2021 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

Date: June, 2021

Information	Swale Borough Council Details
Local Authority Officer	Clare Lydon
Department	Mid Kent Environmental Health
Address	Swale Borough Council Swale House East Street Sittingbourne Kent ME10 3HT
Telephone	01622 602460
E-mail	Clare.Lydon@MidKent.gov.uk
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Executive Summary: Air Quality in Our Area

Air Quality in Swale Borough Council

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

Swale Borough Council is committed to improving air quality, specifically to reduce exposure of its residents and to improve and protect the health and amenity of current and future generations. To this end, we have developed actions and measures which can be categorised under the following topics:

- Emission reductions from the HGV fleets;
- Volume reductions in the HGV fleet using the A2 especially;
- Smoother less congested traffic flows of all vehicles through the AQMAs;
- Policies that encourage only low emission developments being approved;
- Encourage alternative modes to car use to reduce congestion and pollution;
- Initiatives that inform and protect local residents;
- Freight management and access policies within AQMAs; and
- Access to cleaner alternative transport for residents and businesses

[1] Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

[2] Defra. 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

As a direct result of Swale Borough Council's extensive air quality monitoring, six air quality management areas (AQMAs) have been identified and declared to date. These AQMAs are located where the level of air pollution, specifically nitrogen dioxide, has historically exceeded the UK's air quality objectives. In addition, St Paul's Street AQMA was amended in 2020 for exceedance of the 24-hour mean objective for PM_{10}. The six AQMAs[5] are listed below:

- AQMA 1: Newington, (A2 / High St) - declared in 2009.
- AQMA 2/6: Ospringe Street, Faversham (A2 / Ospringe) -declared in June 2011 and revised (as AQMA 6) in May 2016.
- AQMA 3: East Street, Sittingbourne (A2 / Canterbury Road) - declared January 2013.
- AQMA 4: St Paul's Street, Milton, Sittingbourne (B2006) - declared January 2013. Amended for 24-hour Mean objective for PM_{10} 22 October 2020
- AQMA 5: Teynham (A2 / London Rd) - declared December 2015
- AQMA 7: Keycol Hill, Sittingbourne. Declared for annual mean NO_2 22 October 2020

AQMA's 1, 2/6, 3, 5 and 7 are situated on the A2 which is a major transport corridor through Swale, with AQMA 4 located within Sittingbourne urban centre.

Furthermore, Swale Borough Council has a comprehensive monitoring network for nitrogen dioxide (NO_2) and particulate matter (PM_{10}). Throughout 2020, this included measurement by automatic analysers at three locations and a monitoring network of non-automatic, passive diffusion tubes at 72 locations. Triplicate diffusion tubes at four locations are positioned strategically to increase the accuracy of our monitoring data. Also, in 2020 we began monitoring for $PM_{2.5}$ at 1 location – expanding to 2 locations in 2021.

Due to the impact of Covid-19, the average reduction of NO_2 concentrations in 2020 compared to previous years was about 29 % (the decreases ranged across the diffusion tube network from 17 % to 38 %). There were no measured exceedances of the annual mean annual objective of 40 µg m^{-3} at locations relevant for exposure anywhere within Swale in 2020.

[5] https://uk-air.defra.gov.uk/aqma/list

Nitrogen dioxide (NO_2) concentrations measured by all three automatic analysers remained below the annual objective mean concentration in 2020. The largest decrease (31 %) was at ZW6 in Newington where the NO_2 concentration decreased from an average of 28.4 µg m^{-3} over the four years 2016 to 2019 to 19.6 µg m^{-3} in 2020.

There were also no exceedances of the hourly mean objective at all three sites in 2020, for the fourth consecutive year at ZW6 (AQMA 1 - Newington), and the third consecutive year at ZW8 (AQMA 4 – St Paul's Street) and ZW3 (AQMA 6 – Ospringe Street).

In 2020, PM_{10} concentrations were measured by two automatic monitoring stations (ZW3 – Ospringe Street and ZW8 – St Paul's Street). It is noted that there were no exceedances of the annual mean air quality objective (40 µg m^{-3}) for PM_{10} concentrations at either site.

However, it is concerning that there were 59 exceedances during 2020 (up from 42 exceedances in 2019) of the 24-hour mean objective (50 µg m^{-3}, not to be exceeded more than 35 times per year) at St Paul's Street (ZW8) in AQMA 4.

A research project, using the R OpenAir package, aimed to identify the sources of particulates contributing to the frequent exceedance of the 24-hour objective for particulate matter (PM_{10}) at St Paul's Street. However, the project was unable to determine with any certainty which sources of PM_{10} are leading to exceedances of the daily mean objective. The project forms part of other work which aims to identify PM sources and how they contribute to the daily exceedances. The projects will assist the authority to correctly target the most important sources, and to focus the principal measures within the Air Quality Action Plan for NO_2 and PM for the St Paul's Street AQMA.

While we had discussed revoking AQMA 3 (East Street) and AQMA 5 (Teynham) in last year's ASR, given the impact of Covid-19 on NO_2 concentrations it would be prudent to complete monitoring for 2021 to assess whether the previous downwards trends at these locations have continued before starting the revocation process.

SBC manages the network through monitoring, auditing, and implementing measures as part of the Air Quality Action Plan.

We work with our partners through the Kent and Medway Air Quality Partnership Group which includes regular engagement from group members. Kent County Council and Public Health England representatives also attend and contribute to meetings.

Actions to Improve Air Quality

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.

Swale Borough Council has been committed to improving air quality since 1999. We have commenced and delivered a diverse range of action plan projects designed to achieve improvements to local air quality.

The main pollutants of concern in Swale Borough are nitrogen dioxide, released predominantly from motor vehicles, and particulate matter. Many of the measures being investigated and implemented to improve local air quality are focused on reducing emissions from road traffic.

To this end, in 2019 we adopted a unified air quality action plan (AQAP), which considered measures more strategically as well as measures specific to individual AQMAs. Finally, in November 2019, Swale Borough Council adopted a new Air Quality and Planning Technical Guidance Document to ensure that air quality continues to be a material consideration in planning decisions, making certain that air quality impacts from increased road traffic and particulate emissions resulting from new development are appropriately mitigated. To support this, a new Air Quality Policy was created in 2020 to be included in Regulation 19/Pre-Submission Local Plan Review Document. Consultation will take place February to April 2021.

There are no results to show a direct change in concentrations in response to the implementation of measures.

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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

A Clean Air Zone feasibility study along the A2 through the borough has now been completed. The annual review and audit of all diffusion tube sites has also been completed. We plan to engage with Kent County Council regarding delivery of measures. As we are not the highway authority, we need further support from the county for measures.

There is ongoing partnership working between SBC departments.

SBC have match funded to be part of an education package which will run in response to a successful Defra Air Quality Grant Scheme lead by our authority partners in Tunbridge Wells Borough Council and Canterbury City Councill. The AQ grant monies will be used to fund the setting up and dissemination of a digital resource aimed at children aged 5-11 (and their parents) about air pollution.

Conclusions and Priorities

2020 was an unusual year for air quality because nitrogen dioxide concentrations were impacted by Covid-19 – there were no exceedances of the annual objective concentration for NO_2 at locations relevant for exposure anywhere in Swale.

PM_{10} concentrations both as an annual average concentration and the number of exceedances of the 24-hour mean continue to increase at the St Paul's Street sampling site. Understanding why this is happening is a priority.

Our key priorities are to develop measures which deliver compliance of air quality objectives through a combination of strategic and local focused AQMA measures. We have identified measures which target reductions in emissions from vehicle fleets (HGV, LGV and cars), smooth traffic flows and reduce congestion and protect local communities. There will be an amendment to the AQAP to include targeted measures to reduce PM at St Paul's Street.

The priorities of our AQAP are listed below:

https://www.swale.gov.uk/assets/Air-Quality/AQAPSwaleBC2018-final.pdf

https://www.swale.gov.uk/assets/Air-Quality/AQ-Planning-Tech-Guide-Nov-2019-final.pdf

Priority 1 – Identify key strategic and local measures to deliver compliance with Air Quality Standards (AQS);

Priority 2 – Develop AQAP options which focus on key emissions reduction measures from the HGV and LGV fleet travelling through the AQMA's;

Priority 3 – Quantify impact of measures;

Priority 4 – Ensure engagement with all key stakeholders to deliver the AQAP;

Priority 5 - There will be an amendment to the AQAP to include targeted measures to reduce PM at St Paul's Street.

Swale Borough Council expects the following measures to be completed over the course of next reporting year (2021):

- Clean Air Zone Feasibility study – bring forward the measures that will be priority as part of the follow up from the study. Engage with KCC regarding delivery of preferred options and to report back to Cabinet with an update.
- Anti-idling campaign - Lower NOx and PM_{10} emissions in idling hotspots
- Swale Air Quality and Planning Guidance (update) - Lower NOx and PM_{10} emission impacts from further development
- Taxi Licensing - Swale's taxi electric vehicle charging point will be installed (lead KCC). Increase EV infrastructure for districts taxi service.
- Business Travel Plans – undertake research project to collect data on businesses travel plans within the district and incentives. Encourage business mode shift and active travel to reduce traffic related emissions.
- Setting up and dissemination of a digital resource aimed at children aged 5-11 (and their parents) about air pollution. The aim being to educate, raise awareness and promote behaviour change.
- Research sources at St Paul's Street which will assist the authority to correctly target the most important sources, and to focus the principal measures within the AQAP for NO_2 and PM.

The conclusions from this year's ASR are as follows:

Newington and Keycol Hill AQMAs are located close the Swale and Medway border. Recent evidence has shown that there are significant transboundary effects from new developments in our neighbouring district, where substantial impacts have been identified. We will be liaising with Medway Council on this matter.

The Clean Air Zone Feasibility study has identified a list of measures which should be considered as priority for the coming year. We have linked these measures with those of Swales AQAP and draft Transport Strategy. The challenge is that a lot of the measures fall under the remit of KCC.

The exceedances at St Paul's Street are also a priority for the council. We have secured funding for the next project which will take place in the coming year.

Local Engagement and How to get Involved

Swale Borough Council cannot achieve air quality improvements alone. We will continue to work with all stakeholders throughout 2021 and beyond and provide information to the general public.

- Residents can stay informed by visiting the Kent Air website (http://www.kentair.org.uk/) to learn more about air pollution and local air quality or contact the Environmental Protection Team on 01622 602460 or ehadmin@midkent.gov.uk or https://www.swale/gov/uk/air-quality.
- In 2020 a consultation was set up for the declaration of the Keycol Hill AQMA and the amendment to St Paul's Street AQMA. Also consulted with residents, parish council, SBC members by way of direct letter drop regarding the Keycol Hill and St Paul's Street AQMA declarations. Also press releases and info on SBC website
- A consultation was also set up for the CAZ Feasibility Study. This was an important consultation exercise with members, officers of Kent County Council and Swale Borough Council, Parish Councils, representatives from public transport providers etc.
- Swale Borough Council planned to re-engage and re- establish working groups for 2020, however due to the pandemic this was restricted. These groups are formed of a combination of local residents, representatives from local businesses and organisations, and anyone who feels able to contribute suggestions to improve local air quality.

Swale Borough Council continues to engage with stakeholders and working groups:

- Bus operators and attending the Quality Bus Partnership (QBP) group.
- SBC contacted schools, parish councils and members re anti idling hot spots. We also had a press releases re anti idling which has resulted in the public advising us of locations.
- Kent and Medway Air Quality Partnership Group provides a platform to share information and provide update on priorities. Partners includes Kent local authorities and KCC, with guests in academia and Public Health England. Kent local authorities and Medway Council have been working together to integrate air quality data and information exchange for many years, including the provision of a website http://www.kentair.org.uk/ to disseminate the data to all. The website is used by many people for the purposes outlined below.
    - for use by local authority staff and County for local air quality management work
    - for consultants to enable detailed air quality assessments and modelling to be undertaken
    - For educational institutions to support research and for public health including forecast and alerts.

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1 Local Air Quality Management

This report provides an overview of air quality in Swale 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 Swale 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 below:

Air Quality Objectives in England[8]

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

[8] The units are in micrograms of pollutant per cubic metre of air (µg m^{-3}).

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority 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 Swale Borough Council can be found in Table 2.1. The table presents a description of the six AQMAs that are currently designated within Swale Borough Council. Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of AQMA(s) and the air quality monitoring locations in relation to the AQMA(s). The air quality objectives pertinent to the current AQMA designation(s) are as follows:

- NO_2 annual mean;
- PM_{10} 24-hour mean;

We declared (22 October 2020) a new AQMA in Keycol Hill area due to exceedances of the NO_2 annual mean air quality objectives.

We amended (22 October 2020) AQMA 4 (St Paul's Street) to include the PM_{10} 24-hour mean.

While we had discussed revoking AQMA 3 (East Street) and AQMS 5 (Teynham) in last year's ASR, given the impact of Covid-19 on NO_2 concentrations it would be prudent to complete monitoring for 2021 to assess whether the previous downwards trends at these locations have continued before starting the revocation process.

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 (µg m/3): Declaration	Level of Exceedance (µg m/3): Current Year	Name and Date of AQAP Publication	Web Link to AQAP
AQMA 1: Newington (A2 / High Street)	Declared 2009	NO_2 Annual Mean	An area encompassing those parts of London Road and High Street, Newington where the speed limit is 30mph.	NO	50	32	Strategic AQAP 2019	https://services.swale.gov.uk/assets/Air-Quality/AQAP_SwaleBC_2018%20final.pdf
AQMA 2/6: Ospringe Street, Faversham (A2 / Ospringe)	Declared as AQMA 2 in 2011, extended in 2016, consolidated As AQMA 6 in 2017	NO_2 Annual Mean	Area incorporating all of Ospringe Street near Faversham between the grid references 600106, 160936 and 600466, 160839.	NO	48	34	Strategic AQAP 2019	https://services.swale.gov.uk/assets/Air-Quality/AQAP_SwaleBC_2018%20final.pdf
AQMA 3: East Street, Sittingbourne (A2 / Canterbury Road)	Declared 2013	NO_2 Annual Mean	Area incorporating East Street, Sittingbourne.	NO	41	28	Strategic AQAP 2019	https://services.swale.gov.uk/assets/Air-Quality/AQAP_SwaleBC_2018%20final.pdf
AQMA 4: St Paul's Street, Milton, Sittingbourne (B2006)	NO_2 Declared 2013 PM_{10} declared 2020	NO_2 Annual Mean PM10 Daily	Area incorporating St Paul's Street, Sittingbourne	NO	62 42 Exceedances of 50 µg m^{-3}	32 59 Exceedances of 50 µg m^{-3}	Strategic AQAP 2019	https://services.swale.gov.uk/assets/Air-Quality/AQAP_SwaleBC_2018%20final.pdf
AQMA 5: Teynham (A2 / London Road)	Declared 2015	NO_2 Annual Mean	A2 London Teynham.	NO	39	26	Strategic AQAP 2019	https://services.swale.gov.uk/assets/Air-Quality/AQAP_SwaleBC_2018%20final.pdf
AQMA No7 Keycol Hill	Declared 2020	NO_2 Annual Mean	Area incorporates the area of Keycol Hill, Sittingbourne. This was low due to Covid19 and in 2019 the year before the formal declaration the maximum had been 56 µg m 3.	NO	36	36	Strategic AQAP 2019	https://services.swale.gov.uk/assets/Air-Quality/AQAP_SwaleBC_2018%20final.pdf

☒ **Swale Borough Council confirm the information on UK-Air regarding their AQMA(s) is up to date.**

☒ **Swale Borough Council confirm that all current AQAPs have been submitted to Defra**

Defra's appraisal of last year's ASR concluded the report is well structured, detailed, and provides the information specified in the Guidance. The following comments are designed to help inform future reports.

- *Robust and accurate QA/QC procedures were applied. Calculations for bias adjustment, annualisation and distance-correction factors were outlined in detail.*
- *The Council has included discussion and review of its AQMAs and monitoring strategy, informed due to the extensive monitoring network. This demonstrates the Councils proactive and dedicated approach to improving air quality across the area.*
- *Comments from last year's ASR have been mentioned and addressed. This is welcomed, and we encourage this to continue in future ASRs.*
- *An updated AQAP was mentioned in last years' ASR appraisal, and this has been adopted. This is encouraged to see with measures now more aligned to tackle air pollution.*
- *The Public Health Outcomes Frameworks was mentioned. The Council have referred specifically to indicator D01, which is the fraction of mortality attributable to particulate air pollution, and this is encouraged.*
- *Council have provided a clear map of the diffusion tube monitoring network; trends are displays with a brief discussed in the report, this is welcomed.*
- *Overall, the report is detailed, concise and satisfies the criteria of relevant standards. The Council should continue their good and thorough work.*

The air quality monitoring results presented in this section are adjusted for bias and annualisation (where the annual mean data capture is below 75% and greater than 25%). No results required distance correction. Further details on adjustments are provided in Appendix C.

We have used the new diffusion tube processing tool to process all diffusion tube data- this tool allows for efficient annualization, bias adjustment and distance correction.

Through the CAZ feasibility study, we now have an informed understanding of a number of measures that will have the potential to reduce emissions and achieve compliance. We are also aware that due to the economic impact of Covid-19 there could be potentially a slower replacement of the vehicular fleet with less polluting vehicles. This could result in exceedances of the air quality objectives in St Paul's Street and East Street AQMAs.

The increase in PM_{10} concentration at the St Paul's Street monitoring station – both as annual mean and increases in number of exceedances of the 50-μg m^{-3} continues to be investigated. A detailed analysis was undertaken using the R OpenAir package which assessed air quality measurements at the St Paul's Street during 2019 up to 2020 and how they relate to wind direction and speed. The study found it was not possible to determine with any certainty which sources of PM_{10} are leading to exceedances of the daily mean objective. This project forms part of a wider research plan being undertaken by Swale Borough Council to correctly target the most important sources. The research aims to provide an evidence base to inform and feed into an Action Plan which will identify targeted measures to reduce the PM_{10} levels at the St Paul's Street AQMA.

As part of this, we have applied for Defra Air Quality Grant 2020 for a project to identify behaviour of traffic flows and routes being taken by Heavy Good Vehicles (HGVs) and potentially other vehicles through St Paul's Street from the Eurolink Business Park, Milton Parking Lorry Park and Crown Quay Lane Lorry Park to/from the A249. We have also secured funding for a traffic source apportionment study for St Paul's Street. This work will form part of LAQM assessments to determine the relative contribution of vehicle types at the St Paul's Street (AQMA 4).

Swale 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. Twenty-two measures are included within Table 2.2, with the type of measure and the progress Swale Borough Council have 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.

More detail on these measures can be found in the SBC Air Quality Action Plan and the CAZ Feasibility Study.

Progress has been made in 2020 as described in the comments and implementation column in Table 2.2. Key priorities to be completed in 2021 are:

- Clean Air Zone Feasibility study – bring forward the measures that will be priority as part of the follow up from the study. Engage with KCC regarding delivery of preferred options and to report back to Cabinet with an update.
- Anti-idling campaign - Lower NOx and PM_{10} emissions in idling hotspots
- Swale Air Quality and Planning Guidance (update) - Lower NOx and PM_{10} emission impacts from further development
- Taxi Licensing - Swale's taxi electric vehicle charging point will be installed (lead KCC). Increase EV infrastructure for districts taxi service.
- Business Travel Plans – undertake research project to collect data on businesses travel plans within the district and incentives. Encourage business mode shift and active travel to reduce traffic related emissions.
- Setting up and dissemination of a digital resource aimed at children aged 5-11 (and their parents) about air pollution. The aim being to educate, raise awareness and promote behaviour change.
- Research sources at St Paul's Street which will assist the authority to correctly target the most important sources, and to focus the principal measures within the AQAP for NO_2 and PM.

