




2023 Air Quality Annual Status Report (ASR)

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

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Executive Summary: Air Quality in Our Area

The 2023 Annual Status Report (ASR) is designed to provide the public with information relating to local air quality in Basildon, to fulfil Basildon Council's statutory duty to review and assess air quality within its area, and to determine whether or not the air quality objectives are likely to be achieved.

Monitoring has identified that although exceedances remain along the A127 and East Mayne, Basildon Borough Council and Essex County Council have complied with the Environment Act 1995 (Essex County Council and Basildon Borough Council) Air Quality Direction 2021. Work towards further progress is ongoing.

In 2022, Basildon Council measured **no** exceedances of the Air Quality Objectives with respect to Local Air Quality Management (LAQM).

Air Quality in Basildon

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

The mortality burden of air pollution within the UK is equivalent to 29,000 to 43,000 deaths at typical ages³, with a total estimated healthcare cost to the NHS and social care of £157 million in 2017⁴.

The borough of Basildon comprises the urban areas of Basildon, Billericay and Wickford as well as rural villages and settlements set among the surrounding countryside. The main source of air pollution in the borough is from traffic emissions and the Basildon Enterprise Corridor is a busy business area and a through-route for many vehicles, with congestion issues worsening the air quality problems caused by vehicle emissions.

Locations on a stretch of the A127 and two areas to the south of it (notably in East Mayne) in Basildon have been identified as exceeding legal limits for nitrogen dioxide, as set by European Air Quality Directive, which assesses exposure at roadside locations.

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

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

³ Defra. Air quality appraisal: damage cost guidance, January 2023

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

Essex County Council and Basildon Borough Council have been directed by Government to take action and have a legal obligation to make air quality in Basildon compliant in the shortest possible time.

Actions to Improve Air Quality

The Environment Act 1995 (Essex County Council and Basildon Borough Council) Air Quality Direction 2021 requires Basildon Borough Council and Essex County Council to take steps to implement a local plan for NO₂ compliance for the area for which they are responsible.

The plan must ensure that NO₂ compliance is implemented so that:

- compliance with the legal limit value for nitrogen dioxide is achieved in the shortest possible time, and by 2022 at the latest
- exposure to levels above the legal limit for nitrogen dioxide are reduced as quickly as possible.

A new 50mph speed limit was introduced on a stretch of the A127 in Basildon in January 2020 to improve air quality and road safety. Tests showed that a stretch of the road between east and west Basildon exceeded national air quality safe limits for nitrogen dioxide.

The new 50mph limit is in place on both carriageways between the existing 40mph speed limit near the Fortune of War roundabout and approximately 470m east of the Pound Lane (westbound) / Cranfield Park Road (eastbound) junctions.

In addition, a scheme was created to relocate the existing pedestrian and cycle route in East Mayne. This would reduce people's exposure to air pollution at the roadside in the worst affected area and remove the requirement for the location to be reportable.

Our technical work showed this measure, which was approved by the Government, would result in compliance with legal air quality levels in East Mayne in 2022, while avoiding any disproportionate impact on residents and businesses.

Monitoring using air quality sensors has identified that Basildon Borough Council and Essex County Council have complied with the Air Quality Direction.

The monitoring data and relevant calculations are set out in Appendix F.

Local Engagement and How to get Involved

Basildon Council is a member of the Essex Air Quality consortium. The Essex Air website operated by the consortium is being updated and will be available in the second half of 2023.

The [@EssexAir](#) twitter feed provides localised weekly air pollution forecasts.

Figure i.1 Essex Air Twitter Air Quality Notifications



Links to Defra recommended actions and health advice are provided when air pollution is likely to be moderate or higher. This will enable those with heart or lung conditions, or other breathing problems to make informed judgements about their levels of activity or exposure.

Liftshare

Essex County Council has worked closely with Liftshare to develop the Essex Car Share [scheme](#), which operates across Basildon and provides commuters with a car sharing service which helps cut congestion and air pollution, while also saving people money.

Changing travel behaviour

Essex County Council, as the Local Highway Authority, has a number of projects to help reduce pollution and encourage people to consider swapping some of their car journeys to cycling, walking or public transport, especially for short trips.

What can I do to help reduce roadside air quality in Essex?

- Consider swapping some of your car journeys to cycling, walking or public transport, especially for short journeys
- Switch your engine off when stationary
- Consider a hybrid or electric vehicle when replacing your car.

I can't swap some of my journeys. How can I drive in a more environmentally friendly way?

By reducing the amount of fuel you burn, as this contributes to CO₂ emissions and other harmful pollutants such as NO₂. The best thing to do is to reduce the amount of work your engine does. You can cut your CO₂ emissions by up to 15 per cent with some simple steps such as:

Before you set off:

- Check your tyres are at the correct pressure
- Clear out any extra weight from your car, including unused roof racks or roof boxes
- Have your vehicle serviced regularly

While driving:

- Drive at an appropriate speed
- Speed up and slow down smoothly
- Change gears at lower revs
- Avoid leaving your engine running
- Don't use air conditioning unless you really need it

Conclusions and Priorities

Basildon Council have concluded that:

- No air quality exceedances have been identified in 2022 under the LAQM framework
- NO2 Compliance has been achieved on East Mayne in Environment Act 1995 (Essex County Council and Basildon Borough Council) Air Quality Direction 2021.
- Air quality at monitoring locations within Pitsea can be considered borderline with the Air Quality Objectives. However, after adjusting the data using the NO2 Fall-Off Calculator, the pollution at residential dwellings is well below the Air Quality Objectives.
- There are no new developments that will have a significant impact on air quality

Local Responsibilities and Commitment

This ASR was prepared by Public Health and Protection Services of Chelmsford City Council on behalf of Basildon Council.

This ASR has been approved by: Martin Howlett - Environmental Health Team Manager, Basildon Council

This ASR has been sent to the Director of Public Health at Essex County Council.

If you have any comments on this ASR please send them to Martin Howlett

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1 Local Air Quality Management

This report provides an overview of air quality in Basildon during 2022. 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 Basildon Council to improve air quality and any progress that has been made.

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

2 Actions to Improve Air Quality

Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority should prepare an Air Quality Action Plan (AQAP) within 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.

Basildon Council currently does not have any declared AQMAs.

