



# 2016 Air Quality Annual Status Report (ASR) For Dudley MBC

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

August 2016

Local Authority Officer	F. Bull L. Fawthrop T. Glews
Department	Environmental Safety & Health Team
Address	Dudley MBC, Health and Wellbeing Division People Directorate, 4 Ednam Road, Dudley, DY1 1HL
Telephone	01384 812345
E-mail	EnvSafetyHealth.Due@dudley.gov.uk
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## Executive Summary: Air Quality in Our Area

This report fulfils the requirements of the Local Air Quality Management (LAQM) process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 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 national air quality objectives are likely to be achieved. Where exceedances are demonstrated or considered likely, the local authority must then 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. The object of this document is to identify any matters that have changed or improved in 2015 and how Dudley MBC can improve air quality in the borough in the future.

### Air Quality in Dudley MBC

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 and is closely linked to respiratory disease. 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<sup>1,2</sup>.

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion<sup>3</sup>.

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<sup>1</sup> Environmental equity, air quality, socioeconomic status and respiratory health, 2010

<sup>2</sup> Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

<sup>3</sup> Defra. Abatement cost guidance for valuing changes in air quality, May 2013

In 2007 Dudley MBC declared the whole borough as an Air Quality Management Area with respect to exceedances of the national air quality nitrogen dioxide (NO<sub>2</sub>) annual mean objective.

Air quality in Dudley has continued to meet national air quality objectives with the exception of NO<sub>2</sub> which is mainly generated from combustion sources, specifically from internal combustion engines in road vehicles. During the calendar year of 2015, Dudley MBC deployed NO<sub>2</sub> diffusion tubes at 51 sites and operated four automatic monitoring stations which monitor for NO<sub>2</sub>. Three of the stations also monitor for PM<sub>10</sub>.

In 2014, twelve roadside locations within the borough showed exceedances of the national air quality NO<sub>2</sub> annual mean objective. However, the air quality monitoring in 2015 showed that only eight of these roadside locations continued to exceed the national air quality NO<sub>2</sub> annual mean objective, these are listed below:

- Halesowen Road, Netherton
- Windmill Hill, Cradley,
- High Street, Pensnett
- Dudley Street, Sedgley
- High Street, Quarry Bank
- High Street, Wordsley
- Birmingham Road, Dudley
- Castle Hill, Dudley

The other four roadside locations were found to fall just below the national air quality NO<sub>2</sub> annual mean objective during 2015, these are listed below:

- Mill Street, Brierley Hill
- Buffery Road, Dudley
- Hall Street, Dudley
- Burton Road/Eve Lane, Gornal

During 2015, Dudley MBC did not identify any further areas in the borough that need investigation for NO<sub>2</sub>. Air quality monitoring will continue during 2016/17 to quantify concentrations of NO<sub>2</sub> to inform future revisions of the air quality action plan and to confirm that compliance is maintained in areas where improvements have been demonstrated. PM<sub>10</sub> and PM<sub>2.5</sub> will also be monitored to compare to national air quality objectives in order to determine compliance and non-compliance.

## **Actions to Improve Air Quality**

A number of projects have been undertaken to supplement the work of the Air Quality Action Plan and improve the Air Quality in the borough.

- The Low Emissions Towns & Cities Programme (LETCP) is a Defra funded project established in 2011. It is a partnership comprising the seven West Midlands Local Authorities, (Birmingham CC, Coventry CC, Dudley MBC, Sandwell MBC, Solihull MBC, Walsall MBC, Wolverhampton CC) working together to reduce vehicle emissions, through the acceleration of the uptake of cleaner vehicle fuels and technologies. The programme consists of 4 main work streams which are:
  - The Good Practice Air Quality Planning Guidance – a model approach to integrate air quality considerations into land use planning.
  - The Good Practice Procurement Guidance – how public sector procurement can influence vehicle emissions.
  - The Low Emission Zone Technical Feasibility Study – an investigation into different highway scenarios to determine the suitability for a low emission zone.
  - The West Midlands Low Emission Strategy (LES) – is currently being finalised and sets out the aims for creating a low emission future. The LES will form part of the newly adopted West Midlands Strategic Transport Plan “Movement for Growth”, which will be implemented by the West Midlands Combined Authority (WMCA).
  - All reports produced by the LETCP can be found on the LETCP website:
- [http://cms.walsall.gov.uk/low\\_emissions\\_towns\\_and\\_cities\\_programme](http://cms.walsall.gov.uk/low_emissions_towns_and_cities_programme)

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- A project, funded by the Government's Clean Vehicle Technology Fund, for ten coaches to be modified with the latest pollution reducing equipment to minimise emissions of nitrogen dioxide and particulates, therefore benefitting the local environment and the health of Dudley residents. This project is still being monitored; the 6 monthly monitoring of the retrofitted coaches has shown a reduction in emissions by up to 97% for the Euro III coaches and by up to 84% for the Euro II coaches. The final 12 monthly monitoring of the retrofitted coaches will be undertaken in August 2016.
- A project funded by the Defra's Air Quality Grant Programme to upgrade a cycle and pedestrian link across the A458 in Cradley. The project aims to reduce traffic congestion, improve air quality and road safety. During the project, Dudley MBC officers are working closely with the local community to promote the scheme and deliver cycle and pedestrian training in nearby schools. The impacts of the scheme on local air quality will be monitored by collecting NO<sub>2</sub> and PM<sub>10</sub> data from the nearby automatic monitoring site and further NO<sub>2</sub> data from the diffusion tubes on Windmill Hill and Colley Gate. Once cycle and pedestrian training has been completed at the schools, a traffic survey will be undertaken to assess the traffic flow and modal shift following the provision of the new crossing. This information will be fed back to Defra and published on the DMBC website.
- An anti idling project funded by Defra to raise awareness at schools and provide information on Dudley Council's web site to reduce the idling of car engines outside schools.
- National Express and the Department for Transport's Green Bus Fund have invested in a fleet of 21 low emission hybrid buses which operate on the number 1 service between Dudley and Wolverhampton, passing through Sedgley.



Picture low emission bus Number 1 Service

- As part of the West Midlands Bus Showcase Programme, National Express have provided a fleet of Euro VI buses on the number 9 Stourbridge to Birmingham route.
- Netherton and Wordsley are exceedance areas which have been flagged up as priority areas for consideration of cleaner bus fleets. This is a significant opportunity to improve air quality in these areas of poor air quality, which will be pursued through the air quality work programme for 2016/17 (Ref: table 2.2)

In addition to these projects, there are a number of road network improvements that are coordinated with internal and external partners to continue to deliver road traffic management improvements to the borough's road system, in line with the West Midlands Local Transport Plan. These provide additional measures to reduce traffic congestion and improve air quality.

## Local Priorities and Challenges

**The priorities for Dudley MBC are:**

- To improve air quality to achieve the national air quality NO<sub>2</sub> annual mean objective across the Borough and to maintain and improve where possible levels of PM<sub>10</sub> and Pm<sub>2.5</sub>
- To fully participate in the West Midlands Combined Authority to achieve air quality improvements across the region. (The West Midlands Combined Authority (WMCA) replaced the Integrated Transport Authority (ITA) and Centro/Passenger Transport Executive (PTE) from 1<sup>st</sup> June 2016).
- To introduce a new continuous monitor for PM<sub>2.5</sub> to record real time data to compare to the annual mean objectives.
- To introduce road traffic management measures to provide real time information on traffic flow, delay and congestion allowing the optimisation of traffic signals and pedestrian crossing signals to improve traffic flows and reduce congestion.

## Dudley MBC

- To continue to monitor for NO<sub>2</sub> and PM<sub>10</sub> to establish real time data. This will enable the prioritisation of resources and attention to be focussed on the most relevant location for air quality improvements.
- To continue to encourage the use of public transport, walking, cycling and the uptake of cleaner vehicles, focussing on areas where there are exceedances of the national air quality NO<sub>2</sub> annual mean objective.
- To maintain or improve existing levels of NO<sub>2</sub> and PM<sub>10</sub> where they meet annual mean objectives.
- To use real time air quality data to model future predictions in air quality in Dudley Borough to examine and determine planning applications and to prioritise areas that need incentives to improve air quality.
- To work with the West Midlands Combined Authority (WMCA) in particular to improve the bus fleet in areas that exceed the national air quality NO<sub>2</sub> annual mean objective.
- To monitor and assist with the implementation of the Pensnett major highways improvement scheme, scheduled to start in 2016, in order to achieve the air quality outcomes predicted for the scheme.

### **The challenges for Dudley MBC are:**

- To encourage the public to change from using private vehicles to public transport, walking or cycling to reduce traffic emissions and congestion to improve air quality and provide benefits in terms of personal health.
- To increase public awareness of how an individual can effectively reduce vehicle emissions by switching off the vehicle engine when stationary, for example whilst unloading/loading or when waiting in stationary traffic.
- To work effectively with the West Midlands Combined Authority (WMCA), who are responsible for formulating the strategic transport policies for the West Midlands, to help the public make the best choices for travel and improve air quality.
- To achieve a coordinated approach to air quality matters at a strategic level with the WMCA, Public Health and neighbouring authorities.



- Increased financial challenges through internal resource reductions for air quality within Dudley MBC and through gaining external funding via grants to continue to address air quality issues in accordance with the Dudley Air Quality Action Plan and annual work programme.

## **How to Get Involved**

Everyone can help to improve air quality, which can also help to improve health. By reducing dependence on private transport there will be less pollution, less noise and less congestion. Dudley MBC is committed to striking the right balance of providing for economic and social needs whilst reducing the need for private travel and protecting the environment. This can only be achieved by working in partnership with the West Midlands Combined Authority (WMCA) in developing a sustainable transport plan which takes into account regional land use planning. WMCA and Dudley MBC have information on sustainable travel options including bus, rail, metro, cycle and walking routes. For further information go to:-

<http://www.centro.org.uk/transport/>. and <http://www.dudley.gov.uk/resident/bins-recycling/sustainable-development/actions-for-sustainability/transport-and-access/>.

There is a wide range of information available to encourage the general public to use different modes of travel in order to improve air quality and improve health. For example:-

- Car sharing when travelling for work or leisure purposes;  
<http://www.dudley.gov.uk/resident/bins-recycling/sustainable-development/faq-cando/travel/>
- Choosing to walk, see The Fitter for Walking Project at:  
<http://www.dudley.gov.uk/resident/parking-roads/road-safety/fitter-for-walking-project/> ]
- A scheme to encourage residents to leave their car at home one day per week. In conjunction with this initiative, cycling opportunities have been developed by Economic Regeneration & Transportation in Dudley Borough.

For further information go to: <http://www.dudley.gov.uk/resident/parking-roads/road-safety/cycling/cycle-maps/>

- There are events, walkways and cycle routes along the Dudley and West Midlands canals network to help promote different modes of transport and encourage family days out without the need for private vehicles. Further information can be found at: <https://canalrivertrust.org.uk/about-us/our-regions/west-midlands-waterways>
- For all walking and cycling opportunities in the borough go to [www.lets-get.com](http://www.lets-get.com)
- West Midlands Combined Authority (WMCA) has been granted a sustainable transport fund called 'Smart Network, Smart Choices' to increase walking, cycling and public transport within the West Midlands. Further information can be found at: <http://centro.org.uk/sustainability/sustainable-travel/>  
<http://centro.org.uk/transport/cycling-and-walking/>

The above measures will help to reduce congestion on the roads, consequently reduce the amount of pollution emitted and therefore improve air quality. It will also improve fitness if walking or cycling is chosen.

### **Ways to Communicate**

The Dudley MBC Community forum can be utilised by residents and business proprietors to gain greater access to Dudley MBC to discuss ideas and pass comments. For further information go to:

<http://www.dudley.gov.uk/community/community-council/community-forums/>

An enquiry can be made or advice requested by completing a form on the Dudley MBC website:

<https://dudley.firmstep.com/default.aspx/RenderForm/?F.Name=Qux9ydTZYAq&HideToolbar=1> or by email to: [EnvSafetyHealth.DUE@dudley.gov.uk](mailto:EnvSafetyHealth.DUE@dudley.gov.uk)

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## 1 Local Air Quality Management

This report provides an overview of air quality in the Dudley Metropolitan Borough during 2015. 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 demonstrated or 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 reporting requirement detailing the strategies employed by Dudley MBC to improve air quality and any progress that has been made during 2015.

The statutory air quality objectives applicable to LAQM in England can be found in Table E.1 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 local authority must prepare an Air Quality Action Plan (AQAP) within 12 months setting out measures the authority intends to put in place to achieve the objectives.

