2019 Air Quality Annual Status Report (ASR)

Report for Mid Devon District Council

Mid Devon District Council

2019 Air Quality Annual Status Report (ASR)

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

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Executive Summary: Air Quality in Our Area

Air Quality in Mid Devon District Council

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

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

The main source of air pollution in the district is road traffic emissions from major roads, notably the M5, A373, A361, A377, A396 and A3126. Traffic emissions are a major source of nitrogen dioxide (NO_2) and particulate matter of different size fractions (PM_{10} and $PM_{2.5}$). Other pollution sources including commercial, industrial and domestic sources also make a contribution to pollutant concentrations.

Currently there are two Air Quality Management Areas (AQMAs) declared within the district. Both of these are related to traffic emissions; the Crediton AQMA has been designated for exceedances of the NO_2 annual mean objective as well as the PM_{10} 24-hour mean objective and the Cullompton AQMA has been designated for only exceedances of the NO_2 annual mean objective. All current AQMAs can be viewed online at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=161, details of the AQMAs are provided in Table 2-A and boundary maps are presented in Appendix D.

Feedback from Defra on the 2018 ASR noted that current monitoring locations in Mid Devon needed review to reflect the current nature of potential air quality issues in the district given the extent of new development proposed in the district and with a number of monitoring locations showing low levels of NO_2 over a number of years. The council have therefore implemented a review of current monitoring in the district, investigating the potential for using a set of real-time air quality sensors to explore in more detail some areas in the district – notably Crediton and Cullompton.

[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

An AQAP was completed in 2006 and 2009 for the declaration of the Crediton AQMA and the Cullompton AQMA respectively. In December 2017, the council published a new AQAP encompassing both declared AQMAs. The new AQAP outlined a series of actions the council has pledged to deliver between 2017 and 2021 in order to improve air quality within Mid Devon. This AQAP supersedes previous published action plans.

The council are currently reviewing the current AQAP to consider further how it relates to wider policies and programmes at the council (and County Council), whether there were any potential gaps and how key measures could be progressed.

With a significant amount of development proposed in the district, the council will also review how air quality is being considered in its planning policies and guidance and how this can be strengthened.

Nitrogen Dioxide

Concentrations of NO_2 are monitored at 21 sites across the district, consisting solely of diffusion tubes. One diffusion tube had insufficient data capture for annualisation in 2018. No automatic NO_2 monitoring stations are installed within the Mid Devon district. During 2018, three exceedances of the AQS annual mean objective for NO_2 were reported within Mid Devon. Site 13 and 14 in Cullompton had annual mean NO_2 concentrations of 42.9 and 40.6 µg/m^3 respectively and Site 20 in Crediton had an annual mean NO_2 concentration of 44.6 µg/m^3. Four diffusion tubes, Site 12 located within the Cullompton AQMA and Site 16, 18 and 19 located within the Crediton AQMA, reported annual mean NO_2 concentrations to be within 10% of the AQS objective (Site 12 – 37.1 µg/m^3, Site 16 – 37.9 µg/m^3, Site 18 – 37.2 µg/m^3, and Site 19 – 36.7 µg/m^3). Site 13 and 14 are located within the centre of Cullompton, along B3181 / Fore Street – one of the main access roads in and out of the town centre where congestion is likely to occur. Site 12 is a roadside site located on a junction where two arterial roads meet (Tiverton Road meets Fore Street) within Cullompton AQMA. Sites 16, 18, 19 and 20 are located adjacent to the A377 which is the main route through Crediton AQMA.

Results from 2018, compared to 2017 report NO_2 annual mean concentrations to have increased at 18 locations and decreased at one (Site 17). Site 12 shows the largest increase in NO_2 concentration of 13.0 µg/m^3.

Looking at the past five years, NO_2 annual mean concentrations in Crediton (Site 16, 17, 18, 19, 20 and 21) have remained relatively constant with the highest concentration consistently observed at Site 20 (2018 = 44.6 µg/m^3). In Cullompton, NO_2 annual mean concentrations at Site 8, 9, 10 and 11 have remained relatively constant. However, NO_2 annual mean concentrations at Site 12, 13 and 14 appear to be increasing. The highest concentration in Cullompton is consistently observed at Site 13 (2018 = 42.9 µg/m^3). NO_2 annual mean concentrations have remained relatively constant at all other sites with more than one year of monitoring data (Site 1, 2, 3, 4, 5 and 7).

As no concentrations within the district reported above 60 µg/m^3, an exceedance of the 1-hour mean objective is unlikely to occur.

Annual mean NO_2 concentrations recorded within 2018 have exceeded the annual mean AQS objective limit at two locations within Cullompton AQMA and one location within Crediton AQMA. Therefore, it is recommended that the council keep the two designated AQMAs declared for exceedances of the NO_2 annual mean AQS objective.

In addition, it is recommended that the council review the affectivity of the current monitoring network within both AQMAs, with the view to relocate monitoring locations reporting concentrations well below the AQS annual mean objective to any areas of concern to further improve confidence in air quality reporting.

The council is currently undertaking a comprehensive review of the air quality monitoring within the district. The review aims to ensure that the current monitoring locations reflect the current nature of potential air quality issues in the district given the extent of new development proposed in the district and with a number of monitoring locations showing low levels of NO_2 over a number of years. The possibility of using a set of real-time air quality sensors to explore some areas in the district in more detail, notably Crediton and Cullompton, will also be investigated.

Particulate Matter

Concentrations of PM_{10} during 2018 were monitored at CM1 – a continuous monitor located on along Exeter Road / A377, a main arterial route into Crediton.

Annual mean PM_{10} concentrations recorded at CM1 during 2018 were reported to be 23.4 µg/m^3, which is well below the AQS objective limit of 40 µg/m^3. In comparison to 2014, concentrations recorded in 2018 appear to have reduced by 9.9 µg/m^3.

During 2018, CM1 reported concentrations to exceed 50 µg/m^3 on eight occasions. However, as data capture (65%) was less than 85%, the 90.4th percentile of 24-hour means was used to assess against the AQS objective. The 90.4th percentile was 40 µg/m^3 and therefore demonstrated compliance with the 24-hour mean AQS objective. In addition, within the past five years, CM1 has not reported an exceedance of either the 24-hour mean or annual mean PM_{10} AQS objective.

During 2018, it was agreed that the council will give consideration to the removal of CM1 given that this monitoring location hasn't reported an exceedance of both the 24-hour and annual mean AQS objective limits for the past five years.

Based on the historical and 2018 monitoring data discussed, it is recommended that Mid Devon District Council look to revoke the Crediton AQMA for PM_{10}, or alternatively consider relocating CM1 to areas where exceedances are likely to occur in order to further improve confidence in air quality reporting within Crediton AQMA and the decision to revoke the AQMA for PM_{10}. The Crediton AQMA will be retained for the NO_2 annual mean.

Actions to Improve Air Quality

The new Lords Meadow link road in Crediton continues to ensure that particulate and NO_2 levels in the Exeter Road area are below the annual mean objectives. As levels are now well below the guidelines this may result in the boundary of the Crediton AQMA being adjusted to reflect these reduced levels.

Grant funding for the ECO Stars project has continued to encourage operators to move to cleaner vehicles and Mid Devon also continue to push Low Emission Strategies through the planning regime.

The development of EV charging networks through allocated funding is ongoing and will enable further charging points to be installed across the district. Several units have already been installed, as proposed in last year's ASR.

Other actions include marketing campaigns to reduce high street parking and promote the use of car parks, the promotion of E-bike schemes, community car sharing schemes and improvements in cycle parking facilities in town centres.

Ongoing development measures continue to be made with regards to traffic flows, footpath and cycling paths in the major towns and road surfacing improvements.

Public transport improvements are also underway, with a review of bus stop locations and routes, due for completion in 2021, and the Cullompton/Wellington rail link feasibility study.

To improve the air quality in Cullompton, Mid Devon District Council and Devon County Council (DCC) are supporting the implementation of a relief road. The relief road links the B3181/Millennium Way roundabout with the Duke Street / Meadow Lane junction and is located between Cullompton town centre to the west and the M5 to the east. It has been assessed as having a very high impact on air quality in the Mid Devon District Council Air Quality Management Area Action Plan 2009. Other benefits include reduction in traffic noise along town centre routes and reduced congestion.

In 2018, with the support of Mid Devon District Council, Crediton Town Council commissioned a Traffic and Urban Realm Feasibility Study to fully analyse the current traffic and urban realm conditions within Crediton town centre and main approach roads. The two Councils are now working together to commission transport and air quality modelling of up to 7 schemes as part of this study.

Conclusions and Priorities

The 2018 NO_2 annual mean concentrations exceed AQS object limits at two sites within Cullompton AQMA and one site within Crediton AQMA. Reported annual mean NO_2 concentrations are within 10% of the AQS objective at one site in the Cullompton AQMA and three sites in the Crediton AQMA. Concentrations of PM_{10} continue to remain well below the AQS objective limits at the CM1 monitoring site in Crediton AQMA.

Delivery of major transport infrastructure such as the Lords Meadows Link road, has helped significantly to reduce the use of town centre roads as thoroughfares, consequently improving air quality.

In recognition of the above, the following actions are considered to be key priorities for Mid Devon District Council:

- Review the current monitoring programme and explore the need to relocate existing monitoring stations to locations where monitoring has not previously been undertaken and where exceedances may be likely in areas of relevant public exposure;
- Review the current AQAP to consider further how it relates to wider policies and programmes at the council (and County Council), whether there were any potential gaps and how key measures could be progressed;
- Review how air quality is being considered in planning policies for development proposed in the district and guidance and how this can be strengthened;
- Consider the revocation of the Crediton AQMA – declared for exceedance of the PM_{10} 24-hour mean AQS objective limit while retaining the Crediton AQMA for the NO_2 annual mean; and
- Continue to deliver measures set out in the recently published Mid Devon District Council AQAP (2017).

Local Engagement and How to get Involved

Due to the main source of air pollution within Mid Devon being from transport sources, the public can get involved in helping reduce the release of air pollution and thus improving air quality within the district by looking at alternative means of travel. The following are possible alternatives to private travel that would contribute to improving air quality within the district:

Walk or cycle:

- Replacing a car journey by walking or cycling helps reduce traffic and traffic emissions. It has proven health and mental health benefits too. Walking or cycling to school can improve a child's concentration and makes children more alert, fit and healthy.

Take public transport or car share:

- For longer journeys, why not use public transport or car share? Car sharing can help combat congestion and help reduce pollution within urban areas, as well as save you money.

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1 Local Air Quality Management

This report provides an overview of air quality in Mid Devon District Council during 2018. 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 Mid Devon District Council to improve air quality and any progress that has been made.

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

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

A summary of AQMAs declared by Mid Devon District Council can be found in Table 2-A. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=161. Alternatively, see Appendix D: Map(s) of Monitoring Locations and AQMAs, which provides for a map of air quality monitoring locations in relation to the AQMA(s).

