St Albans City and District Council
Annual Status Report 2017

Bureau Veritas

February 2018

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Document Control Sheet

Issue/ Revision	Issue 1	Issue 2	Issue 2
Remarks	DRAFT	DRAFT	FINAL
Date	February 2018	February 2018	February 2018
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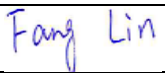
Signature			
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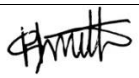
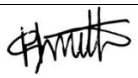
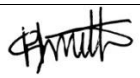
Signature			
Project Number	6366491		

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2017 Air Quality Annual Status Report (ASR)

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

(February, 2018)

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Report Reference number	St Albans City and District Council 2016 Annual Status Report
Date	February 2018

Executive Summary: Air Quality in Our Area

Air Quality in St Albans City and District

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].

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[3].

St Albans City and District Council is set within Hertfordshire to the north of the Greater London. The District has an area of just over 60 square miles with its boundary lines extending from just south of the M25 to a northern point south of Luton. The District is mainly rural in nature but there are a number of urban areas located as towns such as St Albans, Harpenden and Wheathamstead.

The main source of air pollution within St Albans City and District Council is from vehicle emissions, the main pollutants of concern being NO_2, PM_{10} and $PM_{2.5}$. A number of main roads pass through the District in addition to smaller roads serving the main population centres. The M25 runs east to west through the southern area of the District, the M1 runs south to north up through the western area of the District, and the 414 (North Orbital Road) provides an interlink between the M25 and M1.

The road network that serves the main population areas within the District, although smaller in size and in terms of traffic flow to the main roads pass close to residential areas and experience more urban based driving conditions such as congestion causing constant acceleration and deceleration. In addition the siting of buildings close to these roads can entrap pollutants in urban canyon environment's that lessen the effects of natural dispersal, this is apparent to the conditions experienced in St Albans town centre.

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

There are currently three designated AQMAs currently in force within the District, these have been declared due to exceedances of the NO_2 annual mean AQS objective. All AQMA boundaries are either close to, or have busy roads within them, recognising the influence vehicle emissions have upon air quality.

The three AQMAs can be seen online at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=254, details of the AQMAs are provided in Table 2.1 and boundary maps are presented in Figure D.1, Figure D.2 and Figure D.3.

An AQAP was completed in 2003 and was subsequently updated in 2010, within the AQAP measures are outlined to be completed in order to pursue of the annual mean objective for NO_2 thus improving air quality within the AQMAs and therefore the District as a whole. The AQAP is currently in the process of being updated and there are a number of projects that are ongoing that will provide steer for the updated measures included.

Monitoring of NO_2 is completed within St Albans using a network of passive diffusion tubes. There are currently 39 separate monitoring locations within the network, 26 of these locations are kerbside sites, 2 are roadside sites, 7 are urban background sites and 4 are rural sites.

Results from monitoring completed in 2016 indicate that the annual mean AQS objective for NO_2 (40µg/m^3) was exceeded at four locations, SA135, SA136, SA137 and SA138. SA135, SA136 and SA137 are outside of the AQMAs and SA138 is located within St Albans AQMA No.1.

The NO_2 fall-off with distance calculator was used to estimate the NO_2 concentration for the diffusion tube locations SA123 and SA124 at relevant exposures. Details are presented in Appendix C. Following distance correction of the concentrations both locations fell below the annual mean NO_2 objective.

Annual mean concentrations were below 60µg/m^3 at all monitoring locations during 2016, therefore as per Defra guidance it is unlikely that the NO_2 1-hour objective of 200µg/m^3 was exceeded at any location.

NO_2 monitoring data for St Albans is presented from 2012 to 2016 (where available). The majority of the monitoring sites present an overall downward trend of annual mean NO_2 concentrations with peak concentrations experienced predominately in 2012 or 2013.

The only exception from this downward trend is the urban background monitoring sites SA101, SA114/5/6, SA126, SA127, SA132 and SA136. Out of these six sites, all but one increased and still remained far below the NO_2 annual mean AQS objective. Site SA136 increased to exceed the annual mean AQS objective (51µg/m^3), however it is noted that since 2012 this site has consistently breached the annual mean AQS objective. SA136 is located at the exit of a taxi rank and no distance correction for this location was carried out as the nearest relevant exposure to this location is 76m away.

This general trend in concentration reduction from 2012 to 2016 could be due to the continual commitment and progress made by the St Albans City and District Council to improve local air quality with the aim to revoke the declared AQMAs.

Actions to Improve Air Quality

The monitoring network within St Albans City and District is in place to constantly monitor NO_2 throughout the year to identify any increases at identified locations throughout the district. Due to the current AQMAs being designated as a result of elevated NO_2 emissions, the monitoring network is an essential part of LAQM that aids decision making on air quality issues and identifies where actions are required.

Efforts have been focussed on monitoring NO_2 concentrations in St Albans City and District due to the prominence, health effects and growing national concern surrounding this pollutant, illustrated in the Government's Air Quality Plan for NO_2. It is noted that PM_{10} concentrations haven't been ignored, as typically both NO_2 and PM_{10} share the same origin, therefore actions which target NO_2 levels simultaneously impact PM_{10} levels. Nonetheless, we will continue to act upon guidance issued by Defra, and will undertake supplementary monitoring if required. In 2016, the highest PM_{10} concentration within St Alban's City and District area, obtained from the Defra estimated background maps, was 17.5µg/m^3, which is well below the AQS objective of 40µg/m^3.

Real-time and historic air quality data across Hertfordshire and Bedfordshire can be viewed on the Herts and Beds Air Quality website; www.airqualityhertsbeds.co.uk. This allows the public to view current air quality concentrations, historical data and previously completed LAQM reports. Although there are no real-time automatic monitoring stations within St Albans City, the raw diffusion tube concentrations for St

Albans are available for download from the St Albans City and District Council website - https://www.stalbans.gov.uk/environmentandwaste/pollution/air-pollution/.

Due to the main source of air pollutant emissions arising from vehicular sources within the District, alternative modes of transport to private internal combustion engine vehicles continue to be promoted. These 'Green Travel' alternatives are as follows:

- Cycling – A District wide cycling map is available to help plan routes across the District, a free copy has been made available through a number of outlets and by email request. The Green Ring that encircles the city centre is a new continuous 9km cycling and walking route that will help reduce congestion, pollution and provides a valuable and easy way to exercise;
- Public Transport – A well connected bus route serves St Albans city centre aims to reduce the use of private vehicles, there are services from North London, Welwyn Garden City, Hatfield, Luton and Watford in addition to routes to city suburbs and outlying shopping areas;
- Car Sharing & Eco-Driving Tips – A number of car sharing websites are promoted on stalbans.gov.uk helping drivers link up with others who are willing to car share, reducing the number of cars helps alleviate problems such as congestion as well as reducing NO_2 and PM_{10} emissions. Eco-Driving Tips are also provided on stalbans.gov.uk to not only reduce pollutant emissions but also to reduce fuel consumption and save the driver money; and
- Electric Vehicles – There are a growing number of electrical vehicle (EV) charging points within the District to promote the use of both pure EVs and plug-in hybrid EVs. Details of these points in addition to available grants and subsidies available for EVs are given on stalbans.gov.uk.

In addition to the grant from the Department for Transport's Clean Bus Technology Fund, received in 2013 allowing for 40 buses within St Albans to be retrofitted with newer technologies, a grant has been submitted to DEFRA for additional funding for the retrofitting of buses. An application for £1.3 million of funding has been submitted to retrofit all pre-EURO 6 Arriva Southern Countries buses operating on routes running through all designated AQMAs within Hertfordshire.

The ongoing work in reference to the control of idling vehicles has continued in 2017 with an anti-idling campaign raising awareness at schools and for members of the public.

In addition, a feasibility study is to be completed aimed at to identify the implications of supporting the uptake of electric taxis. The option of installing electric vehicle re-charging points at taxi ranks is to be included within the study to promote the uptake of electric vehicles for taxi use. This would benefit to the reduction of emission from idling taxis in the taxi tank.

There are currently two Defra funded projects ongoing that are related to improving air quality within St Albans City and District; an Instantaneous Emissions Modelling Project and a Freight Management Plan.

Instantaneous Emissions Modelling for LAQM Purposes

A study has been completed using detailed vehicle emission modelling approaches to assess NO_2 levels within St Albans city centre. The study was undertaken with assistance from a number of project partners: Hertfordshire Highways and their transport consultants provided the traffic inputs to the project, whilst The Institute for Transport Studies at the University of Leeds provided instantaneous emissions information for model scenarios using the Passenger car and Heavy duty Emission Model (PHEM).

The two key aims of the project were as follows:

- Undertake an assessment of the suitability of an instantaneous emissions dispersion modelling approach to the wider LAQM process; and
- Undertake an advanced quantitative appraisal of the impact of a bus gating scheme on the A5183 (Holywell Hill); a traffic intervention measure to be included in the St. Albans Air Quality Action Plan.

The area considered in the air quality model is based around the A5183 running through St Albans from The Marlborough Science Academy in the south to the junction with the A1057 (Hatfield Road) to the north.

With respect to the first aim of the project, the following three modelled methods were investigated:

- V1 – Emissions used in the dispersion modelling have been calculated using Defra's Emissions Factors Toolkit making use of 24 hour Annual Average Daily Traffic figures. This would be classed as an industry standard approach and would assume a continuous NOx emission form all modelled roads for the entire modelled year;
- V2 – Emissions used in the dispersion modelling have been calculated using Defra's Emissions Factors Toolkit making use of 24 hour Annual Average Daily Traffic figures but emissions have then been varied to take into account of diurnal variation on an hourly basis. This would be classed as an advanced industry approach and assumes NOx emissions vary on an hourly basis over a 24 hour period for all modelled roads for the entire modelled year; and
- V3 – Emissions used in the dispersion modelling have been calculated using Defra's Emissions Factors Toolkit making use of 24 hour Annual Average Daily Traffic figures but emissions have then been varied to take into account of diurnal variation on an hourly basis. This would be classed as an advanced industry approach and assumes NOx emissions vary on an hourly basis over a 24 hour period for all modelled roads for the entire modelled year.

The conclusion with respect to the first aim (i.e. the intercomparison of modelling methods) concluded that NO_2 concentrations predicted by method V2 appears to provide the best fit against the 2013 monitoring data. Therefore it is concluded that the effort required to distil the additional information required for method V3 does not appear to be justified. It is noted however, that this may be due to the limitations of the V3 instantaneous emissions dataset, which only covered the am and pm peak periods (07.30 to 08.30 and 16.30 to 17.30 respectively) due to the constraints of the Paramics traffic model that also only covered these periods - the data for this period had to be scaled back to 24-hour based emissions estimates so as to be modelled, which will have introduced a higher level of uncertainty in the V3 predictions.

With respect to the second aim of the project, the following 2 intervention scenarios were investigated with regards to advanced quantitative appraisal of their impacts relative to the baseline scenario:

- Bus gating scheme on the A5183 (Holywell Hill); and
- Clean Air Zone (CAZ) implementation.

Source apportionment of NO_x showed the greater impact that HGV and bus emissions have to the overall road traffic NO_x contribution, relative to the proportion of these vehicles within the observed fleet. Consideration should be given to intervention strategies/measures that preferentially target reductions in HGV and bus emissions sources, in order to provide the greatest cost-benefit to realising the overall objective of reducing NO_2 concentrations at receptor locations.

The bus gating scenario was shown to marginally improve air quality in the study area in terms of a net impact. However, some areas were predicted to worsen and exceedences of the annual mean NO_2 objective were still predicted to persist with the bus gating (based on 2013 model verification). The benefits of proceeding with the bus gating intervention may therefore be further considered as part of a package of measures as opposed to a single measure that will remove all exceedences.

Preliminary consideration of Clean Air Zone (CAZ) based interventions shows significant reductions in NO_x emissions and therefore NO_2 concentrations, but direct comparison to the BC and GC scenarios is problematic given the assumed base year of 2020 and the limited emissions data available (i.e. only available for the instantaneous method). It has therefore not been possible to quantify the NO_2 concentration impacts of the CAZ feasibility scenarios. However, with respect to the available NO_x emissions data alone this would suggest that a CAZ with a focus comparable to the London ULEZ would bring forwards the most significant reductions in NO_x emissions relative to a 2020 base scenario with a 40% reduction, whilst a HDV only focus would translate to a 18% reduction. A Bus only CAZ focus would give rise to a 9% reduction in NOx emissions. By way of comparison, introduction of the bus gating measure in 2020 will give rise to an estimated 6% NO_x emissions.

Further consideration to CAZ feasibility studies is therefore warranted as part of further work and is likely to bring forwards more significant air quality improvements when compared to the more vigorously tested bus gating scenario.

Freight Management Plan

St Albans Air Quality Management Area (AQMA) No.1 within St Albans city centre has been designated due to exceedances of the NO_2 annual mean AQS objective. The area within and around the AQMA has residential properties present and the main shopping area close by. The shopping area and frequently held markets are served by a significant number of freight deliveries, Heavy Goods Vehicles (HGVs)

and other traffic (LGVs and cars). The main issues resulting in excessive traffic emissions include stationary/queuing/idling/slow moving traffic and inappropriate routing of HGVs (freight lorries). A Further Assessment completed in 2007 showed that HDVs (HGVs and buses) made up between 3.3% and 6.9% at the AQMA junction, but the contribution of HDVs varied between 32% and 45% of total ambient NO_x concentrations at various locations in the AQMA.

