Tunbridge Wells Borough Council

2021 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

Date: June, 2021

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Executive Summary: Air Quality in Our Area

Air Quality in Tunbridge Wells Borough

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

The mortality burden of air pollution within the UK is equivalent to 28,000 to 36,000 deaths at typical ages[3], with a total estimated healthcare cost to the NHS and social care of £157 million in 2017[4].The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[5].

Tunbridge Wells is a borough in Kent and consists of the main town of Royal Tunbridge Wells and a number of small towns and villages including Paddock Wood, Cranbrook and Hawkhurst. The borough is largely rural in character.

The mid-year population of the borough in 2019 was 118,700 based on figures from Kent County Council[1]. This was up from 118,100 in 2018 and is expected to rise to 122,700 by 2026. The main roads which serve the borough include the A26, A264, A267 and the A21.

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[1] www.kent.gov.uk/research

[2] Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

[3] Defra. Air quality appraisal: damage cost guidance, July 2020

[4] Public Health England. Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report, May 2018

[5] Defra. Abatement cost guidance for valuing changes in air quality, April 2013 updated Feb 2019

Royal Tunbridge Wells suffers from congestion, particularly on the approach roads to the town centre. Other pollution sources, including commercial, industrial and domestic sources, also contribute to the background pollution concentrations.

There is one Air Quality Management Area (AQMA) declared in the Borough due to exceedances of the annual mean Air Quality Strategy (AQS) objective for nitrogen dioxide (NO_2). This AQMA was originally declared in 2005 and extended in 2011 due to exceedances outside of the original AQMA boundaries. At the end of 2016, Tunbridge Wells BC commissioned Air Quality Consultants Ltd to review the boundaries of its AQMA again. The review concluded that the northern and southern ends of the AQMA could be extended, but that the width of the AQMA could be reduced. This process was formally completed in 2018, with the new AQMA taking effect from 1st September 2018.

The Action Plan adopted by the Council in 2010 was largely completed by 2017, therefore a new action plan was produced during 2018 to cover the period 2018 to 2023. The new plan was adopted by the council in early 2019 and actions are currently being implemented, although progress in 2020 was hampered by the COVID pandemic.

The 2020 annual mean NO_2 level, measured at the A26 St John's Roadside automatic monitoring location was again slightly lower than previous years, and was below the annual mean objective for NO_2 at 31µg/m^3. This was to be expected as a result of the reductions in traffic levels caused by the pandemic, however, it is also assumed to be a continuation of the downward trend in pollution levels that we have seen for several years. The 1-hour objective for NO_2 was met at this location, with no instances of the hourly mean exceeding 200µg/m^3.

We have seen a steady decline in NO_2 levels at the automatic monitoring station over the past 6 years, during which annual mean NO_2 levels have dropped from 48ugm^3 in 2014 to 31 ugm^3 in 2020. This reflects a national downward trend in pollution levels which is occurring as a result of the introduction of Euro VI engines, increased uptake of electric and hybrid vehicles, and the natural disappearance of some of the oldest and most polluting vehicles from the roads as they reach the end of their lives.

Due to COVID 19, 2020 will not be an accurate representation of a typical year as traffic levels and the movement of people was reduced due to lockdown. The early part of 2021 will be similarly affected by lockdowns, and therefore it may not be until the end of 2022 that we get a true representation of data. We are minded to revoke the AQMA in Tunbridge Wells, but we are also mindful of the fact that data from 2020 and 2021 will not be ideal for basing that decision on.

In 2020, all of the tube locations recorded annual mean NO_2 levels below the NO_2 annual mean objective, and none required distance correcting. The highest reading site was TW63 in Hawkhurst, which recorded a level of 35.3μgm^{-3}

Hawkhurst

In 2020, site TW63 (Smugglers Rest) was upgraded to a triplicate site to improve the robustness of the data. Two additional sites were established in Hawkhurst, namely TW78 and TW79, (see Map 13) although exceedances are not thought likely at these locations.

The detailed air quality assessment of Hawkhurst undertaken in 2020 was reported in the 2020 ASR. The conclusion recommended that a small AQMA should be declared on the uphill section of Cranbrook Road, which would include about 40 properties. TWBC has accepted this recommendation, and plans to declare the AQMA at the earliest opportunity, although it remains the view of officers that the 2019 data was somewhat anomalous, particularly for site TW63, as it showed very large fluctuations between months which could not be explained. One of the highest levels was recorded in June 2019, which would normally be expected to be one of the lowest months of the year. The preferred approach would have been to re-evaluate the need for an AQMA based on 2020 data. It was noted that NO_2 levels in January and February 2020 (ie prior to the first COVID lockdown) were considerably lower than the corresponding months in 2019. However, the remainder of 2020 results were affected by lockdowns, (some more than others) so could not inform the decision about whether or not to declare the AQMA.

A limited consultation exercise was undertaken in the summer of 2020, to inform local residents about the AQMA. Once the AQMA has been declared, we will develop an Air Quality Action Plan and it is anticipated that this will involve more extensive consultation with local residents and other stakeholders.

An additional piece of work undertaken in 2020 was a consideration of the cumulative impacts of development in Hawkhurst. This was carried out by AQC who did the modelling for the AQMA. The basic premise of the work was that we are seeing a downward trend in pollution levels, with year on year reductions, both locally and nationally, which means that a certain amount of development can go ahead each year, with no net worsening of air quality. The report is an attempt to quantify this, and is given as Appendix G.

Whilst a full AQAP is yet to be developed, as an interim measure, TWBC has developed a planning position statement which describes how air quality considerations will be addressed for planning applications in the vicinity of Hawkhurst. The planning position statement can be found here:-

https://tunbridgewells.gov.uk/__data/assets/pdf_file/0011/358616/1594105994_PlanningPositionStatementAirQuality.pdf

Actions to Improve Air Quality

The new Air Quality Action Plan (AQAP) for Tunbridge Wells Borough Council was adopted by the council in early 2019. The aims of the action plan are as follows:

1. To ensure that TWBC is complying with relevant air quality legislation.
2. To achieve a higher standard of air quality across the Tunbridge Wells borough.
3. To engage with partners and colleagues including those representing Highways and Transportation, Public Health, Economic Development, local bus companies and other relevant stakeholders, to improve air quality across the borough.
4. To build on previous work in this area in order to drive further improvements in air quality with the ultimate aim of being able to revoke the Air Quality Management Area.

The proposed general borough-wide measures to improve air quality include:-

- Support for measures to increase the use of sustainable transport modes such as walking and cycling.
- Investigation of a Low Emission Standard for buses.

- Incorporation of an SPD into the emerging Local Plan
- Improve the vehicle emissions for taxis.
- Reduce the idling of engines whilst stationary.
- Engaging with schools to reduce the impact of school traffic.
- Incorporate initiatives into planning policy and the local plan

In addition, a few of the existing policies and strategies also in place to help improve air quality within the borough include:

- Kent and Medway Air Quality Partnership Air Quality and Planning Technical Guidance (Updated 2016)
- Kent County Council Local Transport Plan (2016-2031)
- Tunbridge Wells Borough Local Plan (2006) (currently being updated). The draft Local Plan went out for public consultation in Autumn 2019.
- Tunbridge Wells Borough Development Plan – Transport strategy (2015 – 2026)

Our Clean Air For Schools (CAFS) project continues to run across the boroughs of Tunbridge Wells Borough Council (TWBC), Maidstone Borough Council (MBC) and Swale Borough Council (SBC). In practice, little engagement with schools was possible in 2020, owing to the pandemic, however, the scheme will certainly resume as soon as conditions allow. The scheme has been extremely successful in introducing the subject of air quality to pupils and teachers, promoting our anti idling campaign and encouraging the school to consider how their individual behaviour can help to improve the air quality in their local community. We have engaged with over 80 primary schools since 2018 across the three boroughs by delivering interactive assemblies, creating a CAFS information section on each local authority website and creating additional teaching material.

Figure 1: Logo of Clean Air for Schools Project (from School Assembly material)

Schools were also able to borrow a ‘Plume Flow’ indicative pollution monitoring device, in order to conduct their own experiments, for example comparing pollution levels of different routes to the school or pollution encountered whilst using different modes of transport to school, e.g. walking, cycling, car, bus etc.

In 2020, the COVID situation made further engagement with schools very difficult, however, TWBC in partnership with Canterbury City Council applied to DEFRA for a grant of £103,000 in order to develop a digital resource to educate and inform children about air quality in a fun and interactive way. It is hoped that this resource will ultimately be rolled out across the whole of Kent.

We have produced a new anti-idling sign, as shown below, which is being deployed at various locations around the Borough. Additional locations where the sign will be located will be identified in 2021.

Figure 2: New Anti-Idling Signage Deployed in Tunbridge Wells

Whilst air quality has improved significantly in recent decades, and will continue to improve due to national policy decisions, there are some areas where local action is needed to improve air quality further.

The 2019 Clean Air Strategy[6] sets out the case for action, with goals even more ambitious than EU requirements to reduce exposure to harmful pollutants. The Road to Zero[7] sets out the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

TWBC has taken forward a number of direct measures during the current reporting year of 2020 in pursuit of improving local air quality, However, progress on delivering some of these actions has necessarily been slow in 2020, as so much of the resources of Environmental Health Team were diverted to dealing with the COVID pandemic.

Details of all measures completed, in progress or planned are set out in **Error! Reference source not found.**. More detail on these measures can be found in their respective Action Plans including the Tunbridge Wells Borough Council Air Quality Action Plan (2018-2023), Tunbridge Wells Borough Development Plan Transport Strategy 2015 – 2026 (July 2015), Kent County Council Local Transport Plan (2016-2031), Tunbridge Wells Borough Council Draft Local Plan relating to the Council's proposed strategy for the future development in the borough (public consultation carried out in September to November 2019) with the aim for adoption in early 2022.

A revised AQAP for Tunbridge Wells was produced and published on1 September 2018. Modelling work commissioned from Air Quality Consultants Ltd suggested that the AQMA should be extended slightly to the north and south, but that the buffer, which then stood at 80m, either side of the centreline of the A26 carriageway, could be reduced to 30m. Public consultation on this took place at the same time as the consultation on the new Air Quality Action Plan. A Map of the new AQMA is shown in Figure 2.3, with the old AQMA for comparison.

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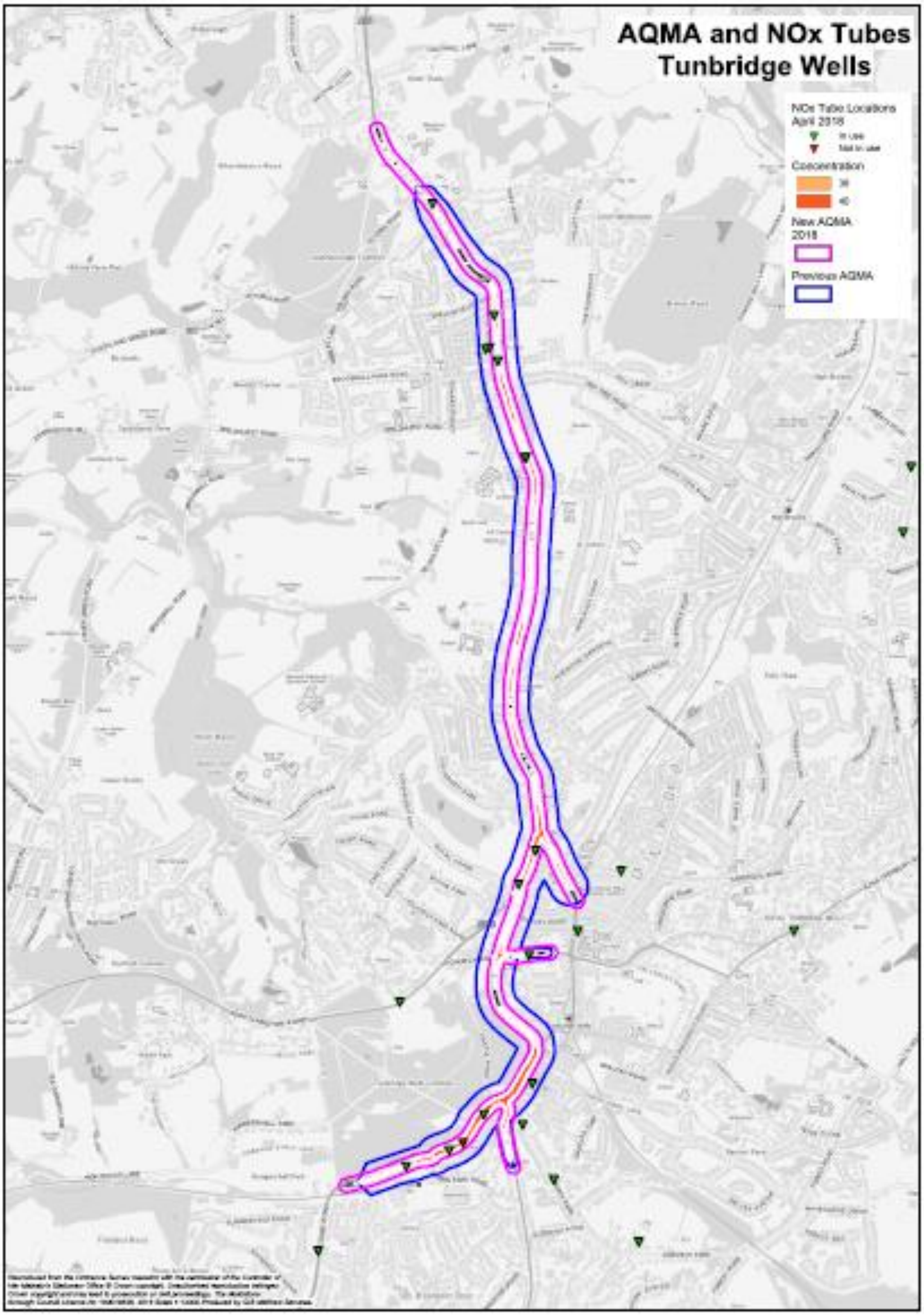
[6] Defra. Clean Air Strategy, 2019

[7] DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

Actions from the new AQAP are included in this report at Appendix 2.2. The actions fall into three themes, namely Transport, Planning and Public Health. Examples of actions included in the Action Plan are:-

- Support for measures to increase the use of sustainable transport modes such as walking and cycling.
- Consider the establishment of an Air Quality Protection zone to replace the AQMA, when we are confident that the AQMA can be revoked.
- Expansion of the Car Club scheme.
- Investigation of a Low Emission Standard for buses.
- Incorporation of an air quality SPD into the emerging Local Plan
- Use S106 funding to introduce a bike share scheme.
- Engaging with schools to reduce the impact of school traffic.

Figure 2.3 - Comparison of new and old AQMA



AQAP progress summary

Cycling, walking and alternative transport schemes

- **TR 1 - Support the development of cycling and walking infrastructure to increase the use of sustainable transport modes such as walking and cycling** - The Local cycling and walking infrastructure plan that focuses on Tunbridge Wells Town Centre has been prepared in draft and due to go out to consultation in early 2020. **Ongoing throughout 2020.**
- **TR 4 - Review opportunities to facilitate the implementation of a Bike Share Scheme. With possible options to provide initial support funding using S106 or grant funding, including. private investor funding. Including as appropriate docking stations and electric bicycle facilities** - Funding has been identified by Kent County Council to investigate the potential of implementing an electric bike share scheme in Tunbridge Wells and are currently at the very early stages of a scoping report. **Ongoing throughout 2020.**
- **PH1 - Infrastructure developments in parks to support cycling and walking links to and through parks to enable sustainable access and support commuting routes**. Improvements to the 21st Century Way cycle route have been delivered which links to Grosvenor & Hilbert Park and Colebrook Recreation Ground. The draft LCWIP analyses several walking and cycling routes through parks and across the Commons in Tunbridge Wells and Rusthall. **Partially completed and further work ongoing through 2020.**

Buses, public transport and taxis

- **TR 2 - Securing Grant funding for buses –** In recent years we have made DEFRA bids for funding to retrofit and improve bus fleets in Maidstone Borough Council and Swale Borough Council, the most recent in 2019 to request funding for electric buses in Maidstone and Swale (as part of the Mid Kent Environmental Health Partnership with Tunbridge Wells Borough

Council, Maidstone Borough Council and Swale Borough Council). Unfortunately we were unsuccessful in these bids and current DEFRA bid guidance currently dissuades applications for retrofitting of buses. No new funding opportunities were identified in 2020, but we anticipate working with KCC to apply for grant funding from DfT in the reasonably near future.

- **TR 3 - Investigate Low Emission Standard for Buses and/or HGV's. Either a graduated scheme of improvement "Low Emissions Zone" or a Euro VI "Clean Air Zone" -** Quarterly Quality Bus Partnership meetings are held with Arriva (the largest operator) and KCC. Arriva currently reports on progress towards improving emission standards at these meetings. Work to review the Borough Transport Strategy is underway and will consider this issue further. Support freight routing as set out in the KCC Freight Action Plan. This action has not progressed, partly because of the pandemic, which has placed additional pressures on both TWBC and the local bus companies. The decline in pollution levels, particularly along the A26 AQMA has reduced the impetus for a Clean Air Zone in TWBC.
- **TR8 - Reduce idling of engines whilst stationary with focus on Taxi's, coaches/ buses and HGV's. -** Wider anti idling campaign started in TWBC targeting schools and other key locations for banners and signage. Social media and TWBC residents' magazine used to publicise the campaign and raise awareness. Signage has been finalised (see Figure 2) installed in about 20 locations so far across the Borough. Parking Services have been investigating possible enforcement options, but are likely to introduce a policy of providing advice to motorists, rather than formal enforcement, in the first instance. The anti-idling campaign outside schools located near the AQMA is expected to continue through our CAFS project.
- **TR9 - Emissions Standard for Taxis (Euro 6 standard) –** Ongoing through vehicle checks and licensing of taxi vehicles to encourage drivers to replace vehicles to meet current licensing standards. **No progress in 2020.**
- **TR10 - The Council will support KCC in their delivery of a 'Demand Response Transport service as part of Kent Connected and Kent**

Connected – KCC are currently working on this, but it is not yet clear whether it will be introduced in TWBC

Electrical vehicle charging improvements

- **PI4 - An effective Electric Vehicle charging network is available for use within the Borough** - Discussions with KCC Highways to further the network to include on street charging and other schemes, currently dependent on local funding and other KCC schemes. Parking Services have worked with KCC to secure funding for the installation of EV in all of TWBC's car parks. Other funding opportunities for additional EV charging are also being explored. A new EV charging point has been installed in Mount Pleasant Road.
- **TR7 - Explore ways in which the Parking Strategy can contribute to improving air quality, by the review of parking restrictions/enforcement** - encourage EV use through parking promotion, currently awaiting the outcome of the borough transport strategy. Parking Services have been involved with the introduction of new restrictions in part of Mount Pleasant Road and Monson Road, with this area now being only open to buses and taxis, as well as cyclists and pedestrians.

Emissions from delivery vehicles

- **TR 5 - Review opportunities to reduce emissions from delivery vehicles -** Guidance prepared for developers of this type of scheme to be provided at the planning stage. Issue will be included in review of the Borough Transport Strategy (currently in draft). **Await outcome and progress of strategy.**

Reduction in vehicle ownership

- **TR 6 - Direct the ongoing expansion of the Tunbridge Wells Car club – Progress on this was limited because of COVID but we still intend to expand the car club when possible.**

Action through planning and future development

- **PI2 - Incorporate a requirement for sustainable travel choices and car club schemes into the emerging Local Plan to support ongoing air quality improvements and maintaining good air quality. The Local Plan to introduce as appropriate a requirement for air quality impacts to be considered as part of Transport Assessments and Transport Statements, and for air quality impacts arising from transport to be a consideration in determining the appropriateness of transport mitigation and the overall transport impacts arising from the development. The Local Plan to introduce a requirement for ongoing monitoring of the impacts of development on air quality as appropriate in those locations within the Borough most at risk of poor air quality, transport mitigation and the overall transport impacts arising from the development.** Sustainable travel is a common theme running through the Pre Submission Local Plan. It is particularly relevant to development management policy TP2 (transport design and accessibility) which ensures provision is made for car club schemes and prioritises active travel. This theme is also covered by Strategic Policy 6 (STR6) Transport and Parking. Appendix 3 of the Pre Submission Local Plan details the monitoring that would take place within the plan period to ensure a continued reduction in air pollution occurs at key locations in the borough.

- **PI3 - Incorporate the development of a future 'Air Quality Protection Area' into the emerging Local Plan to support ongoing air quality improvements and maintaining good air quality** - The borough wide local plan consultation took place during September to November 2019. The comments are being collated and finalised in 2020. No specific progress on this action in 2020.

- **PI5 - Support the protection of existing and development of new Green Infrastructure (GI) as part of the Green Infrastructure Policy** - Progressed by Planning Policy and Development Management, although increasingly part of the climate change agenda rather than air quality management. The Council has negotiated a number of GI improvements as part of new developments in the borough (most new developments have some form of GI). Also maintain GI via the Kent High Weald Partnership

Promotion of air quality

- **PH2 - Engage with schools to reduce impact of school traffic. Work with KM Charity Team to increase the number of schools using green travel** - Very positive engagement through the Clean Air for Schools Project is growing. Successfully working with and engaging with schools through assemblies, competitions, activities and teaching material. Promoted through social media and publications from TWBC and schools. Very little engagement with schools was possible during the pandemic, but we expect to pick this back up in the Autumn of 2021, depending on the COVID situation at that time.
- **PH4** - **Improved Air Quality/sustainability web pages –** project for 2020 as part of the TWBC review and update of their website. **Completed in 2020;** not only have our in house web pages been updated, but we also have a new and informative website for the Kent and Medway Air Quality Partnership. The new web pages can be found here:-

  Tunbridge Wells Air Quality Pages

Review of air quality monitoring in TWBC

- **PH 5 - Annual progress report to Cabinet timed with annual reporting (of the Annual Status Report, ASR), to DEFRA -** Annual report (ASR) submitted to DEFRA and presented to cabinet and general public. **Ongoing annual requirement.**
- **PH 6 - Review of air quality monitoring provision in TW Area -** More intensive monitoring of Hawkhurst Village and to declare an AQMA in Hawkhurst. Further investigation throughout 2020. Review of diffusion tubes was carried out in 2020, with additional tubes added in Camden Road, Rusthall, Langton Green and Hawkhurst.

The principal challenges and barriers to implementation that TWBC anticipates facing during 2021 are: The extent to which COVID 19 continues to be a problem and whether or not new variants or new waves of cases occur, which require the team to focus on COVID 19 priorities. Progress on some projects is likely to depend on the extent to which funding opportunities are available from central and local government.

Tunbridge Wells Borough Council made one bid to DEFRA under the 2020 Air Quality Grant Scheme. It was a joint bid between Tunbridge Wells Borough Council, and Canterbury City Council for £103,000 to develop a digital air quality resource. The resource would be intended to educate and inform children about air quality in a fun and engaging way, including elements of story book and game play.

Conclusions and Priorities

The 2020 monitoring results show that the annual mean levels of NO_2 measured at the air quality station (located on St Johns Road, Tunbridge Wells) and at all of the diffusion tubes across the borough are below the annual mean objective of 40ug/m^3. We acknowledge that the results were affected by lockdowns as a result of the COVID 19 pandemic, however, we are aware that pollution levels have been on a long term downward trend for a number of years, and we would have expected this trend to have continued in 2020, even though it has not been possible to quantify this.

Measurements of particulate matter of less than 10 micrometres in diameter (PM_{10}) measured at the air quality station have continued to reduce and remain below the objective. The level recorded for 2020 was 18µgm^{-3} which was down from 21µgm^{-3} in 2019. PM_{10} levels in Tunbridge Wells are consistently well below the objective level of 40µgm^{-3}

$PM_{2.5}$ is not measured in the Borough, but was estimated according to the procedure described in Chapter 7 of LAQM TG16 to be 12.5µgm^{-3}.

We will continue to work with schools to promote our Clean Air for Schools campaign and anti-idling message and work with other groups, departments and authorities to promote sustainable transport including cycling and walking.

Establishing an AQMA in Hawkhurst was cited as one of our priorities for 2020 in the previous ASR. However, declaration of the AQMA was not possible owing to the other demands on officer time as a result of the pandemic. It is now expected that the AQMA will be declared towards the end of 2021. Once the declaration has been made, TWBC will work on the development of an Air Quality Action Plan for Hawkhurst.

- No exceedances of any air quality objective was measured anywhere in the Borough in 2020. The locations of diffusion tube monitoring are kept under more or less constant review, and more locations are added every year, however, no new exceedances have been found.
- Air pollution levels have been on a long term downward trend since about 2015. This trend appears to have continued in 2020, although this has been masked to some extent by the effects of the pandemic.

- The AQMA was last reviewed in 2018, and at that time it was extended slightly to the north and south although the width was decreased. Since 2018, we have seen NO_2 levels decrease to the point where we are considering revoking the AQMA. In order to do this, we would have liked to have three years in which there were no exceedances of the NO_2 annual mean objective at any relevant receptor. The status of 2020 and 2021 monitoring data, having been affected by lockdowns during the pandemic, is such that we don't want to rely on it for making the decision to revoke the AQMA. Therefore, we would like to wait for data from a 'normal' year (hopefully 2022) in order to use that data make a decision about revoking the AQMA
- A detailed assessment was undertaken in Hawkhurst in 2020 based on monitoring results from 2019. The data was rather noisy, and at times showed some quite dramatic fluctuations from one month to the next, rather than the pattern which we would normally expect, which is to see higher NO_2 levels in the winter which tend to decrease in the summer. Because of the noisy data, we would have preferred to see another year's data before deciding whether or not to declare an AQMA. However, when it became clear that 2020 data was going to be severely impacted by lockdowns as a result of COVID, we commissioned AQC to undertake the detailed assessment based on 2019 data. We considered that the only other alternative would be to wait until the end of 2022 when hopefully the COVID pandemic would have ended.

  The conclusion of the detailed assessment was that a small AQMA including about 40 properties, should be declared in Hawkhurst. However, the report noted the trend of decreasing NO_2 levels and suggested that the number of receptors actually experiencing an exceedance of the NO_2 annual mean objective in Hawkhurst could be expected to reduce year on year, until by 2025 there would be no exceedances.

We don't envisage updating our Air Quality Action Plan since we are fairly sure that compliance with all objectives has been achieved within the existing AQMA, and we are intending to revoke the AQMA in the fairly near future. We will however, be working on a new Air Quality Action Plan for the Hawkhurst AQMA, once that has been declared.

Local Engagement and How to get Involved

As transport is the main source of air pollution within the borough of Tunbridge Wells, the easiest way for the public to get involved with helping to improve air quality within the area would be to look at alternatives to the way they usually travel.

