

Newcastle City Council



AECOM

2017 Air Quality Annual Status Report (ASR)

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

September 2017

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Executive Summary: Air Quality in Our Area

Air Quality in Newcastle City Council

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas^{1,2}.

When quantifying the total impact associated with exposure to pollutants nitrogen dioxide (NO₂) and particulate matter of a size less than 2.5 microns (PM_{2.5}), it is necessary to account for an overlap in the response functions. Defra estimates that the annual equivalent number of attributable deaths associated with the two pollutants combined is 44,750–52,500, with an associated annual social cost of £25.3 billion – £29.7 billion³.

In the City of Newcastle, the main pollutant of concern is NO₂, with the primary source being from road vehicle exhaust. Newcastle City Council (NCC) have declared two air quality management areas due to monitored exceedances of the annual mean NO₂ objective (<https://www.newcastle.gov.uk/environment-and-waste/pollution/air-pollution/monitoring-air-quality>):

- City centre; and
- Gosforth

Annual mean NO₂ concentrations measured in 2016 continue to exceed the annual mean objective at many sites in the centre and on key routes.

No significant new emission sources were identified since the previous ASR, and the most significant source of atmospheric pollution continues to be emissions from road traffic. The concern is predominantly high concentrations of NO₂ in the City of Newcastle, although it is recognised that fine (PM₁₀) and ultra-fine (PM_{2.5}) particulate matter can have health effects at concentrations below the NAQS.

¹ Environmental equity, air quality, socioeconomic status and respiratory health, 2010

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

³ Every breath we take, Royal College of Physicians, 2016.

Actions to Improve Air Quality

The Air Quality Action Plans (AQAP) for Newcastle City Centre and Gosforth were adopted in February 2006 and May 2011 respectively, to satisfy the statutory requirements of Defra's Local Air Quality Management (LAQM) regime for local authorities that have declared Air Quality Management Areas (AQMAs).

A summary of the actions that have been adopted and are currently included in the City's Air Quality Action Plan is presented below.

Action
Residents parking permits - 18,000 residents/visitor parking permits issued.
Specific bus corridors including bus lanes, or segregation of buses - St. Mary's Place bus corridor scheme implemented. Consideration is now being given to Sandyford Road Corridor.
Increase public transport priority - Intro of bus priority enforcement on John Dobson Street (JDS), Tyne Bridge, High Level etc. in 2015/16. Urban Core Plan adopted in 2016.
Higher priority for pedestrians and cyclists (in terms of highway space)
Decriminalized parking enforcement - transfer of enforcement powers from the police to the council to help reduce congestion and improve road safety.
Urban traffic management control (UTMC). Ongoing experiment with SMART (intelligent traffic light system) - in process of implementation.
Encourage low emission/ zero emission vehicles
Enforcing idling engines legislation - All staff within RSPD are authorised to issue fixed penalty notices, and periodic enforcement is currently carried out. Legislation is flawed by requirement to instruct driver to turn off engine before issue of notice, thus making it impossible to issue notice and actually carry out enforcement. 2017 Posters placed at locations within AQMA where engine idling has become a problem, eg, bus/coach stops and taxi ranks.
Delivery times outside peak hour - A freight consolidation centre was operational in Newburn from July 2011. Hours of freight delivery will be co-ordinated around quieter times, in lower emission vehicles. Freight consolidation to be reviewed.
Taxi emissions - Taxi licensing strategy was reviewed in 2011 and emission standard will be gradually introduced. Not completed in 2011 - now underway in 2017 to include age limitations.
Use of low emission delivery vehicles/ times of delivery - To be considered as part of freight consolidation. Freight consolidation to be reviewed.
Low emission zone - Part of Urban Core Area Action Plan. LEZ study completed. Not recommended. Based on compliance being achieved by 2020. Results being reviewed in light of DEFRA predictions and COPERT factors.
Speed Restrictions - The speed restriction scheme "20's Plenty" has been rolled out across large parts of the Gosforth area of Newcastle and is an advisory scheme to encourage people to reduce their speed on selected streets and roads across Newcastle.
Upgrade of Urban Traffic Control (UTC) and Scoot - Signal coordination currently being upgraded as part of the UTMC project.
Park and Ride - To be implemented through both bus and Metro. Metro Park and Rides in operation along with Great Park bus & Soccerbus
Promotion of Cycling - To be implemented through the cycle strategy (Urban Core Plan)
Annual Travel Card discount - This has been rolled out to Newcastle Council staff, and major employers are being encouraged by Nexus to join the scheme.
Quality bus contracts - Discussions were undertaken between regional bus operators and local authorities on Quality bus partnerships. Part of this could be geared around higher quality vehicle emission standards.
Travel Plans for businesses/ schools - Developing programmes from Local Transport Plan 1 and 2 (LTP1 and LTP2). All schools achieved school travel plans and these are now being refreshed.

Action
Alternative Travel - Work is continuing with the football club and key stakeholders to implement a number of measures to mitigate the negative impacts of travel to St James' Park. Current arrangements about to be reviewed but updated arrangements to be in place.
Car Loan schemes - Pool car system currently on-going by some employers.
Use of car parking charges to encourage alternatives - Under investigation as part of the core strategy. Parking strategy encourages Green Travel Hub at Science Central with EV charging, cycle parking and journey planning advice.
Car Clubs - Car clubs are being developed and new cars added as demand arises for this. Car club contract being re-procured.
Home Zones
Electric Vehicle Recharging Infrastructure
Electric Vehicles in NCC Fleet - 25 electric vehicles already in fleet.
Switch EV Council Trial – complete.
Switch EV Public Trial – complete.
Switch EV Car club trial – complete.
Eco driving training - Completed but not within NCC Remit. Low take up among council drivers/no resource to continue.
Subsidise public transport
Create extra capacity on trains/ Metro/buses
Flexible work times/ school hours/ home working - NCC has already implemented this scheme. Most school hours now outwith LA control as schools become academies. Legal process still needed for LA schools. SMOTS being refreshed.
Provision of Real Time Information (RTI) at bus stops
Target schools and parents with information campaigns
Health Promotion
One off events
Education regarding safety on Public Transport
Provision of information on 'High Pollution Days - Not to be implemented in the short term, but may however be linked to future UTMC systems. Being explored with UTMC.
Include cycle facilities in new developments - This is a standard requirement for a new development. Implemented - requirement of new planning applications.
Consideration of the location of essential services such as housing and employment - Implementation as part of the new accessibility strategy and cross organisational working arrangements. Included in Urban Core Plan.
Strengthen joint working between local authorities - Ongoing. Also strengthened relationships with Urban Observatory, Newcastle University.
Implement greater planning controls in AQMAs
Local Development Frameworks need to identify AQMAs - Local development framework has taken air quality into account. Background monitoring to support/validate planning application submissions.
Cap existing development sites
Encourage mixed use developments - This is already part of Newcastle City Council's sustainable development policy.
Undertake air quality assessments of relevant new developments
Air Quality Awareness Campaign - Campaign to raise air quality and how behavioural change can both improve personal health and at the same time improve air quality. Be Air Aware time limited project engaged with the community and supported by Go Smarter.

Conclusions and Priorities

The most significant local challenge in the City continues to be the AQMAs declared across the city centre and in Gosforth (parts of the A189 and B1318). Air Quality Action

Plans (AQAPs) have been adopted by NCC for each AQMA, which includes specific measures to improve air quality in the City.

The annual mean objective for nitrogen dioxide (NO₂) was exceeded or within 10% of the objective value at the majority of monitoring locations in the city centre (30 of 35), which are distributed throughout the AQMA i.e. there are no localised areas of the AQMA where air quality has improved noticeably or discrete areas where exceedances are consistently recorded. Of the six monitoring locations in the Gosforth AQMA, five recorded NO₂ concentrations in exceedance of or within 10% of the annual mean objective. It is the intention to continue to monitor to confirm the extent of potential exceedance outside the AQMA.

NCC is obligated to conduct a clean air zone feasibility study to be delivered to Defra in December 2018. This will be a major piece of work overlapping the current AQAP. The study will need close collaboration with neighbouring authorities and outcomes will need to be balanced across shared priority areas including transportation, public and environmental health.

Local Engagement and How to get Involved

The Newcastle City Centre and South Gosforth AQAPs include a number of measures that will require a high level of public support and buy-in to ensure they are successful, such as:

- Increasing access to alternative modes of travel to the private motor car;
- Increased use of low emission vehicles;
- Increased use of cycle-ways as a modal shift across the city of Newcastle; and
- Use of car loan schemes and car clubs, including the uptake of car sharing and pooling or the use of alternative forms of travel.

NCC will continue to provide information about air quality and pollution control:

- paper copies, or alternative formats, of any of the electronic reports published online at <https://www.newcastle.gov.uk/environment-and-waste/pollution/air-pollution/monitoring-air-quality>
- information on previous review and assessment reports
- Any questions or concerns about air quality in the county answered.

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1 Local Air Quality Management

This report provides an overview of air quality in Newcastle during 2016. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

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

The statutory air quality objectives applicable to LAQM in England can be found in Table F.1 in Appendix F.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

A summary of AQMAs declared by Newcastle City Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at <https://www.newcastle.gov.uk/environment-and-waste/pollution/air-pollution/monitoring-air-quality>. Alternatively, see Appendix D: Map(s) of Monitoring Locations and AQMA, which provides for a map of air quality monitoring locations in relation to the AQMA(s).

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)		Action Plan (inc. date of publication)
						At Declaration	Now	
AQMA No. 1b (City Centre)	Declared April 2004 Amended April 2008	NO ₂ Annual Mean	Newcastle	An area encompassing the previous AQMAs 1-3, covering Newcastle City Centre	YES/NO			City of Newcastle upon Tyne Air Quality Action Plan - Newcastle City Centre AQMA - January 2006): https://www.newcastle.gov.uk/sites/default/files/wwwfileroot/environment-and-waste/pollution/city_centre_aqma_action_plan_0.pdf
AQMA No. 5 (Gosforth)	Declared April 2008	NO ₂ Annual Mean	Gosforth	An area encompassing parts of the A189 and B1318 in Gosforth.	YES			Air Quality Action Plan: South Gosforth, Newcastle City Council (May 2011): https://www.newcastle.gov.uk/sites/default/files/wwwfileroot/environment-and-waste/pollution/gosforth_aqma_action_plan_0.pdf

☒ Newcastle City Council confirm the information on UK-Air regarding their AQMA(s) is up to date - (<https://uk-air.defra.gov.uk/aqma/maps>)

2.2 Progress and Impact of Measures to address Air Quality in the City of Newcastle

NCC has taken forward a number of direct measures during the current reporting year of 2016 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

More detail on these measures can be found in their respective Action Plans. Key measures completed since the previous ASR are:

- Action 7b: Encouraging low/zero emission vehicles – implementation of the Clean Bus transport fund where 30 buses have been adapted with fuel-saving technology.
- Action 25: Electric vehicle (EV) recharging infrastructure – 47 charging points installed to date.
- Action 27-29: Electric vehicle trials - Trialled EVs amongst existing council services along with new technologies, trialled EVs in car clubs and raised public awareness of EV viability and therefore their future uptake by consumers.
- Action 30: Eco driving training – low take up among council drivers and no resources to continue.
- Action 31: Subsidising public transport – concessionary fares for OAPs on buses and metros implemented.
- Action 33: Encouraging/facilitating home working through flexible work times and school hours.
- Action 48: Air quality awareness campaigns – Be Air Aware, through social media.

Newcastle City Council has taken forward a number of measures during the current reporting year in pursuit of improving local air quality. No measures have yet been completed, but progress has been achieved on the following measures:

- Action 1 & 22: Residents parking permits and car parking charges – 18,000 residents/visitor parking permits issued to date to discourage free city centre all-day commuter parking.

- Action 2: Traffic management through bus corridors - St. Mary's Place bus corridor scheme implemented. Consideration is now being given to Sandyford Road Corridor.
- Action 3, 15 & 38: Increase public transport priority – Included in the Urban Core Plan 2016. Bus priority enforcement was introduced on John Dobson Street, Tyne Bridge and High Level in 2015/16. Park and Ride facilities are being implemented through both bus and Metro; Metro Park and Rides are in operation along with Great Park bus and Soccerbus. Public safety on public transport is being addressed through proactive use of more staffing and CCTV.
- Action 4, 16 & 40: Higher priority for pedestrians and cyclists - Included in the Urban Core Plan 2016 is the standard requirement that new developments include cycle facilities. Newcastle was awarded £10.6 m through the Cycle City Ambition fund to implement or expand pedestrianised areas and on and off-road cycle lanes and routes.
- Action 6, 14 and 39: Ongoing monitoring of traffic flow and queuing times using the urban traffic management control (UTMC) and ongoing experiment with SMART (intelligent traffic light system). Signal coordination is currently being upgraded as part of the UTMC project. Linking of UTMC traffic data to air pollution events is being explored with a view to making this information publicly available.
- Action 8: Enforcing idling engines legislation - All staff within the Regulatory Services and Public Protection (RSPP) are authorised to issue fixed penalty notices, and periodic enforcement is currently carried out. However, the legislation is flawed by the requirement to instruct driver to turn off engine before issue of notice, thus making it impossible to issue notice and actually carry out enforcement.
- Action 9: Freight and delivery management - A freight consolidation centre which became operational in Newburn from July 2011 will be reviewed.
- Action 10: Taxi emissions - Taxi licensing strategy was reviewed in 2011 and emission standards will be gradually introduced in 2017 to include age limitations.

- Action 12: Low emission zone (LEZ) - Part of Urban Core Area Action Plan 2016. A LEZ study was completed. The overall recommendation was not to pursue a LEZ as it would not bring about improvements in air quality so desired by the Council.
- Action 17: Annual travel car discount - This has been rolled out to Newcastle Council staff, and major employers are being encouraged by Nexus⁴ to join the scheme.
- Action 19: Travel Plans for businesses/schools - All schools achieved school travel plans and these are now being refreshed.
- Action 23: Car clubs - Car clubs are being developed and new cars added as demand arises for this. Car club contract is being re-procured.
- Action 24: Home Zones – superseded by Streets for People Community Areas and principles carried through in new housing developments.
- Action 26: Electric Vehicles in NCC Fleet – 25 vehicles in fleet, with more to be added in the future.
- Action 34, 36 & 37: Public information initiatives – Ongoing and one off events, such as the provision of real time information at bus stops (bus companies are developing applications), Cycling in the City, Active Newcastle, This Girl Can, Sky Rides, Cycle Cross, Make the Switch.

