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	
Date	February 2018

Executive Summary: Air Quality in Our Area

Air pollution is associated with a number of adverse health impacts and 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].

Air Quality in North Devon

North Devon is fortunate in enjoying good local air quality generally. The main pollutant of local concern is nitrogen dioxide (NO_2). This is a product of combustion and road traffic is the dominant source within the district.

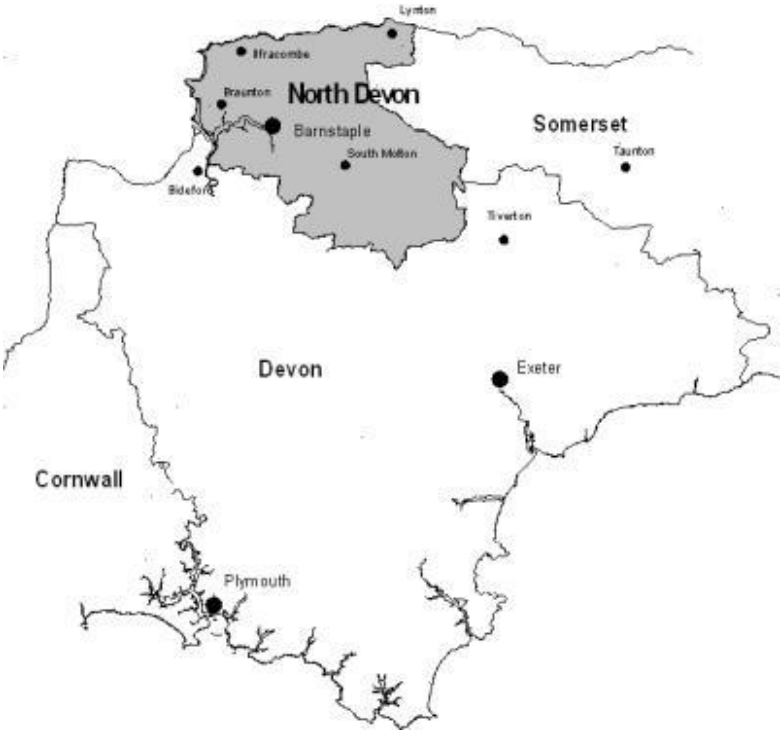

Figure 1: Map showing North Devon Council area

[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

The Council has undertaken a routine monitoring programme for NO_2 since 2000 and currently monitors at 16 permanent locations and a further 11 temporary locations.

If measured levels exceed or appear likely to exceed an air quality objective level, local authorities must declare an “Air Quality Management Area” and develop measures to bring levels of the pollutant down. An Air Quality Management Area was declared by North Devon Council on 11th July 2011, following exceedance of the air quality objective annual mean level for NO_2 at a location in Braunton. This area is referred to as “North Devon Council Air Quality Management Area No1” (AQMA#1). 11 additional NO_2 monitoring sites were set up in the area to ensure results were available for all locations of potential concern.

Monitored annual mean NO_2 levels at the Council’s 27 monitoring sites show fairly stable levels over the past 5 years and the vast majority of results over this period are well below the national air quality objective annual mean standard of 40µg/m^3. In 2016, all sites, including those within the AQMA, complied with the standard.

In relation to the designated AQMA, it is considered too early to say whether current compliance with the objective level can be relied on to continue. The Council will therefore continue to prioritise and progress measures set out in the Air Quality Action Plan 2016. This situation will be reviewed each year as part of the Annual Status Reporting process.

More information on AQMA#1 and actions being taken to improve air quality are provided in this report. Section 3 contains full details of the air quality monitoring undertaken during 2016.

Actions to Improve Air Quality

North Devon Council plays a major role in protecting and improving local air quality, a role that is wide ranging and includes involvement in the protection of green spaces, controlling the air quality impacts of development through the planning regime, working with partners such as Devon County Council to improve road junctions and the non-car travel infrastructure of the district and more. The Council’s Environmental Health & Housing Services Department is the Lead service for Local Air Quality Management in North Devon as well as for the Local Air Pollution Control regime, which regulates prescribed industrial processes. It is also a Consultee to the Council

and County Council Planning Departments in relation to the air quality impacts of new development.

Following the declaration of an Air Quality Management Area in Braunton mentioned above, the Council initiated a programme of additional NO_2 monitoring in order to better understand the nature and extent of air quality impacts in this location. The Council also created a Technical Working Group (TWG) to coordinate and oversee a programme of improvements and develop a detailed Air Quality Action Plan (AQAP). The Action Plan was published in May 2016 and is available on the Council's Air Quality website at: http://www.northdevon.gov.uk/environment/air-quality/

Conclusions and Priorities

Monitored annual mean NO_2 levels at the Council's 27 monitoring sites show fairly stable levels over the past 5 years and the vast majority of results over this period are well below the national air quality objective annual mean standard of 40µg/m^3. In 2016, all sites, including those within the AQMA, complied with the standard.

In relation to the designated AQMA, it is considered too early to say whether current compliance with the objective level can be relied on to continue. The Council will therefore continue to prioritise and progress measures set out in the Air Quality Action Plan 2016. This situation will be reviewed each year as part of the Annual Status Reporting process.

