



Gravesham Borough Council
Annual Status Report 2020

Bureau Veritas

August 2021

Move Forward with Confidence





**BUREAU
VERITAS**

Document Control Sheet

Identification	
Client	Gravesham Borough Council
Document Title	2020 Annual Status Report
Bureau Veritas Ref No.	7709387/UK/V1.0

Contact Details		
Company Name	Bureau Veritas UK Limited	Gravesham Borough Council
Contact Name	Hannah Smith	Deborah Wilders
Position	Senior Consultant	Environmental Protection Team, Regulatory Services
Address	5 th Floor 66 Prescott Street London E1 8HG	Civic Centre Windmill Street Gravesend Kent DA12 1AU

Configuration				
Version	Date	Author	Reason for Issue/Summary of Changes	Status
V1.0	14/04/2021	A Smith	Draft for comment	Draft
V1.0	31/08/2021	A Smith	Final following updates from the Council	Final

	Name	Job Title	Signature
Prepared By	A Smith	Graduate Consultant	
Approved By	P Bentley	Senior Consultant	

Commercial In Confidence

© Bureau Veritas UK Limited

The copyright in this work is vested in Bureau Veritas UK Limited, and the information contained herein is confidential. This work, either in whole or in part, may not be reproduced or disclosed to others or used for any purpose, other than for internal client evaluation, without Bureau Veritas' prior written approval.

Bureau Veritas UK Limited, Registered in England & Wales, Company Number: 01758622
Registered Office: Suite 206 Fort Dunlop, Fort Parkway, Birmingham B24 9FD

Disclaimer

This Report was completed by Bureau Veritas on the basis of a defined programme of work and terms and conditions agreed with the Client. Bureau Veritas confirms that in preparing this Report it has exercised all reasonable skill and care taking into account the project objectives, the agreed scope of works, prevailing site conditions and the degree of manpower and resources allocated to the project.

Bureau Veritas accepts no responsibility to any parties whatsoever, following the issue of the Report, for any matters arising outside the agreed scope of the works.

This Report is issued in confidence to the Client and Bureau Veritas has no responsibility to any third parties to whom this Report may be circulated, in part or in full, and any such parties rely on the contents of the report solely at their own risk.

Unless specifically assigned or transferred within the terms of the agreement, the consultant asserts and retains all Copyright, and other Intellectual Property Rights, in and over the Report and its contents.

Any questions or matters arising from this Report should be addressed in the first instance to the Project Manager.



Move Forward with Confidence



2020 Air Quality Annual Status Report (ASR)

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

August 2021

Gravesham Borough Council

Local Authority Officer	Deborah Wilders
Department	Environmental Protection Team, Regulatory Services
Address	Gravesham Borough Council Civic Centre Windmill Street Gravesend Kent DA12 1AU
Telephone	01474 33 70 00
E-mail	air.quality@gravesham.gov.uk
Report Reference number	7709387/UK/V1.0
Date	August 2021

Executive Summary: Air Quality in Our Area

Air Quality in Gravesham

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

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion³.

Gravesham is in North Kent, twenty-five miles from London and has a population of over 106,939 (2019 mid-year estimates – Office of National Statistics). The majority of the population live in the main urban areas of Gravesend and Northfleet, which are both located in the north of the Borough. The south of the Borough is largely rural in character. Gravesham is one of the Thames Gateway major regeneration areas.

The main source of air pollution is road traffic emissions from major roads, notably the A2, A226 and A227. Alongside this, commercial, industrial and domestic sources of pollution contribute to the background pollution concentrations within the Borough. The Local Air Quality Management (LAQM) system, as set out in Part IV of the Environment Act 1995, places an obligation on all local authorities to regularly review and assess air quality in their area, to determine whether or not the air quality objectives are likely to be achieved. Gravesham currently has declared four Air Quality Management Areas (AQMAs) as a result of exceedances of the air quality objectives in the area. The AQMAs are as follows;

- Gravesham A2 AQMA (Declared for exceedances of the annual mean NO₂ objective, and the 24-hour mean PM₁₀ objective);
- Northfleet Industrial Area AQMA (Declared for exceedances of the annual mean PM₁₀ objective);

¹ Environmental equity, air quality, socioeconomic status and respiratory health, 2010

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

³ Defra. Abatement cost guidance for valuing changes in air quality, May 2013

- Gravesham A226 One-way system AQMA (Declared for exceedances of the annual mean NO₂ objective); and
- Gravesham A227/B261 Wrotham Road / Old Road West AQMA (Declared for exceedances of the annual mean NO₂ objective).

The details for the current AQMAs can be found at the following link: https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=113.

Results for 2019 indicate that both the annual mean objective and 1-hour objective for NO₂ were met at both the continuous monitoring locations (ZG2 and ZG3). The annual mean NO₂ concentration for 2019 has shown a slight decrease at ZG2 from 2018, whereas ZG3 has shown a slight increase.

Additionally, the annual mean and the 24-hour mean air quality objectives for PM₁₀ were met at both continuous monitoring locations in 2019. The annual mean PM₁₀ concentration at ZG2 remained stable in 2019, however concentrations at ZG3 saw a slight increase in annual mean concentrations. The number of exceedances of the 24-hour mean remained stable at ZG2 compared to 2018, however at ZG3 they increased from three to ten.

The review of diffusion tube monitoring data has identified nine locations where the AQS annual NO₂ objective was exceeded in 2019, seven of which are within existing AQMAs. The two remaining exceedance locations were at diffusion tube monitoring site GR135, located at 25 Wrotham Road and GR119, located at Woodville Place. Both locations are outside of the existing AQMA and have reported at least four exceedances in the past five years, however neither of these locations are considered to be representative of relevant exposure as their locations are indicative of commercial properties only. Therefore these are not considered as sensitive receptors in relation to the NO₂ annual mean AQS objective. GR119 was not distance corrected as it is situated on a façade of a commercial building. GR135 however was distance corrected to the nearest relevant exposure (closest commercial property) and was found to be below 40µg/m³ (35.4µg/m³). If relevant receptors are introduced at these locations, then a new AQMA will be declared in response to the monitored exceedance at GR119.

Of the seven exceedances reported within existing AQMAs, two sites (GR31 and GR47) are not located at a site of relevant exposure, therefore distance correction

was not applied. For the remaining five sites (GR13, GR24, GR40, GR57 and GR142), following distance correction calculations all continued to report an exceedance of the annual mean NO₂ objective with the exception of GR57, reporting a concentration of 39.6µg/m³.

The annual mean NO₂ concentration did not exceed 60µg/m³ at any monitoring location with a full data set in 2019 and therefore exceedances of the 1-hour mean objective are unlikely.

Gravesham Borough Council is committed to improving air quality in the borough for the benefit of both residents and visitors. The two existing air quality action plans (Final Action Plan – A2 Trunk Road and Northfleet Industrial Area AQMA (July 2004) and Air Quality Action Plan – Urban Area AQMA (July 2006)) are due to be updated to reflect the revocation of three AQMAs in 2018.

Monitored NO₂ annual mean concentrations in the A226 One-Way AQMA and the A2 AQMA have been increasing at numerous locations over the past five years.

Although no new exceedances have been created in 2019, this will be considered when updating the AQAPs to see if additional measures could help to reduce concentrations throughout the AQMAs and at exceeding locations.

Highways England (HE) has responsibility for the management of the A2 Trunk Road and as such is responsible for any direct actions proposed for the AQMA along the A2 Trunk Road in Gravesham.

Kent County Council (KCC) as the local transport authority is responsible for the management of the local road network and as such is responsible for any direct actions proposed for the AQMAs in the town centre in order to reduce road traffic emissions. Gravesham Borough Council works together with Kent County Highways to improve air quality within these AQMAs and throughout the Borough.

Gravesham Borough Council is continuing to review the declared AQMAs to ascertain whether any significant improvements to pollution levels have been made to allow for boundary adjustment or removal. After implementation of any recommendations of the review a new action plan, to replace the two current AQAPs, will be drawn up reflecting the AQMAs in existence at that time.

The council has produced an Air Quality Strategy which aims to address the wider air pollution issues in the Borough and prevent air quality deteriorating by taking action to improve air quality.

Actions to Improve Air Quality

The declaration of the above AQMAs and the adoption of the Action Plans and Strategy have enabled the Council to make progress on improving air quality within the declared areas for local residents and visitors. This has been achieved by working with partners including Kent County Council, Kent County Highways, Highways Agency and the Environment Agency.

Actions to date include:

- The realignment of the A2 Trunk road away from the residential areas with a linear park buffer zone;
- Variable speed limits on the A2 Trunk Road during peak time in order to smooth the flow of traffic,
- Variable messaging signage to give real-time numbers of car parking spaces to those looking for town centre parking;
- Co-ordination of various traffic signals at junctions on a particular route to improve the flow and reduce congestion;
- Provision of bus priority measures to assist the improvement of public transport in the town centre;
- Improved cycle routes;
- Provision of the Fast Track bus route from Gravesend to Dartford via Ebbsfleet Station and Bluewater Shopping Centre;
- The closure of the Northfleet cement works has also improved air quality in the area significantly,
- The opening of the Ebbsfleet A2 junction and link road with further improvements currently being carried out by Highways England;
- Changes to the one way system in Gravesend Town Centre, including the re-routing of Rathmore Road so as to enable the implementation of the integrated transport interchange; and

- The completion of an independent air quality management area (AQMA) review and dispersion modelling exercise leading to the revocation of three of the seven Air Quality Management Areas.

Conclusions and Priorities

In 2019 there were nine reported exceedances of the annual mean NO₂ air quality objective. Following distance correction, seven of these were continuing to report exceedances. Five of these were in the A226 One-Way AQMA (GR13, GR24, GR31, GR40, GR47), one in the A2 AQMA (GR142), and another located outside any AQMA at Woodville Place (GR119). GR119 is near commercial units with no nearby residential units, therefore the annual mean NO₂ objective is not relevant, however if sensitive receptors are introduced an additional AQMA will be declared here. A review and update of the AQAPs is due to take place following the revocation of three AQMAs in 2018, and also to consider additional measures to further reduce NO₂ concentrations across the AQMAs.

Gravesham Borough Council are focused on maintaining on-going reductions in annual mean NO₂, which have been largely decreasing year-on-year, through the implementation of the identified measures, some of which have already proven to be successful. The following actions are considered to be key future priorities in ensuring reductions continue:

- Locate new mixed use development in areas with best access to services and facilities which minimise the need to travel, particularly by car;
- Improve the local economy to reduce the need for out-commuting. This can also have an impact on air quality;
- Support and where possible provide alternatives to help support a modal shift away from car based transport, e.g. improve public transport including bus, train, cycling and walking provision, and increase the use of water based transport; and
- Ameliorate the implications of additional traffic for air quality.

Local Engagement and How to get Involved

The main source of air pollution within Gravesham Borough Council is from road traffic emissions. Therefore the best way for members of the public to help improve

air quality in Gravesham is to adjust their normal travel patterns to be more sustainable.

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

- Use public transport where available – This reduces the number of private vehicles in operation reducing pollutant concentration through the number of vehicles and reducing congestion;
- Walk or cycle if your journey allows – From choosing to walk or cycle for your journey the number of vehicles is reduced and also there is the added benefit of keeping fit and healthy;
- Car/lift sharing – Where a number of individuals are making similar journeys, such as travelling to work or to school car sharing reduces the number of vehicles on the road and therefore the amount of emissions being released. This can be promoted via travel plans through the workplace and within schools;
- Alternative fuel / more efficient vehicles – Choosing a vehicle that meets the specific needs of the owner, fully electric, hybrid fuel and more fuel efficient cars are available and all have different levels benefits by reducing the amount of emissions being released; and
- Home working – Choosing to work from home can help to alleviate congestion on the roads during peak times and therefore reduce the amount of emissions being released.

Table of Contents

Executive Summary: Air Quality in Our Area	1
Air Quality in Gravesham	1
Actions to Improve Air Quality	4
Conclusions and Priorities	5
Local Engagement and How to get Involved	5
1 Local Air Quality Management	9
2 Actions to Improve Air Quality	10
2.1 Air Quality Management Areas	10
2.2 Progress and Impact of Measures to address Air Quality in Gravesham Borough Council	13
2.3 PM _{2.5} – Local Authority Approach to Reducing Emissions and/or Concentrations	30
3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance	32
3.1 Summary of Monitoring Undertaken	32
3.1.1 Automatic Monitoring Sites	32
3.1.2 Non-Automatic Monitoring Sites	32
3.2 Individual Pollutants	32
3.2.1 Nitrogen Dioxide (NO ₂)	32
3.2.2 Particulate Matter (PM ₁₀)	36
3.2.3 Particulate Matter (PM _{2.5})	37
4 Conclusion and Recommendation	38
4.1 Conclusions from Monitoring Data	38
4.2 Recommendations	39
Appendix A: Monitoring Results	40
Appendix B: Full Monthly Diffusion Tube Results for 2019	63
Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC	68
Diffusion Tube Monitoring Data	68
QA/QC of Diffusion Tube Monitoring	71
Planning Applications in 2019/20	74
Appendix D: Maps of Monitoring Locations and AQMAs	75
Appendix E: Summary of Air Quality Objectives in England	80
Glossary of Terms	81

References 82

List of Tables

Table 2.1 – Declared Air Quality Management Areas.....	11
Table 2.2 – Progress on Measures to Improve Air Quality	16
Table A.1 - Details of Automatic Monitoring Sites.....	40
Table A.2 – Details of Non-Automatic Monitoring Sites	41
Table A.3 – Annual Mean NO ₂ Monitoring Results.....	49
Table A.4 – 1-Hour Mean NO ₂ Monitoring Results	58
Table A.5 – Annual Mean PM ₁₀ Monitoring Results.....	59
Table A.6 – 24-Hour Mean PM ₁₀ Monitoring Results.....	61
Table B.1 - NO ₂ Monthly Diffusion Tube Results - 2019.....	63
Table C.1 – Local Bias Factors.....	69
Table C.2 – Previous Bias Adjustment Factors Used by Gravesham Borough Council	71
Table C.3 – Fall-off with Distance Correction of Relevant Sites Exceeding and Near Exceeding the NO ₂ Annual Mean AQS Objective	72
Table C.4 – Planning Applications Permitted in 2019/20.....	74
Table E.1 – Air Quality Objectives in England	80

List of Figures

Figure A.1 – Trends in Annual Mean NO ₂ Concentrations at Monitoring Sites Located in and Around A226 One-Way System AQMA	54
Figure A.2 – Trends in Annual Mean NO ₂ Concentrations at Monitoring Sites Located in A227 Wrotham Road/B261 Old Road West AQMA	55
Figure A.3 – Trends in Annual Mean NO ₂ Concentrations at Monitoring Sites Located in and Around A2 AQMA	56
Figure A.4 – Trends in Annual Mean NO ₂ Concentrations at Monitoring Sites Located Outside Any AQMA.....	57
Figure A.5 – Trends in Annual Mean PM ₁₀ Concentrations	60
Figure A.6 – Trends in Number of 24-Hour Mean PM ₁₀ Results >50µg/m ³	62
Figure C.1 – Gravesham Roadside: Local Diffusion Tube Correction Factor Calculation.....	69
Figure C.2 – Gravesham Industrial Roadside: Local Diffusion Tube Correction Factor Calculation.....	70
Figure D.1 – Map of Non-automatic Monitoring Stations within Close Proximity of the A226 One-Way System, Gravesend AQMA	75
Figure D.2 – Map of Automatic and Non-automatic Monitoring Stations within Close Proximity of the Northfleet Industrial Area AQMA	76
Figure D.3 – Map of Automatic and Non-automatic Monitoring Stations Near to the A2 Trunk Road AQMA	77
Figure D.4 – Map of Non-automatic Monitoring Stations Near to the B227/B261 Wrotham Road/Old Road West Junction AQMA	78
Figure D.5 – Map of Non-automatic Monitoring Stations Outside of Any AQMA Near Meopham.....	79

1 Local Air Quality Management

This report provides an overview of air quality in Gravesham Borough Council during 2019. 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 Gravesham Borough Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England can be found in Table E.1 in Appendix E.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMA) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

A summary of AQMA declared by Gravesham Borough Council can be found in Table 2.1. Further information related to declared or revoked AQMA, including maps of AQMA boundaries are available online at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=113. Alternatively, see Appendix D: Maps of Monitoring Locations and AQMA, which provides for a map of air quality monitoring locations in relation to the AQMA.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)				Action Plan		
						At Declaration		Now		Name	Date of Publication	Link
A2 Trunk Road AQMA	Declared 2002 Amended 2012	NO ₂ Annual Mean	Gravesham	The A2 Trunk Road AQMA. An area extending either side of the length of the A2 within the borough	YES	50.5	µg/m ³	59.8	µg/m ³	Local Air Quality Management – Final Action Plan 2004	01/07/2004	http://www.kentair.org.uk/home/text/438
Northfleet Industrial Area AQMA	Declared 2005	PM ₁₀ Annual Mean	Gravesham	An area encompassing the Northfleet Industrial Area in Gravesham	NO	40.8	µg/m ³	22.3	µg/m ³	Local Air Quality Management – Final Action Plan 2004	01/07/2004	http://www.kentair.org.uk/home/text/438

Gravesham Borough Council

A226 One-way system in Gravesend AQMA	Declared 2005	NO ₂ Annual Mean	Gravesham	An area incorporating the entirety of the A226 One-way system in Gravesend	NO	57.4	µg/m ³	46.1	µg/m ³	Local Air Quality Management – Final Action Plan 2006	01/07/2006	http://www.kentair.org.uk/home/text/438
A227/B261 Wrotham Road/Old Road West Junction AQMA	Declared 2005	NO ₂ Annual Mean	Gravesham	An area encompassing the junction of the A227 Wrotham Road and B261 Old Road West extending south to a point just beyond the Woodlands Restaurant	NO	47.3	µg/m ³	40.2	µg/m ³	Local Air Quality Management – Final Action Plan 2006	01/07/2006	http://www.kentair.org.uk/home/text/438

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

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

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

- *“As no exceedances in the annual mean PM₁₀ AQOs has been experienced over the past 5 years, the Council may wish to consider revoking the Northfleet AQMA.*
- *The maps included in the report are clearly labelled however they still contain monitoring locations which have been decommissioned, i.e. GR99. It would be beneficial for the Council to remove all monitoring locations that are no longer in use.*
- *The latest AQAP was published in 2004 and 2009. This exceeds the 5-year period recommended by Defra after which an updated plan should be released. The Council have stated that they plan to update their AQAP in 2019. This should be the Council's top priority especially considering the revocation of 3 AQMAs in 2018. It is important that the Council have an AQAP that is up to date and reflect the changes in AQMA designations within the borough.*
- *Section 3 and 4 of the ASR are extremely detailed and informative. The Council provide a very good discussion on their monitoring regime and NO₂ trends seen within the borough. This level of detailed is encouraged for future reports.*
- *It is encouraging to see that the Council discuss and consider the potential implications of planning applications on air quality within the borough.”*

Although the PM₁₀ annual mean AQS objective has not been exceeded at the Northfleet Industrial AQMA within the past five years, Gravesham Borough Council intends to continue to enforce the AQMA due to continual regeneration taking place in the locality. Additionally, permission has been granted for a new bulk aggregate import terminal to be developed, and the existence of the AQMA allows the Council to control, influence and minimise the impact as part of the planning process.

Additionally, in the past Gravesham Borough Council has had capacity and staffing restrictions, resulting in delays in updating the AQAP since that which was published

in 2009. The Council is looking to hire two new members of staff during summer 2020 and intends to commence the updating and publishing a new AQAP in 2020-2021. This will continue to be the Council's priority moving forwards in order to accurately reflect changes in the AQMA designation.

