IPSWICH
BOROUGH COUNCIL

2018 Air Quality Annual Status Report (ASR)

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

June, 2018

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Executive Summary: Air Quality in Our Area

Air Quality in Ipswich Borough

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

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

In order to comply with its duty to review the air quality within its area, Ipswich Borough Council monitors nitrogen dioxide (NO_2) levels within the town using both an automatic monitor located on Chevallier Street and a total of 85 diffusion tubes positioned at carefully selected locations across the borough. Changed and analysed on a monthly basis, the data from the tubes provides a measure of how nitrogen dioxide levels vary over time and is used to calculate an annual mean concentration at each monitoring location. Once corrected for experimental bias and adjusted to take into account the location of the tubes relative to any likely human exposure, these annual values should not exceed the national air quality objective level of 40µg/m^3. In the event that this level is, or is likely, to be exceeded on a consistent basis Local Authorities have a legal duty to declare an Air Quality Management Area (AQMA) encompassing the relevant locations. Both nationally and locally the main source of high levels of nitrogen dioxide is road transport.

To date Ipswich Borough Council has declared a total of five AQMAs, all due to continued exceedance of the annual mean NO_2 objective level:

- *Ipswich AQMA No.1* - Encompassing the land in and around the junction of Norwich Road, Chevallier Street and Valley Road, extending along Chevallier Street to beyond the junction with Waterloo Road (declared 2006; amended 2017);

[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

- *Ipswich AQMA No. 2* - From the junction with Peel Street, extending along Crown Street, St Margarets Street and St Helens Street to the junction with Palmerston Road, and from St Margarets Street extending up Woodbridge Road to just beyond the junction with Argyle Street. (declared 2006; amended 2017);
- *Ipswich AQMA No. 3* - Following the route of the Star Lane / Key Street / College Street gyratory clockwise from the junction with Lower Orwell Street, extending along Star Lane, Grimwade Street, Fore Street, Salthouse Street, Key Street and College Street, terminating at the junction with Bridge Street (declared 2006; amended 2017);
- *Ipswich AQMA No. 4* - Incorporating the Bramford Road / Yarmouth Road / Chevallier Street junction and part of Chevallier Street (declared 2010);
- *Ipswich AQMA No*. 5 - Incorporating the land in or around St. Matthews Street / Norwich Road between the Civic Drive roundabout and Bramford Road (declared 2017).

Further information on the above AQMAs (including maps showing their location and boundaries) is available on Ipswich Borough Council's AQMA webpage on the DEFRA website – https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=133.

Following the amendment of AQMA Nos. 1 to 3 and the declaration of AQMA No. 5 in September 2017 on the basis of the most recent monitoring data, during the last year Ipswich Borough Council has been working closely with Suffolk County Council and other stakeholders to develop a new Air Quality Action Plan (AQAP) to address the challenge of poor air quality within the Borough. Ipswich Borough Council is also a member of the Suffolk Air Quality Management Group which includes all of the Suffolk local authorities.

As illustrated by the trendline plots in Figure A.1 of mean NO_2 concentrations in the vicinity of each of the AQMAs over the last 5 years, levels appear to have remained essentially static with a very marginal downward trajectory.

Actions to Improve Air Quality

During the last year, significant air quality milestones achieved by Ipswich Borough Council have included:

- the declaration of Ipswich AQMA No. 5;
- the amendment of Ipswich AQMA Nos. 1, 2 & 3;
- the establishment of an Ipswich Air Quality Steering Group to drive the development of a new Ipswich AQAP;
- the commissioning of a Source Apportionment and Traffic Intervention Study to gain a more detailed understanding of the nature of the air quality challenge Ipswich faces; and
- the successful capture of a complete year's worth of automatic monitoring data for the first time in three years.

Conclusions and Priorities

Once bias and distance corrected the nitrogen dioxide diffusion tube data for 2017 shows that the national air quality objective for mean annual NO_2 concentrations was exceeded at 10 of Ipswich Borough Council's 76 monitoring locations; 2 of which fall outside of the current AQMA boundaries. In addition to this, the bias corrected special project data also included in this year's report showed a further 2 marginal exceedances at locations outside of the AQMAs.

Over the coming year Ipswich Borough Council's principal air quality priority is to complete, consult on, adopt and action a meaningful new AQAP that can deliver tangible and necessary improvements in air quality across the Borough.

Local Engagement and How to get Involved

More information on air quality within Ipswich is available on the Ipswich Borough Council Air Quality Management website (https://tinyurl.com/mzjsurv).

If you have any specific questions or concerns, or if you would like to make suggestions on possible improvements and/or supply additional air quality information, please contact Environmental Health at Ipswich Borough Council on 01473 433 115 or environmental.health@ipswich.gov.uk.

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1 Local Air Quality Management

This report provides an overview of air quality in Ipswich Borough during 2017. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the *Environment Act (1995)* and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Ipswich Borough 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 Ipswich Borough 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 http://uk-air.defra.gov.uk/aqma/local-authorities?la_id=133 – see full list at http://uk-air.defra.gov.uk/aqma/list. 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).

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
						At Declaration	Now	1) Name 2) Date of Publication 3) Link
Ipswich AQMA No.1	Declared 11/04/2006 Amended 12/09/2017	NO_2 Annual Mean	Ipswich	An area encompassing the land in and around the junction of Norwich Road, Chevallier Street and Valley Road, this area extends along Chevallier Street to beyond the junction with Waterloo Road.	NO	50 µg/m^3	42 µg/m^3	1) Ipswich Air Quality Action Plan 2) 2008 3) https://tinyurl.com/ybu3ys9d Note: New Action Plan pending Due Q1, 2019
Ipswich AQMA No.2	Declared 11/04/2006 Amended 12/09/2017	NO_2 Annual Mean	Ipswich	From the junction with Peel Street, this area extends along Crown Street, St. Margarets Street and St. Helens Street to the junction with Palmerston Road, and from St. Margarets Street it extends up Woodbridge Road to just beyond the junction with Argyle Street.	NO	45 µg/m^3	49 µg/m^3	1) Ipswich Air Quality Action Plan 2) 2008 3) https://tinyurl.com/ybu3ys9d Note: New Action Plan pending Due Q1, 2019

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	1) Name 2) Date of Publication 3) Link
Ipswich AQMA No.3	Declared 11/04/2006 Amended 12/09/2017	NO_2 Annual Mean	Ipswich	Following the route of the Star Lane / Key Street / College Street gyratory clockwise from the junction with Lower Orwell Street, this area extends along Star Lane, Grimwade Street, Fore Street, Salthouse Street, Key Street and College Street, terminating at the junction with Bridge Street.	NO	50 µg/m^3	41 µg/m^3	1) Ipswich Air Quality Action Plan 2) 2008 3) https://tinyurl.com/ybu3ys9d Note: New Action Plan pending Due Q1, 2019
Ipswich AQMA No.4	Declared 14/12/2010	NO_2 Annual Mean	Ipswich	Area encompassing the land in or around the Bramford Road / Yarmouth Road / Chevallier Street junction and part of Chevallier Street	NO	55 µg/m^3	37 µg/m^3	1) Ipswich Air Quality Action Plan 2) 2008 3) https://tinyurl.com/ybu3ys9d Note: New Action Plan pending Due Q1, 2019

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	1) Name 2) Date of Publication 3) Link
Ipswich AQMA No.5	Declared 12/09/2017	NO_2 Annual Mean	Ipswich	Area encompassing the land in or around St. Matthews Street / Norwich Road between the Civic Drive roundabout and Bramford Road.	NO	49 µg/m^3	54 µg/m^3	New Action Plan pending Due Q1, 2019

☒ **Ipswich Borough 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 Ipswich Borough

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

> *"On the basis of the evidence provided by the local authority the conclusions reached are acceptable for all sources and pollutants.*
>
> *The next step for Ipswich Borough Council is to ratify the new AQMA, the amendments to the existing AQMA's and update the AQAP. Details of the revised AQMAs and AQAP should be included in the next Annual Status Report, to be submitted in 2018."*

In accordance with these recommendations, on 5th September 2017 the Council Executive resolved to make the necessary legal orders to ratify both the declaration of the new AQMA (Ipswich AQMA No. 5) and the amendment of three of the four pre-existing AQMAs (Ipswich AQMA Nos. 1, 2 & 3 respectively) as proposed by the *2015 Air Quality Detailed Assessment for Ipswich Borough* (http://tinyurl.com/y78nypla). Coming into effect on 12th September 2017, along with the original order declaring Ipswich AQMA No. 4, all four of these new orders can be viewed on the *Air Quality Management* page of the Ipswich Borough Council website (https://www.ipswich.gov.uk/airqualitymanagement).

Following the revision of the AQMAs, in addition to convening an Air Quality Steering Group with representatives from both Ipswich Borough and Suffolk County Councils, Ipswich Borough Council commissioned environmental consultants WSP to undertake a source apportionment and transport intervention study to gain a clearer understanding of the cause of the poor air quality affecting the AQMAs. With the final draft due before the end of June 2018, it is envisaged that this study will inform the Steering Group's development of a new AQAP to be implemented during Q1, 2019.

Ipswich Borough Council has taken forward a number of direct measures during the current reporting year of 2018 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

More detail on some of these measures can be found in the:

- Ipswich Air Quality Action Plan 2008 (https://tinyurl.com/ybu3ys9d);

- Suffolk Cycling Strategy (https://tinyurl.com/y99w58ez); and
- Active For Life – Suffolk Walking Strategy (https://tinyurl.com/y99xh3lo)

Over the last 12 months the most significant achievements regarding air quality in Ipswich have been:

- the commissioning of a source apportionment study to better understand the cause of the Borough's mean annual nitrogen dioxide exceedances; and
- the establishment of an Air Quality Steering Group to drive the development and implementation of a new AQAP for Ipswich.

Ipswich Borough Council's priorities for the coming year are:

- to develop, consult on, adopt and work with partners to implement a new AQAP; and
- to establish a closer working relationship with Public Health colleagues, with a particular focus on achieving a better understanding of the relevance of the potential risks posed by $PM_{2.5}$.

The principal challenges and barriers to implementation that Ipswich Borough Council anticipates facing are:

- limitations on the level of dedicated resource available for air quality management activities; and
- difficulty in obtaining sufficient support to include potentially more intrusive and/or costly interventions in the new AQAP to secure significant and necessary improvements in air quality.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Ipswich Borough Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of all current AQMAs.

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	Ipswich Radial Corridor Improvements Scheme	Traffic Management	UTC, Congestion management, traffic reduction	Suffolk County Council New Anglia Local Transport Body	2016	Commenced 2016	Infrastructure improvements to reduce congestion and benefit sustainable modes including walking, cycling and buses.	Not classified	Ongoing	2019	
2	Clean Bus Technology Fund	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	Suffolk County Council	Ongoing as funding bids become available	Completed	Reduced vehicle emissions	Not classified	Ongoing		
3	Low Emissions Strategy SPD	Policy Guidance and Development Control	Low Emissions Strategy	Ipswich Borough Council	Commenced June 2017	2018	Mitigation of air quality impacts of new development.	Not classified	Planning	2019	Restricted resources within Planning Policy Team
4	Suffolk Cycling Strategy	Promoting Travel Alternatives	Promotion of cycling	Suffolk County Council	N/A	2015	Suffolk Transport Delivery Plan	Not classified	Ongoing	N/A	Subject to periodic review

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	Suffolk Walking Strategy	Promoting Travel Alternatives	Promotion of walking	Suffolk County Council	N/A	2015	Reverse the trend of walking less (10% fall in walking between 2003 and 2012).	N/A	77% of the population of Suffolk are walking at least once a week for a minim um duration of 10 minutes (0.4% above the national average - DFT 2012/13).	2020	Review outcome at the end of the period
6	Taxi Firm EV fleet Replacement Grants	Promoting Low Emission Transport	Taxi emission incentives	Suffolk County Council BEE Anglia European Regional Development Fund	N/A	2018	Increase uptake of EV in taxi fleet	Not classified	Ongoing	2018	
7	Emissions Standards Policy for Ipswich Borough Council Hackney Carriage and Private Hire Vehicles	Promoting Low Emission Transport	Taxi Licensing conditions	Ipswich Borough Council	2018	Q3, 2018	Increase proportion of taxi fleet that is Euro 4 Petrol / Euro 6 Diesel or hybrid.	Not classified	Planning	2020	

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
8	Green Travel Planning	Promoting Travel Alternatives	Other	Ipswich Borough Council / Suffolk County Council		For new development, changes of use of buildings or land, and alterations to existing buildings, the transportation and accessibility outcomes of development needs to be set out as part of a planning submission.	Encouraging sustainable travel	Not classified	Ongoing	N/A	This is an ongoing commitment.
9	Green Travel information available on the Suffolk County Council website	Public Information	Via the Internet	Suffolk County Council	N/A	Implemented	Number of hits	N/A	Ongoing	N/A	Sign posting function with links to travel plan and alternative modes of transport support

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.

Ipswich Borough Council is taking the following measures to address $PM_{2.5}$:

- The Suffolk Air Quality Group, of which Ipswich Borough Council is a member, has engaged with Suffolk County Council (SCC) Public Health and Protection to pursue a unified approach to tackling $PM_{2.5}$ focused on promoting modal shift away from motor vehicle use towards active means of travel such as walking and cycling. Further details on this approach can be found in the Healthy Suffolk Joint Strategic Needs Assessment (JSNA) Topic Report on Air Quality published in September 2017 (https://tinyurl.com/y8dq6t2r).
- Within Ipswich Borough, again looking to address $PM_{2.5}$ through the promotion of modal shift to more suitable active travel, on 27 July 2016 the Council adopted a Cycling Strategy Supplementary Planning Document (SPD) [https://tinyurl.com/y7wag62m]. Supporting Ipswich's Core Strategy Policies, this document provides detailed guidance in relation to designing cycle routes and infrastructure as part of new development. The document also identifies potential improvements for cycling throughout Ipswich.
- Looking to achieve further improvements in air quality via the SPD route, Ipswich Borough Council's Planning Policy Team is currently in the initial stages of developing a Low Emissions Strategy SPD. Commencing last summer with a call for ideas consultation, work on this strategy has unfortunately been delayed. However, going forward it is envisaged that the Ipswich Air Quality Steering Group convened to develop the new AQAP could also take an active role in the delivery of the SPD. Although at an early stage of development, it is proposed that the finalised document will provide consistency in the approach taken to dealing with air quality and planning in Ipswich. Specifically, it will provide guidance on measures that can be implemented to mitigate the

potentially harmful impacts of new developments (*e.g.* in terms of increased vehicles and congestion, or heating of homes) considering measures such as the use and types of vehicles, the role of walking, cycling and public transport, boiler types, and the role of trees and hedgerows in absorbing pollutants.

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.

Ipswich Borough Council undertook automatic (continuous) monitoring at 1 site during 2017. Table A.1 in Appendix A shows the details of this site.

A map showing the location of this monitoring site is provided in Appendix D. Further details on how the monitor is calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

As part of its normal monitoring programme, Ipswich Borough Council undertook non-automatic (passive) monitoring of NO_2 at 76 sites during 2017. Additionally, on behalf of a third party, Ipswich Borough Council also completed 9 months of diffusion tube measurements at a further 26 sites as part of a preliminary study to evaluate the potential impact of proposed new river crossings. Although no accurate information is held by the Council regarding the proximity of these extra monitoring locations to the nearest receptor, for completeness the data set obtained from this study has also been included in this report. Table A.2 in Appendix A shows the details of all of the non-automatic monitoring sites at which measurements were made during 2017.

Maps showing the location of all 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.

Figure A.1 shows bias and distance corrected trendline and Avg–Max–Min trendline plots for clusters of passive monitoring locations in and around each of the 5 AQMAs. All would appear to indicate that annual mean NO_2 levels remain essentially unchanged.

For diffusion tubes, the full 2017 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.

Looking at the bias corrected data for the normal monitoring locations, exceedances of the annual average air quality objective (shown in bold on the tables) are found at 12 unique sites, 9 of which are located within current AQMA boundaries. Once distance corrections are applied the total number of exceedances drops to 10, of which 2 fall outside current AQMA boundaries:

- Site 61, which has an annual mean NO_2 concentration of 41µg/m^3 and hence only marginally exceeds the objective level (if at all once measurement error is taken into consideration); and
- Site 30, which has an annual mean NO_2 concentration of 45µg/m^3 and is located on the periphery of Ipswich AQMA No.3.

The number and location of exceedances is broadly similar to those observed last year: a total of 11 unique locations, 2 of which occurred outside of current AQMA boundaries.

Looking at the additional special project data included in this year's report, the bias corrected dataset shows modest exceedances of the annual average air quality objective at two monitoring locations; 42µg/m^3 at SP5 and 41µg/m^3 at SP25.

There are no annual averages greater than 60µg/m^3 that would indicate an exceedance of the 1-hour mean objective.

3.2.2 Particulate Matter (PM_{10})

Ipswich Borough Council does not monitor for particulate matter (PM_{10}) – historical studies / monitoring have not identified any exceedance of the objective levels.

3.2.3 Particulate Matter ($PM_{2.5}$)

Ipswich Borough Council does not monitor for particulate matter ($PM_{2.5}$).