A summary of the AQMA declared by Dudley MBC can be found in Table 2.1. Information related to the declared AQMA, including the map of AQMA boundary is available online at <http://www.dudley.gov.uk/business/environmental-health/pollution-control/air-quality/> or <http://uk-air.defra.gov.uk/aqma/list>

**Table 2.1 – Declared Air Quality Management Areas**

AQMA Name	Pollutants and Air Quality Objectives	City / Town	One Line Description	Action Plan
The Dudley Borough AQMA	NO <sub>2</sub> annual mean	Dudley Borough	Declaration of The Dudley Borough AQMA was completed in Dec 2007 due to concentrations of nitrogen dioxide exceeding the annual mean objective value of 40 µg/m <sup>3</sup> at several locations.	Dudley MBC Link to Action Plan <a href="http://www.dudley.gov.uk/business/environmental-health/pollution-control/air-quality/air-quality-action-plan/">http://www.dudley.gov.uk/business/environmental-health/pollution-control/air-quality/air-quality-action-plan/</a>

## 2.2 Progress and Impact of Measures to address Air Quality in Dudley Metropolitan Borough

Dudley MBC 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 the respective Air Quality Action Plan, Dudley Travel Plan, and the West Midlands Combined Authority Strategic Transport Plan “Movement For Growth”.

### Key completed measures are:

- Improving air quality in the Cradley Area; a Defra grant was awarded to fund the upgrade of cycle and pedestrian links across the A458 in Cradley as part of a two year project. The works were completed in 2015, however the educational work and the impact assessment will be completed in 2016.
- Reducing Air Pollution in Dudley’s Environment; a project funded by the Clean Vehicle Technology Fund to retrofit 10 Prospect coaches (Euro II and III) with SCRT. The coaches provide transport for Dudley’s schools and colleges.
- The upgrading of 3 pedestrian crossings in Netherton; re-optimisation of signal timings at the pedestrian crossings and remarking of the carriageway was completed in 2015 to encourage walking and help improve traffic flows at peak periods. The impacts will be assessed in 2016 and further modifications to the signal timings will be made if necessary.
- The installation of four electric charging points at Merry Hill shopping centre to encourage the take up of ultra-low emission vehicles.



Picture of vehicle using EV Charging point Merry Hill Shopping Centre.

- The installation of rapid electric vehicle charging points at three Dudley MBC public car parks, Brierley Hill, Halesowen and Dudley town centre. The chargers enable drivers to top up and be back on the road within 10 to 20 minutes at a cost of £2.50 for the first 10 minutes then 25 pence per minute thereafter. More information about the charging points, including real time availability updates, can be found at <http://chargeyourcar.org.uk/> or <https://www.zap-map.com/live/>
- The inclusion of a planning condition requiring the provision of electric vehicle charging points at 137 developments, including residential, commercial and industrial developments.
- The deployment of Euro VI buses and real time passenger displays along the 243/244 bus routes, which pass through Netherton, an area of exceedance.
- The deployment of Euro VI buses along the number 9 bus route travelling from Stourbridge to Birmingham, which passes through Cradley, an area of exceedance.
- Delivery of a range of measures that promote walking either independently or as part of a group. These include an extensive health walks programme, information on suggested routes, route planning website (walkit.com) and promotional activity linking in with national campaigns such as walk to school week.
- Delivery of a range of measures that promote cycling either independently or as part of a group. These include delivery of group rides via British Cycling programmes, promotion of local cycle clubs, information on suggested routes, cycle training and bike maintenance programmes and promotional activity linking in with national campaigns such as bike week.



**Key Outcomes of the above measures:**

- A reduction in traffic congestion.
- A greater use of electric vehicles.
- Greater levels of walking and cycling.
- Improvement in the bus fleet.
- A reduction of road traffic emissions as a result of the above outcomes, leading to an improvement in air quality.
- An improvement in the health and fitness of the residents of Dudley due to increased walking and cycling and improved air quality.

**Measures to be completed over the next reporting year**

Dudley MBC expects the following measures to be completed over the course of the next reporting year:

- To complete the school interventions of cycle and pedestrian training and to assess the impact of the installation of a pedestrian/cycle friendly crossing at Colley Gate for the Defra funded project. Dudley MBC will then assess the change in modes of travel, improvement in traffic flow and improvement in air quality.
- To complete the evaluation of the Clean Vehicle Technology Fund project with Prospect Coaches following the final monitoring of emissions from the coaches in August 2016.
- To install a Grimm EDM – 180 continuous PM10 and PM2.5 dust analyser at the Colley Gate air quality monitoring station.
- The commencement of a major highway improvement scheme in High Street Pensnett. Following completion, this location will benefit from better traffic flows, less congestion and reduced levels of NO<sub>2</sub>. The scheme will continue through 2016 and the estimated completion date is 2018.

- The development of a new Voluntary Multi Operator Partnership Agreement with WMCA and local Bus Operators. Netherton and Wordsley have been highlighted as priority areas for consideration of cleaner bus fleets, which would lead to reduced vehicle emissions in areas of exceedance.
- The upgrading of traffic signals to improve traffic flows travelling to and from Merry Hill shopping centre, Brierley Hill and the Waterfront is being carried out in three phases.
  - Phase one resurfacing work and upgrading of traffic signals at A4036 junction with The Boulevard and Coppice Lane.
  - Phase two resurfacing and upgrading of traffic signals at A4100 High Street, Quarry Bank.
  - Phase three includes a staggered pedestrian crossing along the A4036 Merry Hill.
  - The works are currently in progress and due to be completed by the end 2016. The improvements will promote walking and cycling thereby reducing vehicle usage, reduce congestion and therefore reduce the levels of NO<sub>2</sub>.
- Further review and validation of SCOOT (Split Cycle Offset Optimisation Technique) Technology deployed on the Burnt Tree/Tesco junction will continue to be carried out to improve traffic flows and air quality.
- The proposed redevelopment of the Castle Hill area of Dudley will result in a reduction in relevant exposure and improved traffic flows.
- The evaluation of the implementation of a Traffic Regulation Order to formalise on street parking & loading restrictions to improve traffic flows in Brierley Hill High Street will be completed during 2016/17.

- The publication of the Low Emissions Towns and Cities, Low Emission Strategy.
- Adoption of the Dudley Active travel strategy to coordinate all work being undertaken to increase walking and cycling levels in the borough.
- For all walking and cycling opportunities in the borough go to [www.lets-get.com](http://www.lets-get.com)

### Dudley MBC Priorities for 2016

Dudley MBC's priorities are to reduce levels of nitrogen dioxide in the borough by completing the works listed above and also to:

- Focus attention on the areas where there are significant exceedances of the national air quality NO<sub>2</sub> annual mean objective, namely Netherton and Wordsley. Dudley MBC will continue to monitor these areas, carry out source apportionment studies and determine the most appropriate course of action to improve air quality.
- Work effectively with the West Midlands Combined Authority and the strategic transport policy to deliver measures to improve Air Quality.

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
	Title	Select from the categories in blue box	Select from the subcategories in blue box		Date	Date				Date	
1	Dudley MBC Travel Plan	Alternatives to private vehicle use	Car & lift sharing schemes	DMBC	Complete	On going	West Midlands Combined Authority (WMCA), increase use of public transport and car sharing.  Annual Staff Surveys	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	Travel Plans required as part of Planning requirements.  Car sharing scheme on Council website for staff.	On going	Mode Shift Targets 2013 – 2018 Results show that there has been a reduction in lone car driver, and increase in car sharing 2% Bus 1%, cycle 1% walking 1%

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
	Title	Select from the categories in blue box	Select from the subcategories in blue box		Date	Date				Date	
2	Stourbridge Rail Station	Alternatives to private vehicle use	Rail based Park & Ride	West Midlands Combined Authority (WMCA)		819 free car parking have been implemented, and 62 Cycle storage facilities  Long Term phase: plan to install electric charging points near to the station building.	<p>WMCA Strategic Transport Plan Monitoring Process Customer Satisfaction, Travel Demand and Modal Share.</p> <p>Performance indicators <a href="http://www.wmita.org.uk/strategy-and-publications.aspx">http://www.wmita.org.uk/strategy-and-publications.aspx</a></p> <p>Ref. Customer 10 modal share of all journeys. Annual data from sample requested from ONS for National Travel Survey, household survey data.</p>	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	Resurfacing in Brook Road car park completed June 2016	2016	Critical factor to reduce private vehicle usage from Stourbridge to Birmingham. Likely reduction of private vehicle use in Windmill Hill, Cradley as an area of poor air quality.

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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
	Title	Select from the categories in blue box	Select from the subcategories in blue box		Date	Date				Date	
3	Midland Metro Extension between Wednesbury and Brierley Hill	Alternatives to private vehicle use	Other	West Midlands Combined Authority( WMCA), Black Country Executive Joint Committee	2016	2022/23 Monitor development schedule	<p>WMCA Strategic Transport Plan Monitoring Process Customer Satisfaction, Travel Demand and Modal Share.</p> <p>Performance indicators <a href="http://www.wmita.org.uk/strategy-and-publications.aspx">http://www.wmita.org.uk/strategy-and-publications.aspx</a></p> <p>Ref. Customer 3 Annual data from Passenger Focus Survey.</p>	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	Still in the planning stages to secure funding.	2023/24	<p>The proposed scheme runs for approx seven miles from the existing line at Wednesbury to Great Bridge.</p> <p>Encourage modal shift to a less polluting travel mode.</p> <p>Could cause some congestion depending on route across busy roads</p>
4	Regulation of Environmental Permits	Environmental Permits	Other	DMBC	Annually March/April	Ongoing action reviewed at Principal Officer and team meetings	Inspections to be carried out in accordance with ESH delivery Plan	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	Planned inspections are made in accordance to the risk rating	31/3/2017	Reduce emissions to air from stationary industrial sources

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
	Title	Select from the categories in blue box	Select from the subcategories in blue box		Date	Date				Date	
5	The Metropolitan Freight Strategy	Freight and Delivery Management	Route Management Plans/ Strategic routing strategy for HGV's	West Midlands Combined Authority (WMCA)	2013	Proposed West Midlands Strategic Freight Corridor Stourbridge to Walsall	The Metropolitan Freight Strategy will provide the strategic framework to prioritise and coordinate investment in schemes, actions and initiatives which will enhance freight movements by all modes in order to meet LTP3 Key Objectives(now finished), new KPI to be confirmed.  Performance indicators <a href="http://www.wmita.org.uk/strategy-and-publications.aspx">http://www.wmita.org.uk/strategy-and-publications.aspx</a>	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	West Midlands Combined Authority (WMCA), are to refresh the Freight Strategy in 2016	April 2019	Key Objectives – KO1 Supporting Sustainable Economic Growth, KO2 Reducing Carbon Emissions, KO5 Quality of Life and Local Environment  <a href="http://www.wmita.org.uk/media/1338/freight-strategy.pdf">http://www.wmita.org.uk/media/1338/freight-strategy.pdf</a>

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
	Title	Select from the categories in blue box	Select from the subcategories in blue box		Date	Date				Date	
6	Black Country Air Quality Supplementary Planning Document,	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	DMBC/ Low Emissions Towns & Cities Programme (LETCP)	Complete	On going	To update the Black Country Core Strategy to allow implementation of the West Midlands Low Emissions Towns and Cities Air Quality guidance as detailed in row 8 below.	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	Summary of consultation response complete and report to go to Cabinet September 2016	September 2016	To protect and enhance air quality through development  <a href="http://www.dudley.gov.uk/resident/planning/planning-policy/local-plan/bcaqspd/">http://www.dudley.gov.uk/resident/planning/planning-policy/local-plan/bcaqspd/</a>
7	Monitoring the effectiveness of Air Quality Planning Recommendations	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	DMBC	Complete	On going	To meet the Black Country Core Strategy target LOI ENV8- proportion of planning permissions granted in accordance with air quality sections recommendations – 100% target	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	Achieved 100% target for 2014/15 financial year. See: <a href="http://www.dudley.gov.uk/resident/planning/planning-policy/local-development-framework/annual-monitoring-report/">http://www.dudley.gov.uk/resident/planning/planning-policy/local-development-framework/annual-monitoring-report/</a>	Rolling programme	To protect and enhance air quality through planning applications
8	West Midlands Low Emissions Town & Cities Programme Good Practise Air Quality Planning Guidance	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	DMBC/ Low Emissions Towns & Cities Programme (LETCP)	Complete	May 2014	Number of Planning permissions granted with air quality conditions as outlined in WM LETC Planning Guidance document.	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	Publication of Guidance and implementation across the West Midlands Metropolitan Authorities	On going	Guidance published. See <a href="http://cms.wallsall.gov.uk/low-emissions-towns-and-cities-programme">http://cms.wallsall.gov.uk/low-emissions-towns-and-cities-programme</a>



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
	Title	Select from the categories in blue box	Select from the subcategories in blue box		Date	Date				Date	
9	West Midlands Low Emissions Town & Cities Programme Low Emissions Strategy	Policy Guidance and Development Control	Low Emissions Strategy	DMBC/ Low Emissions Towns & Cities Programme (LETCP)	Complete	Being developed	Adoption of the Low Emission Strategy within each of the West Midland Metropolitan Authorities.	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	Draft Low Emission Strategy developed and initial consultation feedback was positive; LES document is currently being reviewed with a view to updating key strategies and work streams where required	Due to be complete by September 2016	Aim to improve air quality in the West Midlands from a combined Authority approach
10	West Midlands Low Emissions Town & Cities Programme, Good Practise Procurement Guidance	Policy Guidance and Development Control	Sustainable Procurement Guidance	DMBC/ Low Emissions Towns & Cities Programme (LETCP)	Complete	From September 2014 On going	Improve vehicle fleet emission	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	Publication of Guidance and implementation intended across the West Midlands Metropolitan Authorities in September 2014	On going	Procurement policies to influence a reduction in road transport emissions  Guidance published; See <a href="http://cms.walsall.gov.uk/low-emissions-towns-and-cities-programme">http://cms.walsall.gov.uk/low-emissions-towns-and-cities-programme</a>

