




# MALDON DISTRICT COUNCIL

## 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

Date: May, 2023

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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 Maldon, to fulfil Maldon District 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.

In 2022, Maldon District Council measured two exceedances of the annual mean nitrogen dioxide Air Quality Objectives within the Market Hill Air Quality Management Area. The maximum exceedance was calculated to be 46.2µg/m<sup>3</sup> at relevant exposure.

## Air Quality in Maldon

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<sup>1,2</sup>.

The mortality burden of air pollution within the UK is equivalent to 29,000 to 43,000 deaths at typical ages<sup>3</sup>, with a total estimated healthcare cost to the NHS and social care of £157 million in 2017<sup>4</sup>.

Traffic emissions are the most significant source of air pollution in Maldon. Congestion dominates Market Hill, the town centre and bypass during the rush hour periods and the A414 is the principle route within the district.

### Market Hill Air Quality Management Area (AQMA)

Due to exceedances of the air quality objectives, an AQMA has been declared along the stretch of Market Hill between Anchorage Hill and Bull Lane, Maldon. Maldon District Council has adopted the [Maldon 2025 – 2025 Air Quality Action Plan](#).

The Council recognises the importance of working with partnering Authorities such as Essex County Council to develop transport strategies and to make improvements to local transport infrastructure to reduce congestion.

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<sup>1</sup> Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

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

<sup>3</sup> Defra. Air quality appraisal: damage cost guidance, January 2023

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

## Actions to Improve Air Quality

### Air Quality Grant Funding

Maldon District Council were successful in bidding for £129,000 grant funding to progress with air pollution mitigation measures as set out in the Defra approved air quality action plan (AQAP) 2020-2025. The Council will be able to implement a voluntary Class D Clean Air Zone. This voluntary zone will be communicated to residents and local businesses by way of a communications plan and dedicated air quality website for Maldon.

The Council will assess the impact on traffic congestion and air quality within the wider traffic network if significant traffic management interventions of a one way route (downhill northbound only) and southbound bus gate traffic management interventions within the AQMA on Market Hill were implemented.

Traffic interventions of this kind represent the possibility of making a step change in Nitrogen Dioxide (NO<sub>2</sub>) emissions within the AQMA. Implementation of the voluntary Class D Clean Air Zone and traffic management interventions that are being modelled are rated as high pollution reduction measures within the AQAP.

A communications plan has been proposed to provide information to residents and businesses to comply with the voluntary restrictions of the proposed Class D Clean Air Zone.

It is important that local communities have access to balanced and accurate air quality information. The Council will be developing a dedicated air quality website to provide information and educational resources along with providing an air quality forecasting and alerts service by SMS text message, email and voicemail and 3-day forecasts of air quality, pollen, UV and temperature.

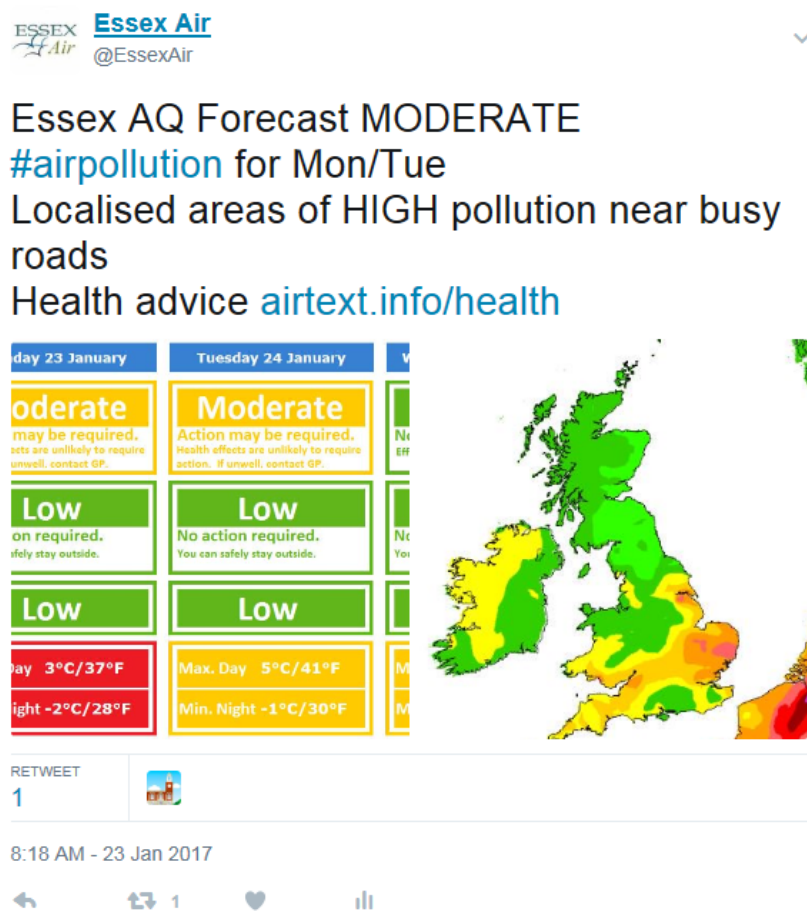
All of these actions are part of the Defra approved AQAP.

## Local Engagement and How to get Involved

Maldon District 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.

The Essex Air twitter also promotes the [DVSA service](#) for reporting smoky lorries or buses. Particulate matter is usually not visible but when poorly maintained diesel engines can produce visible particles, appearing as smoke. Fine particles have an adverse effect on human health, particularly among those with respiratory and cardiovascular problem.

## Conclusions and Priorities

Maldon District Council have concluded that:

- Two exceedances of the nitrogen dioxide annual mean air quality objective has been measured in the Market Hill AQMA in 2022. The maximum exceedance occurred at monitoring site MD27 (46.2µg/m<sup>3</sup>).
- The maximum measured annual mean concentrations are well below 60µg/m<sup>3</sup> which leads Maldon District Council to conclude that there has not been an exceedance of the 1-Hour air quality objective. It may be possible to investigate revoking the 1-hour element of the AQMA.
- There are no new developments that will have an impact on air quality.

Maldon District Council's air quality priority for 2023 will be advancing the adopted air quality action plan measures including the opportunity provided by the successful Defra grant funding.

## Local Responsibilities and Commitment

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

This ASR has been approved by:

Shirley Hall – Interim Head of Service - Environmental Health, Waste & Climate Action ,  
Maldon District Council

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

If you have any comments on this report please send them to Maldon District Council.

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# 1 Local Air Quality Management

This report provides an overview of air quality in Maldon 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 Maldon 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

### 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 Maldon District Council can be found in Table 2.1. The table presents a description of the AQMA that is currently designated within Maldon. Maps of air quality monitoring locations and of the AQMA can be found in Appendix D: Maps of Monitoring Locations and AQMAs.

**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 ( $\mu\text{g}/\text{m}^3$ )	Level of Exceedance: Current Year ( $\mu\text{g}/\text{m}^3$ )	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
MDC Air Quality Management Area Number 1 (Market Hill)	11/12/2018	NO2 Annual & 1 Hour Mean	The stretch of road and properties between Anchorage Hill and Bull Lane, Maldon	No	58.25	46.2	0	Maldon Air Quality Action Plan 2020 – 2025 (July 2020)	<a href="http://www.maldon.gov.uk/download/downloads/id/18206/air_quality_action_plan_2_july_2020.pdf">http://www.maldon.gov.uk/download/downloads/id/18206/air_quality_action_plan_2_july_2020.pdf</a>

Maldon District Council confirms the information on UK-Air regarding their AQMA is up to date

Maldon District Council confirm that all current AQAPs have been submitted to Defra

## Progress and Impact of Measures to address Air Quality in Maldon District 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.