3.2.4 Sulphur Dioxide (SO_2)

Ipswich Borough Council does not monitor for Sulphur Dioxide (SO_2) – previous screening work has not suggested that there will be any exceedance of the objective levels.

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)
IPS	St. Margarets Street [CLOSED]	Roadside	616578	224759	NO_2	YES	Chemiluminescent	0	3	0.27
IPS3	Chevallier Street	Roadside	615261	245350	NO_2	NO	Chemiluminescent	2.5	2.5	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.

(3) Monitoring at site discontinued – included for legacy purposes.

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	Civic Drive	Kerbside	615992	244412	NO_2	NO	30	3.77	NO	2.34
2	Chevallier Street	Kerbside	615144	245245	NO_2	YES	1.49	2.44	NO	2.04
3	Coprolite Street / Duke Street	Kerbside	617070	244039	NO_2	NO	9.07	0.71	NO	2.52
4	Berners Street	Kerbside	615929	244927	NO_2	NO	5.68	1.77	NO	2.36
5	Fore Street	Kerbside	616887	244128	NO_2	YES	1	2.27	NO	2.59
6	Kings Avenue	Urban Background	617286	244420	NO_2	NO	11.9	2.02	NO	2.6
7	Bramford Road	Kerbside	615007	245239	NO_2	NO	0	5.36	NO	2.32
8	Bramford Road	Kerbside	615125	245209	NO_2	NO	4.23	2.2	NO	2.48
9	Bramford Road	Kerbside	615125	245209	NO_2	NO	4.23	2.2	NO	2.48
10	Bramford Road	Kerbside	615125	245209	NO_2	NO	4.23	2.2	NO	2.48
11	St Margaret's Street / Piper's Court	Kerbside	616593	244753	NO_2	YES	0	2.42	NO	2.28
12	St Margaret's Street / Piper's Court	Kerbside	616593	244753	NO_2	YES	0	2.42	NO	2.28
13	Bramford Lane	Kerbside	615117	245305	NO_2	NO	3.03	1.49	NO	2.52
14	Chevallier Street	Kerbside	615285	245393	NO_2	YES	0.52	2.47	NO	2.2

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)
15	Tavern Street	Urban Background	616282	244643	NO_2	NO	N/A	NA	NO	2.62
16	Valley Road / Westwood Court	Kerbside	615362	245437	NO_2	NO	2.4	3.36	NO	2.42
17	Woodbridge Road	Kerbside	616993	244659	NO_2	YES	2.48	1.92	NO	2.5
18	Yarmouth Road	Kerbside	615095	245175	NO_2	NO	0	7.7	NO	2.28
19	St Margaret's Street / Piper's Court	Kerbside	616593	244753	NO_2	YES	0	2.42	NO	2.28
20	Fonnereau Road	Kerbside	616458	244829	NO_2	NO	1.51	2.44	NO	2.6
21	St Margaret's Plain	Kerbside	616494	244807	NO_2	YES	N/A	2.29	NO	2.36
22	St Margaret's Plain / Northgate Street	Kerbside	616489	244785	NO_2	YES	N/A	1.81	NO	2.59
23	St Margaret's Green	Kerbside	616645	244784	NO_2	NO	N/A	3.42	NO	2.5
24	St Margaret's Street	Kerbside	616663	244692	NO_2	YES	N/A	3.65	NO	2.3
25	St Helen's Street	Kerbside	616753	244582	NO_2	YES	3.06	2.11	NO	2.52
26	St Helen's Street / Grimwade Street	Kerbside	616971	244511	NO_2	NO	4.93	3.92	NO	2.46

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)
27	Argyle Street	Kerbside	616965	244546	NO_2	YES	5.69	1.46	NO	2.57
28	Chevallier Street	Kerbside	615194	245292	NO_2	YES	2.39	1.98	NO	2.46
29	Fore Hamlet	Kerbside	617118	244074	NO_2	NO	0	2.17	NO	2.68
30	Fore Street	Kerbside	616939	244114	NO_2	NO	2.2	2.78	NO	2.46
31	Star Lane	Kerbside	616332	244149	NO_2	NO	3.42	2.34	NO	0
32	Spring Road	Kerbside	617398	244573	NO_2	NO	3.02	2.42	NO	2.46
33	Key Street	Kerbside	616666	244114	NO_2	YES	2.29	1.88	NO	2.45
34	College Street	Kerbside	616467	244072	NO_2	YES	N/A	2.52	NO	1.82
35	Cobden Place	Kerbside	616746	244696	NO_2	NO	0	1.27	NO	2.48
36	Valley Road	Kerbside	616820	246158	NO_2	NO	~15.00	2.28	NO	2.48
37	Lower Brook Street	Kerbside	616483	244165	NO_2	NO	N/A	0.83	NO	2.28
38	Civic Drive	Kerbside	615904	244805	NO_2	NO	6.85 9 (est)	0.88	NO	2.48
39	Star Lane / Fore Star	Kerbside	616731	244245	NO_2	YES	N/A	0.61	NO	2.6
40	Norwich Road	Kerbside	615460	245148	NO_2	NO	5.77	3	NO	2.36
41	Bramford Road / Norwich Road	Kerbside	615564	245010	NO_2	NO	N/A	1.27	NO	2.54

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)
42	Norwich Road	Kerbside	615744	244901	NO_2	NO	0 (but est 3 to the nearest flat above)	2.35	NO	2.54
43	Bramford Road / Yarmouth Road	Kerbside	615109	245200	NO_2	YES	0.24	3.6	NO	2.4
44	Bramford Road	Kerbside	615052	245237	NO_2	NO	4.57	1.44	NO	2.35
45	Chevallier Street	Kerbside	615261	245350	NO_2	NO	6.94 [2.50]	4.15	YES	1.2
46	Chevallier Street	Kerbside	615261	245350	NO_2	NO	6.94 [2.50]	4.15	YES	1.2
47	Chevallier Street	Kerbside	615261	245350	NO_2	NO	6.94 [2.50]	4.15	YES	1.2
48	Valley Road	Kerbside	615425	245486	NO_2	NO	6.9	2.49	NO	2.7
49	St Matthew's Street	Kerbside	615792	244876	NO_2	YES	0 (but est 3 to the nearest flat above)	1.91	NO	2.57
50	Barrack Lane	Kerbside	615773	244890	NO_2	NO	1.42	1.52	NO	2.37
51	St Matthew's Street	Kerbside	615769	244866	NO_2	YES	4.03	1.04	NO	2.55
52	St Matthew's Street	Kerbside	615826	244871	NO_2	YES	N/A	2.32	NO	2.49

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)
53	St Matthew's Street	Kerbside	615820	244858	NO_2	YES	0 (but est 3 to the nearest flat above)	2.53	NO	2.28
54	St Matthew's Street Roundabout	Kerbside	615893	244855	NO_2	NO	N/A	1.25	NO	2.53
55	Berners Street	Kerbside	615917	244898	NO_2	NO	0	2.3	NO	2.5
56	Berners Street	Kerbside	615931	244911	NO_2	NO	1 (est)	1.61	NO	2.54
57	Berners Street	Kerbside	615941	244981	NO_2	NO	1.4	7.87	NO	2.55
58	Berners Street	Kerbside	615978	245042	NO_2	NO	7.55	0.44	NO	2.46
59	St Matthew's Street Roundabout	Kerbside	615926	244837	NO_2	NO	N/A	2.98	NO	2.5
60	Colchester Road	Kerbside	617438	246168	NO_2	NO	~13.00	3.02	NO	2.44
61	Valley Road	Kerbside	616099	246105	NO_2	NO	N/A	1.4	NO	2.5
62	St Matthew's Street	Kerbside	615935	244803	NO_2	NO	4 (est)	2.31	NO	2.62
63	St Matthew's Street	Kerbside	615950	244790	NO_2	NO	2 (est)	3.7	NO	2.4
64	Norwich Road	Kerbside	615688	244939	NO_2	YES	0.3	1.35	NO	2.56
65	Norwich Road	Kerbside	615688	244939	NO_2	YES	0.3	1.35	NO	2.56

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)
66	Woodbridge Road	Kerbside	616807	244669	NO_2	YES	0	3.55	NO	2.35
67	Blanche Street	Kerbside	616890	244676	NO_2	NO	7 (est)	1.4	NO	2.62
68	Woodbridge Road	Kerbside	616905	244657	NO_2	YES	0 (but est 1 to flats)	3.48	NO	2.46
69	Argyle Street	Kerbside	616978	244590	NO_2	NO	2.5 (est)	4.84	NO	2.83
70	Argyle Street	Kerbside	616965	244583	NO_2	NO	5.05	1.76	NO	2.56
71	St Helen's Street	Kerbside	617032	244537	NO_2	YES	0	13.77	NO	2.46
72	St Helen's Street	Kerbside	617123	244535	NO_2	YES	0.86	2.66	NO	2.56
73	Regent Street	Kerbside	617124	244517	NO_2	NO	1.19	1.07	NO	2.51
74	Grimwade Street	Kerbside	616953	244443	NO_2	NO	N/A	2.32	NO	2.49
75	Grimwade Street	Kerbside	616932	244362	NO_2	NO	1	3.41	NO	2.52
76	St Helen's Street	Kerbside	616951	244521	NO_2	YES	0	3.14	NO	2.46
77	St Helen's Street	Kerbside	616902	244542	NO_2	NO	0	4.73	NO	2.4
78	Orchard Street	Kerbside	616870	244586	NO_2	NO	1.4	1.4	NO	2.62
79	Woodbridge Road	Kerbside	617052	244677	NO_2	NO	7.76	5.45	NO	2.43
80	St Helen's Street	Kerbside	616821	244546	NO_2	YES	N/A	3.6	NO	2.87

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)
81	St Helen's Street	Kerbside	616821	244546	NO_2	YES	N/A	3.6	NO	2.87
82	St Helen's Street	Kerbside	616821	244546	NO_2	YES	N/A	3.6	NO	2.87
83	Bond Street	Kerbside	616792	244498	NO_2	NO	1.61	1.88	NO	2.34
84	Carr Street / Major's Corner	Kerbside	616702	244601	NO_2	NO	N/A	4.41	NO	2.48
85	Old Foundry Road	Kerbside	616681	244623	NO_2	NO	Est 2	1.43	NO	2.53

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)
SP1	Belstead Road o/s No 14	Kerbside	616029	243694	NO_2	NO	N/K	N/K	NO	N/K
SP2	Belstead Road o/s No. 47 (TP DP1127)	Kerbside	615925	243619	NO_2	NO	N/K	N/K	NO	N/K
SP3	Burrell Road o/s No. 62	Kerbside	616150	243834	NO_2	NO	N/K	N/K	NO	N/K
SP4	Vernon Street by Old Bell Inn	Kerbside	616372	243868	NO_2	NO	N/K	N/K	NO	N/K
SP5	Vernon Street by Co Op Store	Kerbside	616471	243679	NO_2	NO	N/K	N/K	NO	N/K
SP6	Hawes St junc Purplett St	Kerbside	616593	243568	NO_2	NO	N/K	N/K	NO	N/K
SP7	Hawes Street junc Station St	Kerbside	616572	243469	NO_2	NO	N/K	N/K	NO	N/K
SP8	Station Street o/s No 66	Kerbside	616454	243433	NO_2	NO	N/K	N/K	NO	N/K
SP9	Hawes St junc Wherstead Rd	Kerbside	616487	243259	NO_2	NO	N/K	N/K	NO	N/K
SP10	Wherstead Road o/s No. 208	Kerbside	616379	243152	NO_2	NO	N/K	N/K	NO	N/K

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)
SP11	Wherstead Road o/s No. 221 (LP N928 - Orwell View)	Kerbside	616147	242101	NO_2	NO	N/K	N/K	NO	N/K
SP12	Wherstead Road o/s No. 545 (LP N91 - new block of flats)	Kerbside	616160	242204	NO_2	NO	N/K	N/K	NO	N/K
SP13	Wherstead Road o/s No. 568a (TP DP1395)	Kerbside	616176	242223	NO_2	NO	N/K	N/K	NO	N/K
SP14	Wherstead Road o/s No. 522 (TP DP1392)	Kerbside	616317	242883	NO_2	NO	N/K	N/K	NO	N/K
SP15	Duke St in layby o/s shop 9	Kerbside	617153	243847	NO_2	NO	N/K	N/K	NO	N/K
SP16	Cliff Lane o/s Primary School	Kerbside	617476	243199	NO_2	NO	N/K	N/K	NO	N/K
SP17	Cliff Lane entrance Holywells	Kerbside	617227	243223	NO_2	NO	N/K	N/K	NO	N/K
SP18	Landseer Road opp V-Pack	Kerbside	617185	243068	NO_2	NO	N/K	N/K	NO	N/K

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)
SP19	Landseer Road o/s No. 348	Kerbside	618285	242280	NO_2	NO	N/K	N/K	NO	N/K
SP20	Nacton Road o/s No. 471	Kerbside	618989	242308	NO_2	NO	N/K	N/K	NO	N/K
SP21	Landseer Rd/Nacton Rd	Kerbside	618792	242479	NO_2	NO	N/K	N/K	NO	N/K
SP22	Nacton Road opposite No. 270	Kerbside	618497	242888	NO_2	NO	N/K	N/K	NO	N/K
SP23	Felixstowe Road o/s No. 391	Kerbside	618842	243286	NO_2	NO	N/K	N/K	NO	N/K
SP24	Felixstowe Road o/s No. 13	Kerbside	617725	243754	NO_2	NO	N/K	N/K	NO	N/K
SP25	Bishops Hill/Myrtle Road	Kerbside	617406	243885	NO_2	NO	N/K	N/K	NO	N/K
SP26	Cliff Road o/s No. 2A	Kerbside	617112	243355	NO_2	NO	N/K	N/K	NO	N/K

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); N/K if not known.

(2) N/A if not applicable; N/K if not known.

(3) N/K if not known.

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 2017 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2013	2014	2015	2016	2017
IPS	Roadside	Automatic	N/A	N/A	**52**	N/A	N/A	N/A	N/A
IPS3	Roadside	Automatic	91	91	**45**	29	N/A	N/A	29
1	Kerbside	Diffusion Tube	100	100	28	28	26	24	26
2	Kerbside	Diffusion Tube	100	100	**40**	**43**	**41**	39	39
3	Kerbside	Diffusion Tube	100	100	31	29	27	27	25
4	Kerbside	Diffusion Tube	100	100	35	33	34	32	35
5	Kerbside	Diffusion Tube	100	100	**41**	**40**	**42**	**41**	**43**
6	Urban Background	Diffusion Tube	100	100	17	16	16	17	17
7	Kerbside	Diffusion Tube	100	100	33	32	33	30	30
8	Kerbside	Diffusion Tube	100	100	35	33	34	35	33
9	Kerbside	Diffusion Tube	100	100	36	33	34	35	33
10	Kerbside	Diffusion Tube	100	100	34	33	34	34	36
11	Kerbside	Diffusion Tube	92	92	39	**44**	**47**	**45**	**47**
12	Kerbside	Diffusion Tube	100	100	39	**43**	**49**	**47**	**49**
13	Kerbside	Diffusion Tube	100	100	34	35	22	24	24

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2013	2014	2015	2016	2017
14	Kerbside	Diffusion Tube	100	100	**49**	**47**	**48**	**47**	**43**
15	Urban Background	Diffusion Tube	100	100	26	25	24	23	23
16	Kerbside	Diffusion Tube	100	100	36	33	36	35	35
17	Kerbside	Diffusion Tube	100	100	**51**	**47**	**43**	**42**	**44**
18	Kerbside	Diffusion Tube	100	100	31	30	29	28	26
19	Kerbside	Diffusion Tube	92	92	**40**	**41**	**48**	**45**	**47**
20	Kerbside	Diffusion Tube	100	100	33	33	33	29	33
21	Kerbside	Diffusion Tube	100	100	37	36	37	36	36
22	Kerbside	Diffusion Tube	100	100	38	38	38	36	35
23	Kerbside	Diffusion Tube	100	100	23	23	23	21	22
24	Kerbside	Diffusion Tube	100	100	**41**	**42**	**40**	38	35
25	Kerbside	Diffusion Tube	100	100	**40**	**41**	**40**	36	37
26	Kerbside	Diffusion Tube	100	100	33	32	31	30	30
27	Kerbside	Diffusion Tube	75	75	**44**	37	35	39	40
28	Kerbside	Diffusion Tube	100	100	37	35	37	36	35

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2013	2014	2015	2016	2017
29	Kerbside	Diffusion Tube	100	100	33	30	31	32	32
30	Kerbside	Diffusion Tube	100	100	29	29	**47**	**46**	**49**
31	Kerbside	Diffusion Tube	100	100	35	32	34	36	**41**
32	Kerbside	Diffusion Tube	100	100	34	31	32	30	33
33	Kerbside	Diffusion Tube	100	100	34	33	33	33	32
34	Kerbside	Diffusion Tube	100	100	39	**42**	38	37	38
35	Kerbside	Diffusion Tube	100	100	27	28	27	24	26
36	Kerbside	Diffusion Tube	100	100	30	28	30	30	32
37	Kerbside	Diffusion Tube	100	100	27	24	25	24	24
38	Kerbside	Diffusion Tube	100	100	36	35	33	33	33
39	Kerbside	Diffusion Tube	100	100	**41**	39	**42**	**41**	**41**
40	Kerbside	Diffusion Tube	100	100	27	27	27	27	30
41	Kerbside	Diffusion Tube	100	100	35	37	37	34	34
42	Kerbside	Diffusion Tube	92	92	37	34	34	**41**	32
43	Kerbside	Diffusion Tube	100	100	37	37	**40**	37	38