Gravesham Borough Council has taken forward a number of direct measures during the current reporting year of 2019 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

More detail on these measures can be found in their respective Action Plans

<https://www.gravesham.gov.uk/home/environmental-health/air-quality/action-plans,-strategy-and-monitoring> Key completed measures are:

- New road infrastructure (Rathmore Link Road – Phase 2 completed, Phase 3 under development;
- Pedestrianisation of King Street during the core hours;
- Road prioritisation (Bus priority) – completed on all routes;
- Realignment and widening of the A2 with the creation of the linear park buffer zone;
- Reducing overall dust emissions from Lafarge Cement UK Northfleet Works through changes to process technology and procedures; and
- Relocation of the Lafarge Cement UK Northfleet Works.
- Improve emissions standards for Council Fleet and Public Service Vehicles

Gravesham Borough Council expects the following measures to be progressed or completed over the course of the next reporting year:

- General public transportation improvements and further development of the car parking strategy
- Employer and new Development Travel Plans – continued engagement and improvement through the planning process

Longer term actions cited in the 2019 ASR are still applicable and include the following:

- Improvement of transport links around the one-way system related to the Transport Quarter, Heritage Quarter and the Clifton Slipways Developments.
- Locate new mixed-use development in areas with best access to services and facilities which minimise the need to travel, particularly by car;
- Improve the local economy to reduce the need for out-commuting. This can also have an impact on air quality;
- Support and where possible require development to provide alternatives to help support a modal shift away from car based transport, e.g. improve public transport including bus, train, cycling and walking provision, and increase the use of water based transport;
- Ameliorate the implications of additional traffic for air quality;
- The council will continue to encourage the planting of trees which benefit air quality within the borough through the planning process, Gravesham's Open Space Strategy and green initiative partnerships.

The principal challenges and barriers to implementation that Gravesham Borough Council continues to face are associated with the limited resources at Kent Highways to carry out road improvement schemes, and the associated planning process. In terms of transport modes, most working residents travel to work by car; there are still high levels of out-commuting to work, particularly to Dartford and Central London. This contributes to congestion, particularly in parts of the urban area and along the A2. Gravesend town centre also experiences congestion as a result of retail and business activities. Levels of congestion will increase as a result of natural growth in traffic and new development. Traffic levels contribute to poor air quality in some areas, however the improvement works on the A2 including the new Lower Thames Crossing should assist to alleviate this in the coming years.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Gravesham Borough Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the continuing review and revocation of the A226 One-way system in Gravesend AQMA as this AQMA is made up of several street canyons making dispersion of air pollution difficult.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
Measures 1 and 4	Traffic Rerouting using Variable Message Signage (VMS) AND Traffic Management (UTMC and junction improvements) (A226 One-way system Gravesend AQMA)	Traffic Management	UTC, Congestion management, traffic reduction	2012	Kent County Council/Gravesham Borough Council	Kent County Council/Gravesham Borough Council	Reduction in journey time, reduction in congestion	Expected air quality improvement by 0.2µg/m ³ in AQMA	<p>Traffic Rerouting using Variable Message Signage (VMS) scheme has been incorporated into the Urban Traffic Management System (UTMC) and junction improvements scheme.</p> <p>Interlinked with FastTrack Bus priority signal control system refurbished in 2015. This enables it to remain viable.</p> <p>Has reduced congestion in town centre one way system. Likely to be small improvement in levels.</p> <p>Further development will need funding to be secured by Kent County Council, ideally through development.</p> <p>The Fastrack route which uses a combination of designated lanes and shared roadway with preferential use of the junctions using traffic management etc. will pass through land under the planning control of the Ebbsfleet Development Corporation (EDC) rather than GBC.</p> <p>A route through Northfleet Embankment West is being investigated. It will also form part of a proposed Fastrack route C.</p> <p>Fastrack route B will be diverted over the new Springhead Park Bridge. This bridge is partially within the borough of Dartford. The bridge is due to open in spring 2020. Fastrack is likely to use this route from April 2020.</p>	On-going	<p>The two measures are intrinsically linked.</p> <p>These schemes are reviewed each time major development comes forward and are therefore reviewed on an on-going basis.</p> <p>Further development will need funding to be secured by Kent County Council, ideally through development although KCC have historically not asked for these contributions.</p>
2	HGV rerouting - Gravesend Town Centre Road Network AQMA	Freight and Delivery Management	Route Management Plans/ Strategic routing strategy for HGV's	-	Kent County Council Highways England	Kent County Council	Reduction in journey time, reduction in congestion	Expected air quality improvement by at least 0.2µg/m ³ in AQMA	<p>West Street Bridge removed to allow HGVs to exit the one-way system and then access the Northfleet Industrial Area or Imperial Business Park without having to go all the way around the one-way system.</p> <p>Other schemes devised by KCC have not been developed however they will reassess if funding becomes available.</p> <p>Springhead Road –narrowing to the middle length of the road to discourage HGV traffic. HGVs still have access from northern end to Springhead Enterprise Park and Sainsbury's from the southern end of the road.</p> <p>This narrowing should also discourage /prevent the use of the new Springhead Park Bridge from the estate to Ebbsfleet station area by HGVs.</p> <p>The knock on effects of Operation Stack has significantly affected the traffic on the A2 trunk road through Gravesham, and rat running through the residential areas</p>	On-going	<p>All routes highly congested therefore any rerouting will be of limited benefit.</p> <p>Sat Nav routes tend to be followed by drivers rather than signage showing preferred route i.e. via Thames Way A226 which takes HGVs from A2 to western industrial areas.</p> <p>Both KCC and HE recognise there is a HGV parking issue within Kent which needs addressing and is currently examining the findings of the consultation.</p>

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
									<p>of the borough and town centre AQMA on a number of occasions, exacerbating traffic congestion.</p> <p>KCC and Highways England have undertaken reviews of HGV movements and a consultation in relation to the need for lorry parks and their locations particularly when there are delays at ports within Kent.</p> <p>Operation Brock is part of the product of this review, the implementation of which occurred in February 2019 as part of the Brexit preparations.</p> <p>The impact on the traffic on the A2 Trunk Road in Gravesham from Operations Stack and Brock in the future is unknown.</p>		
3	New road infrastructure (Rathmore Link Road)	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	2012	Kent County Council	Kent County Council	Reduction in journey time, reduction in congestion	Expected air quality improvement by at least 1µg/m ³ locally	<p>This scheme is one of the major strategic schemes in Kent Thameside Home and Roads programme which are funded from various government sources and developer contributions Phase 1 completed</p> <p>Phase 2 now complete.</p> <p>Allows two-way traffic to pass south of the railway station thus removing it from the north of the station to improve pedestrian access to public transport and shopping centre.</p> <p>Has benefitted air quality by removing the route of the one-way system to a purpose-built road south of the station.</p> <p>Has delivered medium improvement in levels in some areas, and a slight increase in levels on the new route.</p> <p>KCC purchased land from Network Rail adjacent the railway station for new bus interchange. Due to commence work on site in 2021.</p> <p>KCC is developing the detail for new bus stops in Barrack Row and upgrading those in Garrick Street. Due to commence on site in 2021</p>	<p>Phase 1 (re-routing of one way system through Woodville Place) completed</p> <p>Phase 2 (Rathmore Road construction) completed</p> <p>Phase 3 (Transport Interchange) under development</p>	<p>These phases have enabled the public transport interchange to be taken forward.</p> <p>This will significantly improve public transport access.</p> <p>AQ monitoring at key locations around the new Rathmore Road route have recorded an increase in levels of nitrogen dioxide at 8 of the 17 locations as expected however no additional exceedances of the objectives have occurred.</p>
6	Improve emissions standards for Council Fleet and Public Service Vehicles	Promoting Low Emission Transport	Taxi Licensing conditions	-	Gravesham Borough Council / Transport operators	-	Fleet vehicles replaced by later Euro standards	Expected air quality improvement by 0.2µg/m ³ in all AQMAs	<p>The council won a bid from central government to set up a new recycling scheme and the fleet was replaced in four years with latest Euro standard vehicles.</p> <p>Local bus operator has introduced cleaner more efficient buses on some of its routes through the urban area, this was funded in part from a Local Transport Sustainability Fund.</p> <p>Arriva have implemented a discount arrangement for council employees who use the bus for their commute.</p> <p>The new Fastrack buses have lots of features for the customer to encourage use e.g. charging points, wifi, leather seats etc.</p>	On-going	<p>The council has also trialled various methods of improving fuel consumption of its fleet for example petrol additives and driver training.</p> <p>Taxis - The Council will keep this matter under review and continue to monitor published research, its air quality monitoring results and recommendations, and Government guidelines, etc. with a view to specifying more stringent vehicle emission standards and promoting cleaner fuels in respect of licensed vehicles at the time of the next policy revision, if considered appropriate at that time.</p>

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
									<p>Emissions from taxis and PHVs can also be further reduced by encouraging better maintenance of vehicles and switching off engines when stationary or idling; particularly at taxi ranks; however it is proposed that this aspect be tackled through education and promotion.</p> <p>Consideration is being given to the use of electric buses on the Fastrack routes. There has been a trial of an electric bus on Route A which went well. However the next set of new vehicles will be the latest Euro standard diesel vehicles.</p> <p>Improvements to the Fastrack buses i.e. replaced with latest Euro standards results in the buses replaced being used on other routes.</p> <p>Gravesham are taking part in a joint initiative with Medway and the Energy Savings Trusts (EST) to survey all taxi drivers to ascertain the level of knowledge and possible take up of electric vehicles, what it would take to convert them and what infrastructure they would want and where to make it viable for them to use EVs.</p> <p>Taxis – The Council has reviewed the European emission standards currently in place, and notes that all newly licensed vehicles, other than WAVs and limousines, should meet the Euro 5 or Euro 6 standards as a result of them having to be less than 7 years old at the time of first being licensed. The council has specified within its vehicle criteria (Appendix A) that all vehicles presented for first time licensing from the commencement date of this policy, other than stretched limousines and Wheelchair Accessible Vehicles, must meet the Euro 5 or Euro 6 emission standards.</p> <p>Historical requirements have been removed from the restrictions which required minimum sizes of engines and fuel types so as to enable applicants to licence smaller and more efficient engines and those powered by cleaner fuels e.g. hybrid and electric.</p>		
8	Public transport improvements	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	-	Kent County Council / Public transport operators / EDC / GBC	Kent County Council	Reduction in car use and congestion	-	<p>A dedicated bus route for Fastrack has been created between Gravesend Town Centre, Ebbsfleet International Station along Thames Way, Bluewater and Dartford.</p> <p>A further bus route will be protected in the future as part of the redevelopment of Northfleet Embankment proposals. Details of Ebbsfleet Valley development will include a dedicated Fastrack Route.</p> <p>In 2015 a new fleet of FastTrack buses were introduced. They are the latest euro standard.</p>	On-going	<p>Northfleet Embankment Bulk Aggregate Import Terminal (BAIT) and the Mixed Use Development (MUD) proposals have planning permission, to outline stage and both sites have been designed to include a predominantly dedicated bus corridor for potential future use.</p> <p>Work ongoing on developing and expanding the Fastrack system.</p> <p>There has been a significant drop in passengers since the beginning of lockdown No.1 due to covid-19 restrictions.</p>

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
									<p>The council has negotiated a discount for staff commuting to work on an Arriva bus.</p> <p>The operator - Arriva - has also improved the whole of their fleet on other routes.</p> <p>The council has negotiated a discount for all of GBC staff that use the Arriva buses to commute to work.</p> <p>Rathmore Road improvements were completed in late 2017 which would enable the transport interchange to go forward if funding secured.</p> <p>Crossrail being considered for extension to Ebbsfleet. Many of Gravesend trains stop at Ebbsfleet thus allowing easy access to trains to Heathrow and the Western routes.</p> <p>Ferry routes to Essex and London – pontoon installed in vicinity of town centre to enable ferry services. New routes and services to London have started.</p> <p>Pre-pandemic the ferry to/from Tilbury from pontoon Gravesend was running 6 days a week throughout year from 5.40am to 19.10pm. During ferry hours a bus service operates from Tilbury landing stage to Tilbury town centre. This was continued as it is classed as a "bus" in terms of County public transport support, with both Essex and Kent supporting it.</p> <p>Pre-pandemic the ferry enhancement to Essex being explored to make use of labour market for Ebbsfleet developments and South Essex without need to use Dartford Crossing.</p> <p>A new Cycle hub has been established at the redeveloped railway station to accommodate the HS1 trains.</p> <p>Cycle route from station to Cyclopark (south of urban area) being developed.</p> <p>There has been a significant drop in passengers since the beginning of lockdown No.1 due to covid-19 restrictions.</p>		
9	Car parking strategy	Alternatives to private vehicle use	Bus based Park & Ride	-	Gravesham Borough Council	-	Reduction in car use and congestion		<p>The objectives are to have a sufficient supply of well-located safe and clean car parking spaces and to take into account any development opportunities for housing and or regeneration of the town centre.</p> <p>Town Centre CPZ Consultation completed May 2019.</p> <p>Several large planning permissions have been granted in the town centre to regenerate the town in terms of new housing close to employment and to local amenities to reduce car travel into town and to regenerate commercial areas. Whilst these developments remove old</p>	On-going	<p>Any rise in parking fees could encourage the customers to go to Bluewater and other regional shopping centres and retail parks that all offer free parking.</p> <p>Council need to encourage shoppers and businesses to the town; affordable and competitive parking tariffs is part of the attraction. Parking incentives such as free 2 hours on a Saturday and all day free parking on a Sunday which is currently in operation attract users.</p>

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
									<p>open car parks they bring new parking opportunities with mandatory electric vehicle charging which would be prohibitive in the old set ups.</p> <p>Parking Manager responsible for devising new strategy which will depend on development and the location of parking allocations.</p> <p>There is a distinction between the operational car parking strategy and the Local Plan long term parking provision or what happens to current car parks.</p> <p>Currently car parks are on all sides of town centre including the north between town and river. Planning policy will be encouraged parking to be moved from northern side so as to avoid need to drive around the one-way system to find a car parking space i.e. will improve access and reduce traffic in one-way system AQMA</p> <p>Zoned permit parking has been introduced in the borough. Previously anyone with a permit could park anywhere one was required. Now a person receives the permit for a particular zone only.</p> <p>The provision of parking for electric vehicles will also be included in the Strategy.</p> <p>Baseline work to inform the work on the new strategy has been completed.</p> <p>Work on the planning policy for car parking and partnership working with the county is on-going.</p> <p>When development is settled within the town centre i.e. applications are permitted and or permitted development comes forward the success of the parking strategy will be apparent and adapted going forwards.</p>		
10	The Council's Travel Plan measures	<p>Alternatives to private vehicle use</p> <p>Promoting Travel Alternatives</p>	<p>Car & lift sharing schemes</p> <p>Encouraging home-working</p>	-	Gravesham Borough Council	-	% modal shift to car share/public transport/walking/cycling		<p>Current Plan adopted in February 2007. Car sharing promoted and a reduction in car business mileage. As part of the climate change review this matter will be considered and a new travel plan/way of working introduced.</p> <p>The council's HR service recently held a "Let's Talk Travel" event, in partnership with Kent County Council, to ask people to consider how they get to work and to rethink their commute to improve the environment, congestion, and the quality of peoples work and lives."</p> <p>The number of business miles the council HGV fleet has recorded has decreased in most years through better management although better record keeping, and the introduction of a recycling collection has increased that figure.</p>	On-going	

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
									<p>There has been a significant improvement in emissions from the council's commercial vehicle fleet due to replacement vehicles to Euro 5 this is despite doing more miles due to their being a recycling service/collection.</p> <p>The introduction of the new recycling scheme has increased the mileage of the council's HGV fleet significantly. Although the tailpipe emissions of each vehicle have been identified as being reduced by a considerable percentage on previous fleet emissions the increase in mileage is likely to have negated any reduction in total emissions from the fleet.</p> <p>Discount on purchasing of cycles for staff</p> <p>Lockers now provided for cyclists and a shower.</p> <p>Cycle parking has been provided in the Civic Centre's basement car park.</p> <p>Encouragement to not drive in to work on Clean Air Day, and to test other methods of getting to work.</p> <p>The pandemic has resulted in most of office staff at desk based jobs working from home with a view to assess the new set up - now all equipment has been provided to facilitate this - for it to become a permanent arrangement on 2 to three days per week.</p> <p>Lockers and a new shower facility have been provided for staff cycling in.</p> <p>More staff are choosing to cycle to avoid using public transport. This has given a fresh outlook to staff, with a better work life balance being considered. New senior management team at the council intend to encourage these changes in behaviour.</p>		
11	Employer and School Travel Plans	Promoting Travel Alternatives	School Travel Plans, workplace travel Planning and encouraging home-working	-	KCC / Gravesham Borough Council	-	No. of travel plans in place	-	<p>KCC achieved nearly 100% success with school travel plans.</p> <p>On-going - Travel Plans for developments and for Academy Schools still required by the planning process when appropriate.</p> <p>The planning process continues to require travel plans for all large developments and is part of standard S106 agreements.</p> <p>Environmental Health, Parking Services and Public Health teams worked together on Clean Air Day with two schools encompassing Smoke Freedom, Idling of engines and illegal parking outside schools.</p> <p>An Idling of engines campaigns with a local school was started but lockdown prevented it being followed through. Ongoing restrictions relating to Covid will mean that this will not be taken forward</p>	On-going	<p>Employee and School journeys create significant peak in traffic for short period.</p> <p>Consideration being given to partnership working with Gravesham Local Children's Partnership Group and the council's Public Health team on an educative campaign relating to idling of engines near schools.</p> <p>KCC's school travel plans officer post was removed once during cuts following on the success of 100% of schools in the borough implementing school travel plans. Therefore it is understood that KCC no longer require travel plans for schools etc. due to a lack of staff to work with the schools.</p>

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
									until such time as it is considered appropriate.		
12	Improve the facilities for cycling and walking	Transport Planning and Infrastructure	Cycle network and other	-	KCC / Gravesham Borough Council	-	%modal shift to cycling/walking On-going No. miles new cycle lanes/routes	-	<p>GBC has carried out work on a cycling strategy.</p> <p>The Cycle Hub at the railway station has been completed as part of the Council's plan for the Transport Quarter redevelopment. It includes cycle parking and will include a cycle shop and maintenance.</p> <p>Staff are offered discounts to buy cycles for work and have access to lockers and shower if they cycle to work and secure cycle parking in the basement</p> <p>Cycling routes are being improved and new ones brought forward e.g. Station to Cyclopark.</p> <p>Ebbsfleet Development Corporation are requiring developments to enable cycling routes around the Northfleet embankment area.</p> <p>Walking routes along riverside will be required within all new developments along Northfleet embankment and the Canal Basin area which have been dominated by industry to date with no access to the public. This will create riverside walks for people to enjoy.</p> <p>Natural England has formally published the coastal path route around Kent as part of their work around the country's coast.</p> <p>Cycle paths and provision of cycles and cycle racks continues to be sought in planning approvals.</p> <p>Regeneration in the borough including relocation of the trunk road in 2009 has afforded significant improvements in cycle ways.</p>	Various and on-going	The new transport interchange will make using the trains and buses easier and safer for the public
13	Environmental and Public Health Services will continue to work closely with the Planning and Regeneration Services to ensure that air quality is taken into account in the planning process	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	-	Gravesham Borough Council	-	No. planning applications with air quality conditions/assessments	-	<p>Regular meetings between Planning Officers and Regulatory Services. Development Team Approach (DTA) set up for each development as necessary so meetings with applicant and their consultants commence prior to application being submitted.</p> <p>Pre-App (Pre application) applications are encouraged by Planning Services so that issues are worked on before the application is submitted formally.</p> <p>Number of planning applications consulted on for Air Quality remains steady at between 800 to 850 /year.</p> <p>Currently being consulted on all routine planning applications including large developments e.g. The Charter as well as</p>	On-going	<p>Significant improvement in AQ - the planning process is the strongest tool we have in implementing air quality actions therefore it is considered that its impact on air quality is significant to medium in that it helps prevent worsening of air quality if it doesn't actually improve levels otherwise there would be a status quo.</p> <p>Improvements have been significant enough for the council to be able to revoke, with Defra's permission, three AQMAs declared for NO2 from urban traffic.</p> <p>Air Quality Planning Guidance published by Kent and Medway Air Quality Partnership has raised issues with regards to whether the</p>