Maldon District Council have a number of ongoing measures to improve air quality in Maldon. These are detailed in Table 2.2 below.

**Table 2.2 – 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	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	Implementation on-going	
2	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			County Council / District & Borough Councils	Member Organisations	NO	Funded	< £10k	Implementation	N/A	N/A	Implementation on-going	
3	Development of a Transport Strategy for Maldon	Transport Planning and Infrastructure	Other	2020	2024	Essex County Council / Maldon District Council	Essex County Council / Maldon District Council	NO	Funded	£50k - £100k	Planning	High. Compliance with the Air Quality Objective met in combination with Measure 2	Reduced traffic flow and congestion on Market Hill. Compliance with NO2 air quality objectives		
4	Voluntary Class D Clean Air Zone	Promoting Low Emission Transport	Low Emission Zone (LEZ)	2020	2025	Maldon District Council	Defra / Maldon District Council	YES	Funded	£100k - £500k	Planning	High. Compliance with the Air Quality Objective met in combination with Measure 1	Compliance with NO2 air quality objectives	2022 Defra Grant grant bid successful	
5	Develop a dedicated Air Quality website for Maldon	Public Information	Via the Internet	2022	2024	Maldon District Council	Defra / Maldon District Council	YES	Funded	< £10k	Planning	N/A	Completion of project		
6	Provision of a public Air Quality forecasting system	Public Information	Via other mechanisms	2022	2024	Maldon District Council	Defra / Maldon District Council	YES	Funded	< £10k	Planning	N/A	Numbers of subscribers		
7	Set up working group with bus operators in Maldon	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	2020	2020	Essex County Council / Maldon District Council / Commercial Bus Operators	N/A	NO	Funded	< £10k	Implementation	High	Quarterly meeting with bus operators	Initial discussions with Essex county Council and bus operators undertaken	

8	Retrofitting of buses travelling on routes along Market Hill	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	2020		Maldon District Council / Commercial Bus Operators / DfT	DfT/Defra Joint AQ unit confirmed no plans to run another round of Clean Bus Technology Fund at present	NO	Not Funded	£500k - £1 million	Planning	High	All buses operating on Market Hill to be of a Euro VI standard or retrofitted to CVRAS standard	No Progress	Retrofitting buses with Selective Catalytic Reduction Technology (SCRT) approved by Clean Vehicle Retrofit Accreditation Scheme ensures that legacy fleet vehicles comply with CAZ standards
9	Hackney Carriage & PHV Emissions Standards	Promoting Low Emission Transport	Taxi Licensing conditions	2020	2022	Maldon District Council	N/A	NO	Funded	< £10k	Planning	Medium	All newly licensed or replacement vehicles to be of a Euro VI standard or better, from 2022	Complete	
10	Council Refuse & Recycling Vehicle Routing	Freight and Delivery Management	Route Management Plans/ Strategic routing strategy for HGV's	2020	2020	Maldon District Council	Maldon District Council	NO	Funded	< £10k	Completed	Medium	Quarterly meeting with Head of Waste	Complete	Maldon District Council Refuse & Recycling Vehicles will not use Market Hill unless undertaking collection on Market Hill
11	MDC Team Talk	Policy Guidance and Development Control	Other policy	2020	2020	Maldon District Council	Maldon District Council	NO	Funded	< £10k	Completed	Low	AQ highlighted in MDC team Talk	Implemented as part of Clean Air day work	MDC staff received the Clean Air Day advice going out to residents and asked to support Clean Air Day by making pledges
12	Council Vehicles Upgrade to Electric	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	2020		Maldon District Council	Maldon District Council	NO	Not Funded	£100k - £500k	Planning	Low	Compile an inventory of Council owned vehicles. +Review options to include AQ weighting within the Council's procurement strategy	Initial feasibility work carried out on fleet transition as part of the Council's wider road map to net zero. Two hybrid waste vehicles and an electric parks vehicle in operation	

13	Clean Air Walking & Cycling Routes	Public Information	Via leaflets	2020	2020	Maldon District Council	Maldon District Council	NO	Funded	< £10k	Completed	Low	Provide online information to residents and visitors about walking and cycling routes away from pollution hotspots to include social distancing pavement space advice	Complete	
14	Electric Vehicle Charging Points at Supermarkets	Promoting Low Emission Transport	Procurng alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2020	2020	Maldon District Council	Supermarkets / Grant funding opportunities	NO	Not Funded	£100k - £500k	Completed	Low	Survey local supermarkets re EV charge points and proposals. Promote mapped EV charging points via social media	Complete	
15	School Travel Plans for schools in Maldon	Promoting Travel Alternatives	School Travel Plans	2020		Maldon District Council	Maldon District Council	NO	Not Funded	< £10k	Planning	N/A	Development and implementation of travel plans by schools		
16	Information on Domestic Fuel & Woodburning	Public Information	Via leaflets	2020	2020	Maldon District Council	Maldon District Council	NO	Funded	< £10k	Completed	Low	Mail drop addresses on Market Hill advice leaflet. Promote through Council website and social media	Complete	
17	Indoor Air Quality	Public Information	Via leaflets	2020	2020	Maldon District Council	Maldon District Council	NO	Funded	< £10k	Completed	Low	Distribution of indoor air quality leaflet through website and social media	Complete	

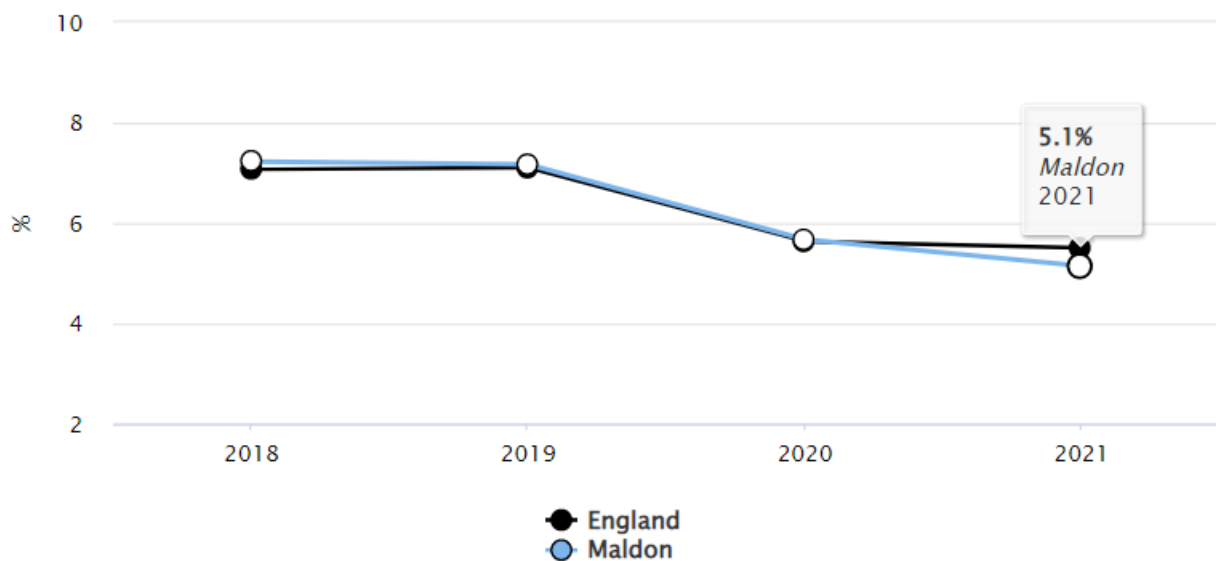
## PM<sub>2.5</sub> – Local Authority Approach to Reducing Emissions and/or Concentrations