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2013	2014	2015	2016	2017
44	Kerbside	Diffusion Tube	92	92	37	37	37	37	36
45	Kerbside	Diffusion Tube	100	100	29	30	29	27	26
46	Kerbside	Diffusion Tube	92	92	30	29	28	27	27
47	Kerbside	Diffusion Tube	100	100	30	29	28	28	25
48	Kerbside	Diffusion Tube	100	100	28	27	27	27	28
49	Kerbside	Diffusion Tube	92	92	**42**	**42**	**42**	**41**	39
50	Kerbside	Diffusion Tube	100	100	26	25	28	26	27
51	Kerbside	Diffusion Tube	100	100	35	36	38	38	36
52	Kerbside	Diffusion Tube	100	100	**48**	**45**	**47**	**47**	**46**
53	Kerbside	Diffusion Tube	92	92	**44**	**49**	**46**	**45**	**40**
54	Kerbside	Diffusion Tube	100	100	31	31	31	31	35
55	Kerbside	Diffusion Tube	100	100	32	30	31	29	27
56	Kerbside	Diffusion Tube	100	100	26	27	28	29	28
57	Kerbside	Diffusion Tube	100	100	27	25	26	25	26
58	Kerbside	Diffusion Tube	92	92	27	25	27	23	24

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2013	2014	2015	2016	2017
59	Kerbside	Diffusion Tube	100	100	34	32	34	32	32
60	Kerbside	Diffusion Tube	100	100	35	36	34	36	30
61	Kerbside	Diffusion Tube	100	100	33	33	34	36	**41**
62	Kerbside	Diffusion Tube	100	100	39	38	38	33	35
63	Kerbside	Diffusion Tube	100	100	38	37	38	35	36
64	Kerbside	Diffusion Tube	100	100	**52**	**52**	**55**	**50**	**51**
65	Kerbside	Diffusion Tube	100	100	**54**	**51**	**51**	**51**	**56**
66	Kerbside	Diffusion Tube	100	100	38	38	38	35	38
67	Kerbside	Diffusion Tube	92	92	29	30	27	26	25
68	Kerbside	Diffusion Tube	100	100	**48**	**46**	**43**	**41**	**43**
69	Kerbside	Diffusion Tube	100	100	29	27	26	26	26
70	Kerbside	Diffusion Tube	83	83	36	33	33	33	34
71	Kerbside	Diffusion Tube	83	83	27	24	27	24	23
72	Kerbside	Diffusion Tube	100	100	39	38	36	36	37
73	Kerbside	Diffusion Tube	100	100	25	22	23	23	22

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2013	2014	2015	2016	2017
74	Kerbside	Diffusion Tube	92	92	29	26	27	26	26
75	Kerbside	Diffusion Tube	100	100	24	23	25	25	25
76	Kerbside	Diffusion Tube	100	100	36	37	37	34	34
77	Kerbside	Diffusion Tube	100	100	30	27	28	28	27
78	Kerbside	Diffusion Tube	100	100	25	23	24	25	24
79	Kerbside	Diffusion Tube	100	100	25	23	30	37	35
80	Kerbside	Diffusion Tube	92	92	36	34	35	32	36
81	Kerbside	Diffusion Tube	92	92	36	35	35	33	35
82	Kerbside	Diffusion Tube	83	83	36	36	35	33	36
83	Kerbside	Diffusion Tube	92	92	31	31	30	27	28
84	Kerbside	Diffusion Tube	100	100	29	27	26	24	24
85	Kerbside	Diffusion Tube	100	100	31	32	32	29	30

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2013	2014	2015	2016	2017
SP1	Kerbside	Diffusion Tube	100	75	N/A	N/A	N/A	N/A	34
SP2	Kerbside	Diffusion Tube	100	75	N/A	N/A	N/A	N/A	36
SP3	Kerbside	Diffusion Tube	89	67	N/A	N/A	N/A	N/A	26
SP4	Kerbside	Diffusion Tube	100	75	N/A	N/A	N/A	N/A	30
SP5	Kerbside	Diffusion Tube	100	75	N/A	N/A	N/A	N/A	**42**
SP6	Kerbside	Diffusion Tube	100	75	N/A	N/A	N/A	N/A	27
SP7	Kerbside	Diffusion Tube	100	75	N/A	N/A	N/A	N/A	27
SP8	Kerbside	Diffusion Tube	100	75	N/A	N/A	N/A	N/A	26
SP9	Kerbside	Diffusion Tube	100	75	N/A	N/A	N/A	N/A	26
SP10	Kerbside	Diffusion Tube	100	75	N/A	N/A	N/A	N/A	29
SP11	Kerbside	Diffusion Tube	100	75	N/A	N/A	N/A	N/A	31
SP12	Kerbside	Diffusion Tube	100	75	N/A	N/A	N/A	N/A	23
SP13	Kerbside	Diffusion Tube	100	75	N/A	N/A	N/A	N/A	31
SP14	Kerbside	Diffusion Tube	100	75	N/A	N/A	N/A	N/A	23
SP15	Kerbside	Diffusion Tube	100	75	N/A	N/A	N/A	N/A	27

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2013	2014	2015	2016	2017
SP16	Kerbside	Diffusion Tube	100	75	N/A	N/A	N/A	N/A	21
SP17	Kerbside	Diffusion Tube	100	75	N/A	N/A	N/A	N/A	20
SP18	Kerbside	Diffusion Tube	100	75	N/A	N/A	N/A	N/A	25
SP19	Kerbside	Diffusion Tube	100	75	N/A	N/A	N/A	N/A	27
SP20	Kerbside	Diffusion Tube	100	75	N/A	N/A	N/A	N/A	30
SP21	Kerbside	Diffusion Tube	100	75	N/A	N/A	N/A	N/A	27
SP22	Kerbside	Diffusion Tube	89	67	N/A	N/A	N/A	N/A	26
SP23	Kerbside	Diffusion Tube	100	75	N/A	N/A	N/A	N/A	23
SP24	Kerbside	Diffusion Tube	100	75	N/A	N/A	N/A	N/A	34
SP25	Kerbside	Diffusion Tube	100	75	N/A	N/A	N/A	N/A	**41**
SP26	Kerbside	Diffusion Tube	100	75	N/A	N/A	N/A	N/A	21

☒ **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 $40\mu g/m^3$ are shown in **bold**.

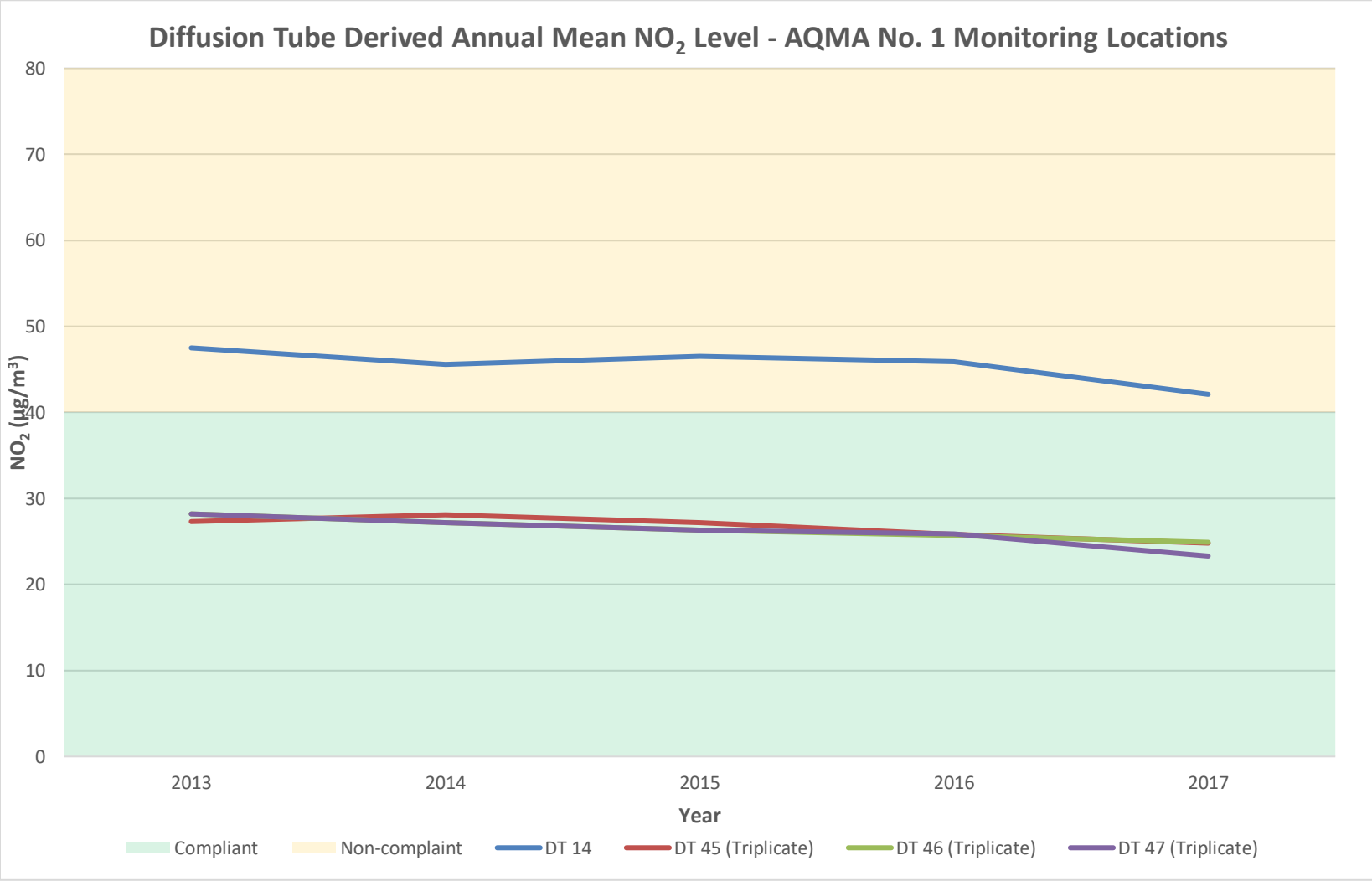
NO_2 annual means exceeding $60\mu g/m^3$, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

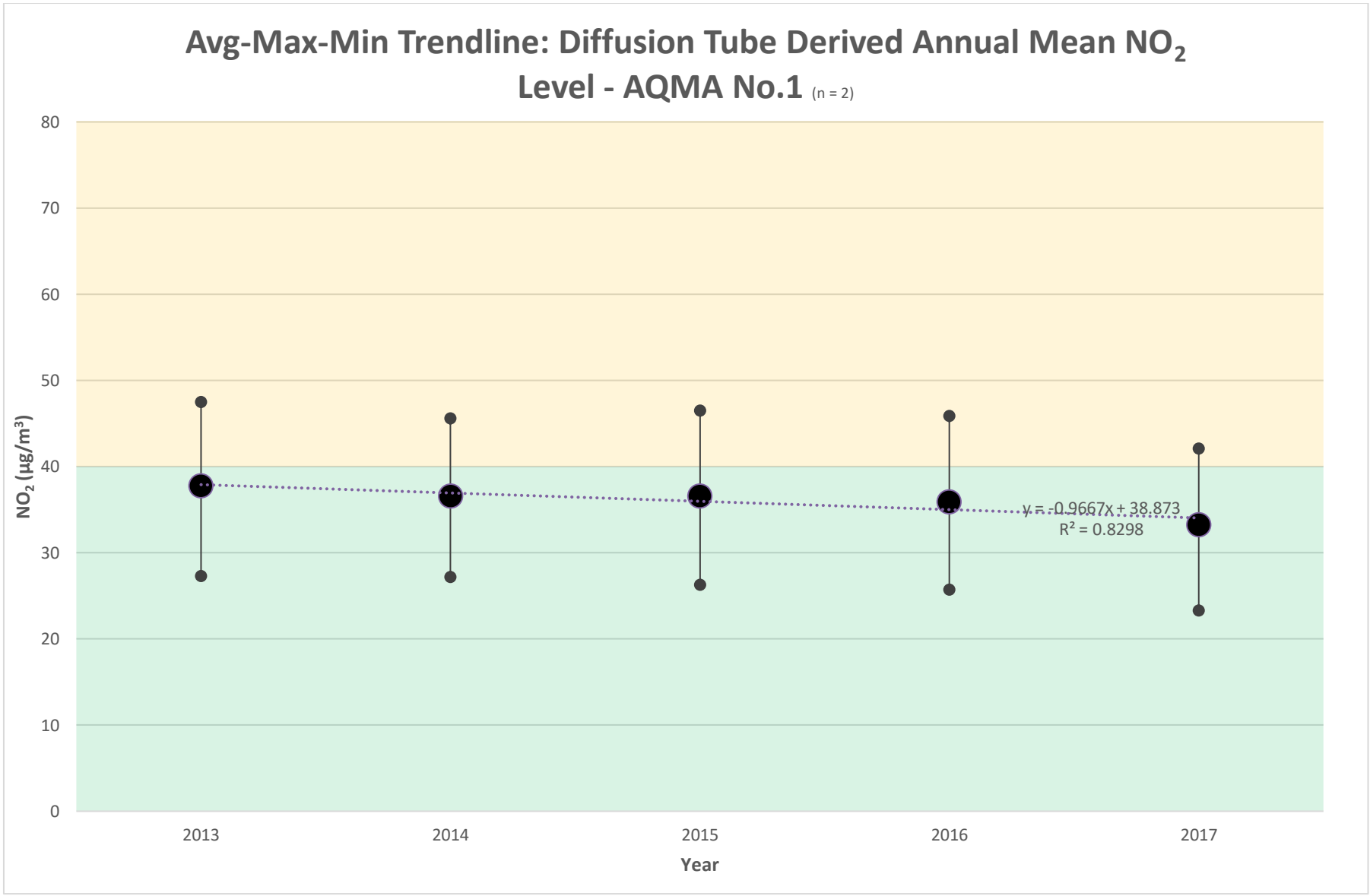
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

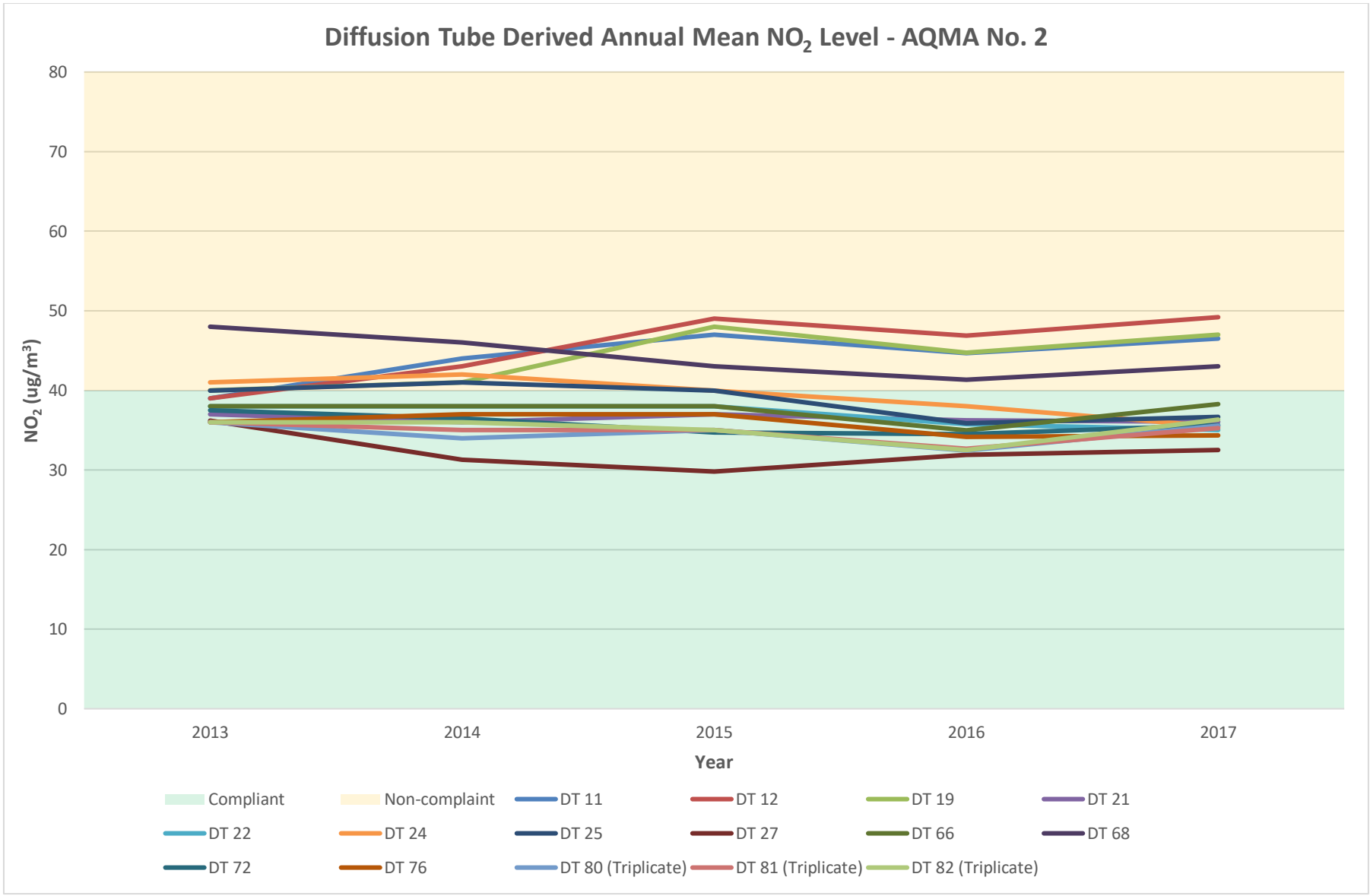
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