Mid Devon District Council propose to keep the two designated AQMAs declared for exceedances of the NO_2 annual mean AQS objective (Crediton and Cullompton AQMA), due to annual mean NO_2 concentrations exceeding the AQS objective limit for 2018. In relation to the Crediton AQMA, which was also declared as a result of exceedances of the PM_{10} 24-hour mean AQS objective, the council will review the suitability of the AQMA for PM_{10} within the coming year, with the view of revocation, considering there has been no reported exceedance of either the 24-hour or annual mean PM_{10} AQS objective within the past five years. The Crediton AQMA for the NO_2 annual mean will be retained.

Table 2-A – 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		
						At Declaration		Now		Name	Date of Publication	Link
Crediton AQMA	08/11/2004	NO_2 Annual Mean	Crediton	The majority of the built-up area of Crediton.	YES	52.7	µg/m^3	44.6	µg/m^3	Mid Devon District Council Air Quality Action Plan	2017	https://www.middevon.gov.uk/media/345645/aqap-mid-devon-district-council-2017.pdf
Crediton AQMA	08/11/2004	PM_{10} 24 Hour Mean	Crediton	The majority of the built-up area of Crediton.	YES	>35	Exceedances	8 (40)	Exceedances	Mid Devon District Council Air Quality Action Plan	2017	https://www.middevon.gov.uk/media/345645/aqap-mid-devon-district-council-2017.pdf

Cullompton AQMA	11/12/2006	NO_2 Annual Mean	Cullompton	An area encompassing the entire built-up area of the town of Cullompton.	YES	55.8	µg/m^3	42.9	µg/m^3	Mid Devon District Council Air Quality Action Plan	2017	https://www.middevon.gov.uk/media/345645/aqap-mid-devon-district-council-2017.pdf

☒ **Mid Devon District Council confirm the information on UK-Air regarding their AQMA(s) is up to date**

2.2 Progress and Impact of Measures to address Air Quality in Mid Devon District Council

Defra's appraisal of last year's ASR confirmed the council's findings that no exceedances of the AQS objective occurred at areas of relevant exposure based on monitoring data from 21 diffusion tubes reporting NO_2 concentrations and one automatic monitoring station reporting PM_{10} concentrations.

With regards to the appraisal commentary received from last year's ASR, feedback has been reviewed and where appropriate integrated within this year's ASR. Last year, Defra supported the proposal to reallocate monitoring resources for sites that have historically experienced low concentration in order to gain a better understanding of air quality/hotspots in the district. It was also recommended that Crediton AQMA be revoked for PM_{10} 24-hour mean given long standing compliance. Furthermore, the suggestion to move CM1 automatic monitor to another area was also supported.

Given the extent of new development proposed in the district and with a number of monitoring locations showing low levels of NO_2 over a number of years. Mid Devon District Council will be proactive with exploring the need to relocate existing monitoring stations to locations where monitoring has not previously been undertaken in order to improve the confidence in air quality reporting within the district. This will ensure the Mid Devon District Council monitoring programme remains effective in identifying areas of potential concern and facilitating accurate mitigation measures to provide safe levels of air quality to its residents.

As the AQAP was released towards the end of the previous reporting year of 2017, measures identified were proposed to be undertaken primarily from 2018 onwards, therefore, the council have no commentary related to measures which have already been completed, or information as to why delivery of certain measures has been slower than expected. Details of the measures undertaken, in progress or planned are set out in Table 2-B. More detail on these measures can be found in their respective Action Plan https://www.middevon.gov.uk/media/345645/aqap-mid-devon-district-council-2017.pdf.

The council are currently reviewing the current AQAP to consider further how it relates to wider policies and programmes at the council (and County Council), whether there were any potential gaps and how key measures could be progressed.

With a significant amount of development proposed in the district, the council will also review how air quality is being considered in its planning policies and guidance and how this can be strengthened.

Key measures which have already been undertaken include:

- Delivery of community run and/or private E-bikes schemes;
- Secure cycle parking facilities in Town Centres and at key transport hubs;
- Marketing campaign to reduce high street parking/promote car parks/raise awareness;
- Review of bus stop locations and routes;
- Coordinated approach to enforcement of anti-idling and illegal parking;
- Development of an EV charging network within Mid Devon;
- Improved footpath and cycling paths in major towns; and
- Cullompton/Wellington Rail link feasibility study.

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

- Coordinated approach to enforcement of anti-idling, illegal parking;
- Increase in level of awareness of local air quality issues/change in behaviour;
- Improved traffic flow at key pinch points delivery of awareness raising campaign with drivers;
- Improve traffic flow through the centre of towns;
- Adopt Mid Devon District Council's Local Plan;
- In 2018, with the support of Mid Devon District Council, Crediton Town Council commissioned a Traffic and Urban Realm Feasibility Study to fully analyse the current traffic and urban realm conditions within Crediton town centre and main approach roads. The two Councils are now working together to

commission transport and air quality modelling of up to 7 schemes as part of this study;

- Modelling of the Cullompton Town Centre Relief Road has been commissioned by Devon County Council to determine the feasibility of the potential route options;
- Mid Devon District Council have commissioned Ricardo Energy & Environment to perform the following:
    - Review of the district's current monitoring programme. Recommendations will be made with regards to the placement of monitoring locations across the district and potential locations for new low-cost sensors in both Crediton and Cullompton;
    - Review of Mid Devon District Council's current planning policies;
    - Review of the Mid Devon District Council AQAP;
    - Air quality assessment of the proposed Crediton traffic management schemes;
    - Development of a Low Emission Strategy (LES) for Cullompton to manage the impacts of future development.

The principal challenges and barriers to implementation that Mid Devon District Council anticipates facing are:

Influence: Stretches of roads controlled by Highways England fall within the jurisdiction of Mid Devon District Council, and as a result influence air quality in the surrounding area. For instance, stretches of the M5 are within close proximity to Crediton and Cullompton AQMAs, and as a result, air quality within these areas are influenced by roads outside of the district's control. In these situations, it can be incredibly tough to deliver effective measures to help improve air quality. In light of this, Mid Devon District Council has acknowledged this influence and has made a focussed effort to strengthen ties with the surrounding local authorities and infrastructure operators, such as Highways England, with a view of improving regional air quality – a shared goal.

Funding: The majority of the actions mentioned above require funding to implement successfully. In particular, delivery of the Eastern Relief Road in Cullompton and

additional M5 junction requires major infrastructure funding. Therefore, Mid Devon District Council must utilise all options available for funding, prioritise measures and be cost effective to ensure the actions outlined in the AQAP are delivered. Mid Devon District Council anticipates that the measures stated above and in Table 2-B will help ensure compliance is maintained for the forthcoming years in the following AQMAs:

- Crediton AQMA; and
- Cullompton AQMA.

Table 2-B – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Community Car sharing schemes	Alternatives to private vehicle use	Car & lift sharing schemes	MDDC	2017/18	2017-21	Number of car share schemes delivered in new developments Usage rate	Low	s106 contribution allocated and included in new housing travel plans	Pending full release of funds and commencement of development	
2	Community run and/or private E-bikes schemes	Alternatives to private vehicle use	Other	MDDC and Local Town Councils	2017/18	2018-21	E-Bikes accepted and utilised as an alternative mode of transport by residents	Low	Pending securing funding from s106 or other funding source	Pending funding secured	
3	Secure cycle parking facilities in Town Centres and at key transport hubs	Promoting Travel Alternatives		MDDC Rail Network DCC	2018/9	2018-21	Initial facility installed in Crediton	Low	s106 allocated for Crediton railway station and Town centre Included in Cullompton Master planning	Pending release of s106 funds	
4	Marketing campaign to reduce high street parking/promote car parks/raise awareness	Public Information		MDDC and Town Councils	2017/18	2018-20	Increase in level of awareness of local air quality issues/change in behaviour	Low	Planning stage	2018/19	Consultation with DCC and Town Councils required

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
5	Develop EV charging network	Promoting Low Emission Transport		MDDC	2017/18	2017-21	7 units to be installed across the district in the first phase	Medium	Contract with supplier signed	Ongoing	
6	Taxi Licensing conditions	Promoting Low Emission Transport		MDDC	2017	2017-21	Policy review undertaken to develop ULEV taxi fleet and infrastructure	Low	Current policy updated 2017	Ongoing	
7	Eastern Relief Road Cullompton and additional M5 junction	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	MDDC DCC Highways	2017/18	To be determined	% reduction in traffic flows through Cullompton Reduction in congestion on minor roads	High	Local Plan submission Land allocated and preliminary design work undertaken	Pending funding and adoption of Local Plan	Major infrastructure funding required
8	Coordinated approach to enforcement of anti-idling, illegal parking	Traffic Management	Anti-idling enforcement	MDDC DCC	2017/18	2017/20	Improved traffic flow at key pinch points Delivery of awareness raising campaign with drivers	Low	Initial consultation held with Town Councils	2018	
9	Kings Mill Industrial site traffic management Cullompto	Traffic Management	UTC, Congestion management, traffic reduction	MDDC DCC Highways	2017/18	To be determined	Improved traffic flows to/from industrial site	Low	Local Plan submission	Ongoing	

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
	n Junction 28										
10	Parking and traffic flow measures	Traffic Management	UTC, Congestion management, traffic reduction	MDDC DCC	2017/8	2018	Improved traffic flows Decrease in main street parking Increase use of MDDC car parks	Medium	Measures identified by Town Councils and MDDC	Ongoing	Introduces resident car parking rates which is often unfavourable
11	Cullompton/ Wellington Rail link feasibility study	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	MDDC and Taunton Deane	2017	2017/18	Feasibility study completed	Medium	Joint project £100K committed to study Local Plan submission	Ongoing	
12	ECO Stars fleet management and recognition scheme	Transport Planning and Infrastructure	Other	MDDC	Completed	Current	% Increase in number of companies in the scheme	Low	Continuing program	Ongoing	
13	Bus stop infrastructure	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	MDDC DCC	2017/18	2017-21	Change to mode of transport Increase in patronage	Medium	S106 contribution allocated	Pending full release of funds	
14	Review of bus stop locations and routes	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	MDDC DCC	2017/18	2017-21	Improved Traffic flow through centre of towns	Medium	Town Council consultation	2021	Pending agreement with DCC and Bus operators District wide
15	Improving footpath and cycling paths	Transport Planning and Infrastructure	Cycle network	Town Councils MDDC DCC	2017/18	2017 -21	Connected pathway network Improved accessibility Reduction in	Low	Initial network improvements identified in Neighbourhood plans and s106 projects	Ongoing	

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
	In major towns						short car journeys				
16	Road surfacing	Transport Planning and Infrastructure	Other	DCC	2018/19	2018-21	Areas of existing or new road network resurfaced	Low	Review phase	Ongoing	
17	Mid Devon Local Plan	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	MDDC	Development Management Policies	Until Dec 2017	Local Plan adopted	High	Review phase completed	Jan-18	
18	Culm Valley Garden Village development and major infrastructure projects	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	MDDC DCC Highways	2017-21	2017-30	Public Health considerations incorporated in Master planning cycle	High	Culm Village funding awarded by Central Government Steering group formed Site and land secured	Ongoing	
19	Planning Policy DM8 Parking	Policy Guidance and Development Control	Other policy	MDDC	2017	2017-21	Standards adopted for electric vehicle infrastructure	Medium	Revised in Local Plan review 2017	Ongoing	
20	Planning Policy DM6 Transport and Air Quality	Policy Guidance and Development Control	Other policy	MDDC	2017	2017-21	Low Emission and Transport Assessments completed Travel Plans completed	Medium	Revised in Local Plan review 2017	Ongoing	

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
21	Planning Conditions on Tiverton Eastern Urban Extension	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	MDDC	2017/18	2017-30	Air Quality Emissions Noise	N/A	Review phase	Ongoing	
22	Review of current monitoring in region	Other	Other	MDDC	2019	2019-2021	More detailed understanding of air quality in the district	N/A	Review Phase	Ongoing	
23	Review of planning policies	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	MDDC	2019	2019-2021	Recommendations on setting targets and emissions reduction ambition for developers	N/A	Review Phase	Ongoing	
24	Air quality assessment of Crediton traffic management schemes	Traffic Management	Other	MDDC	2019	2020-2021	Improved traffic flow through centre of Crediton. Improved air quality	High	Planning phase	Ongoing	
25	Development of a Low Emission Strategy (LES) for Cullompton	Policy Guidance and Development Control	Low Emissions Strategy	MDDC	2019	2020-2021	Improved air quality	High	Planning phase	Ongoing	

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.

