Sevenoaks District Council

Air Quality Annual Status Report

In fulfilment of Part IV of the Environment Act 1995 Local Air Quality Management, as amended by the Environment Act 2021

June 2024

www.sevenoaks.gov.uk/airquality

Sevenoaks
DISTRICT COUNCIL

Information	Sevenoaks District Council Details
Local Authority Officer(s)	Holly Harris, Colin Alden
Department	Environmental Health
Address	Sevenoaks District Council Argyle Road Sevenoaks TN13 1HG
Telephone	01732 227000
E-mail	*environmental.health@sevenoaks.gov.uk*
Report Reference Number	SDC/ASR/2024
Date	June 2024

We have made every effort to make this document accessible for people with visual impairments. However, it includes detailed information we are required to publish. Some of this information is presented in tables and for this reason, screen readers may not work effectively on all pages.

If you need help understanding this document, please call our Environmental Health Team on 01732 227000 or email environmental.health@sevenoaks.gov.uk.

Executive Summary: Air Quality in Our Area

Air Quality in Sevenoaks District

Breathing in polluted air affects our health and costs the NHS and our society billions of pounds each year. Air pollution is recognised as a contributing factor in the onset of heart disease and cancer and can cause a range of health impacts, including effects on lung function, exacerbation of asthma, increases in hospital admissions and mortality. In the UK, it is estimated that the reduction in healthy life expectancy caused by air pollution is equivalent to 29,000 to 43,000 deaths a year[1].

Air pollution particularly affects the most vulnerable in society, children, the elderly, and those with existing heart and lung conditions. Additionally, people living in less affluent areas are most exposed to dangerous levels of air pollution[2].

Table ES 1 provides a brief explanation of the key pollutants relevant to Local Air Quality Management and the kind of activities they might arise from.

Table ES 1 - Description of Key Pollutants

Pollutant	Description
Nitrogen Dioxide (NO2)	Nitrogen dioxide is a gas which is generally emitted from high-temperature combustion processes such as road transport or energy generation.
Sulphur Dioxide (SO2)	Sulphur dioxide (SO2) is a corrosive gas which is predominantly produced from the combustion of coal or crude oil.
Particulate Matter (PM10 and PM2.5)	Particulate matter is everything in the air that is not a gas. Particles can come from natural sources such as pollen, as well as human made sources such as smoke from fires, emissions from industry and dust from tyres and brakes. PM10 refers to particles under 10 micrometres. Fine particulate matter or PM2.5 are particles under 2.5 micrometres.

[1] UK Health Security Agency. Chemical Hazards and Poisons Report, Issue 28, 2022.

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

The Sevenoaks district faces air pollution primarily due to Nitrogen Dioxide (NO2) and Particulate Matter (PM10 & PM2.5), which mainly originate from road traffic. The district is intersected by three major motorways: the M25, M26, and M20. These crucial roads connect London and the north of the UK to the port at Dover and the Channel Tunnel. Consequently, there is a continuous flow of continental Heavy Goods Vehicles (HGVs). Additionally, commuter traffic—whether directly into London or connecting to it—and local journeys, such as school runs, contribute significantly to several air pollution hotspots in Sevenoaks, Swanley, and various small towns along the A25.

Sevenoaks District Council has had no breaches of the NO2 annual, PM10 annual, or PM2.5 annual Air Quality Strategy (AQS) objectives at any of the relevant monitoring locations within the district. In addition, latest monitoring data indicates that all data from 2023 has seen a decline, indicating an improvement in air quality across the district.

At all monitoring locations in 2023, annual mean NO2 concentrations were reported to be below the annual mean AQS objective of 40µg/m3. All diffusion tubes within Sevenoaks District showed an annual decline in average concentrations. Furthermore, with the exception of 4 diffusion tubes (DT36, DT51, DT81 and DT90) all the remaining diffusion tubes within Sevenoaks District have shown a three-year declining trend.

The maximum reported concentration was 34.0µg/m3, reported at DT42 located on London Road, Riverhead next to the A25 and A224 which is not located at a site of relevant exposure. No other site reported an annual mean concentration >34µg/m3.

The second highest concentration (33.7 µg/m3) was reported at DT99 in Seal Road on the A25, Sevenoaks. Both of these diffusion tubes are located within AQMA 13.

Despite declining trends across the district within all AQMA's, Sevenoaks District Council will continue to monitor these closely, as future developments may cause a change in these trends.

In April 2022, Sevenoaks District Council adopted a new Air Quality Action Plan (AQAP). The measures included within this action plan are detailed within this report.

Sevenoaks District Council collaborates with other councils in Kent as part of the Kent and Medway Air Quality Partnership and the UK Health Security Agency. Together, they work on projects that benefit the entire region, not just our own district. Sevenoaks District Council has also provided matching funding to support towards DEFRA Air Quality grants to enhance air quality. These projects include initiatives like Pollution Patrol education packs for schools and educating doctors about the signs and health impacts of air pollution.

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades, there are some areas where local action is needed to protect people and the environment from the effects of air pollution.

The Environmental Improvement Plan[3] sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term targets for fine particulate matter (PM2.5), the pollutant of most harmful to human health. The Air Quality Strategy[4] provides more information on local authorities' responsibilities to work towards these new targets and reduce fine particulate matter in their areas.

The Road to Zero[5] details the Government's approach to reduce exhaust emissions from road transport through a number of mechanisms, in balance with the needs of the local community. This is extremely important given that cars are the most popular mode of personal travel, and the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

Due to the nature of the emission sources (a notable amount of HGV through traffic on the major road network and a large proportion of commuter traffic) it is difficult to target specific 'hot spot' areas within the district so the council is looking to carry out a number of measures that will target road user behaviours. And although these will not be entirely focused on specific areas it is the belief that these will help to significantly improve pollution throughout the district to ensure that residents are not exposed to high pollution levels. In addition to these, further measures which are detailed within the Air Quality Action Plan will also target and encourage the reduction of emissions of PM10 & PM2.5.

Over the past reporting year, Sevenoaks District Councils core actions have included:

---

[3] Defra. Environmental Improvement Plan 2023, January 2023

[4] Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

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

- Idling project with schools throughout the district (Measures 11 and 12)
    - As part of the initiative, we installed infographic banners created by students from schools within the district. However, the engagement levels were disappointingly low. Consequently, it is anticipated that this effort will have minimal impact on mitigating concentration levels. Nevertheless, the Sevenoaks District Council may consider repeating a similar project in the future.
- EV Technical Study (Measure 15)
    - Sevenoaks District Council commissioned Field Dynamics to study future electric vehicle (EV) demand in the district. The study aimed to identify future EV ownership, assess residential demand for public charging (including private charger installation feasibility), create demand zones for infrastructure prioritization, and model the impact of existing and proposed public EV chargers. It is anticipated that the higher-than-average EV ownership within the district, combined with ongoing infrastructure improvements, will positively impact concentrations throughout the district.
- Modelling assessment of Swanley Local Air Quality (Measure 23)
    - The District Council engaged a specialist contractor to review our existing Air Quality Management Areas (AQMA). The purpose of this study was to assess air quality and traffic data across the district and reconfirm the existing AQMA boundaries. Unfortunately, during the commissioning process, it became evident that insufficient and outdated traffic data existed for the Swanley area. As a result, a comprehensive review within the production timescales of the AQAP was not feasible. Consequently, we proceeded with the AQAP under the assumption that the areas would remain as previously declared in 2006 (AQMA 8 - London Road (East), High Street, Bartholomew Way, and parts of the central town area) and 2014 (the junction of London Road and Birchwood Road).
- Additional efforts have centred on enhancing walking and cycling infrastructure, building upon the completion of the Sevenoaks Local Cycling and Walking Infrastructure Plan (LCWIP) (Measure 8). Additionally, we've made strides in transitioning the council's fleet, including the introduction of a new electric

Environmental Health van (Measure 14). Furthermore, we’ve actively promoted public transport by improving signage at rural stations (Measure 18).

Photographs of air quality initiatives in Sevenoaks District

Photograph of idling campaign at local school within the District.

Photograph of new environmental health electric vehicle with a team member.

Conclusions and Priorities

The following conclusions can be made from this year's ASR:

- Annual mean NO2 concentrations at all monitoring sites are below the AQS objective of 40ug/m3 and no breaches have recorded. This is also the case for NO2 hourly, PM10 and PM10 daily AQS objectives.
- With the exception of 4 diffusion tubes (DT36, DT51, DT81 and DT90) all the remaining diffusion tubes within Sevenoaks District have shown a three-year declining trend.
- The highest monitored concentration within the district was measured at DT42, which is located at London Road, Riverhead along the A25. This maximum concentration (34.0ug/m3) was still below the national objective level.
- We will consider revoking the districts remaining AQMA's.

Sevenoaks District Council has the following priorities for the coming year:

- Continue to promote the AQAP and deliver measures identified.
- Continue to implement the Local Cycling and Walking Infrastructure Plan (LCWIP) for Sevenoaks urban area and develop an LCWIP for Swanley.
- To complete the decommissioning of our existing Air Quality Stations and explore new alternates for air quality monitoring.
- To design projects to address emissions of PM2.5, particularly those that are associated with domestic burning.

Local Engagement and How to get Involved

Members of the public can help to improve air quality by making small changes to their everyday lives.

- Finding alternative methods to making car journeys, such as walking or cycling, will help to reduce local traffic, improve congestion and reduce vehicle emissions.
- When vehicles are stationary, such as if you are in a traffic jam, are waiting at traffic lights or at level crossings do not allow car engines to idle. Instead turn off your vehicle to reduce emissions which will also save fuel.
- By anticipating the flow of traffic, remaining in a higher gear and maintaining a continuous speed at low revs per minute (RPM), this helps to reduce pollution from your vehicle whilst also saving on fuel consumption.
- Research alternative vehicle types such as electric, hybrid or ULEZ compliant cars which produce lower emissions and help to improve local air quality.
- Ensure that vehicles are regularly maintained, making sure that filters and oil are inspected and replaced regularly to support optimum performance. If sooty exhaust emissions are coming from your vehicle, take it to a garage for servicing, as this will significantly be contributing to poor air quality. Regular tyre maintenance and pressure checks are important to achieve your vehicles optimum fuel consumption, consequently also saving you money.

- Avoid making short journeys by car as to work effectively engines need to reach a high temperature to work at optimal performance. Walking, cycling or use of public transport will produce much lower emissions,
- For shorter journeys, walking cycling or using public transport can often be a cheaper and the more environmentally conscious option.
- Find alternatives to using wood burners, burning solid fuels and having garden bonfires as they produce harmful toxins, and contribute a significant amount to particulate pollution.

The Kent and Medway Air Quality Partnership launched the Pollution Patrol website, which was funded by DEFRA's 2021 Air Quality Grants. This innovative and interactive platform aims to educate primary school students, children, and families about air pollution, its harmful effects, and ways to mitigate its impact by adopting better behaviours. The website features engaging elements such as games, an immersive 360-degree story mode, curriculum-linked teaching resources, and even a school assembly plan. Sign up to this free resource using the link above.

Further details on air quality monitoring carried out by Sevenoaks District Council can be found on the London Air Quality Network website.

Sevenoaks District Council has one Smoke Control Order in place under the Clean Air Act 1993. To check if their property is subject to a Smoke Control Order residents can visit the Council's website.

Within a Smoke Controlled Area only authorised fuels, or any of the below 'smokeless' fuels can be burnt, unless an exempt appliance is used.

- Gas
- Low volatile steam coal
- Anthracite
- Semi-anthracite

If your property does not fall within a Smoke Control Area, you should still be aware that appliances that burn solid fuel will contribute to local air pollution, evidence shows that these contributions are increasing due to gaining popularity for occasional heating requirements, particularly during the winter months.

The council have noted a rise in complaints concerning smoke emissions from domestic properties, as burning solid fuels can generate significant levels of particulate pollution. Non-compliance with the smoke control legislation can result in a fine of up to £1,000.

The Department for Environmental Food and Rural Affairs have produced guidance should residents still wish to use solid fuels or solid fuel appliances.

Local Responsibilities and Commitment

This ASR was prepared by the Environmental Health Department of Sevenoaks District Council with the support and agreement of the following officers and departments:

- Laura Webb, Environmental Health Manager
- Colin Alden, Environmental Protection Team Leader
- Holly Harris, Trainee Environmental Health Officer
- Sevenoaks District Councils Development Management
- Sevenoaks District Councils Licencing
- Sevenoaks District Councils Direct Services

This ASR has been approved by:

This ASR has been signed off by Dr Anjan Ghosh, Director of Public Health Kent County Council with the recognition of its limitations due to the resources Local Authorities have to enforce restrictions and reduce pollution as highlighted by the Association of Directors of Public Health Consultation Response to the National Air Quality Strategy.

If you have any comments on this ASR please send them to Holly Harris (Trainee EHO) at:

Sevenoaks District Council

Argyle Road

Sevenoaks

Kent

TN13 1HG

01732 227000

air.quality@sevenoaks.gov.uk

Table of Contents

Figures

Tables

1 Local Air Quality Management

This report provides an overview of air quality in Sevenoaks District Council during 2023. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), 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 order to achieve and maintain the objectives and the dates by which each measure will be carried out. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Sevenoaks District Council to improve air quality and any progress that has been made.

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

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority should prepare an Air Quality Action Plan (AQAP) within 18 months. The AQAP should specify how air quality targets will be achieved and maintained and provide dates by which measures will be carried out.

A summary of AQMAs declared by Sevenoaks District Council can be found in Table 2.1. The table presents a description of the 4 AQMAs that are currently designated within Sevenoaks District Council.

Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of AQMA(s) and the air quality monitoring locations in relation to the AQMAs. The air quality objectives pertinent to the current AQMA designations are as follows:

- NO2 annual mean

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
AQMA 8	01/09/2006	NO2 Annual Mean	Swanley - London Road (East); High Street; Bartholomew Way and parts of Central town area.	NO	56.7µg/m3	26.5 µg/m3	5	Sevenoaks Air Quality Action Plan 2022	*Sevenoaks Air Quality Action Plan 2022*
AQMA 10	10/01/2008	NO2 Annual Mean	Sevenoaks – High Street & London Road.	NO	46.5µg/m3	18.2 µg/m3	4	Sevenoaks Air Quality Action Plan 2022	*Sevenoaks Air Quality Action Plan 2022*
AQMA 13	14/01/2014	NO2 Annual Mean	The entire length of the A25 from the border with Tonbridge and Malling in the east to the border with Tandridge in the west.	NO	55.3µg/m3	23.5 µg/m3	4	Sevenoaks Air Quality Action Plan 2022	*Sevenoaks Air Quality Action Plan 2022*
AQMA 14	14/01/2014	NO2 Annual Mean	The junction of London Road and Birchwood Road, Swanley.	NO	48.8µg/m3	20.9 µg/m3	4	Sevenoaks Air Quality Action Plan 2022	*Sevenoaks Air Quality Action Plan 2022*

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

☒ Sevenoaks District Council confirm that all current AQAPs have been submitted to Defra.

2.2 Progress and Impact of Measures to address Air Quality in Sevenoaks District

Defra's appraisal of last year's ASR concluded that the report provides new information on air quality obtained by Sevenoaks District Council (SDC), it shows clear presentation of AQMAs through the use of maps and discusses NO2 and PM10 concentrations clearly and concisely. The following comments from the previous appraisal are designed to help inform future reports.

Air Quality Management Areas (AQMA's)

- The report mentions that the declared AQMA's have been compliant for the last three years. To improve future reports, it's essential to continue monitoring and assessing compliance over an extended period (e.g., five years) to ensure sustained adherence to air quality objectives. This approach aligns with the LAQM Technical Guidance 2022, which emphasizes consecutive compliance for five years before considering AQMA revocation.
- Keeping AQMAs in place longer than necessary risks diluting their meaning and impacting public trust in Local Air Quality Management (LAQM). Future reports should emphasize transparency, explaining the rationale behind AQMA designations and any changes. Clear communication fosters trust and encourages public engagement in air quality improvement efforts.
- While we will be considering revoking the compliant AQMA's in the district, it is anticipated that proposed future (residential) developments in these areas may impact on the air quality.

Collaboration and Consultation

- Collaboration with relevant stakeholders, including Directors of Public Health, is crucial. While sign-off on Annual Status Reports (ASRs) is not mandatory, consultation with health experts can enhance support for measures to improve air quality. Co-benefits for public health should be considered in future reporting processes.
- Sevenoaks District Council has diligently sought sign-off and approval from all relevant stakeholders, including the Director of Public Health, for this year's Annual Status Report.

Sevenoaks District Council has taken forward a number of direct measures during the current reporting year of 2023 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

32 measures are included within Table 2.2, with the type of measure and the progress Sevenoaks District Council have made during the reporting year of 2023 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

More detail on these measures can be found in their respective Action Plans the *Net Zero Action Plan 2022/23*, *the Movement Strategy*, *Low Emission and Electric Vehicle Strategy* and the *Local Walking and Cycling Infrastructure Plan.*

Key completed measures are:

- Measure 11- Reduction in vehicle idling through the promotion of health impacts at primary and secondary schools
- Measure 12- Educational Campaigns for schools- including attendance at assembly and delivery of key messages
- Measure 16- Installing EV charging points within all Council owned carparks
- Measure 21- Implementation of flexible/ hybrid working arrangements for District Council staff
- Measure 23- Complete a detailed modelling assessment of the Swanley Area to quantify the local air quality
- Measure 24- Hire an Air Quality Promotions Officer

Sevenoaks District Council expects the following measures to be completed over the course of the next reporting year:

- Measure 1- Development of Local Plan Policy and guidance to ensure developers take account of onsite and offsite air quality.
- Measure 8- Development of new walking and cycle routes
- Measure 15- Improving and developing the EV infrastructure within the district

Sevenoaks District Council’s priorities for the coming year are:

- To continue progressing actions within the 2022 AQAP.
- Align air quality work with the District Council’s Climate Change Strategy whenever possible.
- Decommissioning both of the automatic monitoring stations within the district.
- Identify Potential New Locations for Diffusion Tubes in and around Upcoming Development Sites.

Sevenoaks District Council worked to implement these measures in partnership with the following stakeholders during 2023:

- Neighbouring local authorities
- Highways England
- Local businesses and fleet operators

The principal challenges and barriers to implementation that Sevenoaks District Council anticipates facing are constraints on funding available to execute some of the proposed measures. Furthermore, we faced challenges related to engagement with campaigns, including those targeting schools and the idling project. These challenges had an impact on the broader significance of the project.

Some of these measures set out may not be viable at this time, however due to the number of measures set out it is hoped that some of these may become more viable in due course.

Progress on the following measures has been slower than expected due to:

- Measure 2 - Junction improvements at Bat & Ball Junction (A25/ A225 Junction) - Progress on this measure is dependent on funding associated with a proposed nearby local development and delivery is subject to appropriate consents being granted.

- Measure 6 - Bike rental schemes - The Council continues to undertake feasibility studies but at present such a scheme appears not to be commercially viable within the Sevenoaks District.
- Measure 14 - Transitioning the Council's fleet to low emission vehicles- Substantial progress has been made but transition is subject to financial constraints and procurement difficulties (i.e. replacement of the animal welfare vehicle with an EV alternative took 8 months).

Sevenoaks District Council anticipates that the measures stated above and in Table 0.2 will achieve compliance in all AQMAs across the district.

The Kent and Medway Air Quality Partnership acquired a Defra AQ Grant for a 5-year initiative aimed at creating a digital training resource for Health Care Practitioners across Kent and Medway. They will be equipped to guide patients with cardio-vascular disease or respiratory conditions on minimizing their exposure to air pollution. Further update on this will be provided in the 2025 ASR.

The following conclusions from last year's ASR have been actioned and further details can be found below or n table 2.2:

- Investigate and report on the future demand for EV infrastructure within Sevenoaks District and work towards meeting the needs of residents without access to off-road parking (Measure 15).
- Continue to develop the Local Cycling and Walking Infrastructure Plan (LCWIP) for Sevenoaks urban area and develop an LCWIP for Swanley (Measure 8).
- Develop a protocol with our Development Management Team for the implementation of Air Quality mitigation measures on developments within/adjacent to an AQMA.
    - In March 2023, it was decided that the Council's Core Strategy (2011) and accompanying Air Quality Action Plan (2022) provide policy support for the implementation of Air Quality mitigation measures on developments within/adjacent to an AQMA. The Development Management and Environmental Health teams will work cooperatively in determining and

securing appropriate mitigation measures for planning applications coming forwards in these areas.

- To undertake a best value review of our existing Air Quality Stations and air quality monitoring.
    - In October 2023, Sevenoaks District Council agreed to decommissioning both of the automatic monitoring stations, as a result of both stations approaching the end of their serviceable lifespans and are expected to become uneconomical to repair.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	Local Plan policy and guidance – Ensure that developers take account of onsite and offsite air quality when assessing the environmental impact of their proposals. That suitable onsite and offsite air quality mitigation measures are included (including financial contributions to strategic air quality improvement measures) as part of a proposal such that future air quality is either improved or sustained at a level that would be achieved without the development.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2022	2040	SDC/ KCC	Internal/ Existing	No	Funded	£10k - 50k	Implementation	NO2, whilst guidance already exists, it is important to keep these up to date as policies and strategies evolve.	Implementation of policy	Second Regulation 18 consultation was held in Nov 2023 - January 2024. Comments on draft policies are currently being considered and implemented where appropriate. There will be ongoing consultation with Environmental Health team as part of the policy development	The emerging Local Plan (Plan 2040) will include more detailed policy for Air Quality. Air Quality will be considered in the site selection for emerging allocations.
2	Junction improvements at Bat & Ball Junction (A25/ A225 Junction)	Traffic Management	UTC, Congestion management, traffic reduction	2022	2030	SDC/ KCC/ STC	CIL / KCC / S106 Funding	No	Not Funded	£1 million - £10 million	Planning	NO2. To be confirmed by further assessment once appropriate scheme is determined by partners.	Reduction in NO2 concentrations (amount to be determined by scenario testing once suitable scheme is identified) / Reduced congestion and journey times	Junction improvements are proposed as part of the Tarmac Quarry planning permission (22/00512/OUT) (granted subject to completion of S106). A Baseline Transport Assessment was completed in August 2022, which sets out current hotspots now and in 2040 with existing growth. The model is now testing three proposed growth scenarios	The Local Plan will consider the impact of development on these junctions and potential improvements. Evidence base documents are being updated to support the Local Plan. Cost of works likely to be significant and to cause significant disruption during implementation phase. Funding not secured.

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
														and will be published in the summer. It will identify potential transport challenges and opportunities to inform future decision making.	
3	Junction improvements at A224/A25 in Riverhead	Traffic Management	UTC, Congestion management, traffic reduction	2022	2030	SDC/ KCC/ STC	CIL / KCC / S106 Funding	NO	Not Funded	£1 million - £10 million	Planning	NO2. To be confirmed by further assessment once appropriate scheme is determined by partners.	Reduction in NO2 concentrations (amount to be determined by scenario testing once suitable scheme is identified) / Reduced congestion and journey times	A Baseline Transport Assessment was completed in August 2022, which sets out current hotspots now and in 2040 with existing growth. The model is now testing three proposed growth scenarios and will be published in the summer. It will identify potential transport challenges and opportunities to inform future decision making.	The Local Plan will consider the impact of development on these junctions and potential improvements. Evidence base documents are being updated to support the Local Plan. Cost of works likely to be significant and to cause significant disruption during implementation phase. Funding not secured.
4	Road/ Junction improvements along A225 Sevenoaks High Street	Traffic Management	UTC, Congestion management, traffic reduction	2022	2030	SDC/ KCC/ STC	CIL / KCC / S106 Funding	NO	Not Funded	£1 million - £10 million	Planning	NO2. To be confirmed by further assessment once appropriate scheme is determined by partners.	Reduction in NO2 concentrations (amount to be determined by scenario testing once suitable scheme is identified) / Reduced congestion and journey times	A Sevenoaks Town wide 20mph speed limit is proposed. A revised scheme was put before Sevenoaks Joint Transport Board in March 2023. Sevenoaks Town Council carried out a consultation on the revised scheme between 1st November and 14th December 2023. JTB resolved to reduce the extent of the scheme to reflect the findings of the consultation and ensure compliance by removing Mount Harry/Hitchen Hatch Road, St Botolph's Road, and the northern section	There is no KCC funding currently identified to progress these proposals. Full funding is required to cover further detailed design work and eventual construction. Sevenoaks Town Council has resolved as part of its Community Investment Plan 2023 to fund the implementation of any resulting 20mph signage scheme estimated at £130,000 and a zebra crossing at Dartford Road estimated at £25,000 as approved for delivery via this

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
														of the A225 from the Vine to the Bat and Ball junction.	consultation process.
5	Road improvements along the A25 in Seal, and the A25 in Brasted	Traffic Management	UTC, Congestion management, traffic reduction	2022	2030	SDC/ KCC/ STC/ SPC/ WTC/ BPC	CIL / KCC / S106 Funding	NO	Not Funded	£1 million - £10 million	Planning	NO2. To be confirmed by further assessment once appropriate scheme is determined by partners.	Reduction in NO2 concentrations (amount to be determined by scenario testing once suitable scheme is identified) / Reduced congestion and journey times	A Baseline Transport Assessment was completed in August 2022, which sets out current hotspots now and in 2040 with existing growth. The model is now testing three proposed growth scenarios and will be published in the summer. It will identify potential transport challenges and opportunities to inform future decision making.	The Local Plan will consider the impact of development on these junctions and potential improvements. Evidence base documents are being updated to support the Local Plan. Cost of works likely to be significant and to cause significant disruption during implementation phase. Funding not secured.
6	Bike rental schemes	Promoting Travel Alternatives	Promotion of cycling	2022	2023	SDC	CIL / Grant/ Commercial Income	NO	Not Funded	£10k - 50k	Planning	NO2. Small impact upon NO2 concentrations from measure individually, estimated to be less than 1µg/m3 based upon a low to medium uptake.	Number of bikes available and rentals	Feasibility study undertaken for e-bike hire in Sevenoaks Urban Area	Cycling infrastructure identified as significant barrier to bike hire schemes. Also, the size of the town poses difficulties to economies of scale and scheme would require significant investment.
7	Promotion of active travel schemes	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2022	2030	SDC/ KCC	Internal/ Existing	NO	Funded	£1 million - £10 million	Planning	NO2. Measure is more an awareness raising tool to encourage uptake and use of existing schemes	Movement Strategy to be adopted Spring 2022. Recruitment of an Air Quality Promotions Officer	We consulted on the proposed East/West route between 1 June-14 July 2023. Based on the consultation responses, an alternative section of the route has been proposed to address respondents' concerns. We will be consulting on this route again in the next few weeks We have held public events for	Promotion of measures to wider audience using dedicated AQPO Resource. Focus on replacing private vehicle movements (38.1% NO2 Emissions) with sustainable alternatives.

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
														Routes 1 and 6 to understand residents views to inform the feasibility studies. These were advertised on the website, via social media.	
8	Development of new walking and cycle routes	Transport Planning and Infrastructure	Cycle network	2022	2027	SDC/ KCC	Internal/Existing to develop plan + CIL/ grant to develop infrastructure	NO	Partially Funded	£10k - 50k	Implementation	NO2. Small impact upon NO2 concentrations from measure individually, estimated to be less than 1µg/m3 based upon a low to medium uptake.	Development of the Local Cycling and Walking Strategy. Completion of cycle routes	The Sevenoaks Urban Area LCWIP completed in January 2023. In May 2022 a funding bid to Central Government for the delivery of the prioritised route of the LCWIP (East to West Sevenoaks, route 3) was successful. £1.2 million was awarded. Work is ongoing in partnership with KCC for the route's delivery. A second consultation for an alternative section of the route will take place in the following weeks. Construction is anticipated to begin Spring 2024. Swanley LCWIP completed in February 2024 with a predominant focus on walking. Feasibility studies for Routes 1 & 6 are ongoing and expected to complete in the following weeks. Route 1 will progress to detailed design stage. We have secured further funding from the Capability Fund extension for outline design of Route 6. Through the Route	It is intended on further LCWIPs to be carried out in the district subject to external funding opportunities.

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
														6 feasibility study, community support and appetite for a Seal/Kemsing link was expressed. We have allocated Officer CIL to explore this further by funding a feasibility study linking Kemsing to Seal via Childsbridge Lane and to Otford via Dynes Road.	
9	District wide promotion of active travel	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2022	2027	SDC	Internal/ Existing	NO	Funded	£1 million - £10 million	Planning	NO2. Measure to increase public awareness	Number of promotion events	We have held public events for Routes 1 and 6 to understand resident's views to inform the feasibility studies. These were advertised on the website, via social media.	Focus on replacing private vehicle movements (38.1% NO2 emissions) with sustainable alternatives
10	Behavioural change campaigns to reduce single use occupancy car journeys	Alternatives to private vehicle use	Other	2023	2027	SDC	Internal/ Existing	NO	Funded	< £10k	Planning	NO2. Measure to increase public awareness	Number of campaigns	Being considered as part of the Council's work to tackle climate change and by the AQPO. In 2023 we launched a new Workplace Travel Plan that encourages staff to use more sustainable modes of transport.	Part of the Council's work to tackle climate change. Would need to consider how best to reach audience. Focus on reducing the number of private vehicle movements within the AQMAs (38.1% NO2 emissions).
11	Reducing vehicle idling	Traffic Management	Anti-idling enforcement	2022	2023	SDC	Internal/ Existing	NO	Funded	< £10k	Completed	NO2. Measure largely to increase public awareness, but will help reduce pollutant levels in key hotspot areas	Reduction in NO2 concentrations. Quantitative assessments undertaken before and after initiatives	Idling campaign was concluded in 2023. Posters were installed at schools involved in the campaign and this was promoted in the district wide quarterly magazine and social media channels.	School engagement has been difficult to establish. Campaign might be run again in the future but low impact with results.
12	Educational campaigns for schools	Public Information	Other	2022	2027	SDC	Internal/ Existing	YES	Funded	< £10k	Completed	NO2. Measure to increase public awareness.	Number of campaigns.	Schools have engaged with presentations and resources offered so far. Idling	School engagement has been difficult to establish throughout many

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
														campaign was concluded in 2023. Installation of posters/banners across schools throughout the district. New campaigns being discussed for 2024.	campaigns. Additionally, it is hard to measure success on the impact on air quality.
13	Collaboration with bus operators to introduce ultra-low emission vehicles into the fleets	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	2022	2027	SDC/ KCC/ Private Operators	Internal/ Existing + CIL/ Grant as necessary	NO	Partially Funded	£50k - £100k	Planning	NO2. Value to be confirmed by scenario testing.	Fleet Composition (% using LEV).	Continued discussions with KCC following the national bus strategy.	Working with KCC to consider how we can work together to bring forward low Emission schemes. Cost likely to be significant for bus operators. SDC unlikely to be able to fund initiatives without CIL/ developer contributions or Grants. AQPO to promote benefits to bus operators of sustainable Technologies. Reduce emissions of Busses 4.7% within AQMAs
14	Transitioning the Council's fleet to low emission vehicles	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	2021	2030	SDC	Internal	NO	Funded	< £10k	Implementation	NO2. Scenario Testing to be undertaken to assess the impact of the measure on NO2 depending on fleet composition	Change in fleet composition to less polluting vehicles	Fleet composition considered by SDC Low Emission and Electric Vehicle Strategy.	A 5-year Vehicle Replacement Plan was approved by members on 10th November 2023, Cabinet Minute 57. Reduce of HGVs 4.9% within AQMAs.
15	Improving and developing the EV infrastructure within the district	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2022	2030	SDC/ KCC	Internal/ Existing to initiate study of probable EV Charging Locations. External funding to be identified for installation/ working with district partners.	NO	Partially Funded	£100k - £500k	Implementation	NO2. Small impact upon NO2 concentrations from measure individually, estimated to be less than 1µg/m3 based upon a low to medium uptake.	Undertake a study to identify suitable locations (demand and infrastructure) for the installation of EV Charging Points. Number of EV charging points.	EV Technical Study began in 2022 and funded from appropriate s106 money Already held by SDC), this was completed Autumn 2023. Implementation of priorities identified in technical study being explored across the district.	Part of the recently published Low Emission and Electric Vehicle Strategy. Reduce % NO2 emissions from private vehicles (38%). Areas across district identified as potentially difficult to install chargers due to access to the National Grid.

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
16	Installing EV charging points within all Council owned carparks	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2022	2027	SDC/ KCC	Internal	NO	Funded	£10k - 50k	Completed	NO2. Small impact upon NO2 concentrations from measure individually, estimated to be less than 1µg/m3 based upon a low to medium uptake.	Number of EV charging points within District Area	A further 12 EVCP being commissioned with Connected Curb, as part of the Kent & Medway 600 in off-streetcar parks in 2024.	UKPN and grid reinforcement.
17	Improving public transport infrastructure	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	2022	2027	SDC/ KCC	External	NO	Not Funded	£1 million - £10 million	Planning	NO2. Small impact upon NO2 concentrations from measure individually, estimated to be less than 1µg/m3 based upon a low to medium uptake.	Increased use of public transport. Additional routes public transport facilities.	The Regulation 18 Local Plan promotes a sustainable movement network including links between transport modes to encourage active first and last mile journeys. We are continuing to engage with KCC & public transport providers through the Local Plan process.	Additional routes for public transport are unlikely to be viable unless commercially sustainable. Numerous bus route services, particularly school routes, have been withdrawn Summer/Autumn 2023.
18	Promote the use of public transport	Promoting Travel Alternatives	Promote use of rail and inland waterways	2022	2027	SDC/ KCC/ Rail Operators	Internal/ External	NO	Partially Funded	£100k - £500k	Implementation	NO2. Measure is more an awareness raising tool to encourage uptake and use of available infrastructure	Number of promotional events. Number of passengers on public transport	Developed 17 popular trails through the Darent Valley Landscape Partnership Scheme, with online and leaflet versions. Co-financed signage at rural stations (£3000) to aid onward travel. Engaged in negotiations to improve footpath access to and from Eynsford station. Collaborated with volunteer groups, received accreditation, and promoted rail travel through exhibitions, posters, and social media.	Obtaining approvals from Network Rail. Ongoing discussions needed for policy improvements. Understanding passenger preferences and experiences. Ensuring sustainable funding for initiatives.
19	On and off-street parking charges linked to vehicle	Promoting Low Emission Transport	Priority parking for LEV's	2021	2025	SDC	Internal/ External	NO	Funded	£1 million - £10 million	Implementation	NO2. Small impact upon NO2 concentrations	Number of discounted permits	Residential on street permits are already discounted for hybrid vehicles.	New parking fees and charges increase approved by Members on

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
	emissions standards											from measure individually, estimated to be less than 1µg/m3 based upon a low to medium uptake.		Review of the impact if changed to EV only.	7th July 2022. The agreed proposals were developed to advance the District Council's move to Net Zero 2030. Part of the Net Zero 2030 work. Reduce % NO2 emissions from private vehicles (38%) by encouraging LEV.
20	Car Club / Sharing schemes	Alternatives to private vehicle use	Car Clubs	2022	2027	SDC	External funding/ CIL	NO	Not Funded	£100k - £500k	Planning	NO2. Small impact upon NO2 concentrations from measure individually, estimated to be less than 1µg/m3 based upon a low to medium uptake	Number of cars sharing individuals	Car Club schemes encouraged in new development thorough Regulation 18 Local Plan. Included within the Movement Strategy.	Car club schemes be further encouraged in new developments in the Regulation 19 Local Plan in Summer 2024.
21	Exploring flexible working and home working	Promoting Travel Alternatives	Encourage / Facilitate home-working	2022	2022	SDC/ KCC	Internal	NO	Funded	< £10k	Completed	NO2. Measure to increase public awareness	Levels of home working/ number of vehicle journeys removed from road network	Local Plan to facilitate flexible working options. Working with businesses to explore how flexible working can contribute to reducing emissions. Hybrid working policy developed implemented for SDC staff.	Reduce % NO2 emissions from private vehicles (38%) by reducing number of private vehicles within AQMAs.
22	Walking to school incentives/ encouragement	Promoting Travel Alternatives	School Travel Plans	2022	2027	SDC	Internal/ Existing Budgets + External funding	NO	Partially Funded	< £10k	Planning	NO2. Measure to increase public awareness	Reduction in school vehicle drop-offs / pick-ups. Reduced congestion around school opening and closing times	Initiatives in discussion. Potentially to interlink with wider scale national projects and regionally projects such as Pollution Patrol.	Could have a big impact and is supported by Councillors. Reduce % NO2 emissions from private vehicles (38%) by reducing number within AQMAs. Engagement from schools has been minimal with previous projects, improvements needed for greater reach and uptake.
23	Complete a detailed modelling	Traffic Management	Other	2022	2023	SDC	Internal/ Existing Budgets	NO	Funded	< £10k	Completed	TBC	Completion of the report	Report completed in 2022.	A number of developments are due to take place

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
	assessment of the Swanley Area to quantify the local air quality														in and near to Swanley, therefore understanding the existing air quality will help inform planning decision making. Survey to be funded from existing budgets within Environmental Health.
24	Hire an Air Quality Promotions Officer	Public Information	Other	2022	2022	SDC	Internal/ Existing Budgets	NO	Funded	£10k - 50k	Completed	N/A	Recruitment of AQPO	Officer was successfully appointed in Jan 2022.	Increasing demand on EH workloads result in AQPO being deployed on other statutory duties
25	To provide information and education in respect of personal emissions and how they may be reduced	Public Information	Other	2022	2027	SDC	Internal/ Existing Budgets	NO	Funded	< £10k	Implementation	PM2.5 / NO2	Number of educational campaigns	Two articles within district wide magazine on air quality, reducing emissions and vehicle idling. Publicising events such as clean air day and Kent air week. Eco fairs attended in the district, to promote how to improve emissions.	Action to form part of the AQPO duties and role. Initiatives may include reducing emissions from home heating etc.
26	To work with businesses to identify ways to reduce emissions from their activities	Public Information	Other	2022	2027	SDC	Internal/ Existing Budgets	NO	Funded	< £10k	Implementation	N/A	Number of educational campaigns	Discussions held with businesses as part of business forums run by Climate Change Team. Identified as a wider priority in the pending Sevenoaks District Council Climate Change Strategy.	Action to form part of the AQPO duties and role. Part of the Climate Change work. Promote Laccase funding and training to businesses in SDC which will enable businesses in SDC to move to lower carbon and low pollution activities.
27	To discourage the use of bonfires as a means of waste disposal.	Public Information	Other	2022	2027	SDC	Internal/ Existing Budgets	NO	Funded	< £10k	Planning	PM10/ PM2.5	Number of interventions to provide advice and information to residents. Total number of enforcement actions undertaken	Forms part of current statutory duties. Advice provided via social media. Discussions being held regarding possible projects and mitigation strategies.	Environmental Health have an enforcement role for bonfires that constitute a statutory nuisance and offences under s2 Clean Air Act.

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
28	To reduce emissions from activities with Environmental Permits	Environmental Permits	Measures to reduce pollution through IPPC Permits going beyond BAT	2022	2027	SDC	Internal/ Existing Budgets	NO	Funded	< £10k	Implementation	NO2 PM10/ PM2.5	Increased compliance with Environmental Permitting Regulations. Number of premises identified as 'low risk; (%)	All relevant activities hold relevant permits. Worked to permit a number of businesses identified as not holding correct permits.	EH regulate activities that pollute to air. Risk based regime
29	To work with Highways England to identify measures which will reduce the need for HGV and LGV vehicles to use the A25	Traffic Management	UTC, Congestion management, traffic reduction	2024	2040	SDC/ KCC/ Highways England	External	NO	Funded	£1 million - £10 million	Implementation	NO2 PM10/ PM2.5	Identification of schemes that may have AQ benefit along the A25 (AQMA 13)	Previous discussions held. To be considered as part of the transport improvements proposed in the Local Plan.	Focus on reducing emissions from LGV/ HGV along A25.
30	To review the effectiveness of introducing 20mph zones within areas where AQS objective levels are highest (Sevenoaks High Street, A25 Seal, Bat & Ball Junction, Riverhead, Westerham)	Traffic Management	Reduction of speed limits, 20mph zones	2023	2025	SDC/ KCC	Internal	NO	Funded	< £10k	Planning	NO2 PM10/ PM2.5	Undertake scenario testing to assess impact of measure	Parish and Town Councils independently seeking 20 mph zones. A Sevenoaks Town wide 20mph speed limit is proposed. A revised scheme was put before Sevenoaks Joint Transport Board in March 2023. Sevenoaks Town Council carried out a consultation on the revised scheme between 1st November and 14th December 2023. JTB resolved to reduce the extent of the scheme to reflect the findings of the consultation and ensure compliance by removing Mount Harry/Hitchen Hatch Road, St Botolph's Road, and the northern section of the A225 from the Vine to the Bat and Ball junction.	Focus on reducing emissions of all sources within AQMAs.