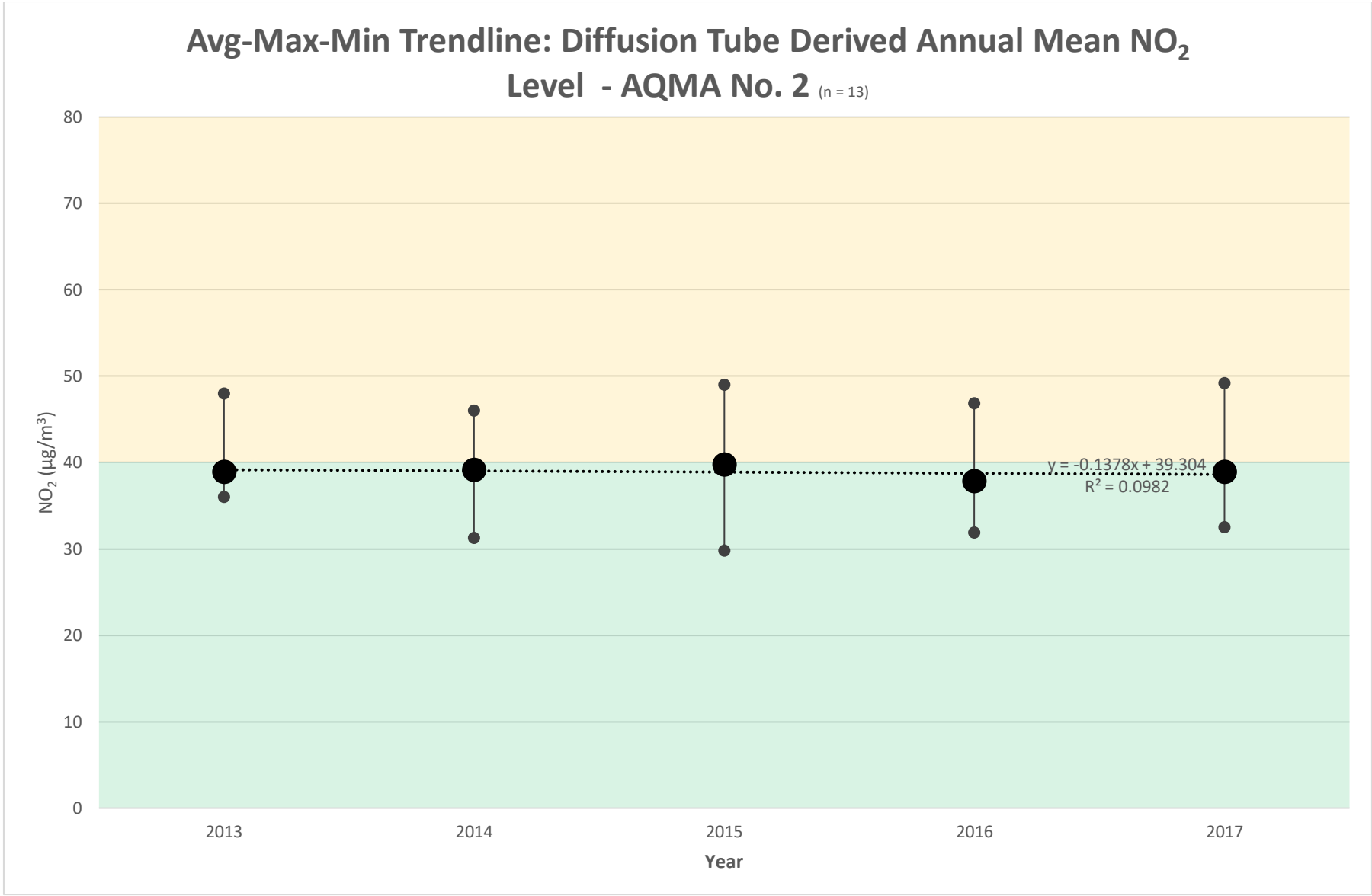
(3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

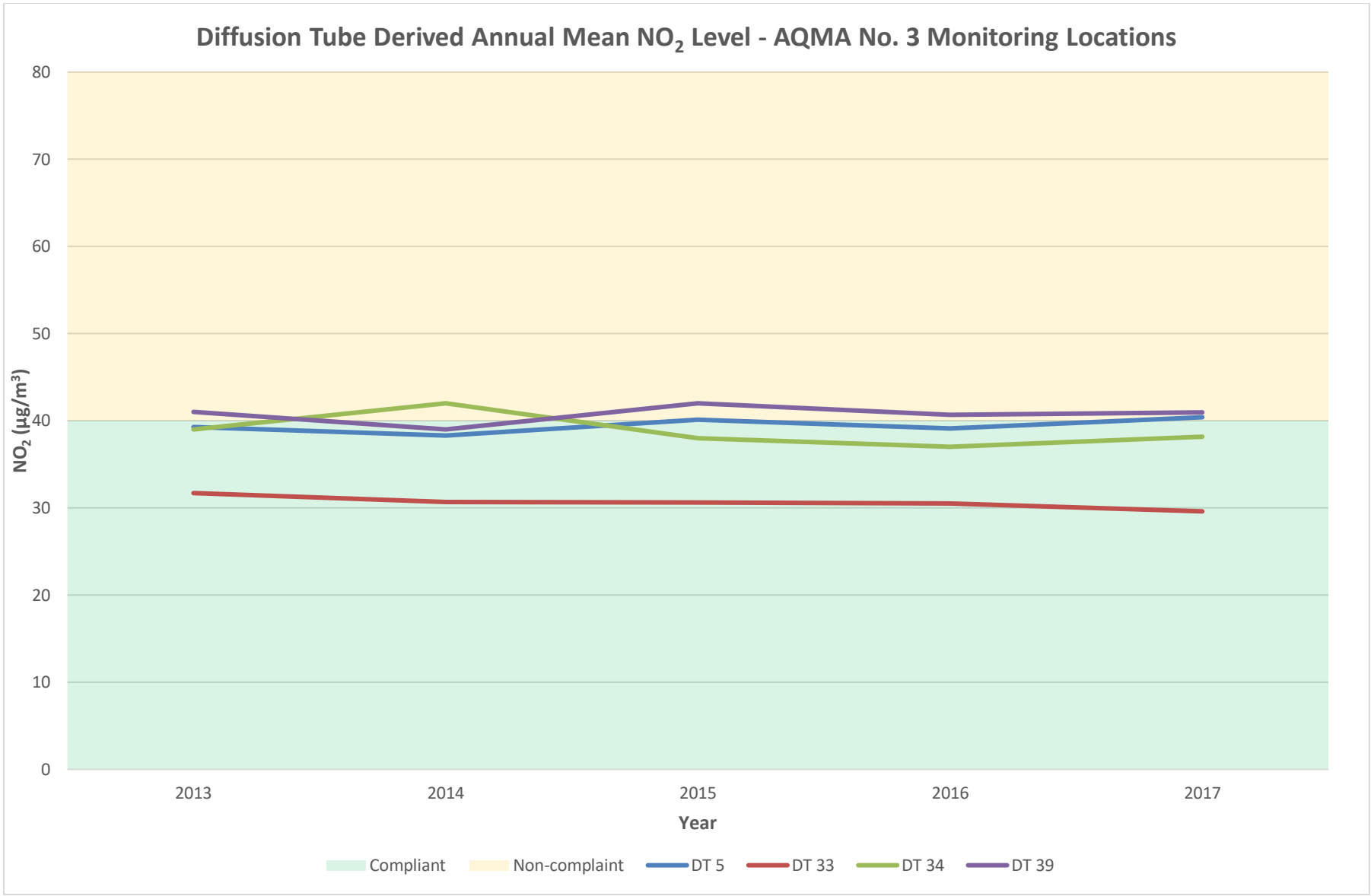
Figure A.1 – Trends in Annual Mean NO2 Concentrations [(1)]

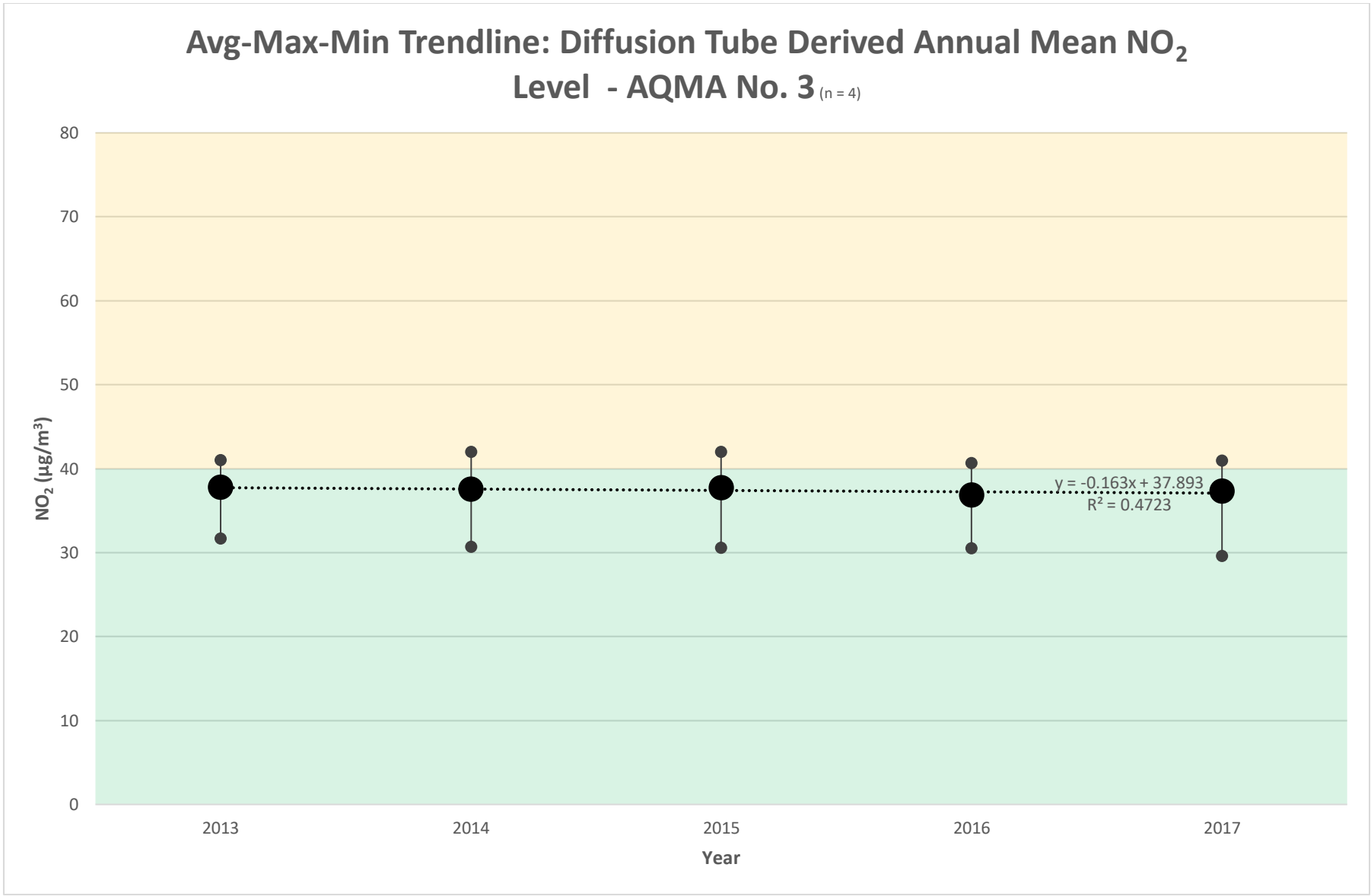


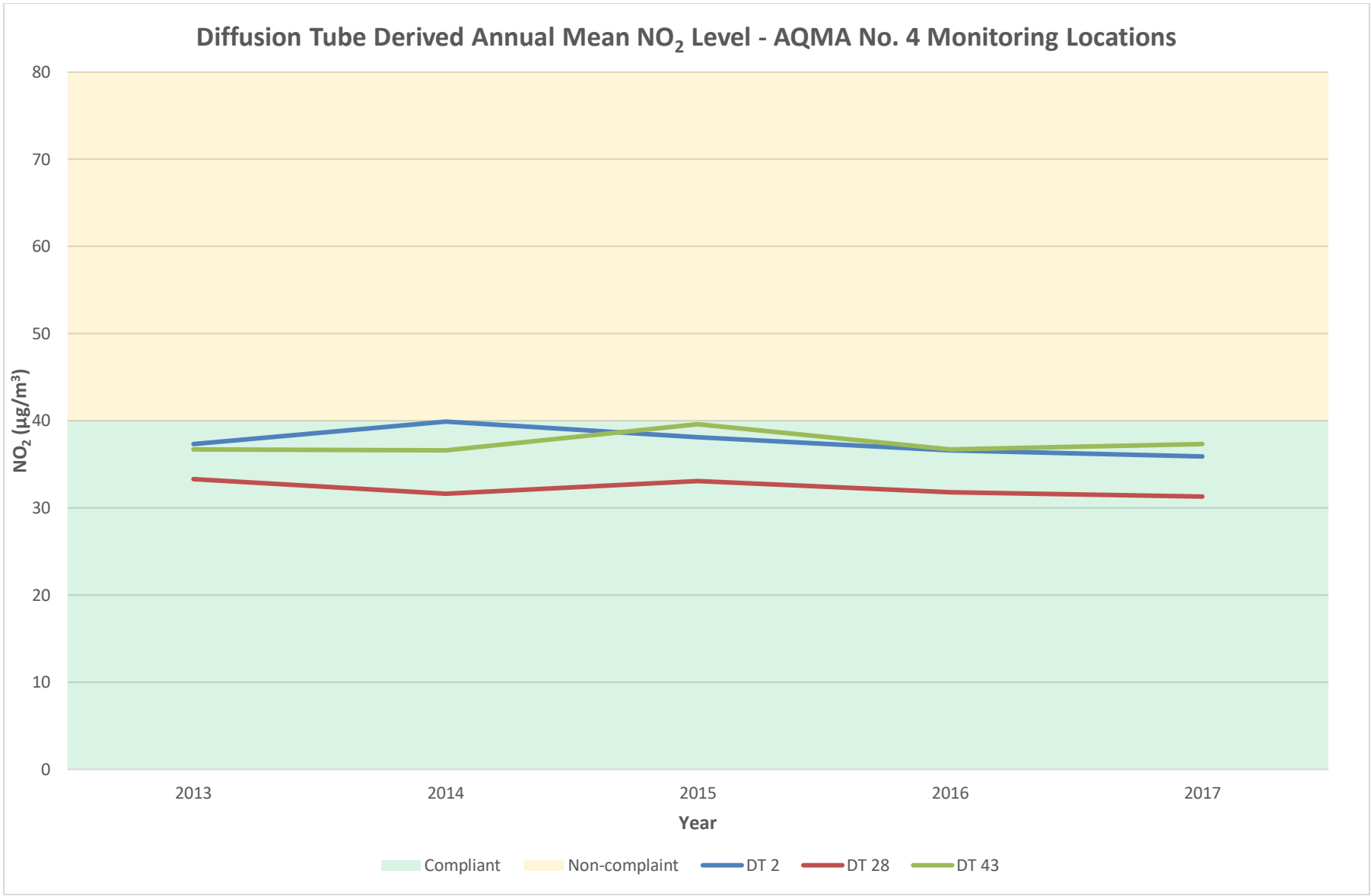

Avg-Max-Min Trendline: Diffusion Tube Derived Annual Mean NO2 Level - AQMA No.1 (n = 2)
80
70
60
50
40
30
20
10
0
NO2 (µg/m3)
2013
2014
2015
2016
2017
Year
y = -0.9667x + 38.873
R² = 0.8298