Progress and Impact of Measures to address Air Quality in Basildon Council

Defra's appraisal of last year's ASR concluded that report was well structured, detailed, and provides the information specified in the Technical Guidance.

Basildon Council have a number of ongoing measures to improve air quality in Basildon. These are detailed in Table 2.1 below.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	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	A127 Non-Charging Clean Air Zone	Traffic Management	Reduction of speed limits, 20mph zones	2018	2020	Basildon Council / Essex County Council	Basildon Council / Essex County Council	NO	Funded	£50k - £100k	Completed	20% NO2 Emissions	AQ Concentrations at key locations	Complete	
2	Cycle route construction linking East Mayne to Pipp's Hill via Cranes Farm Road	Transport Planning and Infrastructure	Cycle network	2018	2019	Joint Air Quality Unit / Basildon Council / Essex County Council	DfT Grant Funding	YES	Funded	£50k - £100k	Completed	Not quantified	N/A	Complete	
3	Electric Charging Infrastructure for Taxis	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2019	2021	Joint Air Quality Unit / Basildon Council / Essex County Council	DfT Grant Funding	YES	Funded	£50k - £100k	Implementation	Not quantified	Number of Users	Two sites yet to complete. Inherited an extra site from partner local authority	Overall delays due to Covid-19, site selection/suitability analysis and contractual issues
4	A127/A130 Fairglens Interchange Improvements	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	2017		Basildon Council / Essex County Council	Essex County Council	NO	Funded	£1 million - £10 million	Implementation	Not quantified	Congestion Reduction	Development Stage	Implementation has been delayed
5	Basildon Integrated Transport Package	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	2015	2021	Basildon Council / Essex County Council	Basildon Council / Essex County Council / Housing Infrastructure Fund / SELEP	NO	Funded	£1 million - £10 million	Implementation	Not quantified	Congestion Reduction	Complete	

6	Essex Liftshare	Alternatives to private vehicle use	Car & lift sharing schemes			Essex County Council	Essex County Council	NO	Funded	< £10k	Implementation	Not quantified	Number of Users	Ongoing	
7	Member of Essex Air	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality			District & Borough Councils / Essex County Council	District & Borough Councils / Essex County Council	NO	Funded	< £10k	Implementation	Not quantified	N/A	Ongoing	
8	Environmental Permit Inspection & Enforcement	Environmental Permits	Measures to reduce pollution through IPPC Permits going beyond BAT			Basildon Council	Basildon Council	NO	Funded	< £10k	Implementation	Not quantified	Operator with Environmental Permit	Ongoing	2020 Borough wide survey brought more businesses under regulation
9	Smoke Controlled Zones	Policy Guidance and Development Control	Low Emissions Strategy			Basildon Council	Basildon Council	NO	Funded	< £10k	Planning	Not quantified	N/A	N/A	Local arrangements to be reviewed in accordance with new legislation
10	DfT E-Scooter Trial	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2020	2020	Basildon Council	Basildon Council	NO	Funded	< £10k	Implementation	Not quantified	Number of Users	Implementation	
11	Active Travel Coordinator	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2021	2021	Basildon Council	Basildon Council	NO	Funded	£10k - 50k	Completed	Not quantified	N/A	Complete	
12	Pedal Power	Promoting Travel Alternatives	Promotion of cycling	2023		The Active Wellbeing Society	The Active Wellbeing Society	NO	Funded	£10k - 50k	Implementation	Not quantified	N/A	Ongoing	
13	Essex EV Strategy	Promoting Low Emission Transport	Other	2022		Essex County Council	Essex County Council	NO	Funded	£50k - £100k	Planning	Not quantified	N/A	Consultation Phase	

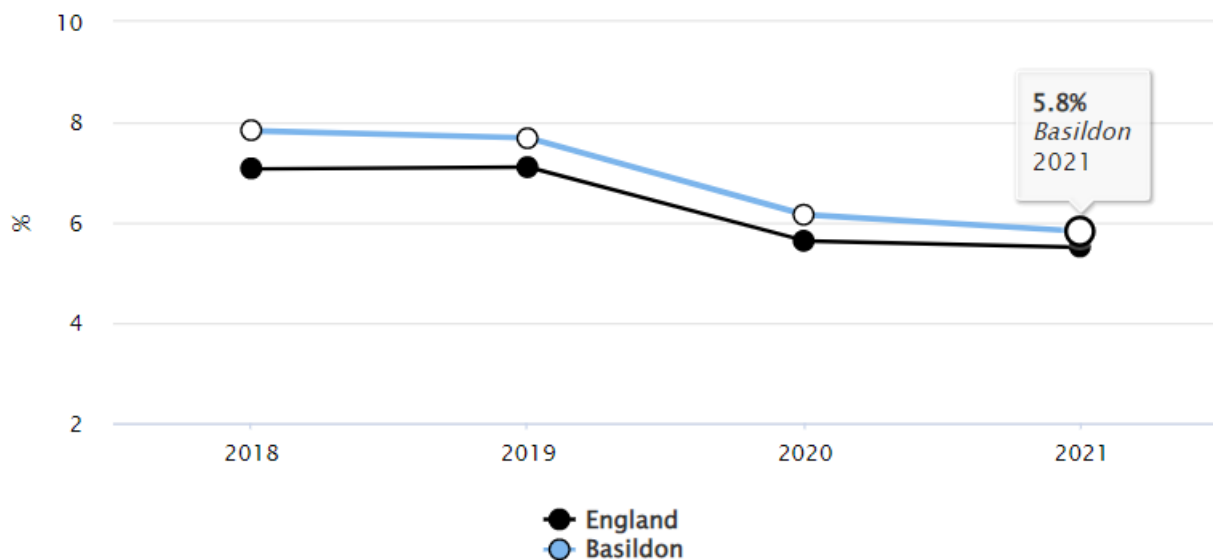
PM_{2.5} – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG22 (Chapter 8), local authorities are expected to work towards reducing emissions and/or concentrations of PM_{2.5} (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM_{2.5} has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Basildon Council does not monitor PM_{2.5} concentrations however notes the Defra background mapping resource which for PM_{2.5} in 2022 models a maximum annual mean concentration of 11.2µg/m³ in the Local Authority area.

