2016 Air Quality Annual Status Report (ASR)

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

June 2017

Local Authority Officer	Becky Wotton
Department	Environment Health and Wellbeing
Address	Forde House, Brunel Road, Newton Abbot, TQ12 4XX
Telephone	01626 215066
E-mail	envc@teignbridge.gov.uk
Report Reference number	ASR 2016
Date	June 2017

Executive Summary: Air Quality in Our Area

Air Quality in Teignbridge

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].

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

Within the district of Teignbridge local air quality is generally very good, however there are locations where air pollution levels are high typically along busy congested roads, with the highest levels being experienced where the roads are either narrow and/or have a steep incline and/or have street canyons (i.e. roads with properties close to the side of the road on both sides.) The pollutant of specific concern in these locations is Nitrogen Dioxide. The review and assessment process commenced in 2005 resulting in four Air Quality Management Areas (AQMA's) being declared because it was predicted that the National Air Quality objective would not be met for Nitrogen Dioxide (NO_2). The original four AQMA's were:-

- Dawlish (Iddesleigh Terrace)
- Teignmouth (A379 Along Bitton Park Road)
- Kingskerswell (Old A380)
- Newton Abbot (Town Centre)

In 2008 a Detailed Assessment was carried out which resulted in the boundary of the Newton Abbot Town Centre AQMA being revised and expanded to include Wolborough Street, and in Kingsteignton, Newton Road and Gestridge Road. In 2016 the geography of the four AQMAs remains unaltered. The latest ratified data shows that there is a year on year trend of pollution levels reducing across the board; however some hotspot locations within the Teignmouth AQMA and the Newton Abbot and Kingsteignton AQMA remain worryingly high. (That is well above the national obj

[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

Kingskerswell (old A380):

The completion of the South Devon Highway has now taken place. As expected, in the first year of opening, the pollution levels within the current Kingskerswell AQMA have reduced dramatically. There is still every expectation that the Council will be able to revoke this AQMA in 2019, as long as pollution levels prove to remain consistently well below the national objective for NO_2. (Note: well below is considered to mean at least 10% below).

Dawlish (Iddesleigh Terrace):

Again monitoring results show a general reduction in 2016. In 2015 we saw the first year where the levels of pollution monitored were well below the National Objective target for NO_2 at all four monitoring locations and this is again the case this year. If this trend is maintained such that the monitoring results for these locations remain more than 10% below the National Objective for 3 consecutive years then this AQMA could also be revoked in 2019.

Teignmouth (Bitton Park Road):

In 2016 the results show a small reduction with 7 sites having figures slightly lower than in 2015. One site has shown an increase since 2016 and there are still 2 sites well exceeding the National Objective target for NO_2.

Newton Abbot and Kingsteignton:

Monitoring results for the Newton Abbot & Kingsteignton AQMA remain consistent with those for 2015. Although the year on year trend shows that pollution levels generally have been reducing, the levels remain close to exceedance of the National Objective for NO_2. Crucially 2 locations are still well over the National Objective target, both of which are in a key hotspot area namely Wolborough Street Newton Abbot.

Actions to Improve Air Quality

In improving Air Quality, Teignbridge District Council has completed a number of measures. Key measures include:-

- The Teignbridge District Council Ten Year Strategy (2016 – 2025) has been produced with specific projects to improve air quality.
- Air Quality Grant 2016/17 Programme.
- Attended an Exeter City Council Air Quality Action Plan stakeholders Steering Group meeting.
- Assessing all planning applications in the District, either within an AQMA or ones that could have a significant impact on an AQMA.

Teignbridge District Council expects the following measures to be completed in 2017:-

- Updated Air Quality Action Plan submitted and approved.
- Work with other Local Authorities on Shared projects – especially to roll out the Personal Exposure Study and to apply for the European Structural Investment Fund (ERDF) jointly with Smart Energy Network Innovator – Greater Exeter (SENIGE).
- Production on a Low Emission Vehicle Strategy.

Conclusions and Priorities

The main priority for the Council is to ensure that the Action Plan is approved. This would then allow us to pursue what will be a more targeted set of actions within this Plan.

Another priority is to ensure that in 2017 current data collection issues are resolved.

Further data collection analyses needs to take place with regard to the current levels of the Dawlish AQMA in order to assess whether or not revocation of this AQMA is applicable.

Local Engagement and How to get involved

Public participation in Air Quality issues are vital to maintaining standards within the objectives. In particular road journeys, transport mode choices, commuting methods and alternative travel methods can have significant local effect.

The following sources of information are available on the Council's website for improving air quality. (https://www.teignbridge.gov.uk/environmental-health-and-wellbeing/land-air-and-water-pollution/air-quality/)

- List of Air Quality Management Areas.

Regular involvement takes place with Elected Councillors regarding current air quality issues and members from the Air Quality Team also attend Council Committee Meetings regarding Air Quality.

The Council also does a lot of interacting with the public by means of social media (facebook & twitter), advising them of Air Quality issues.

In 2016 we also dealt with 50 service requests relating to either planning applications having an impact on air quality or concerns from the public regarding the current air quality levels.

Table of Contents

List of Tables

1 Local Air Quality Management

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

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Teignbridge 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 Teignbridge District Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at https://www.teignbridge.gov.uk/environmental-health-and-wellbeing/land-air-and-water-pollution/air-quality/

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)		Action Plan (inc. date of publication)
						At Declaration	Now	
Iddesleigh Terrace, Dawlish	2005	NO_2 annual mean	Dawlish	Small section of road. It is a winding road and forms a street canyon.	No Devon County Council	42.34	26.83	Teignbridge District Council March 2010 https://www.teignbridge.gov.uk/environmental-health-and-wellbeing/land-air-and-water-pollution/air-quality/
Kingskerswell	2005	NO_2 annual mean	Kingskerswell	Main route into Torbay and experiences very high traffic flows. A congested route with slow moving traffic.	No Devon County Council	50.88	14.14	Teignbridge District Council March 2010 https://www.teignbridge.gov.uk/environmental-health-and-wellbeing/land-air-and-water-pollution/air-quality/
Newton Abbot & Kingsteignton	2005 but revised boundary in 2008	NO_2 annual mean	Newton Abbot	Congested streets and narrow in places with residential	No Devon County Council	48.82	35.84	Teignbridge District Council March 2010 https://www.teignbridge.gov.uk/environmental-health-and-wellbeing/land-air-and-water-pollution/air-quality/

				properties within metres of the edge of the roads. The AQMA was further extended in 2008 following a Detailed Assessment.				
Teignmouth	2005	NO_2 annual mean	Teignmouth	Primary route and main thoroughfare for HGV traffic.	No Devon County Council	56.83	50.46	Teignbridge District Council March 2010 https://www.teignbridge.gov.uk/environmental-health-and-wellbeing/land-air-and-water-pollution/air-quality/

☒ **Teignbridge 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 Teignbridge District Council

Defra's appraisal of last year's ASR concluded:- The following information is in the context of the fact that last year's report was only approved and accepted in February 2017 leaving in practical terms very little time to implement the key comments therein. However, we have recognised the significance of the commentary 9 written by DEFRA in the summary of the ASR 2015.

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

Key completed measures are:

- Teignbridge District Council Ten Year Strategy 2016 – 2025. This new plan for the Council has ten connected areas of work which will each have a widespread impact on the economy, community wellbeing and the environment. The Teignbridge Ten will be the focus of the Council's work over the next ten years. Air Quality features highly in the Teignbridge Ten and in particular within two super projects – namely:- Moving up a gear (to improve travel options), and Health at the Heart (to improve health and wellbeing).

- Air Quality Action Plan. A new 2016 Action Plan has drafted and is ready for the Council's Committee Approval. This has not been submitted yet. We have received the Draft UK Air Quality Action Plan for tackling Nitrogen Dioxide and are awaiting the final version due in 2017 as we want to ensure that key measures and actions from this document will be reflected in Teignbridge District Council's Air Quality Action Plan. Some proposed actions will be developed in partnership with other neighbouring district Councils, - Exeter, Mid Devon, and East Devon and will be replicated in their Action Plans.

- Air Quality Grant 16/17 Programme. A joint bid was submitted between Teignbridge District Council, Exeter City Council, East Devon District Council and Mid Devon District Council for firstly A network of EV charging points. The proposal was to extend the number of electric vehicle charging points in the four authorities with a vision to create a regional network as described in the Exeter and Heart of Devon Growth Board's Electric Vehicle Strategy. Secondly, a bid

was again submitted with other neighbouring authorities (Teignbridge District Council, Exeter City Council, East Devon District Council and Mid Devon District Council. This bid was a proposal to extend the innovation Co Bikes Electric, on street bike hire scheme. Unfortunately on the 22nd February 2017 we found out that these bids were not successful. We are therefore currently looking to pursue the above measures ourselves with capital funding.

- Steering Group.

  This authority attended a meeting arranged by Exeter City Council in June 2016 with key organisations with an interest in Air Quality. Organisations that attended were, Public Health England, Public Health Devon, European Centre for Environment and Health (Peninsular Medical School/Exeter University), Exeter City Futures, Devon County Council Highways, Exeter University (Greenpeace Laboratories), Met Office, East Devon District Council and Mid Devon District Council. At the meeting it was agreed that there was a clear need and desire to take forward innovative measure to reduce vehicle emissions and exposure to them. Smaller, more focussed groups are being set up to take potential measures forward.

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

- Approval of Air Quality Action Plan
- Implement a Low Emission Vehicle Strategy

Teignbridge's priorities for the coming year are:-

- Approval of Air Quality Action Plan
- Implement new data collection method to ensure that previous data collection issues are resolved.

The principal challenges and barriers to implementation that Teignbridge District Council anticipates facing are :-

Data Capture

The lack of reliable connection to our data via our IT system which has meant that improving our capture will be a challenge.

AQAP

It is anticipated that in 2017 our AQAP will be approved. However it is likely that there will be keen public and Councillor scrutiny, and this may mean that plans and measures take longer than anticipated.