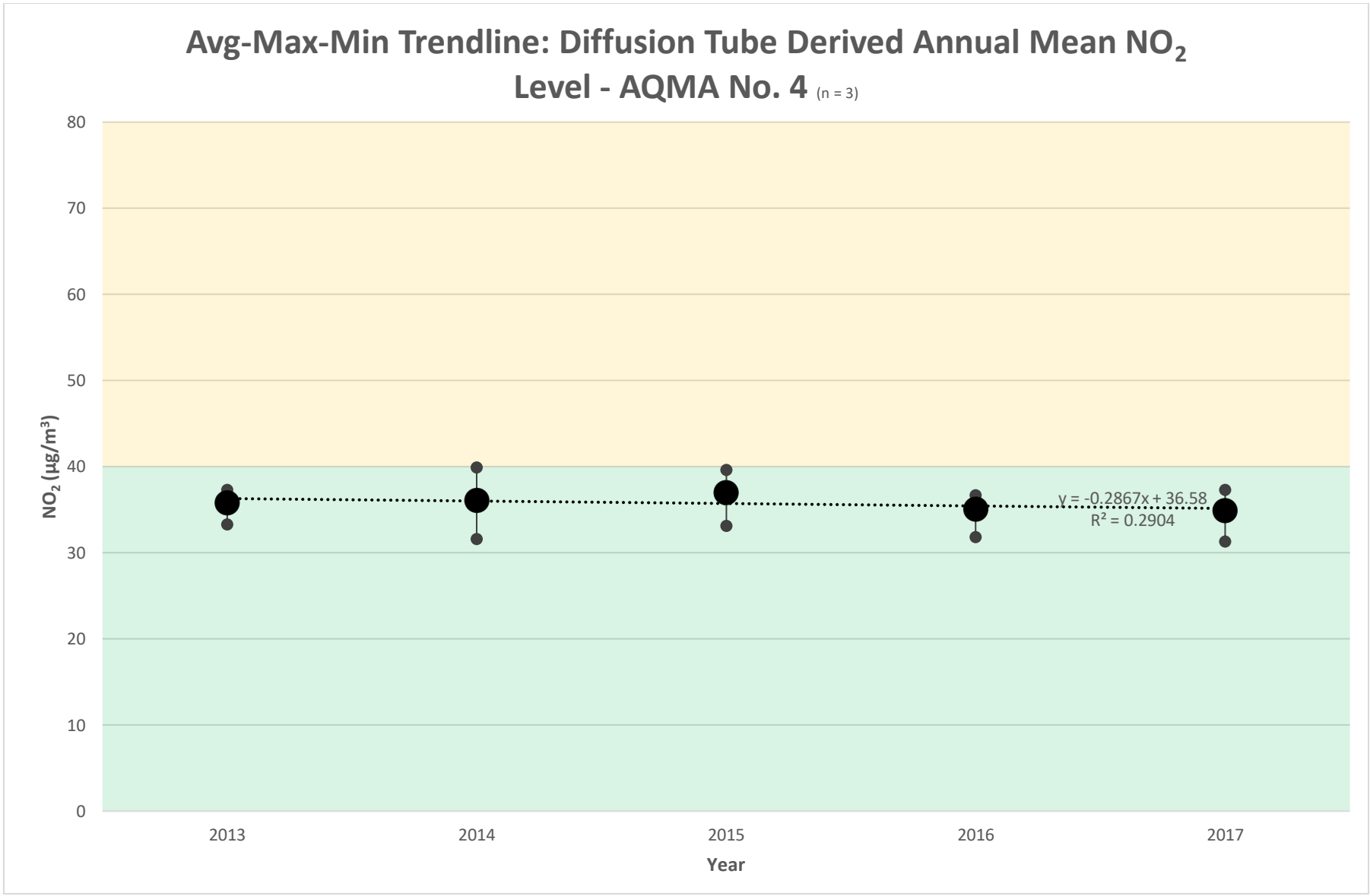

Diffusion Tube Derived Annual Mean NO2 Level - AQMA No. 2
80
70
60
50
40
30
20
10
0
NO2 (ug/m3)
2013
2014
2015
2016
2017
Year
Compliant
Non-complaint
DT 11
DT 12
DT 19
DT 21
DT 22
DT 24
DT 25
DT 27
DT 66
DT 68
DT 72
DT 76
DT 80 (Triplicate)
DT 81 (Triplicate)
DT 82 (Triplicate)

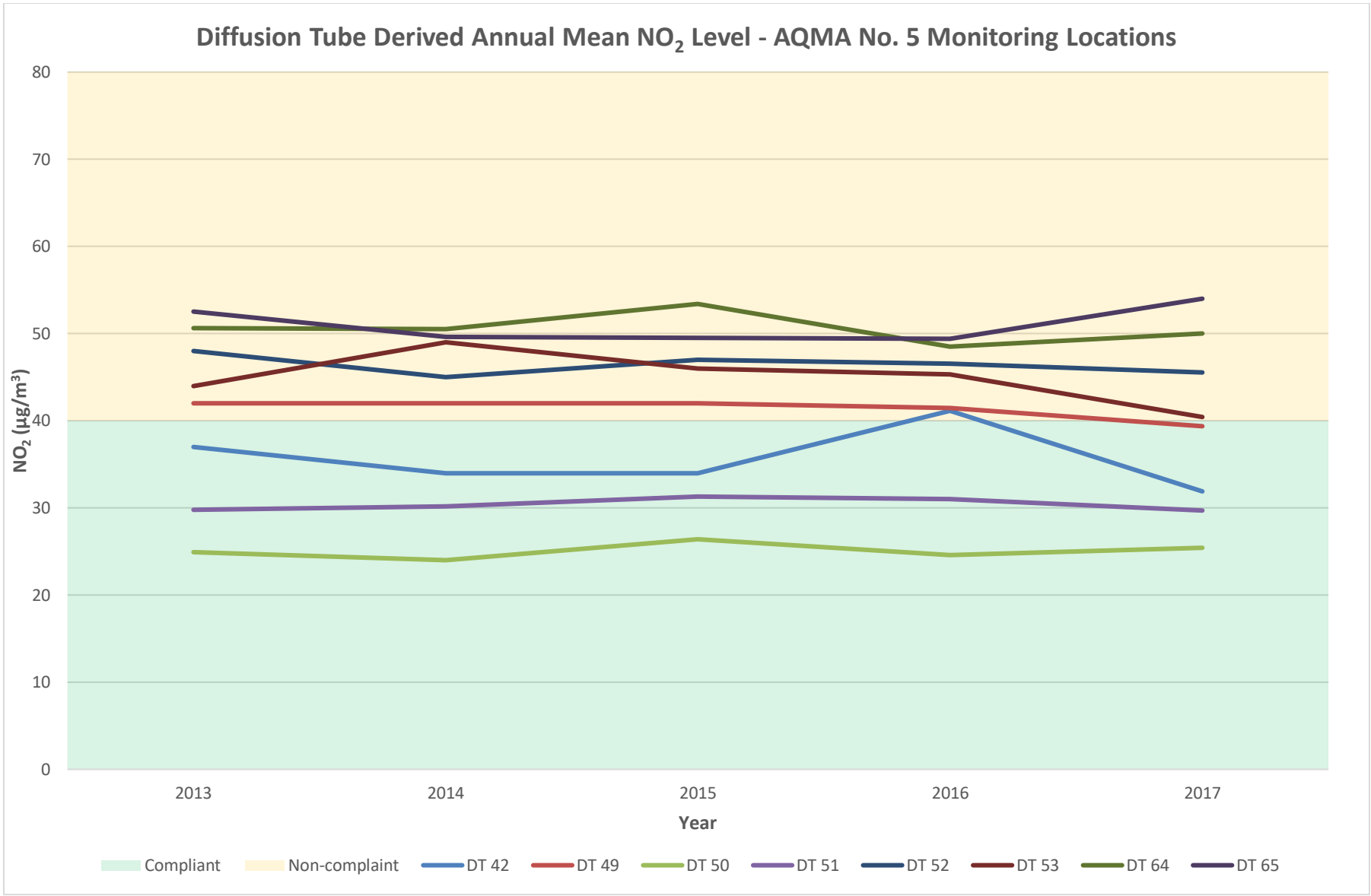

Avg-Max-Min Trendline: Diffusion Tube Derived Annual Mean NO2 Level - AQMA No. 2 (n = 13)
80
70
60
50
40
30
20
10
0
NO2 (µg/m3)
y = -0.1378x + 39.304
R² = 0.0982
2013
2014
2015
2016
2017
Year

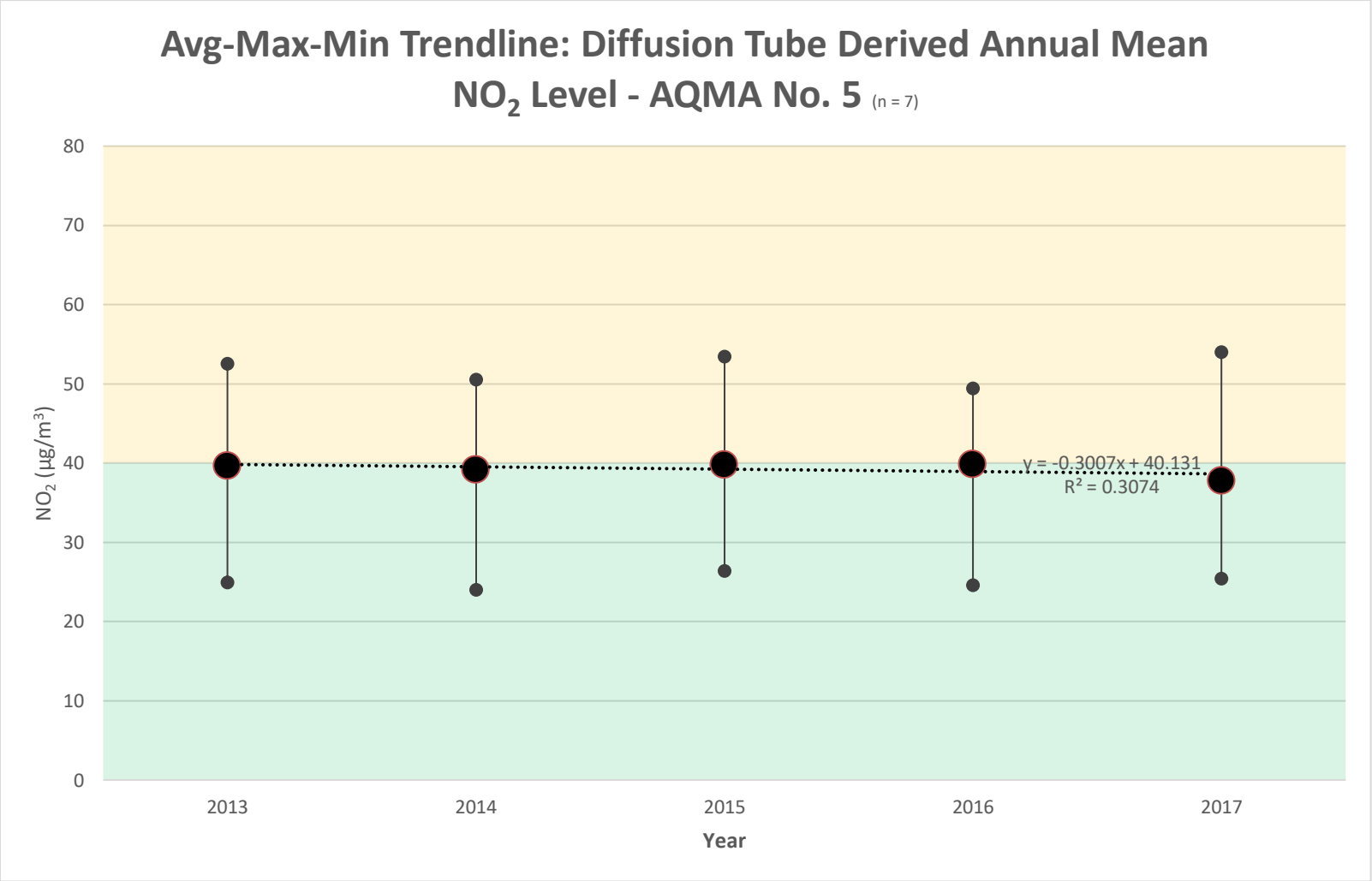

Diffusion Tube Derived Annual Mean NO2 Level - AQMA No. 3 Monitoring Locations
80
70
60
50
40
30
20
10
0
NO2 (µg/m3)
2013
2014
2015
2016
2017
Year
Compliant
Non-complaint
DT 5
DT 33
DT 34
DT 39


Avg-Max-Min Trendline: Diffusion Tube Derived Annual Mean NO2 Level - AQMA No. 3 (n = 4)
80
70
60
50
40
30
20
10
0
NO2 (µg/m3)
y = -0.163x + 37.893
R2 = 0.4723
2013
2014
2015
2016
2017
Year


Diffusion Tube Derived Annual Mean NO2 Level - AQMA No. 4 Monitoring Locations
80
70
60
50
40
30
20
10
0
NO2 (µg/m3)
2013
2014
2015
2016
2017
Year
Compliant
Non-complaint
DT 2
DT 28
DT 43


Avg-Max-Min Trendline: Diffusion Tube Derived Annual Mean NO2 Level - AQMA No. 4 (n = 3)
80
70
60
50
40
30
20
10
0
NO2 (µg/m3)
2013
2014
2015
2016
2017
Year
y = -0.2867x + 36.58
R² = 0.2904


Diffusion Tube Derived Annual Mean NO2 Level - AQMA No. 5 Monitoring Locations
80
70
60
50
40
30
20
10
0
NO2 (µg/m3)
2013
2014
2015
2016
2017
Year
Compliant
Non-complaint
DT 42
DT 49
DT 50
DT 51
DT 52
DT 53
DT 64
DT 65



Notes:

(1) Data both bias corrected using the relevant national factor and distance corrected.

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 2017 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2013	2014	2015	2016	2017
IPS(4)	Roadside	Automatic	N/A	N/A	8	N/A	N/A	N/A	N/A
IPS3	Roadside	Automatic	91	91	0	0	N/A	N/A	0

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.

(4) Monitoring at site discontinued – included for legacy purposes.

Appendix B: Full Monthly Diffusion Tube Results for 2017

Table B.1 – NO_2 Monthly Diffusion Tube Results - 2017

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 (0.77) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
1	44.7	40.1	38.5	30.7	27.1	24.8	26.1	16.3	32.2	37.4	44.8	39.9	33.6	25.8	25.8
2	71.2	55.8	54.8	46.8	49.2	42.7	47.7	26.4	47.0	49.5	58.1	52.3	50.1	38.6	35.9
3	35.7	40.2	35.1	30.3	28.2	30.7	24.5	17.1	32.1	37.1	43.9	34.7	32.5	25.0	20.8
4	67.4	50.5	52.4	41.7	28.5	38.6	38.6	18.3	48.5	48.7	60.9	52.9	45.6	35.1	29.0
5	72.4	54.6	61.6	58.8	53	54.7	51.2	28.9	53.9	53	65	55.5	55.2	**42.5**	**40.4**
6	36.1	28.3	25.5	20.3	17.7	14.3	15.3	9.1	19.6	24	33.9	24.5	22.4	17.2	17.2
7	48.9	42.8	46.4	39.9	33.3	36	37.1	21.5	39.9	41.6	44.2	42.1	39.5	30.4	30.4
8	58.8	46.2	51.6	45.5	41.3	37.2	36.8	20.2	41.1	40.3	50.9	42.8	42.7	32.9	30.1
9	45.7	48.9	52.6	45.3	45.1	40.5	36.6	20.2	44.7	39.9	49.9	45.7	42.9	33.1	30.3
10	66.5	51.5	55.7	48.8	43.7	41.9	37	23.5	45.2	46.4	57	43.4	46.7	36.0	32.8
11	75.6	61.7	63.5	61.8	51.4	58.8	58.6	33	59.2		71.6	69.3	60.4	**46.5**	**46.5**
12	88.3	62.4	68.3	67.1	61.8	60.2	60.1	34	65.6	66.8	78	54.1	63.9	**49.2**	**49.2**
13	52.4	39.3	36.6	28.5	26.4	19.4	23.6	14	27.7	28.9	38.2	35.8	30.9	23.8	21.7
14	76.7	57.3	63.5	59.5	55.3	48.9	46.9	27.3	56.5	59.5	62.6	63	56.4	**43.4**	**42.1**
15	52.2	36.3	26.9	28.4	24.4	20.9	21.8	13.3	29	32.5	42.3	34.2	30.2	23.2	23.2

