2019 Air Quality Annual Status Report (ASR)

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

June 2019

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Executive Summary: Air Quality in Our Area

Air pollution levels within the Borough of Slough continue to remain a significant environmental and public health concern and Slough Borough Council, the 'council', continues to work hard to improve air pollution and to comply with national air quality objectives (AQOs) and EU limits.

Good air quality is not only important to improving health outcomes of our residents, but also for enhancing the natural and built environment and for attracting residents, visitors and businesses to Slough.

The Low Emission Strategy was taken by Cabinet on 17th September 2018. The Strategy was adopted as a Council Strategy at Full Council on 27th September 2018, therefore Slough Borough Council are committed to the objectives contained within the Strategy. The wellbeing of those living in Slough are the highest priority and implementation of the Low Emission Strategy and its Programmes over the next few years will improve air quality and therefore health for all of those living and working in the Borough.

The Town Centre Transport Strategy (2016-2036) and update to our Transport Plan are to be completed this year. These plans focus on increasing public transport infrastructure, to reduce car dependency and encourage a modal shift away from car and reduce congestion, whilst supporting the aims of the Low Emission Strategy (2018-2025). This will be done by promoting sustainable travel such as use of E-bikes and electric vehicles, in transition to a low emission economy.

Slough currently has five Air Quality Management Areas (AQMAs), which exceed the EU limit for NO_2 (40µg/m^3). In response to this, Air Quality Action Plans (AQAPs) were established for AQMA 1 and AQMA 2 (2006) and also AQMA3 and AQMA 4 (2012), with an extension to AQMA 3 in 2017. These plans will be updated under one comprehensive AQAP to reflect regeneration of the town centre and impacts posed by upcoming major infrastructure schemes including the Heathrow expansion and Smart M4. It will also include current and emerging AQMAs, determined by air quality modelling. It is predicted that Langley will be designated as an AQMA in the future as infrastructure and hence traffic increases in the area.

The AQAP will also address sources of local particulate pollution from construction sites and combustion processes Industrial processes are currently regulated by the Local Authority and Environment Agency under the Environmental Permitting Regulations.

The Low Emission Strategy (2018-2025) forms part of the new AQAP, which aims to reduce NO_2 emissions from road transport and improve health outcomes. This will be completed by implementing electric public infrastructure such as fast and rapid electric charging points and promote the operation of electric and ultra-low emission vehicles, including electric car clubs and electric taxis.

A feasibility study for the implementation of a Clean Air Zone (CAZ) in Slough will be conducted in 2019/20, delivered in line with the Slough Transport Strategy. It sets emission standards to encourage the uptake of EVs and ULEVs which meet the latest European Emission Standard, applicable to public transport vehicles, HGVs and LGVs. The CAZ may be charging or non-charging. Should the feasibility study demonstrate that a charging CAZ is necessary in Slough to improve air quality in the shortest possible time, an application will be made to the Secretary of State to introduce such a zone..

Air quality cannot be tackled alone by the Council. The public, businesses and other public and third party sectors need to also play a significant role; either through changes of lifestyle to reduce dependency on the car (modal shift away from the car), increased walking and cycling, adoption of sustainable travel plans, and adoption of EV infrastructure and operation of lower emission vehicles. The Council will lead by example, by adopting policies to increase its EV fleet, reduce grey fleet emissions, and promote modal shift amongst its workforce,

Air Quality in Slough

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].

Sources of Poor Air Quality

The principal source of poor air quality within Slough relates to road traffic emissions, but local construction activities (there is significant regeneration taking place in Slough), diesel trains operating on the Great Western Mainline (some of these are being changed to electric), the town centre bus station (as fleet is relatively old), local industrial processes, larger combustion processes (Energy from Waste Incinerators), airport emissions (affect our receptors in Colnbrook and Poyle), and back-up diesel generators (data centres), as well as transboundary pollutants (e.g. pollutants outside Slough) also contribute to the background pollution levels, and will continue to do so. The Borough has declared 'smoke controlled areas' across Slough's wards, and wood burning and smoke is not known to be a significant source of emissions within Slough, however updated baseline modelling will determine this.

Future significant sources of air pollution relating to permitted and DCO approved developments over the next 5-10 years within Slough relate to:

- Construction and Operation of M4 Smart Motorway (up to 15,000 additional vehicle movements a day during its operation from 2022 (peaking in 2030) and re-routing of traffic through Slough at times during the construction phase (2019-2021) (Impacts: M4 AQMA, Tuns Lane AQMA, Town Centre AQMA and Brands Hill AQMA)
- Construction of M4 construction compound 9 at Sutton Lane on the edge of the Brands Hill AQMA (2019-2021)

[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 charges in air quality, May 2013

- Operation of Sand and Gravel extraction 'Cemex' sites at Riding Court Road and North Park Road (up to 450 HGV movements a day through Brands Hill/M4 AQMAs and Langley area) (2018 – 2030)
- Rail Borne Aggregate Distribution Depot and Concrete Batching Plant at Thorney Mill Sidings, Thorney Mill Road, Iver, (up to 82 HGV movements a day through Brands Hill AQMA and Langley) (2019 onwards)
- Significant Town Centre regeneration (construction HGV movements and operational vehicle movements) up to 6,000 residential properties, new offices and commercial and retail uses (Town Centre/Tuns Lane AQMA)(2016 – 2030)
- Western Rail Access to Heathrow significant construction HGV movements through Langley and Brands Hill AQMA (2021 – 2026)
- Heathrow Expansion - the most significant development yet to be determined by the Secretary of State is Heathrow's 3rd runway (runway located within Slough) and associated airport operations, including the re-routeing of the A4 and diversion of the A3044 into Slough (Construction HGV and operational movements) (2022 – 2040) (All AQMAs).
- Demolition, and construction of the new Grundons Energy from Waste facility 200m north of the current site to accommodate the 3rd runway, including a 55m stack (20m lower than the current stack) (2020 – 2022) (Iver AQMA and Brands Hill AQMA)

Air Quality Modelling and Air Quality Action Plan Measures

Detailed air quality modelling and source apportionment (e.g. which vehicles are mostly responsible for air pollution) was commissioned in 2015[4] to assist with the development of the Councils low emission strategy (the modelling used 2014 air quality data, road traffic data and Heathrow weather data). The modelling determined that local road traffic **contributes around 50% towards NO_2 concentrations** at relevant receptors (i.e. those modelled within the AQMAs and surrounding area).

[4] http://www.slough.gov.uk/pests-pollution-and-food-hygiene/low-emission-strategy-2018-2025.aspx

The remainder is due to background levels that prevail in the area. Light passenger diesel cars are the main source of air pollution in the Borough accounting for between (7% and 30% of the total NO_2 concentrations). Heavy duty vehicles; artic and rigid HGVs and buses also contribute significantly to poor air quality in the Brands Hill AQMA.

The Council will commission further detailed air quality modelling and source apportionment during 2019, to take account, as far as practicable, the above 'significant development schemes and future traffic growth forecasts in Slough' as well as baseline monitoring data, air quality monitoring, traffic count data and weather data. In addition to running transport and low emission strategy scenarios, to determine:

- The baseline NO_2 concentrations within Slough
- If any existing AQMAs should be revoked or amended
- If any new AQMAs should be declared within Slough (particularly Langley due to the impact of the Western Rail Link to Heathrow)
- The effectiveness of the Low Emission Strategy/Air Quality Action Plan measures in addressing poor air quality
- The effectiveness of implementing transport measures (e.g. dedicated bus lane, junction re-design etc.) in addressing poor air quality
- The effectiveness of implementing a Clean Air Zone/Zones within Slough to deal with poor air quality

Air Quality Monitoring and Future Monitoring Proposals

The Council has monitored air quality for over 20 years and operates both passive (diffusion tubes) and continuous air quality monitoring stations in the Borough. The Council has upgraded its air quality monitoring network by adding 3 new air quality monitoring stations within the AQMA 4 (Wellington Road, Town Centre), AQMA 2 (London Road, Brands Hill) and AQMA 3 extension (Windmill, Bath Road) in October 2017. 2018 represents a full year dataset of monitoring stations introduced in 2017

and is presented in this Annual Status Report, which will be used to inform air quality modelling and source apportionment work to be updated this year.

The Council now continuously monitors air quality at six locations; 6 monitoring stations monitor nitrogen dioxide (NO_2) concentrations; 4 monitoring stations monitor particulates (PM_{10}) concentrations, using established reference methods (TEOM or BAM). The Council also currently operates 2 indicative particulate monitors these measure ($PM_{1.0}$), ($PM_{2.5}$) and ($PM_{1.0}$). Additionally, the Council has access to air quality data (NO_2), (PM_{10}) and ($PM_{2.5}$) from a monitoring station operated by Grundons Lakeside Energy from Waste plant in Colnbrook. Access to real-time and historic monitoring data can be found in the following hyperlink http://sloughair.aeat.com/.

Air quality monitoring stations at Colnbrook, Pippins (SLH 3) and Salt Hill (SLH 4) are old stations and frequently suffer from water leaks. Slough Borough Council are in discussion with their current monitoring station provider to replace the monitors at Colnbrook with a new walk-in cabinet. Salt Hill monitoring station is planned to be decommissioned, as it is close by to the Windmill monitor (SLH 12). Chalvey monitoring station (SLH 7) is also due to be replaced and there are plans to install a continuous roadside monitor in Langley to observe continuous air quality trends in the area and aid determination of an AQMA in the future for Langley.

The Council also operates a comprehensive (non-automatic) passive diffusion tube network. The Council expanded its diffusion tube network in late 2016 to cover Langley village and the surrounding area, adding a further 5 monitoring sites. The Council has also co-located diffusion tubes with its new air quality monitors in late 2017. Additionally, the Council decommissioned its temporary air quality monitoring station (TRL) and relocated the diffusion tubes to three new sites (Tuns Lane, Windsor Road and Castle Street) in 2017. Full datasets for these locations were recorded in 2018. Please refer to **Appendix D** to see maps of all the air quality monitoring sites in the Borough. The Council operated 65 diffusion tubes across 53 sites in 2018. The diffusion tubes monitor nitrogen dioxide (NO_2) concentrations. These tubes are collected on a 4 or 5 weekly basis and analysed at a UKAS accredited laboratory (SOCOTEC, Didcot). The 2018 ratified data is reported within the **Appendix A.3** of the report.

Slough Borough Council

Slough Borough Council renewed the diffusion tube contract to commence in January 2019, which was subsequently awarded to Gradko International (3 year contract). Plans are in place to increase the current diffusion tube provision to 100+ diffusion tubes. This will account for:

- Monitoring commissioned by Highways England to monitor the impact of the Smart M4 Scheme on nearby receptors.
- Support of an upcoming project which focuses on trialling low cost air quality sensors outside of schools to monitor congestion, which will commence in summer 2019.
- Background monitoring in open spaces to determine the NO_2 'clean' baseline recorded by diffusion tubes.
- New monitoring in residential locations that are affected by high % volume of HGVs on the local road network (Poyle area).

One of the key objectives within Slough's 5-year plan is to protect the livelihood and wellbeing of children. As the health impacts related to poor air quality are becoming more apparent, the need to monitor the impact of vehicle emissions outside of schools is increasing. Evidence obtained through monitoring can be used to support the aims of the Low Emission Strategy, encourage behavioural change of parents to use sustainable travel methods and engage with public health campaigns.

On 30th November, Slough Borough Council submitted an application to receive funding for the trialling of low cost air quality sensors to aid implementation of the Low Emission Strategy, and on 29th March 2019, Slough Borough Council received confirmation that the application was successful.

The project will focus on NO_2 emissions originating from idling vehicles and congestion around three local schools, to produce an evidence base from which implementation of sustainable travel measures can be used to encourage behavioural change. This will be achieved by installing Vaisala air quality sensors on lamp posts close to school boundaries, so the impact of idling vehicles during peak school pick up and drop off times can be monitored. Continuous monitoring of air quality outside of schools will also allow the impact of air quality awareness and public health campaigns to be observed.

One Vaisala sensor will be co-located with the continuous monitoring station and diffusion tubes in Colnbrook (SLH 3) and each sensor will be co-located with one diffusion tube, to allow sensor accuracy to be determined.

Air Quality Management Areas

Air Quality Management Areas (AQMAs) are defined geographical areas where air pollution levels are, or are likely to, exceed national air quality objectives (AQOs) at relevant locations (where the public maybe exposed to harmful air pollution over a period of time e.g. residential homes, schools etc.). **These are also shown within Appendix D.**

Five AQMAs have been declared within Slough due to breaches of the annual mean concentrations for nitrogen dioxide (NO_2), which is **40µg/m^3.** Details of the AQMAs can be found on https://www.slough.gov.uk/pests-pollution-and-food-hygiene/air-quality-reports.aspx and more detailed maps can be found on the Defra Website https://uk-air.defra.gov.uk/aqma/maps.

AQMA1: including land adjacent to the M4 along the north bound carriageway (junctions 5-7) and southbound carriageway (junction 5 – Brands Hill) up to a distance of approximately 100m from the central carriageway. **As of June 2019 there are currently 559 residential properties located within AQMA1.**

AQMA 2: incorporates A4 London Road east of junction 5 M4, 300m past Sutton Lane along the Colnbrook by- pass and covers the entire gyratory system on A4 and both side of the A4 carriageway. **As of June 2019 there are currently 28 residential properties located within AQMA 2.** A new residential development (Rogans) is being developed opposite the A4 gyratory (within the AQMA 2) will at least double the number of residential properties exposed.

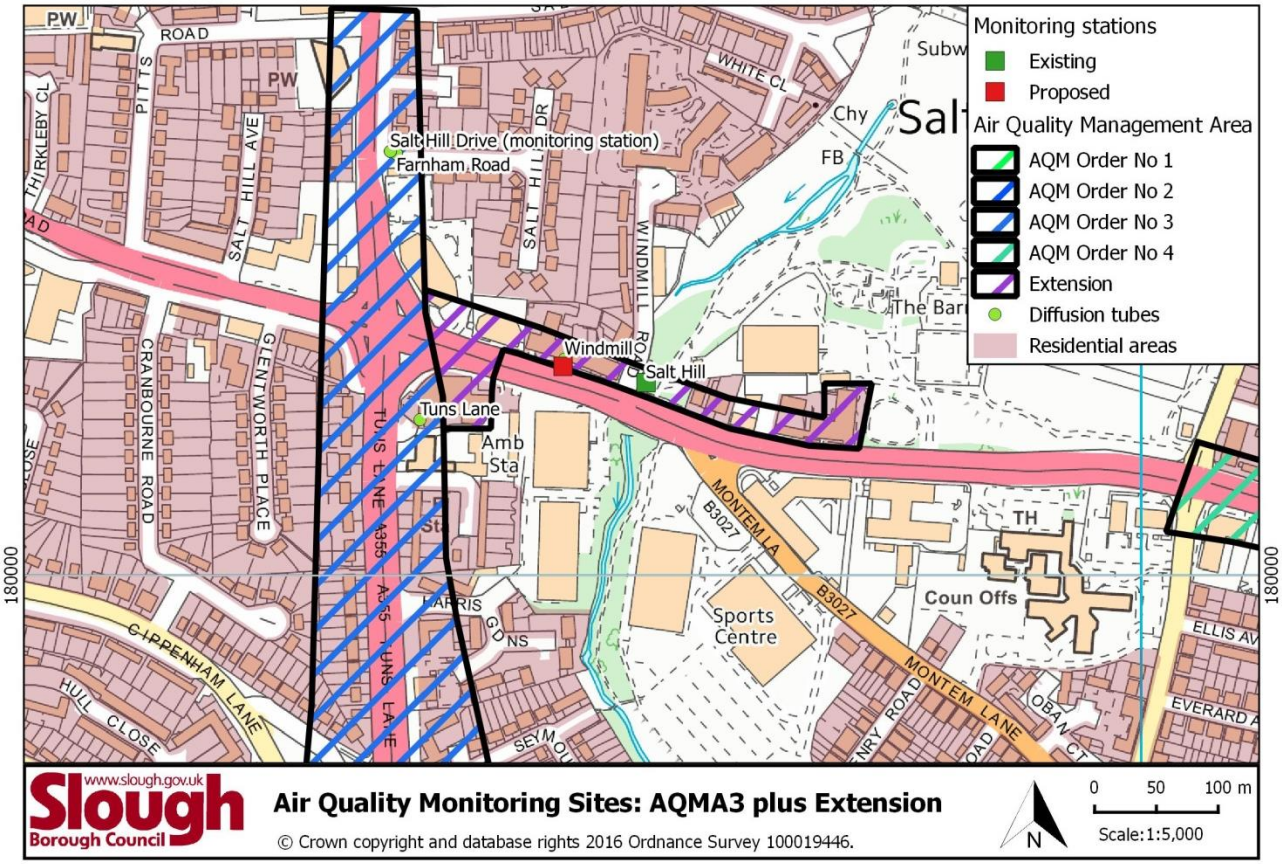
AQMA 3: incorporates the A355 Tuns Lane from junction 6 of the M4 motorway in a northerly direction to just past its junction with the A4 Bath Road approximately 200m north along A355 Farnham Road, the area is known as the "Three Tuns". **As of June 2019 there are currently 351 residential properties located within the AQMA 3**.

AQMA 4: incorporates the A4 Bath Road from the junction with Ledgers Road/Stoke Poges Lane, in an easterly direction, along Wellington Street, up to the Sussex Place junction. **As of June 2019 there are currently 823 residential properties located within the AQMA4**.

AQMA Order 3 Extended:

The Council declared the new extended AQMA 3 on 10th May 2018 and formally submitted this to DEFRA, see Figure 1.1. **As of June 2019 there are 227 residential properties located within the extended AQMA3.**

Figure 1.1 – Map of AQMA 3 extension



In June 2019, **1988 residential properties** were located within one of Slough's AQMAs (included the extended AQMA3). There are no schools located within Slough's AQMAs. The playing grounds of Foxborough Primary School, just skirts the edge of the AQMA1 M4. The number of residential properties is set to increase as

more residential units will be built within the Town Centre and along the A4 Bath Road.

Air Quality Concentrations 2018

This report covers the air quality results obtained for 2018 and compares these results over the past five years (or less time if sites are new) at the same sites to determine if there are any clear trends in pollution levels. These rolling trends must be treated with caution as they do not include statistical confidence, and air quality can change significantly from one year to the next due to metrological conditions and pollution episodes. The air quality trend across the majority of sites shows a decrease in concentrations in 2018 when compared with the previous years data, which is also the case with the trend from 2016 to 2017, however pollution concentrations need to be continually monitored over the next few years to determine if air quality is improving in the Borough, or if the improvement is caused by favourable meteorological or climatic conditions. Additionally, the national trend has tended to show a decrease in pollution concentrations (both PM and NO_2) in 2018.

Table 1.1 shows the air quality results in 2018 (after been ratified, bias corrected, annualised and distance corrected – *note some of the receptors are closer to the main road than the monitor*) that identifies 3 residential monitoring locations in breach of the national AQO for annual mean nitrogen dioxide (NO_2) in 2018, and 11 are within 10% of the national AQO.

Sites that have been included for distance correction include all sites reported in ASR 2018, sites that are located close to receptors and sites that are over or within 10% of the AQO. Values in red are above the AQO (40µg/m^3), values in black are within 10% of AQO and values in green are below the AQO.

- There are breaches of the AQO in AQMA 2 and 4 at residential receptors. AQMA 1 and 3 show improvements in air quality; however this is not enough evidence to suggest the AQMAs should be revoked. Air quality improvements in AQMA 1 may be due to temporary closures of the M4 overnight for the construction of the Smart Motorway, and the use of variable speed limits

through sections being worked. This is expected during the construction phase of the M4 Smart motorway.

- The Windsor Road site ID 49 NO_2 concentrations have dropped significantly by 8µg/m^3. This is a similar case for Windsor Road ID 21, which has dropped from 40.9µg/m^3 in 2017 to 35.0µg/m^3 in 2018, which suggests that the town centre AQMA may not need extending. These sites will be kept under close review and if modelling indicates potential breaches of the AQOs in the future then this may result in an extension along Windsor Road.

- Windmill Site IDs 57, 58 and 59 are triplicate co-location diffusion tubes located on the Windmill air quality monitoring station. Although NO_2 concentrations have decreased, the bias corrected data still indicates a breach in AQO, therefore this AQMA should not be revoked.

- Tuns Lane (B) ID 50 is within 10% of the AQO when distance corrected to the closest relevant receptor and has increased slightly from 2017 to 2018, therefore AQMA 3 should not be revoked.

- Langley Site ID 53 has shown improvement and is no longer within 10% of the AQO. ID 56 shows no change from 2017 and is within 15% of the AQO, and ID 51 NO_2 concentrations have improved by 1.8µg/m^3. Although these sites show improvements, the sites will be kept under review as it is known that a number of developments are generating significant HGV traffic in this area and there are proposals by Network Rail to close the Hollow Hill Lane Bridge, subject to the granting of the DCO for Western Rail Access to Heathrow in 2019. If modelling indicates potential breaches of the AQOs, this may lead to a new AQMA being declared in the Langley area.

Table 1.1 – Distance corrected diffusion tube results for 2018

Site ID	Site Name	AQMA	Distance to the kerb of nearest main road from 'receptor exposure' (m)	Distance to the kerb of nearest main road from diffusion tube (m)	Bias corrected and annualised concentration for diffusion tube	Distance corrected annual mean NO_2 at 'relevant receptor' µg/m3
8	Grampian Way	1	20	35	34.8	38.8
9	Tweed Road	1	13	22	32.6	35.3
11	Torridge Road	1	30	50	30.0	32.6
22	Winvale	1	20	31	33.8	36.1
10	London Road	2	12.5	4	44.4	37.6
18	Brands Hill	2	10.5	6	53.2	47.9
28	Rogans (Colnbrook)	2	8.5	4.5	44.0	40.1
63	Brands Hill AQ monitor station	2	16.5	4	43.2	35.2
64	Brands Hill AQ monitor station	2	16.5	4	43.4	35.3
65	Brands Hill AQ monitor station	2	16.5	4	43.3	35.3
43	Windmill Bath Rd	3	7.5	7.5	34	34
50	Tuns Lane (B)	3	13	4	45.8	38.9
57	Windmill Monitor A4	Ext 3	12	7.5	41.6	39.0
58	Windmill Monitor A4	Ext 3	12	7.5	41.8	39.2
59	Windmill Monitor A4	Ext 3	12	7.5	41.5	38.9
4	Lansdowne Avenue	4	5.5	13.5	33.8	37.0
5	Princess Street	4	12	12	34.4	34.4
29	Yew Tree Road	4	6	1.5	52.7	43.7
37	Blair Road	4	11	11	39.9	39.9
40	Wexham	4	11	11	38.6	38.6

	Road					
46	Cornwall House	4	11	5	40.1	36.8
21	Windsor Road 1N	NO	10.5	2.5	35.0	31.8
49	Windsor Road (B)	NO	6	1.5	40.0	35.7
51	Langley Road	NO	10	2.5	36	31.8
53	High St Langley (A)	NO	5.5	2	37.9	34.8
56	Sutton Lane	NO	7.5	4	37.6	35.1

Air Quality Trends Over 5 Years

Air quality monitoring data for 2018 shows a slight decrease in pollution concentrations; this is not unusual as some years will show variations in pollution levels due to weather and climate. This tends to follow the general trend in the UK for 2018. The short-term 5 year trends are consistently showing a slight reduction in pollution concentrations in most locations.

The average reduction in concentrations of annual mean (NO_2) over the past 5 years across all diffusion tube monitoring sites and one continuous monitoring site (Chalvey) across the Borough is **1.33µg/m3 per year** (3.25% of the AQO). This is an improvement from the previous 5 year trend reported in ASR 2018 (average 1.15µg/m^3).

However, the rate of improvement required to meet the AQOs is still relatively slow and air pollution remains a significant issue for Slough residents and will continue to do so for some years to come as there are clearly some stubborn hotspots of air pollution, as well as potential for new areas of relevant exposure (Windsor Road and Langley) to be declared. Concentrations vary significantly between diffusion tube monitoring sites located within our AQMAs.

Whilst some diffusion tube sites within our AQMAs are demonstrating compliance with the national AQOs, others are still showing significant breaches. Also, despite the diffusion tube network undergoing a bias correction (i.e. statistical correction against our continuous air quality monitoring data), diffusion tube accuracy is still ± 25% and continuous air quality monitoring stations accuracy ± 10% at best. Therefore, in order to be confident that the air quality concentrations are below the

national AQOs the levels should, at the very least, be consistently demonstrating levels 10% below the national AQOs (i.e. 36µg/m^3) and over several years before considering the revocation or amendment of an AQMA.

