

2018 Air Quality Annual Status Report (ASR)

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

June 2018

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Executive Summary: Air Quality in Our Area

The Borough of Broxbourne is located to the North of Greater London, there are two main roads, the A10 which passes through on a north-south axis in addition to the M25 which runs along the southern boundary of the Borough. This unique position makes the Borough a desirable place to live and work and also places it within the axis of two major road transport hubs. In many areas, vehicle emissions have become the dominant source of air pollutants such as nitrogen dioxide (NO₂), and PM10s (Particulate Matter up to 10 microns in diameter). These emissions contribute to risks of morbidity and mortality for drivers, commuters and individuals living near roadways, as shown by epidemiological studies, evaluations of proposed vehicle emission standards, and environmental impact assessments for specific road projects ¹.

Air Quality in the Borough of Broxbourne

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas^{2,3}.

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion ⁴.

The main pollutant of concern within the Borough of Broxbourne is nitrogen dioxide (NO₂). There are several areas within the Borough where elevated levels of NO₂ are regularly recorded, which include Great Cambridge Road & Halfhide Lane within Cheshunt, High Road within Wormley, Arlington Crescent, Eleanor Cross Road, Winston Churchill Way, Sturlas Way & High Street within Waltham Cross and Essex Road, Dinant Link Road/Burford Street Junction within Hoddesdon.

¹ World Health Organization. Health effects of transport-related air pollution. Copenhagen: WHO Regional Office for Europe; 2005. pp. 125–165

² Environmental equity, air quality, socioeconomic status and respiratory health, 2010

³ Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

⁴ Defra. Abatement cost guidance for valuing changes in air quality, May 2013

In response to these results the Borough of Broxbourne has previously declared AQMAs at the following locations,

- Arlington Crescent to Abbey Road, Waltham Cross (AQMA 1)
- 33-35 Teresa Gardens, Waltham Cross (AQMA 2)
- Tyle Kiln Cottage, Goffs Oak (AQMA 3)
- Eleanor Cross Road/Monarch's Way, Waltham Cross (AQMA 4)
- Monarch's Way/Winston Churchill Way, Waltham Cross (AQMA 5)
- Great Cambridge Road, Cheshunt (AQMA 6)
- High Road, Wormley (A1170) (AQMA7)

Actions to Improve Air Quality

AQMAs declared within the Borough of Broxbourne can be accessed via <https://uk-air.defra.gov.uk/aqma/list>

The Council has commissioned Bureau Veritas to develop a single Air Quality Action Plan (AQAP) with respect to AQMAs 4-7. The single AQAP will also update the source apportionment and list of actions with respect to AQMA 1. The first steering group meeting was held in August 2017, where Officers and Member's from both the Borough of Broxbourne and Hertfordshire County Council took the opportunity to discuss existing and developing actions and policies which could contribute to emissions reductions within the AQMAs. Highways England were not present at the first Steering Group Meeting, however we expect their future attendance further to requesting their input in to the AQAP.

The Council also regularly attends meetings with other stakeholders including Hertfordshire County Council, the Herts and Beds Air Quality Monitoring Group and the North London Air Quality Cluster Group.

The Council will continue to monitor and report upon air quality within the district and has extended it's NO₂ Diffusion tube network to eight new locations in October 2017.

The Borough of Broxbourne was successful in securing a grant of £249,780 from the Department of Transport (DFT) in 2016, in order to facilitate the retrofitting of 15 buses with Selective Catalytic Reduction Technology. The Borough of Broxbourne commissioned Green Urban Technologies Ltd to install their ecoNox “DMXr” SCR Technology which is a Selective Catalytic Reduction System. Following on from the 2017 ASR, an additional three buses were successfully retrofitted in 2017. The upgrades have brought the vehicle’s emissions in line with Euro 6 standards, which will improve the air quality within AQMAs 1, 2, 4 and 5 which are located within Waltham Cross. The retrofitted vehicles which operate out of Waltham Cross travel along the 410, 410A and 410X bus routes. The Borough of Broxbourne is awaiting for a progress update from Green Urban with respect to the completion of the project and will provide a further update within the next ASR.

