WELWYN HATFIELD

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: June, 2023

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Executive Summary: Air Quality in Our Area

Air Quality in Welwyn Hatfield Borough Council

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

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

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[5] sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term $PM_{2.5}$ targets. The National Air Quality Strategy, due to be published in 2023, will provide more information on local authorities' responsibilities to work towards these new targets and

[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

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

reduce $PM_{2.5}$ in their areas. The Road to Zero[6] details the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

The air quality within the borough is monitored closely to observe any potential changes and what this may attributed to. The council are dedicated to try and make changes to improve air quality across the borough. The council are working towards the implementation of an effective climate change strategy. This links in with air quality monitoring and the change of operations internally within the council. A hybrid working system has now been put in place, this typically means that staff are in the office two days a week, with other work being undertaken at home and out on district. This has significantly reduced staff travel and made for a more efficient use of office space. As a result, this is naturally reducing the carbon footprint created by staff travelling and helps to reduce traffic congestion across the borough.

Planning and development control is a key area for air quality promotion and reduction in local emissions. The focus is on promoting the installation of green travel alternatives for new developments and change of use. This will include utilising spatial planning to minimize air pollution hotspots and promote cleaner environments. Identify areas with poor air quality and develop policies that encourage the separation of sensitive land uses, such as schools and hospitals, from major pollution sources like busy roads or industrial sites.

Green Infrastructure and Urban Design: Incorporate green infrastructure elements, such as parks, green spaces, and trees, into urban design plans. These elements can help absorb pollutants, provide shade, and improve overall air quality. Incorporate green roofs, green walls, and permeable surfaces into building designs to mitigate pollution.

Building Design and Energy Efficiency: Promote energy-efficient building design and construction practices to reduce emissions from heating and cooling systems. Incorporate ventilation systems that filter outdoor air and prevent the infiltration of pollutants. Encourage the use of low-emission building materials and construction techniques. The use of conditions to include the provision of cycle facilities, boiler emission limits and the

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

installation of electric vehicle charging points. This will begin to facilitate the use of greener transport across the borough and make that process more convenient.

Monitoring locations are still being closely monitored and diffusion tube sites will be relocated when necessary. There is not a particular issue with any one pollutant across the borough. The main aim is to reduce all levels of pollution as much as possible.

The Hertfordshire and Bedfordshire air quality group are working closely with Hertfordshire County Council to join forces and align joint practices to make improvements across the county. This relationship is blossoming, and the collaborative working allows us to develop plans together, share information and to ensure that we are working towards the same goal. The connection with the County Council opens up access to assist with information regarding the highway infrastructure, transport planning and key highway networks.

Conclusions and Priorities

The results show that pollution levels have reduced slightly or remain unchanged. There are currently no locations across the borough that breach the air quality objectives so there is no requirement to declare an air quality action area. The monitoring network is well established, and this is gathering very important data across the borough. Work is ongoing with planning development to install and provide more green transport solutions. Green transport facilities should be provided for new developments to aid the green transport infrastructure across the borough.

The council are prioritising air quality and emission reduction and take this matter very seriously. The engagement with Hertfordshire County Council has been vital in improving communication and working together to make improvements. The sharing of data and knowledge during quarterly meetings is showing benefits, measures are in place to make improvements where possible. These measures encourage the use of public transport where possible. This reduces the number of private vehicles in operation reducing pollutant concentration through the number of vehicles and reducing congestion; Walk or cycle if your journey allows. From choosing to walk or cycle for your journey the number of vehicles is reduced, this also encourages and improves health and fitness. This can be promoted via travel plans through the workplace and within schools, as well as promotion through planning and development control.

The main sources of pollution within the borough are thought to be from road traffic, this is predominantly the focus of the monitoring that is undertaken. Monitoring locations are

situated as close to the roadside as possible to establish an accurate picture of the current situation. The sources of PM2.5 and Nitrogen Dioxide in this case will be from vehicle exhausts, along with tyre and brake wear.

Local Engagement and How to get Involved

The authority has engaged with Hertfordshire County Council and other stakeholders. There has been regular engagement and communication with the Hertfordshire and Bedfordshire air quality group. Local engagement has come via social media and the air quality schools project. This has included the promotion of air quality, green travel, development control and being aware of the differences that can be made at a local level.

Link to the air quality alert scheme:

https://www.airqualityengland.co.uk/local-authority/sign-up

Local Responsibilities and Commitment

This ASR was prepared by the Public Health and Protection Department of Welwyn Hatfield Borough Council with the support and agreement of the following officers and departments:

Terry Vincent, Environmental Protection Officer.

This ASR has been approved by:

Sue McDaid, Director of Resident and Neighbourhood.

If you have any comments on this ASR please send them to e.health@welhat.gov.uk or call the team on 01707 357 242.

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1 Local Air Quality Management

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

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

Welwyn Hatfield Borough Council currently does not have any declared AQMAs. A local Air Quality Strategy is under development to prevent and reduce polluting activities. Please also refer to table 2.1 which shows the measures taken to help reduce pollution.

Progress and Impact of Measures to address Air Quality in Welwyn Hatfield Borough Council

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

There are some formatting errors, such as inconsistent text colour/size, missing subscripts, and a paragraph, rather than a title, included as an item in the table of contents. Reports should be thoroughly checked for such formatting errors prior to submission.

These have been noted. This year's report will undergo addition checks prior to submission.

Although there are no designated AQMAs (and therefore, no AQAP), the Council has provided thorough details on the measures currently being undertaken to improve local air quality. This demonstrates the Council's dedicated and proactive approach to addressing air quality issues and it very much welcomed.

In last year's ASR appraisal, it was recommended that the Council co-locate a set of triplicate diffusion tubes. This recommendation is re-instated in this ASR, as it would enable the calculation of a local bias adjustment factor.

A diffusion tube has now been located next to the operational analyser.

The Council state in the text (and in Table A.1) that there are two automatic monitoring sites. Although information regarding the site names, site types and pollutants measured are given in Table A.1, it may be useful to add this information to the main text in future, for clarity.

This has been noted and addressed.

Monitoring data for 2021 is presented in the report. However, there is no discussion of trends. This is encouraged in future reports, as it shows that the Council are monitoring

changes in NO2 across the years and gives an indication of how the air quality is changing over this time.

Information has been included within this report regarding data trends.

The Council provided detailed maps of all monitoring locations in the ASR. However, as noted in last year's appraisal, some labels overlap/are missing.

Due to the scaling of the maps within the software, it is very difficult to avoid this in some locations, depending upon the proximity of the monitoring sites. The labelling has now been changed, to try and avoid overlapping.

Overall, the report is concise and satisfies the criteria of relevant standards. The Council should continue their good work in improving local air quality.

Welwyn Hatfield Borough Council has taken forward several direct measures during the current reporting year of 2022 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.1.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	AQ schools project	Promoting Travel Alternatives	School Travel Plans	2020	Ongoing	Local Authority Environmental Health, Local Authority Transport Dept.	Local authority/Charity/Volunteer	NO	Fully funded	< £10k	Planning	Reduced vehicle emissions	60%	Ongoing	Continue obtaining data using diffusion tubes.
2	Development control	Policy Guidance and Development Control	Intensive active travel campaign & infrastructure	2020	2024	Local Authority Environmental Health	Environmental health	NO	Funded	< £10k	Implementation	Reduced vehicle emissions	100%	Implementation on-going	For development projects, air quality conditions are being put on applications for provision of cycle storage and electric vehicle charging points
3	Herts Living Lab	Transport Planning and Infrastructure	Other	2020	2025	Environmental Health, Herts County Council, Ocado, University of Hertfordshire	Multiple project schemes	NO	Funded	£10k - 50k	Planning	Reduced vehicle emissions	10%	Implementation on-going	Local air quality monitors are being prepared to be located in strategic positions
4	Electric Cars	Alternatives to private vehicle use	Car Clubs	2017	2024	Local authority	Local authority	NO	Funded	< £10k	Completed	Reduced vehicle emissions	80%	Ongoing	The electric cars are used for air quality monitoring work where possible. Staff are encouraged to use the electric vehicles for district visits. The cars are available for public hire out of hours and over the weekends.
5	Working at home/hybrid working	Promoting Travel Alternatives	Encourage / Facilitate home-working	2020	2024	Local authority	Local authority	NO	Funded	< £10k	Implementation	Reduced vehicle emissions	80%	Ongoing	The council has now implemented the hybrid working scheme. The offices have been cleared and set up for hot desking. This is working well, and staff are still working form home on a regular basis. In general each officer is in at least two day a week.

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
6	Permits	Environmental Permits	Other measure through permit systems and economic instruments	2020	2024	Local authority	Local authority/consultant	NO	Funded	< £10k	Implementation	Permitted process emission controls	70%	Ongoing	A consultant has been employed to assist with the permitting process and to ensure that inspections are carried out and permits are issued
7	Herts & Beds AQ Group	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	2020	2024	Local authority	Local authority	NO	Funded	£10k - 50k	Implementation	Reduced vehicle emissions	70&	Ongoing	The group meet quarterly through the year and have regular contact at other times - Promotion and implementation of air quality strategies - promotion and sharing knowledge regarding improvements to air quality via development control - sharing new guidance - sharing measures adopted across the county to improve air quality - Links to Hertfordshire County Council Public Health to network and link in with projects to improve and promote public health county wide
8	Air Alert Scheme	Public Information	Via the Internet	2020	2024	Local authority	Local authority	NO	Funded	< £10k	Completed	Awareness of AQ in locality and promotion of green travel	100%	Ongoing	The air alert scheme has been reviewed, in terms of membership sign up. There has been a significant advertising drive to promote the system across the county. This has been actively supported by the county council public health team. The promotion of the service has been via social media

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
															and medical centres. As a result, sign up rates have now increase.
9	Cycle to work scheme	Alternatives to private vehicle use	Other	2020	2023	Local authority	Local authority	NO	Partially Funded	< £10k	Completed	Reducing vehicle emissions	50%	Ongoing	Scheme available for staff to purchase bikes once every 6 months through the subsidised scheme
10	Climate Change Carbon Emission Reduction - Herts County Council Sustainability Partnership	Other	Other	2021	2030	Local authority	Local authority	NO	Partially Funded	£10k - 50k	Planning	Decarbonisation	20%	Ongoing	Most of the changes in how and what the community, (households and businesses) consumes as energy will change radically over the coming decades. Most of that change will depend on central government policy on decarbonisation of electricity production. There will be a switch to electrical heating of homes, as we move to greener electricity production. The Council, as most local authority in the country will have to manage and facilitate this change by providing help to the most vulnerable households, to reduce fuel poverty and offering advice and managing behavioural change as we

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
															move to net zero emissions.
11.	Electric fleet council vehicles	Alternative use from diesel and petrol vehicles	Emission reduction	2022	Ongoing	Local authority	Local authority/County Council	No	Partially funded	£20k	Implemented	Reducing vehicle emissions	50%	Ongoing	The use of council fleet vehicles, such as council contractor maintenance fleet, that are used to move across the borough. These vehicles are now mostly electric. This helps to reduce vehicle emissions from council fleet vehicles.

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
12	Strategic Action Plan Transport - Herts County Council Sustainability Partnership	Promoting Low Emission Transport	Other	2021	2030	Local authority	Local authority	No	Partially Funded	£10k - 50k	Planning	Decarbonisation	20%	Ongoing	Deliver net zero carbon emissions for local authority transport operations by 2030 - Work towards zero carbon emissions for Hertfordshire's transport network by 2050 - Embed sustainable transport policies in Local Plans and prioritise the needs of sustainable travel within every planning decision - Only support new developments where they will have full sustainable transport access - Systematically pursue opportunities for active travel in everything we do - Look to reduce air pollution arising from local transport sources - Promote a shift to active travel and public transport through behaviour change campaigns and infrastructure improvements - Facilitate a move to BEV for taxis across the county - Facilitate appropriate EV charging networks across Hertfordshire

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
13	Links with Air quality and public health - hertfordshire councty council	Other	Other	2021	2024	Local authority	Local authority	YES	Not Funded	< £10k	Implementation	Increased awareness	70&	Ongoing	Hertfordshire County Council have employed an air quality programme manager - this has provided a very useful link between the district councils and the county council. This link is vital, because it allows communication with multiple departments, links with highways, public health, schools. It permits a very broad range of facilities to promote and improve air quality awareness

$PM_{2.5}$ – 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.

Welwyn Hatfield Borough Council is taking the following measures to address PM2.5: The council still operate the electric scheme run by e car. We ensure that the cars are used for as many operational site visits as possible. The cars are booked in advance for each monthly diffusion tube run throughout the year.

The council officers, aside from core emergency staff, are mostly working to a hybrid scheme. This has resulted in staff working at home some of the time and then working in the office for the rest of the time. This has significantly reduced the need for all staff to commute to work every day. The council have also continued to undertake virtual meetings where possible with the main view to reducing carbon emissions from reduced travel.

The council have also invested in a fleet of electric council vehicles that are used to travel around the borough for council maintenance staff. These have replaced diesel and petrol vehicles.

The council are also working closely with Hertfordshire County Council via the air quality forum. This work involves consulting and reviewing the county wide transport plan with a view to reducing emissions from PM2.5.

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

This section sets out the monitoring undertaken within 2022 by Welwyn Hatfield Borough 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.

Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Welwyn Hatfield Borough Council undertook automatic (continuous) monitoring at 2 sites during 2022. Table A.1 in Appendix A shows the details of the automatic monitoring sites. The Hertfordshire and Bedfordshire - Air Quality monitoring service (airqualityengland.co.uk) page presents automatic monitoring results for Welwyn Hatfield Borough 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

Welwyn Hatfield Borough Council undertook non- automatic (i.e. passive) monitoring of NO_2 at 51 sites during 2022. 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.

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.

3.1.3 Nitrogen Dioxide (NO_2)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

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.

Table A.5 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past five years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

The trends in annual nean NO_2 concentrations can be observed in the charts presented in figure A1. The diffusion tube monitoring for the 33 sites across the borough demonstrate the difference in data pror to the pandemic. Typically, pollution emissions from road traffic tend to improve year on year, despite an increase in road traffic, the introduction of greener transport helps to make improvements each year. Therefore, in general air quality will tend to improve slightly for any given location. The data generally shows that pollution levels reduced from 2018 to 2019. When the pandemic hit, the data in the main shows a noticable reduction in pollution levels for 2020.

As the pandemic eased, traffic levels increased and the population started to travel again. However, there has been a significant change in general working practices in that a lot of people are now permitted to work from home more often. This may not remain in place for years to come, but at this present time, the data demonstrates that current pollution levels have not generally returned to pre pandemic levels.

The data for 2021 and 2022 shows some fluctuations in certain locations. There are improvements in some areas but then regresion in others. This is likely to be down to the fact that the country is still adjusting and recovering from the pandemic, some bussinesses are still changing working patterns and the requirement for people to return to office working. However, the changes in levels are considered to be minor and will hopefully show consistent improvements in future years.