The 5 year average concentration at most diffusion tube sites within our AQMAs and extended AQMA 3 exceed 36µg/m3. Torridge Road and Tweed Road (AQMA 1), London Road (B) (AQMA 2), Farnham Road (AQMA 3), Wellesley Road and Wellington Street (AQMA 4) have fallen slightly below 36µg/m3. Although this indicates an improvement in air quality, it is recommended that none of the AQMAs are revoked until a clear declining trend over many years can be observed, to exclude natural fluctuation.

Where diffusion tubes within our AQMAs are demonstrating exceedances of the national AQOs, the % rate of concentration improvement required at the nearest residential receptors to meet these AQOs varies between 10.2% and 24.8% (to meet 36µg/m^3). Of equal concern is the number of new residential builds being developed in areas already experiencing poor air quality. Additional diffusion tube monitoring sites have been set up over the past 3 years. The 5 year trends will be reported in future ASRs.

The Chalvey continuous monitoring station SLH 7 located in our waste transfer station and recording air pollution from the M4 AQMA1 demonstrated a significant decrease in air pollution concentrations in 2017 (35µg/m3) when compared to 2016 (41µg/m3). This continues to be the case in 2018, declining further to 32 µg/m3. The past 5 years trend is showing a negative trend (-0.59 µg/m3 per annum, see Table 3.1), contrasting to results from 2017 which indicated a slight increase in NO_2. This site is located further away from the motorway then a number of our properties on Spackmans Way. The residential property on Yew Tree Road ID29 is demonstrating an increase in air pollution in 2018 at 52.7µg/m3 (increase of 9.8µg/m3). This has fluctuated over the last 5 years, but remained above the national AQO. It should be noted that data for Yew Tree Road (ID26) no longer represents the front building façade due to frequent falling of tubes, so consequentially the tube was relocated <20cm to the left on a drainpipe. Relocation has caused the diffusion tube to be more sheltered and explains the drop of NO_2 from 48.1µg/m3 to 31.5µg/m^3 for this location. To have representative façade monitoring, a new diffusion tube location will be installed close to the original site in a more secure location.

Finally, there is no conformity to the change in concentrations from one monitoring site to the next even within the same AQMA. This could be down to how traffic is managed on the road network, and where queueing of traffic occurs. It could also be due to how traffic growth has affected some parts of network more than others. Also the impact of weather conditions (wind direction, precipitation and temperature) can have a significant effect on air pollution; so for some years air pollution levels will be higher than others (and this trend appears to be regional and sometimes national), additionally there may be significant changes to background concentrations from one year to the next, which can also vary significantly from one site to the next even within the same AQMA.

The Government submitted its draft Air Quality Plan in May 2017 and final Air Quality Plan[5]. The PCM modelling undertaken by DEFRA indicated that Sloughs Roads (A4 and A335) breached EU Limits for annual mean of nitrogen dioxide (NO_2) of **40µg/m^3** in 2015 at 3 locations out of 12, which would continue to breach **EU Limits until 2018**. In response to this, DEFRA published the Clean Air Strategy in January 2019[6], which describes actions to be taken to improve air quality in the UK. DEFRA has not identified Slough as an authority that is required to prepare a detailed feasibility assessment or is required to adopt a Clean Air Zone, at this time.

However, it is also recognised that air quality hotspots are going to become even more localised and importance of action at a local level will increase. The effort to reduce NO_2 also needs to be targeted on the sources that make the biggest contribution to the problem: as road vehicles contribute about 80% of NO_2 pollution at the roadside and the growth in the number of diesel cars has exacerbated this problem.

Actions to Improve Air Quality

The council has developed Air Quality Action Plans that cover AQMA 1 and AQMA 2 (2006) and also AQMA3 and AQMA 4 (2012) these can be accessed on the following web link: https://www.slough.gov.uk/pests-pollution-and-food-hygiene/air-quality-reports.aspx. There is a need to update these Air Quality Action Plans and make them more relevant to reflect the significant regeneration of town centre

[5] Defra, UK Plan for tackling roadside nitrogen dioxide concentrations, July 2017
[6] https://www.gov.uk/government/publications/clean-air-strategy-2019

development, as well as considering the transport impacts of major permitted infrastructure schemes (Smart M4) and potentially the expansion of Heathrow Airport and Western Rail Access to Heathrow.

The Council will update its Air Quality Action Plans under one comprehensive Air Quality Action Plan that will cover all five AQMAs as well any new emerging AQMAs during 2019/20. This allows time to evaluate the impact of air pollution in Slough during 2017 and 2018, including within the Langley area which have previously demonstrated elevated pollution levels (NO_2) at the kerbside and roadside monitoring locations. The updated AQAP will include updated air quality modelling using the latest transport model and traffic growth forecasts, and will also consider the effect of the low emission strategy programme on air quality levels as well as the effect of implementing a Clean Air Zone in Slough.

The Council reported to Department of Environment, Food and Rural Affairs (DEFRA) in 2018 on 41 measures that are aimed at improving directly or indirectly air quality in Slough. Slough measures are reported within the Southeast Zone[7].

The number of measures reported within this 2019 ASR stands at 43 (one additional measure for 2019). A number of these measures are still ongoing, some have yet to start, and others that were completed in 2016 were removed in ASR 2018. Whilst these measures may have had some positive effects on air pollution concentrations and contribute towards the downward trend, there is a need for more robust measures to be co-ordinated through a live strategy (e.g. Low Emission Strategy and emerging Transport Strategy).

It is also clear, that improving air quality requires a multi-disciplinary approach across all Council Services and its Partners and across the wider residential and business community. The Council has developed a Low Emission Strategy (2018-2015) aimed at reducing road transport emissions and improving health outcomes.

Slough's Low Emission Strategy

The objective of the Low Emission Strategy (2018 - 2025) is to focus on the short to medium term (over next 1-8 years) with the following principal outcomes:

[7] https://www.gov.uk/government/publications/air-quality-plan-for-reducing-nitrogen-dioxide-no2-in-south-east-uk0031

- Improving air quality within the whole Borough.
- Improving communication and raising awareness of vehicle emissions and their impact on air quality and health (section in the LES Webpage outlines the Communication Plan in 2018).
- Implementing electric public transport infrastructure (pubic ‘fast’ and ‘rapid’ electric charging points) to cater for and allow for the acceleration of EVs in the Borough.
- Implementing and enabling the operation of electric/ULEV taxis through changes to the Licensing emission standards and provision of dedicated EV taxi infrastructure.
- Working with bus operators to upgrade the emission standards of their buses operating in the Borough (including through retro-fitting) with a view to promoting and facilitating (through the provision of low emission infrastructure) electric/hybrid/gas buses.
- To implement and operate in partnership a dedicated town centre wide electric/ULEV car club for all residents to use, and to expand the car club to transport hubs (Burnham and Langley).
- Adopting planning policies for new developments to support sustainable transport (including restrictions on parking) and implementation of low emission technologies and vehicles standards (including on site EV charging, low emission NOx boilers and requiring the latest EURO standards for HDVs servicing new major commercial developments).
- Developing planning air quality and planning guidance to promote air quality mitigation at the design stage of new development and support wider air quality improvements through off-setting mitigation.
- Requiring developers to produce sustainable travel plans that are focused on modal shift away from car use, and where this is not possible on increased uptake of ULEVs.
- The Council leading by example, by implementing Fleet Challenge and Low Emission Standards within all the Council fleet operations.

- As necessary, enforceable regulatory controls (such as the potential introduction of Clean Air Zones), subject to suitable funding, feasibility assessments and air quality modelling evidencing their effectiveness in tackling poor air quality in Slough.

Brunel Way Rapid Charger – Charges Electric Car in 30 minutes – charger has successfully been used over 800 times since its installation December 2014. The Council installed its second rapid charger at its new leisure centre in Farnham Road in 2019. The Council is looking to expand its rapid charger network to 10 rapid chargers by the end of 2021.

Transport Strategy 2019

The draft Slough Transport Strategy 2017 has been updated to reflect and address the review of Slough's Local Plan and it principal objectives for significant residential and business growth over the next 20 years. One of the main strands of the Transport Strategy is aimed at reducing impact of travel on communities (in particular air pollution) and the main emphasis is to reduce congestion.

This Strategy is focussed on the medium/long term (5-20 years) in particular ensuring significant modal shift, improved cycling infrastructure, improved public transport

service access and connectivity, constraint on town centre car parking, introduction of park and ride bus service, a dedicated ULEV mass rapid transit system on the A4 and the potential slough transit network across the north of the Borough[8]. The final strategy will be produced during 2019.

To date, there is no update on the progress with the Transport Strategy for 2019, as focus within the Council has mainly been on major infrastructure delivery. In support of the Transport Strategy 2019, the Transport Vision which describes the aspirational vision for Slough alongside Local Transport Plans, has been produced. The Local Plan core strategy consists of a suite of strategy documents, which runs until 2026. The Transport Vision went to Cabinet on 25th February 2019 and was subsequently published. Local Transport Plans tie in with Transport Vision and align with regional partners.

Conclusions and Priorities

Air Quality continues to breach national AQOs in Slough's AQMA and for some sites outside the AQMAs. The Council has prepared a low emission strategy to co-ordinate and outline robust measures to address poor air quality. The Air Quality Action Plans for all five AQMAs will be updated in 2019 under one consolidated Air Quality Action Plan. Air Quality is a priority for the Council to address.

The key challenges Slough faces in addressing poor air quality are:

- Our population is growing at a significant rate. We are expected to build nearly 20,000 new homes over the next 20 years within a heavily populated and congested urban Borough. Slough is only (32.54 km^2). We will need to reduce the amount of parking allocated to town centre residential developments and ensure significant EV charging infrastructure is installed and EV/ULEV car clubs are operating to enable residents to have a low emission car option.
- The main challenges are non-conforming EURO 6 light passenger diesel cars and vans coupled with the significant growth in diesel vehicles over the past 20 years, although these are now showing a significant decline in sales following the VW emission scandal. The Government needs to ensure newer

[8] http://www.slough.gov.uk/council/strategies-plans-and-policies/the-emerging-local-plan-for-slough-2016-2036.aspx

diesel vehicles entering the market will meet the tougher real-world emission standards. There needs to be more promotion and awareness of Electric Vehicles and their air quality benefits over diesel cars. The Government has announced the ban of sale of all petrol and diesel cars from 2040.

- A Lack of public awareness and understanding of air pollution is a significant barrier to change. There is a need for a public awareness campaigns at a national level and at a local level, and Slough will work collaborative with Public Health and all its stakeholders and officers on local communication and awareness of air quality.
- Over the next 10 years – significant traffic growth locally, associated with the operation of M4 Smart Motorway, Town Centre Development, and potentially the expansion of Heathrow airport will place significant strain on the highway network and will adversely impact air quality.

How to Get Involved – Local Engagement

Slough residents can find out more about air quality by visiting the Councils Webpages: http://www.slough.gov.uk/pests-pollution-and-food-hygiene/air-quality.aspx.

Slough residents have access to the free app, Airtext, which provides accurate air quality alerts, and health advice for At-Risk Groups and the General Population, on http://www.airtext.info/.

The new Low Emission Strategy has its own dedicated web page on the SBC website. http://www.slough.gov.uk/pests-pollution-and-food-hygiene/low-emission-strategy-2018-2025.aspx.

Slough has prepared a communication Campaign in 2018 to raise awareness of poor air quality and to advise what actions can be taken at a local level to address air pollution. This will be published on the website. http://www.slough.gov.uk/pests-pollution-and-food-hygiene/low-emission-strategy-2018-2025.aspx.

In May 2019, Public Health Slough launched a new website. A dedicated air quality page has been set up and will be populated with information on air quality, how

members of the public can reduce their impact on air quality and the health benefits. This can be found on the following link.

https://www.publichealthslough.co.uk/campaigns/air-quality/

1 Local Air Quality Management

This report provides an overview of air quality in Slough Borough Council during 2018. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the AQOs 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 Slough Borough Council to improve air quality and any progress that has been made.

The statutory AQOs applicable to LAQM in England can be found in Appendix E.1.

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 AQO. 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.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored at location of relevant exposure) – same sites unless otherwise indicated		Action Plan (including data of publication)
						At Declaration (µg/m3)	Now (µg/m3)	
Slough AQMA 1	Declared <23/06/2005>	NO2 Annual Mean	AQMA M4 Motorway	An area encompassing land adjacent to the M4 motorway along the north carriageway between junctions 5 and 7 and along the south carriageway between junction 5 and Sutton Lane.	YES	44	38.8*	Annex C of the Local Transport Plan 2006. http://www.slough.gov.uk/downloads/LTP2-annexes-A-H.pdf

Slough AQMA 2	Declared <23/06/2005>	NO2 Annual Mean	AQMA Brands Hill	An area encompassing the A4 London Road east of junction 5 of the M4 motorway as far as Sutton Lane	NO	62	47.9**	Annex C of the Local Transport Plan 2006. http://www.slough.gov.uk/downloads/LTP2-annexes-A-H.pdf
Slough AQMA 3	Declared <24/01/2011>	NO2 Annual Mean	AQMA Tuns Lane	The Designated Area incorporates the A355 Tuns Lane from junction 6 of the M4 motorway in a northerly direction to just past its junction with the A4 Bath Road and A355 Farnham Road, known as the Three Tuns.	NO	51	38.9***	Action Plan for Slough Air Quality Management Areas Nos. 3 and 4 (19/11/2012) http://www.slough.gov.uk/downloads/air-quality-management-areas-3-and-4.pdf
Slough AQMA 4	Declared <24/01/2011>	NO2 Annual Mean	AQMA Town Centre	The Designated Area incorporates the A4 Bath Road from the junction with Ledgers Road/Stoke Poges Lane, in an easterly direction, along Wellington Street, up to Sussex Place junction.	NO	63	43.7****	Action Plan for Slough Air Quality Management Areas Nos. 3 and 4 (19/11/2012) http://www.slough.gov.uk/downloads/air-quality-management-areas-3-and-4.pdf
Slough AQMA Extended 3	Declared <10/05/2018>	NO2 Annual Mean	AQMA Bath Road	The designated area incorporates a stretch of road between Tuns Lane Junction known as the “Three Tuns” and 30 Bath Road and also includes Quadrivium Point.	NO	42	39.2*****	TBC 2019

*Highest measured NO_2 concentration within AQMA 1 is at Grampian Way ID 8 corrected to nearest residential façade

** Highest measured NO_2 concentration within AQMA 2 is at Brands Hill ID 18 corrected to nearest residential façade

*** Highest measured NO_2 concentration within AQMA 3 is at Tuns Lane ID 50 corrected to nearest residential façade
**** Highest measured NO2 concentration within AQMA 4 is at Yew Tree Road ID 29 corrected to nearest residential façade. Note this is different to ASR 2018 which recorded Blair Road – Victoria Court ID 37 as the highest measured NO2 concentration
***** Highest measured NO_2 concentration within AQMA 3 Extension is Windmill Monitor Station A4 corrected to the nearest residential façade. Note last year the highest measured NO_2 concentration within this AQMA was ID 57.

Summary of AQMAs declared by Slough Borough Council can be found in **Error! Reference source not found.**. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at <insert link to local authority's AQMA webpage – this should look like https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=xxx – see full list at https://uk-air.defra.gov.uk/aqma/list>. Alternatively, see **Error! Reference source not found.**, which provides for a map of air quality monitoring locations in relation to the AQMA(s).

☒ **Slough Borough Council confirm the information on UK-Air regarding their AQMA(s) is up to date (confirm by selecting in box)**

Update to AQMA Extension of AQMA 3

The Council declared the extension of AQMA 3 on 10th May 2018 after several years of monitoring indicated breaches of the national AQO at Windmill care home, Bath Road on the A4. This order extends the AQMA from the Three Tuns junction; 300m in an easterly direction along the A4 Bath Road, see Figure 1.1.

The Air Quality Action Plan will be updated in 2019 to cover all five AQMAs in the Slough, and any additional AQMAs that may need to be declared during this time. The new AQMA 3 extended Order was uploaded to DEFRA website and approved.

In October 2017, a continuous air quality monitoring station which measures NOx, NO_2 and PM_{10}, was installed and commissioned outside Windmill Care Centre, indicated by the red square. This was co-located with diffusion tubes ID 57, 58 and 59, installed in August 2017. Results from 2012 to present are shown in Table 2.2 below.

Table 2.2 – NO_2 Annual Mean Concentration (µg/m3)

Site ID	Site Type	2012	2013	2014	2015		2016	2017	2018
ID 43 facade	Roadside	43.7	44.5	41.2	39.5		42.0	37.2	34.0
ID 57	Roadside							44.1	41.6
ID 58	Roadside								
ID 59	Roadside								
Automatic SLH 12	Roadside							41.5	42.0

2.2 Progress and Impact of Measures to address Air Quality in Slough Borough Council

Defra's appraisal of last year's ASR concluded the 2017 monitoring results demonstrate continuing exceedance of the NO_2 annual objective within all AQMAs, except AQMA No. 3 which remains marginally below the objective level, and monitoring at all AQMAs should continue. Defra acknowledge the major initiatives of developing a Low Emission Strategy in 2018 and AQAP review in 2018-19.

The A4 and M4 are the main road networks responsible for poor air quality. Distance corrections to relevant receptors have been double checked and reported in Table 1.1 in ASR 2019 and the corrections with the background levels have been reported in Appendix C. It should be noted three of the receptors ID 4, ID8, ID 22 are closer to the main road than the diffusion tube, and a note of caution is reported for several receptors which have tubes more than 10m from the road, or receptors more than 20m from the road. Please refer to Appendix C on distance corrections for more details.

Slough 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 2.3. Measures completed in 2016 were removed in ASR 2018. A number of these measures extend over a number of years and by nature will be reported annually within the ASR. Most of these measures are outlined within the Local Transport Plan (2011-2026)[9], Air Quality Action Plan (2012)[10] and within the draft Low Emission Strategy (2018-2025)[11].

Key completed measures are:

- Publish and acceptance of the Low Emission Strategy (2018-2015) at full Council in September 2018. The strategy aims at accelerating uptake of electric vehicles and improving emission standards for buses, taxis and council operations.

[9] http://www.slough.gov.uk/council/joint-strategic-needs-assessment/transport.aspx

[10] http://www.slough.gov.uk/downloads/air-quality-management-areas-3-and-4.pdf

[11] http://www.slough.gov.uk/pests-pollution-and-food-hygiene/low-emission-strategy-2018-2025.aspx

- Development of the dedicated Communication Plan in conjunction with Public Health to raise awareness of air quality in Slough, its impact and actions that can be taken, at a local level, to reduce air pollution.
- Recruited dedicated air quality officer for the Council.
- Implemented our Access Fund '*better by'* and promote sustainable travel options across business, schools and council operations and residents.
- Installation of 6 fast chargers at our community and leisure sites in Langley, Salt Hill and Montem Ice Rink.

Slough Borough Council proposes the following measures during 2019/2020:

- Complete air quality modelling (using the latest transport model and traffic growth scenarios) to test low emission scenarios including the potential implementation of a Clean Air Zone to tackle poor air quality within our AQMA 2, AQMA 3 and AQMA 4.
- Consolidate all current AQAPs under one comprehensive plan to improve air quality in the Borough..
- Increase EV charging provision expansion of staff electric vehicle fleet for the HQ move, including 13 fast chargers, 1 rapid charger and a fleet of 20 electric vehicles.
- Installation of 4 fast and 1 rapid charger at a new leisure site on Farnham Road.

The principal challenges and barriers to implementation that Slough Borough Council anticipates facing are significant resistance from Taxi/PHV trade to changes to taxi licensing standards in relation to emissions. The main concern expressed by the trade is the cost of *electric vehicles* to meet more stringent emission standards. An EV taxi demo project is being prepared to enable the trade to access and trial EVs.

The other barrier is a lack of staff resources (*officer time*) to implement all relevant air quality measures in a timely fashion, alongside competing priorities. There are challenges around the procurement of electric vehicles and electric vehicle infrastructure; the significant time to draft tender/contract specifications and implement a full tender and evaluation process.

Progress on the following measures has been slower than expected:

- Healthy Active Travel due to resistance take up by parents/children – school travel dependency on cars remains a key barrier to improving air quality. This will require a concerted communication campaign, improved public transport infrastructure, increase uptake of cycling and walking. This requires a longer term approach (number of years) which will utilise a joined up internal stakeholder approach with our transport and public health colleagues.

- A meeting with Slough Youth Parliament representatives has taken place, outlining the issues relating to poor air quality and the need to consider alternative sustainable travel options to travel to school. Colleagues in the 'better by' team will also be presenting to the Slough Youth Parliament to encourage cycling and walking to school.

- Commission air quality modelling and source apportionment, and low emission scenario assessments to prepare a new Air Quality Action Plan for Slough.

- .

Slough Borough Council anticipates that the measures stated above and in Table 2.3 will achieve compliance in **AQMA 3 and 4.**

Whilst the measures stated above and in Table 2.3 will help to contribute towards compliance, Slough Borough Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of Brands Hill AQMA and M4 AQMA.

M4 AQMA 1 – Smart Motorway

AQMA 1 is designated due to road traffic emissions from the M4 modelled up to approximately 100m from its central reservation. Slough will work with Highways England on projects and measures to minimise the impact of motorway road traffic emissions on Slough's local air quality.

Highway England plans to extend the M4 by using the hard shoulder lane and highway land to operate a 'Smart M4'. The Smart M4 works are anticipated to take 2-

3 years to complete. The new SMART M4 will be operational from 2022 and will reach full operating capacity several years later with the potential for 15,000 additional vehicle movements per day on the motorway.

As part of the DCO requirement 26 there are several conditions relating to air quality, including monitoring and reporting and potentially mitigation. The requirements are reported below:

DCO Air quality monitoring and management for M4 Motorway AQMAs

26(1) No part of the authorised development is to commence until the undertaker has prepared a monitoring scheme for Nitrogen Dioxide ("NO_2")[12].

Highways England and Slough Borough Council have formed an agreement as to the monitoring strategy and agreement is being sought that air quality monitoring results can be reported within the ASR annually. Monitoring is to commence 2019/2020, therefore the first set of data will be presented in ASR 2020.

SBC Measures to tackle poor air quality

Whilst the measures stated above and in Table 2.3 below will help to contribute towards compliance with the national AQOs, Slough Borough Council anticipates that further additional measures (i.e. Clean Air Zones) will be required in subsequent years to achieve compliance and enable the revocation of AQMA 2, AQMA 3 and AQMA 4. In additional air quality measures may also be needed to tackle poor air quality in Langley this is because of the significant HGV traffic growth and congestion impacts within the Borough associated with significant Town Centre development and major infrastructure developments (M4 SMART, WRLtH HEATHROW) over the next 10 years.

[12] https://smpbim.withbc.com/pub/english.cgi/0/1569846?op=download_page&id=1569846

Table 2.3 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
1	Access Fund Smarter Travel for Slough Business Programme	Promoting Travel Alternatives	Workplace Travel Planning	SBC	completed	active	% mode share	Borough Wide	Access programme in progress	Ongoing	DfT Funding in place until 2020
2	Access Fund Smarter Travel for Slough Schools Programme	Promoting Travel Alternatives	School Travel Plans	SBC	completed	active	% mode share	Borough Wide	Access programme in progress	Ongoing	DfT Funding in place until 2020
3	Access Fund Smarter Travel for Slough residents Programme	Promoting Travel Alternatives	Other	SBC	in progress	active	% mode share	Borough Wide	Access programme in progress	Ongoing	DfT Funding in place until 2020
4	Marketing and Promotion of Sustainable travel options in Slough	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	SBC	completed	active	% mode share	Borough Wide	Access programme in progress	Ongoing	DfT Funding in place until 2020
5	Promote use of rail SBC staff	Promoting Travel Alternatives	Promote use of rail and inland waterways	SBC	completed	active	% mode share rail travel % increase of travel warrants	Borough Wide and Outside Borough	Interest free Rail travel loans and Travel warrants issued for business travel	Ongoing	Increased partnership work with GWR recommended to further promote rail travel.
6	Access Fund: Personalise Travel Planning	Promoting Travel Alternatives	Personalised Travel Planning	SBC	completed	active	Numbers of personalise travel plan	Borough Wide and Outside Borough	Access programme in progress	Ongoing	DfT Funding in place until 2020

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
7	Home Working	Promoting Travel Alternatives	Encourage / Facilitate home-working	SBC	active	active	% take up of staff	Borough Wide and Outside Borough	Smarter working policy in place	Ongoing	Greater uptake required to allow proper analysis of the success of the scheme
8	Promotion of cycling	Promoting Travel Alternatives	Promotion of cycling	SBC	completed	active	cycling counts	N/A	increased promotion through Access programme	ongoing	Also being promoted by the development of the LCWIP
9	Promotion of walking	Promoting Travel Alternatives	Promotion of walking	SBC	completed	active	walking counts	N/A	increased promotion through Access programme	ongoing	Also being promoted by the development of the LCWIP
10	Freight Partnerships	Freight and Delivery Management	Freight Partnerships for town centre deliveries	SBC	active	planning	Reduction in emissions of freight deliveries	AQMA2 & AQMA 4	dialogue with logistics industry	ongoing	Stalled a new freight strategy to be developed in 2019/20
11	Slough Cycle Hire Scheme	Transport Planning and Infrastructure	Public cycle hire scheme	SBC	completed	active	cycle usage	Borough Wide	Year on Year increase on uptake – more than 48 bikes and 123 docking bays available in the scheme.	Ongoing	Expanded via community funds. 17 docking stations. Town Centre cycle hub now closed and new location sought
12	East to West Cycle Lane	Transport Planning and Infrastructure	Cycle network	SBC	completed	active	Cycling counts	AQMA 3 and 4	Construction of A4 element in progress.	September 2018	SBC Capital Funding with LEP contribution
13	Pedestrian Wayfinding System	Transport Planning and Infrastructure	Other	SBC	completed	active	% mode share	Borough Wide	Ongoing	Ongoing	S106 funding

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
14	Local safety and accessibility schemes to schools and businesses	Transport Planning and Infrastructure	Cycle network	SBC	completed	active	% mode share	Borough Wide	Ongoing	Ongoing	To be further enhanced by Access fund
15	Bus route improvements	Transport Planning and Infrastructure	Bus route improvements	SBC	completed	active	Bus patronage	Borough Wide	Bus routes and frequencies have been reviewed following the Better Bus Area Fund highway improvements	ongoing	Ongoing, regular reviews by principle bus operator. Bus Quality Partnership ongoing. Reading Buses are now providing some services, relinquished by First. Long term contracts to be reviewed.
16	Public transport improvements-interchanges stations and services	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	SBC	completed	active	Bus patronage	Borough Wide	New bus station opened town centre and integrated with adjacent rail station enhancement	ongoing	Burnham Station access scheme with LEP funding is complete. Langley station access scheme in progress, also LEP funded.

