidance LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Table A.6 - 24-Hour Mean PM_{10} Monitoring Results

Site ID	Local Authority	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	PM10 24-Hour Means > 50µg/m3 (3)				
						2011	2012	2013	2014	2015
Bury Whitefield	Bury	Urban Traffic	Automatic	N/A	79.7	-	-	-	-	6
Bury Prestwich	Bury	Urban Traffic	Automatic	N/A	89.12	19	14	8	4	6
Bury Radcliffe	Bury	Urban Traffic	Automatic	N/A	98.89	15	11	9	4	5
Manch Oxford Rd	Manchester	Urban Traffic	Automatic	N/A	98.28	33	28	21	18	25
Manch. Piccadilly	Manchester	Urban Background	Automatic	N/A	96	8	11	7	5	3
Manchester South	Manchester	Suburban Background	Automatic	N/A	100	5	7	6	8	4
Oldh'm Shaw Compton	Oldham	Urban Traffic	Automatic	N/A	77.1	-	-	-	5 (28)	11
Salford Eccles	Salford	Urban Industrial	Automatic	N/A	95.76	13	6	6	6	5
Salford M60	Salford	Urban Traffic	Automatic	N/A	94.83	12	16	19	4(35)	5
Stockp't Hazel Grv	Stockport	Urban Traffic	Automatic	N/A	95.99	23	20	12	11	6
Tameside Mott'm M'r	Tameside	Urban Traffic	Automatic	N/A	81.24	-	-	0	3	3
Tameside Two T's	Tameside	Urban Background	Automatic	N/A	89.21	2	1	3	0	1

Site ID	Local Authority	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	PM10 24-Hour Means > 50µg/m3 (3)				
						2011	2012	2013	2014	2015
Trafford	Trafford	Urban Background	Automatic	N/A	98	2	2	0	1	2
Trafford A56	Trafford	Urban Traffic	Automatic	N/A	99	6	3	1	3	5
Wigan Centre	Wigan	Urban Background	Automatic	N/A	88	3	3	1	1 (26)	1

Notes: Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in **bold.**

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

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

(3) If the period of valid data is less than 90%, the 90.4th percentile of 24-hour means is provided in brackets.

Table A.7 - $PM_{2.5}$ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	$PM_{2.5}$ Annual Mean Concentration (µg/m^3) (3)				
					2011	2012	2013	2014	2015
Manch. Piccadilly	Urban Background	Automatic	N/A	91	14	14	13	12	10
Manchester South	Suburban Background	Automatic	N/A	96	10	9	10	10	8
Salford Eccles	Urban Industrial	Automatic	N/A	97	16	13	15	15	11
Wigan Centre	Urban Background	Automatic	N/A	76	-	9	13	14	11

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

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

(3) All means have been "annualised" as per Technical Guidance LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Table A 8 - SO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	Number of Exceedances (percentile in bracket) (3)		
					15-minute Objective (266 µg/m^3)	1-hour Objective (350 µg/m^3)	24-hour Objective (125 µg/m^3)
Manchester South	Suburban Background	Automatic	N/A	98.54	0	0	0
Manchester Piccadilly	Urban Background	Automatic	N/A	94.84	0	0	0

Notes: Exceedances of the SO_2 objectives are shown in **bold** (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed a year)

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

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

(3) If the period of valid data is less than 90%, the relevant percentiles are provided in brackets.

Appendix B: Full Monthly Diffusion Tube Results for 2015

Table B.1 - NO_2 Monthly Diffusion Tube Results – 2015

The full list of the 236 non-automatic monitoring sites is detailed in the attached “GM Tube Results” file, due to the large number of tubes in the data set.

(1) See Appendix C for details on bias adjustment

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

Each of the 10 Greater Manchester authorities committed to undertaking a detailed air quality review and assessment in relation to road traffic. The Detailed assessment was completed in September 2015 for the base year 2014, and confirmed that a new AQMA should be declared. It was decided to declare a single AQMA for the whole of Greater Manchester. The dispersion modelling report was submitted alongside this. The report describes using the Greater Manchester emissions dispersion model), referred to as GMEDIS, to produce emissions concentrations for a 2016 model year. The work was undertaken on behalf of the Greater Manchester Public Protection Partnership (GMPPP) and was funded by grants from Defra and the ten Greater Manchester local authorities. The model results will be used to support the work of the GMPPP and the GM local authorities in the discharge of their air quality duties under the Environment Act 1995. This report describes the modelling methodology to map the concentrations of NO_2 and particulates in Greater Manchester area. The model covers the entire of Greater Manchester with an area of approximately 1275 km^2.