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
31	To work with business operators to increase the % composition of LEV within private fleets	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	2023	2027	SDC/ KCC	Internal	NO	Funded	£10k - 50k	Planning	NO2	Number of businesses approached by AQPO. Update of LEVs by businesses	Publicly available EV charging delivered, aligning with EV Infrastructure study.	Reduction of emissions from HGV and LGV within AQMA 13. Promotion of the Kent REVs scheme and the buying of the Kent REVs electric vehicles.
32	To increase the number of Taxi operators using LEV and EV vehicles	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	2023	2030	SDC	Internal/ External	NO	Not Funded	£10k/£10k	Planning	NO2	Number of vehicles within the taxi fleet changing to LEV/EV alternatives	Central Government have revised the date to 2030. SDC have successfully had their policy amended to reflect that LEVs have a 15-year lifespan, which came into effect April 2024.	Kent wide survey carried out directed to all licensed drivers for response on moving over to EV's. Survey highlighted barriers: High cost of vehicles, Lack of infrastructure, Unable to fit home charger as no drive, Faulty public charge-points, public charging takes too long, Cost of insurance, cannot do long impromptu trips, need to take time out working day to re-charge

2.3 PM2.5 – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG22 (Chapter 8) and the Air Quality Strategy[6], local authorities are expected to work towards reducing emissions and/or concentrations of fine particulate matter (PM2.5). There is clear evidence that PM2.5 (particulate matter smaller 2.5 micrometres) has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

No monitoring of PM2.5 is currently conducted within the Sevenoaks District, however the two automatic monitoring sites located at Greatness and Bat & Ball monitor PM10 concentrations.

Reviewing our annual mean PM10 concentrations from both stations and calculating the annual mean PM2.5 concentrations from this, it shows a continuous fall in results from 2021 to 2023, supporting the belief that all background levels in Sevenoaks District are well below the annual mean limit for PM2.5.

Following the decommissioning of both of these monitoring stations in 2024, Sevenoaks District Council will look to use budgetary savings to explore portable monitoring technologies, which have seen significant technical advancements in recent years including real time monitoring of a range of pollutants including PM2.5. SDC will look to deploy a network of these throughout the district, which can be used in a range of projects and monitoring locations. More information will be provided on this in next year's ASR.

The Public Health Outcomes Framework data tool compiled by UKHSA and The Department of Health and Social Care has a number of public health indicators that are used to focus public health action, identify areas of health inequality and concern and monitor the differences in health impacts across regions in the UK. This framework includes an indicator "D01- Fraction of Mortality Attributable to Particulate Air Pollution" which is calculated using background annual average PM2.5 concentrations, modelled at a 1km2 resolution based on measured concentrations from the AURN. As such, this quantifies the mortality burden of PM2.5 within England on a county and local authority scale. The 2022 fraction of mortality attributable to PM2.5 pollution across England is

---

[6] Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

5.82%, and the fraction within the Southeast region is lower than this at 5.67%. The fraction reported within Sevenoaks specifically is lower than the national and regional average, at 5.5%.

A number of the measures set out in the new AQAP aim to reduce vehicular travel frequency and time via means such as encouraging active travel and reducing single occupancy journeys. In addition, some of the measures are specifically targeted at reducing PM2.5 concentrations, such as controlling the use of bonfires as a means of waste disposal and reducing emissions from activities with environmental permits. These are all expected to have a positive impact on reducing PM2.5 concentrations.

Sevenoaks District Council currently has a smoke control area that encompasses the Swanley urban area and land to the west of Crockenhill. Within this area, emissions of smoke from a chimney are forbidden unless authorised fuels or exempt appliances are being used.

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

This section sets out the monitoring undertaken within 2023 by Sevenoaks District Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2019 and 2023 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Sevenoaks District Council undertook automatic (continuous) monitoring at 2 sites during 2023. Table A.1 in Appendix A shows the details of the automatic monitoring sites. NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem.

The *LAQN website* presents automatic monitoring results for Sevenoaks District Council, with automatic monitoring results also available through the UK-Air website .

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

Sevenoaks District Council undertook non- automatic (i.e. passive) monitoring of NO2 at 54 sites during 2023. Table A.2 in Appendix A presents the details of the non-automatic sites.

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

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, annualisation (where the annual mean data capture is below 75% and greater than 25%), and distance correction. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO2)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO2 annual mean concentrations for the past five years with the air quality objective of 40µg/m3. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2023 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

Table A.5 in Appendix A compares the ratified continuous monitored 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.

No exceedances of the annual mean NO2 Air Quality Strategy (AQS) objective (40µg/m3) have been reported at any monitoring location operated by Sevenoaks District Council in 2023.

The maximum reported concentration is 34.0µg/m3, within 10% of the AQS objective (36µg/m3), reported at DT42 located on London Road, Riverhead next to the A25 and A224 which is not located at a site of relevant exposure. No other site reported an annual mean concentration >34µg/m3.

Annual mean NO2 concentrations have shown a trending decrease at all of monitoring locations from 2022 to 2023. Additionally, with the exception of 7/54 diffusion tubes (4 in AQMA 10, 1 in AQMA 13 and 2 outside of any AQMA), there has also been a trending decrease from 2021 to 2023.

Annual mean NO2 concentrations at all monitoring sites are below the AQS objective of 40ug/m3. This is also the case for NO2 hourly, PM10 and PM10 daily AQS objectives.

There continues to be an overall downward trend in annual mean NO2 concentrations across all monitoring sites.

Although there is no clear reason as to why NO2 is decreasing throughout Sevenoaks District, it is believed this is due to the increase in electric vehicles and the expansion of the London ULEZ in August 2023 within neighbouring London Boroughs of Bromley and Bexley, which led to a wiper portion of the population changing their vehicles to comply with the emissions standards.

Sevenoaks District Council will continue to monitor the annual data for the designated AQMA's, particularly AQMA 8 and AQMA 13 due to the large, proposed developments within these areas, which may result in an increase in NO2 for these areas.

3.2.2 Particulate Matter (PM10)

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM10 annual mean concentrations for the past five years with the air quality objective of 40µg/m3.

Table A.7 in Appendix A compares the ratified continuous monitored PM10 daily mean concentrations for the past five years with the air quality objective of 50µg/m3, not to be exceeded more than 35 times per year.

Both continuous monitoring locations reported annual mean PM10 concentrations below the annual mean objective of 40µg/m3. Both Greatness (CM1) and Bat & Ball (CM2) reported a concentration of 15.0µg/m3. This has decreased from what was reported in 2022 (-2.0 µg/m3 at CM1 and -3.0 µg/m3 at CM2). Longer term trends indicate the concentrations at both sites appear to be relatively stable.

With respect to the 24-hour objective, where there should be no more than 35 24-hour averages which exceed 50µg/m3. Both Greatness (CM1) and Bat & Ball (CM2) reported 0 periods where this was the case. The maximum number reported over the past 5 years was 9 at CM1 in 2019, with both sites showing a decreasing trend for this (with the exception of CM2 in 2022).

In October 2023, it was decided that Sevenoaks District Council would decommission both of the automatic monitoring stations from April 2024. This is as a result of both stations approaching the end of their serviceable lifespans and are expected to become uneconomical to repair.

3.2.3 Particulate Matter (PM2.5)

Table A.8 in Appendix A presents the ratified and adjusted monitored PM2.5 annual mean concentrations for the past five years.

Both automatic monitoring stations have shown an overall decrease in trends over the past five years. The only exception to this is Greatness (CM1) in 2021 which increased to 12.1 from 11.9, however this decreased to 11.5 in 2022 and now is 10.3 in 2023.

Bat and Ball has seen a significant drop from 2022 to 2023 from 11.6 to 9.1, which correlates with the overall 2023 data for Sevenoaks, which suggests an improvement in air quality.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
CM1	Greatness	Urban Background	553603	156774	NOx, NO, NO2, PM10, 03	NO	Chemiluminescent / TEOM	Y	46m	1.8
CM2	Bat & Ball	Roadside	553044	156690	NOx, NO, NO2, PM10	YES AQMA13	Chemiluminescent / TEOM	N - (30m)	8m	1.8

Notes:

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

(2) N/A if not applicable

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

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DT02	Sevenoaks, High St South 1	Roadside	553157	154416	NO2	Y - AQMA No.10	0.0	2.0	No	2.0
DT03	Sevenoaks, Garvock Drive	Urban Background	552465	154165	NO2	N	0.0	2.0	No	2.0
DT05	Riverhead, Riverhead 2	Roadside	551414	156196	NO2	Y - AQMA No.13	0.0	2.5	No	2.5
DT06	Riverhead, Riverhead 3	Kerbside	551442	156159	NO2	Y - AQMA No.13	2.0	2.5	No	2.5
DT07	Seal, High St East 1	Roadside	555096	156692	NO2	Y - AQMA No.13	3.0	2.5	No	2.5
DT08	Seal, High St West 1	Roadside	554991	156728	NO2	Y - AQMA No.13	0.0	2.0	No	2.0
DT12	Brasted, Station Rd	Roadside	546813	155850	NO2	N	0.0	2.0	No	2.0
DT13	Swanley, London Rd /Wested Lane	Kerbside	552510	167704	NO2	N	3.0	2.5	No	2.5
DT14	Swanley, Wadard Terrace (Button St)	Roadside	553107	167868	NO2	N	6.0	2.5	No	2.5
DT23	Sevenoaks, Bat & Ball 1	Roadside	553050	156625	NO2	Y - AQMA No.13	4.0	2.5	No	2.5
DT24	Westerham, High St	Roadside	544418	153918	NO2	Y - AQMA No.13	10.0	2.5	No	2.5
DT25	Westerham, Vicarage Hill	Roadside	544638	154041	NO2	Y - AQMA No.13	20.0	2.5	No	2.5
DT26	Farningham, Farningham Hill	Roadside	554218	167252	NO2	N	4.0	2.5	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DT27	Sevenoaks, High St South 2	Roadside	553138	154260	NO2	Y - AQMA No.10	0.0	2.5	No	2.5
DT28	Sevenoaks, High St North 2	Roadside	553044	154889	NO2	Y - AQMA No.10	7.0	2.5	No	2.5
DT29	Sevenoaks, High St North 3	Roadside	553073	155030	NO2	Y - AQMA No.10	1.5	2.5	No	2.5
DT30	Sevenoaks, Bat & Ball 2	Roadside	553019	156692	NO2	Y - AQMA No.13	0.0	2.5	No	2.5
DT31	Sevenoaks, Bat & Ball 3	Kerbside	553165	156686	NO2	Y - AQMA No.13	1.5	2.5	No	2.5
DT32	Sevenoaks, Bat & Ball 4	Roadside	553147	156563	NO2	Y - AQMA No.13	6.0	2.5	No	2.5
DT33	Seal, High St East 2	Roadside	555069	156709	NO2	Y - AQMA No.13	2.0	2.5	No	2.5
DT34	16 Main Road, Sundridge Dunbrik	Roadside	544802	154895	NO2	N	36.0	2.5	No	2.5
DT35	Sevenoaks, Seal Hollow Rd	Roadside	554092	156797	NO2	Y - AQMA No.13	0.0	2.5	No	2.5
DT36	Westerham, Market Sq.	Roadside	544598	154021	NO2	Y - AQMA No.13	3.0	2.5	No	2.5
DT39	Swanley, Bartholomew Way2, opposite ASDA delivery	Roadside	551492	168695	NO2	Y - AQMA No.8	0.0	2.0	No	2.0
DT40	Swanley, London Rd 1	Roadside	551579	168507	NO2	Y - AQMA No.8	0.0	0.0	No	2.5
DT41	Swanley, London Rd 2	Roadside	552175	168162	NO2	Y - AQMA No.8	18.0	2.5	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DT42	Riverhead, London Rd	Roadside	551383	156064	NO2	Y - AQMA No.13	2.5	2.5	No	2.5
DT43	Dunton Green, London Rd	Roadside	551315	156381	NO2	Y - AQMA No.13	8.0	2.5	No	2.5
DT48	Sevenoaks, 73 London Rd	Roadside	552867	154858	NO2	Y - AQMA No.10	8.0	2.5	No	2.5
DT49	Sevenoaks, 20 London Rd	Roadside	553018	154655	NO2	Y - AQMA No.10	0.0	2.0	No	2.0
DT51	Sevenoaks, 130 London Rd	Roadside	552761	155050	NO2	Y - AQMA No.10	1.5	2.5	No	2.5
DT52	Sevenoaks, 142 London Rd	Roadside	552504	155271	NO2	N	42.0	2.0	No	2.0
DT54	Dunton Green, 57 London Rd	Roadside	551224	156975	NO2	Y - AQMA No.13	0.0	2.5	No	2.5
DT71	Sundridge, 204 Main Rd	Roadside	548239	155355	NO2	Y - AQMA No.13	0.0	2.5	No	2.5
DT74	Bessels Green, (A25) Westerham Rd	Roadside	550768	155584	NO2	Y - AQMA No.13	3.0	2.5	No	2.5
DT76	Worships Hill, Witches Lane	Roadside	551019	155714	NO2	Y - AQMA No.13	3.0	2.5	No	2.5
DT77	Sevenoaks, London Rd/Montreal Av	Kerbside	551528	155967	NO2	Y - AQMA No.13	3.0	2.5	No	2.5
DT81	Swanley, Farningham Hill Rd	Urban Background	553419	167614	NO2	Y - AQMA No.10	14.0	2.5	No	2.5
DT83	Swanley, Birchwood Rd, Jessamine Terrace	Roadside	550298	169627	NO2	Y - AQMA No.14	15.0	2.5	No	2.5
DT84	Brasted, West End	Roadside	546803	154999	NO2	Y - AQMA No.13	13.0	2.5	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DT85	Brasted, Chart Lane	Kerbside	547094	155099	NO2	Y - AQMA No.13	2.0	2.5	No	2.5
DT86	Bessels Green,(A25) 59 Westerham Rd	Roadside	550306	155595	NO2	Y - AQMA No.13	6.0	2.5	No	2.5
DT87	Sevenoaks, Bradbourne Vale Rd South	Roadside	551639	156334	NO2	Y - AQMA No.13	17.0	2.5	No	2.5
DT88	Sevenoaks, Bradbourne Vale Rd North	Roadside	552950	156578	NO2	Y - AQMA No.13	0.5	2.5	No	2.5
DT90	Sevenoaks St Johns, A4 St Johns Hill	Roadside	553053	154708	NO2	Y - AQMA No.10	10.0	2.5	No	2.5
DT93	Swanley, Birchwood Rd, end of Pucknells Close	Roadside	550284	169743	NO2	N	10.0	2.0	No	2.0
DT94	Swanley, Birchwood Rd, Beefeater Restaurant	Roadside	550249	169573	NO2	Y - AQMA No.14	20.0	2.5	No	2.5
DT95	Swanley, Birchwood Rd, London Rd opposite Malvern	Roadside	550351	169490	NO2	Y - AQMA No.14	0.0	2.0	No	2.0
DT96	Sevenoaks STN 1	Roadside	552371	155346	NO2	N	1.8	2.5	No	2.5
DT97	Ellis Close	Urban Background	550555	168253	NO2	N	35.0	14.0	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DT98	Dunton Green M26	Roadside	550962	157662	NO2	N	16.0	2.0	No	2.5
DT99	Sevenoaks, Bat & Ball 5	Roadside	553104	156676	NO2	Y - AQMA No.13	6.0	2.0	No	
BC01, BC02, BC03	Sevenoaks, Greatness 3	Urban Background	553607	156776	NO2	N	39.0	2.0	Yes	1.8
BC04, BC05, BC06	Sevenoaks, Bat & Ball AQ Station	Roadside	553045	156690	NO2	Y - AQMA No.13	30.0	2.0	Yes	1.8

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: Automatic Monitoring (µg/m3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
CM1	553603	156774	Urban Background	87	87	14.0	12.0	11.6	12.0	10.0
CM2	553044	156690	Roadside	100	100	23.0	18.0	20.1	20.0	16.0

☒ Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.

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

☐ Where exceedances of the NO2 annual mean objective occur at locations not representative of relevant exposure, the fall-off with distance concentration has been calculated and reported concentration provided in brackets for 2023.

Notes:

The annual mean concentrations are presented as µg/m3.

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

All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

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

Table A.4 – Annual Mean NO2 Monitoring Results: Non-Automatic Monitoring (µg/m3)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
DT02	553157	154416	Roadside	100	100	40.4	29.6	31.8	30.9	27.5
DT03	552465	154165	Urban Background	100	100	9.9	8.0	8.0	8.4	6.1
DT05	551414	156196	Roadside	100	100	34.4	30.3	30.6	29.8	26.0
DT06	551442	156159	Kerbside	92.0	92.0	34.8	27.3	30.0	29.2	25.3
DT07	555096	156692	Roadside	100	100	36.6	26.2	29.3	28.6	25.4
DT08	554991	156728	Roadside	92.0	90.4	23.7	19.2	20.3	18.4	15.7
DT12	546813	155850	Roadside	92.0	92.0	33.2	26.6	25.5	24.2	21.6
DT13	552510	167704	Kerbside	100	100	27.7	21.7	23.1	19.5	18.5
DT14	553107	167868	Roadside	100	100	25.2	20.9	20.7	18.7	17.3
DT23	553050	156625	Roadside	92.0	92.0	33.0	26.6	28.9	26.0	22.9
DT24	544418	153918	Roadside	83.0	84.6	28.2	23.0	24.9	22.3	21.2
DT25	544638	154041	Roadside	83.0	81.9	23.5	18.4	30.6	27.6	24.6
DT26	554218	167252	Roadside	92.0	90.4	34.8	29.6	28.9	28.3	24.4
DT27	553138	154260	Roadside	100	100	33.2	21.6	24.3	23.0	20.3
DT28	553044	154889	Roadside	100	100	31.5	23.5	23.6	25.2	21.1
DT29	553073	155030	Roadside	100	100	23.7	17.6	19.9	19.0	16.6
DT30	553019	156692	Roadside	100	100	30.8	24.2	25.4	24.3	22.1

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
DT31	553165	156686	Kerbside	100	100	43.6	35.0	36.3	32.6	31.6
DT32	553147	156563	Roadside	100	100	40.7	32.5	34.1	30.6	28.8
DT33	555069	156709	Roadside	92.0	92.6	34.6	26.3	29.8	26.8	25.6
DT34	544802	154895	Roadside	100	100	23.5	18.3	18.6	18.3	16.0
DT35	554092	156797	Roadside	100	100	30.0	24.3	26.5	24.5	22.9
DT36	544598	154021	Roadside	83.0	83.0	33.5	28.2	28.1	30.0	23.5
DT39	551492	168695	Roadside	92.0	92.6	34.8	28.1	29.4	26.8	22.2
DT40	551579	168507	Roadside	92.0	90.1	37.5	28.4	34.1	32.4	30.6
DT41	552175	168162	Roadside	92.0	92.9	32.6	27.2	29.5	27.2	26.0
DT42	551383	156064	Roadside	100	100	27.4	23.6	37.5	35.2	34.0
DT43	551315	156381	Roadside	100	100	26.5	19.3	24.9	22.2	20.1
DT48	552867	154858	Roadside	83.0	84.9	20.0	13.6	15.9	14.7	13.6
DT49	553018	154655	Roadside	100	100	25.1	17.2	18.6	18.1	15.5
DT51	552761	155050	Roadside	100	100	30.2	22.3	18.1	20.7	14.3
DT52	552504	155271	Roadside	100	100	29.5	21.8	21.8	20.8	19.4
DT54	551224	156975	Roadside	100	100	28.8	24.8	24.1	23.5	20.8
DT71	548239	155355	Roadside	100	100	25.6	22.5	23.6	22.8	17.3
DT74	550768	155584	Roadside	100	100	30.7	22.2	25.5	21.9	19.8

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
DT76	551019	155714	Roadside	92.0	91.5	33.3	27.4	29.0	26.3	22.7
DT77	551528	155967	Kerbside	100	100	31.6	25.0	26.5	26.4	23.3
DT81	553419	167614	Urban Background	67.0	65.7	25.7	20.7	19.6	21.4	15.6
DT83	550298	169627	Roadside	100	100	42.4	33.3	33.1	31.7	26.5
DT84	546803	154999	Roadside	100	100	26.5	23.0	25.1	21.8	18.2
DT85	547094	155099	Kerbside	92.0	92.3	35.7	31.5	30.1	28.0	24.3
DT86	550306	155595	Roadside	100	100	30.7	21.1	24.3	23.3	19.0
DT87	551639	156334	Roadside	92.0	92.6	42.3	35.7	37.5	34.2	30.6
DT88	552950	156578	Roadside	92.0	90.1	28.1	20.7	21.5	20.2	17.5
DT90	553053	154708	Roadside	100	100	29.5	21.1	21.4	23.0	19.3
DT93	550284	169743	Roadside	100	100	25.9	19.5	20.2	17.4	15.1
DT94	550249	169573	Roadside	100	100	28.6	22.8	22.7	21.4	16.2
DT95	550351	169490	Roadside	100	100	30.2	25.0	25.3	23.3	20.1
DT96	552371	155346	Roadside	100	100	30.5	21.2	22.4	22.4	20.4
DT97	550555	168253	Urban Background	100	100		17.7	16.9	15.1	14.0
DT98	550962	157662	Roadside	100	100		22.8	24.7	21.9	20.0
DT99	553104	156676	Roadside	100	100					33.7
BC01,	553607	156776	Urban Background	100	100	13.0	10.8	11.0	9.6	9.2

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
BC02,	553045	156690	Urban Background	100	100	13.0	10.8	11.0	10.0	9.1
BC03	553157	154416	Urban Background	100	100	13.0	10.8	11.0	9.8	8.9
BC04,	552465	154165	Roadside	100	100	24.9	19.6	20.3	19.3	16.1
BC05,	551414	156196	Roadside	100	100	24.9	19.6	20.3	19.7	16.8
BC06	551442	156159	Roadside	100	100	24.9	19.6	20.3	19.7	16.9

☒ Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.

☒ Diffusion tube data has been bias adjusted.

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

Notes:

The annual mean concentrations are presented as µg/m3.

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.

Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

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

Figure A.1 – Trends in Annual Mean NO2 Concentrations AQMA 8

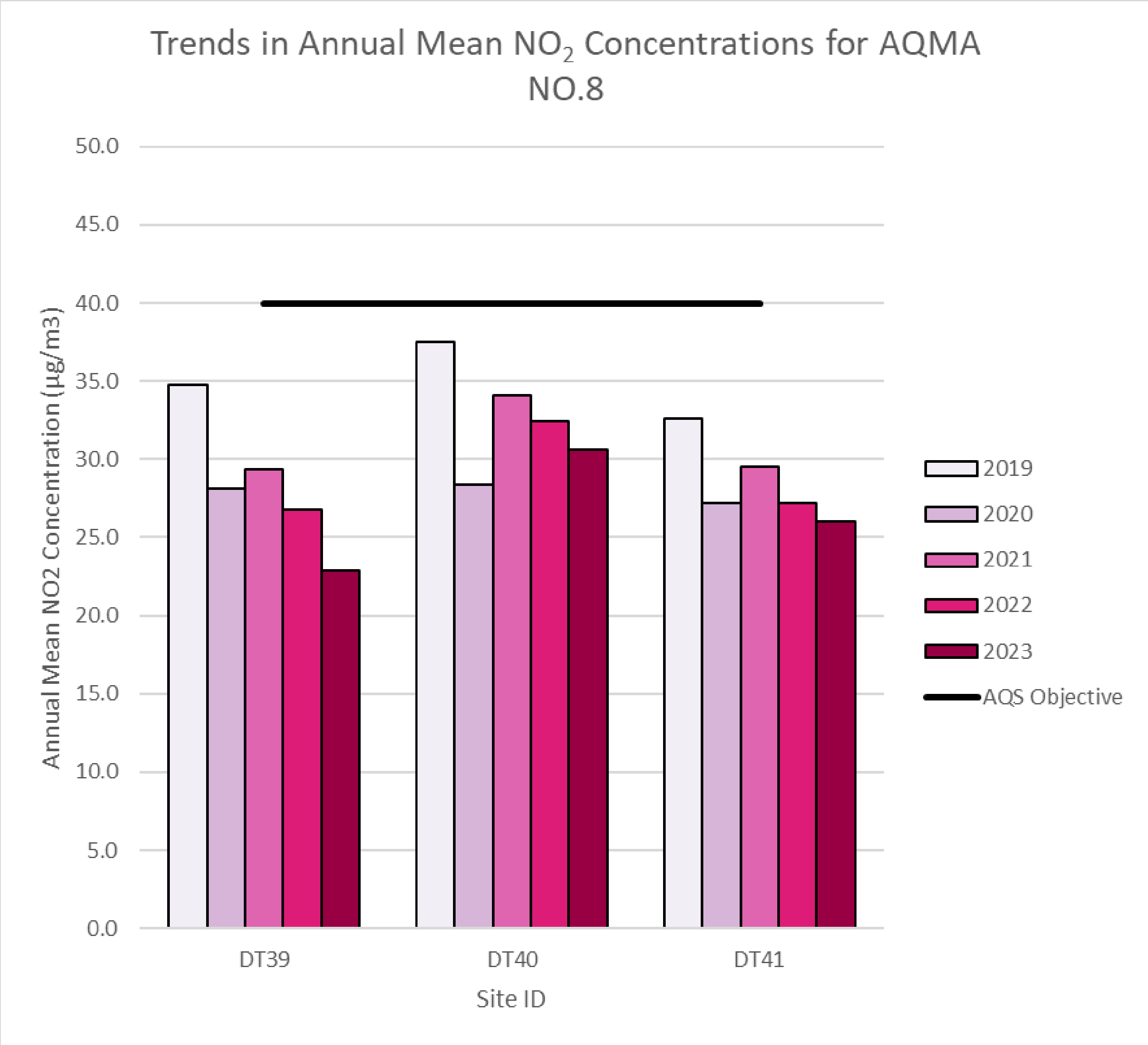


Figure A.2 – Trends in Annual Mean NO2 Concentrations AQMA 10

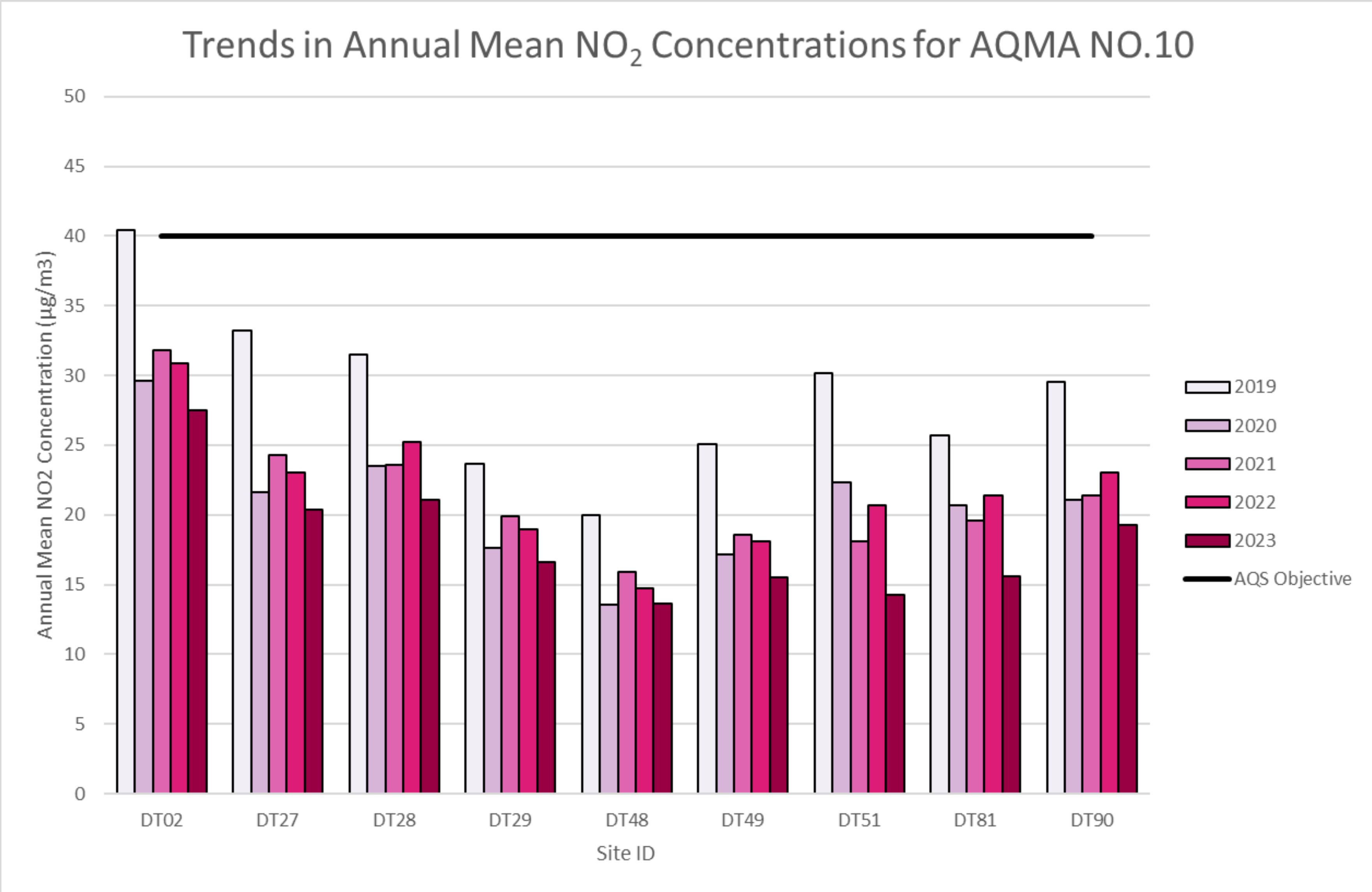


Figure A.3 – Trends in Annual Mean NO2 Concentrations AQMA 13

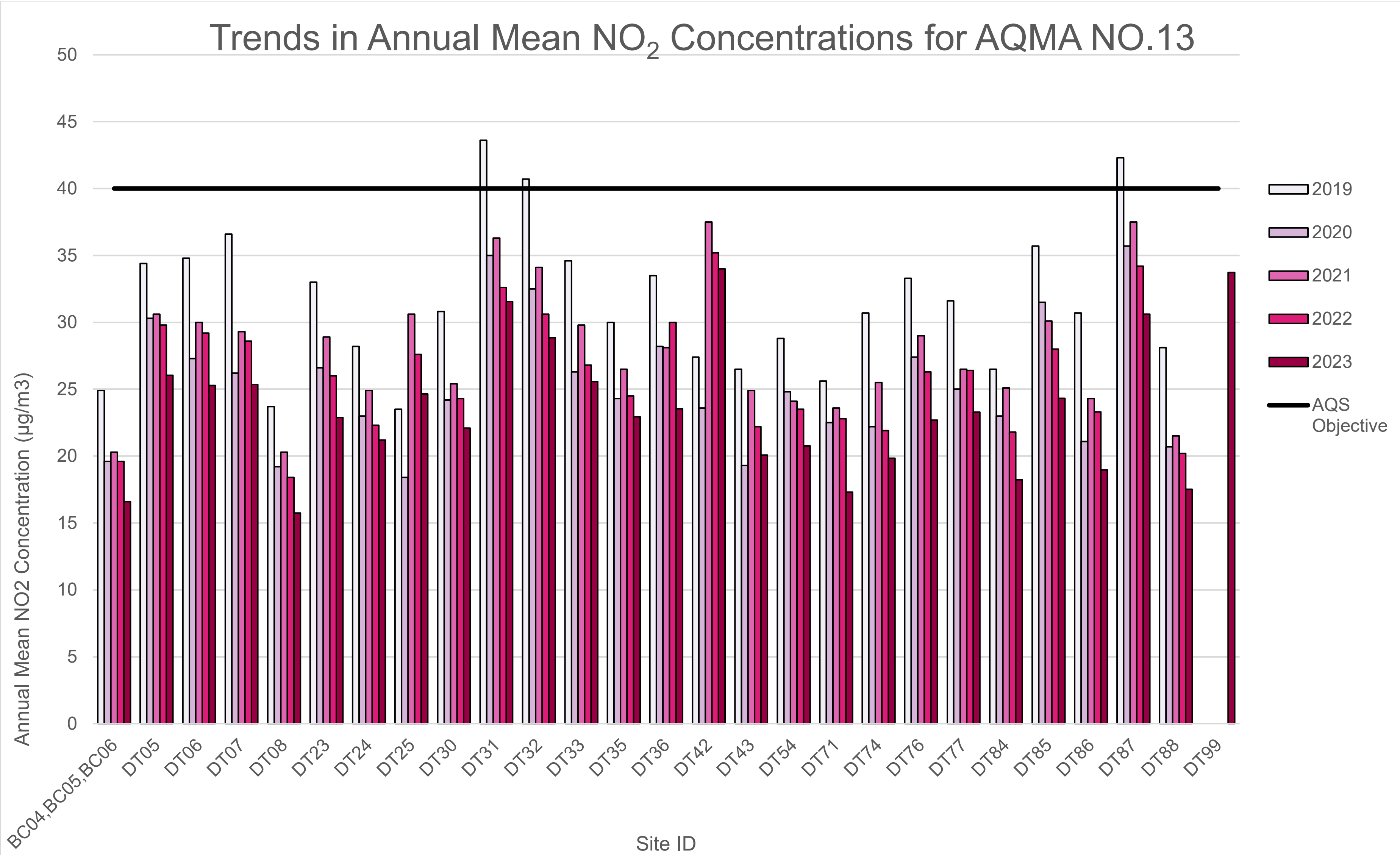


Figure A.4 – Trends in Annual Mean NO2 Concentrations AQMA 14

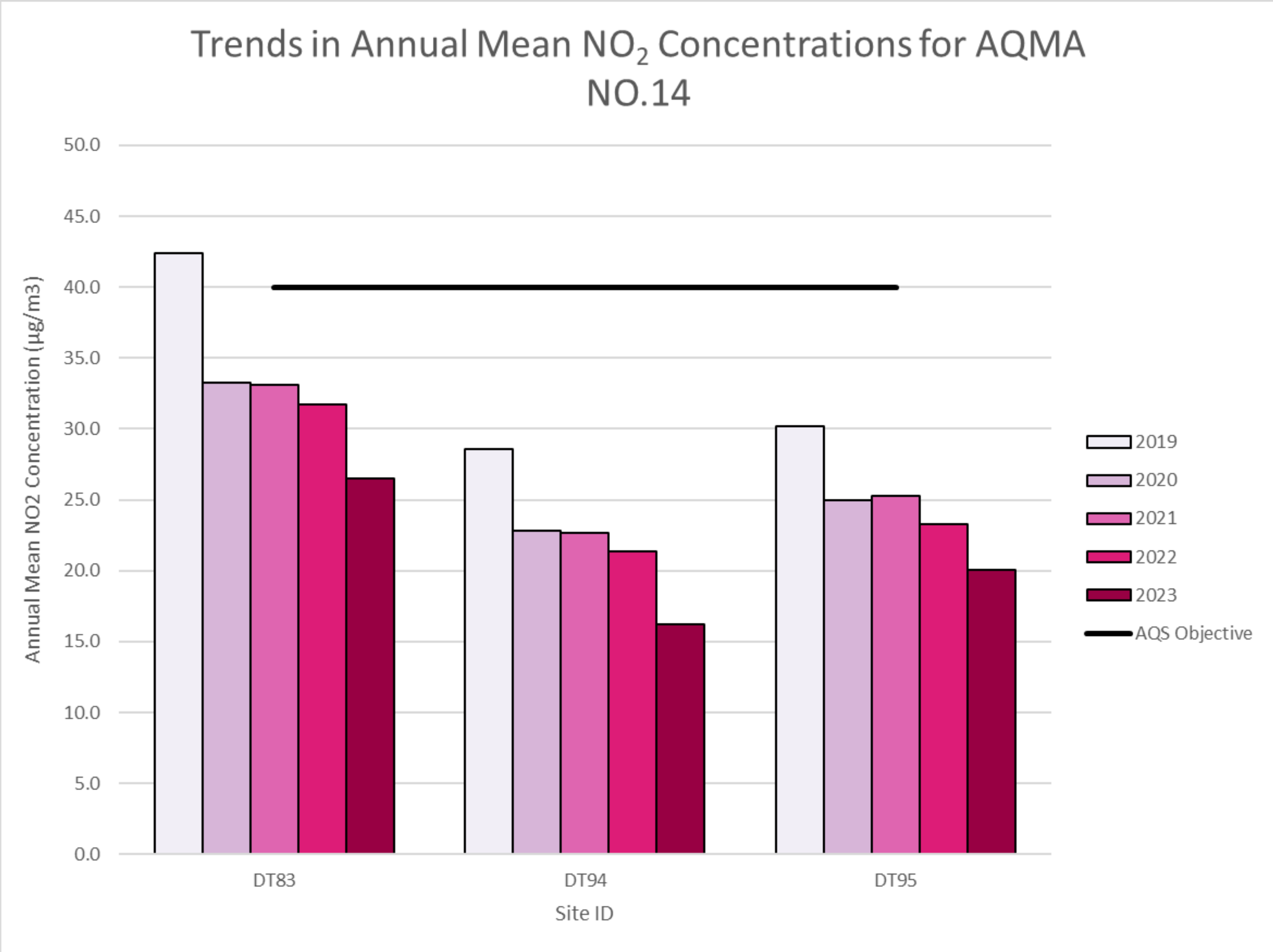


Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
CM1	553603	156774	Urban Background	87	87	0	0	0	0	0
CM2	553044	156690	Roadside	100	100	0	0	0	0	0

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m3 have been recorded.

Exceedances of the NO_2 1-hour mean objective (200µg/m3 not to be exceeded more than 18 times/year) are shown in bold.

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

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

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

Table A.6 – Annual Mean PM10 Monitoring Results (µg/m3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
CM1	553603	156774	Urban Background	84	84	20.00	17.00	17.00	17.00	15.00
CM2	553044	156690	Roadside	85	85	20.00	18.00	18.20	18.00	15.00

☒ Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.

Notes:

The annual mean concentrations are presented as µg/m3.

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

All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

Figure A.5 – Trends in Annual Mean PM10 Concentrations

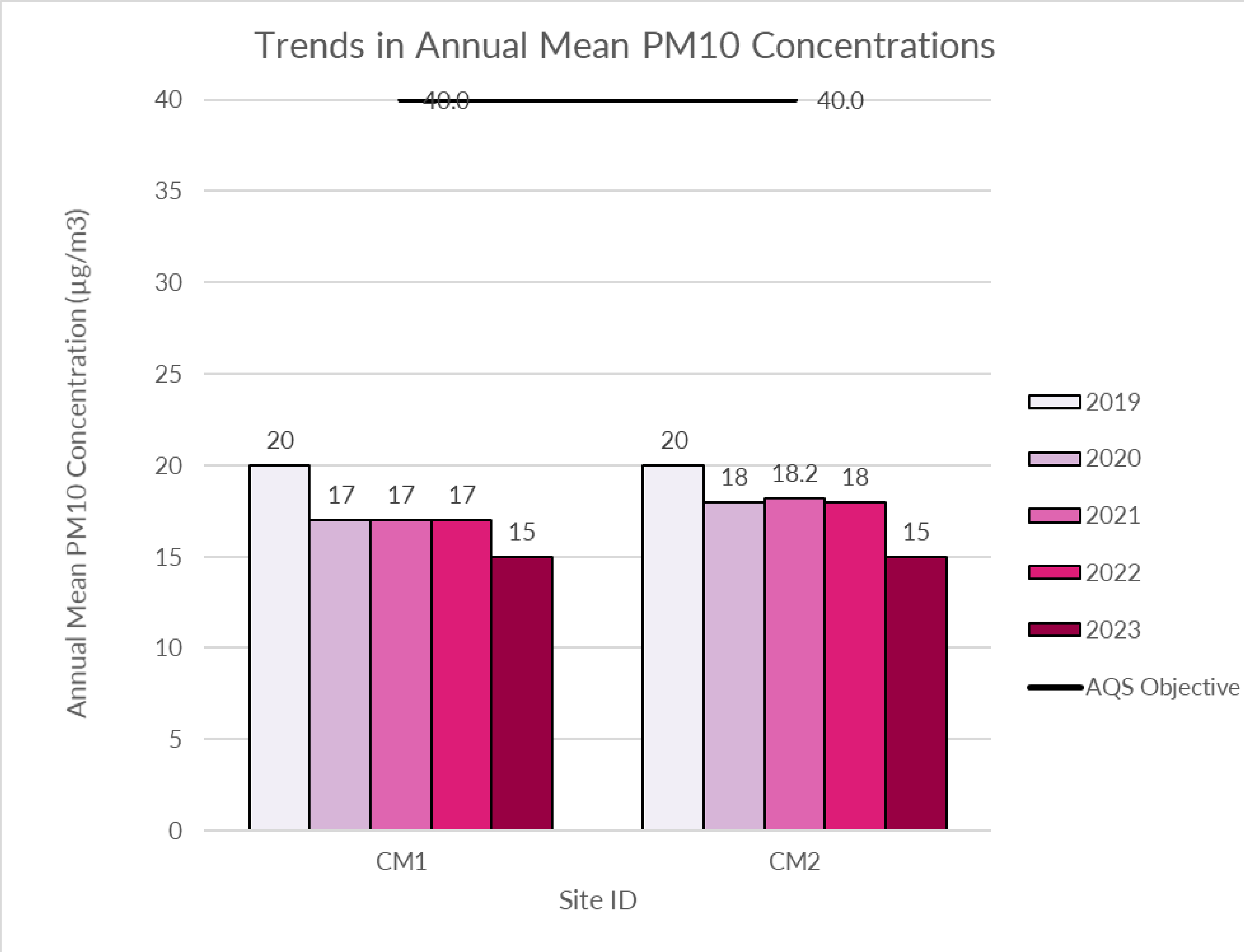


Table A.7 – 24-Hour Mean PM10 Monitoring Results, Number of PM10 24-Hour Means > 50µg/m3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
CM1	553603	156774	Urban Background	84	84	9	3	2	2	0
CM2	553044	156690	Roadside	85	85	8	4	2	3	0

Notes:

Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m3 have been recorded.