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

More detail on these measures can be found in the Air Quality Action Plan available at: North Devon air quality webpage

Key completed measures during 2016 are:

- Publication of an Air Quality Action Plan in May 2016 (AQAP 2016) for Braunton which sets out a package of measures designed to address the AQMA
- AQAP Measure 7: Redirecting traffic along A399 - Electronic signage now redirects traffic at peak flow times

North Devon Council's key priorities for the coming year are:

- To undertake a review of NO_2 monitoring locations to determine whether there may be any further locations with relevant exposure above objective levels within North Devon and to ensure that results from existing locations are reliable and comply with the latest technical guidance
- Continued implementation of the measures set out in the Air Quality Action Plan 2016 with a view to achieving reductions in measured NO_2 concentrations within the AQMA
- Continuing to monitor and analyse NO_2 concentrations at all monitoring locations in order to assess progress and work towards revocation of the Braunton AQMA
- To consult with Public Health England with a view to undertaking a Health Needs Assessment (HNA) for air quality. The aim is to better understand how air pollution may be affecting local populations within North Devon and to establish how best to deploy limited resources so as to maximise health benefits. HNAs are a recommended tool to provide evidence about a population on which to plan services and address health inequalities and offer a systematic method for reviewing the health issues affecting local populations

Local Engagement and How to get Involved

Residents, local businesses and visitors to North Devon can make their own important contributions to improving air quality and some of the changes that help to reduce air pollution also have proven mental and physical health benefits too.

Here are some examples of possible changes that make a real difference:

- Make more short trips and journeys on foot or by bike instead of by car
- Find someone to try car sharing with such as a work colleague or other parents on the school run
- For longer journeys switch from using a car to public transport

And if you have to use your car…..

- Make sure your tyre pressures are correct (low tyre pressure increases fuel use, fuel costs and emissions).
- Think about whether you need to use the air conditioning. Using it increases fuel consumption by up to 20%
- Using a roof rack on your car can also increase fuel consumption by 20%. Bicycles are better attached to the back of the car.

Opt for local produce!

- Transporting food and other goods a long way creates more air pollution than transporting them short distances. Buying local also helps our local economy!

Other ideas worth considering might include:

- Purchasing a low-emission electric and/or hybrid vehicle, with government funding and grants often available.
- Upgrading boilers to more efficient versions such as gas condensing boilers with lowest NOx (and carbon) emissions.
- Improving building insulation to reduce pollution associated with wasted energy.

Further information on local air quality and a link to Defra's Local Air Quality Management website can be found online at:

www.northdevon.gov.uk/environment/air-quality/

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1 Local Air Quality Management

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

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

Local authorities in England no longer have to report on 1,3-Butadiene, Benzene, Carbon Monoxide and Lead. There are no significant concerns regarding these pollutants in North Devon.

There is a new requirement for local authorities to work towards reducing levels of $PM_{2.5}$ (fine particulates). This report sets out what North Devon Council will do in relation to $PM_{2.5}$ in section 2.3 below.

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 the AQMA declared by North Devon Council 2011 can be found in Table 2.1 below. Further information related to the AQMA, including maps of the AQMA boundary and the Air Quality Action Plan 2016 is available online at: http://www.northdevon.gov.uk/environment/air-quality/

For reference, a map of North Devon Council's monitoring locations is available at Appendix D of this report.

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	
NDC AQMA#1	11 July 2011	NO_2 annual mean	Braunton	Braunton B3231 from "The Square" junction to the "Village Green".	NO	44.35 µg/m^3	36.10 µg/m^3	Air Quality Action Plan 2016 North Devon air quality webpage

☐ **North Devon 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 North Devon

Defra's appraisal of last year's ASR concluded:

> *"On the basis of the evidence provided by the local authority the conclusions reached are acceptable for all sources and pollutants, with the provisos listed in the commentary below.*
>
> *The report is well structured, detailed, and provides the information specified in the Guidance.*
>
> 1. *It is noted that the District Council are continuing to carry out routine monitoring with the use of passive diffusion tubes for nitrogen dioxide at 27 sites across the District, with results significantly below objective levels.*
> 2. *Table A.1 in Appendix A suggests that some of the sites are not representative of relevant exposure. On this basis, the results for these sites should be corrected for distance as advised in the latest Technical Guidance Manual TG(16).*
> 3. *The Borough Council may wish to consider reviewing the current monitoring programme in light of these results, to determine whether there may be any further locations with relevant exposure above objective levels elsewhere.*
> 4. *The results suggest there has not been an exceedance of the annual mean objective for nitrogen dioxide in Braunton since 2011. On this basis the Council should take steps towards revoking this AQMA."*

The above points have been addressed as follows:

1. Routine monitoring is carried out at 16 sites – the remainder are additional monitoring associated with the declaration of the AQMA.
2. This recommendation is acknowledged. In future, all relevant result data will be corrected for distance in accordance with Technical Guidance Manual TG(16).
3. The Council's monitoring locations are currently under review, including in relation to relevant exposure distances. The aim of the review is to ensure that monitoring is being undertaken at the most appropriate locations and that subsequent data analysis produces reliable results in accordance with the

latest technical guidance. The review will be completed in time for the start of the monitoring year 2018.