## Dudley MBC

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
	Title	Select from the categories in blue box	Select from the subcategories in blue box		Date	Date				Date	
11	Control of New Biomass Installations	Promoting Low Emission Plant	Other	DMBC	Complete	On going	Annual work programme to record locations of biomass appliances	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	Quarterly update of information via Building Control to record locations of biomass appliances	Annual rolling programme	To enable the evaluation of all Biomass installations and identify all required measures to protect air quality
12	Low NO <sub>x</sub> boilers installed at new developments	Promoting Low Emission Plant	Other	DMBC	Propose new planning condition for low NO <sub>x</sub> boilers with maximum NO <sub>x</sub> emissions of under 40 mg/kWh to minimise the impact of building emissions on local air quality	End of 2016	Record number of planning applications which include conditions requiring low NO <sub>x</sub> boilers to be provided.	NO <sub>x</sub>	Ongoing action	On going	<p>Could be a potential additional cost to developers</p> <p>Planners may not support the condition in planning applications</p> <p>Aim to reduce background measured concentration of NO<sub>x</sub></p>

## Dudley MBC

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
	Title	Select from the categories in blue box	Select from the subcategories in blue box		Date	Date				Date	
13	Encouraging the Uptake of Low Emissions Vehicles	Promoting Low Emission Transport	Private and Company Vehicle Procurement - Prioritising uptake of low emission vehicles	DMBC	Complete	On going	Planning conditions on applications to provide electric charging points to encourage the uptake of low emission vehicles. Target 100% of eligible planning applications	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	In 2015, 137 planning decision notices have electric charging point condition requirement	On going	Officers can use WM LETC Planning Guidance document or parking SPD at Dudley MBC to recommend conditions in planning applications to increase the uptake of low emission vehicles.
14	Tesco Superstore, Burnt Tree, Dudley Improvements	Promoting Low Emission Transport	Company Vehicle Procurement – Prioritising uptake of low emission vehicles	DMBC/ Tesco	2015	2016/17	To submit a low emission fleet strategy	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	Tesco improvements to vehicle standards. Awaiting low emission fleet strategy.	On going	This planning condition should result in reduced vehicle emissions to improve air quality around Burnt Tree, Dudley.

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
	Title	Select from the categories in blue box	Select from the subcategories in blue box		Date	Date				Date	
15	Taxi Licensing	Promoting Low Emission Transport	Taxi Licensing conditions	DMBC	Complete	On going	DMBC to carry out MOT Licensing Tests on all taxi's to ensure compliance.including emissions tests  0-6 year old vehicles – 1 test per year 6-10 year old vehicles – 2 tests per year 10 year and older vehicles – 3 tests per year	NO <sub>x</sub> PM <sub>10</sub>	The overall licensing test average pass rate 63% for Hackney Carriage and 75% for Private Hire full tests	Rolling programme	As of 21/06/16 995 total Licensed Vehicles by Dudley MBC comprising of 395 Hackney Carriages 600 Private Hire
16	Travel Planning	Promoting Travel Alternatives	Encourage / Facilitate home-working  Workplace Travel Planning	DMBC	December 2014	On going	Increase the number of employees working in companies with a Travel Plan to 18%- The amended Traffic and Transportation Service Plan.	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	Travel Plan adopted December 2014	On going  Annual staff surveys	Encourage less days of travel to reduce congestion and improve air quality

## Dudley MBC

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
	Title	Select from the categories in blue box	Select from the subcategories in blue box		Date	Date				Date	
17	Implementation of proposed Local Cycle Network	Promoting Travel Alternatives	Promotion of cycling	DMBC	Complete	On going	Black Country Core Strategy LOI TRAN4a 1% Increase in cycling use of monitored routes by 2026  Black Country Core Strategy LOI TRAN4b Increase % length implemented	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	Dudley MBC has produced three cycling maps (available on the website or local library) promote cycling, taking part in Bike Week and other events.  Increase cycle routes and improve infrastructure that have been identified in the Cycle Network Programme	Rolling Programme	The road safety & travel awareness team provides training, advice and information to cyclists of all ages and types to help change mode shift to reduce air pollution and traffic congestion.  <a href="http://www.dudley.gov.uk/resident/parking-roads/road-safety/cycling/cycle-maps/">http://www.dudley.gov.uk/resident/parking-roads/road-safety/cycling/cycle-maps/</a>
18	Cycle Purchase Scheme For DMBC Employees	Promoting Travel Alternatives	Promotion of cycling	DMBC	Complete	On going	Increase the West Midlands Active Travel index by 5% from the 2010/11 baseline of 100 by 2016/17.	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	Cycle monitoring at local sites in the borough has shown a good increase in cycle usage between 2013/14 and 2014/15.	On going	Promotion of cycling to help change mode shift to reduce air pollution and 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
	Title	Select from the categories in blue box	Select from the subcategories in blue box		Date	Date				Date	
19	Active Travel Plan for Cycling and Walking	Promoting Travel Alternatives	Promotion of cycling	DMBC	New policy awaiting to be adopted June 2016	On going	Automatic counter on crossing and travel loops. Figures reported on annual basis via planning policy to compare with national figures	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	Implementing cycle routes, regular cycle meetings, working with schools to make safer walking and cycling, implementing new pelican & toucan crossings	Rolling Programme	Public Health are developing an active travel strategy to promote walking and cycling across the borough to reduce congestion and improve air quality
20	Schools Initiative	Promoting Travel Alternatives	School Travel Plans	DMBC	Complete	On going	100% of schools to have travel plans by 2011 and to at least maintain the proportion of children (aged 5 to 15) travelling to school by non-car modes between 09/10 and 16/17.	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	100% of schools with Travel Plans and sustainable mode share both maintained by giving travel pack to new intakes and training given when new crossings are installed near schools.	Rolling Programme	Annual travel packs given to new intake years, travel interventions given when new crossings are installed, training given when requested by schools.

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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
	Title	Select from the categories in blue box	Select from the subcategories in blue box		Date	Date				Date	
21	Awareness Raising Campaign to reduce idling vehicles	Public Information	Via leaflets and Posters and working with schools	DMBC	2011	On going	Maintain an anti idling campaign	NO <sub>x</sub>	Website upgrade, preparation and distribution of promotional material completed by 31/3/13  Educational programme at schools.  Signs and posters placed at schools and bus stations	On going	The Defra Grant funded a campaign in 2013; however promotional material is still used in the educational programme at 75 primary schools in Dudley borough.
22	Dudley Council Website	Public Information	Via the Internet & Twitter	DMBC	Complete	On going	Annual website review of all air quality pages including educational material for schools	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	Information and reports updated annually	On going	Information on air quality in Dudley MBC Borough. Information on annual report and incentives to reduce air pollution <a href="http://www.dudley.gov.uk/business/environmental-health/pollution-control/air-quality/">http://www.dudley.gov.uk/business/environmental-health/pollution-control/air-quality/</a>

## Dudley MBC

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
	Title	Select from the categories in blue box	Select from the subcategories in blue box		Date	Date				Date	
23	Reporting Smoky Vehicles	Public Information	Via the Internet & Twitter	DMBC	2010	On going	100% of reported smoky vehicles to be actioned within 5 working days	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	Reporting programme ongoing via Website and by contacting Dudley Council by phone or email	On going	Encourage the public to alert Dudley council to any such vehicles so that appropriate action can be taken  <a href="http://www.dudley.gov.uk/business/environmental-health/pollution-control/air-quality/vehicle-air-pollution-smoky-vehicles/">http://www.dudley.gov.uk/business/environmental-health/pollution-control/air-quality/vehicle-air-pollution-smoky-vehicles/</a>
24	Control of Bonfires and use of Other Unauthorised Fuels	Public Information	Other	DMBC	Complete	On going	75% of reported bonfires & use of unauthorised fuel to be actioned within 5 working days in accordance with the ESH Delivery Plan	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	Measured throughout the year and reported each quarter	On going	Encourage the public to use alternative methods of disposal of waste to reduce the impact on air quality



## Dudley MBC

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	Title	Select from the categories in blue box	Select from the subcategories in blue box		Date	Date				Date	
25	Anti Idling Measure	Traffic Management	Anti-idling enforcement	DMBC	2011	On going	Patrols deployed to areas for traffic restrictions following requests from general public  Benchmark staff work rates	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	Patrols are deployed outside schools to enforce traffic restrictions  The Ttraffic Management Act 2004 prohibits the setting of targets for the number of penalty charge notices issued	Ongoing	Traffic enforcement officers give advice if they see any contravention of the traffic order to stop idling of vehicle engines 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
	Title	Select from the categories in blue box	Select from the subcategories in blue box		Date	Date				Date	
26	DMBC 20mph speed limits outside schools	Traffic Management	Reduction of speed limits, 20 mph zones	DMBC	Annual reviews	On going	Annual assessments for road safety near schools to be applied for the safer routes programme.	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	As part of the Council's policy for 20mph Speed Limits outside schools, 18 areas were identified for inclusion in the Safer Routes to School programme to introduce a 20mph Speed Limit to improve safety for children and parents travelling to and from school. 11 areas near schools have been introduced as 20mph speed limits and 7 more are in the process of being implemented	Rolling Programme	Research by Imperial College (2013) concluded reduced speeds can benefit air quality due to lower P.M. from diesel vehicles. This action could therefore improve AQ, however consideration of congestion due to this measure needs to be taken.

## Dudley MBC

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	Title	Select from the categories in blue box	Select from the subcategories in blue box		Date	Date				Date	
27	Reducing Congestion	Traffic Management	UTC, Congestion management, traffic reduction	DMBC highways	Complete	On going	Annual Road traffic to grow less in % terms than the local economy between 2010/11 and 2015/16	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	Congestion reduction measures were previously contained within LTP3 and will be continued within the WMCA Strategic Transport Plan.  A new KPI to be confirmed.	Rolling Programme	Current works being implemented Pensnett, High Street Highway Improvement, Quarry Bank Area, Traffic signal and Pedestrian Crossing improvement, Burnt Tree, traffic signal timings monitoring, Brierley Hill, Road markings to reduce congestion,
28	Highway Enforcement	Traffic Management	Parking Enforcement on highway	DMBC	Complete	On going	Benchmark staff work rates  Monitor trends in the number of tickets issued per year	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	Undertake on-street parking enforcement of Traffic Regulation Orders  Circa 1500 parking enforcement actions taken in 2015	Rolling Programme	Reduce parking obstructions on road to prevent congestion and improve air quality

## Dudley MBC

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
	Title	Select from the categories in blue box	Select from the subcategories in blue box		Date	Date				Date	
29	Defra AQ grant 2014/15	Traffic Management	Other	DMBC	2014	On going	Install new crossing by end of 2015 in Windmill Hill, Colley Gate.  Second traffic survey w/c 4 <sup>th</sup> July 2016 to show impact of improvement of new crossing.	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	New Crossing completed end of November 2015.  First traffic survey completed, Second survey w/c 4 <sup>th</sup> July 2016	Assessment of the traffic survey to be completed by end of 2016.  Continue to monitor and assess the impact on reducing air pollution	Correlate the traffic and travel surveys to ascertain if there has been a shift in mode of transport due to new crossing and or and improvement in traffic flow. Continue to monitor air quality to assess any improvements
30	Developing and Delivering Bus Infrastructure Improvements via Implementation of Voluntary Bus Partnership Commitments.	Transport Planning and Infrastructure	Bus route improvements	West Midlands Combined Authority and DMBC	2011	On going	New buses have been installed on routes between Dudley and Wolverhampton and Dudley and Brierley Hill and Stourbridge and Birmingham	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	WMCA have secured funding from the Clean Bus Technology Fund for National Express to fit particle traps on 150 buses in the next 12 months, which will effectively improve them from Euro II to Euro VI	End of 2017	Improve vehicle fleet to Euro VI which will reduce impact on air quality in Dudley borough

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
	Title	Select from the categories in blue box	Select from the subcategories in blue box		Date	Date				Date	
31	Provision of Better Information for Passengers at Key Railway Interchange Facilities, e.g. Cradley Heath	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	DMBC	Complete	On going	<p>WMCA Strategic Transport Plan Monitoring Process Customer Satisfaction, Travel Demand and Modal Share.</p> <p>Ref. Customer 10 modal share of all journeys. Annual data from sample requested from ONS for National Travel Survey, household survey data.</p> <p>Performance indicators <a href="http://www.wmita.org.uk/strategy-and-publications.aspx">http://www.wmita.org.uk/strategy-and-publications.aspx</a></p>	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	2015 but evaluation will continue until 2018	2018	Work has commenced on £1.9M scheme to improve facilities and public transport in Brierley Hill, Merry Hill and Cradley Heath. See <a href="http://centro.org.uk/about-us/news/2015/work-underway-on-£19m-cradley-heath-interchange/">http://centro.org.uk/about-us/news/2015/work-underway-on-£19m-cradley-heath-interchange/</a> Improve public transport to encourage change in mode of transport to reduce congestion and improve air quality