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
									<p>many major infrastructure project including the following: Lower Thames Crossing Tilbury2 A2 Junctions Tilbury Energy Centre London Resort Theme Park</p> <p>Financial contributions towards ensuring the continuation of air quality monitoring in the locality of the development is request using S106 agreements.</p> <p>Air Quality conditions applied to all relevant planning decisions</p> <p>Pre-App (Pre application) applications are encouraged by Planning Services so that issues are worked on before the application is submitted formally.</p> <p>Planning permissions refused when necessary to prevent the impact affecting public health significantly.</p>		<p>emphasis on Air Quality impact Assessments needs to change to emissions reductions and damage costs. Gravesham Planners are still considering their options.</p> <p>Meanwhile the K&M Air Quality Partnership has started to review the document to update it and make it into a format more easily adopted by councils.</p> <p>No up to date Kent Air Quality Planning Guidance.</p>
14	Improve sustainable transport links serving new developments.	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	-	Gravesham Borough Council	-	No. planning applications where improvements secured	-	<p>On-going – included in Planning Policy CS12. However, implementation is complex as KCC is the transport authority and the Master Plan for the regeneration of the brown field sites on the Northfleet Embankment has changed from residential to industrial and back to residential over the last 10 years which has prevented any confidence in what the long-term plan will be.</p> <p>Dependent on development scale however discussions have gone ahead with Arriva. The plans for the regeneration area will include FastTrack as well as Arriva bus routes.</p> <p>If the development is on an existing route, then a bus stop will be installed.</p> <p>New development is required to do highway improvements e.g. junction lights, new lanes etc to ensure the nearby junctions can cope with the development traffic.</p> <p>Fastrack is so successful that consideration in all new planning applications for large developments with new buses coming forward with better euro standards however Ebbsfleet Development Corporation (EDC) now in place to act as planning authority for the riverside embankment development areas in both Dartford and Gravesham with Gravesham Council now only a consultee.</p>	On-going	<p>The Ebbsfleet Development Corporation (EDC) Implementation Framework now exists. This will possibly clarify what the master plan for the regeneration of the western and eastern embankment areas is and as such what sustainable transport links can be planned for and supported.</p> <p>GBC unfortunately now only a consultee in the planning process for many large scale developments in the brown field regeneration sites along the riverside. Many of these developments have ability to improve or worsen AQ.</p> <p>The proposed Lower Thames Crossing will be a three lane motorway from the A2 Trunk Road east of Gravesend to M25 junction 29. This will introduce a new route for people to access southern Essex more easily and vice versa and will avoid congestion at the Dartford Crossing.</p> <p>The proposed LTC will introduce traffic into areas previously without any i.e. it will be a new source of air pollution.</p>
15	The development of supplementary planning guidance for air quality assessments of developments	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	-	Gravesham Borough Council / Kent and Medway Air Quality Partnership	-	Completion of a Supplementary Planning Document	-	<p>The K&MAQ Partnership published the 2015 version of the air quality and planning guidance entitled, "Air Quality Planning Guidance" with two Options A and B relating to a borough wide approach or AQMA only. It is available to developers and public via www.kentair.org.uk</p>	On-going	<p>Gravesham Planning Services are keen to have policies that cover air quality such that it enables the restriction of in appropriate development, enables electric vehicle infrastructure to be installed and protects Gravesham residents against the impact of developments in neighbouring boroughs or in the area of the borough which comes</p>

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
									<p>Due to the complex and lengthy situation with adoption of SPDs Gravesham were not able to adopt this document as an SPD but refer to the document as recommended good practice.</p> <p>The guidance was reviewed at which time the emphasis was changed away from air quality impact assessments – although these still have their place - with the intention of adding information on electric vehicle infrastructure, damage costs, emissions reduction etc. The new guidance was published in December 2015. and has emphasis on emissions reduction.</p> <p>Due to the poor formal adoption rate of the new document the Partnership ran a workshop for Planning Officer in Feb 2017. Gravesham's Planners attended and are keen that revised guidance is drawn up as they felt that the published document would soon need reviewing again. A reviewed version may fit GBC better.</p> <p>The ELES (Energy and Low Emission Strategy) that KCC are leading on with the support of the AQ Partnership is completed with county wide buy in.</p> <p>Gravesham Planning Services have consulted on detailed Development Management Policies.</p>		<p>under the Ebbsfleet Development Corporation.</p> <p>K&M AQ Partnership working with KCC on new regional Energy and Low Emissions Strategy for councils to sign up to. This may introduce a stronger stance on emission from new developments. KCC are keen to champion ELES in Kent.</p> <p>K&M AQP no longer review the existing planning guidance leaving it up to each authority to do so if they wish to better suit their needs.</p>
16	Develop a local air quality strategy	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	-	Gravesham Borough Council	-	Completion of air quality strategy	-	<p>The finalised report was adopted by Cabinet in July 2006.</p> <p>The fifteen policies within the Strategy are being progressed details of which are included in this ASR report</p> <p>The review of this will be carried out in parallel with the two action plans to commence in 2021/22</p>	On-going	The strategy will remain in place until a review is done at the same time as a review of the two air quality action plans.
17	Local air quality monitoring within the GBC Borough	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	-	Gravesham Borough Council / Kent and Medway Air Quality Partnership	-	No. monitoring sites % data capture		<p>Gravesham's air quality monitoring network is comprehensive and has been in place since 1993 with two stations installed in 1998. Network of background and hotspot monitoring.</p> <p>Currently monitoring at two continuous air stations monitoring both PM10 and NO2, including collocation, three background locations and 59 other sites including hotspots, along the edge of the A2 Trunk Road AQMA in the east of the corridor to help validate the model and around new development sites e.g. Rathmore Road link, locations along the A226 from Gravesend to Strood and near the houses in Thong Lane adjacent the new route of the Lower Thames Crossing,</p> <p>Data capture remains high (95%+) year on year.</p> <p>Monitoring data plays a large role in determining what planning comments and conditions are required for planning</p>	On-going	-

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
									<p>permissions contributing significantly to the improvement in air quality or preventing worsening of air quality across the borough.</p> <p>Passive monitoring in all AQMAs has seen a significant reduction in NO2 over the last 10 years resulting in the revocation of three AQMAs. The monitoring in these areas will remain to ensure the quality of the air continues to improve.</p> <p>Additional passive monitoring has gone up in locations relevant to Lower Thames Crossing.</p> <p>Small amounts of money are requested through S106 agreements for contributions towards both passive and continuous monitoring of air quality.</p>		
18	Make details of the Action Plan measures and annual progress reports GBC available on the Website to ensure broad access to the consultation and implementation process.	Public Information	Via the Internet	-	Gravesham Borough Council	-	Availability of recently published reports on the Website	-	<p>Gravesham has a webpage on its webpage www.gravesham.gov.uk for air quality with details of the air quality strategy, action plans and consultations on it with a link to www.kentair.org.uk where all of the council's reports are published as well as the monitoring data.</p> <p>Advice posted on website and available to any caller in person or by telephone/email</p> <p>The council's reports are published on the www.kentair.org.uk and the continuous monitoring data is posted daily, and the diffusion tube data is regularly posted.</p> <p>The School Air Quality Toolkit – Care For Air – is available to teachers and parents through the KentAir website, financed by Kent County Public Health. https://care-for-air.kentair.org.uk/</p>	On-going	
19	Work together the Kent and Medway Air Quality Partnership GBC on promotional activities to raise the profile of air quality in Gravesham	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	-	Gravesham Borough Council	-	Promotional activities undertaken with the Partnership		<p>Gravesham take an active role in the air quality partnership. The partnership carries out work with partners e.g. Kent County Public Health.</p> <p>The partnership also delivered, with the finance from Kent Public Health, a school's toolkit – Care For Air - relating to air quality and the co-benefits of exercise, cycling, walking etc. it is available through https://care-for-air.kentair.org.uk/</p> <p>The air quality partnership holds workshops, seminars, presentations etc. for officers and Members.</p> <p>GBC is working as part of the Partnership with KCC on a new regional Low Emissions Strategy which included workshops for all relevant agencies and groups on matters to include in the strategy.</p>	On-going	
20	Promote and implement energy efficiency measures	Policy Guidance and Development Control	Other policy	-	Gravesham Borough Council	-	% improvement in energy efficiency SAP rating	-	Gravesham is actively involved in giving advice, support and funding for energy efficient schemes in the borough. PV panel installation to 1100 council homes continues to reduce the carbon emission.	On-going	

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
									<p>Emissions of CO2 continue to identify as being reduced by overall percentage on the council's own estates and operations.</p> <p>The Council has piloted few schemes to look into innovative technologies. In particular renewal energy, solar PV battery storage and also in house monitoring systems for energy use.</p> <p>The council also delivered measures to reduce carbon emission in the council's own estate and the private sector through insulation and heating programmes and reducing energy bills through a collective switching scheme.</p> <p>Gravesham has adopted reporting on the Home Energy Conservation as was required by BEIS. This will enable progress being monitored on all areas of energy efficiency work in Housing.</p> <p>All lights are now on sensors to ensure lights are not on in areas where no one is present.</p> <p>Programme in place for lighting replacement in own estates and also Housing stock.</p> <p>Emissions of CO2 continue to identify as being reduced by overall percentage on the council's own estates and operations. There is an emphasis on "green" issues with the council's properties service researching and trialling and implementing low energy schemes as well as giving consideration to whole of life, significant reduction in the use of plastics including an inhouse staff scheme.</p> <p>The council has a strong Climate Change Officer Working Group with senior management and councillor support. The Climate Change Action Plan has been adopted and due to the influence of the Environmental Protection Team the emphasis on the reduction of all emissions include those relating to LAQM i.e. the climate change actions cannot be at the expense of local air quality e.g. the introduction of biomass CHP etc.</p>		
21	The council will encourage the planting of trees which benefit air quality within the borough through the planning process, Gravesham's Open Space Strategy and green initiative partnerships.	Policy Guidance and Development Control	Other policy	-	Kent County Council/Gravesham Borough Council / Groundwork	-	No. of trees planted	-	<p>Advice given on planting trees beneficial for air quality to developers and to other council services on a regular basis</p> <p>Tree and other green planting schemes expected on major developments including highways schemes</p> <p>Ongoing through the planning process and through Gravesham's own horticultural services. A total of 4775 trees were planted in the borough in 2014-2020.</p> <p>Lower Thames Crossing is keen to plant trees to help ensure the mental wellbeing of the local residents.</p>	On-going	

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
									The benefit to air quality is small but it is aesthetically important		
22	Provide advice and pursue an advocacy role to assist in minimising the effects of poor air quality in public buildings.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	-	Kent County Council/Gravesham Borough Council	-	Number utilising the service	-	<p>Advice posted on website and available to any caller in person or by telephone/email</p> <p>Review of the KentAir website content is regularly carried out to provide more user friendly and focussed.</p> <p>Members of the public often contact the council to find out what the air quality is like at their address. Advice is always given.</p> <p>There is a link on the council's website to the main website www.KentAir.org.uk which enables anyone to source the air quality data and reports for all councils in Kent.</p> <p>The School Air Quality Toolkit – Care For Air – is available to teachers and parents through the KentAir website, financed by Kent County Public Health and available through the www.KentAir.org.uk website. https://care-for-air.kentair.org.uk/</p>	On-going	
23	Adequate enforcement of on-street parking restrictions	Traffic Management	UTC, Congestion management, traffic reduction	-	Kent County Council/Gravesham Borough Council / Groundwork	-	No. on street parking offences	-	<p>Parking enforcement is carried out in in all congested areas in the urban area and Air Quality Management Areas.</p> <p>The one-way system remains the main area of focus in respect of ensuring parked cars that obstruct the traffic flow are moved on straight away.</p> <p>Parking Services attend regular meetings with County to ensure that the local perspective is put forward.</p> <p>The objectives in the Parking Services Annual Report 2017/18 include: Maintain the free flow of traffic across the borough through enforcement of parking restrictions. Effectively manage and maintain on-street and off-street parking spaces throughout the borough. Working with the Highway Authority (Kent County Council), ensure that bus stops are located in the most convenient locations and are enforced efficiently.</p> <p>The number of on street parking tickets issued in 19/20 was 18,754</p> <p>The Parking Team have been considering potential permit schemes linked to carbon emissions and a report will be presented to Management Team in the coming months.</p> <p>Maintain the on-street parking signs and lines and repaint or replace any missing signs/lines.</p> <p>The move to zoned parking permit areas will significantly improve street parking in the town and make enforcement easier.</p>	On-going	

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
24	Speed Regulation	Traffic Management	UTC, Congestion management, traffic reduction	-	Highways England	Highways England	Improved journey times with improved traffic flows	-	<p>Traffic management on the A2 Trunk Road was implemented despite the historical reluctance on the part of the Highways England however traffic growth has been significant, and the A2 Trunk Road at Gravesend is often queuing due to weight of traffic at peak times.</p> <p>The congestion caused by the Dartford Crossing can also impacts on the A2's congestion.</p> <p>Highways England are still consulting on the design of new junction layouts at both A2 Bean and A2 Ebbsfleet both west of the AQMA which may assist in alleviating peak hour congestion on the A2.</p> <p>The Lower Thames Crossing is of concern in terms of causing congestion during construction however the road itself should reduce congestion on the A2/M2 considerably. The council are involved in regular consultations on the scheme.</p> <p>Despite significant queues at peak times and severe congestion caused by the more frequent disruption at the Dartford Crossing, and sheer weight of traffic, the exceedances previously experienced before the re-routing of the A2 Trunk Road have not returned however some houses remain in the area of marginal exceedance at Pepperhill and Marling Cross where the existing route of the A2 remains.</p>	On-going	<p>The proposed Lower Thames Crossing is involving the council in discussions with Highways England on the route and speed of the traffic.</p> <p>HE intends to have it designated as 70 mph which is of concern to Gravesham as it is considered that a well-managed 50mph limit is safer and will cause less congestion due to lower numbers of accidents etc.</p> <p>The LTC is considered by Highways England to be a key way of reducing congestion at the Dartford River Crossing.</p> <p>LTC opening date of late 2027 still remains.</p>
25	Reduction in overall background levels	Policy Guidance and Development Control	Other policy	-	Central Government / Kent County Council / Gravesham Borough Council	-	Decline in monitored NO2 concentrations at background sites	Air quality improvement by at least 1.8µg/m ³ at background monitoring sites since 2012	<p>All background monitoring locations in Gravesham Borough Council have reported a decline in NO2 concentrations on a yearly basis.</p> <p>NO2 concentrations have declined by up to 5.5µg/m³ between 2012 and 2019 at background monitoring locations.</p> <p>PM10 background concentrations have remained relatively stable between 2012 and 2019 at the industrial background site.</p> <p>The following measures have been completed which are likely to have contributed significantly to the improvement in AQ:</p> <p>Minimise releases at Lafarge Cement UK Northfleet Works (PM10)</p> <p>Relocation of the Lafarge Cement UK Northfleet Works (PM10)</p> <p>Reduction in PM10 emissions from the combined impact of industrial processes in Northfleet due to improved technologies and or relocation</p>	On-going	<p>Improvements in the background levels throughout the Borough could be achieved, but the impact on NOx and PM10 emissions within the AQMA is likely to be small without National Policies.</p> <p>Socio-economic impacts: Tighter standards and controls could affect industry, businesses and the public</p> <p>Dependent of the measures introduced. Tighter controls and fiscal measures are likely to be viewed negatively. Local measures such as through travel plans and quality partnerships are likely to be viewed more positively.</p> <p>Major infrastructure developments may well contribute to background levels in future even if they do not create an exceedance:</p> <p>Tilbury2</p> <p>Tilbury Energy Centre</p> <p>Lower Thames Crossing</p> <p>A2 junctions</p> <p>Lower Thames Crossing</p>

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
											London Resort Theme park
29	Reduction in PM ₁₀ emissions from combined impact of industrial processes in Northfleet	Environmental Permits	Other measure through permit systems and economic instruments	-	GBC, the Environment Agency, the Local Business Partnership, local industries	-	Reduction in PM10 to below objective	Level of PM ₁₀ below objective	Significant reduction in emissions to below objectives therefore measure has been completed but work carries on ensuring the levels of PM10 are kept as low as possible.	On-going	<p>Although the objective for PM10 has not been exceeded for 10 years in the Northfleet Industrial AQMA the PM10 levels have increased in the three years including the number of days of exceedance. Whilst the levels are still currently low following a significant improvement in PM10 levels in Northfleet. This may be due to the introduction of new infrastructure developments along the river in Essex and an increase in open hold ships at the Cement Terminal as well as a significant amount of construction of mixed use development in the locality. The latter will be completed eventually however there is still to be a significant number of years of development to come.</p> <p>Gravesham is now only a Consultee on major development along its riverside as Ebbsfleet Development Corporation is now the Planning Authority.</p>
30	Rail Freight Strategy	Freight and Delivery Management	Other	2012	Kent County Council/Gravesham Borough Council	-	-	-	<p>Rail use of Northfleet sidings has ceased after dealing with Crossrail spoil</p> <p>KCC have produced a Freight Action Plan for Kent – which includes Operation Stack, lorry routing, rail freight which sets out the vision to: "Promote safe and sustainable freight distribution networks into, out of and within Kent, which support local and national economic prosperity and quality of life, whilst working to address any negative impacts on local communities and the environment both now and in the future."</p> <p>Although not relating to freight usage, the rail station redevelopment at Gravesham has rejuvenated the rail use in GBC especially with its access to HS1 and the new Cycle Hub, with bus interchange to come. It is hoped that the temporary influence of the pandemic will not impact the long term use of the passenger services from the nearby towns which help to reduce the number of cars in the town.</p>	On-going	

Notes:

Measures completed prior to 2019 are not detailed in this table. Refer to previous ASRs for information on these.

2.3 PM_{2.5} – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of PM_{2.5} (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM_{2.5} has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Gravesham Borough Council does not currently undertake any monitoring of PM_{2.5}. However, PM₁₀ monitoring is undertaken in the district and can therefore be used to estimate PM_{2.5} concentrations, as recommended in Box 7.7 of LAQMTG(16). The national factor of 0.7 was applied to the 2019 PM₁₀ annual mean concentration to estimate the PM_{2.5} annual mean concentration. The estimated PM_{2.5} annual mean concentration, based on the PM₁₀ monitored data at the Gravesham Roadside monitoring location, was calculated at 10.7µg/m³ for 2019.

The current Defra 2019 background maps for Gravesham Borough Council (2017 based⁴) show that the highest concentration is predicted to be 12.3µg/m³ within the 1km x 1km grid square with the centroid grid reference of 563500, 173500. This is an area that encompasses a stretch of the B261.

The Public Health Outcomes Framework data tool⁵ compiled by Public Health England quantifies the mortality burden of PM_{2.5} within England on a county and local authority scale. The 2019 fraction of mortality attributable to PM_{2.5} pollution across England is 5.1% and 5.2% within the South East region. In contrast, the fraction within Gravesham Borough Council is slightly higher than both the National and Regional averages, at 6.0%.