4. This statement is incorrect: the results show an exceedance in Braunton (site 13) up to 2014, not 2011. If monitoring for 2017 confirms a below objective level trend, the Council will take further advice from DEFRA regarding the potential revocation of the AQMA.

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

More detail on these measures can be found in the Air Quality Action Plan available at: North Devon air quality webpage

Key completed measures are:

- Publication of an Air Quality Action Plan in May 2016 (AQAP 2016) for Braunton which sets out a package of measures designed to address the AQMA
- AQAP Measure 7: Redirecting traffic along A399 - Electronic signage now redirects traffic at peak flow times

North Devon Council expects the following measures to be completed over the course of the next reporting year:

- Undertake a review of NO_2 monitoring locations to determine whether there may be any further locations with relevant exposure above objective levels within North Devon and to ensure that results from existing locations are reliable and comply with the latest technical guidance.
- AQAP Measure 12: Developing a supplementary planning document re air quality – expected March 2018
- AQAP Measure 14: Installation of a "Park + Change" facility at Chivenor - Development currently under construction

North Devon Council's priorities for the coming year are:

- Continued implementation of the measures set out in the Air Quality Action Plan 2016 with a view to achieving reductions in measured NO_2 concentrations within the AQMA
- Continuing to monitor and analyse NO_2 concentrations at all monitoring locations in order to assess progress and work towards revocation of the Braunton AQMA

- To consult with Public Health England with a view to undertaking a Health Needs Assessment (HNA) for air quality. The aim is to better understand how air pollution may be affecting local populations within North Devon and to establish how best to deploy limited resources so as to maximise health benefits. HNAs are a recommended tool to provide evidence about a population on which to plan services and address health inequalities and offer a systematic method for reviewing the health issues affecting local populations.

Table 2.2 – Progress on Measures to Improve Air Quality (as of January 2018 - to provide up to date progress report)

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 / Actual Completion Date	Comments / Barriers to implementation
1	Upgrading of the traffic signals at "The Square" to "MOVA" (Microprocessor Optimised Vehicle Actuation)	Traffic Management	UTC, Congestion management, traffic reduction	DCC	Ongoing	To be confirmed	Improved junction capacity and traffic flows	Not Specified	Review completed	To be Confirmed	Community engagement 2018
2	Consider amending the South Street one way system in relation to optimising traffic flow	Traffic Management	UTC, Congestion management, traffic reduction	DCC	Completed	To be confirmed	Reduced traffic volume on Caen Street	Not Specified	Review completed	To be Confirmed	DCC assessment concludes minor impact on traffic volumes which highlights potential for AQ benefit – albeit small - exists. But a high impact to local residents. Community engagement 2018
3	Consider the implementation of a comprehensive one way system around the village and / or the pedestrianisation of Caen Street	Traffic Management	UTC, Congestion management, traffic reduction	DCC	Completed	To be confirmed	Reduced traffic volume on Caen St	Not Specified	Report completed	To be Confirmed	Community engagement 2018. . High cost. Funding, land and planning barriers
4	Review all pedestrian movements around the village, to identify the optimal type and location of signals / crossings to maximise traffic	Traffic Management	UTC, Congestion management, traffic reduction	DCC	Initial Review undertaken. Ongoing	To be confirmed	Increased walking / improved traffic flows	Not Specified	Review completed	To be Confirmed	Community engagement 2018 to consider specific recommendations

	flow. (Including signal crossing timings, resiting removal etc.)										
5	Improving parking management, including the prevention of parking associated with blocking bus stops	Traffic Management	, Congestion management, traffic reduction	DCC	Review & consultation completed 2014	To be confirmed	Improved traffic flow	Not Specified	Review completed but not fully implemented	To be confirmed	DCC to revisit recommendations with community in 2018
6	Installation of a delivery hub	Freight and Delivery Management	Freight Consolidation Centre	DCC and businesses	Ongoing	To be confirmed	Reduction in heavy vehicles	Not Specified	Ongoing	To be confirmed	Community engagement 2018
7	Redirecting traffic along A399	Traffic Management	UTC, Congestion management, traffic reduction	DCC	Complete	Completed	N/A	N/A	Completed	Completed	Electronic signage redirects traffic at peak flows times.
8	Off peak delivery times	Freight and Delivery Management	Quiet & out of hours delivery	DCC	To be confirmed	To be confirmed	Reduction in heavy vehicles at peak times	Not Specified	None	To be confirmed	Community engagement 2018
9	Improving Public Transport	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	DCC	Ongoing	Ongoing	Reduced bus emissions Improved A361 bus facilities And improved passenger information services.	Not Specified	Ongoing Some S106 contributions secured. Service frequency has been increased. Upgraded waiting facilities have been introduced Real Time Information is been introduced in 2017/18.	Ongoing	DCC to investigate future green fleet options with bus operators in conjunction with DCC\S106 funding