The schools air quality project started in 2020. The locations have remained the same so this provides a stable data set. The data clearly shows a noticable increase in pollution levels in 2021 as lockdowns were lifted. However, more encouragingly, there has been a reduction in the 2022 dataset closer to the levels captured during the pandemic. The montoring locations are immediately at the front of the school. This hopefully demonstrates the use of active travel such as cycling and walking.

The automatic analyser located at West View in Hatfield shows a stable dataset from 2020 to 2022. It is encouraging to note that pollution levels have stayed fairly consistent over this time, there has not been a significant rise in pollution levels in this location as the padnemic eased. There has never been an exceedence recorded for the 1 hour mean by this analyser.

3.1.4 Particulate Matter ($PM_{2.5}$)

Table A.6 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past five years.

The data from 2017 to 2022 shows a marked decrease from 2017 until 2020. This is consistent with national data which demonstrates that pollution levels tend to improve slightly year on year. The data from 2020 to 2021 is identical which will be due to the pandemic. There is an increase in 2022 which is back to pre pandemic levels. This is obviously disapointing, but it is expected. The pandemic created a rather unusual scenario in that roads were extremely quiet. It appears that things are completely back to normal. There are changes still being made with some businesses still making changes and bringing people back into the office. This will increase pollution levels. It also appears that travel patterns and routines are now different, people tend to operate in a more sporadic way in terms of travelling to and from a place of work, this means that peak times are fluctuating. This will naturally have an effect on the data that is recorded.

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)
WHBAM	Great North Rd/A1000	Roadside	523292	209170	PM2.5	No	Beta Attentuation	10	8	1.5
WHNOX	West View	Roadside	522106	209460	NO2	No	Chemiluminescent	16	3	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)
WH1	Great North Rd A1000(2)	Roadside	523326	209153	NO2	No	6.0	2.0	No	2.0
WH2	Bessemer Road, WGC	Roadside	524340	213087	NO2	No	23.0	2.0	No	2.0
WH3	West View, Hat, next to nox analyser	Roadside	522102	209455	NO2	No	16.0	3.0	No	2.0
WH4	London Rd, Welwyn, Tenterfield Nursery School	Roadside	523146	215700	NO2	No	8.0	2.0	No	2.0
WH5	Cuffley High Street 1	Roadside	530553	202715	NO2	No	16.0	5.0	No	2.0
WH6	Cuffley High Street 2	Roadside	530502	202694	NO2	No	6.0	5.0	No	2.0
WH7	Briars Lane, Hatfield	Roadside	522193	208434	NO2	No	18.0	2.0	No	2.0
WH8	Black Fan Road - Opposite Morrisons	Roadside	525688	212769	NO2	No	14.0	3.0	No	2.0
WH9	Great North Rd Adjacent to A1(M)	Kerbside	522429	212150	NO2	No	13.0	1.0	No	2.0
WH10	Parkside, Welwyn	Near road	523347	216002	NO2	No	9.0	3.0	No	2.0

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)
WH11	Knighsfield, WGC	Roadside	524429	214000	NO2	No	20.0	2.0	No	2.0
WH12	St Albans Road East/Heyford Way, Hatfield	Roadside	523148	209148	NO2	No	6.0	2.0	No	2.0
WH13	Stanborough Rd 2, WGC	Near road	523416	211958	NO2	No	9.0	2.0	No	2.0
WH14	Campion Road, Hatfield	Roadside	521585	209696	NO2	No	6.0	3.0	No	2.0
WH15	Cuffley High Street 3	Near road	530439	202681	NO2	No	25.0	2.0	No	2.0
WH16	Standborough Road 1, WGC	Roadside	523358	211931	NO2	No	9.0	3.0	No	2.0
WH17	Great North Road, Hatfield (A1000)	Near road	523293	209164	NO2	No	15.0	5.0	No	2.0
WH18	B195/Broadwater Road, WGC	Near road	524285	212988	NO2	No	16.0	5.0	No	2.0
WH19	Comet Way on A1001 & A1M	Near road	522144	209516	NO2	No	50.0	5.0	No	2.0
WH20	Wellfield Road, Hatfield	Roadside	522466	208908	NO2	No	13.0	2.0	No	2.0
WH21	Roadside Laybay A414 Essendon	Background	527258	210364	NO2	No	7.0	5.0	No	2.0
WH22	Garden Village, Hatfield	Kerbside	521801	209471	NO2	No	20.0	1.0	No	2.0

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)
WH23	Burrowfield, WGC	Roadside	523921	211698	NO2	No	10.0	2.0	No	2.0
WH24	Ellenbrook Lane @ A1001	Near road	521164	207740	NO2	No	40.0	5.0	No	2.0
WH25	West View, Hatfield	Near road	522093	209431	NO2	No	8.0	5.0	No	2.0
WH26	West View, Hatfield	Near road	522064	209328	NO2	No	24.0	5.0	No	2.0
WH27	West View, Hatfield	Near road	522060	209289	NO2	No	8.0	5.0	No	2.0
WH28	Stanborough Rd, 3	Roadside	523545	212021	NO2	No	13.0	3.0	No	2.0
WH29	Stanborough Rd, 4	Roadside	523623	212056	NO2	No	30.0	1.0	No	2.0
WH30	Northaw Road East, Cuffley	Roadside	530424	202589	NO2	No	21.0	3.0	No	2.0
WH31	B197 - Opp The East WGC	Roadside	522579	211012	NO2	No	9.0	2.0	No	2.0
WH32	Clock Hotel, Welwyn	Near road	523438	216512	NO2	No	12.0	5.0	No	2.0
WH33	Mill Green A414	Roadside	524140	209730	NO2	No	33.0	2.0	No	2.0
SCH1	Monks Walk 1	Urban Background	523441	214980	NO2	No	14.0	1.0	No	2.0
SCH2	Monks Walk 2	Urban Background	523482	214966	NO2	No	17.0	3.0	No	2.0

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)
SCH3	Monks Walk 3	Urban Background	523491	215032	NO2	No	24.0	4.0	No	2.0
SCH4	Monks Walk 4	Urban Background	523529	215082	NO2	No	33.0	2.0	No	2.0
SCH5	Monks Walk 5	Urban Background	523480	215086	NO2	No	0.0	26.0	No	2.0
SCH6	Monks Walk 6	Urban Background	523579	215043	NO2	No	4.0	1.0	No	2.0
SCH7	Panshanger Academy 1	Urban Background	525626	213140	NO2	No	29.0	2.0	No	2.0
SCH8	Panshanger Academy 2	Urban Background	525616	213123	NO2	No	21.0	2.0	No	2.0
SCH9	Panshanger Academy 3	Urban Background	525622	213114	NO2	No	11.0	1.0	No	2.0
SCH10	Panshanger Academy 4	Urban Background	525610	213113	NO2	No	25.0	2.0	No	2.0
SCH11	Panshanger Academy 5	Urban Background	525594	213093	NO2	No	19.0	2.0	No	2.0
SCH12	Panshanger Academy 6	Urban Background	525578	213070	NO2	No	20.0	2.0	No	2.0
SCH13	Countess Anne 1	Urban Background	522985	208913	NO2	No	9.0	2.0	No	2.0
SCH14	Countess Anne 2	Urban Background	523003	208919	NO2	No	9.0	2.0	No	2.0
SCH15	Countess Anne 3	Urban Background	523018	208925	NO2	No	14.0	2.0	No	2.0

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)
SCH16	Countess Anne 4	Urban Background	523044	208936	NO2	No	17.0	3.0	No	2.0
SCH17	Countess Anne 5	Urban Background	523086	208961	NO2	No	13.0	2.0	No	2.0
SCH18	Countess Anne 6	Urban Background	523078	208926	NO2	No	8.0	2.0	No	2.0

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results: Automatic Monitoring (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
WHNOX	522106	209460	Roadside	91.51	91.51	N/A	N/A	29	27	28

☐ **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 (confirm by selecting in box).**

Notes:

The annual mean concentrations are presented as µg/m^3.

Exceedances of the NO_2 annual mean objective of 40µg/m^3 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 NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2022 (%) [2]	2018	2019	2020	2021	2022
WH1	523326	209153	Roadside	100	100	26.0	26.0	17.6	18.7	24.9
WH2	524340	213087	Roadside	100	100	21.0	22.0	27.4	24.9	25.3
WH3	522106	209460	Roadside	100	100	27.0	24.0	19.1	26.1	25.6
WH4	523146	215700	Roadside	100	100	17.0	19.0	14.6	14.7	14.9
WH5	530553	202715	Roadside	92	92	28.0	33.0	24.5	23.9	22.0
WH6	530502	202694	Roadside	92	92	30.0	27.0	19.7	19.8	18.8
WH7	522193	208434	Roadside	100	100	28.0	28.0	19.9	19.9	20.3
WH8	525688	212769	Roadside	100	100	17.0	27.0	21.2	19.6	20.9
WH9	522429	212150	Kerbside	100	100	19.0	35.0	26.8	27.6	26.6
WH10	523347	216002	Near road	100	100	25.0	26.0	19.0	18.2	19.1
WH11	524429	214000	Roadside	100	100	28.0	29.0	15.7	15.4	16.4
WH12	523148	209148	Roadside	92	92	15.0	27.0	19.8	18.8	19.1

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 2022 (%) [2]	2018	2019	2020	2021	2022
WH13	523416	211958	Near road	100	100	14.0	20.0	14.1	34.2	33.5
WH14	521585	209696	Roadside	100	100	21.0	25.0	25.3	23.3	25.5
WH15	530439	202681	Near road	100	100	21.0	20.0	14.0	18.8	17.7
WH16	523358	211931	Roadside	100	100	20.0	38.0	30.2	29.2	29.0
WH17	523293	209164	Near road	100	100	27.0	29.0	20.8	19.4	20.0
WH18	524285	212988	Near road	100	100	35.0	31.0	24.0	23.2	25.0
WH19	522144	209516	Near road	100	100	**44.0**	**42.0**	31.8	32.4	32.3
WH20	522466	208908	Roadside	100	100	23.0	23.0	22.3	22.8	23.9
WH21	527258	210364	Background	100	100	31.0	29.0	21.6	22.0	22.0
WH22	521801	209471	Kerbside	100	100	35.0	37.0	28.1	26.8	26.1
WH23	523921	211698	Roadside	100	100	24.0	23.0	19.3	19.2	19.4
WH24	521164	207740	Near road	100	100	38.0	36.0	25.2	24.8	20.8
WH25	522093	209431	Near road	100	100.0	**40.0**	36.0	28.9	26.7	29.3
WH26	522064	209328	Near road	100	100.0	**45.0**	**48.0**	35.1	33.5	32.6

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
WH27	522060	209289	Near road	100	100.0	34.0	34.0	26.2	26.2	26.5
WH28	523545	212021	Near road	100	100.0	25.0	24.0	17.2	16.7	21.5
WH29	523623	212056	Near road	100	100.0	35.0	34.0	25.3	24.9	23.8
WH30	530424	202589	Roadside	100	100.0	23.0	21.0	18.4	17.1	16.6
WH31	522579	211012	Roadside	100	100.0	21.0	34.0	23.6	25.2	27.0
WH32	523438	216512	Near road	100	100.0	31.0	31.0	23.5	22.1	23.3
WH33	524140	209730	Roadside	100	100.0	21.0	20.0	15.2	14.8	19.9
SCH1	523441	214980	Urban Background	100	100	**N/A**	**N/A**	16.3	15.5	12.5
SCH2	523482	214966	Urban Background	100	100	**N/A**	**N/A**	13.4	14.7	13.1
SCH3	523491	215032	Urban Background	92	92	**N/A**	**N/A**	11.8	12.4	10.8
SCH4	523529	215082	Urban Background	92	92	**N/A**	**N/A**	11.4	12.0	13.4
SCH5	523480	215086	Urban Background	100	100	**N/A**	**N/A**	10.4	12.1	11.9
SCH6	523579	215043	Urban Background	92	92	**N/A**	**N/A**	10.2	11.1	11.4
SCH7	525626	213140	Urban Background	100	100	**N/A**	**N/A**	12.4	15.2	13.8

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 2022 (%) [2]	2018	2019	2020	2021	2022
SCH8	525616	213123	Urban Background	100	100	N/A	N/A	14.0	16.7	15.2
SCH9	525622	213114	Urban Background	100	100	N/A	N/A	12.0	13.2	12.8
SCH10	525610	213113	Urban Background	100	100	N/A	N/A	13.8	16.0	15.0
SCH11	525594	213093	Urban Background	92	92	N/A	N/A	13.5	15.6	14.6
SCH12	525578	213070	Urban Background	100	100	N/A	N/A	14.8	16.7	16.0
SCH13	522985	208913	Urban Background	100	100	N/A	N/A	15.1	17.0	15.1
SCH14	523003	208919	Urban Background	100	100	N/A	N/A	13.6	15.7	14.2
SCH15	523018	208925	Urban Background	100	100	N/A	N/A	13.8	16.3	15.6
SCH16	523044	208936	Urban Background	100	100	N/A	N/A	13.9	15.1	14.9
SCH17	523086	208961	Urban Background	100	100	N/A	N/A	13.0	14.8	14.4
SCH18	523078	208926	Urban Background	100	100	N/A	N/A	13.7	15.7	15.1

☐ **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/m^3.