A Freight Management Plan (FMP) has been considered to target reductions in NO_x/NO_2 emissions from freight movements within the city centre. However, progress on developing the FMP has been limited due to difficulties in identifying suitable candidate sites within the vicinity of the St Albans city centre that could provide for a freight consolidation centre. The Council will however continue to give due consideration to the development of the FMP.

Conclusions and Priorities

St Albans City and District is predominately rural in nature and the main source of air pollution within the District is from road traffic emissions. The city centre has a number of busy streets where canyon effects of pollution are apparent due to buildings being in close proximity to the road. In addition there are a number of main roads with a high volume of traffic that pass through the District including the M1, the M25 and the A414. The three AQMAs that are currently designated reflect these road conditions as two of the AQMAs are close to the areas of the M25 and the M1, and the third is located within a congested central road within St Albans that is representative of street canyon conditions.

The priorities for the coming year include continuing to work with the Air Quality Action Plan (AQAP) measures, implementing the actions that are ready for completion and working with separate departments within St Albans City and District Council on measures benefitting air quality within the Climate Change Action Plan 2016, the council Green Travel Plan and the Hertfordshire County Council Local Transport Plan 2011 – 2031. To continue the good work already undertaken in relation to the reduction of vehicle idling and to explore new options for promotion and enforcement of anti-idling.

The 2016 monitoring network showed exceedances of the NO_2 annual mean Air Quality Strategy (AQS) objective at the four locations SA135, 136, 137 and 138. Only

one of these is located in the AQMA, which is SA138 - Peahen PH, Holywell Hill, St Albans. All these four locations are not situated at locations of relevant exposures.

A challenge for the coming year would be for these results to remain below the AQS annual mean objective at all locations. Actions within the AQAP and those listed below will help for this target to be reached.

Local Engagement and How to get Involved

At an individual level there are a number of ways the public are able to get involved and help improve air quality on a local level. The main source of air pollution with the District is vehicle emissions, changing the method of transport used can help reduce the amount of pollutant emissions released from vehicle sources. This is apparent from the reduction in number of vehicles being used and also through the type of vehicles being used.

Changes in transport use such as the following help in reducing emissions of NO_2, PM_{10} and $PM_{2.5}$ from vehicle sources:

- Use public transport where available – This reduces the number of private vehicles in operation reducing pollutant concentration through the number of vehicles and reducing congestion;
- Walk or cycle if your journey allows – From choosing to walk or cycle for your journey the number of vehicles is reduced and also there is the added benefit of keeping fit and healthy. In addition many of the cycle routes are off-road meaning you are not in close proximity to emissions from road traffic sources;
- Reduce time of idling vehicles – If using a car for a journey avoid idling for any long periods of time. When it is apparent there will be no movement required then switch the engine off to reduce the amount of pollutant emissions released;
- Car/lift sharing – Where a number of individuals are making similar journeys, such as travelling to work or to school car sharing reduces the number of vehicles on the road and therefore the amount of emissions being released. This can be promoted via travel plans through the workplace and within schools; and

- Alternative fuel / more efficient vehicles – Choosing a vehicle that meets the specific needs of the owner, fully electric, hybrid fuel and more fuel efficient cars are available and all have different levels benefits by reducing the amount of emissions being released.

During 2017 a number of queries have been raised from members of the public in relation to air pollution from aircraft flying over the District. London Luton airport is located approximately 4 miles north of Harpenden with its aircraft constantly landing and taking off. Due to the aircraft being in flight over the District and the landing/taking off phase not being located within the District boundary pollutant concentrations within the District will not be significantly affected. The height at which the airplanes fly will enable any pollutants emitted to be dispersed through meteorological conditions experienced. London Luton Airport will complete pollutant monitoring close to the airport and if concentrations are not in exceedance of AQS objectives close to the airport, the airports operation will not have a significant effect at a greater distance away from the airport.

Real time and historical air quality data for Hertfordshire and Bedfordshire is presented at www.airqualityhertsbeds.co.uk, an index related legend is provided so users can follow the current air quality. Also there are a number of links providing further information including the legislation of air quality within the UK, diffusion tube data, previous LAQM reports and graphical representations of data across the region. Up to date diffusion tube data and news relating to air quality within the District can be found on the St Albans City and District website at https://www.stalbans.gov.uk/environmentandwaste/pollution/air-pollution/.

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1 Local Air Quality Management

This report provides an overview of air quality in St Albans City and District Council during 2017. 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 St Albans City and District 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 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 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 St Albans City and District 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://uk-air.defra.gov.uk/aqma/local-authorities?la_id=254, the full list of AQMAs is available at http://uk-air.defra.gov.uk/aqma/list.

We propose to keep the current three designated AQMAs in St Albans City and District Council (see monitoring section) and to review the NO_2 monitoring network surrounding these AQMAs.

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	
St Albans AQMA No. 1	Declared 02/11/2004, amended 08/07/2009	NO_2 Annual Mean and PM_{10}	St Albans	The area comprising of odd numbers 1-7 London Road, 1-11c Holywell Hill and even numbers 2-38 London Road, St Albans.	NO	61µg/m^3	46.5µg/m^3	Air Quality Action Plan for St Albans City and District Council http://aqma.defra.gov.uk/action-plans/StADC%20AQAP%202003.pdf
St Albans AQMA No. 2	Declared 02/11/2004	NO_2 Annual Mean	St Albans	The area comprising of Beechtree Cottages, Hemel Hempstead Road, St Albans (adjacent to junction of M1 (J7) and M10).	YES	52µg/m^3	No monitoring currently available within AQMA	
St Albans AQMA No. 7	Declared 21/09/2004	NO_2 Annual Mean	St Albans	An area encompassing a number of domestic properties in Frogmore on Radlett Road and Colney Street in the vicinity of the M25.	NO	44.2µg/m^3	36.4µg/m^3	

☒ **St Albans City and District Council confirm the information on UK-Air regarding their AQMA(s) is up to date**

2.2 Progress and Impact of Measures to address Air Quality in St Albans City and District Council

Defra's appraisal of last year's ASR concluded there were no exceedances reported within the three AQMAs in 2015 after corrections were applied, and it is expected that air quality is set improve in these areas, unless there are significant increases in traffic levels. All the current AQMA sites are situated close to significant sources of road traffic emissions, with few monitoring locations at each AQMA site, therefore current monitoring should continue until it is clear that objectives are continuing to be met. We agree with the points raised regarding consistency of compliance, and as a result will continue to use diffusion tube monitoring at all locations available to ensure progress is made and will be open to supplementary monitoring

St Albans City and District Council has taken forward a number of direct measures during the current reporting year of 2017 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; August 2010 Update to the 2003 Air Quality Action Plan.

Key completed measures are:

- From the DfT grant received, continue the process of retrofitting the existing bus fleet with cleaner technologies to reduce emissions;
- Station Travel Plan covering three stations: St Albans City, St Albans Abbey and Hatfield; encouraging motorists to use greener forms of transport when travelling to and from train station. Eased congestion around St Albans City station in peak travel hours with a 30% increase in the number of cycle spaces in the car park; and
- Instantaneous Emissions Model facilitating more effective measurement of NO_2 levels within St Albans city centre through improvements to the accuracy of results obtained from dispersion modelling enabling quantification of implementing various traffic intervention measures.

St Albans City and District Council expects the following measures to be completed over the course of the next reporting year:

- Investigate the impact of on-street parking and loading in AQMAs, and consult on proposals to amend restrictions in an attempt to improve traffic flows;
- Continue to monitor NO_2 using passive diffusion tubes across the District to measure concentrations, and review suitability of new locations and/or relocation of existing tubes to within the designated AQMAs to improve competency of the network;
- Improve reliability and accessibility of bus services to encourage modal shift from car to public transport, through consultation with stakeholders to identify areas for feasible improvement and investment in resources which increase accessibility (real time information and signage) to encourage uptake;
- Retrofit existing bus fleets operating near AQMAs to help efforts in improving air quality. Submitted an application for £1.4 million of funding from DEFRA to retrofit all pre-Euro 6 Arriva Southern Counties buses operating on routes running through Hertfordshire AQMA's to ensure services operating are recognised as cleaner internationally. The outcome will be revealed in due course.
- Development of St Albans AQ Planning Policy Guidance via consultation to provide consistency and advice to developers across the region;
- Continue to investigate any nuisance complaints received relating to air quality across the District and to complete inspections of permitted processes;
- Continue the on-going programme of community engagement events to encourage greater use of the Abbey Line; Abbey Days Out tourism programme and events on the line and at station;
- Work to reduce the number of trips taken by car by promotion of the green travel initiatives shown online at http://www.stalbans.gov.uk/environmentandwaste/greenerliving/greentravel/default.aspx;
- Completion of the Freight Management Plan to reduce emissions from freight movements within the city centre, working towards the aim of revoking St Albans AQMA No.1;

- Annual review undertaken with NCP Limited of car parking charges to encourage uptake of public transport options and reducing congestion;
- Maintain investment in cycling and walking infrastructure to ensure cleaner travel alternatives are continually considered as attractive feasible options, reducing dependency on cars and to encourage active lifestyles. Work to date includes; provision of cycle parking racks at key locations, investment in safe cycling and walking paths and strengthening way-finding resources to aid accessibility; and.
- Continue the work on the Trees Against Pollution project where already a large number of trees have been planted in Wheathampstead forest and explore possibilities for green wall/hedging as appropriate.

St Albans City and District Council's priorities for the coming year are:

- Expand the electric vehicle charging points within the District through inclusion within new residential developments under S106 agreements and continual promotion of the grants available small and medium-sized enterprises;
- Investigate the introduction of additional charging points for electric vehicles and taxis at NCP car parks within St Albans, increasing capacity of the network;
- Examine impacts of amendments to taxi licensing conditions to promote low emission fleets in St Albans. Currently, a fully electric vehicle which compiles with the regulatory taxi standards attracts a £60 discount. The Licensing and Regulatory committee expect a feasibility study to be published by late March 2018, where new options could be considered;
- St Albans City and District Council wishes to build on the progress made in 2017 continuing to investigate the suitability of implementing a Clean Air Zone (CAZ) for St Albans city centre and eligibility for funding in an attempt to achieve compliance in St Albans AQMA No.1. Rigorous cost and impact assessments have been developed to view the potential for deploying Civil Enforcement Officers to enforce anti-idling zones within the CAZ.

- Monitor the progress and uptake of the travel plans that are in use within the District, traffic management schemes, cycling and walking strategy business travel plans, and the council green travel plan; and.
- Develop new community out-reach events and build on the success of previous campaigns which raised awareness of air quality, such as the Clean Air Day and Anti-Idling campaigns. The fantastic efforts of the 2017 Anti-Idling campaign engaged 1,700 schools and 696 members of the public to raise awareness urging all drivers to switch off their engine when parked or stationary.

The principal challenges and barriers to implementation that St Albans City and District Council anticipates facing are:

- Funding: The majority of the actions mentioned above require funding to implement successfully. It is widely accepted that funding for councils is becoming increasingly strained and must therefore be concentrated on other major efforts (education and healthcare). Therefore, St Albans City and District Council must utilise all options available for funding, prioritise measures and be cost effective to ensure our actions outlined in the AQAP are delivered.
- Conflicts with disciplines: On occasion, measures which address air quality can negatively impact other disciplines; such as business and commerce, causing delays. For instance, delivery of the proposed consolidation centre within the Freight Management Plan will improve air quality along roads in St Albans and will help revoke existing AQMA's, however many businesses with heavy supply chains which rely on frequent deliveries will be impacted causing impacts to their day-to-day business activity. Therefore, when a conflict arises, St Albans City and District Council will exploit the use of consultation groups to help address multidisciplinary concerns in an attempt to deliver cross-channel benefit. St Albans City and District Council will also proactively consider potential conflicts and combine disciplines when developing strategies to help minimize these barriers and utilise benefits from each discipline; such as the Hertfordshire's Local Transport Plan 2018-31, where air quality has been closely aligned with transport to deliver multidisciplinary benefits.

- Cooperation: Sometimes, delivery of specific measures can fall under the responsibility of multiple government bodies and/or private enterprises. An example of this would be road infrastructure, where in some cases a network is controlled by several groups who all need to participate to deliver effective change. In these situations, it can be incredibly tough to deliver our pledged measures, as they can cross multiple boundaries of different interest groups. Therefore, St Albans City and District Council should strengthen ties with surrounding local authorities and infrastructure operators with a view of improving regional air quality – a shared goal.