Funding

In 2016 we were unsuccessful in applying for capital funding. With the new Draft UK Air Quality Action Plan for Tackling Nitrogen Dioxide it is likely that future government funding will go to the 75 Local Authorities specified and therefore Teignbridge District Council may find it a challenge to deliver some of the capital projects within it's AQAP.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Teignbridge District Council Ten Year Strategy 2016 – 2025	Policy and Guidance and General Control	Air Quality Planning and Policy Guidance	TDC	Ongoing	Ongoing	TDC Ten Year Strategy 2016 – 2025		Ongoing	Ongoing with a completion date 2025	N?A
2	Air Quality Action Plan	Policy and Guidance and General Control	Air Quality Planning and policy guidance	TDC	Ongoing	Ongoing	Reduction below the National Air Quality Objective	Revocation of AQMA	Drafted and Awaiting committee approval	June 2017	N/A/
3	Air Quality Grant 16/17 Programme	Policy Guidance and General Control	Air Quality Planning and policy guidance	DEFRA	Completed	N/A	N/A	N/A	Unsuccessful in bid	N/A	N/A
4	Steering Group	Policy Guidance and General Control	Air Quality Planning and policy guidance	TDC, Exeter City Council, Mid Devon District, East Devon District Council, Devon County Council, Public Health England, Exeter University,	Completed	N/A	N/A	N/A	Awaiting sub groups to be formed.	2018	N/A
5	Planning Applications	Policy Guidance and General Control	Air Quality Planning and policy guidance	TDC	Ongoing	Ongoing	Local Plan 2013 – 2033	N/A	Ongoing	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.

Currently there is no actual direct monitoring of $PM_{2.5}$ in Teignbridge. It is possible however to estimate concentrations based upon local PM_{10} data using the correction figure in TG (16). This method suggests that $PM_{2.5}$ concentrations in Teignbridge are no more than 20 µg/m^3 and the annual objective is 25 µg/m^3 so there is no suggestion that this level is being exceed in Teignbridge.

During the year the Council will also be submitting the updated Air Quality Action Plan that will include reference to $PM_{2.5}$.

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 the National objectives.

Teignbridge District Council undertook automatic (continuous) monitoring at 8 sites during 2016. 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.

Teignbridge District Council only undertakes monitoring for NO_2 and PM_{10} in our administrative area. NO_2 monitoring has been undertaken utilising diffusion tubes and two continuous analysers. PM_{10} has been monitored at various locations using Osiris (indicative monitors) and a BAM (Beta Attenuation Monitor) monitors and it is noted that the Osiris' are purely used as a screening tool option.

3.1.2 Non-Automatic Monitoring Sites

Teignbridge District Council undertook non- automatic (passive) monitoring of NO_2 at 68 sites during 2016. 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 2016 dataset of monthly mean values is provided in Appendix B.

Table A.4 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

The data from 2016 shows that there were 5 roadside locations within the Teignbridge District that exceeded the annual National Air Quality Objective for Nitrogen Dioxide. They are distributed as follows:-

3 Locations inside the Newton Abbot/Kingsteignton AQMA. (85 Wolborough Street, 90 Wolborough Street and 79 Wolborough Street)

2 Locations inside the Teignmouth AQMA. (96 Bitton Park Road and 1 Reed Vale Lodge).

It should be noted that as expected there are now no longer any exceedances within the Kingskerswell AQMA due to the construction of the South Devon Highway.

There were also no tubes that exceeded that annual objective within our Dawlish AQAM. The levels within this AQMA have been reducing year on year and it is therefore likely that this AQMA could also be revoked following the statutory monitoring period required for revocation. Teignbrige would therefore be looking to revoke this AQMA in 2019.

With regard to the exceedances, the extent of the exceedence of the national objectives range from nearly 1 µg/m^3 at 96 Bitton Park Road, Teignmouth to 10 µg/m^3 at 1 Reed Vale Lodge, Teignmouth.

There was no annual average level over 60 µg/m^3 which would indicate that an exceedance of the 1-hour mean objective is also not likely.

Each year Teignbridge reviews the sites of the diffusion tubes and takes into conisderation extending, reducing or revoking an AQMA. With current levels in two of our AQMA's, namely Dawlish and Kingskerswell, being significantly below the

national objective, monitoing is taking place in line with current Government guidelines to enable revokation of these AQMA's in the forseable future.

Figure A4.1 shows the NO_2 trend from 6 of our highest exceeding sites between 2012 – 2016. Although there are some significant peaks and troughs, this is due to missing tubes. There is a slight downwards trend from the results but it is still evident that these tubes are exceeding the national objective in 2016 (albeit the tubes located at 30 – 34 Bradley Court and 68 Bitton Park Road). It is not possible to link this trend directly to any specific national or local intervention.

4 locations in the Newton Abbot/Kingsteignton AQMA.

4.1.1 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 40µg/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 50µg/m^3, not to be exceeded more than 35 times per year.

As can been seen by Table A.5 in Appendix A, unfortunately the percentage of data capture has not been successful. This has been as a result of in house changes to our Information Technology Department and equipment not functioning correctly. It is therefore this Council's priority to get adequate data available for 2017.

4.1.2 Particulate Matter ($PM_{2.5}$)

Error! Reference source not found. in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years.

4.1.3 Sulphur Dioxide (SO_2)

Error! Reference source not found. in Appendix A compares the ratified continuous monitored SO_2 concentrations for year 2016 with the air quality objectives for SO_2.

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	Halcyon Rd, Newton Abbot	Roadside	285681	71393	NO2	Y	Chemiluminescent analyser	5	2	1.7
CM2	Bitton Park Rd, Teignmouth	Roadside	293363	73094	NO2	Y	Chemiluminescent analyser	8.5	1.73	1.7
CM3	BAM - Magnolia	Roadside	283220	75972	PM10	N	Absorption of Beta Radiation.	14	N/A	1.7
CM4	Queen St, Newton Abbot	Roadside	286617	71332	PM10	Y	Light scattering technique	2.18	2.63	1.7
CM5	11 Brow Hill, Heathfield TQ12 6SW	Special	283149	75937	PM10	N	Light scattering technique	80	N/A	1.7
CM6	Magnolia, Heathfield TQ12 6RE	Special	283220	75972	PM10	N	Light scattering technique	14	N/A	1.7
CM7	Battle Road, Heathfield	Special	282813	75775	PM10	N	Light scattering technique	N/A	0	1.7

CM8	A38, Heathfield, Bovey Tracey	Special	283435	75826	Pm10	N	Light scattering technique	N/A	5	1.7

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)
1	Aller Brake Road N Abbot	Roadside	287396	69902	NO2	N	1m	5m	N	1.7
2	DP 155(153) Bitton Park Road, Teignmouth	Kerbside	293277	293277	NO2	Y	0	1m	N	1.7
3	9 Gestridge Rd, Kingsteignton	Kerbside	286967	73146	NO2	Y	0	1m	N	1.7
4	DP 85 Wolborough St, Newton Abbot	Kerbside	285526	71010	NO2	Y	0	1m	N	1.7
5	96 Bitton Park Rd, Teignmouth	Kerbside	293387	73101	NO2	Y	0	1m	N	1.7

6	157 Queen St, Newton Abbot	Kerbside	286630	71329	NO2	Y	0	1m	N	1.7
7	54 Newton Rd, Kingsteignton	Roadside	286718	72523	NO2	Y	1m	5m	N	1.7
8	57 East St, Newton Abbot	Kerbside	285991	71158	NO2	Y	0	1m	N	1.7
9	Forde House Offices, Newton Abbot	Other	287073	70915	NO2	N	N/A	N/A	N	1.7
10	Control	Other	N/A	N/A	N/A	N	N/A	N/A	N	N/A
11	12 Torquay Rd, Newton Abbot	Kerbside	286345	71078	NO2	Y	0	1m	N	1.7

12	Bus Stop/Datal office Torquay Rd, Newton Abbot	Kerbside	287939	68823	NO2	Y	0	1m	N	1.7
13	22 Courtenay Road, Newton Abbot	Urban Background	286061	70812	NO2	N	24m	1m	N	1.7
14	Bus StopWestcombe Caravan Park Torquay Rd, N Abbot	Kerbside	288024	68769	NO2	Y	15m	1m	N	1.7
15	38 Ashburton Road	Roadside	275659	69917	NO2	N	2m	2m	N	2
16	46/48 Newton Rd, Kingsteignton	Roadside	286727	72538	NO2	Y	2m	5m	N	1.7
17	Whitecourt, Iddesleigh Terrace, Dawlish	Kerbside	296299	76738	NO2	Y	0	1m	N	1.7

18	DP Flat 2, Birchwood Court, Addison Rd, NA	Roadside	287211	70496	NO2	Y	0	2m	N	1.7
19	DP 49 The Avenue, Newton Abbot	Roadside	286479	71558	NO2	Y	0	5m	N	1.7
20	Specsavers 16 Queen Street Ground Floor Newton Abbot	Kerbside	286056	71334	NO2	Y	0	1m	N	1.7
21	Specsavers 16 Queen Street First Floor Newton Abbot	Kerbside	286056	71334	NO2	Y	0	1m	N	4
22	Opp Aster House, Starcross	Kerbside	297737	81748	NO2	N	0	1m	N	1.7
23	108-110 Queen St First Floor level Newton Abbot	Kerbside	286519	71344	NO2	Y	0	1m	N	4

24	87 East St, Newton Abbot	Kerbside	286061	71151	NO2	Y	0	1m	N	1.7
25	DP 7 Station Rd, Newton Abbot	Roadside	286703	70922	NO2	Y	0	4m	N	1.7
26	DP 34 Bradley Lane, Newton Abbot	Roadside	285510	71305	NO2	Y	0	3m	N	1.7
27	DP 173 Bitton Park Rd, Teignmouth	Kerbside	293231	73085	NO2	Y	0	1m	N	1.7
28	Western Cottages 1 Greenhill Road KKwell	Roadside	287671	67405	NO2	N	5m	3m	N	1.7
29	Jct of Huxnor Rd and Eddginswell Lane Kkwell	Kerbside	287667	67263	NO2	N	0	1m	N	1.7

30	1A Piermont Place, Dawlish	Kersbide	296281	296281	NO2	Y	0	1m	N	1.7
31	DP 108-110 Queen St, Newton Abbot	Kerbside	286517	71336	NO2	Y	0	1m	N	1.7
32	21 Oakford, Broadway Rd, Kingsteignton	Kerbside	286957	73112	NO2	Y	0	1m	N	1.7
33	DP 30-34 Bradley Court, Highweek Street NA	Kerbside	285681	71393	NO2	Y	0	1m	N	1.7
34	Nox Analyser, Halcyon Road, Newton Abbot	Other	286071	71478	NO2	Y	0	N/A	Y	1.7
35	Lamp post St Mary Church Road Newton Abbot	Roadside	287299	70621	NO2	N	5m	1m	N	1.7