10	Fleet partnerships - working with local companies to encourage lower emissions fleet vehicles	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	NDC	Review Undertaken	Complete	Uptake increased County wide	Not Specified	Complete	Complete	Eco-Stars Scheme in place.(DCC engagement with bus company in context of measure 9)
11	Implementing school / work travel plans	Promoting Travel Alternatives	School Travel Plans	DCC	Ongoing	Ongoing	Sustainable School Travel In place	Not Specified	Ongoing	Ongoing	Ensure Primary School included in previously mentioned Community Engagement in 2018
12	Developing a supplementary planning document re air quality	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	NDC	To be prepared	Dec-17	Draft being prepared	N/A	Draft being prepared	Mar-18	Consultation exercise following adoption of Local Plan
13	Producing travel packs for holiday accommodation	Public Information	Via leaflets	NDC	Ongoing	Ongoing	Number of participating Companies	N/A	NDC Communications exercise to be undertaken	Spring 2018	None.
14	Installation of a "Park + Change" facility at Chivenor	Alternatives to private vehicle use	Bus based Park & Ride	NDC / DCC	Soon Completed	Permission Granted	Uptake of facility	Not Specified	Awaiting completion of Development	Expected 2018	Development Under Construction
15	Establish and develop NDC's role in relation to assessing and reducing exposure to PM2.5 in North Devon	Other	Other	NDC	See Comments					see comments	To be removed from list and incorporated within a new North Devon Council Air Quality Strategy

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.

Public Health England has created an online data tool known as The Public Health Outcomes Framework, which is intended to help focus public health action on increasing healthy life expectancy and reducing differences in life expectancy between communities. The tool uses indicators to assess improvements and includes indicator 3.01:

> *"Fraction of all-cause adult mortality attributable to anthropogenic particulate air pollution (measured as fine particulate matter, $PM_{2.5}$)*

This indicator can be used to compare the situation regarding $PM_{2.5}$ in North Devon with other areas and with England as a whole. The comparison is shown in Table 2.3 below:

Table 2.3: Adult mortality attributable to particulate air pollution ($PM_{2.5}$)

AREA	North Devon District	South West Region	England Highest	England Lowest
Percentage of adult Mortality	**3.6%**	**4.3%**	**6.7%**	**3.0%**

Source: Public Health England - http://www.phoutcomes.info/public-health-outcomes-framework (2015 data)

It can be seen from the above comparison that North Devon has amongst the lowest fractions of mortality attributable to $PM_{2.5}$.in England and is also lower than the average for the wider South West Region. Last year's ASR reported a figure of 3.7% based on 2013 data, suggesting a slight improvement has occurred during the period within North Devon. While this is to be welcomed, it is also clear that exposure to this pollutant does occur and so further reductions would have health benefits.

North Devon Council is taking the following measures that are expected to help in further reducing levels of $PM_{2.5}$ pollution:

- Regular inspections of industrial processes permitted by North Devon Council where combustion and non-combustion processes could lead to anthropogenic emissions of $PM_{2.5}$
- Continuing to work with Devon County Council (as the Authority with primary responsibility for the delivery of major road improvement schemes) to secure the delivery of such schemes to improve air quality in Braunton.
- An Action Plan has been prepared in respect of the Braunton AQMA. Although the action plan measures are primarily aimed at reducing the exposure of residents within the AQMA to NO_2, the initiatives within it will typically have a positive effect on the reduction of $PM_{2.5}$
- To consult with Public Health England with a view to undertaking a Health Needs Assessment (HNA) for air quality. The aim is to better understand how air pollution including $PM_{2.5}$ may be affecting local populations within North Devon and to establish how best to deploy limited resources so as to maximise health benefits.

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

3.1 Summary of Monitoring Undertaken

The Council has undertaken a routine monitoring programme for NO_2 since 2000 and currently monitors at 16 permanent locations and a further 11 temporary locations.

3.1.1 Automatic Monitoring Sites

There are no automatic monitoring sites in North Devon.

3.1.2 Non-Automatic Monitoring Sites

North Devon Council undertook non- automatic (passive) monitoring of NO_2 at 27 sites during 2016. 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 other adjustments applied (e.g. “annualisation” and/or distance correction), are included in Appendix C.

3.1.3 Nitrogen Dioxide (NO_2)

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

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

Monitored annual mean NO_2 levels at the Council’s 27 monitoring sites show fairly stable levels over the past 5 years and the vast majority of results over this period are well below the national air quality objective annual mean standard of 40µg/m^3. In 2016, all sites, including those within the AQMA, complied with the standard.

In relation to the designated AQMA, it is considered too early to say whether current compliance with the objective level can be relied on to continue. The Council will therefore continue to prioritise and progress measures set out in the Air Quality Action Plan 2016. This situation will be reviewed each year as part of the Annual Status Reporting process.

3.1.4 Particulate Matter (PM_{10})

The Council does not carry out any routine monitoring of PM_{10} in its area.

3.1.5 Particulate Matter ($PM_{2.5}$)

The Council does not carry out any routine monitoring of $PM_{2.5}$ in its area.

3.1.6 Sulphur Dioxide (SO_2)

The Council does not carry out any routine monitoring of SO_2 in its area.