Swale Borough Council's priorities completed in 2020:

- Investigate changes in local ambient air quality as a result of COVID-19. Openair analysis for St Paul's Street investigated PM_{10} and NO_2 concentrations during initial Covid-19 lockdown period.
- Declaration of a new AQMA in Keycol Hill area due to exceedances of the NO_2 annual mean air quality objectives (22 October 2020).
- Amendment of AQMA 4 (St Paul's Street) to include the PM_{10} 24-hour mean (22 October 2020).

- Continue to work with developers to ensure the planning system appropriately reduces air quality impacts through our new Air Quality and Planning Technical Guidance, adopted in November 2019.
- Finalising new AQ Policy included in Regulation 19/Pre-Submission Local Plan Review Document. Consultation will take place February to April 2021.
- 2020 annual audit completed for NO_2 diffusion tubes.
- Anti-idling campaign approved by Cabinet. Fixed Penalty Notifications (FPNs) being finalised and in-house training of authorised officers. Campaign engagement and work with schools is on hold due to Covid restrictions/situation. We plan to re-engage with schools at the start of the 2021/22 academic year in September. Taxi drivers regularly reminded via newsletters.
- Clean Air Zone (CAZ) Feasibility Study completed in 2020. Report and recommendations approved by Cabinet in December 2020. Next step is to engage with KCC regarding delivery of preferred options and to report back to Cabinet with an update.

The principal challenges and barriers to implementation that Swale Borough Council anticipates facing were:

- Covid 19 restrictions have caused barriers with various measures such as the school travel plans and anti-idling campaign.
- Staffing resources (due to vacant posts) and staff having to prioritise other workload including Covid-19 enforcement and advice has resulted in delays in some areas.

Progress on the following measures has been slower than expected:

- Measure 1: HGV “Clear Air Corridor”. Some delay with this due to LA officers having to undertake Covid–19 enforcement work.
- Measure 4: “Clear Air Corridor” signage and information scheme”. This measure was impacted in a similar way to Measure 1.
- Measure 9: Local school and business travel plans. The Clean Air for Schools programme and REVS Up for Cleaner Air scheme were hold due to Covid-19.
- Measure 14: Anti-idling Campaign targeting hotspot areas within the district. Campaign engagement and work with schools was on hold due to Covid-19 restrictions/situation.
- Measure 18: Promote and encourage change of transport modes. Public transport usage reduced due to the pandemic and lockdowns. Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Swale Borough Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of St Paul’s Street and Keycol Hill AQMAs.

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
1	HGV "Clear Air Corridor"	Promoting Low Emission Transport	Clean Air Zone (CAZ)	2020	2022	KCC / SBC	Joint bids with KCC	NA	No funding source at present	15 to 118 million	Implementation phase	Lower NOx and PM10 emissions	Reduction in pre-Euro VI HGV	Clean Air Zone feasibility study and options appraisal completed.	Report and recommendations approved by Cabinet in December 2020. Next step is to engage with KCC regarding delivery of preferred options and to report back to Cabinet with an update. Some delay for this due the Environmental Health having to spend some time undertaking Covid 19 enforcement work.
2	Air Quality and Low Emission Strategy	Policy Guidance and Development Control	Low Emissions Strategy	2019	Ongoing	SBC	Joint bids with KCC	NA	No funding source at present	NA	Implementation phase	Lower NOx and PM10 emissions	Development of LES	Planning stage for SBC strategy will commence in 2020.	Through the Climate and Ecological Emergency Action Plan progress has been made on some of the areas included in the LES. The SBC fleet has been replaced with EVs and the procurement strategy has been reviewed to include more requirements on sustainability. Low Emission projects are planned within this, including increasing EV charging infrastructure and longer-term behaviour change initiatives. Many of the proposed actions face funding barriers. The Kent and Medway ELES implementation plan has now been approved and SBC continues to work with KCC via the Climate Change Network. KCC source/ Kent Realising Electric Vans Scheme (Kent REVS) Trial - The scheme loans electric vans to businesses around Kent for two months, giving them the opportunity to trial the vehicles and see if making the switch will work for their business. 10 Swale businesses taken up EV REVs via the trial.
3	Develop't of Air Quality standards within new Local Plan	Policy Guidance and Develop't Control	Low Emissions Strategy	2020	2021	SBC	S106 contributions	NA	NA	NA	Implementation phase	Unquantifiable	Air Quality standards to reduce district-wide emissions	New AQ Policy included in Regulation 19/Pre-Submission Local Plan Review Document. Consultation will take place February to April 2021.	i.e., Standards for low emissions boilers to new homes/developments, parking standards policy, mitigation measures and use of s106. •The Local Plan Review 2021 Pre-Submission Document includes an Air Quality Policy •The Swale Borough Council Parking Standards SPD includes requirements for Parking for Ultra Low Emission Vehicles with the objective of improving air quality. •The Standard Parking measures for Ultra Low Emission Vehicles and Low NOx boilers have been incorporated into the recommended standard measures within the Air Quality and Planning Technical Guidance document.
4	"Clear Air Corridor" signage and information scheme"	Freight and Delivery Management	Non charging Clean Air Zone (CAZ)	2020	2022	KCC	Part of measure 1					Part of measure 1.	Reduction in pre-Euro VI HGV	Part of measure 1.	Part of measure 1.
5	KCC development control policies	Policy Guidance and Development Control	Low Emissions Strategy	2021	On-going	KCC	NA	NA	NA	NA	Implementation phase	Unquantifiable	Controlled parking allowances for developments	In progress	We anticipate new Standards being published as part of KCC's update to the Kent Design Guide which is currently in progress

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
6	Swale Freight Management Plan (2016)	Freight and Delivery Management	Delivery and Service plans	2016	On going	KCC	S106 contributions and joint bids with KCC	NA	NA	NA	Planning Phase for Transport Strategy	Unquantifiable, contributes to measure 1	Engagement with operator and links with Transport Strategy	Continued engagement with and support for the FREIGHT Plan	The Transport Strategy should support the FMP which is at the planning stage (workshop commencing June 2020).
7	Air pollution alerts and information	Public information	Via other mechanisms	2018	On-going	SBC	SBC budget for website and data management	Split between districts for AQ grant money	Fully funded	NA	Implementation phase	Lower NOx and PM10 emissions	Number of (vulnerable) people using the alert service in Swale	Kentair website has free air pollution alerts and information. Emails are issued whenever air quality is forecast to be Moderate or above for the following day. The email includes Defra's recommended actions and health advice. There are currently 336 registered users for the email service.	Kent and Medway Air Quality Partnership Group are reviewing the website in line with the new data management contract to incorporate improvements to the resources and content of materials including more interactive guidance for vulnerable groups. Kent and Medway Partnership Group plan to create a communication subgroup in 2021 - attendees include various district councils, Kent County Council and Public Health England representatives. SBC have match funded to be part of an education package which will run in response to a successful Defra Air Quality Grant Scheme lead by our authority partners in Tonbridge Wells Borough Council (BC) and Canterbury Councill. The AQ grant monies will be used to fund the setting up and dissemination of a digital resource aimed at children aged 5-11 (and their parents) about air pollution. The aim being to educate, raise awareness and promote behaviour change. The resource will be made available firstly to all primary schools in the Swale BC, Maidstone BC, Tonbridge Wells BC (the Mid Kent EH Partnership) and Canterbury Council. KCC are involved as the organisation responsible for both public health and education in our area. In addition, other districts in Kent will also be able to benefit from the package as it's rolled out.
8	EcoStars	Vehicle Fleet Efficiency	Driver training and ECO driving aids	2019	2019	SBC	NA	NA	NA	NA	Not currently active	No direct measure available.	Number of HGV and LGV drivers taken through scheme.	14 members originally signed up and an additional 8 freight operators signed up in 2019	EcoStars continued in 2019 but at present the Emissions Toolkit which is planned to measure the direct improvement on air quality from members implementing improvement measures is not available. As a result, SBC are not planning to finance the recruitment of additional members in 2020.
Local AQMA Measures															
9	Local school and business travel plans	Promoting travel alternatives	Promotion of walking and cycling and travel plans	2019	On-going	KCC (+ PHE, SBC)	AQ grant scheme, SBC funding and S106 contributions	As part of an AQ grant scheme	NA	Unknown	Implementation phase	Lower NOx and PM10 emissions	% participant in Kent smarter travel challenge recorded by KCC	SBC informed all schools of the Kent Smarter Travel scheme. Responses included a discussion about their travel plans and how the scheme and SBC could help.	This measure and work in relation to Clean Air for Schools has been on hold during 2020 due to Covid 19 restrictions. SBC plan to continue to work with schools' once restrictions have been lifted and schools are ready to take part. KCC and district distribution to support local business to switch to ULEV vans through the Kent REVS Up for Cleaner Air scheme - information being distributed among businesses and the scheme will take place in 2021. The digital education package mention above (measure 7) will be created in 2021 and will be used as part of the Clean Air for Schools scheme.

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10	Pinch-point parking alternatives (red-route)	Traffic Management	Parking Enforcement on highway	2019	2022	KCC	Combination of the S106 contributions	NA	NA	Unknown	Planning phase	Lower NOx and PM10 emissions	A2 parking space reduction	Ongoing	Remove pinch point A2 parking by providing alternate off-street parking and/or camera enforcement of loading bays (AQMA's: 1, 3, 5, 6) Vehicle Parking Supplementary Planning Document is going through the final stages for adoption. This measure might be factored into the transport strategy.
11	"20 is plenty" zones	Traffic Management	Reduction of speed limits, 20mph zones	NA	NA	KCC	NA	NA	NA	Unknown	Not currently active in AQMAs	Lower NOx and PM10 emissions	Smoothing Traffic flow to reduce emissions	On-going	Faversham town centre now has 20 mph speed limit which was funded by the Department for Transport's Emergency Active Travel Fund. This was led by Faversham Town Council and Kent County Council. Ospringe AQMA was not included in this. Modelling scenarios in the CAZ feasibility study showed changing the speed to 20mph along the Ospringe A2 road would not make a significant difference to the air pollution levels, due to the nature of the road and recorded speeds. However, further assessment into this may need to be considered. The reduction of speed in Faversham will encourage active travel and road safety confidence for walking and cycling, which may result in a reduction of vehicles on the road. It is not as simple along the A2 corridor, as there is limited space for bike lanes and being an 'A' road, the speeds include outside of residential areas. Therefore, this road is less appealing to new walkers and cyclists due to the road safety aspect. We could investigate the possibility of reducing speeds along country back roads to enable safer access to villages as an alternative to the A2.
12	Quiet delivery zones	Freight and delivery management	Quiet & out of hours delivery	2021	2022	KCC	Combination of the S106 contributions	NA	NA	To be confirmed	Being reviewed as part of a planning application	Lower NOx and PM10 emissions	Reducing noise and emissions by restricting delivery times	To start	This measure has not been actioned by KCC. Further engagement with the highways authority is required to identify a work plan for this measure.
13	Local LEV car-club	Promoting Low Emission Transport	Other	2020	2022	SBC	Combination of the S106 contributions	NA	NA	NA	NA	Lower NOx and PM10 emissions	LEV car club vehicle no.	This measure is ongoing. Could be factored into the Transport strategy.	A high level of research has been conducted to understand the options for subsidising a car club, starting with Faversham. If approved, the project would focus on low emission hybrid vehicles that would be positioned in permanent bays e.g., Queens Hall Car Park and geo-fenced to areas with a lack of off-road parking for residents. A present a car club would have to be subsidised by the council at a high cost with a high risk level for success. Expansion of a car club would likely depend on developer contributions although this isn't always a reliable way of ensuring good distribution of car club vehicles.
Additional measures															
14	Anti-idling Campaign targeting hotspot areas within the district	Traffic Management	Anti-idling enforcement	2020	Ongoing	SBC	SBC budget	NA	Fully funded	NA	On going	Lower NOx and PM10 emissions in idling hotspots	Sustainable business, cleaner greener Swale	Implementation on-going	Anti-idling campaign approved by Cabinet. FPNs being finalised and in-house training of authorised officers. Campaign engagement and work with schools is on hold due to Covid restrictions/situation. We plan to re-engage with schools at the start of the 2021/22 academic year in September. Taxi drivers regularly reminded via newsletters.

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14	Swale Air Quality and Planning Guidance (update)	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2017	2021	SBC	No funding needed	NA	NA	NA	Active	N/A	Planning Guidance update	Planning Technical Guidance was approved November 2019: leading to a clearer expectation of what is required from Developers, especially concerning assessment and mitigation measures. Document will be updated, Spring 2021.	The Local Plan Review 2021 Pre-Submission Document will include a more robust Air Quality Policy which will support the Air Quality and Planning Technical Guidance document. The guidance document is being reviewed and updated relative to localised best practice.
15	Low emission taxi licencing scheme (Kent)	Promoting Low Emission Transport	Taxi Licensing conditions	2017/18	2021	SBC	KCC	NA	Unknown	NA	Active	N/A	Lower emissions from taxis	Ongoing	KCC Energy and Low Emission Strategy (ELES) include priority to work with private transport sector, including school transport providers and taxi licencing to incentivise and switch to Ultra Low Emission Vehicles. Swale's taxi charging point will be installed by 2021 (lead KCC). Taxi fleet has been upgraded: currently 6 hybrids (all Prius) and 1 Tesla.
16	Clean-air walking and cycle ways	Promote travel alternatives	Intensive active travel campaign & infrastructure	2019	2022	SBC/ KCC	Explore Kent's maps comes from KCC's bid for funding from the UK Government's Access Fund. The funding for the cycling and walking audits for Faversham and Sheppey also came from the same funding stream.	NA	Active	Unknown	Multiple phases being completed	NA	Reduction of vehicles by encouraging the use of cycling	KCC and SBC - Transport Strategy workshop commencing June 2020. This will include a strategy for model shift options for sustainable transport and active travel in Swale, as well as funding options.	Emerging Local plan and Transport Strategy developed (out for consultation in early 2021) include model shift priorities. SBC is working with Kent Downs AONB and Medway Swale Estuary Partnership on the Linking Coast to Downs project to develop leisure routes, with work being undertaken to identify potential routes. The Economy and Community Services team are also providing information to Explore Kent who are designing a map to encourage active travel in the Faversham and Sittingbourne area. Clean Air Zone Feasibility Study approved by Cabinet in December 2020 contains a Modal Shift package which includes working with KCC on investment in walking and cycling infrastructure and other active travel measures
17	Clean-air travel planning	Promote travel alternatives	Personalised Travel Planning	2019	2022	KCC /SBC	Swale Borough Council's Special Projects Fund, KCC joint bids and S106 contributions	NA	Active	To be confirmed		NA	Lower vehicle emissions	On-going	The draft Transport Strategy is a step change for Swale in terms of promoting active travel through new (and existing) development. Planning team will be working on LCWHIP (Local Walking and Cycling Strategy) with Faversham Town Council for the whole of Faversham and then a Faversham to the countryside project to link Faversham to the wider villages. The possibility of a district-wide strategy is being considered. Local Cycling and Walking Infrastructure Plan (LCWIP) for the Faversham Area was funded through a bid to Swale Borough Council's Special Projects Fund.

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18	Promote and encourage change of transport modes	Promote low emission transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2021	On-going	SBC	SBC/KCC	NA	Existing budgets	NA	Active	Unquantifiable	% increase in electric /hybrid vehicles on the road using traffic counts.	On-going	SBC are working on promoting business fleet decarbonisation and our work-place car chargers. Energy improvement grant signposting via e-bulletin for businesses and website for householders. Kent County Council's (KCC) plan to launch a two-year scheme earlier next year (Kent Realising Electric Vans Scheme) which Swale BC plan to promote to all local business. Due to Covid 19 bus usage has reduced and promoting bus use is not appropriate in the current situation during national lockdown. S106 planning application funding for air quality for sustainable transport fund. Looking to set up pulled contributions for overall improvements. EV infrastructure has been increased with 8 new charge points in SBC car parks in 2020. The EV strategy is to be taken to consultation in late 2021. Potential to increase EV charging capacity at Swale House has been confirmed. Application to the OZEV ORCS funding scheme is being investigated. SBC supports KCC plans for EV charging at village halls and taxi ranks.
19	Air Quality Policy	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2020	2023	SBC	No funding needed				Implementation phase	Unquantifiable	Improve air quality through location, linkage, layout, land-use, landscaping and building design; plus, passive and active mitigation measures.	Final draft AQ policy for Regulation 19 consultation/Pre-Submissions Document completed (2020). Consultation on Regulation 19 Local Plan Review will take place between February to April 2021. Local Plan Review and policy due to be adopted 2023.	The Local Plan Review (Regulation 19/Pre-Submission) Document (2021) includes a robust Air Quality Policy and is supported by the Air Quality Planning Technical Guidance Document.
20	Diversion of HGV traffic (time / weight or other restrictions)	Freight and Delivery Management	Route Management Plans/ Strategic routing strategy for HGV's	2020	2030	KCC	Defra Air Quality Grant 2020	Match funding by SBC (43%) £15,000 Defra funding (57%) £20,000	To be confirmed	£35,000	Application phase – awaiting response from Defra	NA	Reduce number of HGV through St Paul's Street (AQMA 4)	Application for Defra Air Quality Grant 2020	Funding barrier for project
22	Promotion of public transport alternatives with quality bus and train services at enhanced frequencies	Alternatives to private vehicle use	Other		2022	KCC/SBC	S106 contributions	NA	Currently unknown – SBC are reviewing potential 106 contributions	NA	NA	Unquantifiable	Statistical evidence of behaviour and travel choices	Recommendation made with planning applications and S106 contributions to improve bus services	Continue engaging with operators and attending the Quality Bus Partnership (QBP) group. We plan to guide developer contributions to support and promote the services.

2.2 $PM_{2.5}$ – 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.

Although no specific measures to address $PM_{2.5}$ concentrations are in place at present, it is recognised that measures to reduce NO_2 and PM_{10} should also have a beneficial effect on $PM_{2.5}$ concentrations. The follow is a list of measures Swale Borough Council is undertaking to reduce PM_{10} and NO_x which should have a beneficial impact on $PM_{2.5}$:

Measure 1: HGV "Clear Air Corridor"

Measure 2: Air Quality and Low Emission Strategy

Measure 7: Air pollution alerts and information

Measure 9: Local school and business travel plans

Measure 10: Pinch-point parking alternatives (red-route)

Measure 11: "20 is plenty" zones

Measure 14: Anti-idling Campaign targeting hotspot areas within the district

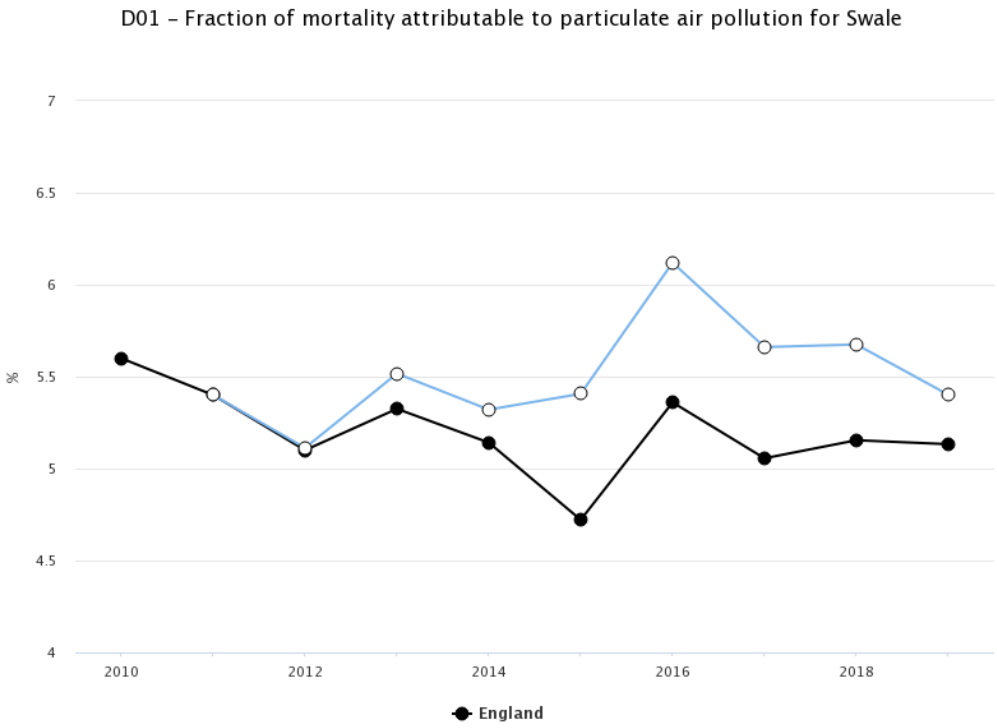
The most recent available data from Public Health England's Public Health Outcomes Framework[9] show that the fraction of total mortality which is attributable to particulate air pollution[10] in Swale Borough was 5.4% in 2019 (the most recent data available). This is

[9] https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/4/gid/1000043/pat/102/par/E10000016/ati/101/are/E07000113/iid/30101/age/230/sex/4/cid/4/tbm/1/page-options/car-ao-0_car-do-0_tre-ao-0

[10] The $PM_{2.5}$ concentrations used in the Public Health England's Public Health Framework are the background annual average $PM_{2.5}$ concentrations which are modelled on a 1km x 1km grid using an air dispersion model, and calibrated using measured concentrations taken from background sites in Defra's Automatic Urban and Rural Network (http://uk-air.defra.gov.uk/interactive-map.)

slightly above the average for both Kent (5.3%) and England as a whole (5.1%). Since 2010 the fraction of total mortality has remained more or less constant- with some inter year variability. There was a peak in 2016 for both Swale and England but these have decreased since then.

