2020 Air Quality Annual Status Report (ASR)

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

July 2020

Local Authority Officer	David Rudland
Department	Environmental & Regulatory Services
Address	Council Offices, High Street, Coleford, Gloucestershire, GL16 8HG
Telephone	01594 810000
E-mail	ers@fdean.gov.uk
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Executive Summary: Air Quality in Our Area

Air quality across the Forest of Dean District remains very good, with measured levels of nitrogen dioxide (NO_2) generally well within national limits.

We have one Air Quality Management Area (AQMA) in the District which is in Lydney and was declared in July 2010. It was identified that traffic congestion (at the T-junction between the High Street and the Bream Road) was the most likely cause of the nitrogen dioxide (NO_2) levels which exceeded the national air quality objectives at the time the AQMA was declared.

Monitoring throughout 2019 has not identified any other exceedances of the national objectives within the Forest of Dean District.

This year the diffusion tube survey results were similar to the previous year's (plus or minus 1-2 ug/m^3). Within the AQMA, the results were again similar to last year's, close to and in one location just above (40.7 ug/m^3) the national air quality objective of 40ug/m3. These monitoring points within the AQMA were the only sites with nitrogen dioxide levels within 10 per cent of the annual average air quality objective (i.e. above 36 ug/m^3).

As pollutant concentrations may vary significantly from one year to the next, due to the influence of meteorological conditions, it is not desirable to revoke our AQMA whilst we have sites still measuring levels within 10% of the national objective level, set to protect health. Our monitoring survey around the District will continue, in conjunction with planning controls in accordance with national guidance, to try to ensure that pollution levels do not approach the national air quality objective and that those within our AQMA remain closely monitored.

Within Forest of Dean District Council's administrative area there are no point sources of pollution that give rise to concern in respect of air quality. No new or significantly changed sources have been identified within the district. All proposed residential and industrial developments are considered with regard to their potential to increase traffic pollution in the AQMA and other areas.

Air Quality in Forest of Dean 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]. In common with most local authority districts in England and Wales, the main pollutant of concern within Forest of Dean District is nitrogen dioxide from road traffic. Nationwide, levels of nitrogen dioxide have been steadily falling over the years.

We deploy a number of diffusion tube monitors across the District, measuring nitrogen dioxide as part of an ongoing survey. These are collected and sent for analysis on a monthly basis.

Air quality across the Forest of Dean District remains very good with measured levels of nitrogen dioxide (NO2) generally well below national limits.

The nitrogen dioxide diffusion tube survey results were similar to those recorded last year. Our 2019 monitoring programme confirms that within the Lydney Air Quality Management Area (AQMA), the nitrogen dioxide annual mean objective is only exceeded at one location, (although 4 monitoring sites within the AQMA, including the site where we locate 3 tubes together for quality control purposes, recorded levels within 10% of the objective) and at all other monitoring locations it continues to be comfortably met.

The 2005 – 2019 Forest of Dean District Council Air Quality reports are available online at:
Forest of Dean District Council - Air Quality pages

[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

Actions to Improve Air Quality

Lydney Air Quality Management Area (AQMA) was declared in July 2010 and a subsequent “Further Assessment” was submitted to Defra in June 2011. It is thought that congestion at the T junction which is in a “street canyon” (i.e. the buildings by the roadside are high compared to the width of the road, preventing exhaust emissions from dispersing easily) was the cause of the previously higher NO_2 levels.

Since the “Further Assessment”, there has been an investigation into options to improve air quality in the AQMA. The key change, that may have brought about the required improvement, is the introduction of a 20 mph speed limit in Lydney High Street; it is thought that this had the effect of relieving congestion at the T junction, as drivers on the main road more readily give way to exiting traffic when moving more slowly. Conditions have not worsened at this location.

Gloucestershire County Council is responsible for strategies relating to traffic management across the county. Further details of these strategies can be found at http://www.gloucestershire.gov.uk/ltp3

The Overarching Transport Strategy is supported by further policy documents relating to: Bus, Cycle, Freight, Highways, Rail and Think Travel.

Conclusions and Priorities

The nitrogen dioxide diffusion tube monitoring programme will continue and we will review results on a monthly basis, as they are received. We will work with our Planning Department and the County Planning and Highways Departments to ensure that developers of agreed new developments consider potential air quality impacts from the outset, so as not to cause undue deterioration of air quality in the District. We will follow national guidance to ensure air quality impacts are assessed for proposed developments and that any potential adverse impacts are mitigated as necessary.

Over the coming year a priority is to encourage other forms of transport use in the Forest of Dean District and in particularly within the Lydney area. Here a new scheme is providing a new network of cycleways linking key parts of the town centre with outlying areas, such as Aylburton. The scheme is under construction at the time of writing. More information can be found here:

https://www.gloucestershire.gov.uk/highways/major-projects-list/lydney-cycling-improvements/

Local Engagement and How to get Involved

Public participation is integral to effective air quality management. We can all play our part in improving air quality in our area. You could consider taking the train or bus, cycling or even walking for short journeys rather than taking the car. Switching off the car engine when you are stationery or parked rather than leaving it idling reduces pollution and is especially important outside schools and other sensitive areas. Sharing regular car journeys to work reduces amounts of traffic on the roads at peak hours. These are all ways in which we could reduce pollution and traffic congestion in our locality.

So, before using your car, ask yourself:

- Do I really need to make this journey?
- Could I walk or cycle instead of taking the car and get fitter at the same time?
- Could I take a bus or train?
- Are the levels of air pollution already too high today?
- Could I car share?

Copies of the latest Air Quality Report can be found on the Council's Website at: Forest of Dean District Council - Air Quality pages

Any queries about Air Quality should be directed to the Environmental Protection team within Forest of Dean District Council.

This team can be contacted by email on: ers@fdean.gov.uk

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1 Local Air Quality Management

This report provides an overview of air quality in Forest of Dean District Council's area during 2019. 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 Forest of Dean 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 the objectives.

The Forest of Dean District Council declared Lydney AQMA in July 2010. The details will be found in Table 2.1.

This AQMA was designated in relation to a likely breach of the nitrogen dioxide (annual mean) objective as specified in the Air Quality Standards Regulations 2007.

The outlined area on the map in Figure 2.1 shows the designated AQMA in Lydney, which incorporates roads affronting residential properties in High Street, Hill Street and Newerne Street from Temple Way junction (A) to Albert Street Junction (D); and Bream Road from High Street junction (B) to approximately 75m past the entrance to Lydney Church of England Primary School (F); and Forest Road from Hill Street (C) to just past 17 Forest Road (E). A more detailed plan showing the locations of monitoring points within the AQMA will be found of Appendix D.

Figure 2.2 shows that changes in the nitrogen dioxide concentrations measured within our Lydney AQMA since 2012. Comparing the last three or four years' data with those of 2012 it can be seen that at the 7 sites where the readings were the highest in 2012 (around 40µg/m^3 or above) there has been a decrease in levels. This year, with the exception of location LYD01, at 57 High Street Lydney, all measured levels within the AQMA are below the 40µg/m^3 national objective (marked with a black line on the graph in Figure 2.2). At all the other sites, where the concentration did not exceed 40µg/m^3 in 2012, the levels have not changed significantly since that time.

2.2 Progress and Impact of Measures to address Air Quality in Forest of Dean District

An Air Quality Action Plan (AQAP) was drafted in 2015 and consultations undertaken. Various options were assessed and assigned scores. Those options scoring 20 or more were considered to be the most feasible and cost effective options for positive air quality impacts in the town centre.

There were 8 options which score higher than 20, as detailed below:

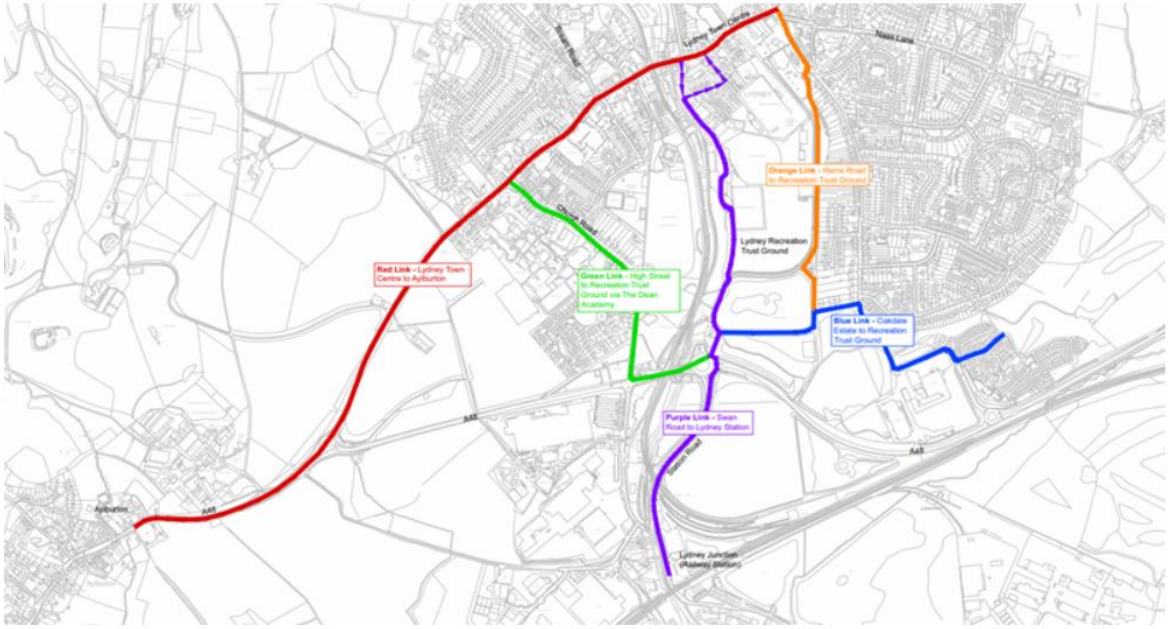
- Option 1 - Action Schemes to encourage alternative transport
- Option 2 - Bream Road – Signalisation
- Option 7 - Switch off engines at heritage railway level crossing whilst idling
- Option 8 - Reduce parking near Lydney C of E School and encourage parking in car park at the bottom of Bream Road
- Option 10 - Promote regular HGV servicing and emission testing to ensure cleaner running vehicles
- Option 13 - Newerne Street Link
- Option 14 - Improve rail services and facilities
- Option 15 - Other public transport services

Option 1 aligns with Gloucestershire County Council's LTP regarding 'smarter choices', their 'Active Together' scheme and their 'Connecting Places' proposals. It provides low cost methods to encourage mode shift from the private car.

Options 2 and 13 have been promoted by the Council as part of the Forest of Dean District Council Infrastructure Delivery Plan (2015, Infrastructure Plan Link to: infrastructure plan) and funding is either provisionally available or is being actively sought.

Options 7, 8 and 10 are not necessarily straightforward to implement.

Options 14 and 15 involve other organisations, e.g. Network Rail, Great Western Trains, Transport for Wales, Stagecoach, Forest of Dean Community Transport Partnership, etc. Improvements put forward include improvements to station car parking and providing a cycle link from the town centre to the railway, with cycle parking at each end of the scheme. Cycleway improvements have already been commenced (see Table 2.2, Measure 2) – the "Purple Link" will provide an off-carriageway route from Lydney railway station to the Town Centre. A plan showing the scope of the completed scheme is shown below:



Lydney Cycle Improvements Scheme Routes

The introduction of a 20 mph speed limit in Lydney High Street, already completed, is thought to have had the effect of relieving congestion at the T junction, as drivers on the main road more readily give way to exiting traffic when moving more slowly.

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

2.3.1 General Approach

As detailed in Policy Guidance LAQM.PG16 (Chapter 7) (Reference D), 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.

Other than the potential source from vehicles, no other significant source of $PM_{2.5}$ has been identified within the District. Therefore the control at this stage is aligned with the measures designed to achieve a reduction in vehicular emissions. The Forest of Dean does not have any smoke control areas.

Partnership working with the county-wide Gloucestershire Pollution Group has included liaison with Gloucestershire County to coordinate air quality policy.

2.3.2 Public Health Outcomes Framework

PM2.5 is the pollutant which has the biggest impact on public health and on which the Public Health Outcomes Framework (PHOF) indicator 3.015 is based[4].

The importance of the effect of air pollution on public health is reflected by the inclusion of an indicator of mortality associated with air pollution in the Public Health Outcomes Framework. This is a series of “indicators” prepared by Central Government as a measure of public health in various categories and across the regions of the UK. One category of data is “D01 - Fraction of mortality attributable to particulate air pollution” (2017).

For Gloucestershire as a whole, the estimated Fraction of Mortality attributable to particulate air pollution is ranked 6 out of 16 areas in the South West of England. This equates to a percentage of 4.7% compared with the regional average of 4.4%.

For the Forest of Dean district, the estimated Fraction of mortality attributable to particulate air pollution is relatively low with the area ranked 23 out of 37

[4] Source: Background annual average PM2.5 concentrations for the year of interest are modelled on a 1km x 1km grid using an air dispersion model, and calibrated using measured concentrations taken from background sites in Defra’s Automatic Urban and Rural Network (http://uk-air.defra.gov.uk/interactive-map.) Data on primary emissions from different sources and a combination of measurement data for secondary inorganic aerosol and models for sources not included in the emission inventory (including re-suspension of dusts) are used to estimate the anthropogenic (human-made) component of these concentrations. By approximating LA boundaries to the 1km by 1km grid, and using census population data, population weighted background PM2.5 concentrations for each lower tier LA are calculated. This work is completed under contract to Defra, as a small extension of its obligations under the Ambient Air Quality Directive (2008/50/EC). Concentrations of anthropogenic, rather than total, PM2.5 are used as the basis for this indicator, as burden estimates based on total PM2.5 might give a misleading impression of the scale of the potential influence of policy interventions (COMEAP, 2012).

areas in the South West of England. This equates to a percentage of 4.3% compared with the regional average of 4.4%.