Gravesham is taking the following measures to address PM_{2.5}:

- Regulatory Services will continue to work closely with the Planning and Regeneration Services to ensure that air quality is taken into account in the planning process;

⁴ Defra Background Mapping data for local authorities (2017-based), available online at <https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html>

⁵ Public Health Outcomes Framework, Public Health England. data tool available online at <https://fingertips.phe.org.uk/profile/public-health-outcomes-framework>

- Continue to improve emissions standards for Council Fleet and Public Service Vehicles;
- Further public transport improvements;
- Further improve the facilities for cycling and walking;
- Continue promoting Employer and School Travel Plans;
- Public information
- HGV rerouting; and
- Continued strict implementation of the Environmental Permitting Regime at minerals sites particularly with regards to cement etc.

The adoption of the new Kent and Medway Energy and Low Emissions Strategy across Kent will help to reduce emissions over the coming years of PM_{2.5}, PM₁₀ and NO₂, as well as emissions of greenhouse gases such as CO₂ and Methane. This will be published and implemented in 2020 following the finalisation of the consultation period at the end of 2019.

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how it compares with objectives.

Gravesham Borough Council undertook automatic (continuous) monitoring at two sites during 2019. Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at https://uk-air.defra.gov.uk/data/data_selector.

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

Gravesham Borough Council undertook non- automatic (passive) monitoring of NO₂ at 61 sites during 2019, five of which are triplicate locations. Table A.2 in Appendix A shows the details of the sites. No adjustment to existing monitoring sites and no deployment of new monitoring sites was carried out in 2019.

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

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias⁶, “annualisation” (where the data capture falls below 75%), and distance correction⁷. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO₂)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past five years with the air quality objective of 40µg/m³.

⁶ <https://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html>

⁷ Fall-off with distance correction criteria is provided in paragraph 7.77, LAQM.TG(16)

Note that the concentration data presented in Table A.3 represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2019 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

Table A.4 in Appendix A compares the ratified continuous monitored NO₂ hourly mean concentrations for the past five years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year.

A226 One-Way System AQMA

Figure A.1 in Appendix A presents the annual mean NO₂ concentrations recorded at monitoring sites located in and in close proximity to the boundary of the A226 One-Way System AQMA during 2015 to 2019. In 2019, the following sites recorded concentrations in exceedance of the NO₂ annual mean AQS objective of 40µg/m³, with Site GR13 recording the highest concentration of 46.1µg/m³:

- GR13 – West Street
- GR24 – Milton Road
- GR31 and GR47 – Harmer Street
- GR40 – Darnley Road

Additionally, Sites GR58 and GR140 recorded concentrations within 10% of the AQS objective (36µg/m³). Following distance correction calculations to determine the concentrations at the nearest relevant receptor (where the site is not already located at the nearest relevant receptor), all sites continued to exceed the AQS objective, with GR58 and GR140 continuing to be within 10%.

It should be noted that GR24, GR31 and GR47 have been adjusted for relevant exposure to the nearest building façade. However, residential receptors are only present on the first floor and therefore it is likely the concentrations will reduce further as a function of height. There is currently no method to estimate this reduction with height and therefore the fall-off with distance correction calculation has been carried out as a conservative assessment of exposure.

There is no single identifiable trend across all locations within this AQMA, with sites showing both increases and decreases compared to previous years. It should be noted however, that Site GR31 has shown an increase to concentrations recorded in the past five years, with a $0.8\mu\text{g}/\text{m}^3$ increase compared to 2018. Additionally, Sites GR58 and GR140 have shown a slight increase to concentrations recorded in 2018. All other Sites that are exceeding the AQS objective have shown a decrease compared to 2018, but the overall trend from the past five years shows that these locations are either increasing in concentrations, or remaining constant.

As the annual mean NO_2 concentration was not greater than $60\mu\text{g}/\text{m}^3$ at any relevant monitoring site within this AQMA, it is unlikely that there have been exceedances of the 1-hour mean objective at any monitoring locations.

This AQMA will continue to be enforced, however a future update to the AQAP should consider additional measures to reduce NO_2 concentrations in this area due to rising concentrations.

A227 Wrotham Road/B261 Old Road West AQMA

Figure A.2 in Appendix A presents the annual mean concentrations recorded at the diffusion tube monitoring sites within the A227 Wrotham Road/B261 Old Road West AQMA during 2015 to 2019. An exceedance of the NO_2 annual mean AQS objective of $40\mu\text{g}/\text{m}^3$ was only recorded at Site GR57 in 2019, with a concentration of $40.2\mu\text{g}/\text{m}^3$. Site GR59 recorded a concentration in 2019 of $37.7\mu\text{g}/\text{m}^3$, which is within 10% of the AQS objective.

Following distance correction calculations to determine the concentration at the nearest relevant receptor, GR57 is estimated to be just below the AQS objective at $39.6\mu\text{g}/\text{m}^3$. Concentrations at GR59 have remained relatively consistent with a slight increase, however the 2019 annual average shows a decrease from 2018 and 2017. GR57 on the other hand has shown a general increase in the past five years, with an increase of $1.8\mu\text{g}/\text{m}^3$ from 2018 to 2019.

As the annual mean NO_2 concentration was not greater than $60\mu\text{g}/\text{m}^3$ at any relevant monitoring site within this AQMA, it is unlikely that there have been exceedances of the 1-hour mean objective at any monitoring locations.

The A227 Wrotham Road/B261 Old Road West AQMA should continue to be enforced to control emissions in the area, whilst monitoring continues to identify whether the concentrations continue to increase in the coming years.

A2 Trunk Road AQMA

Figure A.3 in Appendix A presents the annual mean concentrations recorded at the diffusion tube and continuous monitoring sites located within or in close proximity to the A2 Trunk Road AQMA during 2015 to 2019. One exceedance of the NO₂ annual mean AQS objective of 40µg/m³ was recorded 2019, at Site GR142 with a concentration of 59.8µg/m³. Additionally, Sites GR92, GR107 and GR110 recorded concentrations within 10% of the AQS objective.

Sites GR92, GR107 and GR110 are all located at the nearest relevant exposure, however distance correction is required for Site GR142. Following distance correction calculations, the point of nearest relevant exposure to GR142, at a hotel, is estimated to have a much lower concentration of 42.9µg/m³, still however above the AQS objective. Over the past five years, the majority of monitoring sites in this AQMA have remained relatively consistent, with sites GR107 and GR110 appearing to be increasing in NO₂ annual mean concentrations. GR141 has shown a decrease in concentrations since deployment, however Site GR142 remains consistently above the AQS objective since deployment. As this site has only been active since 2017, an overall trend cannot yet be determined.

As the annual mean NO₂ concentration was not greater than 60µg/m³ at any relevant monitoring site within this AQMA, it is unlikely that there have been exceedances of the 1-hour mean objective at any monitoring locations.

The A2 Trunk Road AQMA will continue to be enforced to control emissions in the area, with updates to the AQAP considering additional measures to reduce the NO₂ concentrations in this area due to rising concentrations.

Outside AQMA

Figure A.4 in Appendix A presents the annual mean concentrations recorded during 2015 to 2019 at the diffusion tube and continuous monitoring sites which are located outside of any AQMA. Two exceedances of the NO₂ annual mean AQS objective of 40µg/m³ were recorded 2019, at Sites GR119 and GR135, with a maximum concentration of 59.8µg/m³ recorded at GR119. Additionally, seven locations

recorded concentrations to be within 10% of the AQS objective: Sites GR60, GR67, GR94, GR122, GR133, GR136 and GR143.

Both Sites GR119 and GR135 are not considered to represent relevant exposure as their locations are indicative of commercial properties, which are not considered to be sensitive receptors for the AQS objective. Site GR119 is located at the façade of a commercial building and does not require distance correction, however GR135 has been distance corrected to the nearest relevant exposure (closest commercial property). Following distance correction calculations, it is estimated that the concentration at the point of nearest relevant exposure to GR135 is $35.4\mu\text{g}/\text{m}^3$, below the AQS objective of $40\mu\text{g}/\text{m}^3$.

Over the past five years, concentrations recorded at the majority of locations outside of AQMA have shown a gradual increase in annual NO_2 concentrations, however no new exceedances have been created during this time. It has been noted that a potential AQMA extending along the stretch of road encompassing Sites GR119 and GR135 would be declared if future development introduces sensitive receptors, however as this has not occurred within 2019 there is no need to declare any new AQMA outside those currently in place.

As the annual mean NO_2 concentration was not greater than $60\mu\text{g}/\text{m}^3$ at any relevant monitoring site within this AQMA, it is unlikely that there have been exceedances of the 1-hour mean objective at any monitoring locations.

3.2.2 Particulate Matter (PM_{10})

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of $40\mu\text{g}/\text{m}^3$.

Table A.6 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past five years with the air quality objective of $50\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times per year.

Both annual mean and 24-hour mean PM_{10} AQS objectives have been met in the past five years.

Figure A.5 in Appendix A shows trends in annual mean PM_{10} concentrations measured at the two automatic monitoring sites. It can be seen that overall the annual mean PM_{10} concentration has decreased at the A2 Roadside site (ZG2), with the 2019 concentration remaining similar to that of 2018. However, at the Industrial

Background site (ZG3) concentrations have been increasing gradually from 2016. This may be due to the introduction of new infrastructure developments along the river in Essex and an increase in open hold ships at the Cement Terminal as well as a significant amount of construction of mixed use development in the locality. The latter will be completed eventually however there is still to be a significant number of years of development to come. Despite this, annual mean PM₁₀ concentrations are still well below the PM₁₀ annual mean AQS objective of 40µg/m³ at both automatic monitoring sites.

Figure A.6 in Appendix A shows the number of exceedances of the PM₁₀ daily mean air quality objective of 50µg/m³ at both automatic monitoring sites. The number of exceedances at the A2 Roadside site (ZG2) remains very low in 2019, however at the Industrial Background site (ZG3), the number of exceedances has risen from 2018. Despite this however, these remain well below the number of PM₁₀ daily mean >50µg/m³ AQS objective of 35 exceedances per year, and has done so for the past five years.

Although this indicates that the Northfleet Industrial AQMA could be revoked, there is a considerable amount of regeneration still to take place in the area, alongside a new bulk aggregate import terminal being built in the near future. The existence of the AQMA allows the Council to manage and control the impact from ongoing development as part of the planning process, and therefore wish to keep the AQMA in place.

3.2.3 Particulate Matter (PM_{2.5})

Gravesham Borough Council does not undertake monitoring of PM_{2.5} within its designation, however as per LAQM.TG(16) Sections 7.107 to 7.111, PM_{2.5} concentrations can be estimated from PM₁₀ concentrations. This uses a nationally derived correction ratio of 0.7, which has been calculated as the average of all ratios of PM_{2.5}/PM₁₀ reported for years 2010 to 2014 for 40 sites within the AURN where both PM₁₀ and PM_{2.5} are measured hourly.

Using the PM₁₀ annual averages, the estimated PM_{2.5} annual averages for both continuous monitoring sites in 2019 is as follows:

ZG2 – 10.7µg/m³

ZG3 – 15.6µg/m³

4 Conclusion and Recommendation

4.1 Conclusions from Monitoring Data

Results for 2019 indicate that both the annual mean objective and the 1-hour objective for NO₂ were met at both of the continuous monitoring locations ZG2 and ZG3, with the annual mean concentrations at the roadside location ZG2 decreasing from that measured in 2018, and ZG3 showing an increase.

The annual mean and the 24-hour mean objectives for PM₁₀ also continue to be met at both monitoring locations. Compared to the previous years, the annual mean concentration at ZG2 had a slight decrease, whereas at the industrial background location ZG3 there has been a slight increase. The number of 24-hour mean exceedances has also increased at ZG3 from one to ten, which suggests a potential increase due to the large amount of construction taking place in the Northfleet Industrial Area.

No new diffusion tube monitoring sites were deployed in 2019. Exceedances of the annual mean objective was observed at nine locations and following distance correction calculations to the nearest relevant receptor where possible, seven locations are predicted to be in exceedance. These seven locations are as follows: GR13, GR24, GR31, GR40, GR47, GR119, and GR142. Five of these are located within the existing A226 One Way System AQMA, and one location is within the existing A2 AQMA. There has been little to no improvement in concentrations over the past five years at these locations.

One monitoring site is located outside any existing AQMA, GR119. This site is not representative of exposure, and due to there being no residential receptors currently nearby this site is not relevant in terms of the annual mean NO₂ AQS objective. If sensitive receptors are introduced in this area, then a new AQMA will be declared.

Three new developments are due to take place in the near vicinity of the A226 One Way System AQMA. The impact on this AQMA will be monitored closely and considered in future ASRs, the developments are as follows:

- Erection of two buildings with a total of 227 new dwellings and associated vehicle parking at Clifton Slipways, Gravesend;

- Conversion of Block M at the Former Gravesend & North Kent Hospital to 115 residential units and associate 79 motor vehicle parking spaces; and
- Erection of 242 residential units alongside a multi-storey car park at New Swan Yard, Gravesend.

4.2 Recommendations

Recommendations from the annual status report are as follows:

- Continued review of incoming planning applications to ensure that any new developments do not cause adverse air quality impacts in the currently declared AQMAs. Particular attention should be paid to the existing A226 One Way System AQMA due to monitoring concentrations showing no or little improvement, as well as the area around Woodville Place as concentrations are currently exceeding the annual mean NO₂ AQS objective however there is currently no relevant exposure;
- Continuation of diffusion tube monitoring throughout the Borough, with consideration of a monitoring strategy review to determine if there are any locations where new monitoring sites should be deployed or relocated to more relevant areas; and
- Continual progression with the measures set out in the AQAP in order to reduce pollutant concentrations across the Borough.

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?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
ZG2	Gravesham A2 Roadside	Roadside	562589	172076	NO ₂ ; PM ₁₀	Y – A2 AQMA	Chemiluminescent; BAM	0	72	3
ZG3	Gravesham Industrial Background	Industrial Background	562155	174360	NO ₂ ; PM ₁₀	Y – Northfleet Industrial Area AQMA	Chemiluminescent; BAM	3.7	24	3

Notes:

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

(2) N/A if not applicable

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

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
GR08	Painters Ash School Northfleet, Air Monitoring Station, Northfleet	Roadside	562589	172076	NO ₂	Yes	0	72	YES	3
GR13	88 West Street, Gravesend, Kent, DA11 0BX Pelican Crossing	Roadside	564696	174431	NO ₂	Yes	0.08	2	NO	2.85
GR19	Lawn Primary School, Air Monitoring Station, Highstreet, Northfleet, DA11 9HB	Industrial Background	562155	174360	NO ₂	No	3.7	20	YES	2
GR24	28- 29 Milton Road (Lamp post), Gravesend, Kent, DA12 2RF	Roadside	565128	174049	NO ₂	Yes	0.2	2.2	NO	2.5
GR31	32 Harmer Street GF (façade), Gravesend, DA12 2AX	Roadside	565052	174149	NO ₂	Yes	0	2	NO	2.7

Gravesham Borough Council

GR39	19 Stone Street (Downpipe), Gravesend, DA12 1AP	Roadside	564730	174030	NO ₂	Yes	0.1	2	NO	2.5
GR40	Somerset Public House (signpost), 10 Darnley Road, Gravesend, DA11 0RU	Roadside	564486	174095	NO ₂	Yes	0.05	1.5	NO	2.5
GR45	Princes Street (Signpost) (Opp Jury Street), Gravesend, Kent, DA11 0AA	Roadside	564708	174266	NO ₂	No	6.8	2	NO	2.5
GR47	29- 31 Harmer Street (façade), Gravesend, DA12 2AP	Roadside	565043	174173	NO ₂	Yes	0	2	NO	2.5
GR52	32 The Hill (Lamppost), Northfleet, DA11 9EX	Roadside	562449	174191	NO ₂	No	0.2	1.5	NO	2.5
GR55	Butchers (façade) 140 Pelham Road, Gravesend	Roadside	563943	173378	NO ₂	Yes	0	2.5	NO	2.7
GR56	Junies (façade), Parrock Road, Gravesend, DA12 1QF	Roadside	565210	172980	NO ₂	No	0.4	2	NO	2.5
GR57	61 Old Road West (Hairdressers - façade), Gravesend,	Roadside	564472	173158	NO ₂	Yes	0.3	2.2	NO	2

Gravesham Borough Council

	Kent, DA11 0LW									
GR58	The Venue (Lampost), Milton Road, Gravesend, DA12 2rf	Roadside	565166	174036	NO ₂	Yes	0.02	3	NO	2.7
GR59	44 Old Road West (Façade - Pharmacy), Gravesend, Kent, DA11 0LJ	Roadside	564530	173171	NO ₂	Yes	0.4	2	NO	2.5
GR60	Bookmakers (Down Pipe), 188 Old Road West, Gravesend	Roadside	563899	173368	NO ₂	Yes	0	4.3	NO	2.7
GR61	62 New Road (Pounce - Down Pipe), Gravesend, Kent, DA11 0AD	Roadside	564429	174152	NO ₂	Yes	0.2	2.6	NO	3
GR62	The Terrace (façade), Gravesend, DA12 2BB	Roadside	565004	174324	NO ₂	Yes	0	4	NO	2.8
GR66	Russell Quay (Lampost), West Street, Gravesend, DA11 0BE	Roadside	564512	174448	NO ₂	No	0.1	2.5	NO	2.5
GR67	Echo Public House (Façade), Old Road East, Gravesend, DA12 1NR	Roadside	565214	172958	NO ₂	NO	3.3	2	NO	2.5

Gravesham Borough Council

GR68	Opp The Old Prince of Orange (Lamppost), Old Road West, Gravesend, DA12 1NG	Roadside	564808	173086	NO ₂	No	1.6	1.5	NO	2.7
GR69	Golf Driving Range (Fencing), Thong Lane, Gravesend, DA12 4LF	Background	567270	171925	NO ₂	No	N/A	410	NO	2.5
GR72	Northfleet Cemetery (Post), Northfleet, DA11 8HW	Background	562437	173175	NO ₂	No	41	157	NO	2.8
GR75	Gravesend Cemetery, Gravesend, DA11 7LY	Background	564087	173080	NO ₂	No	79	110	NO	2
GR78	Canal Tavern Public House, Canal Road, Gravesend, DA12 2RS	Roadside	565658	174195	NO ₂	No	0.2	1.8	NO	2.5
GR92	1 Hall Road, Northfleet, Kent, DA11 8AW	Roadside	562323	172589	NO ₂	Yes	0	7.9	NO	1.5
GR94	Opp The George PH, Wrotham Road, Meopham, DA13 0AJ	Roadside	564392	166012	NO ₂	No	0.9	0.7	NO	2.75
GR96	Parrock Street, Gravesend, DA12 1EZ	Roadside	564963	173717	NO ₂	Yes	2	1.7	NO	2.28

Gravesham Borough Council

GR98	The Leather Bottle PH, Dover Road, Northfleet, DA11 9PH	Roadside	562529	174049	NO ₂	No	0	2	NO	2.75
GR104	8 Roman Road (Downpipe), Northfleet	Roadside	562465	172153	NO ₂	Yes	0	8.7	NO	2.6
GR107	46 Pepper Hill (Façade), Northfleet	Roadside	562272	172281	NO ₂	Yes	0	8.5	NO	1.96
GR109	30 Old Road East (Façade) DA11 8EP	Roadside	565229	172955	NO ₂	Yes	0	7.3	NO	1.6
GR110	Nells Café, Valley Drive, Gravesend	Roadside	566149	170436	NO ₂	Yes	0	20	NO	1.9
GR112	50 Stonebridge Road (Façade), Northfleet	Roadside	561502	174682	NO ₂	No	0	4	NO	2.54
GR116	Saxon Close, Northfleet, Lamp post opposite No.38.	Roadside	562480	172225	NO ₂	Yes	7.5	1	NO	2.69
GR118	40 Windmill Street, Gravesend DA12 1BA (Façade)	Roadside	564755	173862	NO ₂	No	0	9	NO	2.4
GR119	Woodville Place (lamp post)	Roadside	564729	173824	NO ₂	No	0	2	NO	2.5
GR122	King & Taylor 10-12 Wrotham Road (façade) DA11	Roadside	564667	173891	NO ₂	No	0	8	NO	2.5
GR123	City Praise Centre Lower Higham Road,	Roadside	566538	173109	NO ₂	No	0	9	NO	2