36	DP Westhill House, Kingskerswell	Kerbside	288111	67872	NO2	Y	0	1m	N	1.7
37	Telegraph pole Ringslade, Highweek	Kerbside	284851	72101	NO2	N	0	1m	N	1.7
38	DP 26 Newton Road, Kingsteignton	Roadside	286757	72583	NO2	Y	2m	5m	N	1.7
39	Rock House 1 Maddacombe Rd KKwell	Kerbside	287477	67698	NO2	N	0	1m	N	1.7
40	DP 8 Furze Cap, Kingsteignton	Roadside	286987	73148	NO2	N	1m	5m	N	1.7
41	DP Aller Farmhouse, Kingskerswell	Kerbside	288077	68761	NO2	Y	0	1m	N	1.7

42	Lay By Exeter Rd (opp Vauxhall Garage) Whitehill N Abbot	Kerbside	285477	72510	NO2	N	N/A – pre planning application.	1m	N	1.7
43	Nox Analyser, Halcyon Road, Newton Abbot	other	285681	71393	NO2	Y	0	N/A	Y	1.7
44	Nox Analyser, Halcyon Road, Newton Abbot	Other	285681	71393	NO2	Y	0	N/A	Y	1.7
45	DP 4 Commercial Rd, Dawlish	Kerbside	296302	76756	NO2	Y	0	1m	N	1.7
46	DP 3 Iddesleigh Terrace, Dawlish	Kerbside	296318	76763	NO2	Y	0	1m	N	1.7
47	DP 114 Bitton Park Rd, Teignmouth	Kerbside	293256	73109	NO2	Y	0	1m	N	1.7

48	DP 1 Reed Vale Lodge, Teignmouth	Kerbside	293446	73091	NO2	Y	0	1m	N	2
49	DP 68 Bitton Park Rd, Teignmouth	Kerbside	293541	73083	NO2	Y	0	1m	N	2
50	L/Post Newton Road (Northbound opp Priory Ave) Kkwell	kerbside	288027	68381	NO2	Y	0	1m	N	1.7
51	DP St Mary's Court, Highweek St,NA	Roadside	285674	71401	NO2	Y	0m	4m	N	1.7
52	DP 29 Vicarage Hill, Kingsteignton (Blindwell)	Roadside	287544	73067	NO2	N	2m	5m	N	1.7
53	90 Wolborough Street Newton Abbot	Kerbside	285537	71035	NO2	Y	0	1m	N	1.7

54	DP 3 Gestridge Road, Kingsteignton	Kerbside	286969	73130	NO2	Y	0	1m	N	1.7
55	DP 79 Wolborough St, Newton Abbot	Kerbside	285554	71043	NO2	Y	0	1m	N	1.7
56	DP Wywurree Bungalow, Addison Road NA	Roadside	287198	70542	NO2	Y	0	10m	N	1.7
57	DP Aster House, The Strand, Starcross	Kerbside	297724	81743	NO2	N	0	1m	N	1.7
58	L/Post Level with 28 Water laneTorquay Road (Northbound) Kkwell	Kerbside	288168	67516	NO2	Y	0	1m	N	1.7
59	LP Newton Road, South of Pottery Road, Kingsteignton	Roadside	286730	72518	NO2	Y	15m	2m	N	1.7

60	Nox Analyser - Bitton Park Road, Teignmouth	Other	293363	73094	NO2	Y	0	N/A	Y	1.7
61	Nox Analyser - Bitton Park Road, Teignmouth	other	293363	73094	NO2	Y	0	N/A	Y	1.7
62	Nox Analyser - Bitton Park Road, Teignmouth	Other	293363	73094	NO2	Y	0	N/A	Y	1.7
63	DP 3 Gestridge Rd, Kingsteignton (Broadway Rd)	Kerbside	286965	73120	NO2	Y	0	1m	N	1.7
64	Telegraph Pole, 22 Gestridge Road, Kingsteignton	Kerbside	286985	73111	NO2	N	0	1m	N	1.7
65	96 Wolborough St, Newton Abbot	Kerbside	285518	71018	NO2	Y	0	1m	N	1.7

66	Halfway House Torquay Road (next to Hare +Hound) Kkwell	Kerbside	288339	66936	NO2	Y	0	1m	N	1.7
67	Coventry Cottage Torquay Road (Southbound)	Kerbside	288487	66690	NO2	Y	0	1m	N	1.7
68	Cliffpark, Bishopsteignton Road, Teignmouth	Kerbside	292886	72930	NO2	N	0	1m	N	1.7
69	Highweek Inn crossroad	Kerbside	284813	72062	NO2	N	0	1m	N	1.7

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2012	2013	2014	2015	2016
BP	Roadside	Automatic		0.00	19.17	21.45	19.29	19.82	0.00
HR	Roadside	Automatic		0.00	27.33	29.77	**44.63**	29.01	0.00
1	Aller Brake Road N Abbot	DT		91.67				27.66	24.07
1 (A)	DP 62 Queen Street,	DT		0.00	32.08	23.37	20.80		
2	DP 155(153) Bitton Park Road, Teignmouth	DT		83.33	**40.71**	38.82	38.88	36.97	28.77
3	9 Gestridge Rd, Kingsteignton	DT		91.67	**41.34**	37.87	38.41	37.37	31.32
4	DP 85 Wolborough St, Newton Abbot	DT		100.00	**55.14**	**58.17**	**51.40**	**50.12**	**45.00**
5	96 Bitton Park Rd, Teignmouth	DT		100.00	32.67	**50.03**	**46.05**	**42.08**	**40.77**
6	157 Queen St, Newton Abbot	DT		100.00	37.20	**44.50**	36.79	34.97	34.25
7	54 Newton Rd, Kingsteignton	DT		100.00	31.78	33.49	30.72	30.76	28.16
8	57 East St, Newton Abbot	DT		91.67	35.88	35.55	31.62	30.75	28.32
9	Forde House Offices, Newton Abbot	DT		100.00	16.66	17.34	16.51	13.84	13.64
10	Control	DT		100.00	0.27	0.23	0.11	0.13	0.10
11	12 Torquay Rd, Newton Abbot	DT		100.00	23.70	34.83	37.41	31.46	29.70
12	Bus Stop/Datal office Torquay Rd, Newton Abbot	DT		100.00				37.65	21.86
12 (A)	1 Northernhay, Newton Abbot	DT		0.00	24.53	17.72	17.72		

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
13	22 Courtenay Road, Newton Abbot	DT		100.00	9.91	10.72	8.93	8.33	8.92
14	Bus StopWestcombe Caravan Park Torquay Rd, N Abbot	DT		100.00				31.38	16.67
14 (a)	10 Hameldown Way	DT		0.00	18.32	14.13	14.13	0.00	0.00
15	38 Ashburton Road	DT		100.00	0.00	0.00	8.93	27.08	27.65
15 (a)	20 East Street	DT		0.00	25.21	25.21			
16	46/48 Newton Rd, Kingsteignton	DT		100.00	35.69	35.64	13.51	36.40	31.94
17	Whitecourt, Iddesleigh Terrace, Dawlish	DT		100.00	37.38	38.37	30.77	36.03	32.84
18	DP Flat 2, Birchwood Court, Addison Rd, NA	DT		100.00	23.45	22.00	36.57	22.68	21.81
19	DP 49 The Avenue, Newton Abbot	DT		100.00	28.86	27.43	**40.07**	24.19	24.47
20	Specsavers 16 Queen Street Ground Floor Newton Abbot	DT		100.00	0.00	22.07	25.25	19.45	20.59
20 (a)	DP 11 Lyn Grove	DT		0.00	14.30				
21	Specsavers 16 Queen Street First Floor Newton Abbot	DT		100.00	0.00	23.32	28.05	19.39	19.83
21 (a)	DP 3 Coburg Cottages, Chudleigh	DT		0.00	22.06				
22	Opp Aster House, Starcross	DT		100.00	30.02	31.04	21.21	25.49	24.54
23	108-110 Queen St First Floor level Newton Abbot	DT		100.00	0.00	**40.82**	21.07	36.34	34.38
23 (a)	Roadsign, Ugbrooke Park, A380	DT		0.00	26.56				
24	87 East St, Newton Abbot	DT		100.00	37.17	**42.64**	28.45	39.91	37.95
25	DP 7 Station Rd, Newton Abbot	DT		100.00	35.68	36.46	38.62	36.03	32.68
26	DP 34 Bradley Lane, Newton Abbot	DT		100.00	24.27	24.82	**42.46**	21.56	22.10

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
27	DP 173 Bitton Park Rd, Teignmouth	DT		75.00	**44.69**	**41.71**	36.67	**40.27**	26.85
28	Western Cottages 1 Greenhill Road KKwell	DT		100.00				9.72	11.44
28 (a)	Roadsign, A380 Kennford	DT		0.00	**44.56**	**43.78**			
29	Jct of Huxnor Rd and Eddginswell Lane Kkwell	DT		100.00				11.01	11.82
29 (a)	Willene, Kennford	DT		0.00	23.99	25.50			
30	1A Piermont Place, Dawlish	DT		100.00	34.66	35.59	29.64	34.30	33.51
31	DP 108-110 Queen St, Newton Abbot	DT		100.00	**43.11**	**43.46**	**42.71**	38.09	36.30
32	21 Oakford, Broadway Rd, Kingsteignton	DT		91.67	27.93	26.78	26.43	25.12	20.60
33	DP 30-34 Bradley Court, Highweek Street NA	DT		91.67	**43.00**	**44.39**	**43.58**	**41.28**	35.84
34	Nox Analyser, Halcyon Road, Newton Abbot	DT		100.00	28.89	31.96	29.06	28.11	26.42
35	Lamp post St Mary Church Road Newton Abbot	DT		91.67			30.33	27.49	25.77
35 (a)	DP 80 Fore Street, Bovey Tracey	DT		0.00	22.83	23.53			
36	DP Westhill House, Kingskerswell	DT		91.67	0.00	38.98	37.78	34.18	15.88
37	Telegraph pole Ringslade, Highweek	DT		100.00				17.81	18.28
37 (a)	LP Aller Cottages, Kingskerswell	DT		0.00	37.81	33.77	33.77		
38	DP 26 Newton Road, Kingsteignton	DT		100.00	35.39	35.37	34.76	32.90	29.95
39	Rock House 1 Maddacombe Rd KKwell	DT		100.00				14.99	17.58
39 (a)	Redmount Nursing Home	DT		0.00	22.76	0.00	0.00		
39 (b)	45 C Plymouth Road, Buckfastleigh	DT		0.00		35.37			
40	DP 8 Furze Cap, Kingsteignton	DT		100.00				13.48	