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

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

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

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

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

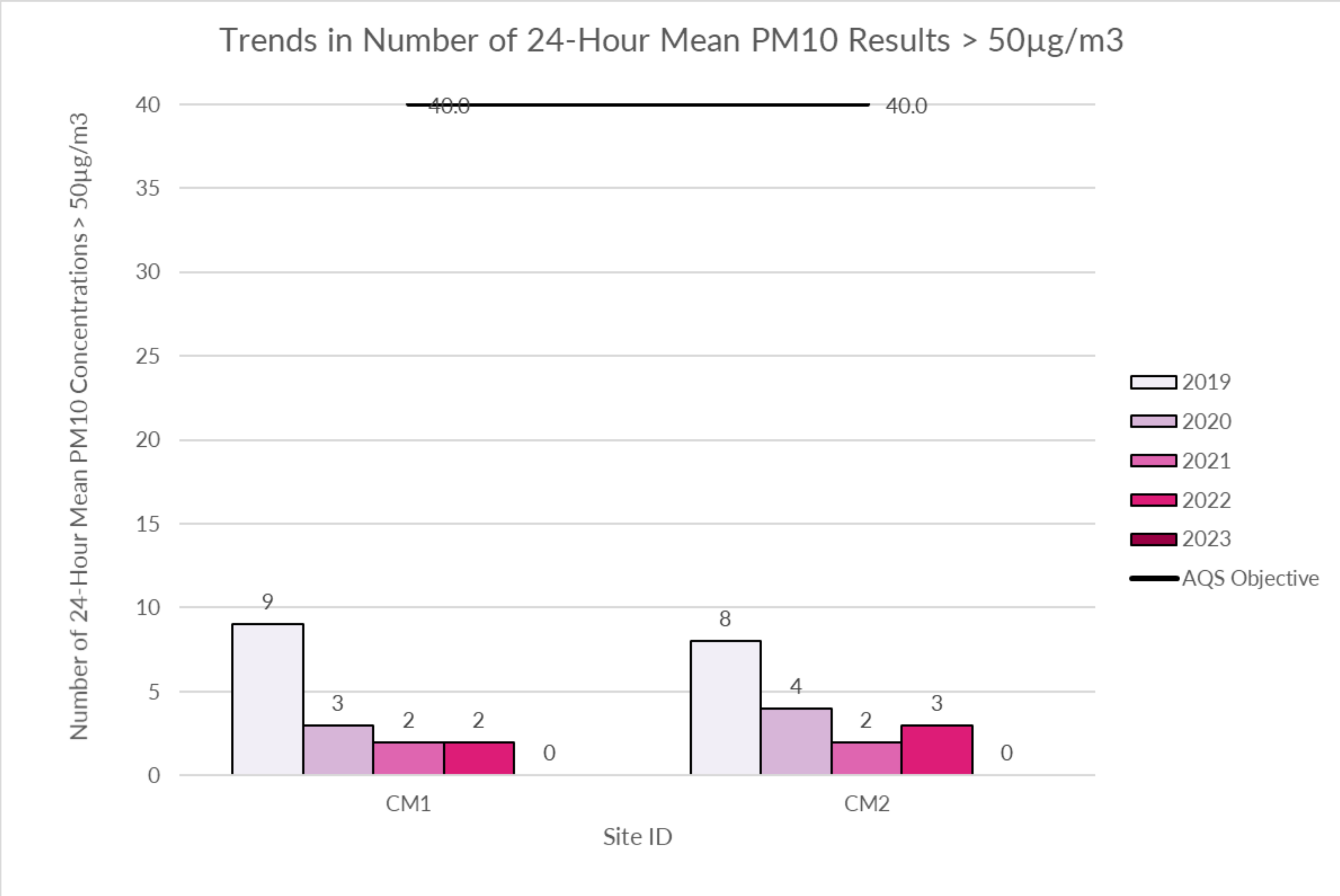


Table A.8 – Annual Mean PM2.5 Monitoring Results (µg/m3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
CM1	553603	156774	Urban Background	84	84	14	11.9	12.1	11.5	10.3
CM2	553044	156690	Roadside	85	85	14	12.6	12.5	11.6	9.1

☒ Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.

Notes:

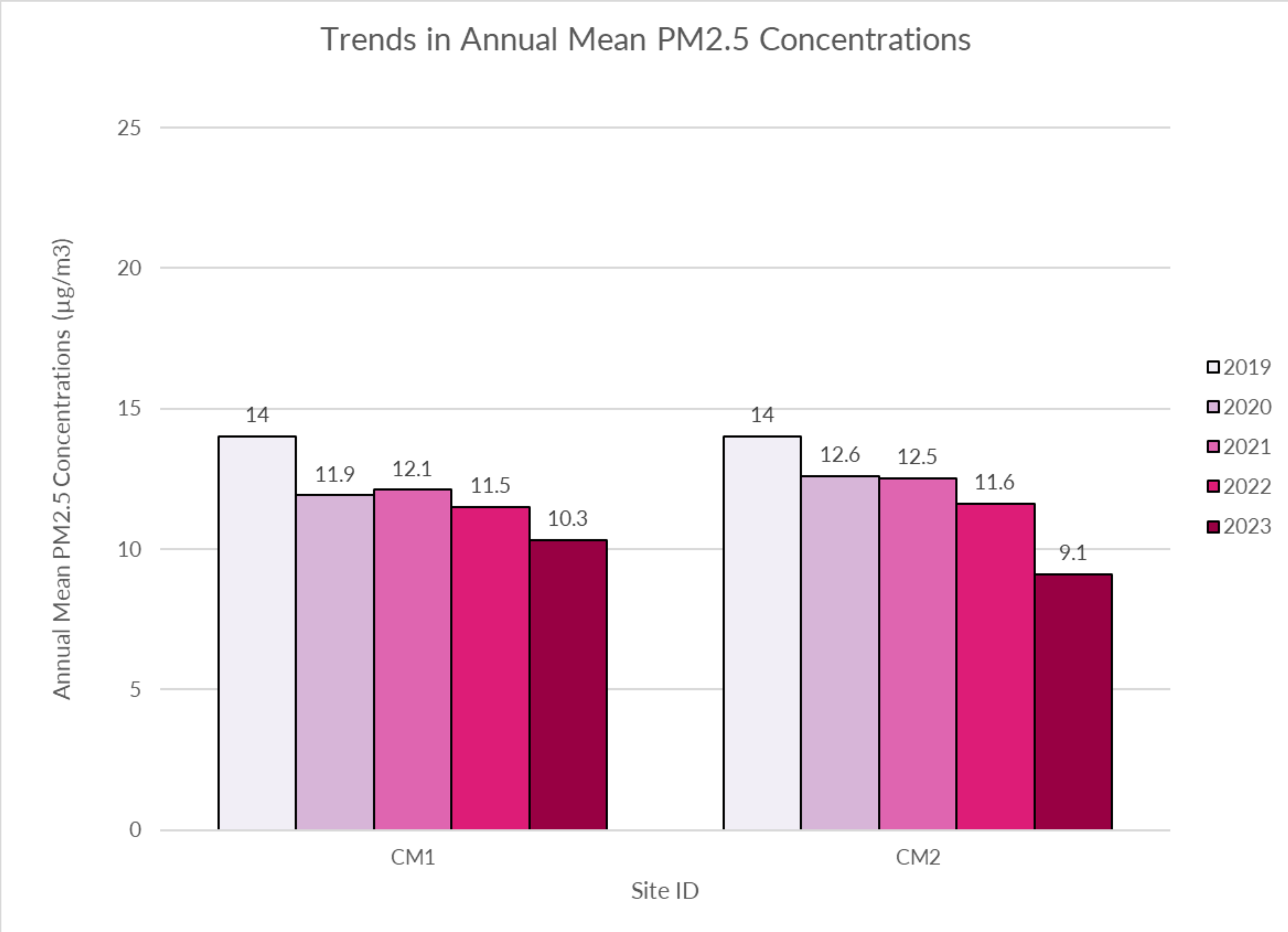
The annual mean concentrations are presented as µg/m3.

All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

Figure A.7 – Trends in Annual Mean PM2.5 Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2023

Table B.1 – NO2 2023 Diffusion Tube Results (µg/m3)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted <(0.77)>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DT02	553157	154416	44.6	47.9	35.2	33.6	32.7	34.2	25.0	31.4	38.7	39.7	39.3	26.2	35.7	27.5		
DT03	552465	154165	13.4	11.6	8.3	6.6	7.8	7.1	5.4	7.4	6.6	8.4	9.0	4.2	8.0	6.1		
DT05	551414	156196	41.9	40.3	34.1	36.5	29.7	28.7	28.2	30.6	35.9	38.4	37.6	23.8	33.8	26.0		
DT06	551442	156159	33.4	41.6	35.2	39.5	41.4	38.3	23.6	31.3		31.3	23.8	21.8	32.8	25.3		
DT07	555096	156692	35.2	41.0	36.8	32.6	26.5	26.4	28.5	28.5	38.1	38.1	39.5	23.9	32.9	25.4		
DT08	554991	156728	28.6	26.0		19.8	19.1	18.7	14.9	18.2	18.5	21.2	26.2	13.7	20.4	15.7		
DT12	546813	155850	41.0	40.5	24.1	28.2	34.0	30.1	19.2	9.8		25.3	36.0	20.1	28.0	21.6		
DT13	552510	167704	31.5	32.4	21.4	27.4	24.2	22.9	15.2	20.9	23.3	25.7	28.6	15.4	24.1	18.5		
DT14	553107	167868	33.3	32.2	16.9	18.0	17.1	19.1	19.1	21.0	23.6	25.1	26.9	17.5	22.5	17.3		
DT23	553050	156625	21.4	39.2	15.0	35.5	33.6	33.1	30.3	29.1		33.9	35.2	20.6	29.7	22.9		
DT24	544418	153918	31.2	29.5	22.0	29.6	29.8	28.0	19.5	28.1		30.6	27.1		27.5	21.2		
DT25	544638	154041	35.1	38.1		36.9	36.0		23.1	30.3	32.0	34.9	34.9	18.8	32.0	24.6		
DT26	554218	167252	41.5	41.8		33.2	27.4	29.2	25.1	29.7	34.6	32.6	30.6	23.5	31.7	24.4		
DT27	553138	154260	34.5	35.7	25.7	22.9	25.9	22.8	24.2	21.8	27.8	28.9	28.9	18.0	26.4	20.3		
DT28	553044	154889	35.8	35.8	19.8	24.2	25.4	24.8	19.4	23.4	29.5	32.6	36.8	21.1	27.4	21.1		
DT29	553073	155030	35.4	29.2	19.2	18.8	17.1	19.8	15.0	18.7	20.3	19.9	28.7	16.7	21.6	16.6		
DT30	553019	156692	36.1	32.7	22.0	30.9	27.7	30.0	24.4	24.3	32.1	32.2	30.6	21.3	28.7	22.1		
DT31	553165	156686	53.5	51.9	33.9	36.3	36.2	39.0	33.8	36.2	41.7	46.3	52.0	31.0	41.0	31.6		
DT32	553147	156563	43.1	49.9	35.5	38.6	40.0	36.4	25.8	35.7	39.9	38.9	42.9	22.9	37.5	28.8		
DT33	555069	156709	39.1	30.0	31.2	36.1	35.4	35.9	24.3	30.5	34.2	31.9	36.6		33.2	25.6		
DT34	544802	154895	26.9	28.6	18.2	21.2	21.0	21.6	12.3	18.4	21.1	20.3	25.9	14.5	20.8	16.0		
DT35	554092	156797	34.3	35.4	16.8	28.0	28.0	34.5	27.6	31.5	36.5	27.3	35.0	22.7	29.8	22.9		
DT36	544598	154021	14.8	42.8		33.6	28.2	29.8	28.1	33.1	35.9		30.9	28.5	30.6	23.5		
DT39	551492	168695	31.7	34.7	23.7	31.4	31.6	31.4	21.0	26.1	30.5	31.6	24.0		28.9	22.2		
DT40	551579	168507	40.4	47.0	27.5	44.8	43.1	39.4	23.9	35.8	35.3	38.6	<0.5	61.7	39.8	30.6		
DT41	552175	168162	78.2	<0.7	26.6	33.1	28.5	26.4	22.1	25.8	33.3	37.1	36.9	23.9	33.8	26.0		
DT42	551383	156064	49.6	49.3	42.0	40.8	36.9	42.1	35.4	39.7	47.3	46.9	62.8	37.0	44.2	34.0		
DT43	551315	156381	35.3	35.5	30.1	24.6	21.5	21.1	20.2	24.0	29.8	31.3	20.8	18.8	26.1	20.1		
DT48	552867	154858	23.0	25.4	15.2		14.0	14.8	12.6	14.2	18.0	20.6	19.1		17.7	13.6		

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted <(0.77)>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DT49	553018	154655	25.8	25.6	21.5	21.4	19.2	19.2	11.1	20.1	19.3	19.1	26.3	13.0	20.1	15.5		
DT51	552761	155050	25.1	29.1	8.8	18.7	20.9	17.8	11.5	16.4	17.1	20.0	24.3	13.0	18.6	14.3		
DT52	552504	155271	29.8	32.2	22.2	27.0	26.3	26.3	17.5	21.5	29.1	27.3	27.7	15.8	25.2	19.4		
DT54	551224	156975	39.5	36.5	23.9	24.3	20.8	21.4	22.6	24.5	27.0	30.6	31.8	20.6	27.0	20.8		
DT71	548239	155355	33.1	26.6	15.4	21.3	20.8	19.2	19.9	20.2	21.2	27.0	27.9	17.1	22.5	17.3		
DT74	550768	155584	32.4	31.5	27.0	21.5	19.2	22.8	18.8	20.5	34.6	31.2	32.1	17.7	25.8	19.8		
DT76	551019	155714	38.4	37.5	22.1	27.8	32.0		25.9	28.3	32.0	32.0	25.9	22.2	29.5	22.7		
DT77	551528	155967	30.7	36.6	30.7	28.5	32.8	34.1	23.2	27.7	31.1	34.2	33.9	19.4	30.2	23.3		
DT81	553419	167614	31.8	31.4		7.6	15.5	17.8	20.7	21.3	13.3				19.9	15.6		
DT83	550298	169627	55.5	28.2	29.3	32.5	27.4	31.8	34.2	34.2	36.4	38.6	34.7	30.3	34.4	26.5		
DT84	546803	154999	28.1	30.3	16.3	22.5	22.3	23.8	20.3	22.1	27.9	26.6	28.4	15.4	23.7	18.2		
DT85	547094	155099	43.3	41.4	27.3		30.9	26.8	25.8	27.2	32.1	34.8	36.9	21.0	31.6	24.3		
DT86	550306	155595	28.8	36.1	21.0	24.7	19.4	20.9	20.0	22.5	23.6	25.3	32.2	21.1	24.6	19.0		
DT87	551639	156334	50.6	51.7	33.2	38.2	34.4	38.4	34.3	38.4	27.9	43.2	47.0		39.8	30.6		
DT88	552950	156578	28.6	27.8	21.7	24.1	22.5	21.6	18.3	22.3	23.5	25.0		14.9	22.8	17.5		
DT90	553053	154708	31.0	34.8	14.8	27.7	23.3	24.2	15.4	22.8	28.0	28.2	34.5	15.5	25.0	19.3		
DT93	550284	169743	28.0	28.1	18.6	19.3	20.5	19.2	13.4	18.4	18.1	16.6	22.1	13.1	19.6	15.1		
DT94	550249	169573	33.0	30.9	18.7	15.2	20.4	24.6	16.0	22.9	23.2	26.9	7.8	13.6	21.1	16.2		
DT95	550351	169490	36.8	35.3	16.7	24.2	26.6	26.1	17.4	24.7	27.9	25.4	35.5	16.4	26.1	20.1		
DT96	552371	155346	33.9	29.4	27.4	25.1	21.1	21.4	22.0	22.0	28.6	31.8	30.8	24.6	26.5	20.4		
DT97	550555	168253	25.1	24.8	19.2	15.4	14.9	14.6	13.5	17.2	18.5	20.1	23.1	12.3	18.2	14.0		
DT98	550962	157662	32.2	34.8	28.1	23.6	21.7	25.0	20.9	23.4	26.3	27.7	30.1	18.5	26.0	20.0		
DT99	553104	156676	50.1	55.2	42.0	44.9	45.4	44.3	34.6	39.5	46.4	44.5	47.9	30.8	43.8	33.7		
BC01,	553607	156776	17.6	16.1	11.1	10.0	9.5	8.0	8.0	10.7	10.0	14.0	19.4	8.5	11.9	9.2		
BC02,	553045	156690	17.6	16.3	11.7	9.9	8.5	8.9	7.9	9.0	11.1	13.8	17.1	10.3	11.8	9.1		
BC03	553157	154416	18.8	16.4	9.9	9.9	8.9	8.4	8.1	9.3	9.6	13.0	17.7	8.4	11.5	8.9		
BC04,	552465	154165	28.6	27.0	19.3	16.8	15.9	15.8	13.6	19.2	21.2	24.1	32.2	17.3	20.9	16.1		
BC05,	551414	156196	29.1	23.3	23.0	21.2	16.3	18.2	20.2	20.2	22.2	26.0	23.4	18.0	21.8	16.8		
BC06	551442	156159	19.2	29.2	22.7	20.7	17.1	14.8	19.3	20.6	23.7	27.7	30.2	18.2	22.0	16.9		

☒ All erroneous data has been removed from the NO2 diffusion tube dataset presented in Table B.1.

☒ Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.

☐ Local bias adjustment factor used.

☒ National bias adjustment factor used.

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

☒ Sevenoaks District Council confirm that all 2023 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m3 are shown in bold.

NO_2 annual means exceeding 60µg/m3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in bold and underlined.

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within Sevenoaks District Council During 2023

Sevenoaks District Council have identified five proposed developments as potentially having an impact on air quality within the district. These are:

- Development of Sevenoaks Quarry; including 800 residential dwellings, 150 residential institutional units, business, retail, leisure and sports uses, as well as a new primary school.
- Development of a Lidl store including a new roundabout at the Broomhill site in Swanley.
- Development of a new roundabout at Bat & Ball, which will include replacing existing junction and requiring the removal of the automatic monitoring station.
- A proposed residential development at Bevan Place, Swanley, located at an area identified as a street canyon.
- A proposed development of social housing flats at the Bat & Ball junction, near Seal.

Additional Air Quality Works Undertaken by Sevenoaks District Council During 2023

Within 2023, Sevenoaks District Council undertook a technical assessment of the existing Air Quality Management Areas in Swanley, which was completed by Bureau Veritas. This report means Measure 23 of the AQAP 2022-2027 (Complete a detailed modelling assessment of the Swanley Area to quantify the local air quality) has been completed.

The key findings included:

- The model predicted no exceedances of Air Quality Objectives outside of the existing AQMA boundaries. Therefore, there is no need/ requirement to extend the existing AQMAs.
- The model did predict likely exceedances of the annual NO2 objective level along the High Street, near to the junction of Bevan Place (AQMA 8). Development in this area has already created a partial street canyon and additional monitoring is required to establish if this will result in a deterioration of air quality for residents over the next few years.

- Source apportionment indicates that in AQMA 8, diesel cars account for 34.5% of emissions, diesel LGVs 21.5%, HGVs 19.6% and petrol cars 6.9%. Background emissions account for 16.3% with bus, coaches and motorcycles accounting for the remaining 1.3%
- The model did not predict the effect of the proposed Bevan Place development. However, depending on the nature and scale of this building a longer street canyon may be created, impacting further on existing air quality standards.
- The model and monitoring data predicts exceedances of the Air Quality Objectives for NO2 at the Junction of Birchwood Road and London Road (AQMA 14). This AQMA will therefore be retained and as per the report recommendations, we will consider deploying additional monitoring in this area.
- Source apportionment indicates that within AQMA 14, diesel cars account for 30.6% of emissions, diesel LGVs 20.8%, HGVs 15.7% and petrol cars 5.3%. Background emissions account for 26.7 % with bus, coaches and motorcycles accounting for the remaining 0.9%.

A copy of this Assessment can be found in Appendix F.

Additionally, within 2023, Sevenoaks District Council also completed a technical study into future EV demand within Sevenoaks District. Which was completed by Field Dynamics. This report means Measure 15 of the AQAP 2022-2027 (improving and developing infrastructure for Electrical Vehicles within the district) has been significantly progressed towards further implementation.

The primary aims for this study were:

a) Identification of future EV ownership within Sevenoaks District
b) Identification of future residential demand for public charging (with consideration of a property owner/ occupiers' ability to install a private EV charger (on their driveway)
c) Creation of demand zones- to allow prioritisation of future infrastructure/ funding and resources.
d) Modelled impact of public EV chargers (those already installed and those proposed).

A copy of this Assessment can be found in Appendix G.

QA/QC of Diffusion Tube Monitoring

Sevenoaks District Council's diffusion tubes were supplied and analysed by SOCOTEC Didcot during 2023, using the 50% Triethanolamine (TEA) in acetone preparation method. SOCOTEC's laboratory is UKAS accredited, participating in the AIR-PT Scheme (a continuation of the Workplace Analysis Scheme for Proficiency (WASP)) for NO2 tube analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO2 concentrations reported are of a high calibre. The lab follows the procedures set out in the Harmonisation Practical Guidance.

In the latest available AIR-PT results, AIR-PT results, AIR PT AR059 (Sept - Dec 2023), SOCOTEC scored 100%. For 2023 SOCOTEC scored 100% for all rounds. The percentage score reflects the results deemed to be satisfactory based upon the z-score of < ± 2. 20 of the 23 local authority co-location studies which use tubes supplied by SOCOTEC

Didcot with the 50% TEA in acetone preparation method in 2022 had an overall rating of 'good', with all 12 months being rated as 'good', as shown by the precision summary results. 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.

Tubes are considered to have a "good" precision where the coefficient of variation of triplicate diffusion tubes is less than 20% is any given month, and less than 10% when averaged for the year.

Monitoring in 2023 had been completed in adherence with the 2023 Diffusion Tube Monitoring Calendar, whereby all changeovers were completed within ±2 days of the specified date.

Diffusion Tube Annualisation

Annualisation is necessary for any site with data capture between 25% and 75%. Consequently, annualisation was performed for one diffusion tube monitoring site. This was DT81, which is located in Farningham Hill Road, Swanley and had a data capture of 67% for 2023.

The two nearest continuous monitoring background locations were:

- Greatness Park, Sevenoaks (CM1)

- Bat and Ball, Sevenoaks (CM2)

These sites were chosen for annualisation because both have a data capture exceeding 85% and are suitable for this purpose.

Table C.1 – Annualisation Summary (concentrations presented in µg/m3)

Site ID	Annualisation Factor Bat and Ball	Annualisation Factor Greatness	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
DT81	1.0389	0.9927	1.0158	19.9	20.2

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2023 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG22 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NOx/NO2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Sevenoaks District Council have applied a national bias adjustment factor of 0.77 to the 2023 monitoring data. This has been taken from the 03/24 version of the national spreadsheet, which included a total of 28 studies for this factor.

A summary of bias adjustment factors used by Sevenoaks District Council over the past five years is presented in Table C.2.

Figure C.1 – National Diffusion Tube Bias Adjustment Factor Spreadsheet - Partial Image

National Diffusion Tube Bias Adjustment Factor Spreadsheet

Spreadsheet Version Number: 03/24

Follow the steps below **in the correct order** to show the results of **relevant** co-location studies

Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods

Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet

This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of June 2024

LAQM Helpdesk Website

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

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

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List. If a laboratory is not shown, we have no data for this laboratory.

Step 2: Select a Preparation Method from the Drop-Down List. If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down List. If a year is not shown, we have no data[2]

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

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

Analysed By[1]	Method (To undo your selection, choose (All) from the pop-up list)	Year[5] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision[6]	Bias Adjustment Factor (A) (Cm/Dm)
SOCOTEC Didcot	50% TEA in acetone	2023	KS	Marylebone Road intercomparison	11	53	38	41.4%	G	0.71
SOCOTEC Didcot	50% TEA in acetone	2023	R	Vale Of White Horse District Council	10	22	18	21.2%	G	0.83
SOCOTEC Didcot	50% TEA in acetone	2023	UB	Wirral Council	11	15	13	16.7%	G	0.86
SOCOTEC Didcot	50% TEA in acetone	2023		Overall Factor[3] (28 studies)				Use		0.77

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2023	National	03/24	0.77
2022	National	03/23	0.76
2021	National	03/22	0.78
2020	Local	-	0.78
2019	National	06/20	0.75

NO2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO2 concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO2 concentrations corrected for distance are presented in Table B.1.

No diffusion tube NO2 monitoring locations within Sevenoaks District Council required distance correction during 2023.

QA/QC of Automatic Monitoring

Data management and local site operator (LSO) duties for both the automatic monitoring locations within Sevenoaks are carried out by the Environmental Research Group at Imperial College London. As part of this, routine calibrations of instruments are carried out every two weeks.

The data presented within the ASR for the 2023 monitoring year is fully ratified, and both live and historic data is available through the LAQN website.

PM10 and PM2.5 Monitoring Adjustment

The TEOM PM10 analysers utilised at both Greatness Park and Bat & Ball have been converted to reference equivalence using the volatile correction method. This is carried out by the data managers prior to being presented on the LAQN website.

Automatic Monitoring Annualisation

All automatic monitoring locations within Sevenoaks District Council recorded data capture of greater than 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

NO2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO2 concentration at the nearest location relevant for exposure has been estimated using the NO2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, automatic annual mean NO2 concentrations corrected for distance are presented in Table A.3.

No automatic NO2 monitoring locations within Sevenoaks District Council required distance correction during 2023.

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

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

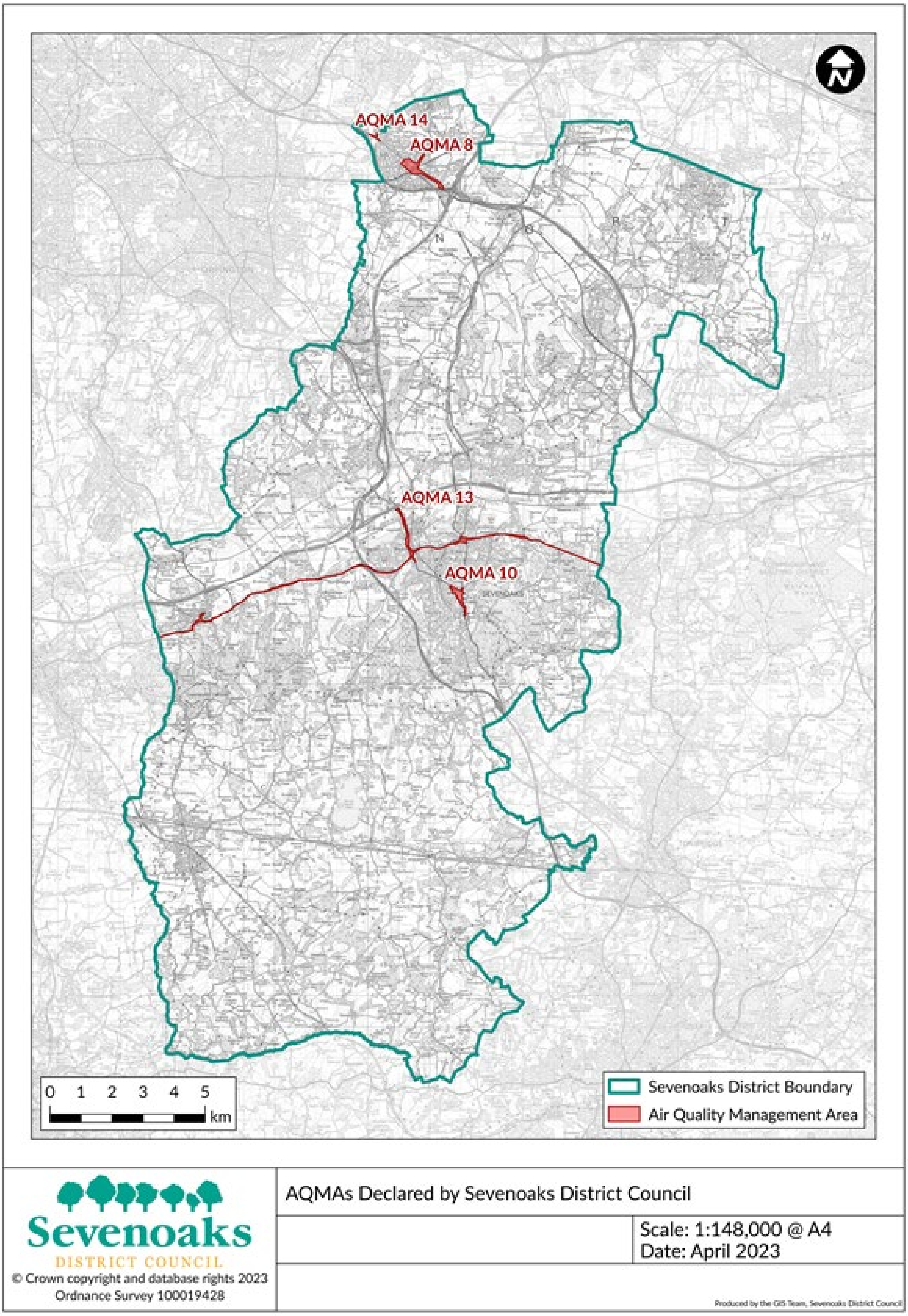
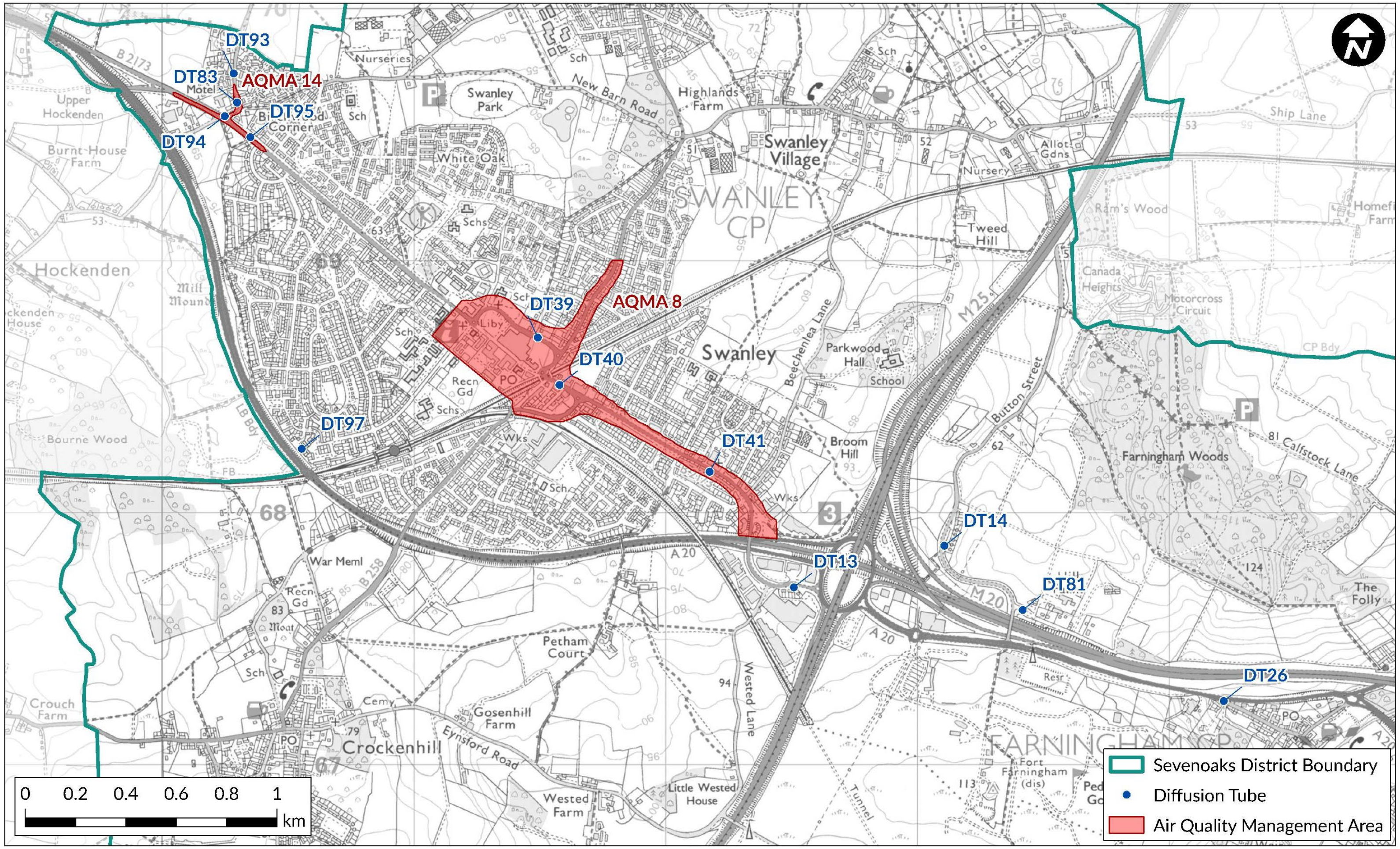


Figure D.2 – Map of Monitoring Locations and AQMAs near Swanley



Monitoring Locations and AQMAs near Swanley

Scale: 1:20,000 @ A4
Date: April 2023

Sevenoaks District Council

Produced by the GIS Team, Sevenoaks District Council

Figure D.3 – Map of Monitoring Locations and AQMAs near Sevenoaks

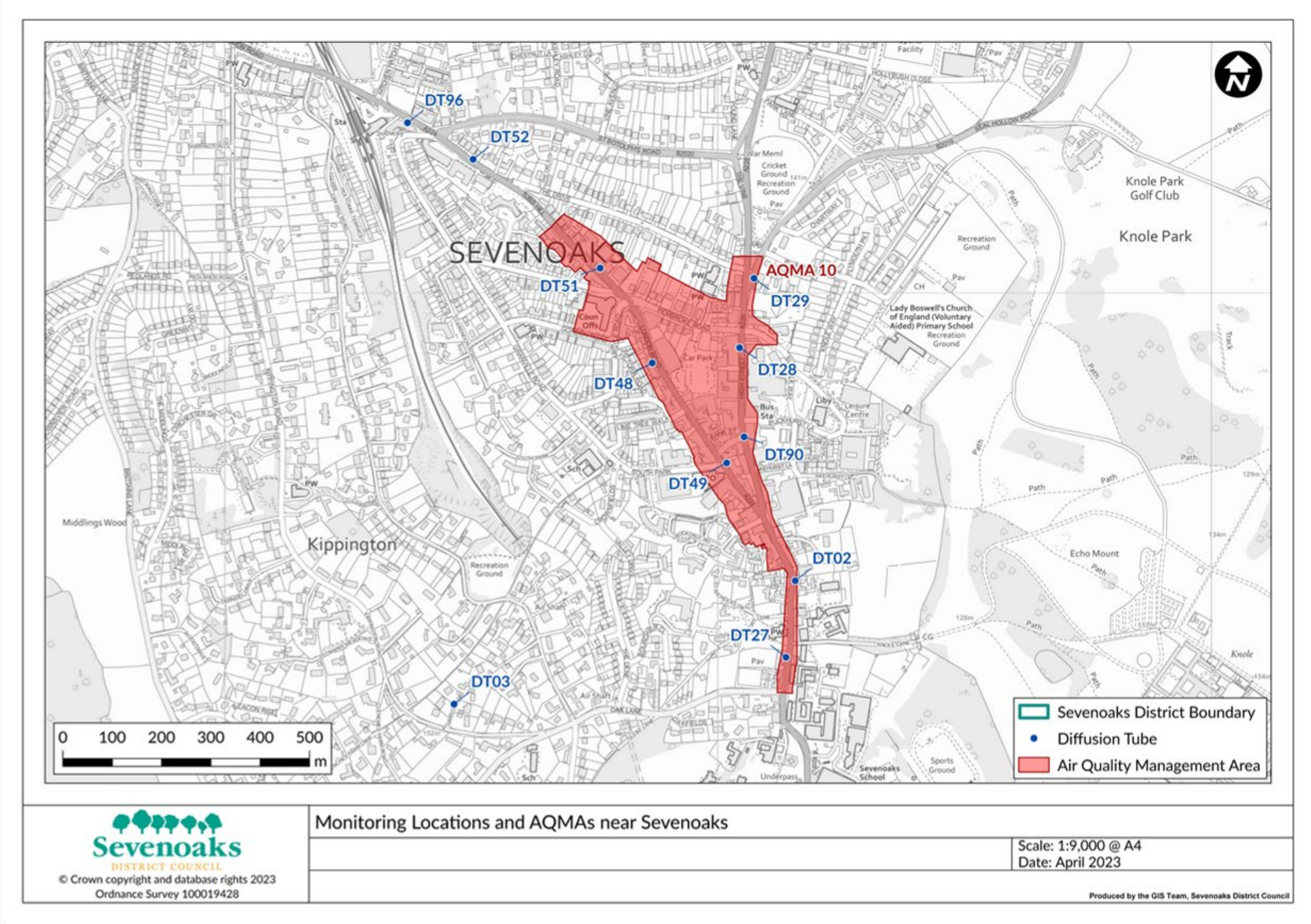
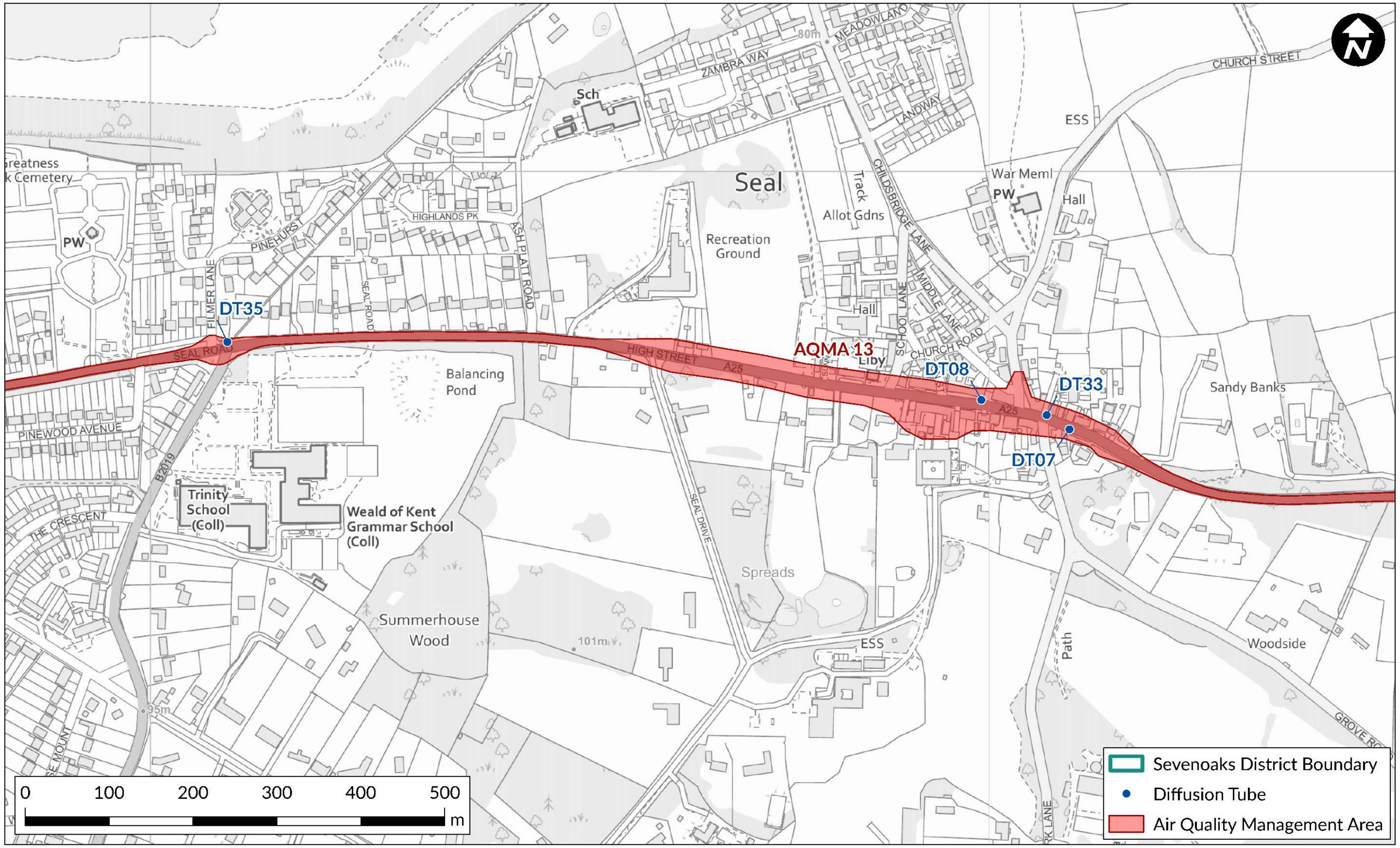