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

Maldon District Council does not monitor PM<sub>2.5</sub> concentrations however notes the Defra background mapping resource which for PM<sub>2.5</sub> in 2022 models a maximum annual mean concentration of 9.7µg/m<sup>3</sup> in the Local Authority area.

The Public Health Outcomes Framework indicator D01 – Fraction of mortality attributable to particulate (PM<sub>2.5</sub>) air pollution which for 2021 gave a value of 5.1% which is below the average for England and significantly down from 7.2% in 2019.

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



Maldon District Council is taking the following measures to address PM<sub>2.5</sub>:

- Regular inspections of permitted industry where combustion and non-combustion processes could lead to anthropogenic emissions of PM<sub>2.5</sub>
- 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 Maldon District 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.

Two exceedances of the nitrogen dioxide air quality objectives have been identified and 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 Non-Automatic Monitoring Sites

Maldon District Council undertook non-automatic (i.e. passive) monitoring of NO<sub>2</sub> at 26 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

### 3.1.2 Nitrogen Dioxide (NO<sub>2</sub>)

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 NO<sub>2</sub> annual mean concentrations for the past five years with the air quality objective of 40µg/m<sup>3</sup>.

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.

As no measured annual mean concentrations were greater than 60µg/m<sup>3</sup>, 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 Market Hill AQMA

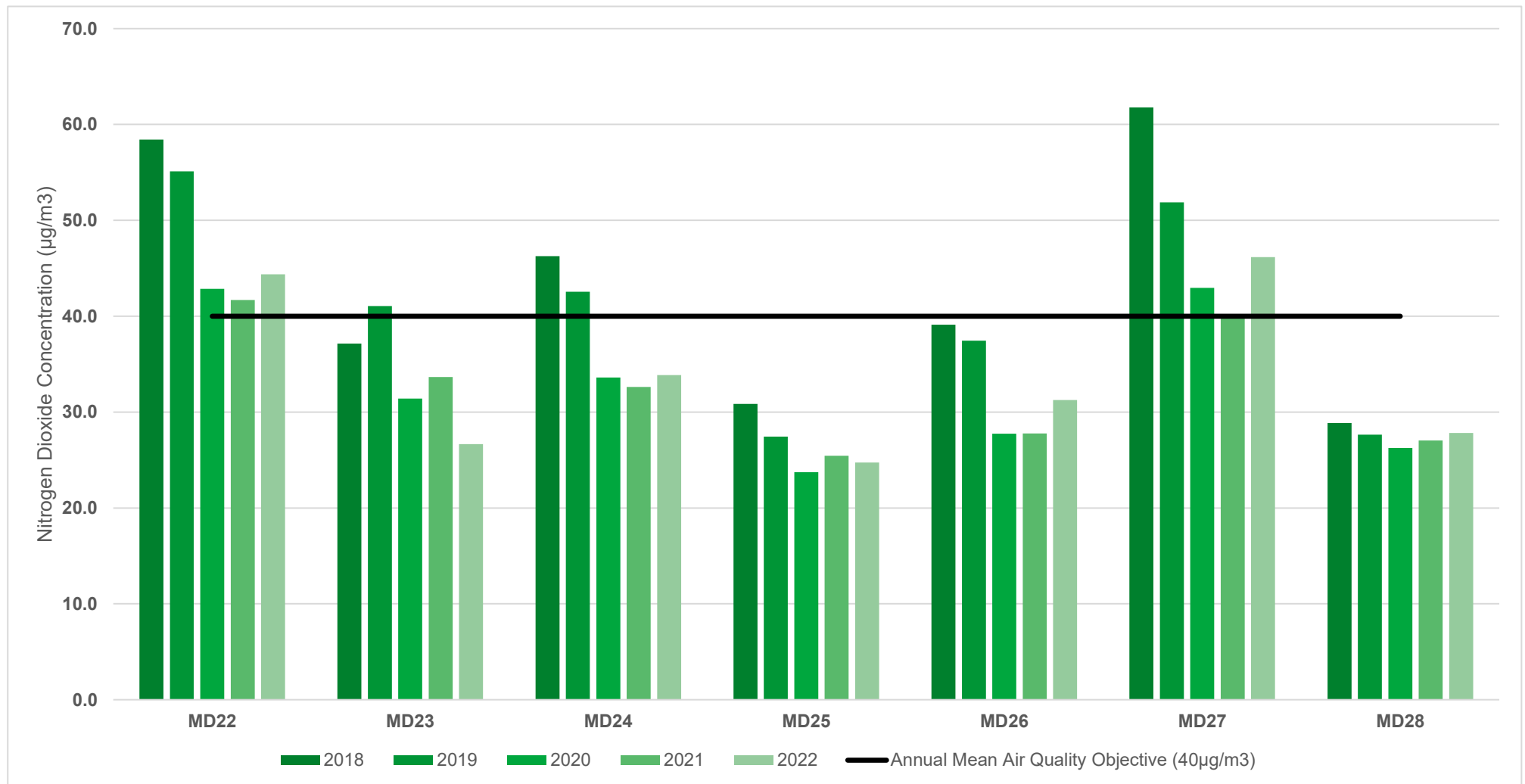
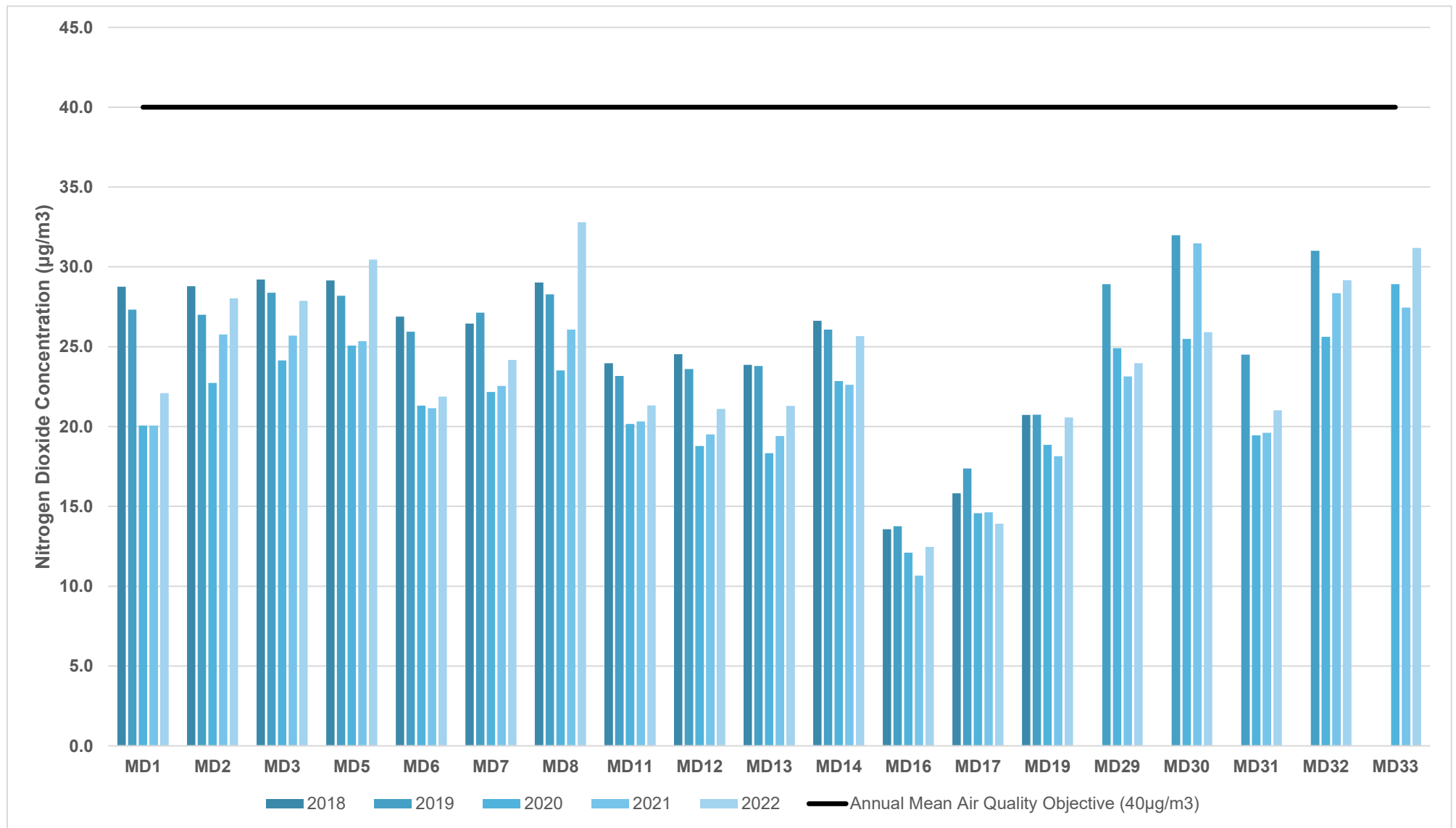