Figure 2-1 Faction of total mortality attributable to particulate air pollution in Swale



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

This section sets out the monitoring undertaken within 2020 by Swale 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.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Swale Borough Council undertook automatic (continuous) monitoring at three sites during 2020. Table A.1 in Appendix A shows the details of the automatic monitoring sites. NB. local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem. The Kentair website presents automatic monitoring results for Swale Borough Council, with automatic monitoring results also available through the UK-Air website[11] .

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

Swale Borough Council undertook non-automatic (i.e., passive) monitoring of NO_2 at 72 sites during 2020. There was a significant realignment of sites after the 2019 site audit with 30 sites being closed[12] and monitoring starting at 20 new locations. Table A.2 in Appendix A presents the details of the non-automatic sites.

[11] https://uk-air.defra.gov.uk/data/datawarehouse

[12] Sites closed at the end of 2019 included: SW13, SW14, SW22, SW35,SW36,SW38,SW52,SW53,SW58,SW73,SW82,SW84,SW87,SW95,SW97,SW99,SW100,SW101,SW102,SW103,SW104,SW105 ,SW106,SW108,SW111,SW113 (closed end May 2020), SW114,SW115,SW116,SW129

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

3.2 Individual Pollutants

The air quality monitoring results presented in this section are adjusted for bias, annualisation (where the annual mean data capture is below 75% and greater than 25%). No results required distance correction. Further details on adjustments are provided in Appendix C.

3.2.1 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 40 µg 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).

The five-year trends in NO_2 concentrations are also presented in Figures A.1 to A.9 in Appendix A. The impact of Covid-19 on concentrations can clearly been seen.

For diffusion tubes, the full 2020 dataset of monthly mean values is provided in Appendix B.

Table A.5 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past 5 years with the air quality objective of 200 µg m^{-3}, not to be exceeded more than 18 times per year. There have been no exceedances of the 200 µg m^{-3} hourly value since 2018.

Due to the impact of Covid-19, the average reduction of NO_2 concentrations in 2020 compared to previous years was about 29 % (the decreases ranged from 17 % to 38 %). Hence, there was no measured exceedance of the annual mean standard of 40 µg m^{-3} at locations relevant for exposure anywhere within Swale in 2020.
Sampling was discontinued after five months in 2020 at site SW113 (in AQMA 7) because the site no longer met the siting criteria defined by Defra in TG (16) - a tree canopy near

the tube had increased in size to such an extent that it was no longer possible to sample a representative volume of air. This site has hence been excluded from the air quality assessment presented here. There are other diffusion tube sites in the immediate vicinity of the discontinued site and none of these showed exceedances. The two nearest sites were SW121 and SW144 measuring NO_2 concentrations of 33.9 µg m^{-3} and 32.9 µg m^{-3}, respectively in 2020.

Within each of the other AQMAs concentrations were also correspondingly lower compared to previous years (see Table 2.1) with the largest concentrations measured in AQMA 2/6 and AQMA 7 – both 34 µg m^{-3}.

Given that 2020 was an abnormal year for air quality, monitoring should continue before decisions on amending or revocation can be made with confidence.

3.2.2 Particulate Matter (PM_{10})

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 40 µg 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 50 µg m^{-3}, not to be exceeded more than 35 times per year.

At ZW8 (St Paul's Street) in AQMA 4, both the annual mean PM_{10} and the number of exceedances of the 24-hour average increased for a third year in a row. The annual mean PM_{10} concentration in 2020 was 34.9 µg m^{-3} and the number of exceedances of the 24-hour mean greater the 50 µg m^{-3} was 59, significantly more than the AQS Objective of the 35 exceedances. As discussed in Section 2.1 work is ongoing to understand better the reasons for these exceedances.

At ZW3 (Ospringe Street) in AQMA 2/6 the annual mean concentration was 22.2 µg m^{-3} significantly less than the AQS standard of 40 µg m^{-3}. The number of exceedances of the 24-hour mean greater the 50 µg m^{-3} was 13, significantly less than the AQS Objective of the 35 exceedances.

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.8 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentration.

$PM_{2.5}$ is the pollutant which has the biggest impact on public health and on which the Public Health Outcomes Framework (PHOF) indicator is based. Therefore, although not covered by the LAQM regulations local authorities are encouraged to understand the $PM_{2.5}$ concentration within their council area.

Monitoring of $PM_{2.5}$ concentrations began on 11th March 2020 at the St Paul's Street sampling site and there is sufficiently good data capture (77.3 %) to have a valid annual mean. The annual mean was 13.1 µg m^{-3} which is higher than the World Health Organisation guideline of 10 µg m^{-3}. This is lower than the annual mean objective of 25µg/m3 for PM 2.5. Elsewhere, the background $PM_{2.5}$ maps[13] for Swale Borough Council for 2020 showed eighteen 1 km x 1 km squares exceeding the guideline concentration in 2020 (about 4 % of borough's area).

[13] https://uk-air.defra.gov.uk/data/laqm-background-home

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)
ZW6	Newington 3	Roadside	585861	164817	NO_2	YES, AQMA 1	Chemiluminescent	5	1.6	2.4
ZW10	Newington 4 (starts 6/4/2021)	Roadside	585970	164787	NO_2, PM_{10}, $PM_{2.5}$	YES, AQMA 1	Chemiluminescent, BAM x 2			
ZW8	St Paul's Street	Roadside	590264	164396	NO_2, PM_{10}, $PM_{2.5}$	YES, AQMA 4	Chemiluminescent, BAM x 2	9	2.5	3.2
ZW3	Ospringe Roadside (2)	Roadside	600360	160869	NO_2, PM_{10}	YES, AQMA 2/6	Chemiluminescent, TEOM	0.5	1.7	2

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)
AQMA1	**Newington**									
SW19	4/5 High Street, Newington	Roadside	585907	164794	NO_2	YES, AQMA1	0.0	2.3	NO	2.05
SW20A, SW20B, SW20C	Newington Co Op	Roadside	585860	164816	NO_2	YES, AQMA1	0.0	1.9	YES	2.25
SW37	32 High Street, Newington	Roadside	585868	164803	NO_2	YES, AQMA1	4.0	1.9	NO	2.05
SW42A, SW42B, SW42C	High Street, Opp Church Lane	Roadside	585935	164787	NO_2	YES, AQMA1	0.0	1.3	NO	2.18
SW45	64 High Street, Newington	Roadside	585989	164774	NO_2	YES, AQMA1	2.9	1.2	NO	2.25
SW66	96/94High Street, Newington	Roadside	586083	164745	NO_2	YES, AQMA1	0.0	1.1	NO	1.86
SW78	55-57 High Street, Newington	Roadside	585960	164788	NO_2	YES, AQMA1	0.9	2.2	NO	1.9
AQMA 2/6	**Ospringe Street Faversham area**									
SW28	Mayors Arms, Ospringe	Roadside	600223	160885	NO_2	YES, AQMA2/6	0.0	1.5	NO	2.37
SW30A, SW30B, SW30C	ZW3 Ospringe Street	Roadside	600383	160869	NO_2	YES, AQMA2/6	1.7	2.5	YES	1.75
SW29	43 Ospringe Street, Ospringe	Roadside	600286	160868	NO_2	YES, AQMA2/6	0.0	2.4	NO	2.05
SW31	Site 7, 4 Ospringe Street	Roadside	600444	160848	NO_2	YES, AQMA2/6	0.0	1.5	NO	2.26
SW32	11 Ospringe Street, Ospringe	Roadside	600420	160845	NO_2	YES, AQMA2/6	0.0	2.0	NO	2.3
SW96	Maison Dieu, Ospringe Street	Roadside	600358	160859	NO_2	YES, AQMA2/6	0.0	1.5	NO	2.3
SW98	Canterbury Road, Preston, Faversham	Kerbside	601818	160474	NO_2	NO	2.0	0.4	NO	2.03
SW117	Land Adj Orchard, Canterbury Road, Faversham	Roadside	601629	160525	NO_2	NO	26.2	1.1	NO	2.03
SW119	Flats, The Mount, Ospringe	Roadside	600568	160819	NO_2	YES, AQMA2/6	0.0	8.0	NO	1.9

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)
SW120	1-3 Ospringe Street, Ospringe, Faversham	Roadside	600456	160836	NO_2	YES, AQMA2/6	0.0	1.4	NO	1.96
SW135	L/P 31/33 Ospringe Street, Ospringe	Roadside	600317	160861	NO_2	YES, AQMA 2/6	0.5	2.5	NO	2.08
SW136	Preston Grove, Faversham	Roadside	601491	160570	NO_2	NO	20.0	2.2	NO	2.05
SW137	Ashford Road, Faversham	Roadside	601452	160487	NO_2	NO	6.0	1.4	NO	2.05
SW138	17/18 East Street, Faversham	Roadside	601739	161310	NO_2	NO	0.0	1.3	NO	2.05
SW139	14 Crescent Road, Faversham	Roadside	601706	161334	NO_2	NO	10.0	1.1	NO	2.15
AQMA 3	**East Street**									
SW90	Junction of Canterbury Road Goodnestone Road	Roadside	591551	163456	NO_2	NO	2.9	2.2	NO	2.15
SW56	126 East Street, Sittingbourne	Roadside	591453	163456	NO_2	YES, AQMA3	0.0	3.1	NO	1.8
SW151	Beatrice Lodge, East Street, Sititngbourne	Roadside	591515	163451	NO_2	NO	6.0	1.6	NO	2
SW152	157 East Street, Sittingbourne	Roadside	591423	163484	NO_2	YES, AQMA3	4.0	1.8	NO	2
AQMA 4	**St Paul's Street**									
SW51	14/16 St Paul's Street	Roadside	590236	164408	NO_2	YES, AQMA4	0.5	2.0	NO	2.2
SW71	o/s 8 Staple Close, Staplehurst Road, Sittingbourne	Roadside	590096	164455	NO_2	NO	4.4	3.3	NO	2.25
SW89A, SW89B, SW89C	St Paul's Air Quality Station	Roadside	590252	164397	NO_2	YES, AQMA4	11.1	1.9	YES	2
SW140	36/38 Chalkwell Road, Sittingbourne	Roadside	590079	164367	NO_2	NO	0.0	1.1	NO	2.06
SW141	37/39 Chalkwell Road, Sittingbourne	Roadside	590071	164375	NO_2	NO	0.0	1.6	NO	2.1
SW142	L/P opp Stumble Inn, St Paul's Street	Roadside	590146	164397	NO_2	YES, AQMA4	20.0	1.6	NO	2.08

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)
SW150	24/26 St Paul's Street	Roadside	590203	164409	NO_2	YES, AQMA4	0.0	4.5	NO	2
AQMA 5	**Teynham**									
SW80	A2 Teynham, 107 London Road	Roadside	595160	162470	NO_2	YES, AQMA5	0.6	1.5	NO	1.8
SW91	Adj to 72 London Road, Teynham	Roadside	595150	162461	NO_2	NO	0.0	2.4	NO	1.75
SW92	FJ Williams, London Road	Roadside	595195	162446	NO_2	YES, AQMA5	1.0	3.4	NO	1.85
SW153	190/192 London Road, Teynham	Roadside	594748	162602	NO_2	NO	1.5	1.5	NO	2.05
AQMA 7	**Keycol Hill**									
SW121	Façade Squirrel Cottage, Keycol Hill	Roadside	587936	164268	NO_2	NO	0.0	9.3	NO	1.9
SW124	31/33 Keycol Hill Sittingbourne Highest Point	Roadside	587774	164321	NO_2	YES, AQMA7	0.0	1.5	NO	2
SW130	31/33 Keycol Hill Sittingbourne Mid Point	Roadside	587774	164321	NO_2	YES, AQMA7	0.0	1.5	NO	1.4
SW131	31/33 Keycol Hill Sittingbourne Lowest Point	Roadside	587774	164321	NO_2	YES, AQMA7	0.0	1.5	NO	0.8
SW144	3/5 Keycol Hill	Roadside	587917	164277	NO_2	YES, AQMA7	0.0	4.8	NO	1.9
SW145	L/P 40 Keycol Hill	Roadside	587692	164356	NO_2	YES, AQMA7	40.0	1.5	NO	2.05
SW146	Fox Cottage, Chestnut Street, Danaway	Roadside	587516	163885	NO_2	NO	7.0	1.8	NO	2.15
SW154	Bus Stop 9-11 Keycol Hill, Sittingbourne	Roadside	587874	164292	NO_2	YES, AQMA7	9.0	1.5	NO	2.05
Sittingbourne										
SW62	13 Key Street, Sittingbourne	Roadside	588178	164236	NO_2	NO	15.0	1.9	NO	2.1
SW76	155 Canterbury Road, Sittingbourne	Roadside	592211	163302	NO_2	NO	3.5	1.7	NO	2.2

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)
SW77	Kemsley Fields, Swale Way, Sittingbourne	Roadside	591035	166521	NO_2	NO	13.6	6.0	NO	2
SW83	Pembury Court, Dover Street	Roadside	590375	163774	NO_2	NO	6.3	1.4	NO	1.95
SW88	Sonara Way, Sonara Fields, Sittingbourne	Urban Background	589320	165047	NO_2	NO	5.8	1.8	NO	2.1
SW107	110 Borden Lane, Sittingbourne	Roadside	589261	163338	NO_2	NO	11.7	1.8	NO	2
SW109	39 Wises Lane, Sittingbourne	Roadside	588433	163917	NO_2	NO	6.5	1.2	NO	2
SW110	2 Cherryfields, Sittingbourne	Roadside	588467	164123	NO_2	NO	4.1	1.9	NO	2.2
SW112	56 Key Street, Sittingbourne	Roadside	588329	164188	NO_2	NO	5.5	2.1	NO	2.1
SW118	Opp Fruit Stall, 9 Fox Hill, Bapchild	Roadside	592791	163168	NO_2	NO	31.5	5.1	NO	2
SW122	Façade 13 Key Street, Sittingbourne	Roadside	588184	164250	NO_2	NO	0.0	18.0	NO	1.22
SW123	12 Key Street, Sittingbourne	Roadside	588153	164227	NO_2	NO	0.0	3.7	NO	1.8
SW125	Fox & Goose, The Street, Bapchild	Roadside	592868	163132	NO_2	NO	0.0	1.6	NO	1.95
SW126	16/18 The Street, Bapchild	Roadside	592837	163150	NO_2	NO	1.0	1.0	NO	2.08
SW132	Fountain Street, Sittingbourne	Roadside	590507	163849	NO_2	NO	5.0	3.0	NO	2.05
SW143	L/P 49 Key Street, Sittingbourne	Roadside	588388	164189	NO_2	NO	5.0	2.0	NO	2
SW147	Flats 1-20 St Michaels Road	Kerbside	590370	163877	NO_2	NO	1.0	0.4	NO	2.07
SW148	156/160 London Road, Sittingbourne	Roadside	589163	164011	NO_2	NO	4.0	1.5	NO	2.05
SW149	Balmoral Terrace, London Road, Sittingbourne	Roadside	589799	163856	NO_2	NO	10.0	1.9	NO	2

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)
Sheerness										
SW85	Sheerness College 2, Bridge Road, Sheerness	Roadside	591751	175009	NO_2	NO	-	2.4	NO	2.23
SW86	Swale Foyer, Bridge Road, Sheerness	Roadside	591723	175020	NO_2	NO	-	2.4	NO	2.05
SW127	Halfway Road (14) Halfway, Sheerness	Roadside	593151	172962	NO_2	NO	9.0	2.5	NO	2.05
SW128	Queenborough Road (12/14) Halfway, Sheerness	Roadside	593092	172870	NO_2	NO	3.0	1.5	NO	2.1
SW133	159 High Street, Sheerness Lampost	Roadside	592207	174597	NO_2	NO	0.5	1.5	NO	2
SW134	12/14 High Street Sheerness Post	Roadside	591889	174944	NO_2	NO	3.5	1.6	NO	2.4
Rural										
SW07	Capel Hill Farm, Harty	Rural	600745	169572	NO_2	NO	5.0	N/A	NO	1.7
SW34	Hernhill Village Hall, Hernhill	Rural	606624	161110	NO_2	NO	0.0	N/A	NO	1.87

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
ZW6	585861	164817	Roadside	98.0	98.0	28.1	29.7	29.1	26.8	19.6
ZW8	590264	164396	Roadside	99.2	99.2	37.7	35.1	39.7	39.1	31.6
ZW3	600360	160869	Roadside	99.1	99.1	-	-	31.6	31.4	25.1

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.**

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

Notes:

The annual mean concentrations are presented as µg m^{-3}.