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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
	Title	Select from the categories in blue box	Select from the subcategories in blue box		Date	Date				Date	
32	DMBC Travel Plans	Vehicle Fleet Efficiency	Driver training and ECO driving aids	DMBC The Institute of Advanced Motorists West Midland Fire Service	2014	On going	Complete two courses a year for driver training for the over 60's  35 hours every 5 years of compulsory training for DMBC drivers of 3.5 tonne vehicles	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	Two courses a year for driver training for the over 60's 2016/17  7 hours training for each driver per year.	Rolling programme	Approximately 330 drivers driving 3.5 tonne vehicles
33	Improving the DMBC Fleet	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	DMBC	Complete	Rolling programme of renewal of vehicles	All new fleet vehicles must comply with current Euro Standards	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	New vehicles purchased to be of current Euro Standards	Rolling programme	The improvement of the vehicle fleet will assist in the improvement of air quality in Dudley borough
34	Clean Vehicle Technology Fund (CVTF)-Retrofit programme for 10 coaches.	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	DMBC	2014	On going	Second emission test to show a 90% reduction in emissions	NO <sub>x</sub> PM <sub>10</sub> PM <sub>2.5</sub>	10 Coaches retrofitted and first phase emission testing completed, awaiting second phase testing in August 2016	December 2016	The coaches travel within Dudley Borough through areas that have exceedances in air quality, this will help to reduce the impact of vehicle emissions in such areas

## 2.3 PM<sub>2.5</sub> – 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<sub>2.5</sub> (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM<sub>2.5</sub> has a significant adverse impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Dudley MBC Air Quality officers and Public Health specialists are working together to determine the most appropriate way to address the links between Public Health and Air Quality, in particular PM<sub>2.5</sub>. The Dudley Health & Wellbeing Board has the responsibility for the health and wellbeing of residents in Dudley Borough and has developed a Health and Wellbeing Strategy, setting out the priorities for the people living and working in Dudley Borough. Public Health has a benchmark indicator for the fraction of mortality attributable to particulate air pollution, which is published as a public health outcome and can be found using the link below. By working closer together, the effect of measures introduced to cut PM<sub>2.5</sub> levels can be measured in terms of health benefits and reduced mortality. The measures introduced may also have the beneficial effect of addressing other pollutants such as PM<sub>10</sub> and NO<sub>x</sub>. For information on Public Health at Dudley MBC see the link below:

<http://www.dudley.gov.uk/community/initiatives/health-wellbeing/>

<http://www.phoutcomes.info/search/air%20pollution#pat/104/ati/101/par/E45000005>

Dudley MBC is taking the following measures to address PM<sub>2.5</sub>:

- The installation of new monitoring equipment at Colley Gate air quality monitoring station will enable the real time monitoring of PM<sub>2.5</sub> data allowing Dudley MBC to identify trends and any elevated PM<sub>2.5</sub> concentrations at that location. The data may then be used to benchmark progress on reducing PM<sub>2.5</sub> emissions and give a better understanding of the associated health effects at a local level.

Table 2.2: Progress on Measures to Improve Air Quality, shows that Dudley MBC has the following existing measures in place to address PM<sub>2.5</sub>;

- Encouraging alternative ways to travel, (measures 1, 2, 3, 5, 16, 17, 18, 19, 20, 30, 31) by public transport, cycling or walking and encouraging the uptake of low emission vehicles for business fleets and public transport. Improving public transport services, walkways and cycle paths will improve general health, ease congestion on the roads and reduce emissions of PM<sub>2.5</sub>.
- Educating the general public and businesses through media (measures 21, 22, 23).
- Planning and development controls to reduce concentrations in local polluted hotspots. Introducing policy guidance to assist in improving air quality (measures 6, 7, 8, 9, 10, 13,14). Developers will be encouraged to incorporate alternative travel options through travel plans, improve convenient and segregated cycle paths to link to local networks, incorporate electric vehicle charging points, facilities for other ultra-low emission vehicles and any other innovative mitigation measures that facilitate a change in road transport behaviour, thus minimising emissions of PM<sub>2.5</sub>.
- The control of emissions from industrial processes including combustion processes (measure 4). Regulation of environmental permitting to ensure that industry complies with current legislation controlling emissions of particulate matter. The increased use of biomass as a fuel to meet renewable energy targets may give rise to increased emissions of PM<sub>2.5</sub> if combustion plants are not well managed. (Measure 11)
- The control of emissions from solid fuel domestic heating (Measure 24)
- The enforcement of legislation to ensure the public and contractors use appropriate methods to dispose of waste to reduce PM<sub>2.5</sub> emissions from bonfires (measure 24).
- Reducing traffic congestion through the careful management of road infrastructure, improved traffic and pedestrian signals, speed restrictions and parking enforcement to reduce obstructions on congested roads (measures 25, 26, 27, 28, 29). By incorporating all of these measures traffic congestion will be reduced and air quality improved by reducing emissions of PM<sub>2.5</sub>,



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

### 3.1 Summary of Monitoring Undertaken

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

#### 3.1.1 Automatic Monitoring Sites

Dudley MBC undertook automatic (continuous) monitoring at four sites during 2015. All Four of the stations monitor for nitric oxide, nitrogen dioxide and total oxides of nitrogen (NO/NO<sub>2</sub>/NO<sub>x</sub>) and three of the stations also monitor for fine particulates (PM<sub>10</sub>). There are three diffusion tubes at each of the monitoring stations, co-located with the NO<sub>x</sub> analyser and this data is used to assess diffusion tube accuracy by comparing the two monitoring techniques. The data from the co-located tubes is reported to the national network to be used in the calculation of the national bias adjustment factor.

- **Central Dudley, Ednam Road** - monitoring NO/NO<sub>2</sub>/NO<sub>x</sub> and PM<sub>10</sub>. This station has been operational since 1999 but was re-located by approximately 150m to a similar site in 2015. It is classified as an urban background site and data from this site is representative of typical exposure levels found in urban centres but away from main roads.
- **Colley Gate, Cradley** - monitoring NO/NO<sub>2</sub>/NO<sub>x</sub> and PM<sub>10</sub>. This roadside monitoring station has been operational since 2006 and monitors roadside pollution levels indicating that the national air quality NO<sub>2</sub> annual mean objective is not presently exceeded at the station, although it is at nearby diffusion tube locations in Windmill Hill. Dudley MBC has chosen this location to identify new priority measures to tackle PM<sub>2.5</sub>. The installation of new monitoring equipment, changing the TEOM to a Grimm EDM-180, will enable the monitoring of PM<sub>10</sub> and PM<sub>2.5</sub>.

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- **Burnt Tree, Ernest Road, Dudley** - monitoring NO/NO<sub>2</sub>/NO<sub>x</sub> and PM<sub>10</sub>. This roadside monitoring station has been operational since August 2010 and monitors roadside pollution levels indicating that the national air quality NO<sub>2</sub> annual mean objective is not presently exceeded at the station, although it is at nearby diffusion tube locations in Birmingham Road. The data from the station will be used to assess the impact of the opening of a dot.com delivery service nearby.
- **Wordsley, High Street** - monitoring NO/NO<sub>2</sub>/NO<sub>x</sub>. This roadside monitoring station has been operational since April 2011 and monitors roadside pollution levels in one of the areas where the national air quality NO<sub>2</sub> annual mean objectives has been exceeded.

Maps showing the location of the four automatic air quality monitoring stations are provided in Appendix D. Details of the sites are provided in Table A.1 in Appendix A.

Measurement of NO, NO<sub>2</sub> and NO<sub>x</sub> is performed at all stations using API chemiluminescent monitors. PM<sub>10</sub> measurements are made using Tapered Elemental Oscillating Microbalances (TEOMs) corrected using the King's College Volatile Correction Model (VCM). All monitoring equipment is operated within air conditioned enclosures and operated by Dudley MBC personnel using local procedures based on national guidance protocols.

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

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. Dudley MBC has previously monitored for these pollutants, measured concentrations always being below the objective. No monitoring results

are provided in this ASR report for these pollutants. National monitoring results are available at <http://naei.defra.gov.uk/data/gis-mapping>

### **3.1.2 Non-Automatic Monitoring Sites**

Dudley MBC completed non- automatic (passive) monitoring of NO<sub>2</sub> at 51 sites during the 2015 calendar year. With a network of diffusion tubes located at strategic points across the borough this form of monitoring supplements the data captured by the automatic air quality monitoring stations. A full description of the diffusion tube sites is provided in Table A.2 in Appendix A.

The map in Appendix D shows the location of all NO<sub>x</sub> diffusion tube monitoring sites within Dudley Borough and the four automatic air quality monitoring stations. Measurement data for historic and current diffusion tube surveys can be downloaded from the Dudley Council website:

<http://qismo.dudley.gov.uk/public/envprot/no2/default.asp>

Further details regarding 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<sub>2</sub>)**

During 2015, Dudley MBC undertook automatic (continuous) monitoring of NO<sub>2</sub> levels at four sites and non-automatic (passive) monitoring by deploying diffusion tubes at 51 sites. All locations are representative of public exposure and the results have been ratified using LAQM.TG (16). Diffusion tube results are adjusted using a national bias adjustment factor of 0.92 calculated using spreadsheet version 9/15.

Table A.3 in Appendix A, compares the ratified and adjusted monitored NO<sub>2</sub> annual mean concentrations for the past 5 years with the national air quality NO<sub>2</sub> annual mean objectives.

Table A.4 in Appendix A, compares the ratified continuous monitored NO<sub>2</sub> hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m<sup>3</sup>, not to be exceeded more than 18 times per year.

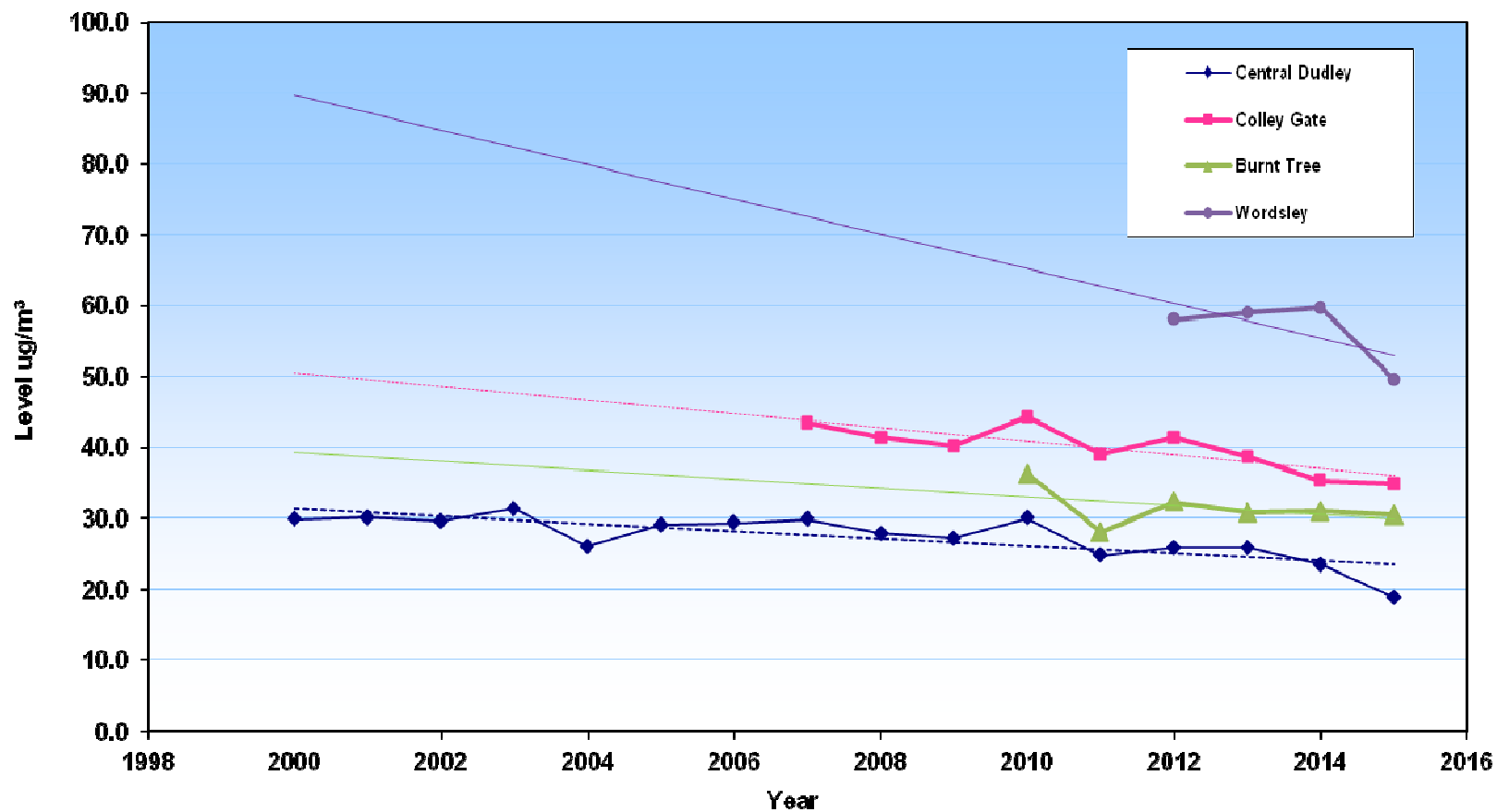
The data in Table A.3 and Table A.4 indicates:

- Excellent overall data capture of 98.6 % at the automatic monitoring sites and 98.0% at the diffusion tube sites over the year 2015.
- Only one of the four automatic (continuous) monitoring stations (Wordsley site) shows exceedances of the national air quality NO<sub>2</sub> annual mean objectives.
- There has been a general decrease in measured NO<sub>2</sub> concentrations at all four of the automatic monitoring stations in the last two years.
- There have been no more than 18 exceedances of the 200 µg/m<sup>3</sup> short term hourly NO<sub>2</sub> objective recorded at any of the four automatic air quality monitoring stations.
  - There were no exceedances at Dudley Central or the Colley Gate monitoring stations.
  - There was one exceedance at Burnt Tree monitoring station.
  - There were five exceedances at Wordsley monitoring station.