Gravesham Borough Council

	Gravesend, Kent, DA12 2LY									
GR124	Stonebridge Road Telegraph Post Opposite No.67	Roadside	561338	174925	NO ₂	No	1.5	4.7	NO	2.6
GR125	Café Taj (Façade), 170 Parrack Street, Gravesend	Roadside	564877	173937	NO ₂	Yes	0	4.9	NO	2.4
GR127	17 Darnley Road	Roadside	564456	173979	NO ₂	N	0	8.8	NO	2.5
GR128	1a Railway Place (façade)	Roadside	564727	174002	NO ₂	Y	0	1.5	NO	2.4
GR129	20 Stone Street (façade)	Roadside	564694	173969	NO ₂	N	0	2.6	NO	2.5
GR130	6 Wrotham Road, The Hair Shop (Façade)	Roadside	564687	173934	NO ₂	N	0	5.2	NO	2.2
GR131	7 Wrotham Road, Martin Tolhurst Solicitors (façade)	Roadside	564661	173940	NO ₂	N	2.2	34.4	NO	1.8
GR132	36 Cobham Street	Roadside	564504	173952	NO ₂	N	0	33	NO	1.9
GR133	23 Wrotham Road (façade)	Roadside	564657	173799	NO ₂	N	0	5.8	NO	1.9
GR134	17 Wrotham Road (façade)	Roadside	564659	173831	NO ₂	N	0	5.8	NO	2
GR135	25 Wrotham Road (lamp post adjacent to building)	Roadside	564657	173764	NO ₂	N	6	1.6	NO	2.6
GR136	Woodville Place, Lamp Post opp	Roadside	564686	173828	NO ₂	N	0.2	1.8	NO	2.7

Gravesham Borough Council

	17 Wrotham Road									
GR137	Lamp post Opposite 2 Peartree Place, Gravesend Road	Roadside	570719	171143	NO ₂	No	6	2.1	NO	0.73
GR138	Telegraph Post, Foxbury Manor, Old Watling Street, Rochester	Roadside	570583	169549	NO ₂	No	6.1	32	NO	1.8
GR139	Rosherville Way, Lamppost near Compass Court	Roadside	563178	173976	NO ₂	N	14.1	4.31	NO	2.28
GR140	Nuxley Toys, 13- 14 Milton Road	Roadside	564955	174098	NO ₂	Yes	0	4.03	NO	2.44
GR141	Park Pale, Telegraph Post	Roadside	569588	169603	NO ₂	Yes	9.4	29.5	NO	1.95
GR142	Inn on the Lake, Watling Street, Shorne DA12 3HB (Light post)	Roadside	567500	169836	NO ₂	Yes	25.2	21.4	NO	2.35
GR143	29 Wrotham Road (Façade)	Roadside	564646	173745	NO ₂	N	0	3.02	NO	1.97
GR144	43 Singlewell Road (Downpipe)	Roadside	564728	172826	NO ₂	N	0	2.28	NO	3.7
GR145	Lamp post adjacent Chantry Community Academy, Ordnance Road	Roadside	565336	174066	NO ₂	N	17	1.52	NO	2.57
GR146	Lamp post adjacent 354 Thong Lane DA12 4LH	Roadside	567150	171231	NO ₂	N	12	4.8	NO	2.4

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 NO₂ Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2019 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ^{(3) (4)}				
							2015	2016	2017	2018	2019
ZG2	562589	172076	Roadside	Automatic	96.0	96.0	30.0	29.6	31.6	29.9	29.1
ZG3	562155	174360	Industrial Background	Automatic	98.4	98.4	23.4	24.1	23.9	23.5	24.5
GR08	562589	172076	Roadside	Diffusion Tube	100.0	100.0	32.0	30.6	31.7	30.4	30.9
GR13	564696	174431	Roadside	Diffusion Tube	100.0	100.0	40.0	37.5	44.0	47.1	46.1
GR19	562155	174360	Industrial	Diffusion Tube	100.0	100.0	22.3	23.2	23.2	23.3	23.2
GR24	565129	174051	Roadside	Diffusion Tube	100.0	100.0	43.1	41.3	42.9	45.4	42.7
GR31	565052	174149	Roadside	Diffusion Tube	100.0	100.0	41.8	43.0	43.2	42.9	43.7
GR39	564730	174030	Roadside	Diffusion Tube	100.0	100.0	34.0	36.7	34.1	35.8	35.0
GR40	564486	174095	Roadside	Diffusion Tube	100.0	100.0	41.2	42.4	41.3	45.2	43.4
GR45	564708	174266	Roadside	Diffusion Tube	100.0	100.0	25.0	26.6	26.8	27.0	29.3
GR47	565043	174173	Roadside	Diffusion Tube	100.0	100.0	39.1	40.1	41.9	45.4	42.9
GR52	562449	174191	Roadside	Diffusion Tube	100.0	100.0	29.3	32.9	34.7	36.4	32.6
GR55	563943	173378	Roadside	Diffusion Tube	91.7	91.7	29.7	33.6	32.8	34.1	32.1
GR56	565210	172980	Roadside	Diffusion Tube	100.0	100.0	31.6	30.8	33.6	27.5	30.3

GR57	564472	173158	Roadside	Diffusion Tube	100.0	100.0	36.6	38.2	38.5	38.4	40.2
GR58	565166	174036	Roadside	Diffusion Tube	100.0	100.0	34.4	38.3	39.5	37.6	38.0
GR59	564530	173171	Roadside	Diffusion Tube	100.0	100.0	37.1	37.7	39.2	39.5	37.7
GR60	563899	173368	Roadside	Diffusion Tube	100.0	100.0	34.7	34.0	34.4	36.9	36.5
GR61	564429	174152	Roadside	Diffusion Tube	100.0	100.0	35.1	34.9	34.5	35.5	35.1
GR62	565004	174324	Roadside	Diffusion Tube	100.0	100.0	29.2	30.2	31.2	30.7	30.8
GR66	564512	174448	Roadside	Diffusion Tube	100.0	100.0	26.5	30.2	31.0	31.9	31.6
GR67	565214	172958	Roadside	Diffusion Tube	100.0	100.0	32.8	34.0	36.5	34.9	36.3
GR68	564808	173086	Roadside	Diffusion Tube	100.0	100.0	30.9	33.7	35.8	34.7	35.8
GR69	567270	171925	Urban Background	Diffusion Tube	97.2	97.2	17.4	20.3	21.3	19.1	20.7
GR72	562437	173175	Urban Background	Diffusion Tube	100.0	100.0	22.3	24.1	25.2	23.9	24.4
GR75	564087	173080	Urban Background	Diffusion Tube	97.2	97.2	21.0	21.9	21.7	21.8	21.8
GR78	565658	174195	Roadside	Diffusion Tube	100.0	100.0	28.9	28.9	30.3	31.3	32.5
GR92	562323	172589	Roadside	Diffusion Tube	100.0	100.0	36.4	38.0	37.8	36.9	38.6
GR94	564392	166012	Roadside	Diffusion Tube	100.0	100.0	35.3	36.0	34.3	37.2	36.1
GR96	564963	173717	Roadside	Diffusion Tube	91.7	91.7	26.0	30.1	30.8	32.4	31.4
GR98	562529	174049	Roadside	Diffusion Tube	100.0	100.0	31.3	32.7	32.0	33.5	33.2
GR104	562465	172153	Roadside	Diffusion Tube	100.0	100.0	35.0	34.4	36.7	33.4	34.2

GR107	562272	172281	Roadside	Diffusion Tube	100.0	100.0	33.3	36.9	34.9	35.0	36.3
GR109	565229	172955	Roadside	Diffusion Tube	100.0	100.0	35.9	32.8	34.7	33.9	34.3
GR110	566149	170436	Roadside	Diffusion Tube	100.0	100.0	36.5	34.5	40.4	35.3	38.7
GR112	561502	174682	Roadside	Diffusion Tube	100.0	100.0	31.5	33.2	34.3	34.8	35.7
GR116	562480	172225	Roadside	Diffusion Tube	100.0	100.0	32.6	34.7	35.9	32.2	32.3
GR118	564755	173862	Roadside	Diffusion Tube	100.0	100.0	29.7	31.4	32.5	34.8	34.9
GR119	564729	173824	Roadside	Diffusion Tube	91.7	91.7	42.4	39.5	49.2	53.4	49.5
GR122	564667	173891	Roadside	Diffusion Tube	100.0	100.0	31.5	31.1	35.9	36.1	37.0
GR123	566538	173109	Roadside	Diffusion Tube	100.0	100.0	23.7	25.1	26.1	24.0	26.3
GR124	561338	174925	Roadside	Diffusion Tube	100.0	100.0	30.2	31.1	32.7	30.4	31.0
GR125	564877	173937	Roadside	Diffusion Tube	100.0	100.0	30.4	32.7	32.7	32.1	33.2
GR127	564456	173979	Roadside	Diffusion Tube	100.0	100.0	24.9	28.3	29.9	30.1	30.4
GR128	564727	174002	Roadside	Diffusion Tube	91.7	91.7	30.3	34.5	29.6	30.9	31.8
GR129	564694	173969	Roadside	Diffusion Tube	100.0	100.0	21.4	27.9	29.0	27.8	28.4
GR130	564687	173934	Roadside	Diffusion Tube	100.0	100.0	25.9	28.8	29.1	30.6	31.3
GR131	564661	173940	Roadside	Diffusion Tube	100.0	100.0	21.3	25.9	25.6	24.9	26.4
GR132	564504	173952	Roadside	Diffusion Tube	100.0	100.0	22.2	25.0	24.8	23.6	24.3
GR133	564657	173799	Roadside	Diffusion Tube	100.0	100.0	32.6	32.8	36.9	36.3	36.2

GR134	564659	173831	Roadside	Diffusion Tube	100.0	100.0	31.5	33.1	31.4	32.8	33.7
GR135	564657	173764	Roadside	Diffusion Tube	100.0	100.0	41.5	41.1	46.8	44.8	43.9
GR136	564686	173828	Roadside	Diffusion Tube	100.0	100.0	36.4	34.3	35.8	39.3	37.4
GR137	570719	171143	Kerbside	Diffusion Tube	100.0	100.0	-	-	29.2	30.7	33.1
GR138	570584	169550	Other	Diffusion Tube	100.0	100.0	-	-	29.2	28.8	30.2
GR139	563178	173976	Roadside	Diffusion Tube	91.7	91.7	-	-	37.6	30.5	34.0
GR140	564955	174098	Roadside	Diffusion Tube	100.0	100.0	-	-	43.1	38.1	38.5
GR141	569588	169603	Roadside	Diffusion Tube	100.0	100.0	-	-	36.7	29.3	27.1
GR142	567500	169836	Roadside	Diffusion Tube	100.0	100.0	-	-	65.6	55.0	59.8
GR143	564646	173745	Roadside	Diffusion Tube	100.0	100.0	-	-	47.5	36.6	37.0
GR144	564728	172826	Roadside	Diffusion Tube	100.0	100.0	-	-	41.4	33.4	34.9
GR145	565336	174066	Roadside	Diffusion Tube	100.0	100.0	-	-	-	32.2	30.6
GR146	567150	171231	Roadside	Diffusion Tube	100.0	100.0	-	-	-	22.8	18.5

☒ Diffusion tube data has been bias corrected

☐ Annualisation has been conducted where data capture is <75%

☒ 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 adjustment

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

- (1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
- (2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).
- (3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.
- (4) Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

Figure A.1 – Trends in Annual Mean NO₂ Concentrations at Monitoring Sites Located in and Around A226 One-Way System AQMA



Figure A.2 – Trends in Annual Mean NO₂ Concentrations at Monitoring Sites Located in A227 Wrotham Road/B261 Old Road West AQMA

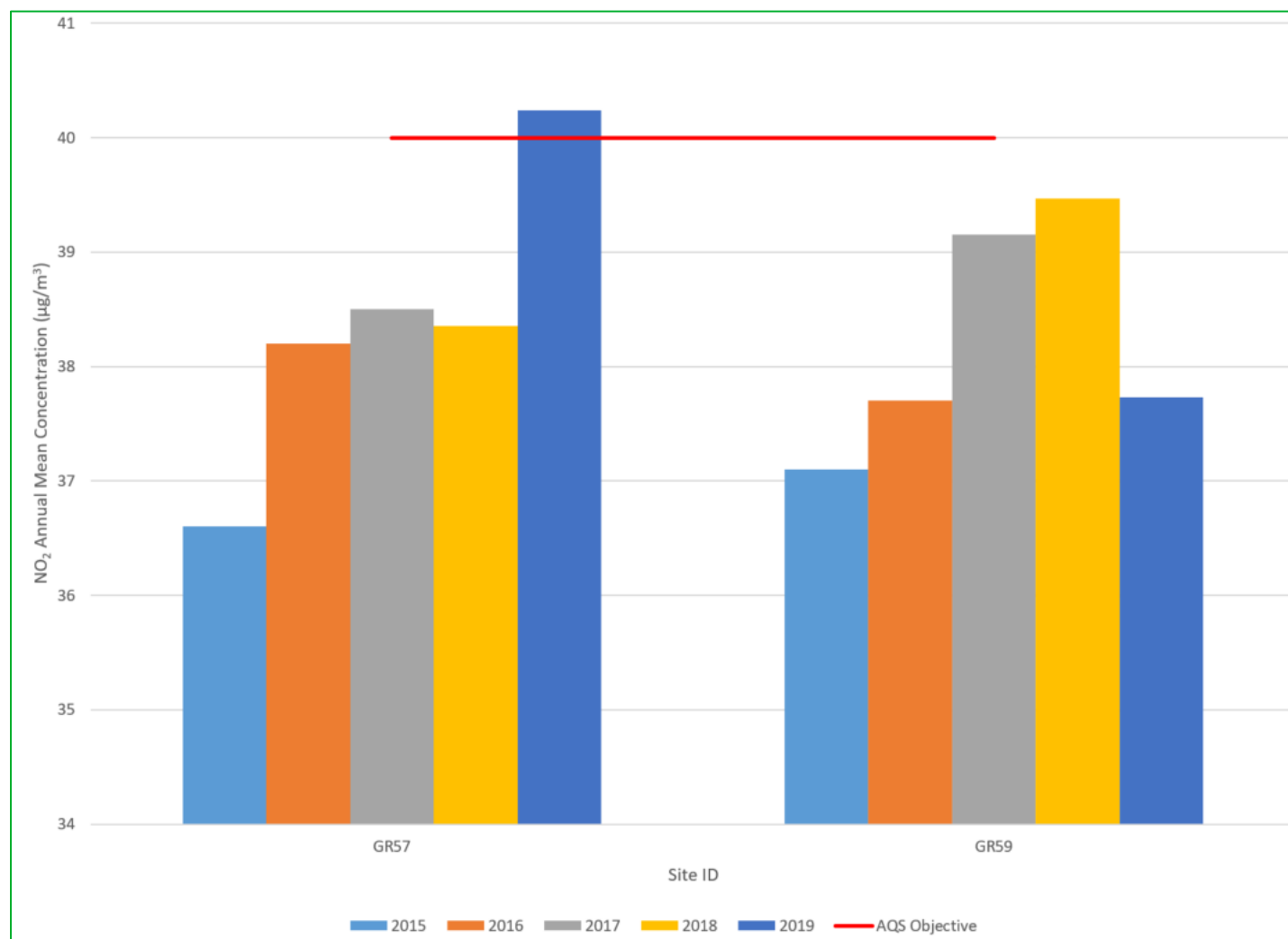


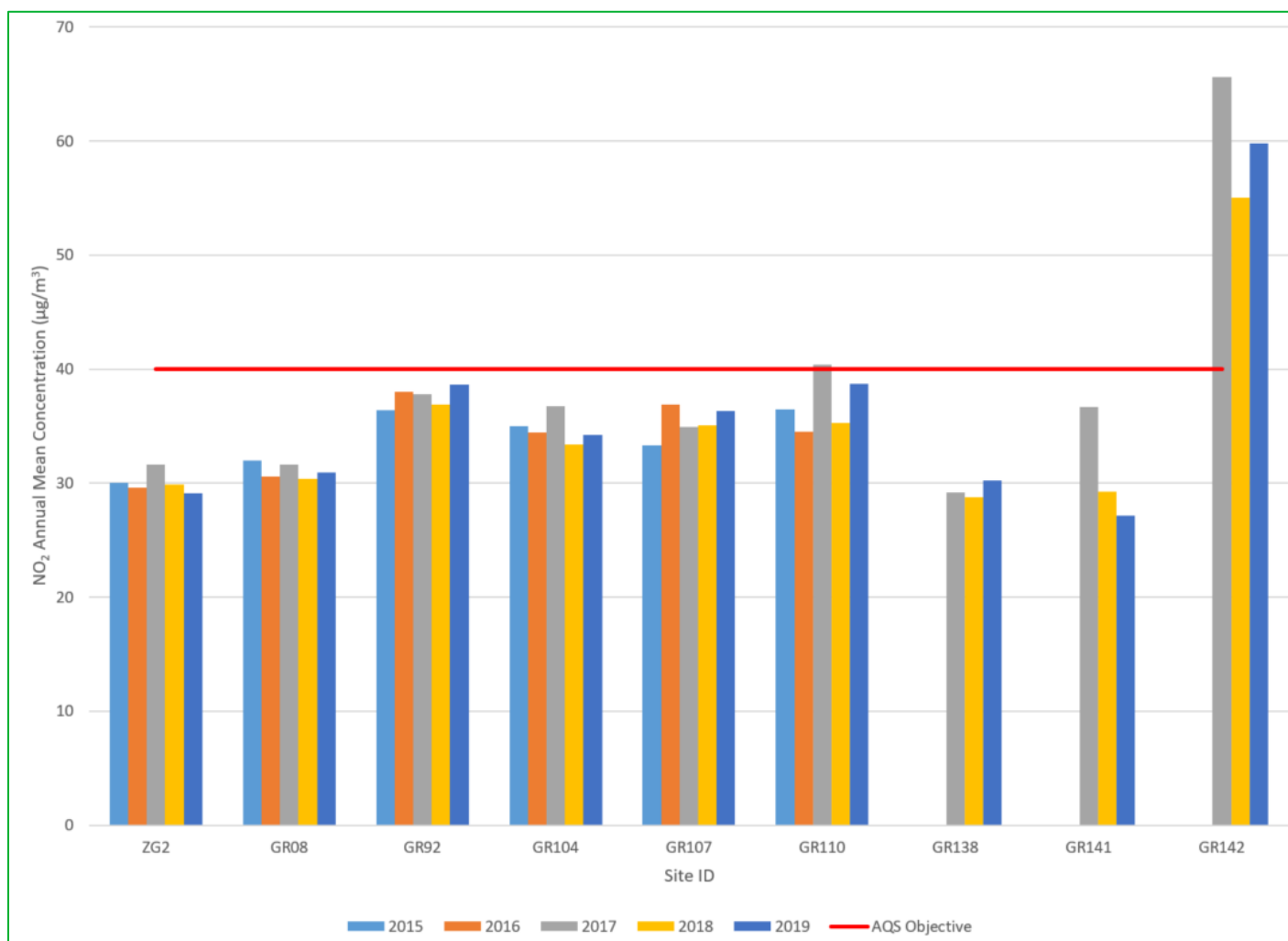
Figure A.3 – Trends in Annual Mean NO₂ Concentrations at Monitoring Sites Located in and Around A2 AQMA