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)
site 1	Pilton Causway, Barnstaple	Kerbside	SS 55756	BNG 33720	NO_2	NO	1	0.5	NO	3
site 2	Rolle Street 1, Barnstaple	Kerbside	SS 55533	BNG 33615	NO_2	NO	1	0.5	NO	3
site 3	Rolle Street 2, Barnstaple	Kerbside	SS 55421	BNG 33652	NO_2	NO	1	0.5	NO	3
site 4	Lower Sticklepath Roundabout, Barnstaple	Kerbside	SS 55658	BNG 32828	NO_2	NO	10	0.5	NO	3
site 5	Sticklepath School, Barnstaple	Urban Backgrnd	SS 54230	BNG 32526	NO_2	NO	1	n/A	NO	3
site 6	Cedars Roundabout, Barnstaple	Kerbside	SS 53936	BNG 32409	NO_2	NO	100	0.5	NO	3
site 7	Newport Road, Barnstaple	Kerbside	SS 56716	BNG 32203	NO_2	NO	1	0.5	NO	3
site 8	South Street, Newport,	Kerbside	SS 56671	BNG 32088	NO_2	NO	1	0.5	NO	3
site 9	Castle Street, Barnstaple	Kerbside	SS 55559	BNG 33298	NO_2	NO	1	0.5	NO	3

site 10	Alexandra Road, Barnstaple	Kerbside	SS 56130	BNG 33181	NO_2	NO	3	0.5	NO	3
site 11	Belle Meadow Road, Barnstaple	Kerbside	SS 55764	BNG 33702	NO_2	NO	1	0.5	NO	3
site 12	The Square, Braunton	Kerbside	SS 48896	BNG 36714	NO_2	YES	1	0.5	NO	3
site 13	The London Inn, Braunton	Kerbside	SS 48731	BNG 36642	NO_2	YES	1	0.5	NO	3
site 14	Church Street, Ilfracombe	Kerbside	SS 51544	BNG 47330	NO_2	NO	1	0.5	NO	3
site 15	High Street, Ilfracombe	Kerbside	SS 55704	BNG 33169	NO_2	NO	1	0.5	NO	3
site 16	Broad Street, South molton	Kerbside	SS 71426	BNG 25877	NO_2	NO	1	0.5	NO	3
site B1	Exeter Road 1, Braunton	Kerbside	SS 49052	BNG 35885	NO_2	NO	1	1	NO	3
site B2	Exeter Road 2, Braunton	Kerbside	SS 48970	BNG 36071	NO_2	NO	1	1	NO	3
site B3	Exeter Road 3, Braunton	Kerbside	SS 48916	BNG 36188	NO_2	NO	1	1	NO	3
site B4	Exeter Road 4, Braunton	Kerbside	SS 48886	BNG 36320	NO_2	NO	1	1	NO	3
site B5	Exeter Road 5, Braunton	Kerbside	SS 48859	BNG 36407	NO_2	NO	1	1	NO	3
site B6	South Street 1, Braunton	Kerbside	SS 48712	BNG 36059	NO_2	NO	1	1	NO	3
site B7	South Street 2, Braunton	Kerbside	SS 48788	BNG 36495	NO_2	NO	1	1	NO	3
site B8	Chaloners Road, Braunton	Kerbside	SS 48781	BNG 36656	NO_2	NO	1	1	NO	3

site B9	Caen Gardens, Braunton	Kerbside	SS 48619	BNG 36628	NO_2	NO	4	3	NO	3
site B10	Saunton Road 1, Braunton	Kerbside	SS 48429	BNG 36598	NO_2	NO	1	1	NO	3
site B11	Saunton Road 2, Braunton	Kerbside	SS 48335	BNG 36648	NO_2	NO	1	1	NO	3

Notes:

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

(2) N/A if not applicable.

Table A.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/m³) [3]				
					2012	2013	2014	2015[4]	2016
site 1	Kerbside	Diffusion Tube	25	25	26.35	32.11	28.39	25.02	33.2
site 2	Kerbside	Diffusion Tube	67	67	27.93	29.21	27.65	26.45	27.2
site 3	Kerbside	Diffusion Tube	0	0	34.88	33.91	31.09	30.16	no data
site 4	Kerbside	Diffusion Tube	67	67	21.85	21.77	19.93	21.99	15.2
site 5	Urban Backgrnd	Diffusion Tube	42	42	7.70	22.15	23.31	19.08	24.4
site 6	Kerbside	Diffusion Tube	67	67	18.33	18.75	17.30	15.27	18.9
site 7	Kerbside	Diffusion Tube	67	67	27.68	27.80	27.56	25.65	25.9
site 8	Kerbside	Diffusion Tube	17	17	23.94	24.73	24.26	23.05	24.9
site 9	Kerbside	Diffusion Tube	67	67	15.28	16.12	15.81	13.37	15.2
site 10	Kerbside	Diffusion Tube	58	58	27.37	27.70	27.32	25.08	20.6
site 11	Kerbside	Diffusion Tube	50	50	25.02	26.57	24.08	22.04	25.8
site 12	Kerbside	Diffusion Tube	67	67	38.84	38.87	0.00	**40.97**	35.5
site 13	Kerbside	Diffusion Tube	50	50	**42.32**	**40.70**	**40.53**	30.83	29.1
site 14	Kerbside	Diffusion Tube	67	67	20.97	20.18	21.89	16.47	19.7