Figure 2.1- Map of Lydney AQMA Boundaries

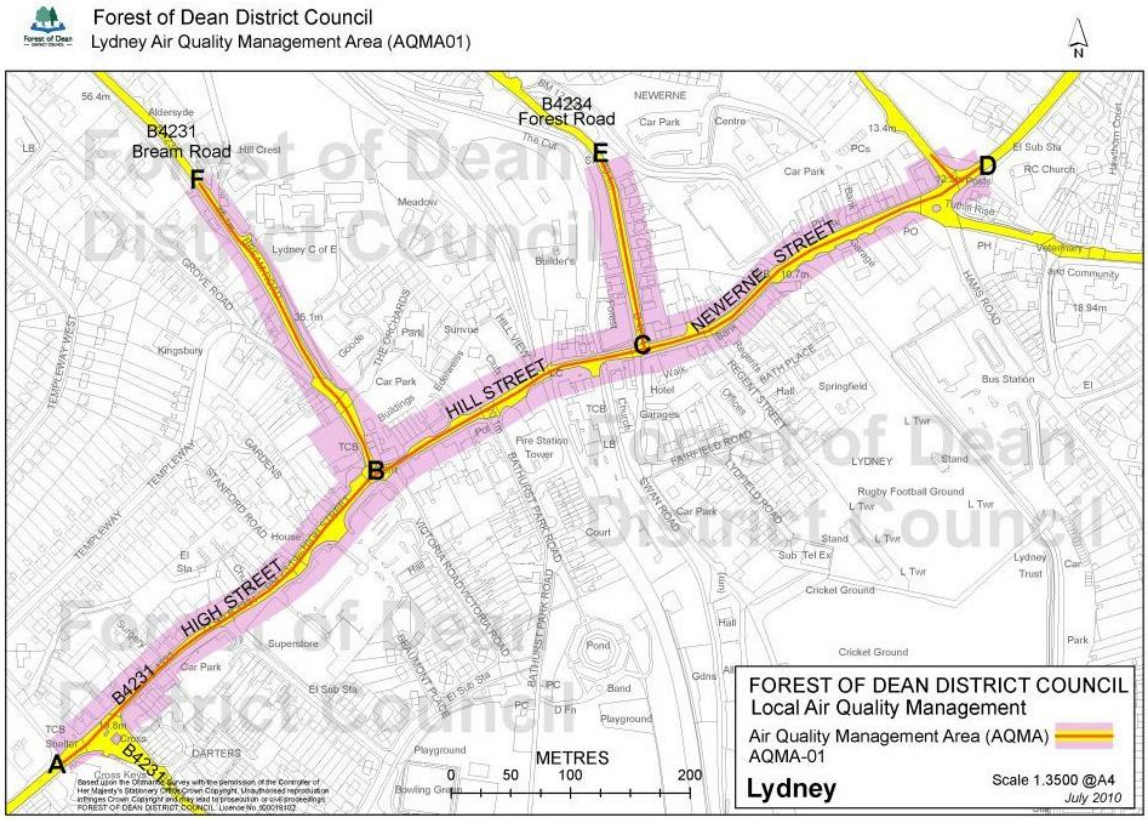


Table 2.1 – Declared Air Quality Management Area

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		
						At Declaration		Now		Name	Date of Publication	Link
Lydney AQMA	2010	NO_2 annual mean	Lydney	High Street, Hill Street and Newerne Street from Temple Way junction (A) to Albert Street Junction (D); and Bream Road from High Street junction (B) to approximately 75m past the entrance to Lydney C of E Primary School (F); and Forest Road from Hill Street (C) to just past 17 Forest Road (E).	No	46.9	µg/m3	40.7	µg/m3	A draft Lydney AQMA Action Plan dated January 2015 has been prepared with the assistance of a steering group and after local consultation with stakeholders. Since introduction of a 20mph speed limit at the junction the nitrogen dioxide levels have mostly fallen below the national air quality objective level (with the exception of the area around 57 High Street). As levels remain within 10% of the limit we have not revoked the AQMA but are continuing to monitor the situation.		

Figure 2.2 Graph showing the trend over the last 8 years of nitrogen dioxide levels within our Lydney AQMA

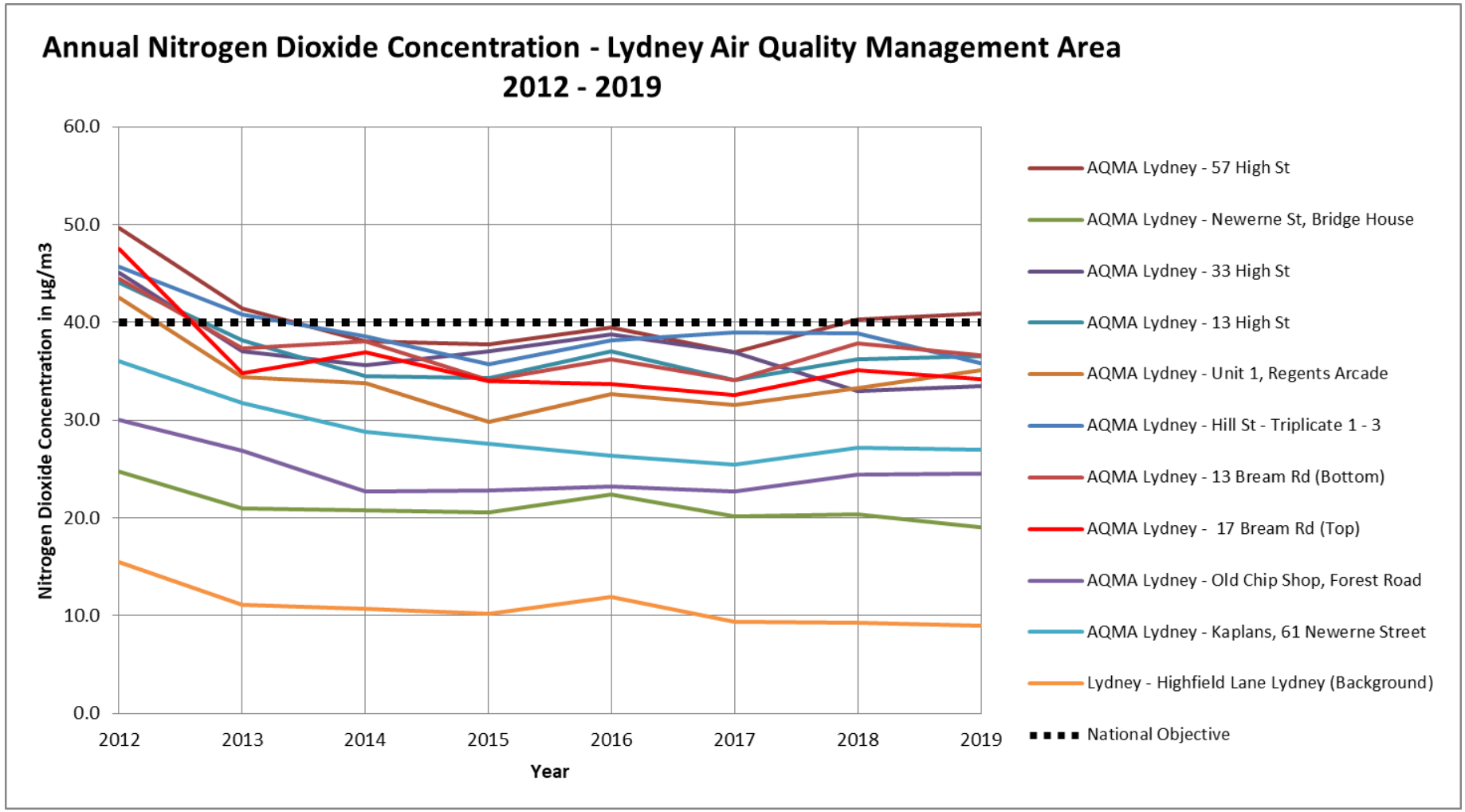


Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Air Quality Technical Guidance for Forest of Dean District Council 2015	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2015	FOD Council	Local Authority, Funding: Defra Air Quality Grant	Approved policy in place and in use, with associated technical guidance available on FODDC website	Address potential increase in vehicular emissions due to vehicle usage associated with new residential and business developments	Policy approved and in use from 30 July 2015.	2015	Air Quality Technical Guidance
2	The Lydney Cycle Improvement Scheme	Promoting Travel Alternatives	Promotion of cycling	Ongoing	Gloucestershire County Council, with GFirst LEP Growth Deal	Gloucestershire County Council	The Scheme involves the construction of an integrated cycleway network incorporating 5 individual “links” throughout Lydney.	Provide alternatives for travel around Lydney, especially within the AQMA	A Public Share event was held on 4th Sept 2018 to discuss the proposals	Ongoing	Scheme partially complete. Construction ongoing Lydney Cycle Scheme website
3	Travel Alternatives	Promoting Travel Alternatives	Encourage / Facilitate home-working	Ongoing	Gloucestershire County Council & FOD Council	Gloucestershire County Council	n/a	Reduced vehicle emissions	Implementation on-going	n/a	First phase successful, second phase on-going
4	Travel Alternatives	Promoting Travel Alternatives	Promotion of walking	2016	Gloucestershire County Council & FOD Council	Gloucestershire County Council	n/a	Reduced vehicle emissions	Implementation on-going	n/a	Information such as “Real Time Passenger Information System” online
5	Public Transport Information	Public Information	Via the Internet	Ongoing	Gloucestershire County Council	Gloucestershire County Council	n/a	Reduced vehicle emissions	Implementation on-going	n/a	-
6	Targeted speed limit reductions	Traffic Management	Reduction of speed limits, 20mph zones	2015	Gloucestershire County Council	Gloucestershire County Council	Improved traffic flow at peak hours in the Lydney Town Centre	Reduced vehicle emissions	Implementation on-going	Completed	-
7	Gloucestershire’s Local Transport Plan 2015-2031	Traffic Management	Travel Planning	2016	Gloucestershire County Council	Gloucestershire County Council	Improvements to Lydney rail station, cycle networks at Lydney and park & ride study	Reduced vehicle emissions	Implementation on-going	Scheme under review. The LTP review 10 week consultation period has closed (26th of March 2020)	-

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

3.1 Summary of Monitoring Undertaken

This section sets out what monitoring has taken place and how the results compare with the national objectives, set to protect health.

3.1.1 Non-Automatic Monitoring Sites

Forest of Dean District Council undertook non- automatic (passive) monitoring of NO_2 at 30 sites during 2019. We exposed 3 tubes at one site (61 High Street, Lydney) within the AQMA for Quality Control purposes, so we have 32 results each month. Table A.1 in Appendix A shows the details of the sites.

Maps showing the location of these 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.

Some changes were made to the locations of tubes during 2019. The monitoring site at Aylburton (26 High Street) was discontinued after 3 months because of consistently low nitrogen dioxide concentrations measured there (well within the national objective level). Detailed analysis of this data has not been carried out at this location because of the small amount of data collected. Monitoring at a second location, Bream (High Street) was also discontinued for similar reasons (after 6 months) and this larger data set has been included in the analysis. New locations were set up at Longhope (Knapp House, Monmouth Road) and Tutshill (Beachley Rd - Wyedean School), operational for 9 months and 4 months respectively.

3.1.2 Automatic Monitoring Sites

Forest of Dean District Council does not currently operate any automatic monitors within its district.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias[5], "annualisation" (where the data capture falls below 75%), and distance correction[6]. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

The focus of our monitoring has been measurement of concentrations of nitrogen dioxide. The locations of individual monitoring points are set out in Table A.1.