Within Mid Devon, there are no appropriate local sites measuring both PM_{10} and $PM_{2.5}$, therefore in accordance with Defra's LAQM.TG(16), the nationally derived correction ratio of 0.7 has been applied to annual mean PM_{10} concentrations recorded at CM1 (23.4 µg/m^3 x 0.7 = 16.4 µg/m^3). This factor was calculated as the average of all ratios of $PM_{2.5}/PM_{10}$ found for years 2010 to 2014 for forty sites within the AURN where both PM_{10} and $PM_{2.5}$ are measured on an hourly basis. Estimated annual mean concentrations of $PM_{2.5}$ at CM1 during 2018 were estimated to be 16.4 µg/m^3, below the 2020 annual mean $PM_{2.5}$ AQS objective.

The Defra 2018 background maps for Mid Devon District Council (2015 based)[4] show that all background concentrations of $PM_{2.5}$ are far below annual mean $PM_{2.5}$ AQS objective limit. The highest concentration is predicted to be 10.5 µg/m^3 within the 1km x 1km grid square with the centroid grid reference of 302500, 107500. This grid square is located immediately to the east of Cullompton within close proximity to the M5.

The Public Health Outcomes Framework data tool[5] compiled by Public Heath England quantifies the mortality burden of $PM_{2.5}$ within England on a county and local authority scale. The 2017 fraction of mortality attributable to $PM_{2.5}$ pollution in Mid Devon is 3.9%, which is below the South West's average of 4.4% and the national average of 5.1%. The council operates a comprehensive section of their website dedicated to air quality where information surrounding the use of bonfires, including a step-by-step guide to dealing with nuisances from persistent bonfire smoke, is accessible and easily digestible for the public.

[4] Defra Background Mapping data for local authorities (2015-based), available online at https://uk-air.defra.gov.uk/data/laqm-backgroundmaps?year=2015
[5] Public Health Outcomes Framework, Public Health England. data tool available online at https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/0/gid/1000043/pat/6/par/E12000009/ati/101/are/E07000042/iid/20101/age/235/sex/4

LAQM.TG(16) Table A.1 Action toolbox presents a list of measures that can be implemented to help reduce concentrations of $PM_{2.5}$. The actions Mid Devon have taken, and will continue to take, have invariably also included benefits for the reduction of $PM_{2.5}$ pollution. Although not designed specifically for the reduction of $PM_{2.5}$, improvements in NO_2 concentrations will lead to a net reduction of $PM_{2.5}$ concentrations from combustion-based sources where both pollutants arise. This is apparent for the measures that are aimed at reducing car usage and also promoting the uptake of electric vehicles.

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

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

Mid Devon District Council undertook automatic (continuous) monitoring at one site during 2018 (CM1). Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at https://uk-air.defra.gov.uk/.

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

3.1.2 Non-Automatic Monitoring Sites

Mid Devon District Council undertook non- automatic (passive) monitoring of NO_2 at 21 sites during 2018. Table A.2 in Appendix A shows the details of the sites.

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

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO_2)

Table A.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 2018 dataset of monthly mean values is provided in Appendix B.

Concentrations of NO_2 are monitored at 21 sites across the district, consisting solely of diffusion tubes. One diffusion tube had insufficient data capture for annualisation in 2018 (Site 6). No automatic NO_2 monitoring stations are installed within the Mid Devon district. During 2018, three exceedances of the AQS annual mean objective for NO_2 were reported within Mid Devon. Site 13 and 14 in Cullompton had annual mean NO_2 concentrations of 42.9 and 40.6 µg/m^3 respectively and Site 20 in Crediton had an annual mean NO_2 concentration of 44.6 µg/m^3. Four diffusion tubes, Site 12 located within the Cullompton AQMA and Site 16, 18 and 19 located within the Crediton AQMA, reported annual mean NO_2 concentrations to be within 10% of the AQS objective (Site 12 – 37.1 µg/m^3, Site 16 – 37.9 µg/m^3, Site 18 – 37.2 µg/m^3, and Site 19 – 36.7 µg/m^3). Site 13 and 14 are located within the centre of Cullompton, along B3181 / Fore Street – one of the main access roads in and out of the town centre where congestion is likely to occur. Site 12 is a roadside site located on a junction where two arterial roads meet (Tiverton Road meets Fore Street) within Cullompton AQMA. Sites 16, 18, 19 and 20 are located adjacent to the A377 which is the main route through Crediton AQMA.

Results from 2018, compared to 2017 report NO_2 annual mean concentrations to have increased at 18 locations and decreased at one (Site 17). Site 12 shows the largest increase in NO_2 concentration of 13.0 µg/m^3.

Looking at the past five years, NO_2 annual mean concentrations in Crediton (Site 16, 17, 18, 19, 20 and 21) have remained relatively constant with the highest concentration consistently observed at Site 20 (2018 = 44.6 µg/m^3). In Cullompton, NO_2 annual mean concentrations at Site 8, 9, 10 and 11 have remained relatively constant. However, NO_2 annual mean concentrations at Site 12, 13 and 14 appear to be increasing. The highest concentration in Cullompton is consistently observed at Site 13 (2018 = 42.9 µg/m^3). NO_2 annual mean concentrations have remained relatively constant at all other sites with more than one year of monitoring data (Site 1, 2, 3, 4, 5 and 7).

As no concentrations within the district reported above 60 µg/m^3, an exceedance of the 1-hour mean objective is unlikely to occur.

Annual mean NO_2 concentrations recorded within 2018 have exceeded the annual mean AQS objective limit at two locations within Cullompton AQMA and one location within Crediton AQMA. Therefore, it is recommended that the council keep the two

designated AQMAs declared for exceedances of the NO_2 annual mean AQS objective.

In addition, it is recommended that the council review the affectivity of the current monitoring network within both AQMAs, with the view to relocate monitoring locations reporting concentrations well below the AQS annual mean objective to any areas of concern to further improve confidence in air quality reporting.

3.2.2 Particulate Matter (PM_{10})

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of 40 µg/m^3.

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

Concentrations of PM_{10} during 2018 were monitored at CM1 – a continuous monitor located on along Exeter Road / A377, a main arterial route into Crediton.

Annual mean PM_{10} concentrations recorded at CM1 during 2018 were reported to be 23.4 µg/m^3, which is well below the AQS objective limit of 40 µg/m^3. In comparison to 2014, concentrations recorded in 2018 appear to have reduced by 9.9 µg/m^3.

During 2018, CM1 reported concentrations to exceed 50 µg/m^3 on eight occasions. However, as data capture (65%) was less than 85%, the 90.4th percentile of 24-hour means was used to assess against the AQS objective. The 90.4th percentile was 40 µg/m^3 and therefore demonstrated compliance with the 24-hour mean AQS objective. In addition, within the past five years, CM1 has not reported an exceedance of either the 24-hour mean or annual mean PM_{10} AQS objective.

During 2018, it was agreed that the council will give consideration to the removal of CM1 given that this monitoring location hasn't reported an exceedance of both the 24-hour and annual mean AQS objective limits for the past five years.

Based on the historical and 2018 monitoring data discussed, it is recommended that Mid Devon District Council look to revoke the Crediton AQMA for PM_{10}, or alternatively consider relocating CM1 to areas where exceedances are likely to occur in order to further improve confidence in air quality reporting within Crediton AQMA

and the decision to revoke the AQMA. The Crediton AQMA should be retained for the NO_2 annual mean.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
CM1	Exeter Road, Crediton	Roadside	283847	99857	PM_{10}	YES	FDMS	0.3	2.2	1.5

Notes:

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

(2) N/A if not applicable.

Table A.2 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
DT1	43 Bampton Street, Tiverton	Roadside	295598	112741	NO_2	NO	0	2.4	NO	2.4
DT2	Horsdon Terrace, Tiverton	Roadside	296567	112786	NO_2	NO	0	4.7	NO	2.2
DT3	Leat Street, Tiverton	Roadside	295120	112727	NO_2	NO	2.3	0.8	NO	2.9
DT4	Leat Street, Tiverton #2	Roadside	294995	112925	NO_2	NO	2	1.7	NO	2.9
DT5	Primary School, Burlescombe	Roadside	307035	117007	NO_2	NO	9.4	0.5	NO	2.5
DT6	Broad Path, Burlescombe	Roadside	306575	114289	NO_2	NO	13	2	NO	2.2
DT7	Sommerville Close, Willand	Roadside	303290	111062	NO_2	NO	4	1.6	NO	2.9
DT8	1 Culm Lea, Cullompton	Roadside	303010	107416	NO_2	YES	3	3.4	NO	2.2
DT9	Police Station, Station Road, Cullompton	Roadside	302176	107546	NO_2	YES	1.3	1.6	NO	3
DT10	49 Station Road, Cullompton	Roadside	302289	107591	NO_2	YES	0.4	3.5	NO	3

DT11	17 High Street, Cullompton	Roadside	302092	107446	NO_2	YES	4.5	6	NO	2.9
DT12	HSBC, Cullompton	Roadside	302050	107359	NO_2	YES	0.1	0.8	NO	3.2
DT13	8 Fore Street, Cullompton	Roadside	302056	107296	NO_2	YES	0.1	1.6	NO	3
DT14	45 Fore Street, Cullompton	Roadside	302071	107199	NO_2	YES	0.1	2.3	NO	2.8
DT15	Newton St Cyres	Roadside	288011	98009	NO_2	NO	0.5	0.87	NO	2.44
DT16	Bottom Exeter Road, Crediton	Roadside	283990	99650	NO_2	YES	0.4	1.5	NO	2.8
DT17	Middle Exeter Road, Crediton	Roadside	283946	99731	NO_2	YES	0.1	1.45	NO	3.05
DT18	Top Exeter Road, Crediton	Roadside	283873	99940	NO_2	YES	1.9	0.3	NO	2.7
DT19	HSBC High Street, Crediton	Roadside	283278	100291	NO_2	YES	0	1.9	NO	3
DT20	Duke of York, High Street, Crediton	Roadside	282785	100374	NO_2	YES	0	2.65	NO	2.2
DT21	5 Commercial Road, Crediton	Roadside	283981	100350	NO_2	YES	0	4	NO	2.2