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
40 (a)	DP 8 Gestridge Road, Kingsteignton	DT		0.00	20.44			21.37	
41	DP Aller Farmhouse, Kingskerswell	DT		100.00	**40.54**	**40.62**	**45.90**	24.57	14.14
42	Lay By Exeter Rd (opp Vauxhall Garage) Whitehill N Abbot	DT		100.00				20.39	21.79
42 (a)	DP 7 & 8 Chapel St, Buckfastleigh	DT		0.00	13.80				
42 (b)	76 Plymouth Road, Buckfastleigh	DT		0.00		22.22			
43	Nox Analyser, Halcyon Road, Newton Abbot	DT		100.00	30.20	31.05	29.31	27.45	26.94
44	Nox Analyser, Halcyon Road, Newton Abbot	DT		100.00	30.70	33.76	28.64	27.64	26.86
45	DP 4 Commercial Rd, Dawlish	DT		100.00	28.08	28.58	27.65	26.35	25.34
46	DP 3 Iddesleigh Terrace, Dawlish	DT		100.00	29.27	32.98	**41.81**	32.30	26.83
47	DP 114 Bitton Park Rd, Teignmouth	DT		100.00	27.29	28.04	28.34	26.13	25.16
48	DP 1 Reed Vale Lodge, Teignmouth	DT		91.67	**46.56**	**62.32**	**70.43**	**41.35**	**50.46**
49	DP 68 Bitton Park Rd, Teignmouth	DT		58.33	**58.16**	**50.16**	**48.70**	**47.25**	31.09
50	L/Post Newton Road (Northbound opp Priory Ave) Kkwell	DT		100.00				**44.73**	21.45
50 (a)	The Toll House, Teignmouth	DT		0.00	25.43	26.56	26.56		
51	DP St Mary's Court, Highweek St,NA	DT		100.00	26.10	26.74	26.58	26.09	25.11
52	DP 29 Vicarage Hill, Kingsteignton (Blindwell)	DT		100.00	38.91	39.99	24.54	19.92	20.82
53	90 Wolborough Street Newton Abbot	DT		100.00	**42.01**	**46.90**	**44.15**	**45.89**	**42.03**
54	DP 3 Gestridge Road, Kingsteignton	DT		100.00	36.47	37.52	36.73	35.00	32.18
55	DP 79 Wolborough St, Newton Abbot	DT		100.00	**52.03**	**56.34**	**50.69**	**48.76**	**42.76**
56	DP Wywurree Bungalow, Addison Road NA	DT		100.00	26.89	26.75	26.35	25.45	24.22

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
57	DP Aster House, The Strand, Starcross	DT		83.33	26.86	31.36	33.53	32.27	27.12
58	L/Post Level with 28 Water laneTorquay Road (Northbound) Kkwell	DT		83.33				**42.35**	17.41
58 (a)	DP 50 Exeter Road, Kingsteignton	DT		0.00	23.49	24.12	24.12		
59	LP Newton Road, South of Pottery Road, Kingsteignton	DT		83.33	31.38	29.20	30.50	29.36	23.43
60	Nox Analyser - Bitton Park Road, Teignmouth	DT		100.00	23.28	25.11	23.45	20.92	20.90
61	Nox Analyser - Bitton Park Road, Teignmouth	DT		100.00	23.02	23.53	23.01	21.31	21.01
62	Nox Analyser - Bitton Park Road, Teignmouth	DT		100.00	23.25	25.21	22.73	21.26	20.77
63	DP 3 Gestridge Rd, Kingsteignton (Broadway Rd)	DT		100.00	29.59	26.22	12.13	22.28	25.10
64	Telegraph Pole, 22 Gestridge Road, Kingsteignton	DT		100.00				23.36	18.34
64 (a)	Streetsign, Oakford, Kingsteignton	DT		0.00	27.77	27.94	27.94		
65	96 Wolborough St, Newton Abbot	DT		100.00	30.90	33.03	30.88	30.76	26.76
66	Halfway House Torquay Road (next to Hare +Hound) Kkwell	DT		100.00				39.03	21.20
66 (a)	LP Newton Road, Kingsteignton,	DT		0.00	28.58	25.35	25.35		
67	Coventry Cottage Torquay Road (Southbound)	DT		83.33	0.00	0.00	0.00	**41.43**	20.87
67 (a)	Housing Dev, Bradley Lane	DT		0.00	25.02	28.08	28.08		
68	Cliffpark, Bishopsteignton Road, Teignmouth	DT		100.00	30.40	34.02	30.53	25.92	26.91
69	Highweek Inn crossroad	DT		100.00				12.86	13.32
71	Old Town Street, Dawlish	DT			19.69				

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

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

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

Notes:

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

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

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

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

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

Table A.4 – 1-Hour Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2012	2013	2014	2015	2016
1	Roadside (Halcyon Road)	Automatic	80	80	**0**	4	18	No data	**No data**
2	Roadside (Bitton Park Road)	Automatic	95	95	2	0	0	**No data**	No data

Notes:

Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold.**

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

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

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

Table A.5 – Annual Mean PM_{10} Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	PM_{10} Annual Mean Concentration (µg/m^3) (3)				
					2012	2013	2014	2015	2016
Mag	Roadside (BAM)	Automatic		0	No Data	Not at this location	**55.06**	25.79	No Data
Brow Hill	OSIRIS	Light Scattering		0	No Data	7.33	16.15	No Data	No Data
Magnolia	OSIRIS	Light Scattering		0	No Data	11.94	25.9	**49.38**	No Data
A38	OSIRIS	Light Scattering		0	No Data	**N/A**	**128.59**	No Data	No Data
Queen Street	OSIRIS	Light Scattering		0	No Data	22.71	**61.56**	No Data	No Data
Battle Road	OSIRIS	Light Scattering		0	No Data	**N/A**	9.52	No Data	No Data

☒ **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.

Table A.6 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	PM_{10} 24-Hour Means > 50µg/m³ (3)				
				2012	2013	2014	2015	2016
Brow Hill	Osiris	-	-	4	0	No Data	No Data	No Data
Magnolia	Osiris	-	-	20	1	0	0	No Data
A38	Osiris	-	-	N/A	N/A	No Data	No Data	No Data
Queen Street	Osiris	-	-	8	308	0	No Data	No Data
Battle Road	Osiris	-	-	N/A	N/A	No data	No data	No Data

Notes:

Exceedances of the PM_{10} 24-hour mean objective (50µg/m³ not to be exceeded more than 35 times/year) are shown in **bold.**

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

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2016

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

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.87) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
1	32.53	33.03	29.45	2.17	28.68	25.24	28.47	29.58	29.41	M	39.10	**45.67**	29.39	24.07	24.07
2	37.90	39.22	39.84	34.69	36.95	34.56	M	40.15	37.66	M	37.03	**45.12**	38.31	28.77	28.77
3	**41.54**	34.41	M	34.65	38.81	30.46	29.66	32.99	35.08	39.52	**48.12**	**54.86**	38.19	31.32	31.32
4	**51.18**	**54.88**	**50.03**	**53.46**	**55.69**	**43.21**	**40.80**	**43.57**	**46.86**	**59.17**	**59.90**	**61.95**	**51.73**	**45.00**	45.00
5	**44.24**	**49.37**	**52.52**	**53.78**	**46.57**	**43.00**	33.24	35.91	**43.93**	**49.30**	**54.74**	**55.70**	**46.86**	**40.77**	**40.77**
6	**40.13**	**40.71**	**42.95**	39.74	38.97	36.52	27.72	30.88	35.18	**40.57**	**48.24**	**50.74**	39.36	34.25	34.25
7	30.26	33.50	35.39	32.12	35.96	29.04	25.60	27.06	29.32	31.27	39.93	38.93	32.37	28.16	28.16
8	37.67	38.06	36.59	32.83	34.05	27.74	26.06	M	26.80	37.09	**43.23**	**44.52**	34.97	28.32	28.32
9	17.36	16.35	14.93	15.11	13.30	12.17	10.01	10.97	14.51	17.88	21.42	24.16	15.68	13.64	13.64
10	0.13	0.18	0.05	0.13	0.04	0.02	0.11	0.25	0.04	0.21	0.10	0.06	0.11	0.10	0.10
11	**42.86**	36.59	35.23	30.61	32.81	23.01	26.95	24.72	33.63	35.72	39.93	**47.56**	34.14	29.70	29.70
12	25.07	29.55	24.28	23.68	22.89	23.89	18.21	22.11	21.95	25.99	31.47	32.46	25.13	21.86	21.86
13	8.90	11.47	11.87	8.76	8.14	6.53	5.44	5.59	8.17	14.49	15.33	18.29	10.25	8.92	8.92
14	19.45	20.49	18.12	18.25	18.20	14.61	17.85	16.43	18.11	18.38	25.23	24.84	19.16	16.67	16.67
15	36.65	34.43	32.82	29.21	31.26	24.79	23.31	24.65	29.62	32.61	39.02	42.97	31.78	27.65	27.65
16	**49.67**	**41.88**	37.99	30.46	35.40	27.70	29.70	27.80	33.33	36.20	**45.91**	**44.56**	36.72	31.94	31.94
17	34.44	36.35	38.92	**40.63**	**41.92**	35.64	31.15	36.65	34.83	39.68	**41.00**	**41.81**	37.75	32.84	32.84