The following are suggested alternatives to private travel that would contribute to improving the air quality within the Borough:

- Use public transport where available – This reduces the number of private vehicles in operation reducing pollutant concentration and helping to reduce congestion;

- Walk or cycle if your journey allows – From choosing to walk or cycle for your journey the number of vehicles is reduced and also there is the added benefit of keeping fit and healthy;

- Car/lift sharing – Where a number of individuals are making similar journeys, such as travelling to work or to school car sharing reduces the number of vehicles on the road and therefore the amount of emissions being released. This can be promoted via travel plans through the workplace and within schools; and there is further information on https://kent.liftshare.com

- Alternative fuel / more efficient vehicles – Choosing a vehicle that meets the specific needs of the owner. Fully electric, hybrid fuel and more fuel efficient cars are available and all have different benefits by reducing the amount of emissions being released. The installation of Electric Vehicle charging points is being promoted through the use of conditions attached to relevant planning permissions.

We plan to resume work on our CAFS project and engage with more primary schools within the three boroughs when the COVID situation allows. Eventually, we also plan to extend the project to secondary schools, possibly through presentations to class groups and curriculum related teaching material and projects, however, we don't have a definite time table for this at present.

For Hawkhurst we will start the development of an Air Quality Action Plan as soon as the AQMA is declared. The AQAP will require the involvement of local stakeholders, particularly Kent County Council, as it is envisaged that a number of actions will be transport related. Full consultation on the AQAP will be undertaken prior to its being finalized.

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1 Local Air Quality Management

This report provides an overview of air quality in Tunbridge Wells Borough Council during 2020. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Tunbridge Wells Borough Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England are presented in Table E.1.

2 Actions to Improve Air Quality

Air Quality Management Areas

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

A summary of AQMAs declared by Tunbridge Wells Borough Council can be found in Table 2.1. The table presents a description of the one AQMA that is currently designated within Tunbridge Wells Borough Council. Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of AQMA and also the air quality monitoring locations in relation to the AQMA. The air quality objectives pertinent to the current AQMA designations are as follows:

- NO_2 annual mean;

We propose to declare a new AQMA in Hawkhurst area due to exceedances of the NO_2 annual mean air quality objective (see monitoring/additional information section).

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
A26 AQMA	Declared <2005>, Amended <2011> Amended 2018	NO2 Annual Mean	The A26 between Park Road and Neville Terrace also including Grosvenor Road, at 0-30m from the road (centre line)	NO	41.8	21.2	TWBC AQAP 2018	Link to A26 AQMA

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

☒ **Tunbridge Wells Borough Council confirm that all current AQAPs have been submitted to Defra (confirm by selecting in box).**

Progress and Impact of Measures to address Air Quality in Tunbridge Wells Borough Council

Defra's appraisal of last year's ASR concluded

1. The declaration of the new Hawkhurst AQMA is supported as new monitoring data has indicated exceedances of the NO_2 annual mean objective is experienced in the area. The Council anticipate the official declaration of the AQMA in late 2020.

   Declaration of Hawkhurst AQMA was not achieved in 2020. This was primarily due to a considerable extra workload on the Environmental Health Team and changed priorities as a result of the COVID pandemic. Consultation about the proposed AQMA was undertaken in 2020, and air quality issues in Hawkhurst including the proposed AQMA are already considered in any planning applications in the area. We now anticipate that the AQMA will be declared in 2021, but we note that no exceedances of any air quality objective were recorded in Hawkhurst during 2020.

2. The revocation of the existing A26 AQMA is supported. However due to the current circumstances regarding Covid-19 the Council will not revoke the AQMA until 2022, as the impacts of Covid are not yet fully understood. (i.e. It is anticipated that there will be an impact on NO_2 concentrations and trends may be skewed due to Covid).

   As discussed, there were no exceedances of any air quality objective in Tunbridge Wells Borough in 2020, and we are still minded to revoke the AQMA. However, we will proceed with caution because of the impact of COVID on the 2020 data, and we will defer this decision until we have data from 2022, assuming that this is unaffected by COVID.

3. The Council have presented the annualised results from the 5 new monitoring locations at Hawkhurst at the start of the ASR but not in the main body of the report. Consequently, data in Figure 2.1 and Table A.3 for these monitoring locations are not consistent with one another. This can be confusing for the reader as the sites show two different concentrations. It would be beneficial for the Council to use the same concentrations in both Figure 2.1 and Table A.3.

   Tunbridge Wells Borough Council has used the new diffusion tube data processing tool for all its data processing for 2020, which should hopefully eliminate this type of issue.

4. Distance corrected values have been presented in Table A.3 for TW41 and TW58. The template requests for non-distance corrected results to be presented in Table A.3. Distance corrected results are to be presented in Table B.1.

   Tunbridge Wells Borough Council has used the new diffusion tube data processing tool for all its data processing for 2020, which should hopefully eliminate this type of issue. No diffusion tubes required distance correction in 2020.

5. The Council have provided and very good and detailed discussion of pollutant trends within the borough. This is encouraged in future ASRs.
   Noted – thank you.

Tunbridge Wells Borough Council has taken forward a number of direct measures during the current reporting year of 2020 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. 23 measures are included within Table 2.2, with the type of measure and the progress Tunbridge Wells Borough Council has made during the reporting year of 2020 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2. We note that whilst the COVID pandemic restricted progress on the Action Plan in 2020 to some extent, nevertheless, there was compliance with all air quality objectives in TWBC in 2020.

Only one measure in the Action Plan has been completed at this stage, although we would note that the Action Plan was only adopted in early 2019, and progress in 2020 was hampered by the COVID situation. The action completed was PH4 which was to improve our Air Quality web pages. As part of this, we have reviewed and updated our TWBC's own web pages, but we have also launched a new and improved website for the Kent and Medway Air Quality Partnership, which can be found at www.kentair.org.uk

Although only one action has been completed to date, we would also note, that a number of actions are ongoing, and as such have no real completion date. For example we undertake to review our monitoring provision annually, which we do, and will continue to do for the foreseeable future. Another example would be our 'Clean Air For Schools' programme, which we expect will be developed and expanded for a number of years and is likely to continue for as long as we judge it to be successful.

Tunbridge Wells Borough Council's priorities for the coming year are listed below. (reference numbers from the AQAP are included where appropriate)

1 To complete the declaration of the Hawkhurst AQMA.

2 To begin developing an Air Quality Action Plan for Hawkhurst

3 To continue with the Clean Air For Schools programme – PH2

4 To continue with the incorporation of air quality measures into the new local plan - PL1

5 To begin work on developing a bicycle hire scheme -TR4

6 To improve the way we tackle engine idling – TR8

7 To expand Tunbridge Wells Car Club – TR6

The principal challenges and barriers to implementation that Tunbridge Wells Borough Council anticipates facing are potentially a continuation of the COVID pandemic increasing the workload of officers who would otherwise be progressing the air quality objectives.

Progress on some measures has been slower than expected due to additional demands on the Environmental Health Team as a result of the COVID pandemic.

Tunbridge Wells Borough Council believes that compliance with all air quality objectives has already been achieved in the majority of the Borough including in all of the existing A26 AQMA. However, we need to confirm this with data from a year unaffected by lockdowns and other disruptions from the COVID pandemic.

Compliance with all air quality objectives was also achieved in the proposed Hawkhurst AQMA, however, it is not clear whether this will be repeated in a year unaffected by COVID. Our current modelling suggests that compliance will be achieved by 2025, however, we remain of the view that the 2019 data used as the basis for this modelling was somewhat high, and therefore compliance might well be achieved sooner than predicted. We also note that the 2025 date is modelled in the absence of the Air Quality Action Plan which is still to be developed. It could be reasonably expected that the AQAP could also help to bring forward compliance.

The measures stated above and in Table 2.2 will help to contribute towards compliance, Tunbridge Wells Borough Council does not anticipate that any further additional measures be required in subsequent years to achieve compliance and enable the revocation of the A26 AQMA, however we are yet to consider what measures will be necessary in Hawkhurst.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
Tr1	Support the development of cycling and walking infrastructure to increase the use of sustainable transport modes such as walking and cycling.	Promoting Travel Alternatives	Promotion of cycling	2018	2019	TWBC Economic Development Team and KCC Transport	Developers & highway infrastructure funding	NO	Fully funded	£100k - £500k	Planning	unquantifiable		Phase 1 LCWIP (Local Cycling and Walking Infrastructure Plan) prepared in Draft that focuses on RTW town centre. Consultation on the draft will start early 2020. Phase 2 LCWIP to be commissioned and will cover low traffic neighbourhoods and inter-urban routes.	Lengthy Timescale
Tr2	Securing Grant funding for buses	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	2018	2021	Local Authority Environmental Health, Local Authority Transport Dept.	Defra and LA	NO	Not Funded	< £10k	Planning	unquantifiable		On-going	
Tr3	Investigate Low Emission Standard for Buses and/or HGV's. Either a graduated scheme of improvement "Low Emissions Zone" or a Euro VI "Clean Air Zone" Support freight routing as set out in the KCC Freight Action Plan	Vehicle Fleet Efficiency	Other	2018	2024	Environmental Protection Team in conjunction with QPB and Economic Development Team	Local Authority, Funding: Defra Air Quality Grant will be sought if opportunity arises	NO	Partially Funded	< £10k	Planning	Reduced vehicle emissions		Not progressed at this time. Currently not budget allocation. However experience of completed project in neighbouring authority with much higher levels of pollution demonstrated very little gain for cost.	Unlikely to be project worth implementing. Money (approx £50,000 better spent on other projects). Quarterly Quality Bus Partnership meetings are held with Arriva (the largest operator) and KCC. Arriva currently reports on progress towards improving emission standards at these meetings. Work to review the Borough Transport Strategy is underway and will

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
															consider this issue further.
Tr4	Review opportunities to facilitate the implementation of a Bike Share Scheme. With possible options to provide initial support funding using S106 or grant funding, inc. private investor funding. Including as appropriate docking stations and electric bicycle facilities	Promoting Travel Alternatives	Promotion of cycling	2018	2024	Sustainability, Economic Development, and Healthy Lifestyles Team, with support from Parking Services and Environmental Health.	Funding to implement project awarded by KCC. Very early stages of scoping in progress	NO	Partially Funded		Planning	unquantifiable		Funding has been identified by Kent County Council to investigate the potential of implementing an electric bike share scheme in Tunbridge Wells.	
Tr5	Review opportunities to reduce emissions from delivery vehicles	Freight and Delivery Management	Other	2018	2023	Environmental Protection and Economic Development	Within existing budgets	NO	Not Funded	< £10k	Planning	unquantifiable		Guidance prepared for developers of this type of scheme to be provided at the planning stage. Issue will be included in review of the Borough Transport Strategy.	
Tr6	Direct the ongoing expansion of the Tunbridge Wells Car club.	Alternatives to private vehicle use	Car Clubs	2018	2022	With Planning Policy, Parking and KCC	s106	NO	Partially Funded	£10k - 50k	Implementation	unquantifiable		Expansion of the car club could not go ahead in 2020 due to the Covid situation, however, the car club did remain operational, albeit at a reduced level. Nevertheless, funding has been secured from S106 agreements for three additional cars and a new location for an EV charging point will be sought.	Delayed by COVID but resumption is imminent
Tr7	Explore ways in which the Parking Strategy can contribute to improving air quality, by the review of parking restrictions/enforcement	Promoting Low Emission Transport	Priority parking for LEV's		2022	TWBC Parking Services	Within existing budgets	NO	Funded	< £10k	Planning	unquantifiable		Issue to be covered in emerging Borough Transport Strategy. Parking Services have been involved with the introduction of new restrictions in part of Mount Pleasant Road and Monson Road, with this area now being only open to buses and taxis, as well as cyclists and	

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
														pedestrians.	
Tr8	Reduce idling of engines whilst stationary with focus on Taxi's, coaches/ buses and HGV's. With an option to extend to anti-idling campaigns outside schools located near the AQMA.	Traffic Management	Anti-idling enforcement	2018	2022	Environmental Protection Team and Parking Services	Within existing budgets	NO	Partially Funded	< £10k	Implementation	unquantifiable		Wider anti idling campaign started in TWBC targeting schools and other key locations for banners and signage. Social media and TWBC residents magazine used to publicise the campaign and raise awareness. Parking to add update on enforcement options	
Tr9	Emissions Standard for Taxis (Euro 6 standard)	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport		2024	TWBC Licensing Team	Within existing budgets	NO	Funded	< £10k	Planning	unquantifiable		Ongoing through vehicle checks and licensing of taxi vehicles	
Tr10	The Council will support KCC in their delivery of a 'Demand Response Transport service as part of Kent Connected and Kent Connected +	Promoting Travel Alternatives	Other		2024	KCC Public Transport Team	Within existing budgets	NO			Implementation	unquantifiable		KCC's Public Transport Team currently working on an Enhanced Bus Partnership Scheme and DRT but it is not yet clear whether it will be introduced in TWBC.	
Tr11	To revise and update the Councils own 2011 Travel Plan.	Promoting Travel Alternatives	Workplace Travel Planning		2022	Sustainability	Within existing budgets	NO	Funded	< £10k	Planning	unquantifiable		To be progressed	
Tr12	To deliver an adaptive traffic management control system	Traffic Management	UTC, Congestion management, traffic reduction		2024	KCC Highways		NO			Planning	unquantifiable		To be progressed	

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
Pl1	Good air quality is appropriately recognised in the Local Plan - Development Plan Document/SPD in emerging local plan.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2017	2024	TWBC Planning Policy	Within existing budgets	NO	Funded	< £10k	Implementation	unquantifiable		SPD has been prepared and provided to planning policy for adoption. In line with the local plan,The Pre-Submission Local Plan is currently undergoing Reg 19 consultation and includes three air quality themes development management policies. These are entitled Air Quality, Air Quality Management Areas, and Biomass Technology. They are designed to prevent unacceptable air quality impacts, ensure air quality neutral development and strongly encourage air quality positive proposal in planning applications.	

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
PI2	Incorporate a requirement for sustainable travel choices and car club schemes into the emerging Local Plan to support ongoing air quality improvements and maintaining good air quality. The Local Plan to introduce as appropriate a requirement for air quality impacts to be considered as part of Transport Assessments and Transport Statements, and for air quality impacts arising from transport to be a consideration in determining the appropriateness of transport mitigation and the overall transport impacts arising from the development. The Local Plan to introduce a requirement for ongoing monitoring of the impacts of development on air quality as appropriate in those locations within the Borough most at risk of poor air quality.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2016	2024	TWBC Development Control and Planning Policy	Within existing budgets	NO		< £10k	Implementation	unquantifiable		SPD had been written and provided to planning policy for adoption in line with the local plan.Sustainable travel is a common theme running through the Pre Submission Local Plan. It is particularly relevant to development management policy TP2 (transport design and accessibility) which ensures provision is made for car club schemes and prioritises active travel. This theme is also covered by Strategic Policy 6 (STR6) Transport and Parking.Development management policy TP1 – Transport Assessments/Statements, Travel Plans and Mitigation, does not mention air quality specifically. However, the previously mentioned policies above would ensure this process takes place.Appendix 3 of the Pre Submission Local Plan details the monitoring that would take place within the plan period to ensure a continued reduction in air pollution occurs at key locations in the borough.	
PI3	Incorporate the development of a future 'Air Quality Protection Area' into the emerging Local Plan to support ongoing air quality improvements and maintaining good air quality.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2018	2024	TWBC Planning Policy, Sustainability and Environmental Health	Within existing budgets		Funded	< £10k				SPD has been written and provided to planning policy for adoption.	

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
PI4	An effective Electric Vehicle charging network is available for use within the Borough	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging		2021	Sustainability, Development Control, Parking Services. KCC Highways		NO			Planning	unquantifiable		Discussions with KCC Highways regarding on street charging and other schemes. Parking Services have worked with KCC to secure funding for the installation of EV in all of TWBC's car parks. Other funding opportunities for additional EV charging are also being explored. A new EV charging point has been installed in Mount Pleasant Road.	
PI5	Support the protection of existing and development of new Green Infrastructure(GI) as part of the Green Infrastructure Policy	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2016	2024	TWBC landscape and biodiversity	TWBC and KCC	NO	Funded	< £10k	Implementation	unquantifiable		Progressed by Planning Policy and Development Management, although increasingly part of the climate change agenda rather than air quality management. The Council has negotiated a number of GI improvements as part of new developments in the borough (most new developments have some form of GI) Also maintain GI via the Kent High Weald Partnership	
PH1	Infrastructure developments in parks to support cycling and walking links to and through parks to enable sustainable access and support commuting routes.	Promoting Travel Alternatives	Other	2018	2022	TWBC Parks and Economic Development	TWBC and KCC	NO	Partially Funded		Implementation	unquantifiable		Improvements to the 21st Century Way cycle route have been delivered which links to Grosvenor & Hilbert Park and Colebrook Recreation Ground. The draft LCWIP analyses several walking and cycling routes through parks and across the Commons in Tunbridge Wells and Rusthall.	

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
PH2	Engage with schools to reduce impact of school traffic Work with KM Charity Team to increase the number of schools using green travel	Promoting Travel Alternatives	School Travel Plans	2018	2022	TWBC Environmental Protection Team	Within existing budgets	NO	Funded	< £10k	Implementation	unquantifiable		Project was successfully rolled out and is now in second year. Officers are delivering assemblies to schools taking part in the scheme and providing anti idling banners to put outside. Schools are being asked to design and implement an anti idling campaign and tell TWBC what they have done with a prize to the winner. Schools also provided with a Plumeflow portable monitoring device to look map levels or polluting around he school and on different routes to school to raise awareness and promote walking, cycling etc as well using less trafficked routes to walk to school. Have applied to DEFRA for funding to develop a digital educational resource aimed at primary schools, to educate and inform about air quality in fun an interactive way.	Progress during 2020 was more or less impossible due to COVID situation
PH3	Raising Awareness of Air Quality and health issues	Public Information	Other	2018	2024	KCC Public Health TWBC Environmental Protection	Within existing budgets	NO	Funded	< £10k	Implementation	unquantifiable		Working on articles for residents magazines etc and promoting our Clean Air For Schools promotion.. AQ remains a lower priority for overall public comms attention. New Kent and Medway Air Quality Partnership website includes more health information	Much was achieved via the Clean Air for Schools Project which involved working with and engaging with schools through assemblies, competitions, activities and teaching material. Promoted through social media and publications from TWBC and schools

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
PH4	Improved Air Quality/sustainability web pages.	Public Information	Via the Internet	2019	2020	TWBC Environmental Protection Team	Within existing budgets	NO	Funded	< £10k	Completed	unquantifiable		Websites have been updated and Clean Air for Schools promotion with additional material. Additional updates took place in 2020 for compliance with Accessibility Regs. Also we now have an improved website for the Kent and Medway Air Quality Partnership.	
PH5	Annual progress report to Cabinet timed with annual reporting (of the Annual Status Report, ASR), to DEFRA.	Public Information	Other	2018		TWBC Environmental Protection Team	Within existing budgets	NO	Funded	< £10k	Implementation	unquantifiable		This report will be included on our Intranet and submitted for noting.	
PH6	Review of air quality monitoring provision in TW Area	Public Information	Other	2014		TWBC Environmental Protection Team	Within existing budgets	NO	Funded	< £10k	Implementation	unquantifiable		The continuous monitoring station was upgraded in 2019 following equipment failure.. Results indicate that NO2 is not in excess of the annual mean objective and that no objectives are being exceeded for particulates. The diffusion tube network is reviewed annually and the updated round was started in January 2020. More extensive monitoring of a potential hotspot in Hawkhurst has been implemented to address anomalous results and gain a more detailed data set. Additonal tubes were added in Rusthall, Langton Green, and in Camden Road.	More intensive monitoring of Hawkhurst Village and to declare an AQMA in Hawkhurst. Further investigation throughout 2020. Review of diffusion tubes to be carried out in 2021. Unfortunately, no further clarification of the air quality situation in Hawkhurst was possible because all air quality monitoring has been affected by lockdowns.

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
PH7	Review the opportunity to identify the 'cost of illness' by using the newly developed Public Health England tool in the: 'Estimations of costs to the NHS and social care due to the health impacts of air quality.'	Public Information	Other	2018	2022	TWBC and KCC		NO	Funded		Aborted	unquantifiable		Owing to the additional demands on Officer's time as a result of the COVID situation, staff have not had sufficient time to familiarise themselves with the tools in 2020. Too complicated - national data will be used.	

$PM_{2.5}$ – 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.

Tunbridge Wells Borough Council is not taking any measures specifically to address $PM_{2.5}$: We note that in the neighbouring Borough of Maidstone, in Upper Stone Street, which has considerably higher levels of pollution that anywhere in Tunbridge Wells Borough, the annual mean level of $PM_{2.5}$ was 16µgm^{-3}, which is comfortably below the objective of 25µgm^{-3}. The PM_{10} annual mean in Upper Stone Street was 23µgm^{-3}. Using the method for estimating $PM_{2.5}$ levels, given in LAQM TG16 Chapter 7, we can calculate a $PM_{2.5}/PM_{10}$ ratio for Upper Stone Street of 16/23 = 0.696. Applying this to the PM_{10} annual mean level measured in Tunbridge Wells gives 18 x 0.696 = 12.5. Therefore, the estimated $PM_{2.5}$ level in Tunbridge Wells is 12.5µgm^{-3}, or half of the objective level.

Many of the actions in our action plan are likely to have a beneficial impact on $PM_{2.5}$ in addition to their impact on PM_{10} and NO_2 levels. We will be including advice on bonfires and household fuels in our Clean Air For Schools project which we hope will be beneficial in terms of $PM_{2.5}$, and the Environmental Health Team continues to police nuisance bonfires and illegal burning, eg Clean Air Act Offences.

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

This section sets out the monitoring undertaken within 2020 by Tunbridge Wells Borough Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2016 and 2020 to allow monitoring trends to be identified and discussed.

Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Tunbridge Wells Borough Council undertook automatic (continuous) monitoring at 1 sites during 2020. Table A.1 in Appendix A shows the details of the automatic monitoring sites.

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

Tunbridge Wells Borough Council undertook non- automatic (i.e. passive) monitoring of NO_2 at 33 sites during 2020. Table A.2 in Appendix A presents the details of the non-automatic sites. In 2020, two additional tubes were added at site TW63 which is in our proposed new AQMA in Hawkhurst, in order to create a triplicate site to improve the robustness of the data. 2019 data indicated exceedances of the annual mean objective for NO_2 at a few properties in the vicinity of TW63, although no exceedances were seen in 2020. Three additional tubes were deployed in Southborough, inside the existing A26 AQMA which we continue to monitor with a view to revoking in the not too distant future.

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.

Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, annualisation (where the annual mean data capture is below 75% and greater than 33%), and distance correction. Further details on adjustments are provided in Appendix C.

3.1.3 Nitrogen Dioxide (NO_2)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2020 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

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

There were no exceedances of either the annual mean or the hourly mean objective for NO_2 in 2020 anywhere in Tunbridge Wells Borough. No tube was within 10% of the annual mean objective, therefore no tube required distance correction.

3.1.4 Particulate Matter (PM_{10})

All data presented in this reported has been properly ratified according to the procedures described in the Technical Guidance, LAQM TG16. Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of 40µg/m^3.

Table A.7 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past five years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
CM1	A26 St Johns Road, Southborough	Roadside	558260	141599	NO_2; PM10	YES (St Johns Tunbridge Wells)	Chemiluminescent; TEOM	18	4	3

Notes:

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

(2) N/A if not applicable

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

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
TW01	62 LONDON ROAD, SOUTHBOROUGH, TUNBRIDGE WELLS	Roadside	558100	142200	NO2	Y A26	4.2	2.0	No	2.4
TW02	11 THE HURST, TUNBRIDGE WELLS	Urban Background	560000	141300	NO2	N	6.0	1.6	No	2.1
TW12	Monson Road, T. Wells	Roadside	558300	139500	NO2	N	2.0	1.8	No	2.4
TW19	Maidstone Road, Paddock Wood	Roadside	566800	144800	NO2	N	2.5	1.8	No	2.5
TW20	Mount Ephraim, T. Wells	Roadside	558300	139800	NO2	Y A26	2.8	2.0	No	2.4
TW22	Pembury Road, T. Wells	Roadside	559400	139500	NO2	N	16.0	1.0	No	2.3
TW23	Neville Gate, T. Wells	Urban Background	558800	138300	NO2	N	16.0	0.7	No	2.4
TW25	Flying Dutchman	Roadside	558136	142017	NO2	Y A26	1.8	2.6	No	2.9
TW31	London Road Mt Epraim junction	Roadside	558227	139757	NO2	Y A26	3.1	1.0	No	2.7
TW34.1, TW34.2, TW34.3	The Cutout St John Road TW AQ	Roadside	558250	141750	NO2	Y A26	14.0	4.0	Yes	3.0
TW41	by 38 The Pantiles, London Rd/Pantiles, Tunbridge Wells	Roadside	558076	138762	NO2	Y A26	4.8	1.8	No	2.3
TW43	Junction Church Rd/Clarence Rd, Tunbridge Wells	Roadside	558271	139451	NO2	N	2.6	1.3	No	2.6
TW46	A26, Eridge Road, Tunbridge Wells	Roadside	557740	138538	NO2	N	12.0	1.0	No	2.4
TW53	Warrington Road, Paddock Wood	Roadside	567638	144732	NO2	N	9.0	1.8	No	2.5
TW55	Badsell Road opposite Mascalls park., Paddock Wood	Roadside	566746	144112	NO2	N	11.0	1.8	No	2.5
TW60	12 Gorse Road	Urban Background	560230	140150	NO2	N	10.0	30.0	No	3.0
TW56	32 Liptraps lane, TN2 3AA	Roadside	559888	141278	NO2	N	7.2	1.0	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
TW57	2 Liptraps lane, TN2 3BS	Roadside	559923	141560	NO2	N	5.5	1.8	No	2.9
TW58	Union House, Tunbridge Wells	Roadside	557927	138609	NO2	Y A26	7.4	1.3	No	2.5
TW61	5 Warwick Park TN2 5TA	Roadside	558242	138715	NO2	N	18.0	1.5	No	2.5
TW62	Pembury High Street	Roadside	562284	140746	NO2	N	3.9	1.0	No	2.5
TW63.1 HH, TW63.2 HH, TW63.3 HH	Cranbrook Road, Hawkhurst Smugglers Rest triplicate (new January 2020)	Roadside	576061	130599	NO2	N	0.0	1.0	No	1.8
TW66 HH	8 The Colonade, Rye Road, Hawkhurst re-opened site	Roadside	576102	130567	NO2	N	2.0	2.0	No	1.8
TW67 HH	Happy Garden Chinese, Highgate Hill, Hawkhurst	Roadside	575998	130528	NO2	N	7.5	1.8	No	2.0
TW68 HH	Old Infant School, Cranbrook Road, Hawkhurst	Roadside	576051	130602	NO2	N	0.2	3.0	No	2.0
TW69 HH	Near Substation, Cranbrook Road, Hawkhurst	Roadside	576062	135116	NO2	N	3.0	2.5	No	2.0
TW70 HH	Outside 8/9 Cranbrook Road, Hawkhurst	Roadside	576040	130734	NO2	N	0.2	1.2	No	2.0
TW71	Tube on post just besides of entrance next to Seven Springs Home	Roadside	560838	140389	NO2	N	7.0	1.5	No	2.0
TW72	Southborough new flats (new January 2020)	Roadside	558140	142080	NO2	Y A26	2m	3.0m	No	1.8
TW73	Summervale Rd (new January 2020)	Roadside	558137	142215	NO2	N	15m	4.5m	No	1.6
TW74	Papa Johns (new January 2020)	Roadside	557354	138128	NO2	Y A26	0m	5.0m	No	1.8
TW76	107 Forest Road by Lyle Pub (New Mar 20)	Roadside	559537	138500	NO2	N	9.0m	2.8m	No	2.0

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results: Automatic Monitoring (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
CM1	558260	141599	Roadside	Automatic	99.2	**44**	**40**	37	34	31

☒ **Annualisation has been conducted where data capture is <75% and >33% in line with LAQM.TG16 (confirm by selecting in box).**

☒ **Reported concentrations are those at the location of the monitoring site (annualised, as required), i.e. prior to any fall-off with distance correction (confirm by selecting in box).**

Notes:

The annual mean concentrations are presented as µg/m^3.