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

- Outcome of various feasibility studies surrounding implementing major projects; bus gates or a CAZ, to ensure effective delivery and any potential impacts have been identified and mitigated.
- In some cases funding has caused issues with delivery. As funding is the main tool to implement change, if the supply is cut off or reduced, this can cause stagnation in delivery. For instance the Quality Network Partnership has been working at improving public transport services within St Albans, however funding provided from the DfT's Local Sustainable Fund has now ceased which caused delays.
- Awaiting outcomes from relevant committees and consultation groups to help address stakeholders concerns and impacts which can delay delivery significantly in specific cases. We would rather ensure the voices of St Albans were heard and addressed, rather than implementing change and causing dissatisfaction and inflicting unknown socio-economic issues.

St Albans City and District Council anticipates that the measures stated above and in Table 2.2 will help to contribute towards compliance in St Albans AQMA Number 1, 2 and 7.

With the measures stated above and in Table 2.2, St Albans City and District Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of St Albans AQMA Number 1, 2 and 7.

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	Progress to Date	Estimated Completion Date	Comments / Barrier to implementation
1	Investigate the status of on-street parking in the AQMA and determine if parking is contributing to traffic congestion at each junction. Investigate the provision of on-street loading facilities and co-ordinated timings of deliveries.	Traffic Management	Other	SADC/HCC	2017	2018	Parking restrictions in place	See note 1 at end of table	The Parking Team will be consulting on proposals to amend parking restrictions to improve traffic flows during 2018/19. These changes included minor changes to parking bays and the conversion of single yellow lines to double yellow lines. All changes are subject to the outcome of the consultation and the responses received. Loading restrictions are in place during peak traffic hours near the shops and these will continue to be enforced.	2018/19	
2	SADC will assert comprehensive control over Part B/Part A2 processes for smaller scale industries under the environmental permitting (England & Wales) regulations 2007.	Environmental Permits	Other	SADC	NA	Annually	Number of inspection	See note 1 at end of table	All processes are risk rated annually and inspection frequency determined based upon risk. Programmed annual inspections to April 2017, are currently up to date. Processes operating without a permit are identified and appropriate enforcement action taken.	Continuous	
3	SADC will investigate complaints about nuisance (domestic and industrial emissions).	Public Information	Other	SADC	NA	On receipt	Time taken to resolve complaints	See note 1 at end of table	Complaints are investigated as and when received.	Continuous	First phase successful, second phase on-going

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	Progress to Date	Estimated Completion Date	Comments / Barrier to implementation
4	Continue to monitor air quality within the district and as necessary review the suitability of monitoring locations in line with DEFRA guidance TG16	Policy Guidance and Development Control	Other	SADC	2018	Continuous - Reviewed September 2017	Data capture	N/A	The details of diffusion tubes and continuous monitoring are recorded on http://www.stalbans.gov.uk/environmentandwaste/pollution/air-pollution/	Continuous	
5	To initiate further discussions with Intalink Quality Partnership to improve the reliability of bus services and increase patronage and encourage modal shift from the car to public transport.	Transport Planning and Infrastructure	Bus route improvements	SADC/HCC	2017	2017-19	Service numbers	See note 1 at end of table	Quality Network Partnership (QNP) has been working at improving public transport services. Through the QNP improvements have been made to bus stop signage, bus route signage and real time information. Funding (formerly from the DfT's Local Sustainable Fund) has now ceased to the group but the group now meets again under the branding of the Intalink Quality Partnership.	Ongoing (two buses purchased)	
6	To investigate the feasibility of a Clean Air Zone	Promoting Low Emission Transport	Low Emission Zone (LEZ)	SADC / HCC	2010	NA	Vehicle counts	N/A	To investigate suitability and eligibility for funding for Clean Air Zones via DEFRA		

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	Progress to Date	Estimated Completion Date	Comments / Barrier to implementation
7	Pilot the Station Travel Plan.	Promoting Travel Alternatives	Other	HCC	2010	2012	Usage figures	See note 1 at end of table	The County and District councils, together with the rail and bus operators were part of the DfTs pilot programme of station travel plans. The Station Travel Plan will remain ongoing within Hertfordshire County Council. The plan helps to co-ordinate the efforts of the Urban Transport Plans for Hatfield and St Albans, the St Albans Abbey Community Rail Partnership and Quality Network Partnership in St Albans. The train operating company GTR which operates services from St Albans City station have commissioned transport consultants to create a new STP for St Albans City Station and Harpenden Station. Data gathering and station audits have been completed and reports written. HCC is awaiting sight of the draft travel plans and will be feeding back comments on the documents to ensure they reflect the concerns of rail users and the Highway Authority. The plans will inform any future partnership working with the TOC on access to the stations	Oct-17	

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	Progress to Date	Estimated Completion Date	Comments / Barrier to implementation
8	Community Rail Partnership The Abbey Line.	Promoting Travel Alternatives	Promote use of rail and inland waterways	SADC/HCC	2010	2011-2016	Usage figures	See note 1 at end of table	This covers the line from St Albans Abbey to Watford Junction. There is an-ongoing programme of community engagement events to encourage greater use of the line. These include: • Trial shuttle bus to city centre and City station; • Abbey Days Out tourism programme; • Events on the line and at stations e.g. Santa specials and fundays. Further opportunities will be discussed with the new train operator who will be in place from October 2017.		
9	Investigate possibility of road signs to discourage through traffic.	Traffic Management	Other	HCC	2016/17	2017/18	Traffic counts	See note 1 at end of table	Variable Message Signs completed 2013. No new signage and routings are planned for installation on approach to the city	Completed	
10	Investigate introduction of additional charging points for electric vehicles at NCP car parks within St Albans.	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	SADC	2016/17	2017/18	Usage figures	See note 1 at end of table	Further work on this measure is dependent on preferred service provision options arising from work on the procurement of the car parking contracts	Continuous	

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	Progress to Date	Estimated Completion Date	Comments / Barrier to implementation
11	Consider requiring developers to install electric charging points in new developments under S106 agreements.	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	SADC	2017/18	Following implementation of SLP and subject to discussions with Planning Dept. for inclusion in the detailed Local Plan	Installation figures	See note 1 at end of table	SLP out to public consultation until Feb 2018. We will provide a response and have further discussion with the Planning Department regarding formulation of St Albans AQ Planning Policy Guidance to provide consistency of advice to developers across Herts & Beds.	2018/19	
12	Consider an increase in car parking charges with the view to making bus travel a more attractive alternative.	Promoting Travel Alternatives	Other	SADC`	2017/18	2018/19	Car park volume figures	See note 1 at end of table	Annual review undertaken with NCP Limited.	Continuous	
13	Continue the Trees Against Pollution project and explore green wall/hedging opportunities	Transport Planning and Infrastructure	Other	SADC	2017/18	2017/18	Number of trees planted	See note 1 at end of table	Large number of trees planted in the Wheathampstead forest.	Continuous	

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	Progress to Date	Estimated Completion Date	Comments / Barrier to implementation
14	Cycling and walking strategy	Promoting Travel Alternatives	Promotion of cycling	SADC / HCC	2016/17	2017/18	Usage figures	See note 1 at end of table	Cycling (2008) and Walking (2009) strategies in place. SADC Green Travel Plan sets out a range of actions to reduce emissions from staff travel. Improvements and investments in cycling and walking infrastructure include; • Implementation of the St Albans Green Ring route project. • Production of revised St Albans Cycling maps. • Construction of cycle and walking paths in Verulamium Park. • Provision of secure cycle parking racks within the city centre and at rail stations. • Upgrading and resurfacing of the Alban Way Leisure path. • Installation of Trixie mirrors at key junctions within the city centre. • Improved access to Nickey Line in Harpenden. • New link from Alban Way to St Albans City Rail station. • Provision of way finding monoliths within the city centre.	Continuous	

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	Progress to Date	Estimated Completion Date	Comments / Barrier to implementation
15	Taxi emissions.	Promoting Low Emission Transport	Taxi Licensing conditions	SADC	2016/17	2017/18	Certificate of Compliance data	See note 1 at end of table	Emissions controlled through Certificate of Compliance at garage check. The frequency of checks is dependent upon the age of the vehicles; 1 – 5 years old; annually 5 – 7 years old; every 6 months Over 7 years old; every 4 months Vehicle Licence Conditions amended to include the following; Any taxi driver can licence a fully electric vehicle as long as it complies with the hackney carriage and private hire vehicle licence conditions. This type of vehicle attracts a discount of £60 The Licensing and Regulatory committee have commissioned a feasibility study into the infrastructure/technological and financial implications of supporting electric taxis across the district. This is due to be reported back to this committee at the end of March	Continuous	

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	Progress to Date	Estimated Completion Date	Comments / Barrier to implementation
16	Campaign to raise awareness of air quality and the impact on air quality, of idling engines (when parked)	Public Information	Via the Internet	SADC	2016/17	2017	Media coverage	See note 1 at end of table	Clean Air Day (15th June 2017) . The Anti-idling campaign was run during 2017. This raised awareness and urged car, van, lorry, bus and taxi drivers to switch off their engine when parked or stationary for more than a minute. It included social media activities and information leaflets issued with resident car parking permits. The following numbers were spoken to as part of the campaign: School engagement total 1,700; Community engagement 696 This campaign will continue into 2018	2018	

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	Progress to Date	Estimated Completion Date	Comments / Barrier to implementation
17	Retrofitting of existing bus fleet to lower pollutant emissions	Promoting Low Emission Transport	Other	SADC/HCC	2013	2015/16	Number of buses retrofitted	See note 1 at end of table	St Albans are part of a Herts & Beds bid application to DEFRA to work with Arriva Southern Counties to retrofit all pre-Euro 6 buses operating on the bus routes running through the Hertfordshire AQMAs. Arriva Southern Counties operate bus routes through AQMAs within five Local Authority Areas within Hertfordshire: Dacorum Borough Council, East Hertfordshire District Council, North Hertfordshire District Council, St Albans City and District Council and Watford Borough Council. The bid was to retrofit approx. 90 buses costing approx. £1.4 million. Result of bid for funding is pending	2018	
18	Instantaneous Emissions Modelling	Policy Guidance and Development Control	Other policy	SADC	2014/17	2018	Updated NO2 modelling within St Albans	See note 1 at end of table	Project delivered. Outputs supporting Freight Management Plan project work	Completed 2018	
19	Freight Management Plan	Freight and Delivery Management	Other	SADC	2014/17	2018	Numbers of vehicles and routes taken	TBC	Project is currently ongoing.	Ongoing	
NOTE 1 - It is not possible to specifically quantify the impact of small scale projects that the Council are working on with partners. However individual & cumulative AQ measures which reduce emissions are beneficial to improving pollutant levels both AQMA's and the District generally.											

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

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

St Albans City and District Council are working to reduce emissions of air pollutants across the District, many of the measures used to reduce emissions of NO_2 also impact emissions from $PM_{2.5}$, due to the pollutants originating from the same sources. Therefore, efforts will be concentrated on targeting main sources of pollution with the view that wider pollutants will be reduced simultaneously. For instance, in St Albans, the main source of local air pollution is from vehicle emissions, where both NO_2 and particulates are released from vehicular sources, therefore measures focussing on changing the number of vehicles on the roads, and the type of vehicles being used will help reduce emissions of both pollutants.

St Albans City and District Council is taking the following measures to address $PM_{2.5}$:

- Traffic management improvements, changes in parking restrictions, co-ordinating timing of goods deliveries and possible re-routing of HGVs;
- Changes to Public Transport, introduction of two new hybrid buses and retrofitting of 40 buses with new technology to produce less NOx/NO_2 emissions;
- Promotion of Green Travel, reducing the number of journeys taken by car and using public transport, car-sharing, cycling or electric vehicles; and
- Promotion of energy efficiency measures across the District.

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

There is currently no continuous monitoring undertaken by St Albans City and District Council.

3.1.2 Non-Automatic Monitoring Sites

St Albans City and District Council undertook non-automatic (passive) monitoring of NO_2 at 39 separate locations during 2016, 38 single tube locations and 1 triplicate location. Table A.1 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites 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.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.2 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

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

Table A.2 below provides a summary of measured annual mean concentrations (annualised and bias adjusted) that were recorded for 2016. During 2016 there were seven locations with the annual mean concentration above 36µg/m^3. They are:

- SA123 - Radlett Road, Park Street,
- SA124- Smug Oak Lane, Bricket Wood,

- SA133- Belmont Hill, St Albans,
- SA135- Watsons Walk, St Albans,
- 1SA36- St Peters Street,
- SA137- High Street, St Albans and
- SA138 - Peahen PH, Holywell Hill, St Albans

Four of these seven locations have observed to exceed the AQS annual mean objective for NO_2. These four sites are named as follows:

- SA135- Watsons Walk, St Albans,
- 1SA36- St Peters Street,
- SA137- High Street, St Albans and
- SA138 - Peahen PH, Holywell Hill, St Albans

SA138 is located at the AQMA No.1 and the remaining three locations are situated outside the AQMAs. The NO_2 fall-off with distance calculator was used to estimate the NO_2 concentration for the diffusion tube locations with non-relevant exposures. However, the calculator could not be used to assess relevant exposure for diffusion tubes SA133, SA135, SA136 SA137 and SA138 due to the positioning of the receptors in respect to the diffusion tubes. The closest receptors to SA133, SA135 and SA137 are located on the opposite side of the road being monitored and SA136 is closer to the kerb than its closest receptor, which is 76m away. It is recommended that there should be a maximum distance of 20m between the monitor and receptor to ensure accuracy in the calculations. The 2015 concentration at SA137 was distance corrected at a distance of 2m when presented in the 2016 ASR, upon review during 2017 the closest relevant receptor was found to be located on the opposite side of High Street, therefore the concentration has not been distance corrected for 2016.