2.2.1 NCC's Priorities for the Coming Year

As part of recent developments by Defra 29 local authorities have been told they must take action (previously only five authorities had been explicitly told to introduce clean air zones (CAZs)) to reduce NO₂ near to specific roads. These locations were identified through the Pollution Climate Mapping (PCM) dispersion model. NCC must undertake a clean air zone feasibility study as part of this process. Defra has made funding available for Newcastle City Council to work with its partners (e.g. Gateshead and North Tyneside) to examine air quality along parts of the A167 across the Tyne Bridge and towards North Tyneside. A draft feasibility plan is expected by Defra around December 2018.

⁴ Nexus is the Tyne and Wear Passenger Transport Executive administering funds on behalf of the North East Combined Authority. Their task is to improve the quality of life and fortunes of everyone in Tyne and Wear, by creating better transport networks.

The principal anticipated challenges and barriers to implementation of existing AQAP are:

- Whilst the feasibility plan will take precedence over the existing programme of work by Environmental Health the Council will be working hard to continue to accelerate the measures described here and included in the AQAPs.
- Newcastle City Council recognises that in order to deliver air quality across AQMAs it must work with its neighbouring authorities and other stakeholders such as Highways England. In addition, the Council understands that unintended consequences of low emission measures are very likely but will be ameliorated by working closely with the Transportation Authority and Public Health England.

Progress on the AQAP measures has been slower than expected due to:

- Uncertain of allocations of funding for both public and private enterprise schemes;
- The need to ensure plans are coordinated with the National Air Quality Strategy, which was published as a draft in April 2017, and the updated PCM model used to identify roads where the annual mean concentration of NO₂ exceeds National Air Quality Objectives.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Newcastle City Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of the City Centre and Gosforth AQMAs.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure (see footnote)	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Residents parking permits	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Newcastle City Council	2001	Ongoing	Issue residents parking permits to discourage free city centre all-day commuter parking	Low-Medium	18,000 residents/visitor parking permits issued	2030	
2	Specific bus corridors including bus lanes, or segregation of buses.	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	Newcastle City Council	2001	Ongoing	Assess bus corridors for priority measures such as selective vehicle detection at traffic signals, new signal installations, or bus priority or 'no-car' lanes	Low (in some targeted areas)	St. Mary's Place bus corridor scheme implemented. Consideration is now being given to Sandyford Road Corridor. Identified public transport corridors in 2015 Cabinet report. CITS Corridor trial	2020	
3	Increase public transport priority	Alternatives to private vehicle use	Other	Newcastle City Council	2011	Ongoing		Medium (< 2 µg/m ³ NO ₂)	Ongoing - Included in Urban Core Plan 2016. Introduction of bus priority enforcement on John Dobson Street, Tyne Bridge and High Level in 2015/16.	2015	
4	Higher priority for pedestrians and cyclists (in terms of	Promoting Travel Alternatives	Promotion of cycling	Newcastle City Council	2011	Ongoing	Implement or expand pedestrianised areas and expand on and off-road cycle	Low	Ongoing – Included in Urban Core Plan 2016. Taking place through Cycle City Ambition fund – Newcastle awarded	2020	

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	highway space)						lanes and routes		£10.6m between 2015-2018.		
5	Decriminalized parking enforcement	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Newcastle City Council	2008	Implemented	Improve enforcement of parking controls to reduce congestion caused by illegally parked cars, by transferring enforcement to local authority.	Low	Introduced on 15 April 2009. The transfer of enforcement powers from the police to the council to help reduce congestion and improve road safety.	2009	
6	Urban traffic management control (UTMC). Ongoing experiment with SMART (intelligent traffic light system)	Traffic Management	UTC, Congestion management, traffic reduction	Tyne and Wear Authorities	2011	Ongoing	Monitoring using traffic flow count data, as well as subjective analysis of the queuing times, and compared with the modelled option to indicate whether the predicted emission reductions may be achieved.	Low	Ongoing	2020	
7	Encourage low emission/zero emission vehicles	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	Tyne and Wear Authorities	2004	Implemented	Anticipated reduction in NO _x and PM emissions due to increased use of low/zero emission vehicles.	Low	Diesel electric hybrid buses were operating on Quaylink Quayside/City Centre Route. These buses have been removed from Q3 circulation. Hydrogen Alliance in discussion with bus operator about hydrogen fuelled buses	2006	

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7b	Encourage low emission/zero emission vehicles	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	Tyne and Wear Authorities	2013	Implemented	Anticipated reduction in NO _x and PM emissions due to increased use of low/zero emission vehicles.	Low	Clean Bus Technology Fund (CBTF) implemented – 30 buses operated by Go North East adapted with Gyrodrive fuel-saving technology.	2015	
7c	Encourage low emission/zero emission vehicles	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	Tyne and Wear Authorities	2015	Implemented		Low	Clean Vehicle Technology Fund (CVTF) implemented	2016	
8	Enforcing idling engines legislation	Policy Guidance and Development Control	Other policy	Newcastle City Council	2008	Implemented	Anticipated reduction in NO _x and PM emissions due to less idling vehicles.	Low	All staff within RSPF are authorised to issue fixed penalty notices, and periodic enforcement is currently carried out. Legislation is flawed by requirement to instruct driver to turn off engine before issue of notice, thus making it impossible to issue notice and actually carry out enforcement.	2020	
9	Delivery times outside peak hour	Freight and Delivery Management	Quiet & out of hours delivery	Newcastle City Council	2006	Ongoing	Anticipated reduction in NO _x and PM emissions due to decreased congestion caused by delivery vehicles parking in congested streets.	Low	A freight consolidation centre operational in Newburn from July 2011. Hours of freight delivery will be coordinated around quieter times, in lower emission vehicles. Freight consolidation to be reviewed.	2020	
10	Taxi emissions	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	Newcastle City Council	2011	Ongoing	Anticipated reduction in NO _x and PM emissions due to stricter standards for taxis and	Low	Taxi licensing strategy was reviewed in 2011 and emission standard will be gradually introduced. Not completed in 2011 -	2020	

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							private hire vehicles.		now underway in 2017 to include age limitations		
11	Use of low emission delivery vehicles/ times of delivery	Vehicle Fleet Efficiency	Other	Newcastle City Council	2011	Under consideration	Anticipated reduction in NO _x and PM emissions due to increased use of low/zero emission vehicles.	Low	Under consideration	2020	
12	Low emission zone	Policy Guidance and Development Control	Low Emissions Strategy	Newcastle City Council	2013	Considered	Conduct viability assessment of LEZ. The completion of the assessment will have a single point of implementation and so there will be a definite milestone for completion.	Medium-High (High: > 2 µg/m ³ NO ₂) (in zone)	Part of Urban Core Area Action Plan 2016. LEZ study completed. Not recommended. Based on compliance being achieved by 2020. Results being reviewed in light of DEFRA predictions and COPERT factors	2014	
13	Speed Restrictions	Traffic Management	Reduction of speed limits, 20mph zones	Newcastle City Council	2009	Complete	Establish a "Clear Zone", where a speed limit of 20 mph applies to all vehicles.	Low	The speed restriction scheme "20's Plenty" has been rolled out across large parts of the Gosforth area of Newcastle and is an advisory scheme to encourage people to reduce their speed on selected streets and roads across Newcastle.	2011	
14	Upgrade of Urban Traffic Control (UTC) and Scoot	Traffic Management	UTC, Congestion management, traffic reduction	Tyne and Wear Authorities	2011	Ongoing		Low	Signal coordination is currently being upgraded as part of the UTMC project.	2020	

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15	Park and Ride	Promoting Travel Alternatives	Other	Newcastle City Council	2014	Ongoing	Anticipated reduction in NO _x and PM emissions due to decreased use of private vehicles for commuting.	Low-Medium	To be implemented through both bus and Metro. Metro Park and Rides in operation along with Great Park bus & Soccerbus	2020	
16	Promotion of Cycling	Promoting Travel Alternatives	Promotion of cycling	Newcastle City Council	2011	Ongoing		Low	Ongoing	2020	
17	Annual Travel Card discount	Promoting Travel Alternatives	Workplace Travel Planning	Newcastle City Council	2010	Ongoing	Anticipated reduction in NO _x and PM emissions due to decreased use of private vehicles for commuting.	Low	This has been rolled out to Newcastle Council staff, and major employers are being encouraged by Nexus to join the scheme.	2020	
18	Quality bus contracts	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	Newcastle City Council	2015	Not implemented		Low	Not implemented - discussions were undertaken between regional bus operators and local authorities on Quality bus partnerships. Part of this could be geared around higher quality vehicle emission standards	2017	
19	Travel Plans for businesses/ schools	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	Newcastle City Council	2005	Ongoing		Low	Developing programmes from Local Transport Plan 1 and 2 (LTP1 and LTP2). All schools achieved school travel plans and these are now being refreshed.	2020	
20	Alternative Travel	Promoting Travel Alternatives	Other	Newcastle City Council	2010	Ongoing		Low	Ongoing	2020	

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21	Car Loan schemes	Promoting Travel Alternatives	Workplace Travel Planning	Newcastle City Council	2005	Ongoing		Low	Ongoing	2020	
22	Use of car parking charges to encourage alternatives.	Promoting Travel Alternatives	Workplace Travel Planning	Newcastle City Council	2014	Ongoing		Medium (< 2 µg/m ³ NO ₂)	Ongoing	2020	
23	Car Clubs	Promoting Travel Alternatives	Workplace Travel Planning	Newcastle City Council	2011	Ongoing		Low	Car clubs are being developed and new cars added as demand arises for this. Car club contract being re-procured.	2020	
24	Home Zones	Policy Guidance and Development Control	Other policy	Newcastle City Council	2014	Ongoing		Low	Currently programmed as part of Plan Partners LTP schemes. Home Zones as a project dropped although some of principles carried through in new housing developments. Superseded by Streets for People Community Areas.	2020	
25	Electric Vehicle Recharging Infrastructure	Promoting Travel Alternatives	Other	Newcastle City Council	2011	Ongoing	Charging points on the network and anticipated reduction in NO _x and PM emissions due to increased use of electric vehicles	Medium (< 2 µg/m ³ NO ₂)	47 charging points installed – this element completed	2015	
26	Electric Vehicles in NCC Fleet	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	Newcastle City Council	2007	Ongoing	Electric vehicles in fleet and anticipated reduction in NO _x and PM emissions due to increased	Low	Ongoing - 25 electric vehicles already in fleet	2020	

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							use of electric vehicles				
27	Switch EV Council Trial	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	Newcastle City Council	2014	Implemented		Low	Trialled electric vehicles amongst existing council services along with new technologies.	2014	
28	Switch EV Public Trial	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	Newcastle City Council	2014	Implemented		Low	Trials to increase public awareness of the viability of electric vehicles, and hence their future uptake	2014	
29	Switch EV Car club trial	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	Newcastle City Council	2014	Implemented	Greater awareness of viability of car club as well as publicity for electric vehicles	Low	Implemented	2014	
30	Eco driving training	Vehicle Fleet Efficiency	Driver training and ECO driving aids	Newcastle City Council	2011	Implemented	Incorporate into standard staff (driver) training. Anticipated reduction in NO _x and PM emissions due to more efficient driving	Low	Completed but not within NCC Remit. Low take up among council drivers/no resource to continue.	2016	
31	Subsidise public transport	Promoting Travel Alternatives	Other	Newcastle City Council	2011	Implemented	Reduce fares for public transport to encourage use and anticipated reduction in NO _x and PM emissions due to decreased use of private	Low	To be implemented by way of concessionary fares for OAPs on buses and Metro. Out of NCC control - with Nexus, who are considering subsidies for 16-19 year olds in full time education	2016	

Newcastle City Council

							vehicles for commuting, etc.		(high fares a major barrier to public transport use by young people).		
32	Create extra capacity on trains/Metro/buses	Promoting Travel Alternatives	Other	Newcastle City Council	2010	Implemented		Low-Medium	Operator investment as deemed appropriate. Out of NCC control - believe Nexus have submitted a bid for rolling stock refurb and extra capacity.	2015	
33	Flexible work times/school hours/home working	Promoting Travel Alternatives	Encourage / Facilitate home-working	Newcastle City Council	2014	Implemented		Low	NCC has already implemented this scheme. Most school hours now outwith LA control as schools become academies. Legal process still needed for LA schools. SMOTS being refreshed.	2016	
34	Provision of Real Time Information (RTI) at bus stops	Public Information	via other mechanisms	Newcastle City Council	2010	Ongoing	Access to real-time air information at bus stops.	Low	Out of NCC control - believe this is underway. Nexus and bus companies developing applications.	2020	
35	Target schools and parents with information campaigns	Public Information	via other mechanisms	Newcastle City Council	2014	Ongoing		Low	Go Smarter to School AQ bid submitted to DEFRA but unsuccessful.	2020	
36	Health Promotion	Public Information	via other mechanisms	Newcastle City Council	2006	Ongoing		Low	To be led by (Primary Care Trust) PCT in liaison with Transport Policy staff. Cycling in the City Active Newcastle/This girl can.	2020	

Newcastle City Council

37	One off events	Public Information	via other mechanisms	Newcastle City Council	2014	Ongoing		Low	Sky Rides, Cycle Cross, Make the Switch	2030	
38	Education regarding safety on Public Transport	Public Information	via other mechanisms	Newcastle City Council	2010	Ongoing		Low	LTP3 was committed to improve actual and perceived levels of security through proactive use of more staffing and CCTV. Nexus delivering.	2020	
39	Provision of information on 'High Pollution Days'	Traffic Management	UTC, Congestion management, traffic reduction	Tyne and Wear Authorities	2014	N/A	Access to real-time air quality information on the air quality website.	Low	Not to be implemented in the short term, but may however be linked to future UTMC systems. Being explored with UTMC.	2020	
40	Include cycle facilities in new developments	Promoting Travel Alternatives	Promotion of cycling	Newcastle City Council	2005	Ongoing		Low	This is a standard requirement for planning applications for new developments.	2030	
41	Consideration of the location of essential services such as housing and employment	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Newcastle City Council	2014	Ongoing		Potentially Medium-High (High: > 2 µg/m ³ NO ₂)	Implementation as part of the new accessibility strategy and cross organisational working arrangements. Included in Urban Core Plan.	2030	
42	Strengthen joint working between local authorities	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Newcastle City Council	2014	Ongoing		No defined target	Ongoing. Also strengthened relationships with Urban Observatory, Newcastle University.	2030	
43	Implement greater planning controls in AQMAs	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Newcastle City Council	2004	Ongoing		Low-Medium	Air quality is considered when it is a material issue, and consideration is given to planning controls. Dilution of local planning control has	2020	

Newcastle City Council

									affected the LA's ability to exert pressure.		
44	Local Development Frameworks need to identify AQMAs	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Newcastle City Council	2004	Ongoing		Low-Medium	Local development framework has taken air quality into account. Background monitoring to support/validate planning application submissions.	2020	
45	Cap existing development sites	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Newcastle City Council	2014	Ongoing		Low-Medium	Economic redevelopment is essential to the regeneration of the City, and this should only be considered where that development cannot be facilitated.	2030	
46	Encourage mixed use developments	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Newcastle City Council	2001	Ongoing		Low	This is part of NCCs sustainable development policy	2030	
47	Undertake air quality assessments of relevant new developments	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Newcastle City Council	2001	Ongoing	The completion of the assessment will have a single point of implementation and so there will be a definite milestone for completion.	Low-Medium	Air quality is considered when it is a material issue, and consideration is given to planning controls. Validation criteria for planning applications.	2030	
48	Air Quality Awareness Campaign	Public Information	via other mechanisms	Newcastle City Council	2014	Implemented		Low	Campaign to raise air quality awareness and how behavioural change can both improve personal health and improve air quality. Be Air Aware is a time	2016	

									limited project, engaged with the community and supported by Go Smarter.		
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Reduction in pollutant classification terminology:

Low: imperceptible (a step in the right direction). Improvements unlikely to be detected within the uncertainties of monitoring and modelling.