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

All means have been "annualised" as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

(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%).

Table A.4 – Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring ($\mu g/m^3$)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
TW01	558100	142200	Roadside	75	75.0	**44.2**	39.0	35.4	32.2	22.5
TW02	560000	141300	Urban Background	100	100.0	13.4	12.3	11.9	11.9	9.4
TW12	558300	139500	Roadside	84.6	84.6	29.6	28.1	28.5	23.4	23.0
TW19	566800	144800	Roadside	92.3	92.3	26.9	22.7	23.3	16.9	18.3
TW20	558300	139800	Roadside	90.4	90.4	**43.7**	36.0	37.1	34.8	25.0
TW22	559400	139500	Roadside	100	100.0	33.9	33.0	35.7	30.5	24.0
TW23	558800	138300	Urban Background	100	100.0	12.5	11.3	10.8	11.0	7.7
TW25	558136	142017	Roadside	100	100.0	**40.2**	35.5	33.2	30.7	22.5
TW31	558227	139757	Roadside	92.3	92.3	**45.0**	37.5	36.1	37.5	27.9
TW34.1, TW34.2, TW34.3	558250	141750	Roadside	100	100.0	**43.5**	**40.5**	38.1	31.5	25.1
TW41	558076	138762	Roadside	92.3	92.3	**49.1**	**43.3**	**44.5**	37.5	34.9
TW43	558271	139451	Roadside	92.3	92.3	32.9	30.1	29.3	27.8	21.2
TW46	557740	138538	Roadside	92.3	92.3	29.8	26.0	28.9	27.0	20.5
TW53	567638	144732	Roadside	92.3	92.3	15.9	20.0	15.0	16.7	10.6
TW55	566746	144112	Roadside	92.3	92.3	18.3	18.4	18.5	16.3	13.8
TW60	560230	140150	Urban Background	84.6	84.6	18.3	16.1	16.7	16.3	11.4
TW56	559888	141278	Roadside	50	50.0		21.0	28.4	24.4	14.5
TW57	559923	141560	Roadside	100	100.0		20.1	26.1	24.7	18.7
TW58	557927	138609	Roadside	75	75.0		30.3	**47.3**	30.3	31.7
TW61	558242	138715	Roadside	90.4	90.4			15.7	13.7	11.8
TW62	562284	140746	Roadside	92.3	92.3			24.2	22.0	16.7

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
TW63.1 HH, TW63.2 HH, TW63.3 HH	576061	130599	Roadside	100	100.0			**52.4**	**54.0**	35.3
TW66 HH	576102	130567	Roadside	84.6	84.6				23.6	18.0
TW67 HH	575998	130528	Roadside	84.6	84.6				34.4	25.2
TW68 HH	576051	130602	Roadside	84.6	84.6				35.8	29.3
TW69 HH	576062	135116	Roadside	100	100.0				**41.4**	33.0
TW70 HH	576040	130734	Roadside	100	100.0				37.0	27.1
TW71	560838	140389	Roadside	82.7	82.7				31.3	27.6
TW72	558140	142080	Roadside	81.8	75.0					29.4
TW73	558137	142215	Roadside	100	92.3					14.1
TW74	557354	138128	Roadside	81.8	76.9					18.2
TW76	559537	138500	Roadside	72.7	55.8					21.0

☒ **Annualisation has been conducted where data capture is <75% and >33% in line with LAQM.TG16 (confirm by selecting in box).**

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

☒ **Reported concentrations are those at the location of the monitoring site (bias adjusted and annualised, as required), i.e. prior to any fall-off with distance correction (confirm by selecting in box).**

Notes:

The annual mean concentrations are presented as µg/m^3.

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 **<u>bold and underlined</u>**.

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

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

(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%).

Figure A.1 – Trends in Annual Mean NO_2 Concentrations at the Automatic Monitoring Station

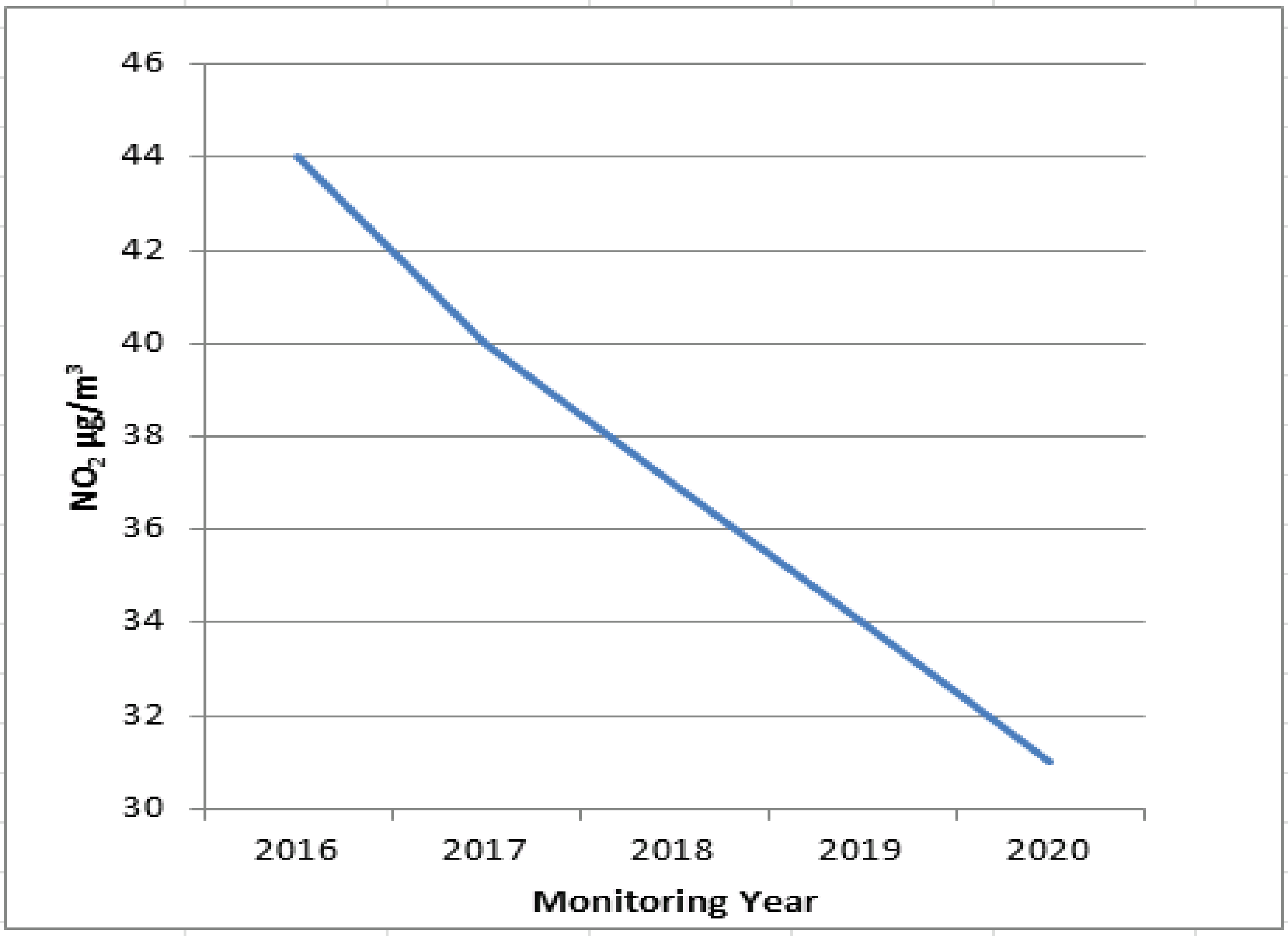


Figure A.2 – Trends in Annual Mean NO_2 Concentrations at diffusion tubes inside the AQMA

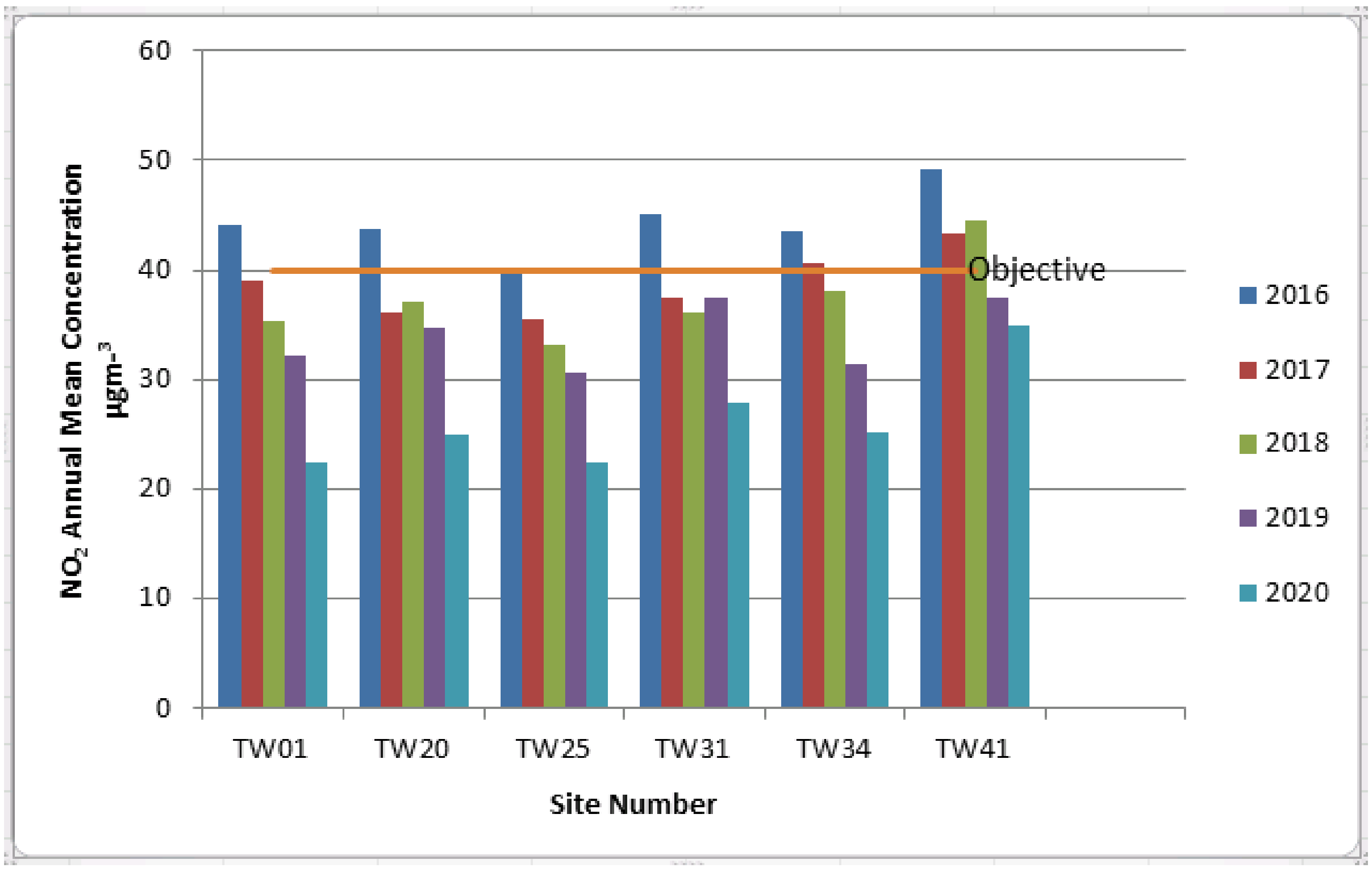


Figure A.3 – Trends in Annual Mean NO_2 Concentrations at Diffusion Tubes Outside the AQMA

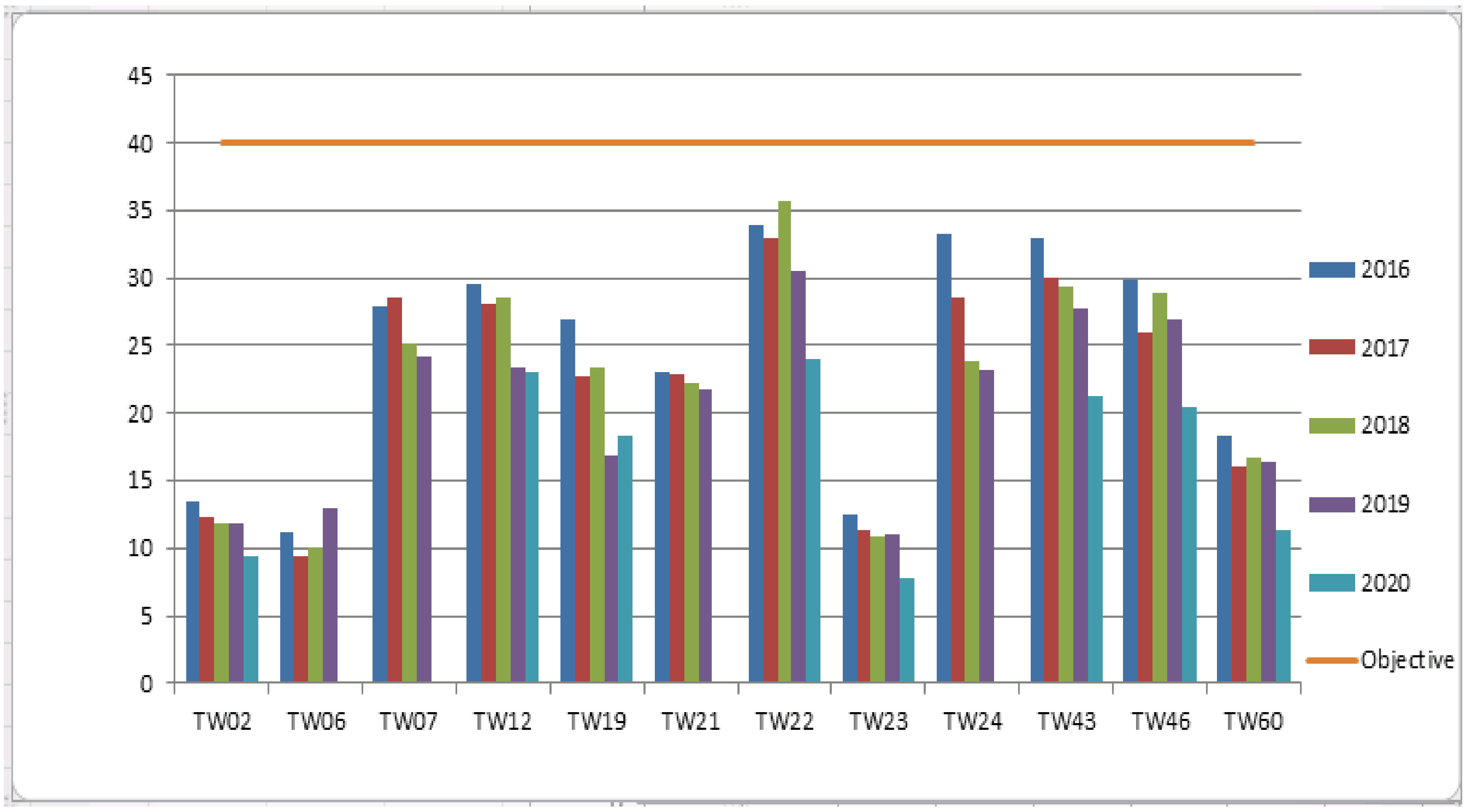


Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
CM1	558250	141750	Roadside	99.2	99.2	0	0	0	0	0

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m^3 have been recorded.

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**.

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

(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%).

Table A.6 – Annual Mean PM_{10} Monitoring Results ($\mu g/m^3$)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
CM1	666555	333444	Roadside	100	80	61.0	48.1	44.1	43.2	41.4
CM1	558250	141750	Roadside	99.4	99.4	**26**	**24**	**27**	**21**	**18**

☒ **Annualisation has been conducted where data capture is <75% and >33% in line with LAQM.TG16 (confirm by selecting in box).**

Notes:

The annual mean concentrations are presented as $\mu g/m^3$.

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

All means have been “annualised” as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(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%).

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

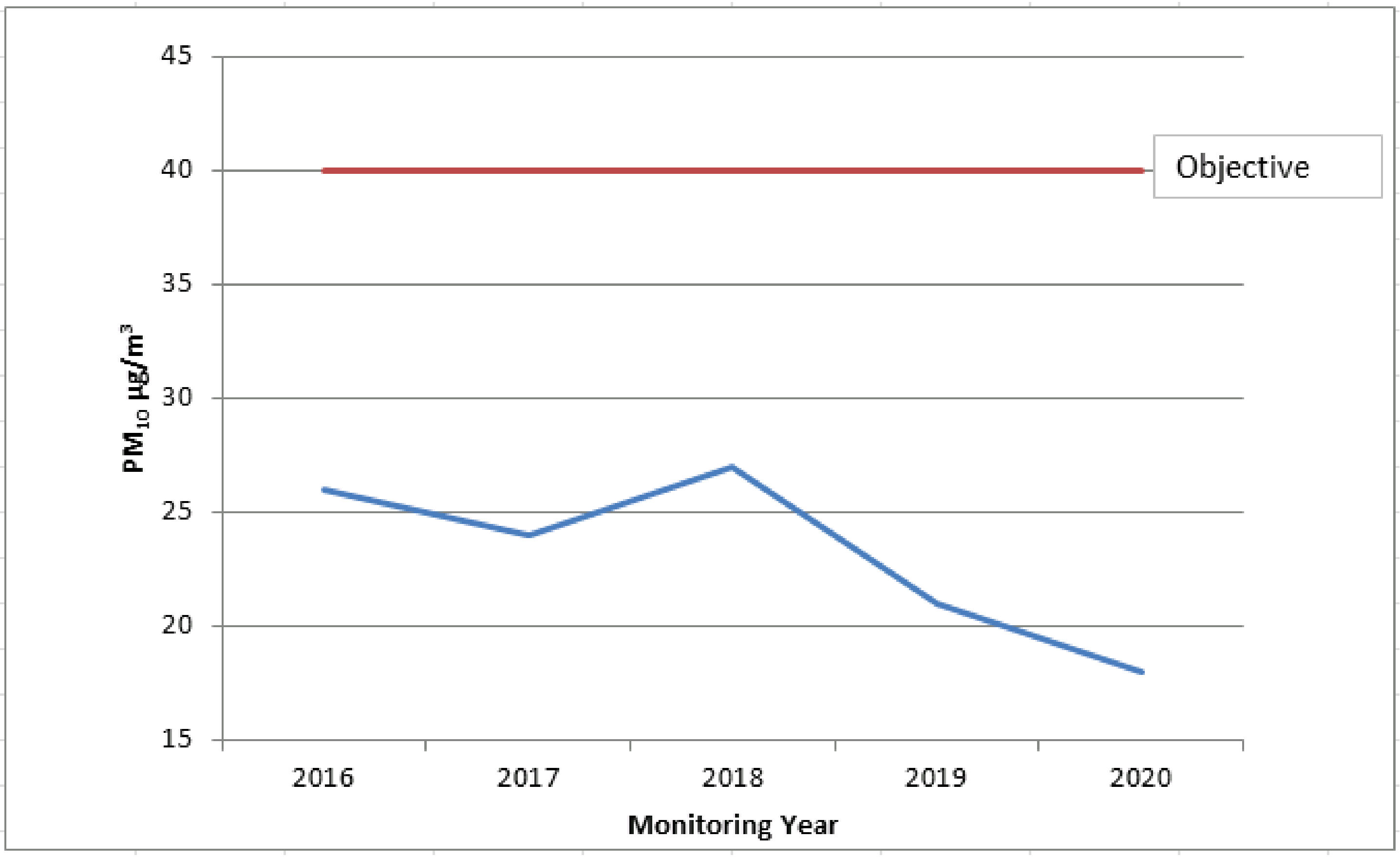


Table A.7 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
CM1	558250	141750	Roadside	99.4	99.4	10	13	13	10	1

Notes:

Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m^3 have been recorded.

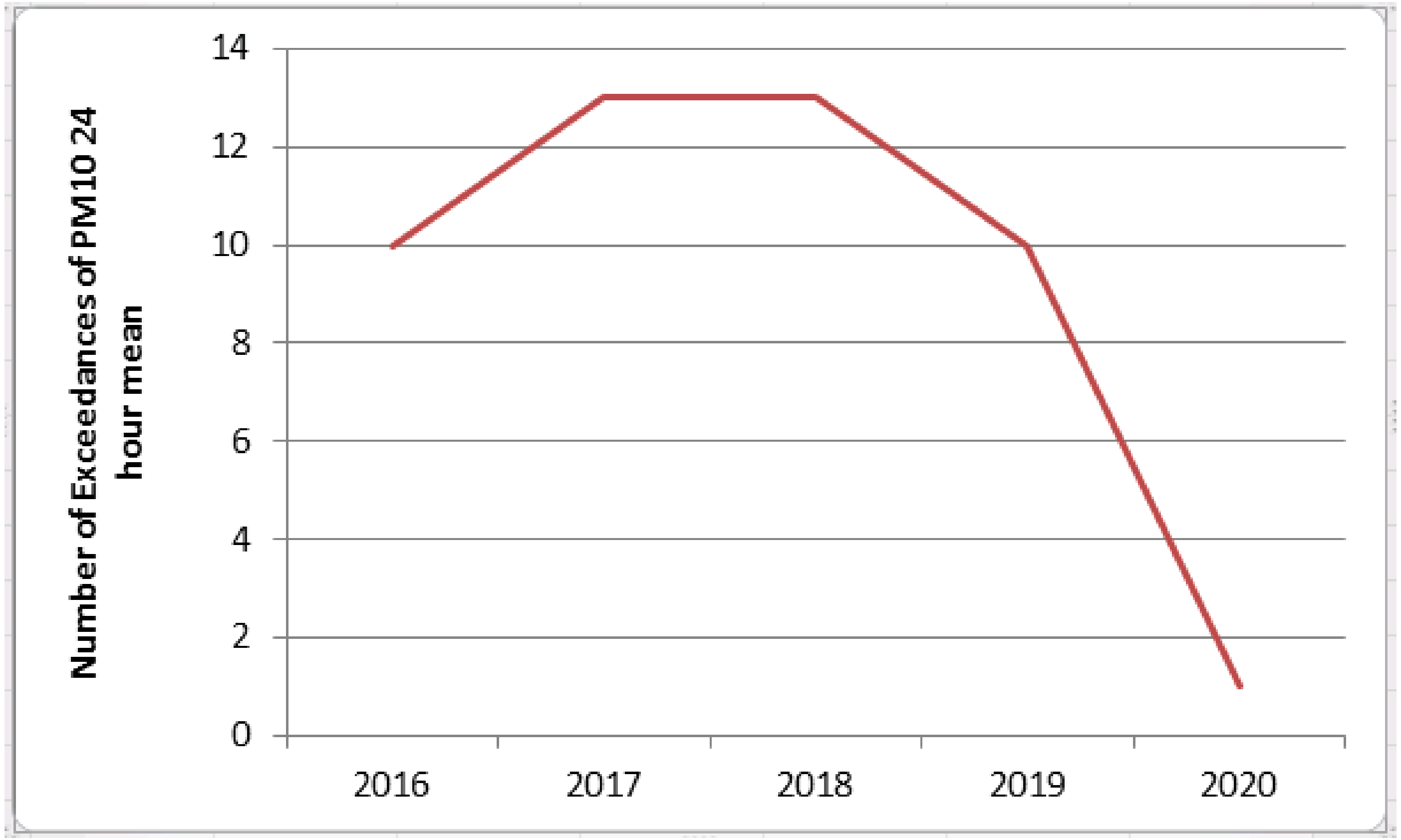
Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in **bold**.

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

(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%).