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
						2014	2015	2016	2017	2018
DT1	43 Bampton Street, Tiverton	Roadside	Diffusion Tube	100%	100%	-	-	18.81	16.96	19.96
DT2	Horsdon Terrace, Tiverton	Roadside	Diffusion Tube	100%	100%	23.67	21.83	21.75	17.69	19.44
DT3	Leat Street, Tiverton	Roadside	Diffusion Tube	100%	100%	29.36	28.88	29.98	26.25	30.81
DT4	Leat Street, Tiverton #2	Roadside	Diffusion Tube	100%	100%	24.88	22.61	24.94	22.33	25.83
DT5	Primary School, Burlescombe	Roadside	Diffusion Tube	100%	100%	14.07	12.37	13.53	12.63	14.88
DT7	Sommerville Close, Willand	Roadside	Diffusion Tube	100%	100%	24.93	24.36	24.45	22.79	24.63
DT8	1 Culm Lea, Cullompton	Roadside	Diffusion Tube	100%	100%	-	-	16.67	15.65	17.79
DT9	Police Station, Station Road, Cullompton	Roadside	Diffusion Tube	92%	92%	27.42	24.00	27.37	22.70	28.76
DT10	49 Station Road, Cullompton	Roadside	Diffusion Tube	100%	100%	26.08	24.40	25.70	25.00	27.73
DT11	17 High Street, Cullompton	Roadside	Diffusion Tube	100%	100%	25.12	25.12	25.65	22.24	26.45

DT12	HSBC, Cullompton	Roadside	Diffusion Tube	100%	100%	-	-	30.99	24.11	37.07
DT13	8 Fore Street, Cullompton	Roadside	Diffusion Tube	100%	100%	-	38.49	**41.33**	37.00	**42.94**
DT14	45 Fore Street, Cullompton	Roadside	Diffusion Tube	100%	100%	34.12	32.53	34.84	31.06	**40.58**
DT15	Newton St Cyres	Roadside	Diffusion Tube	92%	92%	-	-	-	-	32.09
DT16	Bottom Exeter Road, Crediton	Roadside	Diffusion Tube	100%	100%	36.18	32.16	34.59	32.43	37.91
DT17	Middle Exeter Road, Crediton	Roadside	Diffusion Tube	100%	100%	36.14	28.85	32.35	29.14	27.83
DT18	Top Exeter Road, Crediton	Roadside	Diffusion Tube	100%	100%	38.20	30.45	33.68	29.93	37.15
DT19	HSBC High Street, Crediton	Roadside	Diffusion Tube	92%	92%	34.20	29.95	33.55	28.50	36.68
DT20	Duke of York, High Street, Crediton	Roadside	Diffusion Tube	92%	92%	**40.87**	36.13	39.48	37.81	**44.58**
DT21	5 Commercial Road, Crediton	Roadside	Diffusion Tube	100%	100%	-	-	18.36	16.52	20.13

*DT6 is not included as there was insufficient data capture for annualisation in 2018

☒ **Diffusion tube data has been bias corrected**

☒ **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) 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.