18	27.30	26.55	24.98	23.82	22.83	19.02	19.01	19.74	25.02	26.41	30.78	35.43	25.07	21.81	21.81
19	31.12	33.54	25.96	27.08	26.75	21.40	23.41	22.08	23.00	31.68	35.34	36.11	28.12	24.47	24.47
20	25.96	25.75	23.19	23.07	22.84	17.03	15.42	17.09	19.23	29.26	31.11	34.05	23.67	20.59	20.59
21	27.68	25.83	22.45	21.08	21.50	16.11	14.15	15.62	19.39	27.39	29.49	32.89	22.80	19.83	19.83
22	22.55	29.91	29.56	26.81	28.15	24.11	23.54	24.99	28.14	30.35	33.55	36.82	28.21	24.54	24.54
23	**47.32**	**44.74**	**41.32**	36.06	38.74	31.63	26.68	34.69	**40.73**	**40.02**	**45.61**	**46.60**	39.51	34.38	34.38
24	**45.12**	**43.12**	**46.56**	**42.54**	**41.50**	36.52	33.87	35.25	39.68	**50.92**	**56.22**	**52.09**	**43.62**	37.95	37.95
25	38.87	**41.62**	**44.59**	30.39	30.83	35.13	29.65	34.47	37.19	37.01	**46.80**	**44.24**	37.57	32.68	32.68
26	20.71	27.43	28.42	24.03	26.48	34.93	15.79	16.93	22.39	27.21	29.05	31.52	25.41	22.10	22.10
27	**43.37**	**40.62**	39.27	10.32	45.12	37.88	M	39.79	**45.73**	39.19	M	M	37.92	26.85	26.85
28	14.33	14.49	14.64	10.26	11.58	9.47	7.05	7.94	13.01	14.93	18.68	21.40	13.15	11.44	11.44
29	12.23	13.94	15.99	12.49	11.70	10.75	6.97	8.60	13.22	16.61	19.39	21.19	13.59	11.82	11.82
30	35.75	**40.61**	**42.89**	38.18	**43.73**	34.02	34.60	39.68	**42.53**	39.94	30.72	39.51	38.51	33.51	33.51
31	**53.53**	**49.58**	39.24	37.40	**43.06**	36.44	31.81	38.86	**44.08**	**43.33**	25.83	**57.59**	**41.73**	36.30	36.30
32	28.33	M	26.38	23.64	26.04	20.50	21.98	22.80	11.91	27.89	32.94	27.94	24.58	20.60	20.60
33	**50.95**	M	**46.54**	37.10	**43.68**	38.68	35.70	**41.97**	**43.10**	**44.24**	**51.52**	**47.15**	**43.69**	35.84	35.84
34	30.44	30.73	30.81	31.63	32.64	26.14	22.92	24.26	27.09	36.31	36.44	35.07	30.37	26.42	26.42
35	M	29.80	32.26	28.12	27.47	16.20	21.98	23.72	33.61	36.34	**45.24**	**45.73**	30.95	25.77	25.77
36	22.21	22.68	19.80	18.15	16.50	15.85	17.68	M	17.37	18.85	21.78	22.20	19.37	15.88	15.88
37	21.28	23.21	22.04	18.98	20.72	15.74	13.35	14.41	18.35	27.44	30.56	26.03	21.01	18.28	18.28
38	**40.41**	36.64	37.63	27.41	34.81	27.50	28.16	29.96	34.17	34.90	**44.46**	37.01	34.42	29.95	29.95
39	20.53	23.10	18.24	18.54	20.44	15.75	15.13	15.73	19.66	22.71	26.19	26.45	20.21	17.58	17.58
40	Removed	from	site	at	end	of	2015								
41	15.33	18.66	14.36	13.84	15.58	12.26	10.07	11.00	15.78	16.77	23.03	28.29	16.25	14.14	14.14
42	26.20	26.39	25.21	22.26	24.36	21.32	16.94	17.25	23.87	29.35	32.39	35.07	25.05	21.79	21.79
43	30.83	33.99	31.85	31.16	35.54	27.69	21.87	24.02	28.88	34.33	37.60	33.82	30.97	26.94	26.94

44	29.85	31.79	34.55	31.59	29.81	30.96	21.69	23.01	29.47	34.62	37.82	35.26	30.87	26.86	26.86
45	28.11	30.42	29.33	28.93	31.76	31.02	24.41	29.11	26.28	28.26	30.54	31.34	29.13	25.34	25.34
46	32.47	34.05	30.14	27.37	36.14	30.28	25.90	30.13	27.65	28.45	36.31	31.23	30.84	26.83	26.83
47	30.33	27.73	30.17	26.97	32.32	29.15	26.03	22.83	27.17	30.55	33.51	30.31	28.92	25.16	25.16
48	**52.96**	M	**65.97**	**50.57**	**66.29**	**63.34**	**47.00**	**54.84**	**71.70**	**76.61**	**75.52**	**57.41**	**62.02**	**50.46**	**50.46**
49	**55.03**	M	**57.35**	**44.16**	**53.56**	**46.31**	M	**51.18**	M	M	**69.90**	M	**53.93**	31.09	31.09
50	23.70	28.98	27.80	23.07	20.65	23.34	16.86	18.15	25.04	23.62	31.99	32.73	24.66	21.45	21.45
51	26.02	29.24	33.04	29.77	32.83	30.62	18.00	21.53	26.69	34.00	35.02	29.58	28.86	25.11	25.11
52	23.94	28.09	27.84	21.59	21.75	19.64	13.45	15.76	22.20	26.17	33.30	33.44	23.93	20.82	20.82
53	**52.03**	**48.99**	**50.86**	38.89	**48.76**	**46.87**	39.47	**42.89**	**47.22**	**51.30**	**61.87**	**50.59**	**48.31**	**42.03**	**42.03**
54	40.76	37.49	39.41	31.40	34.90	32.56	29.00	32.99	39.09	38.70	**47.98**	39.55	36.99	32.18	32.18
55	**59.14**	**53.18**	**55.07**	**47.53**	**54.46**	**52.49**	36.92	**45.91**	**59.06**	**56.21**	**69.66**	0.16	**49.15**	**42.76**	**42.76**
56	30.06	30.56	26.82	26.57	28.20	23.31	20.54	22.88	26.31	28.43	36.42	33.99	27.84	24.22	24.22
57	31.30	M	34.53	M	35.11	34.37	28.84	35.32	32.40	33.07	**42.78**	**44.52**	35.22	27.12	27.12
58	25.87	26.94	24.38	19.71	M	17.32	16.43	17.56	21.17	24.03	M	30.36	22.38	17.41	17.41
59	M	37.95	30.59	26.54	30.76	22.28	22.65	25.34	M	30.72	36.22	36.54	29.96	23.43	23.43
60	22.87	26.48	23.60	23.39	21.87	21.97	18.21	19.69	21.96	28.93	29.36	29.91	24.02	20.90	20.90
61	20.61	25.77	24.96	24.20	24.67	20.38	19.52	19.10	22.74	27.18	30.71	29.96	24.15	21.01	21.01
62	23.45	21.99	24.09	23.53	24.66	20.79	19.81	19.99	22.55	27.59	26.98	31.00	23.87	20.77	20.77
63	28.51	31.89	31.29	28.60	26.14	22.81	20.24	22.80	26.21	30.39	37.45	39.92	28.85	25.10	25.10
64	22.34	22.96	19.79	19.53	18.48	15.60	12.40	14.30	22.62	22.10	28.28	34.57	21.08	18.34	18.34
65	30.92	31.24	29.74	29.02	28.25	28.69	29.77	27.35	28.79	31.25	37.52	36.55	30.76	26.76	26.76
66	23.84	25.32	25.49	21.46	23.06	20.49	17.09	18.82	25.56	26.26	30.77	34.24	24.37	21.20	21.20
67	M	28.62	26.43	25.05	24.19	M	18.66	15.82	25.75	28.64	34.14	38.09	26.54	20.87	20.87
68	22.33	27.32	36.47	29.97	35.56	27.31	27.71	29.55	33.18	30.49	32.32	38.97	30.93	26.91	26.91
69	14.86	15.07	16.55	13.68	14.06	12.86	11.32	10.05	13.67	18.86	20.40	22.31	15.31	13.32	13.32

☒ **National bias adjustment factor used**

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

Notes:

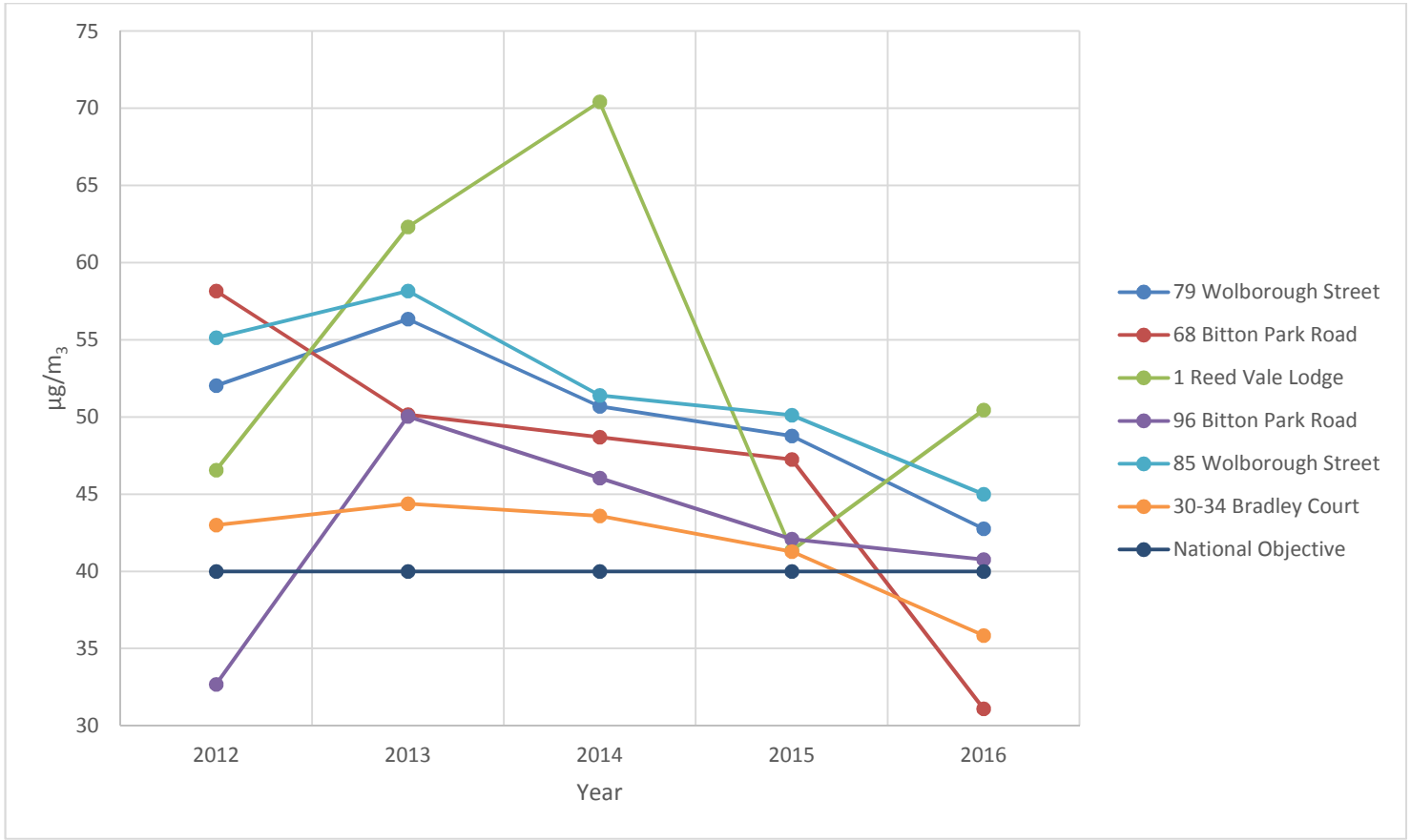
Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