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



Appendix B: Full Monthly Diffusion Tube Results for 2020

Table B.1 – NO_2 2020 Diffusion Tube Results ($\mu g/m^3$)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (x.x)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
TW01	558100	142200	missing	/	18.6	15.1	23.7	26.8	28.9	33.6	39.8	36.6	43.9	/	29.7	22.5	-	
TW02	560000	141300	19.1	13.3	10.4	10.8	7.5	7.4	7.3	8.5	13.9	12.4	21.0	17.5	12.4	9.4	-	
TW12	558300	139500	43.1	/	29.2		19.0	23.6	23.7	29.6	31.2	34.4	37.0	31.5	30.2	23.0	-	
TW19	566800	144800	34.0	20.3	21.2		17.1	19.8	16.6	20.3	25.5	24.0	32.7	33.2	24.1	18.3	-	
TW20	558300	139800	43.9	32.5	30.7	19.3	26.8	29.0	27.9	38.0	42.1	30.2	41.3	/	32.9	25.0	-	
TW22	559400	139500	43.1	36.4	30.4	19.6	27.0	22.4	29.3	29.4	40.1	32.5	35.9	32.3	31.5	24.0	-	
TW23	558800	138300	16.2	11.0	8.6	6.0	7.3	6.7	7.0	8.6	12.2	8.0	17.3	13.2	10.2	7.7	-	
TW25	558136	142017	44.7	31.9	26.4	19.9	18.2	25.2	21.6	29.1	33.2	30.2	39.8	35.6	29.7	22.5	-	
TW31	558227	139757	49.7	/	36.9	26.8	29.2	35.8	32.9	18.6	44.0	40.9	46.6	42.9	36.8	27.9	-	
TW34.1	558250	141750	44.1	34.4	34.0	26.4	29.7	33.4	26.3	33.3	34.7	28.3	33.4	31.7	-	-	-	Triplicate Site with TW34.1, TW34.2 and TW34.3 - Annual data provided for TW34.3 only
TW34.2	558250	141750	48.9	39.1	31.3	26.7	27.5	33.4	26.5	36.7	32.9	27.1	38.3	32.5	-	-	-	Triplicate Site with TW34.1, TW34.2 and TW34.3 - Annual data provided for TW34.3 only
TW34.3	558250	141750	42.7	38.3	31.6	26.4	29.8	32.3	28.3	36.5	35.2	28.5	37.9	29.1	33.0	25.1	-	Triplicate Site with TW34.1, TW34.2 and TW34.3 - Annual data provided for TW34.3 only
TW41	558076	138762	56.3	50.0	46.4	34.5	37.0	40.7	/	53.7	50.7	46.7	49.9	39.9	46.0	34.9	-	
TW43	558271	139451	40.9	32.8	25,4	18.0	20.7	21.4	22.0	27.3	31.6	25.1	36.2	30.8	27.9	21.2	-	
TW46	557740	138538		29.3	21.4	23.7	23.0	25.0	21.2	27.6	32.3	28.2	35.5	30.1	27.0	20.5	-	
TW53	567638	144732	19.7	12.5	10.1		11.7	10.1	9.4	13.2	16.1	12.0	20.3	18.5	14.0	10.6	-	
TW55	566746	144112	20.2	14.2	16.7		16.4	17.4	13.1	19.4	22.9	14.3	23.5	22.3	18.2	13.8	-	
TW60	560230	140150	missing	17.5	12.3		9.8	14.3	8.6	14.6	14.5	14.6	21.6	22.3	15.0	11.4	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (x.x)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
TW56	559888	141278	38.8	/	18.6	18.9	18.6	/	/	/	27.5	/	/	1.0	20.6	14.5	-	
TW57	559923	141560	36.2	24.4	23.7	21.1	19.9	19.6	15.7	23.6	26.5	23.4	36.7	23.7	24.5	18.7	-	
TW58	557927	138609	missing	/	45.6	31.1	38.3	41.6	34.4	49.7	50.1	38.1	46.5	/	41.7	31.7	-	
TW61	558242	138715	23.1	17.7	15.3	12.3	10.5	9.7	12.1	12.7	18.7	16.7	22.2	/	15.5	11.8	-	
TW62	562284	140746	32.0	21.8	19.5		18.6	17.8	14.3	19.7	23.3	21.7	31.7	21.3	22.0	16.7	-	
TW63.1 HH	576061	130599	45.5	/	41.6	22.0	36.8	28.7	43.8	65.4	52.4	56.3	64.1	45.7	-	-	-	Triplicate Site with TW63.1 HH, TW63.2 HH and TW63.3 HH - Annual data provided for TW63.3 HH only
TW63.2 HH	576061	130599	missing	51.6	45.4	15.6	39.3	29.1	47.2	58.4	57.9	58.5	64.0	48.1	-	-	-	Triplicate Site with TW63.1 HH, TW63.2 HH and TW63.3 HH - Annual data provided for TW63.3 HH only
TW63.3 HH	576061	130599	missing	51.4	42.0	15.0	37.4	30.5	40.5	66.4	57.8	49.3	66.5	56.7	46.5	35.3	-	Triplicate Site with TW63.1 HH, TW63.2 HH and TW63.3 HH - Annual data provided for TW63.3 HH only
TW66 HH	576102	130567	1.7	/	19.6		19.9	24.2	25.1	29.7	31.6	25.8	32.4	27.0	23.7	18.0	-	
TW67 HH	575998	130528	33.4	39.1	34.6		24.7	14.1	32.7	35.9	misssing	38.0	42.1	37.5	33.2	25.2	-	
TW68 HH	576051	130602	46.7	/	missing	25.7	27.6	37.2	38.8	42.2	46.9	40.9	42.4	37.4	38.6	29.3	-	
TW69 HH	576062	135116	56.7	51.9	39.9	21.0	29.7	32.0	42.2	46.1	54.9	46.6	54.5	46.2	43.5	33.0	-	
TW70 HH	576040	130734	43.7	30.7	30.2	18.9	30.2	40.1	40.8	45.2	42.6	36.5	40.0	29.3	35.7	27.1	-	
TW71	560838	140389	50.4	39.2	32.4		25.0	30.6	31.1	36.6	40.3	37.7	39.2	/	36.3	27.6	-	
TW72	558140	142080		/	31.7	28.5	31.5	40.2	30.6	49.0	45.7	37.6	53.6	/	38.7	29.4	-	
TW73	558137	142215		15.6	15.7	13.7	17.9	18.7	10.2	19.5	19.6	19.6	27.3	25.6	18.5	14.1	-	
TW74	557354	138128		/	18.8	/	20.1	20.7	17.3	24.1	27.9	24.4	32.2	30.0	23.9	18.2	-	
TW76	559537	138500	/	/	23.9	22.1	22.5	24.6	26.1	/	36.1	/	37.0		27.5	21.0	-	

☒ **All erroneous data has been removed from the NO_2 diffusion tube dataset presented in Table B.1 (confirm by selecting in box).**

☒ **Annualisation has been conducted where data capture is <75% and >33% in line with LAQM.TG16 (confirm by selecting in box).**

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

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

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

☒ **Tunbridge Wells Borough Council confirm that all 2020 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System (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**.

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within Tunbridge Wells Borough 2020

Tunbridge Wells Borough Council has not identified any new sources relating to air quality within the reporting year of 2020.

Additional Air Quality Works Undertaken by Tunbridge Wells Borough Council During 2020

The detailed assessment carried out on Cranbrook Road in Hawkhurst in 2020 was appended to the 2020 ASR. The proposal to declare an AQMA in Hawkhurst was based on this detailed assessment. Air Quality Consultants Ltd, who undertook the DA, were also commissioned to look at the cumulative impacts of developments in Hawkhurst. The report is appended to this document at Appendix G. The report recognises the national trend of improving air quality which is reflected locally, which means that a certain amount of development can occur without a net worsening of air quality. The report also predicts that exceedances of the annual mean objective for NO2 will not persist in Hawkhurst beyond the end of 2024.

Whilst a full AQAP is yet to be developed, as an interim measure, TWBC has developed a planning position statement which describes how air quality considerations will be addressed for planning applications in the vicinity of Hawkhurst. The planning position statement can be found here:-Hawkhurst Planning Position Statement

QA/QC of Diffusion Tube Monitoring

All diffusion tubes deployed in Tunbridge Wells Borough during 2020 were supplied by Socotec (Didcot). Socotec is a UKAS accredited laboratory and participates in the in the new AIR-PT (Proficiency Test) Scheme previously known as the Workplace Analysis Scheme for Proficiency (WASP)) for NO_2 tube analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO_2 concentrations reported are of a high calibre. The lab follows the procedures set out in the Harmonisation Practical Guidance. In the latest available results, Socotec Didcot scored as follows: AIR-PT AR036 (Jan to Feb 2020) 100%, AIR-PT AR037 (April to May 2020) NR, AIR-PT AR039 (July to August 2020) NR and AIR-PT AR040 (September to October 2020) 100%. NR indicates that the round was cancelled because of the pandemic. The percentage score reflects the results deemed to be satisfactory based upon the z-score of < ± 2. Based on 24 studies, 100% of all local Authority co-location studies in 2020, using the 50% TEA in acetone preparation method, were rated as ‘good’ (tubes are considered to have "good" precision where the coefficient of variation of duplicate or triplicate diffusion tubes for eight or more periods during the year is less than 20%). All diffusion tubes were deployed in accordance with the 2020 diffusion tube calendar

Diffusion Tube Annualisation

Data from two diffusion tube sites required annualisation during 2020. The sites were TW56 and TW76. Annualisation was carried out using the Diffusion Tube Data Processing Tool, with hourly data from automatic monitoring stations at Canterbury and Thurrock. The effect of the annualisation was to reduce the level at TW56 from 20.6µgm^{-3} to 19.1µgm^{-3}, and to increase the level at TW76 from 27.5µgm^{-3} to 27.7µgm^{-3}.

3.1.5 Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2021 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG16 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2

continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Tunbridge Wells Borough Council has applied a local bias adjustment factor of 0.76 to the 2020 monitoring data. This was based on a colocation study at our automatic monitoring station at St Johns Road, Southborough, inside the AQMA. A summary of bias adjustment factors used by Tunbridge Wells Borough Council over the past five years is presented in Table C.1.

We would generally prefer to use a local bias correction factor where possible, and would only generally consider using a national bias correction factor when there are significant deficiencies in our local data, such as poor precision, or a large amount of missing data. In 2020 we had a full set of triplicate data for all 12 months, and only one month where there was poor tube precision. Therefore we were happy to use the local factor. We would note, however, that the difference between the available national factor (0.77) and the local factor (0.76) was very small and so the choice of factor made very little difference to the data. The highest reading tube in Tunbridge Wells Borough in 2020 was TW63 in Hawkhurst. This would have recorded 35.8 if corrected with the national factor, or 35.3 if the local factor were used.

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2020	Local	-	0.76
2019	National	04/20	0.75
2018	Local		0.74
2017	Local		0.72
2016	Local		0.77

NO_2 Fall-off with Distance from the Road

Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure should be estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

No diffusion tube NO_2 monitoring locations within Tunbridge Wells Borough required distance correction during 2020.

QA/QC of Automatic Monitoring

Calibration of the A26 Roadside site is undertaken fortnightly by TWBC's Environmental Protection Team. Matts Monitors undertake 6 monthly servicing, and the QA/QC is part of the K&MAQMN which includes daily data checks and annual audits. The K&MAQMN contract is run by Air Quality Data Management and Envitech Europe who ratify the data. Data is available via the KentAir website www.kentair.org.uk although this has recently been through a major upgrade and full functionality is not yet available. All of TWBC's previous ASRs are available via the TWBC website.

QA/QC of Automatic Air Quality Instruments

Air quality measurements from automatic instruments are validated and ratified to the standards described in the Local Air Quality Management – Technical Guidance LAQM (TG16)

https://laqm.defra.gov.uk/technical-guidance

by Air Quality Data Management (AQDM) http://www.aqdm.co.uk

Validation

This process operates on data during the data collection stage. All data are continually screened algorithmically and manually for anomalies. There are several techniques designed to discover spurious and unusual measurements within a very large dataset. These anomalies may be due to equipment failure, human error, power failures, interference or other disturbances. Automatic screening can only safely identify spurious results that need further manual investigation.

Raw data from the gaseous instruments (e.g. NOx) are scaled into concentrations using the latest values derived from the manual and automatic calibrations. These instruments are not absolute and suffer drifts. Both the zero baseline (background) and the sensitivity may change over time. Regular calibrations with certified gas standards are used to measure the zero and sensitivity. However, these are only valid for the moment of the calibration since the instrument will continue to drift. Raw measurements from particulate instruments (e.g. PM_{10} and $PM_{2.5}$) generally do not require scaling into concentrations. The original raw data are always preserved intact while the processed data are dynamically scaled and edited.

Ratification

This is the process that finalises the data to produce the measurements suitable for reporting. All available information is critically assessed so that the best data scaling is applied and all anomalies are appropriately edited. Generally this operates at three, six or twelve month intervals. However, unexpected faults can be identified during the instrument routine services or independent audits which are often at 6-monthly intervals. In practice, therefore, the data can only be fully ratified in 12-month or annual periods. The data processing performed during the three and six monthly cycles helps build a reliable dataset that is finalised at the end of the year.

There is a diverse range of additional information that can be essential to the correct understanding and editing of data anomalies. These may include

- the correct scaling of data
- ignoring calibrations that were poor e.g. a spent zero scrubber
- closely tracking rapid drifts or eliminating the data
- comparing the measurements with other pollutants and nearby sites
- corrections due to span cylinder drift
- corrections due to flow drifts for the particulate instruments
- corrections for ozone instrument sensitivity drifts
- eliminating measurements for NO_2 conversion inefficiencies
- eliminating periods where calibration gas is in the ambient dataset
- identifying periods were instruments are warming-up after a powercut
- identification of anomalies due to mains power spikes
- correcting problems with the date and time stamp
- observations made during the sites visits and services

The identification of data anomalies, the proper understanding of the effects and the application of appropriate corrections requires expertise gained over many years of operational experience. Instruments and infrastructure can fail in numerous ways that significantly and visually affect the quality of the measurements. There are rarely simple faults that can be discovered by computer algorithms or can be understood without previous experience.

The PM_{10} concentrations require scaling into Gravimetric Equivalent concentration units by use of the Volatile Correction Model (VCM) http://www.volatile-correction-model.info or by corrections published by Defra https://uk-air.defra.gov.uk/networks/monitoring-methods?view=mcerts-scheme depending on the measurement technique.

Further information about air quality data management, expert data ratification and examples of bad practices are given on the Air Quality Data Management (AQDM) website http://www.aqdm.co.uk.

QC Audits

The National Physical Laboratory, (NPL) carry out annual audits to rigorously evaluate analysers to obtain an assessment of performance level. This information, in conjunction with the full analyser data set and calibration and service records, help ensure data quality specifications have been met during the preceding period. Additionally, an assessment of the station calibration cylinder concentrations provides an indication that the cylinder concentrations remain stable and therefore suitable for data scaling purposes.

The following describes the audit process:-

1 Oxides of Nitrogen

1.1 Analyser Response Factors

A stable "intercalibration standard", validated against NPL primary standards, is transported to each site and is sampled by the analyser.

The analyser also samples from a cylinder containing certified metrology grade zero air, or catalytic scrubbers of known efficiency.

The analyser factor quoted is the response to the intercalibration standard, expressed in $nmol.mol^{-1}$.logged $unit^{-1}$, with the zero point being the response to zero air.

For oxides of nitrogen analysers, the NO_x and NO channel response factors are derived from an NO in nitrogen cylinder.

1.2 Analyser Linearity

To determine analyser linearity, a series of amount fractions are produced (using dynamic dilution techniques) covering the analyser range. The analyser output is noted for each of these amount fractions. A linear regression is then carried out, relating analyser output to the dilution factor at each point. The linearity error is defined as the maximum residual of the regression slope.

1.3 Analyser noise levels.

This is defined here as the standard error of ten successive spot readings of analyser output when fully stabilised on zero (zero noise) or span (span noise) amount fraction.

1.4 NO_x analyser Converter Efficiency

NO_2 to NO Converter efficiency is determined as follows:

A stable amount fraction of NO is produced, (by two stage dynamic dilution) and the analyser outputs, NO_x and NO, are noted after a suitable stabilisation period.

Ozone is added to the sample, converting some NO to NO_2, note however, the total NO_x in the sample remains constant. Again, following appropriate stabilisation times, the NO_x and NO outputs are noted.

Converter (in)efficiency is defined as the change in scaled NO_x signal as a percentage ratio of the change in the scaled NO signal.

1.5 Estimation of Site Cylinder Amount fractions

The site cylinder amount fractions are evaluated by sampling from the site cylinder and using the analyser response factors, section 1.1, to derive their amount fraction.

2 **Particle Analysers.**

2.1 Analyser Flow Rates

Flow rates are measured by calibrated flow audit measurement systems. A leak check is also carried out.

2.2 Analyser Calibration Constants

TEOM Analyser calibration constants are measured by consideration of the change in frequency induced by placing pre-weighed masses on the analyser sensors.

PM_{10} and $PM_{2.5}$ Monitoring Adjustment

PM_{10} is monitored in Tunbridge Wells using a TEOM, and the data corrected using the Volatile Correction Model to give an indicative gravimetric equivalent.

Automatic Monitoring Annualisation

All automatic monitoring locations within Tunbridge Wells Borough recorded data capture of greater than 75% therefore it was not necessary to annualise any monitoring data. In addition, any sites with a data capture below 33% do not require annualisation.

NO_2 Fall-off with Distance from the Road

Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure should be estimated using the NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

No automatic NO_2 monitoring locations within Tunbridge Wells Borough required distance correction during 2020

Table C.2 – Annualisation Summary (concentrations presented in µg/m^3)

Site ID	Annualisation Factor Site 1 Name	Annualisation Factor Site 2 Name	Annualisation Factor Site 3 Name	Annualisation Factor Site 4 Name	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
TW56	0.9059	0.9500			0.9280	20.6	19.1	
TW76	0.9616	1.0528			1.0072	27.5	27.7	

Table C.3 – Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4	Local Bias Adjustment Input 5
Periods used to calculate bias	11				
Bias Factor A	0.76 (0.65 - 0.93)				
Bias Factor B	31% (8% - 54%)				
Diffusion Tube Mean (µg/m^3)	41.2				
Mean CV (Precision)	6.5%				
Automatic Mean (µg/m^3)	31.5				
Data Capture	98%				
Adjusted Tube Mean (µg/m^3)	31 (27 – 38)				

Notes:

A single local bias adjustment factor has been used to bias adjust the 2020 diffusion tube results.

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

Figure D.1 – Map of Non-Automatic Monitoring Sites in relation to the Tunbridge Wells AQMA