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. Note that the concentration data presented in Table A.2 represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

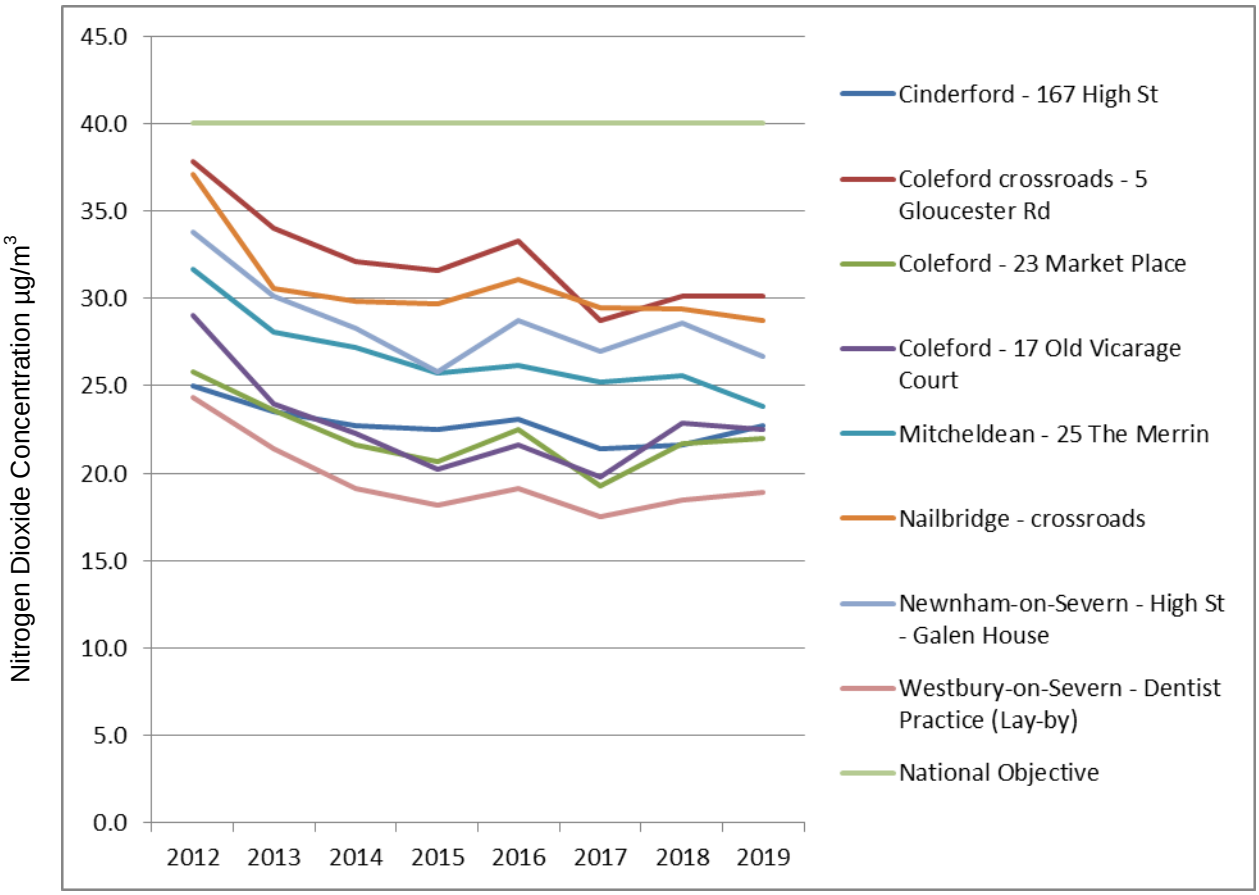
For diffusion tubes, the full 2019 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

Trends

Figure 3.1 shows the trend of nitrogen dioxide levels at a representative selection of sites monitored around the district outside of our Lydney AQMA over the last 7 years to give a fuller picture of changes over the decade (trends within the AQMA area are discussed in Section 2.1).

[5] https://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html
[6] Fall-off with distance correction criteria is provided in paragraph 7.77, LAQM.TG(16)

Fig. 3.1 Graph showing the trend over the last 7 years of nitrogen dioxide levels around the district (outside of our AQMA)



If we compare current monitoring results with those from 2012, it can be seen that at the sites with the highest levels (>25 µg/m^3) there has been a gradual decrease in nitrogen dioxide levels. Levels at most of the other sites have remained broadly similar - with the exception of one location (Cinderford - 167 High St) where a slight increase was noted, concentrations measured have decreased or remained similar this year compared with 2018. However it can be clearly seen that the nitrogen dioxide levels outside of the AQMA are well below the national standard of 40µg/m^3 which is marked by a green line at the top of the graph.

The results of monitoring within our Lydney AQMA demonstrated that away from the Bream junction with Hill Street and High Street, the levels are as expected near busy roads. They range from 19.0 – 34.2µg/m^3. No other locations being monitored in the District experienced annual average levels above 30µg/m^3 once bias adjustment had been carried out. There were three locations within the AQMA, close to the junction, where the results lay within

10% of the national air quality objective, after distance correction. These were as follows:

Tube reference	Location	Nitrogen dioxide concentration ($\mu g/m^3$) (adjusted)
LYD 01	57 High Street	40.7
LYD 08	13 Bream Road	36.6
LYD 16	55 High Street	37.5

As these levels within our AQMA still lie above or within 10% of the national air quality objective, we have not rescinded the AQMA designation.

Appendix A: Monitoring Results

Table A.1 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m)	Tube collocated with a Continuous Analyser?	Height (m)
AYL01	Aylburton, 26 High Street	Roadside	361828	201914	NO2	No	0.15	1.54	NO	2.85
BRE01NEW	Bream, High St, Old Model Shop (Old - St Whites Road, Cinderford)	Roadside	360224	205723	NO2	No	0	0.13	NO	2.9
CIN03	Cinderford - 167 High St	Roadside	365637	214732	NO2	No	0	0.85	NO	2.95
CIN04	Cinderford - 31 Market St (CANDI)	Roadside	365637	214012	NO2	No	0	1.25	NO	2.8
CIN06NEW	Cinderford - High Street, Zebra Crossing (Top, near Factory Shop)	Roadside	365659	214171	NO2	No	1.2	1.5	NO	2.9
COL01	Coleford crossroads - 5 Gloucester Rd	Roadside	357743	210600	NO2	No	0	3.1	NO	2.7
COL02	Coleford - 23 Market Street	Roadside	357551	210756	NO2	No	0	3.2	NO	3.1
COL03	Coleford - 17 Old Vicarage Court	Roadside	357631	210785	NO2	No	3.7	1.5	NO	2.8
HUN03	Huntley - opposite 9 Frogmore Road	Roadside	372370	219678	NO2	No	>10	2.6	NO	2.9
LON01NEW	Longhope, Knapp House, Monmouth Road	Roadside	369176	218673	NO2	No	9	4.1	NO	3.2

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m)	Tube collocated with a Continuous Analyser?	Height (m)
LYD01	Lydney - 57 High St	Roadside	363147	203074	NO2	No	0.1	3.35	NO	3.1
LYD02	Lydney - Newerne St, Bridge House - Tucker	Roadside	363527	203261	NO2	No	0	7	NO	2.9
LYD03	Lydney - 33 High St	Roadside	363036	202972	NO2	No	0.4	1.85	NO	2.9
LYD04	Lydney - 13 High St	Roadside	362971	202915	NO2	No	0.7	1.95	NO	2.85
LYD05	Lydney - Unit 1, Regents Arcade	Roadside	363494	203238	NO2	No	0.2	1.4	NO	2.95
LYD06	Lydney - Hill St - Inspirations Gallery	Roadside	363185	203111	NO2	No	0.7	1.8	NO	2.9
LYD08	Lydney - 13 Bream Rd (Bottom)	Roadside	363109	203213	NO2	No	0	3.35	NO	2.9
LYD09	Lydney - 17 Bream Rd (Top)	Roadside	363042	203322	NO2	No	0.25	0.95	NO	3
LYD10	Lydney - Old Chip Shop, Forest Road	Roadside	363408	203226	NO2	No	0	1.6	NO	2.95
LYD12	Lydney - Kaplans, 61 Newerne Street	Roadside	363607	203320	NO2	No	0	2.5	NO	2.75
LYD15	Lydney - Highfield Lane (Background)	Roadside	364087	204138	NO2	No	0	>15	NO	2.3
LYD16	Lydney - 55 High Street Launderette	Roadside	363142	203069	NO2	No	0.1	1.6	NO	3.05
LYD17	Lydney - 61 High Street (Triplicate 1 of 3)	Roadside	363160	203088	NO2	No	0	1.4	NO	3.05
LYD18	Lydney - 61 High Street (Triplicate 2of 3)	Roadside	363160	203088	NO2	No	0	1.4	NO	3.05

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m)	Tube collocated with a Continuous Analyser?	Height (m)
LYD19	Lydney - 61 High Street (Triplicate 3of 3)	Roadside	363160	203088	NO2	No	0	1.35	NO	3.05
MIT01	Mitcheldean - 25 The Merrin	Roadside	364108	218274	NO2	No	3.8	2.95	NO	3.05
NAI01	Nailbridge - crossroads	Roadside	364566	216246	NO2	No	0.6	1.1	NO	2.9
NEW03	Newent - 12 High Street	Roadside	372117	226049	NO2	No	0.5	1.6	NO	2.95
NOS02	Newnham-on-Severn - High St - Galen House	Roadside	369038	211590	NO2	No	0	3.4	NO	2.55
TUT01	Tutshill - Beachley Rd - Opposite Severn Lodge	Roadside	353926	194467	NO2	No	>10	1.3	NO	3
TUT02[NEW]	Tutshill - Beachley Rd - Wyedean School	Roadside	354268	193950	NO2	No	>10	2.25	NO	2.9

Notes:

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

Table A.2 – Annual Mean NO_2 Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3) (4)				
							2015	2016	2017	2018	2019
AYL01	361828	201914	Roadside	Diffusion Tube	100	25	*	*	*	21.8	21.7
BRE01 NEW	360224	205723	Roadside	Diffusion Tube	100	50	*	*	*	*	17.9
CIN03	365637	214732	Roadside	Diffusion Tube	100	100	22.5	23.1	21.4	21.6	22.7
CIN04	365637	214012	Roadside	Diffusion Tube	100	100	*	*	22.9	23.9	24.2
CIN06 NEW	365659	214171	Roadside	Diffusion Tube	100	100	*	*	*	*	27.3
COL01	357743	210600	Roadside	Diffusion Tube	100	100	31.6	33.3	28.7	30.1	30.1
COL02	357551	210756	Roadside	Diffusion Tube	100	92	20.7	22.5	19.3	21.7	22.0
COL03	357631	210785	Roadside	Diffusion Tube	100	100	20.2	21.6	19.8	22.9	22.5
HUN03	372370	219678	Roadside	Diffusion Tube	100	100	*	*	9.5	9.4	8.7
LON01 NEW	369176	218673	Roadside	Diffusion Tube	100	75	*	*	*	*	18.1
LYD01	363147	203074	Roadside	Diffusion Tube	100	100	37.7	39.5	36.9	**40.3**	**40.9**
LYD02	363527	203261	Roadside	Diffusion Tube	100	100	20.5	22.4	20.1	20.3	19.0

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO2 Annual Mean Concentration (µg/m3) (3) (4)				
							2015	2016	2017	2018	2019
LYD03	363036	202972	Roadside	Diffusion Tube	100	100	37	38.8	36.9	33	33.5
LYD04	362971	202915	Roadside	Diffusion Tube	100	100	34.3	37	34.1	36.2	36.5
LYD05	363494	203238	Roadside	Diffusion Tube	100	100	29.8	32.7	31.5	33.3	35.1
LYD06	363185	203111	Roadside	Diffusion Tube	100	100	35.7	38.2	38.7	38.9	37.5
LYD08	363109	203213	Roadside	Diffusion Tube	100	92	34.1	36.2	34.1	37.8	36.6
LYD09	363042	203322	Roadside	Diffusion Tube	100	100	34.0	33.7	32.6	35.1	34.2
LYD10	363408	203226	Roadside	Diffusion Tube	100	100	22.8	23.2	22.7	24.4	24.5
LYD12	363607	203320	Roadside	Diffusion Tube	100	100	27.6	29.2	25.4	27.2	27.0
LYD15	364087	204138	Roadside	Diffusion Tube	100	100	10.2	11.9	9.4	9.3	9.0
LYD16	363142	203069	Roadside	Diffusion Tube	100	100	*	*	36.9	37	37.9
LYD17	363160	203088	Roadside	Diffusion Tube	100	100	*	*	30.9	36.2	35.9
LYD18	363160	203088	Roadside	Diffusion Tube	100	92	*	*	30.5	33.3	36.3
LYD19	363160	203088	Roadside	Diffusion Tube	100	100	*	*	30.6	37.4	35.1
MIT01	364108	218274	Roadside	Diffusion Tube	100	100	25.7	26.5	25.2	25.6	23.8

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO2 Annual Mean Concentration (µg/m3) (3) (4)				
							2015	2016	2017	2018	2019
NOS02	369038	211590	Roadside	Diffusion Tube	100	100	25.8	28.7	27	28.2	26.7
TUT01	353926	194467	Roadside	Diffusion Tube	100	100	*	*	*	13.6	13.7
TUT02 NEW	354268	193950	Roadside	Diffusion Tube	100	33.3	*	*	*	*	15.8
WOS01	371651	214042	Roadside	Diffusion Tube	100	100	18.2	19.1	17.5	18.5	18.9

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) Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

Appendix B: Full Monthly Diffusion Tube Results for 2019

Table B.1 - NO_2 Monthly Diffusion Tube Results - 2019

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations ($\mu g/m^3$)													
														Annual Mean		
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (factor=0.93) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
AYL01 Aylburton, 26 High Street	361828	201914	31.7	31.5	27.6										30.2	21.7	
BRE01 Bream, High St, Old Model Shop (Old - St Whites Road, Cinderford)	360285	205774	25.5	27.2	25.5	18.3	13.5	14.3							20.7	17.9	
CIN03 Cinderford - 167 High St	365637	214732	31.5	27.0	22.9	24.5	21.8	20.9	19.4	15.8	21.8	26.4	33.9	26.4	24.4	22.7	
CIN04 Cinderford - 31 Market St (CANDI)	365637	214012	30.6	33.5	29.2	23.1	23.3	23.6	21.8	19.7	23.8	24.6	30.2	28.8	26.0	24.2	
CIN06 Cinderford - High Street, Zebra Crossing (Top, near Factory Shop)	365659	214171	14.5	35.3	16.0	39.3	28.9	31.9	30.1	22.0	32.1	29.0	**42.8**	30.2	29.4	27.3	
COL01 Coleford crossroads - 5 Gloucester Rd	357743	210600	32.8	38.3	36.8	34.4	30.8	28.0	31.8	30.8	28.5	30.6	32.7	32.5	32.3	30.1	
COL02 Coleford - 23 Market St	357551	210756	27.9	31.2	22.2	22.6	20.4	19.0	19.3	M	22.6	21.1	25.5	28.0	23.6	22.0	
COL03 Coleford - 17 Old Vicarage Court	357631	210785	29.3	26.9	21.9	27.8	23.2	20.3	20.8	17.5	23.3	24.2	32.0	23.3	24.2	22.5	
HUN03 Huntley - opposite 9 Frogmore Road	372370	219678	15.0	16.1	8.0	8.9	5.7	5.7	5.4	6.1	8.3	11.0	8.7	13.6	9.4	8.7	
LON01 Longhope, Knapp House, Monmouth Road	369176	218673				26.2	21.1	22.0	18.7	6.7	7.0	21.7	29.9	22.1	19.5	18.1	
LYD01 Lydney - 57 High St	363147	203074	**57.0**	**52.2**	**50.2**	**42.1**	**41.8**	**41.1**	**44.1**	33.5	**41.2**	36.9	**43.5**	**44.6**	**44.0**	**40.9**	**40.7**
LYD02 Lydney - Newerne St, Bridge House - Tucker	363527	203261	24.4	21.1	25.7	15.5	18.0	17.8	18.9	20.4	18.7	21.1	23.1	19.9	20.4	19.0	