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 (0.77) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
16	54.8	49.1	46.3	42.8	36.2	42.4	43.9	22.9	48.6	54.1	54.7	54.2	45.8	35.3	32.4
17	76.7	64.6	63.4	55.2	52.4	47.2	47.8	27.6	59.8	55.4	71.5	64.2	57.2	**44.0**	39.2
18	46.2	38.1	41.5	33.5	1.6	34.5	30.3	20.8	36.8	37.4	48.1	32.4	33.4	25.7	25.7
19	75.5	66	64.4	66.9	56.8	56.3	59	33.2	65.5		65.7	62.5	61.1	**47.0**	**47.0**
20	57	44.8	42.2	39.9	37.6	40.7	37.8	21.8	40	45.8	53.2	49	42.5	32.7	31.1
21	56.2	55.7	50.2	47.7	45.5	45.7	41.9	21.3	46.5	46.9	60.4	43.5	46.8	36.0	36.0
22	53.4	54.5	51.8	46.5	45.8	39.4	42.8	22.3	44.6	45.4	53.6	45.7	45.5	35.0	35.0
23	41.1	35.7	32.2	26	23.7	23.5	23.4	12.7	23.6	30.7	37.8	32.4	28.6	22.0	22.0
24	67.9	54.9	52.5	11.5	44.7	42.4	42.2	24.9	44.5	49.5	63.7	53.9	46.1	35.5	35.5
25	51	56.5	50.5	47.9	47.1	42.2	43.3	23.9	55.5	51.7	49.6	52	47.6	36.7	36.7
26	47.4	45.4	46.3	39.5	39.9	33.2	33	19.6	30.6	42.7	55.5	39.6	39.4	30.3	27.7
27	63.1				54.2	46.5	49.1	27.6	53.7	49.6	60.6	58.5	51.4	39.6	32.5
28	55.7	49.9	53.9	42	41.8	38.9	43.5	18.2	46.9	51	51.8	50.3	45.3	34.9	31.3
29	60.5	43.1	44.4	43.1	42.7	34.7	34.3	20.3	40.3	39.6	53.2	41.6	41.5	31.9	31.9
30	82.1	69.4	69.5	65.9	59.5	59.3	58	33.4	70.2	68.7	67.4	61	63.7	**49.0**	**44.6**
31	69.4	55.7	55.7	53.3	45.4	40.6	47.2	29.8	50.1	57.4	70.8	60.5	53.0	**40.8**	38.8
32	60.7	51.7	45.4	40.2	31.9	33.5	33.7	19.8	43.9	49.5	55.6	50.7	43.1	33.1	29.7
33	45.5	44.3	42.1	44.7	42.5	32.7	37.2	23.4	42	44.1	56.6	44.2	41.6	32.0	29.6
34	67	49	58.1	54.4	42.2	45.4	43.8	28.2	46.9	49.5	58.2	51.7	49.5	38.1	38.1

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 (0.77) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
35	48.4	39.6	36.7	33.1	28.5	29.6	27.4	16.4	33.7	37.9	40.6	40.2	34.3	26.4	26.4
36	50.3	50.9	41.5	39.4	33.8	36	35.3	17.7	43.5	49	56.7	49.4	42.0	32.3	23.6
37	46.4	35.3	36	28	27.3	23.9	24.9	16.6	27.5	32.7	39.2	31.4	30.8	23.7	23.7
38	57.8	45.9	45.5	39.9	40	40	41.9	19.1	48.8	44.8	52.7	41.5	43.2	33.2	26.0
39	70.6	57.2	61.4	54.7	45.9	44.2	46	29.6	48.4	52.7	72.1	55.6	53.2	**41.0**	**41.0**
40	59	48.4	44.6	37.9	32.5	26.1	27.8	16.1	34	39.3	50.7	52.4	39.1	30.1	26.0
41	58.7	51.8	51.3	45.7	48.1	42	43.2	25.4	49.8	44.1	45.9	21.2	43.9	33.8	33.8
42		46.3	49	47.9	47.5	34.9	38.5	20.8	41.3	38.7	51.7	39	41.4	31.9	31.9
43	61.9	54.9	56	50.1	48.6	44.8	45.7	22.3	48.5	47.3	57.4	50.6	49.0	37.7	37.3
44	68.5	53.2	53.2	48.4		36.8	48.2	20.3	48.6	37.4	58.4	45.6	47.1	36.3	29.8
45	49.5	40.1	42.3	31.4	31.4	25.9	27.3	15.3	31.5	36.5	42.2	38.2	34.3	26.4	24.8
46	50.3	37.6	26.3	31.5	32	27.4	27.3		33.5	35.2	40	37.5	34.4	26.5	24.9
47	49.5	38.9	37.7	32.6	28.5	24.9	27	16.9	32.5	36.5	33.8	26.3	32.1	24.7	23.3
48	48.2	41.5	43.8	34	30.8	28.5	28.8	17.2	36.5	30.3	50.2	42.7	36.0	27.8	23.7
49		57.9	57	57	57.4	42.3	47.5	25.4	53.2	50	62.6	52.1	51.1	39.4	39.4
50	48.9	38.1	42.5	30.3	31	26.9	27.8	15.1	34.1	36.8	49.1	38.1	34.9	26.9	25.4
51	69.7	54.7	58.1	45.1	44.8	41.6	43.2	23.9	44.3	44.9	50.9	40.4	46.8	36.0	29.7
52	73.5	66.4	66.1	65.2	60.9	38.5	55.4	29.1	66.7	59.9	72.8	55.6	59.2	**45.6**	**45.6**
53	71.1	65.1	68.3		0.9	55.5	53	29.9	59.4	58.7	54	61.6	52.5	**40.4**	**40.4**

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 (0.77) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
54	70.4	56.8	51.4	43.8	40.2	30.1	37.1	21.1	45.1	49.9	53	44.8	45.3	34.9	34.9
55	51.5	47.7	41.4	36.1	37.1	23.8	2.9	16.4	36.6	39.1	47.4	42.5	35.2	27.1	32.0
56	55.6	39.9	44.4	35	31.4	32	30.9	16.7	37.6	36.8	47.4	29.3	36.4	28.0	33.1
57	50.2	44.9	39	29.7	26.8	24.4	26.2	13.4	32.9	35.4	41.3	37.5	33.5	25.8	25.3
58	51.7	39.6	41.1	27.7	26.2	24.1	25.8	13	27.9	32.3	32.2		31.1	23.9	19.6
59	59.6	42.7	49.5	39.6	35.7	34.5	34.5	20.7	43.4	44.4	48.6	46.7	41.7	32.1	32.1
60	60.1	48	47.1	36.6	30.7	24.6	31.7	20	36.7	41.7	48.5	38.3	38.7	29.8	23.2
61	73.5	56.8	60.2	46.8	45.1	41.9	47.1	27.2	53.7	51.8	69.3	57.8	52.6	**40.5**	**40.5**
62	60.2	49.7	51.7	38.5	41.2	50.3	41.4	23.6	49.4	47.4	48.1	48.8	45.9	35.3	35.3
63	61.8	47.9	52.7	45.5	43.3	42.2	40.8	21	48.6	50	53.5	51.8	46.6	35.9	35.9
64	84.3	72.1	73.7	72.9	57.7	64.8	58.7	34.3	68.6	71.6	66.5	77	66.9	**51.5**	**50.0**
65	93.1	68.3	77	78.5	62.4	60	64.5	34.8	81.8	78.3	89.2	79.5	72.3	**55.7**	**54.0**
66	64.4	55.7	53.1	48.4	45	49.7	48.8	27.6	39	50.2	59.5	55.1	49.7	38.3	38.3
67	50.9	37.4	35.2	31.7	30.2	30.3	28.5	15.7	32		37.9	30.3	32.7	25.2	22.8
68	78.1	58.7	59.5	60.3	51.8	51	49.2	27.9	53.9	55.6	68.5	56.2	55.9	**43.0**	**43.0**
69	49.9	42.7	39	31	30.2	26.9	25.2	12.9	30.5	35.2	42.1	32.7	33.2	25.6	25.6
70	63.8	52.8	51.2	48.5	40.2	36.5	36.2	21.9	48.9	46.7			44.7	34.4	29.7
71	46.4	39.1		28.8		22.5	23.6	12.3	27.4	29.3	34.8	32.9	29.7	22.9	22.9
72	62.3	54.4	54	48.9	44.3	42	38.7	22.9	49.5	50.5	58.2	52.2	48.2	37.1	35.6

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 (0.77) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
73	41.1	36.7	35.4	25.7	25.2	20	20.8	12.7	28.6	29.8	31.5	35	28.5	22.0	21.1
74	46.6	41	40.9		28.7	23.6	25.2	14.5	31.8	37	40.3	35.4	33.2	25.6	25.6
75	49.5	37.7	39.7	27.1	27.2	21.5	22.8	14.9	31.3	37.9	39.2	33.9	31.9	24.6	24.6
76	60.3	45.8	54	41.7	41.6	39.4	40.2	22.8	45.4	44.4	50.6	49.1	44.6	34.3	34.3
77	51.6	43.3	40.5	35.9	35	28.6	29.3	17.2	35.9	32.2	32.6	35.5	34.8	26.8	26.8
78	52.9	43.3	39.4	29.5	21.9	22.8	25.1	13.7	26.5	32.7	35.1	35.2	31.5	24.3	28.7
79	64.6	55.2	41.6	38	39.4	37.4	37.5	23.3	47.8	45.4	63.3	50.6	45.3	34.9	32.9
80	53.6	49.8	48.3	40.3	40.7	42	39.9		45.1	48.9	51.6	47.5	46.2	35.5	35.5
81	55.2	48.9	50.9	45.5	38	43.6	40.7		44.7	42.3	52.5	41.6	45.8	35.3	35.3
82	55.7	49.2	52.6	45.6	40.4	41.5			43.6	47.1	54.3	41.8	47.2	36.3	36.3
83	57	43.2	40.8	33.5		27.6	26.9	16.8	33	33.8	41.9	39.6	35.8	27.6	26.4
84	48.5	37.9	34.3	29.5	28.3	20.1	23.6	14.7	24.7	32.2	50	31	31.2	24.0	24.0
85	54.1	44.6	42.9	39.2	34	32.6	31	19.8	36	41.8	50.3	43.4	39.1	30.1	30.1

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 (0.77) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
SP1	55.4	45.7	49.7	41.2	51.6	38.3	51.6	25.5	36.5				43.9	33.8	-
SP2	72.4	56	68.1	62.3	34	31.4	32.7	20.7	44.8				46.9	36.1	-
SP3	57	38.3	35.7	34.9		28	22.9	15.1	31.1				32.9	26.1	-
SP4	52.5	45.2	47.2	42.3	35.5	31.1	32.1	18.9	40.5				38.4	29.5	-
SP5	73.7	60.6	64.9	60	56.8	50	46.2	29.3	53.7				55.0	**42.4**	-
SP6	56.3	41.5	41.2	33.1	32.7	28.5	23.8	18.2	34.8				34.5	26.5	-
SP7	48.9	41.1	44.9	39.9	37.1	28.7	26.8	17.1	32.7				35.2	27.1	-
SP8	46.1	38.8	47.9	37.8	29.9	28.1	26	18.1	33.9				34.1	26.2	-
SP9	48.6	37.8	42.3	30.6	32.4	30.2	26	17.8	34.8				33.4	25.7	-
SP10	46.1	43.7	46.4	38.5	36.2	33.9	30.1	19.5	42.6				37.4	28.8	-
SP11	67.4	49.1	50.7	38.7	41.3	28.8	29.2	19.6	36.1				40.1	30.9	-
SP12	46.2	35.9	39.7	27	28.4	25.9	20.7	13.7	28.2				29.5	22.7	-
SP13	54.2	47.2	47.6	43.2	36.7	36.8	33.7	23.3	45.2				40.9	31.5	-
SP14	45.6	35.1	36.7	28.9	28.3	22.3	23	14.7	30				29.4	22.6	-
SP15	50.9	41.1	43.5	37.9	37.5	27.5	25.6	18.2	36.9				35.5	27.3	-
SP16	42.8	30	34.1	29.3	24.3	21.4	18.3	14	29				27.0	20.8	-
SP17	35.2	28.3	33.3	30.1	24.5	21.6	18.8	12.2	28.2				25.8	19.9	-
SP18	51.5	37.2	38.3	31.4	26.9	24.9	24.1	17.7	34.8				31.9	24.5	-
SP19	47.6	40.4	46.6	37.3	34.3	27.7	28.1	19.2	37.8				35.4	27.3	-

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 (0.77) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
SP20	52.6	46.4	36.7	45.2	40	33.8	30.7	18.4	43.9				38.6	29.7	-
SP21	54.2	40.3	41	38.2	34	28.9	28.1	17.9	35				35.3	27.2	-
SP22	41.6		54.8	33	27.9	24.6	22.2	14.9	29.2				31.0	25.8	-
SP23	51.1	34.3	35.7	31.1	24.8	20.8	21.9	15	30.7				29.5	22.7	-
SP24	53.9	54.8	53.7	48	43	37.9	33.4	26.3	49.7				44.5	34.3	-
SP25	71.4	57.4	58.5	57.7	57.6	50.8	44.6	28.6	57.6				53.8	**41.4**	-
SP26	43.9	36.6	35.2	25.9	24.3	21.1	20.8	14.6	27.5				27.8	21.4	-

☐ **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

Automatic Monitoring

The automatic monitor located on Chevallier Street (IPS3) is subject to monthly routine calibration by an Ipswich Borough Council Technical Officer. The analyser is also serviced and the monitoring site audited biannually by WeCare4Air and Ricardo Energy & Environment respectively. A copy of the Certificate of Calibration issued following the most recent site audit (March 2018) is displayed below (Figure C.1).

All automatic monitoring data collected at the Chevallier Street site is managed by Ricardo Energy & Environment using the same quality control procedures utilised by Defra's national air quality network stations. These procedures represent best practice and fully meet the requirements set out in LAQM.TG(16). Ricardo Energy & Environment currently provide UKAS accredited quality control audits and data management services to all Defra national network (AURN) air quality monitoring stations.

All collected data is screened and scaled (based on site calibrations) and the final data set presented within this report (Figure C.2) has benefitted from a full process of data ratification, including thorough additional data quality checks that include site audits and a ratification process that corrects data for instrument sensitivity drift between routine calibrations.

Figure C.1 – Certificate of Calibration for IPS3

0401

CERTIFICATE OF CALIBRATION

Ricardo Energy and Environment, Gemini Building, Fermi Avenue Harwell, Didcot,

RICARDO

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Approved Signatories:

☐ S. Eaton	☐ B Stacey
☐ D Hector	☐ S Stratton
☐ N Rand	☐ S Telfer
☐ E Marshall-Padkin	☐ S Gray
☐ B Davies	☑ D Lane

Signed:

Date of issue: 25 Jun 18

Certificate Number: 04054

Customer Name and Address:

Ipswich Borough Council
The Civic Centre
Russell Road
Ipswich
Suffolk
1PE 2DE

Description: Calibration factors for the air monitoring station at Ipswich Chevallier Street

Ricardo Energy & Environment ID: ED62657218/March 2018

The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor k=2 providing a level of confidence of approximately 95% The uncertainty evaluation has been carried out in accordance with UKAS requirements.

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory

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Book1 1 of 3

0401

CERTIFICATE OF CALIBRATION

Date of issue: 25 Jun 18

Certificate Number: 04054

Ricardo Energy & Environment ID: ED62657218/March 2018

Ipswich Chevallier Street
Date of audit: 14 Mar 2018

Species	Analyser Serial no	Zero Response[1]	Zero uncertainty ppb	Calibration Factor[2]	Factor uncertainty %	Converter eff (%)[3]
NOx	0606215582	2.1	2.5	1.0316	3.5	100.0
NO	0606215582	1.6	2.5	1.0191	3.5	n/a

0401

CERTIFICATE OF CALIBRATION

Date of issue: 25 Jun 18

Certificate Number: 04054

Ricardo Energy & Environment ID: ED62657218/March 2018

The gaseous ambient analysers listed above have been tested for zero response, calibration factor, linearity and converter efficiency (NOx analysers) by documented methods. The factors have been calculated using certified gas standards. The particulate analysers listed above have been tested for sample flow rates and k0(where appropriate) by documented methods. Note that the test results are valid on the day of test only, as analyser drift over time cannot be quantified. All results for gaseous species are given in ppb (parts per billion) mole fractions or ppm (parts per million) mole fractions.

[1] The zero response is the zero reading on the data logging system of the analyser when audit zero gas was introduced to the analysers under test.

[2] The calibration factor is the multiplying factor required to scale the reading on the data logging system of the analyser into reported concentration units (ppb for NO, NOx, SO_2, O_3 and ppm for CO. Where 1ppm = 1000ppb). It should be used in conjunction with the zero response. A corrected concentration is calculated using the following equation:

Concentration = F(Output - Zero Response)
Where F = Calibration Factor provided on this certificate
Output = Reading on the data logging system of the analyser
Zero Response = Zero Response provided on this certificate

[3] Converter eff. is the measured efficiency of the NO_2 to NO converter within the oxides of nitrogen analyser under test.

The calibration results shaded are those that fall within our scope of accreditation, all other results on this certificate are not UKAS accredited, but have been included for completeness.

Figure C.2 – 2017 Air Pollution Report – Ipswich Chevallier Street (Site ID: IPS3)

Air Pollution Report

Air Quality England

1st January to 31st December 2017

Ipswich Chevallier Street (Site ID: IPS3)

These data have been fully ratified

Only relevant statistics for LAQM are presented in the table. Cells with - indicate no data available or calculated.