Figure D.4 – Map of Monitoring Locations and AQMAs near Seal



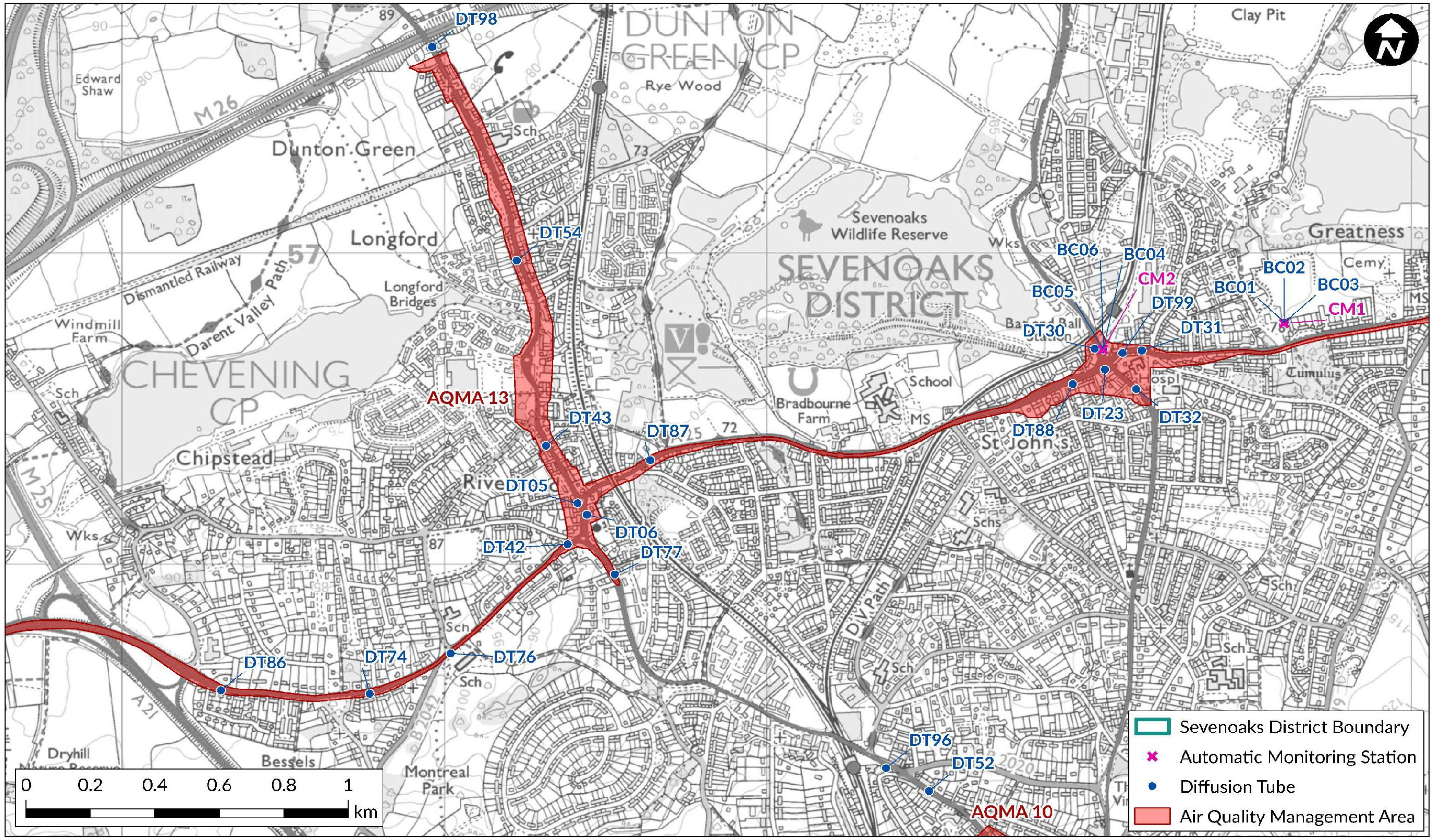
Sevenoaks District Council

Monitoring Locations and AQMAs near Seal

Scale: 1:6,000 @ A4
Date: April 2023

Produced by the GIS Team, Sevenoaks District Council

Figure D.5 – Map of Monitoring Locations and AQMAs near Riverhead and Bat & Ball



Sevenoaks District Council

Monitoring Locations and AQMAs near Riverhead and Bat & Ball

Scale: 1:16,000 @ A4
Date: May 2023

Produced by the GIS Team, Sevenoaks District Council

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[7]

Pollutant	Air Quality Objective: Concentration	Air Quality Objective: Measured as
Nitrogen Dioxide (NO2)	200µg/m3 not to be exceeded more than 18 times a year	1-hour mean
Nitrogen Dioxide (NO2)	40µg/m3	Annual mean
Particulate Matter (PM10)	50µg/m3, not to be exceeded more than 35 times a year	24-hour mean
Particulate Matter (PM10)	40µg/m3	Annual mean
Sulphur Dioxide (SO2)	350µg/m3, not to be exceeded more than 24 times a year	1-hour mean
Sulphur Dioxide (SO2)	125µg/m3, not to be exceeded more than 3 times a year	24-hour mean
Sulphur Dioxide (SO2)	266µg/m3, not to be exceeded more than 35 times a year	15-minute mean

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

Appendix F: Swanley Air Quality Management Area Assessment

Sevenoaks District Council
Detailed Assessment of Swanley AQMAs

November 2022

Move Forward with Confidence

BUREAU VERITAS

THIS PAGE IS LEFT BLANK INTENTIONALLY

Document Control Sheet

Identification	
Client	Sevenoaks District Council
Document Title	Detailed Assessment of Swanley AQMAs
Bureau Veritas Ref No.	AIR15072141

Contact Details		
Company Name	Bureau Veritas UK Limited	Sevenoaks District Council
Contact Name	Hannah Broomfield-Payne	Nick Chapman
Position	Principal Air Quality Consultant	Environmental Health Manager
Address	5th Floor 66 Prescot Street London E1 8HG	Council Offices Argyle Road Sevenoaks Kent TN13 1HG
Telephone	07969 050370	01732 227167
e-mail	hannah.broomfield-payne@bureauveritas.com	Nick.chapman@sevenoaks.gov.uk
Websites	https://www.bureauveritas.co.uk/	https://www.dartford.gov.uk/

Configuration				
Version	**Date**	**Author**	**Reason for Issue/Summary of Changes**	**Status**
1.0	14/11/2022	A Smith	Initial draft for client comment	Draft

	Name	Job Title	Signature
Prepared By	A Smith	Consultant	
Approved By	H Broomfield-Payne	Principal Consultant	

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.

THIS PAGE IS LEFT BLANK INTENTIONALLY

Table of Contents

List of Tables

List of Figures

Executive Summary

Bureau Veritas have been commissioned by Sevenoaks District Council to complete a review of the Council's existing Air Quality Management Areas (AQMAs) within the Swanley Area following the publication of their Air Quality Action Plan (AQAP). The Council currently have two AQMAs within Swanley, both have been declared in relation to traffic emissions, designated for exceedances of the NO_2 annual mean Air Quality Strategy objective. The AQAP was developed to asses and improve air quality in the declared AQMAs within Sevenoaks. However, the two AQMAs within Swanley were not assessed due to the lack of available and representative traffic data for use within the detailed assessment, caused by the COVID-19 pandemic. The Council however consider it important to quantify the existing air quality within these AQMAs now that representative traffic data is available.

A dispersion modelling assessment has been completed whereby NO_2 concentrations have been predicted across all relevant areas within and around the Swanley AQMAs at both specific receptor locations, and across a number of gridded areas to allow the production of concentration isopleths. This has been used to supplement local monitoring data to provide a clear picture of the pollutant conditions within the borough.

Following the completion of the analysis of both monitoring data and modelled concentrations across all of the assessed areas a number of recommendations have been made in terms of the AQMAs within Swanley:

- **AQMA No.8 Swanley Town Centre** – Exceedances have been predicted by the model along the High Street, near to the junction of Bevan Place. It is believed that residential receptors are located here at 1st floor level. A small two-sided street canyon has been modelled in this area, as identified by a development taking place shown in Google Streetview. Monitoring carried out over the past 5 years have indicated exceedances, however once distance correction has been carried out it is predicted that there are no exceedances at the ground level façade. The Council should continue monitoring, deploying additional monitoring as close to any existing residential receptors as possible. If exceedances continue to be identified, then measures should be implemented to reduce NO_2 concentrations, however if no exceedances occur in future years then this AQMA can be revoked.

- **AQMA No.14 Junction of Birchwood Road and London Road** – The model has predicted concentrations within 10% of the AQS objective at one location. The model is shown to be under predicting in this area by up to 10.8%, and therefore caution should be taken. Monitoring carried out within this AQMA has reported exceedances over the past 5 years, and when distance correction has been carried out, exceedances continue to be predicted at the nearest relevant exposure. The Council should therefore retain this AQMA and consider deploying additional monitoring at relevant exposure in order to confirm these predictions. The Council should also consider updating the AQAP to include measures which focus on reducing emissions from Diesel Cars and LGVs, and to reduce congestion at this junction, in order to further reduce NO_2 concentrations.

- No amendments to either of the AQMA boundaries is required based on the modelling conducted, as no exceedances were identified outside of the existing boundaries.

1 Introduction

Bureau Veritas was originally commissioned by Sevenoaks District Council (the Council) to complete a detailed assessment in order to review the designation of the Council's nine Air Quality Management Areas (AQMAs) in 2019 to help inform a new Air Quality Action Plan (AQAP). At the time of the assessment, no traffic data was available for the two AQMAs located within Swanley, and the COVID-19 pandemic meant that traffic surveys carried out would not be representative of typical traffic flows. The assessment therefore focused on the seven remaining AQMAs, and the AQAP was subsequently published in February 2022.

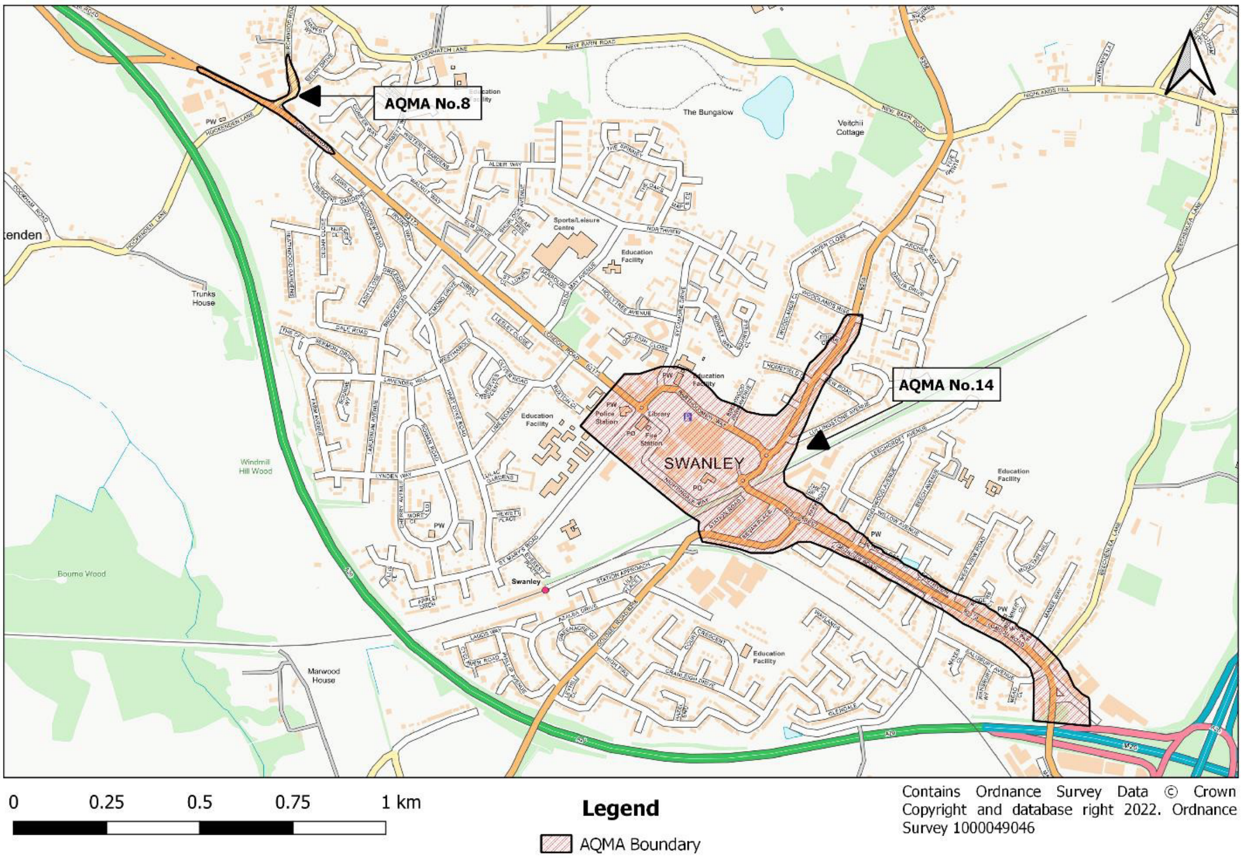
The AQAP details a measure to complete a detailed modelling assessment of the Swanley area to quantify the local air quality, and as such, Bureau Veritas has been commissioned in 2022 to complete the assessment. This utilises traffic survey data which has been collected in 2022.

The Council currently has two declared AQMAs within the Swanley area. Details of the AQMAs included within this assessment are as follows, and maps detailing the locations of the AQMAs are presented in Figure 1.1:

- **AQMA No.8 (Swanley Town Centre)** – An area encompassing Swanley Town Centre, High Street and London Road. Declared in 2006 for exceedances of the annual mean NO_2 Air Quality Strategy (AQS) objective; and

- **AQMA No.14 (Junction of Birchwood and London Roads, Swanley) M25** – Declared in 2014 for exceedances of the annual mean NO_2 AQS objective.

Figure 1.1 – Swanley AQMAs



1.1 Scope of Report

The assessment seeks, with reasonably certainty, to predict the magnitude and geographical extent of any exceedances of the AQS objectives, providing the Council with updated modelling data that can be utilised for the development and/or update to AQAP measures.

The following are the main objectives of this report:

- To assess the air quality at selected locations (receptors) at the façades of locations of relevant exposure, representative of worst-case exposure within, and close to the existing AQMA boundaries, based on modelling of emissions from road traffic on the local road network;
- To determine the geographical extent of any potential exceedance of the annual mean AQS objective for NO_2;
- To determine the relative contributions of various source types to the overall pollutant concentrations through the completion of a source apportionment study; and
- To put forward recommendations as to the extent of any changes to the current AQMA boundary and any changes to the declaration of the specific AQMAs.

The approach adopted in this assessment to assess the impact of road traffic emissions on air quality utilised the atmospheric dispersion model ADMS-Roads, focusing on emissions of oxides of nitrogen (NO_x), which comprise of nitric oxide (NO) and NO_2.

In order to provide consistency with the Council's own work on air quality, the guiding principles for air quality assessments as set out in the latest guidance and tools provided by Defra for air quality assessment (LAQM.TG(22)[1]) have been utilised.

[1] Local Air Quality Management Technical Guidance LAQM.TG(22), August 2022, published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland

2 Assessment Methodology

Atmospheric modelling to predict the pollutant concentrations emitted from road traffic sources was carried out using ADMS Roads version 5.0.0.1, developed by Cambridge Environmental Research Consultants (CERC). The approach used was based upon the following:

- Prediction of NO_2 concentrations to which existing receptors may be exposed to, and a comparison with the relevant AQS objectives;
- Quantification of relative NO_2 contribution of sources to overall NO_2 pollutant concentration; and
- Determination of the geographical extent of any potential exceedances in regards to the existing AQMA boundaries and proposed boundary changes stated in the previous assessment.

Pollutant concentrations have been predicted within a base year of 2019, with model inputs relevant to the assessment based upon the same year, with the exception to traffic data sourced from 2022 traffic surveys. The original assessment for Sevenoaks utilised a 2018 base year as 2019 monitoring data was not available at the time of the assessment. It has therefore been considered appropriate to use 2019 as the latest year where data is available prior to any significant impacts resulting from the COVID-19 pandemic. Motorway sections which are likely to have an influence on NO_x concentrations within the Swanley area have been included, as modelled within the original Sevenoaks model (utilising 2019 DfT traffic count data).

2.1 Traffic Inputs

Traffic flows for the road links included within the model have been sourced from both traffic surveys conducted by Intelligent Data Collection and the DfT traffic count online resource[2].

Independent traffic surveys were conducted at five locations within Swanley to determine traffic flows on the major road links to be modelled. Five automatic traffic counts were deployed, which provided average annual daily traffic (AADT) flows alongside average speeds. In addition to this, one automatic number plate recognition (ANPR) camera was deployed in order to provide a detailed breakdown of vehicle types within the area so that specific euro class splits can be utilised. The proportion of vehicle types identified at the ANPR location was used to inform the proportional vehicle split at the other ATC monitoring locations.

As the traffic surveys were carried out in 2022, a TEMPro reduction factor of 1.0216 has been used to de-growth the data to representative figures for 2019. This factor is specific to the Sevenoaks District, for the years 2019 to 2022. TEMPro (the Trip End Model Presentation Programme) is provided by the DfT and provides forecast data on trips for transport and planning purposes. Whilst it is typically used for forecasting purposes, it can also be used to backcast traffic data where required.

The DfT traffic count data source, utilised for the motorways, provides an AADT flow for the relevant road link in terms of a number of vehicle types; cars, LGVs (light goods vehicles), HGVs (heavy goods vehicles), buses and coaches, and motorcycles. The Emissions Factor Toolkit (EFT) version 9.0[3] default euro class splits for 2019 were utilised on the motorway road sections.

The traffic data used within the dispersion modelling are presented in Appendix A.

It is important to note that some of the traffic data used is based on estimates either from nearby links or estimated from the most recent manual counts. Traffic data, which has been estimated from manual counts that were carried out over 3 years ago, have been highlighted in Appendix A. This may lead to some uncertainty in the accuracy of the traffic data.

Traffic speeds were modelled at the relevant speed limit for each road. However, in accordance with LAQM.TG(22), where appropriate, traffic speeds have been reduced to simulate queues at junctions, traffic lights and other locations where queues or slower traffic are known to occur.

[2] Department for Transport, traffic count data for available road links (2020), available at https://www.gov.uk/government/collections/road-traffic-statistics

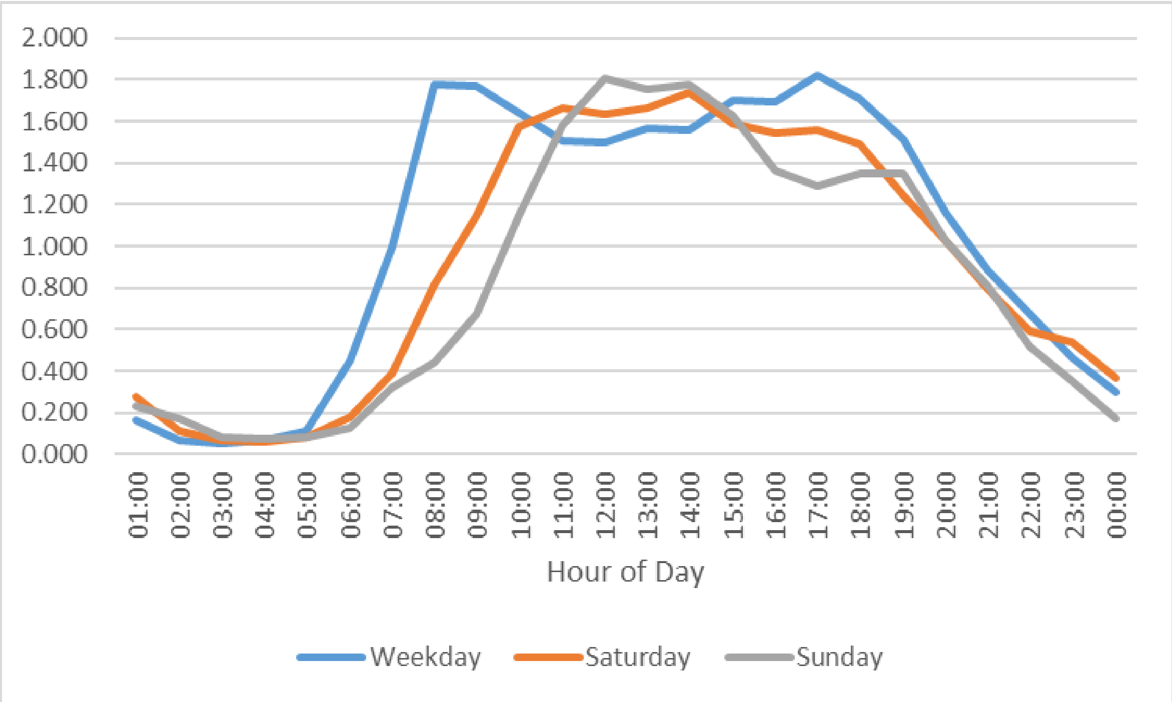
[3] Defra, Emissions Factors Toolkit (2019), available at http://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html

The EFT has been used to determine vehicle emission factors for input into the ADMS-Roads model. The emission factors are based upon the traffic data inputs used within the assessment, with total vehicle flows and proportion of vehicle types taken from the ANPR and existing DfT data. User-defined values for vehicle fleet in terms of vehicle Euro Class has been utilised for road sections within Swanley, however the pre-set national values have been utilised for the motorways in the absence of a vehicle fleet specific information for these. The decision to not use the ANPR based splits for the motorways was due to the motorways being much more likely to have a differing vehicle composition to the roads running through Swanley.

ANPR survey data has also been used to characterise the local diurnal profile of vehicle flows on the roads of interest. These have been included within the ADMS Roads model in the form of an additional model input, which has been applied to allow the temporal variation in emissions throughout the day and across the week to be reflected in the calculated emissions and therefore the predicted concentrations. The diurnal profile was only applied to the roads running through Swanley, as opposed to the motorways, as it is considered likely that the motorways would have a different profile. This however could not be determined as no independent traffic surveys were completed on the motorway sections as part of this assessment, and therefore it was assumed that emissions would remain constant throughout each day of the week.

The diurnal profile utilised is illustrated in Figure 2.1.

Figure 2.1 – Diurnal Profile for Vehicle Emissions Used in the Modelling



2.2 General Model Inputs

A site surface roughness value of 0.5m was entered into the ADMS-roads model, consistent with the suburban nature of the modelled domain. In accordance with CERC's ADMS Roads user guide[4], a minimum Monin-Obukhov Length of 30m will be used for the ADMS Roads model to reflect the urban topography of the model domain.

One year of hourly sequential meteorological data from a representative synoptic station is required by the dispersion model. For the completion of the modelling 2019 meteorological data from the Gatwick airport weather station has been utilised within in this assessment. This particular site has been chosen due to it being the nearest site with a complete data set for 2019 and is representative of an inland suburban area alongside

[4] CERC, ADMS-Roads User Guide Version 5 (2020)

being at a similar elevation to the Sevenoaks District Council area. Gatwick airport was also utilised in the original Sevenoaks model.

A wind rose for this site for the year 2019 is presented in Figure 2.2.

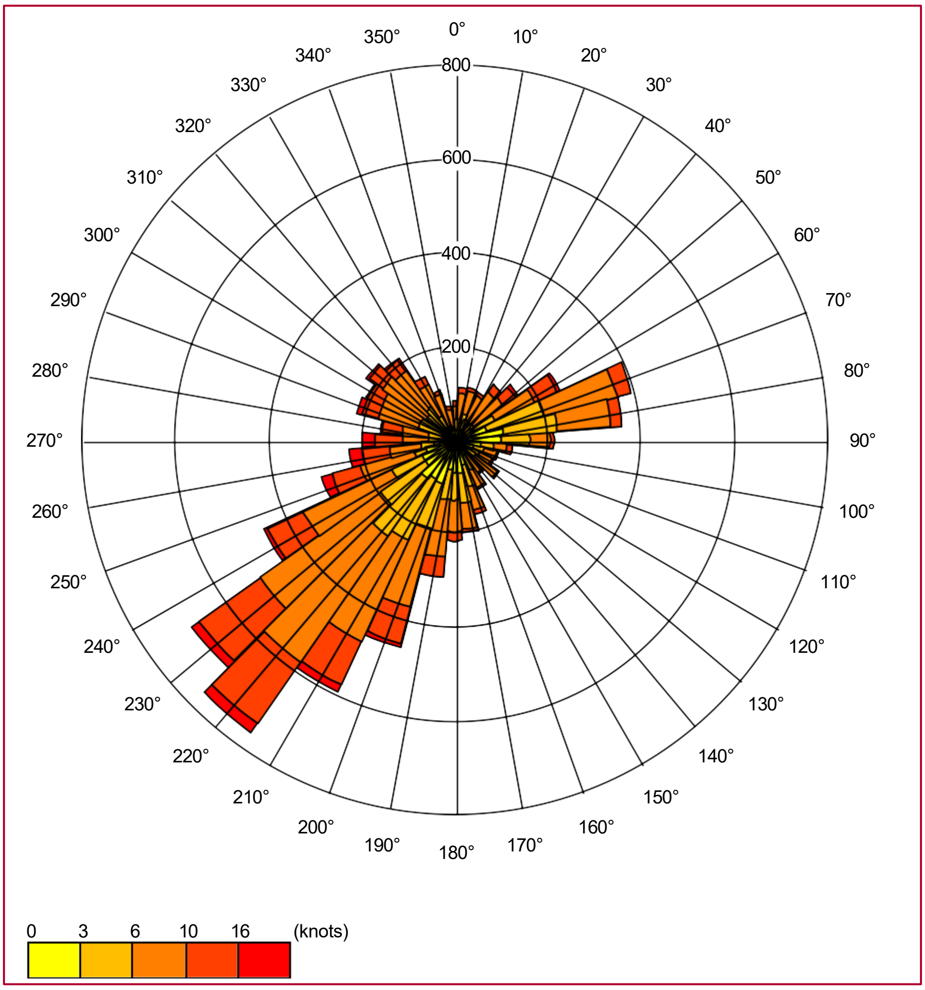


Figure 2.2 – Wind Rose for Gatwick Airport 2019 Meteorological Data

2.3 Emission Sources

A total of 64 road sources were included throughout the model domain. No point sources have been included within the model under the assumption that road traffic is the primary source of the NO_2 emissions. The road links drawn are presented in Figure 2.3. Street canyons were also included along some stretches of road where the roads were surrounded by buildings/walls on both sides. Areas of street canyons are shown in Figure 2.4. These were identified using Google Streetview as part of the desktop study. No variation in the gradient of the road sources was included, and remained at the default 0%, assuming the area is flat.

The roads were drawn along the primary roads within the Swanley area, ensuring to include those running through the AQMAs. These were however restricted due to where available traffic data was located.

Figure 2.3 – Modelled Road Sources

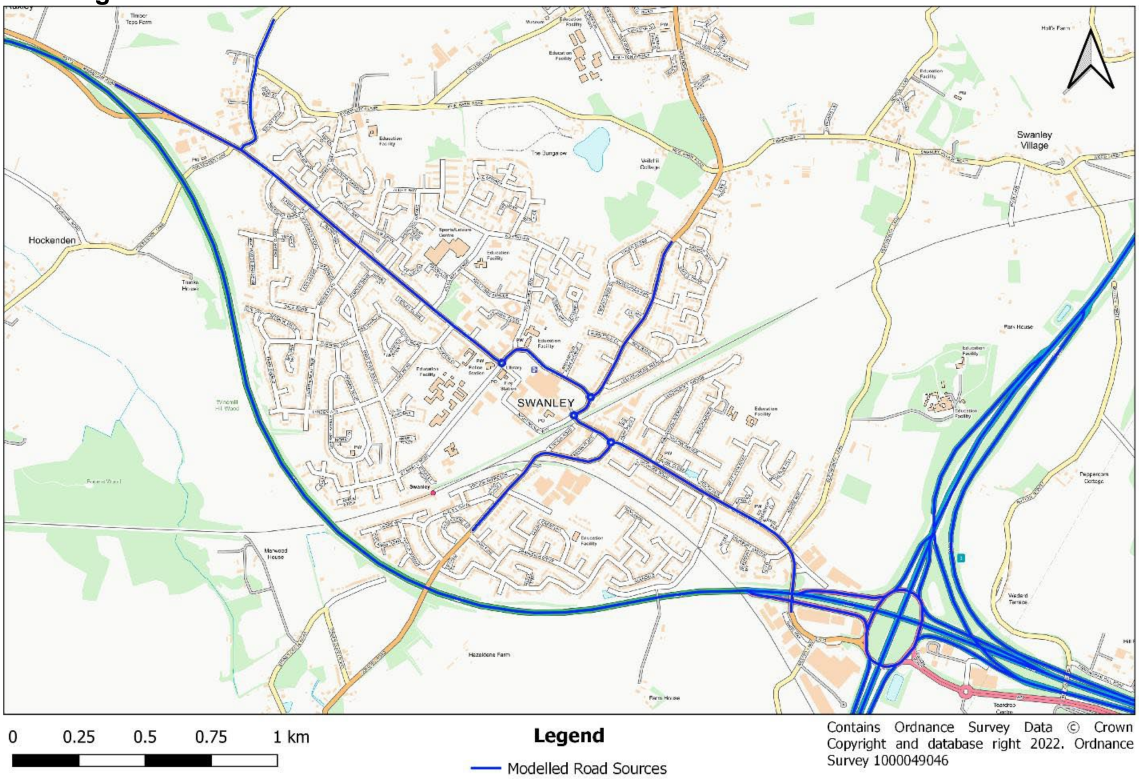
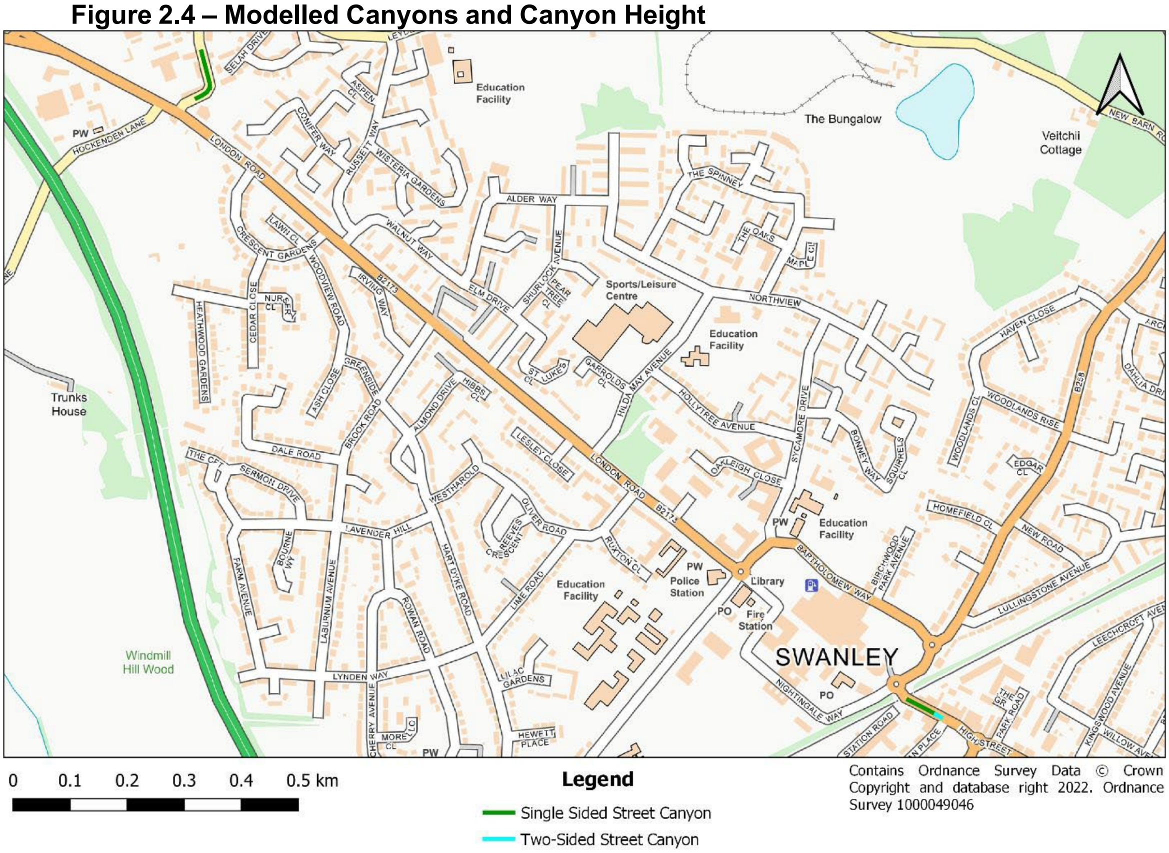


Figure 2.4 – Modelled Canyons and Canyon Height

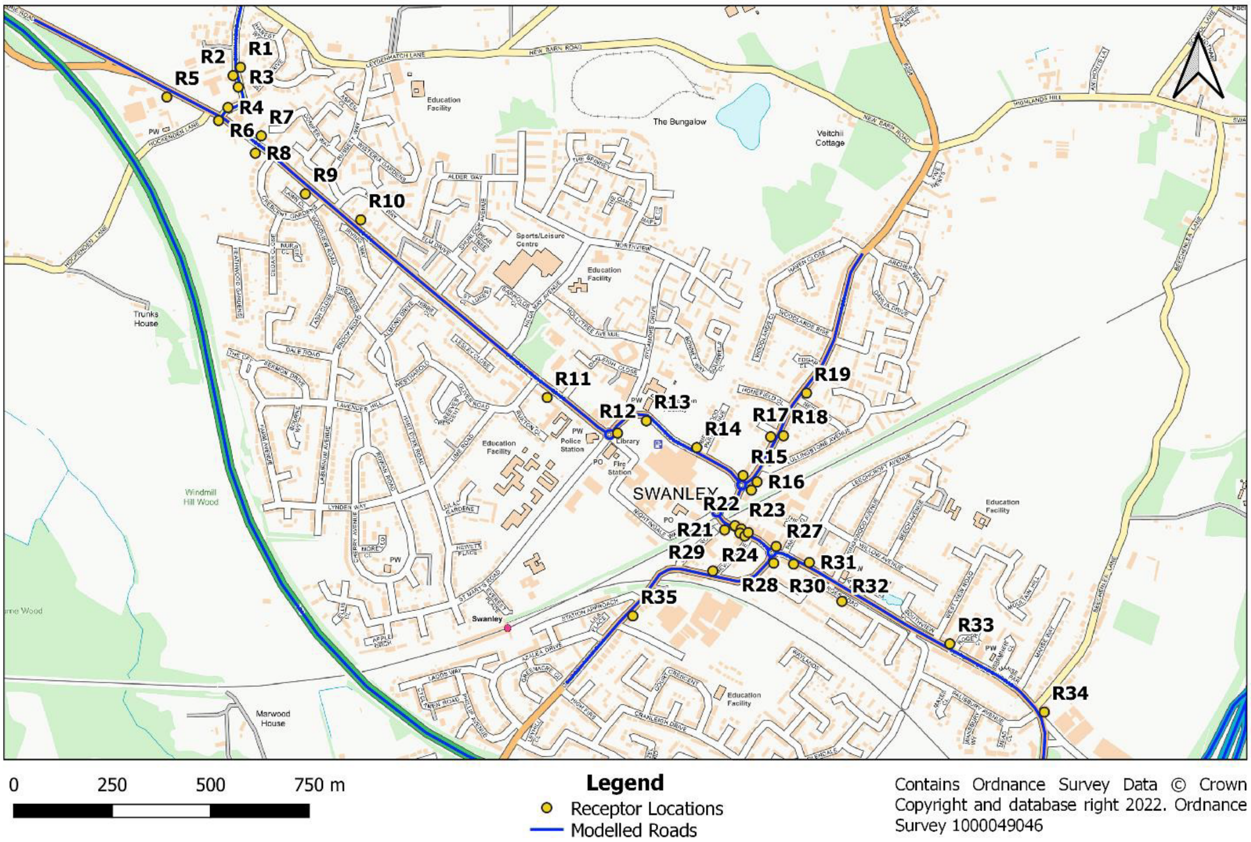


2.4 Sensitive Receptors

There are 35 discrete receptors included within the assessment to represent locations of relevant exposure and are displayed in Figure 2.5. The locations were identified through the completion of a desktop study, and where relevant exposure is believed to be present. In addition, concentrations were also modelled across regular gridded area's set across the AQMAs, with a spatial resolution between the receptors of approximately 12m x 12m, and 15m x 15m. Two grids were utilised to maintain a high resolution whilst remaining within ADMS-Road's capabilities. A receptor height of 1.5m was used for all gridded receptors modelled. The gridded receptor model was split into 2 separate domains to ensure a high resolution was maintained. These were supplemented with additional receptor points added close to the modelled road links, using the intelligent gridding tool in ADMS-Roads.

The majority of the discrete receptors (29) were included at a height of 1.5m to represent ground level exposure, whereas 6 receptors were included at an increased height of 4m to represent exposure at buildings with residential usage on the first storey levels.

Figure 2.5 – Discrete Receptor Locations



2.5 Model Outputs

Background pollutant values for 2019 derived from the Defra background maps database[5] have been used in conjunction with the concentrations predicted by the ADMS-Roads model to calculate predicted total annual mean concentrations of NO_x.

To avoid duplication of the road source contribution from 'Motorway Roads' and 'Trunk A Roads' in the modelling and assessment process, these source sectors have been removed from the overall background concentrations reported both inside and outside the grid squares. The influence of 'Primary A Roads' inside

[5] Defra Background Maps (2020), http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html

the grid squares has also been removed. This has been completed using the Defra NO_x Sector Removal Tool[6] v7.0.

Sevenoaks District Council carries out monitoring of NO_2 at a number of background monitoring sites using both an automatic monitor and diffusion tubes. For modelling purposes, the Defra Background maps have been used as opposed to the available background monitoring data due to there not being any representative background monitoring sites covering the modelling domain.

The background concentrations used within this assessment are presented in Appendix C.

For the prediction of annual mean NO_2 concentrations for the modelled scenarios, the output of the ADMS-Roads model for road NO_x contributions has been converted to total NO_2 following the methodology in LAQM.TG(22), using the NO_x to NO_2 conversion tool developed on behalf of Defra. This assessment has utilised the current version of the NO_x to NO_2 conversion tool, version 7.1[7]. The road contribution is then added to the appropriate NO_2 background concentration value to obtain an overall total NO_2 concentration.

2.5.1 Verification

Verification of the model has been carried out using a number of local authority NO_2 passive monitoring locations, in accordance with the methodology detailed within LAQM.TG(22). A total of 7 roadside diffusion tubes are located within the Swanley area and within the existing AQMAs. Details of these are presented in Table B.1. The locations and heights of these tubes have been adjusted and validated where required via a desktop study.

Verification was carried out using all 7 sites, with the results being presented in Table B.2. It was identified that using this model wide verification factor resulted in all sites predicting with the ±25% acceptance level. There were no further adjustments which could be made to the model further improve the verification. A verification factor of 2.517 was therefore utilised.

Full details of the model verification completed can be found in Appendix B.

2.5.2 Source Apportionment

To help inform the development of measures as part of the action plan stage of the project, a source apportionment exercise was undertaken for the following vehicle classes.

- Petrol, Diesel and Alternative Fuelled (electric, bioethanol and liquefied petroleum gas) Cars;
- Petrol, Diesel and Alternative Fuelled LGVs;
- HGVs;
- Bus and Coaches; and
- Motorcycles.

This provides vehicle contributions of NO_x as a proportion of the total NO_x concentration, which will allow the Council to develop specific AQAP measures targeting a reduction in emissions from specific vehicle types. Locally defined fleet information has been used to determine local Euro Class proportions alongside national averages utilised for the motorways to derive specific emission rates. Details of the local Euro Class proportions are provided in Appendix A. The national averages for England are the pre-set values set within the latest version of the EFT.

It should be noted that emission sources of NO_2 are dominated by a combination of direct NO_2 (f-NO_2) and oxides of nitrogen (NO_x), the latter of which is chemically unstable and rapidly oxidised upon release to form

[6] Defra NO_2 Adjustment for NO_x Sector Removal Tool (2019), available at https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html

[7] Defra NO_x to NO_2 Calculator (2019), available at https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc

NO_2. Reducing levels of NO_x emissions therefore reduces concentrations of NO_2. As a consequence, the source apportionment study has considered the emissions of NO_x, which are assumed to be representative of the main sources of NO_2.

With regards to the discrete receptor locations, consideration has been given to the following groups of receptors located within the designated AQMAs. The source apportionment study has evaluated the following receptor combinations:

- The average NO_x contributions across all modelled locations. This provides useful information when considering possible action measures to test and adopt. It will however understate road NO_x concentrations in problem areas;

- The average NO_x contributions across all locations with modelled NO_2 concentration greater than 40µg/m^3. This provides an indication of source apportionment in problematic areas (i.e. only where the annual mean AQS objective is exceeded). As such, this information should be considered with more scrutiny when testing and adopting action measures; and

- The NO_x contributions at the receptor with the maximum road NO_x and NO_2 contribution. This provides a comparison to the previous two groups, with the identification of the most prominent vehicle source at receptor with the highest predicted NO_2 concentration.