Figure 3.2 – Trends in Annual Mean NO2 Concentrations



## 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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
MD1	Opposite CherryOak A414	Roadside	580645	204820	NO2	No	15.9	10.7	No	2.3
MD2, MD2B, MD2C	A414 Spital Road/A414 Bypass	Kerbside	583952	205742	NO2	No	17.0	1.0	No	2.3
MD3	Heybridge Approach	Roadside	584763	208107	NO2	No	17.9	3.7	No	2.3
MD5	Colchester Rd/Heybridge Street Junction	Roadside	585914	208104	NO2	No	15.6	3.9	No	2.3
MD6	High Street (Market Hill Junction)	Urban Centre	585072	207080	NO2	No	0.0	2.1	No	2.3
MD7	Wantz Road/High Street	Urban Centre	585307	206943	NO2	No	1.9	1.6	No	2.3
MD8	Latchingdon/Burnham Road Junction	Kerbside	588575	200492	NO2	No	11.6	0.4	No	2.3
MD11	Latchingdon Street	Kerbside	588205	200438	NO2	No	0.0	1.3	No	2.3
MD12	A414 Spital Road/A414 Bypass	Kerbside	583862	205549	NO2	No	32.4	1.5	No	2.3
MD13	Limebrook Way/A414 Bypass	Kerbside	584165	205532	NO2	No	31.6	1.5	No	2.3
MD14	The Causeway	Roadside	585221	207682	NO2	No	0.0	9.0	No	2.3
MD16	8 Narvik Close	Roadside	584309	205776	NO2	No	3.0	0.5	No	2.3
MD17	2 Creasen Butt Close	Suburban	585078	207924	NO2	No	5.0	0.5	No	2.3
MD19	Adjacent to 16 Mill Road, Maldon	Kerbside	585565	206723	NO2	No	3.4	0.2	No	2.3
MD22A, MD22B, MD22C	10 Market Hill, Maldon	Roadside	585062	207160	NO2	Yes	0.5	1.5	No	2.3
MD23	59-63 Market Hill, Maldon	Roadside	585055	207324	NO2	Yes	1.5	1.3	No	2.3
MD24	32 Market Hill	Roadside	585045	207272	NO2	Yes	0.7	1.9	No	2.3
MD25	1 Hillside, Maldon	Roadside	585016	207241	NO2	Yes	5.0	1.4	No	2.3
MD26	18 Market Hill, Maldon	Roadside	585045	207186	NO2	Yes	0.0	2.6	No	2.3
MD27	6 Market Hill, Maldon	Roadside	585073	207132	NO2	Yes	0.0	2.3	No	2.3
MD28	21 Market Hill, Maldon	Roadside	585067	207116	NO2	Yes	0.0	1.6	No	2.3
MD29	5 The Square, Heybridge	Roadside	585467	208089	NO2	No	4.0	1.0	No	2.3
MD30	High Street, Maldon	Roadside	584868	207042	NO2	No	0.0	1.0	No	2.3
MD31	Petchey Court, Fambridge Road	Roadside	584809	206962	NO2	No	0.0	3.0	No	2.3
MD32	Goings Wharf, Colchester Road	Roadside	585740	208010	NO2	No	0.0	2.5	No	2.3
MD33	High Street, Maldon	Roadside	584857	207023	NO2	No	0.0	1.0	No	2.3

**Notes:**

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

(2) N/A if not applicable.