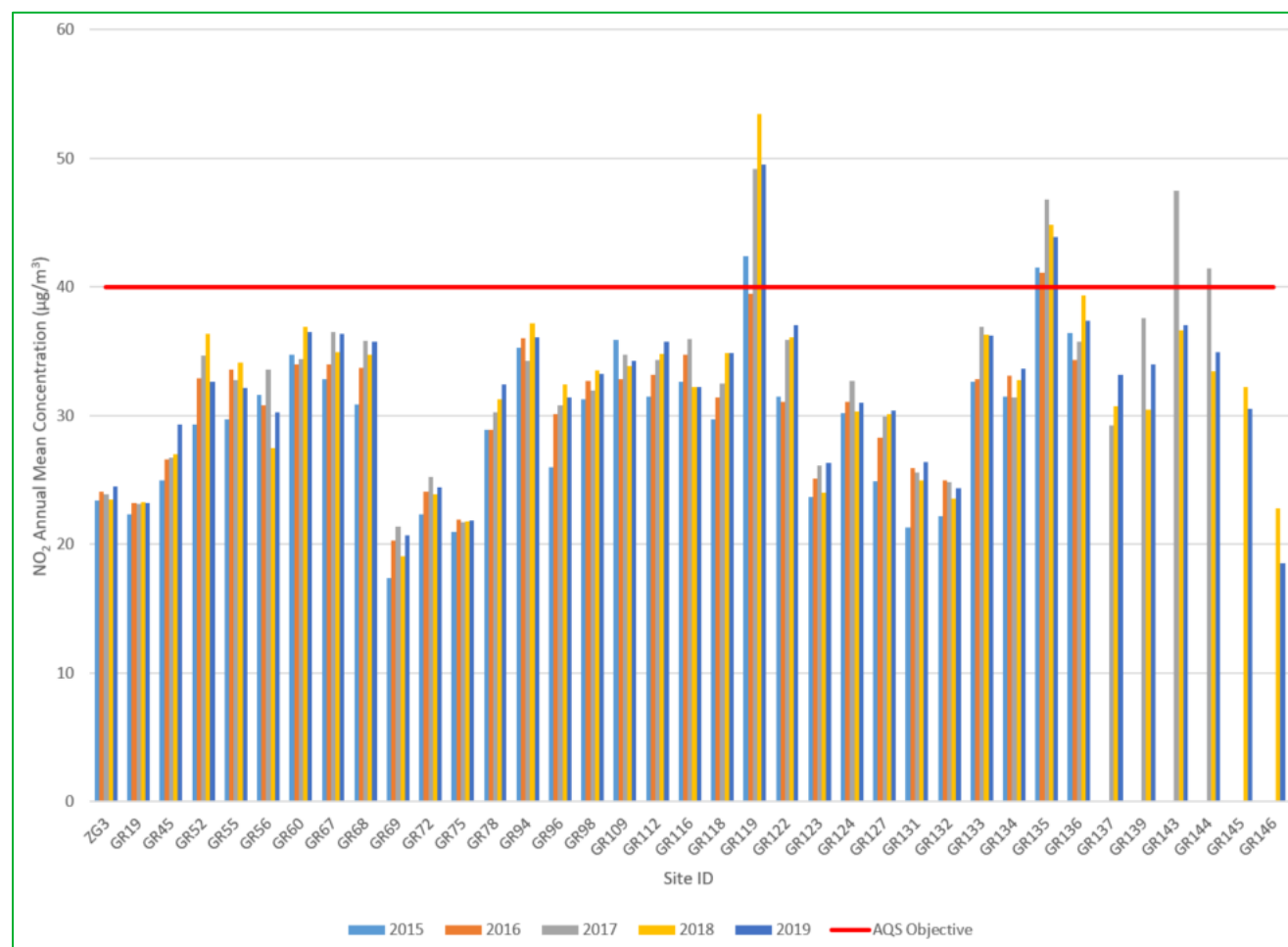
Figure A.4 – Trends in Annual Mean NO₂ Concentrations at Monitoring Sites Located Outside Any AQMA

Table A.4 – 1-Hour Mean NO₂ Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2019 (%) ⁽²⁾	NO ₂ 1-Hour Means > 200µg/m ³ ⁽³⁾				
							2015	2016	2017	2018	2019
ZG2	562589	172076	Roadside	Automatic	96.0	96.0	0	0	0	0	0
ZG3	562155	174360	Industrial Background	Automatic	98.4	98.4	0	0	0	0	0

Notes:

Exceedances of the NO₂ 1-hour mean objective (200µg/m³ not to be exceeded more than 18 times/year) are shown in **bold**.

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

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

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

Table A.5 – Annual Mean PM₁₀ Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2019 (%) ⁽²⁾	PM ₁₀ Annual Mean Concentration (µg/m ³) ⁽³⁾				
						2015	2016	2017	2018	2019
ZG2	562589	172076	Roadside	95.4	95.4	18	19	16.7	15.4	15.3
ZG3	562155	174360	Industrial Background	99.1	99.1	19.7	18	19.4	21.9	22.3

☐ Annualisation has been conducted where data capture is <75%

Notes:

Exceedances of the PM₁₀ annual mean objective of 40µg/m³ are shown in **bold**.

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

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

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

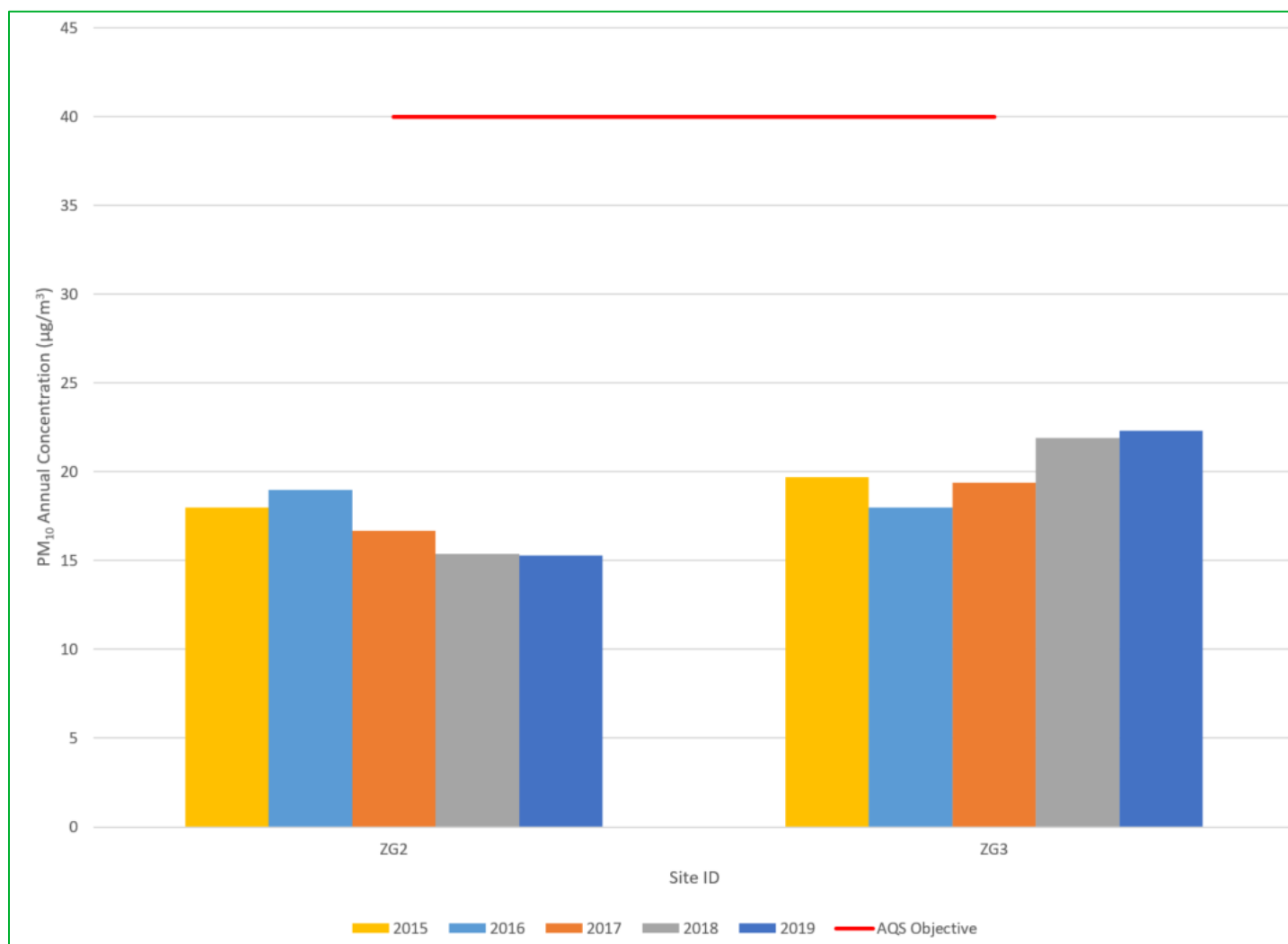
Figure A.5 – Trends in Annual Mean PM₁₀ Concentrations

Table A.6 – 24-Hour Mean PM₁₀ Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2019 (%) ⁽²⁾	PM ₁₀ 24-Hour Means > 50µg/m ³ ⁽³⁾				
						2015	2016	2017	2018	2019
ZG2	562589	172076	Roadside	95.4	95.4	2	1	5	1	1
ZG3	562155	174360	Industrial Background	99.1	99.1	7	2	4	3	10

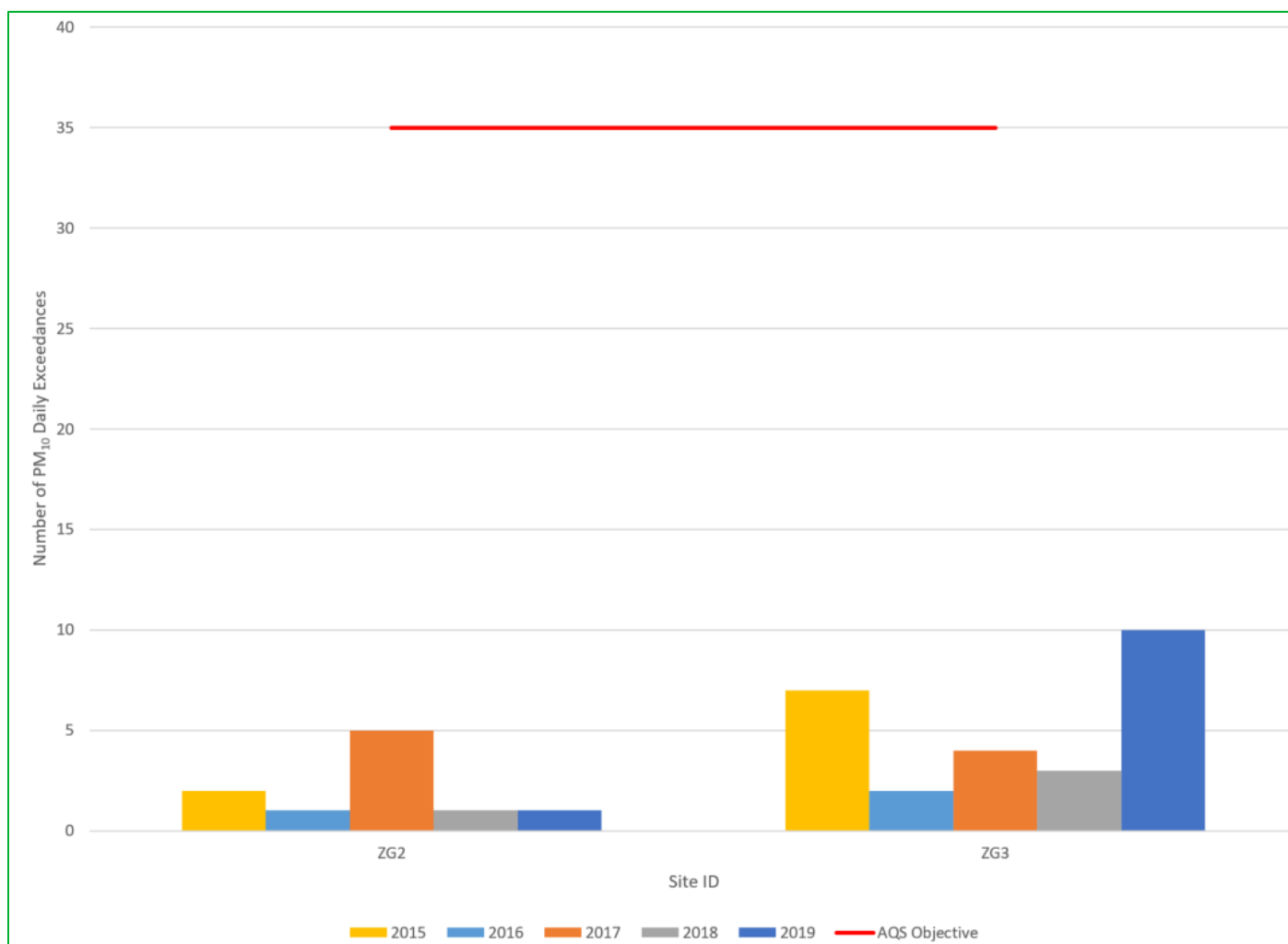
Notes:

Exceedances of the PM₁₀ 24-hour mean objective (50µg/m³ not to be exceeded more than 35 times/year) are shown in **bold**.

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

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

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

Figure A.6 – Trends in Number of 24-Hour Mean PM₁₀ Results >50µg/m³

Appendix B: Full Monthly Diffusion Tube Results for 2019

Table B.1 - NO₂ Monthly Diffusion Tube Results - 2019

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northin g)	NO ₂ Mean Concentrations (µg/m ³)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.85) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
GR08 _a	562589	172076	42.4	39.5	31.9	31.8	32.8	29.7	33.7	36.4	34.2	36.9	43.4	38.4	36.4	30.9	
GR08 _b	562589	172076	45.0	42.6	34.6	30.4	31.4	28.7	33.6	35.2	34.1	32.1	42.2	43.7			
GR08 _c	562589	172076	42	47.7	37.5	32.4	32.3	29.8	35	39.2	30.5	32.3	47.1	39.4			
GR13	564696	174431	68.2	61.7	57.6	57.3	47.8	39.6	47	40.9	48.9	54.3	74.6	52.3	54.2	46.1	45.9
GR19 _a	562155	174360	40.5	32.4	29.4	31.9	22.3	19	19.5	15.8	22.2	26.9	40.4	28.1	27.3	23.2	
GR19 _b	562155	174360	36.4	34.5	28.8	32.8	24.1	16.5	20.2	20.2	23.7	27.5	37.4	27			
GR19 _c	562155	174360	32.6	31.7	28.8	37.5	22.6	19.7	20.4	20.4	23.2	26	36.5	24.8			
GR24	565128	174049	53.9	46.1	47	64.4	51.4	45.3	45	41.1	48.1	50.9	67.6	41.5	50.2	42.7	42.3
GR31	565052	174149	57	52.8	46.4	65.1	49.1	49	50.8	47.7	47.9	43.7	64.3	43.7	51.5	43.7	43.7
GR39	564730	174030	47.9	45.4	41.4	49.1	36.5	32.5	35.4	30.5	38.5	41.2	56.9	39	41.2	35.0	
GR40	564486	174095	59.6	49.8	50.1	55.7	48.9	49	48.4	45.5	50.4	49	62	44.2	51.1	43.4	43.3
GR45	564708	174266	44.6	44.9	33.1	36.9	30.8	26.2	28	30	31.9	30.7	41.9	35.1	34.5	29.3	
GR47	565043	174173	58	57.6	52.6	44.2	52.3	44.3	45.5	48.2	47.6	49.9	57.1	48.9	50.5	42.9	42.9
GR52	562449	174191	37.1	44.1	40	52.8	36.9	37.7	34.3	30.9	36.3	36.9	47.5	25.7	38.4	32.6	

Gravesham Borough Council

GR55	563943	173378	46.3	41.7	39.2	43.8	31.6	30.2	30.7	31.1	34.7	36.5	50.1	-	37.8	32.1	
GR56	565210	172980	45.1	41.8	35.4	29.6	32.5	26.8	31.5	31.5	32.3	34.6	50.1	36.1	35.6	30.3	
GR57	564472	173158	50.6	58.9	52.4	50.3	46	41.8	38.8	42.8	41.7	44.6	60.1	40.1	47.3	40.2	39.6
GR58	565166	174036	66.8	51.3	43	41.5	38.4	30.7	35.7	33	41.3	46.9	61.5	46	44.7	38.0	38.0
GR59	564530	173171	51.6	47.6	48.8	51.8	47.2	35.9	39.7	36.8	41.6	40	58.6	33.1	44.4	37.7	37.0
GR60	563899	173368	48.1	47.2	44.8	47.9	42.1	34	36.1	34.5	44.7	39.7	51.5	44.2	42.9	36.5	36.5
GR61	564429	174152	50.7	41.6	43.2	56.5	41.8	42.3	36.1	34	36.1	39.3	49.7	24.9	41.4	35.1	
GR62	565004	174324	50.2	46.2	37.6	34.3	30.4	28.2	29.4	30.2	32.4	37.3	47.6	30.9	36.2	30.8	
GR66	564512	174448	49.1	44.1	30.2	43.3	33.3	29.3	31.9	26.8	32.2	35.4	53.6	37.3	37.2	31.6	
GR67	565214	172958	52.4	47.2	46.7	41.8	39.6	37.2	36.8	36.6	40.8	41.7	49	43.3	42.8	36.3	32.0
GR68	564808	173086	56.3	49	44.9	42.7	37.4	30.1	31.8	33.4	38.2	37.8	60.5	42.7	42.1	35.8	
GR69 a	567270	171925	38.1	32.7	25.2	18.9	18.1	16	14.9	16.6	22	22.9	35.1	28.3	24.3	20.7	
GR69 b	567270	171925	39.4	34.1	-	19.1	15.9	14.1	15.2	16.6	18.9	23.2	36.3	29.9			
GR69 c	567270	171925	35.4	34.8	29.2	23.2	17	14.2	16.1	16.6	21.1	23.9	36.3	28.9			
GR72 a	562437	173175	41	36.4	27.9	34.8	25.2	19.5	18.9	21.7	22.6	33.4	42.2	32	28.8	24.4	
GR72 b	562437	173175	36.7	39.7	31.2	33.1	16.2	20	20.5	19.3	24.9	24.7	40.1	32.3			
GR72 c	562437	173175	42.1	40.3	31.6	31.8	20.1	18.4	19.4	20.1	22.3	27.4	38	29.3			
GR75 a	564087	173080	43.6	33.7	24.5	29.6	23.1	-	20.3	20.7	21.1	21.1	35.5	23.3	25.7	21.8	
GR75 b	564087	173080	39.3	31	24.6	25.8	20.3	19.3	16.3	17	26.7	29	39.8	24.2			
GR75 c	564087	173080	28.3	30.9	25.1	31.5	22	16.9	16.2	15.2	21.7	24.6	38.5	26.1			
GR78	565658	174195	49.1	44.6	41	43.2	34.3	31.2	31.5	29.1	32.6	37.5	47.2	36.9	38.2	32.5	
GR92	562323	172589	49.8	55.6	42.1	38.1	44.1	36.7	40.9	42	44.8	46.9	52.6	52	45.5	38.6	38.6
GR94	564392	166012	51.4	49.6	40	47.4	43.1	39	38.5	34.1	40	41.8	54.4	30.5	42.5	36.1	32.3