3 Modelling Results

The following section provides a detailed assessment for each of the two AQMAs, comparing both the monitoring completed within the AQMAs over a five year period with the modelled concentrations of annual mean NO_2. Details of each monitoring location and the monitoring results have been taken from the 2022 Annual Status Report[8] completed by the Council. There is a focus on 2019 monitoring data as this is comparable to the modelled results (which used 2019 as a baseline), however the recent monitoring data is also included for completeness. It should be noted that 2020 and 2021 monitoring data is not considered to be typical of normal conditions at the time of writing due to the impact of the COVID-19 pandemic on traffic levels and air quality. Whilst this provides a good indication of how much pollutant concentrations can decrease from removing road vehicles, it is not currently known whether this will be a short term effect or have longer term implications.

For each AQMA, recommendations have been put forward in terms of the current determination of the specific AQMA, in relation to potential changes to the designation or boundary. Furthermore, additional analysis of receptor locations outside the existing AQMAs has been completed to assess if there are any areas outside declared AQMAs where annual mean concentrations of NO_2 are predicted to be in exceedance of the annual mean objective.

In line with the standardised LAQM reporting, the tabulated results present any exceedances of the annual mean AQS objective of 40µg/m^3 in bold, and any predicted concentrations in exceedance of 60µg/m^3 have been underlined. Additionally, annual mean concentrations that are within 10% of the objective have been presented in italics in order to ensure that any uncertainty in relation to the predicted modelling concentrations is taken into consideration for any recommendations made in terms of AQMA designation, amendment or revocation.

Contour results have also been produced for each designation within the AQMAs, with concentration isopleths presented at both 40µg/m^3 and 36µg/m^3 (within 10% of the 40µg/m^3 objective).These have been produced from a gridded results layer covering the model domain. In addition, ADMS-roads automatically places a high number of additional receptors close to each modelled road link to increase the spatial resolution of the receptors.

In addition, the NO_x source apportionment results for each AQMA which have been split across the vehicle classifications detailed in Section 2.5, are presented in both tabulated and pie charts formats. This allows a cross comparison between the main vehicular sources to be completed across each AQMA, and will aid the development of measures specific to each AQMA.

3.1 AQMA No.8 Swanley Town Centre

3.1.1 Council Monitoring Data

AQMA 8 is currently designated for exceedances of the annual mean NO_2 AQS objective. The current boundary encompasses Swanley Town Centre, High Street and London Road to the boundary of the M20. Currently there are three diffusion tubes monitoring annual mean NO_2 concentrations located within the current AQMA boundary. These are presented in Figure 3.1, and the monitoring results from the previous five years are shown in Figure 3.1 – AQMA No.8, Modelled Roads and Monitoring Locations

[8] Seveonaks District Council (2019), 2019 Air Quality Annual Status Report

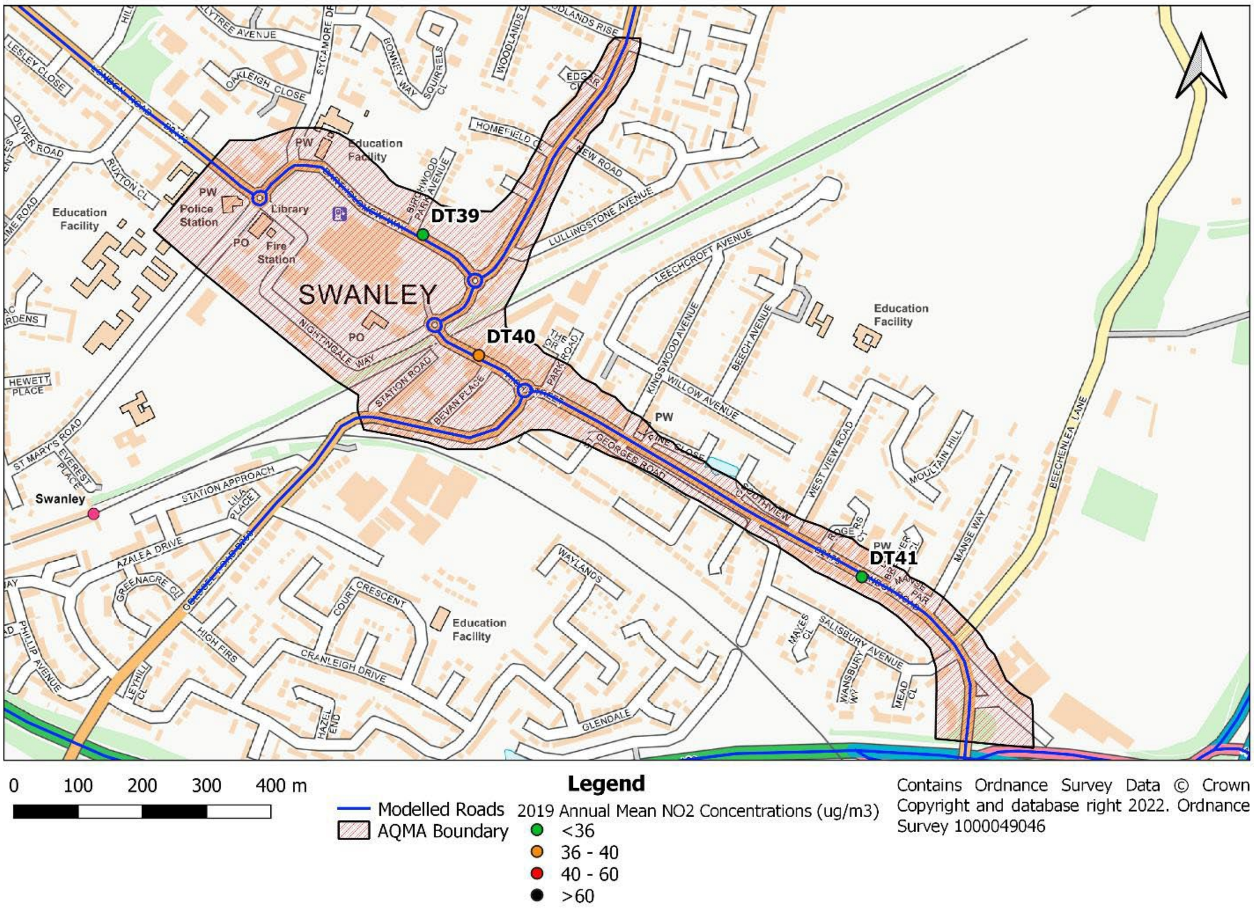


Table 3.1.

Exceedances of the annual mean NO_2 objective have been reported at both DT40 and DT41 in the past five years (2017 and 2018). DT40 has consistently reported the highest concentration out of all three monitoring locations for the past five years. DT40 continued to report a concentration within 10% of the AQS objective in 2019. This is likely due to being located within a small street canyon and between two junctions.

Following the application of distance correction to predict annual mean NO_2 concentrations at the closest point of relevant exposure for sites that are exceeding or within 10% of the AQS objective in 2019, as detailed within Table 3.2, the predicted concentration from DT40 is reported to be below the annual mean NO_2 objective.

Figure 3.1 – AQMA No.8, Modelled Roads and Monitoring Locations

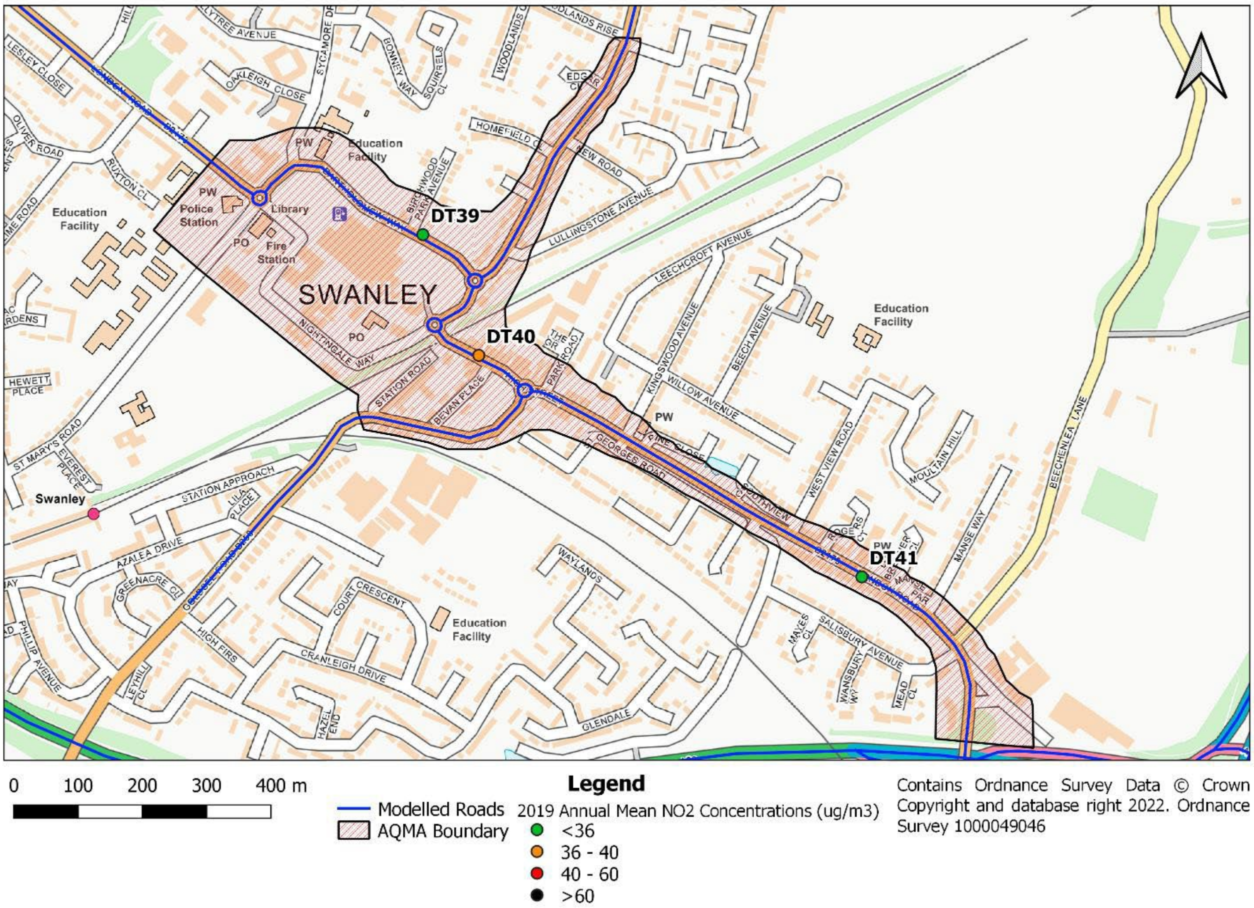


Table 3.1 – Current NO_2 Monitoring Within AQMA No.8

Site	Site Type	OS Grid Ref X	OS Grid Ref Y	Distance to Relevant Exposure (m)	Height (m)	Annual Mean NO_2 Concentration ($\mu g/m^3$)				
						2017	2018	2019	2020	2021
DT39	R	551492	168695	13.0	2.5	34.5	*36.4*	34.8	28.1	29.4
DT40	R	551579	168507	2.0	2.5	**40.9**	**45.6**	*37.5*	28.4	34.1
DT41	R	552175	168162	6.0	2.5	**40.1**	*38.6*	32.6	27.2	29.5

In *italics*, concentration is within 10% of the annual mean NO_2 AQS objective (i.e. 36 – 40$\mu g/m^3$)
In **bold**, exceedance of the annual mean NO_2 AQS objective of 40$\mu g/m^3$.
When **underlined**, NO_2 annual mean exceeds 60$\mu g/m^3$, indicating a potential exceedance of the NO_2 1-hour mean objective
R= Roadside

Table 3.2 – 2019 NO_2 Monitoring Within AQMA No.8, Distance Corrected

Site	Site Type	Distance to Kerbside (m)	Distance from Kerbside to Relevant Exposure (m)	Monitored Concentration ($\mu g/m^3$)	Distance Corrected Concentration ($\mu g/m^3$)
DT40	R	0.5	2.5	37.5	31.4

In *italics*, concentration is within 10% of the annual mean NO_2 AQS objective (i.e. 36 – 40$\mu g/m^3$)
In **bold**, exceedance of the annual mean NO_2 AQS objective of 40$\mu g/m^3$.
When **underlined**, NO_2 annual mean exceeds 60$\mu g/m^3$, indicating a potential exceedance of the NO_2 1-hour mean objective
R= Roadside

3.1.2 Modelled Receptors, Annual Mean NO_2

Table 3.3 provides the modelled annual mean NO_2 concentrations predicted at existing residential receptor locations in 2019. There are 23 discrete receptor locations positioned within the boundary of AQMA No.8, with 1 receptor located at a specific sensitive receptor (Montessori Group Preschool). Two additional receptors located in close proximity to the AQMA were also modelled. Two receptors located within the AQMA, R25 and R26, have predicted exceedances of the annual mean NO_2 objective, with concentrations predicted to be 56.0µg/m^3 and 49.8µg/m^3 respectively. All other receptor locations have a concentration predicted to be below 10% of the AQS objective.

Figure 3.2 presents the modelled receptor locations alongside their predicted annual mean NO_2 concentrations. From this, it can be seen that the exceedances being predicted at R25 and R26 are located along the High Street, just westwards of the junction to Bevan Place. Both of these receptors are positioned at a height of 4m as it is believed there are residential receptors above the commercial properties. Additionally, a small double-sided street canyon has been modelled here hence why concentrations are lower elsewhere along this stretch. The nearest diffusion tube monitoring location to these receptors is DT40, which reported an annual mean NO_2 concentration in 2019 of 37.5µg/m^3. The model is over predicting concentrations at this location by 12.9%, therefore indicating that modelled concentrations are likely to also be slightly over predicted in this location and should be considered as a conservative prediction. Despite this over prediction, an exceedance would still be considered at R25 and R26 even if the model was not over predicting by 12.9%.

The additional sensitive receptor located at the Montessori Group Preschool, R20, has a predicted annual mean NO_2 concentration of 27.5µg/m^3 in 2019, therefore is predicted to be below the annual mean NO_2 objective.

From the annual mean NO_2 concentration contour plots presented in Figure 3.3, it can be seen that the extent of the predicted exceedances of the annual mean objective are focused around the roundabout junctions within the AQMA, and are retained within the AQMA boundary. The contour lines follow the geometry of the road, and with the exception of the section of the High Street around R25 and 26, the exceedance limit does not come into contact with any other residential areas located within the AQMA. Additionally, whilst there are contours for concentrations greater than 60µg/m^3 (which would indicate a potential exceedance of the 1-hour NO_2 AQS objective, as per LAQM.TG(22)), none of these are in areas where members of public would be expected to spend 1-hour or more.

Table 3.3 – AQMA No.8, Summary of Modelled Receptor Results (NO_2)

Receptor ID	OS Grid X	OS Grid Y	Height (m)	In AQMA?	AQS objective (µg/m^3)	2019 Annual Mean NO_2 (µg/m^3)	% of AQS objective
R11	551079	168846	1.5	N	40	20.1	50
R12	551258	168755	1.5	Y	40	32.8	82
R13	551331	168787	1.5	Y	40	25.1	63
R14	551459	168719	1.5	Y	40	28.8	72
R15	551577	168648	1.5	Y	40	35.2	88
R16	551612	168631	1.5	Y	40	26.2	65
R17	551647	168746	1.5	Y	40	22.3	56
R18	551680	168749	1.5	Y	40	22.3	56
R19	551738	168857	1.5	Y	40	22.1	55
R20	551598	168610	1.5	Y	40	27.5	69
R21	551530	168510	1.5	Y	40	25.2	63
R22	551556	168520	4	Y	40	34.3	86
R23	551572	168512	4	Y	40	24.4	61
R24	551569	168501	4	Y	40	35.7	89
R25	551581	168494	4	Y	40	**56.0**	140
R26	551590	168503	4	Y	40	**49.8**	125
R27	551661	168468	4	Y	40	30.1	75
R28	551655	168425	1.5	Y	40	27.3	68

Receptor ID	OS Grid X	OS Grid Y	Height (m)	In AQMA?	AQS objective ($\mu g/m^3$)	2019 Annual Mean NO_2 ($\mu g/m^3$)	% of AQS objective
R29	551500	168405	1.5	Y	40	24.3	61
R30	551705	168423	1.5	Y	40	27.0	67
R31	551745	168427	1.5	Y	40	31.1	78
R32	551828	168328	1.5	N	40	22.0	55
R33	552102	168220	1.5	Y	40	29.6	74
R34	552342	168047	1.5	Y	40	32.0	80
R35	551297	168291	1.5	N	40	22.3	56

In *italics*, concentration is within 10% of the annual mean NO_2 AQS objective (i.e. 36 – 40μg/m³)
In **bold**, exceedance of the annual mean NO_2 AQS objective of 40μg/m³.
When **underlined**, NO_2 annual mean exceeds 60μg/m³, indicating a potential exceedance of the NO_2 1-hour mean objective

Figure 3.2 – AQMA No.8, Modelled Receptor NO_2 Concentrations

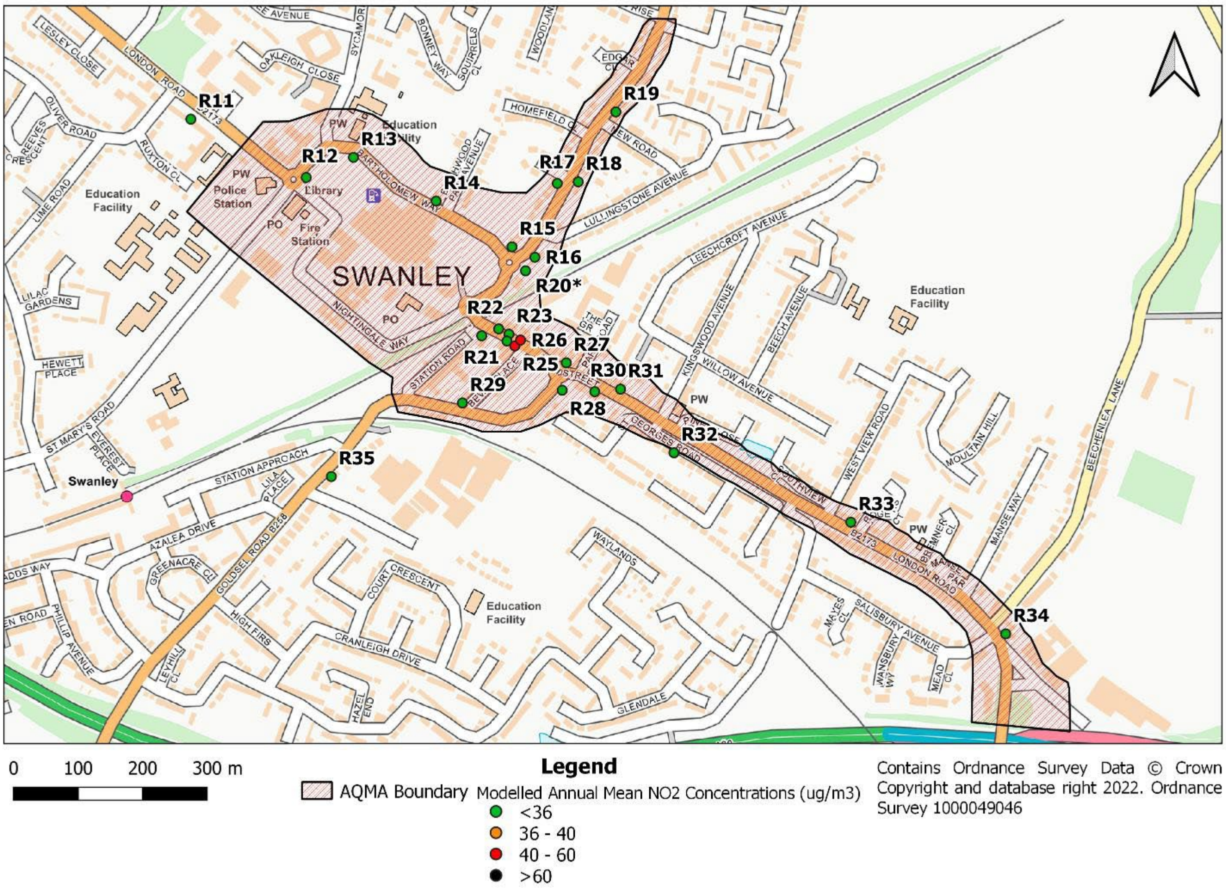
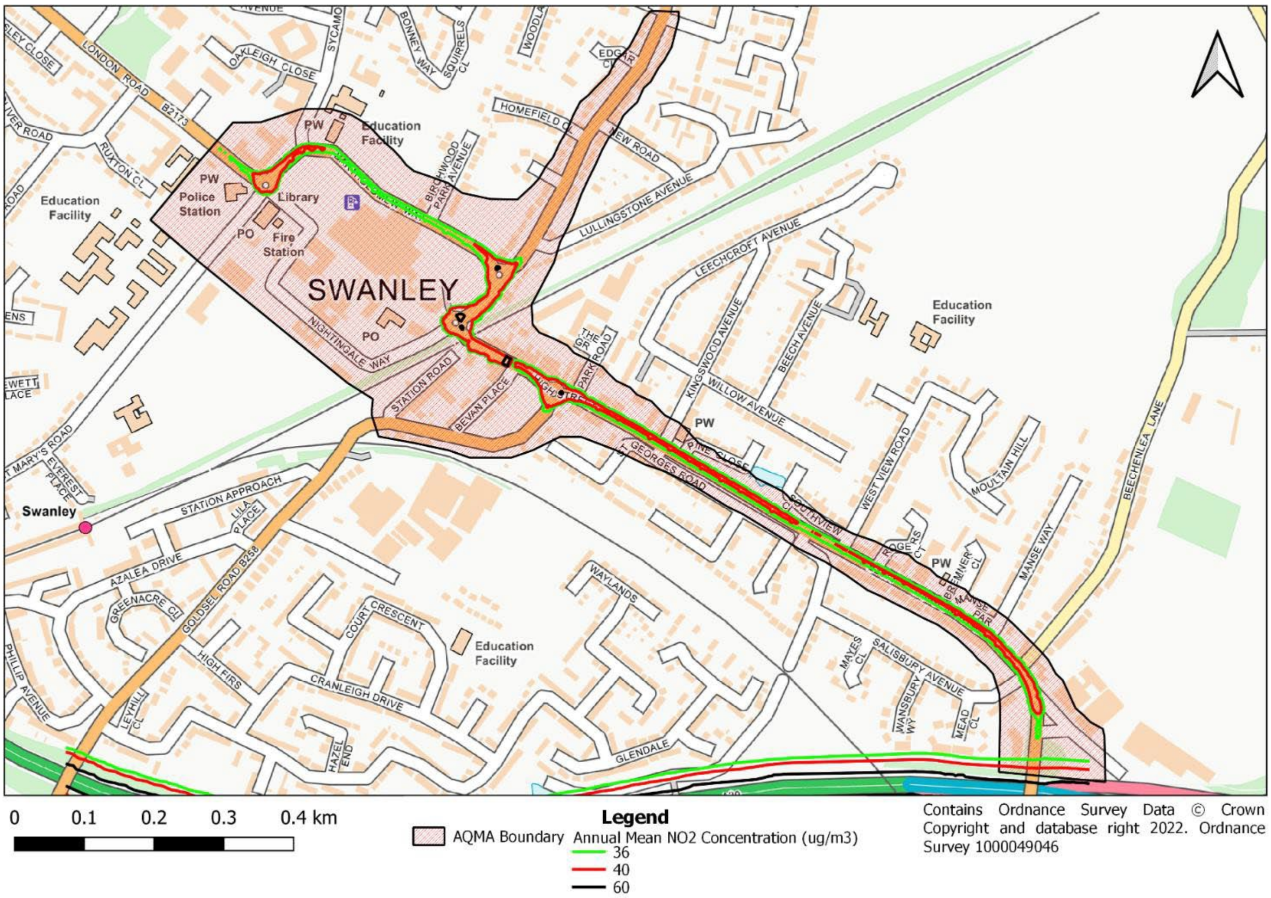


Figure 3.3 – AQMA No.8, Modelled NO_2 Concentration Isopleths



3.1.3 AQMA No.8 Source Apportionment

The source apportionment completed for the modelled receptors within the boundary of AQMA No.8 incorporates the 23 receptors as detailed within Table 3.3 above. Apportionment for NO_x concentrations have been completed for the three separate groups in terms of the receptors as detailed in Section 2.5, with the results presented in Table 3.4 and Figure 3.4.

When considering the average NO_x concentration across all modelled receptors, road traffic accounts for 33.5µg/m^3 (65.0%) of total NO_x concentration (51.5µg/m^3). Of vehicle types contributing to the 51.5µg/m^3 total NO_x concentration, Diesel Cars account for the greatest contribution (27.5%) of any of the vehicle types, followed by Diesel LGVs (18.5%), HGVs (13.1%) and Petrol Cars (5.0%). The remaining vehicle source groups (Petrol LGVs, Alternative Fuel Cars and LGVs, Bus and Coach, and Motorcycles) contribute less than 0.7% each.

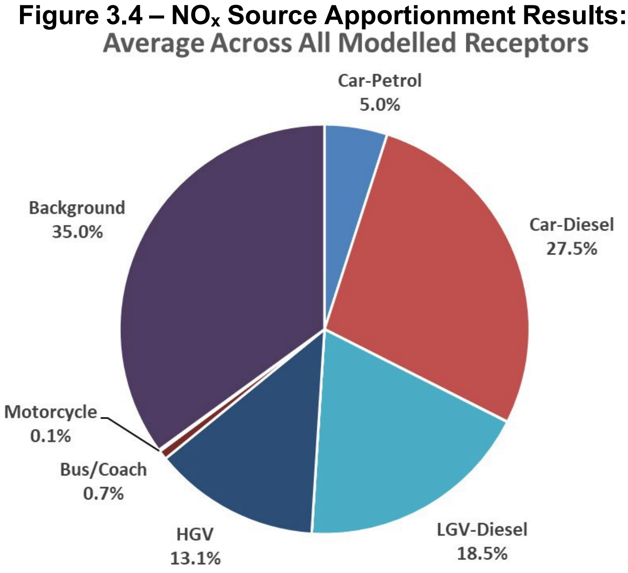
Averaged across the receptors where an exceeding annual mean NO_2 concentration is predicted (R25 and R26), road traffic accounts for 86.0µg/m^3 (82.5%) of the total NO_x concentration (104.3µg/m^3). Of vehicle types contributing to the total NO_x concentration, a similar distribution is observed, whereby Diesel Cars account for the greatest contribution (34.0%), followed by Diesel LGVs (21.2%), HGVs (19.2%) and Petrol Cars (6.7%), with the remaining vehicle source groups contributing less than 1.1% each.

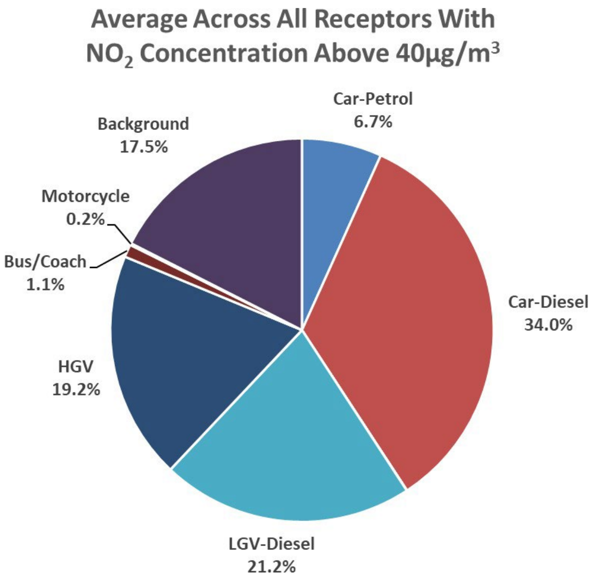
The receptor with the maximum road NO_x concentration is receptor R25, whereby the total road NO_x was predicted to be 94.1µg/m^3. At this receptor, road traffic accounts for 83.7% of total NO_x concentration (112.4µg/m^3). Of the total NO_x concentration, the separate vehicle apportionment remains similar to the previous assessments but with a slightly increased apportionment to Diesel Cars, Diesel LGVs and HGVs, and a slightly decreased apportionment Petrol Cars. The remaining vehicle source groups contributing less than 1.1% each.

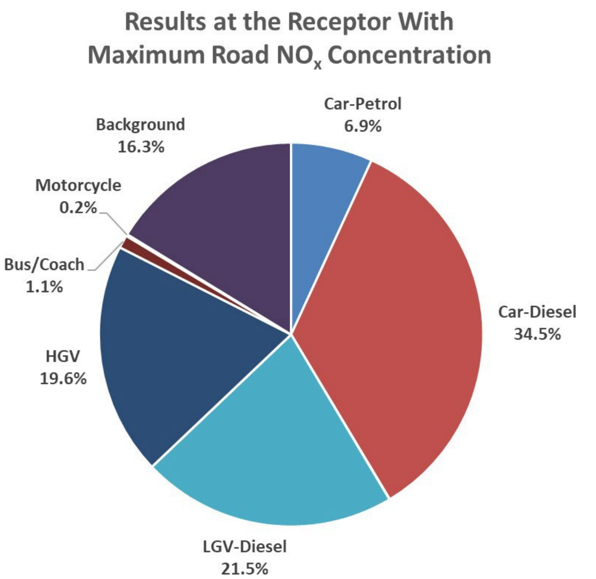
Table 3.4 – NO_x Source Apportionment Results: AQMA No.8

Results	All Vehicles	Car			LGV			HGV	Bus and Coach	Motorcycle	Background
		Petrol	Diesel	EV/LPG	Petrol	Diesel	EV/LPG				
Average across all modelled receptors											
NO_x Concentration (µg/m^3)	33.5	2.6	14.2	0.0	0.0	9.5	0.0	6.8	0.4	0.1	18.1
Percentage of Total NO_x	65.0%	5.0%	27.5%	0.0%	0.0%	18.5%	0.0%	13.1%	0.7%	0.1%	35.0%
Percentage Contribution to Road NO_x	100.0%	7.6%	42.3%	0.0%	0.0%	28.5%	0.0%	20.2%	1.1%	0.2%	-
Average Across All Receptors with NO_2 Concentration exceeding the AQS annual mean objective											
NO_x Concentration (µg/m^3)	86.0	7.0	35.5	0.0	0.0	22.2	0.0	20.0	1.1	0.2	18.3
Percentage of Total NO_x	82.5%	6.7%	34.0%	0.0%	0.0%	21.2%	0.0%	19.2%	1.1%	0.2%	17.5%
Percentage Contribution to Road NO_x	100.0%	8.2%	41.2%	0.0%	0.0%	25.8%	0.0%	23.3%	1.3%	0.2%	-
At Receptor with Maximum Road NOx Concentration (R25											
NO_x Concentration (µg/m^3)	94.1	7.7	38.8	0.0	0.0	24.1	0.0	22.0	1.2	0.2	18.3
Percentage of Total NO_x	83.7%	6.9%	34.5%	0.0%	0.0%	21.5%	0.0%	19.6%	1.1%	0.2%	16.3%
Percentage Contribution to Road NO_x	100.0%	8.2%	41.2%	0.0%	0.0%	25.6%	0.0%	23.4%	1.3%	0.2%	-

Figure 3.4 – NO_x Source Apportionment Results: AQMA No.8







3.2 AQMA No.14 Junction of Birchwood and London Roads

3.2.1 Council Monitoring Data

AQMA No.14 is currently designated for exceedances of the annual mean NO_2 AQS objective with the current boundary covering the junction of Birchwood Road and London Road located within Sevenoaks. Currently there are three diffusion tubes monitoring annual mean NO_2 concentrations located within the current AQMA boundary, with one additional diffusion tube (DT93) located just northwards along Birchwood Road outside the AQMA boundary. The current diffusion tube monitoring sites located within the AQMA are presented in Figure 3.5, and results for the previous five years are detailed in Table 3.5.

DT83, DT94 and DT95 are all located within the boundary of AQMA No.8 and it can be seen that there have been reported exceedances at DT83 in 2017, 2018 and 2019. No exceedances have been reported at any of the other diffusion tube locations, including DT93, nor are any of the concentrations within 10% of the AQS objective.

Following the application of distance correction to predict annual mean NO_2 concentrations at the closest point of relevant exposure at sites which are either exceeding or within 10% of the AQS objective, as detailed within Table 3.6, DT83 shows a predicted concentration to still be in exceedance of the annual mean NO_2 objective in 2019 at the nearest relevant exposure.

Figure 3.5 – AQMA No.14, Modelled Roads and Monitoring Locations

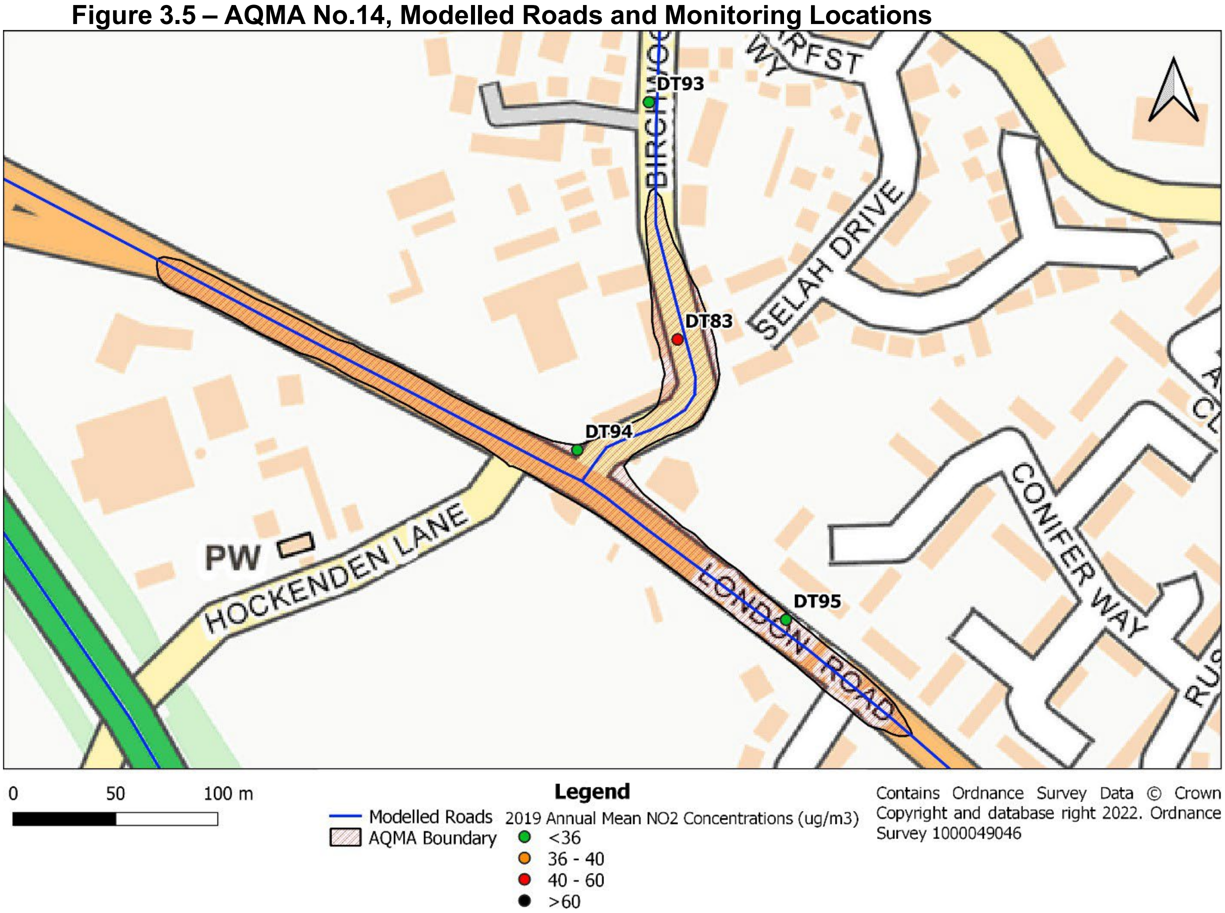


Table 3.5 – Current NO_2 Monitoring Within, or in Close Proximity to AQMA No.14

Site	Site Type	OS Grid Ref X	OS Grid Ref Y	Distance to Relevant Exposure (m)	Height (m)	Annual Mean NO_2 Concentration (μg/m^3)				
						2017	2018	2019	2020	2021
DT83	R	550297	169682	0.5	2.5	**49.8**	**46.7**	**42.4**	33.3	33.1
DT93	R	550283	169743	10.0	2.5	27.2	28.8	25.9	19.5	20.2
DT94	R	550283	169743	10.0	2.0	32.2	33.8	28.6	22.8	22.7
DT95	R	550258	169575	20.0	2.5	33.6	33.0	30.2	25.0	25.3

In **bold**, exceedance of the annual mean NO_2 AQS objective of 40μg/m^3.
When **underlined**, NO_2 annual mean exceeds 60μg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective
R= Roadside

Table 3.6 – 2019 NO_2 Monitoring Within AQMA No.14, Distance Corrected

Site	Site Type	Distance to Kerbside (m)	Distance from Kerbside to Relevant Exposure (m)	Monitored Concentration 2018 (μg/m^3)	Distance Corrected Concentration (μg/m^3)
DT83	R	1.0	1.5	**42.4**	**40.2**

In **bold**, exceedance of the annual mean NO_2 AQS objective of 40μg/m^3.
When **underlined**, NO_2 annual mean exceeds 60μg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective
R= Roadside

3.2.2 Modelled Receptors, Annual Mean NO_2

Table 3.7 provides the modelled annual mean NO_2 concentrations predicted at existing residential receptor locations in 2019. 4 discrete receptor locations are positioned within the AQMA boundary or in very close proximity to AQMA No.14 (i.e. on the edge of the AQMA boundary), with a further 6 being located nearby. None of these receptor locations have predicted and exceedance of the annual mean NO_2 objective.

Figure 3.6 presents the modelled receptor locations alongside their predicted annual mean NO_2 concentrations. The maximum predicted NO_2 concentration is 36.8μg/m^3 at R3, which is located at the residential property on Birchwood Road nearest to monitoring location DT83. The model is shown to be underpredicting NO_2 concentrations at DT83 by up to 10.8%. Therefore a degree of caution should be taken into account when considering the model outputs in this location, as the true concentration could be slightly higher.

From the annual mean NO_2 concentration contour plots presented in Figure 3.7, it can be seen that the extent of the predicted exceedances of the annual mean objective follow the geometry of the road and are located within the existing AQMA boundary. The exceedance limit is not believed to come into contact with any residential properties surrounding the junction.