Figure A.1 – Trends in Annual Mean NO_2 Concentrations within Crediton AQMA

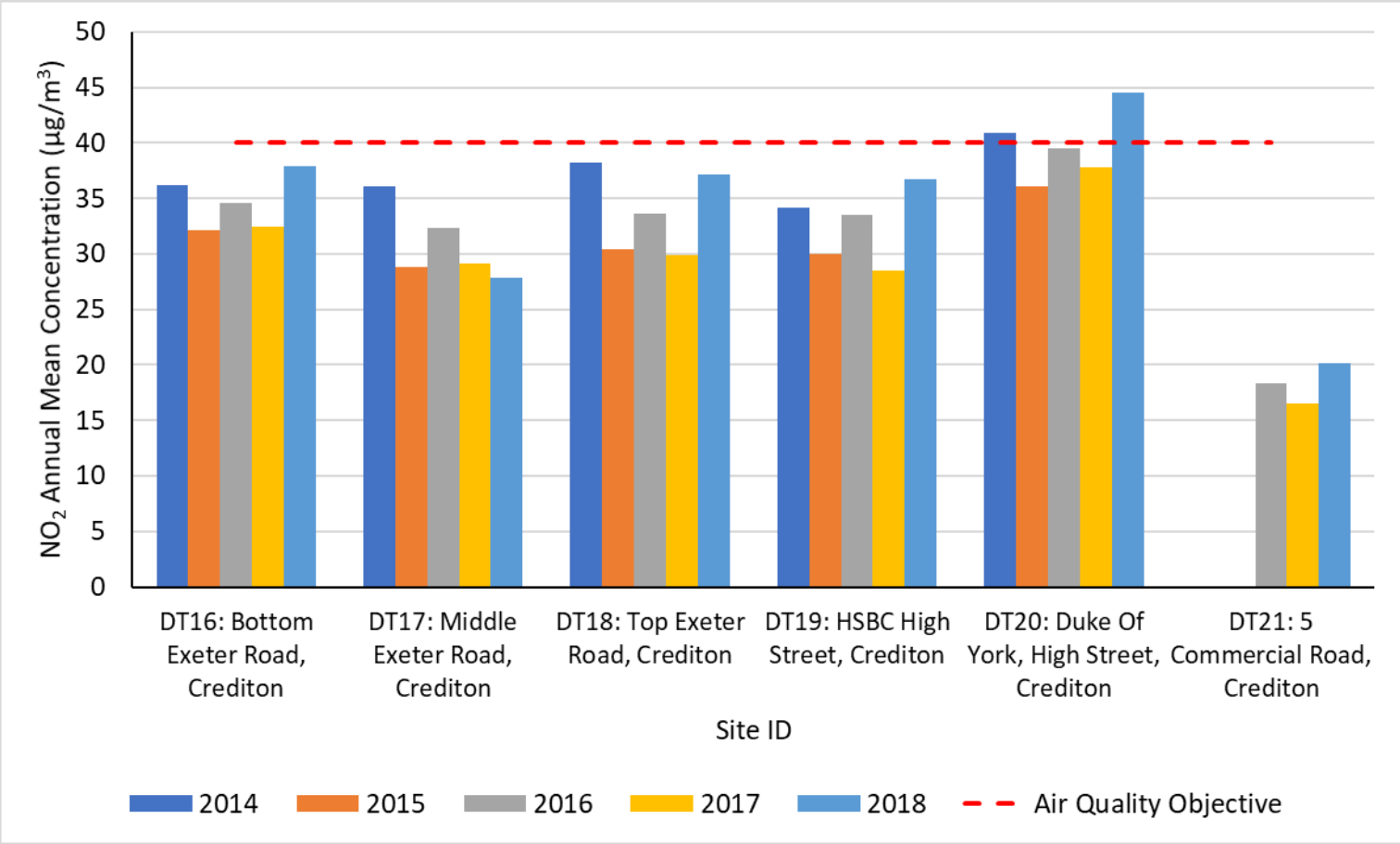


Figure A.2 – Trends in Annual Mean NO_2 Concentrations within Cullompton AQMA

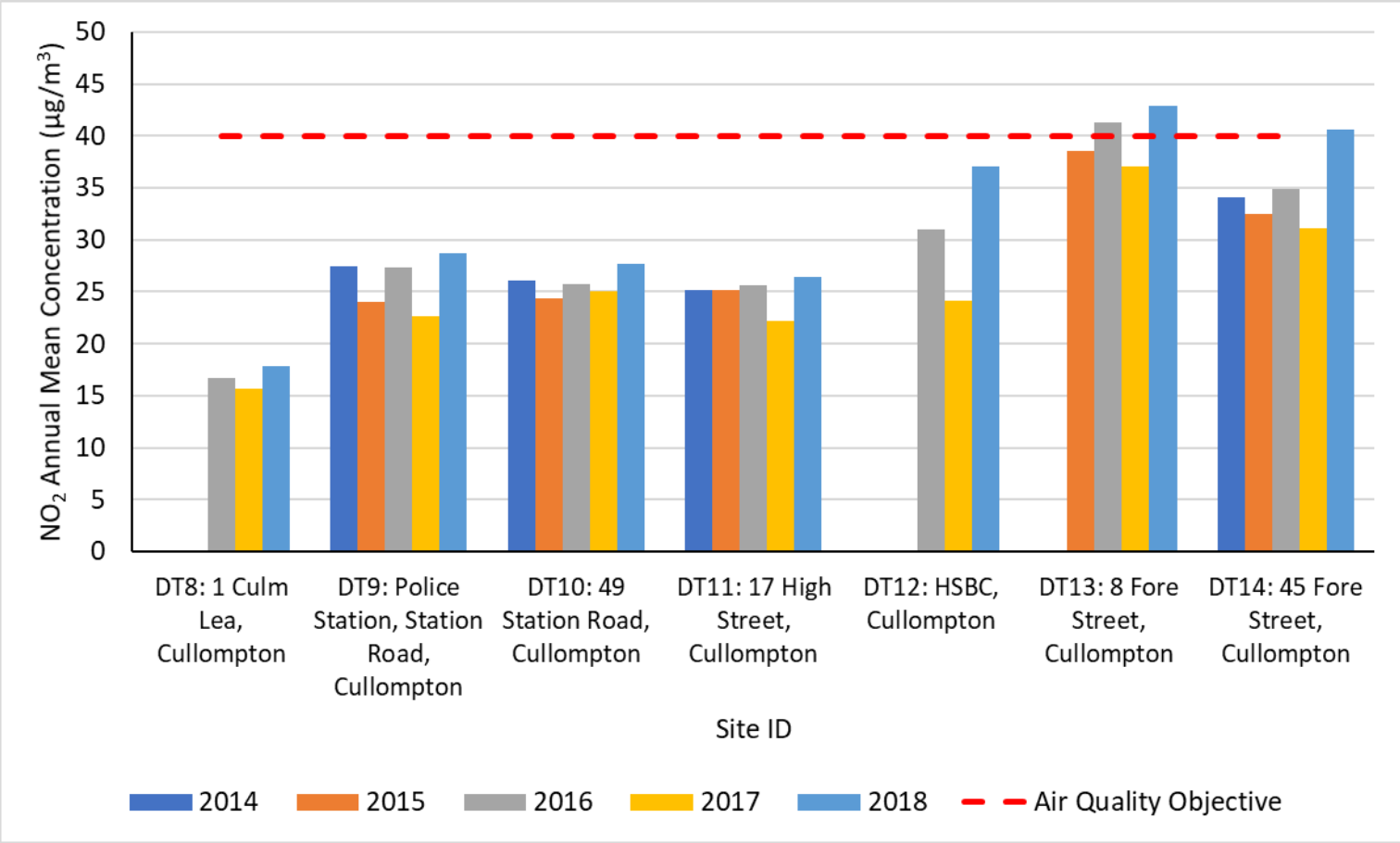


Figure A.3 – Trends in Annual Mean NO_2 Concentrations outside of declared AQMAs

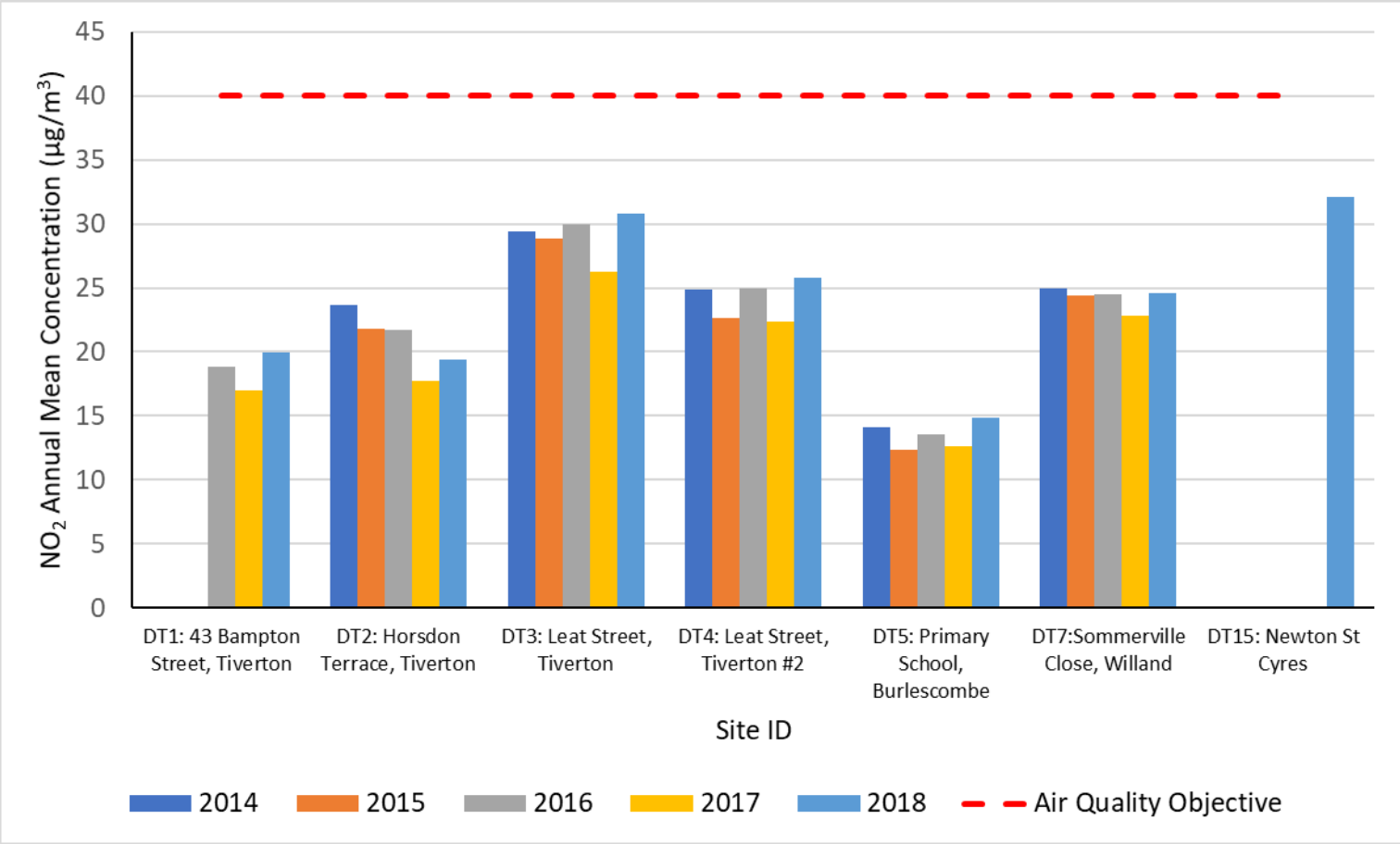


Table A.4 - Annual Mean PM_{10} Monitoring Results

Site ID	Site Name	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	PM_{10} Annual Mean Concentration ($\mu g/m^3$) (3)				
					2014	2015	2016	2017	2018
CM1	Exeter Road, Crediton	Roadside	65	65	33.3	29.2	26.0	23.5	23.4

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

Notes:

Exceedances of the PM_{10} annual mean objective of 40µg/m^3 are shown in **bold.**

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

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

(3) All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure A.4 – Trends in Annual Mean PM_{10} Concentrations

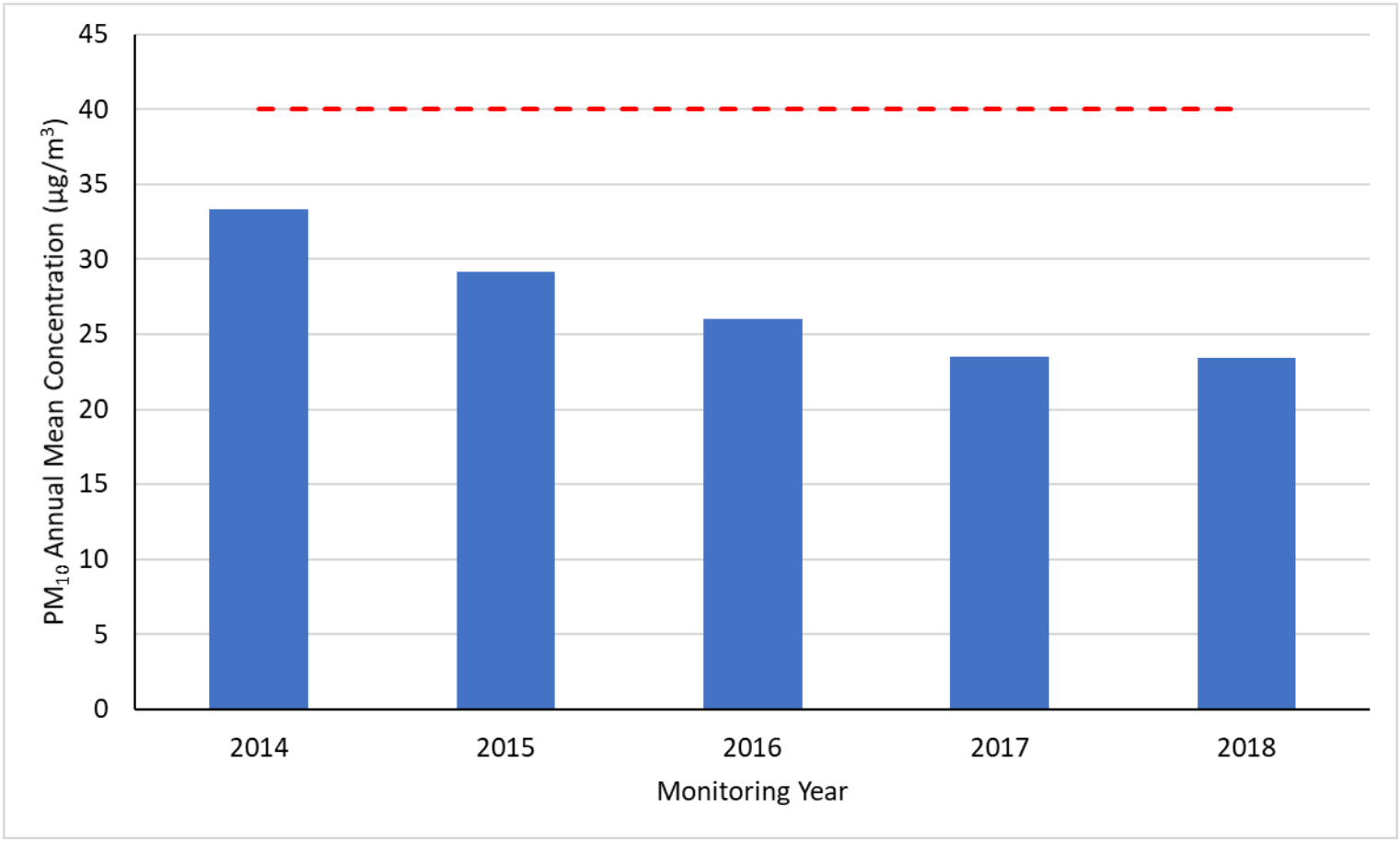


Table A.5 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
				2014	2015	2016	2017	2018
CM1	Roadside	65	65	18	11	3	12	8 (40)

Notes:

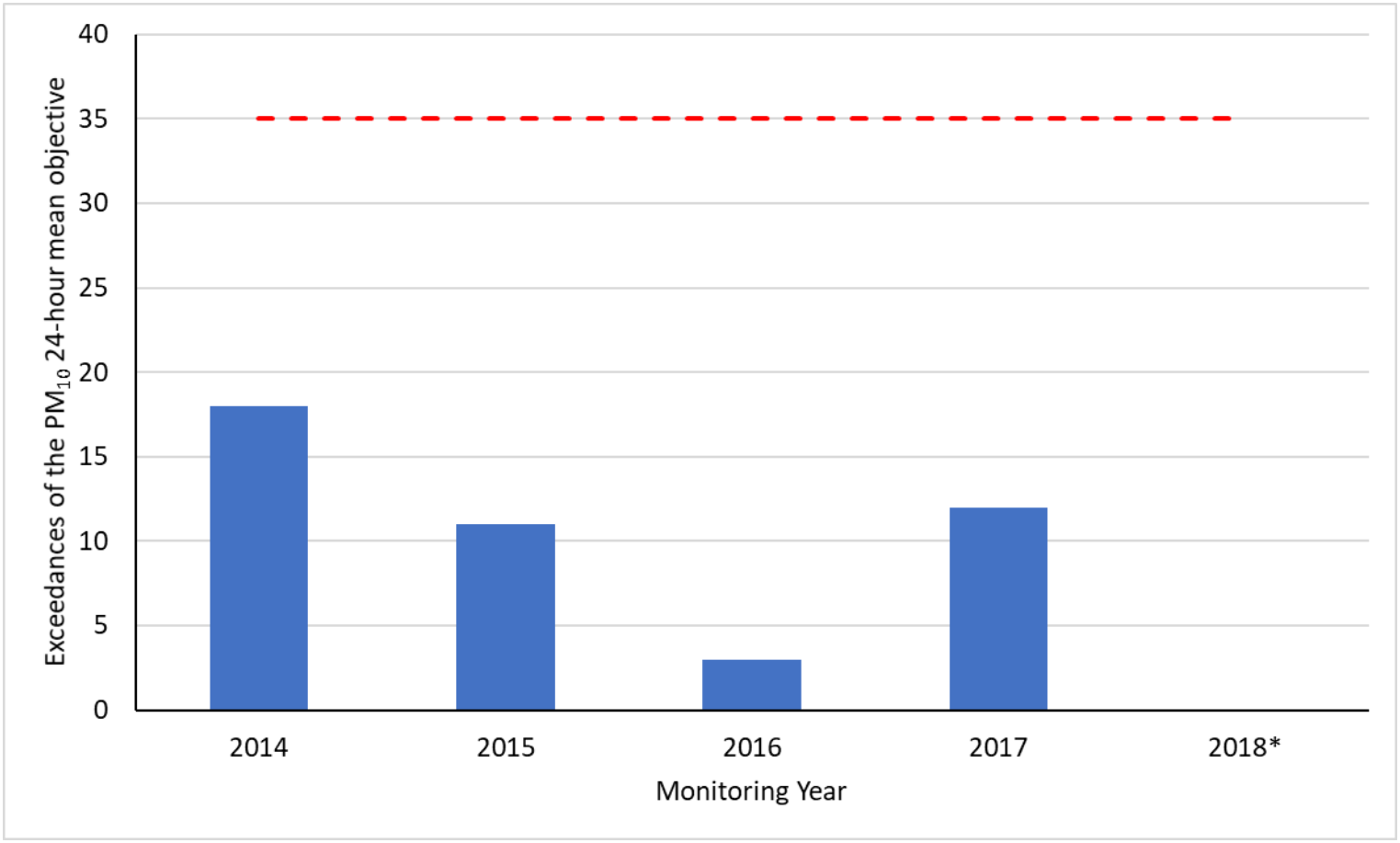
Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in **bold.**