Screening assessments of identified new or changed sources of pollution based on DMRB, industrial nomograms, biomass tools, etc. have been undertaken and have resulted in no changes to monitoring.

Diffusion Tube Bias Adjustment Factors

The tubes are prepared and analysed by Staffordshire Scientific Services using the 20% triethanolamine (TEA) in water method. The laboratory method is UKAS accredited. Results from the quality control schemes published on the LAQM website give the laboratory a good precision rating.

NO_2 diffusion tubes are affected by several factors, which may cause them to have bias (over-read), or negative bias (under-read) relative to the reference technique. To compare with the AQS objectives it's important that tubes are corrected (adjusted) by comparing with a chemiluminescent analyser reference method for NO2.

A bias factor is calculated using a spread sheet provided by Ricardo–AEA. Bias factors are collated in a national database enabling a large number of factors at a

range of different site locations using the same laboratory and analysis method. There is a choice of using a locally derived bias factor based on local data or using the national dataset.

The bias adjustment factor used for 2015 is 0.84

Automatic NO_2 Analysers

Automatic air quality analysers in Greater Manchester area are subject to a high level of quality assurance/ quality control. Most analysers are either operated as part of the national Automatic Urban and Rural Network (AURN) or are part of the 'Calibration Club' scheme run by Ricardo-AEA or similar schemes to provide accurate and robust data.

The procedures are equivalent to the UK Automatic Urban and Rural Network (AURN) the main features of the services being:-

Calibration Club

- Data screened daily for errors and final data ratified and published to same standard as AURN sites.
- Data checked twice daily for errors and faults reported to Local Site operators
- Independent audits twice or once a year at Salford M60
- Final data set scaled and ratified to same standard as AURN.

Casella Data Management

The Casella service is similar to the calibration club with the exception of the independent audits. On site checks do include linearity test of analysers and gas phase titration (GPT) to check converter efficiency on the NOx instruments. Data is scaled to same standard as TG(09). TEOM data is corrected using the Volatile Correction Method.

Greater Manchester Air Quality Network (GMAQN)

Ricardo- AEA manages QA/QC and audit of the air quality stations to the same standard as the AURN. The network officially started on 1 September 2013. Table

A1.7 list the Greater Manchester sites and their respective affiliation to the national network or the GAMQN.

Particulate Monitoring

A number of different instruments are used in Greater Manchester for the measurement of particles. Historically TEOM have been used, but DEFRA recently replaced and number of instruments with TEOM FDMS and some sites use the BAM or Partisol.

The reference method for the UK PM_{10} Objectives (and EU limit values) is based upon measurements from a gravimetric sampler. This samples over a 24 hour period and the particulate proportion less than 10 microns (PM_{10}) is measured by the mass difference before and after exposure. It is labour intensive and the UK, and European Counties have invested heavily in the TEOM (Tapered Element Oscillating Microbalance (TEOM). The TEOM reading have been historically adjusted by a factor of 1.3 to make them gravimetric equivalent. However to further improve the technique; the measurement was modified by lowering the sampling temperature from 50 C to 30 C and adding a dryer to remove water vapour. This system is referred to a Filter Dynamics Measurement System (FDMS) and is equivalent to EU reference method.

Due to widespread use of the TEOM, and its reliability and the need to report to the EU using an 'equivalent method', The Volatile Correction Model (VCM) was developed by Kings College London, to adjust the TEOM data. Studies have shown that FDMS sites within 200 kilometres can be used to correct the Teom data as it assumes that the sample lost by the heating is the same over this geographical area. Sufficient FDMS sites have only been available since 1998/9 for the correction to be applied.

Appendix D: Map(s) of Monitoring Locations

All monitoring locations are detailed at:

https://www.google.co.uk/maps/@53.4989174,-2.3458778,10z/data=!3m1!4b1!4m2!6m1!1s16qq4gYdQtrL3Ct8h6Xp-5lyZUpM?hl=en&hl=en.

Appendix E: Summary of Air Quality Objectives in England

Table E.1 - Air Quality Objectives in England

Pollutant	Air Quality Objective[2]	
	Concentration	Measured as
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

[2] The units are in microgrammes of pollutant per cubic metre of air (µg/m^3).

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide
GM	Greater Manchester
GMCA	Greater Manchester Combined Authority

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