Furthermore, SA138 is located at the façade of a pub and the nearest relevant exposure is located on the second floor of the building. The distance correction calculator cannot assess for height variation and therefore could not be used at SA138. Therefore, the NO_2 fall-off with distance correction calculations have only been carried out for SA123 and SA124, shown in Table C.3, Figure C.1, and Figure C.2.

The results from 2016 generally show an increase in concentrations compared to those in 2015. There were only two monitoring locations in 2016 (SA120 - Sleapcross Gardens, Smallford and SA139 - Civic Centre, St Peters Street, St Albans) that reported a decrease in concentrations from 2015 to 2016. The increase in concentrations between 2015 and 2016 ranged from 0.2µg/m^3 to 12.2µg/m^3, with the average increase being reported as 4.1µg/m^3.

The trend charts presented in Figure A.1 and Figure A.2 display the changing concentrations of NO_2 at the individual monitoring locations (not distance corrected). The majority of monitoring locations have shown an overall decrease in annual mean NO_2 concentrations between 2012 and 2016. However, six sites (SA101, SA114/5/6, SA126, SA127, SA132 and SA136) increased by an average of 2.87µg/m^3 between 2012 and 2016, with the largest increase reported as 6µg/m^3.

The diffusion tube locations which observed exceedances of the annual mean NO_2 AQS objective of 40µg/m^3 in the previous years were SA121, 123, 124, 133, 134, 135, 136, 137 and 138. Although the NO_2 annual mean increased in 2016 compared to 2015, there has been an overall decrease in the concentrations at these locations throughout the previous four years.

There is currently one diffusion tube monitoring site within an existing AQMA (SA138). Although some are close to the boundaries of AQMAs, currently all other monitoring locations are outside of the existing AQMAs. It is recommended that the current NO_2 monitoring is reviewed, with either additional locations established within the designated AQMAs or with the relocation of existing monitoring locations to within the designated AQMAs.

This general trend in minor concentration elevation from 2015 to 2016 could be due to a number of factors such as changing traffic patterns (traffic numbers and journey routes) within the St Albans area and metrological conditions experienced within the monitoring period (especially wind speed and direction).

Defra guidance states that exceedances of the NO_2 1-hour objective are unlikely to occur where the annual mean concentration is below 60µg/m^3. All diffusion tube 2016 annual mean NO_2 concentrations recorded are below 60µg/m^3 therefore it can be considered as per Defra guidance that there were no exceedances of the AQS 1-hour objective for NO_2. In previous years (2012 and 2014), at location SA136 the annual mean NO_2 concentration has been recorded at 60µg/m^3 or above. However,

in the last two years, the annual mean NO_2 concentration at this location has been observed to be below 60µg/m^3.

4 Conclusion

Currently there are three Air Quality Management Areas (AQMAs) designated within St Albans, these have all been declared for exceedances of the annual mean AQS objective for NO_2. The predominant source of NO_2 within the District is traffic emissions from vehicles travelling on the road network, and it has been due to these emissions that the current AQMAs have been designated. There are a number of major roads that pass through the District and also areas within St Albans where roads become congested due to the volume of traffic. The traffic congestion coupled with the narrow, building lined roads within St Albans city centre leads to the build-up of NO_2 concentrations.

Monitoring of NO_2 is completed within St Albans using a network of passive diffusion tubes. There are currently 39 separate monitoring locations within the network, 26 of these locations are kerbside sites, 2 are roadside sites, 7 are urban background sites and 4 are rural sites.

Results from monitoring completed in 2016 indicates that the annual mean AQS objective for NO_2 (40µg/m^3) was exceeded at four locations, SA135, SA136, SA137 and SA138 and a further three locations (SA 123, 124 and 133) reported NO_2 annual mean concentrations of above 36µg/m^3. All these locations are not representative of the relevant exposure and distance correction is required.

The NO_2 fall-off with distance calculator was used to estimate the NO_2 concentration for the diffusion tube locations SA123 and SA124. Following distance correction of the concentrations all two locations fell well below the annual mean NO_2 objective.

The NO_2 fall-off with distance calculator could not be used to assess relevant exposure for diffusion tubes SA133, SA135, SA136, SA137 and SA138 due to the positioning of the receptors in respect to the diffusion tubes. The closest receptors to SA133, SA135 and SA137 are located on the opposite side of the road and SA136 is closer to the kerb than its closest receptor, which is 76m away. It is recommended that there should be a maximum distance of 20m between the monitor and receptor to ensure accuracy in the calculations. Furthermore, SA138 is located at the façade of a pub and the nearest relevant exposure is located on the second floor of the building. Limitations in the usability of the NO_2 fall-off with distance calculator means accurate estimated concentrations at relative exposure was not possible for these

monitoring locations. Annual mean concentrations were below 60µg/m^3 at all monitoring locations, therefore as per Defra guidance it is unlikely that the NO_2 1-hour objective of 200µg/m^3 was exceeded at any location.

NO_2 monitoring data for St Albans is presented from 2012 to 2016 (where available). The majority of the monitoring sites present an overall downward trend of annual mean NO_2 concentration with peak concentrations experienced predominately in 2012 or 2013.

The only exception from this downward trend is the urban background monitoring sites SA101, SA114/5/6, SA126, SA127, SA132 and SA136. Out of these six sites, all but one increased and still remained far below the NO_2 annual mean AQS objective. Site SA136 increased to exceed the annual mean AQS objective (51µg/m^3), however it is noted that since 2012 this site has consistency breached the annual mean AQS objective. SA136 is located at the exit to taxi rank and no distance correction for this location could be carried out as the nearest relevant exposure to is 76m away.

This general trend in concentration reduction from 2012 to 2016 could be due to the continual commitment and progress made by the St Albans City and District Council to improve local air quality with the aim to revoke the declared AQMAs.

In response to the designation of the existing AQMAs an Air Quality Action Plan (AQAP) was completed by St Albans City and District Council originally in 2003 and subsequently updated in 2010. The AQAP documents a number of objectives and measures that have been designed with the overall aim to minimise the effects of air pollution on human health. The measures presented within the AQAP range from short term initiatives such as developing cycling and walking strategies to longer term initiatives such as the potential change of road networks where exceedances have been identified.

The AQAP is designed to be flexible and open to continual updates as new information or new techniques for pollution control become available. Currently the AQAP is going through a period of review with the outcomes of a number of projects being completed within the District to be fed into the revision.

Appendix A: Monitoring Results

Table A.1 – 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)
SA101	Museum, Hatfield Road, St Albans	Roadside	515105	207476	NO_2	N	19m	2.5m	No	2.35
SA102	Folly Lane, St Albans	Kerbside	514160	207694	NO_2	N	20m	2m	No	2.33
SA103	Links View, St Albans	Kerbside	513988	208188	NO_2	N	12m	1m	No	2.4
SA104	Ben Austin, Redbourn	Roadside	509993	211744	NO_2	N	12.5m	6m	No	2.37
SA105	St Agnells, Lybury Lane, Redbourn	Rural	509012	213678	NO_2	N	N/A	0.5m	No	2.4
SA106	Lybury Lane, Redbourn	Rural	509668	212987	NO_2	N	N/A	5m	No	1.2
SA107	Redbourn JMI, Long Cutt, Redbourn	Urban Background	510194	212526	NO_2	N	N/A	28m	No	2.23
SA108	Redding Lane, Redbourn	Rural	509099	214068	NO_2	N	N/A	2m	No	2.24
SA109	High Street, Harpenden	Kerbside	513345	214409	NO_2	N	22m	3m	No	2.4
SA110	Crabtree JMI, Crabtree Lane, Harpenden	Kerbside	514498	214382	NO_2	N	21m	2m	No	2.7
SA111	Butterfield Road, Wheathampstead	Kerbside	517604	213349	NO_2	N	15m	1m	No	2.4
SA112	High Street,	Kerbside	517732	214117	NO_2	N	18m	3m	No	2.65

	Wheathampstead									
SA113	Pondfield Crescent, St Albans	Urban Background	516634	209085	NO_2	N	N/A	9m	No	2.22
SA114/5/6	Fleetville, 1 Royal Road, St Albans	Urban Background	516549	207391	NO_2	N	N/A	20m	No	2.45
SA117	Five Acres, London Colney	Kerbside	517666	204828	NO_2	N	24m	1m	No	2.46
SA118	Ridgeview Hostel, Barnet Rd, London Colney	Urban Background	518645	203435	NO_2	N	N/A	40m	No	2.45
SA119	Bowmans JMI, Telford Rd, London Colney	Kerbside	517482	203881	NO_2	N	24m	1m	No	2.4
SA120	Sleapcross Gardens, Smallford	Kerbside	520053	206618	NO_2	N	23m	1m	No	2.3
SA121	Mount Drive, Park Street	Kerbside	514654	204546	NO_2	N	31m	1m	No	2.45
SA122	Sycamore Drive, Park Street	Kerbside	514899	203857	NO_2	N	12m	2m	No	2.52
SA123	Radlett Road, Park Street	Kerbside	515295	202765	NO_2	N	4m	0.25m	No	2.45
SA124	Smug Oak Lane, Bricket Wood	Kerbside	515383	202528	NO_2	N	25m	1m	No	2.5
SA125	Lye Lane, Bricket Wood	Kerbside	513308	202655	NO_2	N	33m	2m	No	2.4
SA126	Five Acres Avenue, Bricket Wood	Kerbside	512689	202700	NO_2	N	5.5m	2m	No	2.57
SA127	Oakwood Road, Bricket Wood	Kerbside	512570	202716	NO_2	N	8m	2m	No	2.37
SA128	Waterdale, Old Watford Rd	Kerbside	512004	202105	NO_2	N	0m	18m	No	2.4

SA129	Ashridge Drive, Bricket Wood	Kerbside	512880	202238	NO_2	N	9m	1m	No	2.35
SA130	Tippendell Lane, Chiswell Green	Kerbside	513569	204537	NO_2	N	13.5m	2.5m	No	2.67
SA131	Farm Searches Lane, Bedmond	Rural	511351	203740	NO_2	N	N/A	1m	No	2.4
SA132	Westminster Lodge, Holywell Hill, St Albans	Urban Background	514317	206453	NO_2	N	N/A	1m	No	2.27
SA133	Belmont Hill, St Albans	Kerbside	514606	206801	NO_2	N	22m	1.5m	No	2.4
SA134	Albert Street, St Albans	Kerbside	514648	206919	NO_2	N	11.5m	2m	No	2.6
SA135	Watsons Walk, St Albans	Kerbside	515096	206921	NO_2	N	18m	2m	No	2.65
SA136	St Peters Street,	Kerbside	514883	207422	NO_2	N	76m	1m	No	2.34
SA137	High Street, St Albans	Kerbside	514664	207125	NO_2	N	14m	1.5m	No	2.77
SA138	Peahen PH, Holywell Hill, St Albans	Kerbside	514701	207082	NO_2	Y	N/A(3)	2m	No	2.62
SA139	Civic Centre, St Peters Street, St Albans	Urban Background	514921	207391	NO_2	N	N/A	25m	No	>3
SA140	Lattimore Road, St Albans	Kerbside	515185	207070	NO_2	N	5m	3m	No	2.48
SA141	Town Hall, St Albans	Urban Background	514741	207245	NO_2	N	N/A	2m	No	2.26

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.

(3) SA138 is sited at ground floor level of The Peahen Public House, relevant exposure is located on the 2nd floor at a height of approximately 6m. In previous LAQM reports the concentration at this location has been distance corrected through a horizontal axis as there is no tool available to correct a concentration in relation to height. Therefore the concentration is to be presented without correction, due to increased dispersal at the receptor location the concentration at the point of exposure is predicted to be lower than the monitoring concentration.