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

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

(3) If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

Figure A.5 – Trends in Number of 24-Hour Mean PM_{10} Results >50 µg/m^3



*<85% data capture in 2018. The 90.4th percentile of 24-hour means was equal to 40 µg/m^3 and therefore below the AQS objective

Appendix B: Full Monthly Diffusion Tube Results for 2018

Table B.1 – NO_2 Monthly Diffusion Tube Results - 2018

Site ID	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 (0.89) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
DT1	23.4	27.2	24.4	22.1	18.7	18.3	20.3	18.2	18.6	22.8	27.9	27.2	22.4	20.0	20.0
DT2	26.3	25.1	22.6	21.6	19.9	18.6	20.0	16.6	22.6	22.8	22.1	23.8	21.8	19.4	19.4
DT3	39.5	38.3	39.1	36.3	31.2	29.0	34.9	28.2	33.3	36.5	37.8	31.1	34.6	30.8	25.2
DT4	31.2	33.2	34.7	29.9	23.0	26.4	26.9	23.0	27.7	29.7	31.8	30.9	29.0	25.8	22.1
DT5	16.6	19.7	17.9	15.6	16.6	14.8	19.2	12.7	14.5	15.9	17.9	19.3	16.7	14.9	10.8
DT7	31.9	33.0	27.8	26.1	26.4	25.6	27.4	26.3	28.4	30.5	21.9	26.8	27.7	24.6	21.2
DT8	21.2	23.5	19.7	18.5	20.4	20.6	19.4	17.6	19.4	22.9	17.6	18.9	20.0	17.8	16.1
DT9	34.6	36.3	33.7	32.9	31.2	33.1	32.7	25.8	30.2	32.2	-	32.8	32.3	28.8	26.5
DT10	39.2	35.4	34.0	30.4	27.4	24.7	28.6	28.5	29.3	30.6	31.6	34.1	31.2	27.7	27.3
DT11	30.8	35.6	32.4	27.9	29.7	33.0	28.3	19.9	26.2	30.2	33.1	29.6	29.7	26.5	23.8
DT12	37.7	46.6	40.9	42.8	39.8	45.5	46.5	33.8	42.5	45.9	39.9	37.9	41.6	37.1	36.5
DT13	48.7	52.3	53.6	51.8	43.0	45.4	48.2	43.2	46.9	48.3	48.0	49.6	48.2	**42.9**	**42.5**
DT14	45.6	54.6	52.1	53.2	45.6	45.3	39.7	33.8	40.3	47.9	42.4	46.6	45.6	**40.6**	**40.3**
DT15	-	38.7	34.4	39.5	39.2	35.6	36.9	26.4	33.0	33.7	40.3	38.9	36.1	32.1	29.6
DT16	37.2	44.3	43.9	48.5	45.3	42.3	43.3	36.3	41.0	41.0	42.5	45.6	42.6	37.9	36.2

DT17	28.7	34.9	38.7	31.6	29.5	30.7	31.7	26.7	28.2	31.7	31.4	31.5	31.3	27.8	27.5
DT18	37.1	45.5	48.6	44.0	43.6	46.8	39.2	29.7	37.7	40.5	44.1	44.1	41.7	37.2	26.6
DT19	36.7	46.0	-	43.3	43.5	38.2	38.6	33.2	38.8	42.3	43.7	49.3	41.2	36.7	36.7
DT20	48.1	46.6	56.5	50.1	46.6	-	44.6	46.9	43.7	49.9	56.0	62.1	50.1	**44.6**	**44.6**
DT21	26.5	23.9	22.5	23.3	22.1	22.7	20.1	15.4	19.2	21.6	27.8	26.3	22.6	20.1	20.1

*DT6 not included as there was insufficient data capture for annualisation in 2018

☐ **Local bias adjustment factor used**

☒ **National bias adjustment factor used**

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

☒ **Where applicable, data has been distance corrected for relevant exposure**

Notes:

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

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

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

With regard to the application of a bias adjustment factor for diffusion tubes, Defra LAQM.TG(16) and the LAQM Helpdesk[6] recommend the use of a local bias adjustment factor where available and relevant to diffusion tube sites.

Mid Devon District Council does not operate any continuous monitoring measuring NO_2 concentrations within the district and therefore a co-location study is not available to derive a local bias factor, thus the national bias adjustment factor spreadsheet[7] has been used.

Diffusion tubes were supplied and analysed by Somerset Scientific Services utilising the 20% triethanolamine (TEA) in water preparation method. A bias adjustment of 0.89 for the year 2018 (based on 3 studies) has been derived from the national bias adjustment calculator and applied to diffusion tube data collected within this period.

QA/QC of Diffusion Tube Monitoring

Somerset Scientific Services, operated by Somerset County Council, is a UKAS accredited laboratory and participates in the AIR-PT Scheme (a continuation of the Workplace Analysis Scheme for Proficiency (WASP) for NO_2 tube analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO_2 concentrations are reported

[6] laqm.defra.gov.uk
[7] The Diffusion Tube Bias Adjustment Factors Spreadsheet for March 2019. Available from: https://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html

to a high level of accuracy. The lab follows the procedures set out in the Harmonisation Practical Guidance.

In the 2018 AIR-PT results[8], AIR-PT AR024 (January to February 2018), AIR PT AR025 (April to May 2018), AIR PT AR027 (July to August 2018), AIR PT AR028 (September to October 2017) and AIR-PT AR030 (January to February 2019), Somerset Scientific Services scored 100%. The percentage score reflects the results deemed to be satisfactory based upon the z-score of < ±2.

QA/QC of Automatic Monitoring

Equipment maintenance and calibration.

All automatic monitoring equipment has routine (monthly) on-site following documented procedures. These procedures have been drawn up in accordance with equipment manuals, manufacturer instructions and the UK Automatic Network Site Operators Manual.

All analysers and related equipment (e.g. sample pumps, air conditioning units etc.) are subject to independent routine maintenance and support via a service contract with a specialist service provider (Air Monitors Ltd). This includes six-monthly maintenance/service and equipment check visits by manufacturer-approved engineers following national protocols and traceable QA/QC procedures. The service provider is also ISO 9001 accredited and carries out similar or identical support work for the national AURN network of NO_2 and PM_{10} analysers.

Non-routine site visits (e.g. as a result of equipment failure or spurious data) are also carried by the above service providers to the same standards. Contract arrangements ensure that visits are carried out within 48 hours of the notification of call-out in order minimise data loss.

Data processing

The PM_{10} analyser is connected to a data telemetry and handling package enabling full data manipulation and frequent checks on data measurements. Data are stored on internal data loggers and downloaded to a PC via a modem and mobile telephone access. Instrument self-test parameters and filter loading status and internal auto calibration data can be viewed in addition to the collected monitoring data.

[8] Summary of Laboratory Performance in AIR NO2 Proficiency Testing Scheme (April 2017 – February 2019). Available from: https://laqm.defra.gov.uk/assets/laqmno2performancedatauptofebruary2019v1.pdf

User-defined options in the communication package means that incoming data has been set-up for automatic screening in order to ensure representative averages are derived from sufficient raw data. For the purposes of deriving 1-hour means, a minimum of 45 minutes data must be available in each hour (3 x 15 minute means). For the purposes of deriving 24-hour means then a minimum of 18 hours data (18 x 1 hour means) must be available in each day.

Data validation and ratification

Air Monitors Ltd is fully responsible for the collection, checking and ratification of all data.

Following data processing, all collected data are screened or validated by visual examination to see if there are any spurious or unusual measurements. Where causes of such measurements are known (e.g. planned maintenance visits, sampling head cleaning and known equipment/power failures etc.) then the affected data are deleted from the dataset. Any remaining suspicious data, such as large spikes, 'flat-lines' and excessive negative data are 'flagged' for more detailed investigation. At all times an original raw dataset is kept in the data processing software enabling any amendments to the data to be traced and to ensure it is possible to re-examine the original collected data at a later date.

Data validation is routinely carried out at approximate fortnightly intervals and non-routinely at any time. Data validation is followed by a more thorough and detailed check known as data ratification. Ratification is carried at approximate 3-monthly intervals and involves a critical, in-depth review of all information relating to the individual analyser dataset and monitoring location in order to amend, verify or delete data as appropriate. A wide range of variables, inputs and information sources are used to complete the ratification process, as detailed below:

- Instrument history and local site visit reports (to determine effects from recorded previous or current analyser characteristics and problems)
- Data/baseline drift
- Negative or out-of-range data
- Pollutant spikes or other unusual short-term trends
- Data capture rates and distribution of missing or suspect data

- Local events and/or pollution sources (to determine any short-medium term effects on pollutant levels including unusual traffic or commercial/industrial related sources)
- Diurnal trends (to determine if daily and weekly pollutant trends are normal e.g. traffic rush-hour patterns)
- Meteorological phenomena (to determine any unusual data when examined against typical weather conditions and to determine the effect or cause relating to short-term phenomena such as electrical storms or temperature inversions)
- Comparisons with AURN monitoring sites (e.g. national and southwest urban centre sites and a rural site) and other locally available data to determine if similar or different pollutant trends are recorded – allowing for local 'spikes' and concentration differences
- Air Monitors service visit data including QA audit and service reports

When data ratification has been completed then the data are then available for further statistical and critical examination for reporting purposes. An important principle of the data ratification process is that data are always retained unless there are specific reasons for not doing so.

Short-term to Long-term Data Adjustment

Data capture was above 75% at all NO_2 monitoring locations apart from Site 6 where only one month of data was recorded (8%). In accordance with Defra issued guidance in LAQM TG(16), annualisation was not undertaken for Site 6 as data capture was below the minimum requirement of 25% (3 months).

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

NO_2 concentrations along roads are the focus of attention for many local authorities. However, it is not always possible to measure concentrations at the desired location for a range of practical reasons, for example, continuous monitoring stations require space, security and power, and diffusion tubes should be attached to suitable surfaces.