Exceedances of the NO_2 annual mean objective of 40 µg 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 (µg 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
AQMA1	**Newington**									
SW19	585907	164794	Roadside	100	100	34.8	35.4	39	36.8	27.0
SW20 (triplicate)	585860	164816	Roadside	92	92	28.3	29.9	26.1	26	18.9
SW37	585868	164803	Roadside	100	100	35.1	34.2	33.7	32.6	23.1
SW42(triplicate)	585935	164787	Roadside	100	100	**45.7**	**46.4**	**47.8**	**43.9**	31.5
SW45	585989	164774	Roadside	100	100	**43.3**	**41.2**	39.7	31.8	27.4
SW66	586083	164745	Roadside	100	100	36.3	38.5	35.4	33.7	26.9
SW78	585960	164788	Roadside	83	83	35.8	**40.2**	36.9	34.1	25.4
AQMA 2/6	**Ospringe Street Faversham area**									
SW28	600223	160885	Roadside	100	100	**45.5**	**47**	**45.4**	**43**	34.0
SW30 (triplicate)	600383	160869	Roadside	100	100	31.6	37.2	36.3	31.1	22.3
SW29	600286	160868	Roadside	100	100	**48**	**46.2**	**41.1**	**40.9**	30.4
SW31	600444	160848	Roadside	90	90	**48.3**	**40.7**	**42.6**	37.9	27.8
SW32	600420	160845	Roadside	100	100	38.2	39.1	36.8	36.9	25.0
SW96	600358	160859	Roadside	90	90	39.4	**40**	36.4	36.6	27.9
SW98	601818	160474	Kerbside	90	90	34.4	34.3	33	33.5	23.4
SW117	601629	160525	Roadside	100	100	-	-	35.3	28.5	20.3
SW119	600568	160819	Roadside	100	100	-	-	27	24.7	19.1
SW120	600456	160836	Roadside	100	100	-	-	**42.2**	39.9	29.9
SW135	600317	160861	Roadside	100	100	-	-	-	-	31.6
SW136	601491	160570	Roadside	90	90	-	-	-	-	26.4
SW137	601452	160487	Roadside	83	83	-	-	-	-	35.7
SW138	601739	161310	Roadside	100	100	-	-	-	-	24.9
SW139	601706	161334	Roadside	92	92	-	-	-	-	21.5
AQMA 3	**East Street**									
SW90	591551	163456	Roadside	83	83	32.6	31	29.5	26.3	19.3
SW56	591453	163456	Roadside	92	92	39.8	**42.5**	**40.5**	37.7	27.6
SW151	591515	163451	Roadside	85	85	-	-	-	-	19.0
SW152	591423	163484	Roadside	83	83	-	-	-	-	23.9
AQMA 4	**St Paul's Street**									
SW51	590236	164408	Roadside	92	92	39.2	39.6	**45.2**	**40.5**	32.4
SW71	590096	164455	Roadside	100	100	38.3	**40**	37	36.1	27.6
SW89 (triplicate)	590252	164397	Roadside	100	100	**44.3**	**44.7**	**43.2**	**40.1**	32.3
SW140	590079	164367	Roadside	100	100	-	-	-	-	26.1
SW141	590071	164375	Roadside	92	92	-	-	-	-	27.0
SW142	590146	164397	Roadside	90	90	-	-	-	-	24.2
SW150	590203	164409	Roadside	60	60	-	-	-	-	22.2
AQMA 5	**Teynham**									
SW80	595160	162470	Roadside	92	92	**42.1**	39.9	39.3	32.8	26.1
SW91	595150	162461	Roadside	100	100	37.3	35.3	32.3	33.4	23.7
SW92	595195	162446	Roadside	100	100	37.3	29.1	32.1	31.9	23.5
SW153	594748	162602	Roadside	100	100	-	-	-	-	23.8

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
AQMA 7	**Keycol Hill**									
SW121	587936	164268	Roadside	100	100	-	-	-	**42.7**	33.9
SW124	587774	164321	Roadside	100	100	-	-	-	**52.3**	34.8
SW130	587774	164321	Roadside	100	100	-	-	-	**55.5**	35.8
SW131	587774	164321	Roadside	100	100	-	-	-	**55**	35.0
SW144	587917	164277	Roadside	100	100	-	-	-	-	32.9
SW145	587692	164356	Roadside	92	92	-	-	-	-	22.3
SW146	587516	163885	Roadside	100	100	-	-	-	-	17.8
SW154	587874	164292	Roadside	60	60	-	-	-	-	34.0
Sittingbourne										
SW62	588178	164236	Roadside	100	100	38.3	**40.6**	33.7	33.7	26.4
SW76	592211	163302	Roadside	92	92	37.8	37.6	34.2	33.5	22.2
SW77	591035	166521	Roadside	100	100	31.8	31.3	32.9	29.6	24.6
SW83	590375	163774	Roadside	90	90	27.4	29.7	30	24.6	20.3
SW88	589320	165047	Urban Background	92	92	24.1	20.4	22.2	21.1	14.6
SW107	589261	163338	Roadside	100	100	-	-	18.3	17.4	12.3
SW109	588433	163917	Roadside	100	100	-	-	17.8	15.5	12.1
SW110	588467	164123	Roadside	100	100	-	-	21.5	18.7	14.1
SW112	588329	164188	Roadside	100	100	-	-	35.4	33.4	25.8
SW118	592791	163168	Roadside	92	92	-	-	20.2	21.3	13.4
SW122	588184	164250	Roadside	100	100	-	-	-	21.2	16.9
SW123	588153	164227	Roadside	100	100	-	-	-	27.3	21.8
SW125	592868	163132	Roadside	100	100	-	-	-	23.7	16.7
SW126	592837	163150	Roadside	82	82	-	-	-	37.2	24.0
SW132	590507	163849	Roadside	93	93	-	-	-	31.4	25.9
SW143	588388	164189	Roadside	77	77	-	-	-	-	20.7
SW147	590370	163877	Kerbside	92	92	-	-	-	-	26.4
SW148	589163	164011	Roadside	83	83	-	-	-	-	19.5
SW149	589799	163856	Roadside	85	85	-	-	-	-	25.0
Sheerness										
SW85	591751	175009	Roadside	100	100	30.3	32.5	33.3	31	25.0
SW86	591723	175020	Roadside	90	90	30.2	31.4	30.3	28.3	21.5
SW127	593151	172962	Roadside	85	85	-	-	-	31	22.4
SW128	593092	172870	Roadside	92	92	-	-	-	37.4	27.0
SW133	592207	174597	Roadside	65	65	-	-	-	30.4	22.5
SW134	591889	174944	Roadside	92	92	-	-	-	26.8	18.5
Rural										
SW07	600745	169572	Rural	100	100	12.1	10.7	10.7	11.3	8.3
SW34	606624	161110	Rural	100	100	13.2	11.9	10.3	9.8	8.0

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.**

☒ **Diffusion tube data has been bias adjusted.**

☒ **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.**

Notes:

The annual mean concentrations are presented as µg m^{-3}.

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

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

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 presents NO_2 annual mean concentrations for the automatic sampling sites between years 2016 to 2020. There are no exceedances of the annual mean objective in 2020.

Figure A.1 – Trends in Annual Mean NO2 Concentrations: Automatic Monitoring Stations

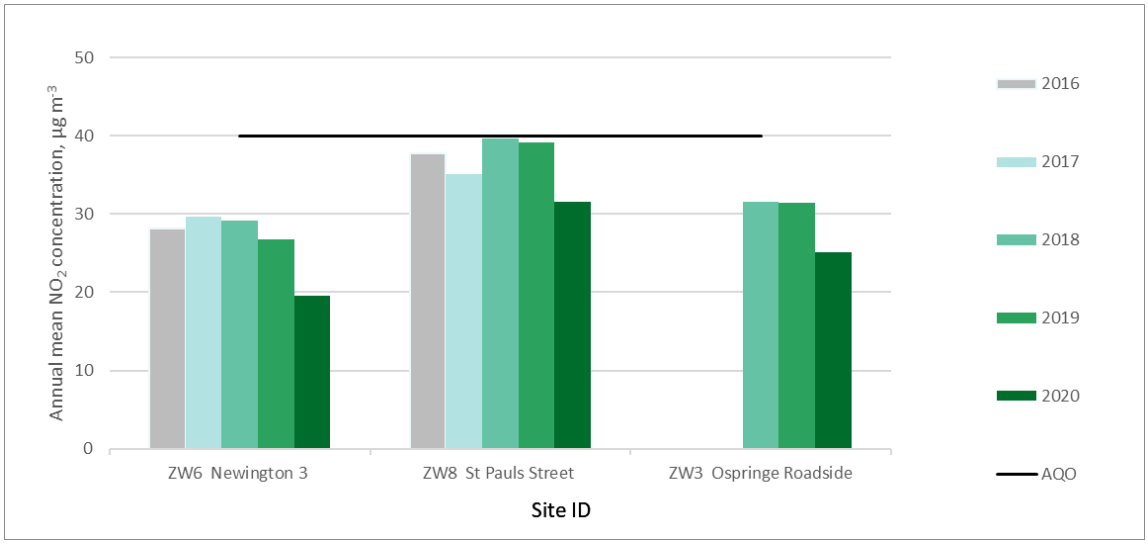


Figure A.2 presents NO_2 annual mean concentrations measured by diffusion tube within AQMA 1 between years 2016 to 2020. 2020 was the first year there was no measured exceedances at site SW42 (High Street).

Figure A.2 – Trends in Annual Mean NO_2 Concentrations: AQMA1 Newington

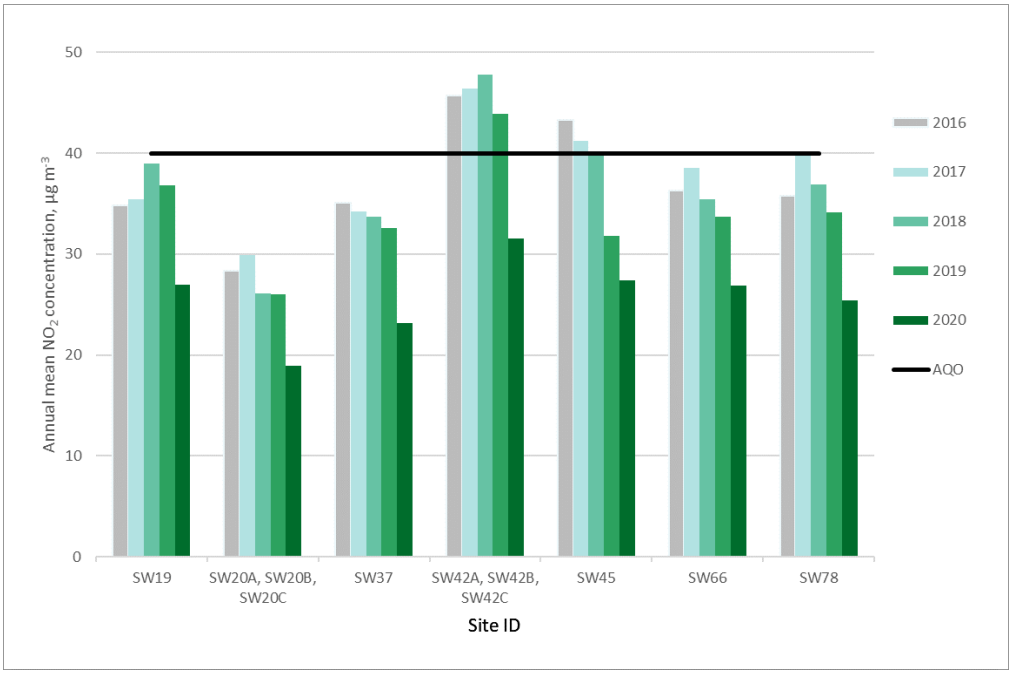


Figure A.3 presents NO_2 annual mean concentrations measured by diffusion tube within AQMA 2/6 between years 2016 to 2020. 2020 was the first year there was no measured exceedances within the AQMAs).

Figure A.3 –Trends in Annual Mean NO_2 Concentrations: AQMA2/6 Ospringe Street and Faversham

Figure A.4 presents NO_2 annual mean concentrations measured by diffusion tube within AQMA 3 between years 2016 to 2020. Two new sites were added in 2020. All measured concentrations significantly below air quality objective.

Figure A.4 –Trends in Annual Mean NO_2 Concentrations: AQMA 3 East Street, Sittingbourne

Figure A.5 presents NO_2 annual mean concentrations measured by diffusion tube within AQMA 4 between years 2016 to 2020. 2020 was the first year there was no measured exceedances of the air quality objective for NO_2 within the AQMA.

Figure A.5 – Trends in Annual Mean NO_2 Concentrations: AQMA 4 St Paul's Street

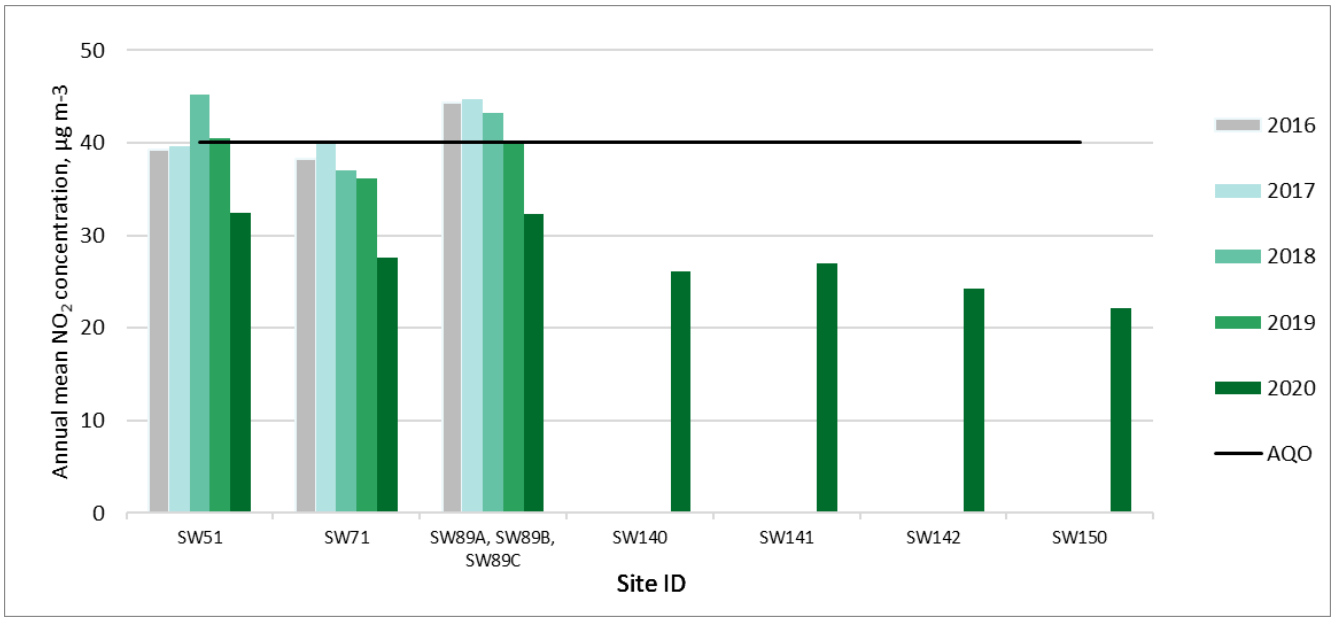


Figure A.6 presents NO_2 annual mean concentrations measured by diffusion tube within AQMA 5 between years 2016 to 2020. Before 2019, NO_2 concentrations were sufficiently high at site SW80 (107 London Road) that suggested that there would be a risk of exceedance in the AQMA. Monitoring should continue.

Figure A.6 – Trends in Annual Mean NO_2 Concentrations: AQMA 5 Teynham

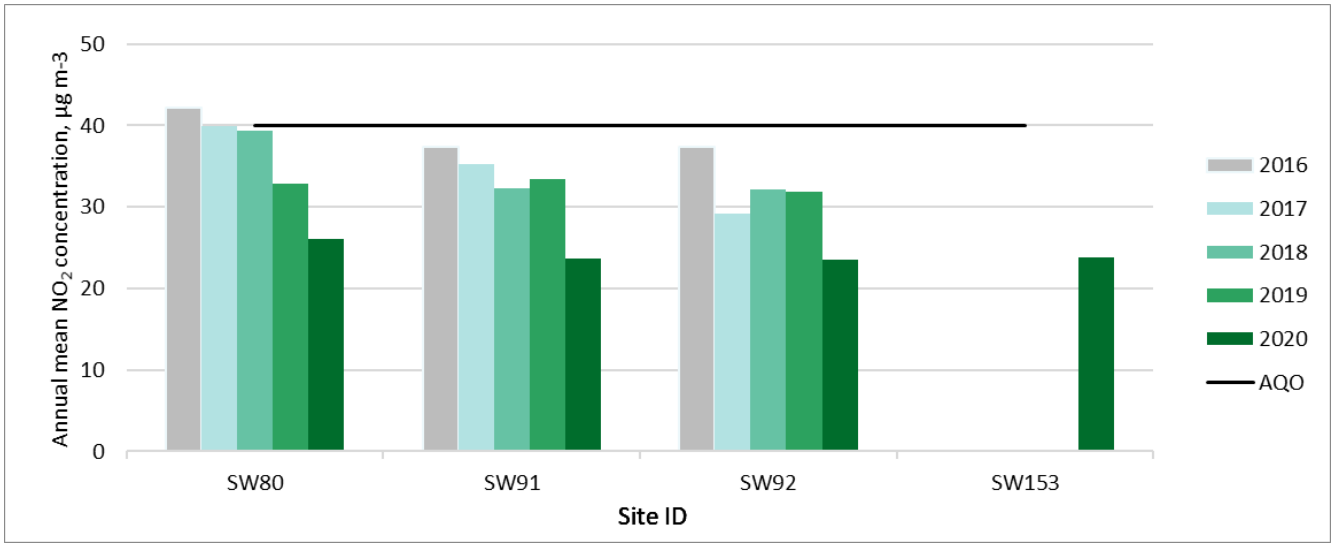


Figure A.7 presents NO_2 annual mean concentrations measured by diffusion tube within AQMA 7 between years 2016 to 2020. Sites SW124 (highest height), SW130 (middle height) and SW131 (lowest height) are located at various heights on the same lamp post. The aim of this study is to assess the impact of height on NO_2 concentration.

Figure A.7 – Trends in Annual Mean NO_2 Concentrations: AQMA 7 Keycol Hill

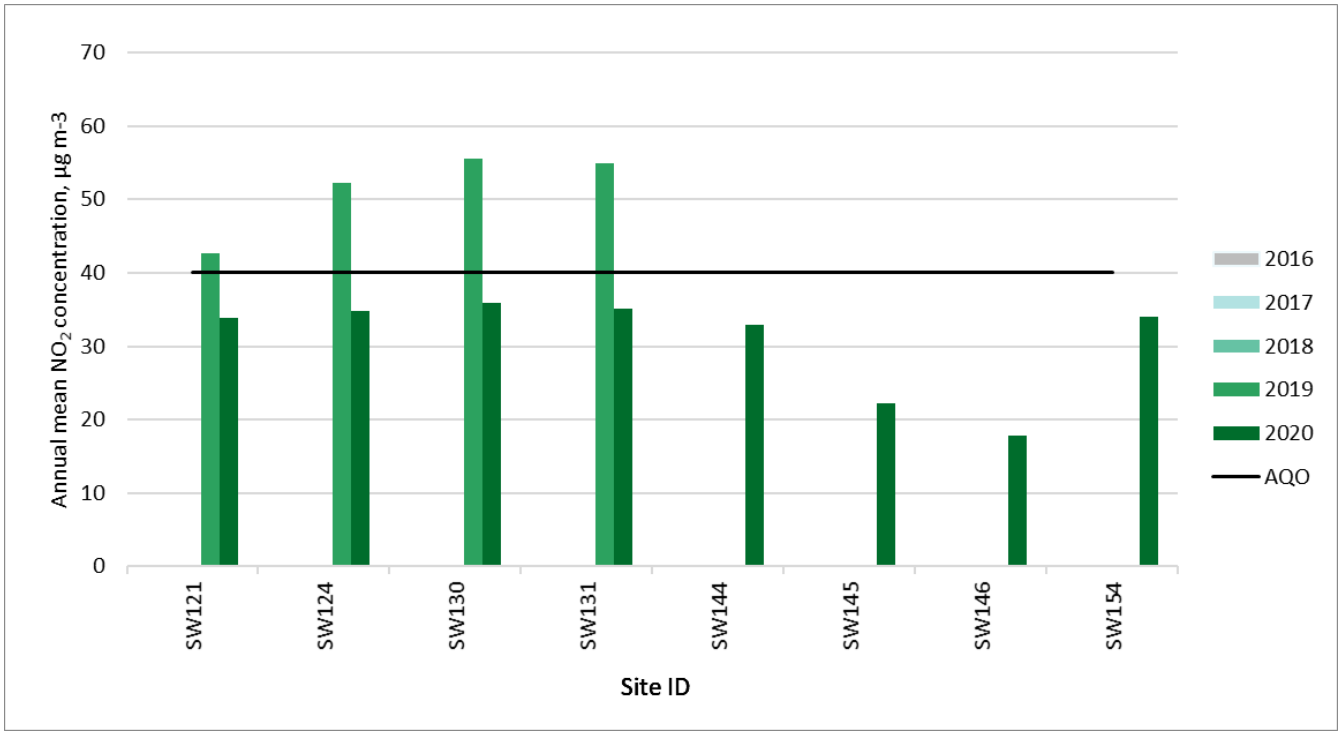


Figure A.8 presents NO_2 annual mean concentrations measured by diffusion tube within Sittingbourne between years 2016 to 2020.