Table A.2 – 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 (%) <sup>(1)</sup>	Valid Data Capture 2022 (%) <sup>(2)</sup>	2018	2019	2020	2021	2022
MD1	580645	204820	Roadside	100.0	100.0	28.8	27.3	20.1	20.1	22.1
MD2, MD2B, MD2C	583952	205742	Kerbside	100.0	100.0	28.8	27.0	22.7	25.8	28.0
MD3	584763	208107	Roadside	100.0	100.0	29.2	28.4	24.1	25.7	27.9
MD5	585914	208104	Roadside	84.6	84.6	29.2	28.2	25.1	25.3	30.5
MD6	585072	207080	Urban Centre	80.8	80.8	26.9	25.9	21.3	21.2	21.9
MD7	585307	206943	Urban Centre	100.0	100.0	26.4	27.1	22.2	22.5	24.2
MD8	588575	200492	Kerbside	84.6	84.6	29.0	28.3	23.5	26.1	32.8
MD11	588205	200438	Kerbside	92.3	92.3	24.0	23.2	20.2	20.3	21.3
MD12	583862	205549	Kerbside	100.0	100.0	24.5	23.6	18.8	19.5	21.1
MD13	584165	205532	Kerbside	100.0	100.0	23.9	23.8	18.3	19.4	21.3
MD14	585221	207682	Roadside	100.0	100.0	26.6	26.1	22.8	22.6	25.7
MD16	584309	205776	Roadside	92.3	92.3	13.6	13.8	12.1	10.7	12.5
MD17	585078	207924	Suburban	100.0	100.0	15.8	17.4	14.6	14.6	13.9
MD19	585565	206723	Kerbside	82.7	82.7	20.7	20.7	18.9	18.1	20.6
MD22A, MD22B, MD22C	585062	207160	Roadside	100.0	100.0	<b>58.4</b>	<b>55.1</b>	<b>42.8</b>	<b>41.7</b>	<b>44.4</b>
MD23	585055	207324	Roadside	90.4	90.4	37.1	<b>41.1</b>	31.4	33.7	26.7
MD24	585045	207272	Roadside	100.0	100.0	<b>46.3</b>	<b>42.6</b>	33.6	32.6	33.9
MD25	585016	207241	Roadside	100.0	100.0	30.9	27.5	23.7	25.4	24.8
MD26	585045	207186	Roadside	100.0	100.0	39.1	37.4	27.7	27.8	31.3
MD27	585073	207132	Roadside	100.0	100.0	<b>61.8</b>	<b>51.9</b>	<b>43.0</b>	<b>40.1</b>	<b>46.2</b>
MD28	585067	207116	Roadside	100.0	100.0	28.9	27.7	26.3	27.0	27.8
MD29	585467	208089	Roadside	100.0	100.0	<b>N/A</b>	28.9	24.9	23.1	24.0
MD30	584868	207042	Roadside	100.0	100.0	<b>N/A</b>	32.0	25.5	31.5	25.9
MD31	584809	206962	Roadside	100.0	100.0	<b>N/A</b>	24.5	19.4	19.6	21.0
MD32	585740	208010	Roadside	100.0	100.0	<b>N/A</b>	31.0	25.6	28.3	29.2
MD33	584857	207023	Roadside	92.3	92.3	<b>N/A</b>	<b>N/A</b>	28.9	27.4	31.2

☒ 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  $\mu\text{g}/\text{m}^3$ .

Exceedances of the  $\text{NO}_2$  annual mean objective of  $40\mu\text{g}/\text{m}^3$  are shown in **bold**.

$\text{NO}_2$  annual means exceeding  $60\mu\text{g}/\text{m}^3$ , indicating a potential exceedance of the  $\text{NO}_2$  1-hour mean objective are shown in **bold and underlined**.

Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.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 (Northing)	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
MD1	580645	204820	43.7	30.2	30.8	29.7	29.0	27.9	28.7	25.5	23.9	30.0	30.8	18.7	29.1	22.1	
MD2, MD2B, MD2C	583952	205742	39.7	32.7	45.2	41.8	31.1	30.5	35.3	37.6	30.5	42.2	42.2	33.9	36.9	28.0	
MD3	584763	208107	51.1	39.8	39.6	32.6	32.1	31.3	34.8	32.6	34.7	36.9	37.5	37.1	36.7	27.9	
MD5	585914	208104	52.7	41.7	40.8	34.4	33.0	26.8	Missing	35.6	Missing	44.1	43.8	47.9	40.1	30.5	
MD6	585072	207080	41.1	31.9	31.6	Missing	24.1	22.8	22.1	28.0	27.1	28.4	30.7	Missing	28.8	21.9	
MD7	585307	206943	49.0	37.2	39.1	31.9	27.6	25.1	26.2	30.4	29.6	30.0	18.4	37.1	31.8	24.2	
MD8	588575	200492	59.8	Missing	52.2	44.2	34.1	33.5	39.3	41.2	39.4	40.7	Missing	47.1	43.2	32.8	
MD11	588205	200438	40.0	30.3	34.8	27.3	25.2	20.5	Missing	25.9	26.1	20.9	26.5	31.1	28.1	21.3	
MD12	583862	205549	34.6	24.7	31.7	28.2	21.8	23.0	26.1	29.2	24.4	30.1	28.3	31.1	27.8	21.1	
MD13	584165	205532	41.9	26.7	28.1	25.4	23.4	24.1	28.3	25.3	27.2	29.2	30.0	26.5	28.0	21.3	
MD14	585221	207682	36.9	38.9	35.3	32.7	26.3	26.1	27.8	39.9	26.3	40.6	37.1	37.4	33.8	25.7	
MD16	584309	205776	26.4	Missing	31.8	12.8	11.4	9.0	9.1	9.6	12.2	16.8	18.9	22.3	16.4	12.5	
MD17	585078	207924	30.3	21.5	22.5	15.0	14.3	11.8	12.4	13.2	12.7	22.8	13.6	29.7	18.3	13.9	
MD19	585565	206723	41.5	26.6	29.3	22.9	Missing	17.7	19.3	22.1	Missing	26.5	26.6	38.1	27.1	20.6	
MD22A, MD22B, MD22C	585062	207160	66.5	44.2	72.5	70.2	51.9	51.8	65.0	70.9	48.4	56.3	56.1	46.9	58.4	<b>44.4</b>	<b>42.3</b>
MD23	585055	207324	79.0	2.8	12.9	37.1	29.5	26.5	25.1	27.2	35.2	50.5	60.2	Missing	35.1	26.7	
MD24	585045	207272	48.7	40.4	44.0	50.6	21.0	42.2	49.1	54.3	35.2	48.8	51.6	48.9	44.6	33.9	
MD25	585016	207241	40.5	30.2	36.7	34.0	39.3	25.0	26.3	23.7	30.3	33.1	33.6	38.1	32.6	24.8	
MD26	585045	207186	46.0	29.3	57.6	48.7	33.1	36.2	44.6	49.6	33.3	40.4	39.1	35.8	41.1	31.3	
MD27	585073	207132	61.5	40.7	71.7	70.2	56.7	56.1	66.0	71.4	55.4	58.3	62.5	58.6	60.8	<b>46.2</b>	
MD28	585067	207116	45.9	40.5	40.9	37.4	31.6	32.3	32.0	36.3	25.5	38.5	38.9	39.7	36.6	27.8	
MD29	585467	208089	34.9	33.4	38.4	31.5	25.7	24.0	29.6	30.8	22.7	35.2	32.8	39.5	31.5	24.0	
MD30	584868	207042	48.4	35.5	42.5	34.5	31.9	27.4	29.7	34.6	32.7	39.4	31.0	21.6	34.1	25.9	
MD31	584809	206962	41.5	30.5	32.6	25.8	22.3	20.6	19.3	22.4	19.4	29.9	30.7	36.9	27.7	21.0	
MD32	585740	208010	52.3	34.5	42.7	39.4	34.8	30.4	38.3	42.8	34.9	31.0	38.7	40.8	38.4	29.2	
MD33	584857	207023	38.2	45.2	49.1	40.2	36.0	Missing	44.4	45.1	31.6	43.5	37.4	40.7	41.0	31.2	

- ☒ All erroneous data has been removed from the NO<sub>2</sub> 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
- ☒ Maldon District Council confirm that all 2022 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System

**Notes:**

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 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 Maldon District Council During 2022

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

### QA/QC of Diffusion Tube Monitoring

- Maldon District Council undertook monitoring at 26 sites in 2022.
- Maldon District 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 NO<sub>2</sub> 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<sub>x</sub>/NO<sub>2</sub> continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Maldon District 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 Maldon District Council over the past five years is presented in Table C.1.