The Public Health Outcomes Framework indicator D01 – Fraction of mortality attributable to particulate (PM_{2.5}) air pollution which for 2021 gave a value of 5.8% which is significantly down from 7.8% in 2018.

Figure 2.1 – Public Health Framework Indicator D01 Fraction of all-cause adult mortality attributable to anthropogenic particulate air pollution



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

- Regular inspections of permitted industry where combustion and non-combustion processes could lead to anthropogenic emissions of PM_{2.5}
- Working with Essex County Council (highway authority) to deliver Major Transport improvement [schemes](#) to alleviate congestion. In addition to reduced exhaust emissions, these schemes will reduce non-exhaust emissions from brake and tyre wear by making traffic flows smoother.

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

This section sets out the monitoring undertaken within 2022 by Basildon Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2018 and 2022 to allow monitoring trends to be identified and discussed.

No exceedances of the nitrogen dioxide air quality objectives have been identified.

Although pollution in 2022 was measured higher than in 2021, the long-term trend for monitored pollution is downwards.

Quality assurance and quality control information for the automatic analysers, diffusion tubes bias adjustments and other adjustments applied (e.g. annualisation and/or distance correction) are presented in Appendix C. Maps showing the location of the monitoring sites are presented in Appendix D.

Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Basildon Council does not undertake automatic continuous monitoring using reference analysers.

Essex County Council undertakes monitoring on East Mayne using air quality sensors to determine compliance with the legal air quality limits as set out in the UK plan for tackling roadside nitrogen dioxide concentrations and the Environment Act 1995 (Essex County Council and Basildon Borough Council) Air Quality Direction 2021. Details of this monitoring are set out in Appendix F.

3.1.2 Non-Automatic Monitoring Sites

Basildon Council undertook non-automatic (i.e. passive) monitoring of NO₂ at 14 sites during 2022 using diffusion tubes. Table A.1 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.

Individual Pollutants

3.1.3 Nitrogen Dioxide (NO₂)

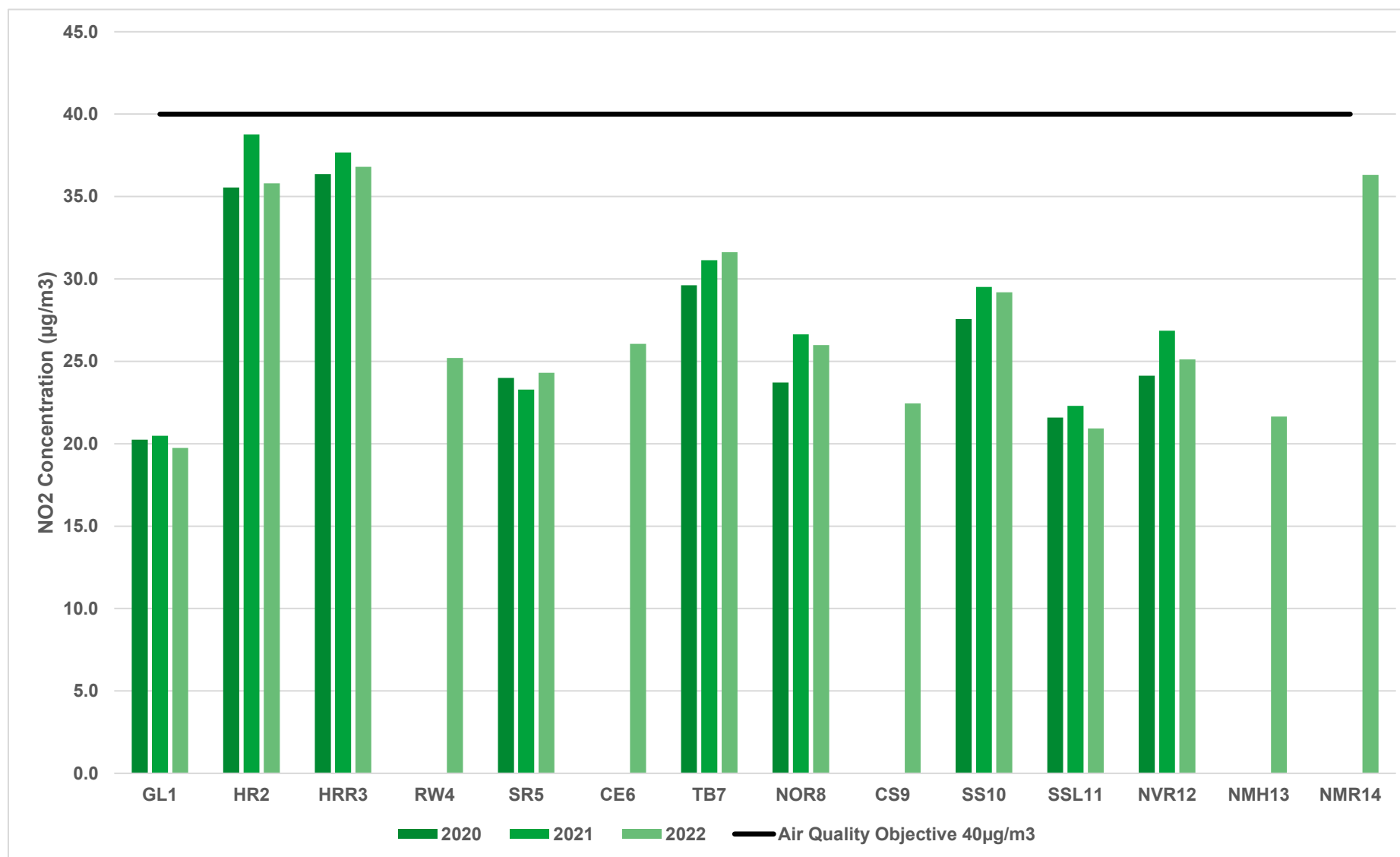
The air quality monitoring results presented in this section are, where relevant, adjusted for bias, annualisation (where the annual mean data capture is below 75% and greater than 25%), and distance correction. Further details on adjustments are provided in Appendix C.

Table A.1 in Appendix A provides the details of the diffusion tube monitoring sites. Table A.2 compares 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 2022 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.

In 2022, no exceedances of the air quality objectives have been measured. In addition, as no measured annual mean concentrations were greater than 60µg/m³, it is considered unlikely that there has been an exceedance of the 1-hour mean objective.