Figure A.8 – Trends in Annual Mean NO_2 Concentrations: Sittingbourne

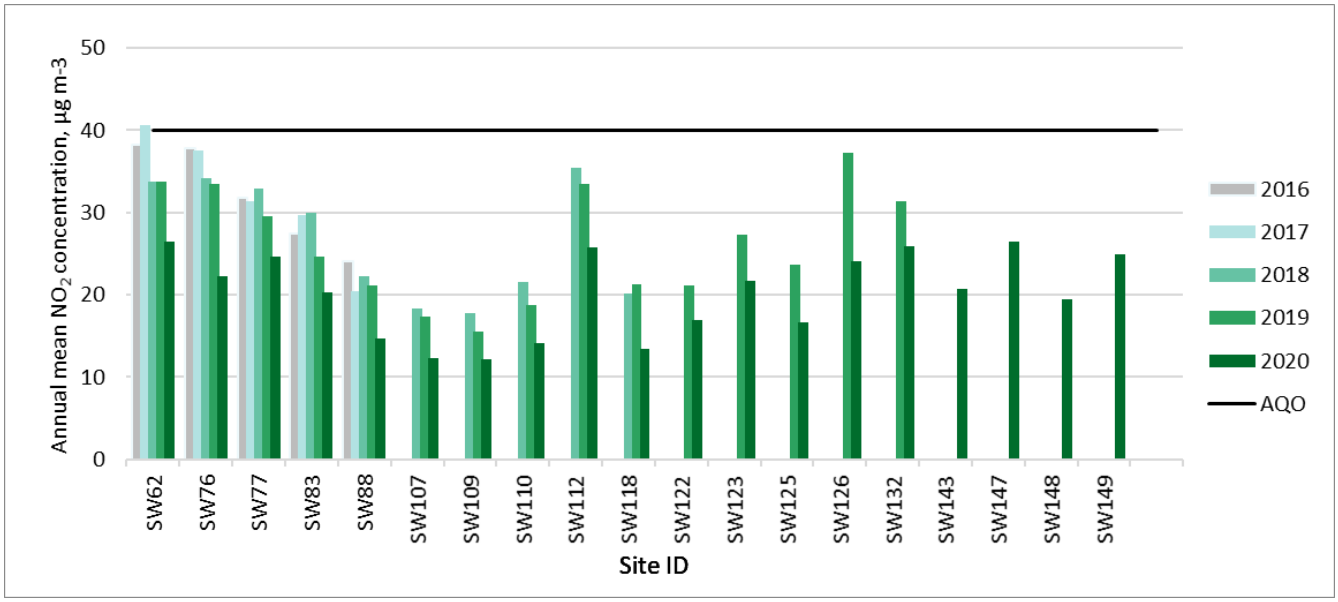


Figure A.9 presents NO_2 annual mean concentrations measured by diffusion tube within Sheerness and at two rural locations (SW07 and SW34) between years 2016 to 2020.

Figure A.9 – Trends in Annual Mean NO_2 Concentrations: Sheerness and rural locations

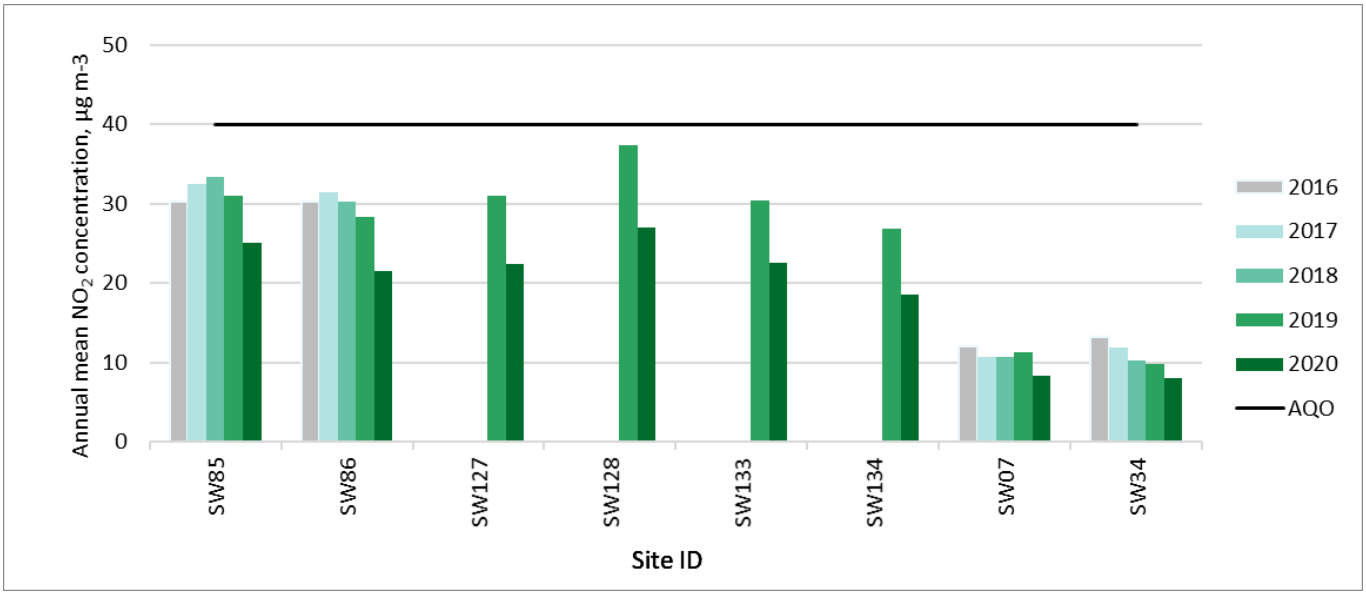


Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200 µg m^{-3}

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
ZW6	585861	164817	Roadside	98.0	98.0	1	0	0	0	0
ZW8	590264	164396	Roadside	99.2	99.2	0	1	0	0	0
ZW3	600360	160869	Roadside	99.1	99.1	N/A	N/A	0 (116.2)	0	0

Notes:

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

Exceedances of the NO_2 1-hour mean objective (200 µg 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%).

Figure A.10 shows the number of hours of NO_2 measured above 200 µg m^{-3} for all years from 2016 to 2020. There have been no exceedances at any site since 2017.

Figure A.10 – Trends in Number of NO_2 1-Hour Means > 200 µg m^{-3}

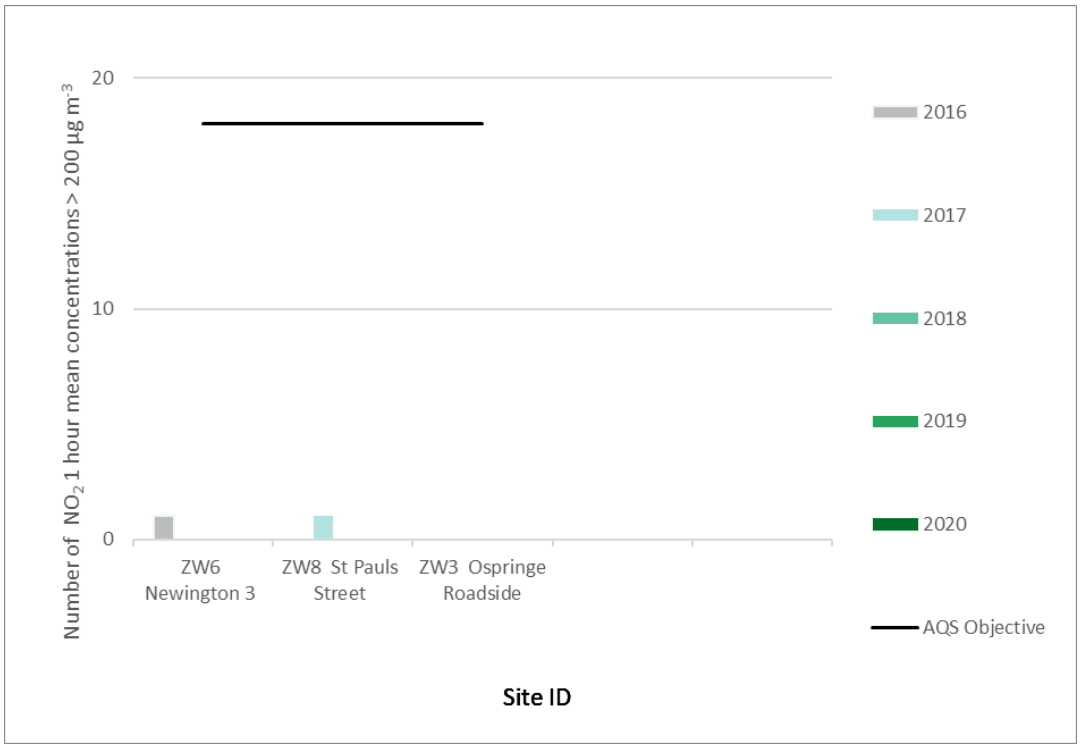


Table A.6 – Annual Mean PM_{10} Monitoring Results (µg m^{-3})

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
ZW8	590264	164396	Roadside	98.4	98.4	-	-	28.1	31.5	34.9
ZW3	600360	160869	Roadside	95.9	95.9	25	23	27.6	24.8	22.2

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.**

Notes:

The annual mean concentrations are presented as µg m^{-3}.

Exceedances of the PM_{10} annual mean objective of 40 µg 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.11 shows the annual mean PM_{10} concentration measured at St Paul's Street and Ospringe Roadside since 2016. Annual mean PM_{10} concentrations are increasing at St Paul's Street but have remained more or less steady at Ospringe Roadside.

Figure A.11 – Trends in Annual Mean PM_{10} Concentrations

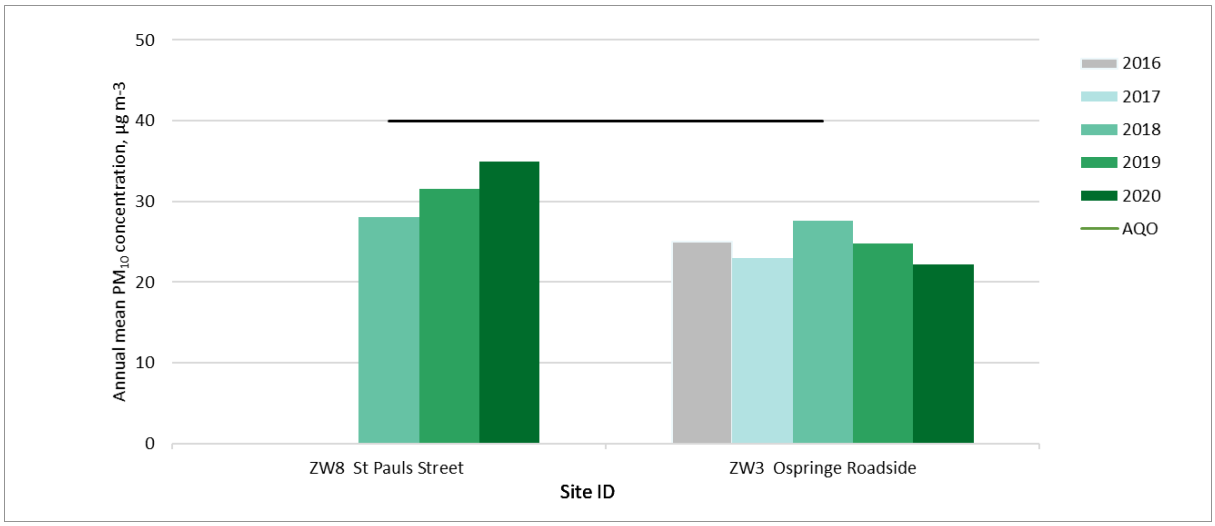


Table A.7 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50 µg m^{-3}

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
ZW8	590264	164396	Roadside	98.4	98.4	0	0	11	**42**	**59**
ZW3	600360	160869	Roadside	95.9	95.9	7	5	5	15	13

Notes:

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

Exceedances of the PM_{10} 24-hour mean objective (50 µg 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.12 shows the number of exceedances of the 24-hour mean PM_{10} concentration at St Paul's Street and Ospringe Roadside. The number of occurrences of the 24-hour mean above 50 µg m^{-3} at St Paul's Street are now above the air quality objective.

Figure A.12 – Trends in Number of 24-Hour Mean PM_{10} Results > 50 µg m^{-3}

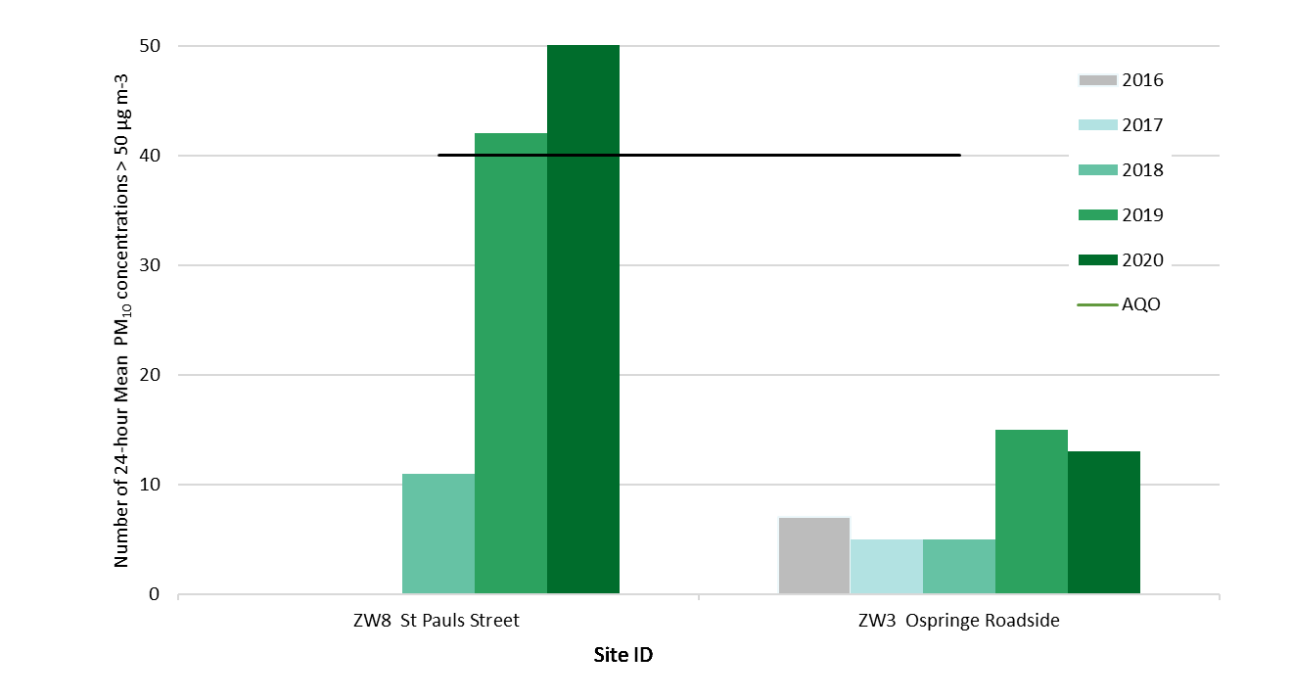


Table A.8 – Annual Mean $PM_{2.5}$ Monitoring Results (µg m^{-3})

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
ZW8	590264	164396	Roadside	95.6	77.3					13.1

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.**

Notes:

The annual mean concentrations are presented as µg m^{-3}.

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%).

Appendix B: Full Monthly Diffusion Tube Results for 2020

Table B.1 – NO_2 2020 Diffusion Tube Results (µg 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 (0.77)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
AQMA 1	**Newington**																	
SW19	585907	164794	49.1	37.7	27.9	26.0	23.8	31.4	29.2	38.5	40.5	32.7	45.2	39.7	35.1	27.0	-	
SW20A	585860	164816	32.7	24.8	20.8	21.6	12.1		20.4	25.7	27.6	26.7	36.5	26.5	-	-	-	
SW20B	585860	164816	33.9	26.7	21.2	21.8	7.9		18.0	26.5		22.4			-	-	-	
SW20C	585860	164816	35.3	25.1	23.0	23.3	17.2		17.5	23.9	25.0		31.0		24.6	18.9	-	Annual data provided for SW20C only
SW37	585868	164803	37.7	26.2	27.1	24.7	23.9	30.8	21.8	35.1	32.7	27.2	40.4	34.4	30.2	23.1	-	
SW42A	585935	164787	59.0	46.0	38.0	25.7	30.7	42.7	32.5	47.2	49.5	44.4	54.3	44.2	-	-	-	
SW42B	585935	164787	53.0	34.3	32.8	22.6	27.9	41.5	34.1	46.5	46.5	44.1	53.3	20.9	-	-	-	
SW42C	585935	164787	54.6	38.6	34.6	27.6	32.5	43.2	36.2	49.1	45.2	44.7	55.1	46.6	41.1	31.5	-	Annual data provided for SW42C only
SW45	585989	164774	51.5	37.6	25.1	23.4	28.3	34.8	32.7	37.7	42.8	33.9	43.7	36.9	35.7	27.4	-	
SW66	586083	164745	47.1	40.4	30.7	22.2	25.9	31.3	29.7	37.5	37.8	35.5	44.6	38.2	35.1	26.9	-	
SW78	585960	164788	37.8	34.6	28.9	28.9	25.5	33.2	26.7	38.4	42.7			34.7	33.1	25.4	-	
AQMA 2/6	**Ospringe Street Faversham area**																	
SW28	600223	160885	50.6	37.5	36.9	36.6	39.7	44.8	38.6	53.9	55.3	43.4	53.2	40.5	44.3	34.0	-	
SW30A	600383	160869	40.1	25.4	20.9	26.2	25.8	25.8	25.2	31.5	34.8	28.6	38.4	30.4	-	-	-	
SW30B	600383	160869	40.3	30.1	12.0	28.2		28.8	22.4		35.8	28.0	40.7	32.3	-	-	-	
SW30C	600383	160869	35.0	27.3	18.7	25.7		20.9	23.8	31.0	31.2	27.5	36.5	33.5	29.0	22.3	-	Annual data provided for SW30C only
SW29	600286	160868	51.8	36.4	32.3	31.0	22.7	40.4	35.5	44.2	46.4	37.1	55.5	41.6	39.6	30.4	-	