Figure 1 below shows trend graphs for the data monitored by the four automatic air quality monitoring stations showing an encouraging downward trend.

Figure 1 – Trends in Annual Mean NO<sub>2</sub> Concentrations measures at Automatic Monitoring Site

Annual Trends:- average NO<sub>2</sub> Levels at Dudley MB Automated Sites

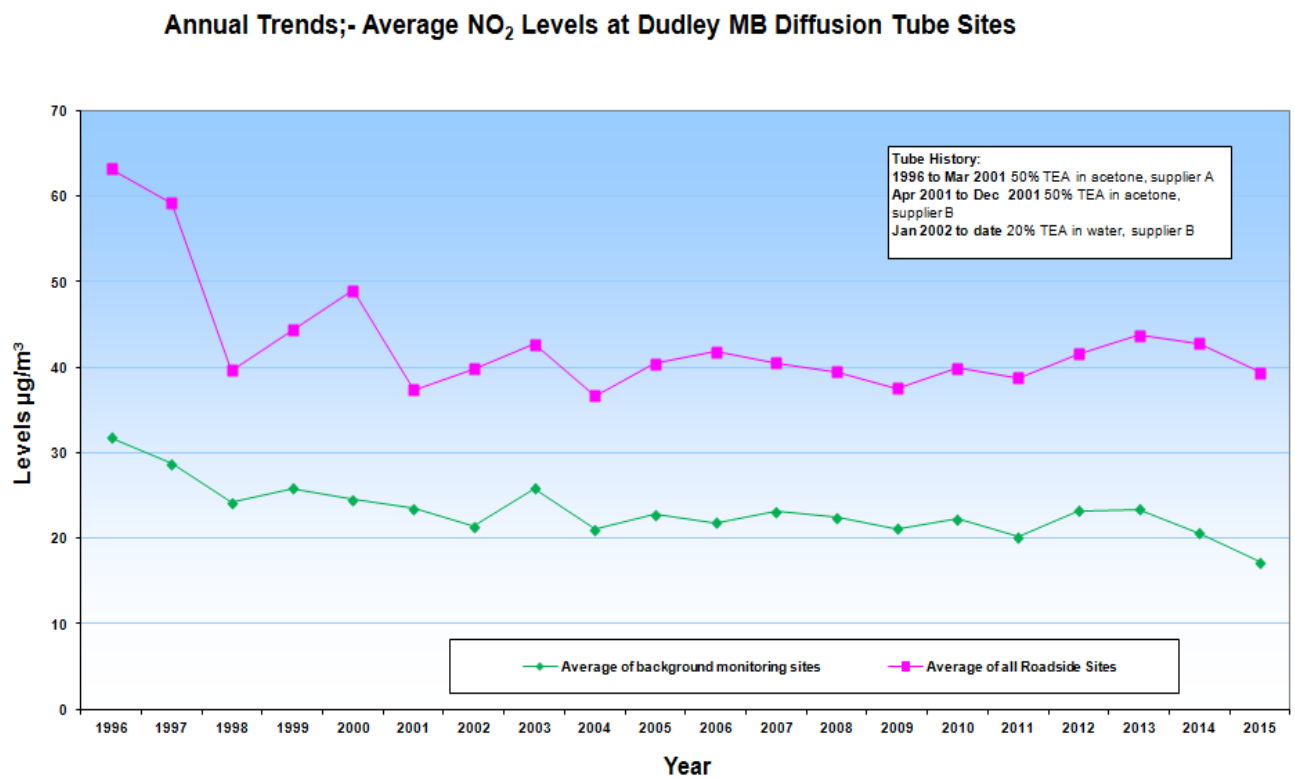


Note: Burnt Tree 2010 covers the period 30/07/2010 to 31/12/2010 only. Data has been annualised against data sets from Colley Gate and the decommissioned Brierley Hill Rose stations.

The full dataset for 2015 diffusion tube monthly mean values are provided in Appendix B.

Figure 2 shows the average results for NO<sub>2</sub> concentrations measured by diffusion tubes located across the borough. The results have been calculated from the mean concentrations measured at roadside and background locations.

**Figure 2 – Trends in Annual Mean NO<sub>2</sub> Concentrations measured at Diffusion Tube Monitoring Sites**



The results from diffusion tube locations show a gradual downward trend over the years that data has been captured, however there are still eight areas that exceed the national air quality NO<sub>2</sub> annual mean objective, these are at the following locations:

- Halesowen Road, Netherton
- Windmill Hill, Cradley
- High Street, Pensnett,
- Dudley Street, Sedley,
- High Street, Quarry Bank,
- High Street, Wordsley,
- Birmingham Road, Dudley,
- Castle Hill, Dudley,

The national air quality NO<sub>2</sub> annual mean objective measured by diffusion tubes at three locations along Halesowen Road, Netherton (27g, 27gX and 27j see table A1.3) are greater than 60µg/m<sup>3</sup>, which indicates that an exceedance of the 1-hour mean objective is likely.

All of the above areas of exceedance are located within the borough wide AQMA, where monitoring will continue to refine future revisions of mitigation measures included in the annual air quality work programme and air quality action plan.

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

During 2015, Dudley MBC undertook monitoring of PM<sub>10</sub> levels at the three automatic air quality monitoring stations located in Central Dudley, Colley Gate and Burnt Tree. All of these locations are representative of public exposure.

Table A.5 in Appendix A compares the ratified and adjusted monitored PM<sub>10</sub> annual mean concentrations for the past 5 years with the air quality annual mean objective of 40µg/m<sup>3</sup>.

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

The results show:

- Good data capture; >93% at all locations for 2015.
- There are no exceedances of the annual mean concentration of 40 µg/m<sup>3</sup> at any of the three automatic air quality monitoring stations operated by Dudley MBC during 2015.
- No more than 35 24-hour exceedances of 50 µg/m<sup>3</sup> PM<sub>10</sub> have been recorded at any of the three automatic air quality monitoring stations operated by Dudley MBC during 2015.
- There were five exceedances of 50 µg/m<sup>3</sup> PM<sub>10</sub> at Dudley Central monitoring station.
- There were seven exceedances of 50 µg/m<sup>3</sup> PM<sub>10</sub> at Colley Gate monitoring station.
- There were four exceedances of 50 µg/m<sup>3</sup> PM<sub>10</sub> at Burnt Tree monitoring station.

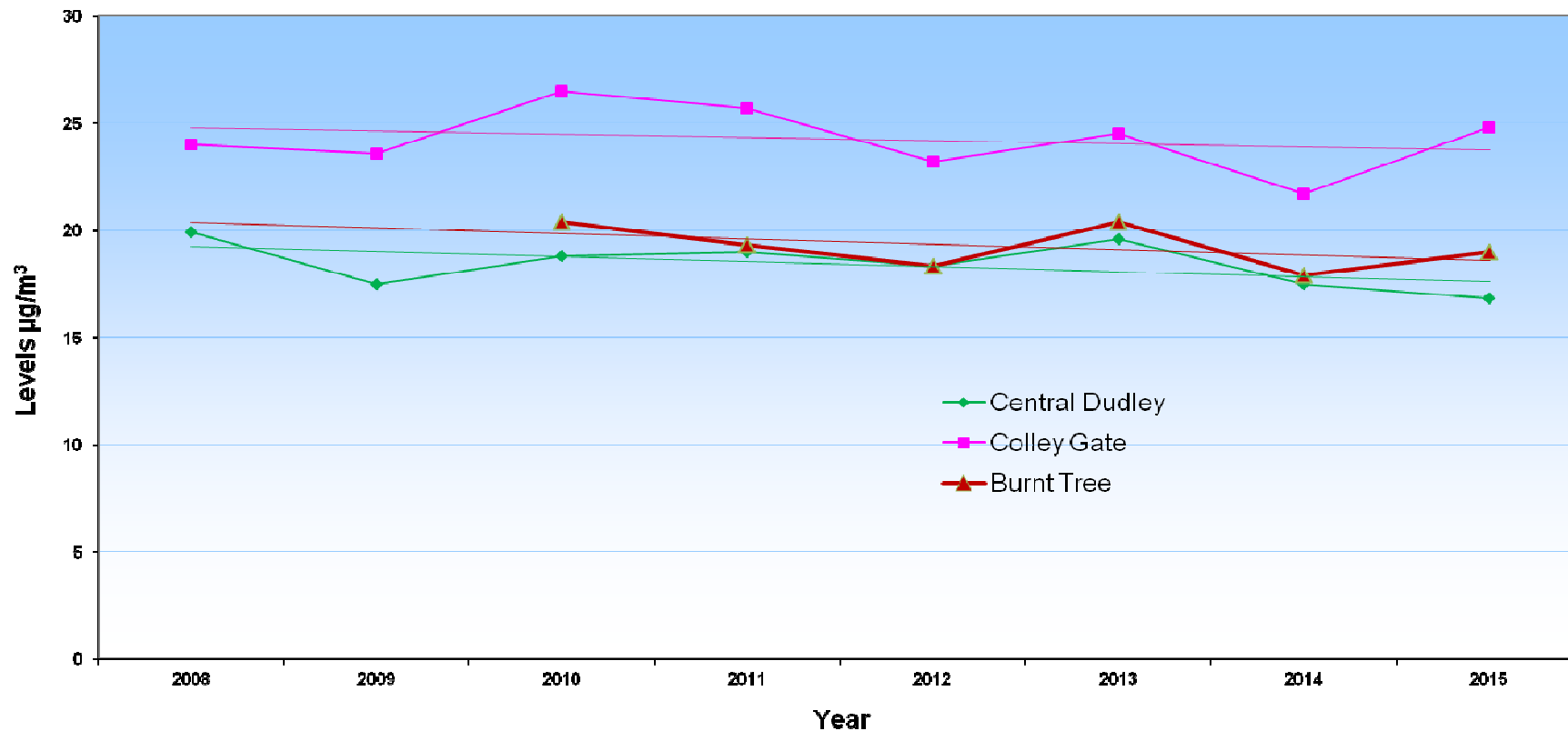


## **Dudley MBC**

The trend graph in Figure 3 shows that between 2008 and 2015 the annual average  $PM_{10}$  concentrations measured at the three automatic air quality stations fluctuate from year to year but there is a downward trend at all of the stations and the results remain well below the air quality annual objective of  $40\mu\text{g}/\text{m}^3$ .

Figure 3 – Trends in Annual Mean PM<sub>10</sub> Concentrations

Annual Trends;- Average PM<sub>10</sub> Levels in Dudley MB



Note: Burnt Tree 2010 covers the period 30/07/2010 to 31/12/2010 only. Data has been annualised against data sets from Colley Gate and the decommissioned Brierley Hill Rose stations.

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

Dudley MBC does not currently monitor PM<sub>2.5</sub>, however at the Colley Gate automatic air quality monitoring station, Dudley MBC is to replace the TEOM with a Grimm EDM-180 monitor which will enable PM<sub>10</sub> and PM<sub>2.5</sub> to be monitored. The monitoring of PM<sub>2.5</sub> at this site is due to start by October 2016.

Dudley MBC have used the PM<sub>10</sub> data from the three automatic monitoring stations in Central Dudley, Colley Gate and Burnt Tree to provide estimated PM<sub>2.5</sub> concentrations using the nationally derived correction factor 0.7 this has given an estimated annual mean of 11.8 µg/m<sup>3</sup> at Central Dudley, 17.4 µg/m<sup>3</sup> at Colley Gate 13.3 µg/m<sup>3</sup> at Burnt Tree. All of these estimates are lower than the suggested annual average limit value of 25 µg/m<sup>3</sup> by 2020.

Table A.7 in Appendix A presents data for the ratified and adjusted monitored PM<sub>2.5</sub> annual mean concentrations for the past 5 years.

## Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Inlet Height (m)
<b>Central Dudley</b>	Urban background	394291	290460	NO <sub>2</sub>	Y	Chemiluminescent	N/A	N/A	3.3
<b>Central Dudley</b>	Urban background	394291	290460	PM <sub>10</sub>	N	TEOM <sub>(VCM)</sub>	N/A	N/A	3.3
<b>Colley Gate</b>	Roadside	394243	284626	NO <sub>2</sub>	Y	Chemiluminescent	21	3.5	1.5
<b>Colley Gate</b>	Roadside	394243	284626	PM <sub>10</sub>	N	TEOM <sub>(VCM)</sub>	21	3.5	1.5
<b>Burnt Tree</b>	Roadside	395761	290575	NO <sub>2</sub>	Y	Chemiluminescent	9	10.5	1.5
<b>Burnt Tree</b>	Roadside	395761	290575	PM <sub>10</sub>	N	TEOM <sub>(VCM)</sub>	9	10.5	1.5
<b>Wordsley</b>	Roadside	389134	286893	NO <sub>2</sub>	Y	Chemiluminescent	7	3.3	1.5

(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

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube collocated with a Continuous Analyser?	Height (m)
13b	Padarn Close, Sedgley	Suburban	391105	293975	NO <sub>2</sub>	Y	3	N/A	N	3.0
32	Dudley Street, Sedgley	Roadside	391853	293650	NO <sub>2</sub>	Y	4	2.6	N	3.0
32b	Dudley Street, Sedgley	Roadside	391875	293642	NO <sub>2</sub>	Y	0	2.7	N	3.1
32e	High Street, Sedgley	Roadside	391823	293788	NO <sub>2</sub>	Y	0	2.9	N	3.3
32f	High Street, Sedgley	Roadside	391825	293830	NO <sub>2</sub>	Y	10	1.2	N	2.9
62b	Birmingham Road, Dudley	Roadside	395597	290560	NO <sub>2</sub>	Y	0	6.5	N	2.5
62e	Birmingham Road, Dudley	Roadside	395402	290568	NO <sub>2</sub>	Y	0	4.4	N	2.0
62r-t	Ernest Road AQMS	Roadside	395762	290575	NO <sub>2</sub>	Y	10	14	Y	2.0
53	High Street, Amblecote	Roadside	389593	285840	NO <sub>2</sub>	Y	0	1.9	N	3.2
16b	High Street, Stourbridge	Roadside	390141	284350	NO <sub>2</sub>	Y	0	1.3	N	2.6
16m	New Road, Stourbridge	Roadside	390177	284074	NO <sub>2</sub>	Y	1	2	N	3.0
34a-ac	High Street, Wordsley	Roadside	389135	286893	NO <sub>2</sub>	Y	0.5	3.2	Y	3.0

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube collocated with a Continuous Analyser?	Height (m)
34ay	High Street, Wordsley	Roadside	389133	286910	NO <sub>2</sub>	Y	0	1.6	N	2.7
34h	High Street, Wordsley	Roadside	389245	286707	NO <sub>2</sub>	Y	0	3	N	3.0
21c	Clent View, Stourbridge	Suburban	388457	282895	NO <sub>2</sub>	Y	8	N/A	N	3.0
54	Himley Rd Gornal Wood	Roadside	391159	290740	NO <sub>2</sub>	Y	0	2.4	N	3.0
57a	Burton Road	Roadside	392576	291949	NO <sub>2</sub>	Y	0	3.6	N	3.0
10-10b	Central Dudley AQMS	Urban Background	394294	290459	NO <sub>2</sub>	Y	75	30	Y	3.0
10e	Ednam Road, Dudley	Urban Background	394327	290483	NO <sub>2</sub>	Y	6	29	N	3.0
63	Castle Hill, Dudley	Roadside	394647	290507	NO <sub>2</sub>	Y	2	3.7	N	3.0
63c	Hall Street, Dudley	Roadside	394719	290191	NO <sub>2</sub>	Y	3	2.0	N	3.2
5w	New Street, Dudley	Urban Centre	394530	290358	NO <sub>2</sub>	Y	0.5	1.7	N	3.0
35c	Buffery Road	Roadside	395064	289514	NO <sub>2</sub>	Y	0.5	2.2	N	3.0
19e	Hagley Road Halesowen	Roadside	396462	283211	NO <sub>2</sub>	Y	0	2.8	N	3.4
3a	Drews Holloway, Halesowen	Roadside	394550	284373	NO <sub>2</sub>	Y	0	4.3	N	2.8

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube collocated with a Continuous Analyser?	Height (m)
3bx	Windmill Hill, Halesowen	Roadside	394499	284408	NO <sub>2</sub>	Y	0	4.7	N	2.4
3c	Windmill Hill, Halesowen	Roadside	394506	284423	NO <sub>2</sub>	Y	0	4	N	3.0
3e	Windmill Hill, Halesowen	Roadside	394384	284543	NO <sub>2</sub>	Y	0	2.7	N	2.6
3gx	Windmill Hill, Halesowen	Roadside	394321	284596	NO <sub>2</sub>	Y	0	2.1	N	3.3
3r-t	Colley Gate AQMS, Halesowen	Roadside	394236	284627	NO <sub>2</sub>	Y	N/A	3.5	Y	2.0
3u	Colley Gate opposite AQMS, Halesowen	Roadside	394225	284643	NO <sub>2</sub>	Y	0	2	N	3.0
15a	Stourbridge Road, Halesowen	Roadside	396392	283752	NO <sub>2</sub>	Y	0	2.4	N	3.0
18	Hawthorne Road, Hayley Green	Suburban	395135	282662	NO <sub>2</sub>	Y	0	16	N	1.8
50e	Pedmore Road, Lye	Roadside	392005	284144	NO <sub>2</sub>	Y	0	2.8	N	2.9
51	Morvale Gardens, Lye	Urban Background	392155	284349	NO <sub>2</sub>	Y	0	18	N	2.0
33	High Street, Pensnett	Roadside	390989	289254	NO <sub>2</sub>	Y	0	6.5	N	2.2
33p	High Street, Pensnett	Roadside	391017	289224	NO <sub>2</sub>	Y	0	3.8	N	2.9

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube collocated with a Continuous Analyser?	Height (m)
33ex	Birds Meadow, Pensnett	Suburban	391027	289410	NO <sub>2</sub>	Y	0	1.9	N	3.0
30	High Street, Quarry Bank	Roadside	393125	286009	NO <sub>2</sub>	Y	0	2.7	N	3.5
30eX	High Street, Quarry Bank	Roadside	392976	286070	NO <sub>2</sub>	Y	3	2.3	N	2.8
30g	High Street, Quarry Bank	Roadside	392943	286098	NO <sub>2</sub>	Y	0	2.3	N	2.9
30t	King Street, Quarry Bank	Urban Background	393038	285843	NO <sub>2</sub>	Y	6	1.6	N	2.7
60	Belper Row, Netherton	Urban Background	395215	287554	NO <sub>2</sub>	Y	0	2	N	3.0
27g	Halesowen Road, Netherton	Roadside	394417	288178	NO <sub>2</sub>	Y	0	1.5	N	2.7
27gX	Halesowen Road, Netherton	Roadside	394417	288171	NO <sub>2</sub>	Y	0	1.5	N	2.7
27j	Halesowen Road, Netherton	Roadside	394416	288169	NO <sub>2</sub>	Y	0	1.6	N	2.7
27p	Halesowen Road, Netherton	Roadside	394474	288029	NO <sub>2</sub>	Y	0	2.7	N	2.9
14	High Street, Brierley Hill	Roadside	391845	287081	NO <sub>2</sub>	Y	40	4.8	N	3.1
14a	High Street, Brierley Hill	Roadside	391859	287232	NO <sub>2</sub>	Y	0	3.1	N	3.0



Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube collocated with a Continuous Analyser?	Height (m)
45c	Mill Street, Brierley Hill.	Roadside	391890	286967	NO <sub>2</sub>	Y	0	1.9	N	3.0
49	Talbot Street, Brierley Hill	Urban Background	391678	287306	NO <sub>2</sub>	Y	2	1.7	N	3.1

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

(2) N/A if not applicable.

**Table A.3 – Annual Mean NO<sub>2</sub> Monitoring Results**

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2015 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
					2011	2012	2013	2014	2015
Central Dudley	Urban Background	Automatic	N/A	96.13	24.7	25.8	25.8	23.4	18.8
Colley Gate	Roadside	Automatic	N/A	99.93	39.0	<b>41.4</b>	38.6	35.3	34.9
Burnt Tree	Roadside	Automatic	N/A	98.52	28.0 <sup>1</sup>	32.2	30.7	30.9	30.4
Wordsley	Roadside	Automatic	N/A	99.87	<b>56.3<sup>2</sup></b>	<b>58.0</b>	<b>58.9</b>	<b>59.6</b>	<b>49.6</b>
17b	Urban Background	Diffusion Tube	N/A	100	20.4	22.4	21.7	20.3	-
13b	Suburban	Diffusion Tube	N/A	92	15.1	17.4	16.0	14.1	11.8
32	Roadside	Diffusion Tube	N/A	100	<b>40.7</b>	<b>44.4</b>	39.7	<b>40.1</b>	38.5
32b	Roadside	Diffusion Tube	N/A	83	39.4	<b>46.3</b>	<b>46.1</b>	<b>43.6</b>	<b>41.9</b>
32e	Roadside	Diffusion Tube	N/A	100	<b>41.8</b>	<b>42.8</b>	<b>42.1</b>	<b>40.5</b>	38.1
32f	Roadside	Diffusion Tube	N/A	100	<b>43.3</b>	<b>45.1</b>	<b>40.5</b>	<b>40.5</b>	37.9
62b	Roadside	Diffusion Tube	N/A	100	37.2	<b>47.7</b>	<b>46.3</b>	<b>46.4</b>	<b>43.3</b>
62d	Roadside	Diffusion Tube	N/A	100	32.7	37.4	36.8	32.1	-
62e	Roadside	Diffusion Tube	N/A	100	39.7	35.9	38.7	<b>40.3</b>	36.2
62r-t	Roadside	Diffusion Tube	N/A	100	31.0	37.4	37.2	32.4	31.3
53	Roadside	Diffusion Tube	N/A	100	35.1	37.4	37.4	35.9	33.2

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2015 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
					2011	2012	2013	2014	2015
16b	Roadside	Diffusion Tube	N/A	100	32.6	37.4	29.8	31.9	30.1
16m	Roadside	Diffusion Tube	N/A	100	-	-	<b>40.7</b>	38.5	35.5
34a-ac	Roadside	Diffusion Tube	N/A	100	<b>48.0</b>	<b>52.4</b>	<b>49.3</b>	<b>47.4</b>	<b>43.4</b>
34ay	Roadside	Diffusion Tube	N/A	100	<b>65.3</b>	<b>63.9</b>	<b>59.5</b>	<b>58.1</b>	<b>51.3</b>
34h	Roadside	Diffusion Tube	N/A	83	-	-	-	-	30.0
21c	Suburban	Diffusion Tube	N/A	100	13.1	14.5	14.1	12.7	10.8
54	Roadside	Diffusion Tube	N/A	100	39.2	<b>42.6</b>	37.7	39.5	34.7
57a	Roadside	Diffusion Tube	N/A	100	<b>40.4</b>	<b>45.1</b>	<b>41.3</b>	<b>40.4</b>	37.5
10-10b	Urban Background	Diffusion Tube	N/A	100	24.5	26.5	25.3	23.4	21.6
10e	Urban Background	Diffusion Tube	N/A	100	-	-	-	-	22.5
63	Roadside	Diffusion Tube	N/A	100	<b>48.6</b>	<b>49.2</b>	<b>51.7</b>	<b>44.7</b>	<b>41.1</b>
63c	Roadside	Diffusion Tube	N/A	100	-	-	<b>40.0</b>	<b>42.3</b>	38.2
5w	Urban Centre	Diffusion Tube	N/A	100	38.6	<b>49.2</b>	<b>42.0</b>	33.1*	36.7
35c	Roadside	Diffusion Tube	N/A	100	-	<b>50.9</b>	<b>41.4</b>	<b>40.3</b>	38.6
19e	Roadside	Diffusion Tube	N/A	100	36.8	<b>42.8</b>	36.6	35.8	32.1
3a	Roadside	Diffusion Tube	N/A	100	<b>50.6</b>	<b>52.3</b>	<b>44.3</b>	<b>40.7</b>	39.0
	Roadside	Diffusion Tube	N/A	92	<b>44.6</b>	<b>47.8</b>	<b>44.9</b>	<b>43.6</b>	<b>40.8</b>
3c	Roadside	Diffusion Tube	N/A	100	39.1	<b>41.8</b>	39.1	36.1	34.1
3e	Roadside	Diffusion Tube	N/A	83	<b>42.7</b>	<b>43.9</b>	<b>45.7</b>	<b>43.7</b>	<b>40.9</b>
3gx	Roadside	Diffusion Tube	N/A	100	<b>45.7</b>	<b>46.7</b>	<b>41.2</b>	<b>43.0</b>	<b>41.3</b>
3r-t	Roadside	Diffusion Tube	N/A	100	39.8	<b>41.8</b>	38.5	37.1	36.8
3u	Roadside	Diffusion Tube	N/A	100	-	-	-	-	34.1
15a	Roadside	Diffusion Tube	N/A	100	39.7	<b>45.6</b>	38.5	39.9	34.8
18	Suburban	Diffusion Tube	N/A	100	14.3	16.7	14.3	14.4	12.8
50d	Roadside	Diffusion Tube	N/A	100	35.9	37.2	37.0	34.9	-
50e	Roadside	Diffusion Tube	N/A	100	39.7	32.6	39.1	39.2	34.6
51	Urban Background	Diffusion Tube	N/A	100	18.3	20.0	19.4	17.2	16.4
33	Roadside	Diffusion Tube	N/A	100	35.2	38.2	34.5	36.0	32.3
33p	Roadside	Diffusion Tube	N/A	83	<b>51.0</b>	<b>55.3</b>	<b>50.0</b>	<b>51.6</b>	<b>45.9</b>
33ex	Suburban	Diffusion Tube	N/A	92	21.3	23.9	22.3	21.3	18.6