Medium: perceptible (a demonstrable improvement in air quality). An improvement of up to 2 µg/m³ NO₂, which could be shown by a modelling scenario. Improvement is not likely to be shown by monitoring due to confounding factors of the weather.

High: significant. Improvement of more than 2 µg/m³ NO₂. Can be clearly demonstrated by modelling or monitoring (a significant improvement is likely to be delivered by a package of options rather than by a single intervention).

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

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

Furthermore, Defra published 'A Briefing for Directors of Public Health' in March 2017 (Defra, 2017), which advises that health outcomes from PM should be considered in the assessment and planning process.

The main sources of PM_{2.5} in the city of Newcastle are road traffic emissions (comprising engine exhaust, road and tyre/brake abrasion). All the AQAP measures aim to reduce road traffic emissions or to promote the use of alternative and sustainable modes of transports.

The estimated background pollutant concentrations for the 1km grid squares for the whole of the UK are published by Defra (<https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2013>). The maximum concentration of PM_{2.5} identified in the Newcastle City Council administrative area in 2013 was 10.9 µg/m³. This is well below the PM_{2.5} target value of 25 µg/m³ to be achieved by 2020.

The Public Health Outcomes Framework has published statistics on the health effects of exposure of the public to fine particulate pollution (<http://www.phoutcomes.info>). The fraction of mortality attributable to particulates measured as healthy life expectancy at birth for males and females are shown below in Figure 2.1 and 2.2. Newcastle is highlighted, and indicates that particulates are near the lower end of the range where particulates are a major contributor to mortality, compared to other regions. These data were downloaded in July 2017.

Figure 2.1 Public Health Outcomes Framework, Fraction of Mortality Attributable to Particulates (Male)

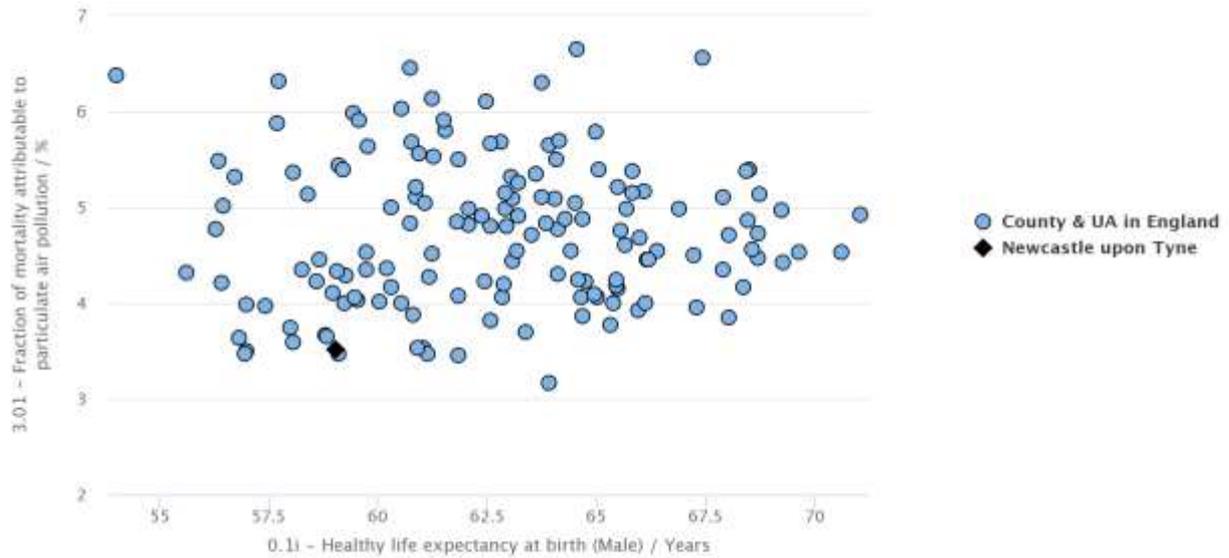
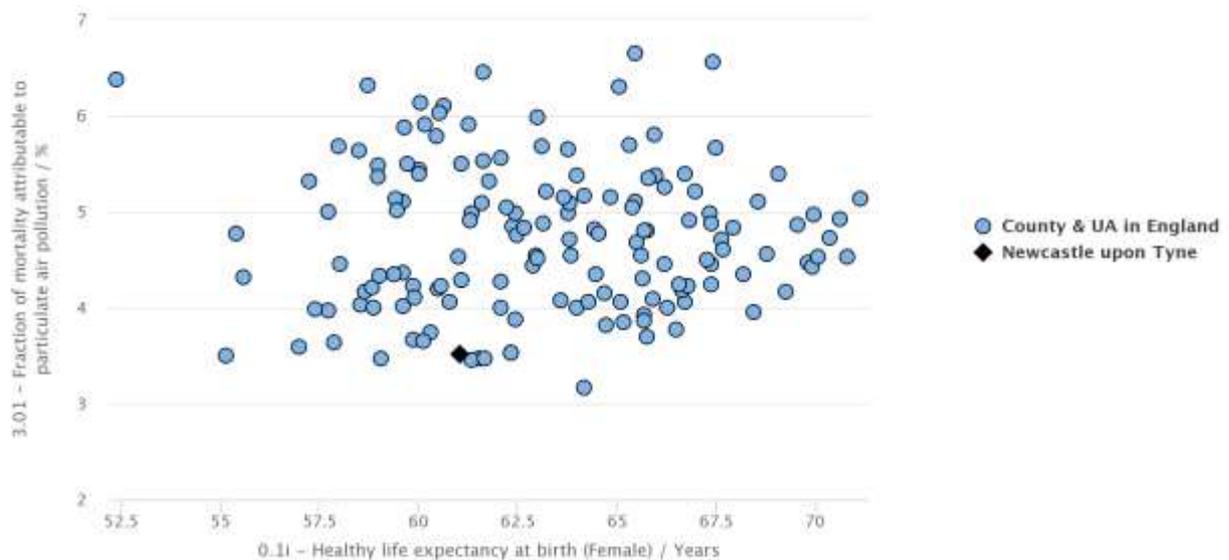


Figure 2.2. Public Health Outcomes Framework, Fraction of Mortality Attributable to Particulates (Female)



2.4 Planning

There are no planning applications for significant new developments or changes to existing sites for which there may be associated potential air quality effects.

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

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

Newcastle City Council undertook automatic (continuous) monitoring at four sites during 2016. The Leazes Lane and High Street, Gosforth automatic monitors ceased to operate in 2014 and January 2016 respectively and thus are not included in this report. These monitoring sites successively recorded levels below the AQO limit values. Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at http://www.airqualityengland.co.uk/local-authority/?la_id=139⁵.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

Newcastle City Council undertook non-automatic (passive) monitoring of NO₂ at 43 sites during 2016. Table A.2 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites operational in 2016 are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. “annualisation” and/or distance correction), are included in Appendix C.

3.2 Individual Pollutants

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

⁵ Note that the link is for Gateshead Metropolitan Borough Council. However all data for Newcastle City Council are available here

3.2.1 Nitrogen Dioxide (NO₂)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³.

For diffusion tubes, the full 2016 dataset of monthly mean values is provided in Appendix B and as maps in Appendix E.

Table A.4 in Appendix A compares the ratified continuous monitored NO₂ hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year.

City Centre AQMA

In April 2008, an AQMA covering Newcastle city centre was declared. During 2016 NCC undertook monitoring at 35 locations within this AQMA; DT2-26, DT28-31, DT34, DT36-37, DT40, DT52-54 and DT63. NCC has historically operated an extensive network of 62 diffusion tubes throughout the city centre AQMA, although several of these sites were closed in December 2015 due to consistently recording values below the annual mean objective. The trends recorded at City Centre AQMA sites are shown in Figure A.1. Accounting for the results in 2016 the general trend is showing little improvement in air quality.

Exceedances of the annual mean objective were recorded at the following monitoring locations in 2016:

- DT5-10
- DT12-14
- DT19-21
- DT25-26
- DT29-32
- DT34
- DT37
- DT40
- DT53

Four sites recorded concentrations within 10% of the annual mean objective ($> 36 \mu\text{g}/\text{m}^3$), which may indicate risk of a potential exceedance:

- D16
- DT28
- DT36
- DT63

Two sites recorded concentrations greater than $60 \mu\text{g}/\text{m}^3$, which indicates that an exceedance of the 1-hour mean objective is also possible at these sites:

- DT12
- DT29

Gosforth AQMA

In April 2008, an AQMA covering parts of the A189 and B1318 in Gosforth was declared. NCC undertook monitoring at six locations within this AQMA; D42-45, D48 and D50. The trends recorded at Gosforth AQMA sites are shown in Figure A.1. Accounting for the results in 2016 the annual mean NO_2 which was improving slightly has started to degrade once again (especially at site DT45).

Exceedances of the annual mean objective were recorded at four monitoring locations in 2016:

- DT43
- DT45
- DT48
- DT50

One site recorded concentrations within 10% of the annual mean objective ($> 36 \mu\text{g}/\text{m}^3$), which may indicate risk of a potential exceedance:

- DT44

Outside the AQMA

Exceedances of the annual mean NO_2 objective were recorded at one site in Newcastle outside the AQMA on City Road:

- DT32

This is an increase in NO₂ concentration from 2014 and 2015, when for both years they were below the objective.

Summary of Monitoring

Monitored annual mean NO₂ concentrations continue to exceed the annual mean objective at locations within the City Centre and Gosforth AQMAs, although there is an exceedence outside the AQMA on City Road. Therefore, monitoring will continue in these areas and will be used to inform any amendments to the AQMAs.

3.2.2 Particulate Matter (PM₁₀)

Table A.5 in Appendix A compares the ratified and adjusted monitored PM₁₀ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³. NCC undertook monitoring at two locations in 2016; concentrations in 2016 were well below the objective, as they have been for all of the past five years. The trends recorded at these locations are shown in Figures A.3 and A.4.

Table A.6 in Appendix A compares the ratified continuous monitored PM₁₀ daily mean concentrations for the past 5 years with the air quality objective of 50µg/m³, not to be exceeded more than 35 times per year. The objective was not exceeded at any site, with just three days above 50 µg/m³ being the maximum at the Cradlewell site.

3.2.3 Particulate Matter (PM_{2.5})

Table A.7 in Appendix A presents the ratified and adjusted monitored PM_{2.5} annual mean concentrations at the St Mary's Place monitor for the past 5 years. The concentration in 2016 was well below the objective, as it has been for all of the past five years. The trends recorded at this location are shown in Figures A.5.

3.2.4 Sulphur Dioxide (SO₂)

Monitoring for SO₂ is not undertaken by NCC.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
	St. Mary's Place (AURN)	Urban Background	425029	564916	NO, NO _x , NO ₂ , PM ₁₀ , PM _{2.5} , O ₃	YES	Chemiluminescence, TEOM-FDMS, UV-absorption	n/a	20	2.5
	Jesmond Road, Cradlewell	Roadside	425992	565831	NO ₂ , PM ₁₀ , O ₃	YES	Chemiluminescence, TEOM-FDMS, UV-absorption	7	3	2.5
	Percy Street	Roadside	424776	564861	NO ₂	YES	Chemiluminescence	20	3	1.8
	Swan House, Pilgrim Street	Roadside	425124	564112	NO ₂	YES	Chemiluminescence	10	2	1.8

Notes:

(1) 0 m 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) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
DT2	Newcastle AURN 1	Urban Background	425029	564916	NO ₂	YES	0	20	YES	2.7
DT3	Newcastle AURN 2	Urban Background	425029	564916	NO ₂	YES	0	20	YES	2.7
DT4	Newcastle AURN 3	Urban Background	425029	564916	NO ₂	YES	0	20	YES	2.7
DT5	St Marys Place/John Dobson Street	Roadside	424948	564870	NO ₂	YES	0	2	NO	2.7
DT6	John Dobson St/North Street	Roadside	425027	564695	NO ₂	YES	0	2	NO	2.7
DT7	Blackett Street/Northumberland Street	Roadside	424934	564474	NO ₂	YES	0	2	NO	2.7
DT8	10 Market Street	Roadside	424943	564347	NO ₂	YES	0	2	NO	2.7
DT9	98 - 100 Pilgrim Street	Roadside	425045	564208	NO ₂	YES	0	4	NO	2.7
DT10	Pilgrim Street/Swan House roundabout	Roadside	425088	564168	NO ₂	YES	60	2	NO	2.7
DT11 (closed)	Swan House/City Road	Roadside	425045	564208	NO ₂	YES	N/A	2	NO	2.7
DT12	8 Mosley Street	Roadside	425186	564147	NO ₂	YES	0	2	NO	2.7
DT13	Neville Street/Westgate Road	Roadside	425077	564116	NO ₂	YES	0	2	NO	2.7
DT14	Waterloo Street/Westmoreland Road	Roadside	424729	563922	NO ₂	YES	2	2	NO	2.7
DT15 (closed)	176 Westgate Road	Roadside	424 302	563 837	NO ₂	YES	N/A	3	NO	2.7