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

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

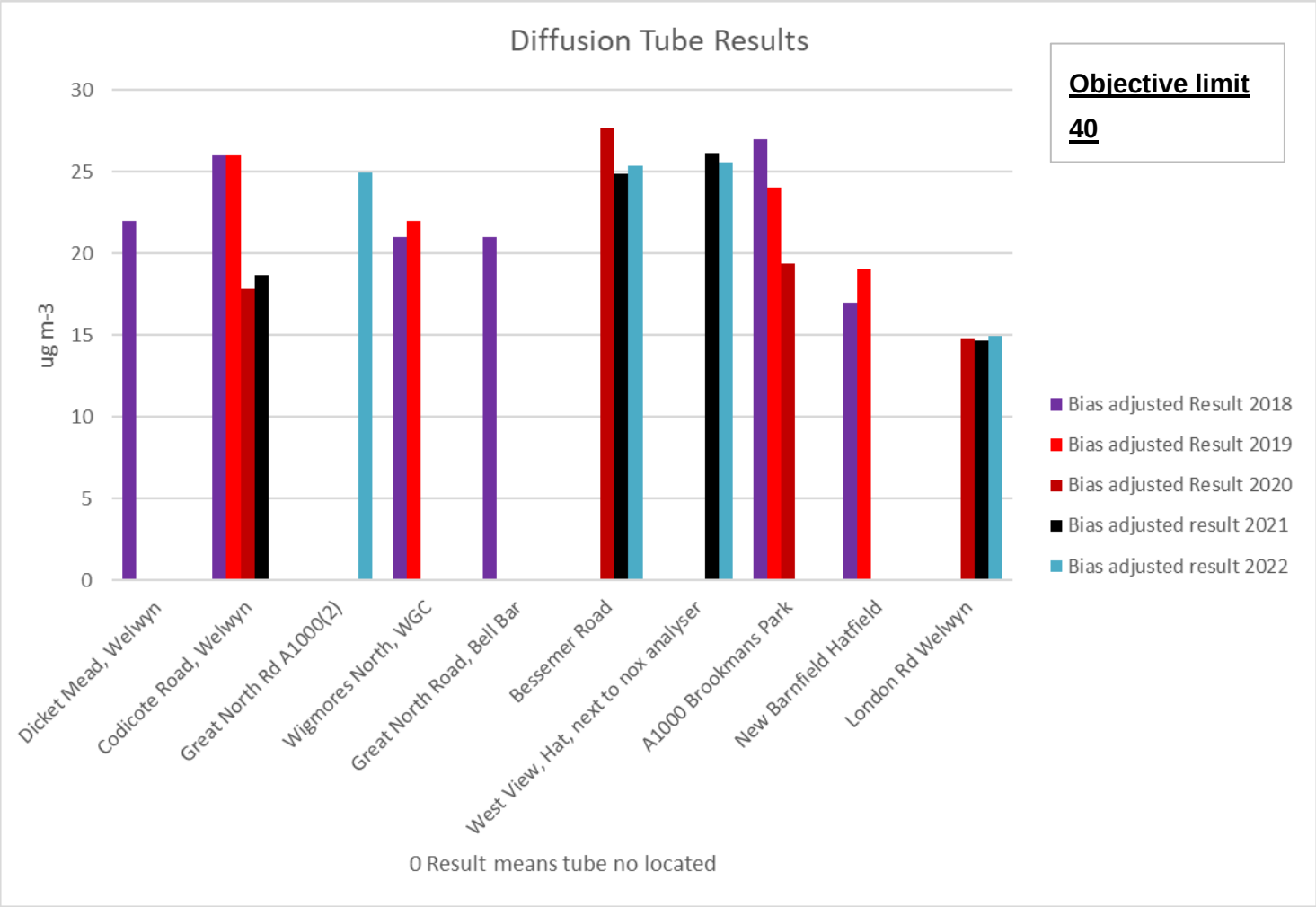
Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

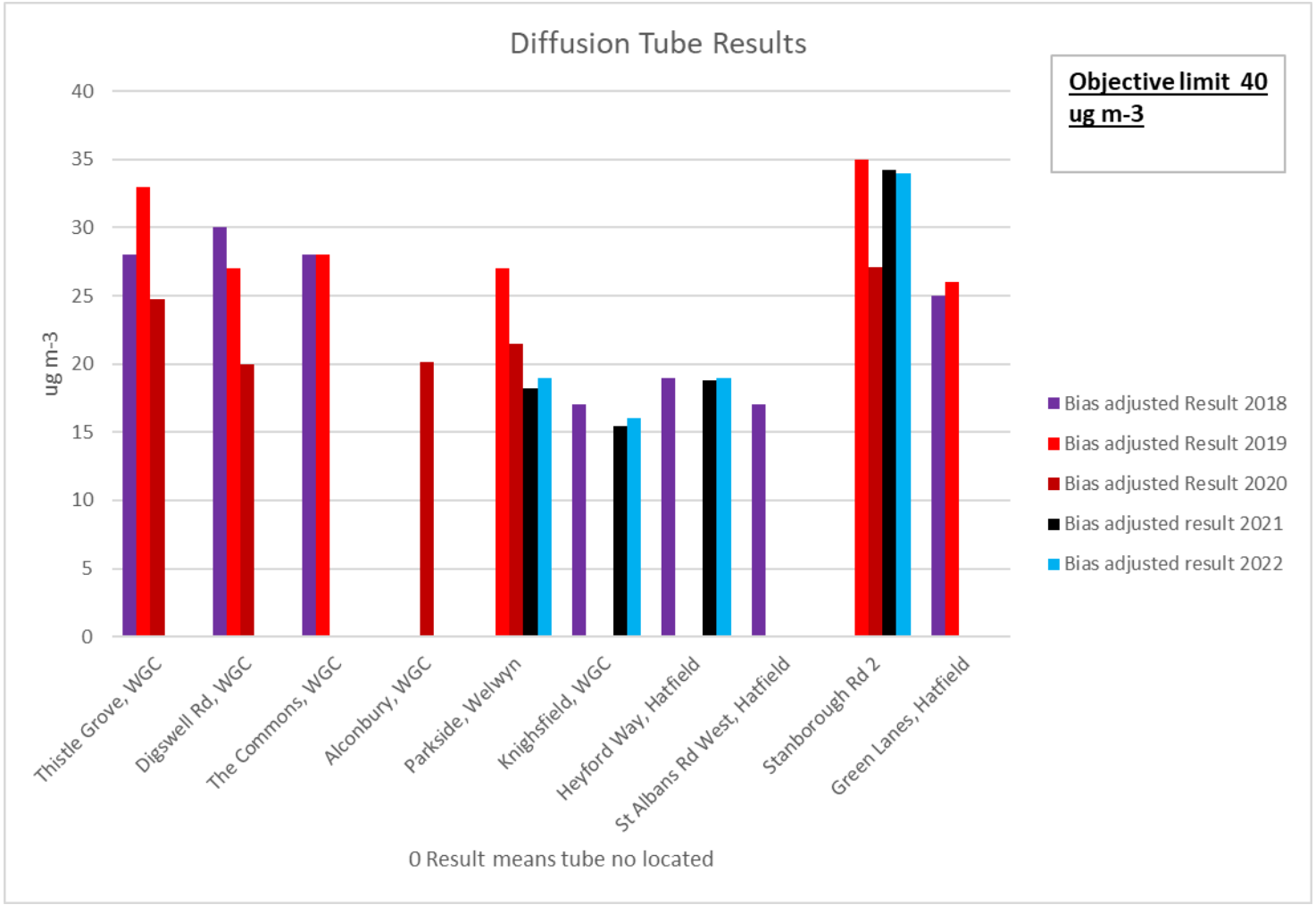
Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

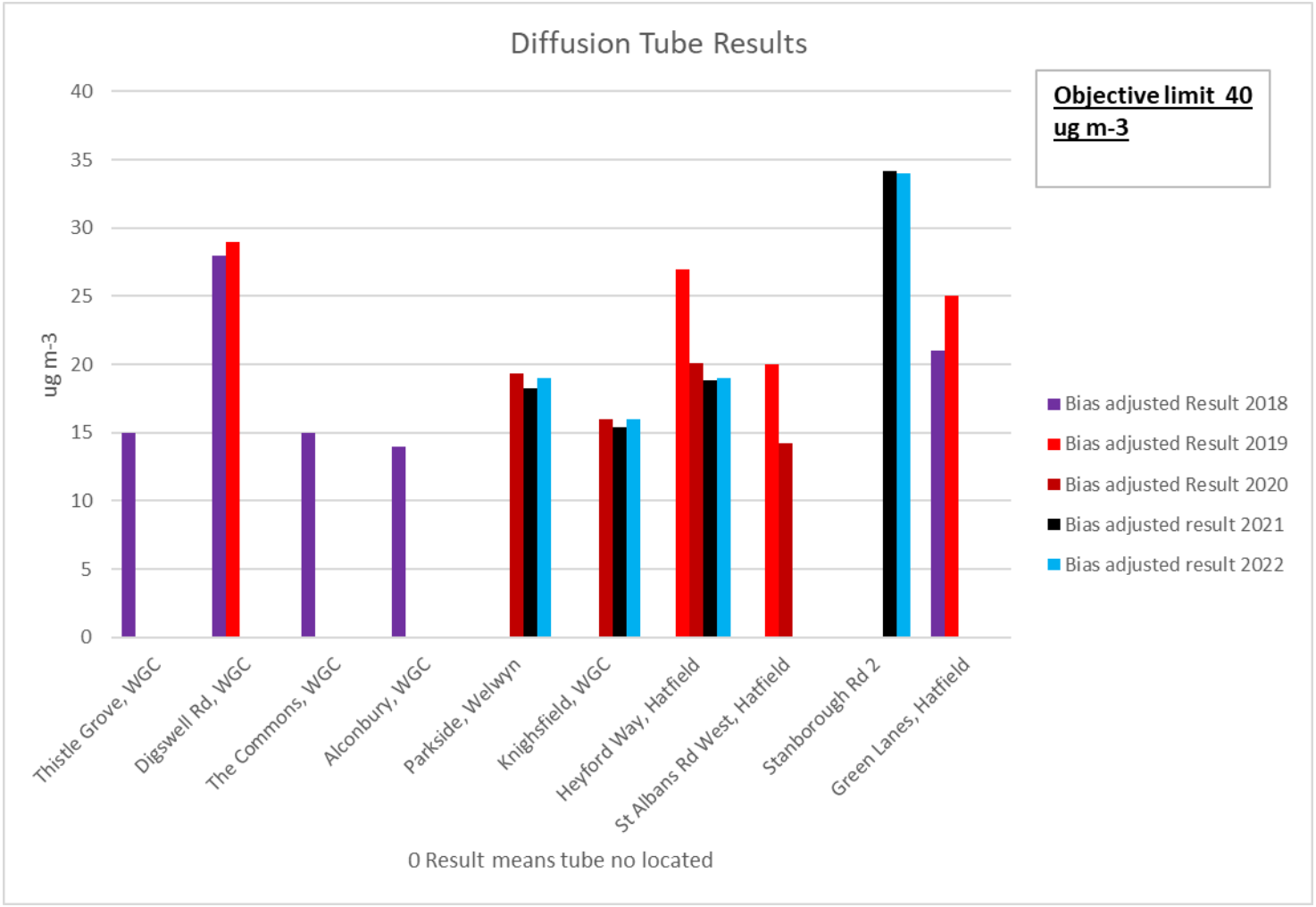
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

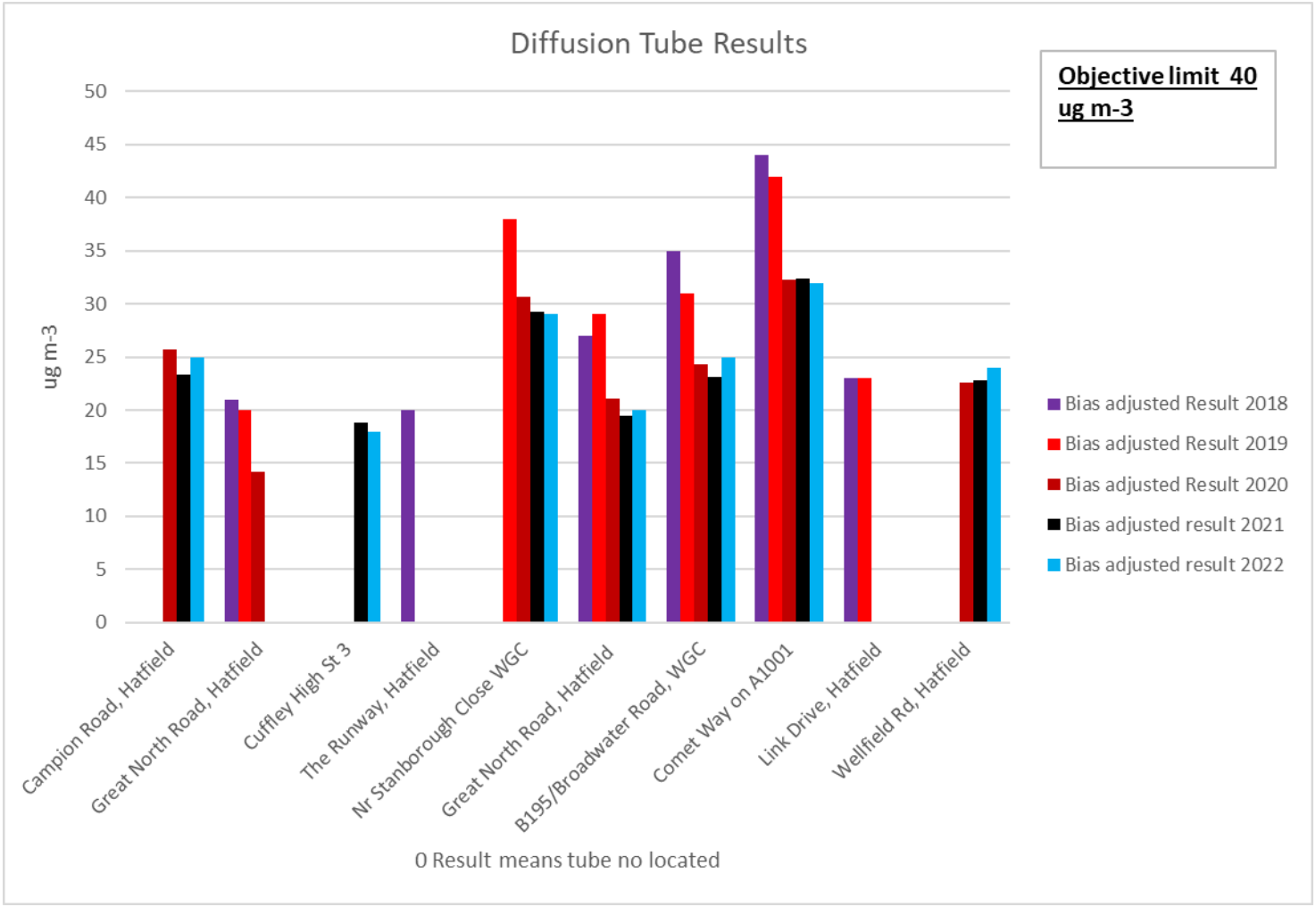
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