TG16 states that wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the

NO_2 concentration at the nearest location relevant for exposure should be estimated, using the NO_2 fall-off with distance calculator available on the LAQM Support website[9]. In such circumstances it is recommended that as a minimum the distance correction should be applied to all monitoring locations that record an annual mean concentration that is above either the NO2 annual objective of 40µg/m^3. Consideration may also be given to applying the calculation to monitoring locations that record an annual mean concentration that is within 10% of the NO_2 annual objective of 40µg/m^3 (i.e. above 36µg/m^3), to account for the inherent uncertainty in diffusion tube monitoring concentration data.

The NO_2 fall-off with distance calculator was therefore applied to predict the annual mean NO_2 for locations ("receptors") that were close to a monitoring site.

[9] NO_2 Fall-Off with Distance Calculator (Version 4.2). Available from: https://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html

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

Figure D-1: Map of Crediton AQMA

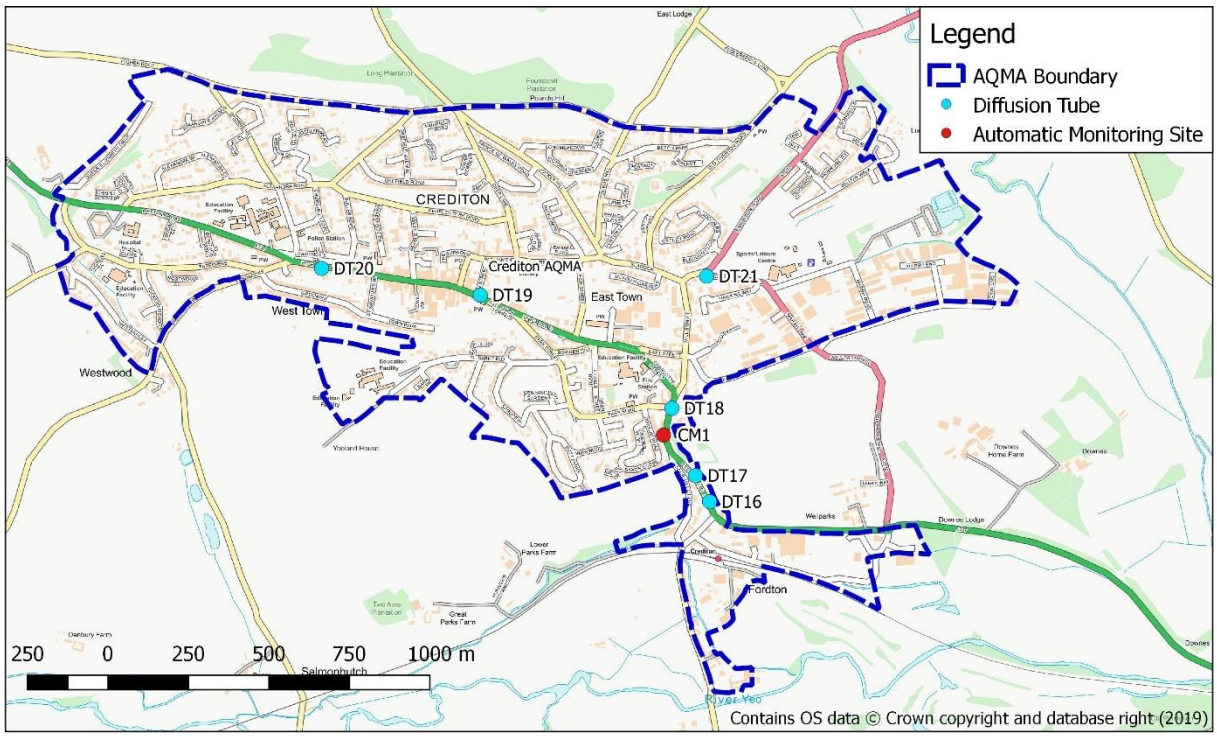


Figure D-2: Map of monitoring locations within Crediton AQMA

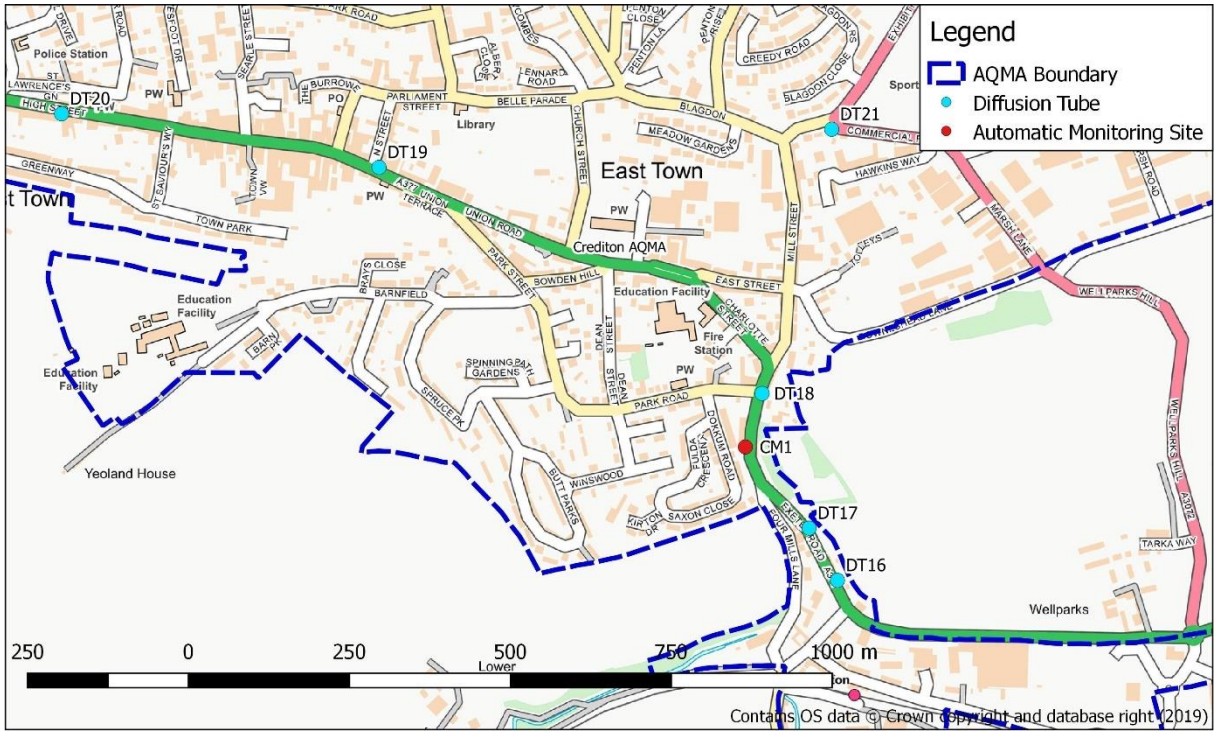


Figure D-3: Map of Cullompton AQMA

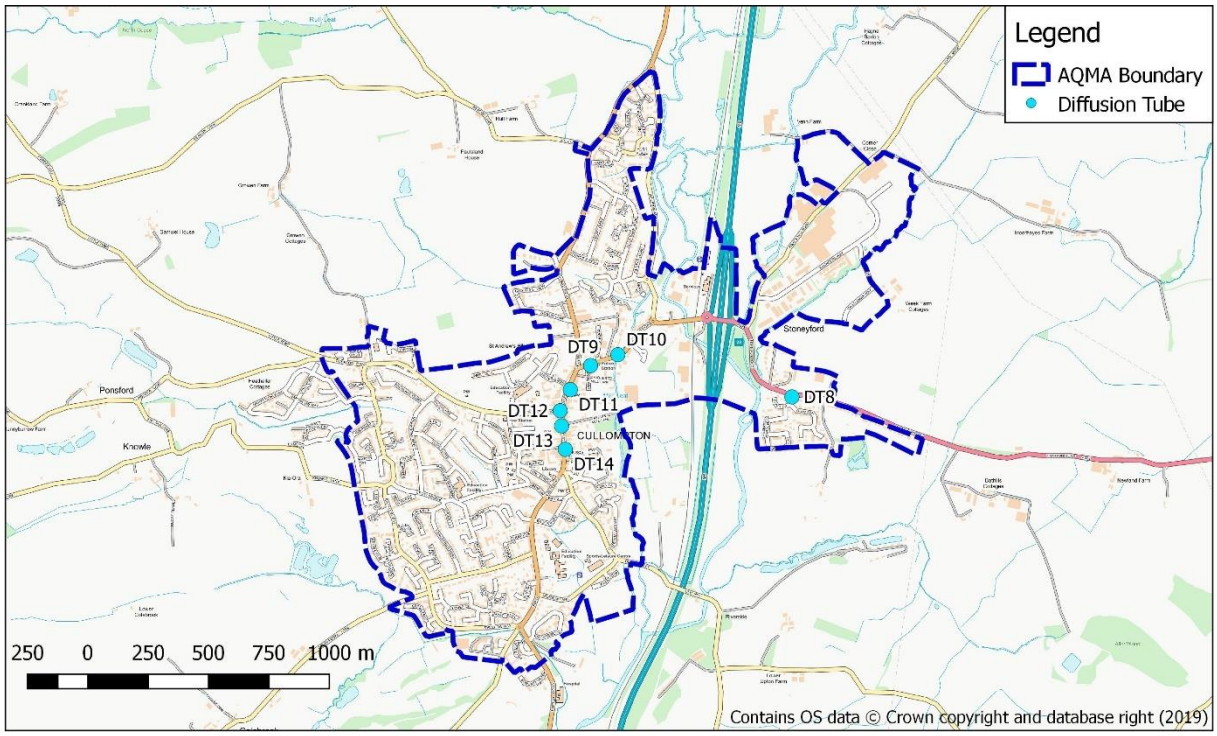


Figure D-4: Map of monitoring locations within Cullompton AQMA

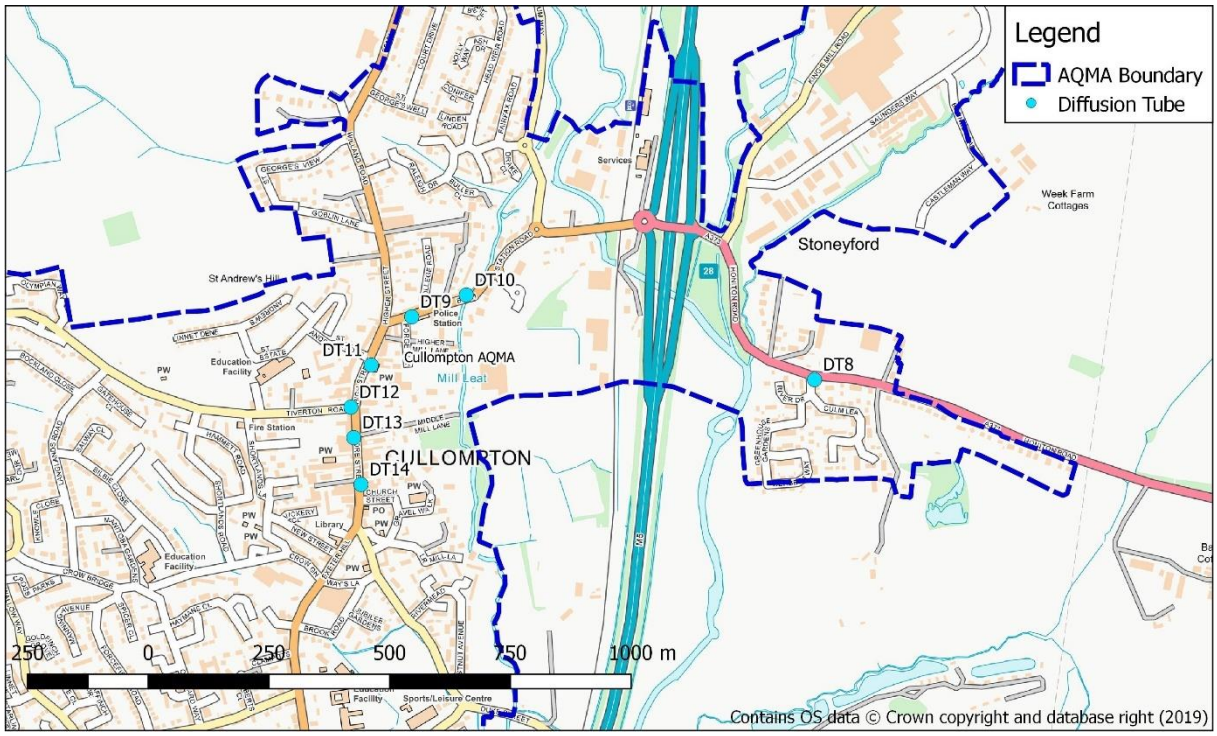


Figure D-5: Map of monitoring locations (Tiverton)