site 15	Kerbside	Diffusion Tube	58	58	18.70	17.62	18.43	16.66	14.9
site 16	Kerbside	Diffusion Tube	67	67	22.65	24.51	22.41	18.95	21.0
site B1	Kerbside	Diffusion Tube	67	67	14.80	14.00	16.60	15.30	17.4
site B2	Kerbside	Diffusion Tube	42	42	16.87	6.61	16.66	17.27	16.2
site B3	Kerbside	Diffusion Tube	67	67	26.49	24.21	19.72	19.17	22.7
site B4	Kerbside	Diffusion Tube	67	67	16.67	19.33	21.38	16.10	18.1
site B5	Kerbside	Diffusion Tube	67	67	37.42	32.65	34.14	36.69	38.7
site B6	Kerbside	Diffusion Tube	58	58	14.07	7.41	9.79	9.34	11.6
site B7	Kerbside	Diffusion Tube	67	67	14.40	14.15	0.00	13.58	16.9
site B8	Kerbside	Diffusion Tube	42	42	24.90	22.49	22.66	21.31	21.8
site B9	Kerbside	Diffusion Tube	67	67	14.98	16.95	14.78	17.50	15.5
site B10	Kerbside	Diffusion Tube	67	67	22.41	19.66	24.34	20.50	27.4
site B11	Kerbside	Diffusion Tube	58	58	19.64	20.67	20.70	18.14	23.0

✓☐**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. PLEASE NOTE**: 2016 data has been distance corrected for relevant exposure following DEFRA appraisal recommendation (see page 4). See Appendix B for full 2016 data including distance corrected results.

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.TG16if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(4) The above 2015 data is the revised results following removal of data from tubes exposed >35days (see page 4 point 2. above).

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 ($\mu g/m^3$)														
	Jan	Feb[3]	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)
site 1	-	-	-	31.70	32.96	-	18.53	-	-	-	-	-	27.73	36.81	33.2
site 2	-	-	-	30.66	30.04	-	24.95	26.94	31.57	33.15	41.07	39.58	32.25	29.94	27.2
site 3	-	-	-	-	-	-	-	-	-	-	-	-	no data	no data	no data
site 4	-	-	-	21.47	26.17	-	19.14	22.55	21.83	25.21	34.10	33.67	25.52	23.69	15.2
site 5	-	-	-	18.83	-	-	19.25	22.38	26.95	-	-	29.72	23.43	24.42	24.4
site 6	-	-	-	12.82	19.44	-	15.45	18.17	20.15	22.72	26.45	27.79	20.37	18.92	18.9
site 7	-	-	-	25.59	28.54	-	24.16	25.59	30.39	34.14	39.56	36.84	30.60	28.41	25.9
site 8	-	-	-	22.07	25.67	-	-	-	-	-	-	-	23.87	27.26	24.9
site 9	-	-	-	13.93	16.50	-	11.34	14.25	16.35	21.12	21.91	24.06	17.43	16.19	15.2
site 10	-	-	-	20.16	-	-	21.98	24.17	28.66	32.55	37.65	41.00	29.45	26.63	20.6
site 11	-	-	-	25.91	26.52	-	18.18	23.23	23.15	29.19	-	-	24.36	28.29	25.8
site 12	-	-	-	35.01	45.23	-	42.04	43.47	42.10	41.85	41.84	51.14	42.84	39.77	35.5
site 13	-	-	-	25.80	-	-	35.78	38.45	-	38.31	34.32	50.67	37.22	32.46	29.1
site 14	-	-	-	20.82	36.45	-	13.81	19.58	20.54	25.77	25.02	24.79	23.35	21.68	19.7
site 15	-	-	-	12.39	17.76	-	19.49	-	17.39	19.65	20.25	21.52	18.35	16.17	14.9

site 16	-	-	-	23.99	28.54	-	16.69	18.84	19.58	32.56	28.93	28.40	24.69	22.93	21.0
site B1	-	-	-	18.75	18.33	-	8.87	13.19	16.12	25.87	22.39	26.07	18.70	17.36	17.4
site B2	-	-	-	17.50	18.56	-	-	-	-	21.10	24.27	24.84	21.25	16.20	16.2
site B3	-	-	-	25.13	24.03	-	19.08	22.58	22.06	25.57	31.00	26.32	24.47	22.72	22.7
site B4	-	-	-	16.50	18.05	-	10.42	14.96	19.52	25.73	24.44	25.91	19.44	18.05	18.1
site B5	-	-	-	42.56	45.14	-	40.58	47.55	37.73	37.32	43.85	38.90	41.70	38.72	38.7
site B6	-	-	-	10.68	-	-	7.27	10.17	10.11	18.49	15.13	17.81	12.81	11.58	11.6
site B7	-	-	-	15.26	16.99	-	10.53	14.95	16.25	25.41	22.64	23.94	18.25	16.94	16.9
site B8	-	-	-	19.01	24.45	-	-	-	25.04	27.82	-	31.34	25.53	21.82	21.8
site B9	-	-	-	13.27	15.85	-	13.44	17.64	14.65	23.98	18.75	22.62	17.53	16.27	15.5
site B10	-	-	-	27.09	29.52	-	26.91	30.41	27.98	28.39	31.12	34.28	29.46	27.36	27.4
site B11	-	-	-	19.06	21.96	-	16.91	22.23	17.30	33.85	-	30.41	23.10	22.98	23.0

✓☐**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.

(3) Site 3 – The Monitoring Site (Lampost) was removed by a third party Agency

(4) Data for January, February, March & June removed (tubes exposed >35 days). See Appendix C.