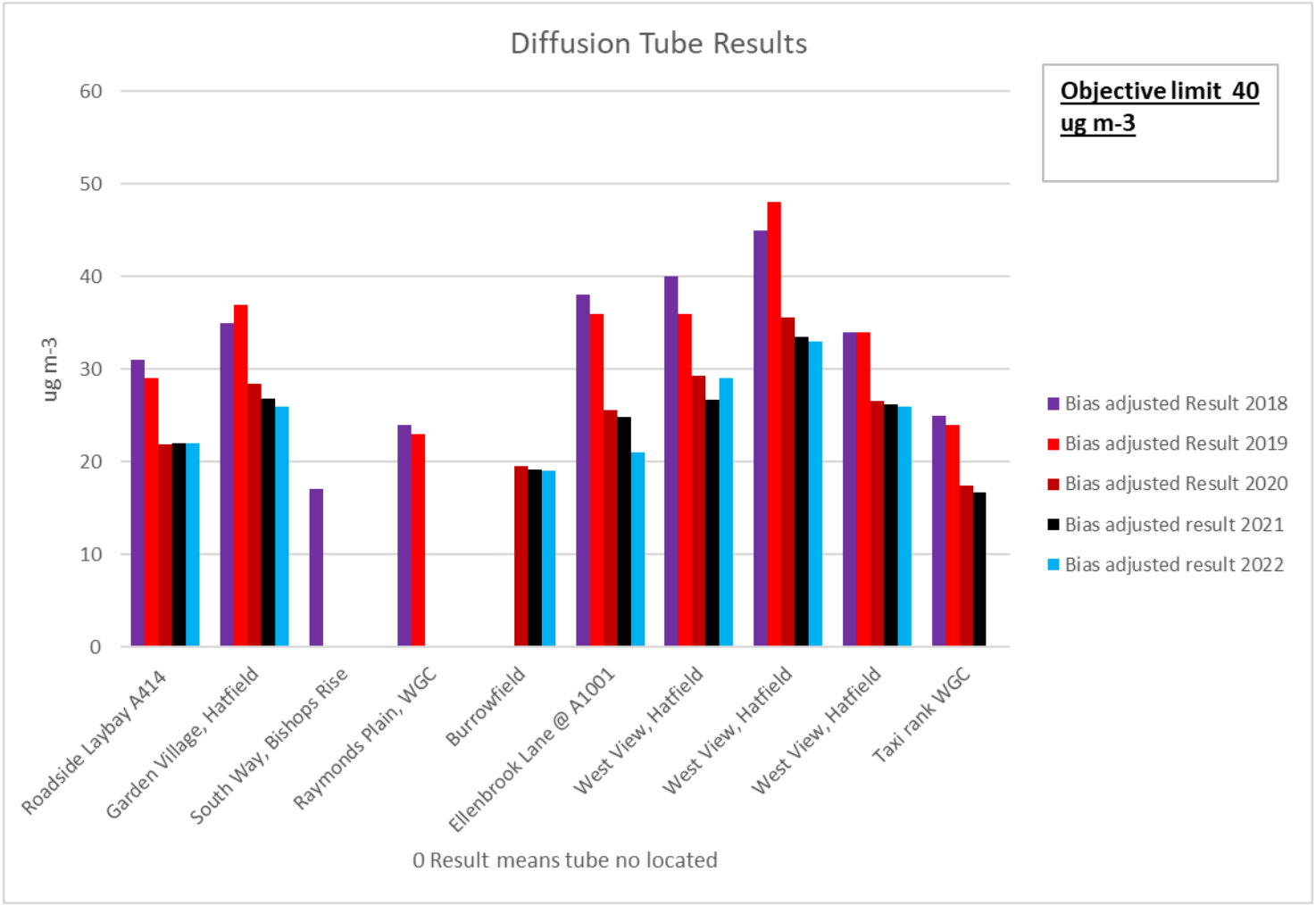
Figure A.1 – Trends in Annual Mean NO_2 Concentrations

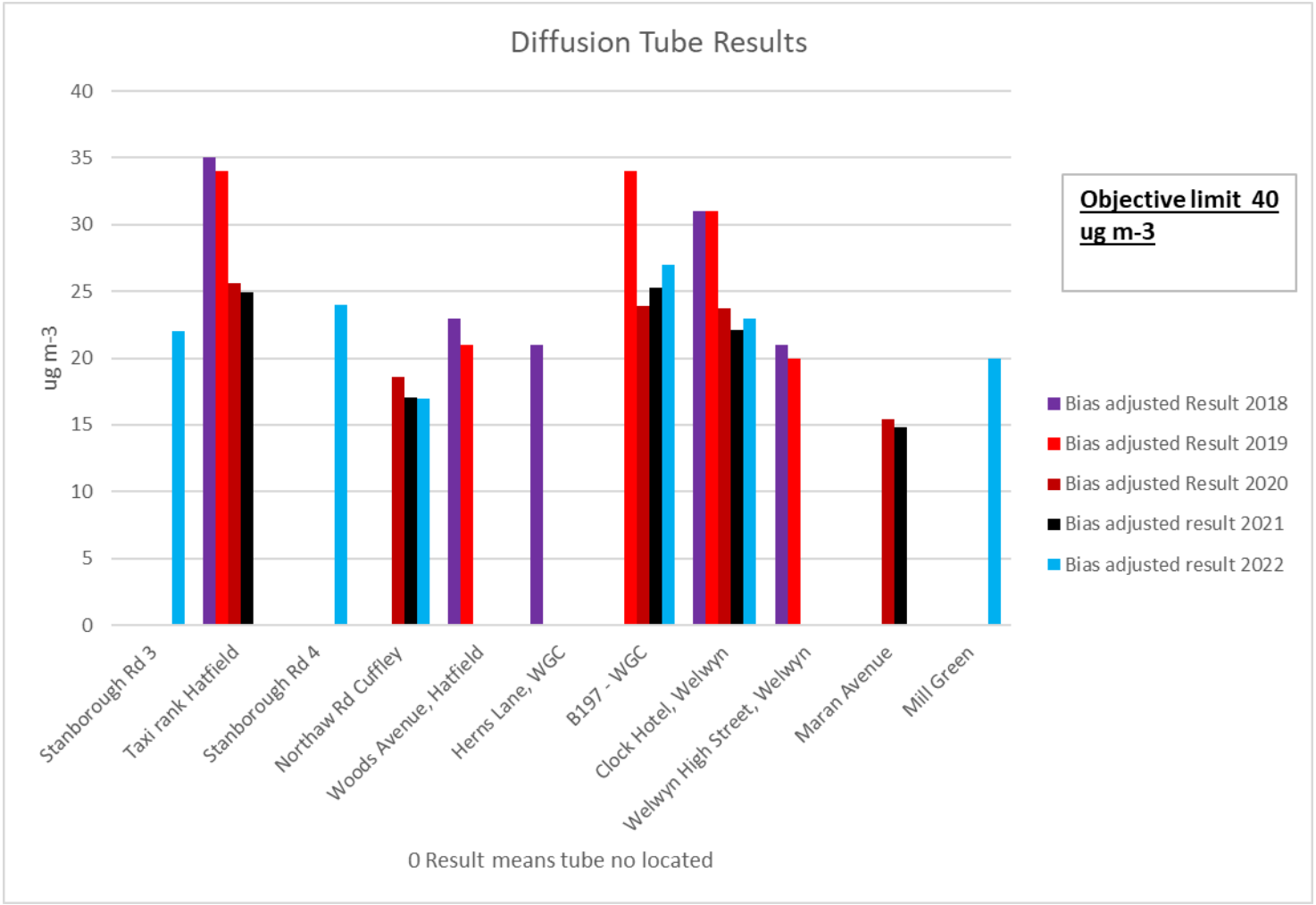



Diffusion Tube Results
Objective limit 40 ug m-3
ug m-3
40
35
30
25
20
15
10
5
0
Thistle Grove, WGC
Digswell Rd, WGC
The Commons, WGC
Alconbury, WGC
Parkside, Welwyn
Knighsfield, WGC
Heyford Way, Hatfield
St Albans Rd West, Hatfield
Stanborough Rd 2
Green Lanes, Hatfield
Bias adjusted Result 2018
Bias adjusted Result 2019
Bias adjusted Result 2020
Bias adjusted result 2021
Bias adjusted result 2022
0 Result means tube no located


Diffusion Tube Results
Objective limit 40 ug m-3
ug m-3
40
35
30
25
20
15
10
5
0
Thistle Grove, WGC
Digswell Rd, WGC
The Commons, WGC
Alconbury, WGC
Parkside, Welwyn
Knighsfield, WGC
Heyford Way, Hatfield
St Albans Rd West, Hatfield
Stanborough Rd 2
Green Lanes, Hatfield
Bias adjusted Result 2018
Bias adjusted Result 2019
Bias adjusted Result 2020
Bias adjusted result 2021
Bias adjusted result 2022
0 Result means tube no located


Diffusion Tube Results
Objective limit 40 ug m-3
ug m-3
50
45
40
35
30
25
20
15
10
5
0
Campion Road, Hatfield
Great North Road, Hatfield
Cuffley High St 3
The Runway, Hatfield
Nr Stanborough Close WGC
Great North Road, Hatfield
B195/Broadwater Road, WGC
Comet Way on A1001
Link Drive, Hatfield
Wellfield Rd, Hatfield
Bias adjusted Result 2018
Bias adjusted Result 2019
Bias adjusted Result 2020
Bias adjusted result 2021
Bias adjusted result 2022
0 Result means tube no located


Diffusion Tube Results
Objective limit 40 ug m-3
ug m-3
60
50
40
30
20
10
0
Bias adjusted Result 2018
Bias adjusted Result 2019
Bias adjusted Result 2020
Bias adjusted result 2021
Bias adjusted result 2022
Roadside Laybay A414
Garden Village, Hatfield
South Way, Bishops Rise
Raymonds Plain, WGC
Burrowfield
Ellenbrook Lane @ A1001
West View, Hatfield
West View, Hatfield
West View, Hatfield
Taxi rank WGC
0 Result means tube no located


Diffusion Tube Results
40
35
30
25
20
15
10
5
0
ug m-3
Objective limit 40 ug m-3
Bias adjusted Result 2018
Bias adjusted Result 2019
Bias adjusted Result 2020
Bias adjusted result 2021
Bias adjusted result 2022
Stanborough Rd 3
Taxi rank Hatfield
Stanborough Rd 4
Northaw Rd Cuffley
Woods Avenue, Hatfield
Herns Lane, WGC
B197 - WGC
Clock Hotel, Welwyn
Welwyn High Street, Welwyn
Maran Avenue
Mill Green
0 Result means tube no located

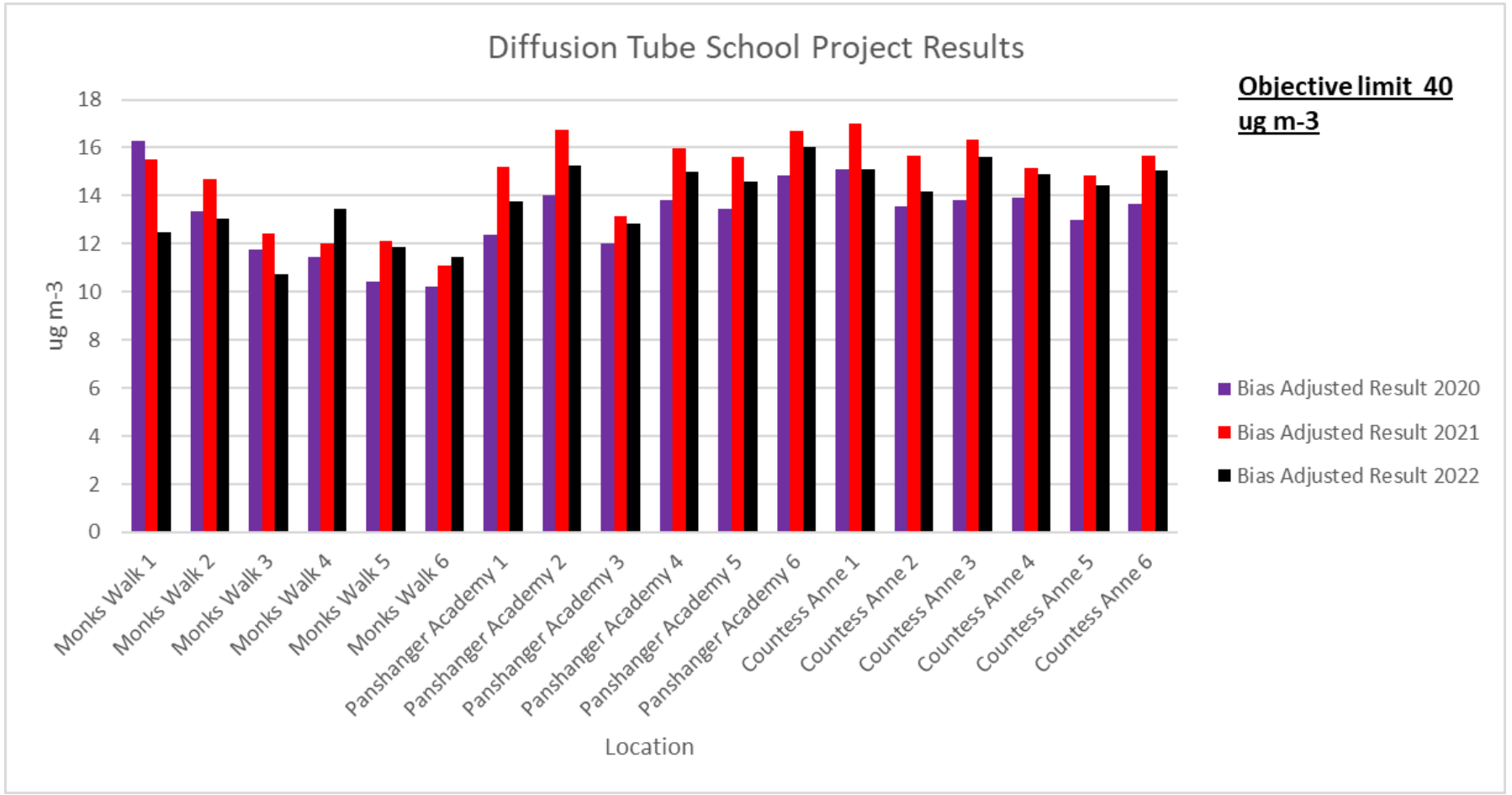

Diffusion Tube School Project Results
Objective limit 40 ug m-3
ug m-3
18
16
14
12
10
8
6
4
2
0
Monks Walk 1
Monks Walk 2
Monks Walk 3
Monks Walk 4
Monks Walk 5
Monks Walk 6
Panshanger Academy 1
Panshanger Academy 2
Panshanger Academy 3
Panshanger Academy 4
Panshanger Academy 5
Panshanger Academy 6
Countess Anne 1
Countess Anne 2
Countess Anne 3
Countess Anne 4
Countess Anne 5
Countess Anne 6
Location
Bias Adjusted Result 2020
Bias Adjusted Result 2021
Bias Adjusted Result 2022

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
WHNOX	522106	209460	Roadside	91.51	91.51	**N/A**	**N/A**	**0**	0	0

Notes:

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

Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold**.