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
17	Slough Mass Rapid Transit[13]	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, bus priority (dedicated bus lane)	SBC	Completed	Complete	Bus usage & NO2 concentrations	AQMA 2, AQMA 3, AQMA 4	Ongoing Enforcement of bus lanes planned.	Summer 18' Phase 1 Summer 22' Phase 2	SMaRT phase 1 infrastructure completed early 2018. Phase 1 bus operations Slough Trading Estate to town centre using Euro VI buses become operational December 18' SMaRT phase 2 – LEP bid submitted. Funding granted. Construction begins August 2019
18	Reduction of speed limits, 20mph zones	Traffic Management	Reduction of speed limits, 20mph zones	SBC	Programme of 20mph zones	First phase zones completed	Number of Zones	Borough Wide	7 zones operational	ongoing	No AQMA declared in areas with 20 mph zone
19	Parking Enforcement on highway	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	SBC	completed	active	Congestion	Borough Wide	ongoing	ongoing	New parking contract with Indigo, June 2018
20	Emissions based parking charges	Traffic Management	Emission based parking or permit charges	SBC	completed	active	Number of spaces	Borough Wide	4 'free' EV spaces	Ongoing	Additional spaces to be secured over 2018-2025

[13] http://www.slough.gov.uk/parking-travel-and-roads/slough-mass-rapid-transit-smart.aspx

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
21	EV Parking Provision – New Developments	Policy Guidance and Development Control	Low Emission Strategy	SBC	completed	active	Number of new EV Parking spaces	Borough Wide	ongoing	ongoing	New Parking must include at least 10% EV provision all new parking
22	Air Quality Assessments for new developments in AQMAs and all Major Developments (significant net increase in trip rates	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance (Low Emission Strategy)	SBC	Drafted	active	Negligible Air Quality Impacts (following mitigation and offsetting)	All AQMAs	Draft – Public Consultation	Ongoing	To be included in the Planners Developers Guide
23	Securing developer air quality contributions for low emission infrastructure and EV car clubs	Policy Guidance and Development Control	Low Emission Strategy	SBC	S106 Programme developed	active	Financial Contributions amount (£s)	All AQMAs	Draft – Public Consultation	Ongoing	S106 Funding (Max of 5 pooled contributions per measure)
24	Ceiling figure on long stay car parking in town centre (5000 spaces)	Policy Guidance and Development Control	Other	SBC	completed	active	Number of spaces	AQMA 4	ongoing	Ongoing	To be reviewed as part of new Local Plan
25	Low Emission Strategy	Policy Guidance and Development Control	Low Emission Strategy	SBC	completed	active	NO_2 concentrations (annual monitoring)	2025 Compliance all AQMAs (except M4 AQMA 1 outside direct LA control - HA led) Significant Intervention Required	Draft – Public Consultation	Autumn 18	LES presented to Cabinet 17th September 2018, and adopted as a Council Strategy at Full Council on 27th September 2018

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
26	EV infrastructure	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging	SBC	drafted	active	Number of EV chargers in Borough Number of EV charge events	All AQMAs and Wider Borough	16 public EV chargers Over 2500 EV charge events	Summer 2020	S106/OLEV/ Capital funding
27	Taxi emission incentives	Promoting Low Emission Transport	Taxi emission incentives – free charging and licensing for early adopters	SBC	active	active	Number of Taxi Rapid Chargers	AQMA 4, and Borough Wide	Successful Taxi Bid	Summer 2020	7 Rapid Chargers to be installed by summer 2020
28	Taxi Licensing	Promoting Low Emission Transport	Taxi Licensing conditions	SBC	active	Sept 2019	Number of ULEV taxi/PHVs licenses	AQMA 4, and Borough Wide	Approved by Licensing Committee	Autumn 2025	Report to sub-licensing committee – approved all PHVs/ taxis (except disabled access) to be ULEVs by 2025
29	Council Electric Pool Car and Bike Scheme	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	SBC	active	June 2017	Number of electric business miles travelled Reduction in CO_2 (tonnes) Reduction in NO2 and PM (Kg and grams)	Borough Wide	6 Electric Pool Cars purchased/leased And 6 E-bikes purchased	Winter 2025	Objective is to reduce 90% CO_2 and 85% NOx emissions from grey fleet

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
30	Council – ULEV staff company salary sacrifice car scheme	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	SBC	Active	May 2016	Number of ULEV Company cars	Borough Wide	6 ULEV company lease cars	Ongoing	Aim is 50 ULEV company lease cars by Dec 2020 in the Councils grey fleet
31	Council – Low Emission Hire Car Scheme	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	SBC	Active	April 18	Number of miles in Low Emission - EURO 6 hire case and Car club car	Outer Borough	Call 0ff framework contract being reviewed	2025	Objective is to reduce 90% CO_2 and 85% NOx emissions from grey fleet and operational cost
32	Clean Air Zone Feasibility Study	Promoting Low Emission Transport	Ultra Low Emission Zone (ULEZ)	SBC	Active	Spring 2019	Successful feasibility study	AQMA 2, AQMA3 and AQMA 4 to be modelled	Ongoing (Modelling planned in 2018)	2019/2020	May Lead to policy to adopt CAZ in summer 2021
33	SBC Car & lift sharing schemes	Alternatives to private vehicle use	Car and Lift Sharing Schemes	SBC	completed	Trial Scheme Autumn 2018	Car share %	Borough Wide	increased activity through Access programme	In Progress	Trial of Car Share Scheme. Faxi App in use, registration encouraged
34	Town Centre E car club	Alternatives to private vehicle use	Car Clubs	SBC	planned	Summer 2019	Number of Electric Cars operating and number of E-Car clubs users	AQMA 4	Capital monies secured	Summer 2020	S106 funding being secured. Capital money secured

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
35	Bus park and ride	Alternatives to private vehicle use	Bus based Park & Ride	SBC	active	planned	Number of journeys	Borough Wide	Bid to LEP. Feasibility study bid made to Heathrow PTL fund.	Subject to Highways England SMaRT motorway completion	PTL bid unsuccessful to date. To resubmit. Bid submitted to LEP for east of borough P&R as part of SMaRT phase 2 bid. Funding successful. Start of construction to follow departure from site by Highways England
36	Rail based park and ride	Alternatives to private vehicle use	Rail based Park & Ride	SBC	active	planned	Number of journeys	AQMA 4 and Borough Wide	Bid to LEP	Subject to funding	Not successful Re-submit bid
37	Promoting Low Emission Public Transport	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	SBC	completed	active	Euro Fleet Emissions	AQMA 4 and Borough Wide	Major bus operator has upgraded vehicle fleet with support of DfT Green Bus Fund	ongoing	Next round of funding to be used for retrofit of Euro V bus
38	Air Quality Communication Plan	Public Information	Via all Media	SBC	active	April 18	Number of re-tweets	Borough Wide	Outline Communication Plan prepared	Ongoing	Using Defra six principles of communication
39	New Air Quality Action Plan	Public Information	via leaflets and social media	SBC	Active	Summer 19	leaflets	Borough Wide	Draft Low Emission Strategy prepared	Ongoing	Using Defra six principles of communication

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
40	Clean Air Campaign	Public Information	Signed up	SBC	Active	Clean Air Day	Various media sources	Borough Wide	Clean Air Day stand at SBC offices	Each Year	Next year to be set up in Town Centre
41	AirText Service	Public Information	Via the Internet and text (smart phones	SBC	Completed	Active	Number of subscribers	Borough Wide	Over 100 Subscribers	Ongoing	Public Awareness Campaign
42	Stoke Road Sustainable Transport Infrastructure and Highways Works (regeneration)	Transport Planning and Infrastructure	Public Transport and Infrastructure	SBC	Completed	2019/2020	Number of journeys (via sustainable modes)	Town Centre	Awaiting business case approved	March 2022	Part of the wider town centre regeneration

Rows highlighted in yellow are measures that were completed during 2018.

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.

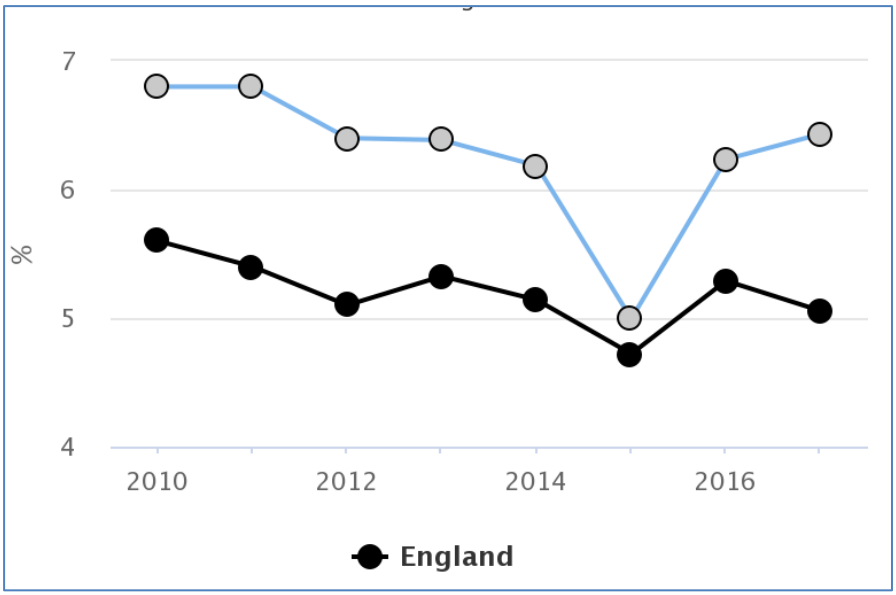
Work carried out by Public Health England as part of the Public Health Outcomes Framework (PHOF) shows that the fraction of mortality associated with particulate air pollution in 2017 within Slough Borough Council is 6.4%. This is slightly higher than 2016 (6.2%) but is still significantly higher than 2015 when the mortality associated with particulate air pollution within Slough Borough Council was 5%. This information is available from the following web link[14].

Figure 2.1 shows the fraction of mortality attributable to particulate air pollution calculated for Slough Borough Council over the past 5 years and compares this with the England average. It is noted over this 5 year trend the mortality has slightly improved since 2016. The England average in 2017 is 5.1% and the regional average in the south east is 5.6%. Slough continues to remain above these mortality rates, at 6.4% (2017). However, as a note of caution regarding the trends; Slough does not actually monitor $PM_{2.5}$ within Slough using reference methods and there may be local sources that could give rise to higher concentrations.

Additionally, local infrastructure development (construction activities), local increase in diesel back-up generators (data centres), potential local increase in use of log wood burners, and local industrial sources, as well as traffic emissions of $PM_{2.5}$ needs to be carefully modelled.

[14] https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/4/gid/1000043/pat/102/par/E06000039/ati/101/are/E06000039/iid/30101/age/230/sex/4

Figure 2.1 – Fraction of mortality attributable to particulate air pollution for Slough



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

- Designation of wards within the Borough as Smoke Controlled Areas, to enforce restrictions on fuels and appliances for combustion.
- The Council Five Year Plan (2018-2023) is a rolling 5 year plan and has outcomes based on improving children's and adults health, wellbeing and the ability to manage their health through increases in levels of physical activity and hence less dependency on car use (*which is very high within Slough*). This plan is due to be renewed soon, but health is still a key outcome and the new plan has a measure on improving air quality concentrations[15].
- The new Low Emission Strategy (2018-2025) is aimed at enabling and accelerating the uptake of ULEVs through the installation of more EV chargers, setting up of a town centre EV car club, and promoting electric taxis this in turn will reduce NOx and some PM emissions.
- The Low Emission Strategy is also aimed at promoting best practice dust controls on construction sites including adoption of Non Road Mobile Machinery Emissions standards; construction machinery above net power

[15] http://www.slough.gov.uk/council/strategies-plans-and-policies/five-year-plan.aspx

rating of 37kW will be required to meet stage IIIA, enforced as a requirement of the planning permission on the development, normally through a s106.

- The Low Emission Strategy will require planning controls on Major Development that all HDVs travelling through the AQMAs will use best endeavours to operate to EURO VI standards (i.e. CAZ compliant).
- The draft transport strategy (2017) is aimed at supporting the new Local Plan that is being developed for slough and will run to (2036). The strategy is aimed at reducing congestion by significantly increasing modal shift away from dependency on cars in Slough, as well as road widening to enable traffic to flow more smoothly, a new mass rapid transit system on the A4, and future proposals for park and ride scheme and improved cycle infrastructure - see weblink http://www.slough.gov.uk/council/strategies-plans-and-policies/the-emerging-local-plan-for-slough-2016-2036.aspx
- The Slough Wellbeing Board takes a lead on promoting a healthier Slough and has developed the Slough Wellbeing Strategy (2016 – 2020) there are a number of strategic aims; including improving health and wellbeing and reducing gaps in life expectancy. The Health and Adult Social Care Priority Delivery Group (PDG) supports the Slough Wellbeing Board. The Low Emission Strategy has been presented to the PDG to raise awareness of the impact on poor air quality on public health and we will report to the group on progress made with the Low Emission Strategy on an annual basis. Public health colleagues will raise the awareness of the harm of air pollution on human health. http://www.slough.gov.uk/council/strategies-plans-and-policies/slough-wellbeing-board.aspx
- Future local air quality modelling will need to consider local industrial sources of $PM_{2.5}$ and model these impacts.
- The Council has signed up to the Airtext Service which is a free app subscription service that provides Members of the Public text alerts on pollution episodes, excess cold and hot weather, including useful health advice and precautions to take when air pollution levels are high including $PM_{2.5}$ http://www.airtext.info/

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.

Slough Borough Council undertook automatic (continuous) monitoring at 7 sites during 2018. This includes:

- Salt Hill (Slough-town-centre, A4) SLH 4
- Slough-Colnbrook-(Pippins) SLH 3 & SLH6
- Slough-Chalvey, M4 SLH 7 (AQMA 1)
- Slough-Colnbrook (Lakeside, Tan House Farm) SLH 5
- Slough Town Centre (Wellington Street) SLH 10 (AQMA 4)
- Slough Brands Hill (London Road) SLH 11 (AQMA 2)
- Slough Windmill (Bath Road) SLH12 (AQMA 3)

Additionally Lakeside Energy from Waste Ltd[16] operate an EfW in Colnbrook, Slough since 2010. The plant processes over 450,000 tonnes of residual waste per year, generating up to 37MW of power. The operator of the site as well as undertaking continuous stack monitoring as part of their Permit, operate ambient air quality monitoring as part of their planning consent, and the data is released to Slough to report on an annual basis. The monitoring includes NOx, PM_{10} and $PM_{2.5}$ monitoring.

- Slough-Lakeside-2 (Lakeside Road) SLH8 & SLH9

Appendix A.1 shows the details of the sites. Monitoring results are available through both the Slough Borough Air Quality[17] and England Air websites[18]. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem.

[16] http://www.lakesideefw.co.uk/
[17] http://sloughair.aeat.com/

[18] http://www.airqualityengland.co.uk/

National monitoring results are available at https://uk-air.defra.gov.uk. Maps showing the location of the monitoring sites are provided in Appendix D. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

Slough Borough Council undertook non- automatic (passive) monitoring of NO_2 at 53 sites during 2018. Appendix A.2 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.

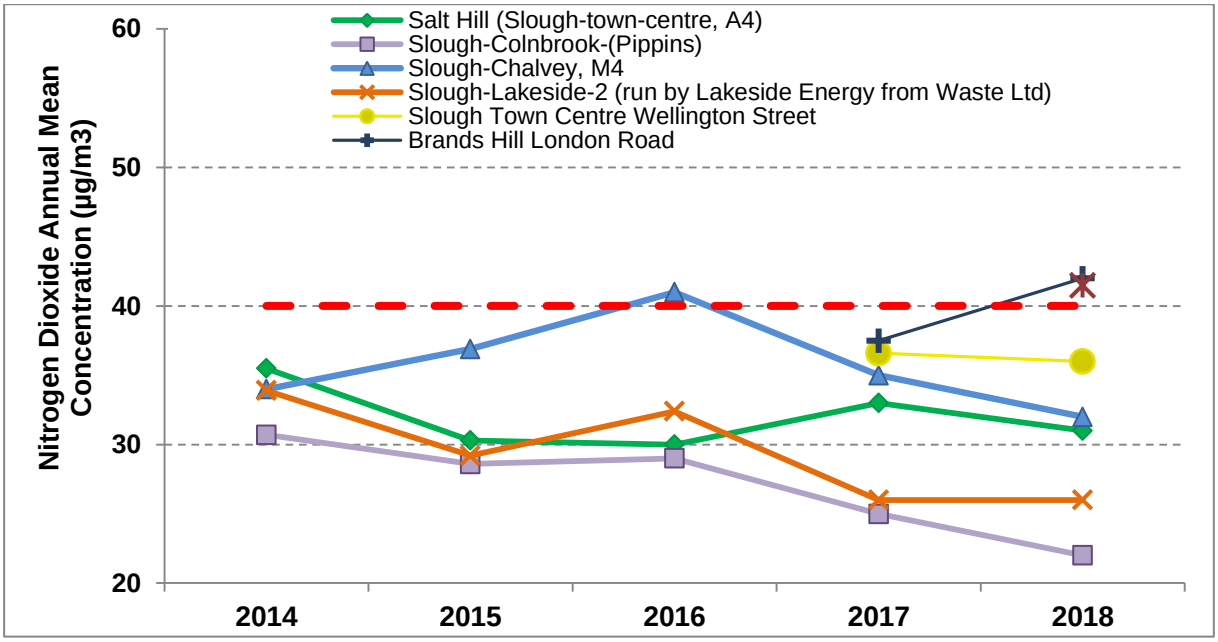
3.2.1 Nitrogen Dioxide (NO_2)

The automatic monitored and passive diffusion tube NO_2 annual mean concentrations for the past 5 years are shown in Appendix A.3. Where figures are in black bold, these demonstrate the NO_2 annual mean is exceeding the national AQOs of 40µg/m^3.

Automatic Monitoring Station Trends

The NO_2 annual mean concentrations for the past 5 years are illustrated in the line graph below for the 4 automatic monitoring stations located in Slough, Figure 3.1. The TRL station is not shown as this was only set up in late 2014 for a 2 year period, and decommissioned in early 2017. Monitoring sites Windmill, Brands Hill and Town Centre were only commissioned in 2017 therefore only 2 data points are shown. The air quality monitoring sites at Slough Chalvey (SLH 7), Slough Colnbrook (SLH 3) and Slough Salt Hill (SLH 4) air quality monitoring stations were used to determine the local bias correction for 2018, using the statistical type B approach that gave a bias correction of **0.775.**

Figure 3.1 – Nitrogen dioxide concentrations measured at automatic monitoring stations (2014 – 2018) including for the new monitoring sites



The full 2016 dataset of monthly diffusion tube mean values is provided in Appendix B.1. These have also been locally bias adjusted, annualised (where necessary) and distance corrected (where appropriate).

Diffusion Tube Trends within AQMAs

The following graphs (Figure 3.2 to 3.6) illustrate the 5 year trends for those diffusion tubes in our AQMAs. The results have been bias corrected and annualised, but not distance corrected to areas of relevant exposure. These are the most relevant tubes to understand if air quality concentrations within Slough are showing a downward trend, no trend or an upward trend. These are particularly important where the trend is not showing any significant change as this indicates pollution hotspots where efforts need to be focussed on measures to deal with poor air quality.