Conclusions and Priorities

Exceedances of the National Air Quality Objectives were identified at four locations with respect to the Annual Mean for nitrogen dioxide, after distance correction had been applied, whereas exceedances of the Hourly mean objective were identified at two locations in 2017. The exceedances were identified within existing AQMAs 1, 4 and 6. An Air Quality Action Plan is currently being developed on behalf of the Borough of Broxbourne in order to address exceedances of nitrogen dioxide within these areas.

The annual concentration of nitrogen dioxide was compliant within AQMA 2, for the fifth consecutive year and whereas it’s revocation was proposed within the 2017 ASR, this at the time of writing has not been completed. It will be a priority to revoke both AQMA 2 and AQMA 3 in 2018, due to sustained compliance with the National Air Quality Objectives, which will be discussed further later on in this report.

Priorities for addressing air quality within the Borough of Broxbourne throughout 2017 include:

- Maintaining existing AQMAs 1, 4, 5, 6 and 7 for nitrogen dioxide.
- Continue to monitor nitrogen dioxide concentrations at existing long-term locations.
- Progress the development of a single Air Quality Action Plan (AQAP) for areas failing to meet the National Air Quality Objective for nitrogen dioxide and hold an associated Steering Group meeting in order to facilitate the Plan's development and delivery.

There are several large developments taking place within the Borough of Broxbourne in addition to several more which are in the Planning phase which have the potential to impact upon Air Quality with respect to nitrogen dioxide, PM_{2.5} and PM₁₀.

One of the continued challenges is ensuring these developments do not contribute to the pollutants listed above, which is usually facilitated through the Planning System, which gives the Council the opportunity to stipulate conditions aimed at mitigating the affects of Air Pollutants to surrounding receptors and to ensure that future residents are not exposed to poor Air Quality.

1 Local Engagement and How to get Involved

Informing people about local air quality, in particular when pollution is elevated can help to protect those members of the community who are most sensitive to the health impacts associated with air pollution. Increasing public understanding of the sources and effects of air pollution can also motivate lifestyle changes which can help improve air quality, for example promoting sustainable travel as method of reducing air pollution.

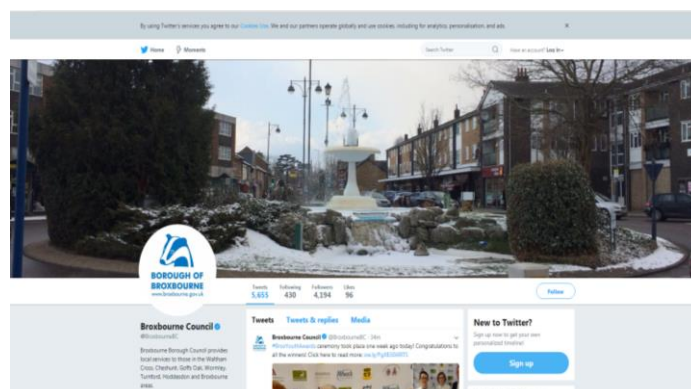
http://www.airqualityengland.co.uk/local-authority/?la_id=408



<https://www.broxbourne.gov.uk/resident-environment/environmental-protection>



<http://Twitter.com/broxbournebc>



In 2016 The Borough of Broxbourne consulted the public with respect to the Emerging Local Plan, which contains several draft development policies pertinent to Air Quality in addition to Walking and Cycling routes and Sustainable Transport. The public were also given the opportunity to add further comments on the Pre-Submission Local Plan by December 2017 and comments with respect to this Plan may be viewed via,

<http://consult.broxbourne.gov.uk/portal/planning/reg19/reg19?pointId=4653994>

The Broxbourne Local Plan 2018 -2033 was submitted to the Secretary of State on 15th March 2018.