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	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 (factor=0.93) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
LYD03 Lydney - 33 High St	363036	202972	**46.9**	M	**42.1**	31.6	32.2	31.5	32.8	31.6	33.9	34.6	36.5	**42.8**	36.0	33.5	
LYD04 Lydney - 13 High St	362971	202915	**49.4**	**47.1**	**45.0**	35.9	37.3	34.3	36.9	31.4	36.6	34.3	**43.4**	39.3	39.2	36.5	
LYD05 Lydney - Unit 1, Regents Arcade	363494	203238	**43.6**	**45.8**	**40.5**	35.7	32.4	33.5	**40.6**	36.3	36.7	33.8	34.1	**40.3**	37.8	35.1	
LYD06 Lydney - Hill St - Inspirations Gallery	363185	203111	**45.2**	**48.8**	**48.2**	**43.2**	37.2	34.1	39.5	30.6	35.4	35.5	**45.5**	**41.0**	**40.3**	37.5	35.3
LYD08 Lydney - 13 Bream Rd (Bottom)	363109	203213	**46.1**	**44.3**	35.4	37.1	38.8	36.7	**41.1**	<LOD	36.3	34.9	**40.3**	**42.4**	39.4	36.6	36.6
LYD09 Lydney - 17 Bream Rd (Top)	363042	203322	**45.6**	**44.5**	39.5	30.4	31.9	27.9	39.7	33.5	28.9	37.1	**40.9**	**41.7**	36.8	34.2	
LYD10 Lydney - Old Chip Shop, Forest Road	363408	203226	32.0	35.1	27.3	29.7	8.4	23.4	24.6	21.4	26.4	25.8	31.2	31.2	26.4	24.5	
LYD12 Lydney - Kaplans, 61 Newerne Street	363607	203320	30.2	31.5	29.8	34.6	26.0	26.9	24.4	21.3	M	M	33.8	31.6	29.0	27.0	
LYD15 Lydney - Highfield Lane (Background)	364087	204138	13.3	15.2	8.3	8.7	6.2	7.4	6.5	6.5	4.5	12.1	13.7	13.2	9.6	9.0	
LYD16 Lydney - 55 High Street Launderette	363142	203069	**48.3**	**48.4**	**46.9**	37.7	32.5	35.9	**43.8**	34.3	38.7	35.1	**41.8**	**46.1**	**40.8**	37.9	37.5
LYD17 Lydney - 61 High Street (Triplicate 1 of 3)	363160	203088	**44.2**	**54.6**	38.3	36.3	34.5	30.7	**41.9**	30.1	37.1	33.4	35.2	**47.3**	38.6	35.9	
LYD18 Lydney - 61 High Street (Triplicate 2of 3)	363160	203088	**43.7**	**56.5**	27.8	36.7	M	36.2	35.9	37.8	34.9	37.0	34.8	**48.1**	39.0	36.3	
LYD19 Lydney - 61 High Street (Triplicate 3of 3)	363160	203088	39.1	52.7	**42.6**	37.2	30.0	28.2	**46.9**	35.4	32.3	34.4	37.2	37.4	37.8	35.1	
MIT01 Mitcheldean - 25 The Merrin	364108	218274	35.7	29.8	21.6	26.7	22.3	22.4	23.4	19.5	25.3	24.7	30.2	25.6	25.6	23.8	
NAI01 Nailbridge - crossroads	364566	216246	**43.8**	36.4	28.7	28.4	28.9	27.2	29.8	22.9	29.6	29.1	35.0	30.6	30.9	28.7	

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations ($\mu g/m^3$)													
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
															Raw Data	Bias Adjusted (factor=0.93) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
NEW03 Newent - 12 High Street	372117	226049	39.6	33.3	29.1	36.8	26.3	28.8	24.6	18.1	28.9	27.3	**41.3**	29.2	30.3	28.1	
NOS02 Newnham-on-Severn - High St - Galen House	369038	211590	33.9	34.7	25.7	34.2	24.6	17.0	25.4	21.8	26.7	30.1	37.7	32.7	28.7	26.7	
TUT01 Tutshill - Beachley Rd - Opposite Severn Lodge	353926	194467	17.8	21.6	12.8	13.6	10.1	11.9	9.4	8.1	11.8	19.7	22.0	17.5	14.7	13.7	
TUT02 Tutshill - Beachley Rd - Wyedean School	354268	193950									3.9	14.8	31.2	17.0	16.7	15.8	
WOS01 Westbury-on-Severn - Dentist Practice (Lay-by)	371651	214042	29.9	24.4	15.7	18.0	17.0	28.8	M	13.0	15.8	18.2	24.1	18.7	20.3	18.9	

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.**

M=tube missing

LOD=below lower limit of laboratory detection

(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

The diffusion tubes (20% TEA in water) were supplied and analysed by Gradko. The tubes at all locations have a monthly exposure period. A bias adjustment factor of 0.93, based upon 27 studies, was obtained via the national bias spreadsheet, and this was applied to all diffusion tubes. This spreadsheet is available at:

http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html

The details are given in the table below.

Table C1 National Bias Adjustment Spreadsheet

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 03/20

Follow the steps below in the correct order to show the results of relevant co-location studies
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet
This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of June 2020
LAQM Helpdesk Website

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1:	Step 2:	Step 3:	Step 4:
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.
If a laboratory is not shown, we have no data for this laboratory.	If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data[3]	If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953

Analysed By[1]	Method (To update your selection, choose (All) from the pop-up list)	Year[3] (To update your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision[4]	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in water	2019	R	NOTTINGHAM CITY COUNCIL	10	37	40	-7.0%	G	**1.07**
Gradko	20% TEA in water	2019	R	Bedford Borough Council	11	29	29	-1.0%	G	**1.01**
Gradko	20% TEA in water	2019	R	Bedford Borough Council	12	37	32	13.0%	G	**0.89**
Gradko	20% TEA in water	2019	R	Gateshead Council	12	30	25	18.1%	G	**0.85**
Gradko	20% TEA in water	2019	R	Gateshead Council	10	32	34	-7.2%	G	**1.08**
Gradko	20% TEA in water	2019	R	Gateshead Council	12	34	27	23.7%	P	**0.81**
Gradko	20% TEA in water	2019	R	Gateshead Council	11	40	44	-10.5%	G	**1.12**
Gradko	20% TEA in water	2019	KS	Marylebone Road Intercomparison	12	85	65	30.1%	G	**0.77**
Gradko	20% TEA in water	2019	R	Borough Council of King's Lynn and West Nor	9	27	21	28.4%	G	**0.78**
Gradko	20% TEA in water	2019	R	Lancaster City Council	13	40	34	16.4%	G	**0.86**
Gradko	20% TEA in water	2019	R	Lancaster City Council	12	31	31	1.6%	G	**0.98**
Gradko	20% TEA in Water	2019	R	Monmouthshire County Council	12	39	39	1.3%	G	**0.99**
Gradko	20% TEA in water	2019	UC	Belfast City Council	10	29	24	21.8%	G	**0.82**
Gradko	20% TEA in water	2019	R	Dudley MBC	12	33	32	4.5%	G	**0.96**
Gradko	20% TEA in water	2019	R	Dudley MBC	12	44	42	3.9%	G	**0.96**
Gradko	20% TEA in water	2019	UB	Dudley MBC	12	23	19	19.8%	G	**0.83**
Gradko	20% TEA in water	2019	UB	Eastleigh Borough Council	12	24	26	-7.1%	G	**1.08**
Gradko	20% TEA in water	2019	R	Gateshead Council	12	34	27	23.7%	P	**0.81**
Gradko	20% TEA in water	2019	R	Gateshead Council	11	40	44	-10.5%	G	**1.12**
Gradko	20% TEA in water	2019	R	Gateshead Council	10	32	34	-7.2%	G	**1.08**
Gradko	20% TEA in water	2019	R	Gateshead Council	12	30	25	18.1%	G	**0.85**
Gradko	20% TEA in water	2019	R	Thurrock Borough Council	12	29	24	21.6%	G	**0.82**
Gradko	20% TEA in water	2019	R	Brighton & Hove City Council	11	45	50	-9.3%	G	**1.10**
Gradko	20% TEA in water	2019		**Overall Factor[3] (27 studies)**				**Use**		**0.93**

Annualisation

Where monitoring has been completed for less than 75% of the year, annualisation techniques can be used to estimate an annual average from a part year average. For annualisation to be completed there must be 3 months of monitoring data available. Monitoring at 3 sites was carried out only part year as the monitoring locations were only set and operational for parts of 2019, meaning that data was only made available for 8 months of the year. These sites are:

- AYL01 Aylburton, 26 High Street
- BRE01 Bream, High St
- TUT02 Tutshill - Beachley Rd - Wyedean School

At a fourth site (Longhope, Knapp House, Monmouth Road) the position was set up at the beginning of March but capture was 75% and thus annualisation at this location was not required.

A measured mean concentration for the respective periods of exposure is available for each location. However it will be necessary to estimate the annual mean for these 3 locations, for comparison with the annual target concentration, because of less than 75% availability for this area.

The procedure involves the following steps:

1. Identification of two to four nearby, long-term, continuous monitoring sites, ideally those forming part of the national network. The data capture for each of these sites should ideally be at least 85%. These sites should be background (Urban Background, Suburban or Rural) sites to avoid any very local effects that may occur at Urban Centre, Roadside or Kerbside sites, and should, wherever possible lie within a radius of about 50 miles. If no background sites are available, and the site to be annualised is itself a Urban Centre, Roadside or Kerbside site, then it is permissible to annualise using roadside or kerbside sites rather than background sites.

The nearest sites that have characteristics similar to the areas requiring annualisation are the two AURN sites located in Bristol (St Pauls) and Chepstow, respectively. Both are located in surburban rather than major urban settings, to approximate to the situation for comparison in Lydney:

- Bristol St Pauls: the monitoring station is located within the car park of a day nursery. The monitoring station is approximately 30 metres south east of Wilder Street, a lightly trafficked urban back street. The surrounding area is primarily residential, with some commercial premises in the immediate vicinity.
- Chepstow: the monitoring station is located on the north side of the A48 Newport Road at the junction with Hardwick Hill Lane. The surrounding area is open with residential dwellings.

2. Obtain the annual means, 'Am', for the calendar year for these sites.

3. Work out the period means, 'Pm', for the period of interest, in this case:

- Jan-Mar 2019 for AYL01
- Jan-Jun 2019 for BRE01
- Sep-Dec 2019 for TUT02

4. Calculate the ratio, 'R', of the annual mean to the period mean ('Am/Pm') for each of the sites.

5. Calculate the average of these ratios, 'Ra'. This is then the annualisation factor.

6. Multiply the measured period mean concentration 'M' by this annualisation factor Ra to give the estimate of the annual mean for 2019.

At the 3 sites, the annualisation factor is different to reflect the different exposure months. See Table C2. For the diffusion tube location Aylburton AYL01, the best estimate of the annual mean in 2019 is 0.77 x 30.2µg/m^3 =23.3 µg/m^3, using data set out in the table below. For the BRE01, Bream tube, the best estimate of the annual mean in 2019 (again using the table below) is 0.93 x 20.7µg/m^3 = 19.3 µg/m^3. For the Tutshill location, the annual mean is 1.02 x 16.7µg/m^3 = 17.0 µg/m^3. These figures are then further adjusted for bias by multiplication with 0.93 (from the national spreadsheet, Table C1) to 21.7 µg/m^3 (AYL01), 17.9 µg/m^3 (BRE01) and 15.8 µg/m^3 (TUT02).