Figure 3.1 – Trends in Annual Mean NO₂ Concentrations

Appendix A: Monitoring Results

Table A.1 – 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)
GL1	Gardiners Lane South Basildon Lampost 9	Kerbside	572143	190454	NO2	No	17.7	1.0	No	2.0
HR2	59 High Road Pitsea	Roadside	573896	188118	NO2	No	4.0	4.0	No	2.0
HRR3	High Road Pitsea Junction with Rectory Road	Roadside	574019	188122	NO2	No	13.0	2.0	No	2.0
RW4	Radford Way Billericay Lamp Post 1	Roadside	567569	195025	NO2	No	2.0	2.0	No	2.0
SR5	95 Southend Road Wickford	Roadside	575315	193539	NO2	No	0	6.0	No	2.0
CE6	Cherrydown East, Basildon Lamp Post 6	Roadside	570475	188238	NO2	No	7.0	1.0	No	2.0
TB7	The Broadway Wickford Lamp Post 14a	Roadside	574715	193613	NO2	No	2.3	2.0	No	2.0
NOR8	Norsey Road Billericay Lamp Post 2	Kerbside	567571	194865	NO2	No	1.0	1.0	No	2.0
CS9	Chapel Street Billericay Sign Post 2A	Kerbside	567496	194653	NO2	No	0.0	0.0	No	2.0
SS10	Sun Street Billericay No Waiting Sign	Kerbside	567451	194259	NO2	No	1.3	0.4	No	2.0
SSL11	Sun Street Billericay Garland Court	Kerbside	567355	194229	NO2	No	3.4	3.4	No	2.0
NVR12	Nevendon Road Basildon Lamp Post 1	Roadside	573243	190795	NO2	No	9.0	1.0	No	2.0
NMH13	Hospital Approach Lamp Post 3A	Roadside	570096	187468	NO2	No	N/A	2.0	No	2.0
NMR14	Nethermayne Roundabout Lamp Post 39	Kerbside	570079	187552	NO2	No	19.0	0.5	No	2.0

☒ 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%).

Table A.2 – 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 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
GL1	572143	190454	Kerbside	100.0	100.0	N/A	N/A	20.3	20.5	19.7
HR2	573896	188118	Roadside	100.0	100.0	N/A	N/A	35.6	38.8	35.8
HRR3	574019	188122	Roadside	92.3	92.3	N/A	N/A	36.4	37.7	36.8
RW4	567569	195025	Roadside	100.0	100.0	N/A	N/A	N/A	N/A	25.2
SR5	575315	193539	Roadside	100.0	100.0	N/A	N/A	24.0	23.3	24.3
CE6	570475	188238	Roadside	100.0	100.0	N/A	N/A	N/A	N/A	26.1
TB7	574715	193613	Roadside	92.3	92.3	N/A	N/A	29.6	31.1	31.6
NOR8	567571	194865	Kerbside	92.3	92.3	N/A	N/A	23.7	26.6	26.0
CS9	567496	194653	Kerbside	100.0	100.0	N/A	N/A	N/A	N/A	22.4
SS10	567451	194259	Kerbside	100.0	100.0	N/A	N/A	27.6	29.5	29.2
SSL11	567355	194229	Kerbside	100.0	100.0	N/A	N/A	21.6	22.3	20.9
NVR12	573243	190795	Roadside	100.0	100.0	N/A	N/A	24.1	26.9	25.1
NMH13	570096	187468	Roadside	100.0	100.0	N/A	N/A	N/A	N/A	21.6
NMR14	570079	187552	Kerbside	100.0	100.0	N/A	N/A	N/A	N/A	36.3

☒ 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%).

Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1 – NO₂ 2022 Diffusion Tube Results (µg/m³)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northin g)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.76)	Annual Mean: Distance Corrected to Nearest Exposure
GL1	572143	190454	39.0	24.8	28.7	20.9	19.7	19.0	18.7	19.1	23.7	30.2	33.0	34.9	26.0	19.7	-
HR2	573896	188118	65.1	45.1	45.1	40.7	40.8	45.4	43.8	40.8	45.1	53.0	48.1	52.2	47.1	35.8	-
HRR3	574019	188122	69.3	55.2	49.5	40.4	42.0	40.5	37.8	Missing	40.4	51.8	55.3	50.6	48.4	36.8	27.3
RW4	567569	195025	42.5	35.5	37.2	29.4	29.4	30.3	26.7	27.1	28.6	37.6	39.9	33.8	33.2	25.2	-
SR5	575316	193567	46.0	35.7	28.0	26.9	30.7	27.9	24.5	25.9	28.8	33.6	39.8	36.0	32.0	24.3	-
CE6	570475	188238	50.3	33.7	44.0	32.0	31.0	26.5	25.5	29.8	30.8	34.9	35.0	37.9	34.3	26.1	-
TB7	574715	193613	52.7	41.9	47.1	43.9	37.0	Missing	36.2	36.3	43.5	36.4	41.3	41.4	41.6	31.6	-
NOR8	567571	194865	55.8	38.4	30.1	29.3	30.9	28.0	27.7	Missing	30.3	35.5	29.1	41.0	34.2	26.0	-
CS9	567496	194653	27.2	31.6	38.3	32.1	27.1	25.4	27.9	29.6	32.0	29.5	25.0	28.7	29.5	22.4	-
SS10	567451	194259	59.0	42.5	52.3	38.2	33.4	29.7	28.1	27.2	33.2	34.3	40.1	43.0	38.4	29.2	-
SSL11	567355	194229	42.1	29.8	34.6	24.7	26.1	25.1	26.2	24.1	26.8	33.0	7.5	30.4	27.5	20.9	-
NVR12	573243	190795	49.4	37.1	30.7	27.5	32.3	30.3	26.7	28.1	28.6	34.1	35.4	36.3	33.0	25.1	-
NMH13	570096	187468	42.4	26.6	35.0	25.9	22.2	22.5	21.4	24.3	26.7	31.0	30.8	33.0	28.5	21.6	-
NMR14	570079	187552	61.4	45.9	58.0	44.7	47.5	41.9	43.9	47.1	46.0	48.6	39.9	48.5	47.8	36.3	22.7

☒ 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

☒ National bias adjustment factor used

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

☒ Basildon Council confirm that all 2022 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System

Notes:

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

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

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 Basildon Council During 2022

Basildon Council has not identified any new sources relating to air quality within the reporting year of 2022.