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 (0.77)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
SW31	600444	160848	39.0	31.9	20.5	36.8	39.9	42.6	27.9		47.5	33.3	42.5	36.8	36.2	27.8	-	
SW32	600420	160845	46.3	32.9	26.7	15.2	25.3	32.2	26.1	35.5	37.4	36.2	42.3	35.3	32.6	25.0	-	
SW96	600358	160859	50.7	36.2	24.2	27.2	26.2	34.4	33.3		41.0	38.6	51.0	36.8	36.3	27.9	-	
SW98	601818	160474	44.7	29.5	24.9	26.8	21.8	30.4	26.7		33.8	27.7	38.8	30.3	30.5	23.4	-	
SW117	601629	160525	31.7	24.9	16.3	25.0	20.6	25.0	21.1	29.5	31.2	23.8	36.7	32.1	26.5	20.3	-	
SW119	600568	160819	32.3	23.9	17.5	20.2	18.4	24.3	22.6	26.1	29.1	27.7	32.0	24.7	24.9	19.1	-	
SW120	600456	160836	48.1	43.1	32.6	29.2	28.9	39.3	34.5	41.9	41.6	40.5	49.7	38.0	39.0	29.9	-	
SW135	600317	160861	52.9	41.9	30.2	30.8	26.8	42.8	41.8	43.9	47.0	40.3	52.9	42.9	41.2	31.6	-	
SW136	601491	160570	44.8	33.8	23.3	38.6	26.7	28.0	24.0	34.5	33.8		47.5	43.4	34.4	26.4	-	
SW137	601452	160487	63.4	49.2	27.3	41.1	36.8	46.7	44.6	51.8	59.2			45.2	46.5	35.7	-	
SW138	601739	161310	43.4	30.6	23.7	32.3	25.6	25.4	27.2	33.2	38.0	28.3	45.0	36.0	32.4	24.9	-	
SW139	601706	161334	43.9	20.1	18.7	28.8	19.9	27.6	19.9	27.2		26.6	40.1	34.8	28.0	21.5	-	
AQMA 3	**East Street**																	
SW90	591551	163456	32.2	23.1	12.6	28.7	19.8		19.2	25.9	30.6	25.6	33.6		25.1	19.3	-	
SW56	591453	163456	44.4	39.3	20.3	30.5	22.6	37.3	33.0	40.2	41.0	41.0		46.5	36.0	27.6	-	
SW151	591515	163451			15.6	29.4	18.4	22.6	17.9	26.6	29.1	23.7	32.0	32.7	24.8	19.0	-	
SW152	591423	163484	36.5	22.8	26.8	37.4	29.7	30.0			30.4	29.7	31.4	36.8	31.2	23.9	-	
AQMA 4	**St Paul's Street**																	
SW51	590236	164408		35.0	30.6	47.2	43.2	43.1	35.2	46.4	48.3	37.2	51.7	46.5	42.2	32.4	-	
SW71	590096	164455	47.1	39.6	22.2	28.8	25.9	28.5	31.3	35.6	42.9	37.6	50.3	41.4	35.9	27.6	-	
SW89A	590252	164397	51.3	43.6	25.8	42.8	36.1	44.0	32.8	45.9	44.2	36.0	50.9	44.9	-	-	-	
SW89B	590252	164397	53.9	42.3	25.3	41.4	38.9	43.6	32.6	46.5	43.7	43.8	47.9	43.9	-	-	-	
SW89C	590252	164397	52.8	41.0	35.5	39.8	35.7	48.0	32.2	47.4	42.8	42.6	50.4	44.0	42.1	32.3	-	Annual data provided for SW89C only
SW140	590079	164367	50.8	39.1	28.4	40.2	30.5	26.9	27.7	40.1	41.1	39.0	10.1	33.7	34.0	26.1	-	
SW141	590071	164375		39.2	31.5	32.5	22.3	38.7	29.0	36.0	41.4	36.2	44.9	35.7	35.2	27.0	-	
SW142	590146	164397	41.5	27.9	24.6	35.4	22.8	33.5	25.8		37.7	28.9	42.0	27.2	31.6	24.2	-	
SW150	590203	164409	35.1	26.7						31.5	31.4	27.0	35.9	35.5	31.9	22.2	-	
AQMA 5	**Teynham**																	
SW80	595160	162470	42.7	24.8	35.7	38.0	29.4	33.4	26.0	36.3		29.0	45.8	33.4	34.0	26.1	-	
SW91	595150	162461	45.5	30.9	23.0	24.3	19.7	26.8	24.1	30.4	32.3	30.1	45.5	37.6	30.9	23.7	-	
SW92	595195	162446	45.7	36.8	23.6	23.1	19.7	27.7	26.4	30.4	34.6	27.5	39.8	31.7	30.6	23.5	-	
SW153	594748	162602	38.0	27.8	25.2	26.3	25.0	32.0	29.3	41.2	30.8	26.3	37.5	32.9	31.0	23.8	-	
AQMA 7	**Keycol Hill**																	
SW121	587936	164268	50.6	48.3	40.7	31.1	33.8	42.0	46.8	53.3	51.8	46.3	46.5	38.6	44.2	33.9		
SW124	587774	164321	60.2	51.8	40.5	28.5	27.8	44.4	35.7	52.7	51.6	46.0	58.0	47.5	45.4	34.8		
SW130	587774	164321	62.4	51.6	39.0	28.2	29.4	43.5	40.3	51.0	57.6	46.6	58.4	52.5	46.7	35.8		

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 (0.77)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
SW131	587774	164321	60.2	48.2	40.8	28.9	29.8	41.6	38.2	51.3	54.5	46.9	61.0	46.6	45.7	35.0		
SW144	587917	164277	47.9	40.0	34.5	31.4	38.0	47.7	38.5	50.1	52.0	43.9	50.4	40.4	42.9	32.9		
SW145	587692	164356	37.2		29.7	24.9	17.4	26.8	18.6	32.2	32.6	24.9	41.3	34.1	29.1	22.3		
SW146	587516	163885	31.1	24.9	22.6	26.1	14.6	18.9	17.2	21.4	26.3	23.6	29.3	22.1	23.2	17.8		
SW154	587874	164292						43.3	28.6	53.4	48.5	39.4	51.9	43.2	44.0	34.0		
Sittingbourne																		
SW62	588178	164236	49.9	39.9	27.3	28.5	21.7	27.6	30.4	34.2	34.2	37.6	44.9	36.7	34.4	26.4		
SW76	592211	163302	34.3	29.7	23.8	22.9	18.8	22.9	25.3	29.1		35.9	36.7	38.7	28.9	22.2		
SW77	591035	166521	37.6	28.0	21.7	38.9	33.5	29.3	24.4	32.2	38.5	28.8	41.2	31.2	32.1	24.6		
SW83	590375	163774	27.6	29.3	18.7	26.4	16.3	21.2	17.6	26.3	39.2		34.5	34.2	26.5	20.3		
SW88	589320	165047	32.3	16.9	10.2	24.2	17.0	15.3	14.3	4.3		19.8	31.2	24.4	19.1	14.6		
SW107	589261	163338	23.0	17.9	13.2	20.2	12.2	13.9	8.6	13.9	17.9	15.2	20.2	15.4	16.0	12.3		
SW109	588433	163917	21.3	15.1	9.6	20.6	10.2	13.9	10.1	15.7	17.5	14.0	21.5	20.0	15.8	12.1		
SW110	588467	164123	23.6	16.4	19.5	23.5	11.5	17.4	12.3	16.5	19.7	16.5	25.6	18.7	18.4	14.1		
SW112	588329	164188	42.7	31.5	30.0	30.9	25.1	32.5	27.5	37.3	32.7	32.8	41.8	38.4	33.6	25.8		
SW118	592791	163168		15.6	16.0	18.2	12.1	15.2	13.7	15.6	19.9	17.3	26.7	21.4	17.4	13.4		
SW122	588184	164250	28.9	29.1	21.4	20.1	14.9	16.0	19.2	19.8	24.3	20.3	29.3	20.4	22.0	16.9		
SW123	588153	164227	36.3	30.7	26.6	26.3	21.8	23.6	26.1	30.4	32.1	29.2	32.8	24.4	28.4	21.8		
SW125	592868	163132	29.7	19.7	15.7	21.2	15.5	20.4	15.8	22.0	23.0	19.7	33.2	25.0	21.7	16.7		
SW126	592837	163150	49.0	34.6	25.1	24.6	19.6	28.2	25.5		36.2	30.3		40.0	31.3	24.0		
SW132	590507	163849	41.2	34.8	20.5	32.4	27.0	29.1		34.3	39.3	34.7	41.1	37.3	33.8	25.9		
SW143	588388	164189			26.3		19.0	23.8	19.2	28.4	35.9	26.3	39.6	24.8	27.0	20.7		
SW147	590370	163877	57.1	41.6	27.2	28.3	27.1	35.8	27.6	35.0	30.2	26.9		42.0	34.4	26.4		
SW148	589163	164011	36.4	23.3	16.3	25.6	16.4	19.5	18.9	26.4			39.6	31.6	25.4	19.5		
SW149	589799	163856	41.1	35.8		29.7	22.8	29.5	26.9	30.9	36.4	36.2		36.0	32.5	25.0		
Sheerness																		
SW85	591751	175009	41.1	35.8	22.8	30.2	24.6	28.8	23.2	32.1	38.2	32.8	44.8	36.5	32.6	25.0		
SW86	591723	175020	32.0	26.8	19.1	31.2	24.8	25.6	19.3	31.8	33.3	25.6	38.2		28.0	21.5		
SW127	593151	172962	37.5	25.6	18.9	30.1	22.2		22.3	31.7		29.2	42.7	31.2	29.1	22.4		
SW128	593092	172870	40.6		24.4	40.3	34.8	30.6	15.9	42.7	44.8	33.6	44.9	33.9	35.1	27.0		
SW133	592207	174597	41.9	35.0	25.6	27.1		20.4	24.2	29.6				31.0	29.4	22.5		
SW134	591889	174944		25.6	18.0	23.8	17.1	20.2	28.5	21.7	25.8	22.7	33.8	28.5	24.2	18.5		
Rural																		
SW07	600745	169572	14.4	10.0	6.1	17.5	8.9	9.1	5.8	9.2	11.1	8.5	17.6	11.4	10.8	8.3		
SW34	606624	161110	15.6	10.3	8.9	12.6	7.6	8.4	5.9	8.5	10.6	8.4	17.6	11.1	10.5	8.0		

☒ **All erroneous data has been removed from the NO_2 diffusion tube dataset presented in Table B.1.**

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.**

☒ **Local bias adjustment factor used**

☐ **National bias adjustment factor used.**

☒ **Where applicable, data has been distance corrected for relevant exposure in the final column.**

☒ **Swale 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 40 µg m^{-3} are shown in **bold**.

NO_2 annual means exceeding 60 µg 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 Swale Borough Council during 2020

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

Additional Air Quality Works Undertaken by Swale Borough Council During 2020

Below are short summaries of two reports undertaken by Ricardo on behalf of Swale Borough Council.

CAZ Feasibility Study[14]

This work was based on a 2019 base line and showed that air quality along the A2 is expected to improve significantly over the next 3 years out to 2022 as the vehicle fleet renews and the proportion of vehicles of the latest Euro emission standard increases significantly. However, it was recognised there is uncertainty in the modelling and exploring this through site-specific adjustment at monitoring locations and a sensitivity test with a slower fleet turnover indicates that there is a risk of remaining exceedances especially in the St Paul's Street AQMA.

As such there is still a need to take further action to reduce transport related emissions and concentrations along the A2. The implementation of a Charging Clean Air Zone would reduce concentrations and manage the risk of further exceedances. However, the overall economic cost of these measures would be high (£30 million for a CAZ B and £118 million for a CAZ D) and likely to be politically challenging to implement.

[14] https://services.swale.gov.uk/meetings/documents/s16026/CAZ%20Appendix%20I.pdf

As such given the scale of the air quality challenge, largely around managing risk rather than tackling significant exceedances, these would appear to be a disproportionate response. This suggests that a more appropriate approach is to implement a package of non-charging measures which have been shown to have about twice the benefit of the CAZ B, in terms of air quality, but at a similar economic cost. It is also clear that there would be further benefits for example in terms of health from active travel that have not been accounted for here.

OpenAir Analysis Report for St Paul's monitoring stations

This report presented an analysis of pollutant measurements at St Paul's Street in Sittingbourne during 2019 and 2020 and how they relate to observed meteorological conditions. This was relative to wind direction to see if the source (s) were coming from specific a location and to undertake a thorough analysis of the PM_{10} exceedances, to see if any trends could be identified. The analysis was primarily focussed on fine particulate matter in the PM_{10} fraction and was conducted using the R Openair package.

However, with the Openair analysis were unable to determine with any certainty which sources of PM_{10} are leading to exceedances of the daily mean objective. The following broad key conclusions of the analysis may however be useful to inform future steps to manage daily mean PM_{10} concentrations within the AQMA:

On an average day, both PM_{10} (excluding background) and NO_2 hourly measurements followed a typical diurnal and weekly profile associated with road traffic activity. Potential sources of PM_{10} associated with road traffic activity are:

- Re-suspended or windblown particulates from the road surface along St Paul's Street – Note: based on local knowledge of activities in the surrounding area, road surfaces are generally dusty and may have an element of fine particulate dust attributable to track-out from construction/industry, unpaved HGV parking, or industrial processes.
- Tailpipe emissions from vehicles on St Paul's Street.

During the initial COVID-19 lock-down period in 2020 measured PM_{10} and NO_2 concentrations did not follow the typical weekday traffic profile observed at all other times; intuitively this corresponds with the expected lack of general traffic at that time. There was however a morning peak of both NO_2 and PM_{10} measured concentrations between 6 and 7am during the lock-down period, indicating peak traffic activity was occurring at this time

on weekdays. This could be associated with either early morning commute traffic to workplaces in the area still operational during the lockdown; or, morning HGV activity associated with nearby lorry parking sites or haulage to/from industrial sites in the area. Although traffic counts are not conducted at St Paul's Street, historical automatic traffic count (ATC) data for this period for relevant nearby roads could provide additional evidence regarding this.

The maximum mean PM_{10} concentrations (in both years) were generally measured when the wind was blowing from north easterly, easterly and south easterly wind directions at moderate speeds; and for NO_2 we see a similar directional component to that seen for PM_{10}.

However, there is no clear indication of measured PM_{10} peaks attributable to open fugitive sources which, unless associated with daytime industrial or construction activity, could occur at any time of the day or week.

QA/QC of Diffusion Tube Monitoring

This section provides detail regarding aspects of non-automatic monitoring using diffusion tubes.

Diffusion tube supplier

Swale Borough Council's diffusion tubes are supplied and analysed by SOCOTEC Didcot utilising the 50% triethanolamine (TEA) in acetone preparation method.

Diffusion Tube Calendar

The diffusion tube calendar used with Swale is provided below. This did not deviate significantly from the 2020 Diffusion Tube Monitoring Calendar

	Diffusion Tube Deployment Dates	
Month	**Tube On**	**Tube Off**
Jan	08/01/2020	05/02/2020
Feb	05/02/2020	04/03/2020
Mar	04/03/2020	01/04/2020
Apr	01/04/2020	29/04/2020
May	29/04/2020	03/06/2020
Jun	03/06/2020	01/07/2020
Jul	01/07/2020	28/07/2020
Aug	28/07/2020	02/09/2020
Sep	02/09/2020	30/09/2020
Oct	30/09/2020	04/11/2020
Nov	04/11/2020	02/12/2020
Dec	02/12/2020	06/01/2021

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2020 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. There are two options:

- Use locally derived bias collection factors
- Use national bias adjustment spreadsheet

A summary of bias adjustment factors used by Swale Borough Council over the past five years is presented in Table C.1.

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2020	Local	-	0.77
2019	Local	-	0.78
2018	National	03/18	0.77
2017	National	03/17 v2	0.77
2016	Local		0.80

The *Diffusion_Tube_Data_Processing_Tool* has been used to process all diffusion data – this carries out the bias adjustment, annualization and where required distance to receptor correction.

Diffusion Tube Annualisation

Annualisation is required when the annual data capture for the diffusion tubes is less than 75 %.

Three sites had a data capture less than 75 % and hence required annualisation. These are listed below:

Diffusion Tube ID	Site Name
SW150	24/26 St Paul's Street
SW133	159 High Street, Sheerness Lampost
SW154	Bus Stop 9-11 Keycol Hill, Sittingbourne

The automatic data for the annualisation was obtained from UK-AIR and included the following background sites:

- Canterbury
- Rochester Stoke
- Southend-on-Sea

In each case the annual data capture was > 85 %. The annualisation factors are provided in Table C.2.

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

Diffusion Tube ID	Annualisation Factor Canterbury	Annualisation Factor Rochester Stoke	Annualisation Factor Southend on Sea	Average Annualisation Factor	Raw Data Simple Annual Mean (µg m^{3})	Annualised Data Simple Annual Mean (µg m^{3})
SW150	0.9450	0.8914	0.8823	0.9063	31.9	28.9
SW133	0.9895	1.0072	1.0067	1.0011	29.4	29.4
SW154	1.0244	0.9860	1.0045	1.0050	44.0	44.3

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.

Within Swale each of the automatic analysis are collocated with diffusion tubes in triplicate. The site codes are:

Site Name	Site Code (auto)	Site Code (DT)
Newington 3	ZW6	SW20
St Paul's Street	ZW8	SW89
Ospringe Roadside	ZW3	SW30

Choice of bias adjustment factor for 2020

The national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method. A bias adjustment of 0.77 for the year 2020 (based on 18 studies) has been derived from the national bias adjustment spreadsheet (v03_21). A screenshot of the spreadsheet for SOCOTEC is shown below:

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 03/21

Follow the steps below **in the correct order** to show the results of **relevant** co-location studies
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet
This spreadhseet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of June 2021
LAQM Helpdesk Website

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List

If a laboratory is not shown, we have no data for this laboratory.

Step 2: Select a Preparation Method from the Drop-Down List

If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down List

If a year is not shown, we have no data[2]

Step 4: Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.

If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953

Analysed By[1]	Method (To make your selection, choose [All] from the pop-up list)	Year[2] (To make your selection, choose [All])	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision[4]	Bias Adjustment Factor (A) (Cm/Dm)
SOCOTEC Didcot	50% TEA in acetone	2020	R	Ipswich Borough Council	12	27	21	28.5%	G	**0.78**
SOCOTEC Didcot	50% TEA in acetone	2020	R	Ipswich Borough Council	12	36	26	36.3%	G	**0.73**
SOCOTEC Didcot	50% TEA in acetone	2020	R	Thanet District Council	9	20	17	21.2%	G	**0.83**
SOCOTEC Didcot	50% TEA in acetone	2020	R	Medway Council	12	26	18	41.7%	G	**0.71**
SOCOTEC Didcot	50% TEA in acetone	2020	B	Medway Council	11	20	10	96.3%	G	**0.51**
SOCOTEC Didcot	50% TEA in acetone	2020	B	Gravesham Borough Council	12	23	22	5.6%	G	**0.95**
SOCOTEC Didcot	50% TEA in acetone	2020	B	Gravesham Borough Council	12	27	24	16.1%	G	**0.86**
SOCOTEC Didcot	50% TEA in acetone	2020	R	Monmouthshire County Concil	10	32	24	35.3%	G	**0.74**
SOCOTEC Didcot	50% TEA in acetone	2020	UI	North Lincolnshire Council	13	18	14	26.6%	G	**0.79**
SOCOTEC Didcot	50% TEA in acetone	2020	R	City of York Council	12	24	19	29.0%	G	**0.78**
SOCOTEC Didcot	50% TEA in acetone	2020	R	City of York Council	11	22	17	34.3%	G	**0.74**
SOCOTEC Didcot	50% TEA in acetone	2020	R	City of York Council	12	33	23	40.4%	G	**0.71**
SOCOTEC Didcot	50% TEA in acetone	2020	R	Cambridge City Council	10	30	20	47.6%	G	**0.68**
SOCOTEC Didcot	50% TEA in acetone	2020	R	Wrexham County Borough Council	9	17	13	26.6%	G	**0.79**
SOCOTEC Didcot	50% TEA in acetone	2020	KS	Marylebone Road Intercomparison	11	59	43	38.0%	G	**0.72**
Socotec Didcot	50% TEA in acetone	2020	R	Horsham District Council	10	23	23	2.2%	G	**0.98**
Socotec Didcot	50% TEA in acetone	2020	R	Horsham District Council	12	22	19	18.6%	G	**0.84**
Socotec Didcot	50% TEA in acetone	2020	R	Horsham District Council	9	25	18	42.0%	G	**0.70**
SOCOTEC Didcot	50% TEA in acetone	2020		**Overall Factor[3] (22 studies)**				**Use**		**0.77**

The NO_2 processing tool provides the following output *Local Bias Adjustment Outputs* (provided in Table C.3). The combined adjustment factor is 0.77, calculated as:

$$Combined\ Bias = 1/((average\ B1, B2, B2) + 1)$$

Where B1= 28 %, B2 = 67 % and B3 = -0.04 %

Table C.3 – Local Bias Adjustment Calculation

Local Bias Adjustment Outputs - Information Only

Go back to STEP 3 - Bias Adjustment to define factor

	STEP 3a Local Bias Adjustment Input 1	STEP 3b Local Bias Adjustment Input 2	STEP 3c Local Bias Adjustment Input 3	STEP 3d Local Bias Adjustment Input 4	STEP 3e Local Bias Adjustment Input 5
Periods used to calculate bias	9	12	10		
Bias Adjustment Factor A	0.78 (0.75 - 0.82)	0.6 (0.55 - 0.65)	1.04 (0.99 - 1.11)		
Diffusion Tube Bias B	28% (21% - 34%)	67% (54% - 80%)	-4% (-10% - 1%)		
Diffusion Tube Mean (µg/m³)	25.8	42.1	30.6		
Mean CV (Precision)	6.9%	4.8%	6.4%		
Automatic Mean (µg/m³)	20.2	25.2	31.9		
Data Capture	100%	100%	100%		
Adjusted Tube Mean (µg/m³)	20 (19 - 21)	25 (23 - 27)	32 (30 - 34)		
Overall Diffusion Tube Precision	Good Overall Precision	Good Overall Precision	Good Overall Precision	Good Overall Precision	
Overall Continuous Monitor Data Capture	Good Overall Data Capture	Good Overall Data Capture	Good Overall Data Capture		

Combined Local Bias Adjustment Factor	0.77

Swale Borough Council have applied a bias adjustment factor of 0.77 to the 2020 monitoring data (both local and national factors were 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. There were no sites where the annual mean NO_2 concentration was greater than 36 µg m^{-3} and would hence require the fall-off with distance calculation.