Figure 3.2 – Nitrogen Dioxide Concentrations measured by diffusion tube in Slough from 2014 to 2018 in AQMA 1

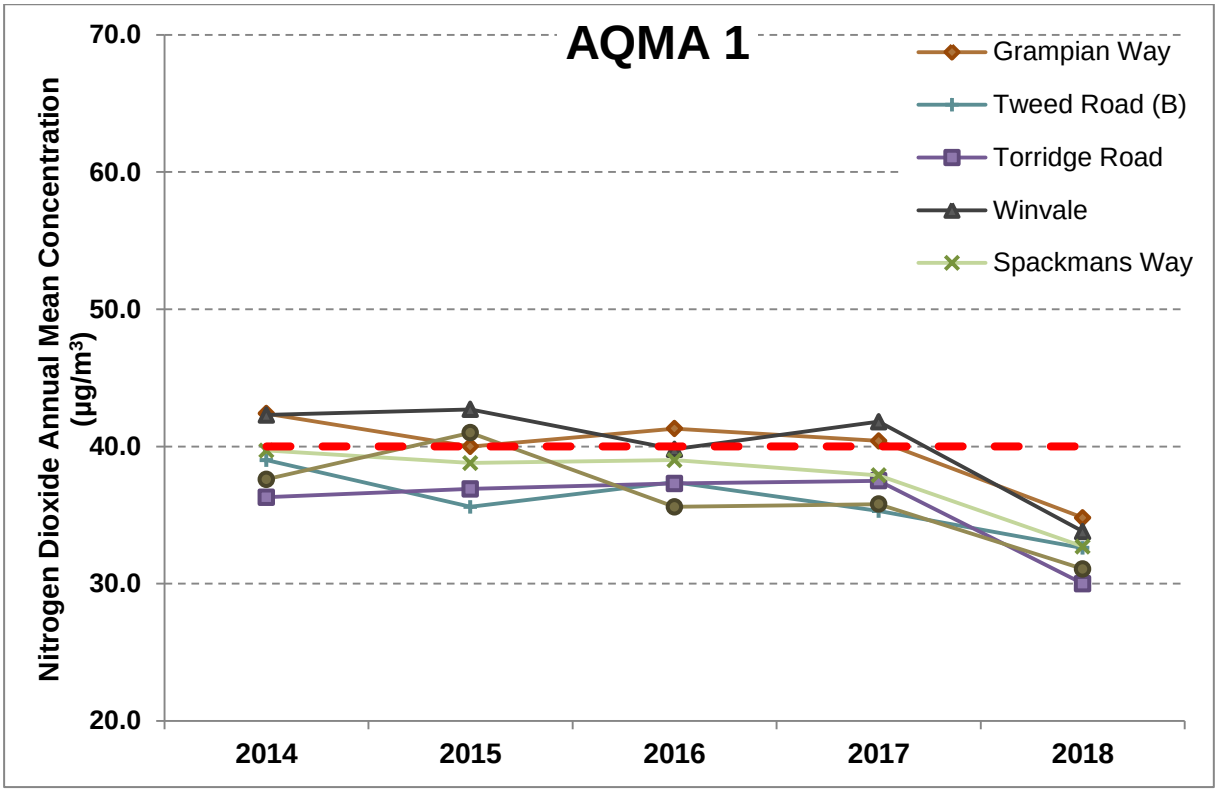


Figure 3.3 – Nitrogen Dioxide Concentrations measured by diffusion tube in Slough from 2014 to 2018 in AQMA 2

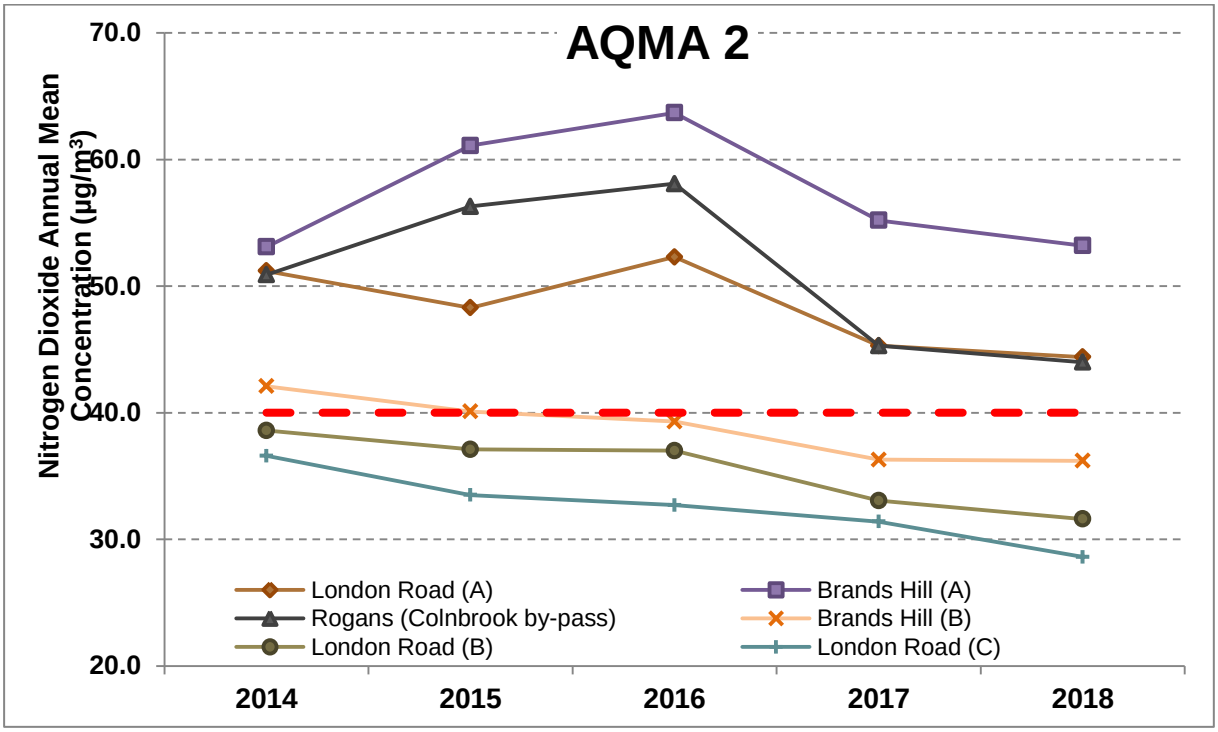


Figure 3.4 – Nitrogen Dioxide Concentrations measured by diffusion tube in Slough from 2014 to 2018 in AQMA 3

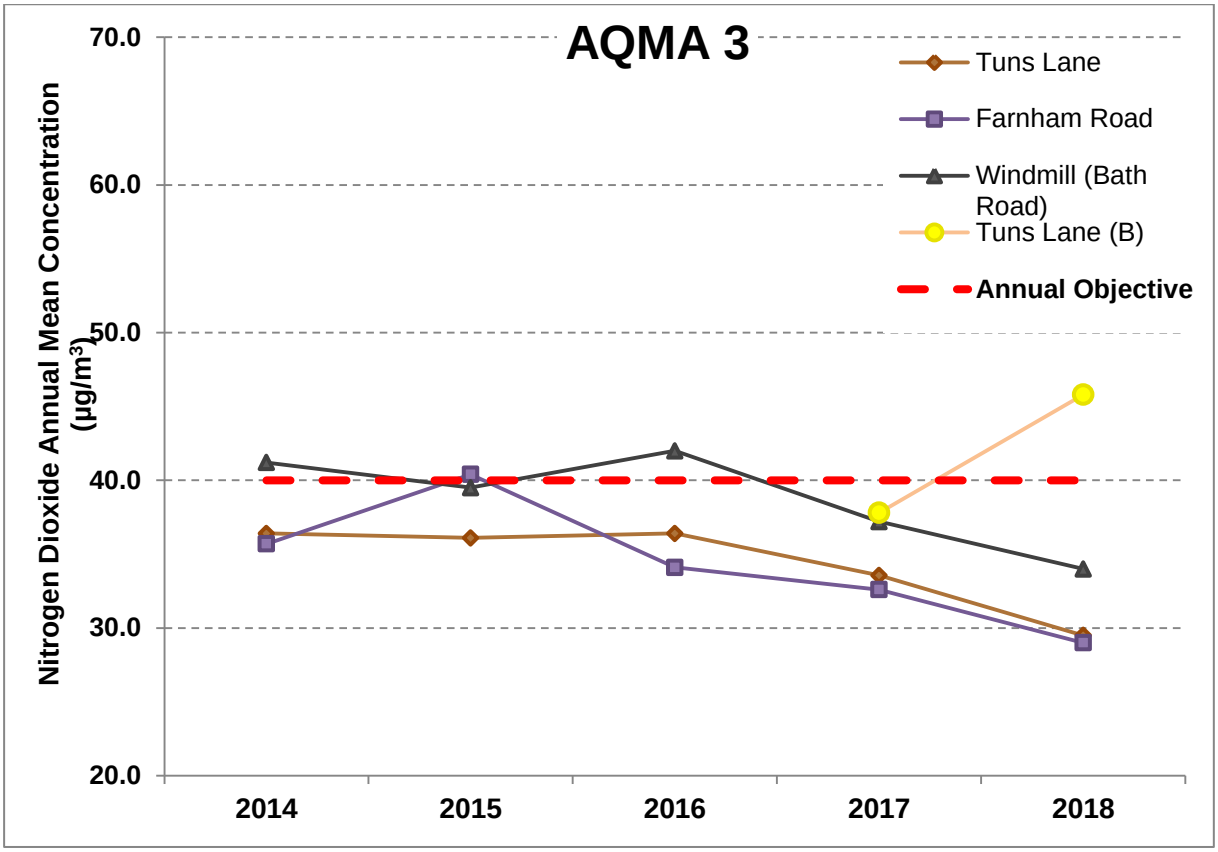


Figure 3.5 – Nitrogen Dioxide Concentrations measured by diffusion tube in Slough from 2014 to 2018 in AQMA 4

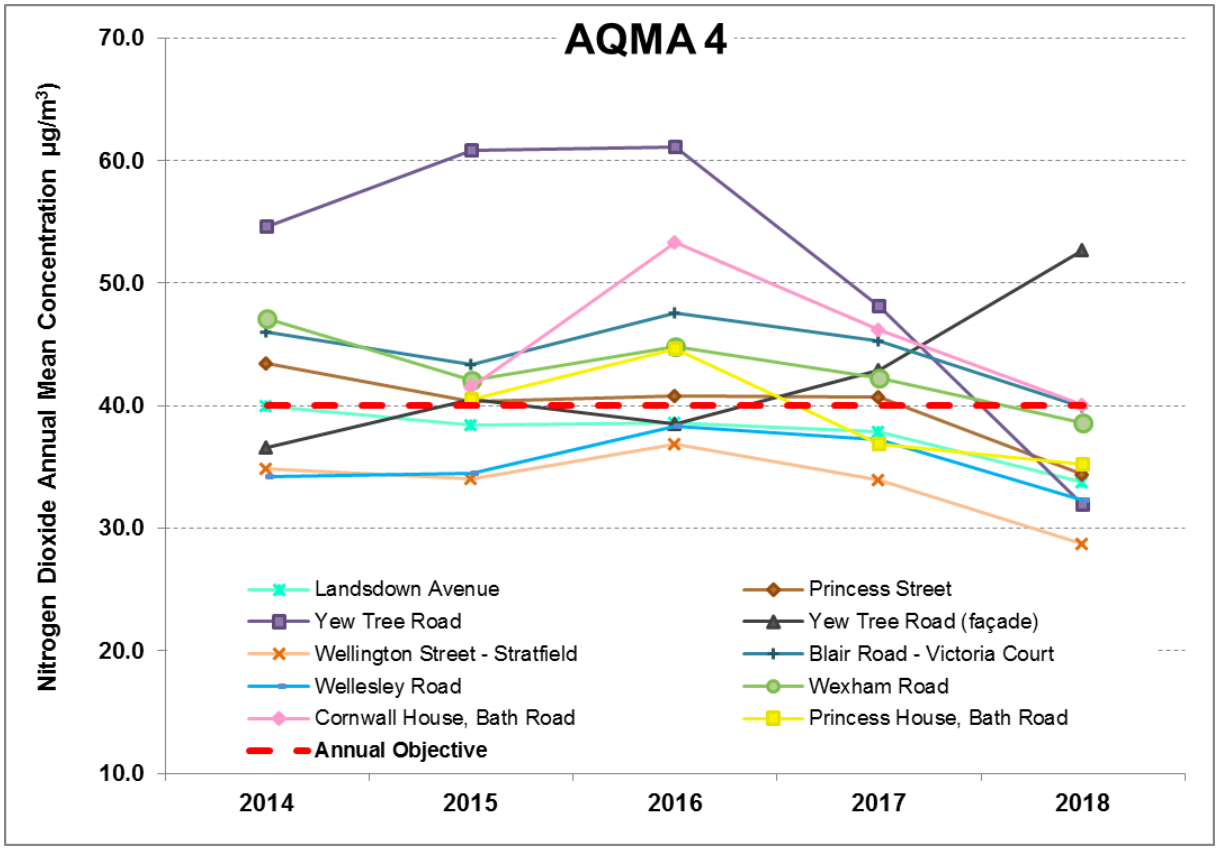
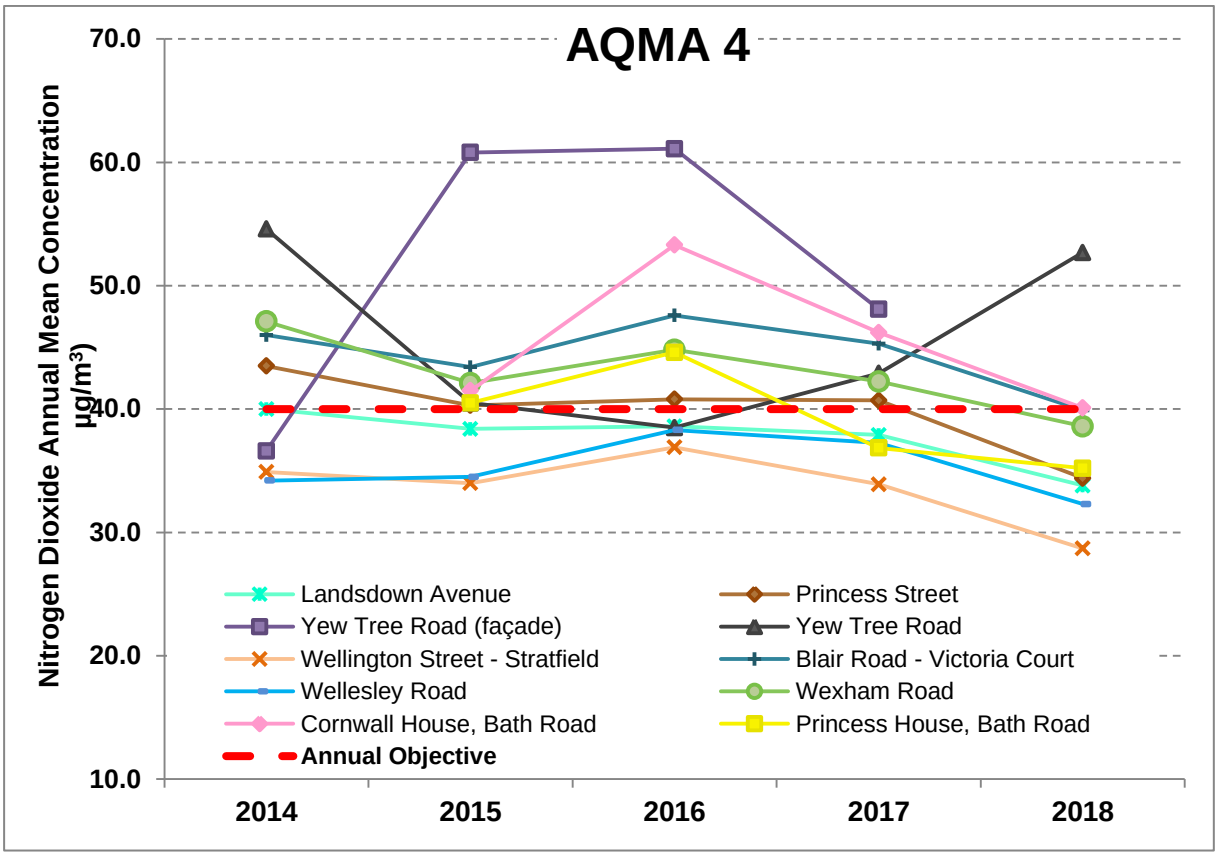


Figure 3.6 – Nitrogen Dioxide Concentrations measured by diffusion tube in Slough from 2014 to 2018 in AQMA 4 (removed data point SLO 26 for 2018)



Diffusion Tube Trends in AQMAs

A summary of the changes in nitrogen dioxide concentrations within each AQMA is provided in Table 3.1. The average change was calculated by estimating the line of best fit though the concentrations and dividing through by the number of monitoring years (most recent five years). The trends were calculated using excel LINEST function. The five year average concentrations for each site are also recorded.

Values in bold red indicate concentrations above the AQO.

Table 3.1 – Diffusion tube trends over 5 years within AQMAs

AQMA	Site Name	Years Monitored	Average nitrogen dioxide concentrations over last 5 years (µg/m^3)	Average change in nitrogen dioxide concentrations over last 5 years (µg/m^3/year)
1	Slough, Chalvey, M4 (Automatic)	5	36.10	-0.59
1	Grampian Way	5	**39.78**	-1.48
1	Winvale	5	**40.08**	-1.79
AQMA	**Site Name**	**Years Monitored**	**Average nitrogen dioxide concentrations over last 5 years (µg/m^3)**	**Average change in nitrogen dioxide concentrations over last 5 years (µg/m^3/year)**
1	Spackmans Way	5	37.62	-1.49
1	Torridge Road	5	35.60	-1.20
1	Tweed Road	5	35.98	-1.31
1	Chalvey (CAS)	5	36.21	-1.83
1	Paxton Avenue	5	38.28	-2.18
	Average decreases in AQMA 1 (µg/m^3)			**-1.48**
2	Brands Hill (B)	5	38.80	-1.56
2	London Road (C)	5	32.56	-1.81
2	Brands Hill (A)	5	**57.26**	-0.57
2	London Road (A)	5	**48.30**	-1.66
2	London Road (B)	5	35.47	-1.80
2	Rogans (Colnbrook by pass)	5	**50.92**	-2.48
	Average decrease in AQMA 2 (µg/m^3/year)			**-1.65**
3	Tuns Lane	5	41.8	-1.63
3	Farnham Road	5	34.36	-2.12
	Average decrease in AQMA 3 (µg/m^3/year)			**-1.88**
Ext 3	Windmill	5	38.78	-1.67
	Average decrease in AQMA 3 extension (µg/m^3/year)			**-0.79**
4	Lansdowne Avenue	5	37.74	-1.29
4	Wellesley Road	5	35.31	-0.10
4	Wellington Street	5	33.68	-1.25
4	Yew Tree Road (29)	5	**45.84**	-0.14
4	Princess Street	5	**39.94**	-1.78
4	Blair Road	5	**44.44**	-1.03
4	Wexham Road	5	**42.97**	-1.69
	Average decrease in AQMA 4 (µg/m^3/year)			**-1.04**
	Overall average decrease across all AQMAs			**-1.24**

1 Note: a negative value (black) indicates a trend showing a decrease in concentrations (improvement) over the past 5 years and a positive number (red) indicates a trend showing an increase in concentrations (deterioration) over the past 5 years, where value is 0 there no discernible trend pollution concentrations are not changing/improving.

It is recognised that five years is a relatively short time for detailed trend analysis and inter-year variability will exist, such as 2018 results. This may be due to changes in traffic volume and congestion, weather or climatic impacts, or local impacts. The intention in future reporting years (ASR) is to report over longer trends (greater than 5 years) to understand the overall pattern in air quality and to smooth out inter-year variability.

The average reduction in concentrations of annual mean (NO_2) over the past 5 years across all diffusion tube monitoring sites and one continuous monitoring site (Chalvey) across the Borough is **1.33µg/m^3 per year** (3.25% of the AQO). This is an improvement from the previous 5 year trend reported in ASR 2018 (average 1.15µg/m^3).

2018 Diffusion Tube Sites monitoring above the National Air Quality Objective – distance corrected to relevant exposure (i.e. residential property)

In addition to those diffusion tubes within the existing and proposed AQMAs exceeding the national AQOs, there are some diffusion tube sites of interest that are currently not located within an AQMA, but are also showing elevated levels of annual mean NO_2 above the national AQOs.

Those sites where the nitrogen dioxide concentrations were measured equal to or greater than **40µg/m^3** are shown in Appendix B.1. Additionally, some sites that measured below the AQO of **40µg/m^3** may lead to relevant exposure above the AQO of **40µg/m^3.** The distance correction concentration to the nearest site for relevant exposure (normally a residential property unless otherwise indicated) is also shown using the DEFRA tool[19] Nitrogen Dioxide Fall Off with distance and in Appendix C.9. The reference year 2017 national background modelled concentrations (adjusted to the monitoring year 2018) for Slough and Royal Borough of Windsor and Maidenhead were used within the DEFRA tool. The distance to the 'relevant

[19] https://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html

exposure' and nearest main road was obtained through a combination of on-site measurements and GIS map measurements. These have been significantly revised and updated from the ASR 2016 and are considered to be accurate.

There are several factors which may affect the distance correction calculation as follows:

- for several sites the receptor is closer to the main road ('A' road, Motorway, local busy main road) than the passive diffusion tube;
- in some cases where the receptor is closer to the main road than the monitor the distance between receptor and monitor is quite large over the recommended minimum 10m (i.e. Winvale, Grampian Way);
- for the purposes of the assessment; the influence of the local road where the tube is located cannot be taken into account within this calculation and it is assumed to make up part of the background NO_2;
- the main roads we are concerned with are; M4 (experiences >100,000 vehicle movements/day) or A4 Wellington Street, Bath Road, London Road, Brands Hill (average more than 20,000-30,000 vehicle movements/day), Sutton Lane, Windsor Road, High Street Langley all these roads experience (>10,000 vehicle movements/day).

Discussion on NO_2 trends and results for 2018

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

For diffusion tubes, the full 2018 dataset of monthly mean values is provided in Appendix B.

Although air quality trends for 2018 indicate that NO_2 concentrations are declining, the rate of improvement required to meet the AQOs is still slow. Air pollution remains a significant issue for Slough residents and will do so for some years to come as there are some hotspots that consistently show exceedance of AQOs, as well as potential for new areas of relevant exposure (Windsor Road and Langley).

Concentrations vary significantly between diffusion tube monitoring sites located within our AQMAs. Whilst some diffusion sites within our AQMAs are demonstrating

compliance with the national AQOs, others are still showing significant breaches in the AQMAs. A summary of progress within AQMAs is summarised below:

- In AQMA 1 (no breaches of AQO in 2018)
- In AQMA 2 (ID10, ID18 and ID28)
- In AQMA 3 (ID 50)
- In Extended AQMA 3 (ID 57, ID 58, ID 59)
- In AQMA 4 (ID29 and ID46. ID26 was discarded due to erroneous data)

Also despite the diffusion tube network undergoing a bias correction (i.e. statistical correction against our continuous air quality monitoring data), diffusion tube accuracy is still ± 25% and continuous air quality monitoring stations accuracy ± 10% at best. Therefore, in order to be confident that the air quality concentrations are below the national AQOs the levels should at the very least be consistently demonstrating levels at least 10% below the national AQOs (i.e. **36µg/m^3**) over several years before considering the revocation or amendment of an AQMA.

In contrast to 2017 data, many diffusion tube sites within AQMAs have dropped below 36 µg/m^3. These are as follows:

- AQMA 1: ID 8, ID 9, ID 11, ID 22, ID 24, ID 25, ID 35, ID 35, ID 36
- AQMA 2: ID 39, ID 45
- AQMA 3: ID 23, ID 30, ID 43
- AQMA 4: ID 33

Data for 2018 brings down the 5 year average NO_2 concentration at some of the diffusion tube sites to below 36µg/m^3. However, the average for the AQMAs as a whole remains above 36µg/m^3 and therefore it is recommended that none of the AQMAs are revoked.

Outside of the AQMAs, all diffusion tubes record concentrations below the AQO except for Lakeside Road (ID 12), Horton Road Caravan Site (ID 17) and Windsor Road B (ID 49), at 40.7µg/m^3, 41.5µg/m^3 and 40.0µg/m^3, respectively. Diffusion tubes in Langley are within 10% of the AQO at ID 51 (36.0µg/m^3), ID 53 (37.9µg/m^3) and ID

56 (37.6µg/m^3). Sites in Langley need to be continually monitored over the next few years to determine if air quality in Langley is deteriorating and to determine if Langley needs to be declared as a new AQMA.

Hourly Air Quality Objectives

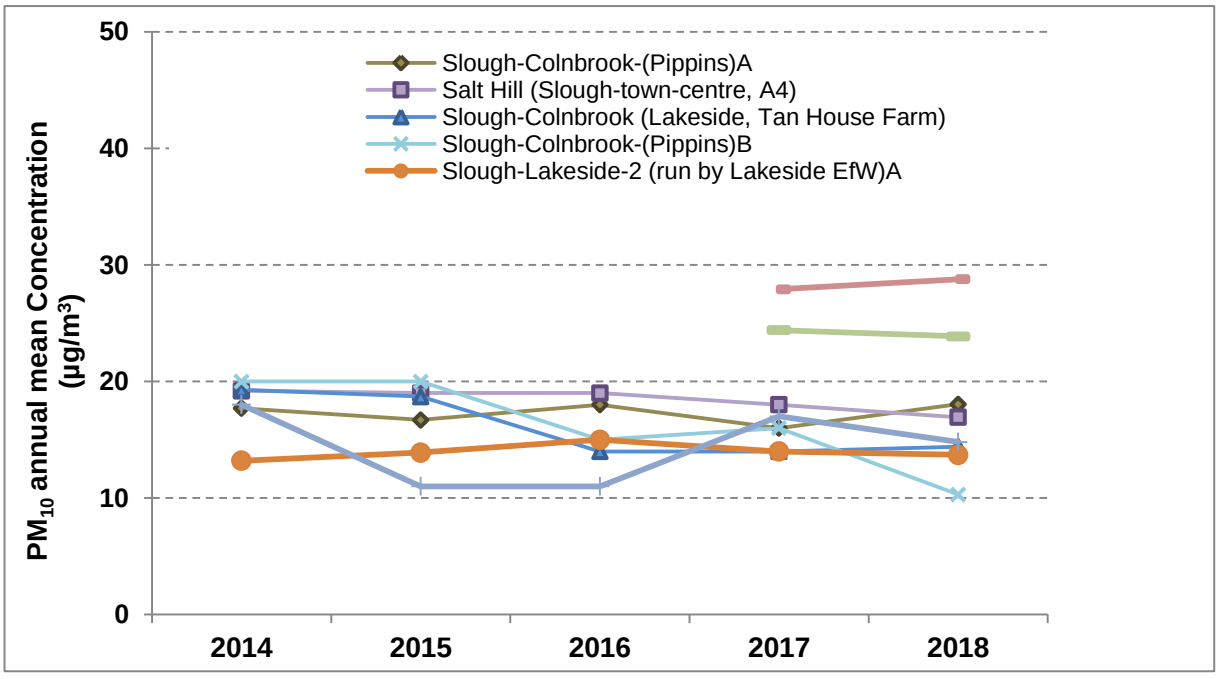
Appendix A.4 compares the ratified continuous monitored NO_2 hourly mean concentrations for the past 5 years with the AQO of **200µg/m^3,** not to be exceeded more than 18 times per year. There were no exceedances of the **200µg/m^3** objective monitored in 2018 at any of the automatic monitoring sites.

There were also no diffusion sites in 2018 where the annual means exceeded **60µg/m^3.** Sites where the annual mean exceeds 60µg/m^3 may indicate breaches of the hourly objective of 200µg/m^3[20].