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2015 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
					2011	2012	2013	2014	2015
30	Roadside	Diffusion Tube	N/A	100	<b>59.2</b>	<b>57.5</b>	<b>53.1</b>	<b>54.7</b>	<b>50.4</b>
30eX	Roadside	Diffusion Tube	N/A	100	<b>46.0</b>	<b>55.1</b>	<b>46.5</b>	<b>47.9</b>	<b>44.5</b>
30g	Roadside	Diffusion Tube	N/A	100	39.0	<b>42.3</b>	37.8	38.3	34.2
30t	Urban Background	Diffusion Tube	N/A	100	21.9	24.5	22.3	20.4	19.0
60	Urban Background	Diffusion Tube	N/A	100	23.2	25.7	25.2	23.0	21.2
27g	Roadside	Diffusion Tube	N/A	100	<b>65.3</b>	<b>70.1</b>	<b>62.6</b>	<b>64.7</b>	<b>65.1</b>
27gX	Roadside	Diffusion Tube	N/A	100	<b>65.6</b>	<b>66.9</b>	<b>66.2</b>	<b>65.5</b>	<b>62.6</b>
27j	Roadside	Diffusion Tube	N/A	100	<b>57.0</b>	<b>59.5</b>	<b>59.0</b>	<b>59.5</b>	<b>57.5</b>
27p	Roadside	Diffusion Tube	N/A	100	<b>40.3</b>	<b>46.1</b>	<b>49.8</b>	<b>47.3</b>	<b>41.6</b>
14	Roadside	Diffusion Tube	N/A	100	38.3	38.1	38.3	37.6	35.9
14a	Roadside	Diffusion Tube	N/A	100	36.6	38.7	34.3	34.2	33.4
45c	Roadside	Diffusion Tube	N/A	100	35.8	39.4	<b>40.1</b>	<b>40.9</b>	37.9
49	Urban Background	Diffusion Tube	N/A	92	21.0	23.3	22.3	19.1	17.4

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

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

(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.

<sup>1</sup> Note that traffic flows on the adjacent road were disrupted for much of these years pending completion of the Burnt Tree junction improvement scheme (opened on 17/10/11).

<sup>2</sup> Covers the period 25/03/2011 to 31/12/2011 and data is annualised against data set from Colley Gate.

\*Road closed for 7 months during 2014.

Table A.4 – 1-Hour Mean NO<sub>2</sub> Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2015 (%) <sup>(2)</sup>	NO <sub>2</sub> 1-Hour Means > 200µg/m <sup>3</sup> <sup>(3)</sup>				
					2011	2012	2013	2014	2015
Central Dudley	Urban Background	Automatic	N/A	96.13	0	0	0	0	0
Colley Gate	Roadside	Automatic	N/A	99.93	0	0	0	0	0
Burnt Tree	Roadside	Automatic	N/A	98.52	0 <sup>1</sup>	0	0	0	1
Wordsley	Roadside	Automatic	N/A	99.87	0 <sup>2</sup>	17(200.6) <sup>3</sup>	5	7	5

Notes: Exceedances of the NO<sub>2</sub> 1-hour mean objective (200µg/m<sup>3</sup> 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. Note that traffic flows on the adjacent road were disrupted for much of this time pending completion of the Burnt Tree junction improvement scheme

(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%). Covers the period 25/03/2011 to 31/12/2011

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

Table A.5 – Annual Mean PM<sub>10</sub> Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2015 (%) <sup>(2)</sup>	PM <sub>10</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
				2011	2012	2013	2014	2015
Central Dudley	Urban Background	N/A	95.6	19.0	18.3	19.6	17.5	16.4
Colley Gate	Roadside	N/A	92.9	25.7	23.2	24.5	21.7	21.9
Burnt Tree	Roadside	N/A	98.9	19.3	18.3	20.4	17.9	17.5

Notes: Exceedances of the PM<sub>10</sub> annual mean objective of 40µg/m<sup>3</sup> 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<sub>10</sub> Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2015 (%) <sup>(2)</sup>	PM <sub>10</sub> 24-Hour Means > 50µg/m <sup>3</sup> <sup>(3)</sup>				
				2011	2012	2013	2014	2015
Central Dudley	Urban Background	N/A	95.6	9	5	6	4	5
Colley Gate	Roadside	N/A	92.9	16	12	11	6	7
Burnt Tree	Roadside	N/A	98.9	7	4	5	5	4

Notes: Exceedances of the PM<sub>10</sub> 24-hour mean objective (50µg/m<sup>3</sup> 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 90.4<sup>th</sup> percentile of 24-hour means is provided in brackets.

Table A.7 – PM<sub>2.5</sub> Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2015 (%) <sup>(2)</sup>	PM <sub>2.5</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
				2011	2012	2013	2014	2015
Central Dudley	Urban Background	N/A	95.6	13.3	12.8	13.7	12.3	11.8
Colley Gate	Roadside	N/A	92.9	18.0	16.2	17.2	15.2	17.4
Burnt Tree	Roadside	N/A	98.9	13.5	12.8	14.3	12.5	13.3

(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.

## Appendix B: Full Monthly Diffusion Tube Results for 2015

Table B.1 – NO<sub>2</sub> Monthly Diffusion Tube Results - 2015

Site ID	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )												Annual Mean	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted 0.92 <sup>(1)</sup>
	13b	15.93	19.72	-	15.28	9.43	7.52	8.42	10.39	13.82	21.37	3.28		
32	48.63	55.84	37.59	38.87	40.02	35.50	39.97	37.49	43.27	48.17	40.63	36.55	41.9	38.5
32b	46.08	46.99	44.16	44.09	37.75	34.64	35.95	43.51	56.93	65.81	-	-	45.4	41.9
32e	32.94	48.31	42.61	41.23	35.84	35.5	35.73	44.52	48.4	64.28	31.91	35.85	41.4	38.1
32f	37.95	42.47	44.3	40.30	33.58	32.32	34.05	39.32	47.28	58.70	41.14	42.72	41.2	37.9
62b	44.39	47.34	45.84	48.63	43.29	43.14	47.97	49.0	59.31	57.14	39.19	39.89	47.1	43.3
62e	43.19	45.19	41.44	38.05	36.14	29.53	36.4	38.87	44.51	45.66	34.02	39.43	39.4	36.2
62r-t	37.3	38.44	41.33	33.0	28.23	27.46	29.50	34.11	40.02	48.98	27.77	22.01	34.0	31.3
53	35.57	42.36	34.94	34.92	29.66	27.4	29.96	38.03	44.1	48.13	36.49	32.12	36.1	33.2
16b	35.59	38.3	35.11	29.86	28.01	26.15	28.81	29.85	37.46	37.13	36.51	29.95	32.7	30.1
16m	40.96	37.38	38.05	35.57	31.41	30.75	32.16	38.38	47.80	50.83	44.21	35.17	38.6	35.5
34a-ac	50.95	48.23	49.90	46.25	39.28	37.11	42.04	54.8	56.34	553.3	41.56	44.58	47.2	43.4
34ay	65.76	54.89	43.29	50.32	54.57	46.74	55.04	50.01	71.1	69.39	70.72	36.88	55.7	51.3
34h	39.59	-	-	21.85	26.99	24.70	30.19	34.88	35.29	43.28	35.77	33.05	32.6	30.0



Site ID	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )													Annual Mean	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted 0.92 <sup>(1)</sup>	
	21c	11.33	18.45	15.65	12.64	6.18	6.90	7.00	9.55	12.42	19.33	11.29			10.59
54	40.40	44.64	30.95	36.92	34.15	34.75	35.04	39.15	40.54	56.82	33.65	36.08	37.7	34.7	
57a	43.04	40.47	45.41	39.82	35.20	32.68	34.02	45.22	47.81	56.41	39.19	29.83	40.8	37.5	
10-10b	25.0	27.07	25.80	23.46	16.43	15.43	16.48	21.18	26.14	35.66	24.6	23.89	23.4	21.6	
10e	23.43	29.19	25.71	24.37	20.16	16.91	18.58	23.45	28.19	33.45	28.07	22.23	24.5	22.5	
63	47.56	54.01	48.93	56.50	34.07	32.27	403.5	47.18	52.60	55.22	40.93	36.53	44.7	41.1	
63c	40.90	40.65	41.35	43.09	33.26	33.56	35.63	45.91	51.36	64.75	31.55	35.95	41.5	38.2	
5w	39.97	44.62	42.63	36.35	34.2	32.02	37.29	41.36	44.75	43.95	45.29	36.81	39.9	36.7	
35c	44.82	53.33	37.3	37.05	41.75	34.85	43.24	44.88	42.37	44.1	46.95	32.64	41.9	38.6	
19e	33.92	40.73	31.26	35.00	29.01	28.91	30.18	32.87	41.34	48.62	33.08	33.38	34.9	32.1	
3a	49.70	46.43	44.63	40.57	40.81	34.26	40.63	47.00	45.47	52.02	36.41	31.12	42.4	39.0	
3bx	50.28	54.80	46.02	42.61	41.53	37.97	42.65	44.62	-	45.85	44.28	37.04	44.3	40.8	
3c	37.57	42.92	38.77	39.28	35.23	28.75	32.06	39.55	46.14	51.90	29.04	23.73	37.1	34.1	
3e	38.29	48.62	41.94	45.09	35.46	35.17	38.54	47.36	47.04	66.86	-	-	44.4	40.9	
3gx	50.68	56.06	42.49	42.08	40.87	34.92	43.21	47.52	44.16	45.23	45.89	45.71	44.9	41.3	
3r-t	48.01	49.22	38.95	37.22	35.28	30.00	39.71	41.21	44.75	44.28	37.39	34.31	40.0	36.8	
3u	41.19	49.99	40.32	33.24	29.40	30.68	32.00	37.46	43.19	43.84	33.66	30.45	37.1	34.1	

Site ID	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )													Annual Mean	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted 0.92 <sup>(1)</sup>	
	15a	40.89	50.45	41.04	37.61	32.39	30.93	31.25	38.37	43.05	55.24	32.62			19.42
18	14.80	19.89	18.66	16.75	8.56	9.12	8.60	12.53	15.28	20.90	11.06	10.30	13.9	12.8	
50e	36.26	44.17	36.85	36.65	32.11	30.90	30.20	39.13	45.86	52.80	35.43	31.18	37.6	34.6	
51	21.92	22.07	20.48	17.86	11.34	10.50	11.69	17.28	19.52	27.77	17.98	14.97	17.8	16.4	
33	36.52	37.57	38.82	43.13	25.46	28.44	31.60	35.91	36.48	52.65	27.30	27.30	35.1	32.3	
33p	58.80	-	-	47.05	47.77	37.65	46.75	50.41	50.06	56.19	51.16	53.35	49.9	45.9	
33ex	24.65	27.71	22.64	19.04	13.75	12.34	12.63	18.43	-	25.93	22.46	22.88	20.2	18.6	
30	53.45	61.82	52.50	51.31	47.13	44.91	58.39	60.08	60.16	59.91	55.95	51.40	54.8	50.4	
30eX	47.17	58.38	45.31	50.66	44.80	41.58	51.06	49.43	51.75	54.19	39.62	46.00	48.3	44.5	
30g	43.24	52.58	44.26	38.65	34.31	29.40	28.83	42.88	20.21	55.54	30.76	24.98	37.1	34.2	
30t	22.95	31.56	24.34	21.21	15.10	12.53	13.62	16.76	21.84	31.38	18.88	17.05	20.6	19.0	
60	28.61	34.74	28.04	21.96	15.79	13.34	16.77	17.67	23.40	34.56	19.12	22.23	23.0	21.2	
27g	90.92	87.27	60.41	66.20	69.18	65.22	70.80	74.44	68.87	81.02	59.76	54.58	70.7	65.1	
27gX	76.50	81.05	59.00	64.15	66.75	56.38	75.47	77.48	73.09	75.25	45.68	65.48	68.0	62.6	
27j	70.75	75.63	66.04	56.29	48.33	45.85	67.53	68.01	64.67	70.38	59.71	57.34	62.5	57.5	
27p	41.42	59.18	45.05	50.43	36.26	37.51	38.23	49.59	50.49	68.29	37.92	28.23	45.2	41.6	
14	45.92	50.12	39.10	35.23	37.11	30.08	37.36	39.71	39.15	46.80	32.15	36.13	39.1	35.9	