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

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

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

Table A.6 – Annual Mean $PM_{2.5}$ Monitoring Results (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
WHBAM	523292	209170	Roadside	92.32	92.32	11	10	9	9	10

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

Notes:

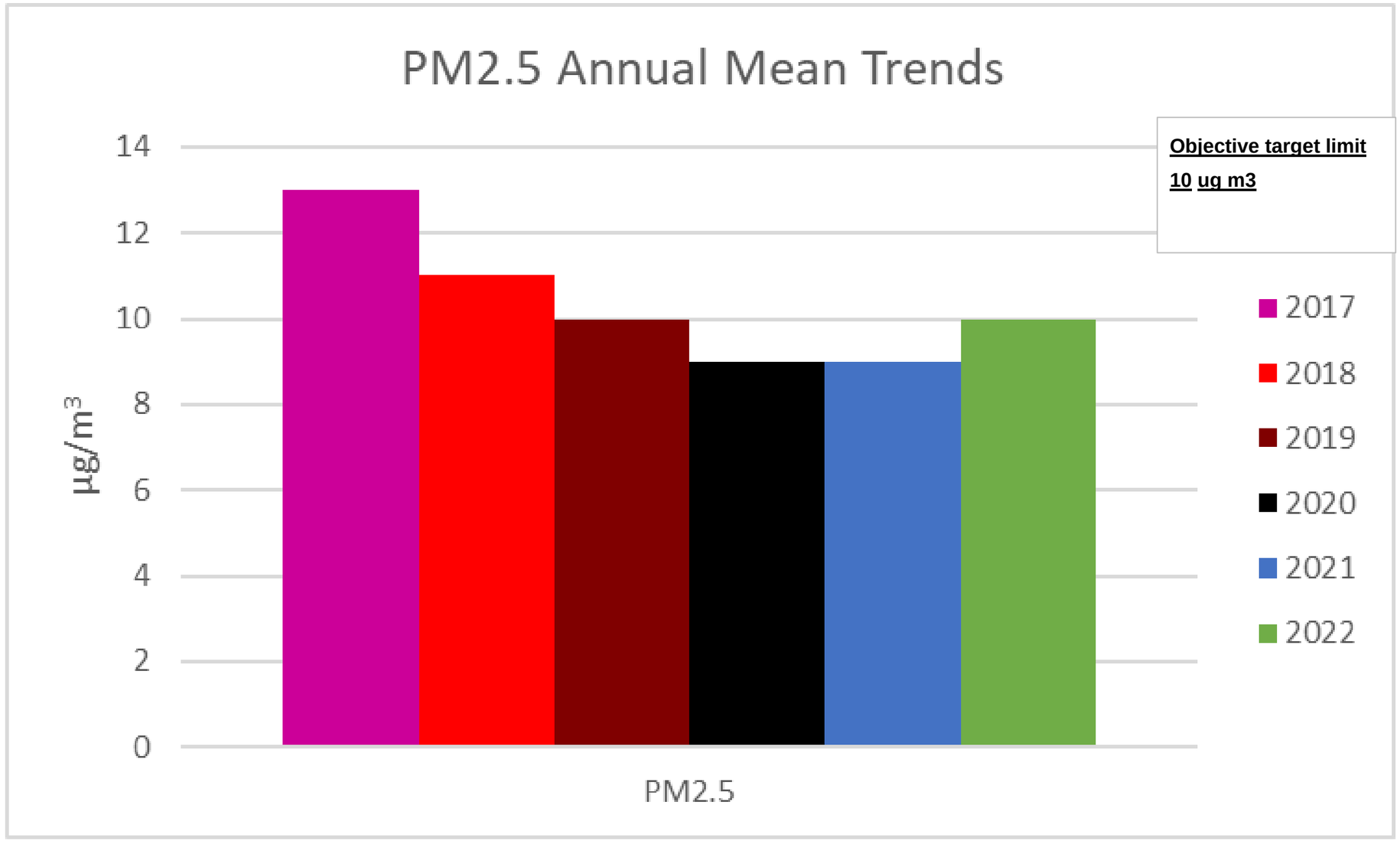
The annual mean concentrations are presented as µg/m^3.

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.2 – Trends in Annual Mean $PM_{2.5}$ Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1 – NO_2 2022 Diffusion Tube Results (µg/m^3)

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	Comment
WH1	523326	209153	47.9	24.1	34.9	26.3	31.6	31.8	31.0	27.2	36.4	33.7	34.4	34.6	32.8	24.9		
WH2	524340	213087	48.3	36.1	42.1	22.9	29.5	32.5	28.5	26.4	30.6	38.1	26.0	39.1	33.3	25.3		
WH3	522106	209460	53.9	39.8	36.4	33.5	32.8	30.7	31.2	29.7	35.0	33.2	7.2	40.7	33.7	25.6		
WH4	523146	215700	28.5	16.8	27.3	15.5	14.3	15.6	14.8	15.2	19.0	20.4	24.2	24.1	19.6	14.9		
WH5	530553	202715		24.5	37.4	23.9	27.2	28.8	25.9	23.1	29.6	34.3	28.4	34.6	28.9	22.0		
WH6	530502	202694	36.9	25.1	31.1	21.7	23.0	19.1	21.4	18.7	23.6		31.0	20.0	24.7	18.8		
WH7	522193	208434	41.3	23.5	33.3	24.7	21.3	13.7	20.6	22.9	29.5	25.8	27.0	37.0	26.7	20.3		
WH8	525688	212769	45.9	23.6	29.0	19.5	23.7	21.5	22.0	21.0	26.6	31.2	32.0	34.0	27.5	20.9		
WH9	522429	212150	49.3	29.6	48.7	35.1	29.2	26.1	30.6	33.6	38.1	32.6	32.5	34.5	35.0	26.6		
WH10	523347	216002	29.4	21.4	38.0	19.9	19.3	19.1	19.5	25.1	22.4	31.2	26.8	29.6	25.1	19.1		
WH11	524429	214000	36.2	19.0	27.8	18.3	15.8	12.7	16.6	15.4	22.0	22.0	22.0	30.6	21.5	16.4		
WH12	523148	209148	41.6		29.8	19.3	20.2	21.5	19.0	18.0	21.4	30.2	26.0	30.0	25.2	19.1		
WH13	523416	211958	62.2	44.9	52.1	33.8	41.9	47.5	45.5	39.2	47.8	54.2	16.7	43.8	44.1	33.5		
WH14	521585	209696	49.2	35.6	36.9	23.8	27.9	28.3	25.9	20.8	32.1	41.7	36.2	43.7	33.5	25.5		
WH15	530439	202681	35.6	22.7	28.5	17.4	20.0	17.3	17.9	18.6	24.6	22.5	26.1	28.7	23.3	17.7		
WH16	523358	211931	49.3	42.5	45.9	31.2	34.3	35.1	35.5	33.1	35.1	43.0	34.1	38.7	38.2	29.0		

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	Comment
WH17	523293	209164	47.2	21.6	29.6	18.2	20.9	18.9	20.5	20.6	25.6	30.5	28.3	34.2	26.3	20.0		
WH18	524285	212988	40.5	23.8	57.4	28.8	23.4	38.5	25.5	28.5	33.0	34.2	28.4	32.0	32.8	25.0		
WH19	522144	209516	65.5	37.4	39.1	39.6	40.2	39.9	40.9	41.1	45.5	37.2	36.4	47.9	42.6	32.3		
WH20	522466	208908	47.8	40.9	36.2	20.8	21.4	22.0	23.7	30.9	30.8	30.8	34.5	37.1	31.4	23.9		
WH21	527258	210364	46.2	27.9	32.5	32.0	24.2	23.3	30.2	29.5	31.1	23.3	24.5	23.4	29.0	22.0		
WH22	521801	209471	58.5	44.4	42.9	27.2	29.9	30.9	31.7	18.9	37.2	38.0	15.2	37.7	34.4	26.1		
WH23	523921	211698	40.5	30.2	35.9	19.2	20.9	18.9	20.8	18.4	21.9	24.9	24.5	30.3	25.5	19.4		
WH24	521164	207740	43.6	35.6	49.7	35.1	24.1	6.1	22.7	21.1	24.4	23.4	10.7	31.2	27.3	20.8		
WH25	522093	209431	63.4	42.6	29.1	31.6	34.7	33.3	34.0	34.6	38.3	36.1	37.1	47.4	38.5	29.3		
WH26	522064	209328	70.8	49.1	36.2	36.8	36.4	40.9	40.6	34.3	46.0	43.2	32.7	48.4	43.0	32.6		
WH27	522060	209289	53.5	41.3	32.6	29.1	31.0	27.1	30.1	26.3	38.1	34.7	36.3	37.6	34.8	26.5		
WH28	523545	212021	42.3	32.3	37.2	19.9	21.2	21.6	19.8	20.8	23.4	31.1	30.7	39.6	28.3	21.5		
WH29	523623	212056	42.1	31.3	40.2	28.4	25.3	22.4	25.1	27.9	32.1	31.9	35.0	33.7	31.3	23.8		
WH30	530424	202589	29.7	17.7	31.2	18.9	17.3	15.3	17.4	17.7	21.6	20.9	25.1	28.7	21.8	16.6		
WH31	522579	211012	44.1	33.1	44.3	36.0	30.9	30.6	33.0	35.9	35.7	32.9	34.0	35.3	35.5	27.0		
WH32	523438	216512	39.5	37.1	34.8	27.3	25.7	24.8	25.1	25.9	29.7	30.1	29.6	37.7	30.6	23.3		
WH33	524140	209730	34.5	29.1	35.9	19.3	22.4	21.7	21.6	22.5	23.3	26.9	29.9	26.4	26.1	19.9		
SCH1	523441	214980	28.7	17.5	21.0	12.4	11.5	11.3	11.0	10.9	16.0	16.7	19.6	20.5	16.4	12.5		
SCH2	523482	214966	30.6	21.1	22.7	12.8	12.4	11.3	11.8	13.9	17.4	19.8	9.0	23.4	17.2	13.1		
SCH3	523491	215032	29.5	17.4	20.6	11.2	11.0	10.5	11.3	10.9	14.9	14.5	3.9		14.2	10.8		
SCH4	523529	215082	32.7	21.2	21.0	10.9	11.8		10.5	11.0	16.7	18.0	18.7	22.0	17.7	13.4		

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	Comment
SCH 5	523480	215086	25.3	22.3	17.1	11.1	11.3	8.6	9.7	10.3	15.4	18.5	17.3	20.5	15.6	11.9		
SCH 6	523579	215043	25.4	17.2	21.8	10.1	10.8		10.3	9.0	14.4	15.3	11.6	19.7	15.1	11.4		
SCH 7	525626	213140	35.8	23.5	25.7	12.3	14.2	12.2	11.4	10.8	16.2	18.8	8.2	28.1	18.1	13.8		
SCH 8	525616	213123	40.0	25.0	21.2	14.0	16.7	12.1	13.3	12.4	16.4	21.7	<0.6	27.8	20.1	15.2		
SCH 9	525622	213114	34.3	19.5	21.5	11.1	12.8	10.0	9.9	9.2	14.4	18.0	16.6	25.1	16.9	12.8		
SCH 10	525610	213113	34.3	23.0	27.2	14.1	14.1	11.3	11.9	12.5	17.3	22.2	20.6	28.1	19.7	15.0		
SCH 11	525594	213093	34.9		20.4	13.9	15.1	12.0	13.4	12.6	17.8	22.4	21.9	26.8	19.2	14.6		
SCH 12	525578	213070	38.6	29.2	28.0	14.9	15.9	14.6	15.0	14.3	18.4	23.1	16.9	24.3	21.1	16.0		
SCH 13	522985	208913	32.7	28.6	26.0	14.2	17.8	15.8	15.7	14.7	19.6	25.5	4.1	23.3	19.8	15.1		
SCH 14	523003	208919	31.8	24.2	23.6	14.0	15.0	12.2	13.3	12.9	17.8	15.9	16.5	26.9	18.7	14.2		
SCH 15	523018	208925	38.4	26.4	25.2	15.0	15.0	13.4	12.3	12.9	18.4	21.6	22.0	25.9	20.5	15.6		
SCH 16	523044	208936	35.7	26.3	25.5	12.5	14.2	12.9	13.5	13.1	17.6	19.0	18.9	25.8	19.6	14.9		
SCH 17	523086	208961	32.7	22.3	23.3	13.8	13.3	11.9	12.3	12.4	18.5	20.1	22.7	24.6	19.0	14.4		
SCH 18	523078	208926	34.5	23.2	24.3	15.3	14.3	13.8	12.4	13.2	17.5	21.2	20.5	27.7	19.8	15.1		

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

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

☒ **Welwyn Hatfield Borough Council confirm that all 2022 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.**

Notes:

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

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

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within Welwyn Hatfield Borough Council During 2022.

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

QA/QC of Diffusion Tube Monitoring

The samples have been analysed in accordance with Socotec (Didcot) standard operating procedure ANU/SOP/1015 Issue 1. This method meets the guidelines set out in DEFRA's 'Diffusion Tubes For Ambient NO2 Monitoring: Practical Guidance.'

The tubes were prepared by spiking acetone:triethanolamine (50:50) onto the grids prior to the tubes being assembled. The tubes were desorbed with distilled water and the extract analysed using a segmented flow autoanalyser with ultraviolet detection. All samples were received in good condition, unless otherwise stated in the comments field of results table. Please note:

(i) As set out in the practical guidance, the results were initially calculated assuming an ambient temperature of 11oC, the reported values have been adjusted to 20oC to allow for direct comparison with EU limits.

(ii) The reported results have not been bias adjusted.

This analysis of diffusion tube samples to determine the amount of nitrogen dioxide present on the tube is within the scope of our UKAS schedule. Any further calculations and assessments requiring exposure details and conditions fall outside the scope of our accreditation.

Diffusion Tube Annualisation

All diffusion tube monitoring locations within Welwyn Hatfield Borough Council recorded data capture of 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.

Table C.1 – Annualisation Summary (concentrations presented in µg/m^3)

All diffusion tube monitoring locations within Welwyn Hatfield Borough Council recorded data capture of 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.

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/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Welwyn Hatfield Borough Council have applied a national bias adjustment factor of 0.76 to the 2022 monitoring data. A summary of bias adjustment factors used by Welwyn Hatfield Borough Council over the past five years is presented in Table C.2.

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	National	03/23	0.76
2021	National	03/22	0.78
2020	National	06/21	0.76
2019	National	03/20	0.75
2018	National	03/19	0.76
2017	National	03/18	0.77

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with

distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

No diffusion tube NO_2 monitoring locations within Welwyn Hatfield Borough Council required distance correction during 2022.

QA/QC of Automatic Monitoring

The council are supported with data management by Ricardo Energy and Environment. The council are also supported by Enviro Technology who regularly service and maintain the automatic analysers and respond to breakdowns when required. Where equipment requires calibration, this is done remotely.

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

The PM2.5 (BAM 1020 Analyser) data supplied to Welwyn Hatfield Borough Council is processed by Ricardo Energy and Environment. All data is ratified before it is displayed in this report.

Automatic Monitoring Annualisation

All automatic monitoring locations within Welwyn Hatfield Borough 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.