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

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

(2) Distance corrected to nearest relevant public exposure

Figure A4.1 Trends in Annual Mean NO_2 Monitoring Results from 2012 – 2016 .



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

QA/QC of Automatic Monitoring

NO_x Analysers

The guidance contained in Technical Guidance LAQM.TG (09) advises that a well-documented quality assurance and quality control programme must be followed in order to ensure reliable and credible measurements. An ongoing resource commitment to QA/QC is required in any monitoring survey, to ensure that measurements fully comply with the requirements of the air quality review and assessment and are therefore fit for the purpose.

The fundamental aims of the QA/QC programme are as follows:

- Data should be representative of ambient concentrations existing in the area under investigation.
- Measurements need to be sufficiently accurate and precise to meet the defined monitoring requirements.
- Data must be intercomparable and reproducible. Results from multi-site networks need to be internally consistent and comparable with national, international or other acceptable standards.
- Measurements should be consistent over time, particularly if long-term trend analysis is to be undertaken.

QA/QC procedures were applied to both sets of automatic monitoring data throughout the monitoring periods. The Chemiluminescent analysers are continuous automatic real time monitors and are housed in 'M' type purpose built air-conditioned enclosures. In order to minimise measurement uncertainty it is important to apply stringent QA/QC procedures to monitoring programmes. The following procedures were carried out in Teignbridge in order to meet the criteria.

Calibration Checks

The following calibration checks were carried out: -
• Daily 'automatic' calibration
• Fortnightly manual calibrations
• 6 monthly reference calibrations

During the daily automatic calibration, a two point calibration is used to quantify the analyser 'zero' and 'span' response. The 'zero' response is the response of the analyser when the pollutant species being measured is not present in the sample air stream. The 'span' response is the response, of the analyser to a gas mixture of accurately known concentration. In order to ensure reproducible data quality, automatic monitoring instruments must be properly calibrated using reliable and traceable calibration standards.

The gas mixture was of mixture type U, nitric oxide 2.5 and nitrogen 5.0, and was provided by E.T. under the service and maintenance contract. Teignbridge trained staff carried out the fortnightly calibration checks and the visits included checking the equipment, sampling systems and security of the enclosure and analyser. E.T. carries out the six monthly reference calibrations and the last one was completed on the 3rd/4th June 2009.

Equipment Service and Maintenance

Teignbridge has an ongoing service and maintenance contract with E.T. for the NOx Analysers. The contract provides the following cover:-

- Routine six monthly service visits in accordance with the manufacturers instruction and warranty conditions;
- Guaranteed breakdown call out service;
- Written reports showing work carried out and status of instrumentation;
- All work and documentation is carried out in accordance with BS ISO 9002;
- Dedicated telephone support in normal working hours.

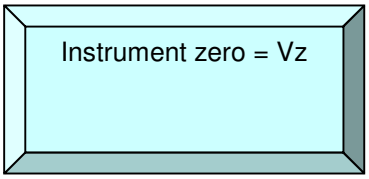
Data Capture

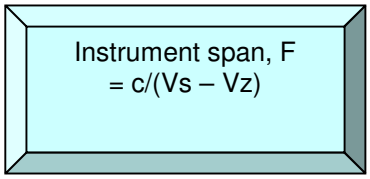
The LAQM.TG(16) recommends a data capture rate of 90% for ratified (usable) data. Teignbridge employs the following methods to ensure maximum data capture: -

- The deployment of a proven NOx analyser;
- Automatic daily data collection using dedicated software (Opis EnviMan using the ComVisioner and Reporter modules). This enabled frequent checks of the data so that on-site problems could be identified quickly;
- M200A in built data storage capability;
- Rapid servicing, maintenance and repair;
- Comprehensive and documented site operational protocols;
- Regular and frequent site visits;
- Trained Teignbridge staff operators.

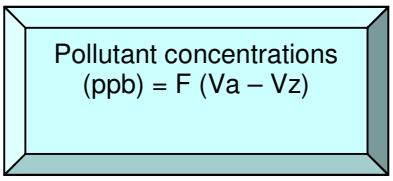
Data Processing

The M200A records the concentration of pollutants as continuous analogue voltage signals.
The signal is averaged over an hour period. An in-built data logger carries out this averaging process and the data is then downloaded via a modem to a computer in the Environment & Safety Services team. The modem is automatically dialled up three times a day at set times. The raw data collected has to be converted to more useful pollutant concentrations and this conversion is achieved using the ‘zero’ and ‘span’ calibration factors that are recorded during the manual fortnightly visits. The two-point calibration quantify’s the analyser ‘zero’ and ‘span’ response. The ‘zero’ response, Vz, is the response in measurement units of the analyser when the pollutant species being measured is not present in the sample air stream. The ‘span’ response, Vs, is the response of the analyser to an accurately known concentration, c, in ppb (parts per billion) of the pollutant species. The instrument ‘zero’ and ‘span’ factors are then calculated using these data as follows:





Ambient pollution data are then calculated by applying these factors to logged output signals as follows:



Where Va is the recorded signal from the analyser sampling ambient air. The fortnightly calibration factors applied to the raw data are then filed.

Data Ratification

Once the calibration factors have been applied to the raw data, the data is screened, by visual examination to see if they contain any spurious and/or unusual measurements. Any suspicious data, such as large spikes or spurious high concentrations can be 'flagged' and investigated more fully. This process is known as validation. Data validation is followed by data ratification, which is carried out at 3 – 6 month intervals. Steps in the ratification process included: -

- Examination of calibration records to ensure correct application of calibration factors;
- Examination of data for other pollutants and monitoring sites to highlight any anomalies;
- Deletion of data shown i.e. spikes generated by the analyser;
- Correction of any baseline drift as indicated by examination of daily calibration records;
- Examination of any local scale changes to the site environment;
- Application of correction factors from QA/QC audits.

When data verification has been completed then the data is ready for further statistical and critical examination for reporting purposes.

QA/QC of the BAM

The BAM-1020 is a continuous automatic real time analyser with a Graseby Anderson 10 sampling lead. It is housed in an M type purpose built air-conditioned enclosure.

The following procedures were carried out in Teignbridge in order to meet the criteria.

Calibration Checks

The BAM-1020 has a built in Mass Membrane Calibrator. The membrane is automatically moved into the Beta Pathway to determine the mass of the membrane each hour or when the filter tape advances. Each membrane has a factory verified mass and the value is stored in the BAM-1020. When the hourly membrane calibration is made, the computed value is compared to the stored factory value to determine proper operation. Should the instrument fail to perform to specification an error is logged in memory and data is flagged.

Zero testing of blank filter paper is performed at the beginning and end of each sample period to ensure the stability of the measurement system.

E.T. also carries out 6 monthly calibrations under the service and maintenance contract.

Equipment Service and Maintenance

Teignbridge has an ongoing service and maintenance contract with E.T. The contract provides the following cover:-

- Routine six monthly service visits in accordance with the manufacturers instruction and warranty conditions
- Guaranteed breakdown call-out service
- Written reports showing work carried out and status of instrumentation
- All work and documentation is carried out in accordance with BS ISO 9002
- Dedicated telephone support in normal working hours

The monitoring equipment has routine (fortnightly) on site checks and maintenance visits by Teignbridge staff. These routine visits include regular filter changes, sampling head cleaning, filtering tape changes and airflow/analyser test function checks at set intervals.

Non-routine visits, as a result of equipment failure or spurious data, are also carried out. All visits are fully documented and details kept of all works carried out i.e. adjustments, modifications and repairs completed.

BAM Monitoring Adjustment

The un-heated BAM inlet meets the equivalence criteria for PM_{10} monitoring, provided the results are corrected for slope. The measured concentrations have been divided by a factor of 1.21.

QA/QC of Osiris Monitors

The Osiris monitors are real-time, portable particulate matter monitors that use light-scattering technology to measure the concentration of different sized particles (PM_1, $PM_{2.5}$ and PM_{10}). Although Osiris' are not an approved method for measuring PM_{10} levels, as it is not possible to compare directly with the air quality objectives, it does provide indicative levels. The monitors are much easier and cheaper and less labour intensive than gravimetric analysers.

Teignbridge has an ongoing service and maintenance service contract with Turnkey Instruments Ltd for each of the monitors. The monitors are routinely checked every 3 months by trained Teignbridge DC officers. This involves a filter change and air flow test of the pump. The following parameters are also logged in a maintenance book filter minutes, filter weight and pump hours. The monitors are sent back to Turnkey Instruments annually for a complete service and calibration.

The monitors are dialled up weekly by trained Teignbridge DC officers and the data is downloaded onto Air Q for windows software. The data is screened by visual examination.