There are numerous simple measures which the public may adopt in order to improve the air quality around them. Such measures include,

- Making short trips and journeys on foot or by bike instead of by car, or using public transport.
- Car sharing with colleagues, or with other parents on the school run.
- Purchasing low-emission electric and/or hybrid vehicles, with government funding and grants available. Please see,
<https://www.gov.uk/plug-in-car-van-grants/what-youll-get>
- Upgrading boilers to newest and most efficient gas condensing boilers with lowest NOx (and carbon) emissions.
- Conserving fuel efficiency of vehicles through ensuring correct tyre pressure is maintained.
- Ensuring your home is sufficiently insulated.
- Installing sources of renewable energy such as solar panel electricity systems, also known as solar photovoltaics or wind turbines.

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1 Local Air Quality Management

This report provides an overview of air quality in the Borough of Broxbourne during 2017. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Borough of Broxbourne to improve air quality and any progress that has been made.

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

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

A summary of AQMAs declared by The Borough of Broxbourne can be found in Table 2.1.

Further information related to declared AQMAs, including maps of AQMA boundaries are available online at <https://www.broxbourne.gov.uk/business-licensing-and-legislation-resident-environment-environmental-health/air-quality>

Images of the AQMA boundaries in conjunction with the wider vicinity can also be viewed on our interactive map via,

<http://mapping.broxbourne.gov.uk/geoexplorer/composer/#maps/10>

In addition please also see Figures 2.1 for Maps of AQMA Boundaries and Appendix D: Map(s) of Monitoring Locations , which also provides for a map of air quality monitoring locations in relation to the AQMA(s).

A Detailed Assessment was completed in September 2016 and covered two areas within the Borough of Broxbourne. This assessment recommended the declaration of two new AQMAs, the first being at the junction of Great Cambridge Road and College Road in Cheshunt, including the Great Cambridge Road (A10) near Theobalds Lane junction up to the Brookfield Centre (B156 Flyover and B156/A10 Slip Road), with respect to likely annual and hourly mean breaches of nitrogen dioxide. The second AQMA recommended being along the High Road in Wormley (A1170) between the junctions of New Road/Springfields and West Side/The Springs, including the junctions of Station Road and Bell Lane, with respect to likely annual mean breaches of nitrogen dioxide. Subsequently the Borough of Broxbourne declared AQMA 6- Great Cambridge Road (A10) and AQMA 7-High Road in Wormley (A1170) in May 2017. Maps of these two new AQMAs can be seen within Figures 2.1.

Air Quality Management Areas 2 and 3

The Borough of Broxbourne intends to revoke AQMA 2 (33-35 Teresa Gardens, Waltham Cross), within 2018, as the NO₂ levels recorded have consistently been recorded below the objective level of 40µg/m³ for over three years. (See monitoring section). Following year on year improvements of nitrogen dioxide in 2014, 2015, 2016 and 2017 we are confident the improvement within AQMA 2 will be sustained in the long term.

The Borough of Broxbourne also intends to revoke AQMA 3 (Tyle Kiln Cottage-Jones Road), within 2018 due to three years sustained compliance with the national air quality objective for nitrogen dioxide. The results of which have been well below the threshold of 40µg/m³.

Revocation Orders will be drafted in conjunction with Paragraph 4.10 of Local Air Quality Management Guidance Policy Guidance (PG16). Copies of the Revocation Orders will then be uploaded to the Council's Air Quality Web page and submitted to the Local Air Quality Management Report Submission Website.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)				Action Plan		
						At Declaration		Now		Name	Date of Publication	Link
AQMA 1 Arlington Crescent to Abbey Road	Declared 04/02/2004 Amended 10/03/2016	NO2 Annual Mean	Waltham Cross	Within a residential Cul-de-sac adjacent to the M25. The AQMA was further extended in March 2016 to include residential properties along Lodge Crescent, Abbey Rd and High Street.	YES	63	µg/m3	54.8	µg/m3	The Borough of Broxbourne's Single Air Quality Action Plan	Development Stage	N.A