QA/QC of Automatic Monitoring

In 2020 the QA/QC of the automatic data were managed by Air Quality Data Management[15]. Up until about the first lock down in March/April 2020 the instrumentation was calibrated every two weeks, after this time access became more difficult and calibration did not take place until the autumn.

Live and historic data are now available through the Kent Air Website: https://kentair.org.uk/

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

The adjustments applied to the PM measurements are shown in the following table:

Site ID	Site	Pollutant	Instrument	Factor applied	Comment
ZW8	St Paul's Street	PM_{10}	TEOM	VCM model	TEOM stopped and replaced by BAM on 11/03/2020
ZW8	St Paul's Street	PM_{10}	BAM	A slope correction factor of 0.9662 is applied	
ZW8	St Paul's Street	$PM_{2.5}$	BAM	None required	
ZW3	Ospringe Roadside	PM_{10}	TEOM	VCM model	

[15] https://www.ukairquality.net/home/map

Automatic Monitoring Annualisation

All automatic monitoring locations within Swale Borough Council recorded data capture of greater than 75% therefore it was not required to annualise any monitoring data.

NO_2 Fall-off with Distance from the Road

As no automatic NO_2 monitoring locations within Swale Borough Council measured a NO_2 concentration greater than 36 µg m^{-3} no distance correction during 2020 was required.

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

Figure D.1 – Map of Non-Automatic Monitoring Site

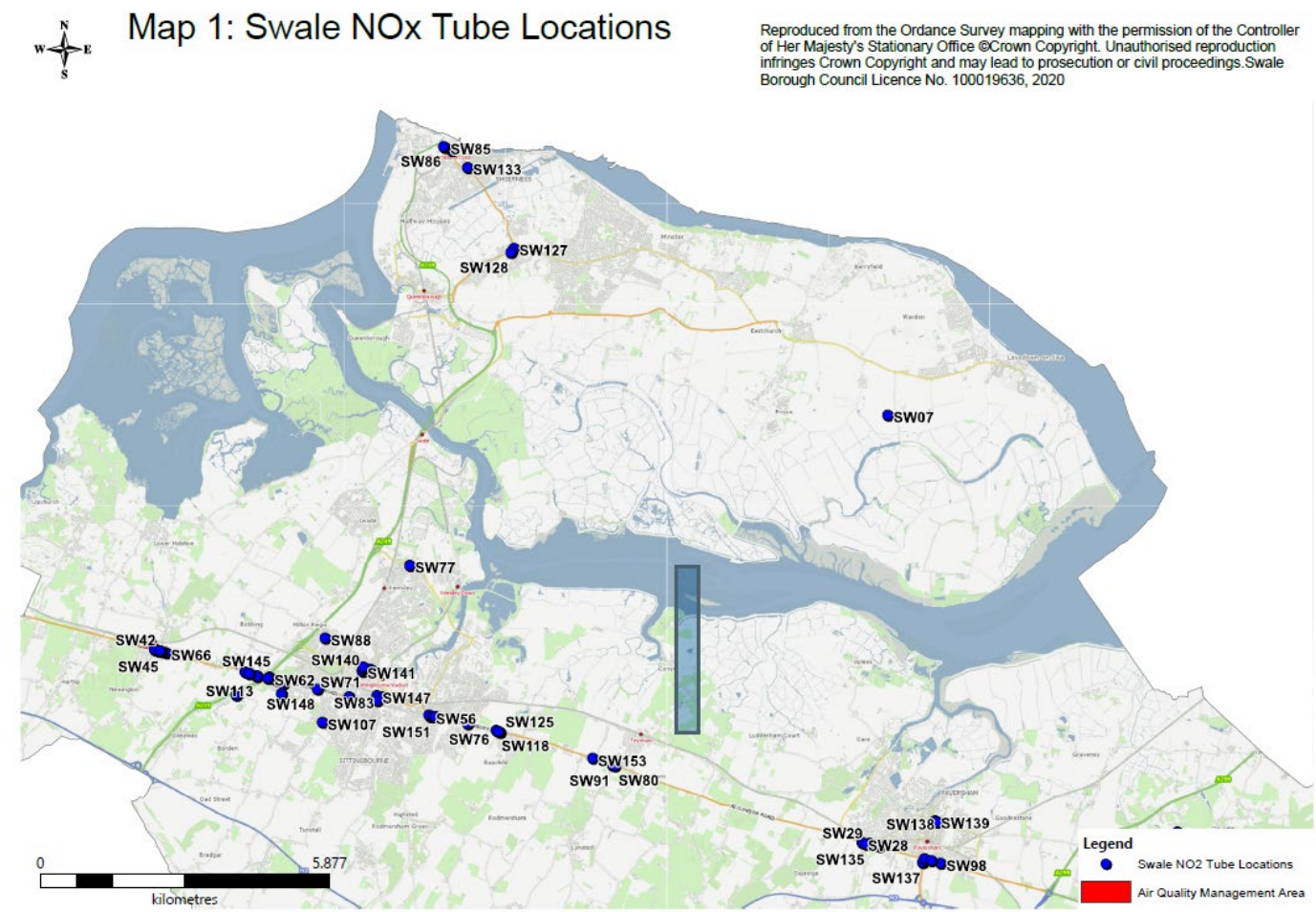


Figure D.2 – Maps of AQMA

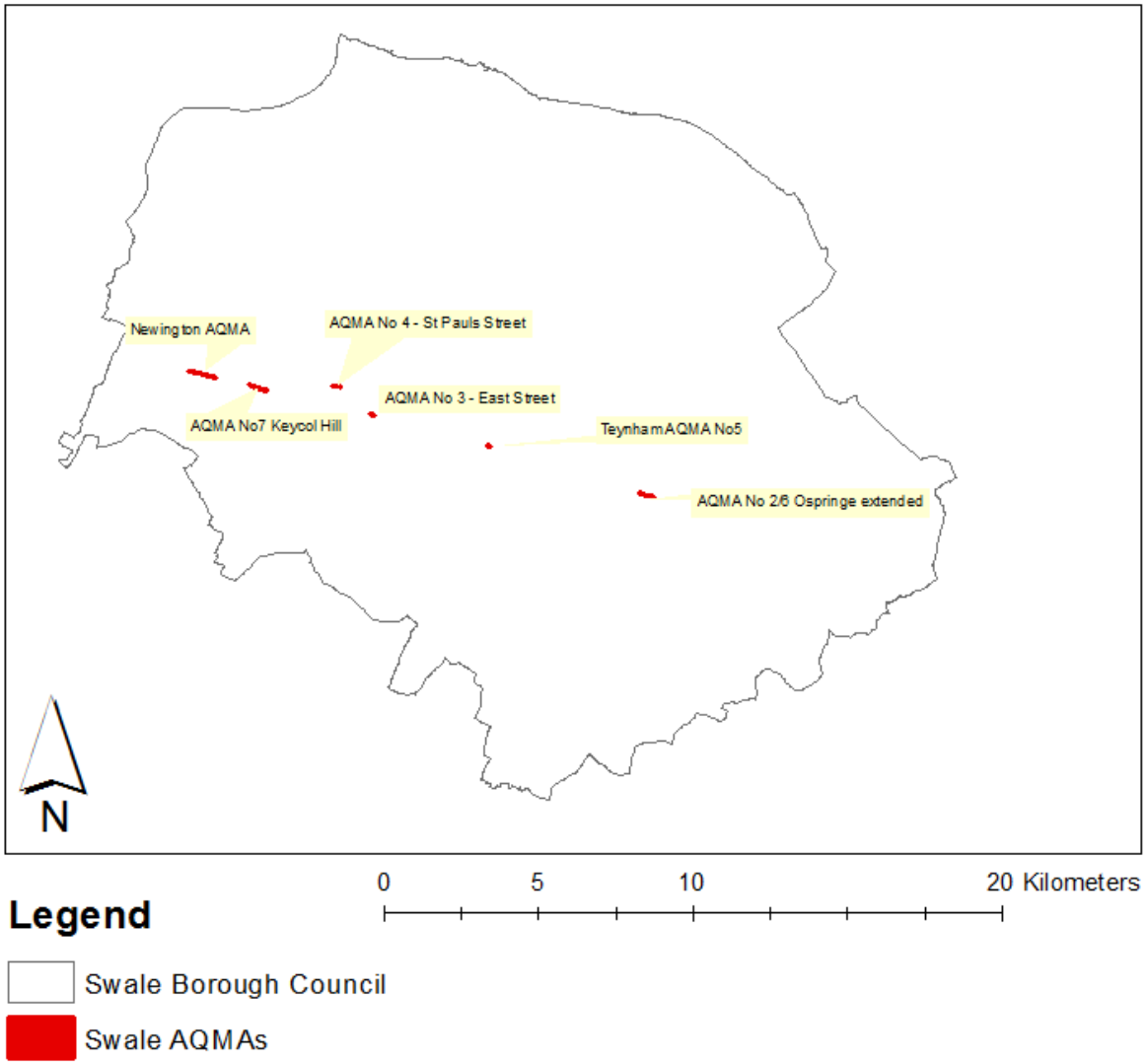
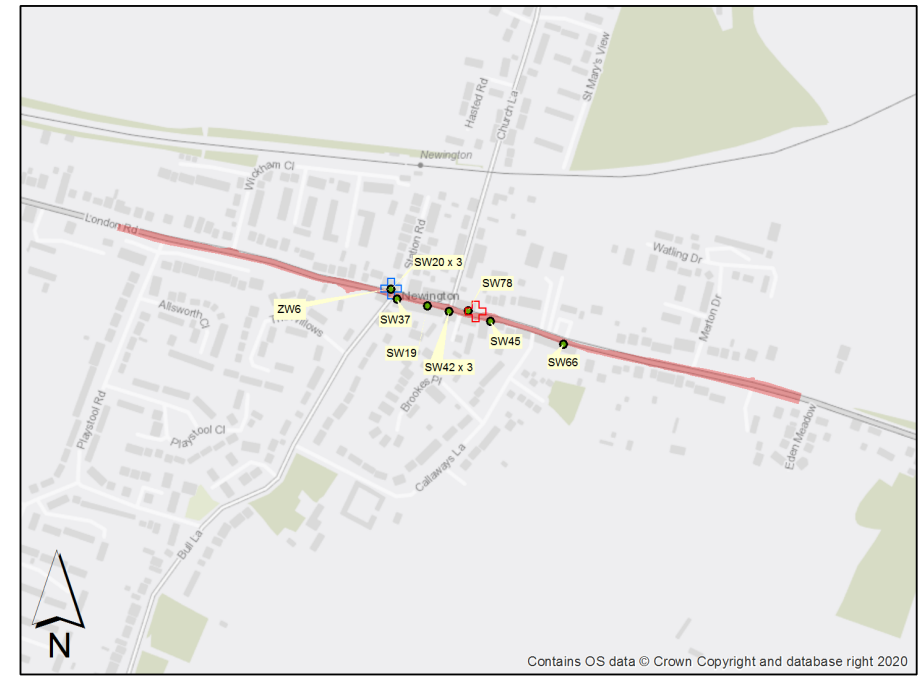


Figure D.3 – Maps of AQMAs – with monitoring sites located within and nearby the AQMA

Newington AQMA 1

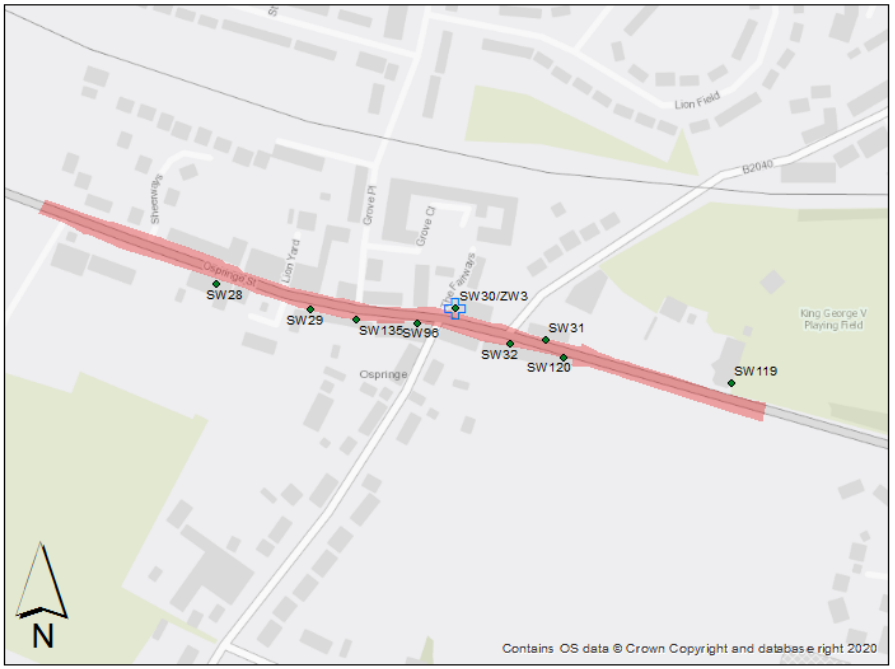


0 200 400 800 Meters

Legend

- Newington 4 (ZW10)
- Auto
- Diffusion tubes

AQMA 2/6: Ospringe Street, Faversham



Legend

0 100 200 400 Meters

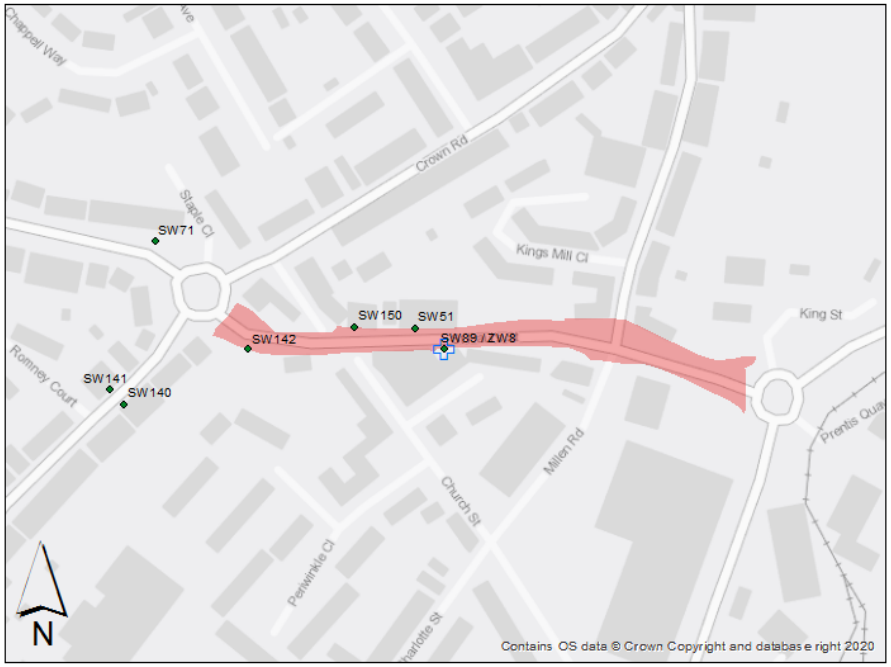
- Auto
- Diffusion tubes

AQMA No3: East Street, Sittingbourne

Legend 0 40 80 160 Meters

- Auto
- Diffusion tubes

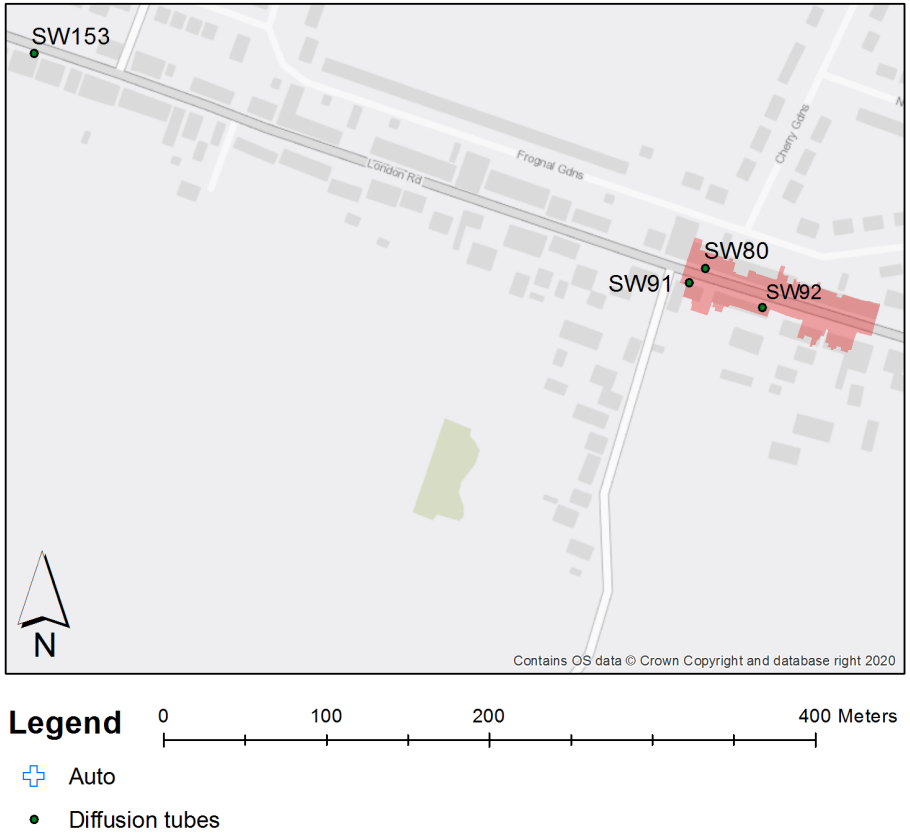
AQMA No4: St Paul's Street



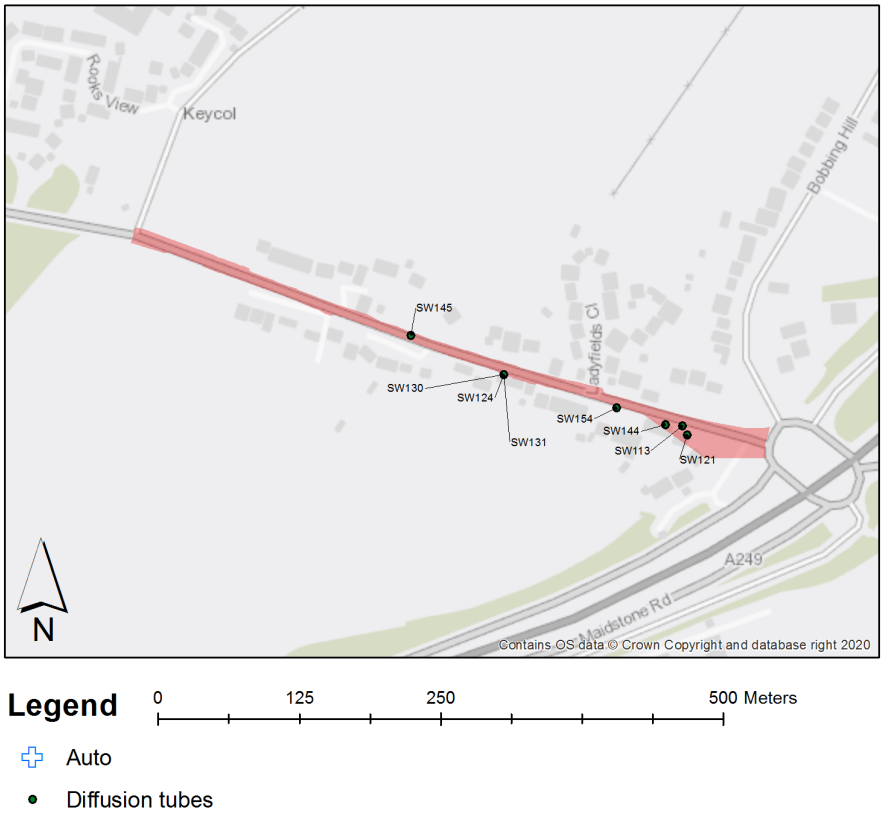
Legend 0 85 170 340 Meters

- Auto
- Diffusion tubes

AQMA 5: London Road, Teynham



AQMA No7: Keycol Hill, Sittingbourne



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[16]