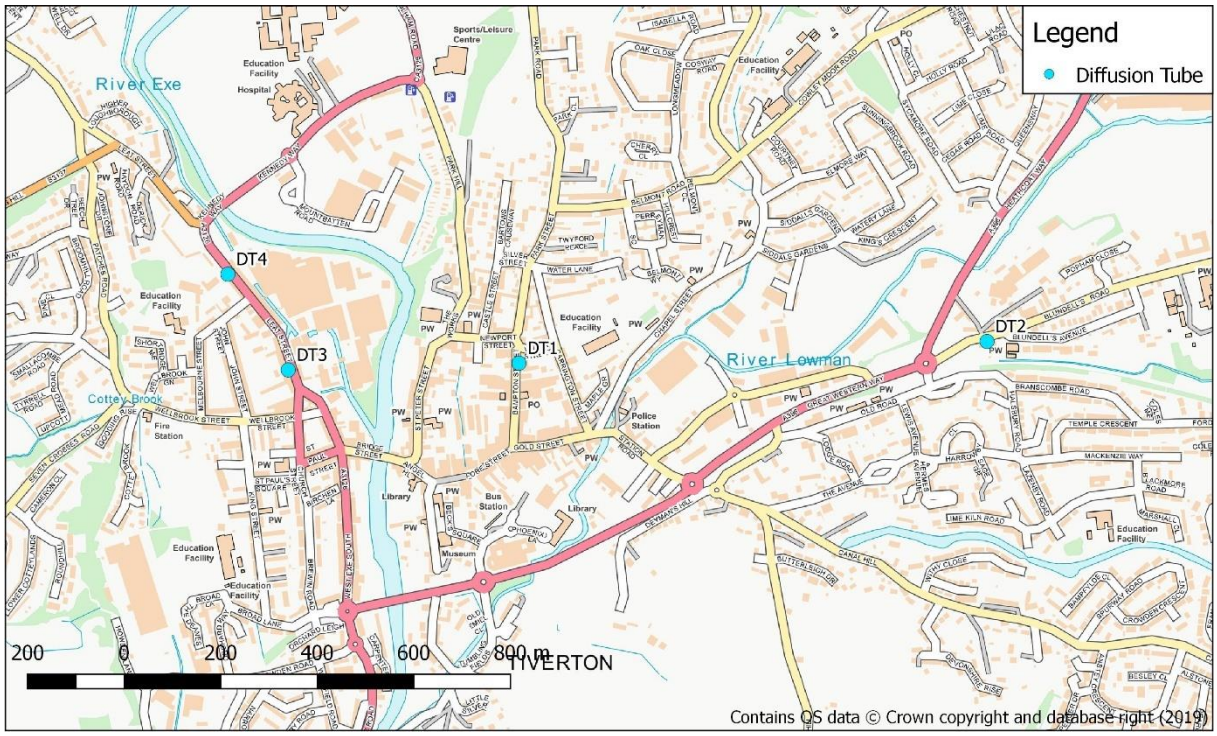


Figure D-6: Map of monitoring locations (M5)

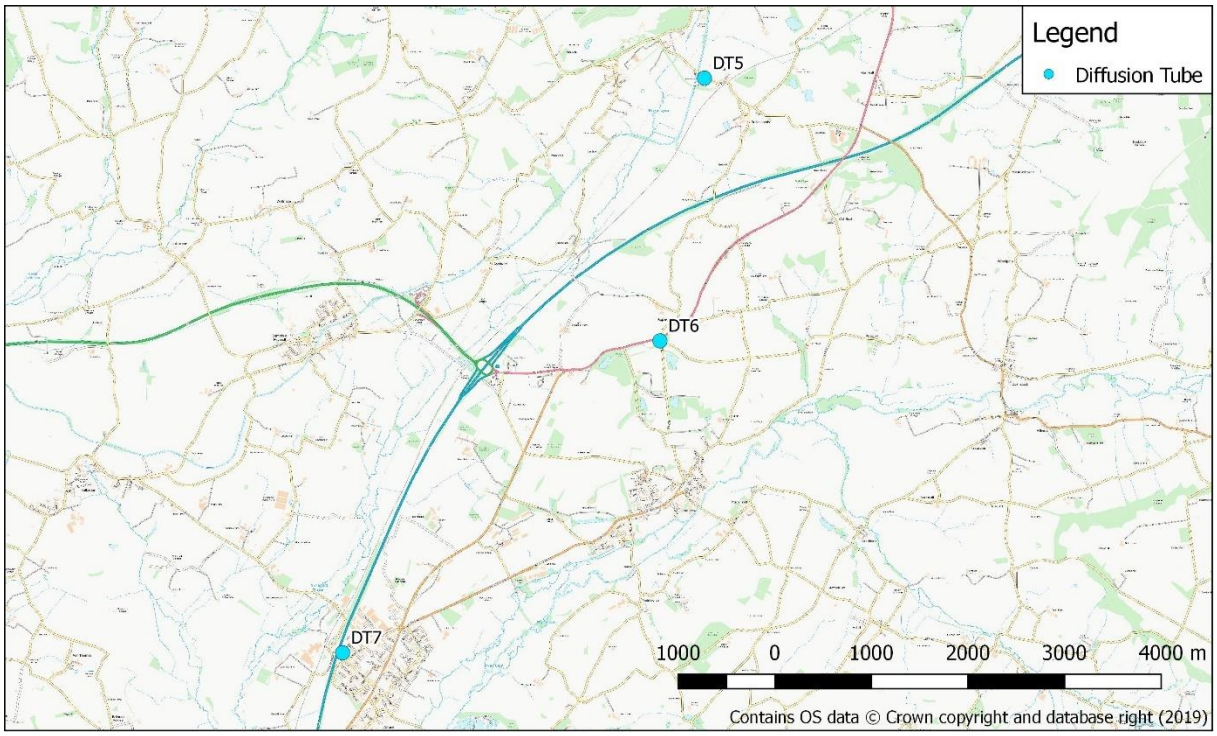
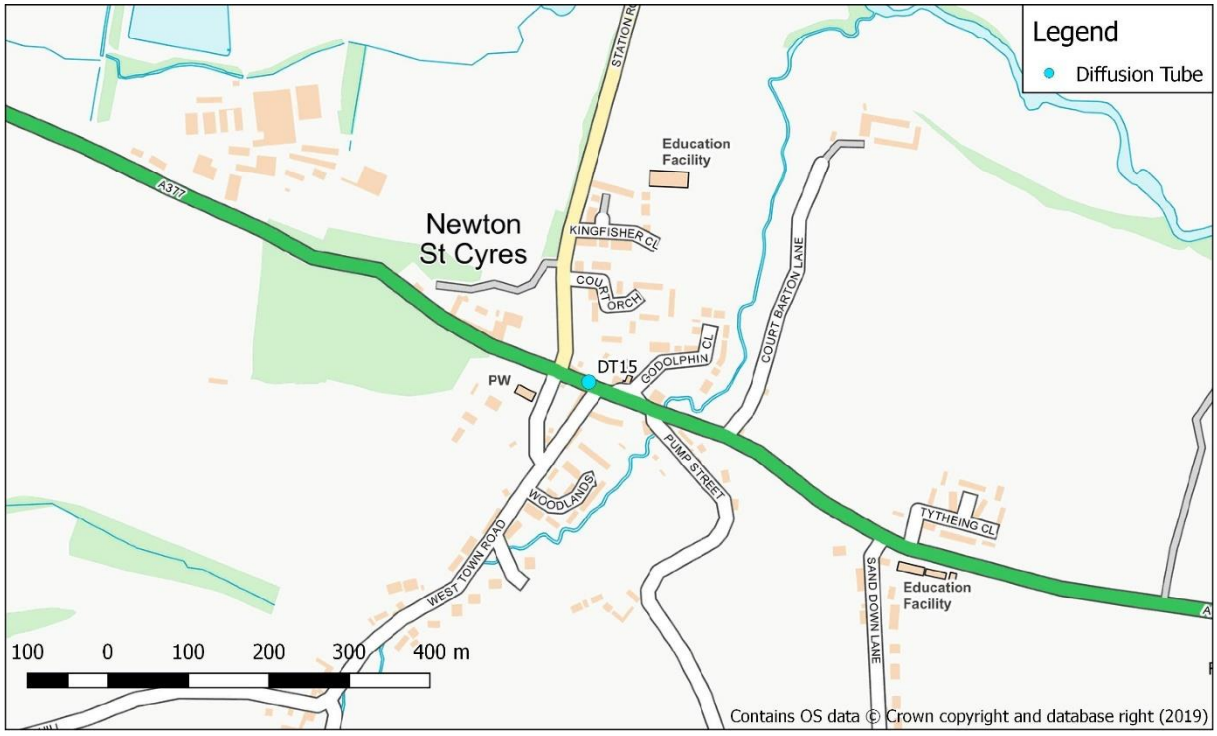


Figure D-7: Map of monitoring locations (Newton St Cyres)



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[10]	
	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

[10] 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

- Local Air Quality Management Technical Guidance LAQM.TG(16). February 2018. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG(16). May 2016. Published by Defra in partnership with the Scottish Government, Welsh.
- Mid Devon District Council 2018 Annual Status Report.
- Mid Devon District Council, 2017 Air Quality Action Plan
- National Diffusion Tube Bias Adjustment Factor Spreadsheet, version 03/19 published in March 2019.
- NO_2 Fall-Off with Distance Calculator (Version 4.2). Available from: https://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html
- Summary of Laboratory Performance in AIR NO2 Proficiency Testing Scheme (April 2017 – February 2019). Available from: https://laqm.defra.gov.uk/assets/laqmno2performancedatauptofebruary2019v1.pdf