Table A.2 – Annual Mean NO_2 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
SA101	Roadside	Diffusion Tube	75.0	75.0	29.6	34	33.2	27.9	35.6
SA102	Kerbside	Diffusion Tube	91.7	91.7	33	28	29.4	24.8	26.8
SA103	Kerbside	Diffusion Tube	100.0	100.0	22.6	21.9	21.2	17.4	21.6
SA104	Roadside	Diffusion Tube	100.0	100.0	27.7	25.7	28	20.3	23.4
SA105	Rural	Diffusion Tube	91.7	91.7	22.9	20	24.6	17.4	20.8
SA106	Rural	Diffusion Tube	91.7	91.7	31.5	28.3	30.5	24	29.2
SA107	Urban Background	Diffusion Tube	75.0	75.0	26.5	24.2	22.6	20.3	24.1
SA108	Rural	Diffusion Tube	100.0	100.0	23.2	19	20.7	16.1	19.1
SA109	Kerbside	Diffusion Tube	66.7	66.7	37.6	32.8	29.3	30.9	33.4
SA110	Kerbside	Diffusion Tube	91.7	91.7	24.1	20.2	19.7	15.7	21.4
SA111	Kerbside	Diffusion Tube	91.7	91.7	23.5	20.7	22	16.8	19.7
SA112	Kerbside	Diffusion Tube	100.0	100.0	26.5	24.4	26.3	20.4	24.6
SA113	Urban Background	Diffusion Tube	100.0	100.0	21.1	17.6	20	14.8	17.7
SA114/5/6	Urban Background	Diffusion Tube	96.2	96.2	23.6[4]	21.5[4]	26.7[4]	22.3[4]	27.2[4]
SA117	Kerbside	Diffusion	83.3	83.3	29.7	24.5	29.1	18.1	28.1

		Tube							
SA118	Urban Background	Diffusion Tube	100.0	100.0	30.1	28.1	26.8	22.6	27.8
SA119	Kerbside	Diffusion Tube	100.0	100.0	31.6	27.5	29.6	22.1	24.9
SA120	Kerbside	Diffusion Tube	100.0	100.0	32.1	34.2	37.4	31.5	30.3
SA121	Kerbside	Diffusion Tube	91.7	91.7	**44.2**	**41.1**	**47**	35.3	36.0
SA122	Kerbside	Diffusion Tube	100.0	100.0	33.9	33.1	29.9	26.9	29.4
SA123	Kerbside	Diffusion Tube	91.7	91.7	**42**	35.1	38.4	32	37.6
SA124	Kerbside	Diffusion Tube	91.7	91.7	**42**	38.8	37.4	36.2	36.4
SA125	Kerbside	Diffusion Tube	58.3	58.3	32.6	34.8	28.2	23.9	29.1
SA126	Kerbside	Diffusion Tube	75.0	75.0	25.7	27.8	25.7	22.6	27.2
SA127	Kerbside	Diffusion Tube	83.3	83.3	31	31	30	26.2	31.4
SA128	Kerbside	Diffusion Tube	100.0	100.0	38.4	35.2	38.8	31	35.9
SA129	Kerbside	Diffusion Tube	91.7	91.7	31.1	29.1	28.3	23.5	26.2
SA130	Kerbside	Diffusion Tube	100.0	100.0	31.3	27.6	34.4	23.6	27.4
SA131	Rural	Diffusion Tube	91.7	91.7	34.8	32.6	33.5	22.3	27.5
SA132	Urban Background	Diffusion Tube	58.3	58.3	24.2	25	22.7	21.5	25.6
SA133	Kerbside	Diffusion Tube	75.0	75.0	**43.1**	**48.8**	30.9	33.9	37.9
SA134	Kerbside	Diffusion Tube	100.0	100.0	**43.4**	36	**42.3**	30.9	35.7

SA135	Kerbside	Diffusion Tube	100.0	100.0	**44.4**	**40.2**	**43.2**	30.9	**40.0**
SA136	Kerbside	Diffusion Tube	83.3	83.3	**46.7**	**62.9**	**60**	38.8	**51.0**
SA137	Kerbside	Diffusion Tube	100.0	100.0	**52.2**	**46.3**	**47.9**	**40.2**	**44.2**
SA138	Kerbside	Diffusion Tube	83.3	83.3	**46.7**	**48.8**	**55.5**	**42.4**	**46.5**
SA139	Urban Background	Diffusion Tube	100.0	100.0	30.5	24	26	28.5	25.1
SA140	Kerbside	Diffusion Tube	83.3	83.3	32.1	30	30	26.8	28.9
SA141	Urban Background	Diffusion Tube	83.3	83.3	38	29.6	30.8	22.1	24.0

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

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

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

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

(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per 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.

(4) The results are the average of the triplicate tubes.

Figure A.1 – Trends in Annual Mean NO_2 Concentrations for Sites SA101-120

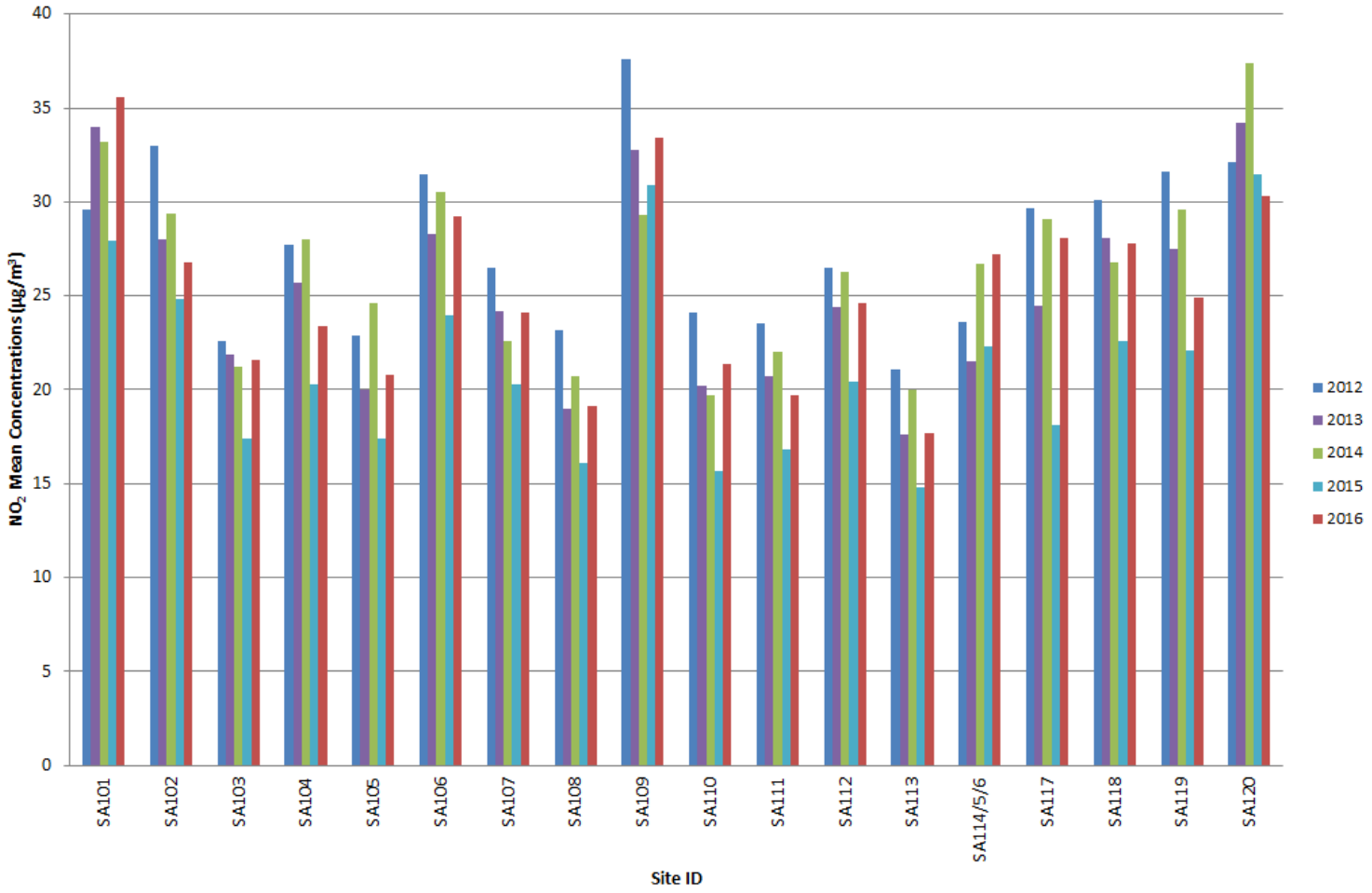
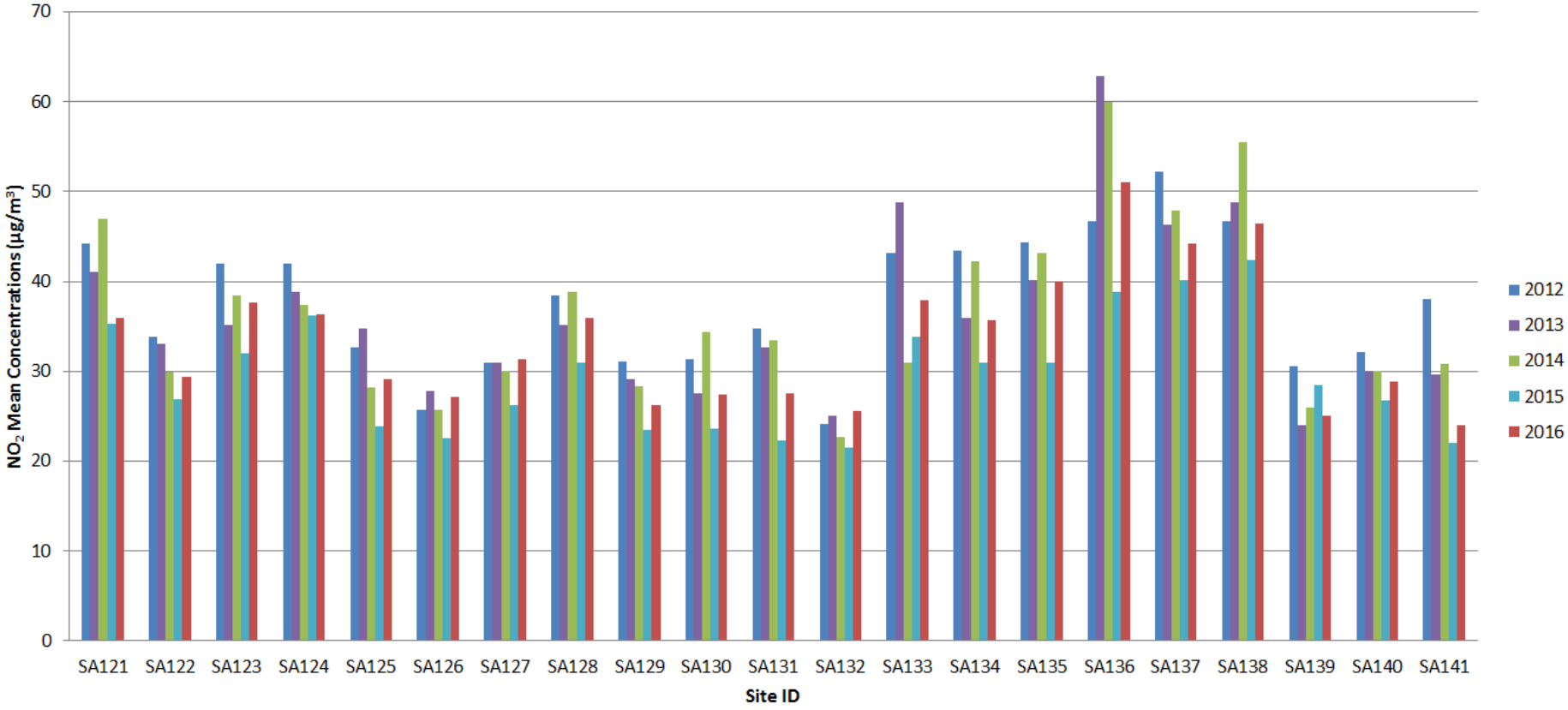


Figure A.2 – Trends in Annual Mean NO_2 Concentrations for Sites SA121-141



Appendix B: Full Monthly Diffusion Tube Results for 2016

Table B. 1 – NO_2 Monthly Diffusion Tube Results - 2016

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.92) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
SA101	45.1	37.2	34.1	31.7	33.6	-	28.7	-	35.6	-	46.1	56.7	38.7	35.6	-
SA102	36.1	32.8	26.9	24.2	25.3	-	14.9	13.9	33.4	23.5	45.4	43.7	29.1	26.8	-
SA103	29.88	26.46	20.98	19.38	18.97	16.48	24.48	25.2	19.3	15.54	32	33.46	23.5	21.6	-
SA104	37.75	29.77	21.94	21.87	17.55	18.92	19.56	18.51	25.44	18.84	38.68	36.87	25.5	23.4	-
SA105	24.82	41.25	-	18.13	19.03	17.69	11.41	14.6	19.79	18.76	32.51	30.64	22.6	20.8	-
SA106	52.53	-	29.44	29.33	29.68	20.08	25.87	25.42	25.75	24.48	47.1	39.18	31.7	29.2	-
SA107	-	28.81	22.84	21.76	-	18.48	18.07	26.44	19.16	40.99	39.66		26.2	24.1	-
SA108	23.04	22.56	21.99	20.32	20.75	18.16	9.36	12.86	19.36	19.51	30.91	29.82	20.7	19.1	-
SA109	-	-	20.82	35.86	37.44	31.56	27.81	-	-	34.62	57.18	49.19	36.8	33.4	-
SA110	30.48	39.45		17.06	16.94	14.31	13.6	11.77	21.16	16.68	38.35	36.38	23.3	21.4	-
SA111	-	25.86	20.67	19.45	17.23	14.51	13.3	12.59	21.86	16.65	38.69	34.67	21.4	19.7	-
SA112	33.83	30.04	20.94	22.32	23.95	21.91	18.6	17.14	24.54	21.22	48.68	37.81	26.7	24.6	-
SA113	29.34	22.07	14.81	16.76	14.22	12.14	9.51	11.82	21.29	13.36	33.68	32.31	19.3	17.7	-
SA114	45.76	42.37	18.69	24.17	20.11	19.33	13.85	22.54	17.07	26.17	42.67	49.57	28.5	26.2	-
SA115	49.31	43.77	21.39	25.11	-	19.99	13.97	23.65	16.51	28.12	39.97	50.42	30.2	27.8	-