Table 3.7 – AQMA No.14, Summary of Modelled Receptor Results (NO_2)

Receptor ID	OS Grid X	OS Grid Y	Height (m)	Inside AQMA?	AQS objective (μg/m^3)	2019 Annual Mean NO_2 (μg/m^3)	% of AQS objective
R1	550300	169684	1.5	N	40	25.5	64
R2	550281	169663	1.5	Y	40	23.1	58
R3	550294	169634	1.5	Y	40	*36.8*	92
R4	550268	169582	1.5	Y	40	35.2	88
R5	550113	169607	1.5	N	40	24.0	60
R6	550244	169549	1.5	Y	40	28.5	71
R7	550353	169510	1.5	N	40	22.9	57
R8	550338	169466	1.5	N	40	21.1	53
R9	550465	169363	1.5	N	40	20.4	51

Receptor ID	OS Grid X	OS Grid Y	Height (m)	Inside AQMA?	AQS objective (µg/m^3)	2019 Annual Mean NO_2 (µg/m^3)	% of AQS objective
R10	550605	169297	1.5	N	40	21.6	54

In *italics*, concentration is within 10% of the annual mean NO_2 AQS objective (i.e. 36 – 40µg/m^3)
In **bold**, exceedance of the annual mean NO_2 AQS objective of 40µg/m^3.
When **underlined**, NO_2 annual mean exceeds 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective

Figure 3.6 – AQMA No.14, Modelled Receptor Locations

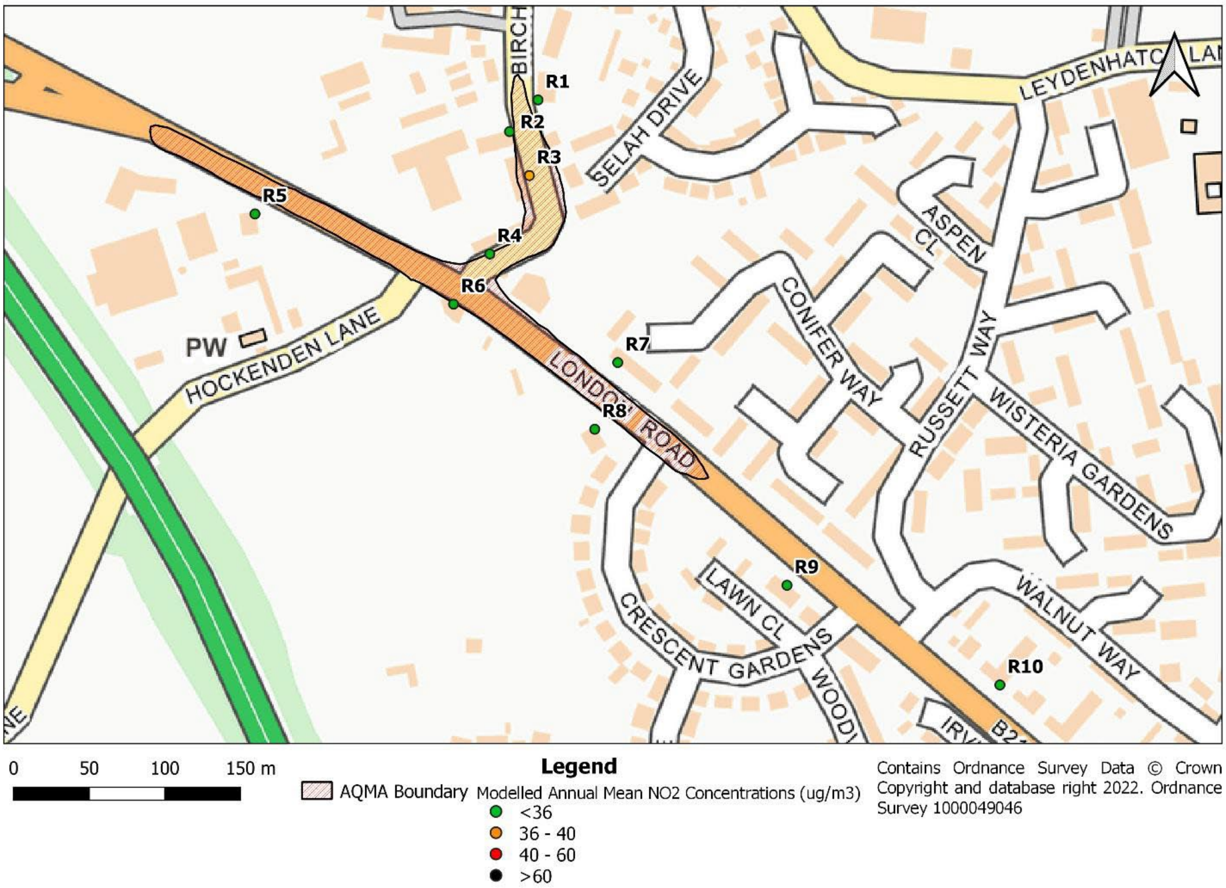
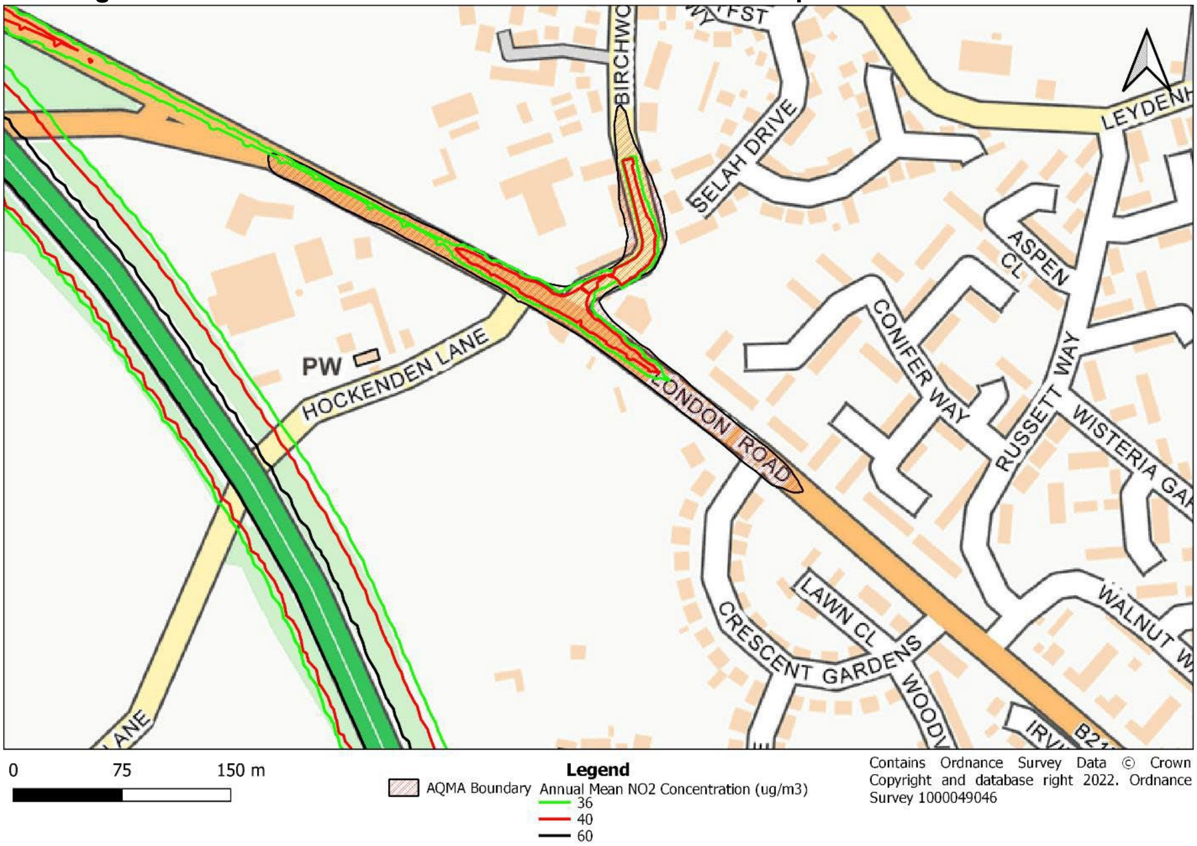


Figure 3.7 – AQMA No.14 Modelled NO_2 Concentration Isopleths



3.2.3 AQMA No.2 Source Apportionment

The source apportionment completed for the modelled receptors within the boundary of AQMA No.14 incorporates the 4 receptors as detailed within Table 3.7 above. Apportionment for NO_x concentrations have been completed for two separate groups in terms of the receptors as detailed in Section 2.5, excluding the average across all receptors with NO_2 concentrations exceeding the AQS annual mean objective as no exceedance was reported. The results are presented in Table 3.8 and

Figure 3.8.

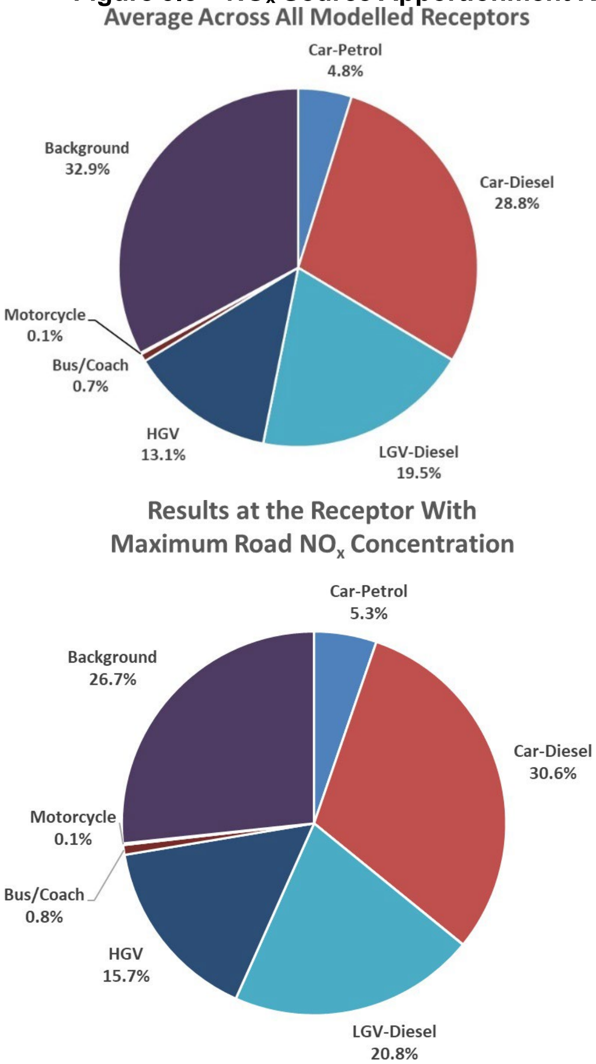
When considering the average NO_x concentration across all modelled receptors, road traffic accounts for 35.7µg/m^3 (67.1%) of total NO_x concentration (53.1µg/m^3). Of the total NO_x concentration, Diesel Cars account for the greatest contribution (28.8%) of any of the vehicle types, followed by Diesel LGVs (19.5%), HGVs (13.1%) and Petrol Cars (4.8%). The remaining vehicle source groups (Petrol LGVs, Alternative Fuel Cars and LGVs, Bus and Coach, and Motorcycles) contribute less than 0.7% each.

The receptor with the maximum road NO_x concentration is receptor R3, whereby the total road NO_x was predicted to be 48.1µg/m^3. At this receptor, road traffic accounts for 73.3% of total NO_x concentration (65.6µg/m^3). Of the total NO_x, the separate vehicle apportionment remains similar to the previous assessment whereby the major contributor is from Diesel Cars, followed by Diesel LGVs, HGVs and Petrol Cars, with the remaining vehicle source groups contributing less than 0.8% each.

Table 3.8 – NO_x Source Apportionment Results: AQMA No.14

Results	All Vehicles	Car			LGV			HGV	Bus and Coach	Motorcycle	Background
		Petrol	Diesel	EV/LPG	Petrol	Diesel	EV/LPG				
Average across all modelled receptors											
NO_x Concentration (µg/m^3)	35.7	2.6	15.3	0.0	0.0	10.4	0.0	7.0	0.4	0.1	17.5
Percentage of Total NO_x	67.1%	4.8%	28.8%	0.0%	0.0%	19.5%	0.0%	13.1%	0.7%	0.1%	32.9%
Percentage Contribution to Road NO_x	100.0%	7.2%	42.9%	0.0%	0.0%	29.1%	0.0%	19.6%	1.0%	0.2%	-
At The Receptor with the Maximum Road NO_x Concentration (R3)											
NO_x Concentration (µg/m^3)	48.1	3.5	20.1	0.0	0.0	13.6	0.0	10.3	0.5	0.1	17.5
Percentage of Total NO_x	73.3%	5.3%	30.6%	0.0%	0.0%	20.8%	0.0%	15.7%	0.8%	0.1%	26.7%
Percentage Contribution to Road NO_x	100.0%	7.2%	41.7%	0.0%	0.0%	28.3%	0.0%	21.4%	1.1%	0.2%	-

Figure 3.8 – NO_x Source Apportionment Results: AQMA No.14



4 Conclusions and Recommendations

Following the completion of the analysis of both monitoring data and modelled concentrations across the two assessed AQMAs within Swanley, a number of recommendations have been made in terms of the current designations of the AQMAs within Sevenoaks. It should be noted that there is a focus on 2019 monitoring concentrations, with 2019 being used as the baseline year for any modelling carried out. This is due to the COVID-19 pandemic and UK Government enforced restrictions occurring throughout 2020 and 2021 and a reduction/change in typical traffic patterns, resulting in monitored NO_2 concentrations to be lower than what would typically be expected. As such, 2019 has been utilised as a conservative worst-case scenario whilst the long term impacts of the COVID-19 pandemic are not fully understood.

4.1 AQMA No.8 Swanley Town Centre

AQMA No.8 is currently designated for exceedances of the annual mean NO_2, with three monitoring locations located within the AQMA using NO_2 diffusion tubes. Exceedances of the annual mean NO_2 objective have been reported at two of the monitoring locations over the past five years (DT 40 and DT41). However, when distance corrected to the nearest relevant exposure, as per LAQM.TG(22), both sites have predicted annual mean concentrations to be below the AQS objective.

Discrete receptor locations have been modelled throughout the AQMA and two exceedances have been predicted along the High Street, near to the junction to Bevan Place and in close proximity to DT40. Both of these receptors are located at 4m height, as it is assumed there are residential residences above the ground floor commercial units. The model is shown to be overpredicting in this area, and therefore this is considered to be a slight conservative estimation, however even with this in consideration an exceedance is still predicted in this area. No other exceedances have been predicted within the AQMA.

The modelled exceedances are likely due to a small section of this road being modelled as a two-sided street canyon, as identified during the desktop review using Google Streetview. It appears that the development of a larger property is taking place from 2020 onwards, with the façade being brought forwards, therefore predicted to amplify the street canyon effects. It is however not known whether any properties along this stretch are used for residential purposes.

It is advised that the Council continues to monitor throughout this AQMA, especially at the location of DT40, to ensure that NO_2 concentrations continue to remain compliant. The Council should also deploy monitoring closer to any residential properties if they exist along this stretch, including at the façade of the new property once construction is completed. Care should be taken with the development of the High Street along this stretch, as this is located between two junctions where congestion occurs, and further development could further exasperate the street canyon effects observed. If residential properties are present, then the Council should strongly consider implementing measures to reduce pollution concentrations along this stretch if monitoring reports exceedances.

The modelling carried out has not indicated that any amendments to the AQMA boundary are required.

From the source apportionment completed, Diesel Cars and LGVs account for over half of the total NO_x concentrations predicted at the worst case receptor. Therefore, if any measures need to be implemented to further reduce NO_2 concentrations then it would be advisable to focus on reducing the emissions from these vehicle types.

If monitoring continues to show that the AQMA is compliant and below 10% of the AQS objective in future years following the completion of the development along the High Street, then the Council could consider revoking the AQMA.

4.2 AQMA No.14 Junction of Birchwood and London Roads

AQMA No.14 is currently designated for exceedances of the annual mean NO_2 AQS objective and monitoring is completed within, and close to the AQMA using NO_2 diffusion tubes. DT83, located within a section of Birchwood Road considered to be a single-sided street canyon, has reported exceedances for three of the past five years. Once distance corrected to a point of relevant exposure this site continued to predict a concentration greater than 40µg/m^3. All other monitoring locations within or in close proximity to the AQMA have however continually reported concentrations below 40µg/m^3 for the past 5 years.

From the modelling conducted, concentrations at relevant receptors are predicted to be below the AQS objective, however at the discrete receptor R3 (the receptor nearest to DT83) the concentration is within 10% of the AQS objective. R3 is likely to be slightly under predicting, therefore caution should be taken when considering the discrete receptor results in this location, as these are also likely to be under predicted.

It is recommended that monitoring continues to be carried out within this AQMA, and where possible to deploy a monitoring location at a relevant point of exposure in order to confirm whether the model is predicting the results accurately. Despite this, exceedances, even following distance correction, have been reported within the past 5 years so the AQMA should be retained.

The modelling carried out has not indicated that any amendments to the AQMA boundary are required.

From the source apportionment completed, Diesel Cars and LGVs account for approximately half of the total NO_x concentrations predicted at the worst case receptor. Therefore, any measures to be implemented to further reduce NO_2 concentrations should be focused on reducing the emissions from these vehicle types.

The Council should consider whether any updates are required to their recently published AQAP in order to consider any further measures to assist in reducing NO_2 concentrations within this AQMA, focusing on the relevant vehicle types and at reducing congestion.

Appendices

Appendix A – Traffic Data

Figure A.1 – Traffic Survey Locations

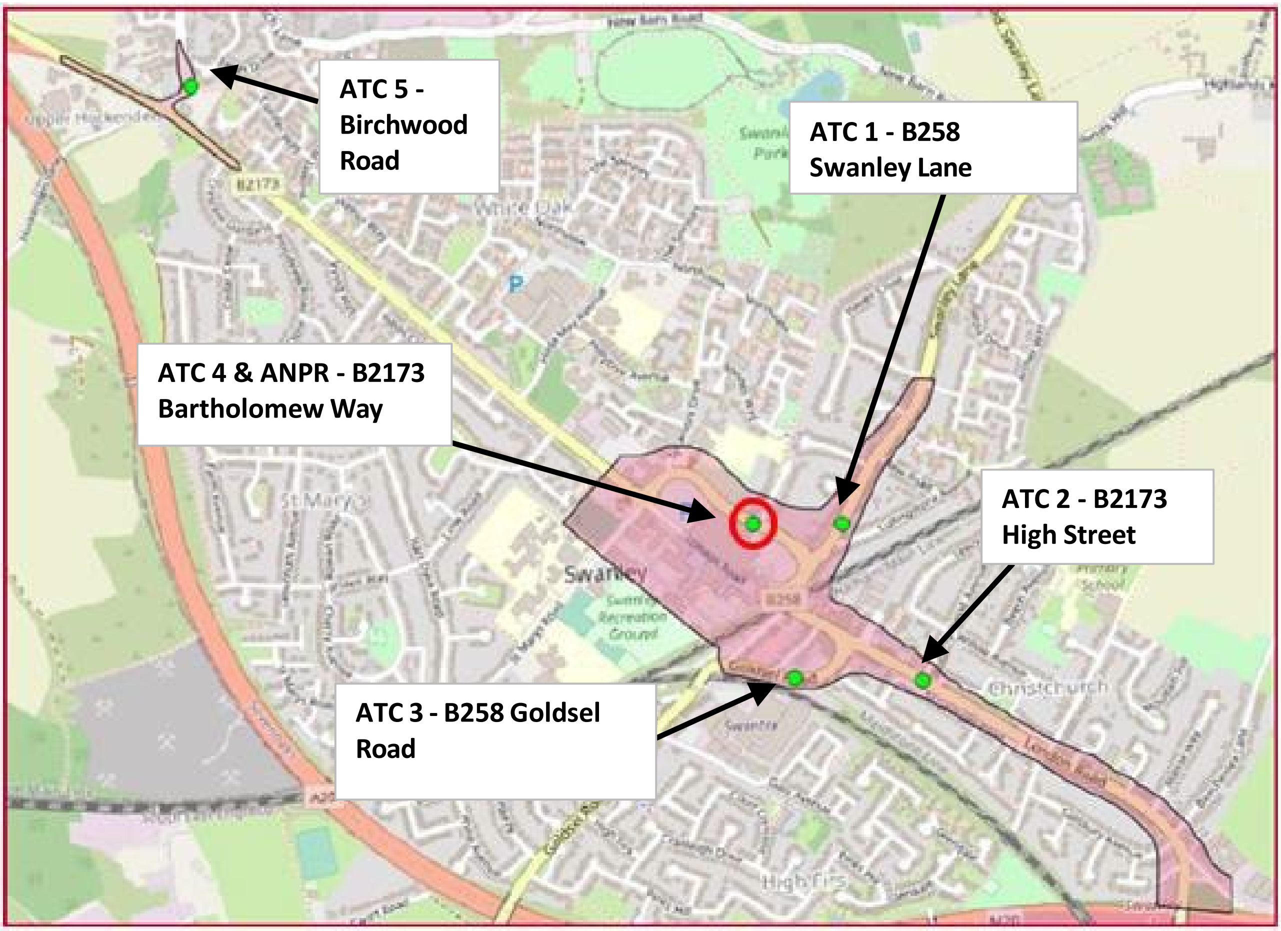


Table A.1 –Traffic Data

ID	Source	2019 Traffic Flow (AADT)	% Car	% LGV	% HGV	% Bus/ Coach	% Motorcycle
ATC 1	Traffic Survey	10278	86.4	10.2	2.3	0.1	0.9
ATC 2	Traffic Survey	19800	82.0	12.9	4.0	0.1	0.9
ATC 3	Traffic Survey	11242	84.2	11.7	3.1	0.1	0.9
ATC 4	Traffic Survey	19605	85.7	10.3	2.9	0.1	1.0
ATC 5	Traffic Survey	9675	81.5	15.0	2.6	0.1	0.8
36247	DFT	54690	75.5	18.7	4.1	0.3	1.4
73157	DFT	43754	75.5	18.7	4.1	0.3	1.4
7824	DFT	130741	66.7	20.8	11.7	0.3	0.5
38019	DFT	121788	71.8	19.0	8.6	0.2	0.5
27865	DFT	58459	68.8	17.5	12.6	0.3	0.9

Table A.2 – User Input Euro Class Splits

Vehicle Type	Euro 1	Euro 2	Euro 3	Euro 4	Euro 5	Euro 6
Petrol Car	0.00	0.00	0.01	0.19	0.26	0.53
Diesel Car	0.00	0.00	0.00	0.16	0.35	0.49
Petrol LGV	0.00	0.00	0.00	0.00	0.21	0.79
Diesel LGV	0.00	0.00	0.00	0.11	0.22	0.67
RIGID HGV Diesel	0.00	0.00	0.01	0.11	0.37	0.51
ARTICULATE HGV Diesel	0.00	0.00	0.00	0.02	0.02	0.96
Bus Coach Diesel	0.00	0.00	0.02	0.51	0.17	0.31
Motorcycle	0.00	0.00	0.00	0.00	0.00	0.00
Full Hybrid Petrol Car	0.00	0.00	0.01	0.01	0.15	0.82
Full Hybrid Diesel Car	0.00	0.00	0.00	0.00	0.08	0.92
Battery EV Car	0.00	0.00	0.00	0.00	0.04	0.96
LPG Car	0.00	0.00	0.00	0.00	0.00	1.00
Full Petrol Hybrid LGV	0.00	0.00	0.00	0.00	0.00	1.00
Battery EV LGV	0.00	0.00	0.00	0.00	0.08	0.92
LPG LGV	0.00	0.00	0.00	0.00	0.00	0.00

Appendix B – Verification

Table B.1 – Details of Passive NO_2 Monitoring Locations Used for Verification within the Swanley Area, Sevenoaks District Council

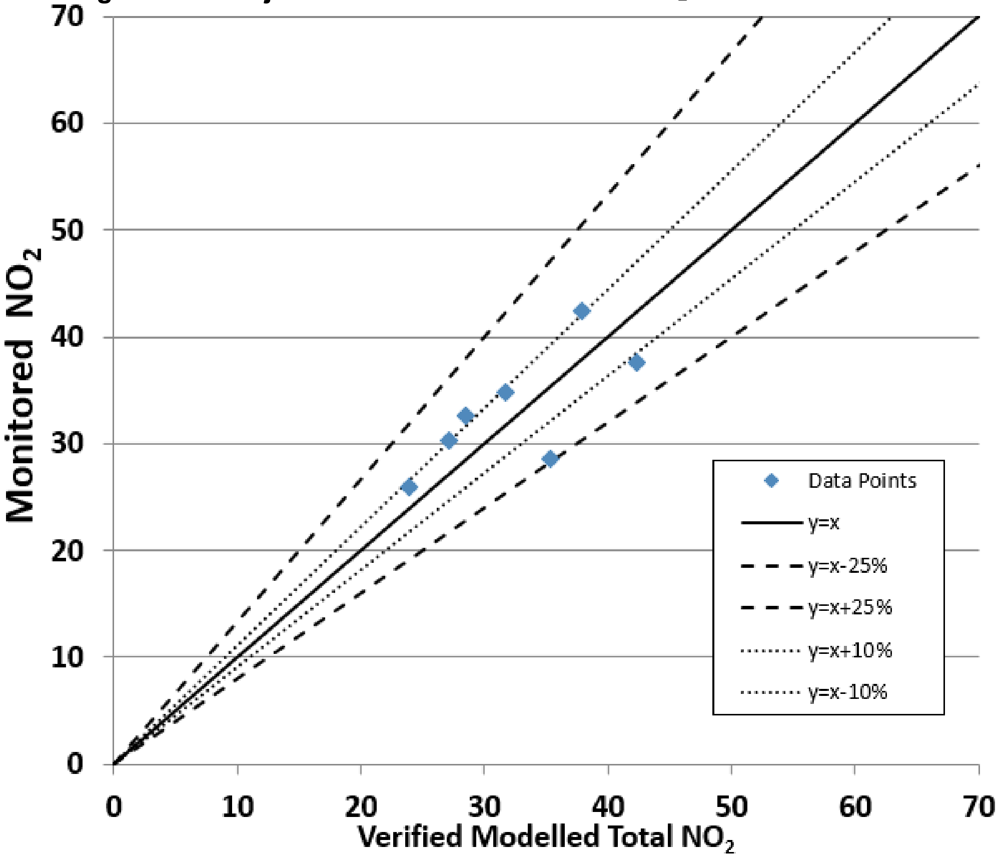
Site ID	X Coordinate	Y Coordinate	Site Type	Height (m)
DT39	551492	168695	Roadside	2.5
DT40	551579	168507	Roadside	2.5
DT41	552175	168162	Roadside	2.5
DT83	550297	169682	Roadside	2.5
DT93	550283	169743	Roadside	2.5
DT94	550283	169743	Roadside	2.0
DT95	550258	169575	Roadside	2.5

Table B.2 – Verification

Site ID	Ratio of monitored road contribution NO_x / modelled road contribution NO_x	Adjustment factor for modelled road contribution NO_x	Adjusted modelled road contribution NO_x (µg/m^3)	Adjusted modelled total NO_x (including background NO_x) (µg/m^3)	Modelled total NO_2 (based upon empirical NO_x / NO_2 relationship) (µg/m^3)	Monitored total NO_2 (µg/m^3)	% Difference (adjusted modelled NO_2 vs. monitored NO_2)
DT39	2.99	2.517	35.99	54.27	31.69	34.79	-8.92
DT40	2.05		59.96	78.24	42.38	37.52	12.94
DT41	3.19		32.45	48.20	28.46	32.57	-12.61
DT83	3.05		50.56	68.04	37.86	42.44	-10.79
DT93	3.00		20.90	38.38	23.89	25.89	-7.74
DT94	1.70		44.94	62.42	35.34	28.56	23.72
DT95	3.12		27.35	44.83	27.09	30.22	-10.37

The results of the verification is presented in Table B.2 and Figure B.1, and it can be seen that all monitoring sites are modelled to be within the ±25% acceptance level. The verification factor for the model is 2.517, with an RMSE of 4.3µg/m^3 and a R^2 value of 0.491. This verification factor shall be used for all remaining modelled receptors. Whilst DT83 is not modelling an exceedance, whereas a monitored exceedance is reported, it is important to note that with consideration of the model uncertainty as indicated by the RMSE, an exceedance could be considered.

Figure B.1 – Adjusted Verification Monitored NO_2 Concentrations vs. Verified Modelled NO_2



Appendix C – Background Concentrations

Table C.1 – Background Concentrations

Grid Square (X, Y)	NO_2 (µg/m³)	NO_x (µg/m³)
550500, 169500	15.7	21.7
551500, 169500	14.8	20.3
552500, 169500	14.7	20.1
550500, 168500	16.6	23.0
551500, 168500	16.1	22.3
552500, 168500	17.8	24.9
Background locations have been taken from the Defra Background Mapping resource for Sevenoaks District Council.		

Appendix G: Electric Vehicle Infrastructure Study

Sevenoaks
DISTRICT COUNCIL

Future Demand for EV Infrastructure

June 2023

Contents

Introduction

a. Sevenoaks District Council recognises that a significant barrier to the adoption of Battery Electric Vehicles (BEV) is the lack of availability of public Electric Vehicle (EV) infrastructure. However, and at the same time, the installation of public EV infrastructure is not currently commercially viable within all areas as EV adoption by the public (although growing) remains relatively low compared to Internal Combustion Engine (ICE) Vehicles.

b. Most current public EV infrastructure is only suitable for supplementary charging (at a destination) and therefore it is almost a necessity for an EV driver to install their own private EV charger at home. In turn this effectively requires that EV owners have privately accessible driveways.

c. Increased Public EV Infrastructure that is suitable to support households without off-street parking is therefore critical to ensure that all households have the opportunity to transition to an EV.

d. Whilst the District Council is unable to implement and install all of the required public EV infrastructure itself, we do consider that we have a leadership role in ensuring that partners install charging where it is most needed.

e. This study seeks to identify the future demand (2030) for EV vehicles within Sevenoaks district. It then utilises bespoke modelling from Field Dynamics to predict the future need for public infrastructure geographically and numerically.

1 Air Quality Context

1.1 Sevenoaks District Council currently has 4 Air Quality Management Areas where Nitrogen Dioxide (NO_2) is predicted/ modelled to exceed national objective levels (40ugm^3 as an annual average). These are:

- AQMA 8- London Road/ High Street, Swanley
- AQMA 10 Sevenoaks Town Centre
- AQMA 13 A25- entire length from boundary with Tandridge to Tonbridge and Malling
- AQMA 14- Junction of Birchwood Road and London Road Swanley

1.2 In each of these areas, poor air quality is primarily as a result of tail pipe emissions from Internal Combustion Engine (ICE) vehicles. Studies commissioned by the District Council have shown that the sources of pollution are as follows:

- Diesel private cars- 32.9%
- Diesel light goods vehicles (LGVs) –19.6%
- Diesel heavy goods vehicles (HGVs)- 9.9%
- Petrol cars- 5.1%
- Bus/Coach –2.0%
- Motorcycle –0.1%

1.3 Measure 15 of the Sevenoaks District Council's Air Quality Action Plan 2022-2027 commits the District Council to improving and developing the EV infrastructure within the district.

2 Climate Action Context

2.1 In 2021 Sevenoaks District Council published its “Low Emission and Electric Vehicle Strategy”. As outlined in this document, in 2019, transport was the largest carbon emitting sector in the UK, responsible for 27% of total carbon emissions. In Sevenoaks District, transport accounts for 63% of the district’s total emissions.

2.2 The Council’s Movement Strategy, adopted in 2022, sets out the District Council’s opportunities and challenges and key priorities for sustainable movement and transport within the district. This identifies the high level of car ownership in the district and the lack of electric vehicle charging infrastructure. A key priority of the strategy is to improve electric vehicle use and infrastructure within the district to facilitate the use of electric vehicles.

2.3 Whilst the best way to reduce carbon emissions from transport is to reduce the need to travel, it is unrealistic to expect residents and businesses to forsake personal motorised transport entirely. Where such journeys continue to be necessary then it is significantly better for the environment if they are made within low or zero emission vehicles.

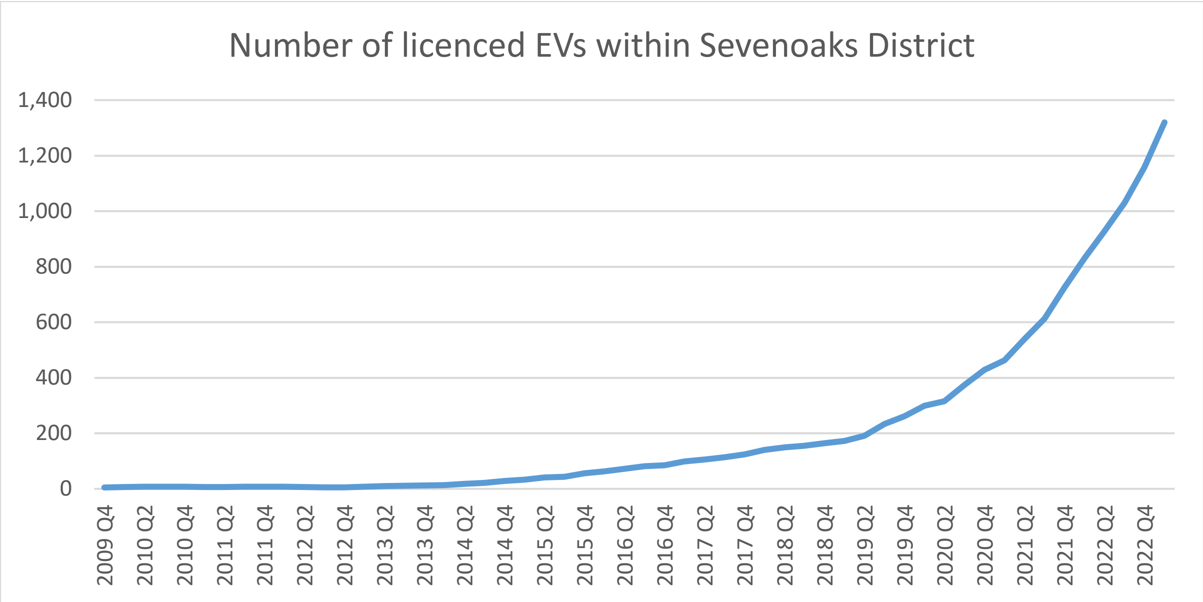
2.4 In March 2021 the Government confirmed 2030 as the phase out date for new petrol and diesel cars and vans, with all vehicles being required to have a “significant zero emissions capability” from 2030 and be 100% zero emissions from 2035.

3 Current Electric Vehicles within Sevenoaks District

3.1 The number of electric vehicles sold in the UK continues to grow. In 2015 electric vehicles accounted for just 1.1% of all new cars registered in the UK compared to 14% in Q3 of 2022 (House of Commons Library, 2023). It is a growing sector and electric vehicles, as well as the accompanying charging infrastructure, are crucial to reducing carbon emissions and improving air quality.

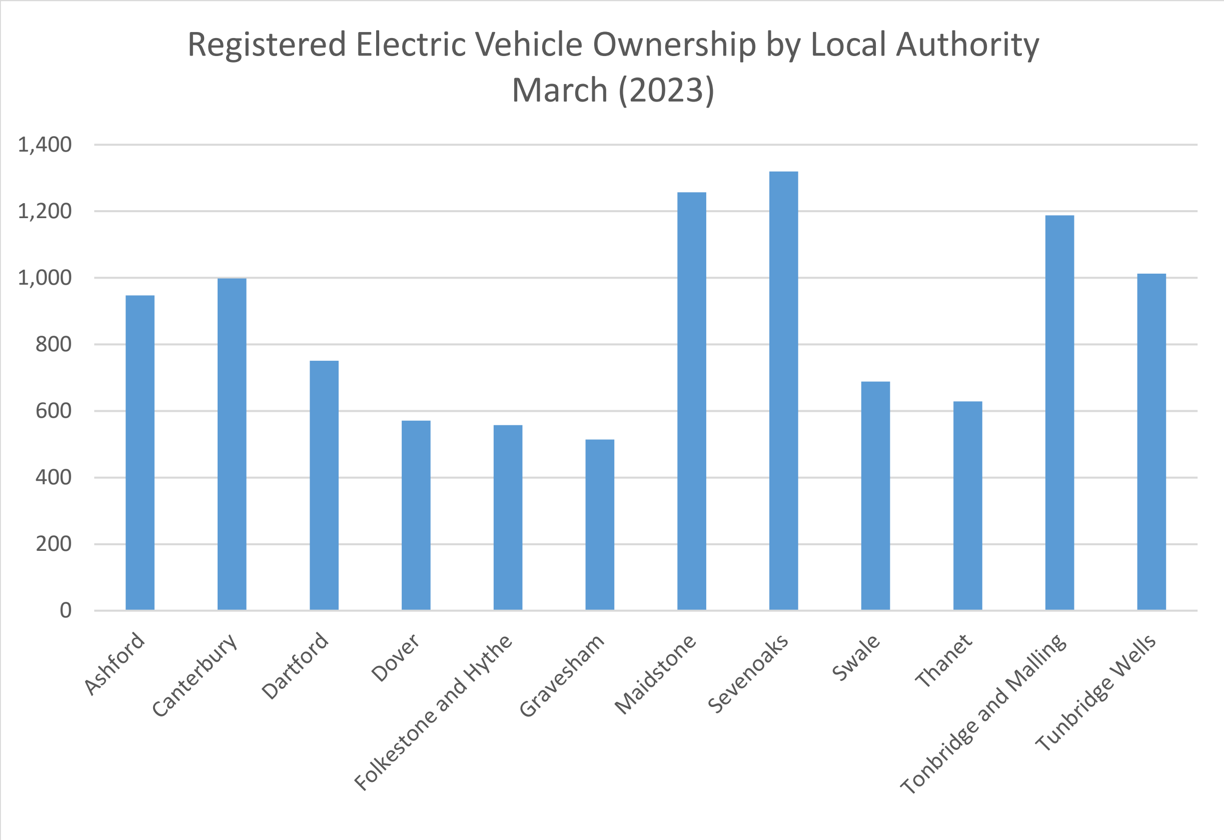
3.2 Within Sevenoaks District the number of registered EVs continues to increase rapidly (over 1300 in Q1 of 2023) as shown in Figure 1 (Gov.uk, 2023).

Figure 1- EV vehicles registered within Sevenoaks District- August 2023



3.3 Sevenoaks District continues to have the highest level of electric vehicle ownership in Kent (Figure 2) (Gov.uk, 2023).

Figure 2: Registered Electric Vehicle Ownership by Local Authority- March 2023



4 The need for Public EV infrastructure

4.1 It is important to understand that EV ownership requires a different mind-set to that required for traditional ICE vehicle ownership. The average range of a new EV vehicle is estimated to be 211 miles, and the majority of EV owners charge their vehicles at home via a slow (3kw) or fast (7kw) chargers. At these charging speeds most, vehicles can be fully charged within about 8 hours (often overnight when some electricity tariffs offer favourable rates for EV owners).

4.2 Most journeys within the UK are relatively short. 61% of car journeys are under 5 miles and the average UK car journey is believed to be around 8.4 miles (Department for Transport, 2022). Therefore, in normal circumstances most EV drivers need to charge their vehicles less than once per week.

4.3 On longer journeys (which exceed the vehicles battery range) or where a resident does not have access to off street parking (where an EV charger can be installed) public charging infrastructure becomes critical to the use of an EV.

4.4 Currently within the UK, EV chargers are classified as:

- Slow- usually rated up to 3kW and can include 3-pin plugs (2.3kW). These are often found at domestic premises where the vehicle will be parked for an extended length of time (6-12hrs)
- Fast- these are typically rated at 7kW (although 22kW charges also fall within this category). Fast chargers tend to be found at destinations where the user is likely to be parked for an hour or more such as car parks, supermarkets, commercial premises or leisure centres. Most home charges installed at domestic properties also fall within this category.
- Rapid chargers- these operate at 50kW+ and have traditionally been installed at motorway service stations, town centres or close to main transport routes. This type of charger is most commonly used by those needing to charge in order to complete a journey.
- Ultra Rapid Chargers provide power at 100kW or more and therefore charging times are significantly reduced. This type of charger is becoming increasingly common as it results in an experience closer to that of an ICE vehicle (i.e. significant charge within 20 minutes).

4.5 Unlike an ICE vehicle where the driver can fill the tank with fuel within a few minutes, EV batteries take time to charge depending on the charger used (see 4.4). As a result, EV technology works best when the battery is charged whilst the vehicles driver carries out a secondary activity (i.e.

charges whilst undertaking the weekly food shop, is asleep at night, goes to the cinema etc.).

4.6 It is often believed that it is important to install the fastest possible charger at all locations in order to try and closely replicate the ICE experience of refuelling. In practice however, this is not possible (owing to electricity grid capacity) or necessary.

4.7 Generally, rapid or ultra-rapid charges have higher unit prices per kW of energy supplied (cost more to use) and most have idle fees which apply after a vehicle remains connected to the charger. Therefore, they are not appropriate for scenarios whereby a driver wishes to charge overnight. They also require significant infrastructure to operate and sufficient electricity grid capacity.

4.8 As outlined in 4.4, different charging speeds have different purposes depending on the type of charging necessary, and often it is the availability and maintenance of chargers which is more critical to EV drivers rather than the speed. Whilst a rapid or ultra-rapid charger is best whilst a driver gets a coffee and uses the facilities at a motorway service station (20–30-minute charge), a slow or fast charger is best for an overnight charge (6-8hrs).

5 Current Public EV Infrastructure within Sevenoaks District

5.1 Currently there are believed to be 33 publicly available charging devices/ stations within the Sevenoaks District. Of these 14 are rapid chargers or faster (50KW+). This represents 27.3 chargers per 100,000 people and 11.6 rapid chargers per 100,000 people or alternatively 2 chargers for every 100 privately registered plug-in vehicles in this area. (House of Commons Library, 2023)

5.2 The District Council have committed to installing electric vehicle charging points in Sevenoaks District Council owned car parks. This is included as an action for the Net Zero 2030 work. Currently the Council has installed 10 charging points within Sevenoaks District Council owned car parks. This is detailed in Table 3.

Table 3- Details of Public EV chargers within SDC car parks

Car Park	Location	Capacity	Disabled dual use bays	Single use disabled bays	Other bays	EVCP
Sevenoaks Town car park	Sevenoaks	449	19	4	0	8 (BP Pulse)
Bradbourne car park	Sevenoaks	420 + 20	8	2	0	2 (Charge Master)

5.3 In addition, we have installed 8 publicly accessible charges at Argyle Road (Carbon 3).

6 Methodology

6.1 Sevenoaks District Council engaged Field Dynamics (a leading net zero data analytics consultancy) to help identify future demand for public EV infrastructure within Sevenoaks District via their ‘JumpStart project’.

6.2 JumpStart is a data driven, structured and proven approach that builds an evidence foundation specific to the needs of their client. Officers from Environmental Health, Planning Policy and GIS teams participated in a number of workshops where key national data sets were adapted around the needs of Sevenoaks District Council. The outputs from this data were combined with local factors and provided back to us for future analysis and decision making.