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

[16] The units are in micrograms 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[17] 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)[18] has estimated that during the initial lockdown period in 2020, within urbanised areas of the UK reductions in NO_2 annual mean concentrations were between 20 and 30% relative to pre-pandemic levels, which

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

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

represents an absolute reduction of between 10 to 20 µg 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 5 µg 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 Swale Borough Council

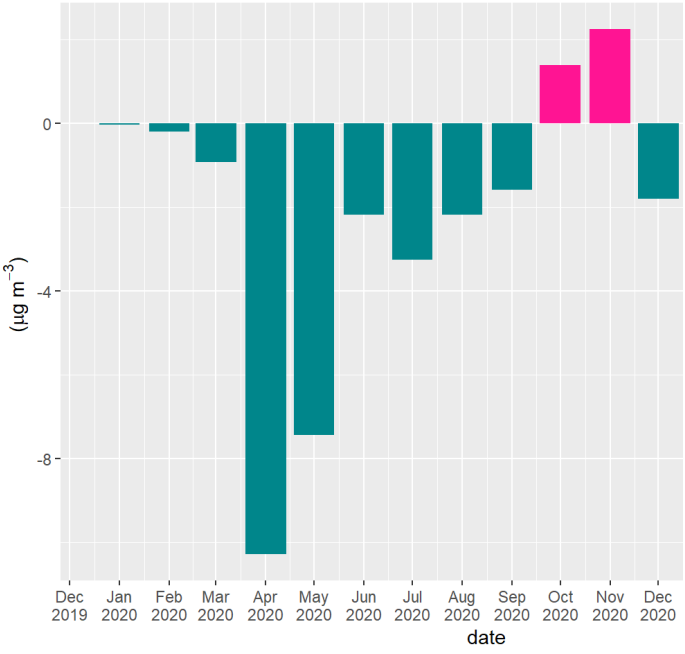
The assessment of impacts of Covid-19 on measured NO_2 concentrations within Swale Borough Council is considered both in terms of monthly changes compared to a business as usual scenario and as a reduction in the annual mean concentrations in 2020 compared to previous years.

Impact of Covid-19 on monthly nitrogen dioxide concentrations in 2020

The monthly changes have been calculated as the difference between monthly measured concentration and the mean concentration for each month derived from a business as usual (BAU) scenario. The BAU scenario was derived from a statistical model[19] which uses local meteorological data such as wind speed, wind direction, ambient temperature as well as other temporal variables such as hour of the day to estimate what the concentration could have been in 2020. The monthly change for the automatic sites are shown in Figure F.1, Figure F.2 and Figure F.3 for Newington 3, Ospringe Street and St Paul's Street, respectively. In each case the large decreases are seen during each lockdown. At Newington 3, the concentrations increased above the BAU in October and November 2020. Newington 3 also showed the largest single month decrease in April 2020 when the concentration was more than 10 µg m^{-3} lower than BAU.

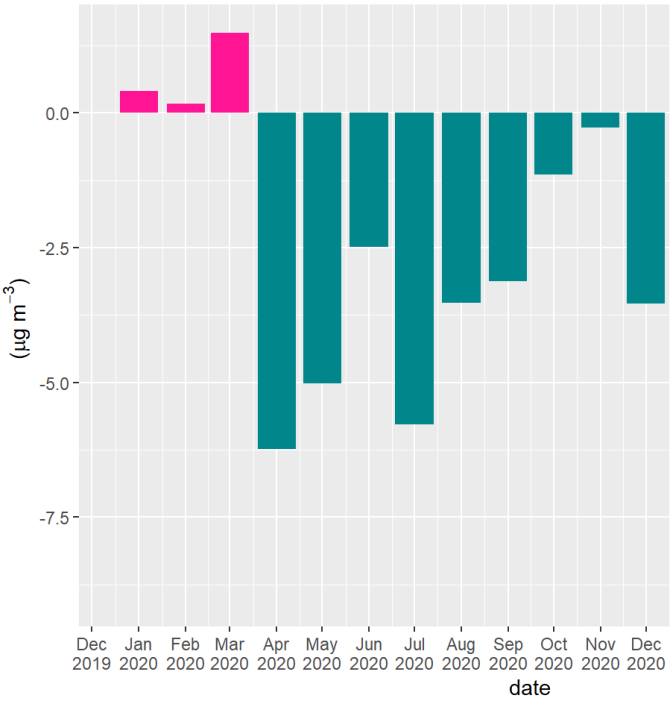
[19] https://ee.ricardo.com/news/analysis-of-covid-19-lockdown-on-uk-local-air-pollution

Figure F.1 – Monthly Changes in NO_2 concentrations at Newington 3 (ZW 6)



The monthly decreases at Ospringe Street during the first lock down were less than the other two automatic monitoring sites.

Figure F.2 – Monthly Changes in NO_2 concentrations at Ospringe Street (ZW 3)



The decreases at St Paul's Street were about 8.3 µg m^{-3} in April 2020 returning to near normal levels in September through to November.

Figure F.3 – Monthly Changes in NO_2 concentrations at St Paul's Street (ZW 8)

Changes in annual mean

As discussed in the main body of the report the average decrease in NO_2 concentration measured by diffusion tube throughout the borough was 29 %. The change[20] in concentration at each site is shown in the Table F.1. The largest decrease (38 %) occurred at SW76 (155 Canterbury Road) while the smallest decrease (17 %) occurred at SW132 (Fountain Street, Sittingbourne).

Table F. 1 - Percentage reduction in NO_2 concentrations measured by diffusion tube within the AQMAs in Swale Borough Council

Diffusion Tube ID	Address	Annual mean concentration, µg m^{-3}					Average concentration 2016 to 2019, µg m^{-3}	Change 2020 compared to previous years (%)
		2016	2017	2018	2019	2020		
SW19	4/5 High Street, Newington	34.8	35.4	39	36.8	27.0	36.5	-26.1
SW20	Newington Co Op	28.3	29.9	26.1	26	18.9	27.6	-31.5
SW37	32 High Street, Newington	35.1	34.2	33.7	32.6	23.1	33.9	-31.7
SW42	High Street, Opp Church Lane	45.7	46.4	47.8	43.9	31.5	46.0	-31.4
SW45	64 High Street, Newington	43.3	41.2	39.7	31.8	27.4	39.0	-29.8

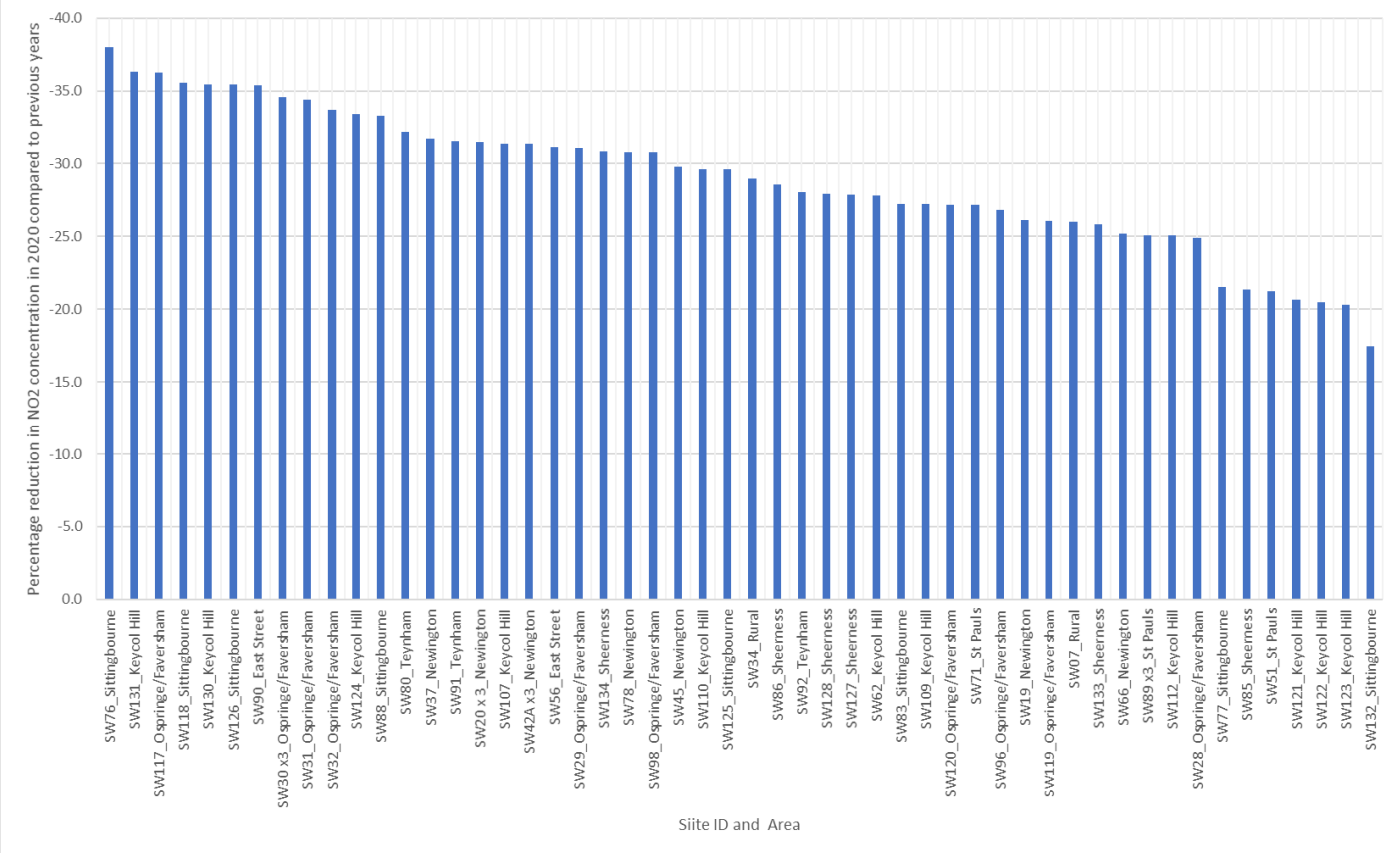
[20] Calculated as difference between the 2020 concentration and average for the previous available years and divided by the average. The difference is expressed as a percentage.

Diffusion Tube ID	Address	Annual mean concentration, µg m ^{3}					Average concentration 2016 to 2019, µg m ^{3}	Change 2020 compared to previous years (%)
		2016	2017	2018	2019	2020		
SW66	96/94High Street, Newington	36.3	38.5	35.4	33.7	26.9	36.0	-25.2
SW78	55-57 High Street, Newington	35.8	40.2	36.9	34.1	25.4	36.8	-30.8
SW28	Mayors Arms, Ospringe	45.5	47	45.4	43	34.0	45.2	-24.9
SW30	ZW3 Ospringe Street	31.6	37.2	36.3	31.1	22.3	34.1	-34.5
SW29	43 Ospringe Street, Ospringe	48	46.2	41.1	40.9	30.4	44.1	-31.1
SW31	Site 7, 4 Ospringe Street	48.3	40.7	42.6	37.9	27.8	42.4	-34.4
SW32	11 Ospringe Street, Ospringe	38.2	39.1	36.8	36.9	25.0	37.8	-33.7
SW96	Maison Dieu, Ospringe Street	39.4	40	36.4	36.6	27.9	38.1	-26.8
SW98	Canterbury Road, Preston, Faversham	34.4	34.3	33	33.5	23.4	33.8	-30.8
SW117	Land Adj Orchard, Canterbury Road, Faversham	-	-	35.3	28.5	20.3	31.9	-36.3
SW119	Flats, The Mount, Ospringe	-	-	27	24.7	19.1	25.9	-26.1
SW120	1-3 Ospringe Street, Ospringe, Faversham	-	-	42.2	39.9	29.9	41.1	-27.2
SW90	Junction of Canterbury Road Goodnestone Road	32.6	31	29.5	26.3	19.3	29.9	-35.4
SW56	126 East Street, Sittingbourne	39.8	42.5	40.5	37.7	27.6	40.1	-31.1
SW51	14/16 St Paul's Street	39.2	39.6	45.2	40.5	32.4	41.1	-21.2
SW71	o/s 8 Staple Close, Staplehurst Road, Sittingbourne	38.3	40	37	36.1	27.6	37.9	-27.2
SW89	St Paul's Air Quality Station	44.3	44.7	43.2	40.1	32.3	43.1	-25.1
SW80	A2 Teynham, 107 London Road	42.1	39.9	39.3	32.8	26.1	38.5	-32.2
SW91	Adj to 72 London Road, Teynham	37.3	35.3	32.3	33.4	23.7	34.6	-31.5
SW92	FJ Williams, London Road	37.3	29.1	32.1	31.9	23.5	32.6	-28.0
SW62	13 Key Street, Sittingbourne	38.3	40.6	33.7	33.7	26.4	36.6	-27.8
SW107	110 Borden Lane, Sittingbourne	-	-	18.3	17.4	12.3	17.9	-31.4
SW109	39 Wises Lane, Sittingbourne	-	-	17.8	15.5	12.1	16.7	-27.2
SW110	2 Cherryfields, Sittingbourne	-	-	21.5	18.7	14.1	20.1	-29.6
SW112	56 Key Street, Sittingbourne	-	-	35.4	33.4	25.8	34.4	-25.1
SW121	Façade Squirrel Cottage, Keycol Hill	-	-	-	42.7	33.9	42.7	-20.7
SW122	Façade 13 Key Street, Sittingbourne	-	-	-	21.2	16.9	21.2	-20.5
SW123	12 Key Street, Sittingbourne	-	-	-	27.3	21.8	27.3	-20.3
SW124	31/33 Keycol Hill Sittingbourne Highest Point	-	-	-	52.3	34.8	52.3	-33.4
SW130	31/33 Keycol Hill Sittingbourne Mid Point	-	-	-	55.5	35.8	55.5	-35.4
SW131	31/33 Keycol Hill Sittingbourne Lowest Point	-	-	-	55	35.0	55.0	-36.3
SW76	155 Canterbury Road, Sittingbourne	37.8	37.6	34.2	33.5	22.2	35.8	-38.0
SW77	Kemsley Fields, Swale Way, Sittingbourne	31.8	31.3	32.9	29.6	24.6	31.4	-21.5
SW83	Pembury Court, Dover Street	27.4	29.7	30	24.6	20.3	27.9	-27.2
SW88	Sonora Way, Sonora Fields, Sittingbourne	24.1	20.4	22.2	21.1	14.6	22.0	-33.3
SW118	Opp Fruit Stall, 9 Fox Hill, Bapchild	-	-	20.2	21.3	13.4	20.8	-35.6
SW125	Fox & Goose, The Street, Bapchild	-	-	-	23.7	16.7	23.7	-29.6
SW126	16/18 The Street, Bapchild	-	-	-	37.2	24.0	37.2	-35.4
SW132	Fountain Street, Sittingbourne	-	-	-	31.4	25.9	31.4	-17.4

Diffusion Tube ID	Address	Annual mean concentration, µg m^{-3}					Average concentration 2016 to 2019, µg m^{-3}	Change 2020 compared to previous years (%)
		2016	2017	2018	2019	2020		
SW85	Sheerness College 2, Bridge Road, Sheerness	30.3	32.5	33.3	31	25.0	31.8	-21.3
SW86	Swale Foyer, Bridge Road, Sheerness	30.2	31.4	30.3	28.3	21.5	30.1	-28.6
SW127	Halfway Road (14) Halfway, Sheerness	-	-	-	31	22.4	31.0	-27.9
SW128	Queenborough Road (12/14) Halfway, Sheerness	-	-	-	37.4	27.0	37.4	-27.9
SW133	159 High Street, Sheerness Lampost	-	-	-	30.4	22.5	30.4	-25.8
SW134	12/14 High Street Sheerness Post	-	-	-	26.8	18.5	26.8	-30.8
SW07	Capel Hill Farm, Harty	12.1	10.7	10.7	11.3	8.3	11.2	-26.0
SW34	Hernhill Village Hall, Hernhill	13.2	11.9	10.3	9.8	8.0	11.3	-29.0

In terms of reductions of NO_2 reductions in each AQMA the following graph shows that the greatest reduction occurred for site SW131 in AQMA 7. The least change occurred for site SW51 in AQMA 4.

Figure F.4 - Percentage reduction in NO_2 concentrations measured by diffusion tube within the AQMAs in Swale Borough Council



Opportunities Presented by COVID-19 upon LAQM within Swale Borough Council

Faversham 20 mph zone was set up as part of the Covid Active Travel grant and funded by the Department for Transport's Emergency Active Travel Fund. This was led by Kent County Council and Faversham Town Council.

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

In this section we provide details on the challenges and/or constraints that have been experienced in relation to LAQM during 2020 that could be attributed to the pandemic. An impact matrix (Table F.2) has been provided by Defra which allows the impact of the pandemic to be assigned to each of nine categories in LAQM process. The impact of the pandemic on these categories is provided below:

Automatic Monitoring – Data Capture (%)

- ⇨ No impact. All automatic monitoring had data capture of at least 95 %

Automatic Monitoring – QA/QC Regime

- ⇨ No impact

Passive Monitoring – Data Capture (%)

- ⇨ No impact. Vast majority of sites had data capture > 75 %. Only three sites required annualisation (had data capture less than 75 %).

Passive Monitoring – Bias Adjustment Factor

- ⇨ No impact. Bias adjustment undertaken as normal

Passive Monitoring – Adherence to Changeover Dates

- ⇨ No impact.

Passive Monitoring – Storage of Tubes

- ⇨ No impact.

AQAP – Measure Implementation

- ⇨ Medium impact

Table F.2 – 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

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

References

- Local Air Quality Management Technical Guidance LAQM.TG16. April 2021. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG16. May 2016. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Openair - data analysis tool Introduction - Defra, UK