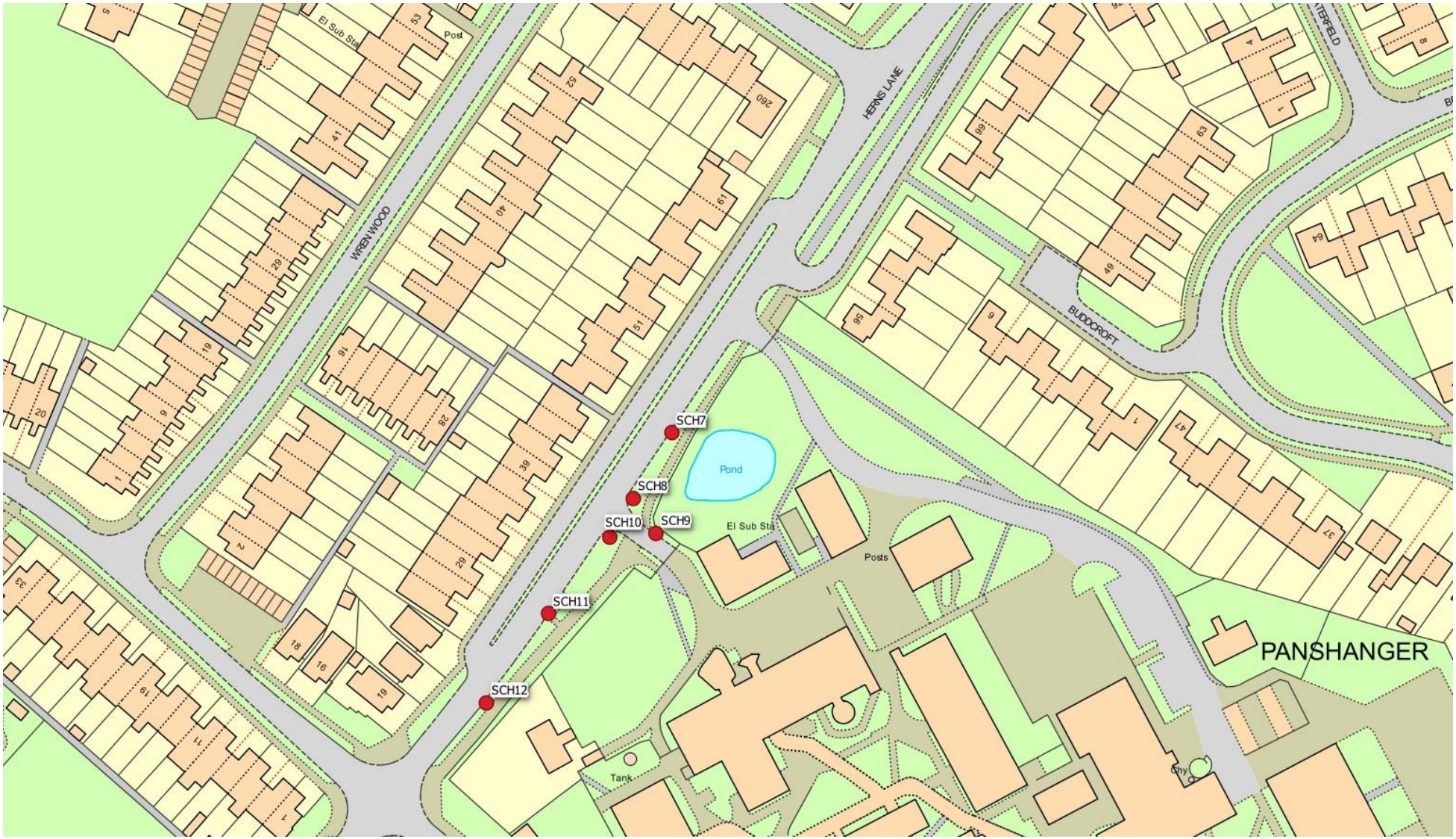
NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

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

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


Knightsfield School
Monk's Walk School
SCH1
SCH2
SCH3
SCH4
SCH5
SCH6


SCH7
SCH8
SCH9
SCH10
SCH11
SCH12
Pond
El Sub Sta
Posts
Tank
Chy
PANSHANGER
HERNS LANE
WREN WOOD
BUDDCROFT
Post

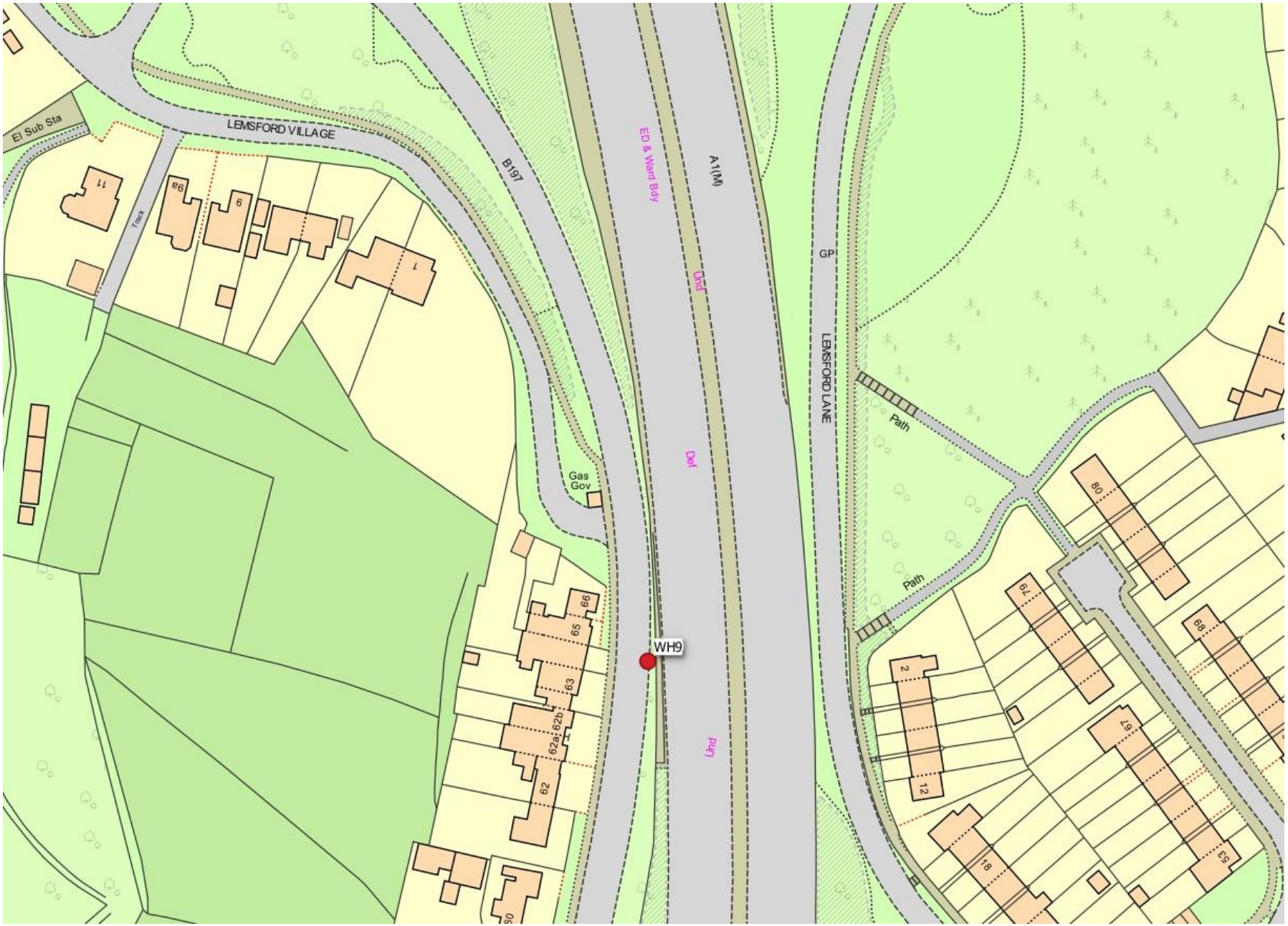

Kings Place
HEYFORD WAY
MP 18.0
BURLEIGH MEAD
York House
25 to 36
El Sub Sta
80.5m
Prospect Place
PM2.5 Analyser
WH17
Shelter
WH1
James Taylor House
Footbridge
WH12
CECIL CRESCENT
El Sub Sta
LB
Bakery
Dawncott
ST ALBANS ROAD EAST
The Colonnades
Shelter
The Parade
TCB
El Sub Sta
1 to 27
71
ESS
GREAT NORTH ROAD
Red Lion Court
1 to 20
Bollards
Newlands
The Red Lion (PH)
1 to 18
69
88

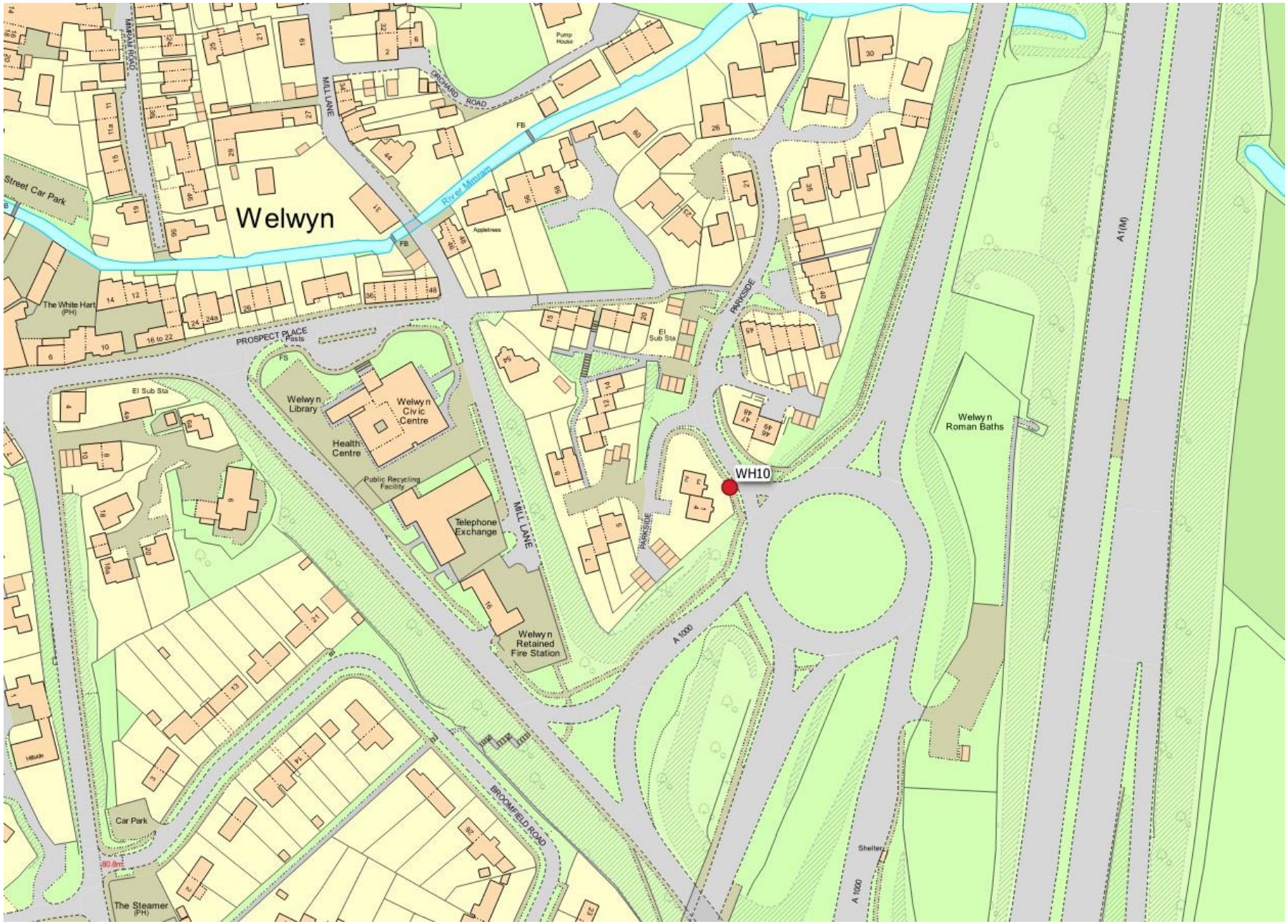

WH2
WH18
Hunters Bridge
BRIDGE ROAD
BRIDGE ROAD EAST
Shelter
Shelter
Shelter
El Sub Sta
El Sub Sta
El Sub Sta
El Sub Sta
El Sub Sta
El Sub Sta
El Sub Sta
Gas Gov
PH
Depot
Garden Court
Garden Court
Bridge Park
Mercury House
Albany Place
ESS
ESS
Mast
85.3m
85.6m
84.4m
86.0m


Welwyn Playing Fields
(Recn Gd)
Welwyn Sports
and Social Club
Sports Pavilion
Childrens
Nursery
ST MARY'S COURT
LONDON ROAD
Posts
WELWYN BY-PASS ROAD
BECKFIELD CLOSE
WH4
Tenterfield
Nursery
School
ESS
BECKET GARDENS
Welwyn St Mary's
Primary School
OTTWAY WALK
THE CRESCENT
83.8m
THE BEECHES
Tenterfield
House
LB
64.7m
HAMMOND CLOSE


WH7
Hatfield Swim Centre
Pond
ST ALBANS ROAD WEST
CAVENDISH WAY
FEATHER DELL
Feather Dell Allotment Garden
CROFT FIELD
BRIARS WOOD
Briars Wood Organic Allotment Garden
BRIARS LANE
QUEENSWAY
Hatfield Library
Queensway House
Gracemead Church
Gracemead House
Subway
DELLFIELD ROAD
Burvill House Surgery
WOODS AVENUE
OAKLANDS WOOD
Play Area
Tennis Courts


Attimore Hall (PH)
HALL BARNS
El Sub Sta
BLACK FAN ROAD
WH8
LATIMER GARDENS
Shamrock Club
Shelter
Birchwood House
GREAT SAMPSONS FIELD
56 to 72
17 to 26
12 to 16
27 to 34

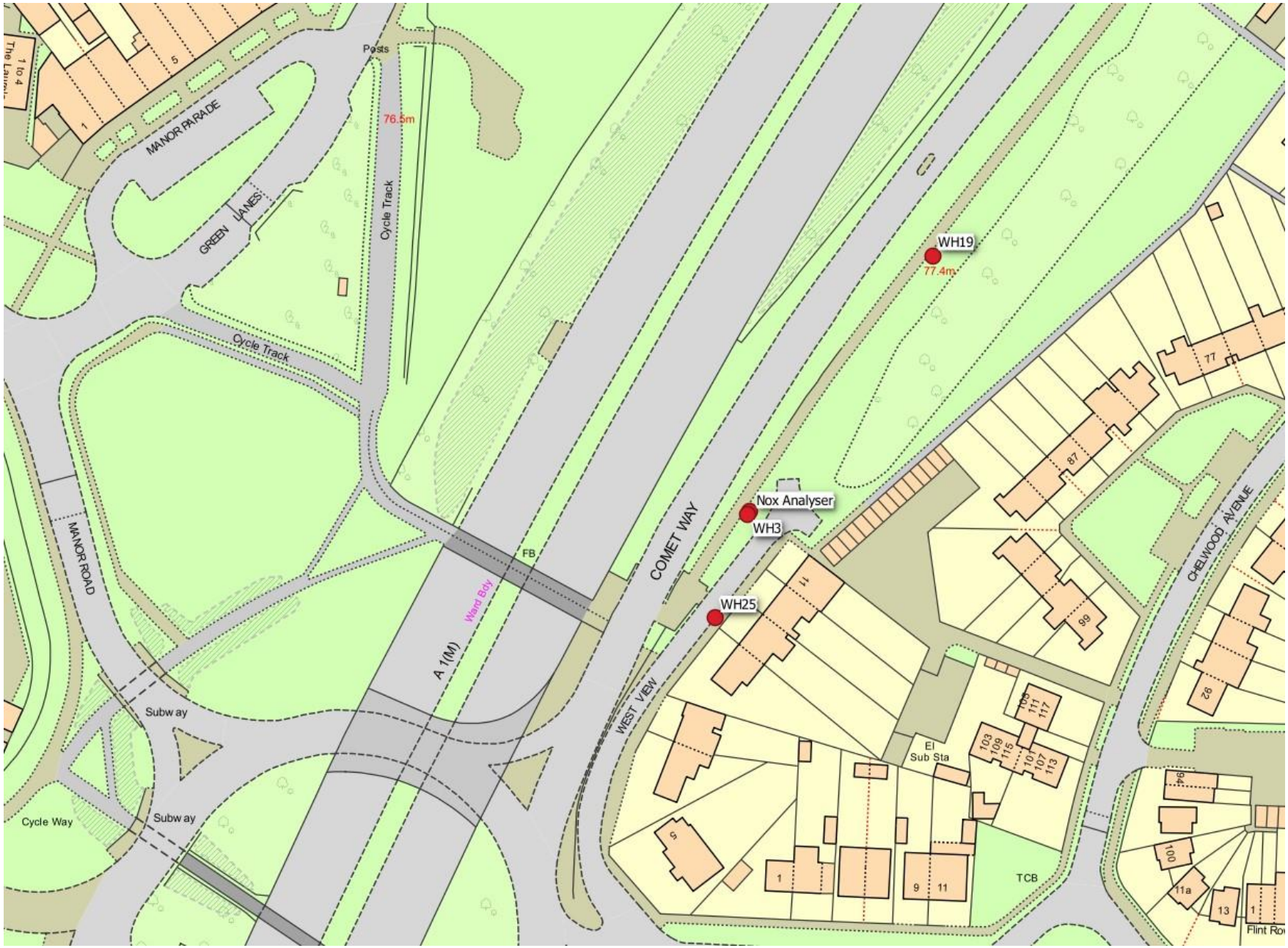

LEMSFORD VILLAGE
B197
A1(M)
LEMSFORD LANE
El Sub Sta
Track
Gas Gov
Path
Path
WH9
11
9a
9
1
66
65
63
62b
62a
62
80
79
68
67
2
12
19
53