Gravesham Borough Council

GR96	564963	173717	48.3	44.2	35.8	39.7	-	29.8	28.9	26.6	33.3	34.3	54.7	31.1	37.0	31.4	
GR98	562529	174049	47	48	41.9	47.6	35.4	35.4	32.5	27.3	32.1	40.6	51.2	30.3	39.1	33.2	
GR10 4	562465	172153	48.2	48.6	39.2	30.9	34.8	34.2	34.5	42.5	38.1	40.6	48.5	43.1	40.3	34.2	
GR10 7	562272	172281	44.4	54.6	43.8	36.7	39	37.5	40.4	44.9	38	41.8	47.8	44.2	42.8	36.3	36.3
GR10 9	565229	172955	46	45.1	45.2	42.7	39.2	30.3	30.9	28.8	35.2	43.2	52.6	44.8	40.3	34.3	
GR11 0	566149	170436	56.4	60.8	45	33	38.5	36.6	41.1	41.7	42.7	47.7	53	50.4	45.6	38.7	38.7
GR11 2	561502	174682	47.9	49.8	39.9	49.5	41.8	37.4	35.3	37	39.4	42.7	48.1	35.6	42.0	35.7	
GR11 6	562480	172225	35.3	54.7	40.7	33.3	31.1	27.2	29.1	35.5	37	41	47.5	42.9	37.9	32.3	
GR11 8	564755	173862	48.9	42	41.9	44.9	37.5	36	36.3	35.2	38.4	41.3	52.6	37.3	41.0	34.9	
GR11 9	564729	173824	51.8	65	57.5	52.3	57.8	51.7	57.1	-	56.8	60.6	71.8	58.5	58.3	49.5	49.5
GR12 2	564667	173891	51.8	49.8	42.3	43.4	38.8	36.5	38.2	40.1	42.3	45.6	52.9	40.7	43.5	37.0	37.0
GR12 3	566538	173109	42.9	36.8	31.6	31.5	26.7	22.3	21.2	24.2	28.3	30.2	42.9	32.8	31.0	26.3	
GR12 4	561338	174925	34.6	42.2	46.1	38.5	32.5	31.7	30.4	29.8	33.9	31.8	50.6	35.3	36.5	31.0	
GR12 5	564877	173937	51.1	42.1	36.4	43.3	36.6	28.7	32.3	30.3	34.6	40.8	57	36.1	39.1	33.2	
GR12 7	564456	173979	43.7	41	35.4	40.6	32.1	30.2	28.7	29.6	32.7	34.6	46.7	33.4	35.7	30.4	
GR12 8	564727	174002	47.9	44	-	39.9	34.1	30.5	30.9	30.3	33.1	35.4	50.4	34.9	37.4	31.8	
GR12 9	564694	173969	46.5	35.4	36.2	34.4	26.2	26.8	25.8	26.6	29.6	33.4	44.5	35.6	33.4	28.4	
GR13 0	564687	173934	46.9	44.3	32.5	38.7	33	28.8	30.6	31.2	32.5	40	45.1	37.6	36.8	31.3	
GR13 1	564661	173940	35.3	37.5	34.2	34.3	28.9	20.3	21.3	23.7	27.2	31.6	45.6	33	31.1	26.4	
GR13 2	564504	173952	39.5	32.5	24.1	36.3	25.9	20.8	21.6	22.2	25.4	27	41.7	26.6	28.6	24.3	

Gravesham Borough Council

GR13 3	564657	173799	54	50.6	49.2	39.6	37.8	34.6	36.2	35.3	37.7	41.3	51.8	43	42.6	36.2	36.2
GR13 4	564659	173831	47.3	47.4	44.5	42.2	35.6	32.9	31.4	33.4	33.3	38.9	49.9	38.4	39.6	33.7	
GR13 5	564657	173764	68.1	62.2	51.6	47.9	48.7	42	40.3	44.5	47.4	50.5	62.1	54.3	51.6	43.9	35.4
GR13 6	564686	173828	46.1	55.8	44.5	51	45.9	37.6	37.9	34.8	41.2	46	48	39	44.0	37.4	37.0
GR13 7	570719	171143	40.4	45.5	37.2	46.2	37.9	34.5	34.3	33.7	33.4	40.5	50.8	33.5	39.0	33.1	
GR13 8	570583	169549	39.6	44.1	37.1	26.6	26.2	27.1	29.6	36.2	32.3	35.7	47.3	44.5	35.5	30.2	
GR13 9	563178	173976	52.2	49.4	43.3	42.3	32.8	33.7	34.4	33.7	33.8	-	49.7	34.9	40.0	34.0	
GR14 0	564955	174098	54.6	37.5	46.7	51.8	47	38.1	38.3	35.9	43.8	45.8	60.4	43.5	45.3	38.5	38.5
GR14 1	569588	169603	47.4	1.8	37.3	26.1	33.2	29.4	32.4	35.9	33.2	34.6	35.3	36.3	31.9	27.1	
GR14 2	567500	169836	83.2	90.3	75.4	49.5	57.5	60.8	59.2	76	58.1	69.9	82.1	82	70.3	59.8	42.9
GR14 3	564646	173745	53.8	49.7	48.2	41.8	40.3	37.8	37.3	38.7	40.7	42.5	50.6	41.2	43.6	37.0	37.0
GR14 4	564728	172826	50.8	51.8	45.1	38.4	37.3	31.1	32.9	36.3	37.6	39.5	48.4	44.1	41.1	34.9	
GR14 5	565336	174066	24.6	42.1	43.6	44.4	31.2	30.1	29.7	29.1	34.4	37.1	52.1	33	36.0	30.6	
GR14 6	567150	171231	31.3	25.7	24.5	23.1	18.8	14	15.1	15.7	19.9	23	28.3	22.3	21.8	18.5	

☒ Local bias adjustment factor used

☐ National bias adjustment factor used

☐ Annualisation has been conducted where data capture is <75%

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

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

- (1) See Appendix C for details on bias adjustment and annualisation.
- (2) Distance corrected to nearest relevant public exposure.

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

Diffusion Tube Monitoring Data

The diffusion tube data has been corrected using a bias adjustment factor, which is an estimate of the difference between diffusion tube concentration and continuous monitoring, the latter assumed to be a more accurate method of monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO₂ continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method. With regard to the application of a bias adjustment factor for diffusion tubes, the Defra Technical Guidance LAQM.TG(16) and the LAQM Helpdesk recommend the use of a local bias adjustment factor where available and relevant to diffusion tube sites.

The national bias adjustment factor is 0.75 (based on 42 studies, using 50% TEA in acetone analysed by Socotec Didcot) as derived from the national bias adjustment calculator (Spreadsheet Version Number: 03/2021).

Gravesham Borough Council operates two continuous analysers and has triplicate collocated tubes at the sites:

- GR08 – Painters Ash School, Northfleet (co-located with Gravesham A2 Roadside); and
- GR19 – Lawn County Primary School, High Street, Northfleet (co-located with Gravesham Industrial Background).

The local bias adjustment factors for these sites have been derived using the Diffusion Tube Bias Adjustment Factor Spreadsheet, as shown in Figure C.1 and Figure C.2. Table C.1 provides a summary of these.

Table C.1 – Local Bias Factors

Site ID	Diffusion Tube Data capture	Continuous Monitor Data Capture for Periods Used	Diffusion Tube Annual Mean ($\mu\text{g}/\text{m}^3$)	Continuous Monitor Annual Mean ($\mu\text{g}/\text{m}^3$)	Bias Factor A	Bias Factor B
Gravesham A2 Roadside	100	96.1	36.4	29.2	0.8	25%
Gravesham Industrial Background	100	98.8	27.3	24.7	0.9	11%

Figure C.1 – Gravesham Roadside: Local Diffusion Tube Correction Factor Calculation

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

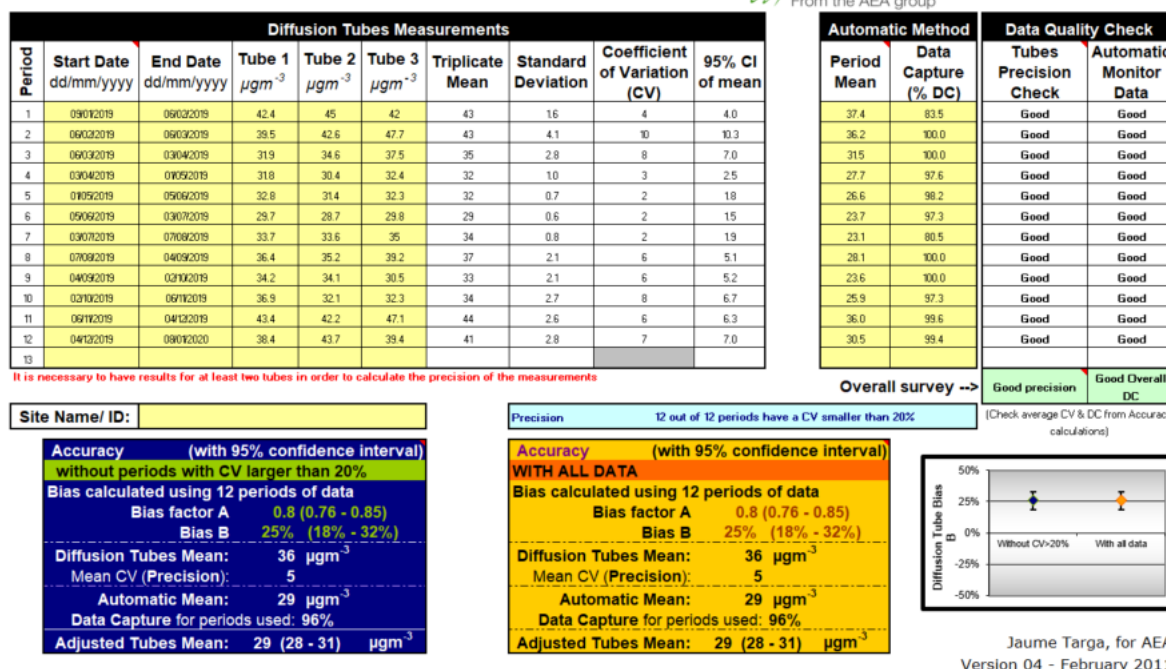
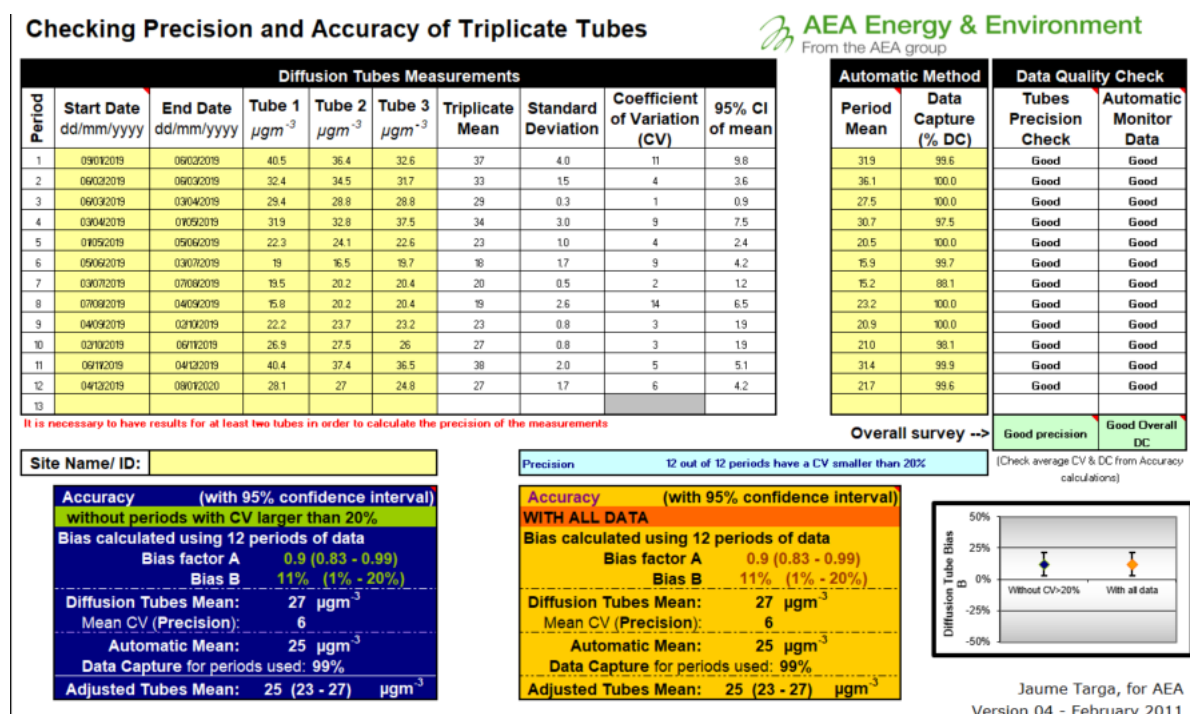


Figure C.2 – Gravesham Industrial Roadside: Local Diffusion Tube Correction Factor Calculation



Choice of Bias Adjustment Factor

Historically in previous ASRs, a combined local bias adjustment factor utilising both the Gravesham A2 Roadside and Gravesham Industrial Background co-location sites. Therefore a combined local bias adjustment factor of 0.85 has been calculated and utilised. This was calculated via orthogonal regression, by averaging the factors of the B values (0.25 and 0.11), adding one to the result (1.18) and then taking the inverse of this ($1/1.18 = 0.85$) to get the final bias adjustment factor.

As per Defra Technical Guidance LAQM.TG(16) the combined local bias adjustment factor has been used to correct the 2019 monitoring as opposed to the national factor as both data capture and tube precision are found, overall, to be good for both co-location studies. Additionally, the local factor has been used in previous years and remains consistent and in-line with the factors used previously shown in Table C.2.

Table C.2 – Previous Bias Adjustment Factors Used by Gravesham Borough Council

Monitoring Year	Bias Adjustment Factor	Local or National?
2018	0.83	Local
2017	0.78	Local
2016	0.77	Local
2015	0.80	Local
2014	0.83	Local

QA/QC of Diffusion Tube Monitoring

The diffusion tubes are supplied and analysed by Socotec UK Limited, Didcot, utilising the 50% Triethanolamine (TEA) in acetone preparation method.

Socotec UK Ltd is a UKAS accredited laboratory and participates in laboratory performance and proficiency testing schemes. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO₂ concentrations reported are of a high calibre. The laboratory follows the procedures set out in the Harmonisation Practical Guidance and participates in the AIR proficiency-testing (AIR-PT) scheme. Defra and the Devolved Administrations advise that diffusion tubes used for LAQM should be obtained from laboratories that have demonstrated satisfactory performance in the AIR-PT scheme. Laboratory performance in the AIR-PT is also assessed by the National Physical Laboratory (NPL), alongside laboratory data from the monthly NPL Field Inter-Comparison Exercise.

In the 2019 AIR-PT results, AIR-PT AR030 (January to February 2019) scored 87.5%, however AIR-PT AR031 (April to May 2019), AR033 (July to August 2019) and AR034 (September to November 2019), Socotec scored 100%. The percentage score reflects the results deemed to be satisfactory based upon the z-score of $< \pm 2$.

Additionally, the precision of the NO₂ diffusion tubes supplied by Socotec has been classified as 'good' for all but one observation during 2019. This precision reflects the laboratory's performance and consistency in preparing and analysing the tubes, as well as the subsequent handling of the tubes in the field. Precision summary results are available from the LAQM website, at: <https://laqm.defra.gov.uk/diffusion-tubes/precision.html>.

Short-term to Long-term Data Adjustment

In accordance with Defra issued guidance in LAQM.TG(16), data capture at all monitoring locations was greater than 75%, therefore annualisation was not undertaken.

Fall-off with Distance Correction

In accordance with the LAQM.TG(16), distance correction calculations using the NO₂ fall-off with distance calculator was performed at those monitoring locations with non-relevant exposures where annual mean NO₂ concentrations were greater than 36µg/m³. The distance correction calculator is used to estimate the NO₂ concentration at the nearest locations representative of relevant exposure – relative to the monitoring location. Distance correction calculations were completed using the 2019 (2017 reference year) Defra background mapped concentrations for the relevant 1km x 1km grid squares within Gravesham (i.e. those within which the monitoring locations are located). The details for the NO₂ fall-off with distance correction calculation are shown in Table C.3.

Table C.3 – Fall-off with Distance Correction of Relevant Sites Exceeding and Near Exceeding the NO₂ Annual Mean AQS Objective

Site ID	Distance (m)		NO ₂ Annual Mean Concentration (µg/m ³)		
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor
GR13	2.0	2.1	28.4	46.1	45.9
GR24	2.2	2.4	27.5	42.7	42.3
GR31	2.0	2.0	27.5	43.7	43.7
GR40	1.5	1.6	28.4	43.4	43.3
GR47	2.0	2.0	27.5	42.9	42.9
GR57	2.2	2.5	19.4	40.2	39.6
GR58	3.0	3.0	27.5	38.0	38.0
GR59	2.0	2.4	19.4	37.7	37.0
GR60	4.3	4.3	19.4	36.5	36.5
GR67	2.0	5.3	17.2	36.3	32.0
GR92	7.9	7.9	20.3	38.6	38.6
GR94	0.7	1.6	11.9	36.1	32.3
GR107	8.5	8.5	20.3	36.3	36.3

Site ID	Distance (m)		NO ₂ Annual Mean Concentration (µg/m ³)		
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor
GR110	20.0	20.0	20.6	38.7	38.7
GR119	2.0	2.0	19.4	49.5	49.5
GR122	8.0	8.0	19.4	37.0	37.0
GR133	5.8	5.8	19.4	36.2	36.2
GR135	1.6	7.6	19.4	43.9	35.4
GR136	1.8	2.0	19.4	37.4	37.0
GR140	4.0	4.0	28.4	38.5	38.5
GR142	21.4	46.6	18.7	59.8	42.9
GR143	3.0	3.0	19.4	37.0	37.0

Planning Applications in 2019/20

Table C.4 provides detail on approved planning applications in relation to Air Quality within the Borough Council.