SA116	48.14	43.97	19	18.35	23.84	19.84	13.18	24.29	17.25	29.89	47.12	53.23	29.8	27.5	-
SA117	-	33.53	33.74	28.59	27.54	23.95	20.69	-	21.37	25.03	46.44	44.87	30.6	28.1	-
SA118	37.4	29.69	30.06	27.13	29.22	22.11	21.98	22.6	33.23	22.13	43.74	42.96	30.2	27.8	-
SA119	37.16	30.72	24.11	21.81	23.02	19.13	17.45	18.38	28.34	20.15	43.72	40.9	27.1	24.9	-
SA120	39.75	33.44	27.65	30.27	31.39	26.52	31.41	28.12	41.25	26.16	37.96	41.42	32.9	30.3	-
SA121	45.29	38.05	33.89	35.82	37.82	-	31.9	32.15	42.96	31.94	57.95	42.47	39.1	36.0	-
SA122	43.32	32.31	26.62	30.68	26.47	24.71	25.52	24.95	32.94	23.99	49.53	42.07	31.9	29.4	-
SA123	51.37	43.7	34.95	33.22	41.79	33.56	35.31	29.99	45.79	-	52.06	48.19	40.9	37.6	32.2
SA124	40.81	42.23	40.1	38.3	46.37	40.18	29.38	36.29	46.48	37.9	-	36.97	39.5	36.4	31.3
SA125	-	33.53	-	-	35.92	25.55	20.73	-	31.89	-	43.66	34.33	32.2	29.1	-
SA126	31.23	29.67	-	26.71	-	21.08	-	20.67	28.99	23.59	45.11	39.39	29.6	27.2	-
SA127	38.69	35.04	30.06	27.83	-	25.3	24.79		32.33	26.4	49.13	52.25	34.2	31.4	-
SA128	43.51	40.05	38.65	38.7	36.18	34.92	31.33	31.77	45.04	34.15	56.57	37.36	39.0	35.9	-
SA129	34.46	31.17		23.32	25.28	20.25	18.58	19.08	30.51	25.19	41.74	43.95	28.5	26.2	-
SA130	38.97	32.12	29.67	26.29	23.5	22.47	22.01	21.08	33.99	21.12	46.36	39.88	29.8	27.4	-
SA131	31.44	32.3	28.73	30.21	30.46	-	15.59	19.74	31.27	29.2	46.44	33.76	29.9	27.5	-
SA132	37.35	24.7	23.07	-	-	15.86	-	26.46	-	-	37.66	49.4	30.6	25.6	-
SA133	44.25	34.05	-	38.7	43.74	38.22	30.18	29.91	-	-	61.51	50.34	41.2	37.9	-
SA134	45.37	37.04	37.37	33.93	38.15	34.73	30.91	26.26	45.59	32.18	53.85	50.12	38.8	35.7	-
SA135	49.52	37.95	36.2	40.95	42.45	38.11	34.68	33.6	49	36.76	67.53	55.14	43.5	**40.0**	-
SA136	52.91	47.13	53.67	54.71	64.19	44.85	-	43.79	68.36	-	63.33	60.99	55.4	**51.0**	-
SA137	48.85	43.13	44.28	44.43	49.97	46.26	32.08	39.05	56.89	41.96	68.29	60.76	48.0	**44.2**	-
SA138	54.82	44	44.46	54.81	59.71	53.01	46.74	46.9	66.72	-	-	34.11	50.5	**46.5**	-
SA139	32.76	26.16	24.86	25.79	22.68	21.02	20.38	20.24	33.83	15.85	42.65	40.76	27.2	25.1	-
SA140	39.17	33.83	27.83	29.81	-	24.62	23.44	22.39	34.25	26.28	52.02	-	31.4	28.9	-
SA141	32.67	29.64	26.62	26.77	26.7	21.36	19.37	21.75	32.95	22.79	-	-	26.1	24.0	-

☐ **Local bias adjustment factor used**

☒ **National bias adjustment factor used**

☒ **Annualisation has been conducted where data capture is <75%**

Notes:

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

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

(1) 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

Diffusion Tube Bias Adjustment Factors

It is stated within the LAQM section of https://uk-air.defra.gov.uk/ that diffusion tubes are affected by several sources of interference which can cause substantial under or overestimation (bias) compared to a chemiluminescent analyser (the reference method). This can prove to be a problem in any situation where diffusion tube results are compared with the AQS objectives. As a result, local authorities are required to quantify the bias of their diffusion tube measurements and apply an appropriate bias adjustment factor if required.

The bias adjustment factor, which is an estimate of the difference between diffusion tube concentration and continuous monitoring, the latter assumed to be a more accurate method of monitoring has been used to factor the results. LAQM.TG(16) provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

With regard to the application of a bias adjustment factor for diffusion tubes, the Defra Technical Guidance LAQM.TG(16) and the LAQM Helpdesk[4] recommend the use of a local bias adjustment factor where available and relevant to diffusion tube sites.

St Albans City and District Council does not operate any continuous monitors within the District and therefore a co-location study is not available to derive a local bias factor, thus the national bias adjustment factor spreadsheet[5] has been used.

Diffusion tube data for St Albans City and District Council is supplied and analysed by Gradko International Ltd, the tubes were prepared using the 20% TEA in water preparation method. The 2016 national bias adjustment factor for Gradko 20% TEA

[4] Laqm.defra.gov.uk
[5] National Diffusion Tube Bias Adjustment Factor Spreadsheet, version 03/16 published in March 2016

in water is 0.92 (based on 32 studies, version 09/17) as derived from the national bias adjustment factor spreadsheet.

The bias adjustment factors used for 2012 to 2016 are shown in Table C.1.

Table C.1 – Bias Adjustment Factors

Year ofData	Bias AdjustmentFactor
2012	0.96 – National factor
2013	0.95 – National factor
2014	0.92 – National factor
2015	0.91 – National factor
2016	0.92 – National factor

QA/QC of Diffusion Tube Monitoring

The diffusion tubes are supplied and analysed by Gradko International Limited utilising the 20% Triethanolamine (TEA) in acetone preparation method.

Gradko International Ltd is a UKAS accredited laboratory and participates in laboratory performance and proficiency testing schemes. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO_2 concentrations reported are of a high calibre. The laboratory follows the procedures set out in the Harmonisation Practical Guidance and participates in the AIR proficiency-testing (AIR-PT) scheme. Defra and the Devolved Administrations advise that diffusion tubes used for LAQM should be obtained from laboratories that have demonstrated satisfactory performance in the AIR-PT scheme. Laboratory performance in the AIR-PT is also assessed by the National Physical Laboratory (NPL), alongside laboratory data from the monthly NPL Field Inter-Comparison Exercise.

In the 2016 AIR-PT results, AIR-PT AR012 (January to February 2016), AIR-PT AR013 (April to May 2016), AR015 (July to August 2016) and AR016 (September to October 2016), Gradko scored 100%. The percentage score reflects the results deemed to be satisfactory based upon the z-score of $< \pm 2$.

Short-term to Long-term Data Adjustment

For the 2016 diffusion tubes, annualisation was required at three sites due to data capture being below 75%. Annualisation has been completed in line with Defra Technical Guidance LAQM.TG(16) Box 7.10 and full working details are provided in Table C.2.

In completing the annualisation procedure, data has been taken from three automatic monitoring stations that are within 50 miles of the sites to be annualised: Haringey Priory Park South, London Bloomsbury and London N. Kensington. These sites form part of the national AURN network and are background monitoring sites. As such, they are not influenced by local sources of air pollution, such as road traffic emissions at roadside monitoring sites. The details of the annualisation have been provided in Table C.2.

Table C.2 – Annualisation for Site SA109/125/132

Site ID	Unadjusted Diffusion Tube Mean (µg/m^3)	AF London Haringey Priory Park South	AF London Bloomsbury	AF London N. Kensington	Average AF	Annualised & Bias Adjusted (0.92) Concentration (µg/m^3)
SA109	36.8	0.999	0.995	0.968	0.987	33.4
SA125	32.2	0.967	1.003	0.970	0.980	29.1
SA132	30.6	0.905	0.906	0.909	0.907	25.6

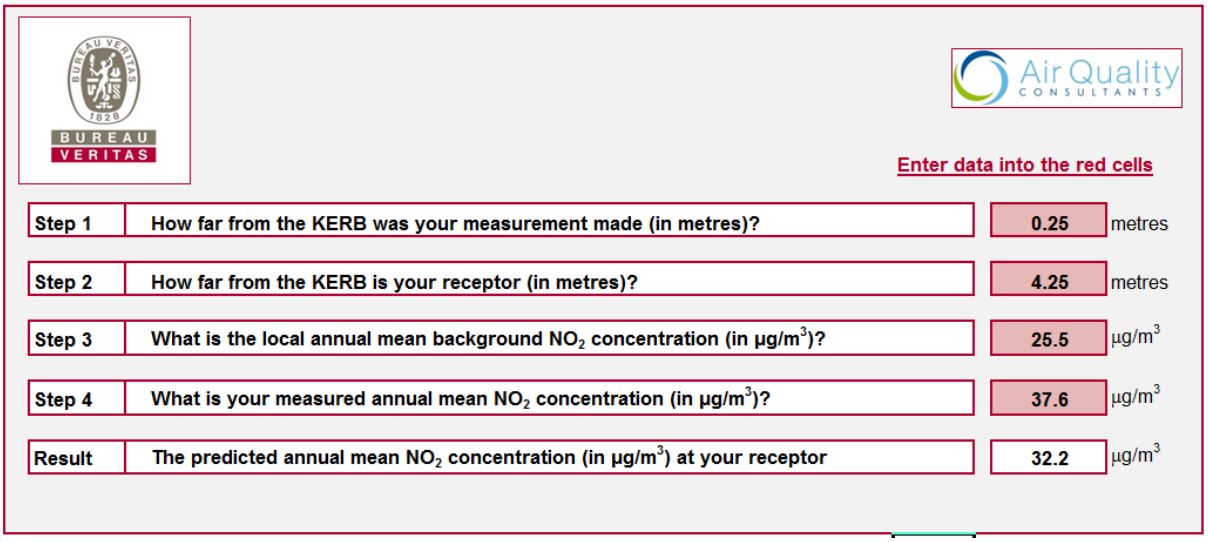
Fall-off Distance Correction of Sites Exceeding the NO_2 Annual Mean Objective

The NO_2 fall-off with distance calculator was used to estimate the NO_2 concentration at the nearest locations relevant for exposure for the diffusion tubes with the annual mean above 36µg/m^3. As the nearest relevant exposure to the diffusion tube locations SA133, SA135 and SA136 is on the other side of the road, and SA136 is closer to the kerb than its relevant exposure and the distance between them is 76m, which is over than the recommended distance of 20m between the two locations, fall off with distance correction could not be undertaken. SA138 is located at the façade of a pub and the nearest relevant exposure is located on the second floor of the building. As the distance correction calculator does not take variations in height into consideration the site could not be corrected. Therefore, the NO_2 fall-off with distance correction calculations are only done for the sites SA123 and SA124 as shown in Table C.3, Figure C.1 and Figure C.2.