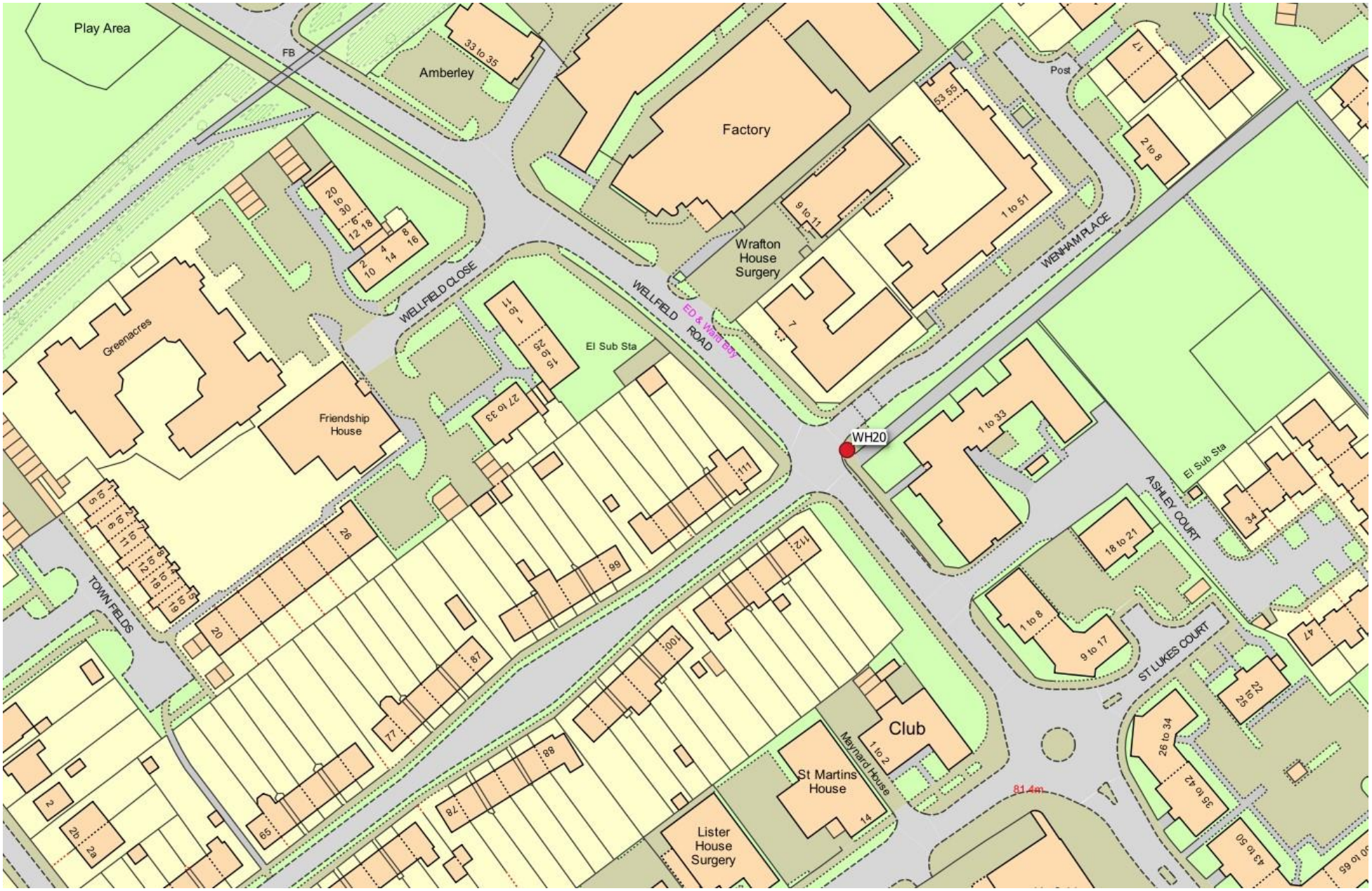

Welwyn
WH10
Welwyn Library
Welwyn Civic Centre
Health Centre
Public Recycling Facility
Telephone Exchange
Welwyn Retained Fire Station
Welwyn Roman Baths
The White Hart (PH)
The Steamer (PH)
Car Park
Street Car Park
PROSPECT PLACE
MILL LANE
ORCHARD ROAD
PARKSIDE
BROOMFIELD ROAD
A1000
A1(M)
River Mimram
El Sub Sta
Pump House
Appletrees
Shelter


WH11
KNIGHTSFIELD
LODGE FIELD
LODGE FIELD
El Sub Sta
El Sub Sta
LB
Poles
SLs
MF 21.0
THE VINEYARD
Offices
Offices
KESTREL WAY
Cycle Track
80.8m


WH14
WH22
HATFIELD AVENUE
MANOR ROAD
MANOR CLOSE
MANOR PARADE
GREEN LANES
One Hatfield Hospital
CAMPION ROAD
DAISY DRIVE
OLYMPIC WAY
Cycle Track
Shelter
Pond
Subway

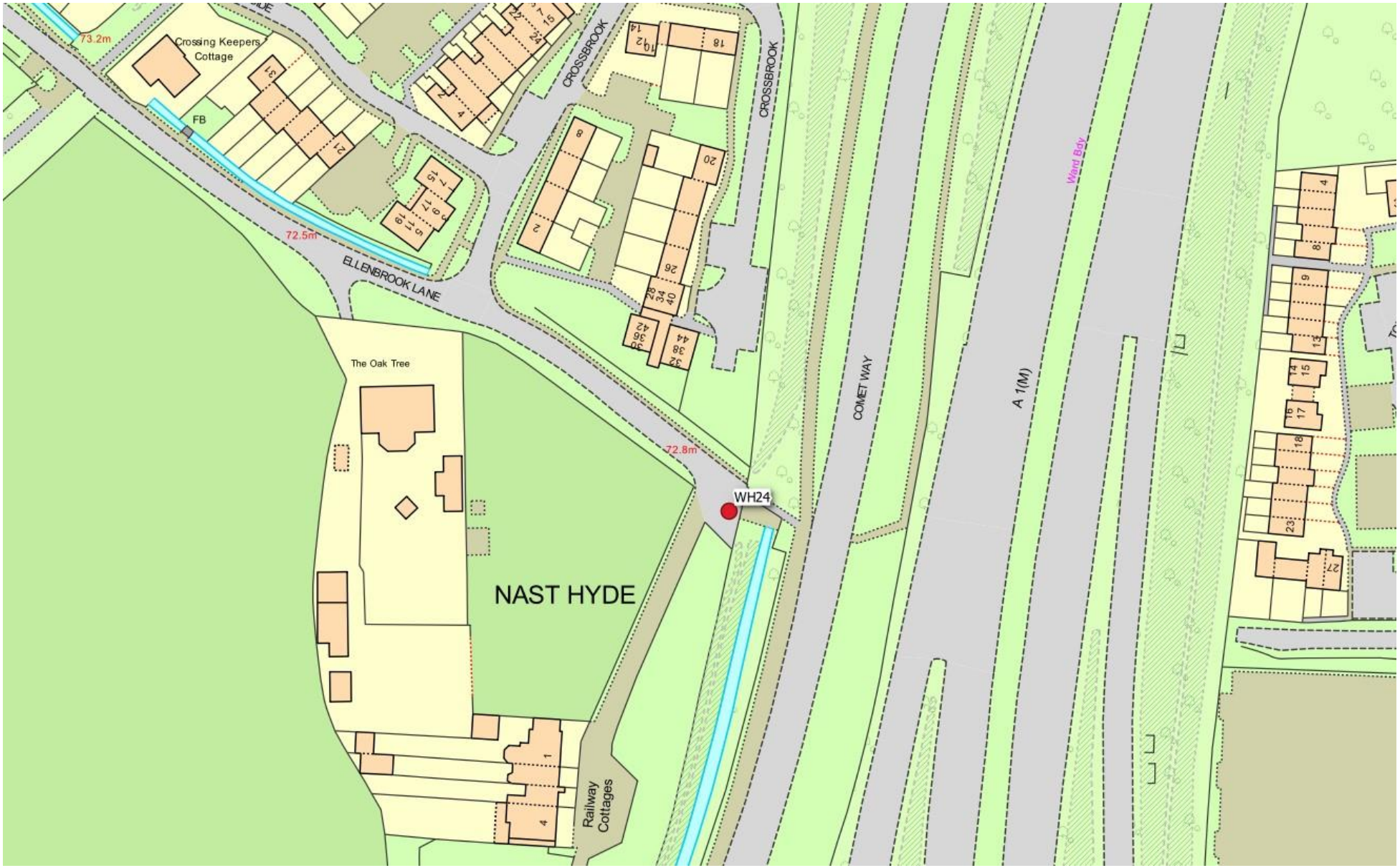

WH29
WH28
WH13
WH16
STANBOROUGH ROAD
ROOKS HILL
PARKWAY
STANBOROUGH CLOSE
LONGCROFT GREEN
Twentieth Mile Bridge
A 6129
Gosling
Sports Park

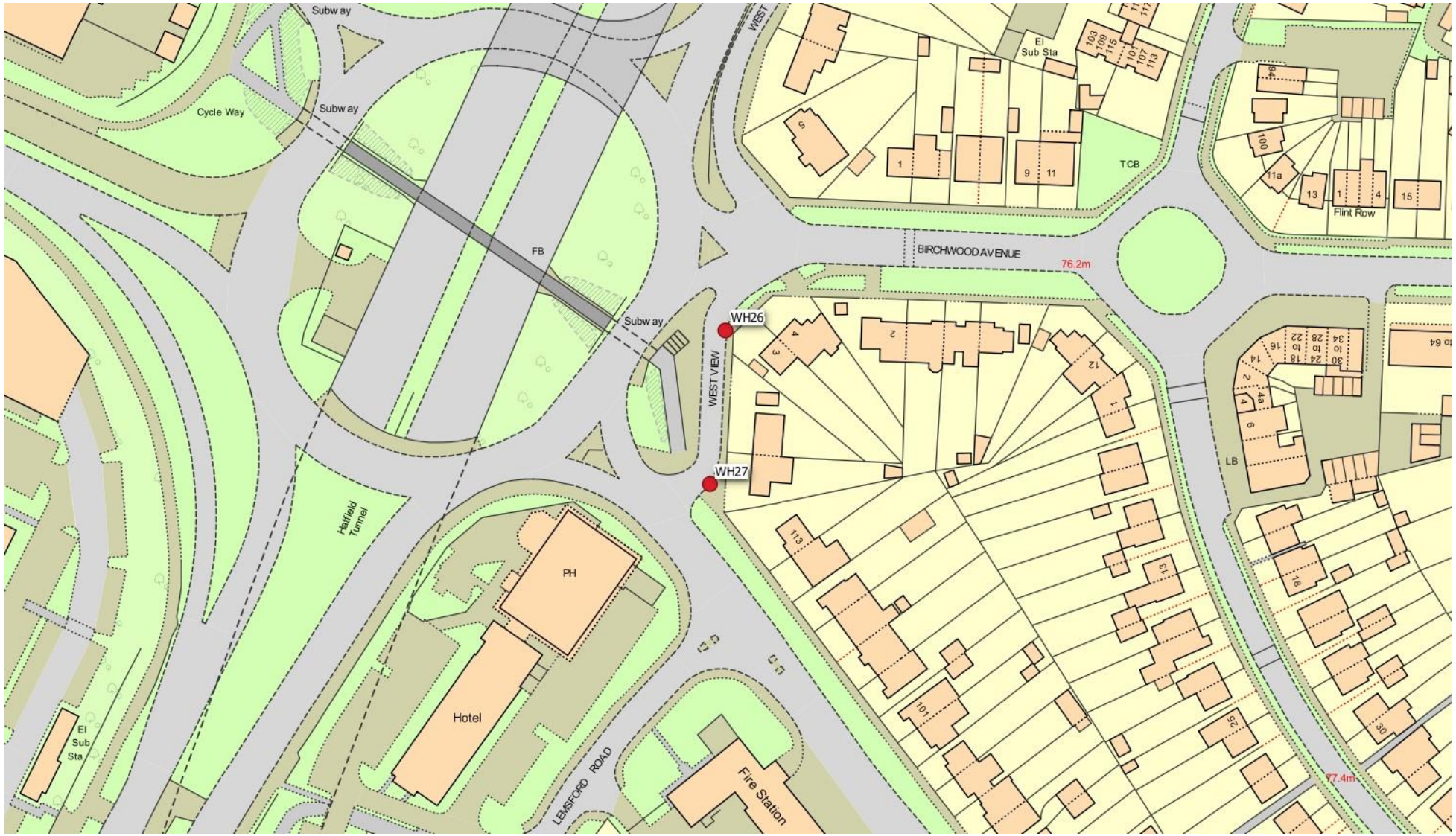

MANOR PARADE
GREEN LANES
Cycle Track
Cycle Track
MANOR ROAD
Subw ay
Subw ay
Cycle Way
A 1(M)
Ward Bdy
FB
COMET WAY
WEST VIEW
CHELWOOD AVENUE
Posts
76.5m
WH19
77.4m
Nox Analyser
WH3
WH25
El Sub Sta
TCB
Flint Ro


Play Area
FB
Amberley
33 to 35
Factory
Post
53 55
17
2 to 8
9 to 11
1 to 51
Wrafton
House
Surgery
WENHAM PLACE
20
to
30
6
12
18
8
16
4
14
2
10
WELLFIELD CLOSE
WELLFIELD ROAD
ED & Wash Bay
Greenacres
1
to
11
15
to
25
El Sub Sta
27 to 33
Friendship
House
7
WH20
1 to 33
El Sub Sta
ASHLEY COURT
34
18 to 21
1 to 8
9 to 17
ST LUKES COURT
47
22
to
25
26 to 34
35 to 42
43 to 50
51 to 65
TOWN FIELDS
1
3
5
2
4
6
8
10
12
14
16
18
19
20
26
111
99
112
100
87
77
88
78
65
Club
1 to 2
Meynard House
St Martins
House
14
81.4m
Lister
House
Surgery
2
2b
2a