Borough of Broxbourne

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)				Action Plan		
						At Declaration		Now		Name	Date of Publication	Link
AQMA 2 33-55 Teresa Gardens	Declared 04/02/2004	NO2 Annual Mean	Waltham Cross	A small geographical area encompassing several residential premises	NO	Exceedances of the 40 µg/m3 Annual Mean	Exceedances	33.7 µg/m3	Exceedances	Under Revocation	N.A.	N.A.
AQMA 3 Tyle Kiln Cottage	Declared 04/02/2004	NO2 Annual Mean	Goffs Oak	A small area located adjacent to the M25 and consisting of one residential property, Boarding Kennels & Catteries.	YES	Exceedances of the 40 µg/m3 Annual Mean	Exceedances	25.9 µg/m3	Exceedances	Under Revocation	N.A.	N.A.

Borough of Broxbourne

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)				Action Plan		
						At Declaration		Now		Name	Date of Publication	Link
AQMA 4 Eleanor Cross Rd/Monarchs Way	Declared 10/03/2016	NO2 Annual Mean	Waltham Cross	An area encompassing residential properties on Abbey Rd, King's Rd and Queen's Rd and including the Monarch's Way and Eleanor Cross Rd roundabout.	NO	78	µg/m3	42	µg/m3	The Borough of Broxbourne's Single Air Quality Action Plan	Development Stage	N.A.
AQMA 5 Monarchs Way/Winston Churchill Way	Declared 10/03/2016	NO2 Annual Mean	Waltham Cross	An area encompassing residential properties on Eleanor Rd, High Street, Sturlas Way and including the Monarch's Way and Winston Churchill Way roundabout.	NO	58	µg/m3	39.3	µg/m3	The Borough of Broxbourne's Single Air Quality Action Plan	Development Stage	N.A.

Borough of Broxbourne

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)				Action Plan		
						At Declaration		Now		Name	Date of Publication	Link
AQMA 6 Great Cambridge Road (A10) & College Road	Declared 05/05/2017	NO2 1 Hour Mean	Cheshunt	Encompassing dozens of residential properties and a school along the (A10) and College Rd, from Theobalds Lane junction up to the Brookfield Centre (B156 Flyover and B156/A10 Slip Rd.	NO	Exceedances of the 60 µg/m3 Hourly Mean and the 40 µg/m3 Annual Mean	Exceedances	49.2 µg/m3	Exceedances	The Borough of Broxbourne's Single Air Quality Action Plan	Development Stage	N.A.
AQMA 7 High Road in Wormley (A1170)	Declared 05/05/2017	NO2 Annual Mean	Wormley/ Broxbourne	Including dozens of residential properties along the High Rd in Wormley (A1170) between the junctions of New Rd/Springfields and West Side/The Springs, including the junctions of Station Rd and Bell Lane	NO	Exceedances of the 40 µg/m3 Annual Mean	Exceedances	26.2 µg/m3	Exceedances	The Borough of Broxbourne's Single Air Quality Action Plan	Developmental Stage	N.A.

Note: There is more than one monitoring location with respect to AQMAs 1, 5 & 6. Therefore the maximum recorded annual nitrogen dioxide concentration, within each AQMA has been applied with respect to column 8 above.

The information relating to the declaration of Air Quality Management Areas 6 and 7 was submitted to Defra in July 2017 in order to facilitate a full update of the Borough of Broxbourne's AQMAs within the UK-Air website.