QA/QC of Diffusion Tube Monitoring

- Basildon Council undertook monitoring at 14 sites in 2022.
- Basildon Council adheres with the Diffusion Tube Monitoring Calendar
- The diffusion tubes were supplied by Socotec (UKAS Testing Laboratory number 1015) with a preparation method of 50% triethanolamine (TEA) in Acetone.
- The AIR NO₂ proficiency testing scheme found that the laboratory achieved the following percentage of results determined as satisfactory for 2022:

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2022 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 NO_x/NO₂ continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Basildon Council have applied a national bias adjustment factor of 0.76 to the 2022 monitoring data to maintain consistency with other Councils in Essex.

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

Table C.1 – Bias Adjustment Factor

Monitoring Year	Local or National	Diffusion Tube	If National, Version of National Spreadsheet	Adjustment Factor
2022	National	Socotec 50% TEA in Acetone	03/23	0.76
2021	National	Socotec 50% TEA in Acetone	03/22	0.78
2020	National	Socotec 50% TEA in Acetone	03/21	0.77
2019	National	Socotec 50% TEA in Acetone	03/20	0.75
2018	National	ESG Didcot 50% TEA in Acetone	03/19	0.76

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.

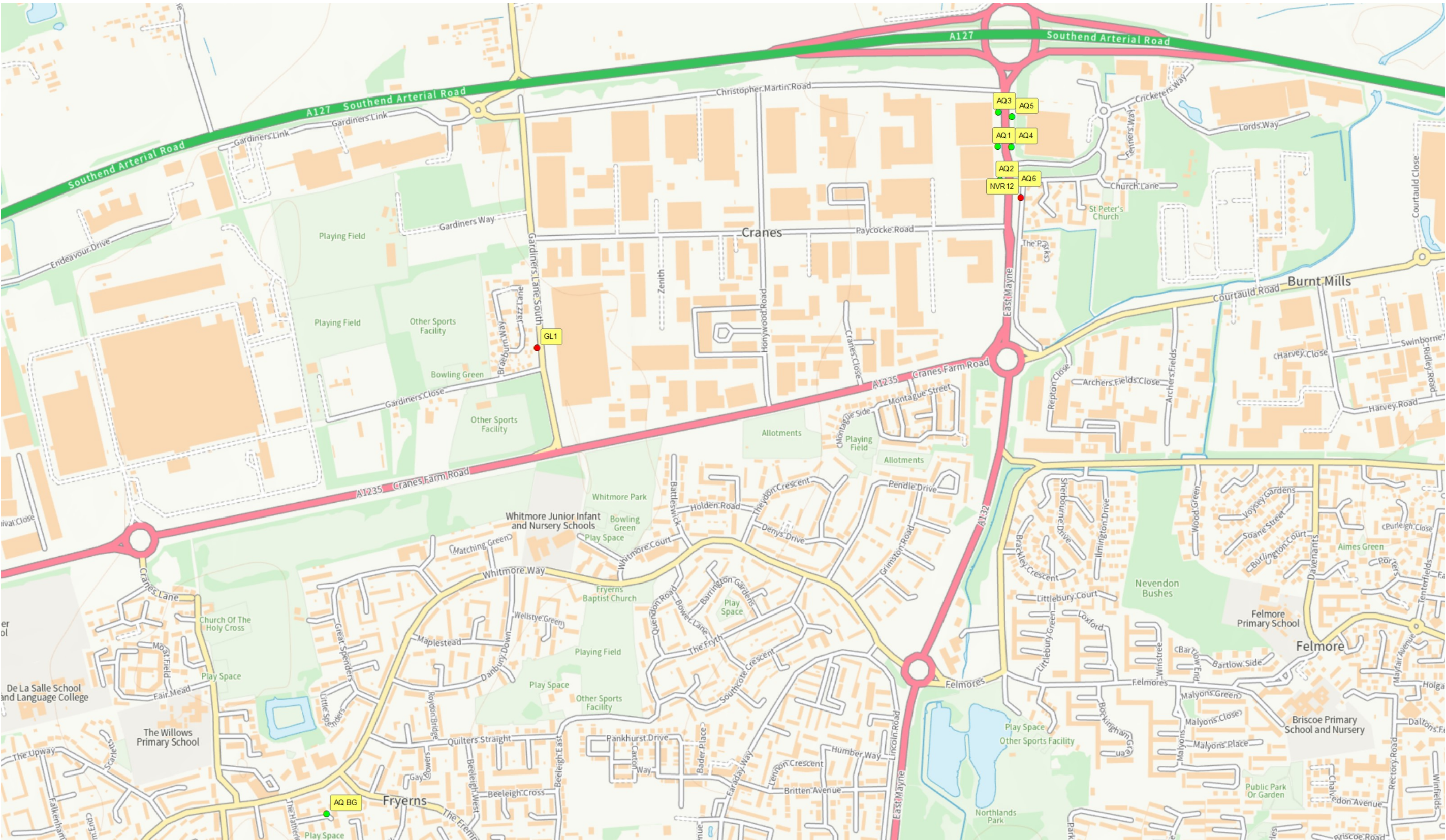
Table C.2 identifies two monitoring locations where NO₂ had been measured borderline with the Air Quality Objectives. The NO₂ Fall-Off calculator estimates the predicted concentration as the receptor is much lower and that each location is not an air pollution hotspot.