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

C.1 – Supporting Technical Information

The Council will continue to monitor for potential exceedances.of the Air Quality Objectives through the Air Quality Annual Status Reporting regime and through its regulatory roles, involvement in the planning process and continued monitoring of air quality across the District.

C.2 – Air Quality Monitoring Data QA/QC

Diffusion Tubes Exposed > 35 days

NO_2 diffusion tube result data from tubes exposed for more than 35 days has been removed because the level of confidence in results from tubes exposed for more than 35 days is reduced. This follows advice from the tube analysis laboratory (Gradko) and subsequent discussion with Defra's LAQM Helpdesk.

In future, every attempt will be made to ensure tubes are collected within the 35 day period.

Diffusion Tube Annualisation

A short-term correction factor was applied to data from sites with a collection efficiency of below 75% and those which had a collection efficiency of below 100% and an unadjusted annual mean concentration of > 36 ug/m3 – in accordance with advice received from the LAQM helpdesk.

Annualisation was undertaken using the average correction factor derived from monthly mean data from the continuous monitoring stations of "Bournemouth" and "Bristol St Pauls". Corrections were undertaken for each relevant site in accordance with advice from the LAQM helpdesk.

Diffusion Tube Bias Adjustment Factor

The bias adjustment factor applied to the annual mean concentration was 0.92. This was calculated using the spreadsheet at:-

https://laqm.defra.gov.uk/

Database_Diffusion_Tube_Bias_Factors-v06 / 17-Final.xls

The spreadsheet was accessed on 8th September 2017, inputting “Gradko” as the analysing laboratory and ”20% TEA in water” for the preparation.

Distance Correction

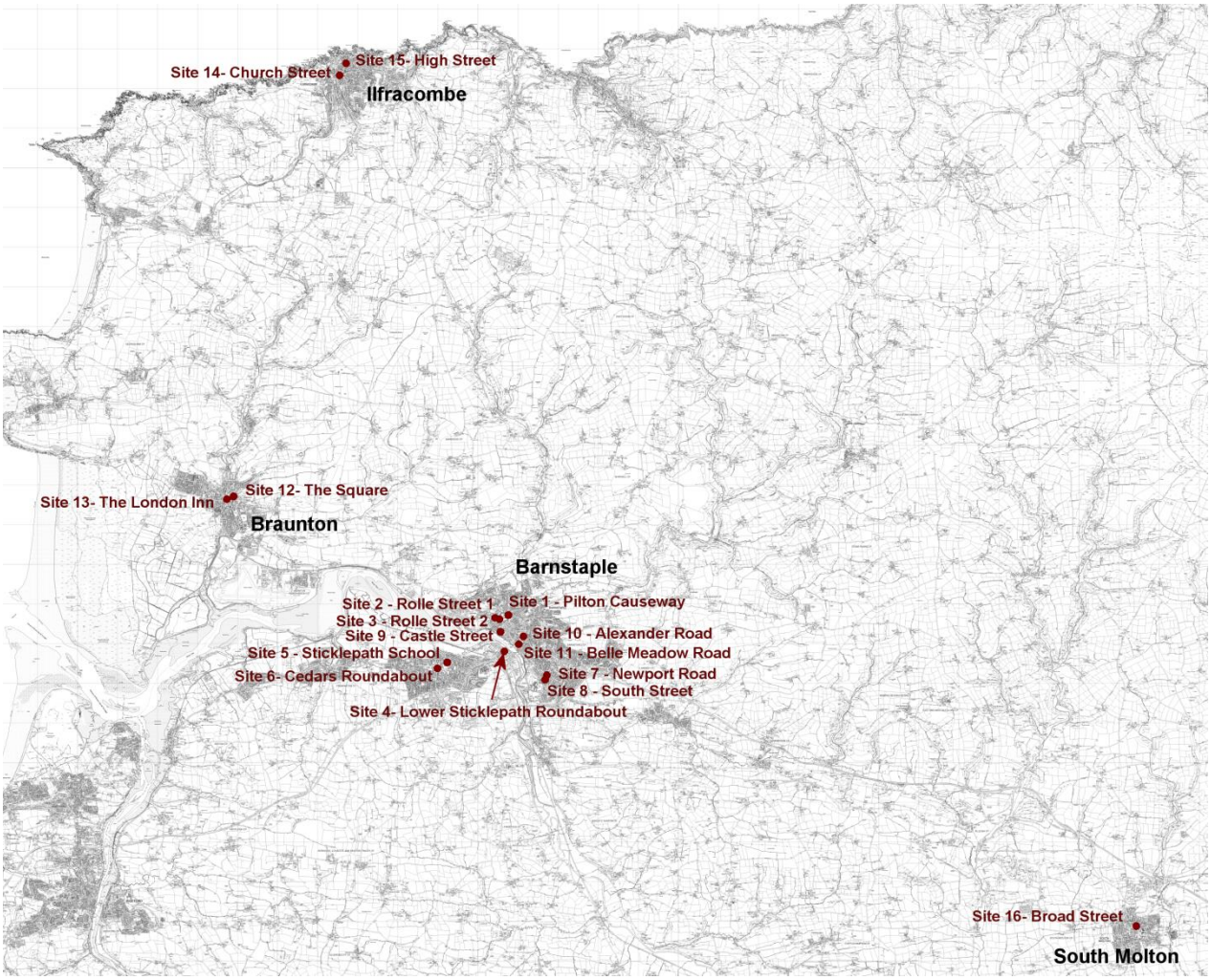
Distance correction has been carried out, where appropriate, in line with paragraphs 7.64 – 7.65 of LAQM.TG (16) using the formula from the NO2 fall off with distance calculator version 4.1. Results are shown in Table B.1 at Appendix B.