**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

**NO<sub>2</sub> Fall-off with Distance from the Road**

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO<sub>2</sub> concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO<sub>2</sub> fall-off with distance calculator available on the LAQM Support website.

Table C.2 below identifies the predicted concentration at receptor MD22.

**Table C.2 – NO<sub>2</sub> 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	Comments
MD22A MD22B MD22C	1.5	2.0	44.4	11.9	<b>42.3</b>	Predicted concentration at Receptor above AQS objective

## Appendix D: Maps of Monitoring Locations and AQMAs

Figure D.1 – Map of Non-Automatic Monitoring Sites: Market Hill AQMA



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Figure D.2 – Map of Non-Automatic Monitoring Sites: East of Maldon Town Centre

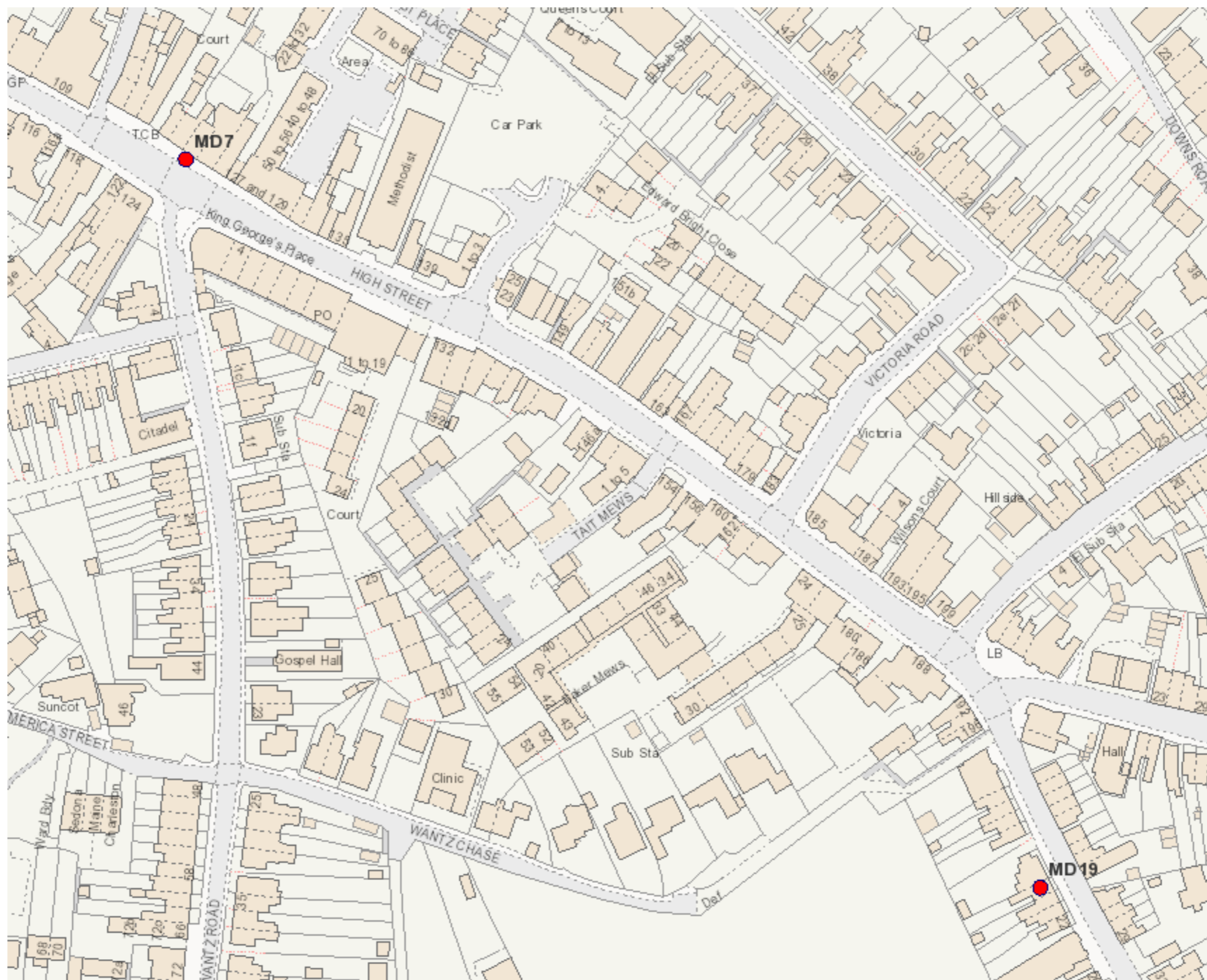


Figure D.3 – Map of Non-Automatic Monitoring Sites: Heybridge

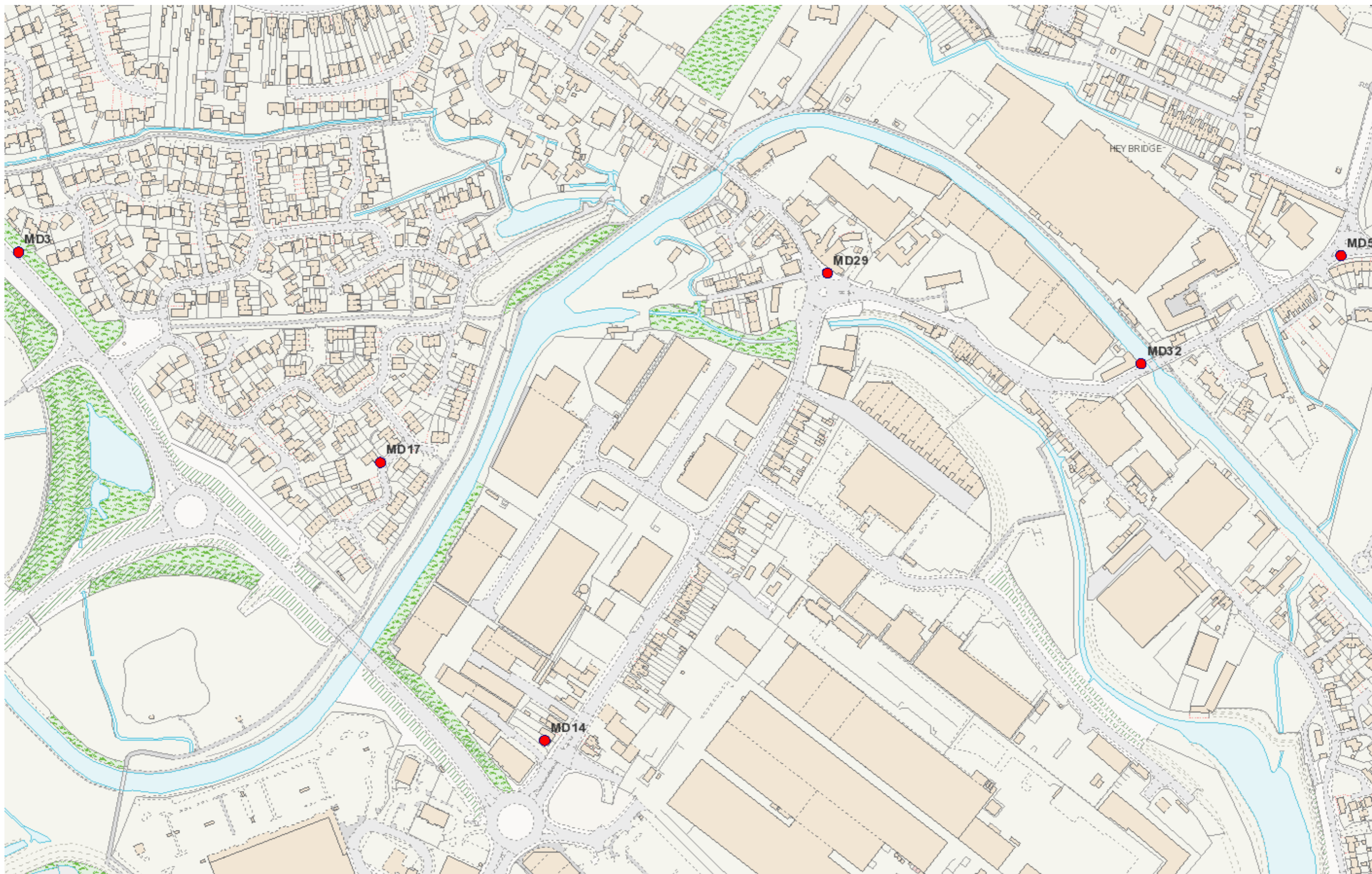


Figure D.4 – Map of Non-Automatic Monitoring Sites: A414 Wycke Hill / Limebrook Way Roundabout