Site ID	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )													Annual Mean	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted 0.92 <sup>(1)</sup>	
	14a	40.28	48.27	37.66	35.12	32.56	26.75	32.23	36.20	34.34	40.87	34.16			36.95
45c	38.61	53.08	42.43	44.85	33.50	27.47	31.58	45.98	42.67	56.50	35.15	41.89	41.1	37.9	
49	21.33	24.35	18.29	-	13.56	11.66	12.36	17.71	21.30	29.74	20.00	18.15	19.0	17.4	

(1) See Appendix C for details on bias adjustment

**Note**

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Data Unavailable

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

### Diffusion Tube Bias Adjustment Factors

The NO<sub>2</sub> tubes employed by Dudley MBC are supplied and analysed by Gradko International Ltd., Winchester, Hampshire. Full details are provided in Box 1.1

#### Box 1.1: Nitrogen Dioxide diffusion tube information

Diffusion Tube Details	
Type Of Tube	Nitrogen Dioxide (NO <sub>2</sub> )
Type of absorbent	Triethanolamine
Method of tube preparation	20% TEA in water
Monitoring site locations	See Table A.8.
Exposure dates	Tubes are exposed in accordance with the NETCEN calendar
Exposure duration	One month
Measured concentrations	See Table B.1
Bias Adjustment Factor	0.92
Spreadsheet Version Number	09/15

### Factor from Local Co-location Studies

Data provided by Dudley MBC for use in the national survey is summarised in Box 1.2

#### Box 1.2 Dudley MBC Co-Location Data 2015

Dudley MBC Co Location Study								
Site	Type	Site Type	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m <sup>3</sup> )	Automatic Monitor Mean Conc. (Cm) (µg/m <sup>3</sup> )	Bias (B)	Tube Precision <sup>6</sup>	Bias Adjustment Factor (A) (Cm/Dm)
Central Dudley	20% TEA in Water	UB	12	23	19	11.2%	G	0.82
Colley Gate	20% TEA in Water	R	12	40	35	15.2%	G	0.88
Burnt Tree	20% TEA in Water	R	12	34	31	18.1%	G	0.92
Wordsley	20% TEA in Water	R	12	47	50	-12.6%	G	1.09
							Mean	0.93
							National Factor	0.92

## Discussion of Choice of Factor to Use

Local Authorities are advised to report both the adjustment factor from their local study, and the national bias adjustment factor. Box 1.2 above demonstrates that the Dudley MBC locally derived average value of 0.93 was slightly higher than the national bias adjustment factor of 0.92 calculated using spreadsheet version 09/15.

The decision of which bias adjustment factor to use depends upon a number of issues that will need to be considered. It is up to each Local Authority to take account of the factors and set out the reasons for the choice made. Dudley MBC has chosen to use the national factor for the following reasons:

- The survey consists of over 29 studies where tubes are exposed over a wide range of settings which differ from the co-location sites employed in Dudley MB. For example, none of the Dudley MBC co-location sites assessed are on a building façade in a canyon-like street.
- The automatic analysers have been operated using local, rather than national, QA/QC procedures.
- During some years, data capture from the automatic analysers has been less than 90%; use of nationally calculated bias adjustment factors enables a consistent approach to be used from one year to the next.

## PM Monitoring Adjustment

King's College ERG (Environmental Research Group) have developed a new model to correct TEOM concentrations to "gravimetric equivalent" values, based on the purge concentrations measured by FDMS analysers. To assist local authorities with the Volatile Correction Model, ERG has developed a web portal that will allow the correction algorithms to be automatically applied. It allows TEOM measurements to be corrected for the loss of volatile components of particulate matter that occur due to the high sampling temperatures employed by this instrument. The resulting corrected measurements have been demonstrated as equivalent to the gravimetric reference equivalent.

Data from 01/01/2010 onwards has been corrected using DEFRA's Volatile Correction Model (VCM) web portal. Corrections for the 2015 data were carried out on 17<sup>th</sup> February 2016 and the portal may include some un-ratified FDMS data and/or distant temperature & pressure sites.

## Short-term to Long-term Data adjustment

Data with >75% data capture rate were adjusted in accordance with Box 7.9 of LAQM. TG (16). Guidance in LAQM. TG (16) states that it is permissible to annualise the data using roadside or kerbside sites. Burnt Tree Automatic Monitoring Station was deployed in July 2010 at a roadside location. Data was used from the background AURN sites at Tyburn, Birmingham and Leamington Spa for NO<sub>2</sub> however data was not available for PM<sub>10</sub> at these locations. As Burnt Tree is classed as roadside location, data was used from Dudley MBC roadside locations at Colley Gate and Brierley Hill Rose, which is no longer operational (both with >95% data capture) the following calculations were employed:

### Box 1.3 Site: Burnt Tree automatic monitoring station data from 30/7/2012 (5 months)

Roadside NO <sub>2</sub>	Annual Mean 2010 (Am)	Period Mean 2010 (Pm)	Ratio (Am/Pm)
Colley Gate	44.2	46.7	0.95
Brierley Hill Rose	45.3	47.6	0.95

Burnt Tree		38.2	
		Average (Ra)	0.95

**Burnt Tree period mean = 38.2 x 0.95 = 36.2**

**Box 1.4 Site: Burnt Tree automatic monitoring station data from 30/7/2012 (5 months)**

Background NO <sub>2</sub> AURN Network	Annual Mean 2010 (Am)	Period Mean 2010 (Pm)	Ratio (Am/Pm)
Tyburn, Birmingham	37.3	44.0	0.8
Leamington Spa	28.3	28.6	1.0
Burnt Tree		38.2	
		Average (Ra)	0.9

**Burnt Tree period mean = 38.2 x 0.90 = 35.1**

**Box 1.5 Site: Burnt Tree automatic monitoring station data from 30/7/2012 (5 months)**

Roadside PM <sub>10</sub>	Annual Mean 2010 (Am)	Period Mean 2010 (Pm)	Ratio (Am/Pm)
Colley Gate	25.5	24.1	1.1
Brierley Hill Rose	22.9	21.7	1.1
Burnt Tree		19.3	
		Average (Ra)	1.1

**Burnt Tree period mean = 19.3 x 1.1 = 20.4**

### QA/QC of Automatic Monitoring

The chemiluminescent NO<sub>2</sub> analysers are housed in an air-conditioned environment and are operated according to manufacturers' instructions. Calibration of instruments is carried out once every two weeks by Dudley MBC personnel. The calibration is performed with zero air from the analyser's internal generators which contain charcoal and Purafil to remove any trace of oxides of nitrogen from the sample stream and a certificated gas cylinder of nitric oxide supplied by BOC. 15-minute averaged data is collected and scaled using the determined calibration factors. All

instruments are serviced at 6-monthly intervals by engineers from Environmental Technology plc, and are covered by that firm’s service contract.

### QA/QC of diffusion tube monitoring

The current test laboratory, Gradko, participates in two centralised QA/QC schemes:

- AIR, which is an independent analytical proficiency-testing (PT) scheme, operated by Laboratory of the Government Chemist (LGC) Standards and supported by the Health and Safety Laboratory (HSL). The scheme, which started in April 2014, combines two long running PT schemes: LGC Standards STACKS PT scheme and HSL WASP PT scheme.
  
- A monthly field inter comparison exercise.

The laboratory demonstrated excellent levels of performance with regard to AIR NO<sub>2</sub> PT performance criteria over the period Jan 2015 to Nov 2015 [5], see Box 1.6:

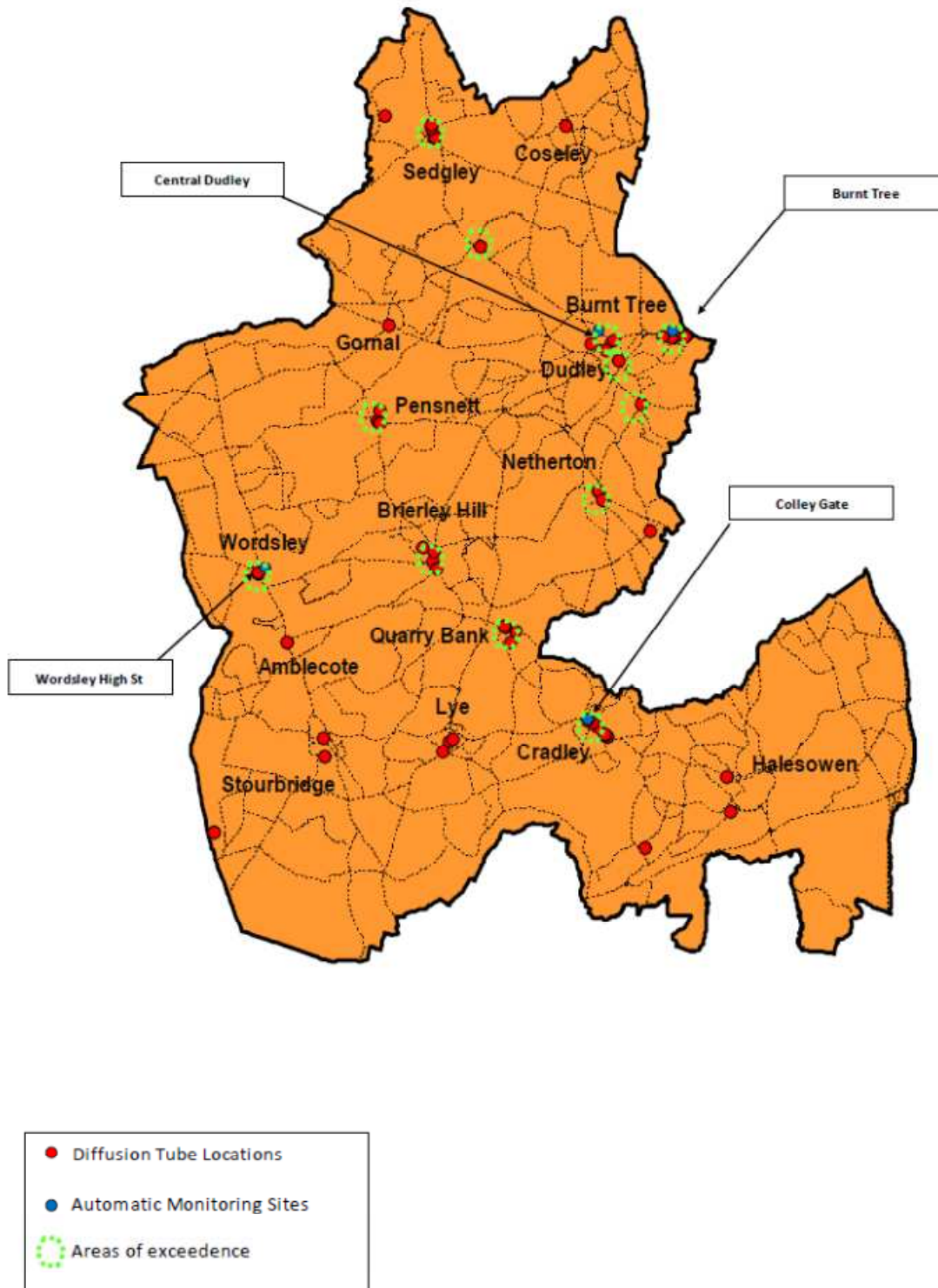
#### Box 1.6 Gradko Summary Performance for AIR NO<sub>2</sub> PT Rounds AR006, AR007, AR009 and AR010

Summary of Gradko Diffusion Tube Performance During 2015				
WASP/AIR NO <sub>2</sub> PT Round	AR PT AR006	AR PT AR007	AR PT AR009	AR PT AR010
Evaluation Period	Jan- Feb 2015	April- May 2015	July- Aug 2015	Oct- Nov 2015
% of results submitted which were deemed to be satisfactory based upon a z-score of ± 2	100%	100%	100%	100%



## Appendix D: Map of Monitoring Locations

Map of Automatic Monitoring Sites and Diffusion Tube Locations



## Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective <sup>4</sup>	
	Concentration	Measured as
Nitrogen Dioxide (NO <sub>2</sub> )	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Particulate Matter (PM <sub>10</sub> )	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Particulate Matter (PM <sub>2.5</sub> )	25 µg/m <sup>3</sup>	Annual mean
	15% reduction in average urban background concentrations against a 2010 baseline	Three-year running annual mean
Sulphur Dioxide (SO <sub>2</sub> )	350 µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean
Benzene	16.25 µg/m <sup>3</sup>	Running annual mean
	5.00 µg/m <sup>3</sup>	Running annual mean
1,3-Butadiene	2.25 µg/m <sup>3</sup>	Running annual mean
Carbon monoxide	10.0 µg/m <sup>3</sup>	Running 8-hour mean
Lead	0.5 µg/m <sup>3</sup>	Annual mean
	0.25 µg/m <sup>3</sup>	Annual mean

<sup>4</sup> The units are in microgrammes of pollutant per cubic metre of air (µg/m<sup>3</sup>).

## 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 <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM <sub>2.5</sub>	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO <sub>2</sub>	Sulphur Dioxide

## References

1. Defra (2016) Local Air Quality Management Technical Guidance LAQM. TG (16)
2. Defra (2016) Local Air Quality Management Policy Guidance LAQM. PG (16)
3. DUDLEY MBC (2015) Updating and Screening Assessment
4. DUDLEY MBC (2015) Air Quality Action Plan Progress Report
5. DUDLEY MBC (2011) Air Quality Action Plan