Table C.2 – NO₂ Fall-Off Calculator

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted)	Background Concentration	Concentration Predicted at Receptor
HRR3	2.0	15.0	36.8	16.7	27.3
NMR14	0.5	19.5	36.3	15.3	22.7

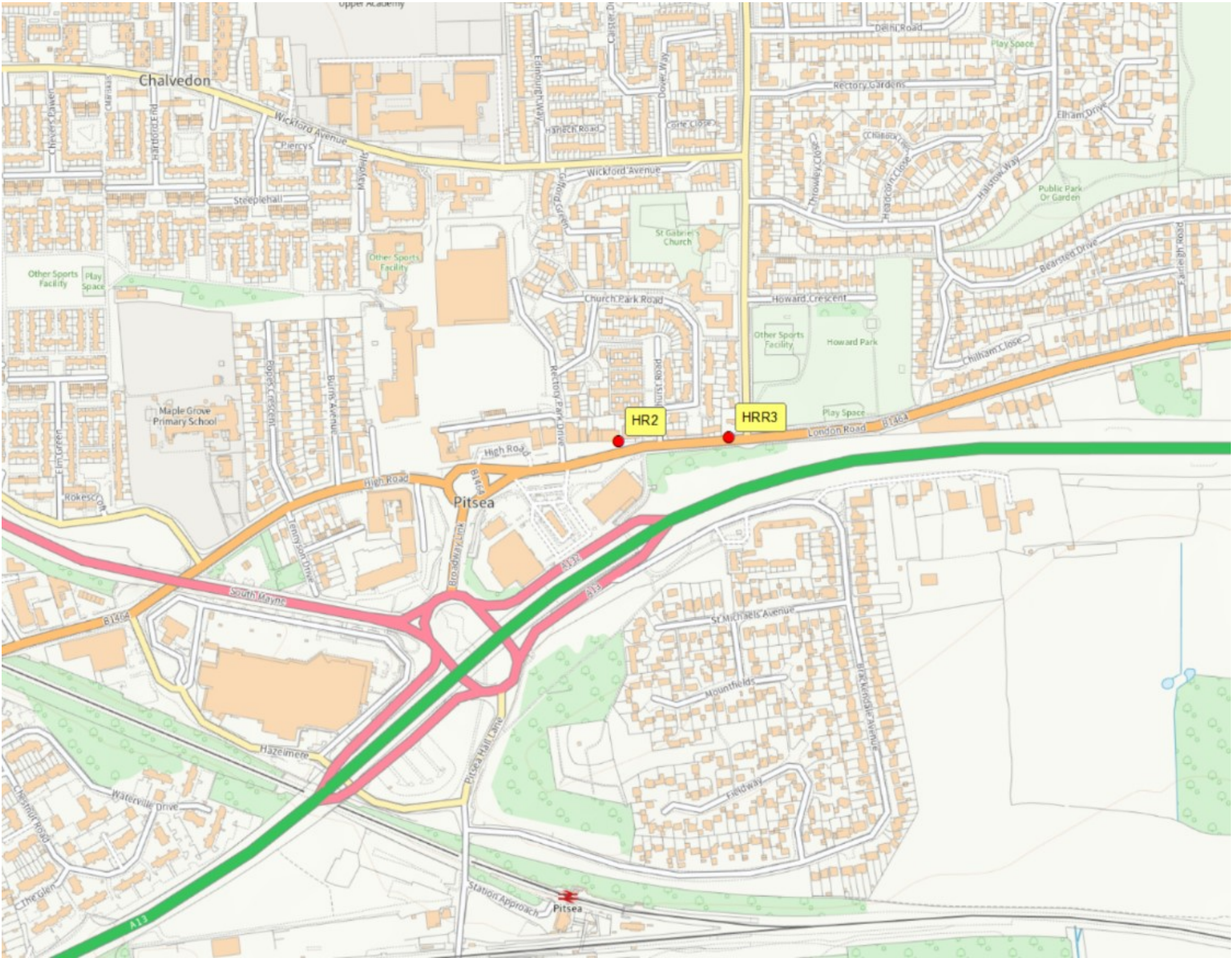
Appendix D: Maps of Monitoring Locations and AQMAs

Figure D.1 – Map of Monitoring Sites: Burnt Mills



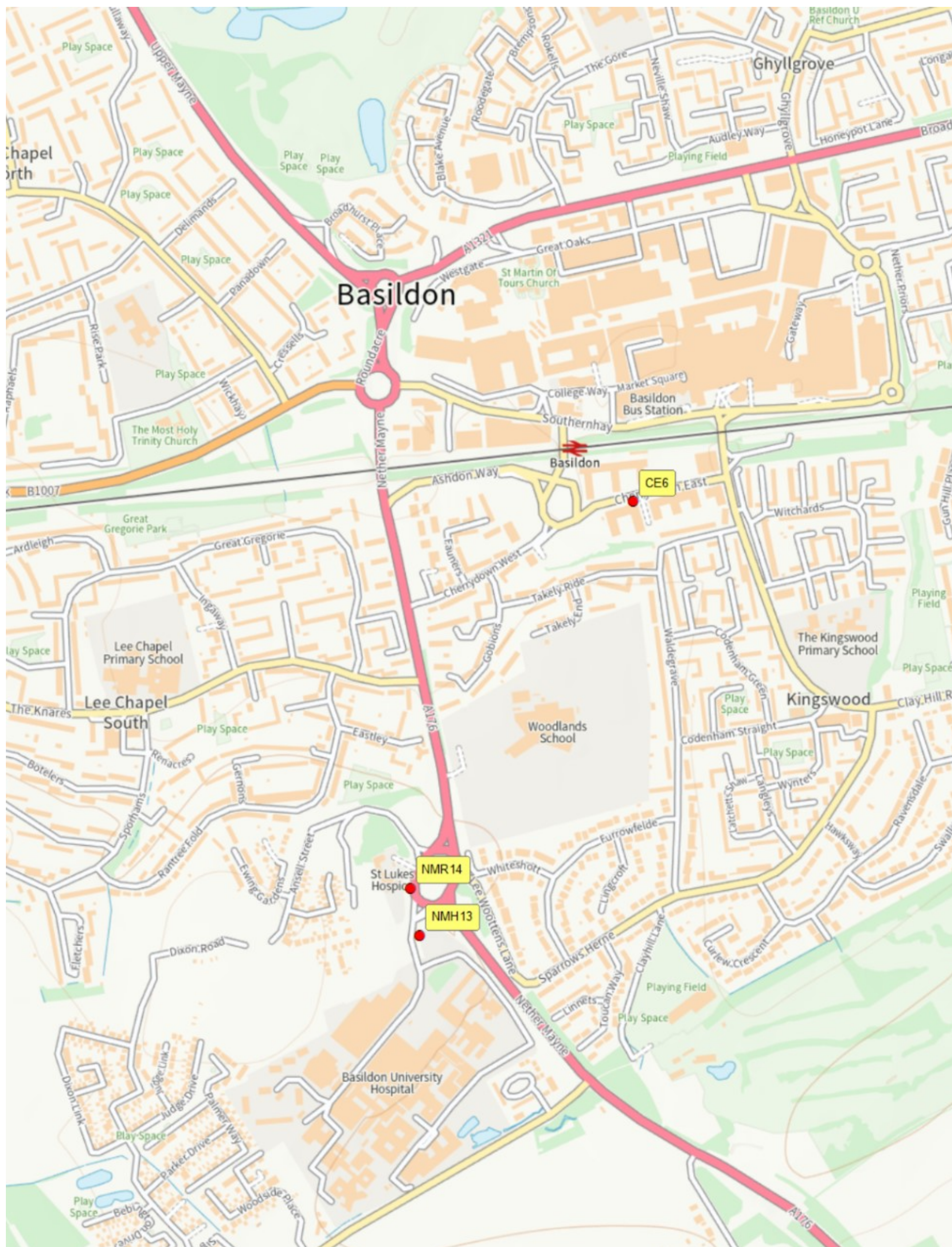
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Figure D.2 – Map of Monitoring Sites: Pitsea