Table C.3 – Fall-off Distance Correction of Sites Exceeding the NO_2 Annual Mean Objective (2015)

Site ID	Site Name	Distance to kerb	Distance from relevant exposure to kerb	Bias Adjusted and Annualised Annual Mean (µg/m^3)	Distance Corrected Annual Mean (µg/m^3)
SA123	Radlett Road, Park Street	0.25m	4m	37.6	32.2
SA124	Smug Oak Lane, Bricket Wood	1m	10m	36.4	31.3

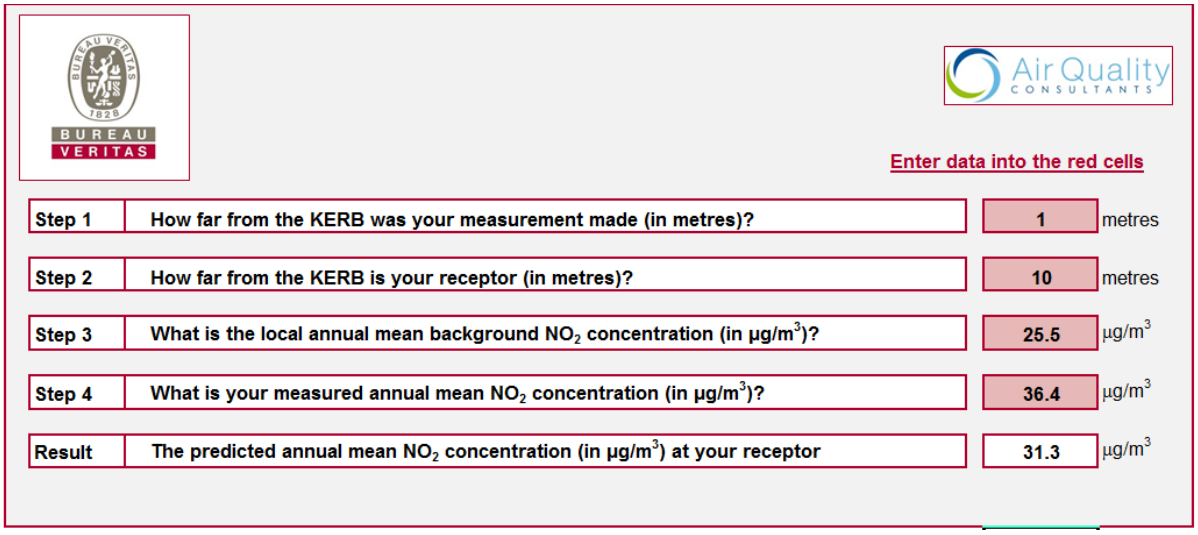
Figure C.1 – Fall-off Distance Correction of Site SA123



Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	0.25	metres
Step 2	How far from the KERB is your receptor (in metres)?	4.25	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	25.5	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	37.6	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	32.2	µg/m^3

Figure C.2 – Fall-off Distance Correction of Site SA124

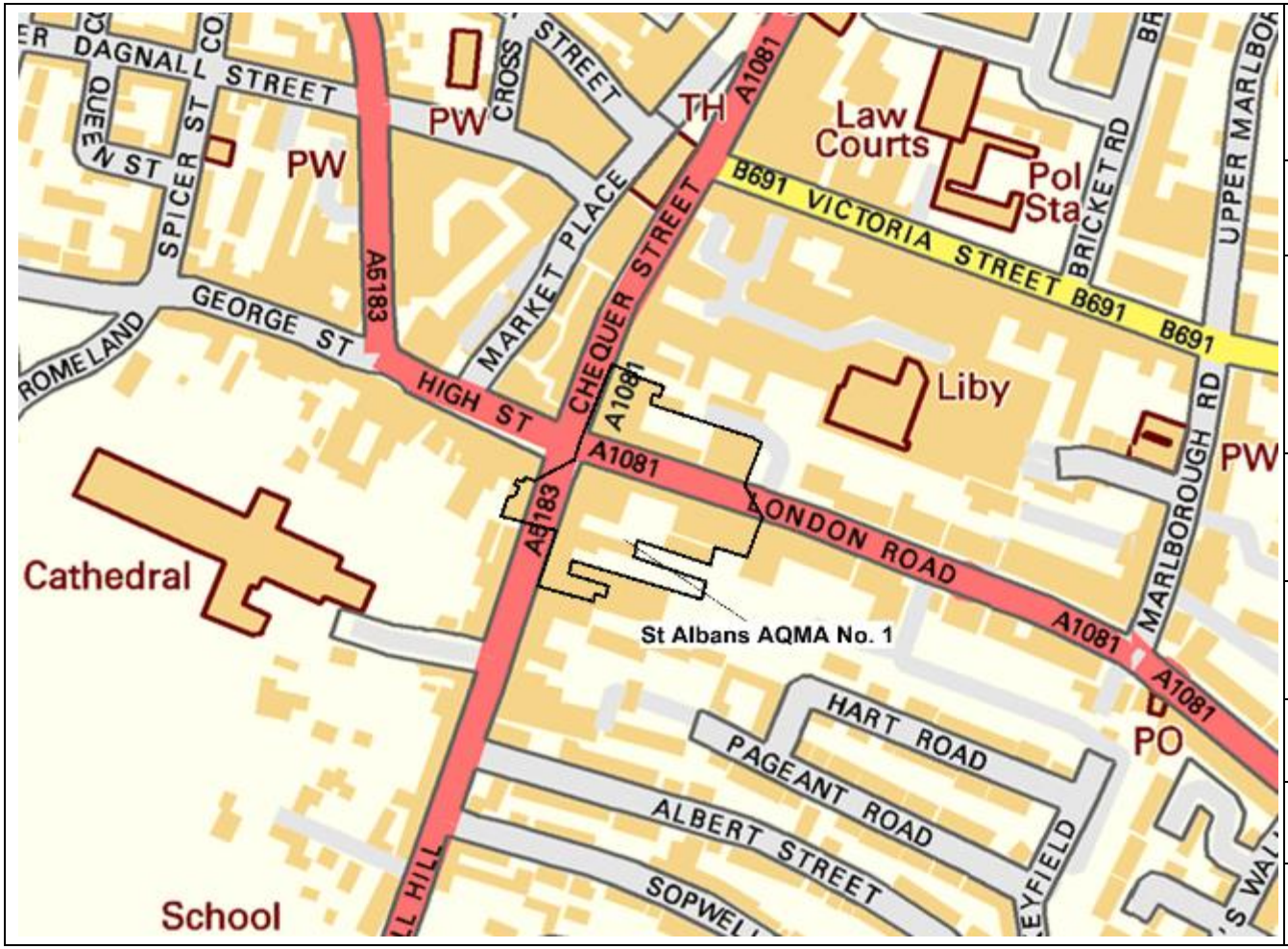


Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	1	metres
Step 2	How far from the KERB is your receptor (in metres)?	10	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	25.5	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	36.4	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	31.3	µg/m^3

Appendix D: Map(s) of Monitoring Locations and AQMAs

Figure D.1– Map of Current Air Quality Management Area Boundaries – St Albans



Legend

AQMA Boundary

Air Quality
Bureau Veritas
5th Floor
66 Prescott Street
London, E1 8HG

Location	**St Albans and City and District Council**
Title	**St Albans AQMA No. 1**
By PB	**Approved** HS
Scale Not To Scale	**Job Ref** 6366491
Date February 2018	**Figure No.** **D.1**

Figure D.2 – Map of Current Air Quality Management Area Boundaries – Beechtree Cottages

Legend

AQMA Boundary

Air Quality
Bureau Veritas
5th Floor
66 Prescott Street
London, E1 8HG

Location

St Albans and City and District Council

Title

St Albans AQMA No. 2

By	Approved
PB	HS
Scale	**Job Ref**
Not To Scale	6366491
Date	**Figure No.**
February 2018	**D.2**

Figure D.3– Map of Current Air Quality Management Area Boundaries - Frogmore

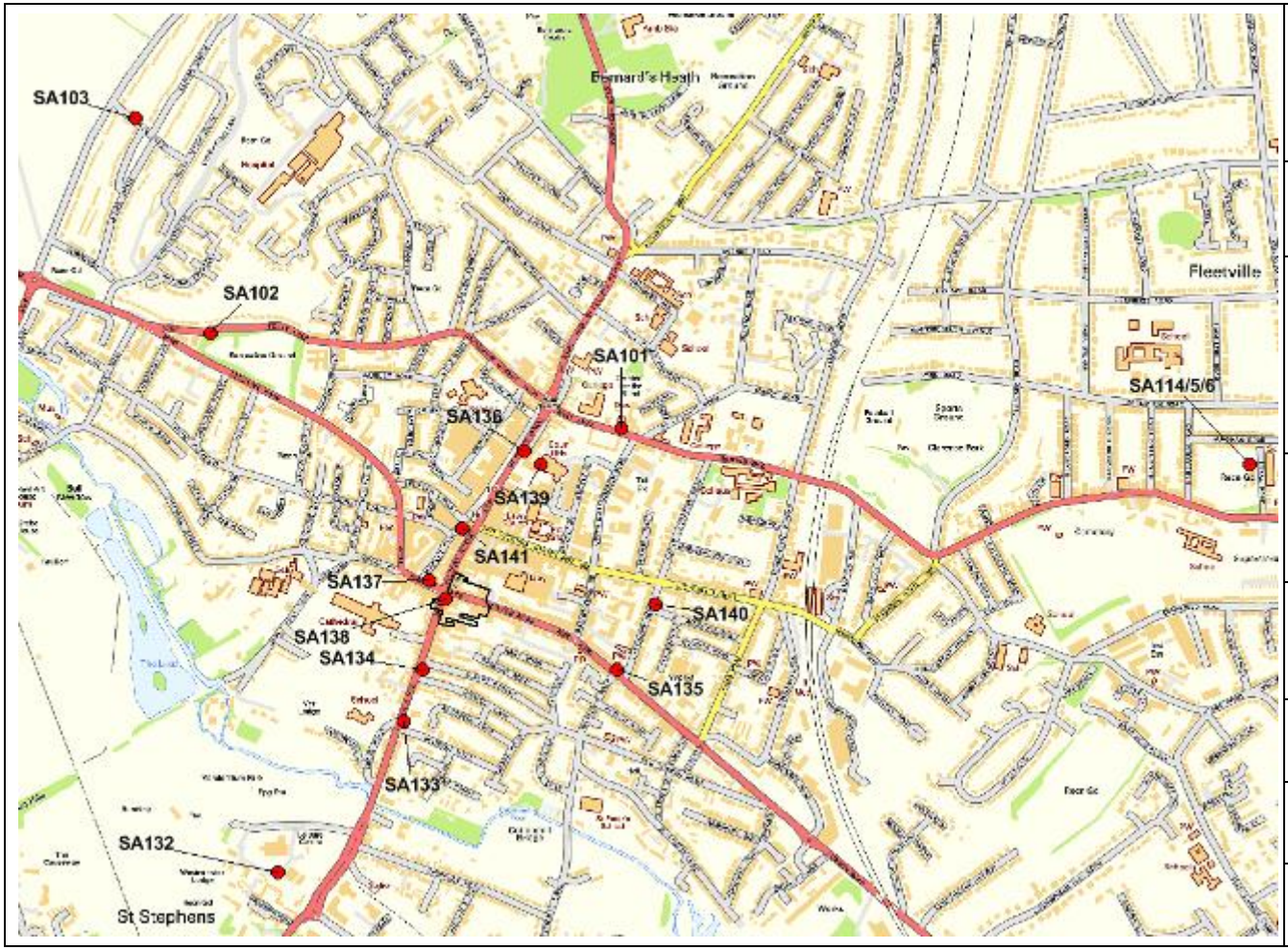
Legend

AQMA Boundary

Air Quality
Bureau Veritas
5th Floor
66 Prescott Street
London, E1 8HG

Location	**St Albans and City and District Council**
Title	**St Albans AQMA No. 7**
By PB	**Approved** HS
Scale Not To Scale	**Job Ref** 6366491
Date February 2018	**Figure No.** **D.3**

Figure D.4 – Map of Diffusion Tube Locations – St Albans



Legend

Diffusion Tube Locations

AQMA Boundary

Air Quality
Bureau Veritas
5th Floor
66 Prescott Street
London, E1 8HG

Location

St Albans City and District Council

Title

Diffusion Tube Locations – St Albans

By	Approved
PB	HS
Scale	**Job Ref**
Not To Scale	6366491
Date	**Figure No.**
February 2018	**D.4**