Pollutant	NO µg/m³	NO_2 µg/m³	NO_x as NO_2 µg/m³
Number Days Low	-	340	-
Number Days Moderate	-	0	-
Number Days High	-	0	-
Number Days Very High	-	0	-
Max Daily Mean	178	74	345
Annual Max	524	126	929
Annual Mean	22	29	63
99.8th Percentile of hourly mean	-	103	-
98th Percentile of hourly mean	123	69	246
95th Percentile of hourly mean	74	58	162
50th Percentile of hourly mean	13	26	46
% Annual data capture	**92.12%**	**91.18%**	**91.18%**

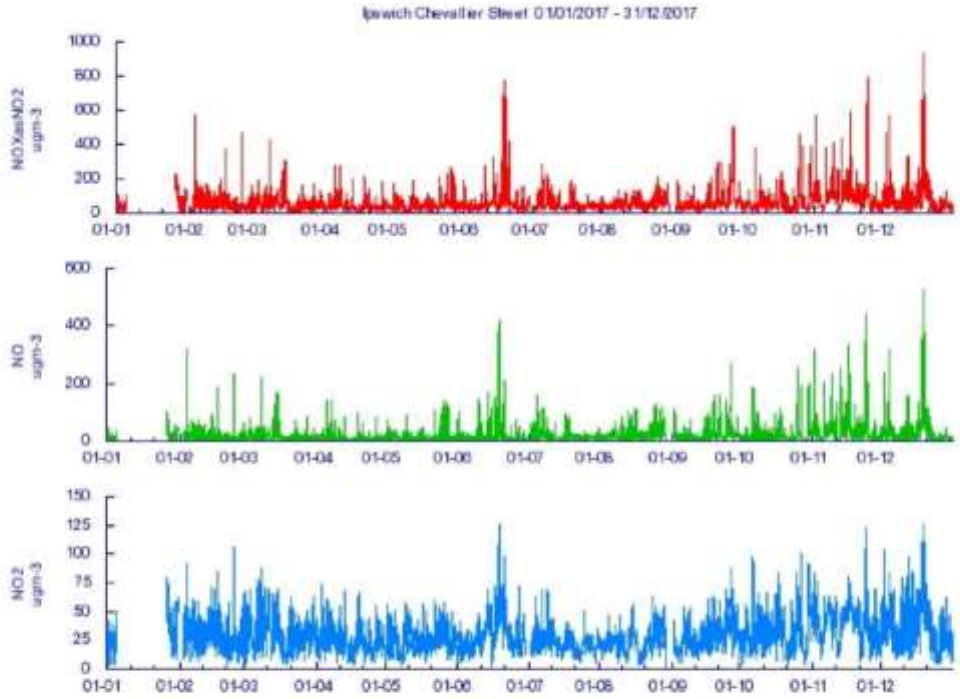
All gaseous pollutant mass units are at 20°C and 1013mb. Particulate matter concentrations are reported at ambient temperature and pressure. NO_X mass units are NO_X as NO_2 µg m-3

Pollutant	Air Quality Standards regulations 2010	Exceedances	Days
Nitrogen dioxide	Hourly Mean > 200 microgrammes per metre cubed	0	0
Nitrogen dioxide	Annual Mean > 40 microgrammes per metre cubed	0	-

1 / 2

Report produced by Ricardo Energy & Environment

Annual Graph



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Report produced by Ricardo Energy & Environment

Diffusion Tube Analysis

Nitrogen dioxide diffusion tubes are supplied by SOCOTEC (previously ESG), Didcot. The exposed tubes are analysed in accordance with SOCOTEC's standard operating procedure which complies with the guidelines set out in DEFRA's *'Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance'*. The analysis of diffusion tube samples to determine the amount of nitrogen dioxide present on the tubes is within the scope of their UKAS schedule. SOCOTEC participates in the AIR NO_2 PT scheme, the results of which indicate that during 2017 100% of QC samples were analysed satisfactorily. During the same period, reported nitrogen dioxide diffusion tube collocation studies indicated that the laboratory achieved good precision in all 23 of the studies assessed.

Using the *AEA_DifTPAB_v04.xls* spreadsheet published on the DEFRA LAQM Support website to check the precision of collocated tubes, the results for all collocated monitoring sites within Ipswich were shown to demonstrate "*Good precision"* (see Figure C.3).

A control tube (travel blank) is sent with each month's tubes.

Figure C.3 – Precision and Accuracy of Collocated Diffusion Tubes

a) Bramford Road (Site ID: 8, 9 & 10)

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data Capture
1	05/01/2017	31/01/2017	58.8	45.7	66.5	57	10.5	18	26.1			Good	
2	31/01/2017	03/03/2017	46.2	48.9	51.5	49	2.7	5	6.6			Good	
3	03/03/2017	29/03/2017	51.6	52.6	55.7	53	2.1	4	5.3			Good	
4	29/03/2017	24/04/2017	45.5	45.3	48.8	47	2.0	4	4.9			Good	
5	24/04/2017	01/06/2017	41.3	45.1	43.7	43	1.9	4	4.8			Good	
6	01/06/2017	29/06/2017	37.2	40.5	41.9	40	2.4	6	6.0			Good	
7	29/06/2017	04/08/2017	36.8	36.6	37.0	37	0.2	1	0.5			Good	
8	04/08/2017	29/08/2017	20.2	20.2	23.5	21	1.9	9	4.7			Good	
9	29/08/2017	25/09/2017	41.1	44.7	45.2	44	2.2	5	5.6			Good	
10	25/09/2017	31/10/2017	40.3	39.9	46.4	42	3.6	9	9.0			Good	
11	31/10/2017	04/12/2017	50.9	49.9	57.0	53	3.8	7	9.5			Good	
12	04/12/2017	03/01/2018	42.8	45.7	43.4	44	1.5	3	3.8			Good	
13													
											Overall survey -->	Good precision	

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

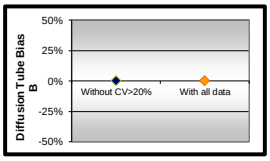
Site Name/ ID:	Bramford Road o/s No 122

Precision: 12 out of 12 periods have a CV smaller than 20%

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	μgm^{-3}
Mean CV (Precision):	
Automatic Mean:	μgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	μgm^{-3}
Mean CV (Precision):	
Automatic Mean:	μgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	μgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

b) Piper's Court (Site ID: 11, 12 & 19)

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data Capture
1	06/01/2017	31/01/2017	75.6	88.3		82	9.0	11	80.7			Good	
2	31/01/2017	03/03/2017	61.7	62.4		62	0.5	1	4.4			Good	
3	03/03/2017	29/03/2017	63.5	68.3	64.4	65	2.6	4	6.3			Good	
4	29/03/2017	26/04/2017	61.8	67.1	66.9	65	3.0	5	7.5			Good	
5	26/04/2017	01/06/2017	51.4	61.8	56.8	57	5.2	9	12.9			Good	
6	01/06/2017	30/06/2017	58.8	60.2	56.3	58	2.0	3	4.9			Good	
7	30/06/2017	01/08/2017	58.6	60.1	59.0	59	0.8	1	1.9			Good	
8	01/08/2017	29/08/2017	33.0	34.0	33.2	33	0.5	2	1.3			Good	
9	29/08/2017	25/09/2017	59.2	65.6	65.5	63	3.7	6	9.1			Good	
10	25/09/2017	01/11/2017		66.8									
11	31/10/2017	06/12/2017	71.6		65.7	69	4.2	6	37.5			Good	
12	06/12/2017	05/01/2018	69.3	54.1	62.5	62	7.6	12	18.9			Good	
13													
										Overall survey -->		Good precision	

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

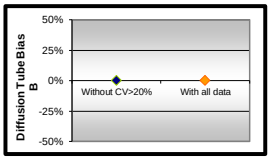
Site Name/ ID:	Piper's Court

Precision: 11 out of 11 periods have a CV smaller than 20%

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

c) Chevallier Street (Site ID: 45, 46 & 47 co-located with IPS3)

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data Capture
1	05/01/2017	03/02/2017	49.5	50.3	49.5	50	0.5	1	1.1	34	21.0	Good	or Data Capture
2	03/02/2017	03/03/2017	40.1	37.6	38.9	39	1.3	3	3.1	30	99.7	Good	Good
3	03/03/2017	29/03/2017	42.3	26.3	37.7	35	8.2	23	20.5	29	99.8	Poor Precision	Good
4	29/03/2017	24/04/2017	31.4	31.5	32.6	32	0.7	2	1.7	25	99.8	Good	Good
5	24/04/2017	01/06/2017	31.4	32.0	28.5	31	1.9	6	4.6	25	97.0	Good	Good
6	01/06/2017	29/06/2017	25.9	27.4	24.9	26	1.3	5	3.1	29	98.4	Good	Good
7	29/06/2017	04/08/2017	27.3	27.3	27.0	27	0.2	1	0.4	23	93.1	Good	Good
8	04/08/2017	29/08/2017	15.3		16.9	16	1.1	7	10.2	23	97.6	Good	Good
9	29/08/2017	26/09/2017	31.5	33.5	32.5	33	1.0	3	2.5	27	86.6	Good	Good
10	26/09/2017	31/10/2017	36.5	35.2	36.5	36	0.8	2	1.9	32	98.7	Good	Good
11	31/10/2017	04/12/2017	42.2	40.0	33.8	39	4.4	11	10.8	40	100.0	Good	Good
12	04/12/2017	03/01/2018	38.2	37.5	26.3	34	6.7	20	16.6	34	100.0	Poor Precision	Good
13													
										Overall survey -->		Good precision	Good Overall DC

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

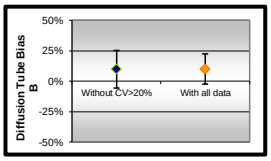
Site Name/ ID:	Chevallier Street

Precision: 10 out of 12 periods have a CV smaller than 20%

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 9 periods of data	
Bias factor A	0.91 (0.8 - 1.06)
Bias B	9% (-6% - 25%)
Diffusion Tubes Mean:	31 µgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	28 µgm^{-3}
Data Capture for periods used:	97%
Adjusted Tubes Mean:	28 (25 - 33) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 11 periods of data	
Bias factor A	0.91 (0.82 - 1.03)
Bias B	10% (-3% - 22%)
Diffusion Tubes Mean:	32 µgm^{-3}
Mean CV (Precision):	8
Automatic Mean:	29 µgm^{-3}
Data Capture for periods used:	97%
Adjusted Tubes Mean:	29 (26 - 33) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

d) Norwich Road (Site ID: 64 & 65)

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data Capture
1	06/01/2017	03/02/2017	84.3	93.1		89	6.2	7	55.9			Good	
2	03/02/2017	03/03/2017	72.1	68.3		70	2.7	4	24.1			Good	
3	03/03/2017	29/03/2017	73.7	77.0		75	2.3	3	21.0			Good	
4	29/03/2017	26/04/2017	72.9	78.5		76	4.0	5	35.6			Good	
5	26/04/2017	02/06/2017	57.7	62.4		60	3.3	6	29.9			Good	
6	02/06/2017	30/06/2017	64.8	60.0		62	3.4	5	30.5			Good	
7	30/06/2017	02/08/2017	58.7	64.5		62	4.1	7	36.8			Good	
8	02/08/2017	29/08/2017	34.3	34.8		35	0.4	1	3.2			Good	
9	29/08/2017	25/09/2017	68.6	81.8		75	9.3	12	83.9			Good	
10	25/09/2017	31/10/2017	71.6	78.3		75	4.7	6	42.6			Good	
11	31/10/2017	04/12/2017	66.5	89.2		78	16.1	21	144.2			Poor Precision	
12	04/12/2017	03/01/2018	77.0	79.5		78	1.8	2	15.9			Good	
13													

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Overall survey --> Good precision

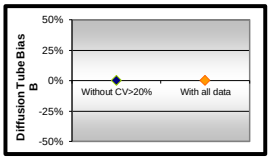
Site Name/ ID:	Norwich Road between Nos. 13 & 15

Precision: 11 out of 12 periods have a CV smaller than 20%

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%
Bias calculated using 0 periods of data
Bias factor A
Bias B
Diffusion Tubes Mean: µgm^{-3}
Mean CV (Precision):
Automatic Mean: µgm^{-3}
Data Capture for periods used:
Adjusted Tubes Mean: µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA
Bias calculated using 0 periods of data
Bias factor A
Bias B
Diffusion Tubes Mean: µgm^{-3}
Mean CV (Precision):
Automatic Mean: µgm^{-3}
Data Capture for periods used:
Adjusted Tubes Mean: µgm^{-3}



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e) St. Helens Street (Site ID: 80, 81 & 82)

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data Capture
1	06/01/2017	03/02/2017	53.6	55.2	55.7	55	1.1	2	2.7			Good	
2	03/02/2017	03/03/2017	49.8	48.9	49.2	49	0.5	1	1.1			Good	
3	03/03/2017	30/03/2017	48.3	50.9	52.6	51	2.2	4	5.4			Good	
4	30/03/2017	26/04/2017	40.3	45.5	45.6	44	3.0	7	7.5			Good	
5	26/04/2017	02/06/2017	40.7	38.0	40.4	40	1.5	4	3.7			Good	
6	02/06/2017	30/06/2017	42.0	43.6	41.5	42	1.1	3	2.7			Good	
7	30/06/2017	02/08/2017	39.9	40.7		40	0.6	1	5.1			Good	
8	02/08/2017												
9		25/09/2017	45.1	44.7	43.6	44	0.8	2	1.9			Good	
10	25/09/2017	01/11/2017	48.9	42.3	47.1	46	3.4	7	8.5			Good	
11	01/11/2017	06/12/2017	51.6	52.5	54.3	53	1.4	3	3.4			Good	
12	06/12/2017	05/01/2018	47.5	41.6	41.8	44	3.4	8	8.3			Good	
13													

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Overall survey --> Good precision

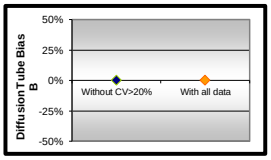
Site Name/ ID:	St Helens Street - County Hall

Precision: 11 out of 11 periods have a CV smaller than 20%

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%
Bias calculated using 0 periods of data
Bias factor A
Bias B
Diffusion Tubes Mean: µgm^{-3}
Mean CV (Precision):
Automatic Mean: µgm^{-3}
Data Capture for periods used:
Adjusted Tubes Mean: µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA
Bias calculated using 0 periods of data
Bias factor A
Bias B
Diffusion Tubes Mean: µgm^{-3}
Mean CV (Precision):
Automatic Mean: µgm^{-3}
Data Capture for periods used:
Adjusted Tubes Mean: µgm^{-3}



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Diffusion Tube Bias Adjustment

Following the resumption of automatic air quality monitoring at the Chevallier Street site (IPS3) in December 2016, for the first time in several years it has been possible to compare mean collocated diffusion tube values with data captured by the cheminescence analyser using the AEA_DifPAB_v04.xls spreadsheet to obtain a local bias adjustment factor of 0.91 (see Figure C.3c).

Consulting the *National Diffusion Tube Bias Adjustment Factor Spreadsheet Version 03/18* published on the DEFRA LAQM Support website, for the SOCOTEC, Didcot laboratory; preparation method 50% TEA in acetone; for the year 2017, a bias adjustment figure of 0.77 was obtained based on 27 studies.

With a 17% difference between the two values, the choice of the bias correction factor to be applied will have a significant effect on the diffusion tube monitoring output. Having given due consideration to the guidance given in Box 7.11 of LAQM.TG16, a decision was made to apply the relevant national coefficient: a choice consistent with the last five annual reports submitted by Ipswich Borough Council. The reasons for this decision were:

- the more robust nature of the nationally derived figure (based on 27 collocation studies rather than one);
- the increased tolerance of different sampling environments offered by national factors; and
- the lack of recent continuous analyser data to benchmark this year's data against.

Diffusion Tube Annualisation

The special project included in this year's report only collected data for 9 months during 2017. As Para 7.190 of LAQM.TG16 states that *"for any monitoring sites with fewer than 9 months' worth of data, it is necessary to perform annualisation",* the data sets from the two monitoring sites with missing data points (SP3 and SP22) have both been annualised in accordance with the procedure detailed in LAQM.TG16 Boxes 7.9 and 7.10.

This adjustment was undertaken using whole year datasets from the following AURN monitoring sites (all within a 50 mile radius of Ipswich and with data capture rates of in excess of 85%):

- Southend-on-Sea (UKA 00409) – Type: Urban Background;
- St Osyth (UKA 00445) – Type: Rural Background; and
- Norwich Lakenfields (UKA 00549) – Type: Urban Background.

Diffusion Tube Distance Correction

Wherever possible diffusion tube monitoring locations are selected to be representative of exposure. However, where this is not practicable measurements should be adjusted to estimate the nitrogen dioxide concentration at the nearest location relevant for exposure.

Where necessary, this correction has been undertaken using the *NO_2 Fall-Off with Distance Calculator Version 4.2* available on the Defra LAQM Support website along with mean background NO_2 concentrations obtained from the 2015-based background NO_2 map for 2017.