Table C2 Annualisation Data – (units µg/m^3)

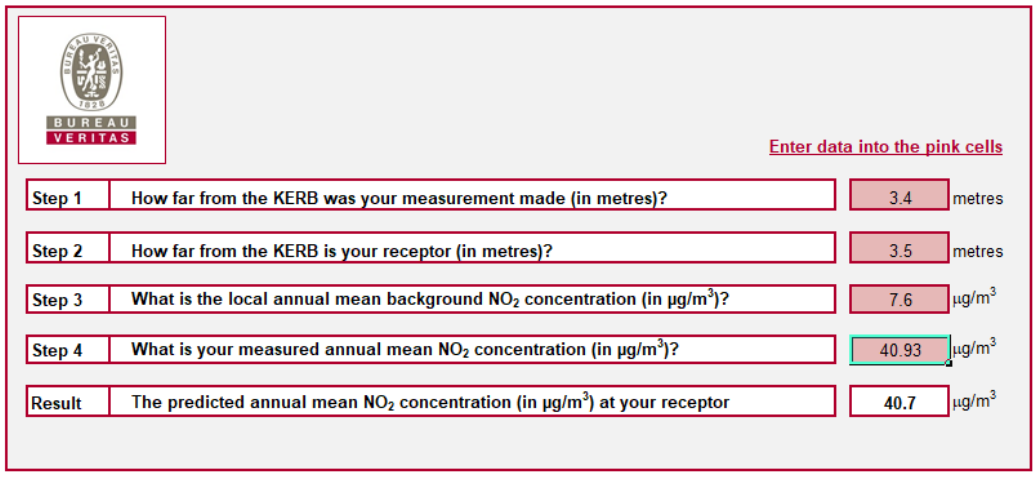
Site	Annual Average Am	Period Mean Pm			Ratio Am/Pm		
		Jan-Mar 2019	Jan-Jun 2019	Sep-Dec 2019	Jan-Mar 2019	Jan-Jun 2019	Sep-Dec 2019
AYL01 BRE01 TUT02		30.2	20.7	16.74			
AURN Bristol St Pauls (Background)	22.83	27.3	22.3	25.5	0.84	1.02	0.90
AURN Chepstow (Background)	13.44	54.6	46.3	33.7	0.71	0.84	1.15
Annualisation Factor					0.77	0.93	1.02

Distance Corrections

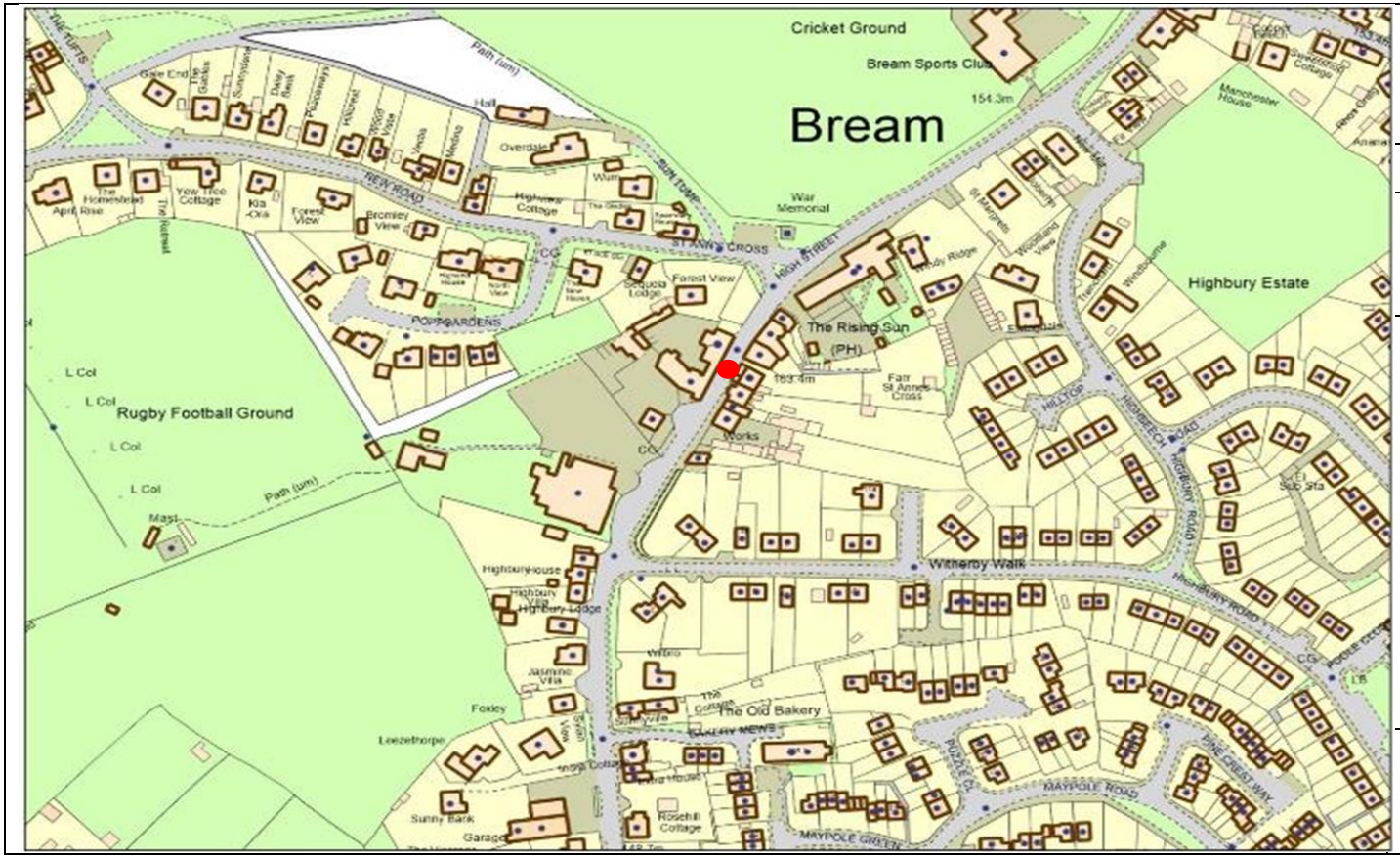
Corrections for distance have been made that allow for the distance the diffusion tubes are from the roadside. The data to feed into this calculation, that is distance of measurement/receptor from kerb, the mean NO_2 are to be found in Table A1 and B1 respectively. The correction has only been made where the adjusted annual mean is close to the national objective (40 µg/m^3). This applied to two locations in Lydney.

In both cases the correction has made only minor difference to the estimated receptor concentration because in most cases the diffusion tube monitors are close to both the roadside and to the nearest relevant receptor (residential building). An example of the output from the calculation is seen below:

LYD01 Lydney - 57 High St



Appendix D: Map(s) of Monitoring Locations



Legend

Diffusion Tube Locations

AQMA Boundary

Contains Ordnance Survey Data Crown Copyright and Database Right [2020]

Location:
CIN03 - Bottom High Street, Cinderford

Title
Diffusion Tube Location

Date	**Figure No.**
Jun 2020	D2

Legend

Diffusion Tube Locations

AQMA Boundary

Contains Ordnance Survey Data Crown Copyright and Database Right [2020]

Location:
CIN04 - Market Street, Cinderford

Title
Diffusion Tube Locations

Date	**Figure No.**
June 2020	D3

Legend

Diffusion Tube Locations

AQMA Boundary

Contains Ordnance Survey Data Crown Copyright and Database Right [2020]

Location:
CIN06 High Street, Cinderford, Zebra Crossing (Top, near Factory Shop)

Title
Diffusion Tube Locations

Date	**Figure No.**
June 2020	D4

Legend

Diffusion Tube Locations

AQMA Boundary

Contains Ordnance Survey Data Crown Copyright and Database Right [2020]

Location:
COL01 - Gloucester Road, Coleford

COL02 – Market Place, Coleford

Title
Diffusion Tube Locations

Date	**Figure No.**
June 2020	D5

Legend

Diffusion Tube Locations

AQMA Boundary

Contains Ordnance Survey Data Crown Copyright and Database Right [2020]

Location:
COL03 – Old Vicarage Court, Coleford

Title
Diffusion Tube Locations

Date June 2020

Figure No.
D6

Legend

Diffusion Tube Locations

AQMA Boundary

Contains Ordnance Survey Data Crown Copyright and Database Right [2020]

Location:
HUN03 Huntley - opposite 9 Frogmore Road

Title
Diffusion Tube Locations

Date	**Figure No.**
	D7

Legend

Diffusion Tube Locations

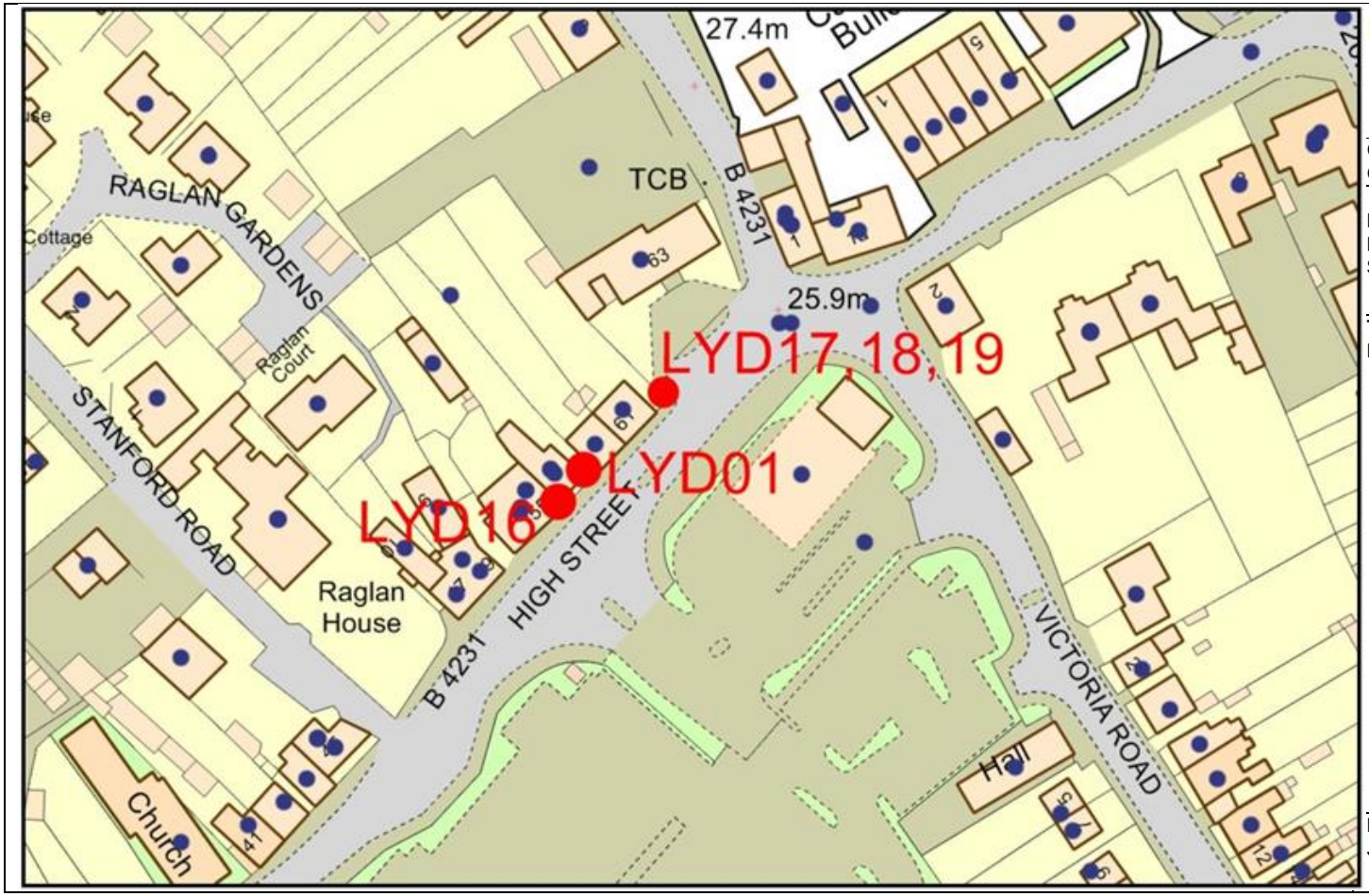
AQMA Boundary

Contains Ordnance Survey Data Crown Copyright and Database Right [2020]

Location:
LON01 Longhope

Title
Diffusion Tube Location

Date	**Figure No.**
June 2020	D8



Legend

Diffusion Tube Locations

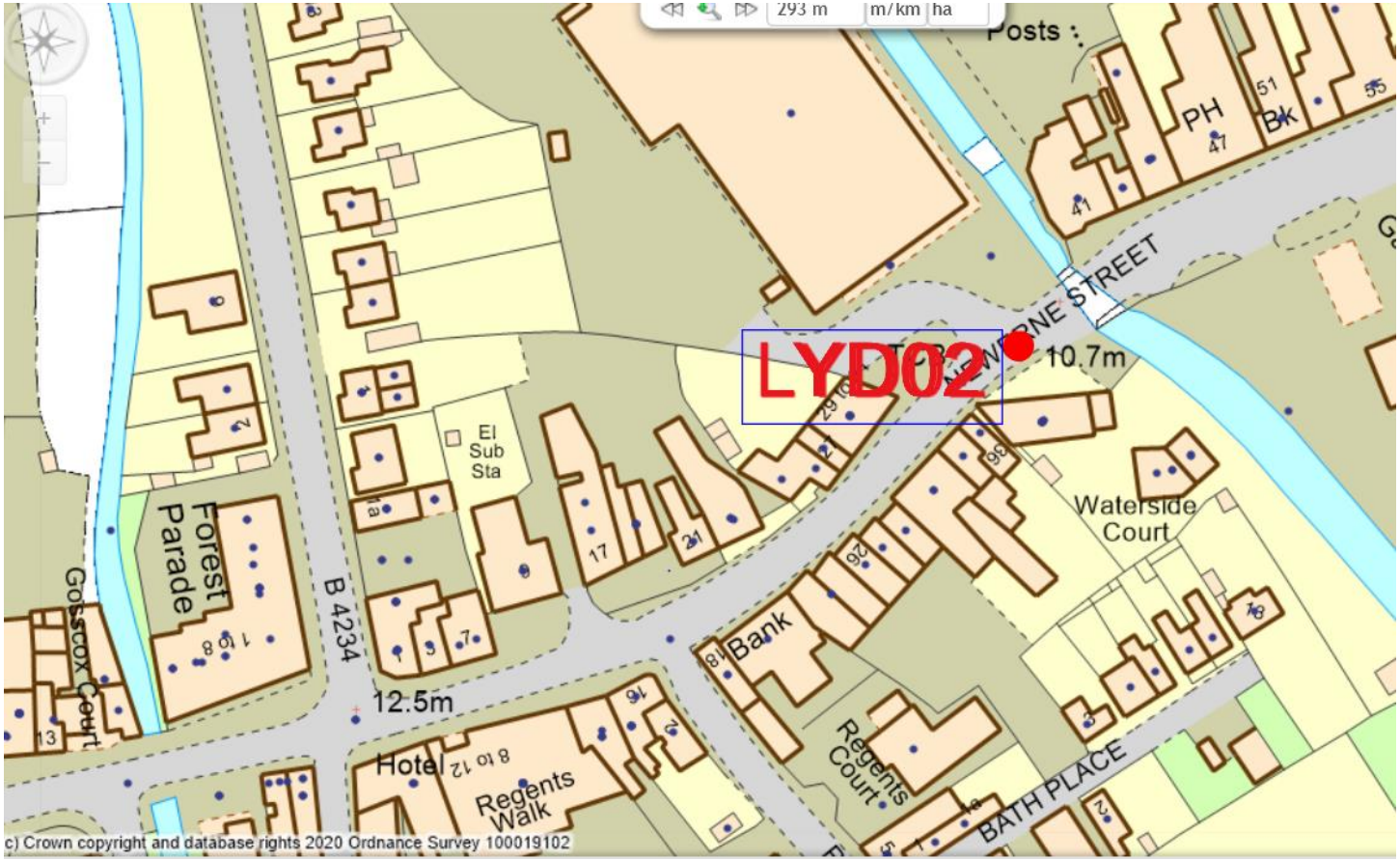
AQMA Boundary

Contains Ordnance Survey Data Crown Copyright and Database Right [2020]