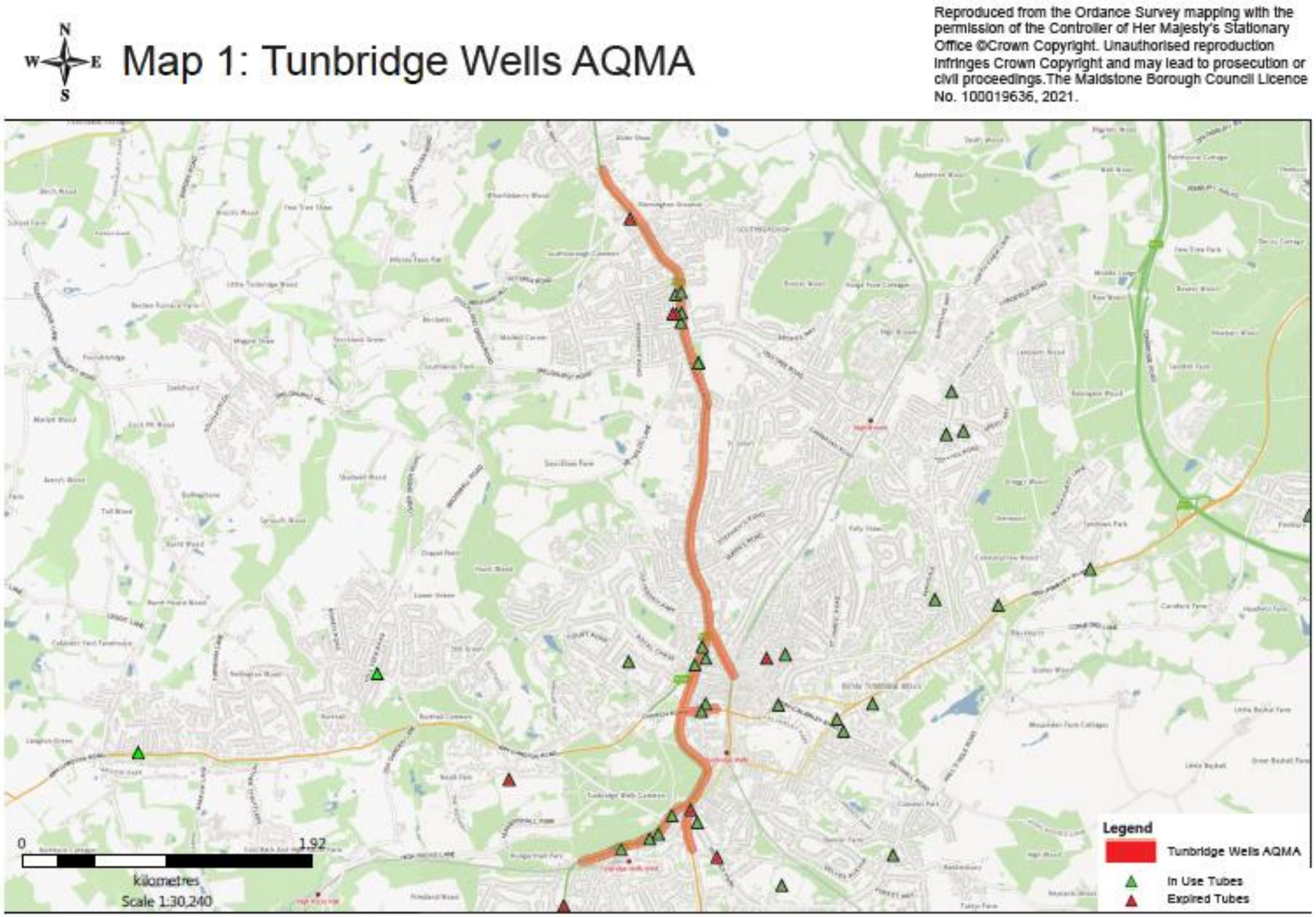


Figure D.2 – Map of Non-Automatic Monitoring Sites

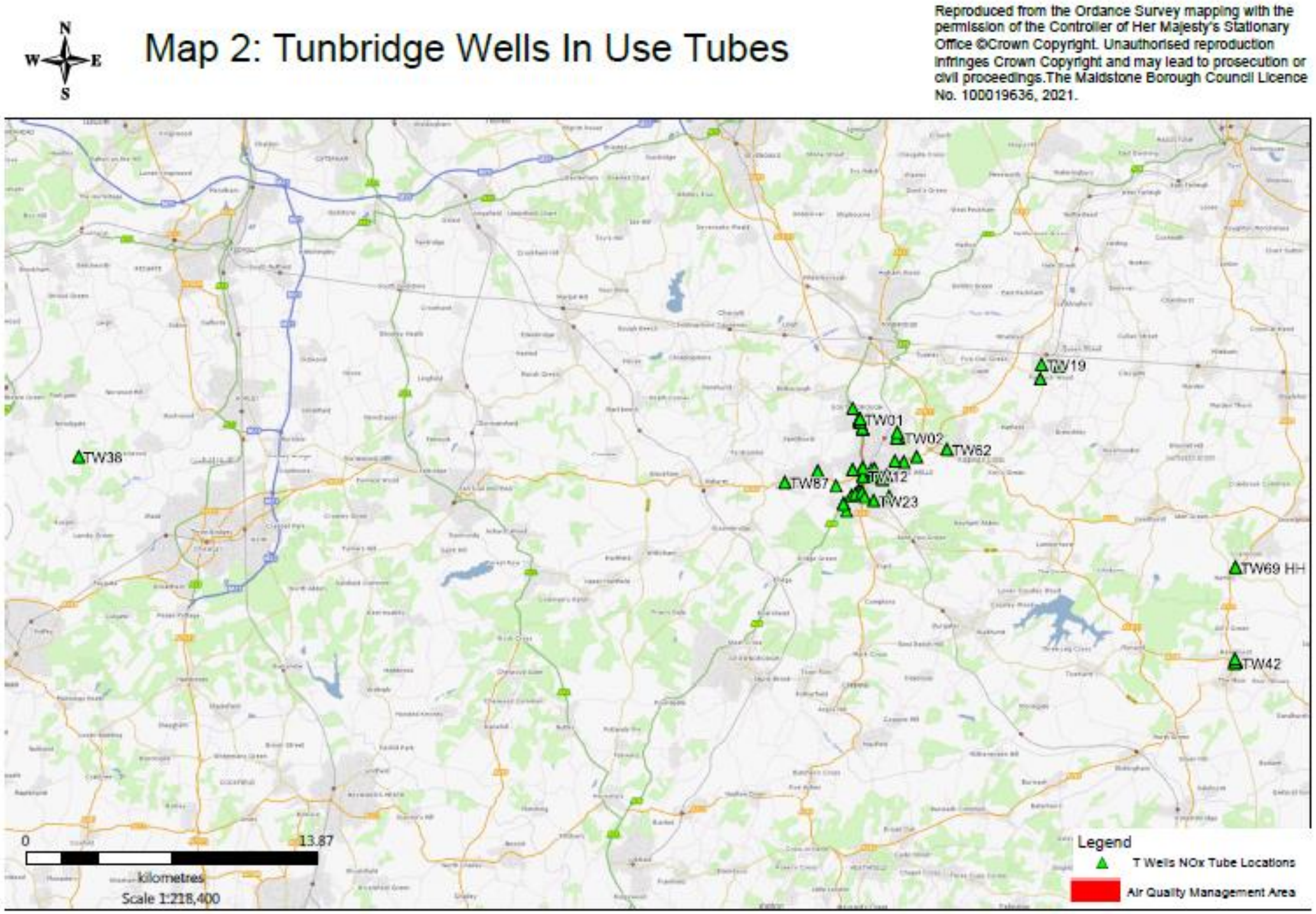


Figure D.3 – Map of Non-Automatic Monitoring Sites TW38 and TW71

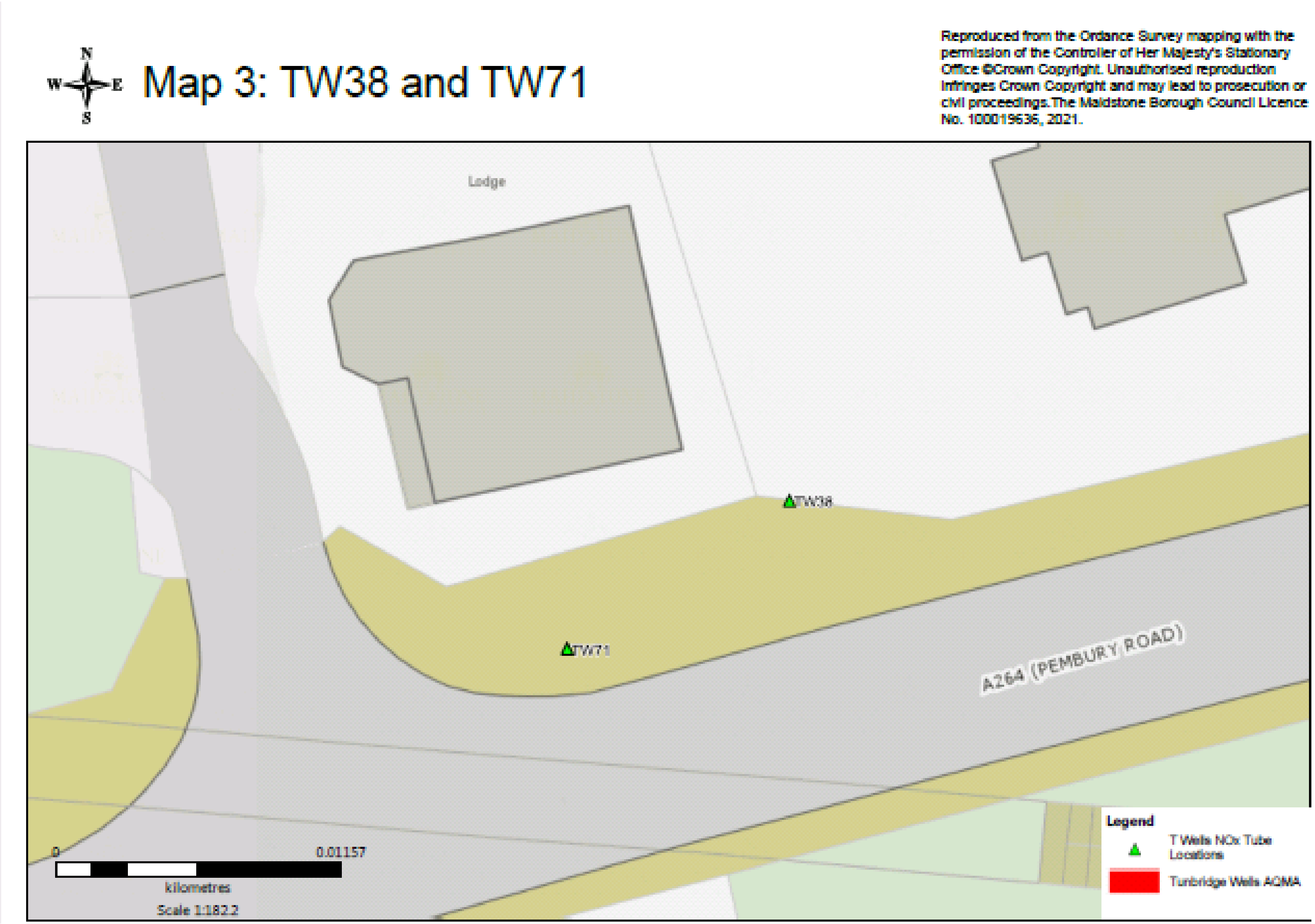


Figure D.4 – Map of Non-Automatic Monitoring Sites in Hawkhurst

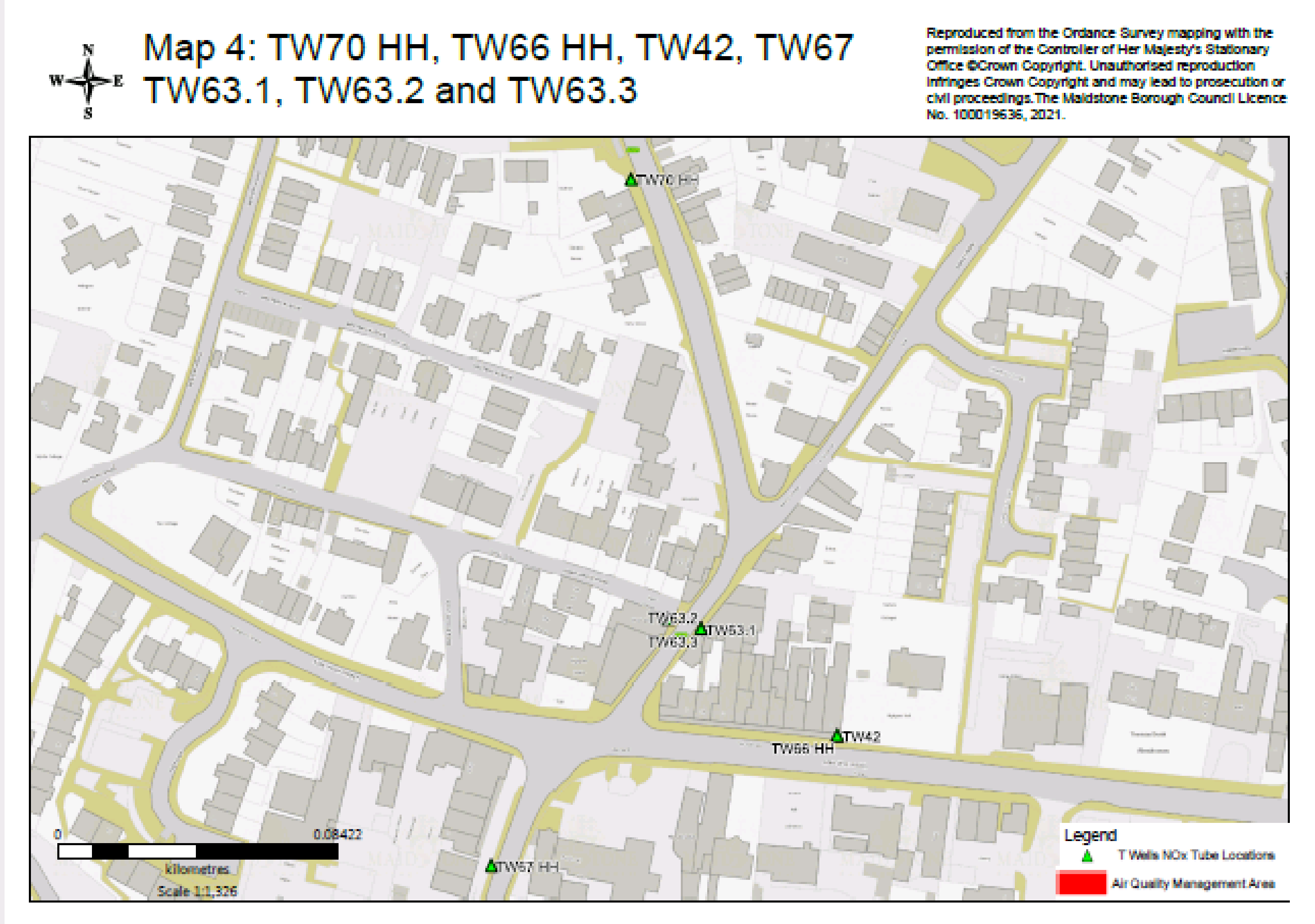


Figure D.5 – Map of Non-Automatic Monitoring Site TW69 in Hawkhurst

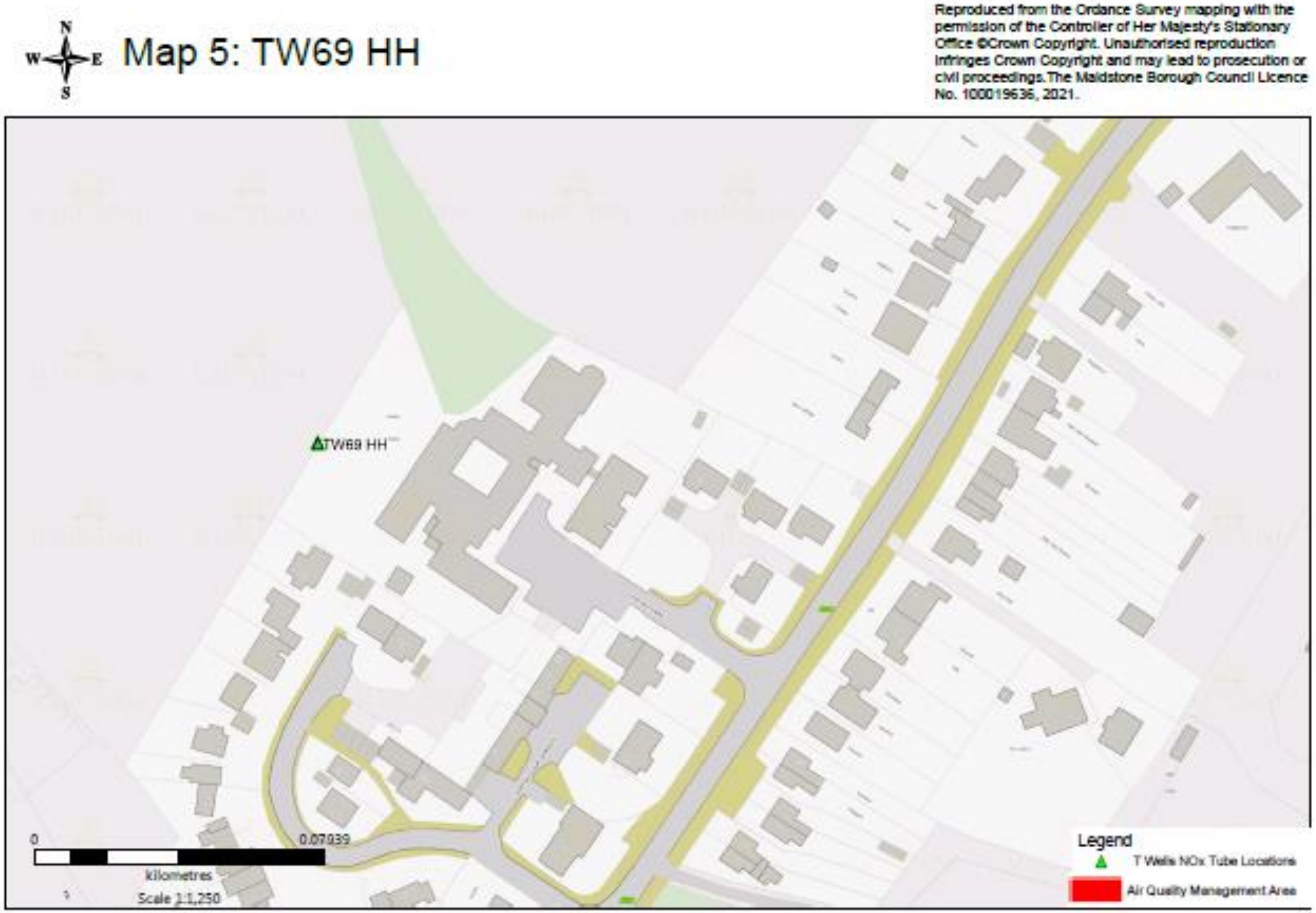


Figure D.6 – Map of Non-Automatic Monitoring Sites TW19, TW53 and TW55

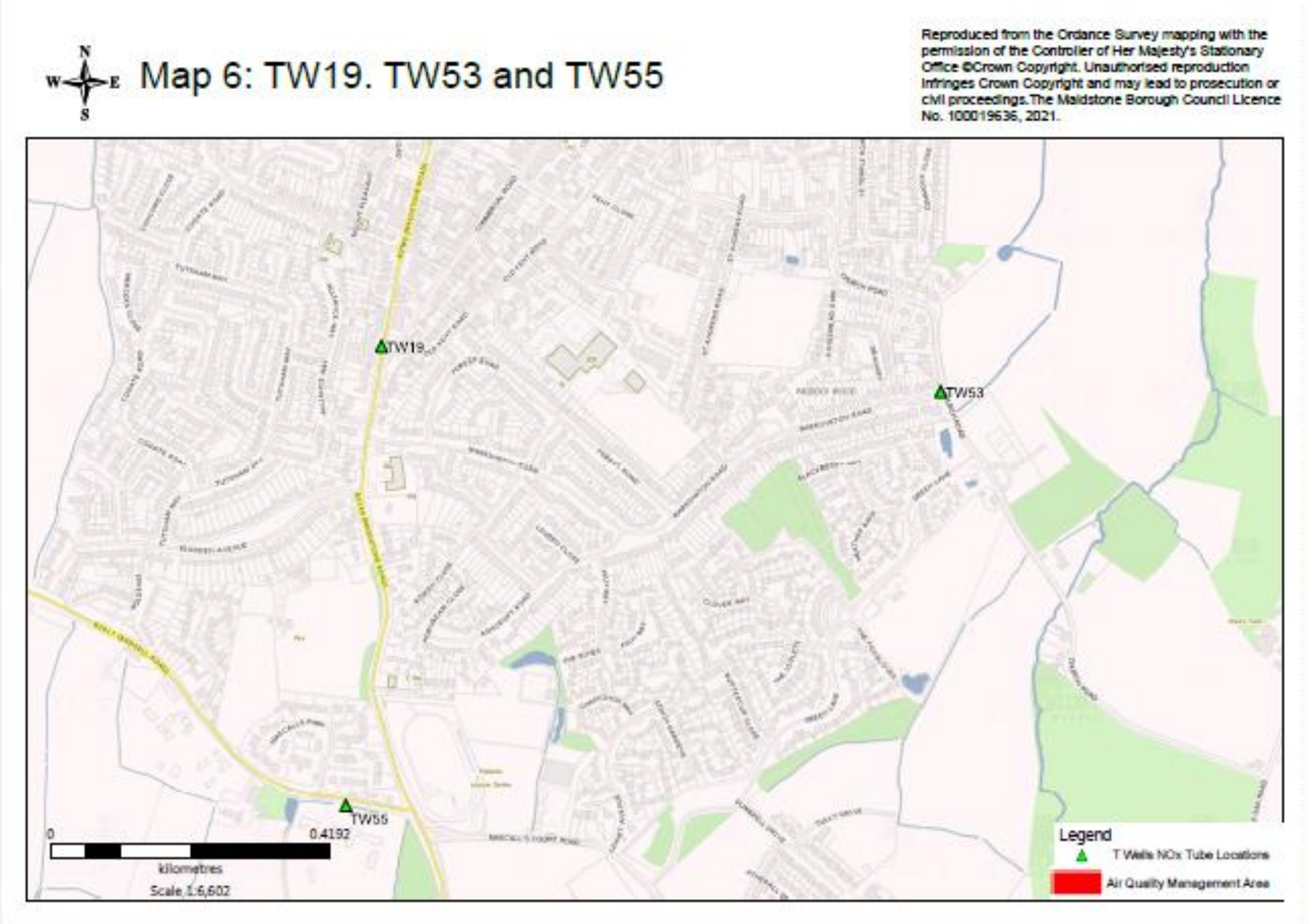


Figure D.7 – Map of Non-Automatic Monitoring Sites TW73, TW01, TW72, TW25, and TW34

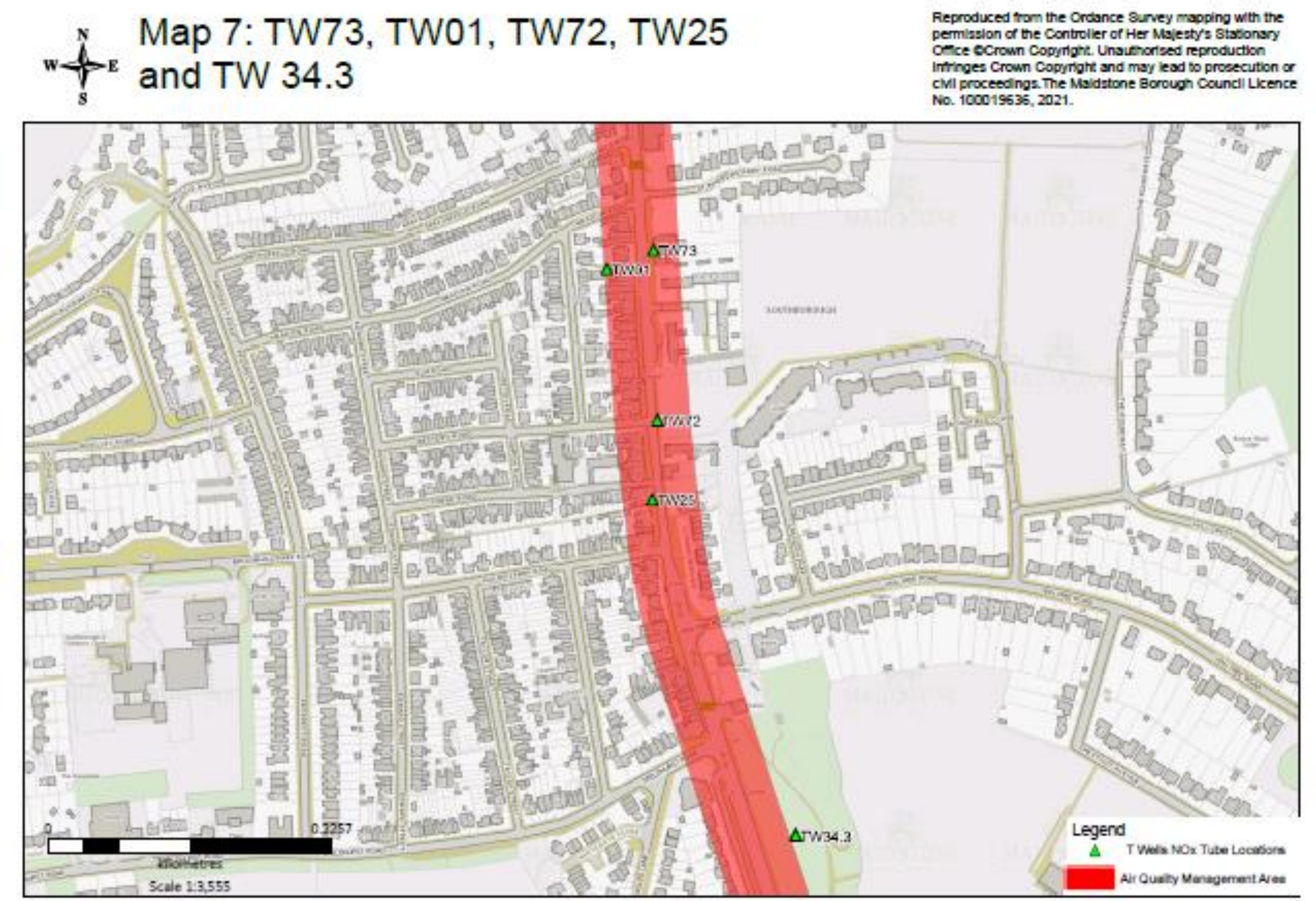


Figure D.8 – Map of Non-Automatic Monitoring Sites TW41, TW54, TW58, TW46, TW61, TW74, TW23, TW76, TW75, and TW82

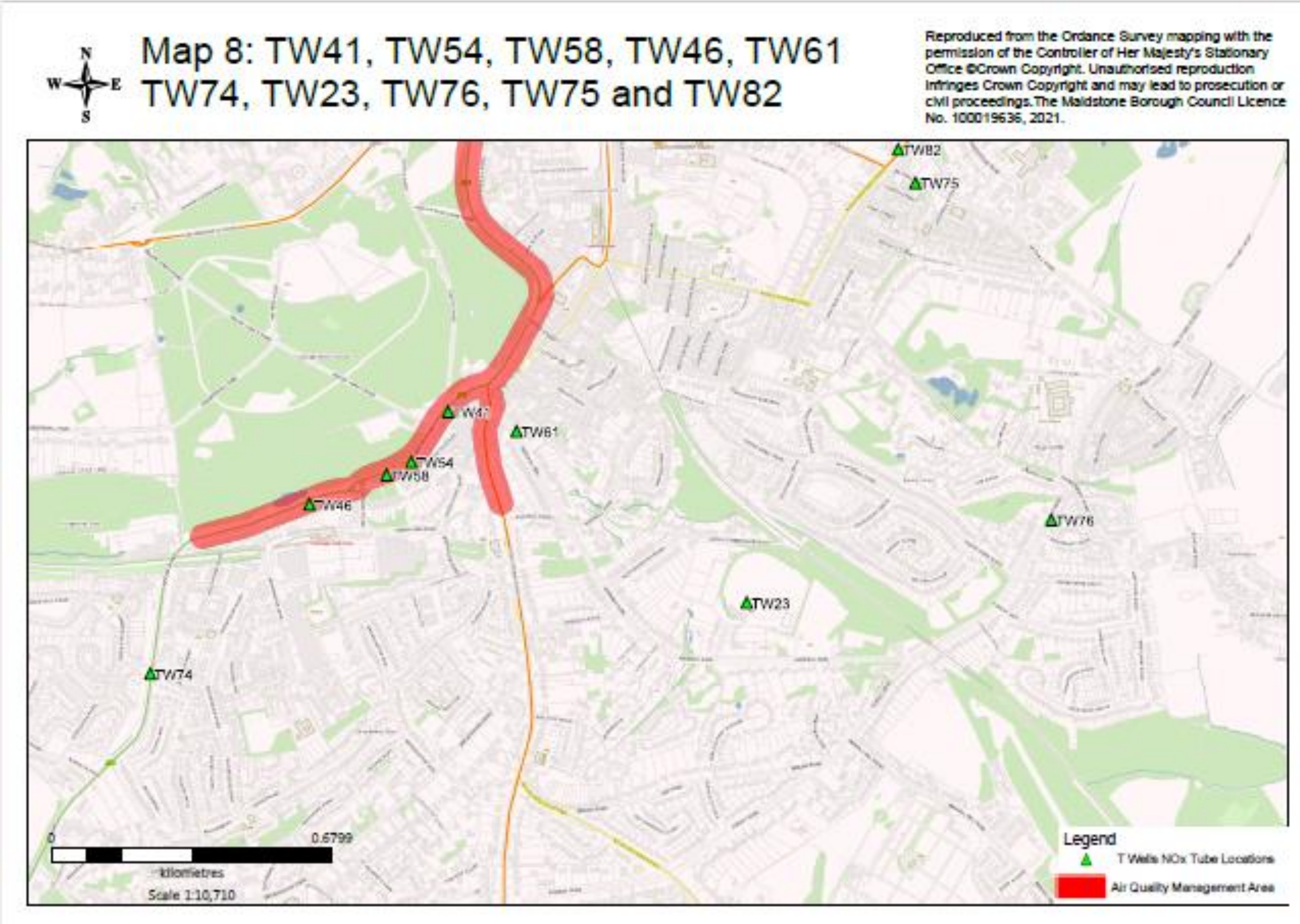


Figure D.9 – Map of Non-Automatic Monitoring Sites TW77, TW84, TW86, TW20, TW31, TW12, TW42, TW83, TW82, TW22, and TW75

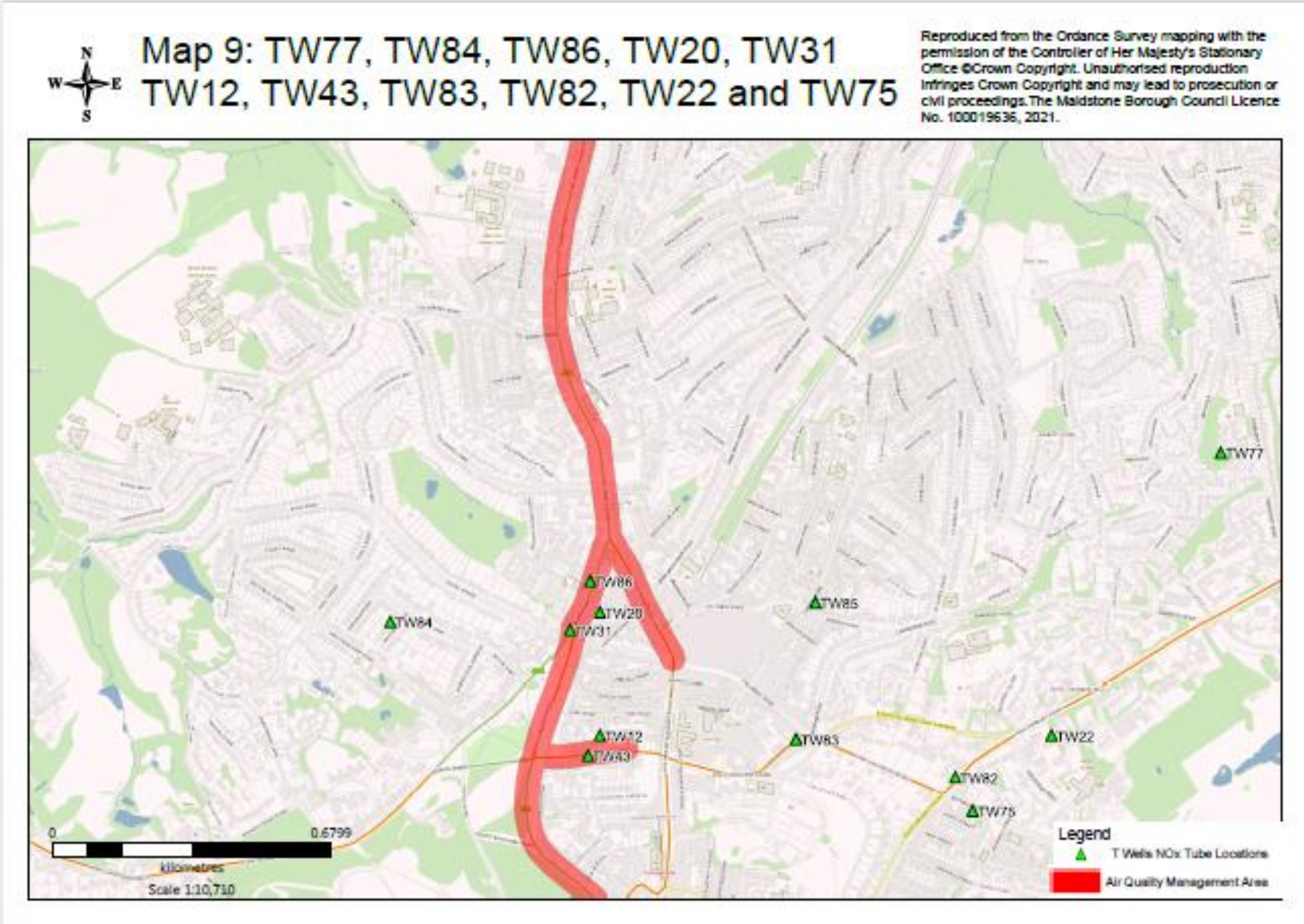


Figure D.10 – Map of Non-Automatic Monitoring Sites TW73, TW01, TW72, TW25, TW34, TW57, TW56 and TW02