3.2.2 Particulate Matter (PM_{10})

Appendix A.5 compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the AQO of 40µg/m^3. This is illustrated in Figure 3.7 below:

Figure 3.7 – PM_{10} concentrations measured within Slough Borough Council from 2014 to 2018



[20] DEFRA LAQM Technical Guidance (TG 16) section 7-31

Table 3.2 summarises the change in PM_{10} concentrations over the 5 year period from 2014 to 2018. The average change was calculated by estimating the line of best fit through the concentrations and dividing through by the number of monitoring years.

Table 3.2 – Average Change in PM_{10} at each monitoring station

ID	Site Name	Number of years of monitoring	Average change[1] in PM_{10} concentration from 2014 to 2018, ($\mu g/m^3$/year)
SLH 3	Slough-Colnbrook-(Pippins)A	5	0.00
SLH 4	Salt Hill (Slough-town-centre, A4)	5	-0.55
SLH 5	Slough-Colnbrook (Lakeside, Tan House Farm)	5	-1.45
SLH 6	Slough-Colnbrook-(Pippins)B	5	-2.34
SLH 8	Slough-Lakeside-2 (run by Lakeside EfW)A	5	0.11
SLH 9	Slough-Lakeside-2 (run by Lakeside EfW)B	5	-0.04
SLH 11	Brands Hill London Road	2	0.87
SLH 12	Slough Windmill Bath Road	2	-0.54

Note: a negative value indicates a decrease in concentration

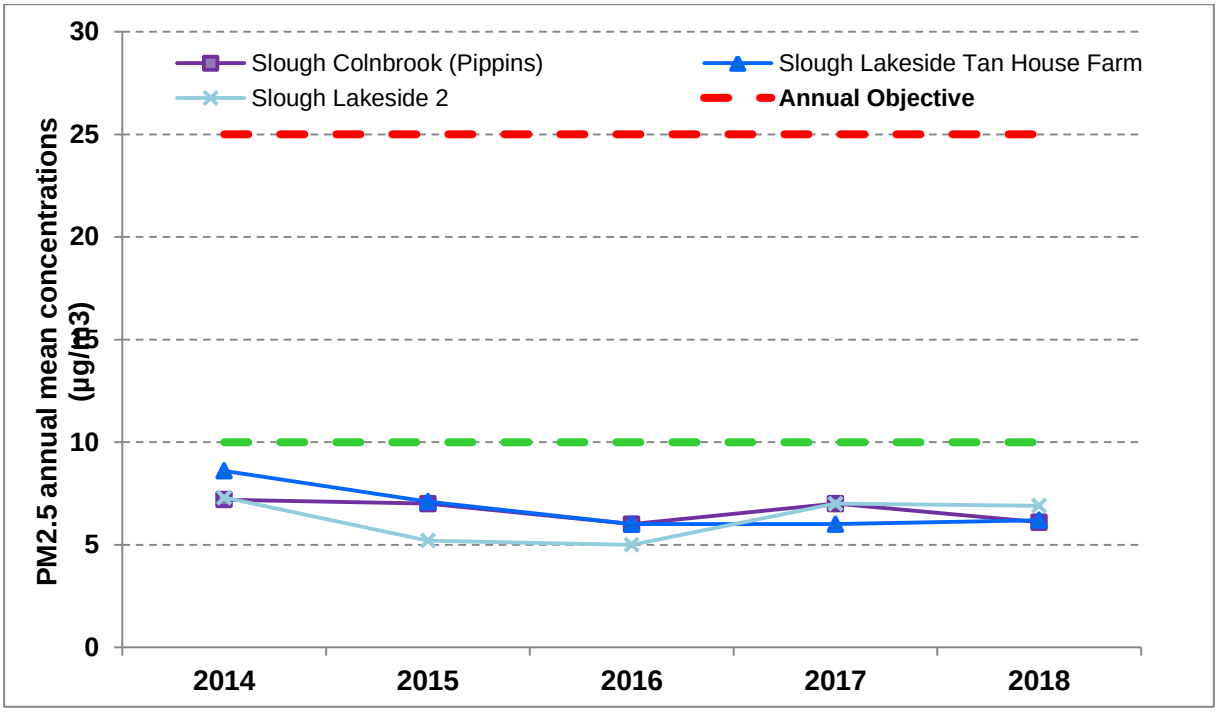
Since 2014, the results show a downward trend for Colnbrook (Pippins), Lakeside 2 and Windmill Bath Road. However Brands Hill and Lakeside 2 show an increase. Also note that Slough Lakeside 2 has two monitors (Osiris and TEOM/BAM) that measure PM_{10} which show opposite trends.

Appendix A.6 compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the AQO of 50$\mu g/m^3$, not to be exceeded more than 35 times per year. The AQOs were not breached at any of the sites, however Brands Hill observed the most exceedances of the daily AQO with 25.

3.2.3 Particulate Matter ($PM_{2.5}$)

Appendix A.7 presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years. This is shown in Figure 3.8 below:

Figure 3.8 – $PM_{2.5}$ concentrations measured within Slough Borough Council from 2014 to 2018



The air quality concentrations are significantly below the national AQOs and also below the World Health Objectives threshold of 10µg/m^3. The reduction of $PM_{2.5}$ concentrations follows a similar pattern to the fraction of mortality attributable to air pollution in Slough, where there was slight increase in 2016, but then a decrease in 2017.

As a note of caution, the OSIRIS[21] instrument has not been demonstrated to be equivalent to the reference method for $PM_{2.5}$ and the results should be considered with caution.

[21] The Osiris instrument gives a continuous indication of PM2.5 concentration by using a light scattering technique to determine the concentration of airborne dust in a given particle size range

Appendix A: Monitoring Results

Appendix 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)
SLH 4	Salt Hill (Slough-town-centre, A4)	Urban Background	496599	180156	NOx, NO2 and PM10	NO	Chemiluminescence TEOM	>30m	12.5m	4m
SLH 3 & SLH6	Slough-Colnbrook-(Pippins)	Suburban	503542	176827	NOx, NO2, PM10, PM2.5 & PM1	NO	Chemiluminescence TEOM and Osiris	7m	1.3m	4m
SLH 5	Slough-Colnbrook (Lakeside, Tan House Farm)	Industrial	503551	177258	PM10, PM2.5 & PM1	NO	Osiris	>200m	>50m	10m
SLH 8 and SLH9	Slough-Lakeside-2 (run by Lakeside Energy from Waste Ltd)	Industrial	503569	77385	NOx, NO2 and PM10	NO	Chemiluminescence BAM (PM10) Co-located Osiris (PM10, PM2.5 and PM1)	>200m	10m	4m
SLH10	Slough Town Centre Wellington Street	Kerbside	498413	179804	NOx and NO2	YES	Chemiluminescence	8m	5m	1.5m
SLH11	Brands Hill London Road	Kerbside	501643	177753	NOx, NO2 and PM10	YES	Chemiluminescence and BAM	12.5m	4m	1.5m
SLH12	Slough Windmill Bath Road	Kerbside	496528	180171	NOx, NO2 and PM10	YES	Chemiluminescence and BAM	12m	7.5m	1.5m

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.

Appendix 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 main road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
SLO 1	Salt Hill *	Urban Background	496599	180156	NO_2	NO	N/A (located in Park) > 30m	12.5	YES	2.5
SLO 2	Salt Hill *	Urban Background	496599	180156	NO_2	NO	N/A (located in Park) > 30m	12.5	YES	2.5
SLO 3	Salt Hill *	Urban Background	496599	180156	NO_2	NO	N/A (located in Park) > 30m	12.5	YES	2.5
SLO 4	Lansdowne Avenue	Roadside	497188	180050	NO_2	YES	5.5	13.8	NO	2.5
SLO 5	Princess Street	Roadside	498541	179815	NO_2	YES	12	22	NO	2
SLO 6	Sussex Place	Roadside	498784	179560	NO_2	NO	4.5	9.6	NO	2
SLO 7	Colnbrook By-pass	Industrial	503196	177349	NO_2	NO	N/A Industrial Area >200m	5	NO	2
SLO 8	Grampian Way	Other	501382	178101	NO_2	YES	20	35	NO	2
SLO 9	Tweed Road (B) Moved 2012	Other	501501	177879	NO_2	YES	12.9	22	NO	2
SLO 10	London Road (A)	Roadside	501733	177725	NO_2	YES	12.5	4	NO	2
SLO 11	Torridge Road	Suburban	501637	177999	NO_2	YES	30	65	NO	3
SLO 12	Lakeside Road	Industrial	503877	177459	NO_2	NO	N/A Industrial Area >200m	>100	NO	2
SLO 13	Elbow Meadows	Suburban	503856	176538	NO_2	NO	37	50	NO	2
SLO 14	Pippins *	Suburban	503542	176827	NO_2	NO	7	>50	YES	2.5
SLO 15	Pippins *	Suburban	503542	176827	NO_2	NO	7	>50	YES	2.5
SLO 16	Pippins *	Suburban	503542	176827	NO_2	NO	7	>50	YES	2.5
SLO 17	Horton Road (Caravan Park)	Suburban	503136	175654	NO_2	NO	28.5	15	NO	2
SLO 18	Brands Hill (A)	Roadside	501798	177659	NO_2	YES	10.5	6	NO	2.5

SLO 19	Ditton Road	Roadside	500851	177890	NO_2	NO	21	1.8	NO	2
SLO 20	Hencroft Street	Urban Background	497925	179450	NO_2	NO	5	>100	NO	2
SLO 21	Windsor Road	Roadside	497457	179566	NO_2	NO	10.5	2.5	NO	2.5
SLO 22	Winvale	Other	497488	179090	NO_2	YES	20	31	NO	2
SLO 23	Tuns Lane	Urban Background	496416	180126	NO_2	YES	18	17.5	NO	2.5
SLO 24	Spackmans Way	Other	496272	179187	NO_2	YES	53	60.5	NO	2.5
SLO 25	Paxton Avenue	Other	496050	179258	NO_2	YES	34.5	27	NO	2
SLO 26	Yew Tree Rd (Uxbridge Rd) (B)	Roadside	498473	179706	NO_2	YES	0	9.5	NO	2
SLO 27	India Road	Other	498681	179972	NO_2	NO	0 (railway exposure)	13	NO	2
SLO 28	Rogans (Colnbrook by pass)	Roadside	501941	177633	NO_2	YES	8.5	4.5	NO	2.5
SLO 29	Yew Tree Road (Uxbridge Rd)	Kerbside	498483	179707	NO_2	YES	6	1.5	NO	2
SLO 30	Farnham Road (2)	Roadside	496397	180341	NO_2	YES	17.5	12	NO	2
SLO 31	Essex Avenue	Suburban	496200	181900	NO_2	NO	3	1.4	NO	2
SLO 32	Brands Hill (B)	Roadside	501853	177620	NO_2	YES	0	9	NO	2
SLO 33	Wellington Street - Stratfield	Roadside	498168	179907	NO_2	YES	8	12	NO	2.5
SLO 34	Chalvey (CAS) *	Other	496562	179109	NO_2	YES	N/A (located in Transfer Station) > 50m	74	YES	1.5
SLO 35	Chalvey (CAS) *	Other	496562	179109	NO_2	YES	N/A (located in Transfer Station) > 50m	74	YES	1.5
SLO 36	Chalvey (CAS) *	Other	496562	179109	NO_2	YES	N/A (located in Transfer Station) > 50m	74	YES	1.5
SLO 37	Blair Road- Victoria Court	Roadside	497105	180081	NO_2	YES	11	11	NO	2
SLO 38	Wellesley Road	Roadside	498071	179949	NO_2	YES	13	11.5	NO	2.5

SLO 39	London Rd (B)	Roadside	501734	177733	NO_2	YES	0	11.5	NO	2.5
SLO 40	Wexham Road	Roadside	498394	179849	NO_2	YES	11.5	11	NO	2
SLO 41	Sandringham Court	Other	493960	181355	NO_2	NO	0 (Railway exposure)	10.5	NO	2.5
SLO 42	Walpole Rd	Other	493493	181378	NO_2	NO	0 (railway exposure)	16	NO	2.5
SLO 43	Windmill (Bath Rd)	Roadside	496533	180175	NO_2	YES	0	12	NO	2
SLO 44	Goodman Park (Uxbridge Rd)	Roadside	498961	180113	NO_2	NO	10	9.7	NO	2.5
SLO 45	London Rd (C)	Roadside	501658	177781	NO_2	YES	0	14	NO	2
SLO 46	Cornwall House, Bath Rd	Roadside	497467	179971	NO_2	YES	11	5	NO	2
SLO 47	Princes House, Bath Road	Roadside	497326	180003	NO_2	YES	0	4.5	NO	2
SLO 48	Castle Street	Other	497960	179243	NO_2	NO	15.5	14	NO	2
SLO 49	Windsor Road (B)	Kerbside	497397	179471	NO_2	NO	6	1.5	NO	2
SLO 50	Tuns Lane (B)	Kerbside	496377	179929	NO_2	YES	13	4	NO	2
SLO 51	Langley Road	Roadside	501014	179316	NO_2	NO	10	2.5	NO	2.5
SLO 52	Station Road	Roadside	501161	179538	NO_2	NO	10	3.5	NO	2.5
SLO 53	High Street Langley (A)	Roadside	501208	178799	NO_2	NO	5.5	2	NO	2.5
SLO 54	High Street Langley (B)	Roadside	501256	179067	NO_2	NO	6	4	NO	2.5
SLO 55	Parlaunt Road	Roadside	501891	178954	NO_2	NO	8	2.5	NO	2.5
SLO 56	Sutton lane	Roadside	502241	178679	NO_2	NO	7.5	4	NO	2.5

***these are co-location sites with continuous air quality monitoring stations**

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.

Appendix A.3 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2018 (%) [2]	NO_2 Annual Mean Concentration (µg/m^3) [3]				
					2014	2015	2016	2017	2018
SLH 3	Suburban	Automatic	96.36%	96.36%	30.7	28.6	29.0	25	22
SLH 4	Urban Background	Automatic	97.15%	97.15%	**35.5**	**30.3**	**30**	**33**	31
SLH 7	Other	Automatic	99.98%	99.98%	**34***	**36.9**	**41.0**	**35**	32
SLH 8	Industrial	Automatic	96.50%	96.50%	33.9	29.2	32.4	26	26
SLH 10	Kerbside	Automatic	100.00%	100.00%	-	-	-	36.6	36
SLH 11	Kerbside	Automatic	99.10%	99.10%	-	-	-	37.5	**42**
SLH 12	Kerbside	Automatic	98.83%	98.83%	-	-	-	**41.5**	**42**
TRL	Roadside	Automatic			-	33.2	32.9	-	-
SLO 1/2/3	Urban Background	Diffusion Tube	100.00%	100.00%	33.7	35.6	32.3	31.1	28.1
SLO 4	Roadside	Diffusion Tube	58.33%	58.33%	**40**	38.4	38.6	37.9	33.8*
SLO 5	Roadside	Diffusion Tube	100.00%	100.00%	**43.5**	**40.3**	**40.8**	**40.7**	34.4
SLO 6	Roadside	Diffusion Tube	91.97%	91.97%	32.5	34.1	34.2	32.1	29.0
SLO 7	Industrial	Diffusion Tube	100.00%	100.00%	39	39.1	38.7	38.7	35.0
SLO 8	Other	Diffusion Tube	100.00%	100.00%	**42.4**	**40**	**41.3**	**40.4**	34.8
SLO 9	Other	Diffusion Tube	100.00%	100.00%	39	35.6	37.4	35.3	32.6
SLO 10	Roadside	Diffusion Tube	100.00%	100.00%	**51.2**	**48.3**	**52.3**	**45.3**	**44.4**
SLO 11	Suburban	Diffusion Tube	100.00%	100.00%	36.3	36.9	37.3	32.7	30.0

SLO 12	Industrial	Diffusion Tube	100.00%	100.00%	**45.4**	**42.9**	**44.3**	38.6	**40.7**
SLO 13	Suburban	Diffusion Tube	100.00%	100.00%	37.9	34.9	35.9	30.5	31.2
SLO 14/15/16	Suburban	Diffusion Tube	100.00%	100.00%	30.3	29.9	30.8	26.0	24.8
SLO 17	Suburban	Diffusion Tube	91.67%	91.67%	33.4	30	31.9	25.6	**41.5**
SLO 18	Roadside	Diffusion Tube	100.00%	100.00%	**53.1**	**61.1**	**63.7**	**55.2**	**53.2**
SLO 19	Roadside	Diffusion Tube	100.00%	100.00%	38.8	**41.1**	**40.0**	34.6	33.2
SLO 20	Urban Background	Diffusion Tube	100.00%	100.00%	29	27.9	28.6	27.0	23.7
SLO 21	Roadside	Diffusion Tube	100.00%	100.00%	34.5	**44.6**	**47.8**	**40.9**	35.0
SLO 22	Other	Diffusion Tube	100.00%	100.00%	**42.3**	**42.7**	39.8	**41.8**	33.8
SLO 23	Urban Background	Diffusion Tube	91.67%	91.67%	36.4	36.1	36.4	33.6	29.5
SLO 24	Other	Diffusion Tube	100.00%	100.00%	39.7	38.8	39.0	37.9	32.7
SLO 25	Other	Diffusion Tube	100.00%	100.00%	**41.4**	**41.9**	38.4	36.5	33.2
SLO 26	Roadside	Diffusion Tube	83.33%	83.33%	36.6	**60.8**	**61.1**	**48.1**	31.5
SLO 27	Other	Diffusion Tube	100.00%	100.00%	34.3	31.4	33.9	31.3	26.9
SLO 28	Roadside	Diffusion Tube	100.00%	100.00%	**50.9**	**56.3**	**58.1**	**45.3**	**44.0**
SLO 29	Kerbside	Diffusion Tube	100.00%	100.00%	**54.6**	**40.5**	38.5	**42.9**	**52.7**
SLO 30	Roadside	Diffusion Tube	83.33%	83.33%	35.7	**40.4**	34.1	32.6	29.0
SLO 31	Suburban	Diffusion Tube	100.00%	100.00%	32.1	30.1	30.9	28.7	27.0

SLO 32	Roadside	Diffusion Tube	100.00%	100.00%	**42.1**	**40.1**	39.3	36.3	36.2
SLO 33	Roadside	Diffusion Tube	100.00%	100.00%	34.9	34	36.9	33.9	28.7
SLO 34/35/36	Other	Diffusion Tube	94.44%	94.44%	37.6	**41**	35.6	35.8	31.1
SLO 37	Roadside	Diffusion Tube	100.00%	100.00%	**46**	**43.4**	**47.6**	**45.3**	39.9
SLO 38	Roadside	Diffusion Tube	100.00%	100.00%	34.2	34.5	38.3	37.4	32.3
SLO 39	Roadside	Diffusion Tube	100.00%	100.00%	38.6	37.1	37.0	33.1	31.6
SLO 40	Roadside	Diffusion Tube	100.00%	100.00%	**47.1**	**42.1**	**44.8**	**42.3**	38.6
SLO 41	Other	Diffusion Tube	91.67%	91.67%	28.1	32.3	25.9	25.9	21.9
SLO 42	Other	Diffusion Tube	50.00%	50.00%	28.4	24.9	28.4	23.1	21.2*
SLO 43	Roadside	Diffusion Tube	91.67%	91.67%	**41.2**	39.5	**42.0**	37.2	34.0
SLO 44	Roadside	Diffusion Tube	100.00%	100.00%	34.2	38.7	38.4	36.4	31.9
SLO 45	Roadside	Diffusion Tube	100.00%	100.00%	36.6	33.5	32.7	31.4	28.6
SLO 46	Roadside	Diffusion Tube	100.00%	100.00%	-	**41.5**	**53.3**	**46.2**	**40.1**
SLO 47	Roadside	Diffusion Tube	91.67%	91.67%	-	**40.5**	**44.6**	36.9	35.2
SLO 48	Roadside	Diffusion Tube	91.67%	91.67%	-	-	-	29.4	28.1
SLO 49	Kerbside	Diffusion Tube	100.00%	100.00%	-	-	-	**48.7**	**40.0**
SLO 50	Kerbside	Diffusion Tube	100.00%	100.00%	-	-	-	**45.3**	**45.8**
SLO 51	Roadside	Diffusion Tube	100.00%	100.00%	-	-	**42.8**	37.8	36.0

SLO 52	Roadside	Diffusion Tube	100.00%	100.00%	-	-	**41.5**	36.4	33.2
SLO 53	Roadside	Diffusion Tube	100.00%	100.00%	-	-	**48.6**	**42.1**	37.9
SLO 54	Roadside	Diffusion Tube	100.00%	100.00%	-	-	39.6	35.4	32.8
SLO 55	Roadside	Diffusion Tube	100.00%	100.00%	-	-	36.9	31.4	30.4
SLO 56	Roadside	Diffusion Tube	100.00%	100.00%	-	-	**43.9**	**37.8**	37.6
SLO 57/58/59	Kerbside	Diffusion Tube	100.00%	100.00%	-	-	-	**44.1**	**41.6**
SLO 60/61/62	Kerbside	Diffusion Tube	100.00%	100.00%	-	-	-	36.6	34.9
SLO 63/64/65	Kerbside	Diffusion Tube	100.00%	100.00%	-	-	-	37.3	**43.3**

***These values have been annualised.**

☒ **Diffusion tube data has been bias corrected (confirm by selecting in box)**

☒ **Annualisation has been conducted where data capture is <75% (confirm by selecting in box)**

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.

Appendix 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 2018 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2014	2015	2016	2017	2018
SLH 3	Suburban	Automatic	96.36%	96.36%	0	**0 (111)**	**0**	**0**	0
SLH 4	Urban Background	Automatic	97.15%	97.15%	0	**0 (101)**	**0**	**0**	0
SLH 7	Other	Automatic	99.98%	99.98%	0	**0 (117)**	0	0	0
SLH 8	Industrial	Automatic	96.50%	96.50%	0	**0 (109)**	0	0	0
SLH 10	Kerbside	Automatic	100.00%	100.00%	-	-	-	**0 (114)**	0
SLH 11	Kerbside	Automatic	99.10%	99.10%	-	-	-	**0 (121)**	0
SLH 12	Kerbside	Automatic	98.83%	98.83%	-	-	-	**0 (117)**	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.

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

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	PM_{10} Annual Mean Concentration ($\mu g/m^3$) (3)				
				2014	2015	2016	2017	2018
SLH 3	Suburban	97.66%	97.66%	**17.7***	**16.7**	**18**	**16**	18.0
SLH 4	Urban Background	96.05%	96.05%	**19.2***	19	19	18	16.9
SLH 5	Industrial	99.86%	99.86%	19.3	18.7	14	14	14.4
SLH 6	Urban Background	99.94%	99.94%	20	20	15	16	10.3
SLH 8	Industrial	98.25%	98.25%	13.2	13.9	15	14	13.7
SLH 9	Urban Background	98.53%	98.53%	18	11	11	17	14.8
SLH 11	Kerbside	98.38%	98.38%	-	-	-	27.9	28.77
SLH 12	Kerbside	95.10%	95.10%	-	-	-	24.4	23.86

☒ **Annualisation has been conducted where data capture is <75%** **(confirm by selecting in box)**

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.

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

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
				2014	2015	2016	2017	2018
SLH 3	Suburban	97.66%	97.66%	1	3	5	5	1
SLH 4	Urban Background	96.05%	96.05%	0	**4**	4	3	1
SLH 5	Industrial	99.86%	99.86%	1	0	1	1	1
SLH 6	Urban Background	99.94%	99.94%	4	3	1	5	0
SLH 8	Industrial	98.25%	98.25%	8	1	1	3	1
SLH 9	Urban Background	98.53%	98.53%	7	1	3	9	1
SLH 11	Kerbside	98.38%	98.38%	-	-	-	**5 (36)**	25
SLH 12	Kerbside	95.10%	95.10%	-	-	-	**5 (36)**	11

Notes:

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

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

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

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

Appendix A.7 – $PM_{2.5}$ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2018 (%) [2]	$PM_{2.5}$ Annual Mean Concentration ($\mu g/m^3$) [3]				
				2014	2015	2016	2017	2018
SLH 5	Industrial	99.90%	99.90%	8.6	7.1	6	6	6.2
SLH 6	Suburban	99.96%	99.96%	7.2	7	6	7	6.1
SLH 9	Industrial	99.97%	99.97%	7.3	5.2	5	7	6.9

☒ **Annualisation has been conducted where data capture is <75%** **(confirm by selecting in box)**

Notes:

(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.