Location:
LYD01, LYD16,17,18,19 – Top High Street, Lydney

Title
Diffusion Tube Locations

Date	**Figure No.**
June 2020	D9



Legend

Diffusion Tube Locations

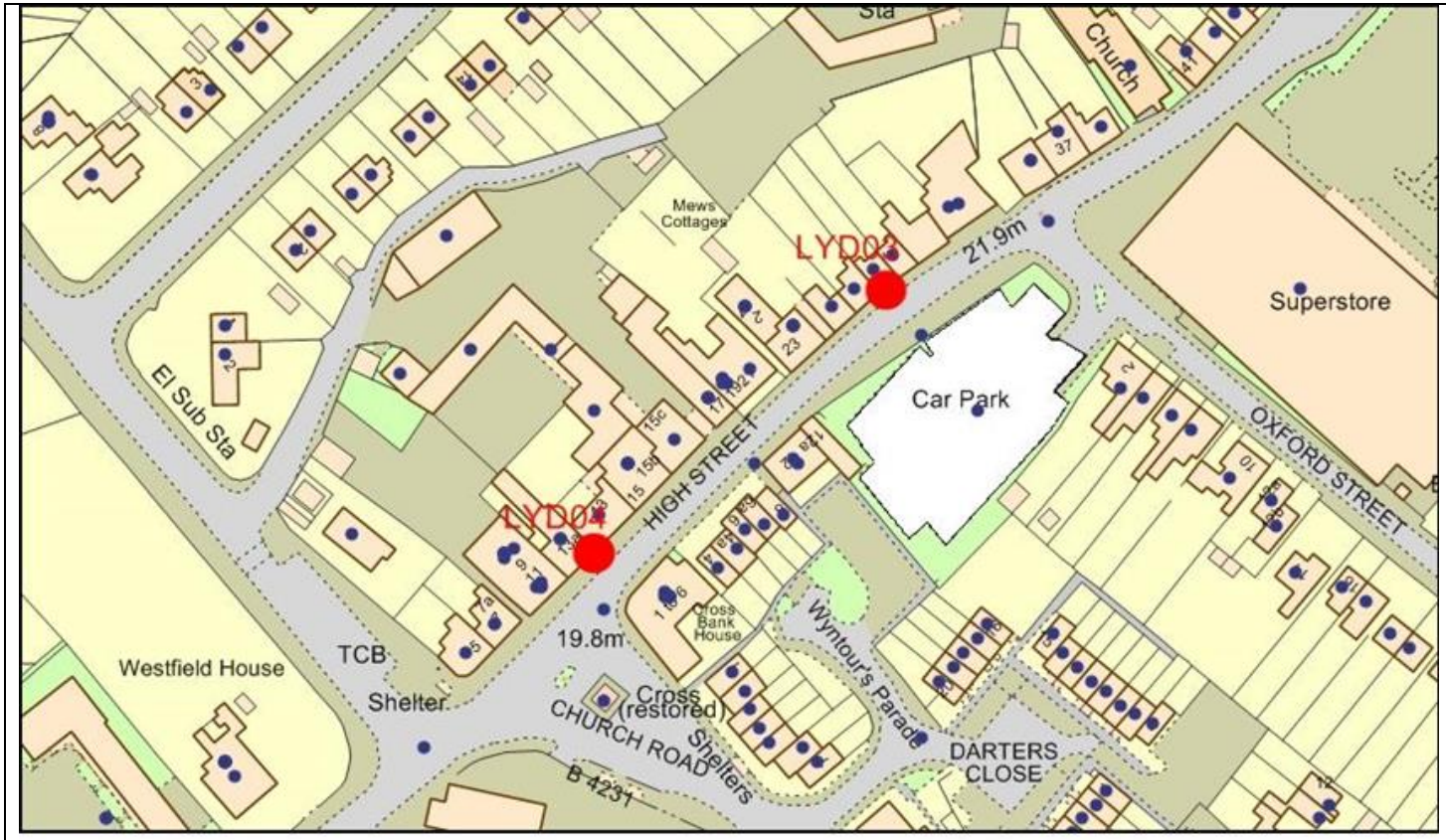
AQMA Boundary

Contains Ordnance Survey Data Crown Copyright and Database Right [2020]

Location:
LYD02 – Newerne St, Bridge House, Lydney

Title
Diffusion Tube Locations

Date	**Figure No.**
	D10



Legend

Diffusion Tube Locations

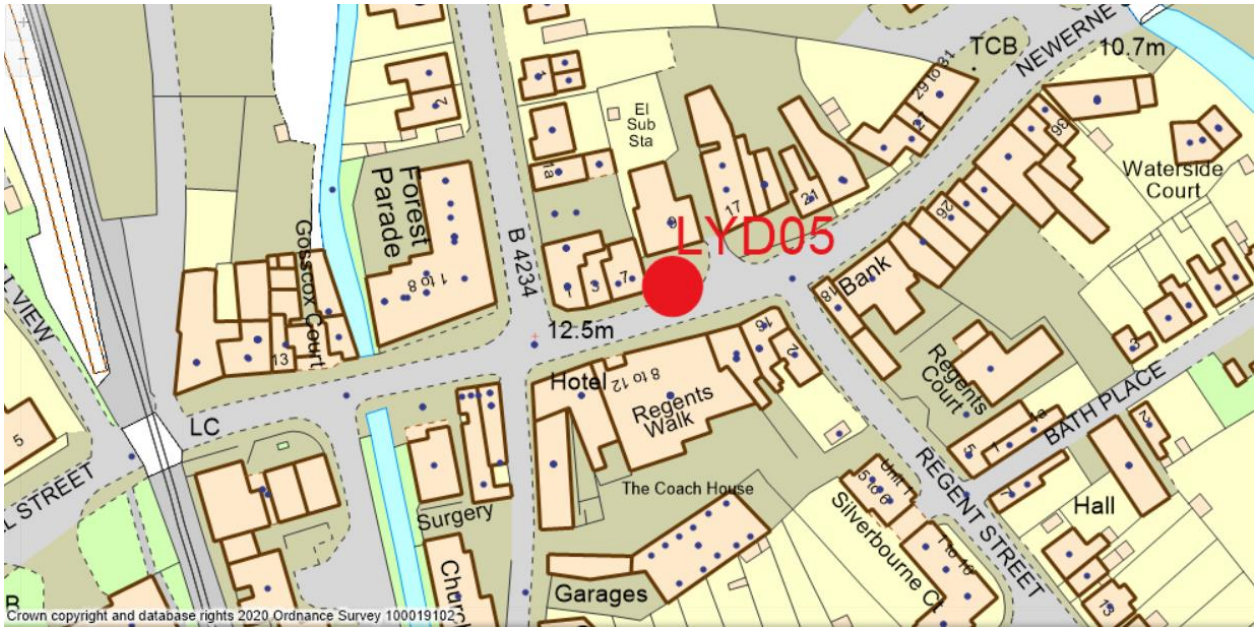
AQMA Boundary

Contains Ordnance Survey Data Crown Copyright and Database Right [2020]

Location:
LYD03 - 33 High Street Lydney,
LYD04 - 13 High Street, Lydney

Title
Diffusion Tube Locations

Date	**Figure No.**
June 2020	D11



Legend

Diffusion Tube Locations

AQMA Boundary

Contains Ordnance Survey Data Crown Copyright and Database Right [2020]

Location:
LYD05 Unit 1, Regents Arcade, Lydney

Title
Diffusion Tube Locations

Date	**Figure No.**
June 2020	D12

Legend

Diffusion Tube Locations

AQMA Boundary

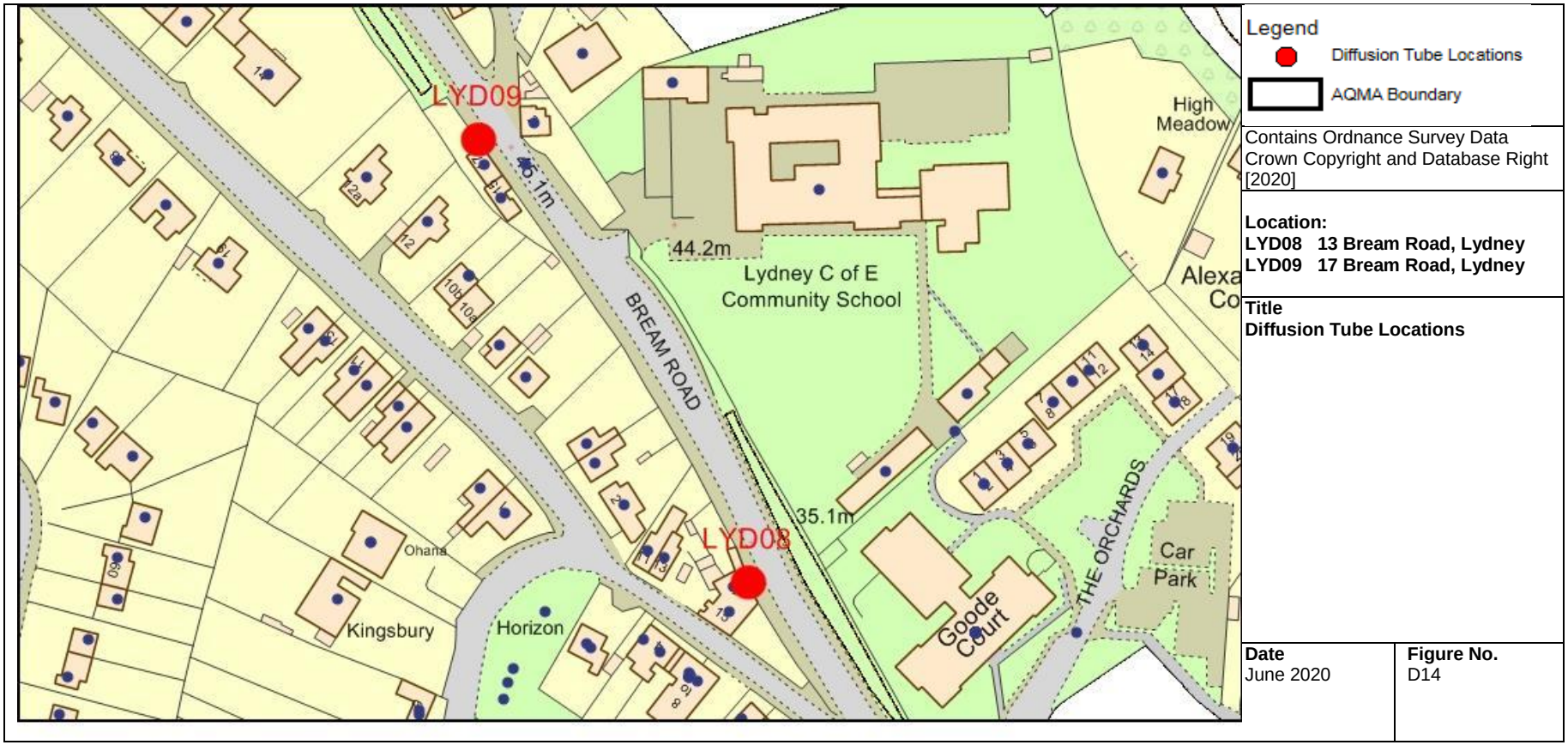
Contains Ordnance Survey Data Crown Copyright and Database Right [2020]

Location:
LYD06 Unit 1, Regents Arcade, Lydney

Title
Diffusion Tube Locations

Date	**Figure No.**
June 2020	D13

Forest of Dean District Council



Legend

Diffusion Tube Locations

AQMA Boundary

Contains Ordnance Survey Data Crown Copyright and Database Right [2020]

Location:
LYD10 Old Chip Shop, Forest Road, Lydney
LYD12 Kaplans, 61 Newerne Street, Lydney