DT16	3 Nexus House, St James Boulevard	Roadside	424550	563899	NO ₂	YES	40	4	NO	2.7
DT17	96 - 98 Westgate Road/Crosss Street	Roadside	424441	564055	NO ₂	YES	2	2	NO	2.7
DT18	Gallowgate/St Andrews Street	Roadside	424432	564414	NO ₂	YES	30	2	NO	2.7
DT19	Gallowgate/Percy Street	Roadside	424591	564477	NO ₂	YES	10	2	NO	2.7
DT20	Newgate Street/Grainger Street	Roadside	424588	564472	NO ₂	YES	5	3	NO	2.7
DT21	115 - 119 Grainger Street/Market Street	Roadside	424737	564171	NO ₂	YES	5	2	NO	2.7
DT22 (closed)	Leazes Lane Romon 1	Roadside	424797	564295	NO ₂	YES	N/A	3	YES	2.7
DT23	Leazes Lane near Romon (formerly Leazes Lane Romon 2)	Roadside	424797	564295	NO ₂	YES	12	3	YES	2.7
DT24 (closed)	Leazes Lane Romon 3	Roadside	424797	564295	NO ₂	YES	N/A	3	YES	2.7
DT25	Strawberry Place	Roadside	424341	564494	NO ₂	YES	0	3	NO	2.7
DT26	Leazes Lane/Percy Street	Roadside	424616	564559	NO ₂	YES	10	2	NO	2.7
DT27 (closed)	3 St Thomas Street	Roadside	424677	564777	NO ₂	YES	N/A	4	NO	2.7
DT28	101 Percy Street/St Thomas Street	Roadside	424726	564768	NO ₂	YES	1	3	NO	2.7
DT29	Percy Street Romon 1	Roadside	424776	564861	NO ₂	YES	25	1	YES	2.7
DT30	Percy Street Romon 2	Roadside	424776	564861	NO ₂	YES	25	1	YES	2.7
DT31	Percy Street Romon 3	Roadside	424776	564861	NO ₂	YES	25	1	YES	2.7
DT32	City Road	Roadside	425819	564237	NO ₂	YES	30	2	NO	2.7
DT33 (closed)	Quayside / Broad Chare	Roadside	425478	563930	NO ₂	YES	N/A	2	NO	2.7

DT34	Trinity Chambers/Flynn's, Quayside	Roadside	425428	563917	NO ₂	YES	2	2	NO	2.7
DT35 (closed)	Queen Street/Lombard Street	Roadside	425255	563913	NO ₂	YES	N/A	2	NO	2.7
DT36	The Side/Dean Street	Roadside	425085	563942	NO ₂	YES	15	2	NO	2.7
DT37	Sandhill/Swing Bridge	Roadside	425151	563807	NO ₂	YES	15	3	NO	2.7
DT38 (closed)	32 Close	Roadside	425048	563752	NO ₂	YES	N/A	2	NO	2.7
DT39 (closed)	Forth Street/Skinnerburn Road	Roadside	424707	563483	NO ₂	YES	N/A	2	NO	2.7
DT40	Near Forth Banks/Pottery Lane	Roadside	424596	563558	NO ₂	YES	100	2	NO	2.7
DT41 (closed)	Blue House Roundabout (East)	Roadside	424686	566845	NO ₂	YES	N/A	4	NO	2.7
DT42	Blue House Roundabout (North)	Roadside	424616	566899	NO ₂	YES	10	4	NO	2.7
DT43	53 High Street, Gosforth	Roadside	424394	567625	NO ₂	YES	1	3	NO	2.7
DT44	102 - 104 High Street, Gosforth	Roadside	424401	567844	NO ₂	YES	2	4	NO	2.7
DT45	201 Gosforth High St (formerly Gosforth Hog 1)	Roadside	424413	568079	NO ₂	YES	2	4	YES	2.7
DT46 (closed)	Gosforth Hog 2	Roadside	424413	568079	NO ₂	YES	N/A	4	YES	2.7
DT47 (closed)	Gosforth Hog 3	Roadside	424413	568079	NO ₂	YES	N/A	4	YES	2.7
DT48	Dene Park House, Killingworth Road	Roadside	425641	568204	NO ₂	YES	1	2	NO	2.7
DT49 (closed)	1 Killingworth Road	Roadside	425687	568377	NO ₂	YES	N/A	2	NO	2.7
DT50	84 Station Road	Roadside	425503	568109	NO ₂	YES	1	3	NO	2.7

DT51 (closed)	16 Jesmond Dene Road	Roadside	425046	567154	NO ₂	YES	N/A	4	NO	2.7
DT52	2 - 4 Victoria Square	Roadside	425183	565261	NO ₂	YES	2	2	NO	2.7
DT53	2 - 3 Osborne Terrace	Roadside	425425	565364	NO ₂	YES	6	4	NO	2.7
DT54	178 Sandyford Road	Roadside	425701	565350	NO ₂	YES	5	2	NO	2.7
DT55 (closed)	9 - 11 Coast Road	Roadside	427031	566575	NO ₂	YES	N/A	4	NO	2.7
DT56	263 Shields Road	Roadside	427234	564893	NO ₂	YES	1	3	NO	2.7
DT57	124 Shields Road	Roadside	426843	564775	NO ₂	YES	1	3	NO	2.7
DT58 (closed)	7 Studley Terrace/129 Brighton Grove	Roadside	423089	565056	NO ₂	YES	N/A	2	NO	2.7
DT59 (closed)	2 Brighton Grove	Roadside	422997	564444	NO ₂	YES	N/A	3	NO	2.7
DT60 (closed)	5 Middleton Avenue	Roadside	422210	564678	NO ₂	YES	N/A	3	NO	2.7
DT61 (closed)	26 West Copperas Lane	Roadside	419581	565481	NO ₂	YES	N/A	3	NO	2.7
DT62	5 Birchfield Gardens	Roadside	419448	565124	NO ₂	YES	3	2	NO	2.7
DT63 (249 in 2015)	Bewick House, Neville Street	Roadside	424302	563837	NO ₂	YES	N/A	1.5	NO	2.7

Notes:

- (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 NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2012	2013	2014	2015	2016
St. Mary's Place (AURN)	Urban Background	Automatic		98.3	29.5	29.1	30	29.4	29.7
Jesmond Road, Cradlewell	Roadside	Automatic		96.8	39.8	45.7	35.9	41.3	37.5
Percy Street	Roadside	Automatic		77	56	47.7	42.6	46.7	58.6
Swan House, Pilgrim Street	Roadside	Automatic		98.2	53.7	52.7	45.7	49.4	54.9
DT2	Urban Background	Diffusion Tube		100	30.4	28.7	25.8	22.4	30.3
DT3	Urban Background	Diffusion Tube		100	29.6	29.1	26.2	22.8	28.8
DT4	Urban Background	Diffusion Tube		100	29.8	28.7	25.8	22.2	29.1
DT5	Roadside	Diffusion Tube		83.3	51.8	49.7	48.8	47.9	45.8
DT6	Roadside	Diffusion Tube		33.3	33.1	34.4	34.2	27.4	38.4
DT7	Roadside	Diffusion Tube		75	53.9	48.2	50.1	48.6	51.0
DT8	Roadside	Diffusion Tube		83.3	47.7	50.6	48.1	60.4	57.4
DT9	Roadside	Diffusion Tube		83.3	44.4	41.4	41.5	38.7	38.8
DT10 ^a	Roadside	Diffusion Tube		75	53.5	51.6	51.7	-	47.3
DT11 (closed)	Roadside	Diffusion Tube		-	44	38.4	35	34.6	-

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2012	2013	2014	2015	2016
DT12	Roadside	Diffusion Tube		83.3	63.7	64.9	62.5	58.4	53.3
DT13	Roadside	Diffusion Tube		83.3	51.7	52.2	50.5	52.2	44.5
DT14	Roadside	Diffusion Tube		75	47.3	42.9	44.7	40.2	41.7
DT15 (closed)	Roadside	Diffusion Tube		-	32.7	32.1	34.4	27.4	-
DT16	Roadside	Diffusion Tube		83.3	40	42.4	37.5	34.6	37.9
DT17	Roadside	Diffusion Tube		83.3	38.3	36.3	34.5	27.8	32.2
DT18	Roadside	Diffusion Tube		83.3	31.7	37.5	35.9	26.2	30.6
DT19	Roadside	Diffusion Tube		83.3	48.1	43.6	41.8	46.8	46.4
DT20	Roadside	Diffusion Tube		75	48.2	48.8	45.5	41.1	50.4
DT21	Roadside	Diffusion Tube		75	50.3	44.9	47.8	45.5	46.0
DT22 (closed)	Roadside	Diffusion Tube		-	27.5	29.6	29.3	-	-
DT23	Roadside	Diffusion Tube		75.0	27	30.8	30.7	25.5	32.3
DT24 (closed)	Roadside	Diffusion Tube		-	27.3	30.5	29.1	-	-
DT25	Roadside	Diffusion Tube		66.7	40	37.7	37.1	30.1	44.8
DT26	Roadside	Diffusion Tube		83.3	39	48.8	44	34.9	47.7

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2012	2013	2014	2015	2016
DT27 (closed)	Roadside	Diffusion Tube		-	27.4	29.2	27.1	24.1	-
DT28	Roadside	Diffusion Tube		75	42.3	40.4	33.5	27.8	37.9
DT29	Roadside	Diffusion Tube		75	60.8	53.9	51.1	53	61.1
DT30	Roadside	Diffusion Tube		83.3	56.8	54.5	49.7	51.3	57.7
DT31	Roadside	Diffusion Tube		83.3	57.3	53.5	51.2	49	59.9
DT32	Roadside	Diffusion Tube		83.3	43.5	44.1	37.2	35.1	42.2
DT33 (closed)	Roadside	Diffusion Tube		-	33.6	36	34.3	35.9	-
DT34	Roadside	Diffusion Tube		83.3	37.1	41	34.6	39.9	45.8
DT35 (closed)	Roadside	Diffusion Tube		-	32.6	32.4	30.2	34.9	-
DT36	Roadside	Diffusion Tube		83.3	40.8	34.7	32.1	34.7	38.1
DT37	Roadside	Diffusion Tube		83.3	41.7	39.3	31.9	36.9	40.8
DT38 (closed)	Roadside	Diffusion Tube		-	34.4	35.5	33.4	33	-
DT39 (closed)	Roadside	Diffusion Tube		-	29.7	29.3	26.3	33.5	-
DT40	Roadside	Diffusion Tube		75	34.9	36.2	47.6	23.1	46.9
DT41 (closed) ^a	Roadside	Diffusion Tube		-	40.5	37.4	33.4	-	-

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2012	2013	2014	2015	2016
DT42 ^a	Roadside	Diffusion Tube		100	36.2	33.4	29.9	-	31.1
DT43	Roadside	Diffusion Tube		100	41.8	41.8	36.5	34.5	42.1
DT44	Roadside	Diffusion Tube		100	36.5	39.1	33.8	28.9	39.2
DT45	Roadside	Diffusion Tube		100	27.9	28.5	26.6	20.5	51.5
DT46 (closed)	Roadside	Diffusion Tube		-	28.3	27.9	25.9	22.2	-
DT47 (closed)	Roadside	Diffusion Tube		-	28.5	29.9	27.9	23.5	-
DT48	Roadside	Diffusion Tube		100	48	47.2	39.2	39.8	46.2
DT49 (closed)	Roadside	Diffusion Tube		-	25.8	26.6	23.5	18.6	-
DT50	Roadside	Diffusion Tube		100	45.4	44.8	33.1	33.2	42.4
DT51 (closed)	Roadside	Diffusion Tube		-	31.6	32.2	26.5	18.9	-
DT52	Roadside	Diffusion Tube		83.3	37.8	38.1	33	36.8	38.3
DT53	Roadside	Diffusion Tube		83.3	39.5	41.1	29.1	35.5	42.7
DT54	Roadside	Diffusion Tube		83.3	37.5	33.4	35.3	30.8	35.5
DT55 (closed)	Roadside	Diffusion Tube		-	33.8	30.3	29.9	29.3	-
DT56	Roadside	Diffusion Tube		75	37	36.3	32.9	37.2	36.7

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2012	2013	2014	2015	2016
DT57	Roadside	Diffusion Tube		75	38.8	37.6	34.9	36.7	37.1
DT58 (closed)	Roadside	Diffusion Tube		-	32.7	32.8	28.4	29.2	-
DT59 (closed)	Roadside	Diffusion Tube		-	31.1	34.1	27.4	25.1	-
DT60 (closed)	Roadside	Diffusion Tube		-	23	22.5	20.9	16.7	-
DT61 (closed) ^a	Roadside	Diffusion Tube		-	32.6	36.8	31.7	-	-
DT62 ^a	Roadside	Diffusion Tube		83.3	38.8	39	36.2	-	38.9
DT63 (249 in 2015)	Roadside	Diffusion Tube		75.0	-	-	-	41.2	37.9

- Diffusion tube data has been bias corrected
- Annualisation has been conducted where data capture is <75%
- If applicable, all data has been distance corrected for relevant exposure

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 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 Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

^a 2015 annual mean not calculated due to there being less than 3 months’ worth of data.