QA/QC of Diffusion Tube Monitoring

The NO_2 tubes diffusion tubes are analysed by Gradko International Limited in Winchester utilising 20% TEA in water for a 1-month exposure duration. Periodically samples of tubes prepared for exposure are spiked with known concentrations of nitrate solution and measured. Blank tube values are also monitored from each new batch of tubes prepared. Once a month, a stock solution containing a known amount of nitrate is received from AEA Technology and measured. The results are used as part of the UK NO_2 Survey QA/QC scheme. This stock solution is used by Gradko to check the ultra-violet spectrophotometer calibration graph. Gradko also participate in the inter-laboratory round robin exercise via the WASP scheme. The performance of the laboratory is rated as satisfactory in the centralised AIR NO_2 PT scheme for quality assurance and quality control.

Gerry Stuchbury of Gradko International also sits on the Working Group on the Harmonisation of Diffusion Tubes. The Working Group's aim was to harmonise the methodology used in preparing, utilising and analysing diffusion tubes.

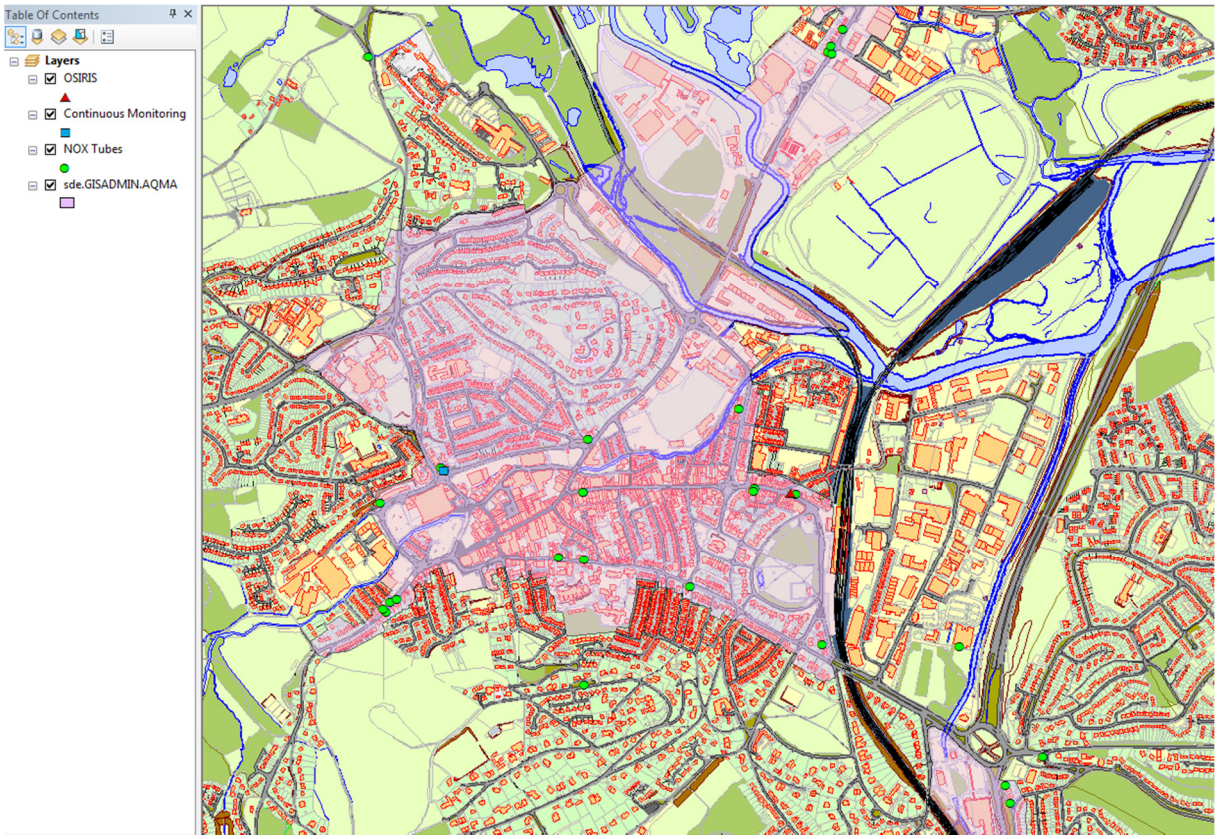
NO_2 Diffusion Tube Handling Procedures

Teignbridge District Council's NO_2 diffusion tube monitoring is carried out in full accordance with the site quality assurance procedures contained in the UK Automatic Network Site Operator's Manual. Teignbridge also participates in the NO_2 UK Network. When the diffusion tubes are received in the post from Gradko they are stored in a refrigerator within the supplied packaging. The tubes ends are not removed until the tube has been placed at the monitoring location at the start of the monitoring period. Once the sampling period is completed, the tubes are recapped with the storage caps and returned for storage in the refrigerator until they are returned to Gradko for analysis. The tubes are returned within 24 hours from the end of the sampling period. The tube exposure period used follows the timetable provided by the Air Quality Support Helpdesk. Location sites and fixings follow the recommendation in the DEFRA practical guidance on the use of diffusion tubes for NO2 monitoring published 2016. Data from the tubes are ratified and then bias adjusted using the current National Bias Adjustment Figure.

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

Newton Abbot AQMA

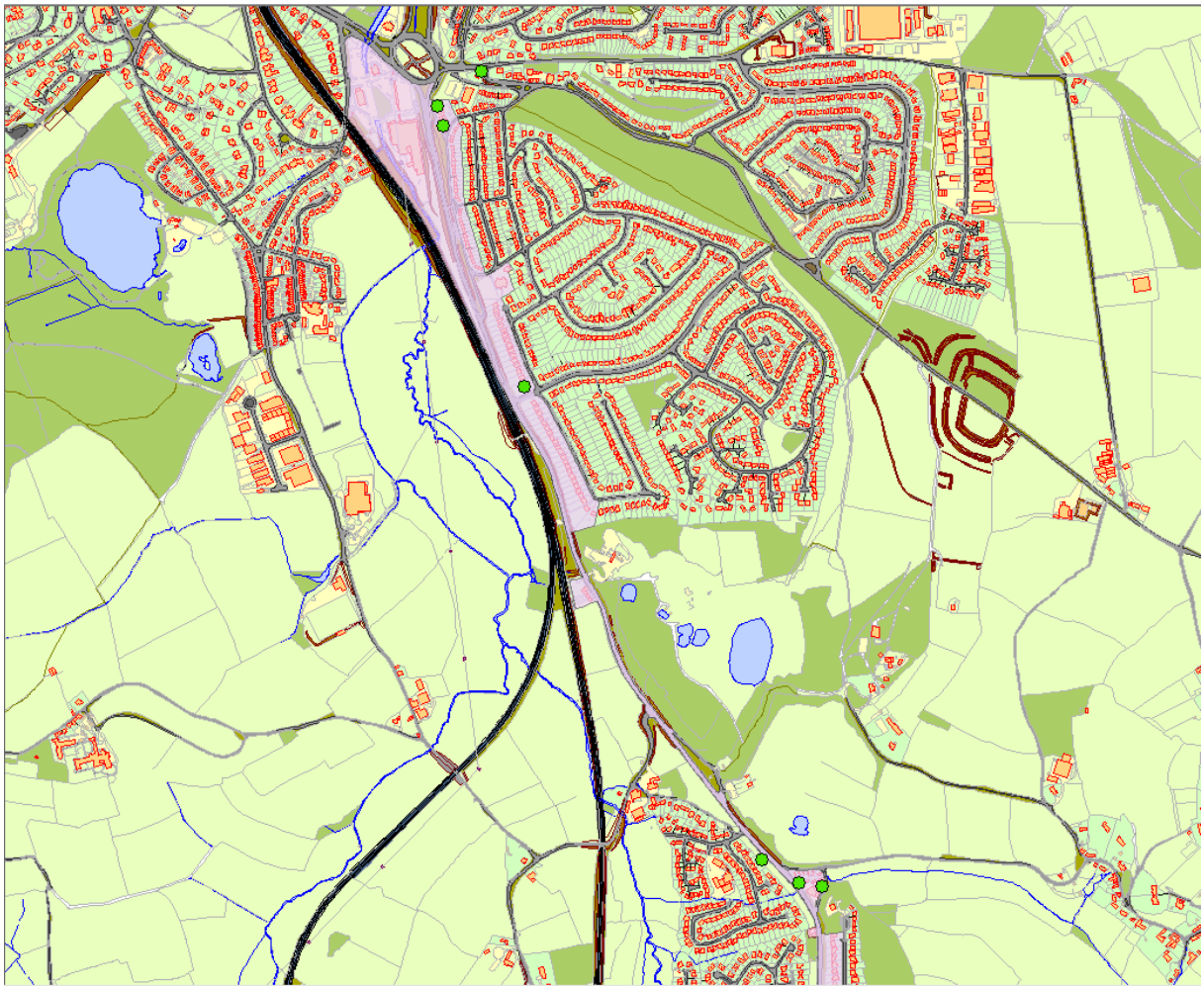
(Please note shaded area is actual AQMA boundary)