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

Figure D.1 – Overview of Ipswich AQMA boundaries and Monitoring Locations [(1)]

Figure D.2 – Ipswich Air Quality Management Areas 1 and 4 (1)

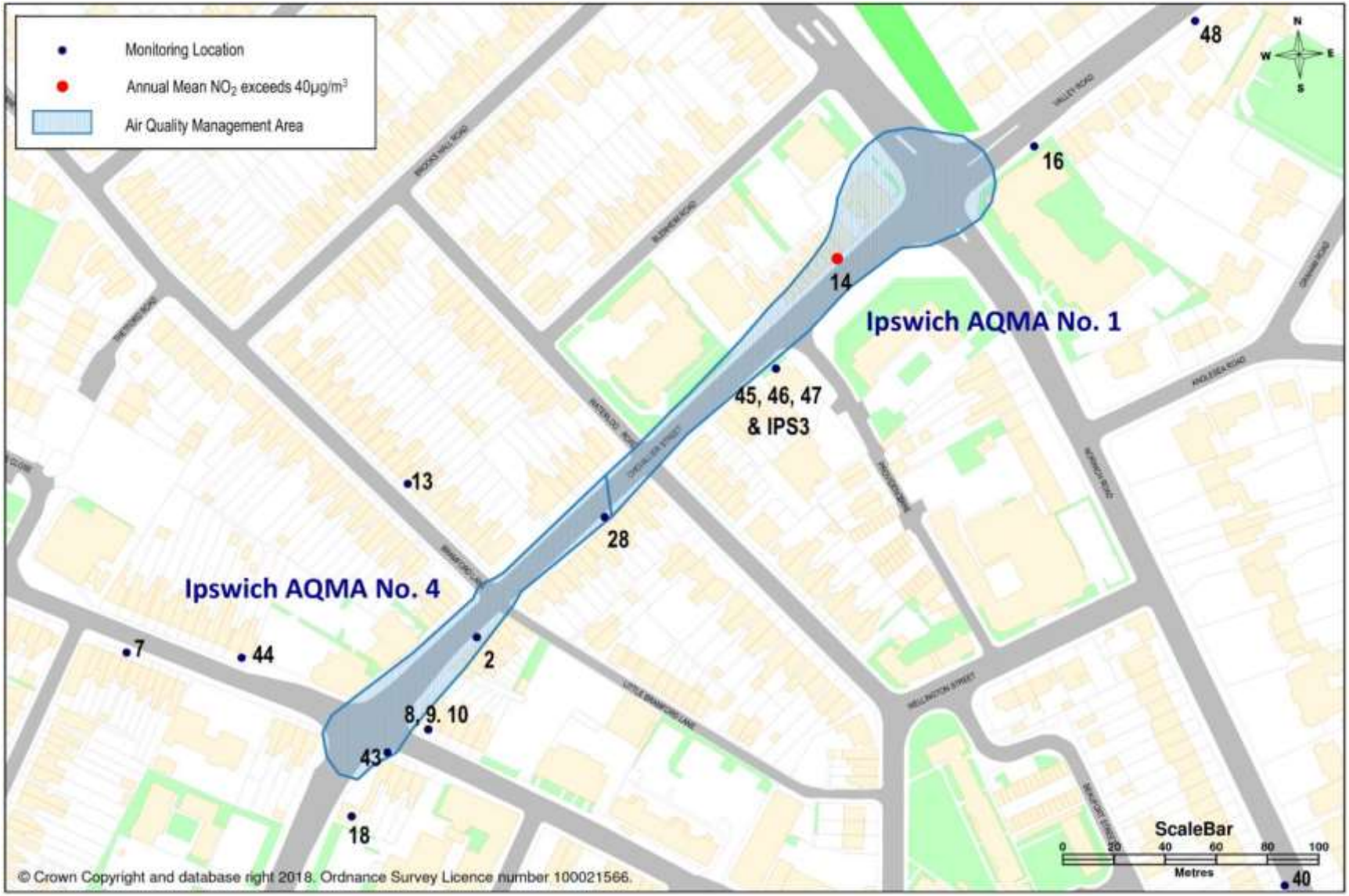


Figure D.3 – Ipswich Air Quality Management Area 2 (1)

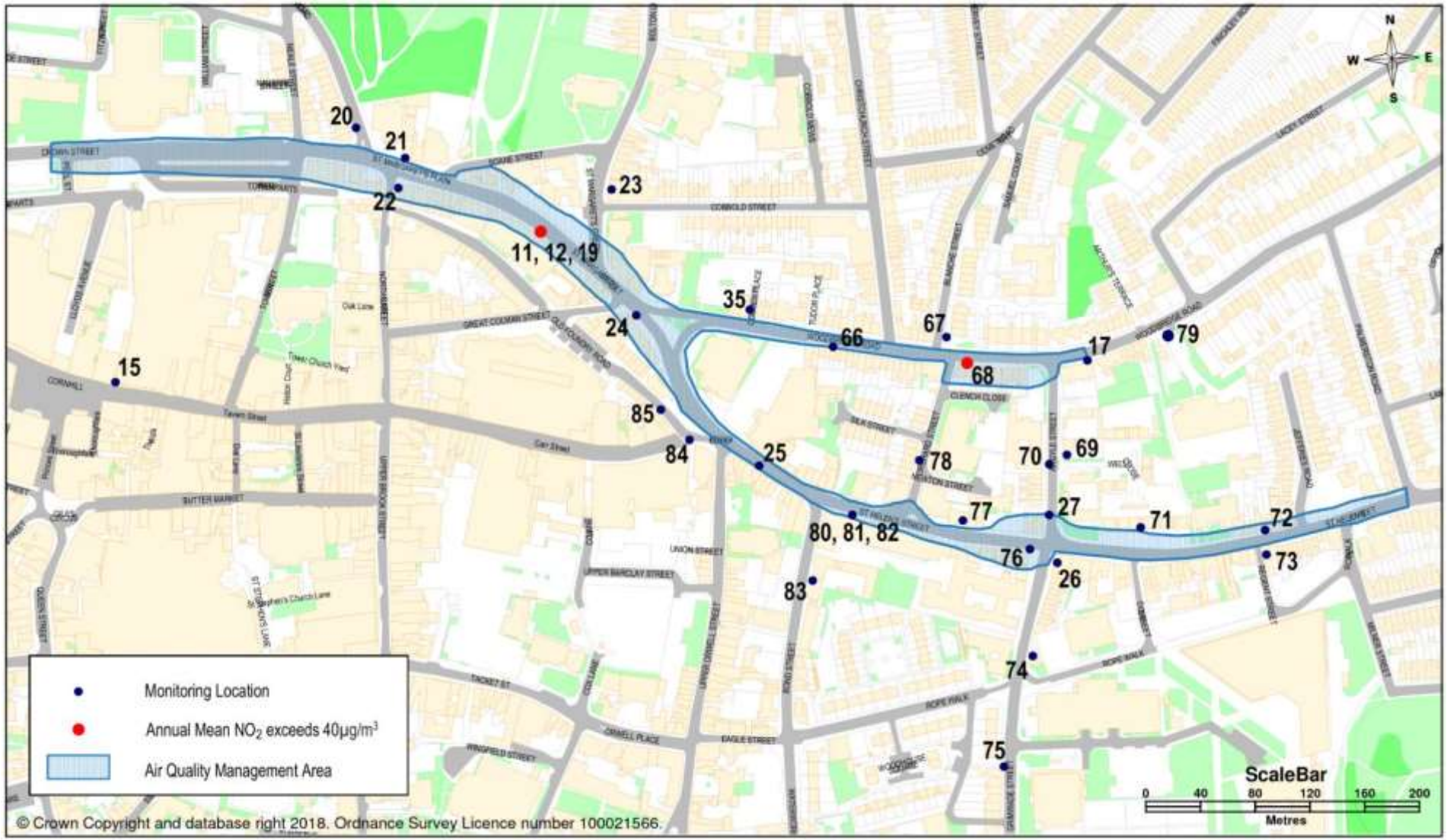


Figure D.4 – Ipswich Air Quality Management Area 3 (1)

Figure D.5 – Ipswich Air Quality Management Area 5 (1)

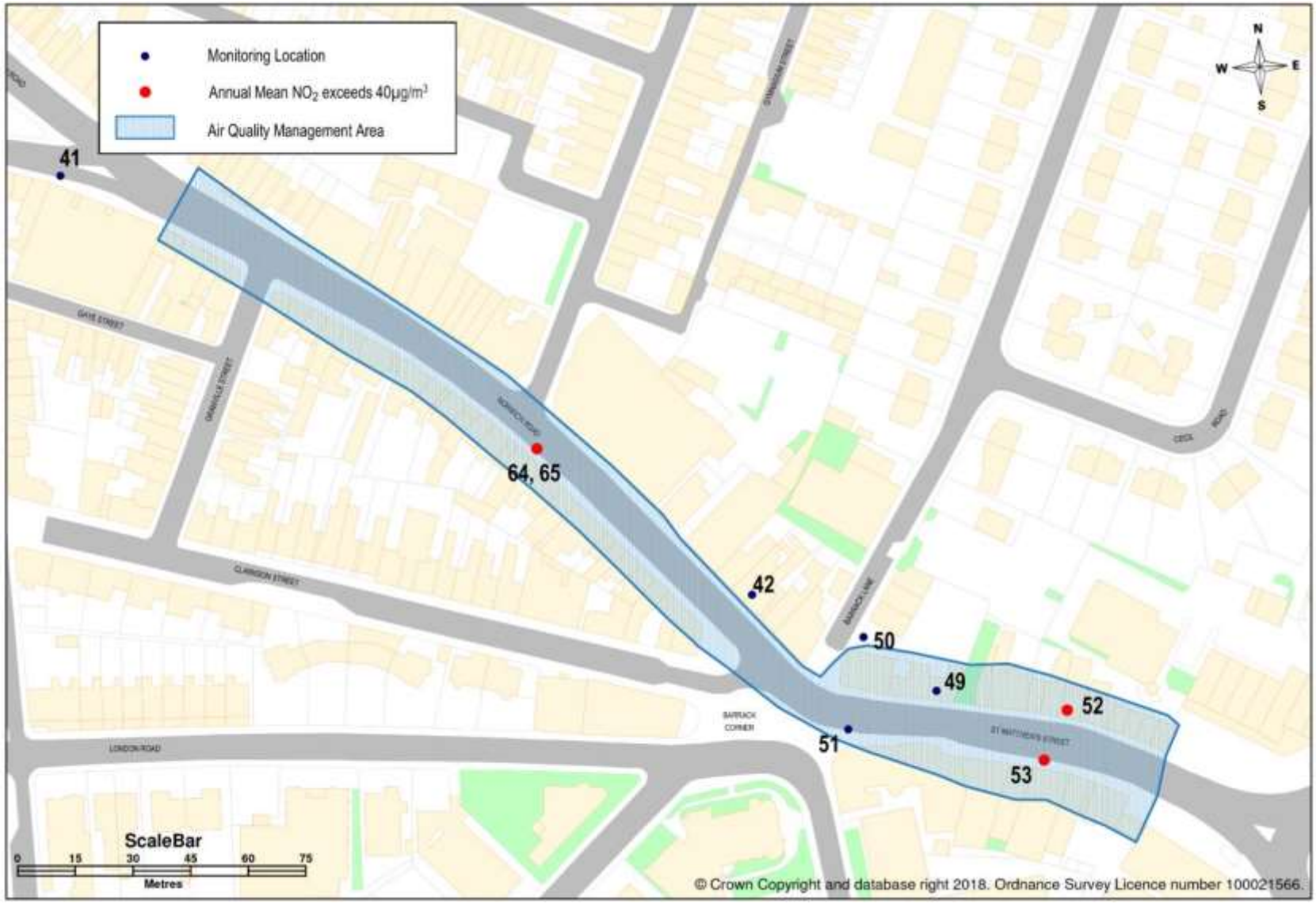
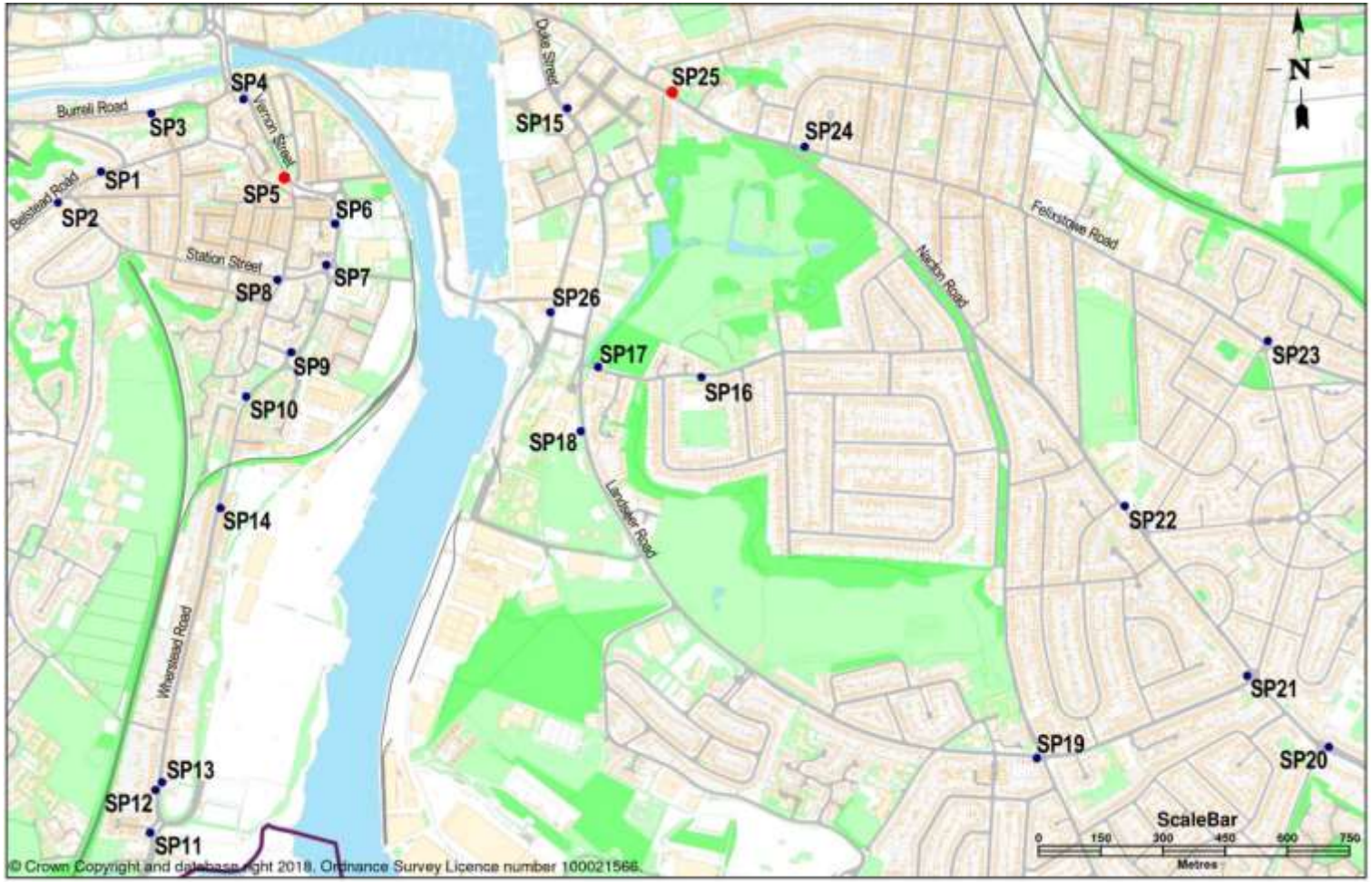


Figure D.6 – Special Project – Orwell Crossing Monitoring Locations



Notes:

(1) Monitoring locations at which the distance corrected annual mean NO_2 level, bias corrected using the national factor, exceeds the objective of 40µg/m^3 are shown in red.

(2) Monitoring locations at which the annual mean NO_2 level, bias corrected using the national factor, exceeds the objective of 40µg/m^3 are shown in red.

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
AURN	Automatic Urban and Rural Network
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
JSNA	Joint Strategic Needs Assessment
LAQM	Local Air Quality Management
LAQM.PG16	Local Air Quality Management Policy Guidance (PG16) [April 2016]
LAQM.TG16	Local Air Quality Management Technical Guidance (TG16) [February 2018]
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
SCC	Suffolk County Council

Abbreviation	Description
SO_2	Sulphur Dioxide
SPD	Supplementary Planning Document

References

- DEFRA, (2018). *Local Air Quality Management: Technical Guidance (TG16)*. London [https://tinyurl.com/yaegeqpm]
- Health and Wellbeing Suffolk, (2015). *Active for Life: Suffolk Walking Strategy 2015 – 2020.* Ipswich [https://tinyurl.com/y99xh3lo]
- Ipswich Borough Council, (2008). *Local Air Quality Management – Ipswich Air Quality Action Plan.* Ipswich [https://tinyurl.com/ybu3ys9d]
- Ipswich Borough Council, (2015). *2015 Air Quality Detailed Assessment Report for Ipswich Borough Council*. Ipswich [https://tinyurl.com/y78nypla]
- Ipswich Borough Council, (2016). *Cycling Strategy Supplementary Planning Document*. Ipswich [https://tinyurl.com/y7wag62m]
- Suffolk County Council, (2015). *Suffolk Cycling Strategy*. Ipswich [https://tinyurl.com/y99w58ez]
- Suffolk County Council, (2017). *Healthy Suffolk JSNA Topic Report on Air Quality.* Ipswich [https://tinyurl.com/y8dq6t2r]