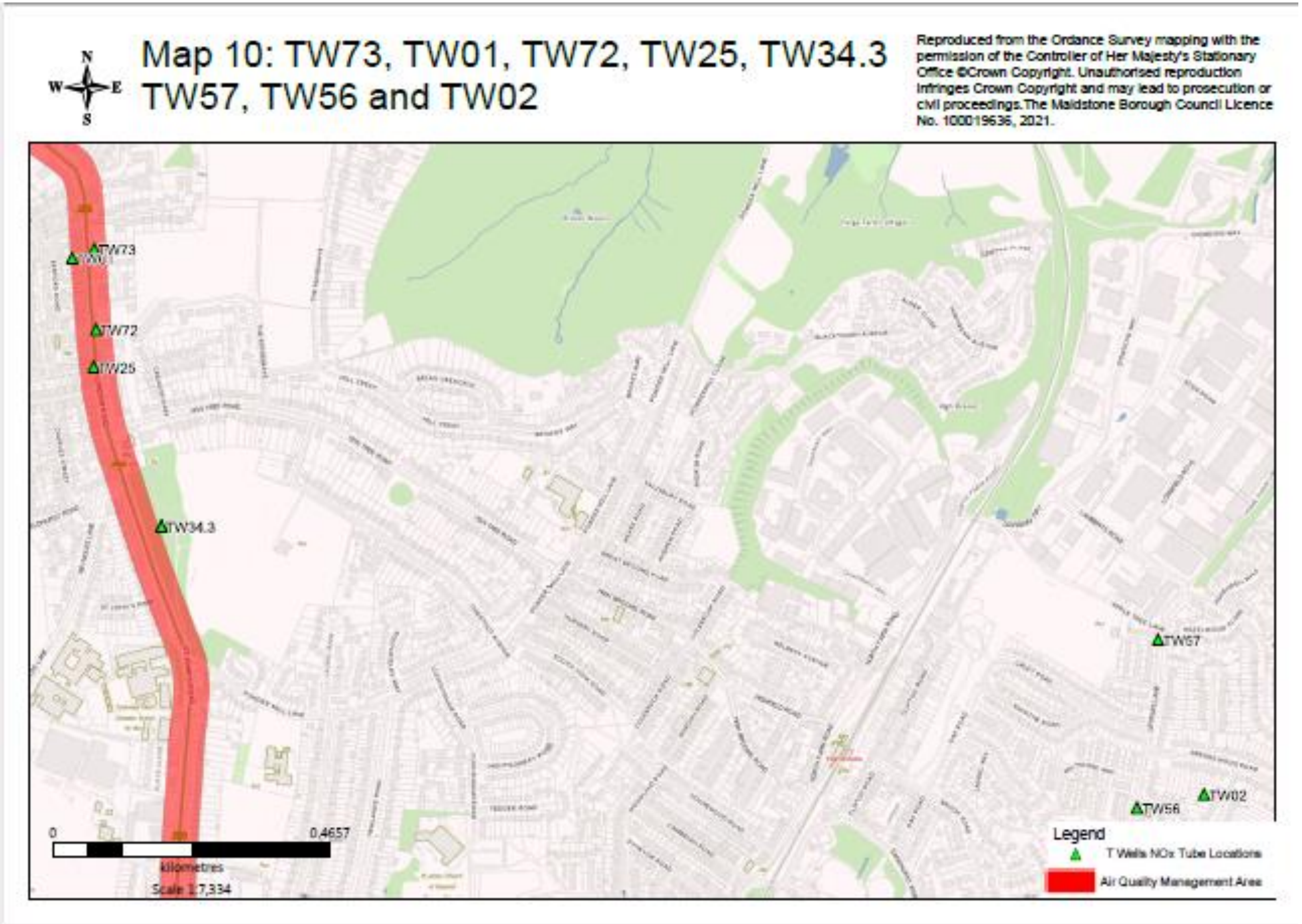


Figure D.21 – Map of Non-Automatic Monitoring Sites TW86, TW20, TW31, TW84, TW12, TW43, TW41, TW61, TW54, TW58, TW46, TW87 and TW88

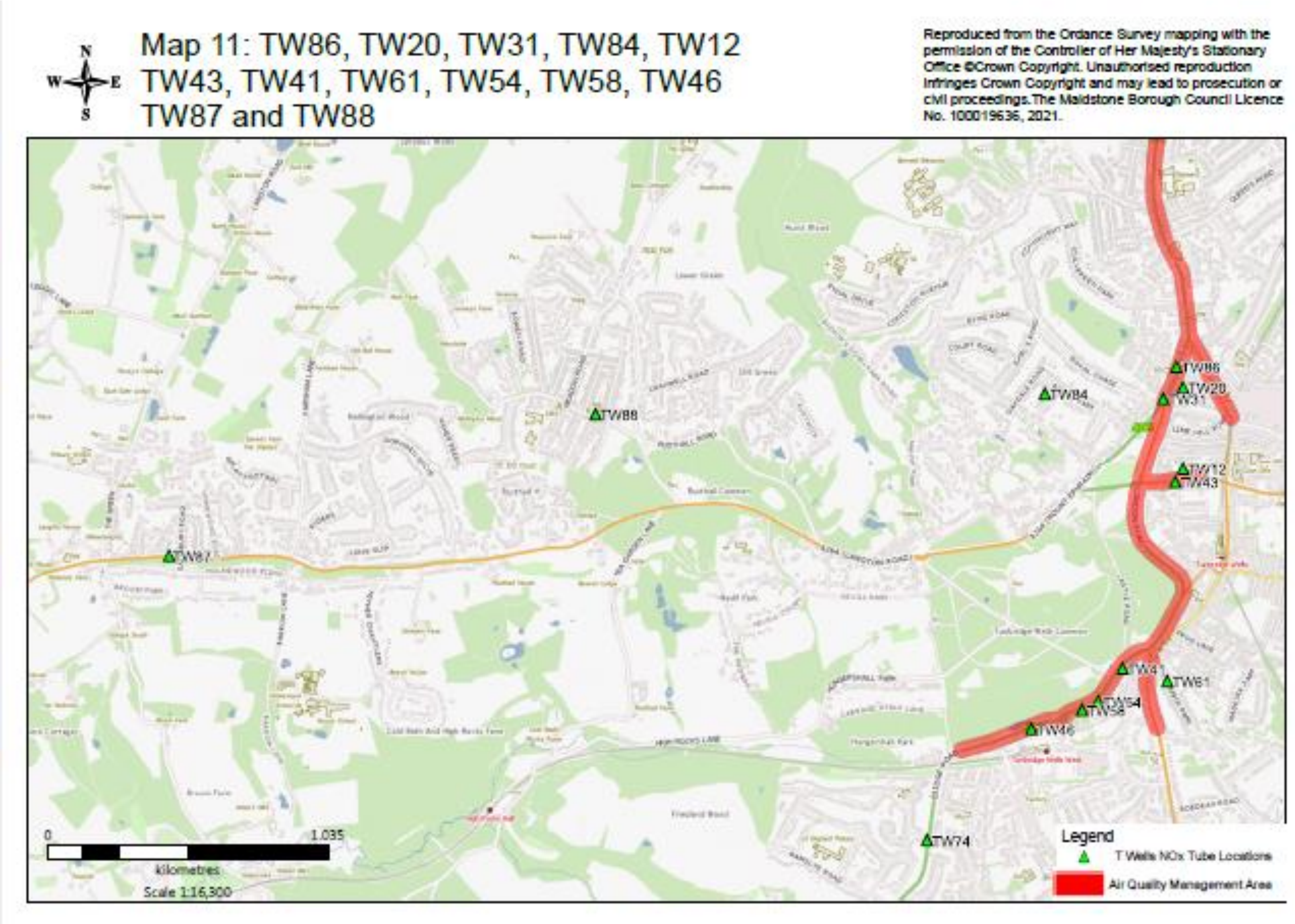


Figure D.32 – Map of Non-Automatic Monitoring Sites TW57, TW02, TW56, TW71, TW62, TW60, TW77, TW85, TW83, TW82, TW22, and TW74

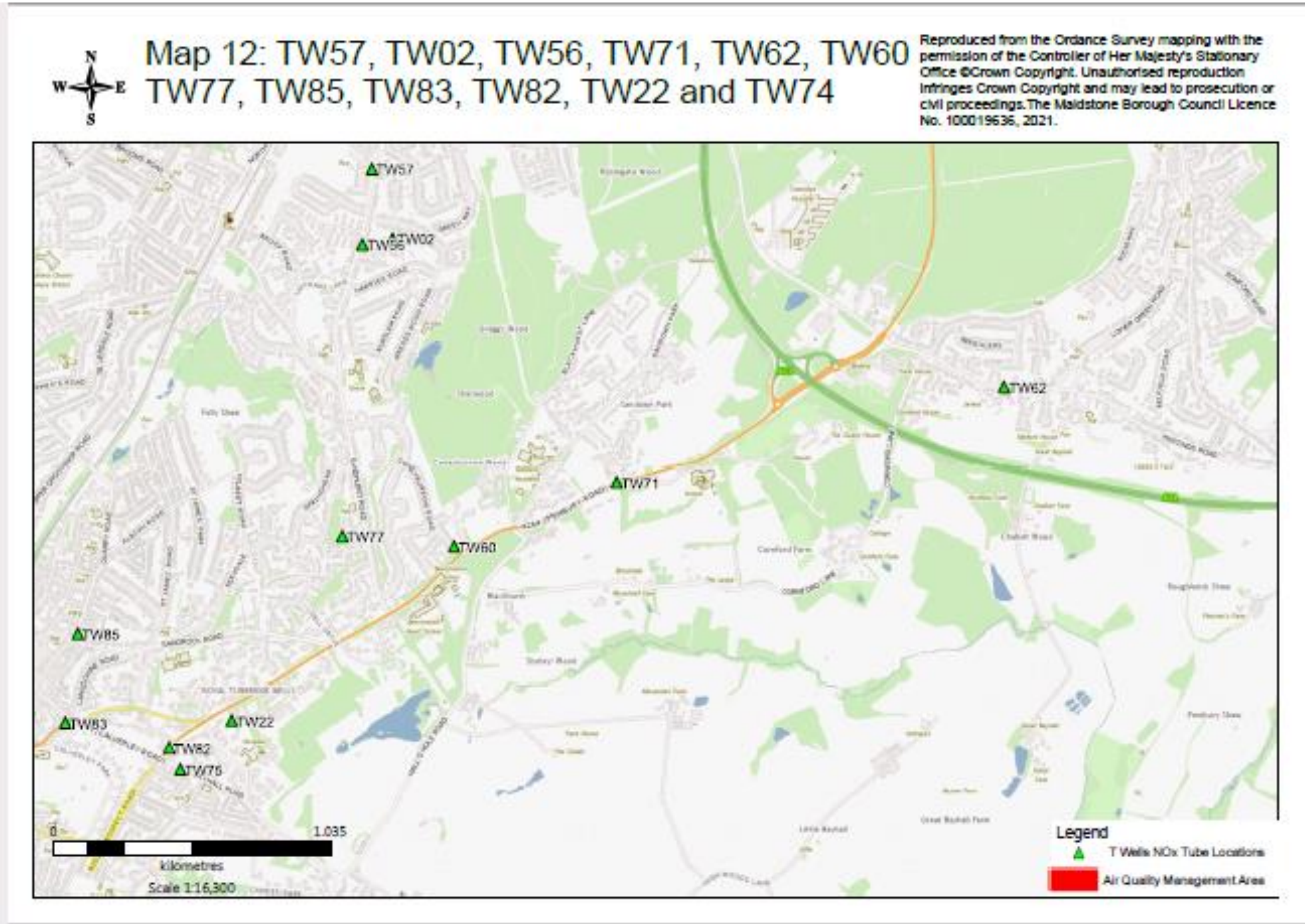
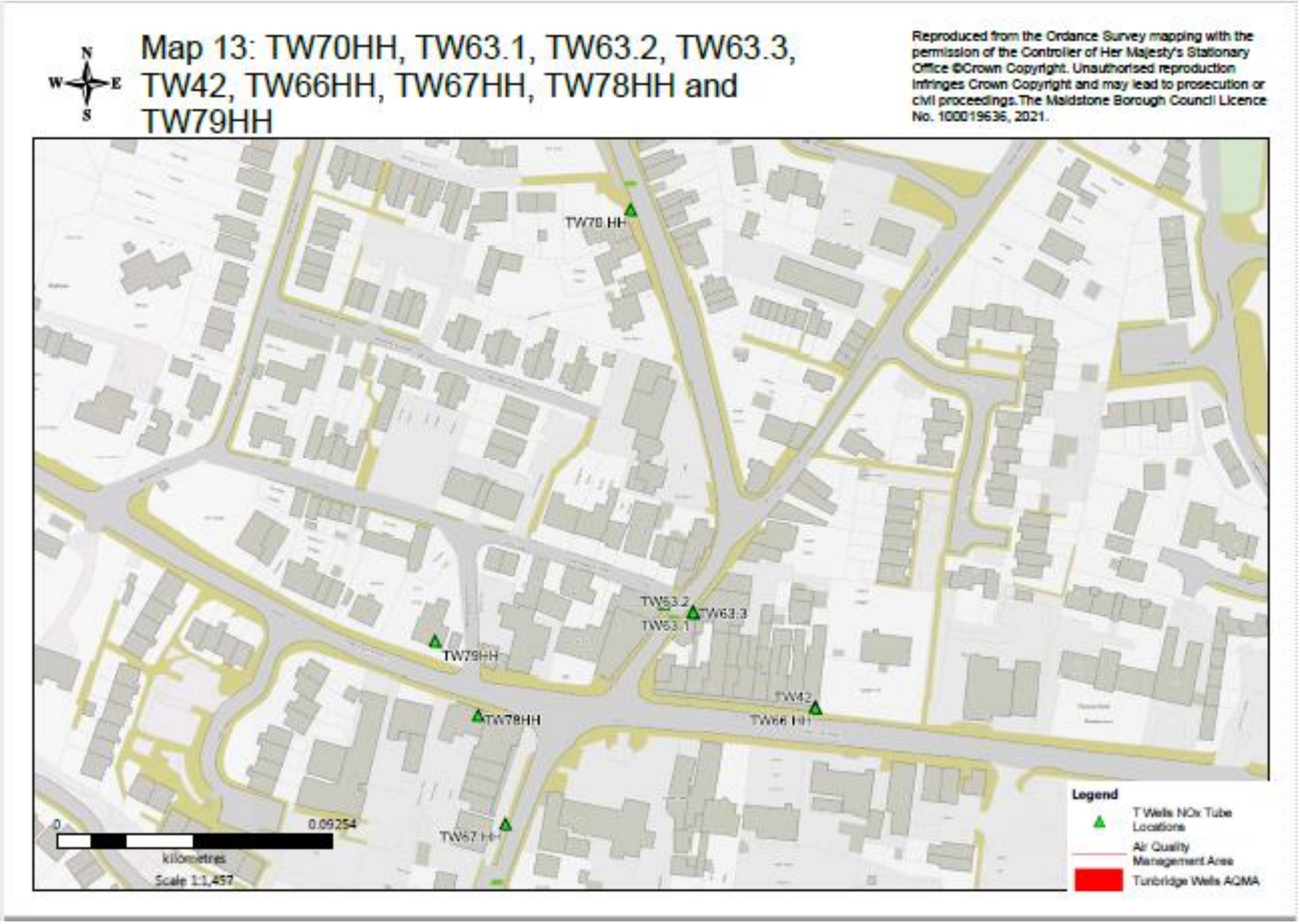


Figure D.43 – Map of Non-Automatic Monitoring Sites in Hawkhurst



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[8]

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

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

Appendix F: Impact of COVID-19 upon LAQM

COVID-19 has had a significant impact on society. Inevitably, COVID-19 has also had an impact on the environment, with implications to air quality at local, regional and national scales.

COVID-19 has presented various challenges for Local Authorities with respect to undertaking their statutory LAQM duties in the 2021 reporting year. Recognising this, Defra provided various advice updates throughout 2020 to English authorities, particularly concerning the potential disruption to air quality monitoring programmes, implementation of Air Quality Action Plans (AQAPs) and LAQM statutory reporting requirements. Defra has also issued supplementary guidance for LAQM reporting in 2021 to assist local authorities in preparing their 2021 ASR. Where applicable, this advice has been followed.

Despite the challenges that the pandemic has given rise to, the events of 2020 have also provided Local Authorities with an opportunity to quantify the air quality impacts associated with wide-scale and extreme intervention, most notably in relation to emissions of air pollutants arising from road traffic. The vast majority (>95%) of AQMAs declared within the UK are related to road traffic emissions, where attainment of the annual mean objective for nitrogen dioxide (NO_2) is considered unlikely. On 23rd March 2020, the UK Government released official guidance advising all members of public to stay at home, with work-related travel only permitted when absolutely necessary. During this initial national lockdown (and to a lesser extent other national and regional lockdowns that followed), marked reductions in vehicle traffic were observed; Department for Transport (DfT) data[9] suggests reductions in vehicle traffic of up to 70% were experienced across the UK by mid-April, relative to pre COVID-19 levels.

This reduction in travel in turn gave rise to a change of air pollutant emissions associated with road traffic, i.e. nitrous oxides (NO_x), and exhaust and non-exhaust particulates (PM). The Air Quality Expert Group (AQEG)[10] has estimated that during the initial lockdown period in 2020, within urbanised areas of the UK reductions in NO_2 annual mean

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[9] Prime Minister's Office, COVID-19 briefing on the 31st of May 2020

[10] Air Quality Expert Group, Estimation of changes in air pollution emissions, concentrations and exposure during the COVID-19 outbreak in the UK, June 2020

concentrations were between 20 and 30% relative to pre-pandemic levels, which represents an absolute reduction of between 10 to 20µg/m^3 if expressed relative to annual mean averages. During this period, changes in $PM_{2.5}$ concentrations were less marked than those of NO_2. $PM_{2.5}$ concentrations are affected by both local sources and the transport of pollution from wider regions, often from well beyond the UK. Through analysis of AURN monitoring data for 2018-2020, AQEG have detailed that $PM_{2.5}$ concentrations during the initial lockdown period are of the order 2 to 5µg/m^3 lower relative to those that would be expected under business-as-usual conditions.

As restrictions are gradually lifted, the challenge is to understand how these air quality improvements can benefit the long-term health of the population.

Impacts of COVID-19 on Air Quality within Tunbridge Wells Borough Council

The monitoring which Tunbridge Wells Borough Council undertook in 2020 indicated that there were no exceedances of any air quality objective anywhere in the Borough, including in the A26 AQMA and the proposed new AQMA in Hawkhurst. At present we don't have any traffic data showing the impact of the pandemic. Clearly levels of pollution will have been reduced as a result of COVID, however, it is likely that even without the pandemic, we would have seen a continuation of the downward trend in pollution which has been evident for the last few years, and that there would have been no exceedances at relevant receptors in the main AQMA.

The situation at Hawkhurst is somewhat less clear. Outside of Hawkhurst, diffusion tube readings across the Borough decreased on average by 21% between 2019 and 2020. In Hawkhurst, the average decrease was 29%. This tends to reinforce our view that there may have been a problem with some of the 2019 data from Hawkhurst, which may have resulted in something of an upward bias.

Opportunities Presented by COVID-19 upon LAQM within Tunbridge Wells Borough Council

Beyond the obvious short term improvements in air quality, we have not as yet identified any opportunities specifically related to COVID within Tunbridge Wells Borough. It is hoped that COVID may lead to a long term or even a permanent change in working patterns which will lead to a net improvement in pollution levels.

Challenges and Constraints Imposed by COVID-19 upon LAQM within Tunbridge Wells Borough Council

As a result of the COVID pandemic, Environmental Health Officers were exceptionally busy in 2020. A number of front line officers were out and about checking that businesses were complying with COVID restrictions, and following the relevant advice with respect to displaying signage, enforcing social distance measures, mask wearing, etc.

Some of the more routine work of these officers, for example, planning consultations, of which there were a very high number, was then taken up by other officers. Thus effort into air quality management was restricted to little more than routine monitoring, deployment of diffusion tubes and LSO duties etc. Data capture, both for diffusion tubes and the automatic monitoring station, was high. Low data capture for diffusion tubes is almost always as a result of tubes going missing during the exposure period, and some sites are more prone to this than others Thus, in terms of the acquisition of air quality data, COVID had **no impact**. However, in terms of the declaration of the AQMA in Hawkhurst, this has been delayed, although there has been a consultation with the Parish Council, with DEFRA and with local residents. It is expected that the declaration will occur in the autumn of 2021, so there has been a **medium impact**.

In general, officers have not had time to drive actions in the AQAP in the way that they might otherwise have done, so COVID has had a **small impact** there.

Although there are no exceedances of any air quality objective, one other challenge experienced as a result of the pandemic is that it may well delay the revocation of our AQMA along the A26, as we don’t know what the results in the absence of the pandemic would have been. It may now be 2022 before the AQMA is revoked. **Medium impact.**

Table F 1 – Impact Matrix

Category	Impact Rating: None	Impact Rating: Small	Impact Rating: Medium	Impact Rating: Large
Automatic Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Automatic Monitoring – QA/QC Regime	Adherence to requirements as defined in LAQM.TG16	Routine calibrations taken place frequently but not to normal regime. Audits undertaken alongside service and maintenance programmes	Routine calibrations taken place infrequently and service and maintenance regimes adhered to. No audit achieved	Routine calibrations not undertaken within extended period (e.g. 3 to 4 months). Interruption to service and maintenance regime and no audit achieved
Passive Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Passive Monitoring – Bias Adjustment Factor	Bias adjustment undertaken as normal	<25% impact on normal number of available bias adjustment colocation studies (2020 vs 2019)	25-50% impact on normal number of available bias adjustment studies (2020 vs 2019)	>50% impact on normal number of available bias adjustment studies (2020 vs 2019) and/or applied bias adjustment factor studies not considered representative of local regime
Passive Monitoring – Adherence to Changeover Dates	Defra diffusion tube exposure calendar adhered to	Tubes left out for two exposure periods	Tubes left out for three exposure periods	Tubes left out for more than three exposure periods
Passive Monitoring – Storage of Tubes	Tubes stored in accordance with laboratory guidance and analysed promptly.	Tubes stored for longer than normal but adhering to laboratory guidance	Tubes unable to be stored according to be laboratory guidance but analysed prior to expiry date	Tubes stored for so long that they were unable to be analysed prior to expiry date. Data unable to be used
AQAP – Measure Implementation	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP
AQAP – New AQAP Development	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP

Appendix G: Modelling of Future Air Quality in Hawkhurst

This section provides a copy of a report produced for Tunbridge Wells Borough Council by Air Quality Consultants (AQC) Ltd. This report follows on from the detailed assessment undertaken by AQC Ltd in 2020. The conclusion of the DA was that a small AQMA should be declared in Hawkhurst. TWBC has agreed to declare an AQMA, however, this has been delayed due to extraordinary demands on officers' time as a result of the COVID pandemic. Officers do have strong reservations about the quality of the data used for the modelling, but it was the only data available at the time, and it was recognised that data in 2020 would be affected by COVID. On balance it was felt better to undertake modelling on potentially unreliable data than to wait for more reliable data, unaffected by COVID, which was unlikely to be available before the end of 2022.

The report below was commissioned because of a significant number of planning applications potentially coming forward in the Hawkhurst area. It considers the long term downward trend in pollution levels which is occurring both locally and nationally. As a result of this reduction in pollution levels, it is recognised that a certain amount of development can go ahead with no net worsening of air quality. The report attempts to quantify this amount, based on when in it scheduled, taking account of this ongoing trend in future years.

Air Quality Consultants

Air Quality Modelling:

Experts in air quality management & assessment

Document Control

Client	Tunbridge Wells Borough Council	Principal Contact	Dr Stuart Maxwell

Job Number	J4114

Report Prepared By:	Paul BENTLEY

Document Status and Review Schedule

Report No.	Date	Status	Reviewed by
J4114B/1/F1	[Publish Date]	Final	Dr Clare Beattie (Associate Director)

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Executive Summary

The air quality impacts associated with potential additional traffic on Cranbrook Road in Hawkhurst as a result of developments in the local area over the course of the years 2020 to 2027 have been assessed. The assessment has been produced to assist Tunbridge Wells Borough Council's planning department in determining the likely impacts of developments on air quality within Hawkhurst, so that they can determine what level of development is sustainable without significant air quality impacts.

It is understood that most of the developments proposed in the area are residential, thus the assessment has focussed on the impacts of car trips, rather than heavier vehicles, which will have a larger impact on air quality; its results and recommendations should not be used to consider the impacts of schemes that will generate potentially significant heavy vehicle traffic. The assessment shows predictions of when the objective will be complied with at all properties within the village, and the impacts of additional traffic from individual, or multiple, developments on existing properties.

In order to inform determination of either individual or multiple planning applications, the results of these sets of results have been combined to derive the number of car trips on Cranbrook Road below which impacts would be limited to a specific descriptor level, and at a limited number of properties. These thresholds are presented in the table below.

Year	All Negligible	Three Slight Adverse	Three Moderate Adverse
2020	93	N/A	114
2021	97	N/A	292
2022	102	N/A	306
2023	107	N/A	322
2024	114	182 [a]	433 [b]
2025	122	367 [c]	1,277 [b]
2026	396	1,319	1,851
2027	428	1,570	2,000

1 [a] The impacts predicted from these additional cars would cause two slight adverse impacts only.

2 [b] The impacts predicted from these additional cars would cause two moderate adverse impacts and one slight adverse impact.

3 [c] The impacts predicted from these additional cars would cause one slight adverse impact only.

There are three properties located on Cranbrook Road close to the junction with the A268 which all have similar and high baseline concentrations, and as such impacts have been determined based on these properties. Applying professional judgement, and considering the EPUK/IAQM guidance, it would seem unlikely that slight or moderate adverse impacts at three properties for a limited number of years would lead to significant health effects. As such the assessment presents the number of vehicles to cause a maximum impact of slight adverse or moderate adverse at a maximum of three properties.

There are inherent uncertainties within the modelling, and as such the suggested screening thresholds should not be considered exact, but represent the best possible estimates, using the best available data available at the time this report was undertaken.

It is recommended that the values for the moderate adverse impacts are used to screen the trip generation of future developments on Cranbrook Road to determine whether they risk having a significant overall air quality effect. The values can be used for individual or multiple schemes, where traffic data are available for multiple schemes. Where trip generation on Cranbrook Road is below the thresholds it can be assumed there will not be a significant overall effect on air quality. Using the values for the assessment of multiple schemes would represent a conservative approach, due to the inclusion of cumulative traffic within the baseline data for each year, which will effectively have already allowed for some cumulative development.

Contents

Tables

Figures

Introduction

3.1 Diffusion tube monitoring undertaken by Tunbridge Wells Borough Council (TWBC) at new sites in Hawkhurst in 2019 highlighted potential exceedances of the annual mean nitrogen dioxide objective in the village. A detailed dispersion modelling assessment was carried out by Air Quality Consultants Ltd (AQC) (AQC Report No. J4114A/1/F1), hereafter referred to as the “Previous Assessment” to identify where the objective was exceeded at locations of relevant exposure, and thus provide recommendations for the extents of the new Air Quality Management Area (AQMA) required.

3.2 This report presents further analysis utilising dispersion modelling of future traffic emissions in the village. It identifies when the annual mean nitrogen dioxide objective can be expected to be achieved in Hawkhurst, and goes on to determine the impacts that additional traffic from developments in the local area might have on air quality in Hawkhurst in the years 2020 to 2027.