Figure A.1 – Trends in Annual Mean NO₂ Concentrations

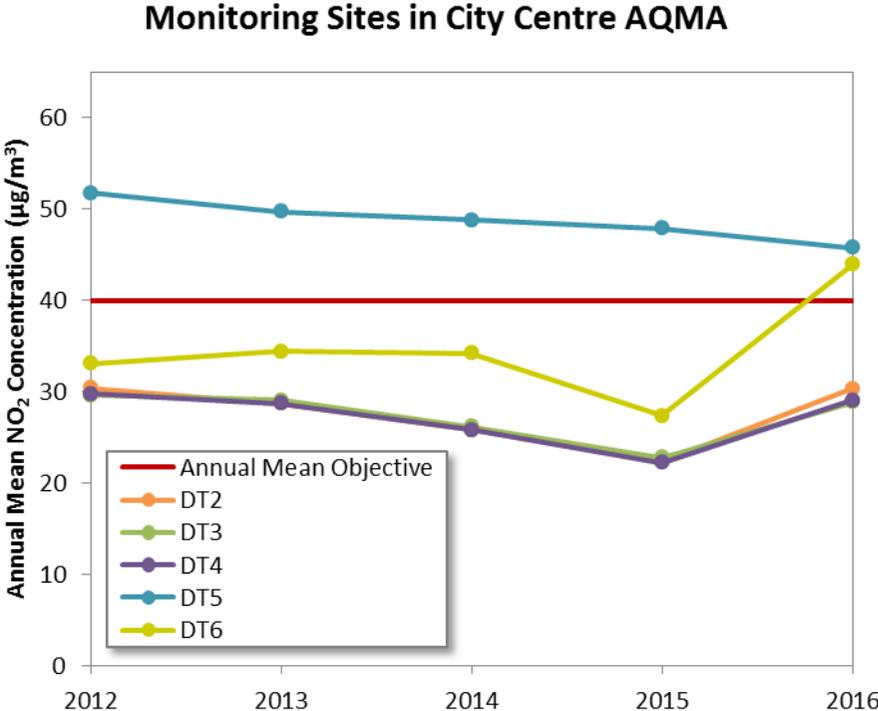
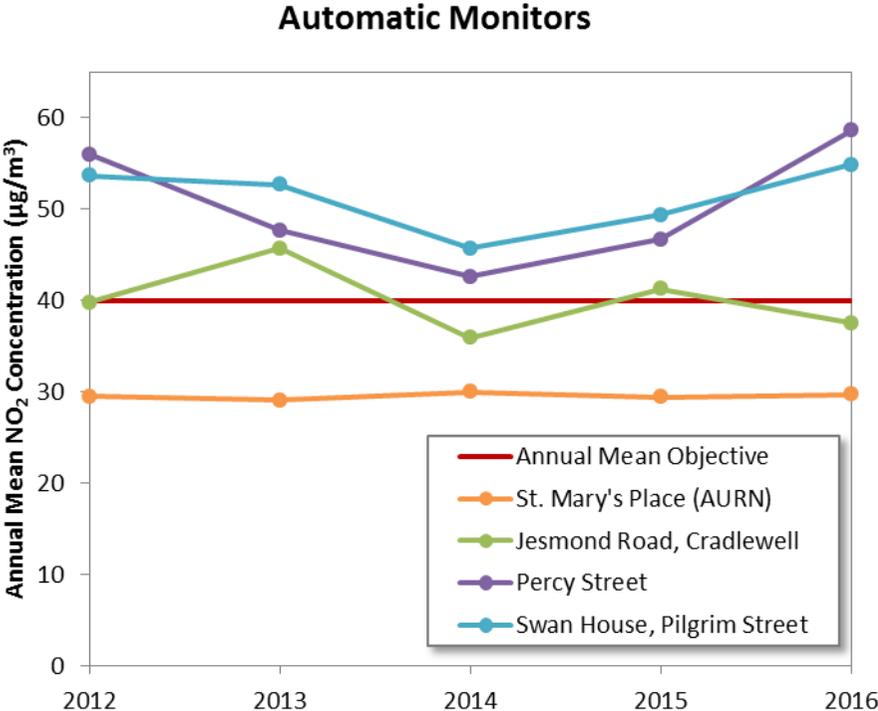


Figure A.2 – Trends in Annual Mean NO₂ Concentrations

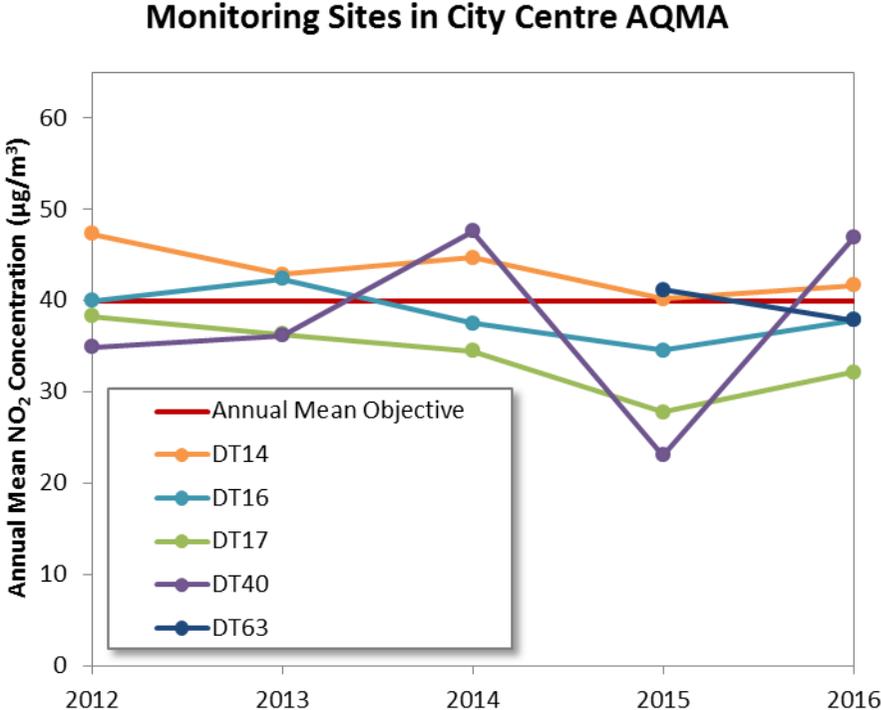
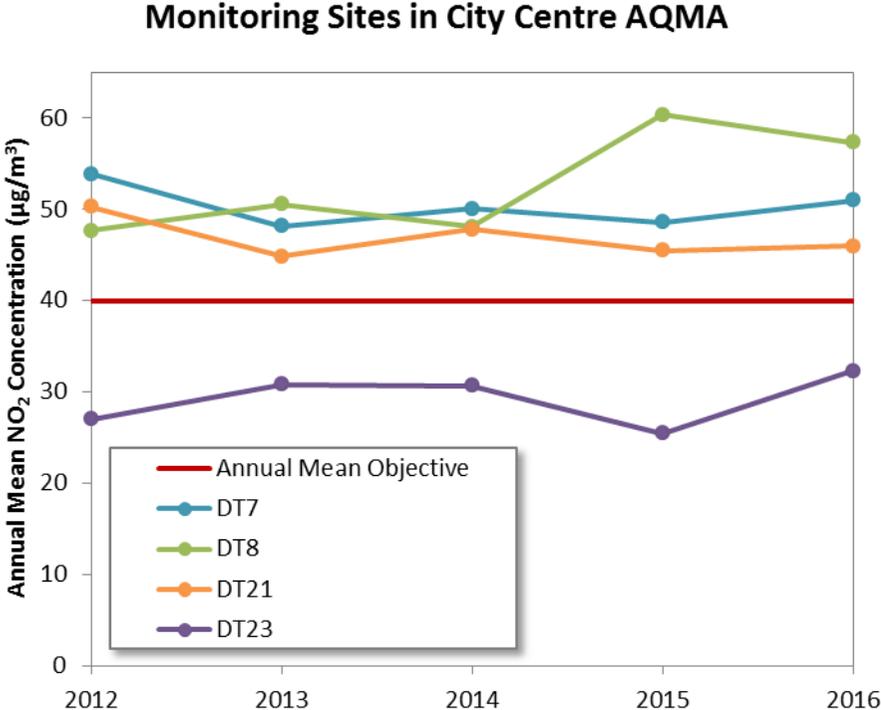


Figure A.3 – Trends in Annual Mean NO₂ Concentrations

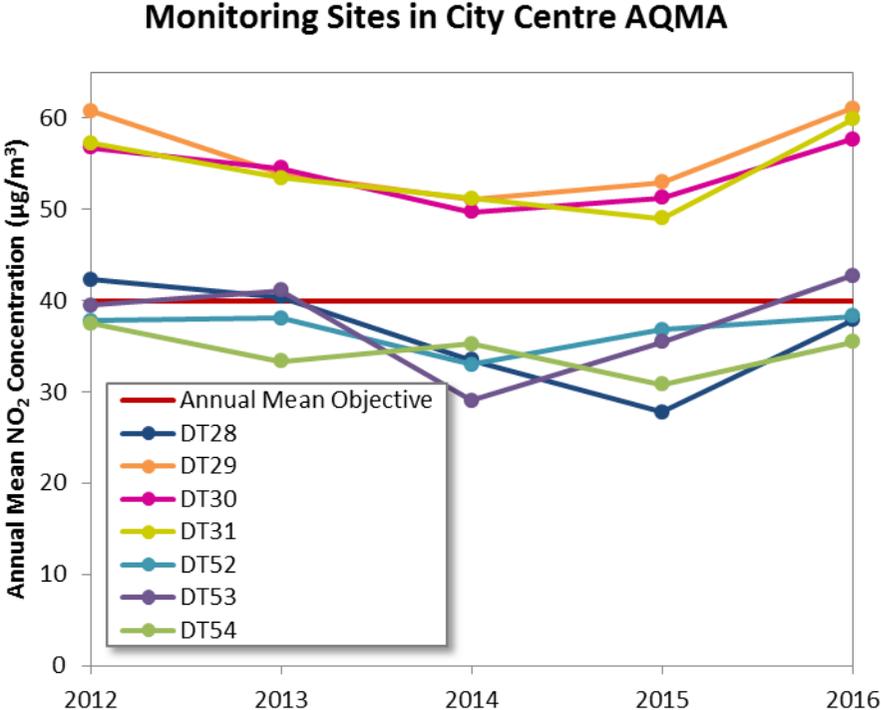
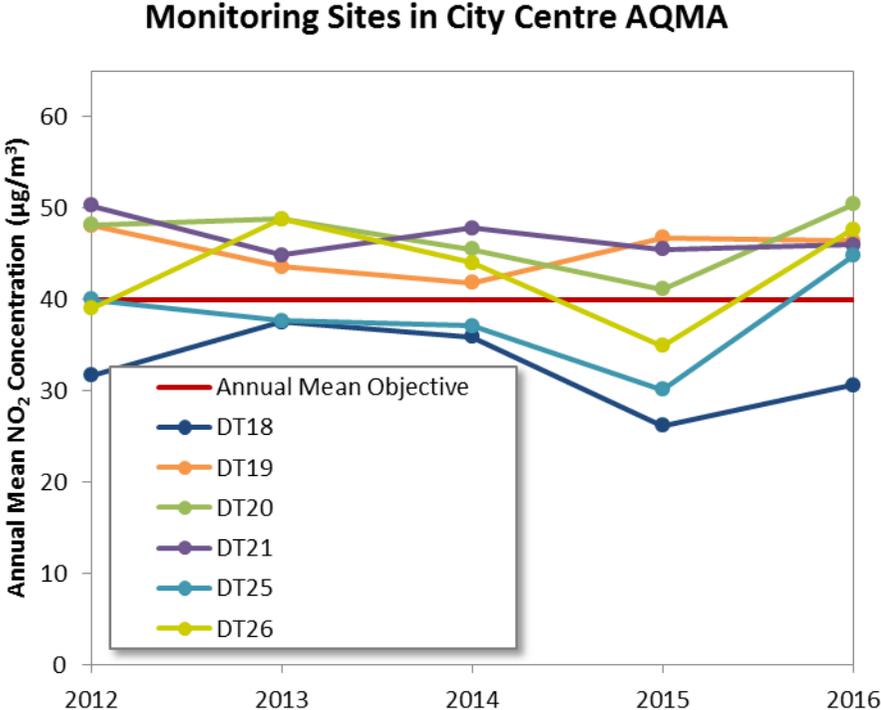


Figure A.4 – Trends in Annual Mean NO₂ Concentrations

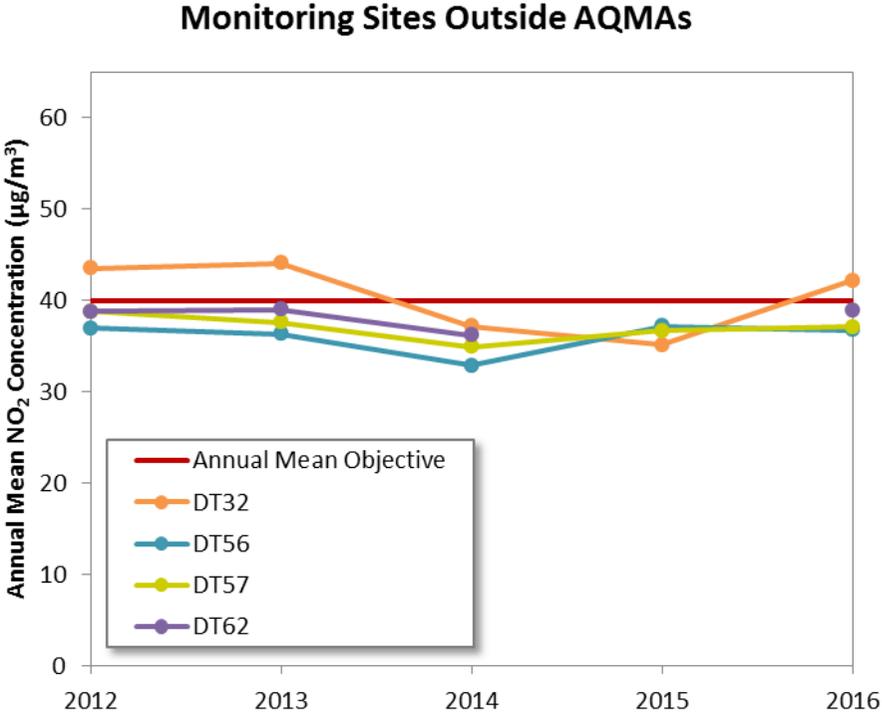
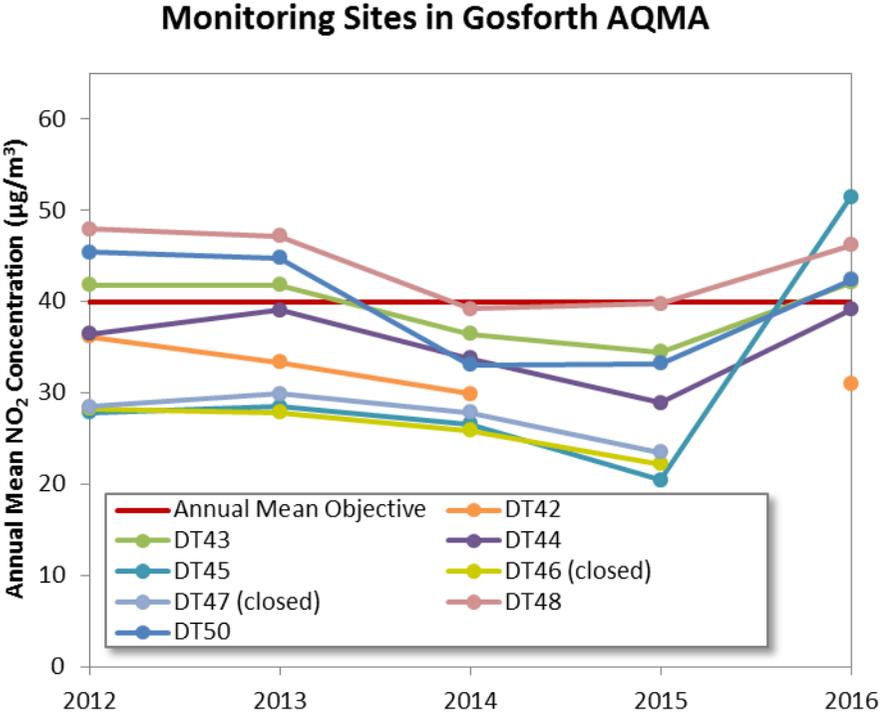


Table A.4 – 1-Hour Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	NO ₂ 1-Hour Means > 200µg/m ³ ⁽³⁾				
					2012	2013	2014	2015	2016
St. Mary's Place (AURN)	Urban Background	Automatic		98.3	N/A	N/A	0 (95.3)	0	0
Jesmond Road, Cradlewell	Roadside	Automatic			0	14	1	0 (135.2)	-
Percy Street	Roadside	Automatic		77.0	0	0	0	0 (139.5)	8 (173.0)
Swan House, Pilgrim Street	Roadside	Automatic		98.2	1	0	0 (143.5)	1	1

Notes:

Exceedances of the NO₂ 1-hour mean objective (200µg/m³ not to be exceeded more than 18 times/year) are shown in **bold**.