Table C.4 – Planning Applications Permitted in 2019/20

Date	Reference	Description	Address	Status
31/10/19	20191122	The erection of two buildings to provide a total of 227 dwellings with associated vehicle parking, cycle storage, highway works, and landscaping. Building 1 comprises the erection of a 23 storey tower on the north side of West Street to provide 121 dwellings with 1 business or retail Unit (B1/A1) comprising 90 sqm of floor space at ground floor level; and Building 2 from four storeys to 10 storeys on the south side of West Street which will provide 106 dwellings. The proposal includes the restoration and adaptation of the existing pier structure to provide public and private amenity space to include the erection of 16 Business (B1) units comprising a total of 510 sqm of floor space; and a cafe (A1/A3) comprising up to 60 sqm of floor space.	Clifton Slipways, West Street, Gravesend, Kent	Permitted
12/03/20	20190504	Conversion of existing building with an 11 storey side extension and a single storey roof extension, the construction of a new residential building ranging from 3-6 storeys to provide 115 residential units consisting of 46 one bed units, 60 two bed units and 9 three bed units, together with associated parking for 77 cars, 2 motorcycles and 174 cycles, amenity space, private gymnasium and waste and a B1, D1 and D2 flexi use space.	Former Gravesend & North Kent Hospital (M Block), Bath Street, Gravesend, Kent	Permitted
20/04/20	20200343	Erection of 242 residential units for Build to Rent (C3 Use Class), within three blocks ranging from 3 to 10 storeys, together with multi-storey car park as well as access, pedestrian, landscaping, highway and other associated works.	The Charter Land At Market Square And Horn Yard Car Parks, New Swan Yard, Gravesend, DA12 2EN	Permitted

Appendix D: Maps of Monitoring Locations and AQMAs

Figure D.1 – Map of Non-automatic Monitoring Stations within Close Proximity of the A226 One-Way System, Gravesend AQMA

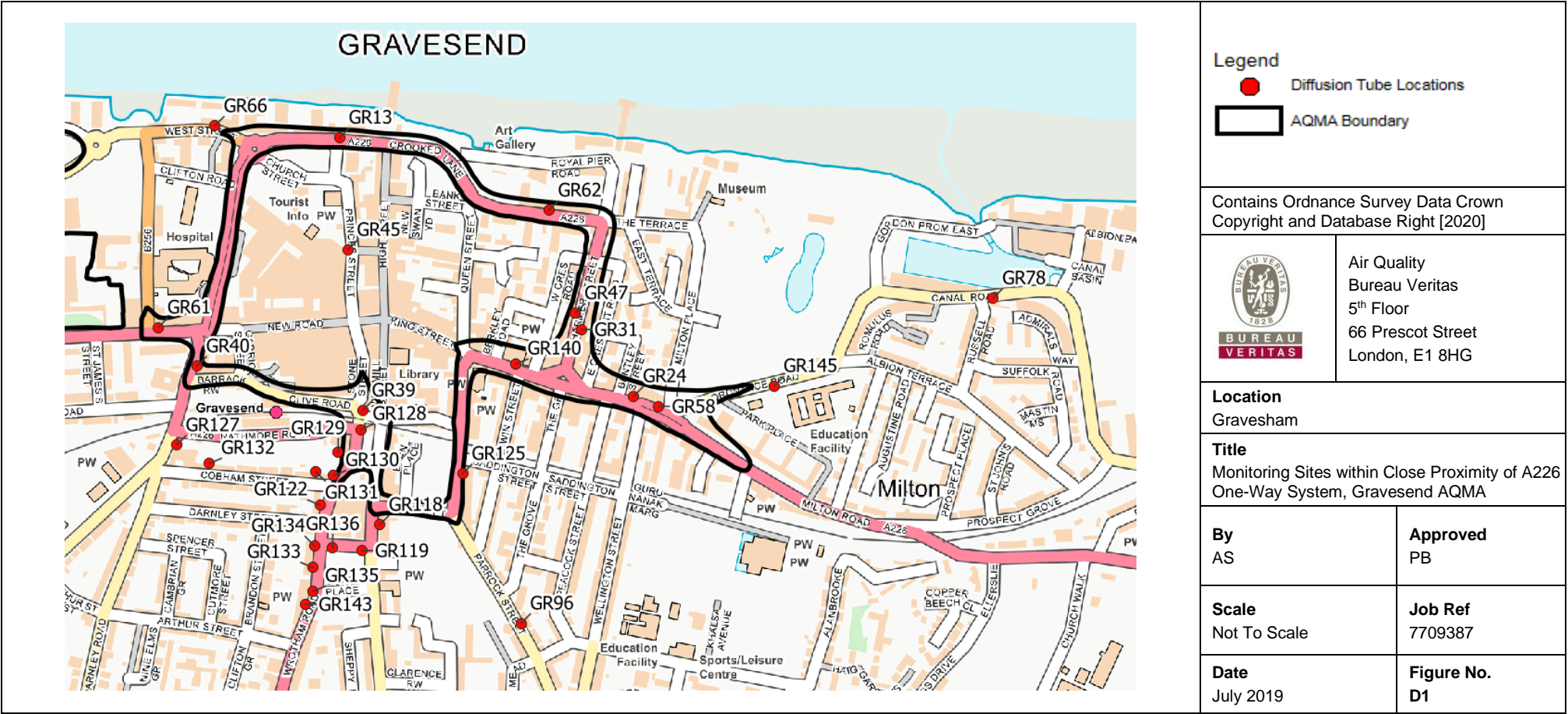


Figure D.2 – Map of Automatic and Non-automatic Monitoring Stations within Close Proximity of the Northfleet Industrial Area AQMA

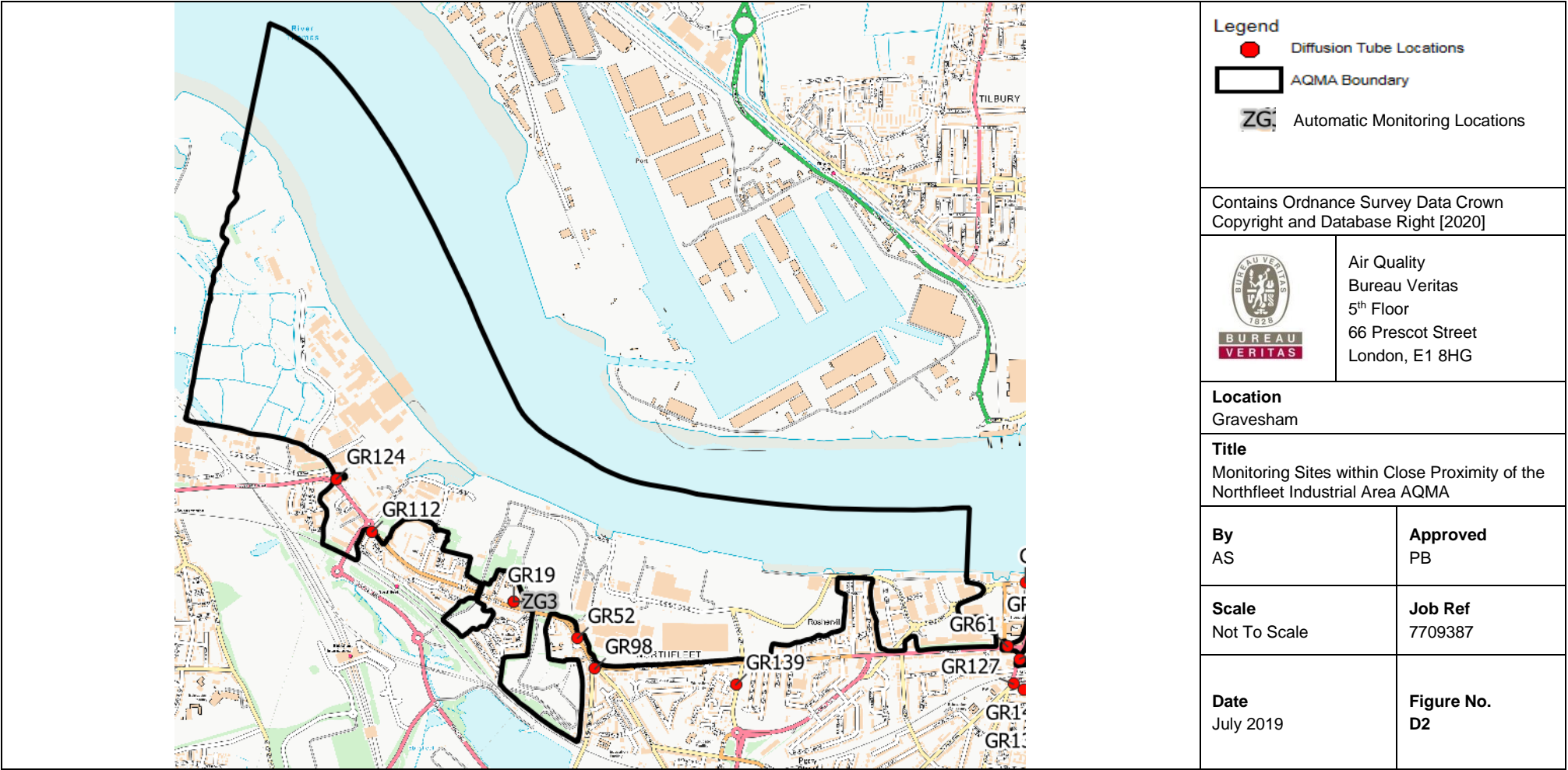


Figure D.3 – Map of Automatic and Non-automatic Monitoring Stations Near to the A2 Trunk Road AQMA

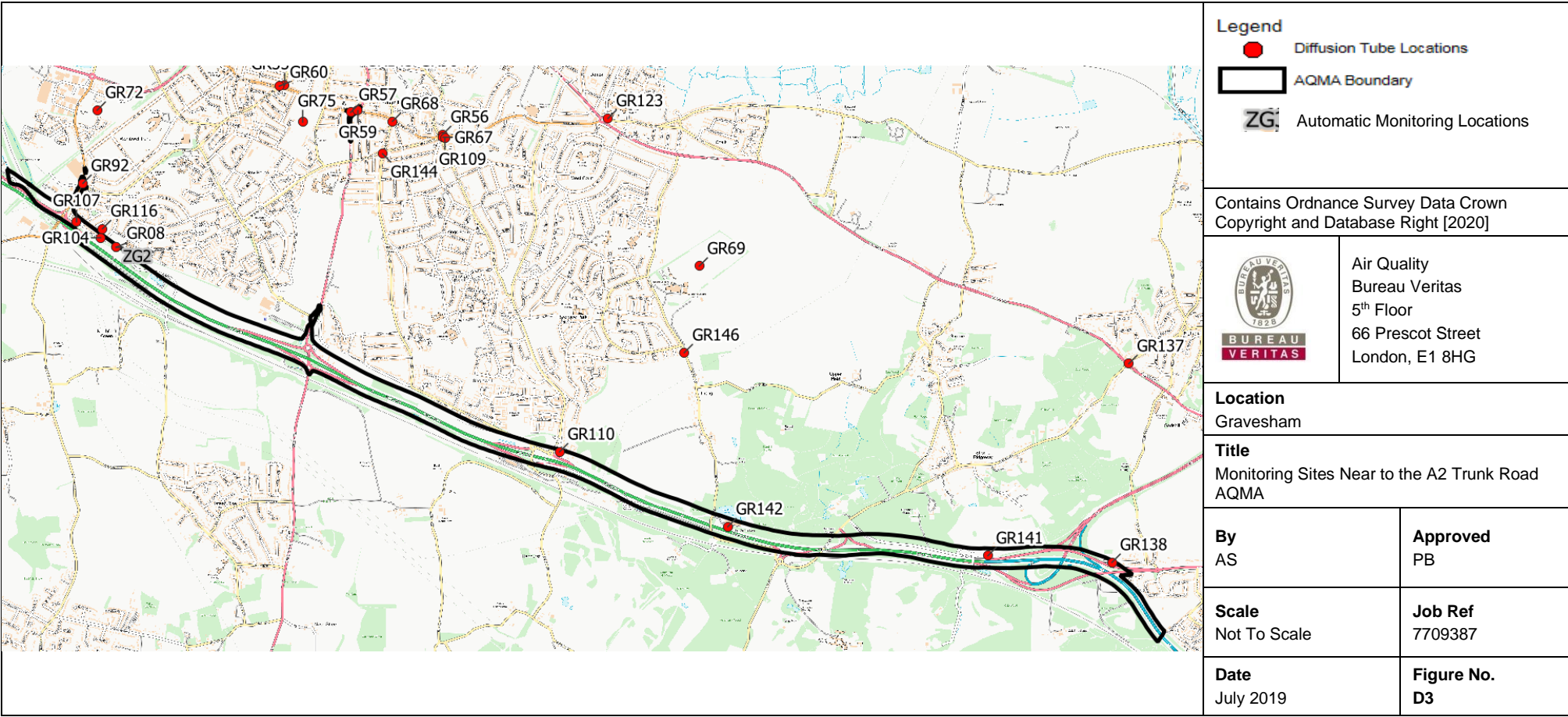


Figure D.4 – Map of Non-automatic Monitoring Stations Near to the B227/B261 Wrotham Road/Old Road West Junction AQMA

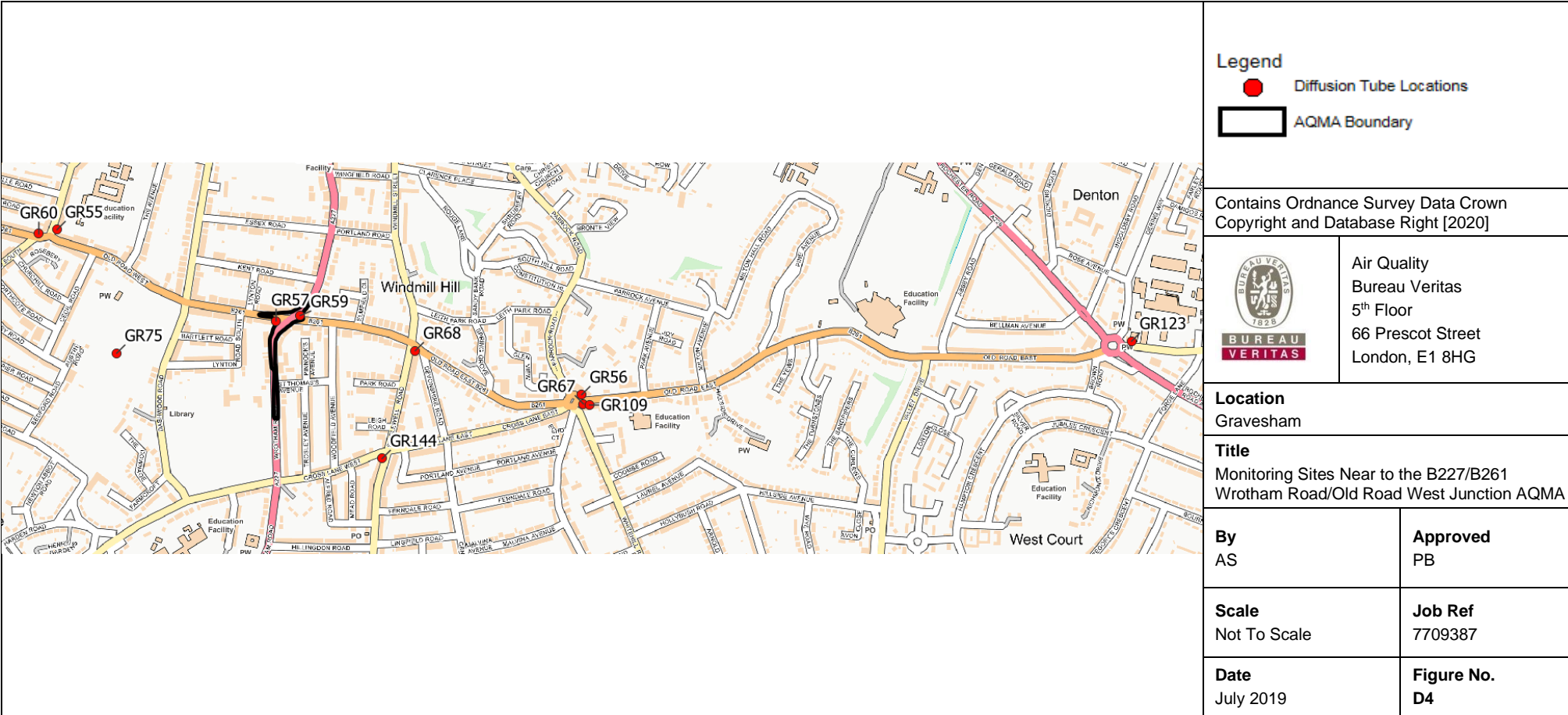
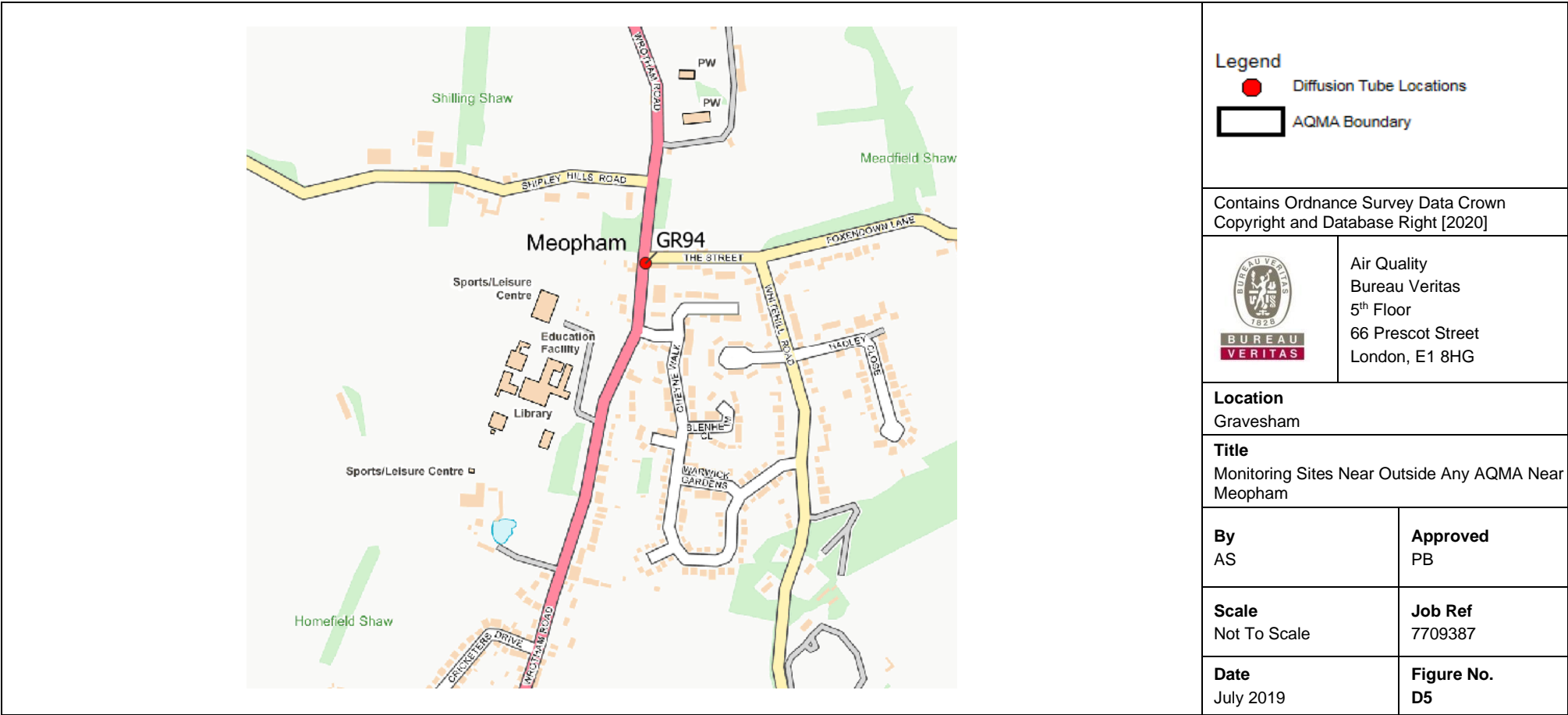


Figure D.5 – Map of Non-automatic Monitoring Stations Outside of Any AQMA Near Meopham



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective ⁸	
	Concentration	Measured as
Nitrogen Dioxide (NO ₂)	200 µg/m ³ not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m ³	Annual mean
Particulate Matter (PM ₁₀)	50 µg/m ³ , not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m ³	Annual mean
Sulphur Dioxide (SO ₂)	350 µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m ³ , not to be exceeded more than 35 times a year	15-minute mean

⁸ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO ₂	Sulphur Dioxide

References

- AEA (2008) Diffusion Tubes for Ambient NO₂ Monitoring: Practical Guidance for Laboratories and Users. Report to Defra and the Devolved Administrations.
- Department for Environment, Food and Rural Affairs (Defra) (2016) Local Air Quality Management Technical Guidance LAQM.TG(16).
- Department of Communities and Local Government (2012) National Planning Policy Framework.
- Environmental Protection UK (2010) Development Control: Planning for Air Quality (2010 Update).
- Gravesham Borough Council (2011) Draft Air Quality Action Plan.
- Gravesham Borough Council (2004) Final Action Plan.
<http://www.kentair.org.uk/library.php?view=la&sort=undefined&author=5>
- Gravesham Borough Council (2006) AQMA Action Plan for A226 One-way system Gravesend.
<http://www.kentair.org.uk/library.php?view=la&sort=undefined&author=5>
- Gravesham Borough Council (2006) Local Air Quality Management – Air Quality Strategy.
- Gravesham Borough Council (2014) Gravesham Local Plan Core Strategy
- Gravesham Borough Council (2016) Annual Status Report
- Gravesham Borough Council (2017) Annual Status Report
- Gravesham Borough Council (2019) Annual Status Report
- Gravesham Borough Council (2019) Annual Status Report Appraisal