3.3 It is understood that a relatively high level of development is anticipated in the local area in the coming years, and this report seeks to provide information to assist TWBC’s planning department in determining the likely impacts of developments on air quality within Hawkhurst, so that judgements can be made without the need for a detailed air quality assessment to accompany every application. The outcomes could also be used to provide an indication of the impacts of multiple developments in future years, assuming that traffic data are available for each of the developments.

Background

Air Quality Strategy

3.4 The Air Quality Strategy (Defra, 2007) published by the Department for Environment, Food, and Rural Affairs (Defra) and Devolved Administrations, provides the policy framework for air quality management and assessment in the UK. It provides air quality standards and objectives for key air pollutants, which are designed to protect human health and the environment. It also sets out how the different sectors: industry, transport and local government, can contribute to achieving the air quality objectives. Local authorities are seen to play a particularly important role. The strategy describes the Local Air Quality Management (LAQM) regime that has been established, whereby every authority has to carry out regular reviews and assessments of air quality in its area to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If this is not the case, the authority must declare an Air Quality Management Area (AQMA), and prepare an action plan which identifies appropriate measures that will be introduced in pursuit of the objectives.

Clean Air Strategy 2019

3.5 The Clean Air Strategy (Defra, 2019) sets out a wide range of actions by which the UK Government will seek to reduce pollutant emissions and improve air quality. Actions are targeted at four main sources of emissions: Transport, Domestic, Farming and Industry. At this stage, there is no straightforward way to take account of the expected future benefits to air quality within this assessment.

The Air Pollutant of Concern

3.6 Nitrogen dioxide is associated with adverse effects on human health. Increases in daily mortality and hospital admissions for cardiovascular diseases and hospital admissions due to asthma have been associated with short-term exposure to nitrogen dioxide. Associations have been found between long-term exposure to nitrogen dioxide and all-cause, cardiovascular, respiratory mortality, lung cancer and pneumonia. However, some debate remains as to the strength of the causal associations (COMEAP, 2018). Decrease in lung function in both children and adults and respiratory infections in early childhood due to long-term exposure to nitrogen dioxide have also been reported.

The Air Quality Objectives

3.7 The Government's Air Quality Strategy (Defra, 2007) provides air quality standards and objectives for key air pollutants, which are designed to protect to protect human health and the environment. The 'standards' are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The 'objectives' set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. It also sets out how the different sectors: industry, transport and local government, can contribute to achieving the air quality objectives. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations, 2000, Statutory Instrument 928 (2000) and the Air Quality (England) (Amendment) Regulations 2002, Statutory Instrument 3043 (2002).

Table 3: Air Quality Criteria for Nitrogen Dioxide

Pollutant	Time Period	Objective
Nitrogen Dioxide	Annual Mean	40 $\mu g/m^3$

3.8 The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Defra explains where these objectives apply in its Local Air Quality Management Technical Guidance (Defra, 2018). The annual mean objectives for nitrogen dioxide are considered to apply at the façades of residential properties, schools, hospitals etc.; they do not apply at hotels.

Impact Descriptors and Assessment of Significance

3.9 There is no official guidance in the UK in relation to development control on how to describe the nature of air quality impacts, nor how to assess their significance. Most air quality practitioners follow the approach recommended within guidance published by Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) (Moorcroft and Barrowcliffe et al, 2017). This approach involves a two-stage process:

4. a qualitative or quantitative description of the impacts on local air quality arising from the development; and
5. a judgement on the overall significance of the effects of any impacts.

Impact Descriptors

3.10 Impact description involves expressing the magnitude of incremental change as a proportion of a relevant assessment level and then examining this change in the context of the new total concentration and its relationship with the assessment criterion. **Table 4** sets out the method for determining the impact descriptor for annual mean concentrations at individual receptors, having been adapted from the table presented in the guidance document. The assessment criterion adopted will be the air quality objective value, which in this case will be the annual mean nitrogen dioxide objective (40 µg/m³). Note that impacts may be adverse or beneficial, depending on whether the change in concentration is positive or negative.

Table 4: Air Quality Impact Descriptors for Individual Receptors for All Pollutants [a]

Long-Term Average Concentration At Receptor In Assessment Year [b]	Change in concentration relative to AQO				
	0%	**1%**	**2-5%**	**6-10%**	**>10%**
75% or less of AQO	Negligible	Negligible	Negligible	Slight	Moderate
76-94% of AQO	Negligible	Negligible	Slight	Moderate	Moderate
95-102% of AQO	Negligible	Slight	Moderate	Moderate	Substantial
103-109% of AQO	Negligible	Moderate	Moderate	Substantial	Substantial
110% or more of AQO	Negligible	Moderate	Substantial	Substantial	Substantial

4 [a] Values are rounded to the nearest whole number.

5 [b] This is the "Without Scheme" concentration where there is a decrease in pollutant concentration and the "With Scheme" concentration where there is an increase.

5.1 Table 4 can usefully be adapted to apply specifically to annual mean nitrogen dioxide concentrations, as shown in **Table 5**.

Table 5: Air Quality Impact Descriptors for Individual Receptors for Annual Mean Nitrogen Dioxide Concentrations

Annual Mean Concentration At Receptor In Assessment Year (µg/m^3)	Change in Concentration (µg/m^3)				
	<0.2	0.2 - 0.6	0.6 - 2.2	2.2 - 4.2	>4.2
<30.2	Negligible	Negligible	Negligible	Slight	Moderate
30.2 - 37.8	Negligible	Negligible	Slight	Moderate	Moderate
37.8 - 41.0	Negligible	Slight	Moderate	Moderate	Substantial
41.0 - 43.8	Negligible	Moderate	Moderate	Substantial	Substantial
>43.8	Negligible	Moderate	Substantial	Substantial	Substantial

Assessment of Significance

5.2 The guidance recommends that the assessment of significance should be based on professional judgement, with the overall air quality impact of the development described as either 'significant' or 'not significant'. In drawing this conclusion, the following factors should be taken into account:

6. the existing and future air quality in the absence of the development;
7. the extent of current and future population exposure to the impacts;
8. the influence and validity of any assumptions adopted when undertaking the prediction of impacts;
9. the potential for cumulative impacts and, in such circumstances, several impacts that are described as '*slight*' individually could, taken together, be regarded as having a significant effect for the purposes of air quality management in an area, especially where it is proving difficult to reduce concentrations of a pollutant. Conversely, a '*moderate*' or '*substantial*' impact may not have a significant effect if it is confined to a very small area and where it is not obviously the cause of harm to human health; and
10. the judgement on significance relates to the consequences of the impacts; will they have an effect on human health that could be considered as significant? In the majority of cases, the impacts from an individual development will be insufficiently large to result in measurable changes in health outcomes that could be regarded as significant by health care professionals.

5.3 The guidance is clear that other factors may be relevant in individual cases.

5.4 The judgement of significance should be made by a competent professional who is suitably qualified.

Assessment Methodology

5.5 Concentrations have been predicted using the ADMS-Roads dispersion model, with vehicle emissions derived using Defra's Emission Factor Toolkit (EFT) (v9.0) (Defra, 2020). Details of the model inputs and assumptions are provided in Appendix 2, together with the method used to derive future year background concentrations. Where assumptions have been made, a realistic worst-case approach has been adopted. Details of the model verification are provided in AQC's Previous Assessment.

5.6 The assessment has focussed on a subset of the receptors modelled in AQC's Previous Assessment; receptor heights and locations are detailed in that report. Only those receptors where an objective exceedance is relatively likely[11] have been considered in this assessment, as adverse impacts elsewhere are unlikely other than for a very large development.

5.7 Nitrogen dioxide concentrations have been predicted for all future years from 2020 to 2027. Baseline predictions for 2020 to 2027 have allowed for traffic growth using growth factors derived using the TEMPro System v7.2 (DfT, 2017).

5.8 Further predictions of future concentrations have then been made been made assuming that there are an additional 10 cars, 100 cars, 500 cars, and 1000 cars on Cranbrook Road, to see what impacts residential-type development that will typically generate mostly car trips might have on nitrogen dioxide concentrations. An equation for a linear relationship fitted to the values for each receptor in each year has then been determined to enable the calculation of the increase in annual mean NO_2 per additional car. While the conversion of NOx emitted by these additional cars to NO_2 is not truly linear, over the small magnitudes of change that are being considered (typically <2 $\mu g/m^3$) the relationship is so close to linear (see **Figure 2**) that using a more complex relationship is judged to be unnecessary.

5.9 These equations have then been used to identify the number of additional cars that might use Cranbrook Road in each year while having only '*negligible*', '*slight adverse'* and '*moderate adverse'* impacts at each individual receptor. This has enabled a more complex consideration of what level of additional car traffic might be acceptable while having an overall 'not significant' effect on air quality, applying professional judgement.

[11] I.e receptors above 37.8 $\mu g/m^3$ for consistency with Table 5.

Uncertainty

5.10 There are many components that contribute to the uncertainty of modelling predictions. The road traffic emissions dispersion model used in this assessment is dependent upon the traffic data that have been input, which will have inherent uncertainties associated with them. The traffic data used in the assessment has been sourced from the Department of Transport website (DfT, 2020), and any uncertainties inherent in these data will carry into the assessment.

5.11 There are then additional uncertainties as models are required to simplify real-world conditions into a series of algorithms. An important stage in the process is model verification, which involves comparing the model output with measured concentrations (see Appendix 2). Because the model has been verified and adjusted, there can be reasonable confidence in the prediction of 2019 concentrations. LAQM.TG16 (Defra, 2018) provides guidance on the evaluation of model performance; based on the analysis shown in AQC's Previous Assessment, the model performance is considered to be good.

5.12 All of the measured concentrations will also have an intrinsic margin of error, which will also have carried into the results of the modelling. These margins of error may be inflated at diffusion tubes TW66, TW67, TW68, TW69 and TW70 due to seven months or fewer of measured data being captured, requiring annualisation to have been undertaken (see AQC's Previous Assessment for further details).

5.13 Predicting pollutant concentrations in a future year will always be subject to greater uncertainty. For obvious reasons, the model cannot be verified in the future, and it is necessary to rely on a series of projections provided by DfT and Defra as to what will happen to traffic volumes, age of vehicle fleet, background pollutant concentrations and vehicle emissions.

5.14 European type approval ('Euro') standards for vehicle emissions apply to all new vehicles manufactured for sale in Europe. These standards have, over many years, become progressively more stringent and this is one of the factors that has driven reductions in both predicted and measured pollutant concentrations over time.

5.15 Historically, the emissions tests used for type approval were carried out within laboratories and were quite simplistic. They were thus insufficiently representative of emissions when driving in the real world. For a time, this resulted in a discrepancy, whereby nitrogen oxides emissions from new diesel vehicles reduced over time when measured within the laboratory, but did not fall in the real world. This, in turn, led to a discrepancy between models (which predicted improvements in nitrogen dioxide concentrations over time) and measurements (which very often showed no improvements year-on-year).

5.16 Recognition of these discrepancies has led to changes to the type approval process. Vehicles are now tested using a more complex laboratory drive cycle and also through 'Real Driving Emissions' (RDE) testing, which involves driving on real roads while measuring exhaust emissions. For Heavy Duty Vehicles (HDVs), the new testing regime has worked very well and NOx emissions from the latest vehicles (Euro VI[12]) are now very low when compared with those from older models (ICCT, 2017).

5.17 For Light Duty Vehicles (LDVs), while the latest (Euro 6) emission standard has been in place since 2015, the new type-approval testing regime only came into force in 2017. Despite this delay, earlier work by AQC (2016) showed that Euro 6 diesel cars manufactured prior to 2017 tend to emit significantly less NOx than previous (Euro 5 and earlier) models.

5.18 AQC has analysed trends in measured NOx concentrations against trends in Defra's EFT model predictions for the period 2013 to 2019 (AQC, 2020). This has demonstrated that, while the EFT typically over-stated the improvements over the period 2013 to 2016, it has tended to under-state the improvements since 2016. Wider consideration of the assumptions built into the EFT suggests that, on balance, the EFT is unlikely to over-state the rate at which NOx emissions decline in the future at an 'average' site in the UK. In practice, the balance of evidence thus suggests that NOx concentrations are most likely to decline more quickly in the future, on average, than predicted by the EFT, especially against a base year of 2016 or later. Using EFT v9.0 for future-year forecasts in this report thus provides a robust assessment, given that the model has been verified against measurements made in 2019.

5.19 The baseline traffic flows for future years (see Table A2.1 in Appendix 2) have allowed for annual traffic growth using the DfT's TEMPro System. This growth already allows for development in the local area, and thus adding the impacts of individual developments in the local area may result in some double-counting, ensuring that the assessment of potential development impacts and effects is worst-case.

12 Euro VI refers to HDVs while Euro 6 refers to LDVs.

Baseline Concentrations

Monitoring Results

5.20 Monitoring results for Hawkhurst in 2019 are presented in AQC's Previous Assessment.

Background Concentrations

5.21 Estimated background concentrations in the study area have been determined for 2019 and for all future years from 2020 to 2027 using Defra's 2017-based background maps (Defra, 2020). The background concentrations are set out in Table 6 and have been derived as described in Appendix 2. The background concentrations are all well below the objectives.

Table 6: Estimated Annual Mean Background NO_2 Concentrations ($\mu g/m^3$)

Year	2019	2020	2021	2022	2023	2024	2025	2026	2027
NO_2	8.2	7.9	7.7	7.4	7.2	6.9	6.7	6.6	6.5
Objective	**40**								

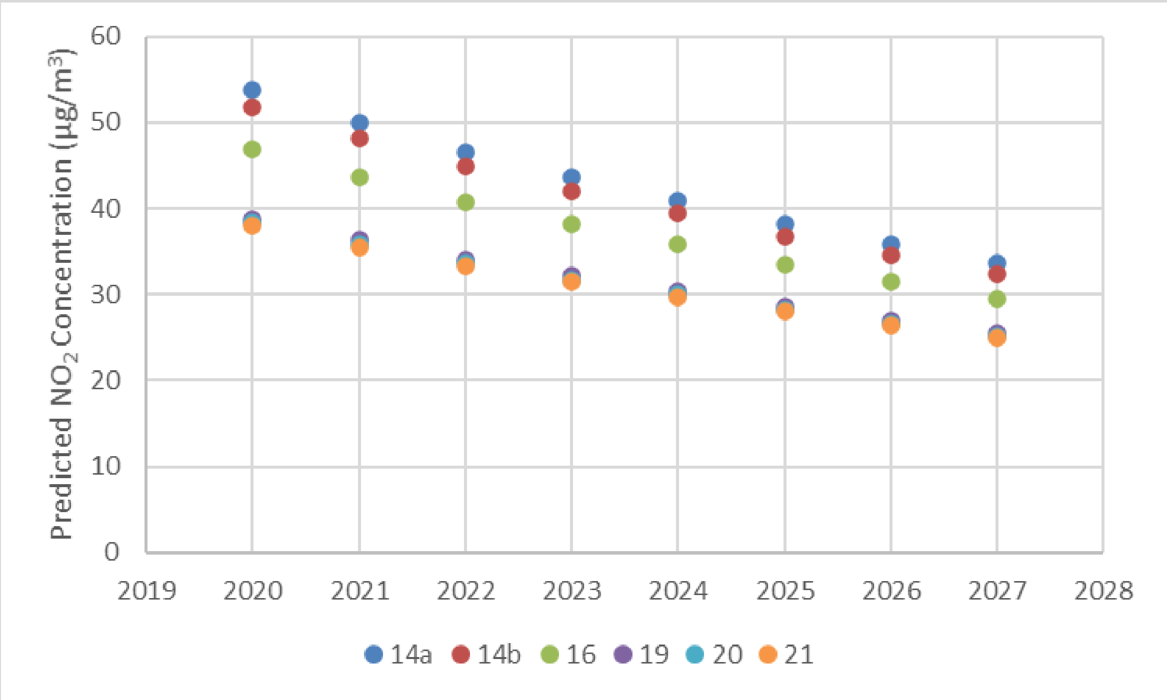
Baseline Dispersion Modelling Results

5.22 Modelled baseline annual mean nitrogen dioxide concentrations are presented in **Table 7** and **Figure 1** for all years 2019 to 2027. The future year concentrations have allowed for traffic growth, as discussed in Paragraphs 5.7 and 5.19.

Table 7: Modelled Baseline Annual Mean NO_2 Concentrations ($\mu g/m^3$) [a]

Receptor	2019	2020	2021	2022	2023	2024	2025	2026	2027
Receptor 14a	**56.6**	**53.7**	**49.9**	**46.4**	**43.4**	**40.7**	38.2	35.8	33.6
Receptor 14b	**54.6**	**51.8**	**48.2**	**44.8**	**41.9**	39.2	36.8	34.5	32.5
Receptor 16	**49.5**	**47.0**	**43.7**	**40.6**	38.0	35.6	33.4	31.4	29.6
Receptor 19	**40.6**	38.8	36.3	34.0	32.0	30.2	28.5	27.0	25.5
Receptor 20	**40.1**	38.3	35.8	33.6	31.6	29.9	28.2	26.6	25.2
Receptor 21	39.8	38.0	35.5	33.3	31.4	29.6	28.0	26.4	25.0
Objective	**40**								

6 [a] Exceedances of the annual mean objective are shown in bold.



A1 **Figure 1: Predicted Baseline NO_2 Concentrations (µg/m^3)**

6.1 There are predicted exceedances of the annual mean nitrogen dioxide objective at Receptor 14 until 2024, and at Receptor 16 until 2022. All other receptors are predicted to have nitrogen dioxide concentrations below 40 µg/m^3 in all years from 2020 to 2027.

6.2 Receptor 14 is representative of two flats, one at basement level (14a) and one at ground-floor level (14b), while receptor 16 is representative of a single house. In 2020 the objective is only exceeded at these three residential properties. In 2023 this reduces to just the two flats, then in 2024 an exceedance is only predicted at the basement flat. There are predicted to be no exceedances in Hawkhurst by 2025, and thus in that scenario there would be no requirement for an AQMA[13].

6.3 The annual mean nitrogen dioxide concentrations are all below 60 µg/m^3 at every receptor; it is, therefore, unlikely that the 1-hour mean nitrogen dioxide objective will be exceeded.

[13] Currently Defra require 2 years of monitored data below the objective before revocation unless results are well below objectives.

7 Future Development Impacts

Modelled Changes in Concentrations

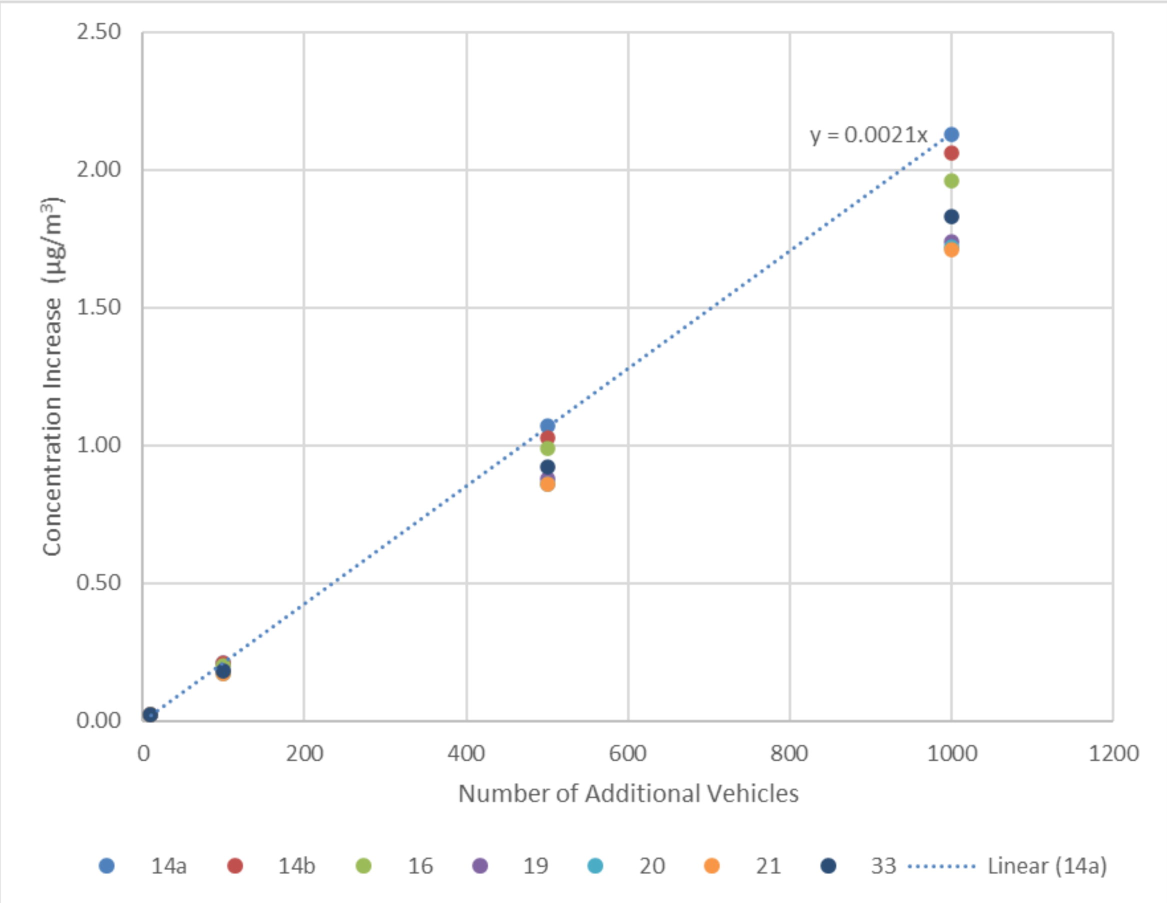
7.1 The first step in determining the potential impacts of future development-generated traffic Hawkhurst has been to calculate the equation for the concentration increase per additional car on Cranbrook Road at each receptor in each year from 2020 to 2027. The increase in the annual mean nitrogen dioxide concentration predicted at each receptor with an additional 10, 100, 500, and 1000 cars on Cranbrook Road, and the subsequent equation for a line fitted to these data, are presented in **Table 8**. A sample graph from which the equation for Receptor 14a was calculated for 2020 is presented in **Figure 2**.

Table 8: Modelled Nitrogen Dioxide Contributions from Increased Car Flows (µg/m^3)

Receptor	Annual Mean NO_2 Process Contribution from Additional Cars (µg/m^3)				Equation for NO_2 Increase per Car (x)
	10	100	500	1000	
2020					
Receptor 14a	0.02	0.21	1.07	2.13	0.00213x
Receptor 14b	0.02	0.21	1.03	2.06	0.00206x
Receptor 16	0.02	0.20	0.99	1.96	0.00196x
Receptor 19	0.02	0.18	0.88	1.74	0.00174x
Receptor 20	0.02	0.17	0.86	1.72	0.00172x
Receptor 21	0.02	0.17	0.86	1.71	0.00171x
2021					
Receptor 14a	0.02	0.21	1.03	2.05	0.00205x
Receptor 14b	0.02	0.20	0.99	1.98	0.00198x
Receptor 16	0.02	0.19	0.94	1.88	0.00188x
Receptor 19	0.02	0.17	0.83	1.66	0.00166x
Receptor 20	0.02	0.17	0.83	1.65	0.00165x
Receptor 21	0.01	0.16	0.82	1.63	0.00163x
2022					
Receptor 14a	0.02	0.20	0.98	1.96	0.00196x
Receptor 14b	0.02	0.19	0.95	1.89	0.00189x
Receptor 16	0.01	0.18	0.90	1.79	0.00179x
Receptor 19	0.01	0.15	0.79	1.57	0.00157x
Receptor 20	0.01	0.15	0.78	1.56	0.00156x

Receptor	Annual Mean NO_2 Process Contribution from Additional Cars (µg/m^3)				Equation for NO_2 Increase per Car (x)
	10	100	500	1000	
Receptor 21	0.02	0.16	0.78	1.55	0.00155x
2023					
Receptor 14a	0.02	0.19	0.93	1.86	0.00186x
Receptor 14b	0.02	0.18	0.90	1.80	0.0018x
Receptor 16	0.01	0.17	0.85	1.70	0.0017x
Receptor 19	0.01	0.15	0.74	1.48	0.00148x
Receptor 20	0.02	0.15	0.74	1.47	0.00147x
Receptor 21	0.02	0.15	0.73	1.46	0.00146x
2024					
Receptor 14a	0.02	0.17	0.85	1.68	0.00174x
Receptor 14b	0.02	0.16	0.80	1.59	0.00168x
Receptor 16	0.02	0.14	0.70	1.38	0.00159x
Receptor 19	0.02	0.14	0.69	1.37	0.00138x
Receptor 20	0.01	0.14	0.68	1.35	0.00137x
Receptor 21	0.02	0.17	0.85	1.68	0.00135x
2025					
Receptor 14a	0.02	0.17	0.82	1.63	0.00163x
Receptor 14b	0.01	0.15	0.78	1.56	0.00156x
Receptor 16	0.01	0.15	0.74	1.48	0.00148x
Receptor 19	0.02	0.13	0.65	1.29	0.00129x
Receptor 20	0.01	0.12	0.63	1.27	0.00127x
Receptor 21	0.01	0.12	0.63	1.26	0.00126x
2026					
Receptor 14a	0.02	0.15	0.76	1.51	0.00151x
Receptor 14b	0.02	0.15	0.74	1.46	0.00146x
Receptor 16	0.02	0.14	0.69	1.38	0.00138x
Receptor 19	0.01	0.12	0.59	1.19	0.00119x
Receptor 20	0.01	0.12	0.59	1.18	0.00118x
Receptor 21	0.01	0.12	0.58	1.17	0.00117x
2027					
Receptor 14a	0.02	0.15	0.70	1.40	0.0014x
Receptor 14b	0.01	0.14	0.68	1.35	0.00135x
Receptor 16	0.01	0.12	0.63	1.27	0.00127x
Receptor 19	0.01	0.11	0.55	1.10	0.0011x

Receptor	Annual Mean NO_2 Process Contribution from Additional Cars (µg/m^3)				Equation for NO_2 Increase per Car (x)
	10	100	500	1000	
Receptor 20	0.01	0.11	0.54	1.08	0.00108x
Receptor 21	0.01	0.11	0.54	1.07	0.00107x



A2 **Figure 2: Modelled Nitrogen Dioxide Contributions from Increased Car Flows in 2020**

8 [a] Only the equation for Receptor 14a is shown, as this provides the worst-case results.

Resultant Impacts

8.1 With the equations for each receptor having been determined, the number of additional cars required to cause an increase of no more than 0.2 µg/m^3, 0.6 µg/m^3, 2.2 µg/m^3 and 4.2 µg/m^3 can be calculated for each receptor in each year (these magnitudes of change being the column headers from **Table 4**/**Table 5**). These are presented in Table A4.1 in Appendix 3.