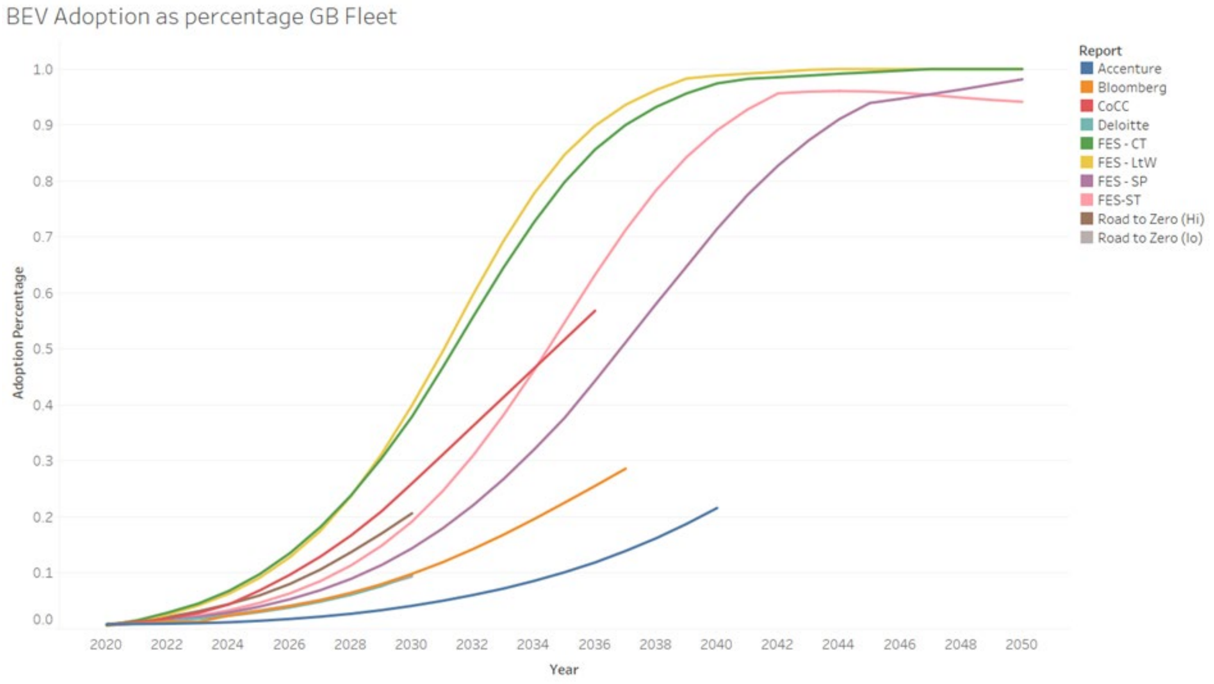
6.3 The stages of JumpStart are:

- Step 1- Planning Horizon- Identify what initial level of adoption to plan for.
- Step 2- Scale of Challenge- Calculate what scale of service would be required for the initial scenario
- Step 3- Demand Zoning- Define how services will be allocated to zones with different demand profiles
- Step 4- Initial Site Location- Selection of ideal Public EV locations within the demand zones

7 Future Demand (2030)

7.1 There are a number of publicly available ‘potential EV adoption’ models which can be used to predict future EV (and therefore EV charger) demand (see figure 4 below).

Figure 4 – Battery Electric Vehicle adoption curbs



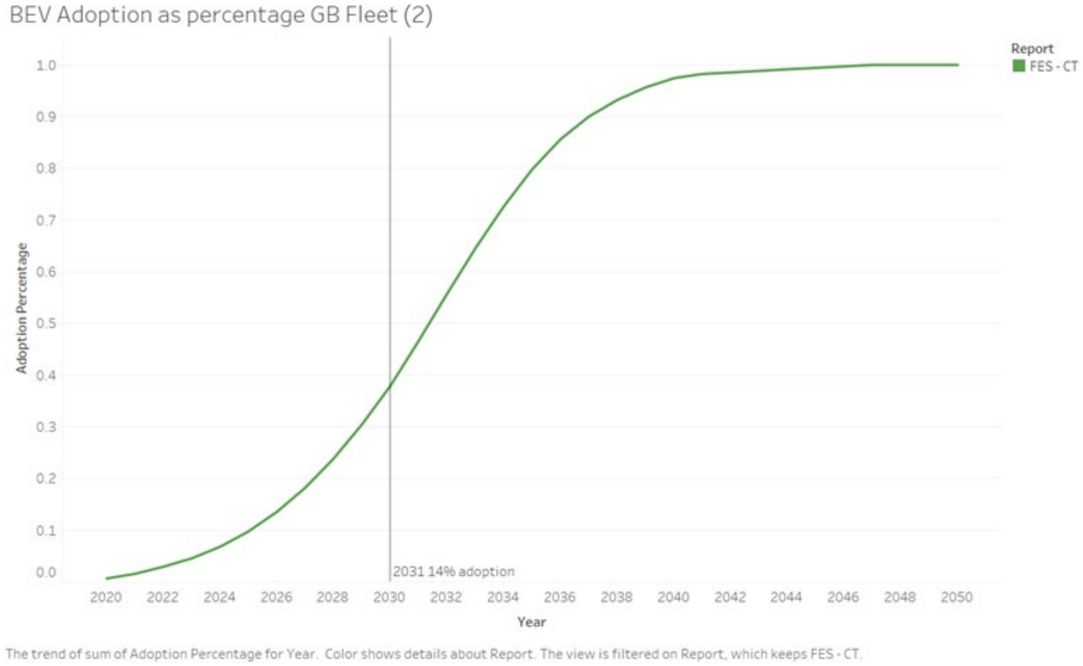
The trend of sum of Adoption Percentage for Year. Color shows details about Report. The view is filtered on Report, which keeps 10 of 10 members.

7.2 Each of these scenarios has built in assumptions which affect the model output. Their accuracy can be significantly affected by future changes to government policy, cost/ availability of infrastructure and vehicles, changes to socioeconomic factors or public perception.

7.3 Field Dynamics have considered the relative merits of each of these adoption curves to act as a ‘Planning Horizon’ for Sevenoaks. With consideration of a number of criteria (including current levels of adoption and local population), it has been determined that the adoption curve published within ‘National Grid: Future Energy Scenarios- Consumer

Transformation' (available at https://www.nationalgrideso.com/future-energy/future-energy-scenarios) is most appropriate for Sevenoaks District (see Figure 5).

Figure 5- Selected adoption curve for Sevenoaks



7.4 Using this adoption curve, Field Dynamics have forecast future EV numbers within Sevenoaks District (Table 6 below).

Table 6- Forecast of EV numbers within Sevenoaks District in 2030

	% of fleet	EV Number	Total Fleet
Current Assumed Adoption	2.20%	1670	63009
Predicted demand in 2030	36%	22683	

8 Scale of Challenge

8.1 The next step of JumpStart is to understand the size of the public charging infrastructure required to support the predicted EV fleet. Field Dynamics have modelled EV use based on the personas of 8 different driver profiles as follows:

Table 7 –Modelled EV driver profiles within Sevenoaks District

Profile	Description	Predicted EV adoption	EV Count	Use of Public EV infrastructure (%)
On Street-Business Miles -1	A salesperson (or similar) who travels a lot outside of the area but returns home each evening	30%	961	4%
On Street-Business Miles -2	A local trades person with a van/ car who primarily travels within the area	30%	" "	" "
On Street Personal Miles -1	A driver who primarily makes use of a charger near to their home	34%	6634	26%
On Street Personal Miles -2	A driver who primarily charges at a secondary destination (in town or destination charger)	34%	" "	" "
Off Street Business Miles- 1	A salesperson (or similar) who travels a lot outside of the area but returns home each evening	38%	2362	70%
Off Street Business Miles- 2	A local trades person with a van/ car who primarily travels within the area	38%	" "	" "
Off Street Personal Miles- 1	An office worker who commutes out of the area, with no work-based charging	40%	15149	0%

Profile	Description	Predicted EV adoption	EV Count	Use of Public EV infrastructure (%)
Off Street Personal Miles- 2	A retiree who goes to different locations or a parent who goes to multiple events	40%	" "	" "

8.2 Each of the profiles outlined above is modelled as using a different mix of private and public charging infrastructure. It is anticipated that where personal and business drivers have off street parking they will install and utilise private charging infrastructure whenever possible and are therefore not reliant on public EV infrastructure except to undertake top-up charges. Those without access to off street parking are more reliant on public EV charging infrastructure. The amount and type of charging required will vary depending on the number of miles travelled and the type of journeys undertaken (i.e. high mileage vehicles undertaking journeys within a vehicles range may only require charging overnight on fast chargers, whereas vehicles travelling significant miles within the district may require destination or top-up charging at rapid chargers).

8.3 These modelled profiles were used by Field Dynamics to predict the numbers of EV chargers required by purpose based on the following categorisations:

- Local- A public EV connector that is within walking distance of the household. These are generally 'fast' (up to 22kW) but may be slower when powered from street furniture (sometimes 3kW). These chargers generally require a vehicle to be plugged in for several hours and so lend themselves to overnight charging.
- High Convenience- A public EV connector that is visited for the primary purpose of charging such as those at designated charging hubs or at motorway service stations. Normally these chargers are rapid or ultra-rapid (50kW+). These chargers can fully charge an EV within 20-40 minutes (depending on battery and charger type).

- Destination- A public EV charger that is visited for some other primary purpose (such as shopping in a town centre, or leisure activity) and where charging is the secondary purpose. These charges are usually fast (7-22kW) or rapid (normally up to 50kW) and can charge a vehicle within approximately 1-3 hours. Ideally the speed of charger is matched to the time spent at the primary activity.

8.4 Field Dynamics have utilised the 'Modelled EV Driver Profiles' to estimate the quantity of public EV chargers required within the district by type in order to fully support predicted adoption levels in 2030 (Table 8 below)

Table 8- Number of Public EV Chargers required to support predicted 2030 adoption.

	Local	High Convenience	Destination
On Street business driver	415	4	19
On-street non-business driver	216	18	155
Off-street business driver	0	3	5
Off street non-business driver	0	8	12
TOTAL	631	33	191

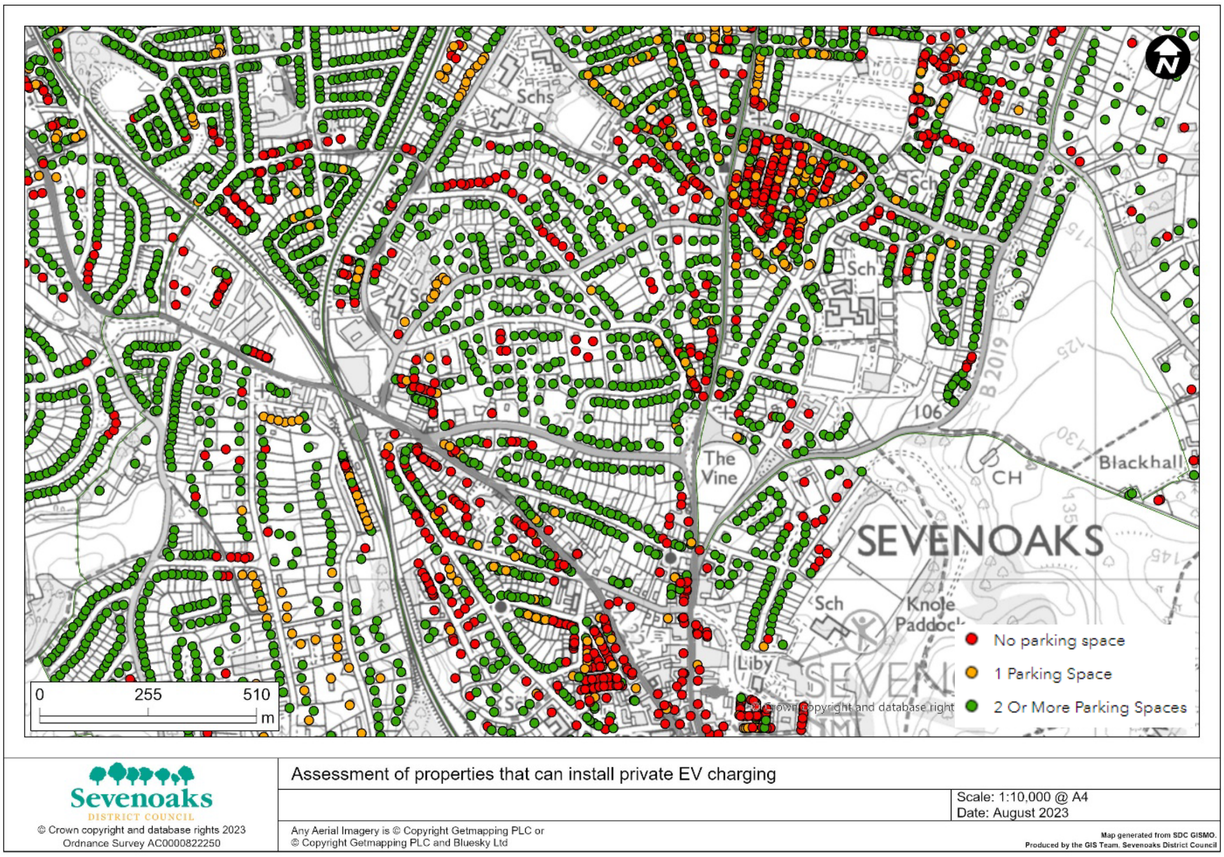
9 Demand Zoning

9.1 Following the assessment of number of public chargers potentially required by 2030 it is necessary to assess geographically the areas of greatest need in order to help the District Council prioritise where to focus its limited resources. This type of evidence-based zoning enables the District Council to prioritise investment based on clear, robust data and evidence decisions made clearly to stakeholders.

9.2 Field Dynamics used their proprietary model to assess which properties in Sevenoaks District are likely to be able to install their own charging infrastructure. As outlined in 4, it can be assumed that the vast majority of residents with off-street parking will install a home charger. They are therefore likely to be far less reliant on public EV infrastructure than those without off road parking and a lack of public EV infrastructure is unlikely to be a substantial barrier to EV adoption.

9.3 Using the Field Dynamics model there are believed to be approximately 16,620 properties within Sevenoaks District that will be reliant on public EV infrastructure (do not have access to off street parking).

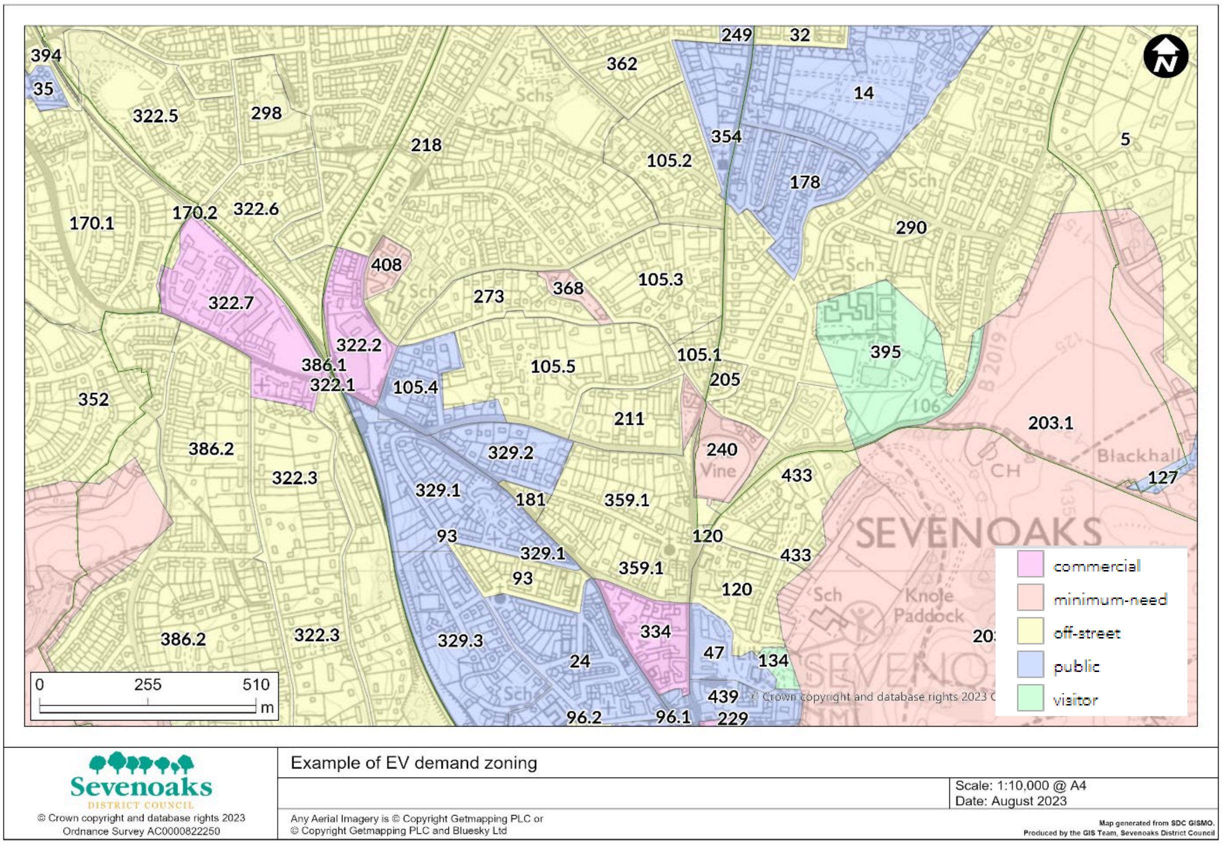
Figure 9- Example of output from Field Dynamics model showing which properties can install private EV charging.



9.4 Using the output from the initial assessment, Field Dynamics have utilised their modelling software to split the Sevenoaks District into 5 types of zones based on their unique household dataset. These zones are:

- Public Need – These zones have a high level of residents who will be reliant on public charging
- Off-Street – These zones have a high level of residents who will be able to charge at home
- Commercial – Zones where residents will be able to rely on commercially provided chargers
- Visitor – Zones where non-residents will make up a high level of charging
- Low Density – Zones where there is a minimum need for public charging

Figure 10- Example of zoning output from Field Dynamics.



9.5 Using this zoning process, Field Dynamic's model split the district into 280 zones. This split is outlined in Table 11 below.

Table 11- Split of zoning output from Field Dynamics

Zone Type	Number of zones	On-Street Households
Public Need	91	8657
Off Street	112	4113
Commercial	19	700
Visitor	4	27
Low Density/ minimum need	54	3123
Total	280	16,620

10 Public EV Charging Site Selection

10.1 The demand zoning helps the District Council to prioritise where there is greatest need for public EV chargers. Generally, these are the areas with the highest number of on-street households which are not served by existing or planned EV infrastructure.

10.2 Analysis of demand zoning for Sevenoaks has been used to identify the top 25 areas of demand for the installation of public charging infrastructure (Table 12 below).

Table 12- Top 25 Demand Zones identified by Field Dynamics

Zone ID	Area description	Total Households	Total On-Street Households	Percentage On- Street Households
200	New Ash Green (Farm Holt, Olivers Mill, Ayelands)	997	662	66.4%
121	Dunton Green (Former West Kent Coldstore)	646	425	65.8%
62	South Darenth- (Former Paper Mill Site)	467	330	70.7%
136	Swanley- (High Firs Estate)	695	313	45.0%
294	New Ash Green (Capelands, Spring Cross, Lambardes, Redhill Wood, Bowes Wood, Manor Forstal, Westfield)	615	311	50.5
76	Edenbridge (Spitals Cross Estate)	432	306	70.8%
329.1	Sevenoaks (Granville Road)	349	275	78.8%
73	Westerham (Croydon Road, Rysted Lane, The Paddock, Grange Close, New Street, Westbury Terrace, Squerryes Mead, Black Eagle Close, Atterbury Close)	663	254	38.3%
126	Hartley (Billings Estate)	235	219	93.2%

Zone ID	Area description	Total Households	Total On-Street Households	Percentage On- Street Households
80	Swanley (Sycamore Drive)	292	213	72.9%
251.2	Swanley (Oakleigh Close)	333	202	60.7%
58	Swanley (Bonney Way)	275	201	73.1%
193	New Ash Green (Punch Croft)	365	199	54.5%
96.1	Sevenoaks (Oak Tree Close)	218	176	80.1%
348	Seal (Childsbridge Lane)	462	175	37.9%
46	West Kingsdown (Kaysland Park)	190	167	87.9%
88	South Darenth (Gorringe Avenue)	203	165	81.3%
24	Sevenoaks (Lime Tree Walk)	233	157	67.4%
354	Sevenoaks (St Johns Road)	222	141	63.5%
14	Sevenoaks (Hillingdon Rise)	392	137	34.9%
144	Edenbridge (Residential area bordered by Lingfield Road, Mont St Aignan Way and High Street, Edenbridge)	302	133	44.0%
438	New Ash Green (Ayelands Lane)	237	133	56.1%
401	Dunton Green- (London Road, Lennard Road, Barretts Road, Donnington Road)	343	129	37.6%
413.2	Edenbridge (Residential area north of the Edenbridge Railway Station bounded by Hilders Lane and Main Road.)	247	129	52.2%
70.2	Hextable (St Davids Road)	242	125	51.7%

10.3 This information indicates the following areas of priority for the installation of public EV infrastructure:

Table 13- Priority Locations for EV infrastructure

Priority	Location	Number of on-street households
1	New Ash Green	1,305
2	Swanley	946
3	Sevenoaks	886
4	South Darenth	495
5	Edenbridge	439
6	Dunton Green	425
7	Westerham	254
8	Hartley	219
9	Seal	175
10	West Kingsdown	167

11 Catchment Modeller

11.1 Demand zoning information was transferred to ‘Field Dynamics’ Catchment Modeller Service’.

11.2 Catchment Modeller allows the District Council to model the impact (potential on-street household’s serviced) of a particular charger type in a particular location. For the purposes of this model chargers are categorised as follows:

- Nearby (<22kW)- users will walk up to 3 minutes to this charger type
- Primary (normally 50kW+)- users will drive up to 10 minutes to use this charger type
- Secondary (normally >22kW to 50kW)- users will normally drive up to 5 minutes to use this charger type.

12 Impact of current public charging infrastructure

12.1 Catchment Modeller was used to model the number of off-street households served by Sevenoaks District Council owned public charging infrastructure installed across the District Council Area (Table 13 below).

Table 14- Modelled impact of current SDC installed public chargers

Location	Town	Field Dynamics classification	Charger Type and number	On-street properties served
Bradbourne Road Car Park	Sevenoaks	Nearby	2x 22kW	56
Sevenoaks Town Car Park	Sevenoaks	Nearby	8x 7kW	95
Council Offices-Argyle Road	Sevenoaks	Nearby	8 x 22kW	193
		TOTAL	18	344

12.2 The public EV chargers within Bradbourne and Sevenoaks Town car parks have been modelled as 'Nearby' owing to their speed (fast chargers). However, the primary use of these chargers is by EV drivers who are visiting Sevenoaks Town Centre and consequently they are technically classified as secondary use as per 8.3. Users of these EV chargers are required to adhere to relevant terms and conditions of the relevant carpark including the payment of fees and stay conditions.

12.3 The public EV chargers at the Council Offices are classified as 'Nearby'. These are sited to allow a vehicle to be charged for several hours (i.e. overnight) and have been made available for local residents to use.

12.4 Including the District Council's public EV chargers (Table 13 above), the number of on-street properties currently served by public charging infrastructure is modelled to be 583 (3.51% coverage of on-street households within Sevenoaks District).

12.5 In addition to the currently installed EV infrastructure provided by SDC, there is further agreement to install additional public EV chargers in a number of District Council maintained carparks. The modelled impact of these is shown in Table 14.

Table 15- Modelled impact of current SDC installed public chargers

Location	Town	Field Dynamics classification	Charger Type and number	On-street properties served
Blighs car park	Sevenoaks	Secondary	Rapid 50 kW - X4	4018
South Park car park	Sevenoaks	Secondary	Rapid 50 kW - x2	" "
Park Road car park	Swanley	Secondary	Rapid 50 kW - x2	2865
Station Road car park	Swanley	Secondary	Rapid 50 kW - x2	" "
Quebec Avenue car park (Outside Village Hall)	Westerham	Secondary	Rapid 50 kW x2	698
		TOTAL	**Rapid 50kW x12**	**7581**

12.6 Owing to the type of charger that it is proposed is installed the scheme outlined in 12.5 (above) will increase modelled coverage of on-street households to approximately 46% (7581 on street households).

13 On-Street Charging

13.1 The District Council recognises that on-street charging (where charging infrastructure is installed along the roadside) has the potential to significantly contribute to/ meet future public EV charging demand. In most cases, this type of charging will be the most convenient for on-street householders as it requires them to make minimal changes to their existing lifestyle choices (simply plugging in when they park).

13.2 Whilst this type of charging is critical to facilitate the transition to EV vehicles, this report focusses on the delivery of charging on private/ public land where power constraints may be more easily overcome and where the District Council can help influence partners.

13.3 Nevertheless, Sevenoaks District Council is committed to working with Kent County Council (the highways authority) to facilitate the installation of roadside public EV charging points whenever possible.

14 Future Priorities for Public EV Infrastructure in Sevenoaks District

a. The District Council is keen to support the continued expansion and availability of public EV charging facilities across the district.

b. We recognise that installation of EV charging (particularly Rapid and Ultra Rapid charging) needs to be commercially viable, and consequently major suppliers are likely to seek sites with significant vehicle turnover and where returns can be made on infrastructure investment. The District Council considers that this process will occur organically (led by consumer demand) without the need for intervention.

c. Unfortunately, it is unlikely that public EV charging will be commercially viable in all areas (particularly rural communities and villages). In these areas the District Council will need to be creative in identifying solutions and funding to meet the EV charging needs of residents who do not have access to off-street parking

d. With consideration to existing and proposed public EV chargers, the following areas have been identified as having the greatest need for focus by the District Council

14.1 New Ash Green

14.1..1 New Ash Green is a wholly designed village with an original innovative core of houses and a commercial centre, built in the early 1960's. A large amount of the housing is arranged in clusters around green spaces accessed by public footpaths. Cars are kept separate from pedestrians and householders park their cars either within designated shared car parks or along the edges of roads and then walk to their properties.

14.1..2 The Field Dynamics model estimates that there are 1372 on street households in this area (8.3% of on street households within Sevenoaks District) and 4 of the top 25 district wide public EV charging demand zones:

Figure 16- Map showing demand zoning in New Ash Green

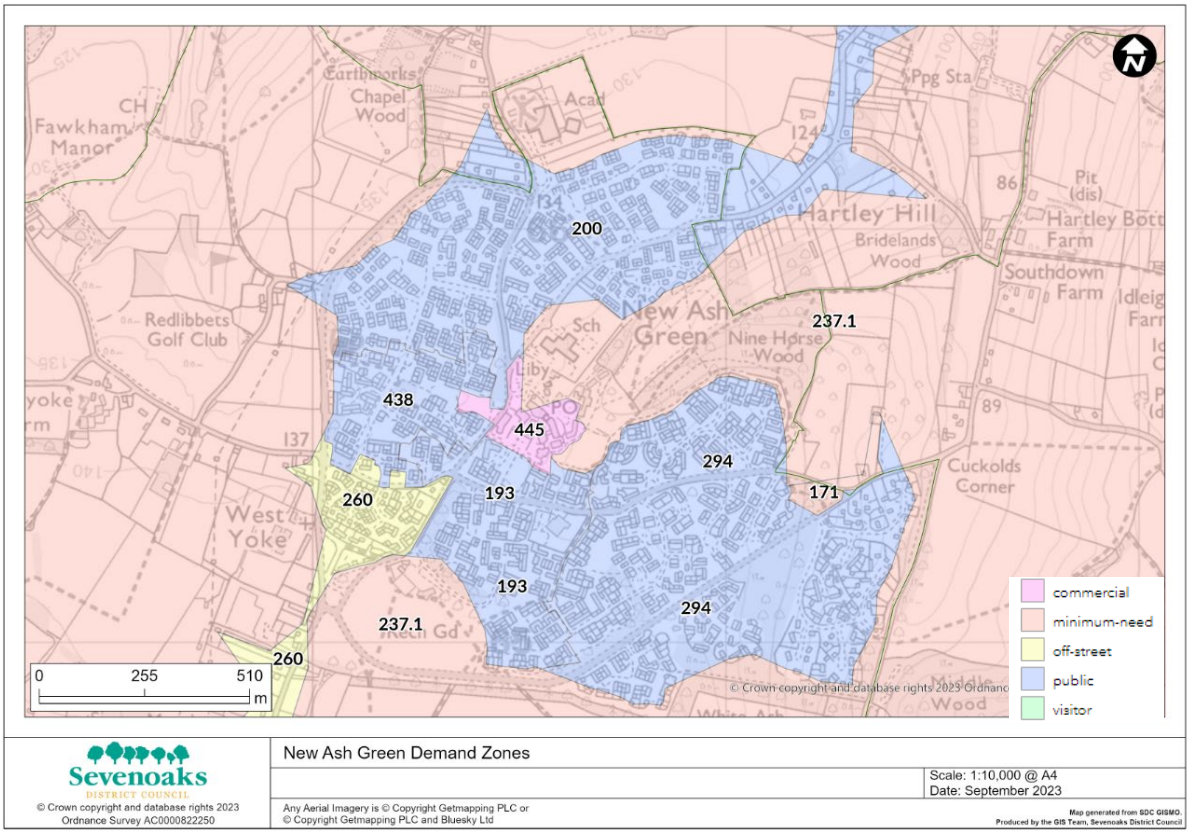


Table 17- Demand Zoning in New Ash Green.

Zone ID	Zone Classification	Number of households	Number of On-Street households	Percentage On-Street Households
193	Public	365	199	54.5
200	Public	997	662	66.4
260	Off-street	155	34	21.9

Zone ID	Zone Classification	Number of households	Number of On-Street households	Percentage On-Street Households
294	Public	615	311	50.6
438	Public	237	133	56.1
445	Commercial	33	33	100
TOTAL		2262	1372	60.7

14.1..3 Many of the residential properties within New Ash Green are served by communal parking areas that are some distance from their associated properties. Consequently, residents are unable to install private EV charging infrastructure.

14.1..4 The communal parking areas are understood to be within the ownership of the New Ash Green Village Association and most areas appear to have limited street lighting from which slow charging (3kW) may be possible. It is however unlikely that it would be possible to install ‘fast’ or ‘rapid’ charging infrastructure in these areas.

14.1..5 The New Ash Green Shopping Centre (zone classification: commercial) has free public car parking and is potentially a suitable location of ‘destination’ EV charging. However, owing to the geographical size of New Ash Green unless this charger is ‘rapid or ultra-rapid’ it would only provide potential infrastructure for up to 150 on-street households.

14.1..6 The installation of Fast/Rapid or Ultra Rapid Charging within New Ash Green would (according to Field Dynamics model) serve the entire village but may not be commercially viable and would require significant alterations to power infrastructure.

14.1..7 Analysis of Network Power UK’s ‘Demand Headroom’ data indicates that there is 56.96% electricity demand headroom in this location. This suggests that grid capacity would not be a significant limiting factor to the installation of public EV charging.

14.2 South Darenth

14.2..1 South Darenth is a village in the parish of Horton Kirby and South Darenth. It is located 4.2 miles east of Swanley & 4.4 miles south of Dartford. The village originally developed around the Horton Kirby Mill (originally built in 1820) which some years later was converted into a paper mill. Accommodation was needed for the workers, so small terraced houses were built close by. The mill ceased operating in February 2003 and has since been redeveloped extensively for housing. A Co-op Food supermarket is located in one of the listed mill buildings.

14.2..2 The Field Dynamics model estimates that there are 495 on street households in this area (3.0% of on street households within Sevenoaks District) and 2 of the top 25 district wide public EV charging demand zones.

Figure 18- Map showing demand zoning in South Darenth

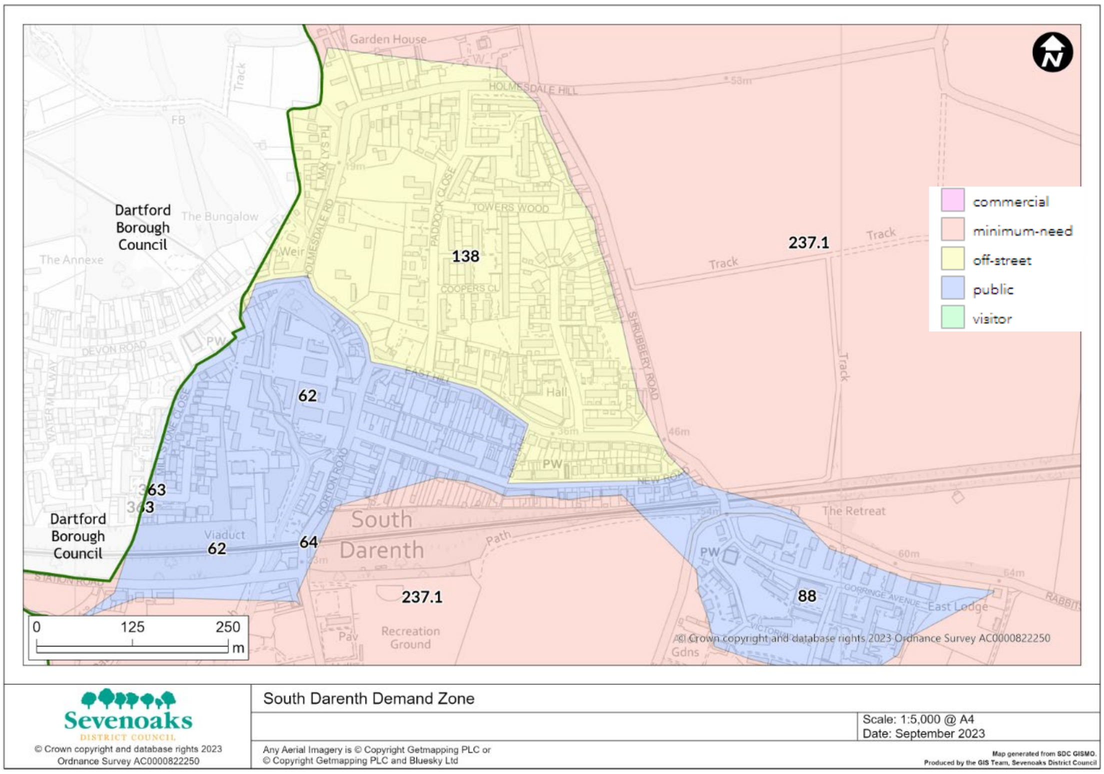


Table 19- Demand zoning in South Darenth

Zone ID	Zone Classification	Number of households	Number of On-Street households	Percentage On-Street Households
62	Public	467	330	70.1
88	Public	203	165	81.3
138	Off Street	417	94	22.5
TOTAL		670	495	73.9

14.2..3 There are a very small number of possible locations within South Darenth that would be viable for installing EV chargers. It is likely that the best solution would (subject to power constraints) would be to install a rapid or ultra-rapid charger near to the Co-op supermarket. Installing a rapid charger in this location would have the potential to serve 821 households within its catchment.

14.2..4 Analysis of Network Power UK's 'Demand Headroom' data indicates that there is 14.41% electricity demand headroom in this location. This suggests grid capacity would not be a significant limiting factor to the installation of public EV charging.

14.3 Edenbridge

14.3..1 Edenbridge lies in the west of the district, close to the Surrey border, and located at the bridging point of the River Eden which flows eastwards until it joins the River Medway at Penshurst. Historically the town grew along an older Roman road, and it was the centre of the Wealden iron industry in the Middle Ages. There are many medieval timber buildings which can still be seen around the town.

14.3..2 The Field Dynamics model estimates that there are 1606 on street households in this area (9.7% of on street households within Sevenoaks District) and 3 of the top 25 district wide public EV charging demand zones.

Figure 20- Map showing demand zoning in Edenbridge

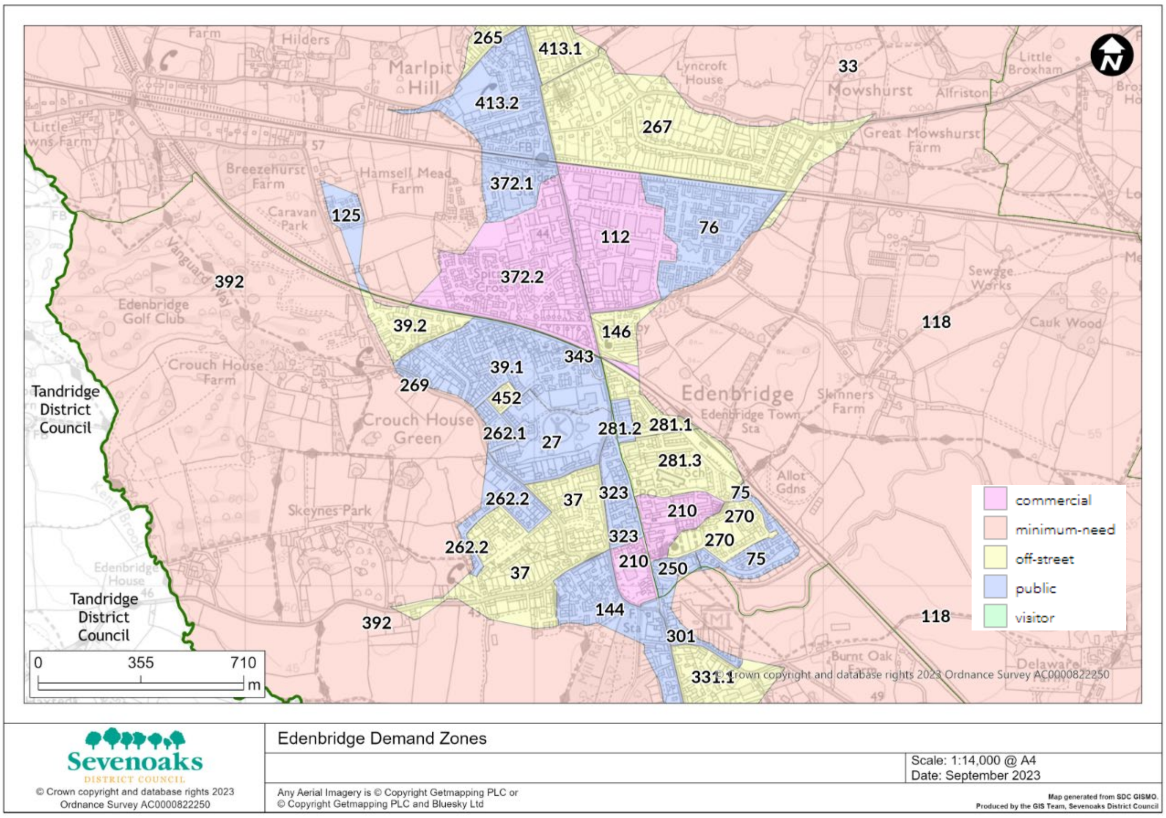


Figure 21- Demand zoning in Edenbridge

Zone ID	Zone Classification	Number of households	Number of On-Street households	Percentage On-Street Households
27	Public	108	60	55.6
37	Off Street	332	29	8.7
39.1	Public	344	124	36.0
39.2	Off Street	61	33	54.1
75	Public	117	38	32.5
76	Public	432	306	70.8
112	Commercial	86	50	58.1
125	Public	52	45	86.5
144	Public	302	133	44.0
146	Off Street	40	30	7.5
210	Commercial	158	90	57.0
250	Public	27	7	25.9
262.1	Public	55	25	45.5

Zone ID	Zone Classification	Number of households	Number of On-Street households	Percentage On-Street Households
262.2	Public	74	21	28.4
265	Off Street	79	8	10.1
267	Off Street	237	46	19.4
269	Public	6	5	83.3
270	Off Street	74	3	4.1
281.1	Off Street	47	11	23.4
281.2	Public	56	56	100
281.3	Off Street	157	83	52.8
301	Public	40	12	30.0
331.1	Off Street	128	57	44.5
343	Public	14	5	35.7
372.1	Public	81	57	70.4
372.2	Commercial	345	102	29.6
413.1	Off-Street	159	37	23.3
413.2	Public	247	129	52.2
452	Off Street	31	4	12.9
TOTAL		3889	1606	41.3

14.3..3 It is understood that Edenbridge Town Council are intending to install 4 public EV chargers within the Market Car Park for use by visitors to the town. It is assumed that these chargers would provide charging capability for 66 on-street households.

14.3..4 Further public EV development opportunities within Edenbridge could be realised by working with existing retailers in the area such as Waitrose, Aldi, or Home Bargains. Destination chargers in these zones could increase the number of on-street households provided for by approximately 244.

14.3..5 Analysis of Network Power UK’s ‘Demand Headroom’ data indicates that there is -13.64% electricity demand headroom in this location and the existing network is more than 5% overloaded. This suggests that current grid capacity may be a limiting factor to the installation of public EV charging.

14.4 Dunton Green

14.4..1 Dunton Green is situated in the valley of the river Darent and is a designated part of the Kent Downs (an area of outstanding natural beauty). Historically Dunton Green was a centre for making bricks and tiles. Dunton Green railway station provides good connections into London, running every 30 minutes and is situated within the commuter belt. There are also many bus connections from Dunton Green which connect to the wider Sevenoaks area, such as Knockholt, Halsted and Sevenoaks Weald.