Title
Diffusion Tube Locations

Date	**Figure No.**
June 2020	D15

Legend

Diffusion Tube Locations

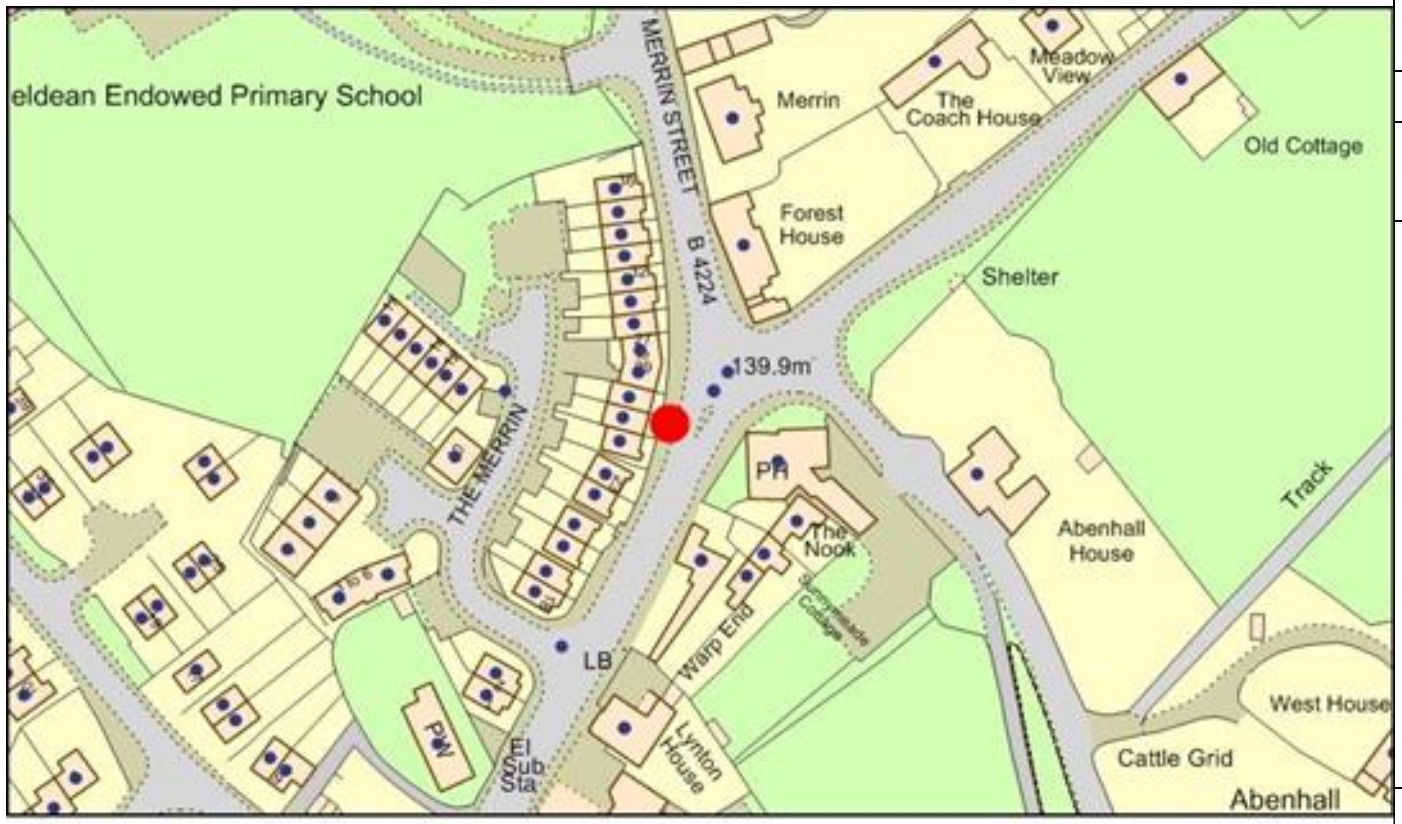
AQMA Boundary

Contains Ordnance Survey Data Crown Copyright and Database Right [2020]

Location:
LYD15, Highfield Lane, Lydney (background)

Title
Diffusion Tube Locations

Date	**Figure No.** D16



Legend

Diffusion Tube Locations

AQMA Boundary

Contains Ordnance Survey Data Crown Copyright and Database Right [2020]

Location:
MIT01 - 25 The Merrin, Mitcheldean

Title
Diffusion Tube Locations

Date	**Figure No.**
	D17

Legend

Diffusion Tube Locations

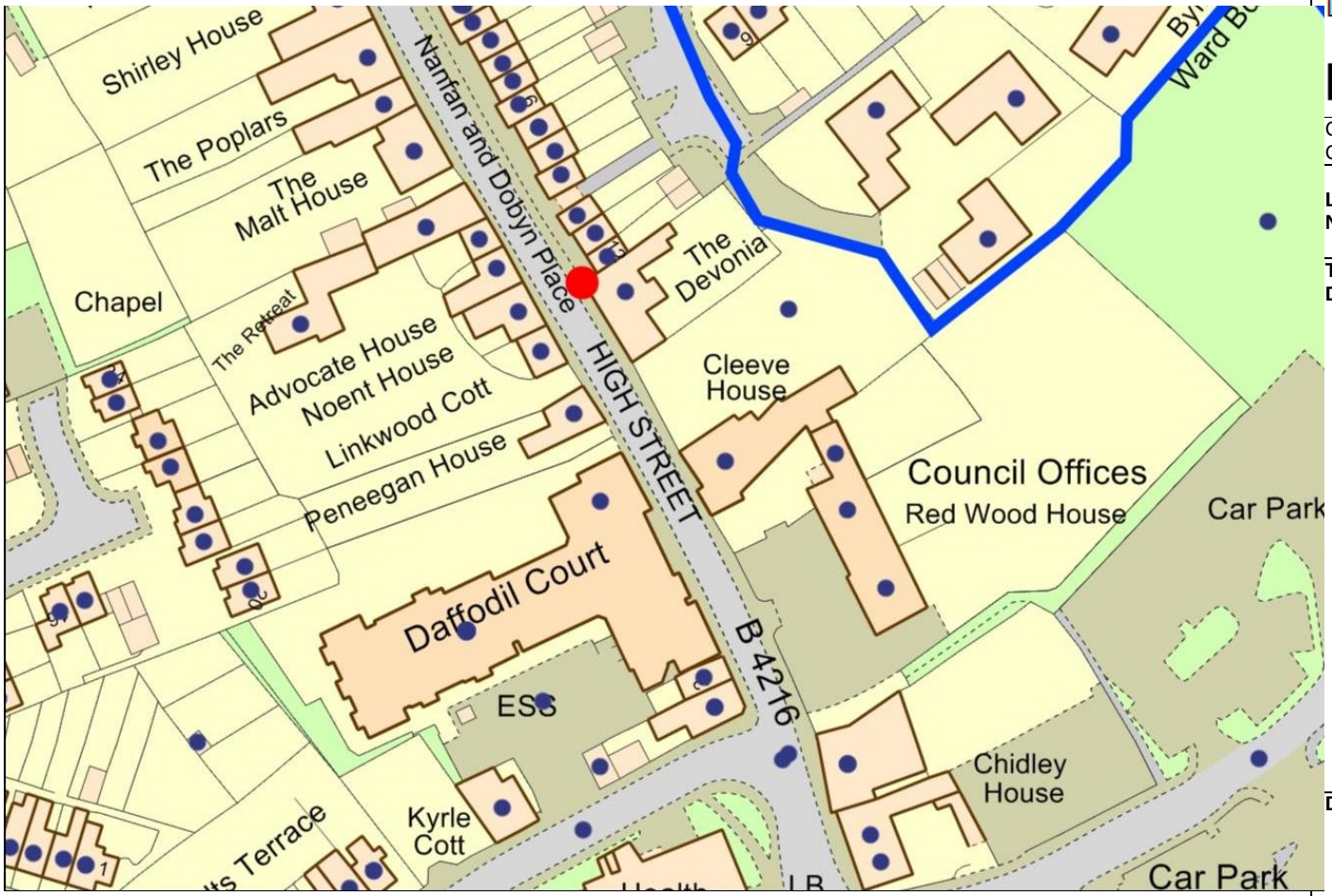
AQMA Boundary

Contains Ordnance Survey Data Crown Copyright and Database Right [2020]

Location:
NAI01 Crossroads, Nailbridge

Title
Diffusion Tube Locations

Date	**Figure No.**
	D18



Legend

Diffusion Tube Locations

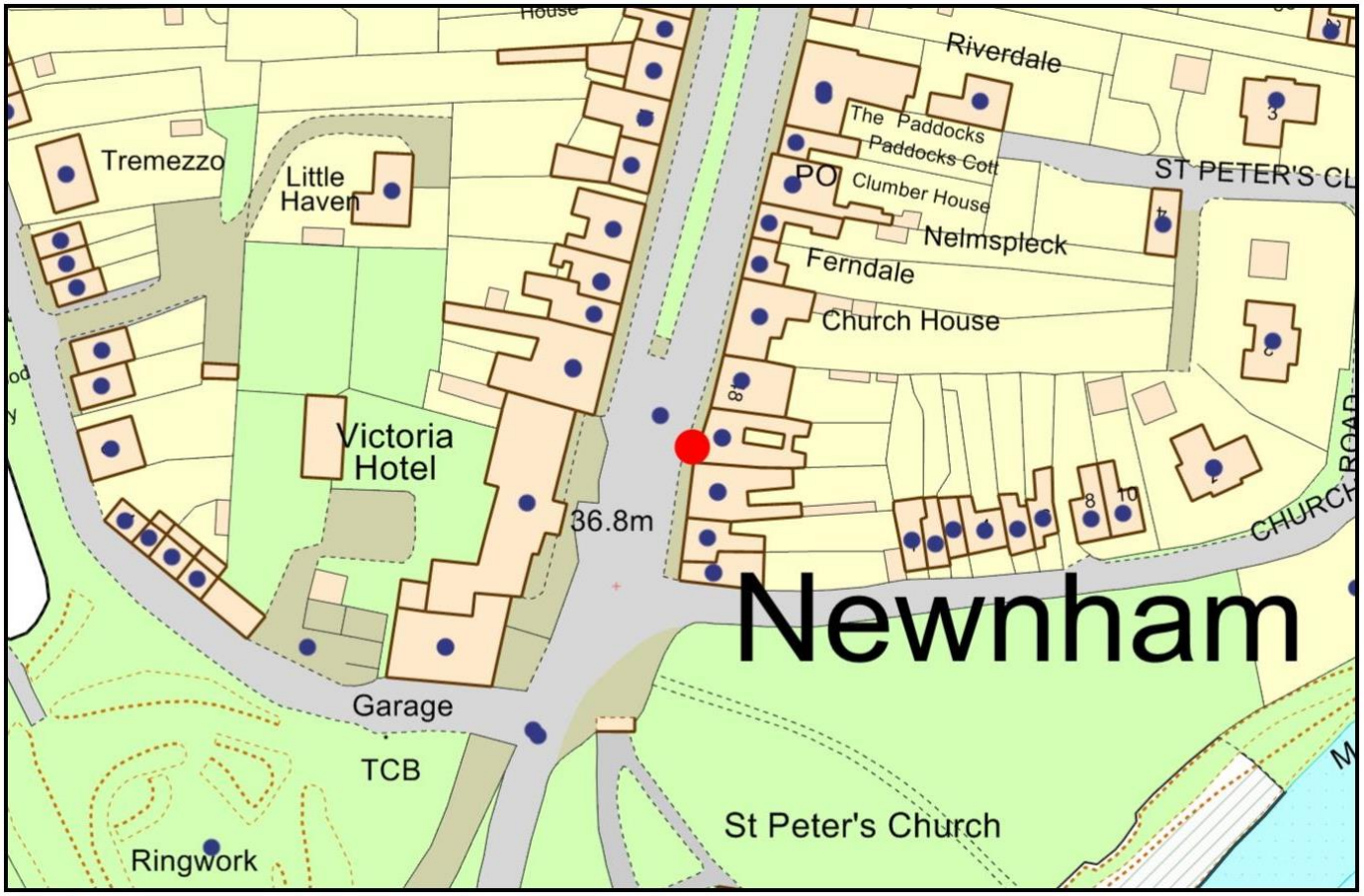
AQMA Boundary

Contains Ordnance Survey Data Crown Copyright and Database Right [2020]