Appendix B: Full Monthly Diffusion Tube Results for 2018

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

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 (0.775) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
SLO 1	43.2	36.8	45.6	41.8	29.2	24.2	33.3	31.9	30.9	34.4	44.6	42.3	36.5	28.3	
SLO 2	39.7	37.3	45.5	42.4	29.3	23.7	35.6	32.8	31.8	35.6	44.3	40.1	36.5	28.3	
SLO 3	38.1	39.3	46.9	39.1	27.7	23.6	32.5	32.8	30.7	35.2	44.7	40.5	35.9	27.8	
SLO 4	47.4	41.2	50.4	44	37	29.3						49.5	42.7	33.8	**37.0**
SLO 5	50.6	38.2	54.7	50.2	38.7	28	43.6	41.3	40	44.1	52.7	50.1	44.4	34.4	34.4
SLO 6	46	41	46.3	39.8	34.7	25.1	36		23.4	36.6	38	45.4	37.5	29.0	
SLO 7	44.9	43.2	58	48.4	40.5	32.5	49.2	39.2	39.8	40.9	56	49	45.1	35.0	
SLO 8	54.6	43.3	53.9	53.3	38	28.5	41.4	41.9	39.9	39.5	54.6	49.2	44.8	34.8	**38.8**
SLO 9	48.9	29.3	52.5	42.8	44.8	35.7	38.4	35.8	33.6	44.2	49.4	49.8	42.1	32.6	35.3
SLO 10	53.1	60.9	68.4	60.7	67	57.5	57.5	50	43.2	53.3	53.6	61.6	57.2	**44.4**	**37.6**
SLO 11	41.4	45.6	36.5	39.2	40.9	32.3	32.3	33.8	32.6	42.5	40.5	46.8	38.7	30.0	**32.6**
SLO 12	51.9	54.2	60	59.8	52	54.8	55.2	48.2	47.1	49.3	49.5	48.6	52.6	**40.7**	
SLO 13	37.5	46	50.8	43.6	39.4	38.4	35.5	31.4	30.3	39.9	48.2	42.2	40.3	31.2	
SLO 14	4.1	35.3	44.5	35	31.7	24	30.6	24.2	24.2	32.9	42.4	35.2	30.3	23.5	
SLO 15	32.4	37.7	44.4	36.9	32.1	26.6	28.6	24.9	24.2	32.1	41.4	35.9	33.1	25.7	

SLO 16	35.5	37.4	43.1	33.6	30.1	25.7	26.5	25.9	22.4	32.6	44.3	34.3	32.6	25.3	
SLO 17		55.3	61	47.7	56.9	52.7	54.6	67.1	39	52.3	49.5	53.3	53.6	**41.5**	
SLO 18	66.2	69.8	82.8	73.5	76.1	66.7	77.4	44.1	65.5	66.3	68.2	66.5	68.6	**53.2**	**47.9**
SLO 19	47.7	48.4	54.8	49.1	43.4	38.4	38.8	32	32.9	36.5	44.9	46.8	42.8	33.2	
SLO 20	35.6	36.5	39.2	32.1	28	20	25.5	24.8	26.4	30.5	35.8	31.9	30.5	23.7	
SLO 21	49.4	49.3	56	47.6	44.6	37.4	42.8	36.1	39.4	42.9	50.7	45.9	45.2	35.0	31.8
SLO 22	57.3	43.4	51.5	48.2	34.1	23.9	40.2	43.3	42.1	40.8	45.2	53.7	43.6	33.8	**36.1**
SLO 23	38.7	43.8	45.7	36.6	40.4	23.8	37.2	35.1	32.1	42.1	43.6		38.1	29.5	
SLO 24	45	43.8	50	43.1	36.5	30.4	42.2	38.9	39.6	41.9	46.1	49.4	42.2	32.7	
SLO 25	48.6	43.5	54.1	47	39	31.9	40.5	39.6	35.5	38.9	50.1	45.4	42.8	33.2	
SLO 26			49.5	36.3	44.3	43.3	39.4	35	32	38.1	46.2	42.8	40.7	31.5	
SLO 27	35.9	42.6	43.7	36.3	31.6	26.2	30.1	29.1	28.1	32	40.5	40.1	34.7	26.9	
SLO 28	65.9	58.2	65.4	50.6	51.7	47.1	56.7	51.6	53.7	62.9	59.8	57.2	56.7	**44.0**	**40.1**
SLO 29	68.4	65.5	74.5	60.6	77.2	69.2	67.7	63.9	61.3	71.4	68.6	67.8	68.0	**52.7**	**43.7**
SLO 30	42.6	40.8	43.1	9.7		35.4	36.2	34.7	38.1	45.7		48.5	37.5	29.0	
SLO 31	43.2	36.8	45.3	38.2	29.4	25.2	29.2	26.9	28.7	31.2	43.3	41.3	34.9	27.0	
SLO 32	40.7	54.9	54.7	40.9	56.1	53.2	46.2	38.9	32.6	49.7	45.8	46.4	46.7	**36.2**	
SLO 33	41.4	34.4	46.2	38.7	37.5	27.8	25.4	35.9	34.7	39.4	36.5	47	37.1	28.7	
SLO 34	46.4	41	51.5	43.9	34.8	26.7	38.3	34.2	33.8	35.9	40.2	44.9	39.3	30.5	
SLO 35	49.4	42.3	50.2	46.1	33.7	27.3			35.3	38.1	47.8	43.7	41.4	32.1	
SLO 36	48.1	43	47.4	44.5	34.1	26.4	36.3	35.4	34.8	38.3	41.2	44.8	39.5	30.6	
SLO 37	59.1	52.1	62.3	51.1	48.9	37.5	56.8	48.9	46.6	47.2	52.2	55.5	51.5	**39.9**	**39.9**
SLO 38	44.1	47.6	50.9	41.5	35.2	25	39.9	38.6	31.1	45.4	50	50.7	41.7	32.3	
SLO 39	30.9	44.3	54.3	40.5	40.8	33.7	42.5	36.1	35.4	42.4	43.4	44.4	40.7	31.6	
SLO 40	53	50.3	59	53.8	47	42.8	49.5	45.4	42	51.4	46.9	56.8	49.8	**38.6**	**38.6**
SLO 41	33.1		35.4	26.7	21.6	16.5	23	22.4	21	27.1	35.1	49.3	28.3	21.9	
SLO 42		33.2	29.7	27.4	23.8		21.3	22.7	20.3	28	32.5	29.3	26.8	21.2	

SLO 43	43.4	49	52.6	45		44.1	43.1	40	35.9	40.8	45.2	43.9	43.9	34.0	34.0
SLO 44	53.5	43.1	47.9	38.6	38.4	32.1	39.7	37.7	33.8	39.2	45.8	43.7	41.1	31.9	
SLO 45	38.9	44.2	45.1	34.1	36.5	30.1	32.4	33.1	29.8	39.1	36.5	42.4	36.9	28.6	
SLO 46	60.5	54.9	63.5	48.6	50.9	35.6	54.7	47.6	47.7	45.3	58.7	53.4	51.8	**40.1**	36.8
SLO 47	47.1	45.3	52	47.2	53.1	43.2	44.3		37.1	43.2	39.9	46.9	45.4	35.2	
SLO 48	36.9	38.4	40.9	32.3	31.1	25.6	34.1		32.1	38.3	44.3	44.6	36.2	28.1	
SLO 49	53.4	55.3	50.6	51.6	51.4	44.3	53.9	49.1	45.7	57	53.6	54.2	51.7	**40.0**	35.7
SLO 50	63.4	56.4	66.8	57.5	67.7	51.4	61	55.4	48.9	60.6	62.4	57.3	59.1	**45.8**	38.9
SLO 51	52.8	48.1	57.6	48.1	44.5	43.1	40.5	38.4	37.7	45	50.9	50.8	46.5	**36.0**	31.8
SLO 52	49	47.6	52.4	44.8	37.8	37.7	39	29.3	35.2	42.8	52.5	46.5	42.9	33.2	
SLO 53	55.4	51.2	37.5	53.2	49.6	41.4	48.4	42.6	41.7	52.5	59.3	53.4	48.9	**37.9**	34.8
SLO 54	43.4	42.1	62.4	46.7	35.6	26.8	38.9	33	33.7	42.5	1.7	100.9	42.3	32.8	
SLO 55	45.8	44.5	51.2	33.9	35.8	29.8	32.2	33.9	27.9	41	49.6	44.5	39.2	30.4	
SLO 56	47.9	53.2	57.2	38.7	41.6	40.5	43	39.7	47.6	49.5	68.2	55.6	48.6	**37.6**	35.1
SLO 57	52.6	53.9	60	58.2	59.4	50.6	51	50.2	45.1	57.6	49.7	55.8	53.7	**41.6**	**39.0**
SLO 58	52	58.9	60.2	51.8	60.3	50.1	51.2	49.7	46.6	57.3	52.3	56.9	53.9	**41.8**	**39.2**
SLO 59	52.3	57.8	55.9	55.8	59.2	51.5	52.8	51.5	47	56.1	52.1	51.2	53.6	**41.5**	**38.9**
SLO 60	47.1	52.5	52.9	47.5	46.2	40.2	43.4	41	38	43.6	47	47.7	45.6	35.3	
SLO 61	47.8	53.8	53.5	45.8	49.8	41.1	44.3	38.4	36	45.1	45.2	48.1	45.7	35.4	
SLO 62	46.8	41.2	52.5	44	48	41.6	43.7	39.7	35.1	47.1	45.6	39.8	43.8	33.9	
SLO 63	50	64.8	65.3	54.8	61.4	55.7	58.1	41.1	42.7	58	62.8	53.5	55.7	**43.2**	35.2
SLO 64	51.8	64.4	63.9	56.5	61.3	58.1	56.7	46.7	42.9	57.9	56.9	54.6	56.0	**43.4**	35.3
SLO 65	41.5	67.5	66.3	60.6	58.1	54.2	57.6	48.2	44.3	54.9	62.5	54.5	55.9	**43.3**	35.3

☒ **Local bias adjustment factor used (confirm by selecting in box)**

☐ **National bias adjustment factor used (confirm by selecting in box)**

☒ **Annualisation has been conducted where data capture is <75% (confirm by selecting in box)**

☒ **Where applicable, data has been distance corrected for relevant exposure (confirm by selecting in box)**

Notes:

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

NO_2 annual means within 10% of the annual mean objective of 40µg/m^3 are shown in **black 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

The bias correction factor (0.775) was derived from the average of the local collation studies within Slough using the method prescribed by TG (16):

- Chalvey = 0.82 (M4 Air Quality Monitoring Station) see Appendix C.1;
- Colnbrook = 0.68 (Suburban Air Quality Monitoring Station) see Appendix C.2
- Salthill = 0.80 (Urban Background Air Quality Monitoring Station) see Appendix C.3
- Windmill = 0.79 (Kerbside Air Quality Monitoring Station) see Appendix C.4
- Brands Hill = 0.76 (Kerbside Air Quality Monitoring Station) see Appendix C.5
- Wellington = 0.8 (Kerbside Air Quality Monitoring Station) see Appendix C.6

National bias adjustment factor is shown in Appendix C.7. This shows good agreement with the local bias adjustment.

Technical Guidance 2016 suggests the calculation of average bias should be done as follows:

1. For each location take the bias correction B, from either the value including all data or with only using those coefficients of variation <20%.
2. Convert the percentage to a factor by dividing by 100, adding 1, and then dividing 1 by the result.
3. Repeat stage 2) for all co-location sites, and average the result.
4. Adjust all diffusion tubes by the resulting value.

Appendix C.1: Chalvey 2018

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

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
1	03/01/2018	01/02/2018	46.4	49.4	48.1	48	1.5	3	3.7
2	01/02/2018	27/02/2018	41	42.3	43	42	1.0	2	2.5
3	27/02/2018	29/03/2018	51.5	50.2	47.4	50	2.1	4	5.2
4	29/03/2018	02/05/2018	43.9	46.1	44.5	45	1.1	3	2.8
5	02/05/2018	05/06/2018	34.8	33.7	34.1	34	0.6	2	1.4
6	05/06/2018	03/07/2018	26.7	27.3	26.4	27	0.5	2	1.1
7	03/07/2018	02/08/2018	38.3	X	36.3	37	1.4	4	12.7
8	02/08/2018	05/09/2018	34.2	X	35.4	35	0.8	2	7.6
9	05/09/2018	03/10/2018	33.8	35.3	34.8	35	0.8	2	1.9
10	03/10/2018	31/10/2018	35.9	38.1	38.3	37	1.3	4	3.3
11	31/10/2018	04/12/2018	40.2	47.8	41.2	43	4.1	10	10.3
12	04/12/2018	10/01/2019	44.9	43.7	44.8	44	0.7	1	1.7
13									

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

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
36.96	99.57	Good	Good
33.45	99.68	Good	Good
39.68	99.58	Good	Good
38.11	99.76	Good	Good
32.91	99.02	Good	Good
20.38	99.11	Good	Good
27.80	99.72	Good	Good
24.04	99.27	Good	Good
28.14	99.41	Good	Good
32.43	100.00	Good	Good
39.55	99.27	Good	Good
44.74	63.44	Good	Good
	Overall survey -->	Good precision	Good Overall

Data Capture

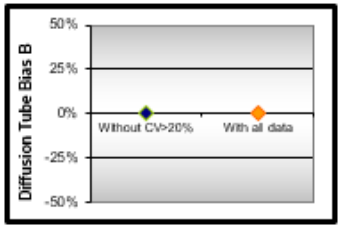
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Chalvey (SLH 7)

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

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 11 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	39 µgm^{-3}
Mean CV (Precision):	3
Automatic Mean:	32 µgm^{-3}
Data Capture for periods used:	99%
Adjusted Tubes Mean:	µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 11 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	39 µgm^{-3}
Mean CV (Precision):	3
Automatic Mean:	32 µgm^{-3}
Data Capture for periods used:	99%
Adjusted Tubes Mean:	µgm^{-3}



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Version 04 - February 2011

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Appendix C.2: Colnbrook 2018

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

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
1	03/01/2018	01/02/2018	4.1	32.4	35.5	24	17.3	72	43.0
2	01/02/2018	27/02/2018	35.3	37.7	37.4	37	1.3	4	3.2
3	27/02/2018	29/03/2018	44.5	44.4	43.1	44	0.8	2	1.9
4	29/03/2018	02/05/2018	35	36.9	33.6	35	1.7	5	4.1
5	02/05/2018	05/06/2018	31.7	32.1	30.1	31	1.1	3	2.6
6	05/06/2018	03/07/2018	24	26.6	25.7	25	1.3	5	3.3
7	03/07/2018	02/08/2018	30.6	28.6	26.5	29	2.1	7	5.1
8	02/08/2018	05/09/2018	24.2	24.9	25.9	25	0.9	3	2.1
9	05/09/2018	02/10/2018	24.2	24.2	22.4	24	1.0	4	2.6
10	02/10/2018	31/10/2018	32.9	32.1	32.6	33	0.4	1	1.0
11	31/10/2018	04/12/2018	42.4	41.4	44.3	43	1.5	3	3.7
12	04/12/2018	10/01/2019	35.2	35.9	34.3	35	0.8	2	2.0
13									

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

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
24.58	99.71	Poor Precision	Good
28.24	99.20	Good	Good
30.28	98.89	Good	Good
23.45	99.88	Good	Good
20.93	98.53	Good	Good
15.02	99.55	Good	Good
17.90	99.72	Good	Good
14.90	99.76	Good	Good
15.66	99.69	Good	Good
21.61	82.93	Good	Good
35.00	20.81	Good	Poor Data Capture
27.02	80.20	Good	Good
Overall survey -->		Good precision	Poor Overall

(Check average CV & DC from Accuracy calculations)

Site Name/ ID: Pippins (SLH 3)

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

Accuracy (with 95% confidence interval) without periods with CV larger than 20%

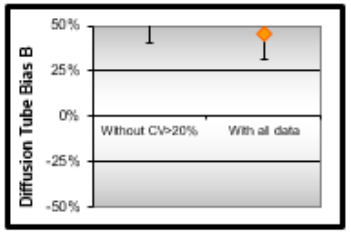
Bias calculated using 10 periods of data

Bias factor A	0.68 (0.64 - 0.72)
Bias B	48% (38% - 57%)
Diffusion Tubes Mean:	32 µgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	22 µgm^{-3}
Data Capture for periods used:	96%
Adjusted Tubes Mean:	22 (20 - 23) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA

Bias calculated using 11 periods of data

Bias factor A	0.7 (0.64 - 0.78)
Bias B	43% (29% - 56%)
Diffusion Tubes Mean:	31 µgm^{-3}
Mean CV (Precision):	10
Automatic Mean:	22 µgm^{-3}
Data Capture for periods used:	96%
Adjusted Tubes Mean:	22 (20 - 24) µgm^{-3}



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Appendix C.3: Salt Hill 2018

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

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
1	03/01/2018	01/02/2018	43.2	39.7	38.1	40	2.6	6	6.5
2	01/02/2018	27/02/2018	36.8	37.3	39.3	38	1.3	3	3.3
3	27/02/2018	29/03/2018	45.6	45.5	46.9	46	0.8	2	1.9
4	29/03/2018	02/05/2018	41.8	42.4	39.1	41	1.8	4	4.4
5	02/05/2018	05/06/2018	29.2	29.3	27.7	29	0.9	3	2.2
6	05/06/2018	04/07/2018	24.2	23.7	23.6	24	0.3	1	0.8
7	04/07/2018	02/08/2018	33.3	35.6	32.5	34	1.6	5	4.0
8	02/08/2018	05/09/2018	31.9	32.8	32.8	33	0.5	2	1.3
9	05/09/2018	02/10/2018	30.9	31.8	30.7	31	0.6	2	1.5
10	02/10/2018	31/10/2018	34.4	35.6	35.2	35	0.6	2	1.5
11	31/10/2018	04/12/2018	44.6	44.3	44.7	45	0.2	0	0.5
12	04/12/2018	11/01/2019	42.3	40.1	40.5	41	1.2	3	2.9
13									

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

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
32.85	99.71	Good	Good
32.21	99.68	Good	Good
35.78	98.06	Good	Good
34.28	85.8	Good	Good
	0	Good	or Data Capture
17.84	71.74	Good	or Data Capture
26.87	99.14	Good	Good
24.45	99.63	Good	Good
24.94	99.85	Good	Good
26.73	100	Good	Good
32.98	98.9	Good	Good
34.09	99.45	Good	Good
Overall survey -->		Good precision	Good Overall

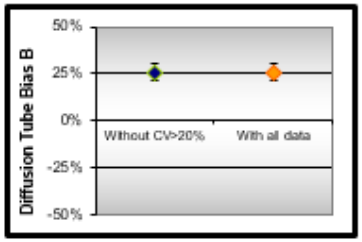
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Salt Hill (SLH 4)

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

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 10 periods of data	
Bias factor A	0.8 (0.77 - 0.82)
Bias B	26% (21% - 30%)
Diffusion Tubes Mean:	38 μgm^{-3}
Mean CV (Precision):	3
Automatic Mean:	31 μgm^{-3}
Data Capture for periods used:	98%
Adjusted Tubes Mean:	31 (30 - 31) μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 10 periods of data	
Bias factor A	0.8 (0.77 - 0.82)
Bias B	26% (21% - 30%)
Diffusion Tubes Mean:	38 μgm^{-3}
Mean CV (Precision):	3
Automatic Mean:	31 μgm^{-3}
Data Capture for periods used:	98%
Adjusted Tubes Mean:	31 (30 - 31) μgm^{-3}



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Appendix C.4: Windmill 2018

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

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
1	03/01/2018	01/02/2018	52.6	52.0	52.3	52	0.3	1	0.7
2	01/02/2018	27/02/2018	53.9	58.9	57.8	57	2.6	5	6.5
3	27/02/2018	29/03/2018	60.0	60.2	55.9	59	2.4	4	6.0
4	29/03/2018	02/05/2018	58.2	51.8	55.8	55	3.2	6	8.0
5	02/05/2018	05/06/2018	59.4	60.3	59.2	60	0.6	1	1.5
6	05/06/2018	04/07/2018	50.6	50.1	51.5	51	0.7	1	1.8
7	04/07/2018	02/08/2018	51.0	51.2	52.8	52	1.0	2	2.5
8	02/08/2018	05/09/2018	50.2	49.7	51.5	50	0.9	2	2.3
9	05/09/2018	02/10/2018	45.1	46.6	47.0	46	1.0	2	2.5
10	02/10/2018	31/10/2018	57.6	57.3	56.1	57	0.8	1	2.0
11	31/10/2018	04/12/2018	49.7	52.3	52.1	51	1.4	3	3.6
12	04/12/2018	11/01/2019	55.8	56.9	51.2	55	3.0	6	7.5
13									

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

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
42.12	99.71	Good	Good
49.56	99.68	Good	Good
49.27	96.39	Good	Good
42.28	99.76	Good	Good
48.82	99.39	Good	Good
37.18	99.86	Good	Good
38.67	99.86	Good	Good
34.45	99.51	Good	Good
35.41	99.08	Good	Good
43.93	91.68	Good	Good
41.51	99.39	Good	Good
45.67	99.56	Good	Good
Overall survey -->		Good precision	Good Overall

(Check average CV & DC from Accuracy calculations)

Site Name/ ID: WINDMILL

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

Accuracy (with 95% confidence interval) without periods with CV larger than 20%

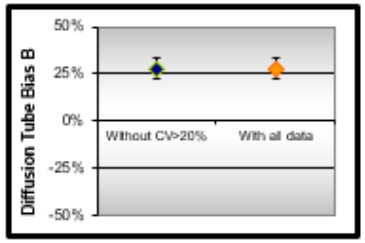
Bias calculated using 12 periods of data

Bias factor A	0.79 (0.76 - 0.83)
Bias B	27% (21% - 32%)
Diffusion Tubes Mean:	54 μgm^{-3}
Mean CV (Precision):	3
Automatic Mean:	42 μgm^{-3}
Data Capture for periods used:	99%
Adjusted Tubes Mean:	42 (41 - 45) μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA

Bias calculated using 12 periods of data

Bias factor A	0.79 (0.76 - 0.83)
Bias B	27% (21% - 32%)
Diffusion Tubes Mean:	54 μgm^{-3}
Mean CV (Precision):	3
Automatic Mean:	42 μgm^{-3}
Data Capture for periods used:	99%
Adjusted Tubes Mean:	42 (41 - 45) μgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

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Appendix C.5: Brands Hill 2018

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

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
1	03/01/2018	01/02/2018	50.0	51.8	41.5	48	5.5	12	13.7
2	01/02/2018	27/02/2018	64.8	64.4	67.5	66	1.7	3	4.2
3	27/02/2018	29/03/2018	65.3	63.9	66.3	65	1.2	2	3.0
4	29/03/2018	02/05/2018	54.8	56.5	60.6	57	3.0	5	7.4
5	02/05/2018	05/06/2018	61.4	61.3	58.1	60	1.9	3	4.7
6	05/06/2018	04/07/2018	55.7	58.1	54.2	56	2.0	4	4.9
7	04/07/2018	02/08/2018	58.1	56.7	57.6	57	0.7	1	1.8
8	02/08/2018	05/09/2018	41.1	46.7	48.2	45	3.7	8	9.3
9	05/09/2018	02/10/2018	42.7	42.9	44.3	43	0.9	2	2.2
10	02/10/2018	31/10/2018	58.0	57.9	54.9	57	1.8	3	4.4
11	31/10/2018	04/12/2018	62.8	56.9	62.5	61	3.3	5	8.3
12	04/12/2018	11/01/2019	53.5	54.6	54.5	54	0.6	1	1.5
13									

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

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
39.41	99.57	Good	Good
49.23	99.84	Good	Good
51.72	95.56	Good	Good
40.68	99.76	Good	Good
45.47	99.02	Good	Good
36.27	99.43	Good	Good
40.18	97.13	Good	Good
32.63	99.51	Good	Good
32.13	98.77	Good	Good
43.98	100.00	Good	Good
49.18	99.51	Good	Good
45.48	99.67	Good	Good
Overall survey -->		Good precision	Good Overall

(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	BRANDS HILL

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

Accuracy (with 95% confidence interval) without periods with CV larger than 20%

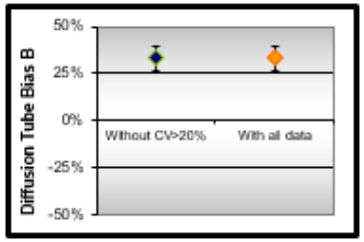
Bias calculated using 12 periods of data

Bias factor A	0.76 (0.72 - 0.8)
Bias B	32% (26% - 39%)
Diffusion Tubes Mean:	56 µgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	42 µgm^{-3}
Data Capture for periods used:	99%
Adjusted Tubes Mean:	42 (40 - 45) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA

Bias calculated using 12 periods of data

Bias factor A	0.76 (0.72 - 0.8)
Bias B	32% (26% - 39%)
Diffusion Tubes Mean:	56 µgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	42 µgm^{-3}
Data Capture for periods used:	99%
Adjusted Tubes Mean:	42 (40 - 45) µgm^{-3}



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Appendix C.6: Wellington 2018

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

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
1	03/01/2018	01/02/2018	47.1	47.8	46.8	47	0.5	1	1.3
2	01/02/2018	27/02/2018	52.5	53.8	41.2	49	6.9	14	17.2
3	27/02/2018	29/03/2018	52.9	53.5	52.5	53	0.5	1	1.3
4	29/03/2018	02/05/2018	47.5	45.8	44.0	46	1.8	4	4.3
5	02/05/2018	05/06/2018	46.2	49.8	48.0	48	1.8	4	4.5
6	05/06/2018	04/07/2018	40.2	41.1	41.6	41	0.7	2	1.8
7	04/07/2018	02/08/2018	43.4	44.3	43.7	44	0.5	1	1.1
8	02/08/2018	05/09/2018	41.0	38.4	39.7	40	1.3	3	3.2
9	05/09/2018	02/10/2018	38.0	36.0	35.1	36	1.5	4	3.7
10	02/10/2018	31/10/2018	43.6	45.1	47.1	45	1.8	4	4.4
11	31/10/2018	04/12/2018	47.0	45.2	45.6	46	0.9	2	2.3
12	04/12/2018	11/01/2019	47.7	48.1	39.8	45	4.7	10	11.6
13									

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

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
38.03	84.94	Good	Good
44.65	95.36	Good	Good
43.45	99.72	Good	Good
36.75	99.63	Good	Good
37.82	99.27	Good	Good
27.58	99.86	Good	Good
32.16	93.54	Good	Good
27.46	79.44	Good	Good
29.29	99.08	Good	Good
35.44	100.00	Good	Good
37.47	99.39	Good	Good
40.35	99.78	Good	Good
Overall survey -->		Good precision	Good Overall

(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	WELLINGTON

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

Accuracy (with 95% confidence interval) without periods with CV larger than 20%

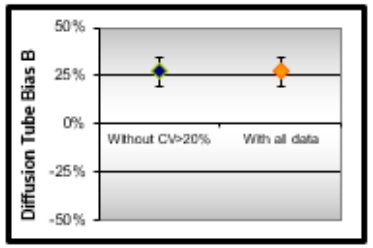
Bias calculated using 12 periods of data

Bias factor A	0.8 (0.75 - 0.85)
Bias B	26% (18% - 33%)
Diffusion Tubes Mean:	45 µgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	36 µgm^{-3}
Data Capture for periods used:	96%
Adjusted Tubes Mean:	36 (34 - 38) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA

Bias calculated using 12 periods of data

Bias factor A	0.8 (0.75 - 0.85)
Bias B	26% (18% - 33%)
Diffusion Tubes Mean:	45 µgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	36 µgm^{-3}
Data Capture for periods used:	96%
Adjusted Tubes Mean:	36 (34 - 38) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

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Appendix C.7: National Diffusion Tube Bias Adjustment Factor Spreadsheet

Analysed By[1]	Method To undo your selection, choose (All) from the pop-up list	Year[5] To undo your selection, choose (All)	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m^3)	Automatic Monitor Mean Conc. (Cm) (µg/m^3)	Bias (B)	Tube Precision[6]	Bias Adjustment Factor (A) (Cm/Dm)
SOCOTEC Didcot	50% TEA in acetone	2018	UB	Slough Borough Council	10	38	31	25.6%	G	**0.80**
SOCOTEC Didcot	50% TEA in acetone	2018	SU	Slough Borough Council	11	32	22	46.7%	G	**0.68**
SOCOTEC Didcot	50% TEA in acetone	2018	R	Slough Borough Council	11	39	32	22.5%	G	**0.82**
SOCOTEC Didcot	50% TEA in acetone	2018		**Overall Factor[3] (21 studies)**				**Use**		**0.76**

PM Monitoring Adjustment

Daily mean TEOM measurements were adjusted to account for the volatile fraction of particulate matter using data download from the Kings College VCM Portal Website.