8.2 The number of additional cars that would result in the total concentration moving into the next concentration band presented in **Table 4**/**Table 5** can also be calculated; these are presented in Table A4.3 in Appendix 3.

8.3 These two sets of values have then been considered alongside the baseline concentrations to determine the maximum number of additional cars that could be accommodated on Cranbrook Road in each year while limiting impacts to a specific descriptor level (e.g. negligible, slight adverse etc.) at each receptor in each year, as presented in Table A4.4 in Appendix 3.

8.4 These three sets of highly technical data are included in Appendix 3 for completeness, but it was not considered necessary to present them in the body of the report, as the outcomes of their analysis are summarised below.

Significance of Effects

Suggested Thresholds

8.5 In order to inform determination of either individual or multiple planning applications, the results of these sets of results have been combined to derive car trip thresholds on Cranbrook Road below which impacts would be limited to a specific descriptor level, and at a limited number of properties. These thresholds are presented in **Table 9**. The "All Negligible" column presents the maximum number of car trips with which all impacts would be negligible at all receptors. The "Three Slight Adverse" column presents the maximum number of car trips on Cranbrook Road with which impacts would be no worse than slight adverse at any receptor, with these slight adverse impacts affecting no more than three receptors. The "Three Moderate Adverse" column presents the maximum number of car trips on Cranbrook Road with which impacts would be no worse than moderate adverse at any receptor, with these moderate adverse impacts affecting no more than three receptors.

Table 9: Car Trip Thresholds on Cranbrook Road

Year	All Negligible	Three Slight Adverse	Three Moderate Adverse
2020	93	N/A	114
2021	97	N/A	292
2022	102	N/A	306
2023	107	N/A	322
2024	114	182 [a]	433 [b]
2025	122	367 [c]	1,277 [b]
2026	396	1,319	1,851
2027	428	1,570	2,000

9 [a] The impacts predicted from these additional cars would cause two slight adverse impacts only.

10 [b] The impacts predicted from these additional cars would cause two moderate adverse impacts and one slight adverse impact.

11 [c] The impacts predicted from these additional cars would cause one slight adverse impact only.

12 Discussion and Conclusions

12.1 The three threshold categories presented in **Table 9** have been identified through the application of professional judgement. It is easy to judge that any development, or groups of developments, whose car trip generation is below the threshold for "All Negligible" impacts would have an overall 'not significant' effect on air quality, but the judgement becomes more complex once adverse impacts begin to occur. The final two categories in **Table 9**, in the sense that they relate to three receptors, have been identified on the basis that changes in concentrations as a result of traffic increases, and baseline concentrations, at receptors 14a, 14b, and 16 are broadly similar and high (see **Table 7** and **Table 8**), while at the other receptors they are considerably lower. Receptors 14a, 14b, and 16 also only represent three properties, while the other selected receptors typically represent several properties. Thus, limiting impacts to receptors 14a, 14b, and 16 ensures that no more than three properties are adversely affected. Applying professional judgement, and considering the EPUK/IAQM guidance described in Paragraph 5.2, it would seem unlikely than slight or moderate adverse impacts at three properties for a limited number of years would lead to significant health effects. The same may be true for a limited number of substantial adverse impacts, but it is not recommended that these are routinely accepted in the determination of planning applications in the way that **Table 9** is intended to be used, thus it has been assumed that any substantial adverse impacts are unacceptable.

12.2 Receptors 19, 20, and 21 have the potential for slight adverse and moderate adverse impacts with larger increases in car trips, however in all years more additional vehicles would be required for a slight adverse impact at these receptors than would cause a moderate adverse impact at receptors 14a, 14b, and 16. The number of cars to cause these impacts are therefore not presented, as focussing on receptors 14a, 14b, and 16 provides the worst-case assessment.

12.3 The bottom two rows of **Table 5** show that, where total concentrations are above 41.0 µg/m^3, there cannot be slight adverse impacts, with impacts jumping from negligible to moderate adverse as the change in concentrations rises from below 0.2 µg/m^3 to above it. This is why there is no level of increase in car trips below which impacts are limited to slight adverse only in 2020, 2021, 2022, and 2023, as concentrations at least one of receptor 14a, 14b and 16 will be above 41.0 µg/m^3.

12.4 By 2024, baseline concentrations are expected to have reduced sufficiently as to allow a significantly greater increase in car trips on Cranbrook Road whilst limiting moderate adverse impacts to no more than three properties.

12.5 It should also be noted that when the results from **Table 9** are used for assessing the cumulative impacts of multiple schemes there will be some double counting, due cumulative traffic also being included within the baseline as described in Paragraph 5.19. As such the results in **Table 9** represent the worst-case impacts if used to assess against multiple developments traffic.

Summary

12.6 It is the professional judgement of the consultants who have prepared this report that moderate adverse impacts limited to three properties on Cranbrook Road where annual mean nitrogen dioxide concentrations can be expected to exceed the objective for no more than the next five years would not constitute an overall significant effect, as the likelihood of them leading to significant health effects for residents of those properties is very low. **It is, therefore, recommended that the final column of Table 9 is used to screen the trip generation of future developments on Cranbrook Road to determine whether they risk having a significant overall air quality effect; schemes whose trip generation on Cranbrook Road is below the thresholds can be assumed not to have a significant overall effect on air quality.**

12.7 Alternatively, a more cautious approach could be to use the higher threshold value from either the "All Negligible" and "Three Slight Adverse" columns (taking the "All Negligible" value where none is presented for "Three Slight Adverse") to identify developments that warrant no further consideration in terms of air quality, while requiring enhanced mitigation from those whose trip generation exceeds these thresholds, but is below the relevant "Three Slight Adverse" threshold. What mitigation it would be appropriate to require will, however, require further consideration

12.8 The inherent uncertainty within the modelling, as described in Section 0, must be acknowledged. The suggested screening thresholds should not be considered exact, but represent the best possible estimates, using the best available data available at the time this report was undertaken.

12.9 It must also be noted that the approach taken has focussed on developments that will generate almost entirely car trips, such as residential schemes. Schemes that will generate potentially significant volumes of other vehicle types, such as buses or light or heavy goods vehicles, will require separate assessment and this report is not intended to address such schemes.

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Glossary

A1	**AADT**	Annual Average Daily Traffic
A2	**ADMS-Roads**	Atmospheric Dispersion Modelling System model for Roads
A3	**AQC**	Air Quality Consultants
A4	**AQMA**	Air Quality Management Area
A5	**AQO**	Air Quality Objective
A6	**Defra**	Department for Environment, Food and Rural Affairs
A7	**DfT**	Department for Transport
A8	**EFT**	Emission Factor Toolkit
A9	**EPUK**	Environmental Protection UK
A10	**Exceedance**	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure
A11	**HDV**	Heavy Duty Vehicles (> 3.5 tonnes)
A12	**HMSO**	Her Majesty's Stationery Office
A13	**HGV**	Heavy Goods Vehicle
A14	**IAQM**	Institute of Air Quality Management
A15	**kph**	Kilometres Per hour
A16	**LAQM**	Local Air Quality Management
A17	**LGV**	Light Goods Vehicle
A18	**µg/m^3**	Microgrammes per cubic metre
A19	**NO**	Nitric oxide
A20	**NO_2**	Nitrogen dioxide

A21 **NOx** Nitrogen oxides (taken to be NO_2 + NO)

A22 **Objectives** A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides

A23 **Standards** A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal

A24 **TWBC** Tunbridge Wells Borough Council

Appendices

1 Professional Experience

Dr Clare Beattie, BSc (Hons) MSc PhD CSci MIEnvSc MIAQM

Dr Beattie is an Associate Director with AQC, with more than 20 years' relevant experience. She has been involved in air quality management and assessment, and policy formulation in both an academic and consultancy environment. She has prepared air quality review and assessment reports, strategies and action plans for local authorities and has developed guidance documents on air quality management on behalf of central government, local government and NGOs. She has led on the air quality inputs into Clean Air Zone feasibility studies and has provided support to local authorities on the integration of air quality considerations into Local Transport Plans and planning policy processes. Dr Beattie has appraised local authority air quality assessments on behalf of the UK governments, and provided support to the Review and Assessment helpdesk. She has carried out numerous assessments for new residential and commercial developments, including the negotiation of mitigation measures where relevant. She has also acted as an expert witness for both residential and commercial developments. She has carried out BREEAM assessments covering air quality for new developments. Dr Beattie has also managed contracts on behalf of Defra in relation to allocating funding for the implementation of air quality improvement measures. She is a Member of the IAQM and IES and is a Chartered Scientist.

Ricky Gellatly, BSc (Hons) CSci MIEnvSc MIAQM

Mr Gellatly is a Principal Consultant with AQC with over eight years' relevant experience. He has undertaken air quality assessments for a wide range of projects, assessing many different pollution sources using both qualitative and quantitative methodologies, with most assessments having included dispersion modelling (using a variety of models). He has assessed road schemes, airports, energy from waste facilities, anaerobic digesters, poultry farms, urban extensions, rail freight interchanges, energy centres, waste handling sites, sewage works and shopping and sports centres, amongst others. He also has experience in ambient air quality monitoring, the analysis and interpretation of air quality monitoring data, the monitoring and assessment of nuisance odours and the monitoring and assessment of construction dust. He is a Member of the IAQM and is a Chartered Scientist.

David Bailey, BSc (Hons)

Mr Bailey is a Consultant with AQC, having joined the Company in 2018. Prior to joining AQC he gained a degree in Environmental Science from the University of Brighton, where his studies included modules focused on Air Quality Management. He has experience in air quality and greenhouse gas assessments, with the use of the ADMS-Roads and ADMS-5 dispersion modelling software. The use of modelling has been used in a wide variety of schemes ranging from large residential EIA developments, and detailed assessments for Local Authorities, to assessing the impacts of gas power generation and agricultural facilities. In addition, he has also gained experience in diffusion tube and automatic monitoring, including data ratification.

2 Modelling Methodology

Model Inputs

A24.1 Predictions have been carried out using the ADMS-Roads dispersion model (v4.1). The model requires the user to provide various input data, including emissions from each section of road and the road characteristics (including road width, street canyon width, street canyon height and porosity, where applicable). Vehicle emissions have been calculated based on vehicle flow, composition and speed data using the EFT (Version 9.0) published by Defra (2020). Road gradients have also been included within the emissions calculations.

A24.2 Hourly sequential meteorological data from Herstmonceux for 2019 have been used in the model, which is considered suitable for this area.

AADT flows and fleet composition data have been determined from the interactive web-based map provided by DfT (DfT, 2020), as described in AQC's Previous Assessment. The baseline AADT flows have been factored forwards to the assessment years using growth factors derived using the TEMPro System v7.2 (DfT, 2017), with factors of 1.0259, 1.0411, 1.0564, 1.0718, 1.0871, 1.1024, 1.1101, and 1.1181 used for the years 2020, 2021, 2022, 2023, 2024, 2025, 2026, and 2027 respectively. The baseline traffic data used in this assessment are summarised in Table AError! No text of specified style in document..**1**. The additional car flows for each year (10, 100, 500, and 1000 cars) assessed in this report have then been added to these growthed baseline flows[14].

[14] The fleet composition for each future 'With Scheme' scenario has been recalculated from those presented in Table A2.1 to reflect the increased proportion of 'cars'.

Table A Error! No text of specified style in document.**.1: Summary of Baseline Traffic Data used in the Assessment (AADT Flows)**

Road Link	AADT								
	2019	2020	2021	2022	2023	2024	2025	2026	2027
Cranbrook Road	8,680	8,905	9,037	9,170	9,303	9,436	9,569	9,636	9,705
Highgate Hill	8,732	8,958	9,091	9,224	9,359	9,493	9,626	9,693	9,763
A268 (Rye Road/ High Street)	6,638	6,810	6,911	7,012	7,115	7,216	7,318	7,369	7,422

Road Link	Fleet Composition					
	%Car	%LGV	%Rigid HGV	%Artic HGV	%Bus and Coach	%Motor cycle
Cranbrook Road	74.7	19.6	3.5	1.3	0.4	0.5
Highgate Hill	72.1	22.5	2.9	1.1	0.6	0.8
A268 (Rye Road/ High Street)	77.1	17.4	2.4	1.5	1.3	0.3

Modelled network extents, canyons, traffic speeds and diurnal and monthly flow profiles are unchanged from those presented in AQC's Previous Assessment, as is the model verification. The model verification factor calculated for 2019 was applied to all future year modelled road-NOx outputs.

Model Post-processing

The model predicts road-NOx concentrations at each receptor location. These concentrations have been adjusted using the adjustment factor set out above, which, along with the background NO_2 concentration, has been processed through the NOx to NO_2 calculator available on the Defra LAQM Support website (Defra, 2020). The traffic mix within the calculator has been set to "All other urban UK traffic", which is considered suitable for the study area. The calculator predicts the component of NO_2 based on the adjusted road-NOx and the background NO_2.

3 Calculation of Concentration Increases and Impacts from Additional Cars

Using the equations shown in **Table 8**, the maximum number of additional cars that could be accommodated without triggering a change of more than 0.2 µg/m^3, 0.6 µg/m^3, 2.2 µg/m^3, and 4.2 µg/m^3 has been calculated, as presented in Table A4.1. These concentration values represent the column change thresholds for impact descriptors in **Table 5**. In every case, adding one more car than the number shown would trigger a change in concentration greater than the threshold stated at the top of the column.

Table A Error! No text of specified style in document.**.2: Maximum Additional Cars Without Exceeding Concentration Threshold**

Receptor	Concentration Threshold			
	<0.2 µg/m^3	<0.6 µg/m^3	<2.2 µg/m^3	<4.2 µg/m^3
2020				
Receptor 14a	93	281	1,032	1,970
Receptor 14b	97	291	1,067	2,038
Receptor 16	101	305	1,119	2,138
Receptor 19	114	343	1,261	2,407
Receptor 20	116	348	1,279	2,442
Receptor 21	116	350	1,285	2,453
2021				
Receptor 14a	97	292	1,071	2,046
Receptor 14b	101	303	1,111	2,121
Receptor 16	106	319	1,170	2,233
Receptor 19	120	361	1,325	2,529
Receptor 20	121	363	1,331	2,541
Receptor 21	122	367	1,348	2,573
2022				
Receptor 14a	102	306	1,122	2,142
Receptor 14b	105	317	1,162	2,219
Receptor 16	111	334	1,227	2,343
Receptor 19	127	381	1,399	2,672
Receptor 20	128	384	1,410	2,693
Receptor 21	128	386	1,417	2,705
2023				
Receptor 14a	107	322	1,182	2,257
Receptor 14b	111	333	1,222	2,333

Receptor	Concentration Threshold			
	<0.2 µg/m³	<0.6 µg/m³	<2.2 µg/m³	<4.2 µg/m³
Receptor 16	117	352	1,294	2,470
Receptor 19	135	405	1,486	2,837
Receptor 20	135	407	1,494	2,852
Receptor 21	136	410	1,506	2,875
2024				
Receptor 14a	114	344	1,263	2,413
Receptor 14b	118	356	1,306	2,493
Receptor 16	125	376	1,381	2,638
Receptor 19	144	433	1,589	3,034
Receptor 20	145	437	1,603	3,060
Receptor 21	147	443	1,626	3,105
2025				
Receptor 14a	122	367	1,347	2,572
Receptor 14b	128	384	1,410	2,693
Receptor 16	135	405	1,486	2,837
Receptor 19	154	464	1,702	3,250
Receptor 20	157	473	1,735	3,313
Receptor 21	158	476	1,746	3,334
2026				
Receptor 14a	132	396	1,455	2,777
Receptor 14b	136	409	1,502	2,868
Receptor 16	144	434	1,593	3,042
Receptor 19	168	505	1,851	3,535
Receptor 20	169	508	1,864	3,558
Receptor 21	171	513	1,883	3,595
2027				
Receptor 14a	142	428	1,570	2,998
Receptor 14b	147	443	1,626	3,105
Receptor 16	157	473	1,735	3,313
Receptor 19	181	545	2,000	3,818
Receptor 20	185	555	2,036	3,888
Receptor 21	186	559	2,051	3,917

Table A4.2 identifies the impact descriptors that would be derived with a change in concentration below a given threshold (the column headers) at each receptor, in each year. It combines the baseline concentrations in **Table 8** with the impact descriptor matrix in Table 4.

Table A Error! No text of specified style in document.**.3: Impact descriptors by Receptor by Concentration Change**

Receptor	Impact at Receptor with Concentration Increase			
	<0.2 µg/m³	<0.6 µg/m³	<2.2 µg/m³	<4.2 µg/m³
2020				
Receptor 14a	Negligible	Moderate	Substantial	Substantial
Receptor 14b	Negligible	Moderate	Substantial	Substantial
Receptor 16	Negligible	Moderate	Substantial	Substantial
Receptor 19	Negligible	Slight	Moderate	Substantial
Receptor 20	Negligible	Slight	Moderate	Substantial
Receptor 21	Negligible	Slight	Moderate	Substantial
2021				
Receptor 14a	Negligible	Moderate	Substantial	Substantial
Receptor 14b	Negligible	Moderate	Substantial	Substantial
Receptor 16	Negligible	Moderate	Substantial	Substantial
Receptor 19	Negligible	Negligible	Moderate	Moderate
Receptor 20	Negligible	Negligible	Moderate	Moderate
Receptor 21	Negligible	Negligible	Slight	Moderate
2022				
Receptor 14a	Negligible	Moderate	Substantial	Substantial
Receptor 14b	Negligible	Moderate	Substantial	Substantial
Receptor 16	Negligible	Moderate	Moderate	Substantial
Receptor 19	Negligible	Negligible	Slight	Moderate
Receptor 20	Negligible	Negligible	Slight	Moderate
Receptor 21	Negligible	Negligible	Slight	Moderate
2023				
Receptor 14a	Negligible	Moderate	Substantial	Substantial
Receptor 14b	Negligible	Moderate	Substantial	Substantial
Receptor 16	Negligible	Slight	Moderate	Substantial
Receptor 19	Negligible	Negligible	Slight	Moderate
Receptor 20	Negligible	Negligible	Slight	Moderate
Receptor 21	Negligible	Negligible	Slight	Moderate
2024				
Receptor 14a	Negligible	Moderate	Moderate	Substantial
Receptor 14b	Negligible	Slight	Moderate	Substantial
Receptor 16	Negligible	Negligible	Moderate	Moderate
Receptor 19	Negligible	Negligible	Slight	Moderate
Receptor 20	Negligible	Negligible	Slight	Moderate
Receptor 21	Negligible	Negligible	Slight	Moderate

Receptor	Impact at Receptor with Concentration Increase			
	<0.2 µg/m³	<0.6 µg/m³	<2.2 µg/m³	<4.2 µg/m³
2025				
Receptor 14a	Negligible	Slight	Moderate	Substantial
Receptor 14b	Negligible	Negligible	Moderate	Substantial
Receptor 16	Negligible	Negligible	Slight	Moderate
Receptor 19	Negligible	Negligible	Slight	Moderate
Receptor 20	Negligible	Negligible	Slight	Moderate
Receptor 21	Negligible	Negligible	Negligible	Moderate
2026				
Receptor 14a	Negligible	Negligible	Moderate	Moderate
Receptor 14b	Negligible	Negligible	Slight	Moderate
Receptor 16	Negligible	Negligible	Slight	Moderate
Receptor 19	Negligible	Negligible	Negligible	Moderate
Receptor 20	Negligible	Negligible	Negligible	Moderate
Receptor 21	Negligible	Negligible	Negligible	Moderate
2027				
Receptor 14a	Negligible	Negligible	Slight	Moderate
Receptor 14b	Negligible	Negligible	Slight	Moderate
Receptor 16	Negligible	Negligible	Slight	Moderate
Receptor 19	Negligible	Negligible	Negligible	Slight
Receptor 20	Negligible	Negligible	Negligible	Slight
Receptor 21	Negligible	Negligible	Negligible	Slight

In some cases an increase in concentration that is between two of the threshold values used in **Table A**Error! No text of specified style in document.**.2** and **Table A**Error! No text of specified style in document.**.3** will cause the total concentration to move into a higher concentration band (See Table 4), i.e from 76-94% of the AQO to 95-102% of the AQO. As a result, the determination of the number of additional cars that can be accommodated while limiting impacts to a certain descriptor level cannot focus solely on the increase in cars that will cause a change in concentrations of just below 0.2 µg/m³, 0.6 µg/m³, 2.2 µg/m³ or 4.2 µg/m³, and needs to also consider the increase in cars that will cause a change in the categorisation of the total concentration into concentration bands. Table A4.3 calculates, using the equations in Table 8, the number of additional cars that would cause the total concentration to move up beyond a given concentration band at each receptor in each year. It should be noted that all calculated values are presented for completeness, but it is generally only the values at the lower end of the range of values presented that have actually been used in the assessment. Where a value of zero is stated, the total concentration already exceeds this range.

Table A Error! No text of specified style in document.**.4: Number of Cars to Cause Total Concentration to Exceed Concentration Band**

Receptor	Number of Cars to Cause Concentration to Exceed Concentration Band			
	103-109% of AQO	95-102% of AQO	76-94% of AQO	75% or less of AQO
2020				
Receptor 14a	0	0	0	0
Receptor 14b	0	0	0	0
Receptor 16	0	0	0	0
Receptor 19	2,883	1,278	0	0
Receptor 20	3,203	1,575	0	0
Receptor 21	3,411	1,775	0	0
2021				
Receptor 14a	0	0	0	0
Receptor 14b	0	0	0	0
Receptor 16	68	0	0	0
Receptor 19	4,516	2,829	902	0
Receptor 20	4,816	3,121	1,185	0
Receptor 21	5,061	3,345	1,384	0
2022				
Receptor 14a	0	0	0	0
Receptor 14b	0	0	0	0
Receptor 16	1,757	195	0	0
Receptor 19	6,216	4,435	2,398	0
Receptor 20	6,540	4,744	2,692	0
Receptor 21	6,756	4,953	2,891	0
2023				
Receptor 14a	111	0	0	0
Receptor 14b	975	0	0	0
Receptor 16	3,327	1,680	0	0
Receptor 19	7,882	5,990	3,828	0
Receptor 20	8,202	6,300	4,127	0
Receptor 21	8,454	6,537	4,345	0
2024				
Receptor 14a	1,790	182	0	0
Receptor 14b	2,705	1,043	0	0
Receptor 16	5,129	3,371	1,361	0
Receptor 19	9,801	7,778	5,466	0
Receptor 20	10,163	8,122	5,791	252

Receptor	Number of Cars to Cause Concentration to Exceed Concentration Band			
	103-109% of AQO	95-102% of AQO	76-94% of AQO	75% or less of AQO
Receptor 21	10,497	8,427	6,061	441
2025				
Receptor 14a	3,454	1,739	0	0
Receptor 14b	4,475	2,680	628	0
Receptor 16	6,992	5,101	2,939	0
Receptor 19	11,802	9,635	7,158	1,277
Receptor 20	12,308	10,098	7,574	1,578
Receptor 21	12,576	10,353	7,812	1,778
2026				
Receptor 14a	5,287	3,435	1,319	0
Receptor 14b	6,320	4,408	2,222	0
Receptor 16	8,973	6,944	4,626	0
Receptor 19	14,161	11,804	9,111	2,714
Receptor 20	14,544	12,172	9,460	3,020
Receptor 21	14,881	12,484	9,745	3,239
2027				
Receptor 14a	7,248	5,250	2,966	0
Receptor 14b	8,374	6,303	3,937	0
Receptor 16	11,231	9,021	6,497	501
Receptor 19	16,632	14,086	11,177	4,268
Receptor 20	17,224	14,632	11,669	4,633
Receptor 21	17,547	14,936	11,951	4,863

Utilising the information from Table A4.1, **Table A**Error! No text of specified style in document.**.3** and Table A4.3, Table A4.4 presents these maximum number of additional cars on Cranbrook Road that could be accommodated while keeping impacts to a certain descriptor level, at each receptor in each year. N/A's reflect occasions where any change above 0.2 µg/m³ causes the impact to increase from 'negligible' directly to 'moderate adverse', as occurs in the bottom two rows of Table 4 and **Table 5**. In these cases, any additional cars above the number stated in the 'negligible' column impacts would lead to 'moderate adverse' impacts.

Table A Error! No text of specified style in document.**.5: Maximum Number of Car to Limit Impacts to Each Descriptor**

Receptor	Negligible	Slight Adverse	Moderate Adverse
2020			
Receptor 14a	93	N/A	281

Receptor	Negligible	Slight Adverse	Moderate Adverse
Receptor 14b	97	N/A	291
Receptor 16	101	N/A	305
Receptor 19	114	343	1,278
Receptor 20	116	348	1,575
Receptor 21	116	350	1,775
2021			
Receptor 14a	97	N/A	292
Receptor 14b	101	N/A	303
Receptor 16	106	N/A	319
Receptor 19	361	902	2,529
Receptor 20	363	1,185	2,541
Receptor 21	367	1,348	2,573
2022			
Receptor 14a	102	N/A	306
Receptor 14b	105	N/A	317
Receptor 16	111	195	1,227
Receptor 19	381	1,399	2,672
Receptor 20	384	1,410	2,693
Receptor 21	386	1,417	2,891
2023			
Receptor 14a	107	N/A	322
Receptor 14b	111	N/A	975
Receptor 16	117	352	1,680
Receptor 19	405	1,486	3,828
Receptor 20	407	1,494	4,127
Receptor 21	410	1,506	4,345
2024			
Receptor 14a	114	182	1,263
Receptor 14b	118	356	1,306
Receptor 16	376	1,361	2,638
Receptor 19	433	1,589	5,466
Receptor 20	437	1,603	5,791
Receptor 21	443	1,626	6,061
2025			
Receptor 14a	122	367	1,739
Receptor 14b	384	628	2,680
Receptor 16	405	1,486	2,939

Receptor	Negligible	Slight Adverse	Moderate Adverse
Receptor 19	1,277	1,702	7,158
Receptor 20	1,578	1,735	7,574
Receptor 21	1,746	1,778	7,812
2026			
Receptor 14a	396	1,319	2,777
Receptor 14b	409	1,502	2,868
Receptor 16	434	1,593	4,626
Receptor 19	1,851	2,714	9,111
Receptor 20	1,864	3,020	9,460
Receptor 21	1,883	3,239	9,745
2027			
Receptor 14a	428	1,570	2,998
Receptor 14b	443	1,626	3,937
Receptor 16	501	1,735	6,497
Receptor 19	2,000	3,818	11,177
Receptor 20	2,036	3,888	11,669
Receptor 21	2,051	3,917	11,951

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	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 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

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