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

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

(3) If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

Table A.5 – Annual Mean PM₁₀ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	PM ₁₀ Annual Mean Concentration (µg/m ³) ⁽³⁾				
				2012	2013	2014	2015	2016
St. Mary's Place (AURN)	Urban Background	Automatic	94.1	15.6	12.7	12.6	14.8	11.3
Jesmond Road, Cradlewell	Roadside	Automatic	94.8	20.9	20.6	18.6	18.1	18.0

Notes:

Exceedances of the PM₁₀ annual mean objective of 40µg/m³ 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 Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure A.5 – Trends in Annual Mean PM₁₀ Concentrations

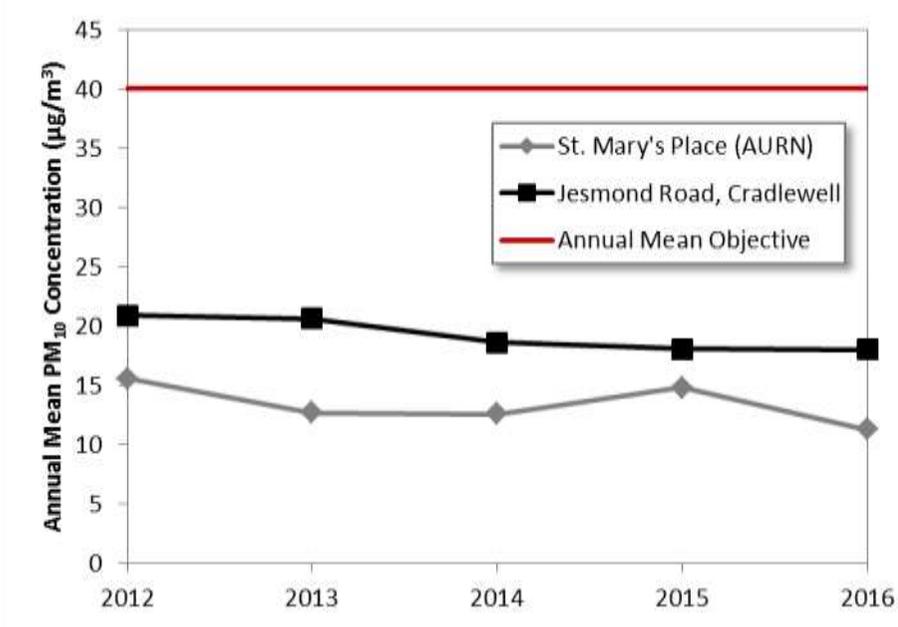


Table A.6 – 24-Hour Mean PM₁₀ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	PM ₁₀ 24-Hour Means > 50µg/m ³ ⁽³⁾				
				2012	2013	2014	2015	2016
St. Mary's Place (AURN)	Urban Background	Automatic		3	2	3 (21.9)	4	0
Jesmond Road, Cradlewell	Roadside	Automatic	94.8	11	4	2	2	3

Notes:

Exceedances of the PM₁₀ 24-hour mean objective (50µg/m³ 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 85%, the 90.4th percentile of 24-hour means is provided in brackets.

Figure A.6 – Trends in Number of 24-Hour Mean PM₁₀ Results >50µg/m³

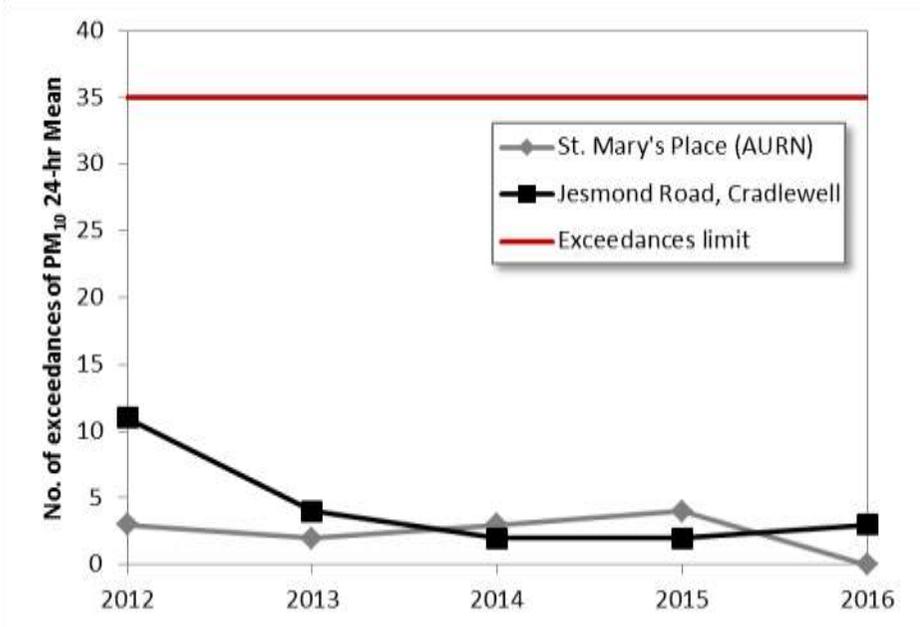


Table A.7 – PM_{2.5} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2016 (%) ⁽²⁾	PM _{2.5} Annual Mean Concentration (µg/m ³) ⁽³⁾				
				2012	2013	2014	2015	2016
St. Mary's Place (AURN)	Urban Background	Automatic	91	9.9	10.4	9.7	10.5	8.9

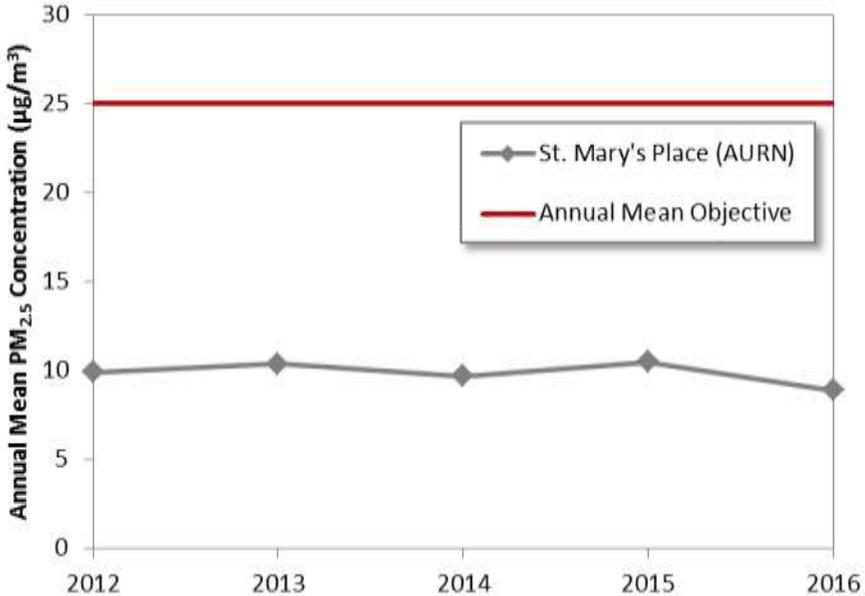
Notes:

(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 Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure A.7 – Trends in Annual Mean PM_{2.5} Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2016

Table B.1 – NO₂ Monthly Diffusion Tube Results - 2016

Site ID	NO ₂ Mean Concentrations (µg/m ³)												Annual Mean		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.89) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
DT2	47.96	51.74	34.05	27.37	26.09	28.36	26.35	21.21	24.71	36.91	43.40	40.85	34.1	30.3	30.3
DT3	38.94	39.28	32.10	25.90	25.34	27.92	25.81	22.38	29.96	35.29	38.89	46.90	32.4	28.8	28.8
DT4	38.52	42.04	31.10	28.03	25.65	28.41	24.13	20.77	28.09	36.35	42.59	46.37	32.7	29.1	29.1
DT5	39.77	-	-	44.73	50.07	40.78	49.00	39.02	52.50	52.66	73.08	72.65	51.4	45.8	45.8
DT6	-	-	-	-	-	-	-	-	36.53	46.39	52.70	62.04	49.4	38.4	38.4
DT7	-	-	-	57.21	48.64	52.26	50.42	47.22	58.81	61.37	69.98	70.05	57.3	51.0	51.0
DT8	73.38	-	-	67.73	77.13	72.45	48.82	42.88	60.38	71.17	65.49	65.16	64.5	57.4	57.4
DT9	53.24	-	-	42.96	41.06	35.20	43.86	34.92	48.02	49.63	54.33	51.94	45.5	40.5	38.8
DT10	-	-	-	53.47	52.39	43.63	47.20	39.52	51.26	56.64	68.14	66.47	53.2	47.3	
DT11 (closed)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DT12	75.11	-	-	65.81	73.51	63.79	58.59	54.28	73.58	83.57	78.25	78.93	70.5	62.8	53.3
DT13	66.86	-	-	58.42	47.70	47.17	57.13	43.59	59.62	57.76	73.72	75.55	58.8	52.3	44.5
DT14	40.80	-	-	-	42.37	39.42	39.22	38.84	43.19	51.86	64.59	61.44	46.9	41.7	
DT15 (closed)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

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DT16	49.99	-	-	37.93	42.80	37.55	33.56	29.01	37.68	48.74	52.99	55.10	42.5	37.9	
DT17	46.06	-	-	31.38	34.11	31.19	28.84	28.71	34.63	40.17	47.81	38.48	36.1	32.2	
DT18	41.43	-	-	33.34	33.64	32.14	25.74	21.19	28.45	46.49	42.31	39.14	34.4	30.6	
DT19	57.56	-	-	51.35	40.28	47.78	49.69	45.46	44.34	55.70	64.61	65.11	52.2	46.4	
DT20	53.77	-	-	-	66.74	57.01	44.35	39.97	56.58	76.18	62.11	53.02	56.6	50.4	
DT21	57.92	-	-	54.07	56.26	45.21	45.35	38.35	51.99	52.98	-	63.24	51.7	46.0	
DT22 (closed)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DT23	-	-	-	30.95	33.24	33.05	26.97	27.56	35.14	46.50	47.42	45.82	36.3	32.3	
DT24 (closed)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DT25	51.46	-	-	-	45.37	41.09	39.41	-	41.43	55.82	66.60	61.72	50.4	44.8	44.8
DT26	58.17	-	-	50.40	65.94	58.09	37.93	34.19	50.25	59.93	60.41	60.46	53.6	47.7	
DT27 (closed)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DT28	-	-	-	39.04	49.98	48.36	29.35	27.91	38.15	54.19	42.24	53.64	42.5	37.9	
DT29	-	-	-	69.28	70.67	63.79	59.68	52.39	66.68	71.84	82.45	80.96	68.6	61.1	
DT30	68.09	-	-	65.87	65.38	62.00	61.08	52.04	59.63	68.68	77.40	67.96	64.8	57.7	
DT31	66.03	-	-	68.81	69.43	57.33	58.47	53.32	64.71	72.38	83.44	78.82	67.3	59.9	
DT32	51.41	-	-	37.60	46.55	44.54	44.09	38.29	41.82	53.14	56.82	59.94	47.4	42.2	
DT33 (closed)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DT34	53.68	-	-	56.03	58.45	49.71	43.91	35.14	39.08	54.56	63.14	61.15	51.5	45.8	
DT35 (closed)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DT36	47.42	-	-	37.54	40.85	39.36	32.44	31.72	38.29	47.68	57.24	55.94	42.8	38.1	
DT37	36.44	-	-	47.98	51.52	45.18	32.80	33.22	40.99	55.47	56.48	58.43	45.9	40.8	
DT38 (closed)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

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DT39 (closed)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DT40	53.20	-	-	54.47	43.09	53.23	46.49	42.04	56.48	-	72.13	53.41	52.7	46.9	
DT41 (closed)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DT42	36.10	32.16	33.32	29.68	31.03	38.99	32.84	27.98	36.76	41.63	33.77	44.75	34.9	31.1	
DT43	52.04	45.80	39.23	41.50	40.26	46.12	43.88	34.03	48.83	55.55	62.24	58.58	47.3	42.1	
DT44	40.75	46.83	47.17	44.38	44.68	53.38	29.73	33.25	42.38	54.11	40.16	51.16	44.0	39.2	
DT45	55.96	57.73	57.20	57.89	59.97	46.23	55.01	45.59	64.27	56.58	77.53	60.74	57.9	51.5	
DT46 (closed)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DT47 (closed)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DT48	51.63	58.70	54.43	48.64	45.65	43.04	44.22	41.42	45.06	58.10	70.87	61.52	51.9	46.2	
DT49 (closed)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DT50	43.75	56.28	49.83	49.88	43.20	46.25	40.50	35.21	35.93	49.62	61.77	59.21	47.6	42.4	
DT51 (closed)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DT52	34.94	-	-	45.50	43.27	43.80	35.15	32.18	37.52	51.42	53.66	53.22	43.1	38.3	
DT53	39.88	-	-	42.79	53.12	56.61	36.62	34.15	41.84	66.46	51.07	57.57	48.0	42.7	
DT54	42.55	-	-	34.78	34.58	34.24	35.18	26.01	36.25	47.44	53.64	53.73	39.8	35.5	
DT55 (closed)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DT56	34.34	-	-	44.52	-	40.74	37.42	29.97	34.37	45.91	52.35	51.83	41.3	36.7	
DT57	38.20	-	-	36.25	38.03	35.30	39.46	36.73	-	45.05	54.52	52.05	41.7	37.1	
DT58 (closed)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DT59 (closed)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DT60 (closed)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

DT61 (closed)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DT62	-	35.39	47.92	45.18	57.51	62.06	28.05	35.89	49.01	-	42.62	33.24	43.7	38.9	
DT63 (249 in 2015)	49.99	-	-	37.93	42.80	37.55	33.56	29.01	37.68	48.74	52.99	55.10	42.5	37.9	

Local bias adjustment factor used

Annualisation has been conducted where data capture is <75%

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

(1) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure.