Short-term to Long-term Data Adjustment

A short to long term data adjustment was not necessary as the data capture was at least 75% for all sites

QA/QC of Automatic Monitoring

Slough Borough Council's automatic sites are part of the National Automatic Monitoring Calibration Club, whereby monitoring data are managed to the same procedures and standards as AURN sites by Ricardo Energy and Environment.

QA/QC of Diffusion Tube Monitoring

SOCOTEC participate in the AIR NO_2 Proficiency Testing Scheme[22] and between 75% and 100% of results submitted during the period January to December 2016 were determined to be satisfactory based upon a z-score of < ± 2.

[22] https://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html

Appendix C.8: Annualisation corrections for diffusion tubes

Annualisation

TG 16 Guidance was followed to analyse diffusion tube results that did not meet at least 75% data capture rates. This was applied to Lansdowne Avenue ID4 and Walpole Road ID42. The annualisation corrections are shown in the table below.

Supplier: SOCOTEC - preparation method: 50% v/v TEA in Acetone — 2018 (µg/m3) — Local Bias Adj. 0.775

	Tube No.	X	Y		Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Mean Raw Data	Data Capture %	Annualisation Factor	Annualised Value	BIAS Adjusted & Annualised	Distance corrected
Walpole Road (moved)	42	493493	181378	R		33.2	29.7	27.4	23.8		21.3	22.7					26.4	50%	0.992	27.4	21.2	
Lansdowne Avenue	4	497188	180050	I	47.4	41.2	50.4	44	37	29.3						49.5	42.7	58%	0.951	43.7	33.8	37

BIAS Factor based on colocations	
Chalvey	0.82
Colnbrook	0.68
Salthill	0.8
Windmill	0.79
Wellington	0.8
Brands Hill	0.76
Average	0.775

Older LAQM Classifications	
I = Intermediate site	Between 10-30 metres from busy road, residential
B = Background	More than 50 metres from a busy road, residential
K = Kerbside	1 - 5 metres from kerb of busy road, public exposure
K[M] = Kerbside Motorway	Between 20 and 50 metres from road centre, residential
I [M] = Intermediate Motorway	Between 50 and 100 metres from road centre, residential
B[M] = Background Motorway	Between 100 and 200 metres fron road centre, residential
R = Main railway	Between 20-30 metres from main railway line (non electric)

KEY

- * UK Nitrogen Dioxide Network
- * Colocated with continuous monitor
- * Grundons
- Tube Missing on Collection
- Monitoring not commenced/ Monitoring ceased
- <0.5 concentration observed, removed as erroneous
- Tube found on the floor
- Unusual Results

* Requires Annualisation
Needs distance correction

Lansdowne Annualisation Factor

Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Town Centre Continuous Mean	Colnbrook Pippins Continuous Mean	Lansdown Avenue NO2	Town Centre Pm	Colnbrook Pippins Pm
03/01/2018	01/02/2018	32.85	24.58	47.4	32.85	24.58
01/02/2018	27/02/2018	32.21	28.24	41.2	32.21	28.24
27/02/2018	29/03/2018	35.78	30.28	50.4	35.78	30.28
29/03/2018	02/05/2018	34.28	23.45	44	34.28	23.45
02/05/2018	05/06/2018	-	20.93	37	-	20.93
05/06/2018	04/07/2018	17.84	15.02	29.3	17.84	15.02
04/07/2018	02/08/2018	26.87	17.90	-		
02/08/2018	05/09/2018	24.45	14.90	-		
05/09/2018	02/10/2018	24.94	15.66	-		
02/10/2018	31/10/2018	26.73	21.61	-		
31/10/2018	04/12/2018	32.98	35.00	-		
04/12/2018	11/01/2019	34.09	27.02	49.5	34.09	27.02
Average		29.37		42.69	31.17	24.22

Site	Annual Mean (Am	Period Mean (Pr	Ann. Factor (Am/Pm)
Town Centre	31	31.2	0.994
Colnbrook	22	24.2	0.909
London Hillingdon			
		Average Factor:	0.951

Walpole Road Annualisation Factor

Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Town Centre Continuous Mean	Colnbrook Pippins Continuous Mean	Walpole Road NO2	Town Centre Pm	Colnbrook Pippins Pm
03/01/2018	01/02/2018	32.85	24.58	-		
01/02/2018	27/02/2018	32.21	28.24	33.2	32.21	28.24
27/02/2018	29/03/2018	35.78	30.28	29.7	35.78	30.28
29/03/2018	02/05/2018	34.28	23.45	27.4	34.28	23.45
02/05/2018	05/06/2018	-	20.93	23.8	-	20.93
05/06/2018	04/07/2018	17.84	15.02	-		
04/07/2018	02/08/2018	26.87	17.90	21.3	26.87	17.90
02/08/2018	05/09/2018	24.45	14.90	22.7	24.45	14.90
05/09/2018	02/10/2018	24.94	15.66	-		
02/10/2018	31/10/2018	26.73	21.61	-		
31/10/2018	04/12/2018	32.98	35.00	-		
04/12/2018	11/01/2019	34.09	27.02	-		
Average		29.37		26.35	30.72	22.62

Site	Annual Mean (Am	Period Mean (Pm	Ann. Factor (Am/Pm)
Town Centre	31	30.7	1.010
Colnbrook	22	22.6	0.973
London Hillingdon			
		Average Factor:	0.992

Appendix C.9: Distance Corrections

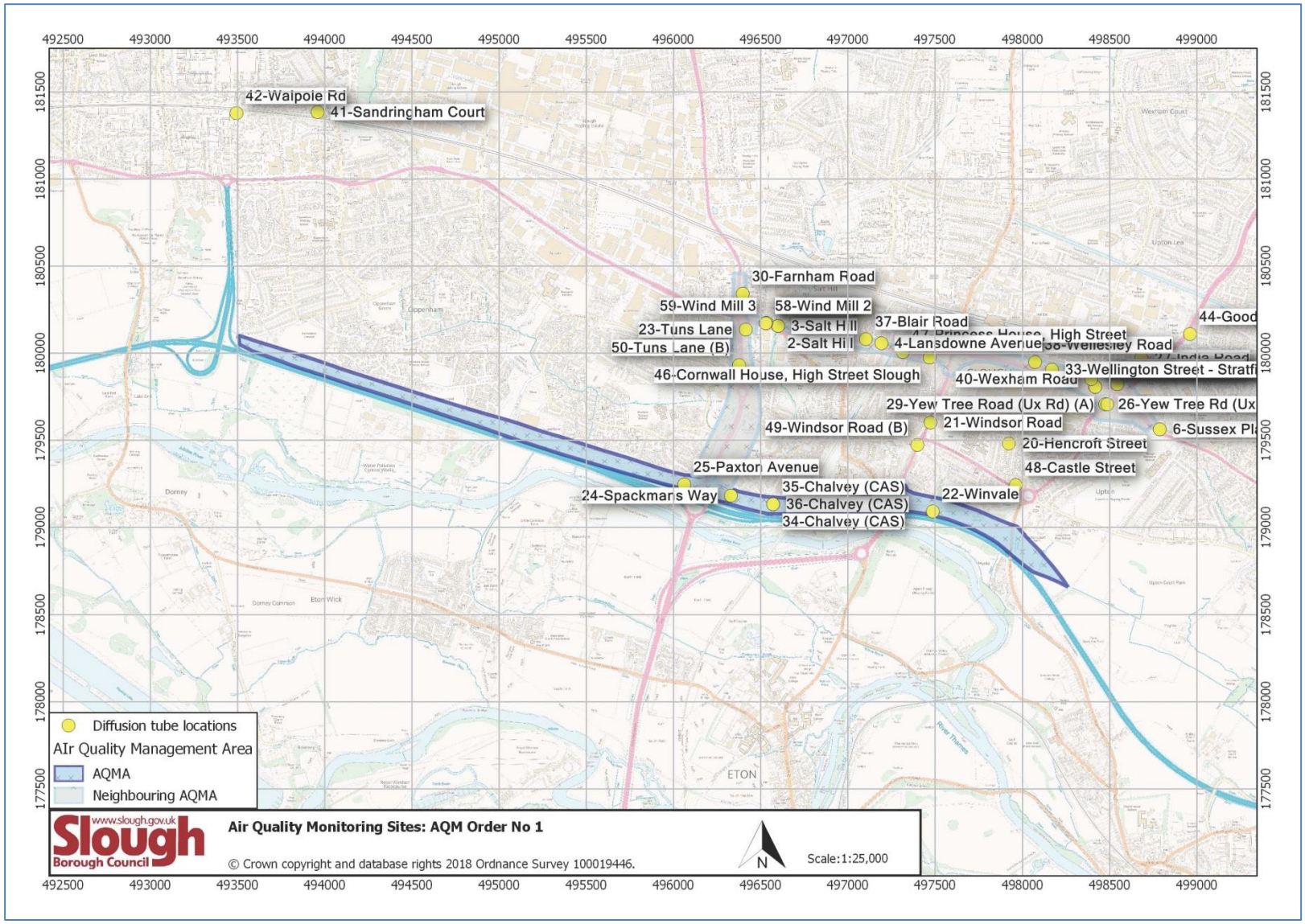
BV tables using approach advocated by TG (16) was used for distance corrections – please see tables below.

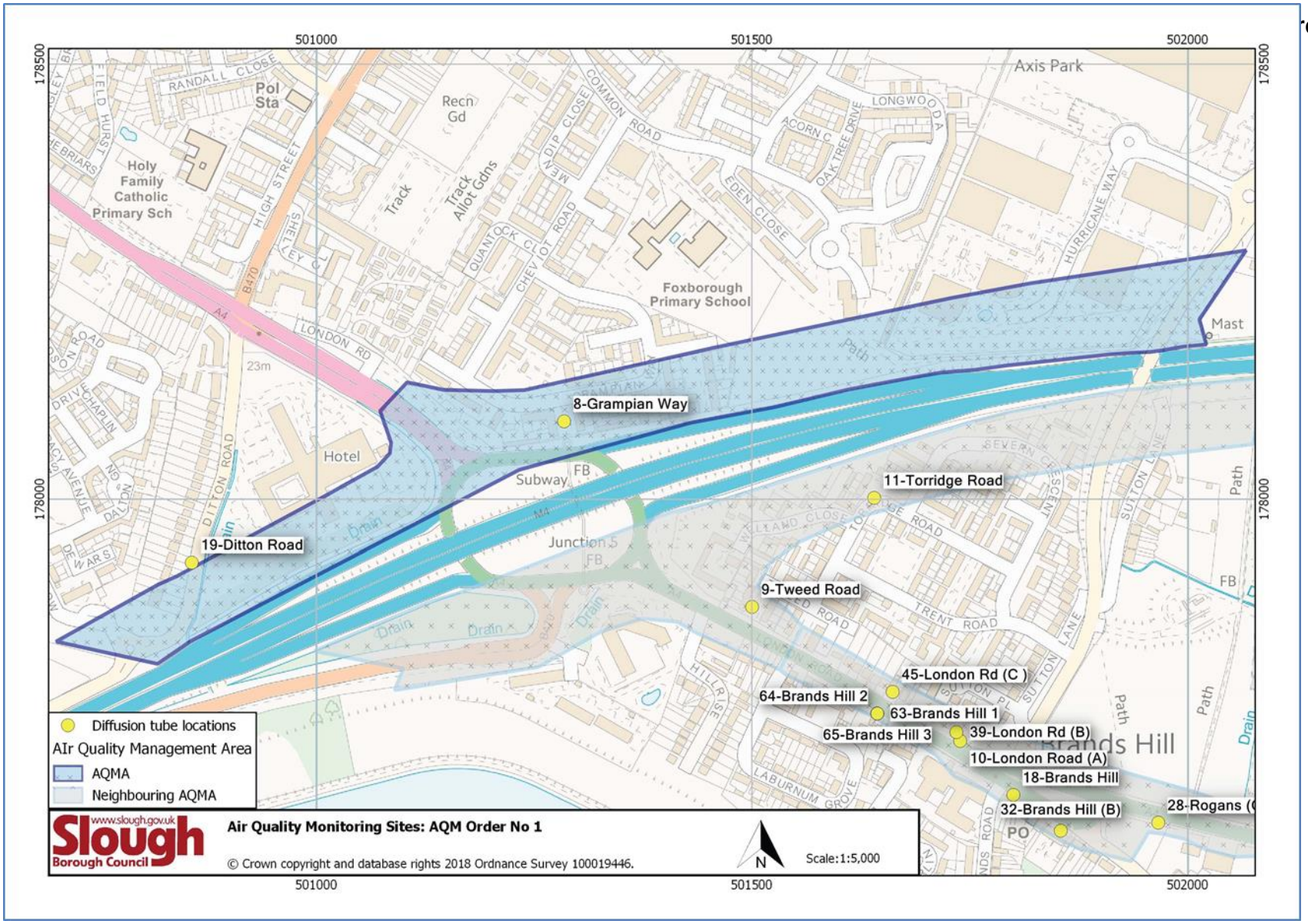
Site Name/ID	Distance (m)		NO_2 Annual Mean Concentration ($\mu g/m^3$)			Comment
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor	
Grampian Way (SLO 8)	35.0	20.0	24.7	34.8	*38.8*	Predicted concentration at Receptor within 10% the AQS objective. Warning: your monitor is more than 10m further from the kerb than your receptor - treat result with caution.
Tweed Road (SLO 9)	22.0	13.0	23.0	32.6	35.3	Warning: your monitor is more than 10m further from the kerb than your receptor - treat result with caution.
Torridge Road (SLO 11)	50.0	30.0	24.7	30.0	32.6	Warning: your receptor is more than 20m further from the kerb than your monitor - treat result with caution. Warning: your monitor is more than 10m further from the kerb than your receptor - treat result with caution.
Winvale (SLO 22)	31.0	20.0	25.9	33.8	*36.1*	Predicted concentration at Receptor within 10% the AQS objective. Warning: your monitor is more than 10m further from the kerb than your receptor - treat result with caution.
London Road (SLO 10)	4.0	12.5	23.0	44.4	*37.6*	Predicted concentration at Receptor within 10% the AQS objective.
Brands Hill (SLO 18)	6.0	10.5	23.0	53.2	**47.9**	Predicted concentration at Receptor above AQS objective.
Rogans, Colnbrook (SLO 28)	4.5	8.5	23.0	44.0	**40.1**	Predicted concentration at Receptor above AQS objective.
Brands Hill (SLO 63)	4.0	16.5	23.0	43.2	35.2	
Brands Hill (SLO 64)	4.0	16.5	23.0	43.4	35.3	
Brands Hill (SLO 65)	4.0	16.5	23.0	43.3	35.3	

Windmill (SLO 43)	7.5	7.5	25.4	34.0	34.0	
Tuns Lane (SLO 50)	4.0	13.0	25.0	45.8	*38.9*	Predicted concentration at Receptor within 10% the AQS objective.
Windmill Monitor (SLO 57)	7.5	12.0	25.4	41.6	*39.0*	Predicted concentration at Receptor within 10% the AQS objective.
Windmill Monitor (SLO 58)	7.5	12.0	25.4	41.8	*39.2*	Predicted concentration at Receptor within 10% the AQS objective.
Windmill Monitor (SLO 59)	7.5	12.0	25.4	41.5	*38.9*	Predicted concentration at Receptor within 10% the AQS objective.
Lansdowne Avenue (SLO 4)	13.5	5.5	25.5	33.8	*37.0*	Predicted concentration at Receptor within 10% the AQS objective. Warning: your monitor is more than 10m further from the kerb than your receptor - treat result with caution.
Princess Street (SLO 5)	12.0	12.0	23.1	34.4	34.4	Warning: your monitor is more than 10m further from the kerb than your receptor - treat result with caution.
Yew Tree Road (SLO 29)	1.5	6.0	23.1	52.7	**43.7**	Predicted concentration at Receptor above AQS objective.
Blair Road (SLO 37)	11.0	11.0	25.5	39.9	*39.9*	Predicted concentration at Receptor within 10% the AQS objective. Warning: your monitor is more than 10m further from the kerb than your receptor - treat result with caution.
Wexham Road (SLO 40)	11.0	11.0	23.1	38.6	*38.6*	Predicted concentration at Receptor within 10% the AQS objective. Warning: your monitor is more than 10m further from the kerb than your receptor - treat result with caution.
Cornwall House, Bath Road (SLO 46)	5.0	11.0	25.9	40.1	*36.8*	Predicted concentration at Receptor within 10% the AQS objective.
Windsor Rd 1N (SLO 21)	2.5	10.5	25.9	35.0	31.8	
Windsor Rd (B) (SLO 49)	1.5	6.0	25.9	40.0	35.7	

Langley Rd (SLO 51)	2.5	10.0	23.8	36.0	31.8	
High St Langley (A)	2.0	5.5	24.7	37.9	34.8	
Sutton Lane (SLO 56)	4.0	7.5	23.1	37.6	35.1	