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Figure D.3 – Map of Monitoring Sites: Basildon



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Figure D.4 – Map of Monitoring Sites: Billericay

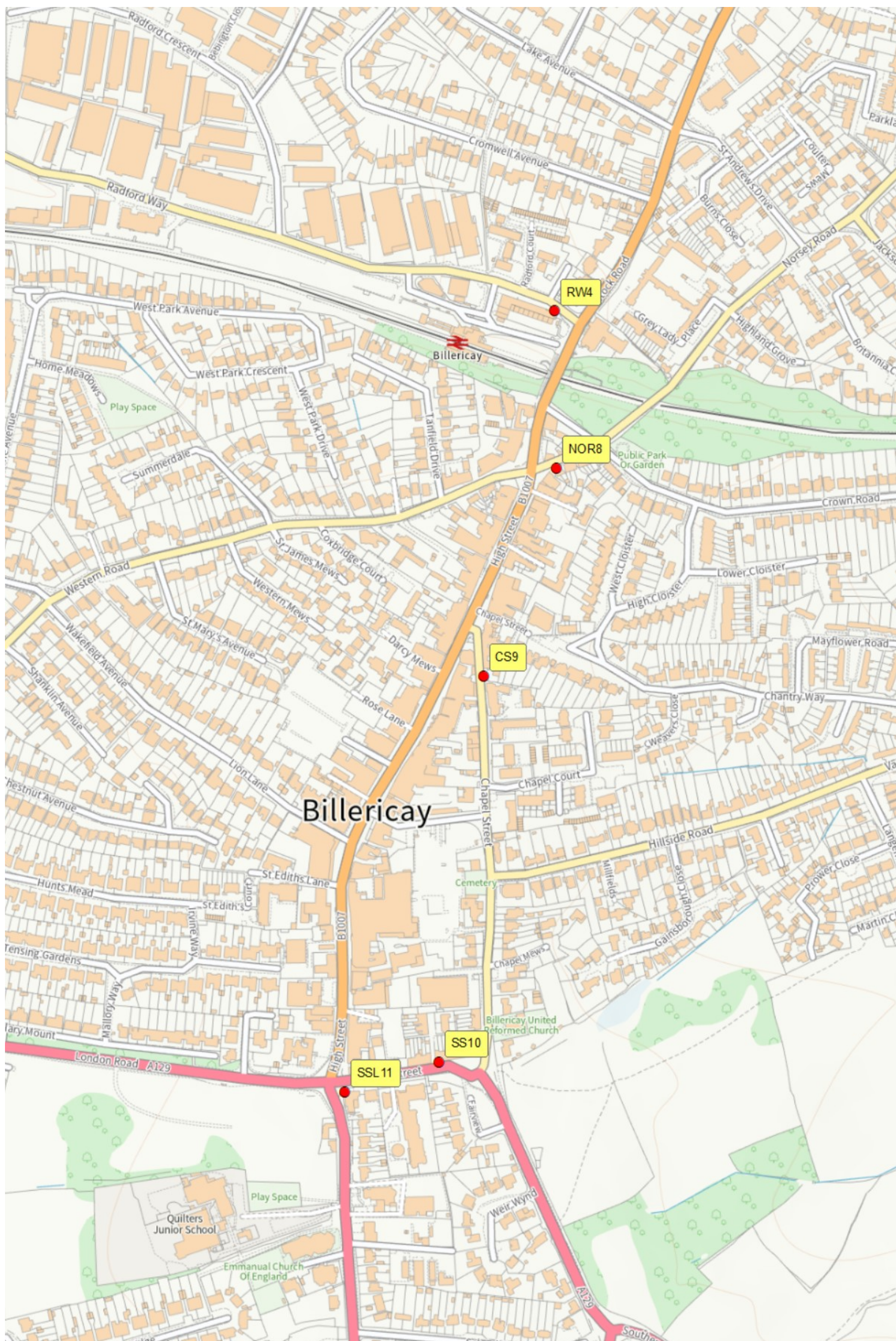
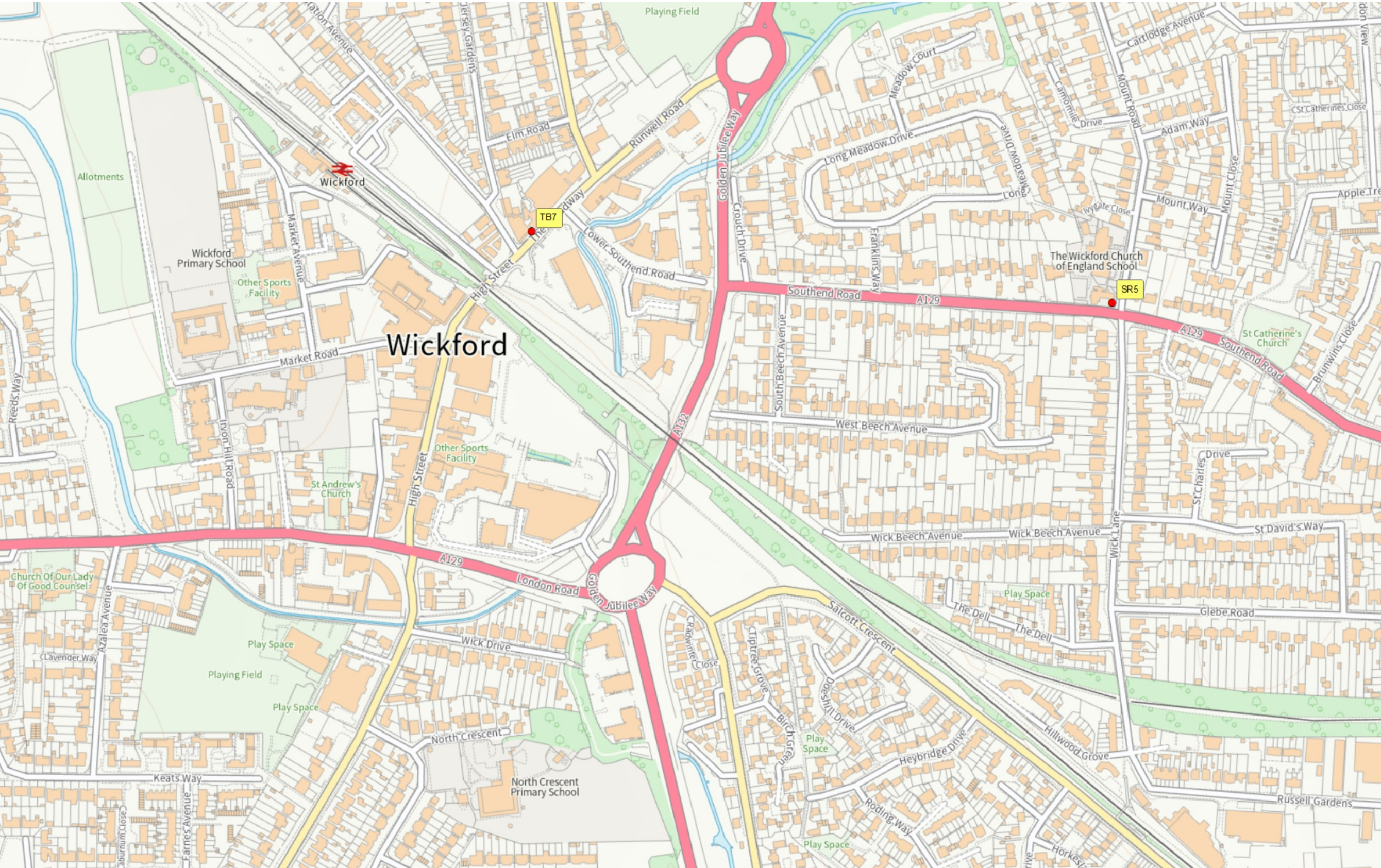