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

QA/QC

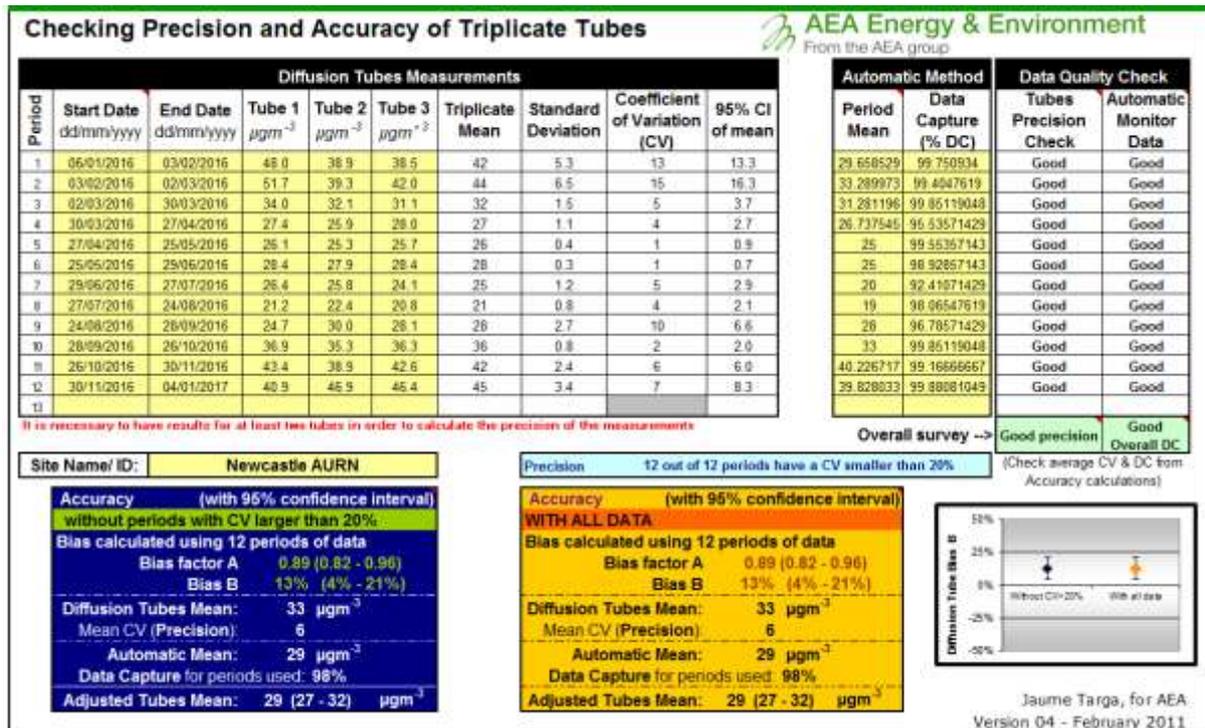
The Council is the Local Site Operator (LSO) for the AURN and has adopted Defra's quality control procedures. Officers have been trained by Defra in the operation and maintenance of the AURN air quality monitoring equipment and they adhere to AEA Technology's Site Operator's Manual for the AURN. The AURN is calibrated on a monthly basis by LSOs and serviced at six monthly intervals by Ricardo-AEA. Data from the AURN are quality controlled and ratified by Bureau Veritas.

The diffusion tubes are supplied and analysed by Environmental Scientifics Group Ltd (ESG) Didcot using the 50% triethanolamine (TEA) in acetone method. ESG participates in the Annual Field Inter-Comparison Exercise and the laboratory also participates in Defra's AIR NO₂ Proficiency Testing Scheme. The ESG laboratory follows the procedures set out in the Harmonisation Practical Guidance and is UKAS accredited. In 2016, the tube precision for nitrogen dioxide Annual Field Inter-Comparison for ESG using the 50% TEA in acetone method was 'good' for the results from 34 participating local authorities, 'satisfactory' for three and 'poor' for one.

Diffusion Tube Bias Adjustment Factors

Newcastle City Council use a local co-location site to validate NO₂ diffusion tube results which are used to calculate the bias adjustment. This is done by comparison with the chemiluminescent analyser located at the AURN, St Mary's Place. The type of monitoring carried out will inevitably vary depending upon local circumstances. See Figure C.1 below showing ratified data and calculated bias adjustment factor for NO₂ diffusion tubes in 2016.

Figure C.0.1: Local bias adjustment factor calculation for NO₂ diffusion tube data.



Discussion of Choice of Factor to Use

As stated above, Newcastle City Council has chosen to use a local co-location site which takes into account local trends.

Short-term to Long-term Data Adjustment

A number of diffusion tube monitoring sites recorded <75% data capture in 2016. These data were seasonally adjusted (annualised) by comparison with four automatic monitoring stations, two of which (St. Mary's Place and Cradlewell) are operated as part of the Defra Automatic Urban and Rural Network (AURN). St. Mary's Place is a urban background site, while the Cradlewell, Percy Street and Pilgrim Street are roadside sites.

Appendix D: Map(s) of Monitoring Locations and AQMA boundaries

NB: Only sites which were operational in 2016 are presented in the following figures. Refer to previous LAQM report for maps of all other sites.

Figure D.0.1: Map of automatic monitoring sites

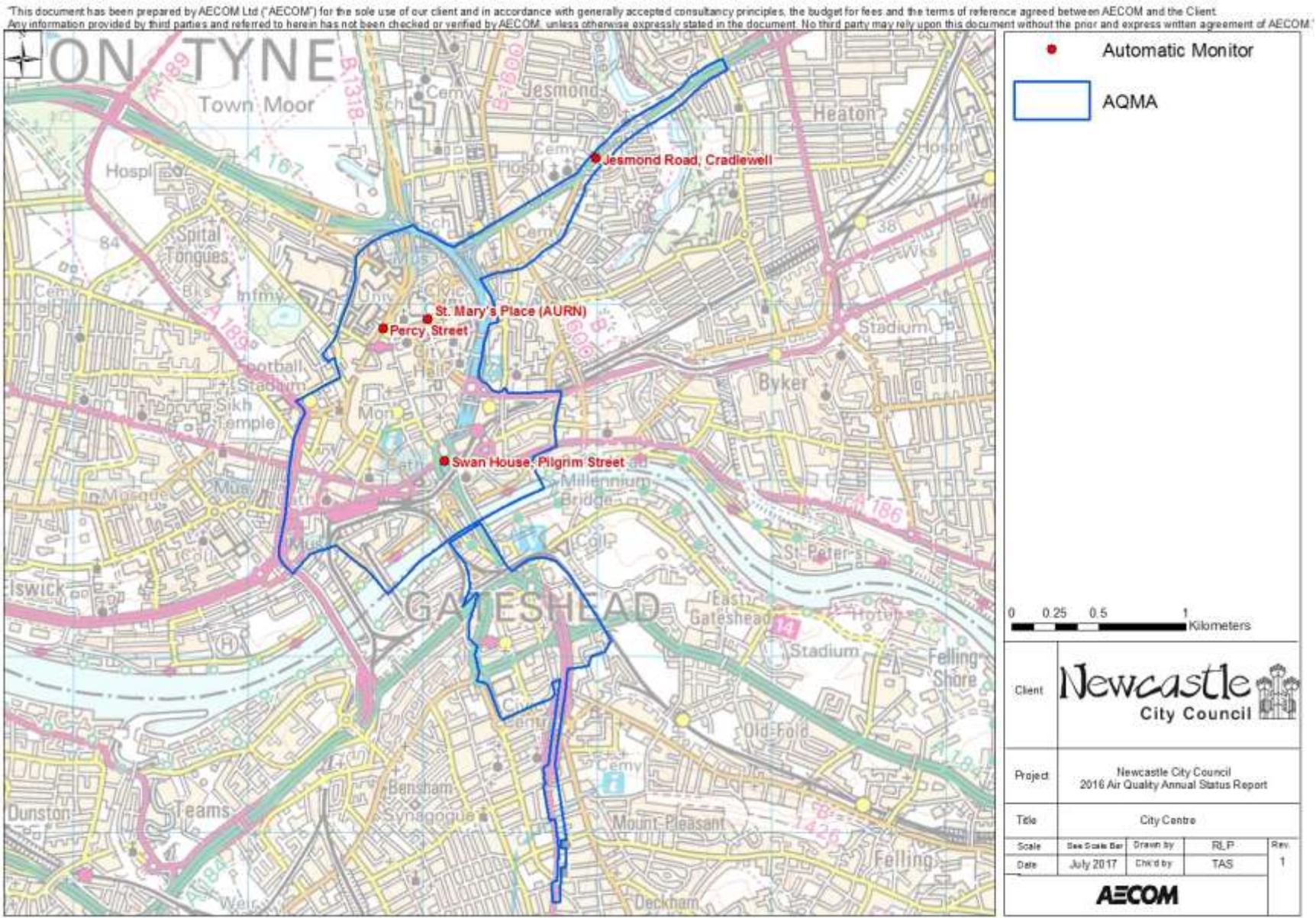
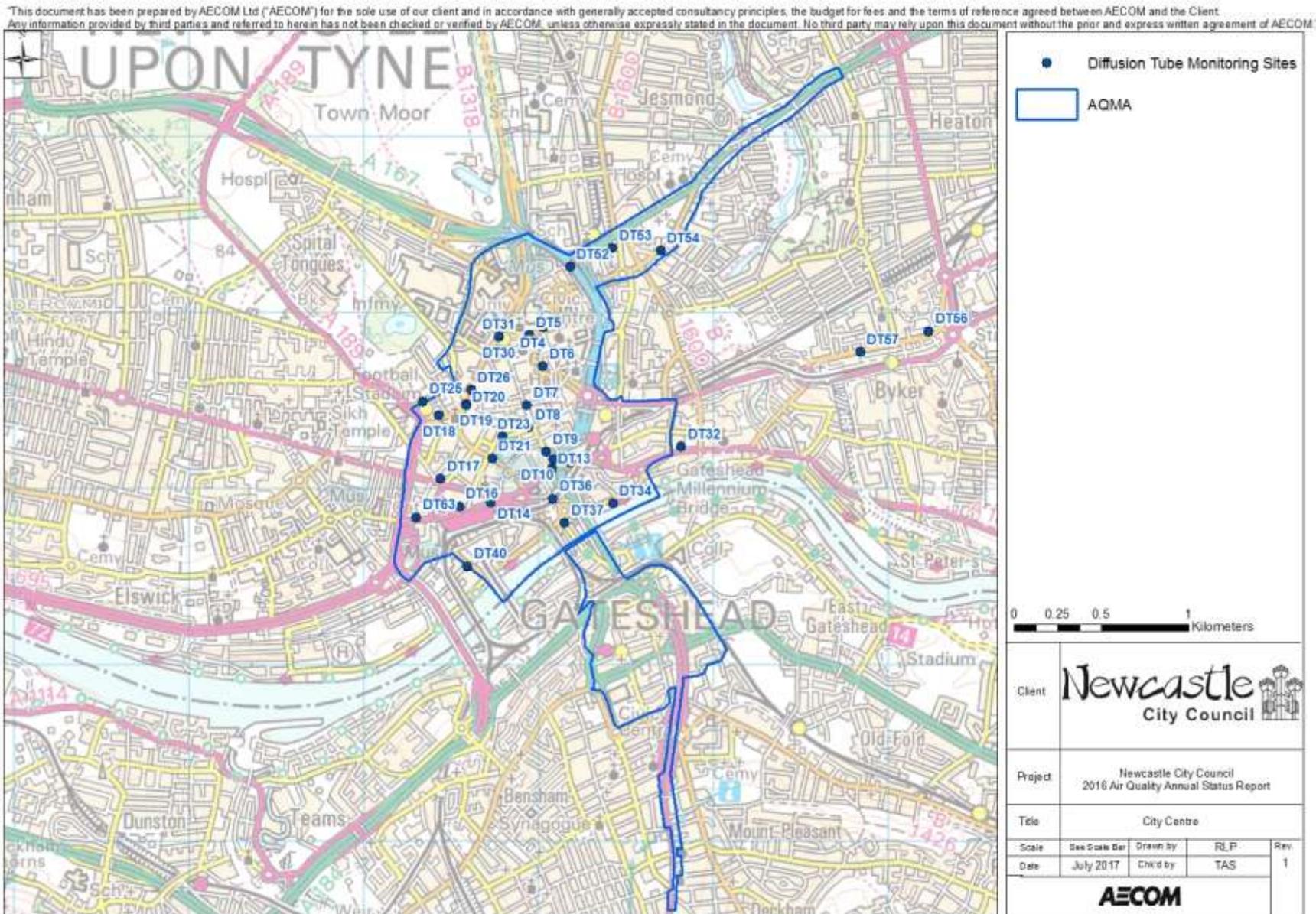


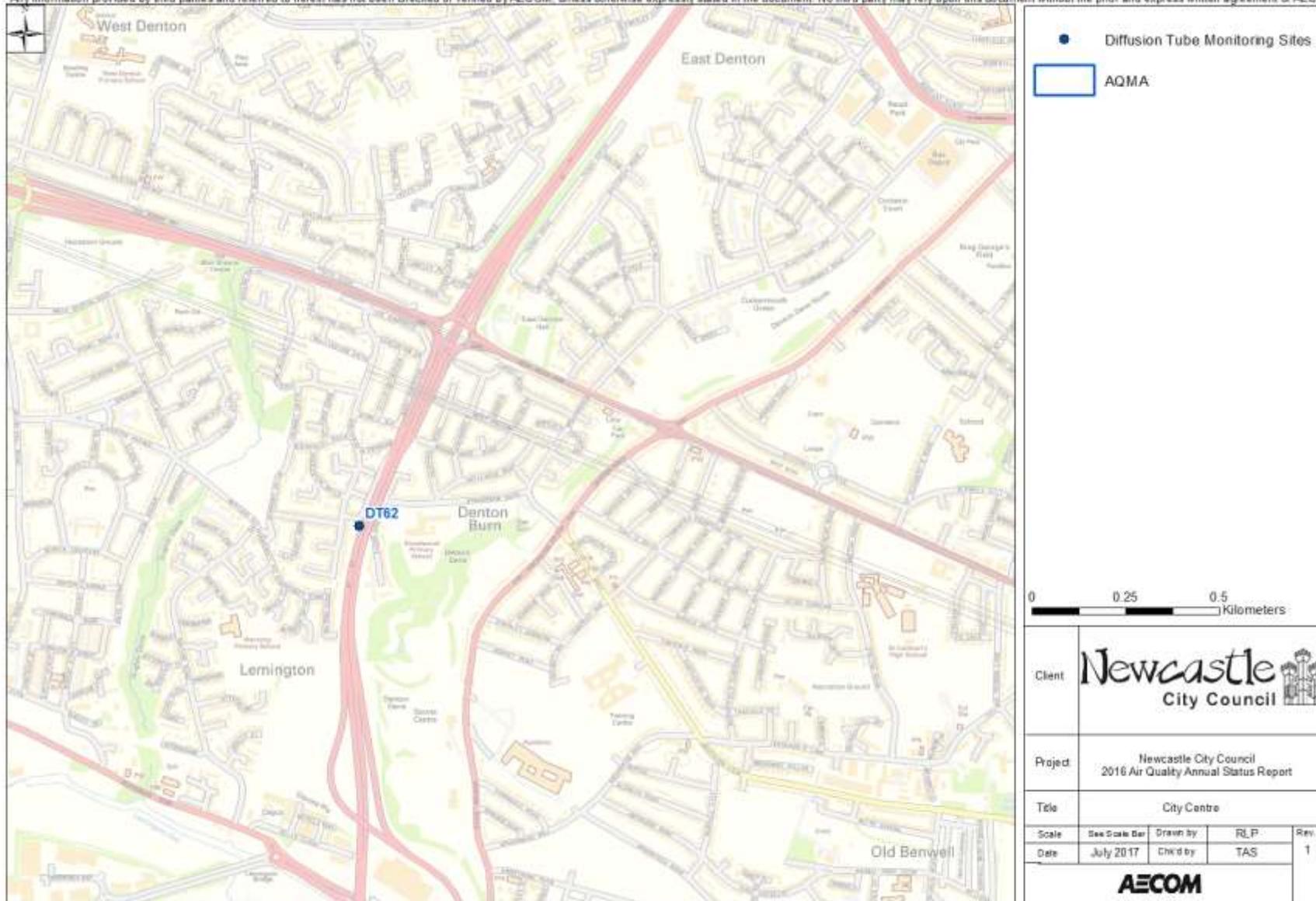
Figure D.0.2: Map of Non-Automatic Monitoring Sites in Newcastle City Centre



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Figure D.0.4: Map of Non-Automatic Monitoring Sites in Denton Burn

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Appendix E: Map(s) of 2016 annual mean NO₂ results

NB: Only sites which were operational in 2016 are presented in the following figures. Refer to previous LAQM report for maps of all other sites.