Figure D.5– Map of Diffusion Tube Locations – Redbourne

Legend

Diffusion Tube Locations

Air Quality
Bureau Veritas
5th Floor
66 Prescott Street
London, E1 8HG

Location

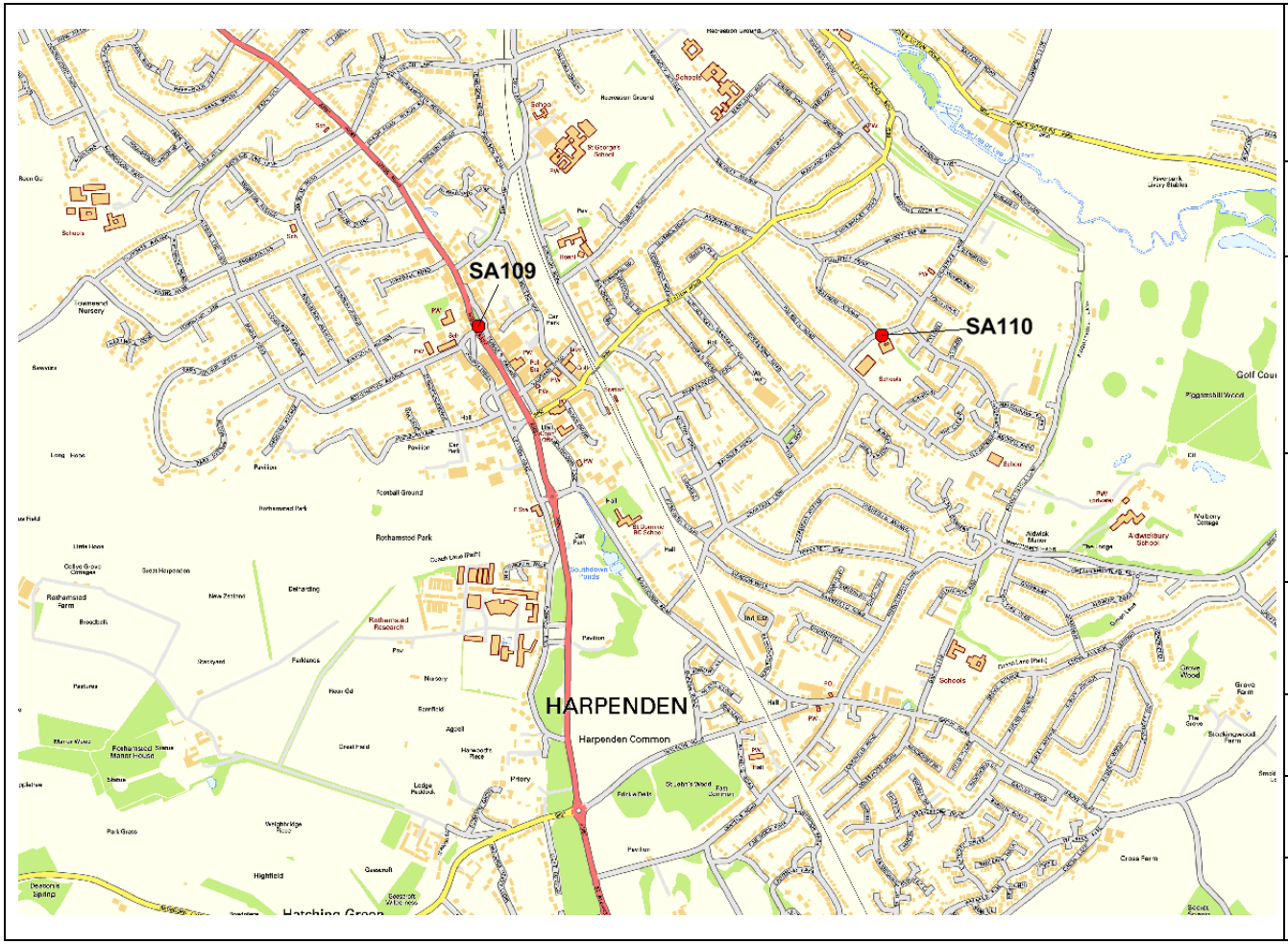
St Albans City and District Council

Title

Diffusion Tube Locations - Redbourne

By	Approved
PB	HS
Scale	**Job Ref**
Not To Scale	6366491
Date	**Figure No.**
February 2018	**D.5**

Figure D.6– Map of Diffusion Tube Locations – Harpenden



Legend

Diffusion Tube Locations

Air Quality
Bureau Veritas
5th Floor
66 Prescott Street
London, E1 8HG

Location

St Albans City and District Council

Title

Diffusion Tube Locations – Harpenden

By	Approved
PB	HS
Scale	**Job Ref**
Not To Scale	6366491
Date	**Figure No.**
February 2018	**D.6**

Figure D.7 – Map of Diffusion Tube Locations – Wheathampstead

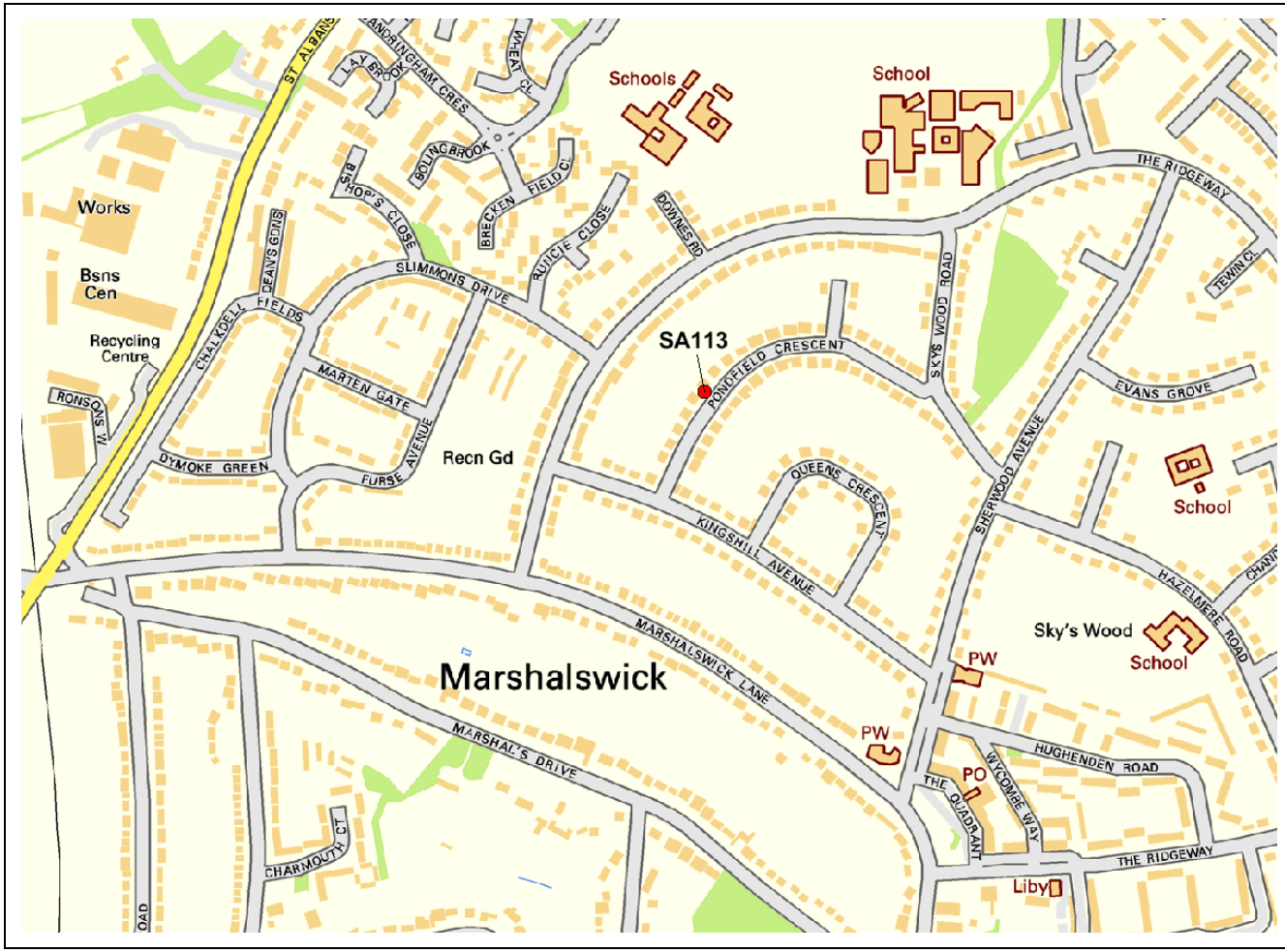
Legend

Diffusion Tube Locations

Air Quality
Bureau Veritas
5th Floor
66 Prescott Street
London, E1 8HG

Location	**St Albans City and District Council**
Title	**Diffusion Tube Locations – Wheathampstead**
By PB	**Approved** HS
Scale Not To Scale	**Job Ref** 6366491
Date February 2018	**Figure No.** **D.7**

Figure D.8– Map of Diffusion Tube Locations – Marshalswick



Legend

Diffusion Tube Locations

Air Quality
Bureau Veritas
5th Floor
66 Prescott Street
London, E1 8HG

Location	**St Albans City and District Council**
Title	**Diffusion Tube Locations – Marshalswick**
By PB	**Approved** HS
Scale Not To Scale	**Job Ref** 6366491
Date February 2018	**Figure No.** **D.8**

Figure D.9 – Map of Diffusion Tube Locations – London Colney

Legend

Diffusion Tube Locations

Air Quality
Bureau Veritas
5th Floor
66 Prescott Street
London, E1 8HG

Location

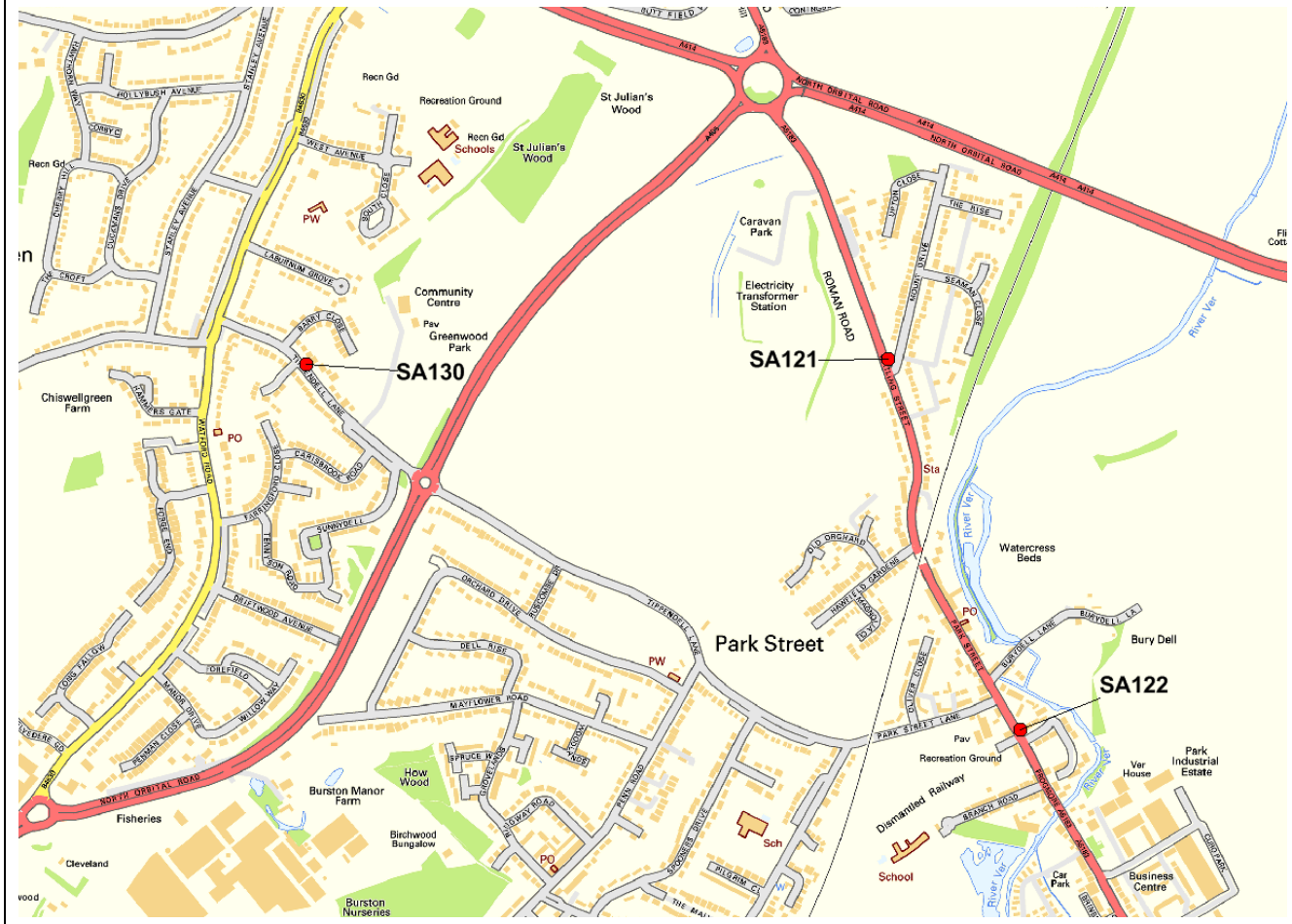
St Albans City and District Council

Title

Diffusion Tube Locations – London Colney

By	Approved
PB	HS
Scale	**Job Ref**
Not To Scale	6366491
Date	**Figure No.**
February 2018	**D.9**

Figure D.10 – Map of Diffusion Tube Locations – Chiswell Green/Park Street



Legend

Diffusion Tube Locations

Air Quality
Bureau Veritas
5th Floor
66 Prescott Street
London, E1 8HG

Location	**St Albans City and District Council**
Title	**Diffusion Tube Locations – Chiswell Green/Park Street**
By PB	**Approved** HS
Scale Not To Scale	**Job Ref** 6366491
Date February 2018	**Figure No.** **D.10**

Figure D.11 – Map of Diffusion Tube Locations – Frogmore

Legend

Diffusion Tube Locations

AQMA Boundary

Air Quality
Bureau Veritas
5th Floor
66 Prescott Street
London, E1 8HG

Location	**St Albans City and District Council**
Title	**Diffusion Tube Locations – Frogmore**
By PB	**Approved** HS
Scale Not To Scale	**Job Ref** 6366491
Date February 2018	**Figure No.** **D.11**

Figure D.12 – Map of Diffusion Tube Locations – Bricket Wood

Appendix E: Summary of Air Quality Objectives in England

Table E.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/m^3).

Glossary of Terms

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

References

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- Local Air Quality Management Policy Guidance LAQM.PG(16). Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- NO_2 Fall off With Distance Tool, available at http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html
- National Diffusion Tube Bias Adjustment Spreadsheet, version 09/17 published in September 2017.
- St Albans City and District Council 2016 Annual Status Report
- Hertfordshire County Council, Local Transport Plan 3, 2011-2031.
- St Albans City and District Council Climate Change Action Plan 2016.
- St Albans City and District Council Green Travel Plan, July 2012.