Figure D.5 – Map of Monitoring Sites: Wickford



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Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England⁵

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

⁵ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

Appendix F: Air Quality Sensor Data

Essex County Council undertakes monitoring on East Mayne using air quality sensors to determine compliance with the legal air quality limits as set out in the UK plan for tackling roadside nitrogen dioxide concentrations and the Environment Act 1995 (Essex County Council and Basildon Borough Council) Air Quality Direction 2021.

Table F.1 provides 2022 monitoring data for six air quality monitoring sensors sited on East Mayne and a sensor located in a background location. Two locations (AQ1 and AQ2) exceeded the annual mean NO₂ air quality objective of 40µg/m³. However, location AQ1 had low valid data capture and was disregarded for assessment of compliance.

Table F.1 – Air Quality Sensor Monitoring Data for 2022

Metric	AQ1	AQ2	AQ3	AQ4	AQ5	AQ6	AQ BG
Annual Mean (µg/m ³) (Raw)	41.4	48.5	34.0	27.3	27.3	32.9	15.7
Annual Valid Data Capture (%)	44.3%	93.2%	93.2%	46.3%	70.0%	24.2%	93.5%

The air quality sensor at location AQ2 had a high valid data capture. The location is one metre from the kerb but is not representative of human exposure. The adjacent footpath where exposure takes place is four metres from the kerb. Using the NO₂ Fall-Off with Distance Calculator, we have predicted that the annual mean NO₂ concentration at the footpath is 39.6 µg/m³ and **complies** with the Air Quality Direction.

Table F.2 – NO₂ Fall-Off with Distance Calculator

Step 1	How far from the KERB was your measurement made (in metres)?	1	metres
Step 2	How far from the KERB is your receptor (in metres)?	4	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	16.6	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	48.5	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	39.6	µg/m ³

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'
AQIA	Air Quality Impact Assessment – Reports provided in support of planning applications.
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air Quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
EU	European Union
Euro Standard	Euro standards define the acceptable limits for exhaust emissions of new vehicles sold in EU and EEA member states.
LAQM	Local Air Quality Management
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
Street Canyon	Road which is flanked by buildings resembling a canyon
TEA	Triethanolamine – substance used in diffusion tubes for absorbing nitrogen dioxide
UK-AIR	An information resource providing in-depth information on air quality and air pollution in the UK. A range of information is available, from the latest pollution levels , pollution forecast information , a data archive , and details of the various monitoring networks .
UKAS	United Kingdom Accreditation Service
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'

References

- Defra Diffusion Tube Bias Adjustment Factors Spreadsheet available at; <https://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html>
- Defra LAQM Summary of Laboratory Performance in AIR NO₂ PT Scheme available at; <https://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html>
- Defra NO₂ Fall Off with Distance Calculator available at; <https://laqm.defra.gov.uk/air-quality/air-quality-assessment/no2-falloff/>
- Defra Air Quality Plan for Nitrogen Dioxide (NO₂) in UK (2017) available at; <https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017>
- Environment Act 1995 (Essex County Council and Basildon Borough Council) Air Quality Direction 2021 available at; <https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017-air-quality-directions>
- Essex Air Quality Consortium available at; <http://www.essexair.org.uk>
- Essex Air Twitter Feed available at; <https://twitter.com/essexair>
- EssexCarShare.com available at; <https://liftshare.com/uk/community/essex>
- 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 available at; <https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-TG22-August-22-v1.0.pdf>
- 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 available at; <https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-Policy-Guidance-2022.pdf>
- Public Health Outcomes Framework Indicator D01 available at; <https://fingertips.phe.org.uk/profile/public-health-outcomes-framework>
- UK-AIR Background Mapping Data available at; <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018>