Figure E.0.1: Map of Non-Automatic Monitoring Sites in Newcastle City Centre: Annual mean NO₂ (µg/m³)

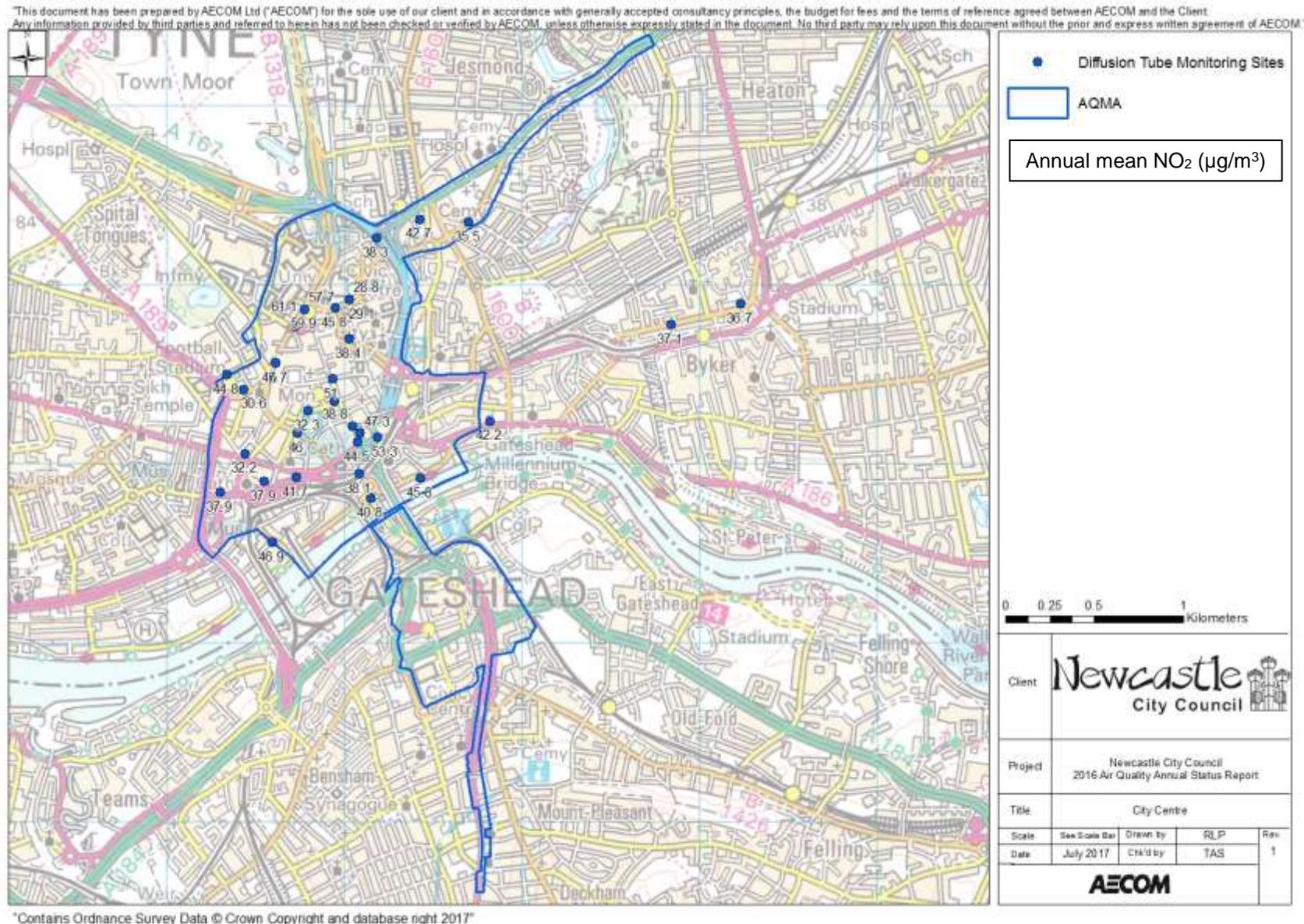
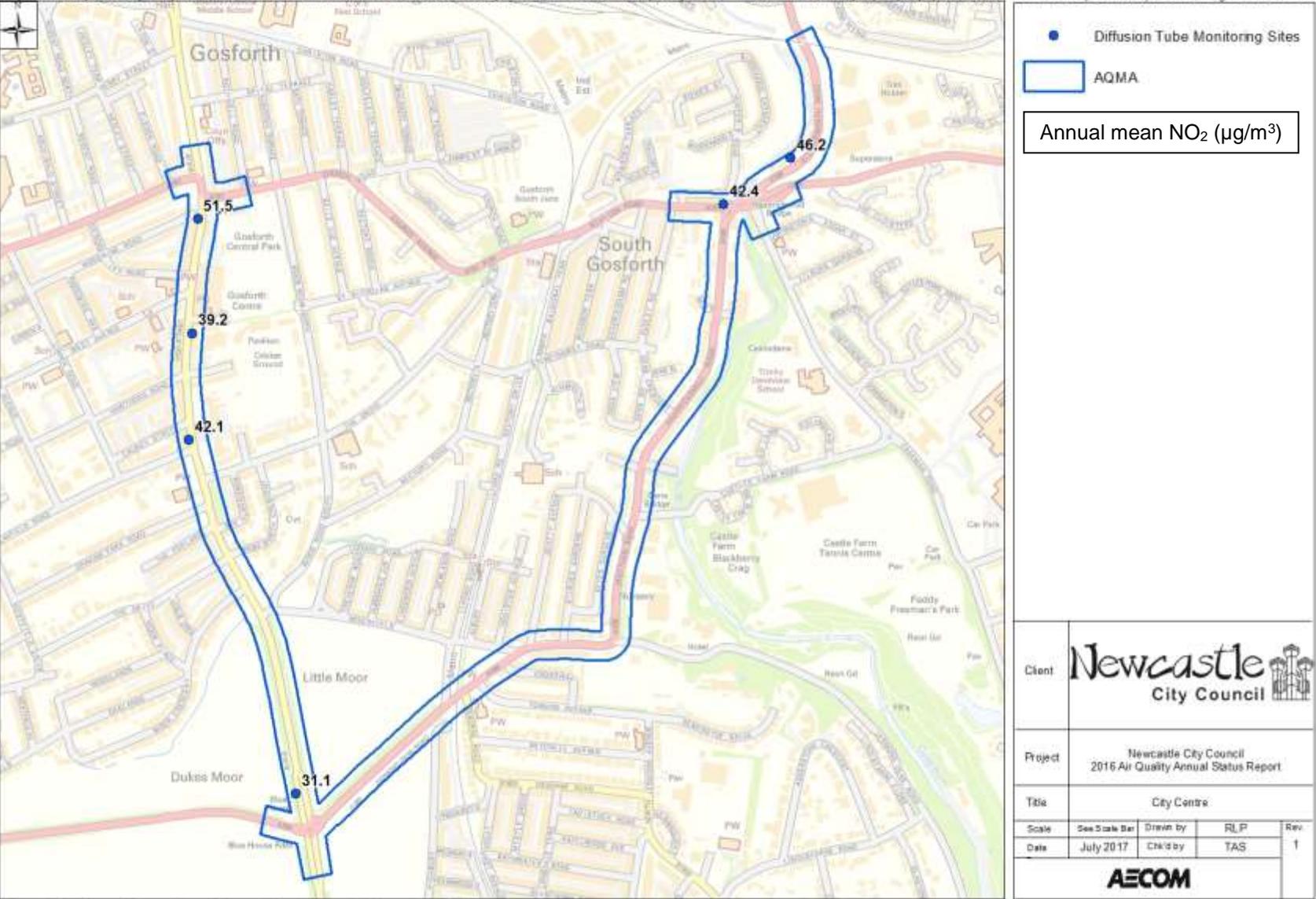


Figure E.0.2: Map of Non-Automatic Monitoring Sites in Gosforth: Annual mean NO₂ (µg/m³)

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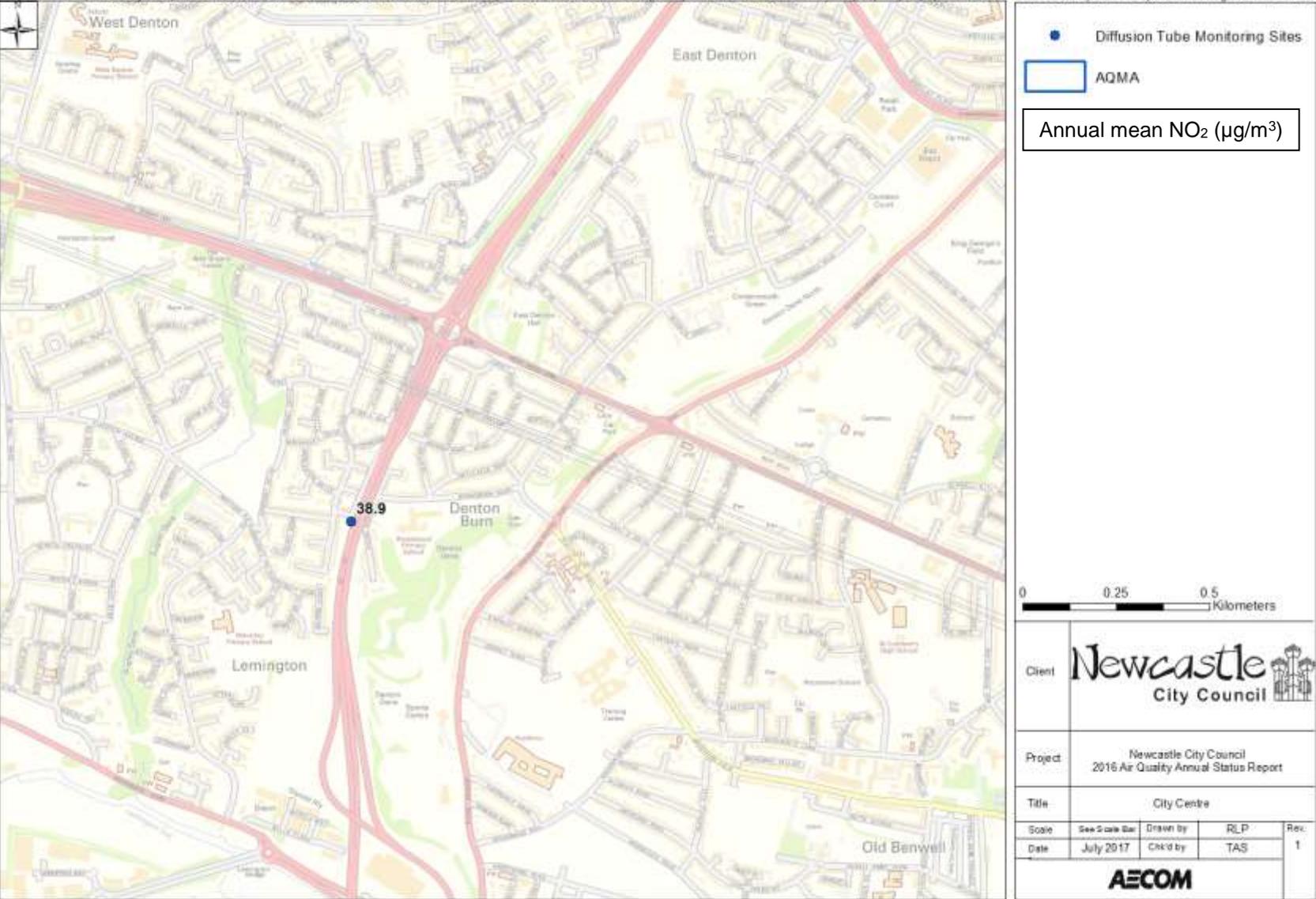


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Client				
Project	Newcastle City Council 2016 Air Quality Annual Status Report			
Title	City Centre			
Scale	See Scale Bar	Drawn by	RLP	Rev.
Date	July 2017	Chk'd by	TAS	1
AECOM				

Figure E.0.3: Map of Non-Automatic Monitoring Sites in Denton Burn: Annual mean NO₂ (µg/m³)

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Appendix F: Summary of Air Quality Objectives in England

Table F.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective ⁶	
	Concentration	Measured as
Nitrogen Dioxide (NO ₂)	200 µg/m ³ not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m ³	Annual mean
Particulate Matter (PM ₁₀)	50 µg/m ³ , not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m ³	Annual mean
Sulphur Dioxide (SO ₂)	350 µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m ³ , not to be exceeded more than 35 times a year	15-minute mean

⁶ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO ₂	Sulphur Dioxide

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