Local annual mean background NO2 concentrations have been derived from the latest DEFRA background maps (2013), corrected to 2016 to coincide with the latest monitoring results.

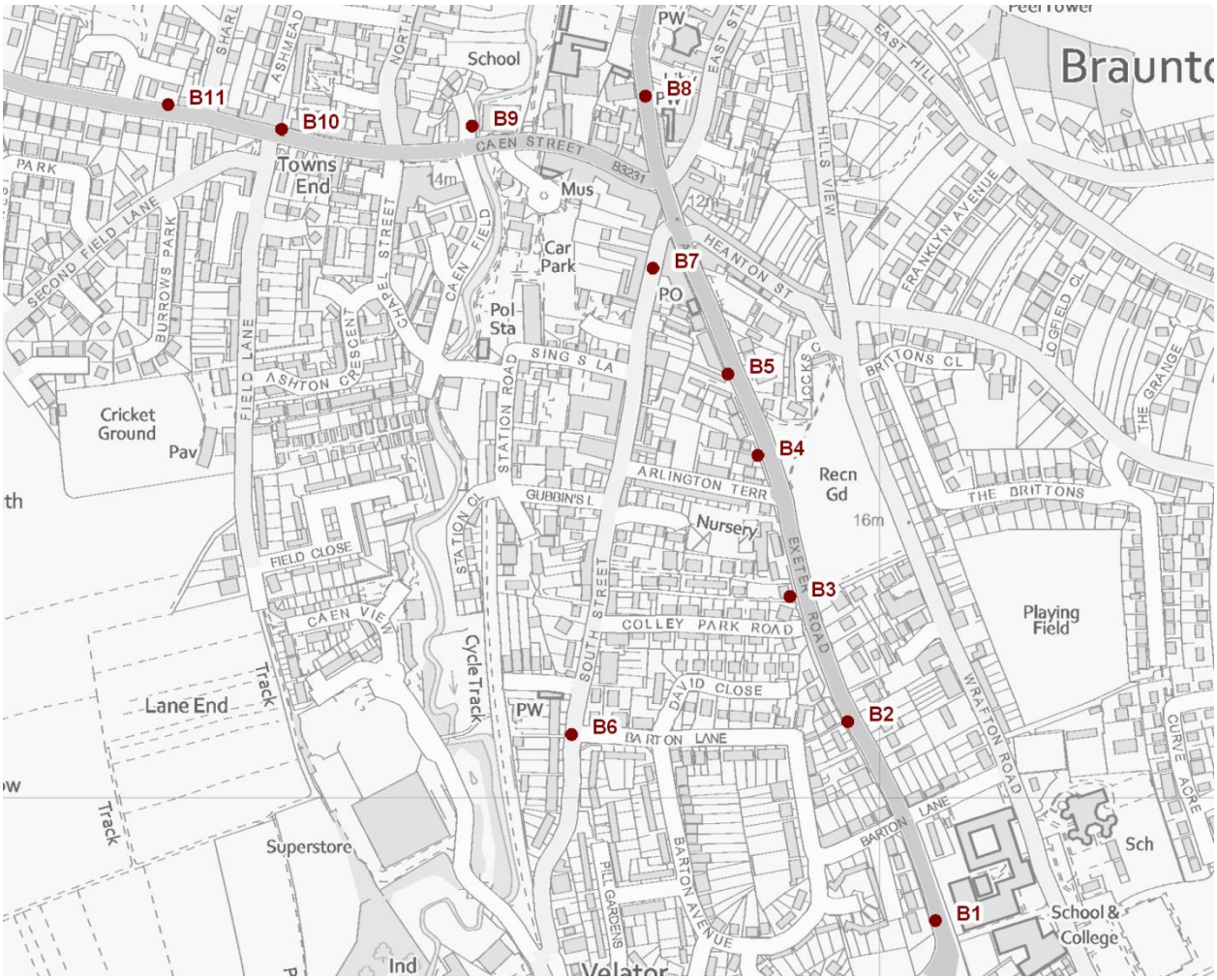
Please Note: Distance Correction was not applied to Site 5 as no road is within a relevant distance. Similarly, Site 6 is too far from a relevant receptor to apply a distance correction.

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

Diffusion Tube Monitoring Locations – North Devon Permanent Sites



Diffusion Tube Monitoring Locations – Braunton AQMA Sites



Appendix E:Summary of Air Quality Objectives in England

Table E.1 –Air Quality Objectives in England

Pollutant	Air Quality Objective[4]	
	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

[4] 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
…	…

References

DEFRA (2016) – Local Air Quality Management Technical Guidance TG16

DEFRA (2016) – Local Air Quality Management Policy Guidance PG16