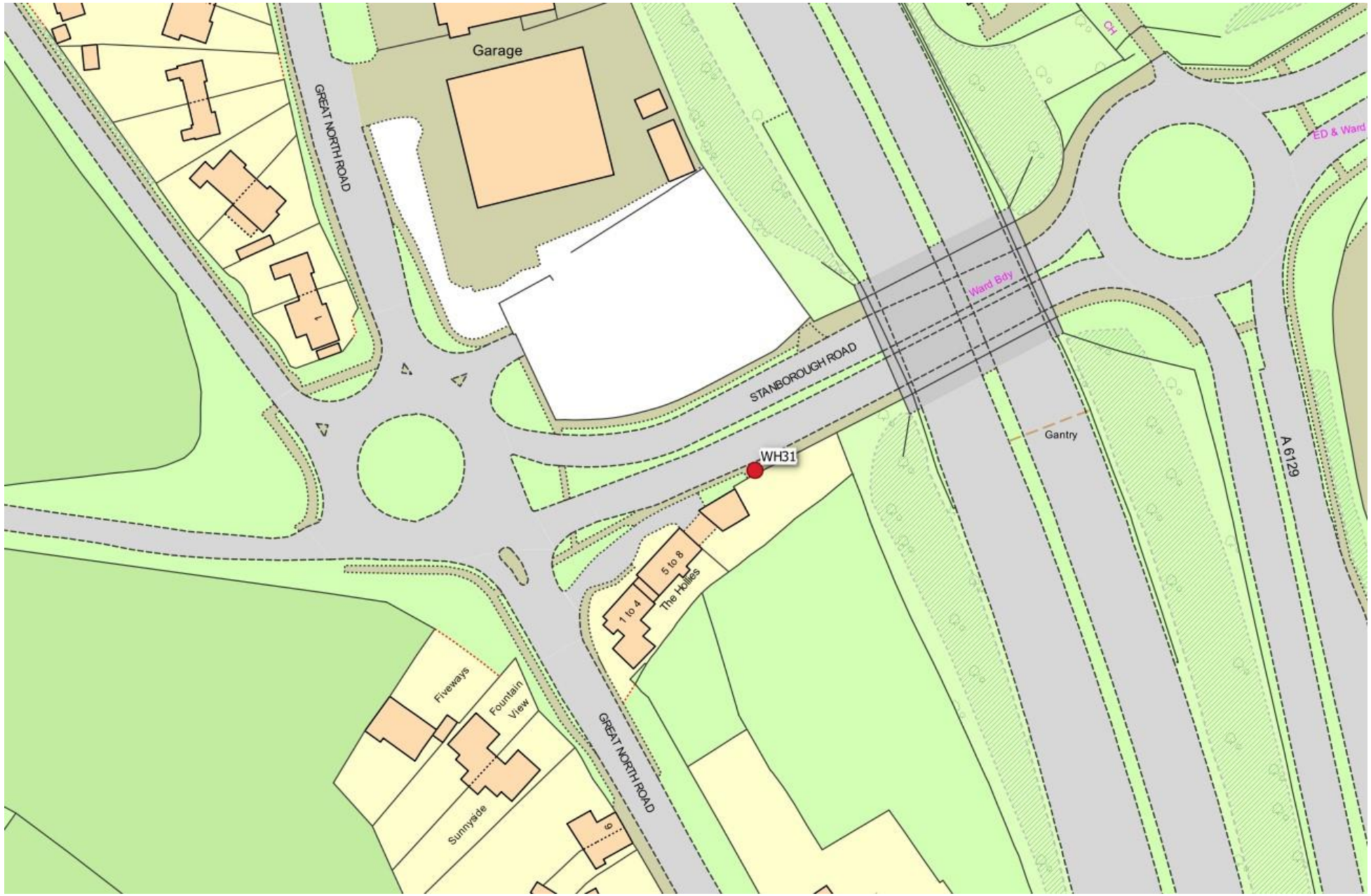

Lay-by
Pond
WH21
Pond
Pond
Mast
Issues
A 414
A 414
Drain
B 1455
Holwell
Caravan Park
(Travellers Site)
Drain
HOLWELL LANE
Pond

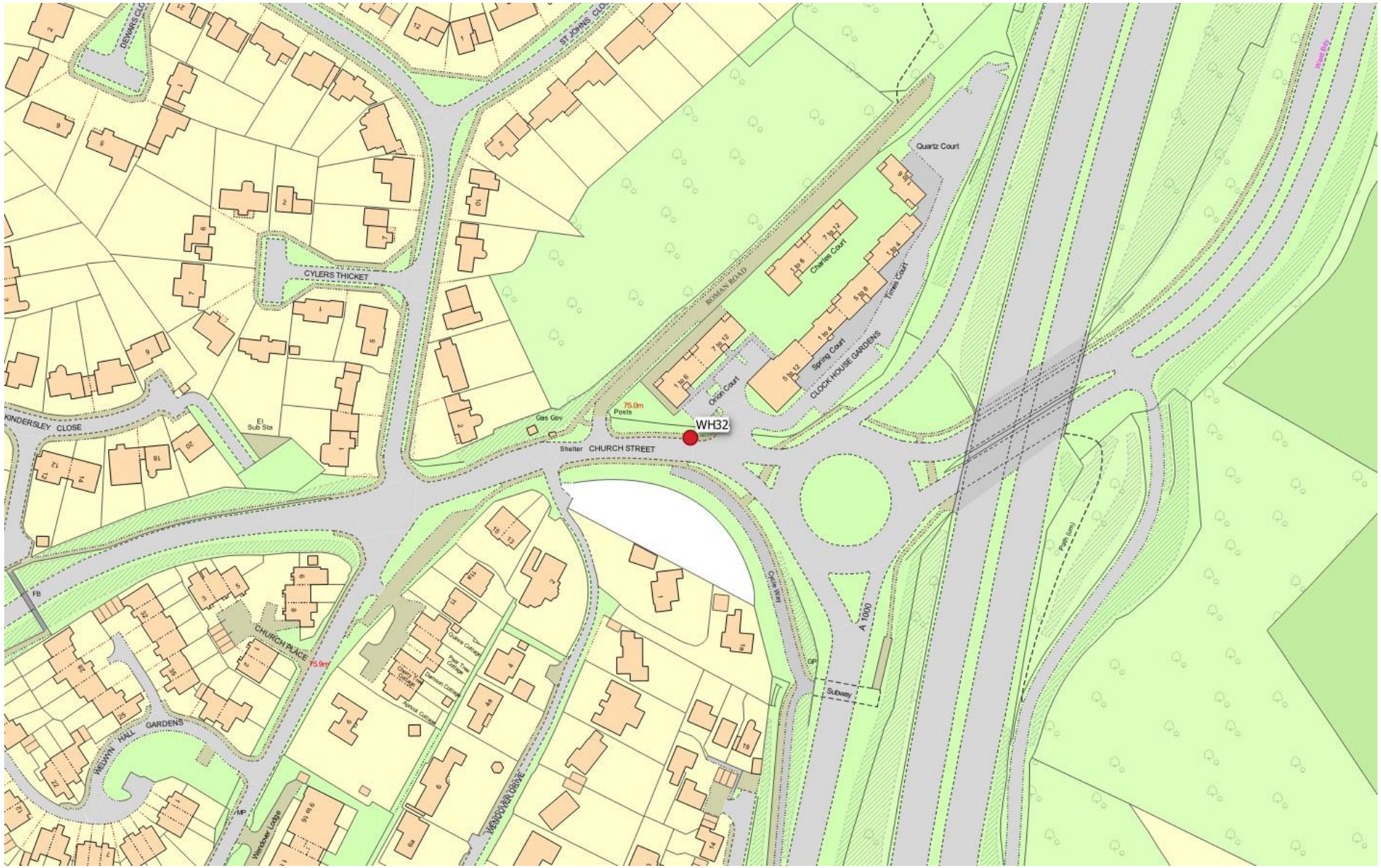

El Sub Sta
John Doyle House
LITTLE BURROW
28
12
14
16
LB
WH23
6
2
74
CHEQUERS
82.9m
LB
30
20
18
ESS
BURROWFIELD
21
17
25
16
SOUTHFIELD
1
5
1
76
31
33
86
7

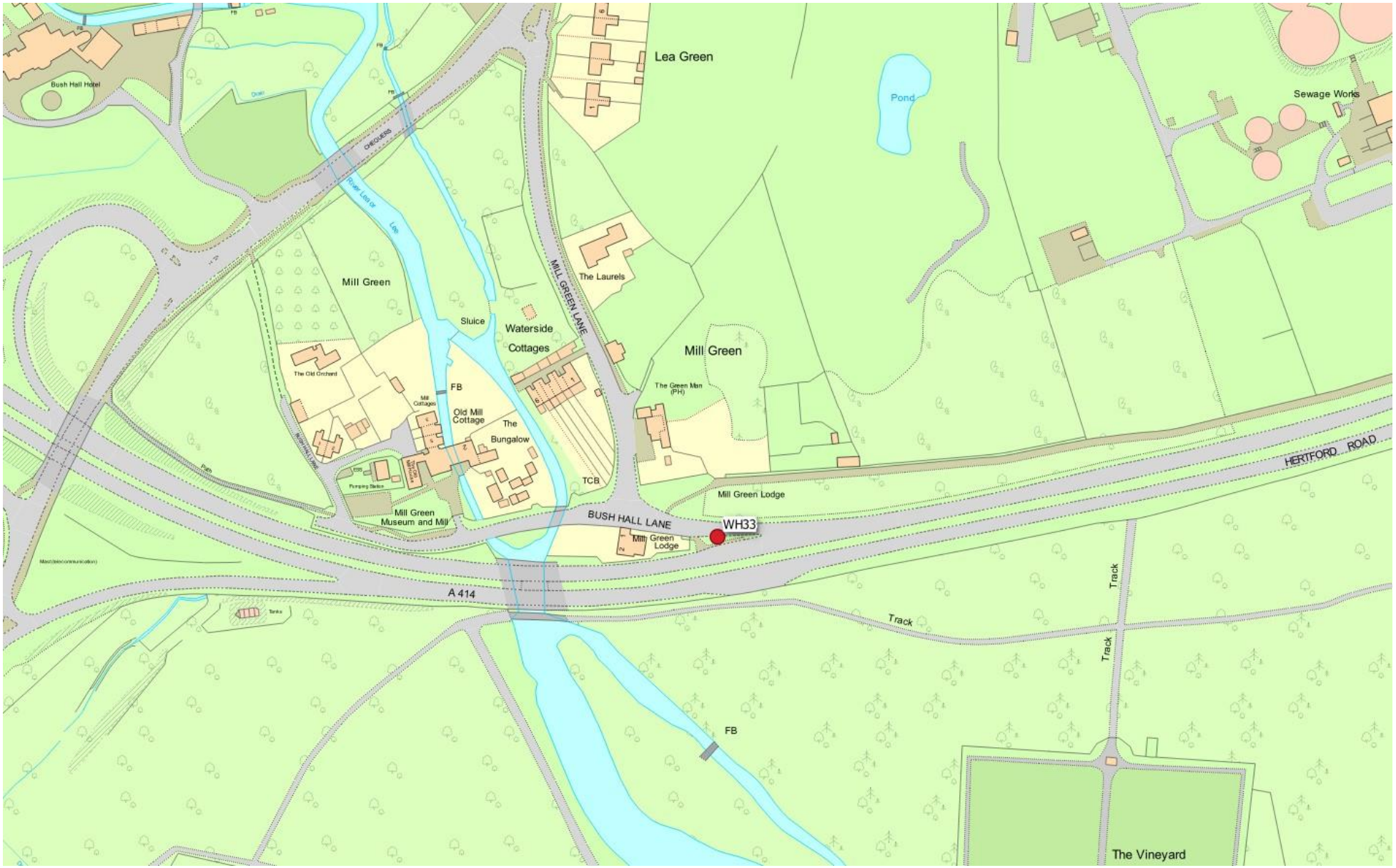

73.2m
Crossing Keepers Cottage
FB
72.5m
ELLENBROOK LANE
CROSSBROOK
CROSSBROOK
Ward Bdy
COMET WAY
A 1(M)
The Oak Tree
72.8m
WH24
NAST HYDE
Railway Cottages


Subw ay
Cycle Way
Subw ay
FB
Subw ay
WEST VIEW
WH26
WH27
BIRCHWOOD AVENUE
76.2m
77.4m
TCB
El Sub Sta
Flint Row
LB
Hatfield Tunnel
PH
Hotel
LEMSFORD ROAD
Fire Station
El Sub Sta


B157
MAYNARD PLACE
STATION ROAD
El Sub Sta
St Andrews Church
GP
LB
73.7m
63.1m
WH5
WH6
WH15
WH30
Tel Ex
CHURCH CLOSE
LAMBS CLOSE
The Brooks
El Sub Sta
SL
1 to 12
13 to 24
25 to 36
17 to 23
27 29 31
33 to 43
45 to 55


Garage
GREAT NORTH ROAD
STANBOROUGH ROAD
Ward Bdy
ED & Ward
CH
Gantry
A 6129
WH31
5 to 8
The Hollies
1 to 4
Fiveways
Fountain View
Sunnyside
9
GREAT NORTH ROAD


WH32
CHURCH STREET
CYLERS THICKET
KINDERSLEY CLOSE
CHURCH PLACE
WELWYN HALL GARDENS
WENDOVER DRIVE
CLOCK HOUSE GARDENS
ROMAN ROAD
Quartz Court
Charles Court
Spring Court
Orion Court
Yinnis Court
A 1000
SUBWAY
Cycle Way
Shelter
Posts
Gas Gov
El Sub Sta
FB
MP
GP


Lea Green
Pond
Sewage Works
Bush Hall Hotel
Mill Green
The Laurels
MILL GREEN LANE
Sluice
Waterside
Cottages
Mill Green
The Old Orchard
FB
Old Mill
Cottage
The
Bungalow
The Green Man
(PH)
HERTFORD ROAD
TCB
Mill Green Lodge
Mill Green
Museum and Mill
BUSH HALL LANE
WH33
Mill Green
Lodge
A 414
Track
Track
Track
FB
The Vineyard

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 (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

[7] The units are in microgrammes of pollutant per cubic metre of air (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'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

References

- Local Air Quality Management Technical Guidance LAQM.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.
- https://laqm.defra.gov.uk/review-and-assessment/tools/tools.html
- **Air quality data collection website:**
- https://www.airqualityengland.co.uk/local-authority/?la_id=408
- **Air quality alert scheme:**
- https://www.airqualityengland.co.uk/local-authority/knr-subscriptionv
- **Diffusion tube supplier and laboratory:** https://www.socotec.co.uk/services/laboratory-and-analytical-services/
- **Link to the national air quality strategy:** https://www.gov.uk/government/publications/the-air-quality-strategy-for-england