14.4..2 The Field Dynamics model estimates that there are 813 on street households in this area (4.9% of on street households within Sevenoaks District) and 2 of the top 25 district wide public EV charging demand zones:

Figure 22- Map showing demand zoning in Dunton Green

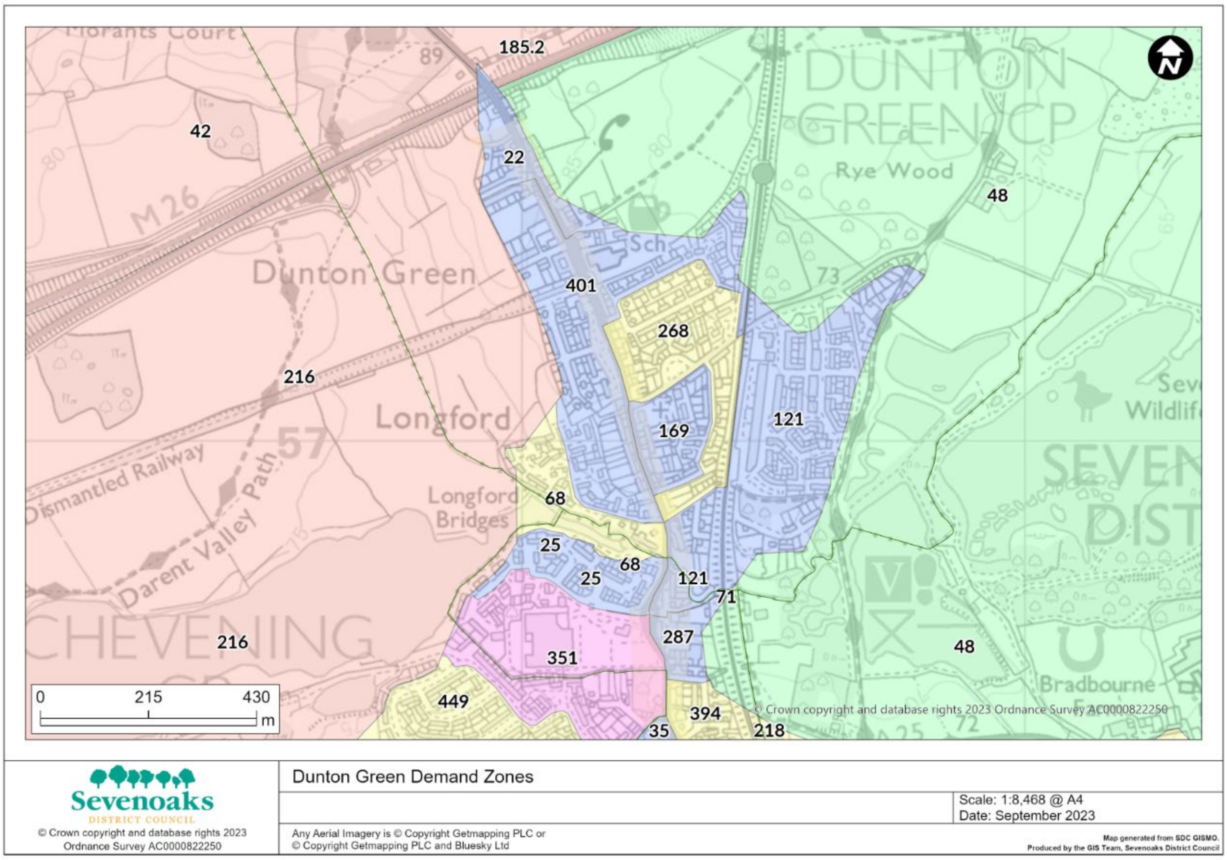


Table 23- Demand zoning in Dunton Green

Zone ID	Zone Classification	Number of households	Number of On-Street households	Percentage On-Street Households
22	Public	83	35	42.2
25	Public	123	33	26.8
68	Off Street	39	9	23.1
121	Public	646	425	65.8
169	Public	117	70	59.8
268	Off street	186	29	15.6
287	Public	24	16	66.7
351	Commercial	182	67	36.8
401	Public	343	129	37.6
TOTAL		1743	813	46.6

14.4..3 Currently no specific locations have been identified for potential EV charger installations within Dunton Green, however the most likely proposal would be to expand the existing locations available within Tesco or seek expansion of the Tesla station at Donnington Manor Hotel to other makes of EV.

14.4..4 Analysis of Network Power UK's 'Demand Headroom' data indicates that there is 49.89% electricity demand headroom in this location. This suggests grid capacity would not be a significant limiting factor to the installation of public EV charging.

14.5 Hartley

14.5..1 Hartley is a small village located in the North of Sevenoaks District and borders both Dartford and Gravesham Borough Council areas. Historically, the village of Hartley was referred to within the Domesday Book of 1086 and some believe it dates to early Anglo-Saxon times. In 1872 following the development of the Longfield railway station, the village began to evolve from an agricultural hub to a commuter belt community.

14.5..2 The Field Dynamics model estimates that there are 1241 on street households in this area (7.5% of on street households within Sevenoaks District) and 2 of the top 25 district wide public EV charging demand zones:

Figure 24- Map showing demand zoning in Hartley

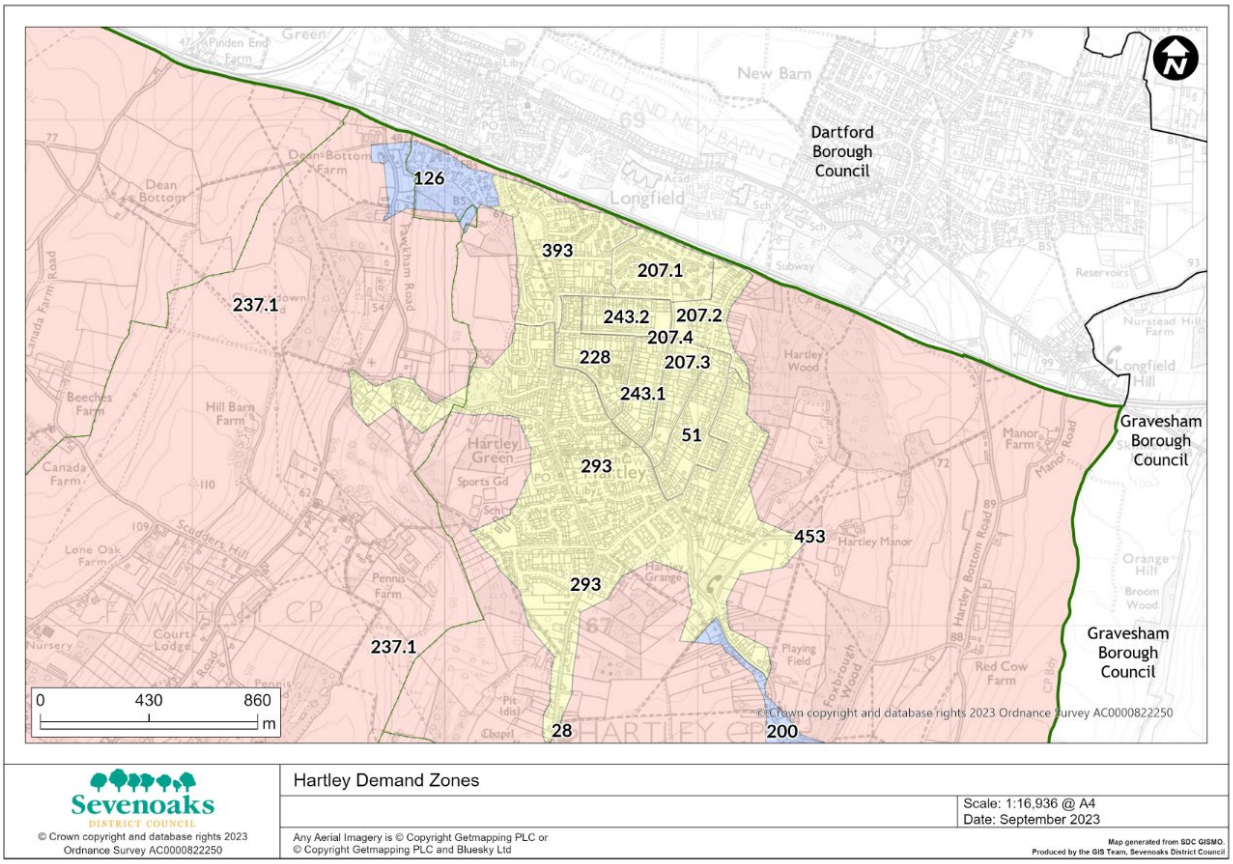


Table 25- Demand zoning in Hartley

Zone ID	Zone Classification	Number of households	Number of On-Street households	Percentage On-Street Households
51	off-street	93	2	2.2
126	public	235	219	93.2
200	public	997	662	66.4
207.1	off-street	323	145	44.9
207.2	off-street	65	6	9.29
207.3	off-street	73	8	10.99
207.4	public	0	0	0
228	off-street	104	11	10.6
243.1	off-street	64	1	1.6
243.2	off-street	65	29	44.6

Zone ID	Zone Classification	Number of households	Number of On-Street households	Percentage On-Street Households
293	off-street	952	103	10.8
393	off-street	261	55	21.1
TOTAL		3232	1241	38.4

14.5..3 Development opportunities within Hartley would require cross borough cooperation, as many of the larger amenities within the village lie outside of the Hartley boundary and within Dartford Borough Council's area.

14.5..4 Analysis of Network Power UK's 'Demand Headroom' data indicates that there is 56.96% electricity demand headroom in this location. This suggests grid capacity would not be a significant limiting factor to the installation of public EV charging.

14.6 Seal

14.6..1 Seal is situated along the A25 to the Northeast of Sevenoaks Town. Historically it is believed Seal dates to Anglo Saxon times and was recorded in the Domesday Book in 1096. The main High Street of Seal is located along the A25 and has a small number of amenities. Transport links in Seal are limited to bus links, which connect to other parts of Sevenoaks District and surrounding areas.

14.6..2 The Field Dynamics model estimates that there are 224 on street households in this area (1.3% of on street households within Sevenoaks District) and 1 of the top 25 district wide public EV charging demand zones:

Figure 26- Map of demand zones in Seal

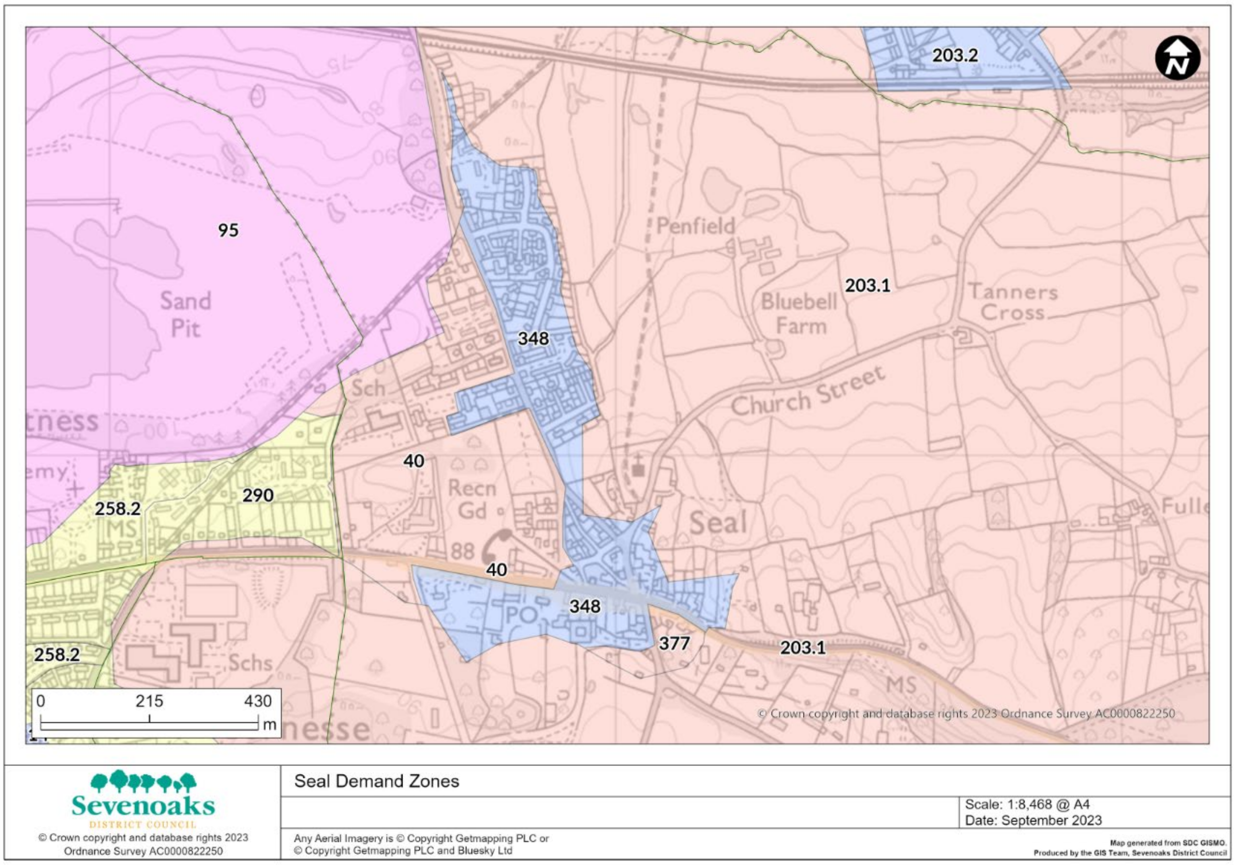


Table 27- Demand zones in Seal

Zone ID	Zone Classification	Number of households	Number of On-Street households	Percentage On-Street Households
348	Public	462	175	37.9
40	Minimum need	130	49	37.7
TOTAL		592	224	37.8

14.6..3 Due to its small size, EV development opportunities within Seal are limited. The most appropriate location to look at installing chargers is within the Seal Recreation Ground Car Park, which is located west of the Library and Parish Council.

14.6..4 Analysis of Network Power UK's 'Demand Headroom' data indicates that there is 49.89% electricity demand headroom in this location. This suggests grid capacity would not be a significant limiting factor to the installation of public EV charging.

14.7 West Kingsdown

14.7..1 West Kingsdown is located along the A20 and grew significantly in size following the First World War. It is most known for being home to Brands Hatch Racing Circuit, which held its first race in 1926 for cyclists and cross-country runners. In 1947, the BBC televised the first motorcycle event on British TV from Brands Hatch and in 2012 hosted the UK Paralympic Games Road cycling. Historically, West Kingsdown was known as Kingsown, and can be traced back to Anglo Saxon settlements. In the 1950s the Post Office requested the name be changed to avoid confusion with other villages in Kent, where it now became known as West Kingsdown.

14.7..2 The Field Dynamics model estimates that there are 482 on street households in this area (2.9% of on street households within Sevenoaks District) and 1 of the top 25 district wide public EV charging demand zones.

Figure 28- Map of demand zones in West Kingsdown

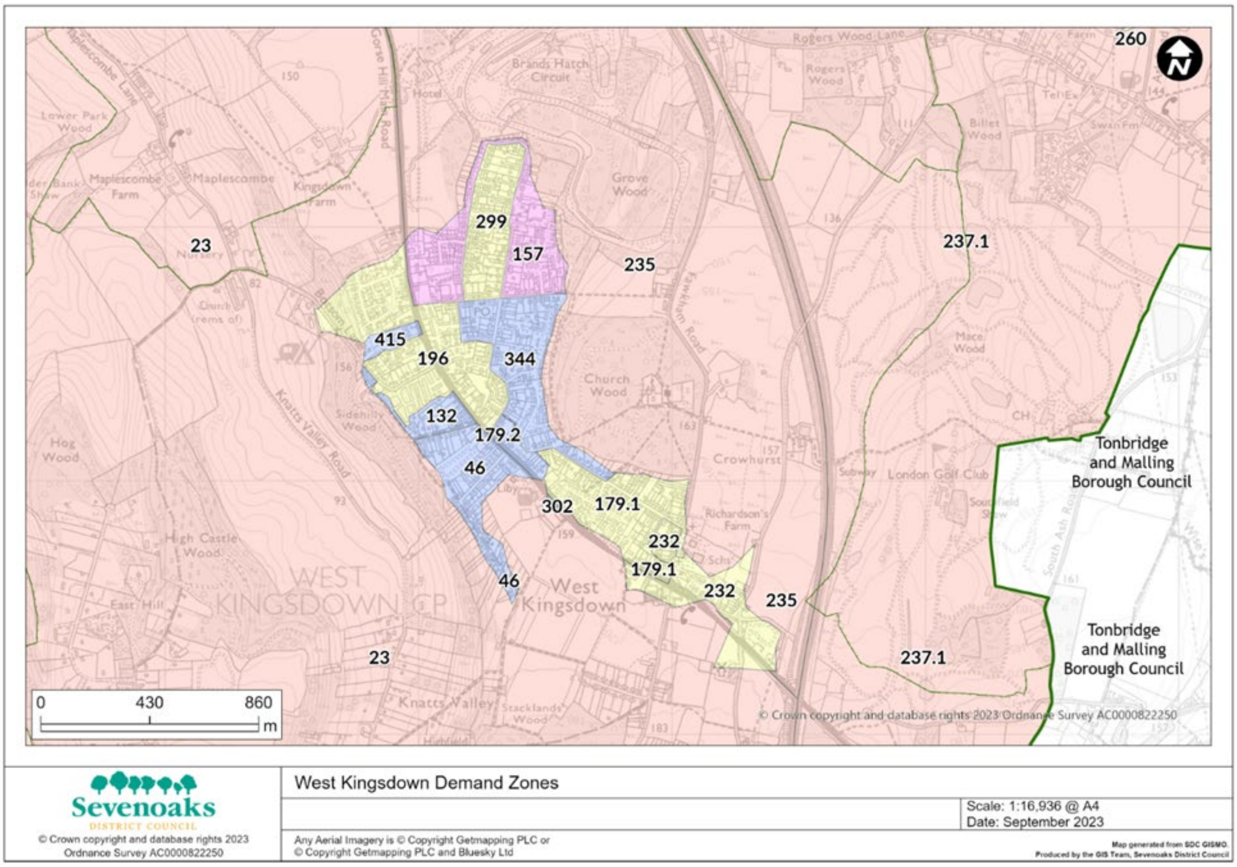


Table 29- Demand Zones in West Kingsdown

Zone ID	Zone Classification	Number of households	Number of On-Street households	Percentage On-Street Households
46	public	190	167	87.9
132	public	68	23	33.8
157	Commercial	294	48	16.3
179.1	Off Street	255	33	12.9
179.2	public	36	19	52.8
196	Off street	423	66	15.6
344	public	328	105	32.0
415	public	45	21	46.7
TOTAL		1639	482	29.4

14.7..3 The most appropriate locations to look at installing chargers is within the car park west of the Parish Council, the newly developed car park for the co-op off Hever Road/Hever Avenue. It may also be possible to work with a few larger sporting venues within the area such as Brands Hatch and London Golf Club to install rapid/ultra-rapid charging that would provide a facility for a significantly wider area.

14.7..4 Analysis of Network Power UK's 'Demand Headroom' data indicates that there is 14.41% electricity demand headroom in this location. This suggests grid capacity would not be a significant limiting factor to the installation of public EV charging.

14.8 Sevenoaks

14.8..1 Sevenoaks is a built-up area with an approximate population of more than 30,000. Sevenoaks consists of a main high street and a core retail centre at Bligh's, which is pedestrianised off the main high street. The average ages of Sevenoaks residents fall between 35-64 years old, with a substantial proportion of its residents owning their own homes and being in full time employment. Sevenoaks has a large commuter population, due to its fast train connections into central London and is a desirable location.

14.8..2 The Field Dynamics model estimates that there are 3330 on street households in this area (20.0% of on street households within Sevenoaks District) and 5 of the top 25 district wide public EV charging demand zones.

Figure 30- Map of demand zones in Sevenoaks

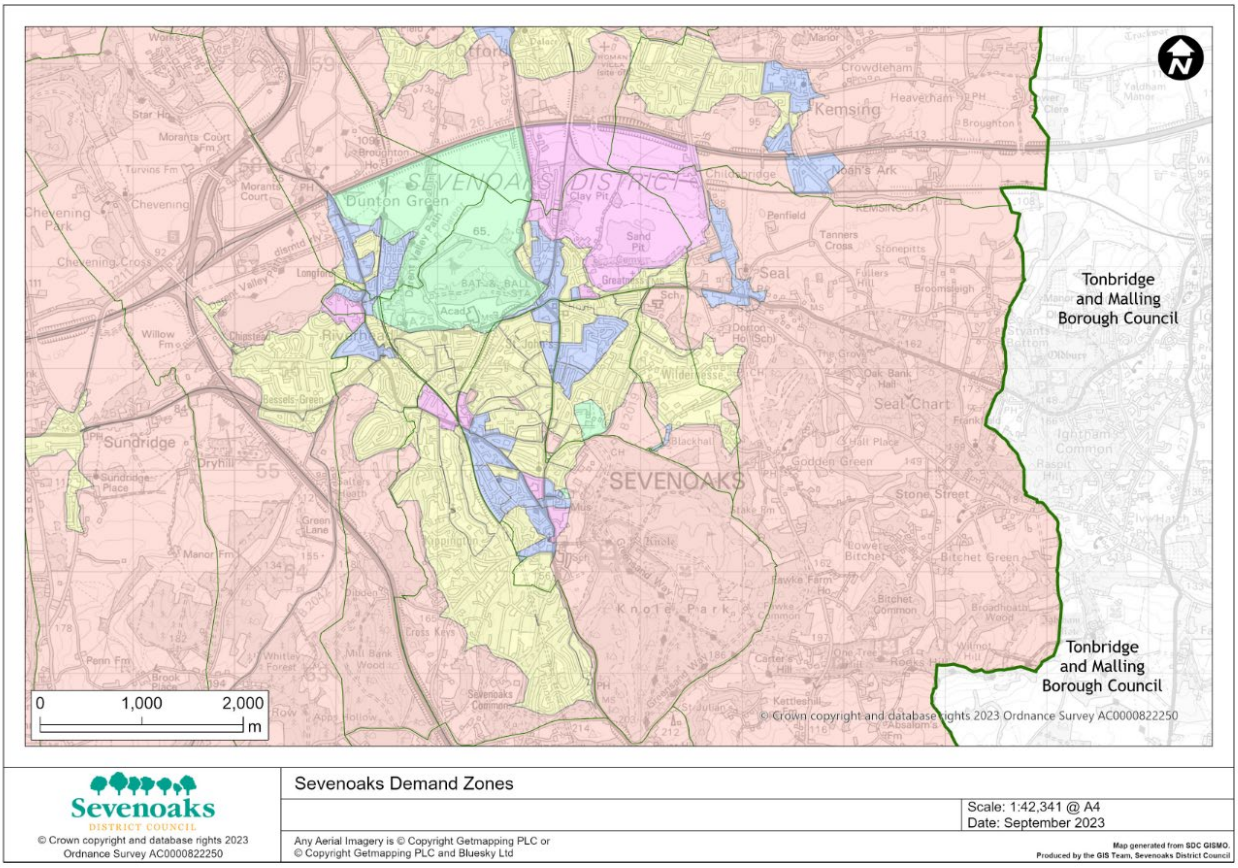


Table 31- Demand zones in Sevenoaks

Zone ID	Zone Classification	Number of households	Number of On-Street households	Percentage On-Street Households
5	Off-street	139	20	14.4
10	Commercial	49	15	30.6
12.1	Public	234	105	44.9
12.2	Public	217	69	31.8
14	Public	392	137	34.9
24	Public	233	157	67.4
25	Public	123	33	26.8
32	Off-street	199	9	4.5
35	Public	235	118	50.2
47	Public	14	12	85.7
48	Visitor	43	19	44.2
68	Off-street	39	9	23.1
93	Off-street	40	1	2.5
95	Commercial	31	17	54.8
96.1	Public	218	176	80.7

Zone ID	Zone Classification	Number of households	Number of On-Street households	Percentage On-Street Households
96.2	Off-Street	151	64	42.4
105.1	Off-street	55	29	52.7
105.2	Off-street	176	99	56.2
105.3	Off-street	75	14	18.7
105.4	Public	72	48	66.7
105.5	Off-street	108	30	27.8
120	Off-Street	38	6	15.8
134	Visitor	0	0	0
139	Off-street	59	12	20.3
149	Off-street	70	18	25.7
170.1	Off-street	165	36	21.8
170.2	Off-street	0	0	0
178	Public	199	84	42.2
181	Off-street	11	0	0
205	Off Street	21	7	33.3
211	Off-street	30	0	0
214	Off-steer	1	0	0
218	Off-street	673	66	9.8
229	Commercial	58	40	69.0
240	Minimum need	10	0	0
249	Public	73	36	49.3
258.1	Public	53	33	62.3
258.2	Off-street	262	112	42.7
273	Off-street	31	0	0
287	Public	24	16	66.7
290	Off Street	660	104	15.8
298	Off-street	30	9	30
322.1	Commercial	0	0	0
322.2	Commercial	48	27	56.3
322.3	Off-street	118	9	7.6
322.5	Off-street	126	7	5.6
322.6	Off-Street	114	23	20.2
322.7	Commercial	83	71	85.5
329.1	Public	349	275	78.8
329.2	Public	57	19	33.3
329.3	Public	128	92	71.9
334	Commercial	51	49	96.1
351	Commercial	182	67	36.8
352	Off-street	257	9	3.5
359.1	Off-street	143	66	46.2

Zone ID	Zone Classification	Number of households	Number of On-Street households	Percentage On-Street Households
362	Off-street	274	68	24.8
368	Minimum need	6	0	0
380	Public	61	8	13.1
386.2	Off Street	1545	386	25.0
394	Off-street	92	16	17.4
395	Visitor	0	0	0
396	Off-street	170	14	8.2
400	Off-street	87	12	13.8
408	Minimum need	5	3	60
425	Off-street	314	58	18.5
433	Off street	128	86	67.2
434	Off-street	84	14	16.7
439	Public	86	70	81.4
440	Off-street	14	0	0
434	Off-street	84	14	16.7
449	Off-street	796	107	13.4
TOTAL		10713	3330	31.1

14.8..3 As outlined above, the District Council has already installed multiple public EV chargers within Sevenoaks, and more are proposed within Sevenoaks District Council owned carparks.

14.8..4 Currently no further locations have been identified for potential EV charger installations within Sevenoaks, however there are lots of potential opportunities available.

14.8..5 Analysis of Network Power UK's 'Demand Headroom' data indicates that there is 27.81% electricity demand headroom in this location. This suggests grid capacity would not be a significant limiting factor to the installation of public EV charging.

14.9 Swanley

14.9..1 Swanley is Sevenoaks District's second largest town, after Sevenoaks itself. Swanley borders both the London Borough of Bexley and the London Borough of Bromley. It is a commuter town for London and is situated within the M25. It is believed the name originates from the agricultural past of the town. Swanley has a pedestrianised high street, comprising of several shops and amenities. It also has a newly refurbished leisure centre White Oak and a 60-acre park formally known as New Barn Park. Swanley also has a general market which takes place every Wednesday and Sunday in the town centre.

14.9..2 The Field Dynamics model estimates that there are 2036 on street households in this area (12.3% of on street households within Sevenoaks District) and 4 of the top 25 district wide public EV charging demand zones.

Figure 32- Map of demand zones in Swanley

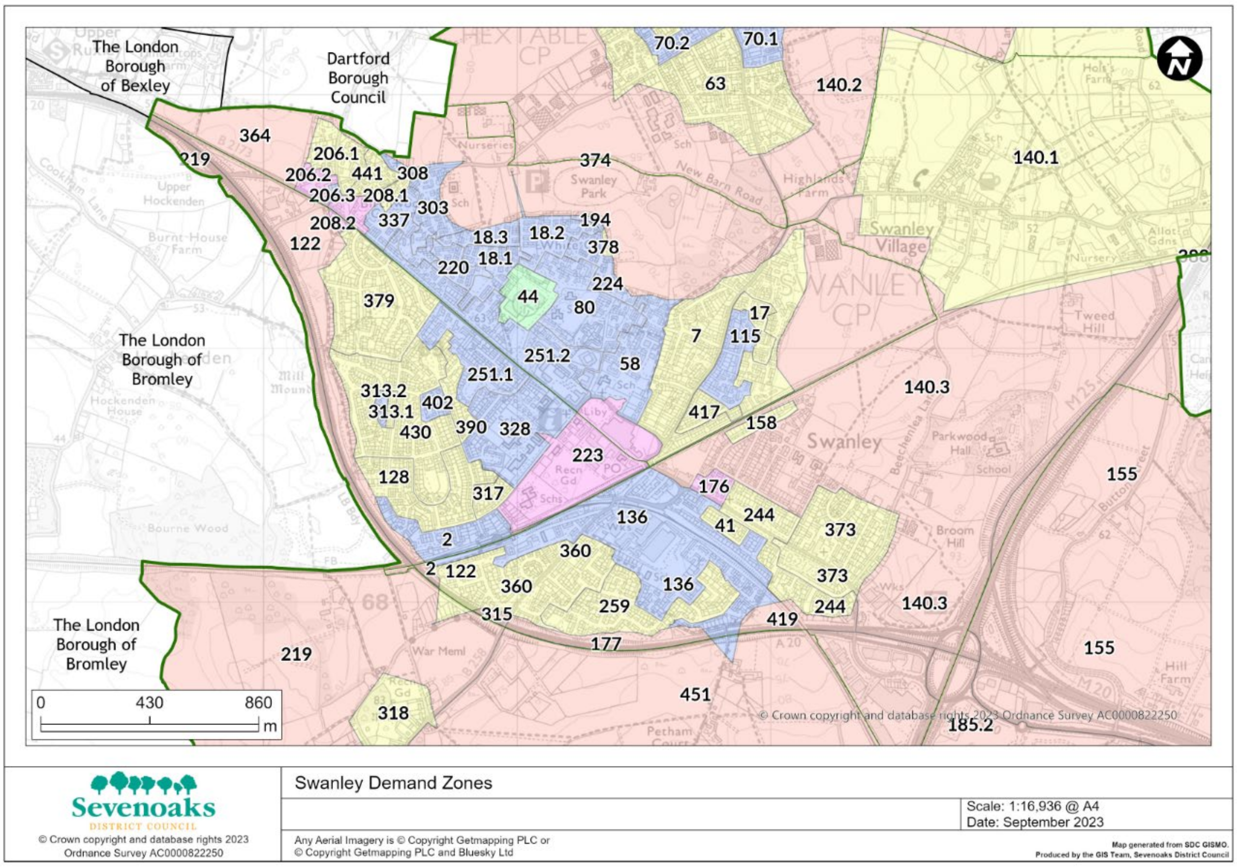


Table 33- Demand Zoning in Swanley

Zone ID	Zone Classification	Number of households	Number of On-Street households	Percentage On-Street Households
2	Public	163	49	30.1
7	Off-street	597	99	16.6
17	Off-street	59	3	5.1
18.1	Public	103	19	18.4
18.2	Public	168	28	16.7
18.3	Public	72	17	23.6
41	Off-street	46	9	19.6
44	Visitor	33	8	24.2
58	Public	275	201	73.1
80	Public	292	213	72.9
115	Public	179	106	59.2
128	Off-street	260	30	11.5

Zone ID	Zone Classification	Number of households	Number of On-Street households	Percentage On-Street Households
136	Public	695	313	45.0
158	Off-street	36	0	0
176	Commercial	30	0	0
194	Public	13	9	69.2
206.1	Off-street	62	23	37.1
206.2	Commercial	6	0	0
206.3	Public	19	19	100
208.1	Off-Street	24	0	0
208.2	Commercial	24	8	33.3
220	Public	96	42	43.8
223	Commercial	86	74	86.0
224	Public	170	104	61.2
244	Off-street	203	30	14.8
251.1	Public	190	57	30
251.2	Public	333	202	60.1
259	Off-street	323	15	4.6
303	public	156	68	43.6
313.1	Off-street	20	0	0
313.2	Public	20	11	55
317	Off-street	46	0	0
328	Public	169	62	36.7
337	Public	127	12	9.4
360	Off-street	450	30	6.7
373	Off-street	368	57	15.5
378	Off-street	9	0	0
379	Off-street	364	28	7.7
390	Off-street	81	5	6.2
402	Public	37	22	59.5
417	Off-street	67	4	6.0
430	Off-street	518	59	11.4
441	Off-street	32	0	0
TOTAL		7021	2036	29.0

14.9..3 There is a current ‘fast’ public EV Charger located at ASDA in Swanley. Further an as outlined above the District Council will be installing additional chargers within its carparks in the near future.

14.9..4 Analysis of Network Power UK’s ‘Demand Headroom’ data indicates that there is 26.9% electricity demand headroom in this location. This suggests grid capacity would not be a significant limiting factor to the installation of public EV charging.

14.10 Westerham

14.10..1 Westerham is situated in the West of Sevenoaks District and shares a boundary with Surrey and Greater London. Evidence suggests that the area around Westerham can date back to 2000BC, and it was also noted in the Domesday Book. Westerham was granted a market charter by King Henry III, which boosted the growth of the town as a major player in buying and selling cattle in Kent, this lasted until 1961 when the last cattle market was held. Westerham is also home to Chartwell, which was home to Winston Churchill and is now part of the National Trust. Westerham has a small high street with a good amenities and good transport links to the M25.

14.10..2 The Field Dynamics model estimates that there are 478 on street households in this area (2.9% of on street households within Sevenoaks District) and 1 of the top 25 district wide public EV charging demand zones.

Figure 34- Map of demand zoning in Westerham

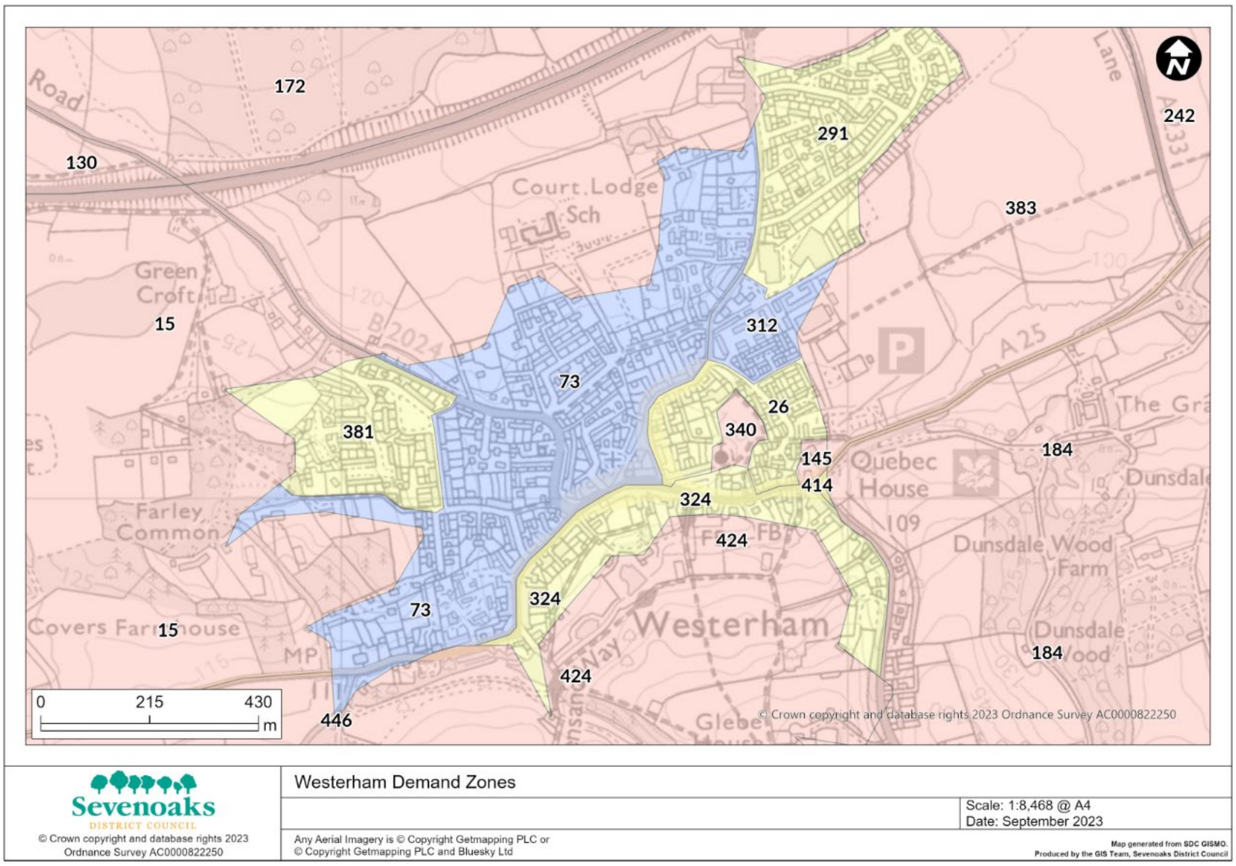


Table 35- Demand zoning in Westerham

Zone ID	Zone Classification	Number of households	Number of On-Street households	Percentage On-Street Households
26	Off-street	159	46	28.9
73	Public	663	254	38.3
291	Off-street	319	40	12.5
312	Public	113	74	65.5
324	Off-street	152	61	40.1
381	Off-street	102	3	2.9
414	Off-street	1	0	0
TOTAL		1509	478	31.7

14.10..3 As outlined in 12.5, the District Council has committed to installing public EV infrastructure within the Quebec Avenue Car-Park. This public charger is estimated to serve 698 on-street households.

14.10..4 Analysis of Network Power UK's 'Demand Headroom' data indicates that there is 27.81% electricity demand headroom in this location. This suggests grid capacity would not be a significant limiting factor to the installation of public EV charging.

15 Other Key Partners

15.1 As more and more drivers transition to EV vehicles, it will become increasingly commercially viable for large existing fuel suppliers to diversify and offer EV charging. This transition has already begun, and a number of traditional fuel companies are branching out into providing public EV charging.

15.2 Petrol Filling Stations are often located strategically in areas where they can service the largest possible driver population. They may therefore be ideal locations for future EV infrastructure. The table below shows the predicted impact (number of on street households that would be served) from installing rapid/ ultra-rapid public EV infrastructure at the existing sites within Sevenoaks district.

Table 36- Potential impact of installing Rapid/ Ultra Rapid charging at petrol stations

Station Name	Location	Number of On-street households served
Champion Filling Station	Station Road, Edenbridge	1810
Farningham Filling Station	Dartford Road, Farningham	2586
Mill Hill Garage	Mill Hill, Edenbridge	1783
Oakstead Service Station	London Road, Swanley	2614
Oil Well Service Station,	London Road Swanley	2559

Station Name	Location	Number of On-street households served
Sainsburys Petrol Filling Station	Otford	3627
Seal Road Filling Station	Seal Road, Sevenoaks	4638
Swanley Service Station	High Street, Swanley	2870
Tesco Petrol Filling Station	Riverhead	3944
Tubbs Hill Petrol Filling Station	London Road, Sevenoaks	4312
Twenty Mile Service Station	London Road, West Kingsdown	1032
Wolfe Garage	London Road, Westerham	740

15.3 There is a Tesla Supercharger site located at the Donnington Manor Hotel in Dunton Green. This site has 8 EV chargers available 24hrs a day which can operate up to 250kW. Currently, the majority of Tesla supercharger sites are restricted to Tesla vehicles but in 2022, Tesla began a pilot at selected sites whereby they were opened up for use by owners of other vehicle types. It is understood that the Donnington Manor Supercharger was not part of this pilot scheme, but should Tesla open this up to other manufacturers it may provide infrastructure for up to 6234 on street households.

Table 37- Potential impact of Tesla supercharger being made available to other vehicle types

Station Name	Location	Number of On-street households served
Tesla Supercharger	Donnington Manor, Dunton Green	6,234

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values’
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Annual Status Report
BAT	Best Available Techniques
BPC	Brasted Parish Council
CO2	Carbon Dioxide
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
EU	European Union
EV	Electric Vehicle
FDMS	Filter Dynamics Measurement System
HGV	Heavy Goods Vehicle
IPPC	Integrated Pollution Prevention and Control
KCC	Kent County Council
LAQM	Local Air Quality Management
LEV	Low Emission Vehicle
LGV	Light Goods Vehicle
NO2	Nitrogen Dioxide
NOx	Nitrogen Oxides
O3	Ozone
PM10	Airborne particulate matter with an aerodynamic diameter of 10µm or less
PM2.5	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less

Abbreviation	Description
QA/QC	Quality Assurance and Quality Control
SO2	Sulphur Dioxide
SDC	Sevenoaks District Council
SPC	Seal Parish Council
STC	Sevenoaks Town Council
TEOM	Tapered Element Oscillating Microbalance
UTC	Urban Traffic Control
WTC	Westerham Town Council

References

- Local Air Quality Management Technical Guidance LAQM.TG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Chemical hazards and poisons report: Issue 28. June 2022. Published by UK Health Security Agency
- Air Quality Strategy – Framework for Local Authority Delivery. August 2023. Published by Defra.
- Sevenoaks District Council Air Quality Action Plan 2022
- Sevenoaks District Council 2023 Annual Status Report

To find out more, please contact us:

t 01732 227000

e air.quality@sevenoaks.gov.uk

w sevenoaks.gov.uk/airquality

Sevenoaks District Council, Council Offices,
Argyle Road, Sevenoaks, Kent TN13 1HG

Visit our Sevenoaks offices:
Monday to Thursday, 8.45am to 5pm
Friday 8.45am to 4.45pm

This publication is available in large print and can be explained in other languages by calling 01732 227000

sdc_newsdesk
Sevenoaks District Council Official
sevenoaksdistrictcouncil
Sevenoaks District Council