Location:
NEW03 High Street, Newent

Title
Diffusion Tube Locations

Date	**Figure No.**
	D19



Legend

Diffusion Tube Locations

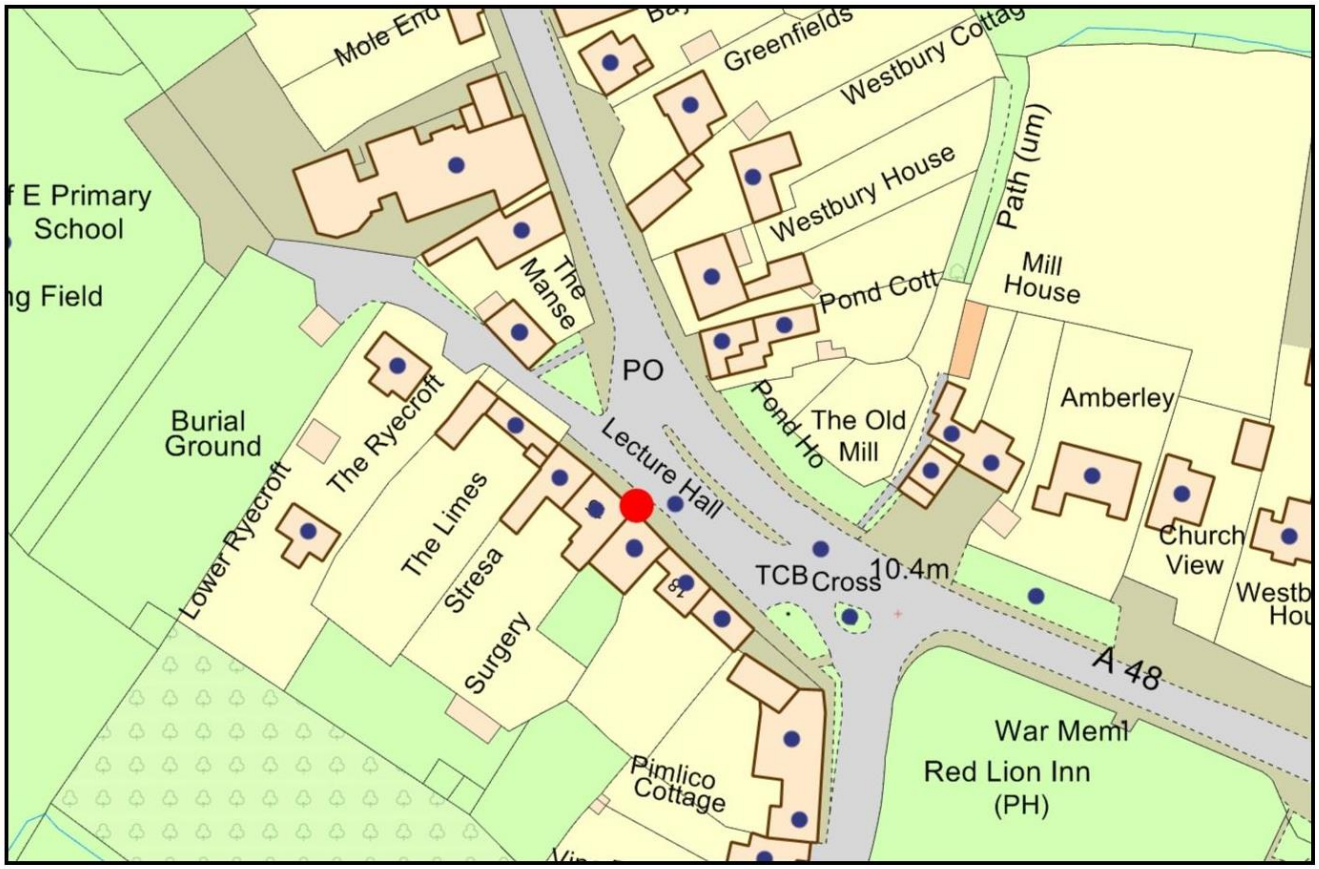
AQMA Boundary

Contains Ordnance Survey Data Crown Copyright and Database Right [2020]

Location:
NOS02 - High St - Galen House, Newnham-on-Severn

Title
Diffusion Tube Locations

Date	**Figure No.**
June 2020	D20



Legend

Diffusion Tube Locations

AQMA Boundary

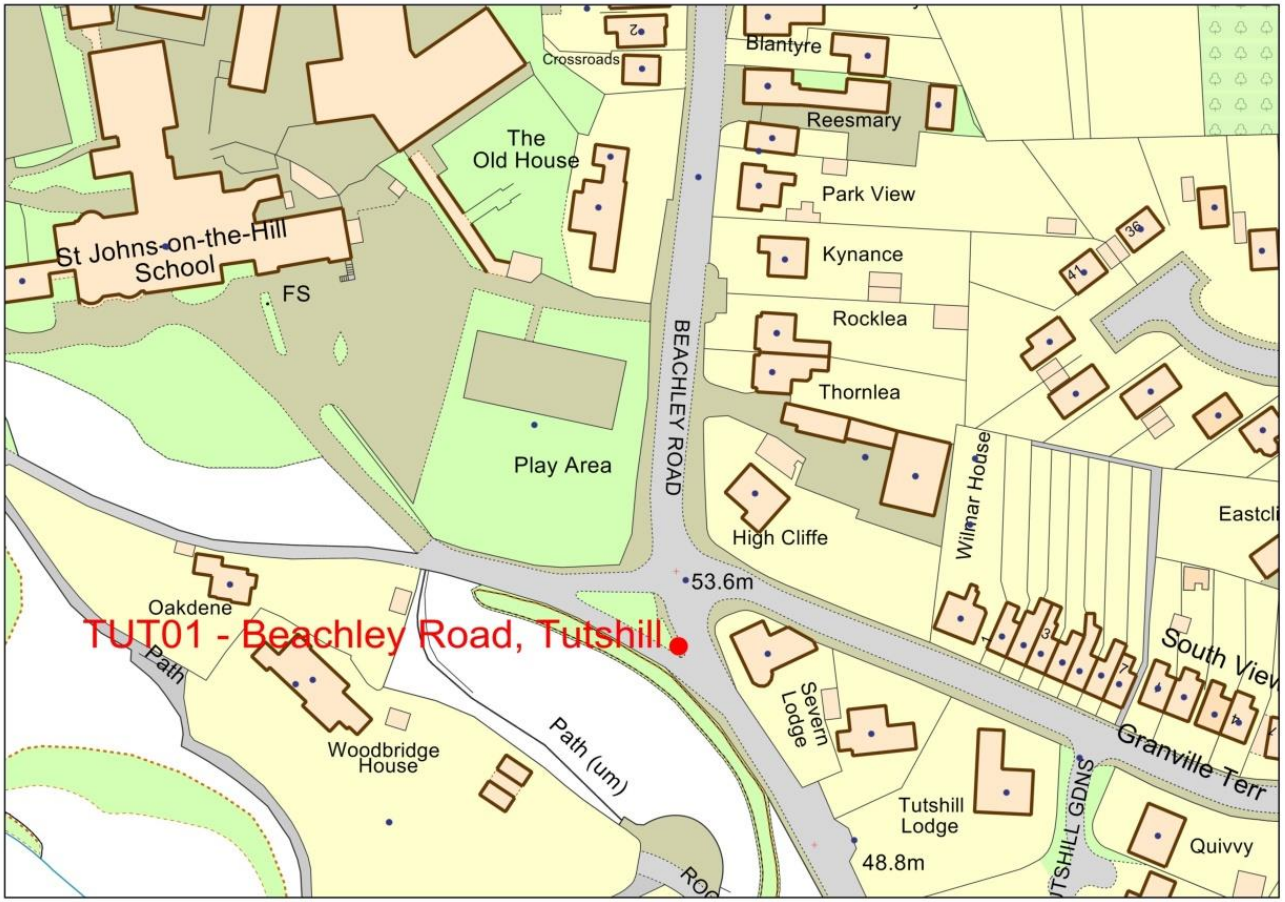
Contains Ordnance Survey Data Crown Copyright and Database Right [2020]

Location:
WOS01 Westbury-on-Severn - Dentist Practice (Lay-by)

Title
Diffusion Tube Locations

Date	**Figure No.**
June 2020	D21

Forest of Dean District Council



Legend

Diffusion Tube Locations

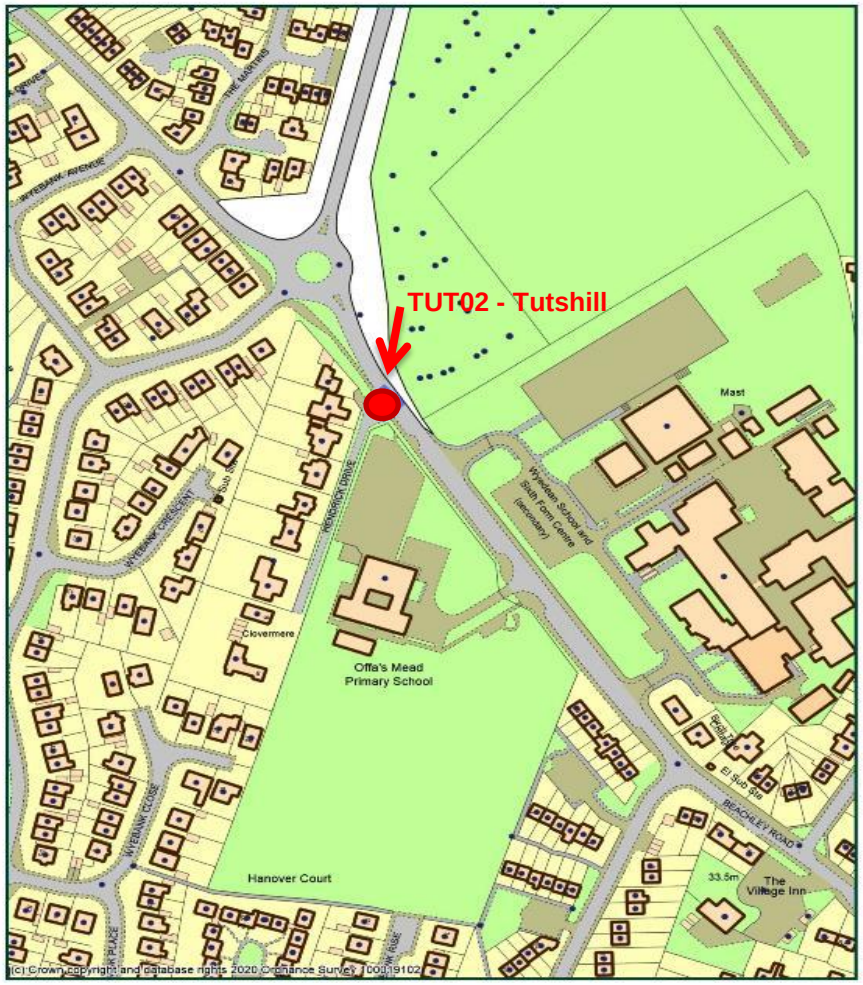
AQMA Boundary

Contains Ordnance Survey Data Crown Copyright and Database Right [2020]

Location:
TUT01 Beachley Road, Tutshill

Title
Diffusion Tube Locations

Date	**Figure No.**
June 2020	D22



Forest of Dean

Scale: 1:2000

20 May 2020

(c) Crown copyright and database rights 2013 Ordnance Survey 100019102

Legend

Diffusion Tube Locations

AQMA Boundary

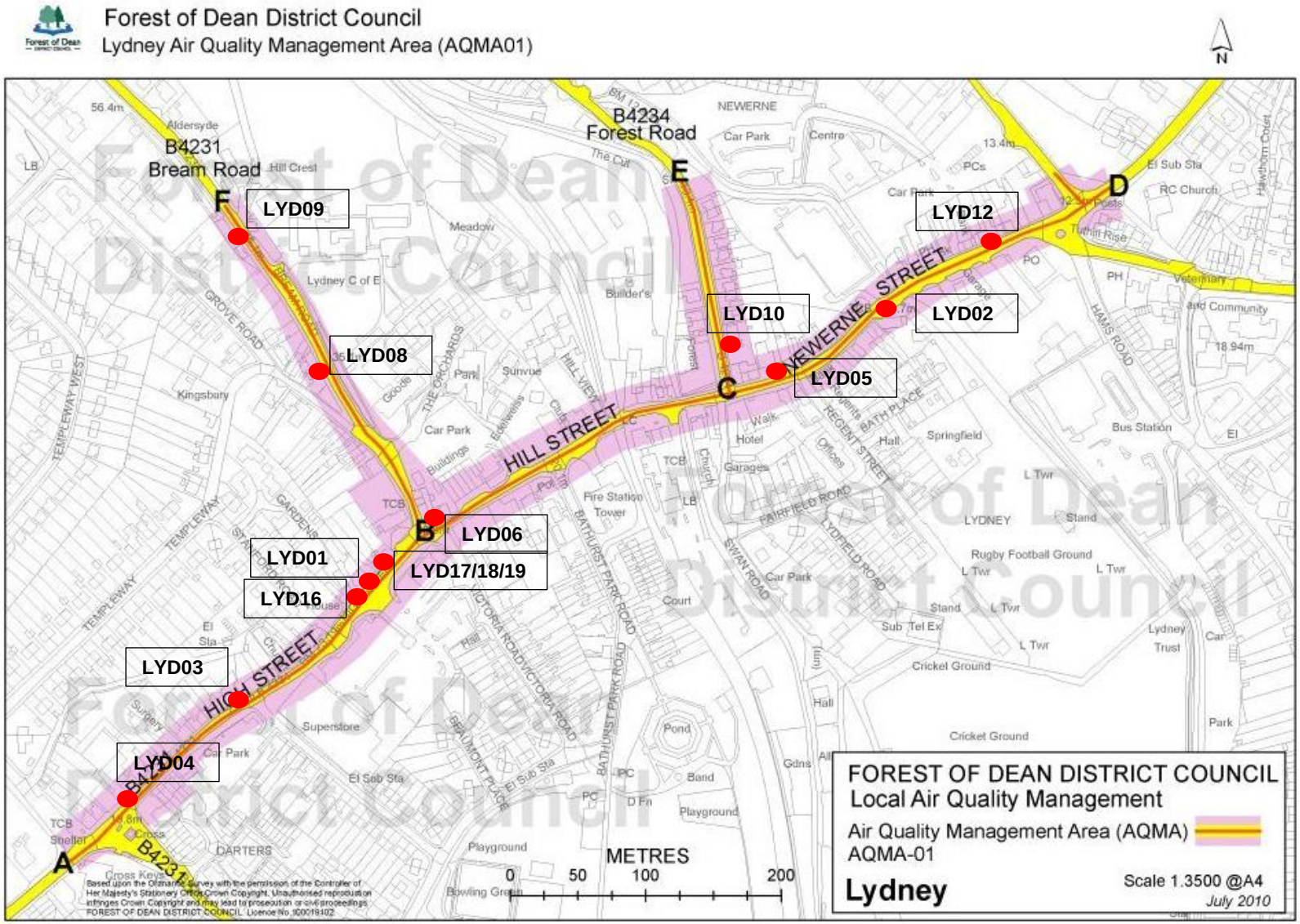
Contains Ordnance Survey Data Crown Copyright and Database Right [2020]

Location:
TUT02 Tutshill - Beachley Rd - Wyedean School

Title
Diffusion Tube Locations

Date	**Figure No.**
June 2020	D23

Figure D24 Lydney AQMA Boundary Plan with diffusion tube positions



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[7]	
	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

[7] 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