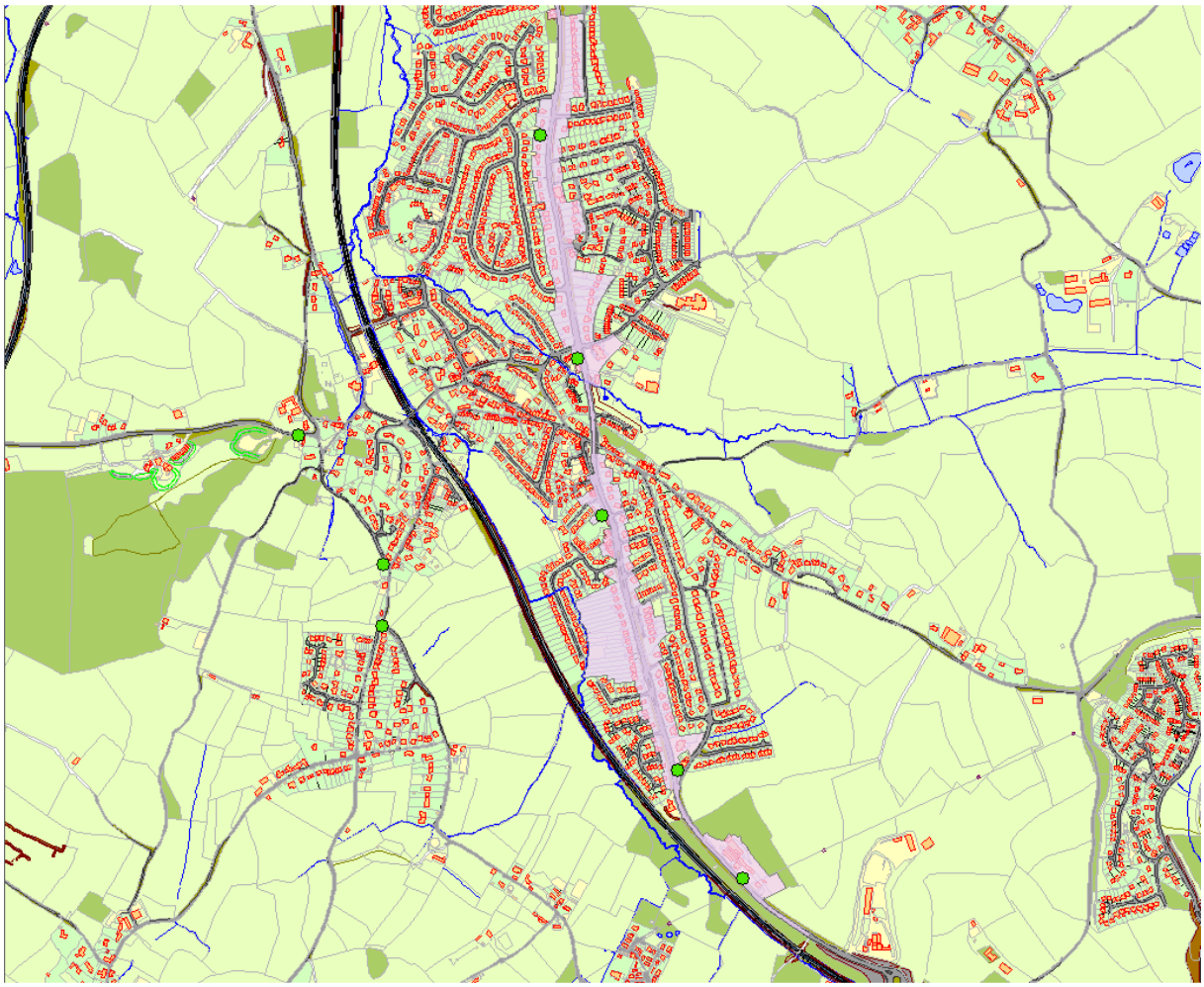


Kingsteignton AQMA

(Please note the AQMA is Newton Abbot & Kingsteignton but for ease of sight the two locations have been separated)

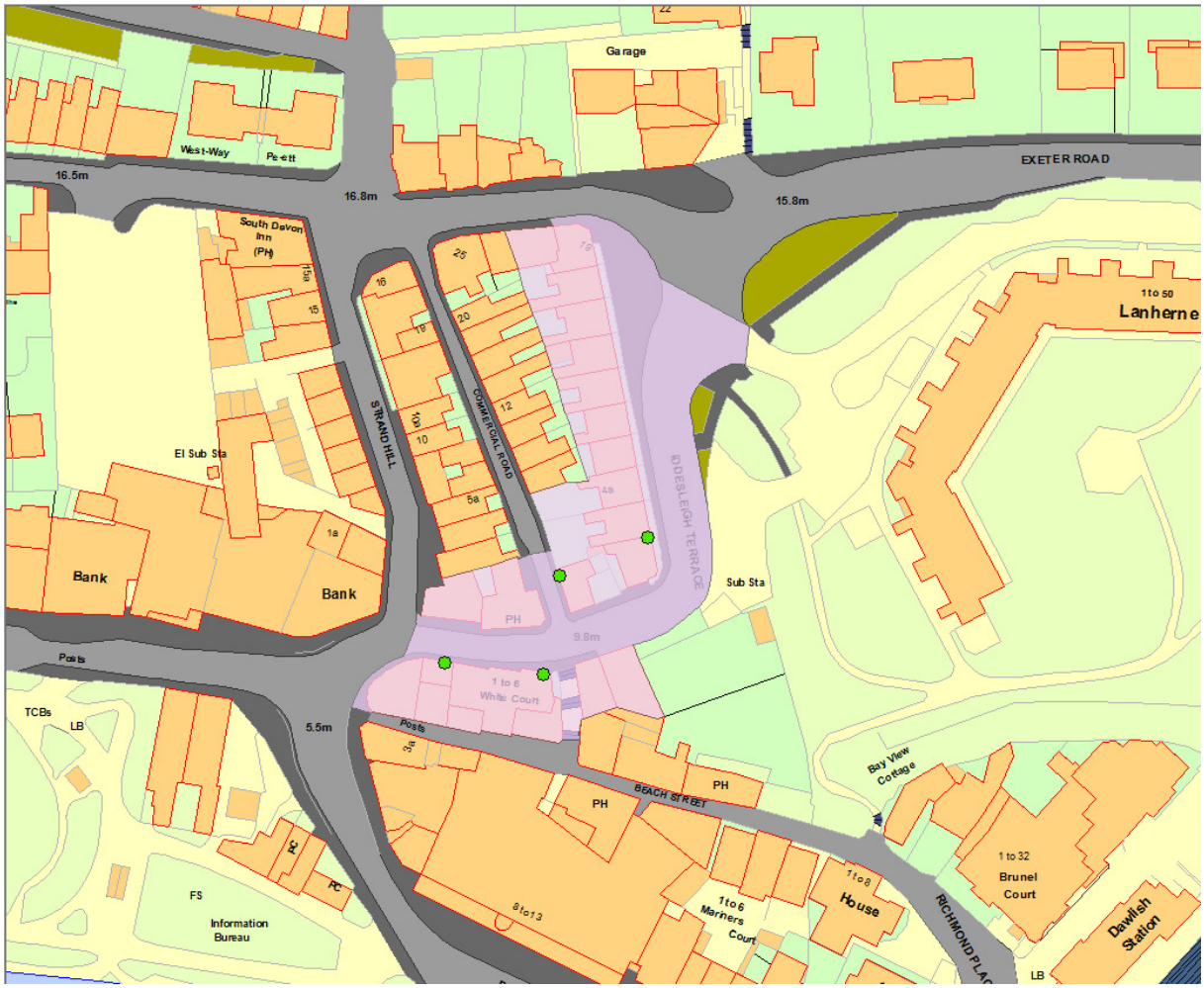
Kingskerswell AQMA





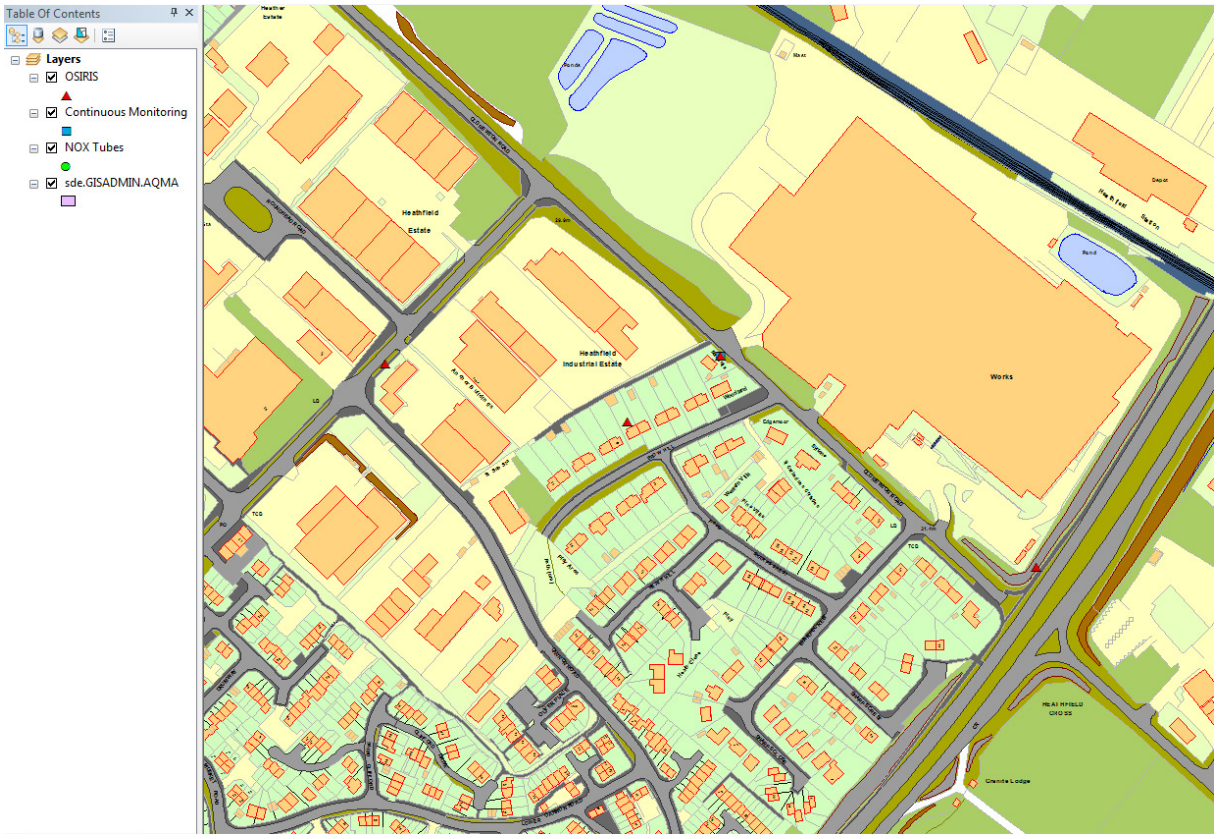
Teignmouth AQMA

Dawlish AQMA



Starcross Monitoring Locations

Heathfield Monitoring Location



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[4]	
	Concentration	Measured as
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

[4] The units are in microgrammes of pollutant per cubic metre of air (µg/m^3).

Glossary of Terms

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

References

Teignbridge District Council Action Plan 2010. www.teignbridge.gov.uk/environmental-health-and-wellbeing/land-air-and-water-pollution/air-quality

Local Air Quality Management Technical Guidance 2016 – LAQM.TG (16)

National bias adjustment factor spreadsheet: https://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html