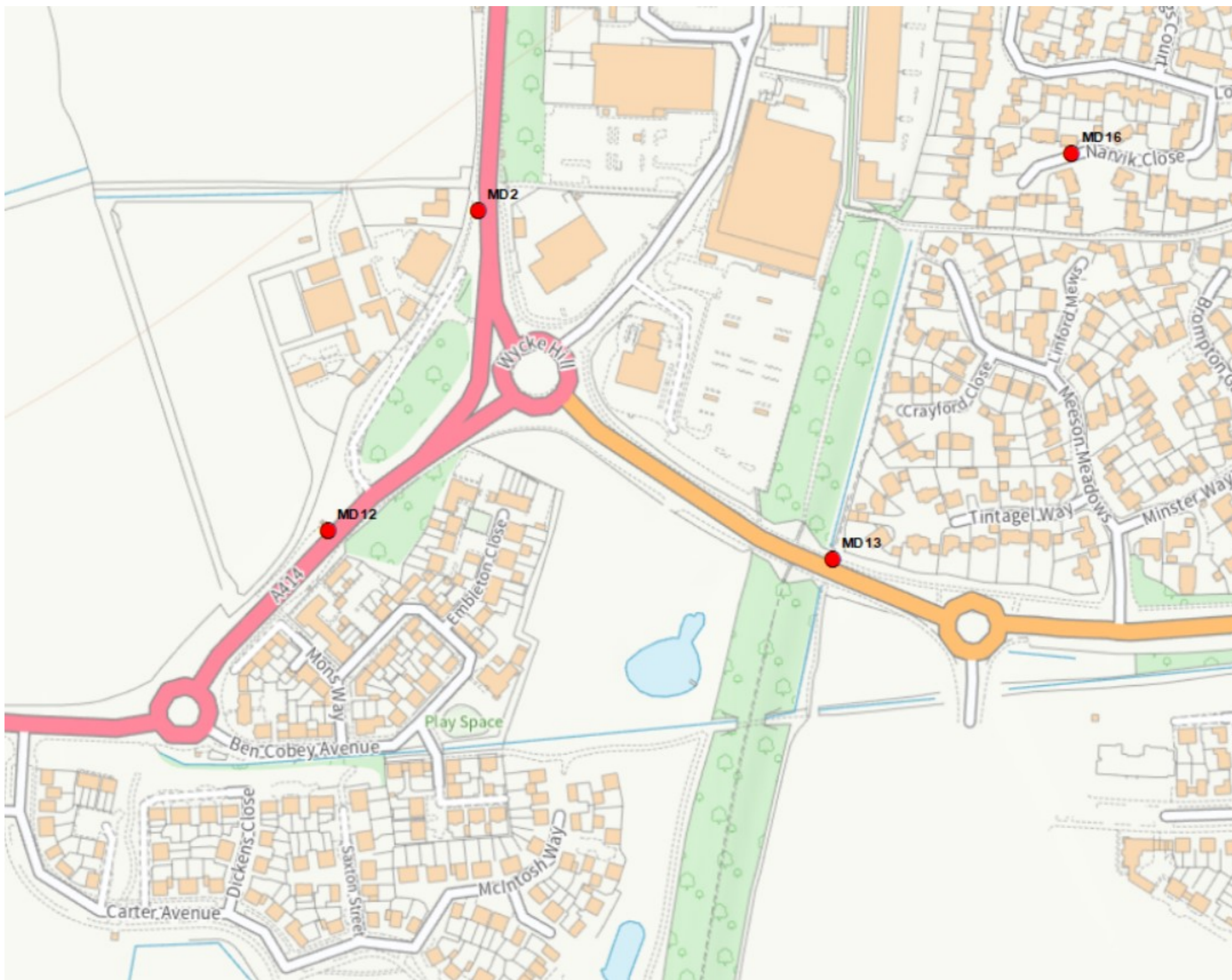
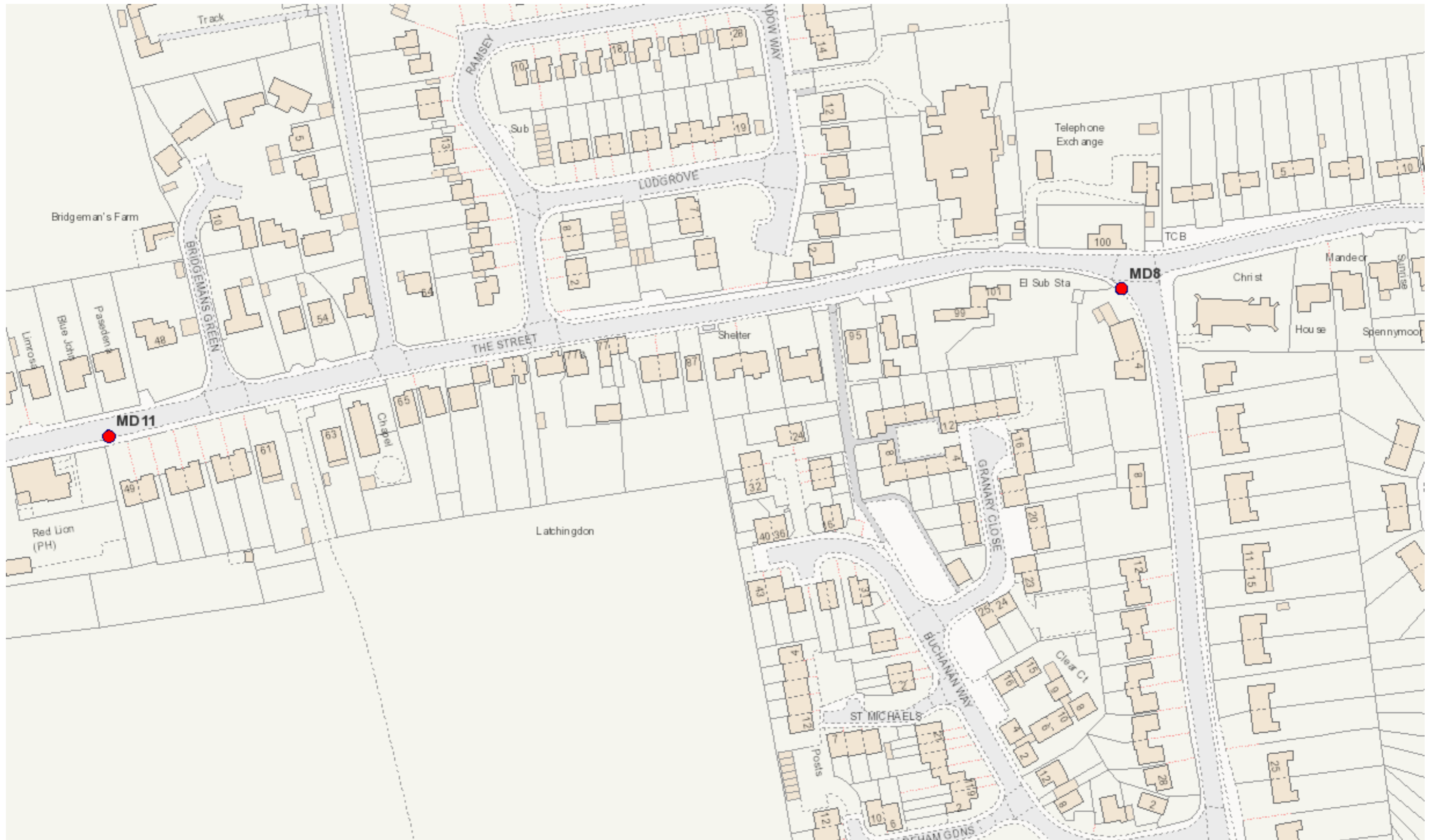
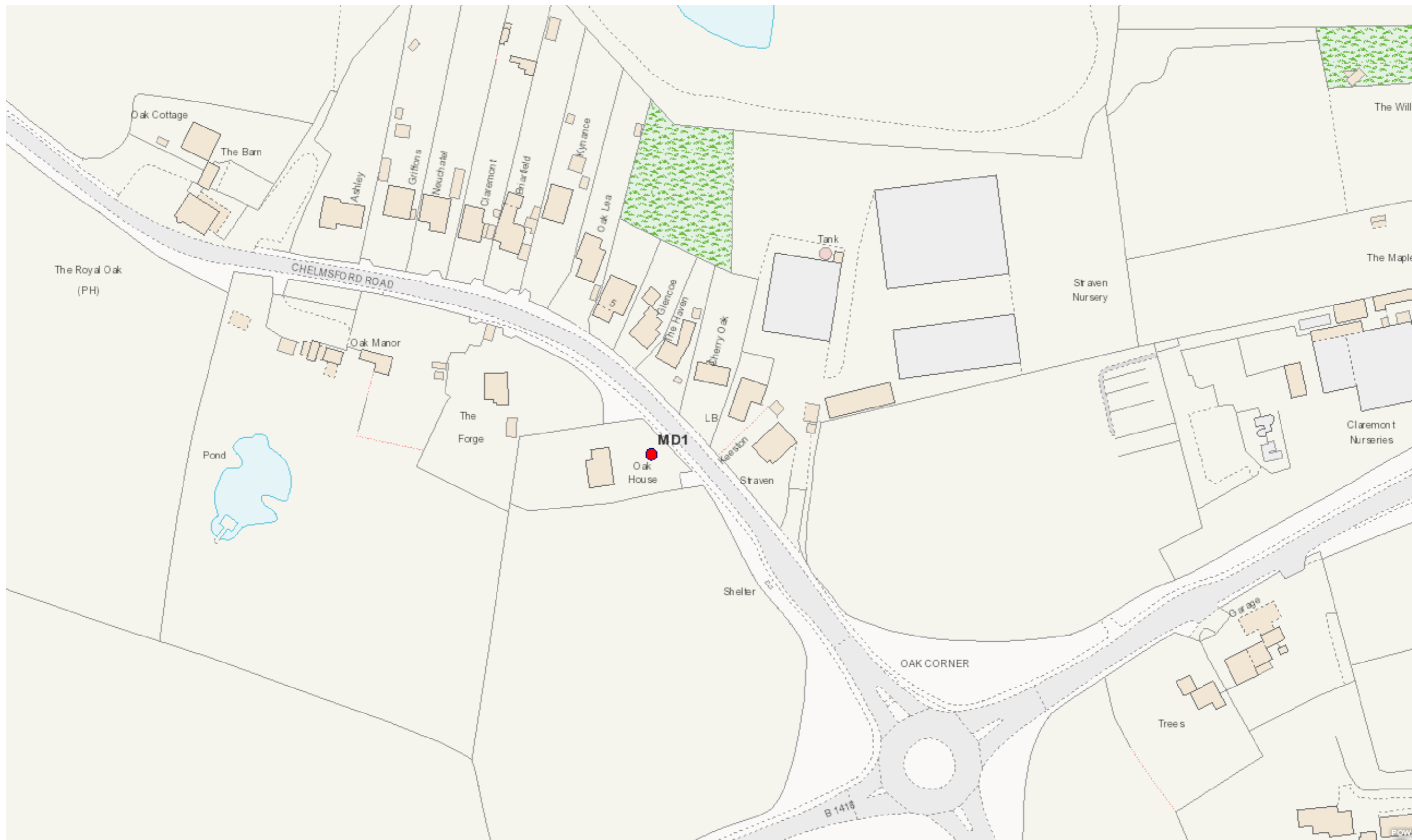


Figure D.5 – Map of Non-Automatic Monitoring Sites: Latchingdon



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Figure D.6 – Map of Non-Automatic Monitoring Sites: A414 Chelmsford Road



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## Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England<sup>5</sup>

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

<sup>5</sup> The units are in microgrammes of pollutant per cubic metre of air (µg/m<sup>3</sup>).



## 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 <a href="#">EU</a> and <a href="#">EEA</a> member states.
LAQM	Local Air Quality Management
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM <sub>2.5</sub>	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 <a href="#">latest pollution levels</a> , <a href="#">pollution forecast information</a> , <a href="#">a data archive</a> , and details of the various <a href="#">monitoring networks</a> .
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

- Air Quality Funding for Local Authorities available at; <https://www.gov.uk/government/news/107-million-in-funding-for-local-authorities-to-improve-air-quality>
- 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 NO<sub>2</sub> PT Scheme available at; <https://laqm.defra.gov.uk/diffusion-tubes/ga-gc-framework.html>
- 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>
- Maldon District Council Air Quality Action Plan available at; [http://www.maldon.gov.uk/download/downloads/id/18206/air\\_quality\\_action\\_plan\\_2\\_july\\_2020.pdf](http://www.maldon.gov.uk/download/downloads/id/18206/air_quality_action_plan_2_july_2020.pdf)
- Public Health Outcomes Framework Indicator D01 available at; <https://fingertips.phe.org.uk/profile/public-health-outcomes-framework>