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

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Subway
Junction 5
8-Grampian Way
11-Torridge Road
19-Ditton Road
9-Tweed Road
45-London Rd (C)
64-Brands Hill 2
63-Brands Hill 1
65-Brands Hill 3
39-London Rd (B)
10-London Road (A)
18-Brands Hill
32-Brands Hill (B)
28-Rogans (
Brands Hill
PO
Diffusion tube locations
AIr Quality Management Area
AQMA
Neighbouring AQMA
www.slough.gov.uk
Slough Borough Council
Air Quality Monitoring Sites: AQM Order No 1
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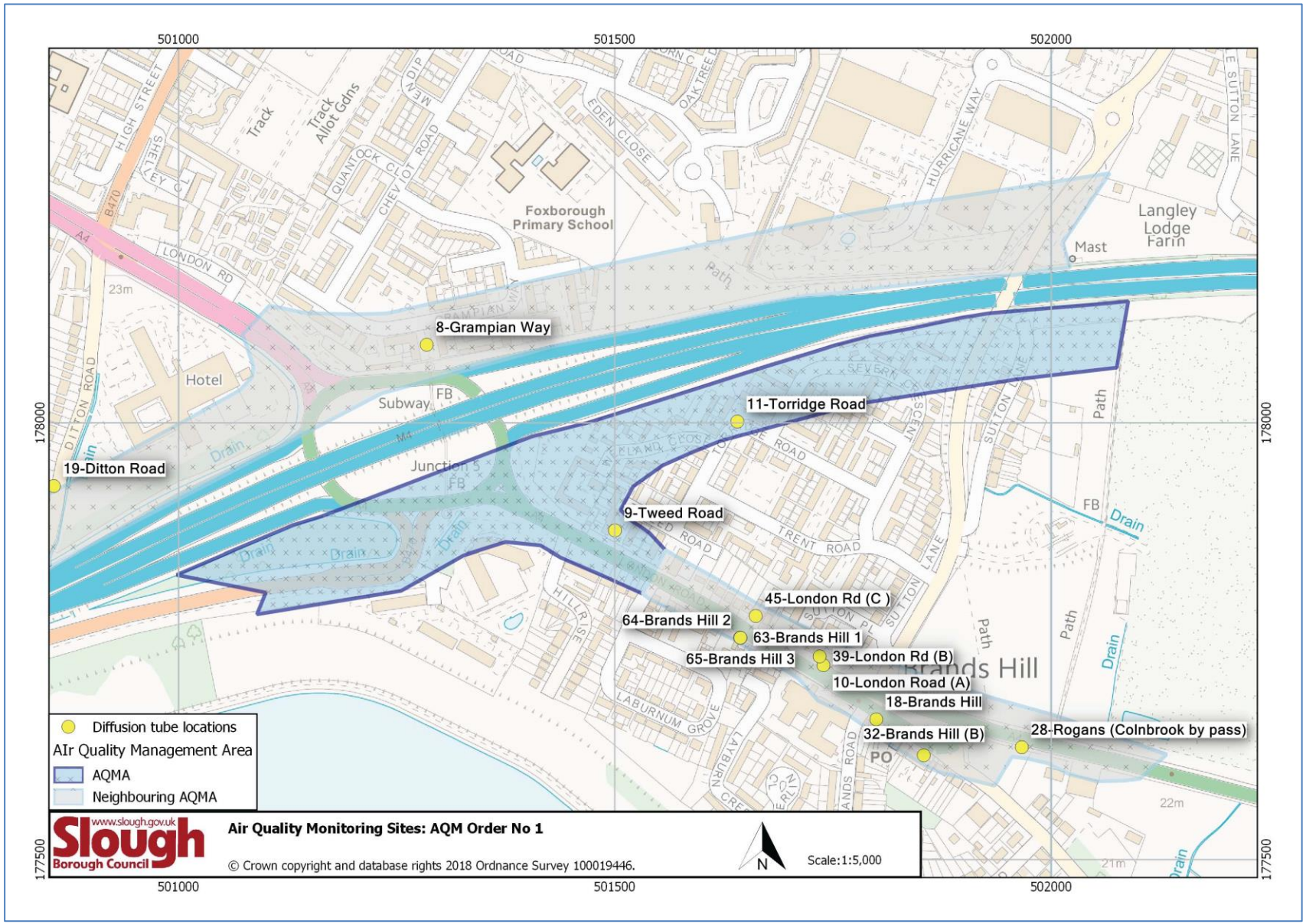
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177500
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11-Torridge Road
19-Ditton Road
9-Tweed Road
45-London Rd (C)
64-Brands Hill 2
63-Brands Hill 1
65-Brands Hill 3
39-London Rd (B)
10-London Road (A)
18-Brands Hill
32-Brands Hill (B)
28-Rogans (Colnbrook by pass)
Foxborough Primary School
Langley Lodge Farm
Hotel
Subway
Junction 5
Brands Hill
Diffusion tube locations
AIr Quality Management Area
AQMA
Neighbouring AQMA
Air Quality Monitoring Sites: AQM Order No 1
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Scale:1:5,000
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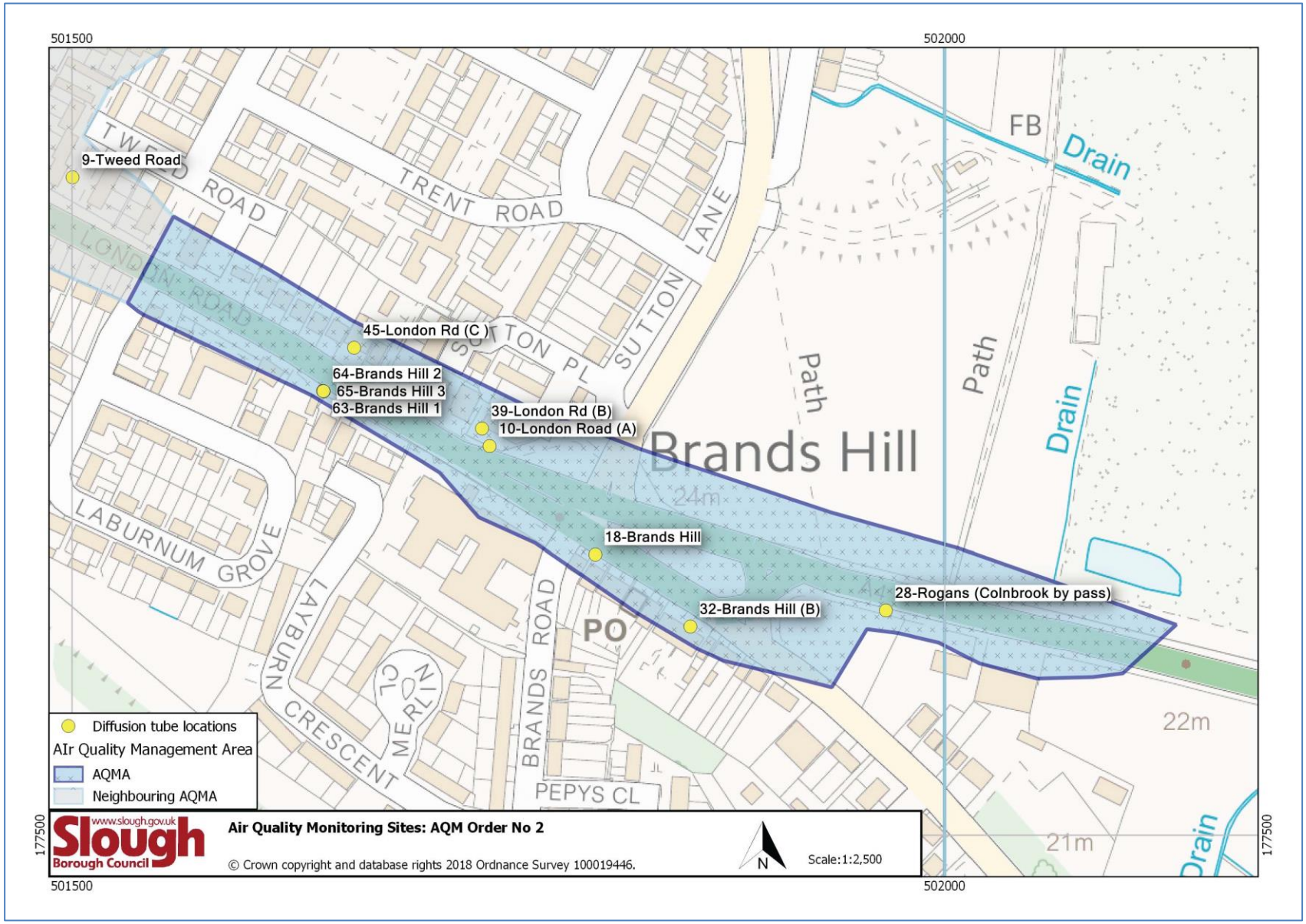
Slough Borough Council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64-Brands Hill 2
65-Brands Hill 3
63-Brands Hill 1
39-London Rd (B)
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18-Brands Hill
28-Rogans (Colnbrook by pass)
32-Brands Hill (B)
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LAYBURN CRESCENT
MERLIN CL
BRANDS ROAD
PO
PEPYS CL
22m
21m
Drain
Diffusion tube locations
AIr Quality Management Area
AQMA
Neighbouring AQMA
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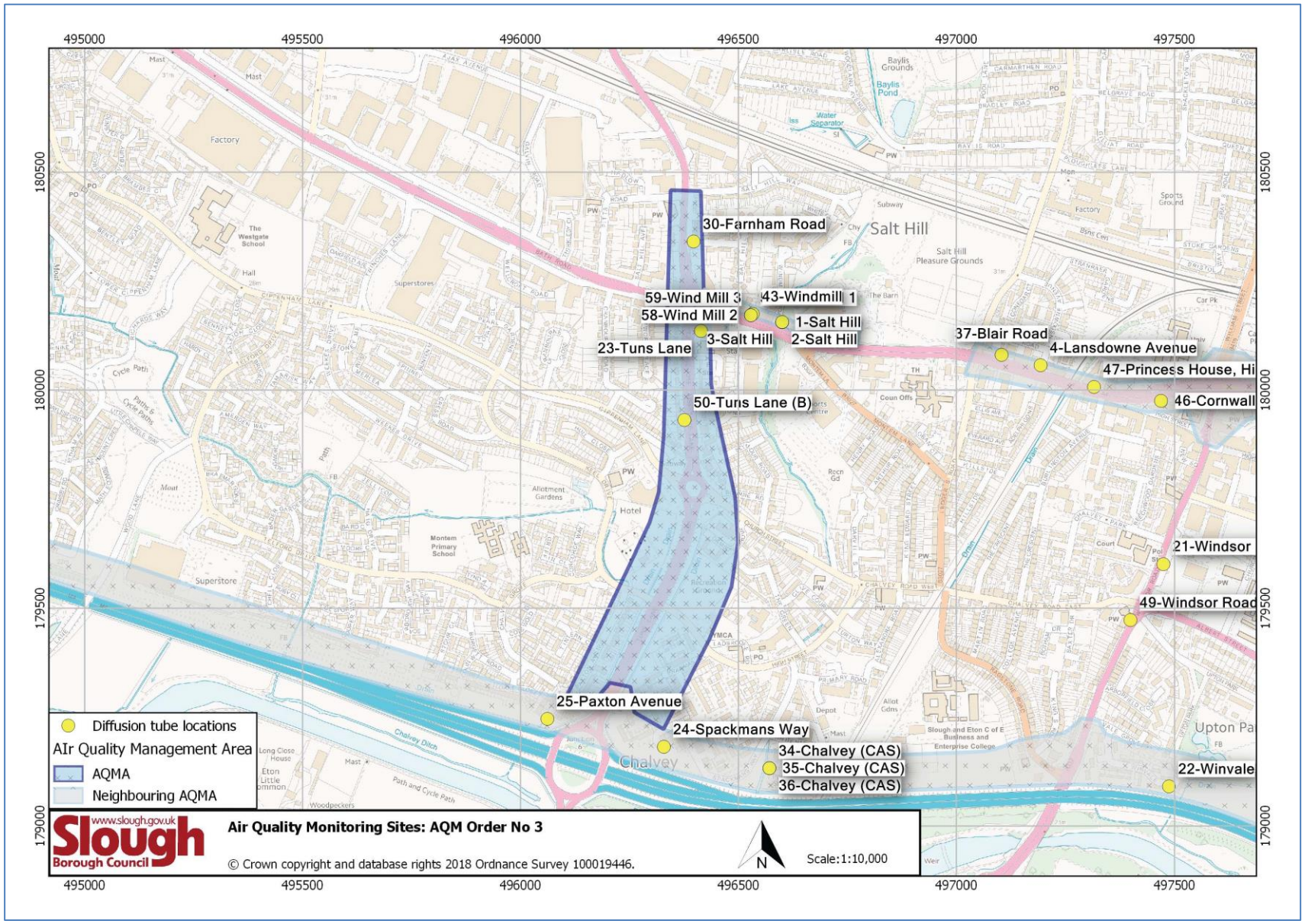
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2-Salt Hill
23-Tuns Lane
37-Blair Road
4-Lansdowne Avenue
47-Princess House, Hi
46-Cornwall
50-Tuns Lane (B)
21-Windsor
49-Windsor Road
25-Paxton Avenue
24-Spackmans Way
34-Chalvey (CAS)
35-Chalvey (CAS)
36-Chalvey (CAS)
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Slough Borough Council
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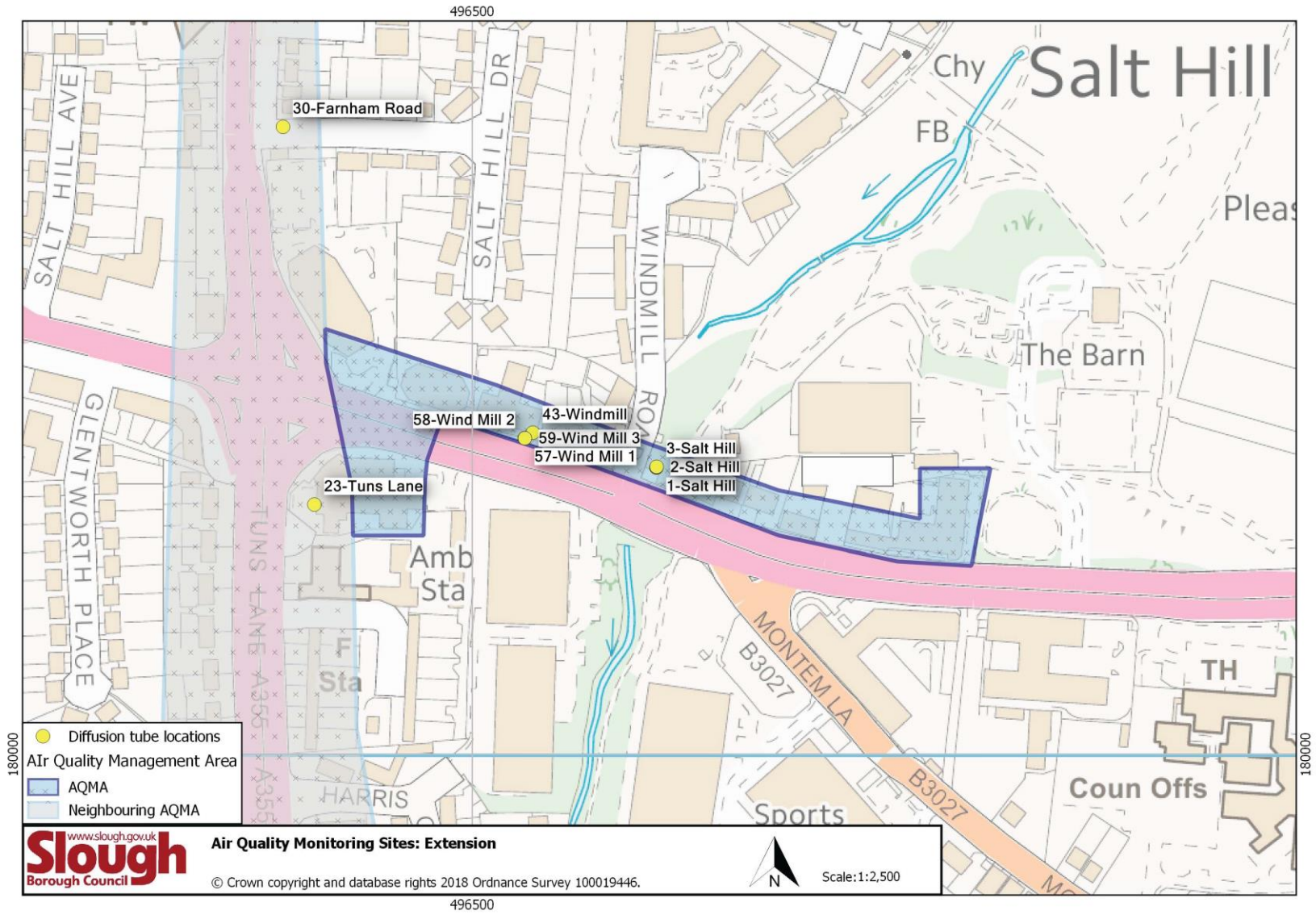
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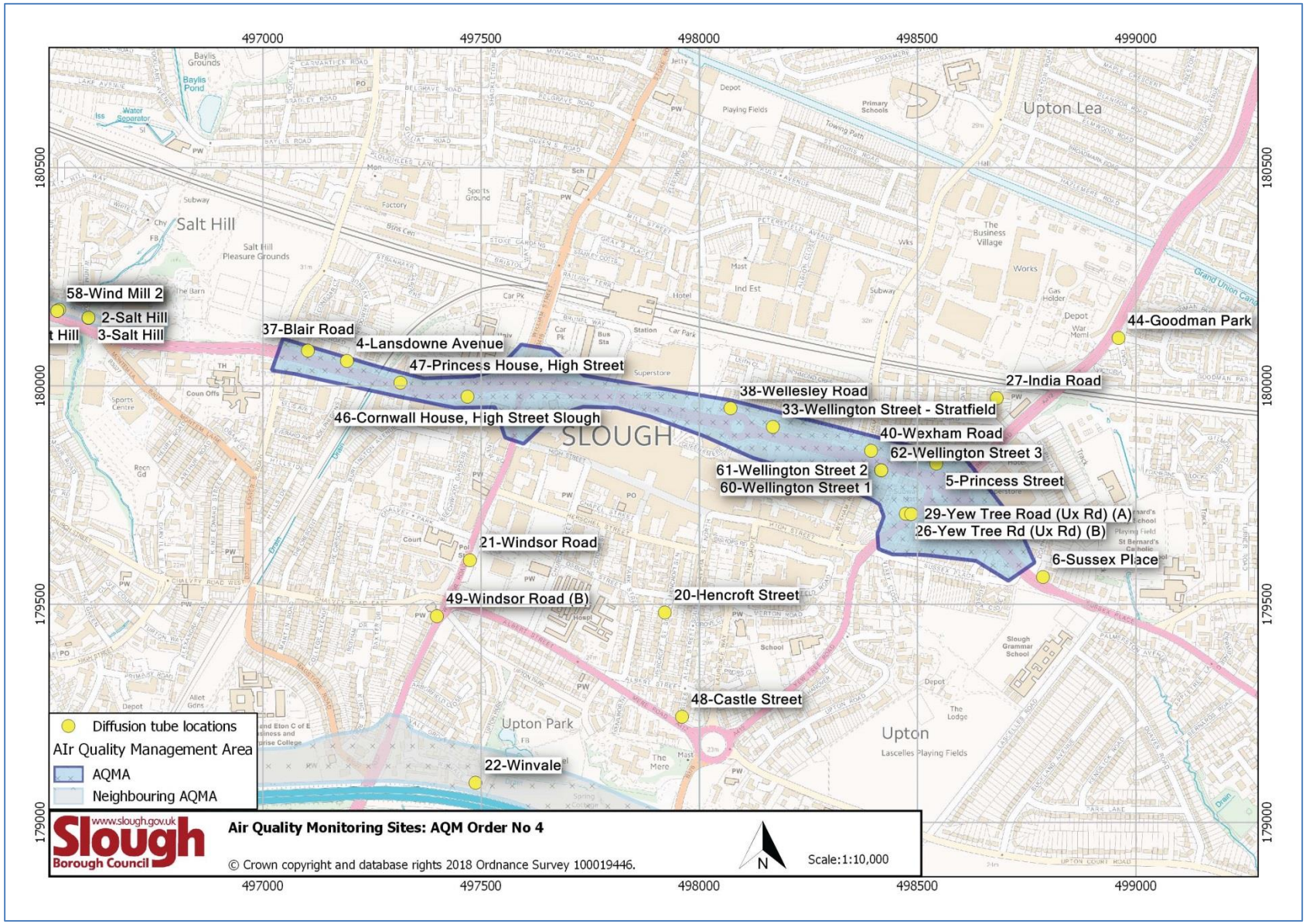
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38-Wellesley Road
33-Wellington Street - Stratfield
40-Wexham Road
62-Wellington Street 3
61-Wellington Street 2
60-Wellington Street 1
5-Princess Street
29-Yew Tree Road (Ux Rd) (A)
26-Yew Tree Rd (Ux Rd) (B)
6-Sussex Place
27-India Road
44-Goodman Park
21-Windsor Road
49-Windsor Road (B)
20-Hencroft Street
48-Castle Street
22-Winvale
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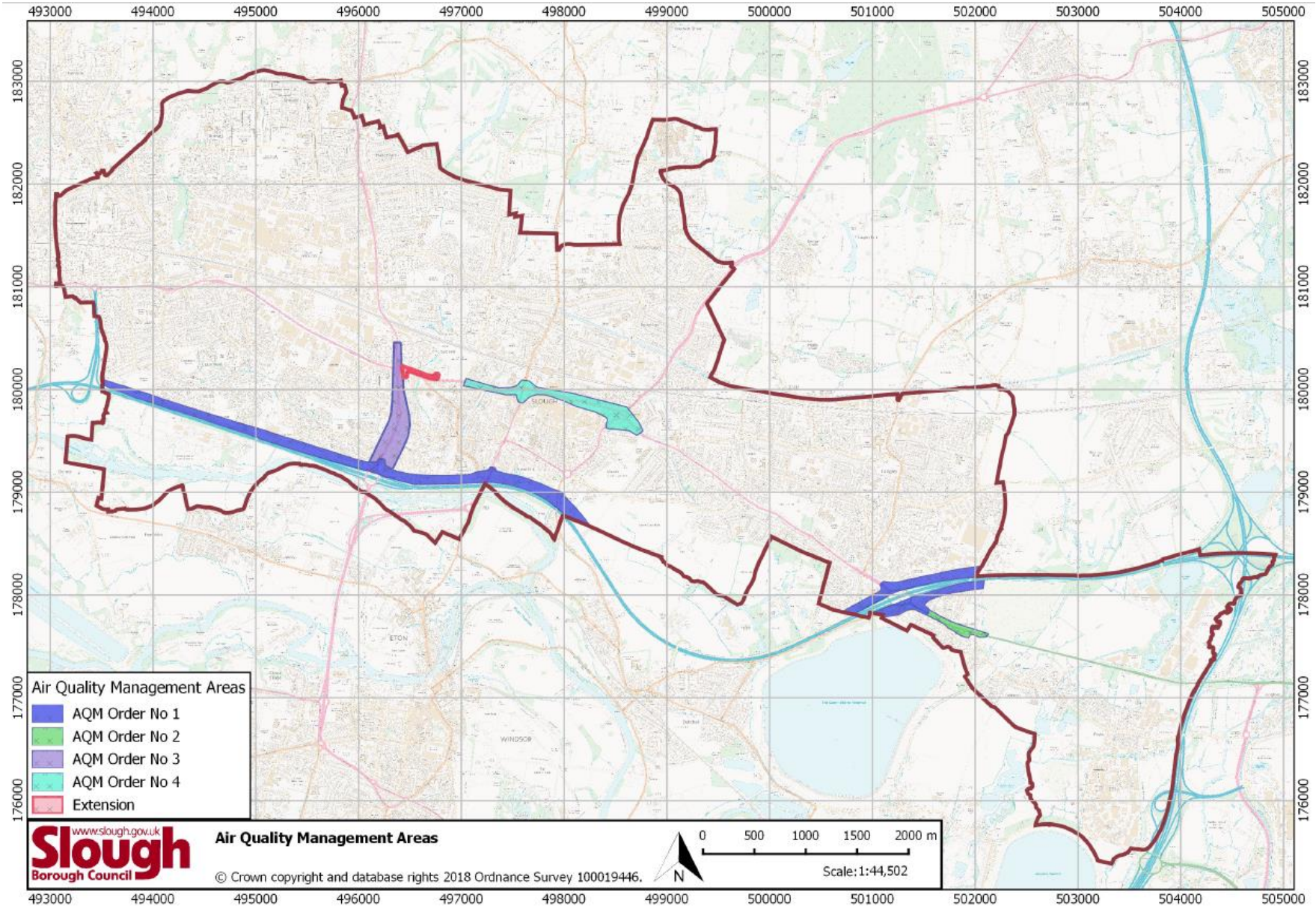
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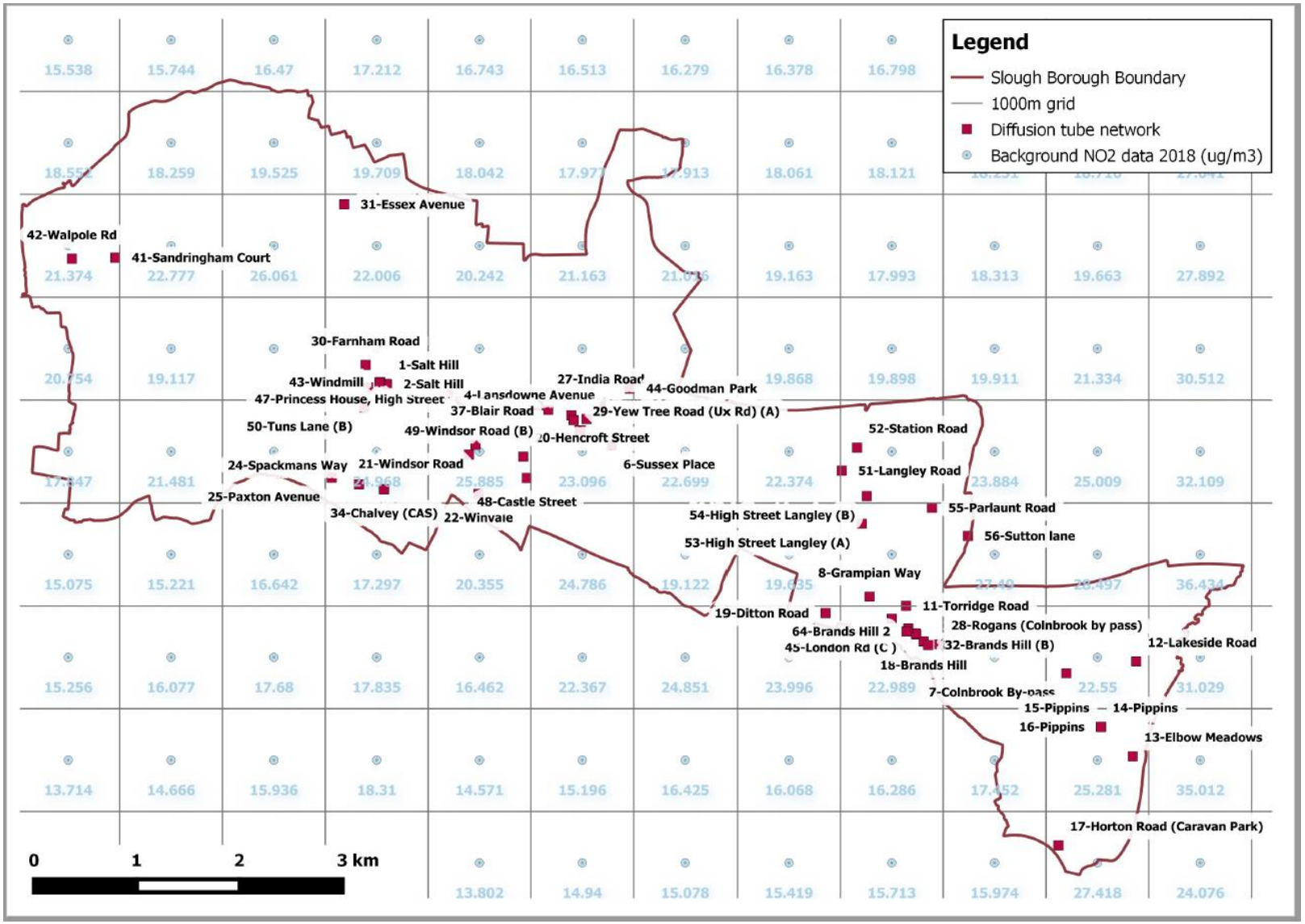
Appendix E: Summary of Air Quality Objectives in England

Appendix E.1: Air Quality Objectives in England

Pollutant	Air Quality Objective[23]	
	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

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

Appendix F: Background Data Maps



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