Figures 2.1 Maps of AQMA Boundaries and Diffusion Tube Locations

Figure 2.1 (1) AQMA 1 – Arlington Crescent to Abbey Road, Waltham Cross
Including: **TUBE 8: 35 High Street, (BB11)**, **TUBE 13: Parkside, (BB17)** and **TUBE 6: Arlington Crescent, (BB05)**

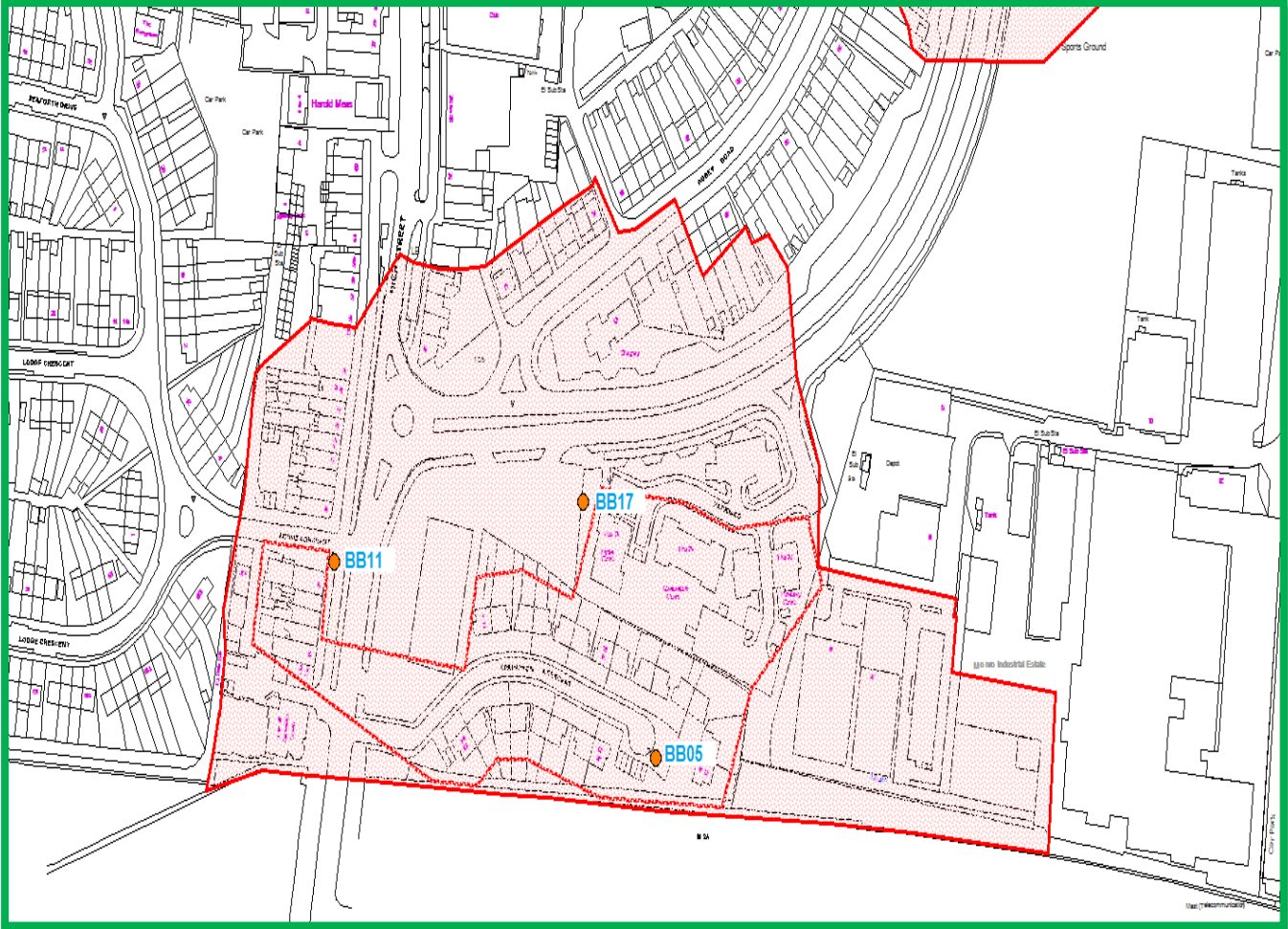


Figure 2.1 (2) AQMA 2-33-35 Teresa Gardens, Waltham Cross

Including: TUBE 7: Teresa Gardens, (BB10)

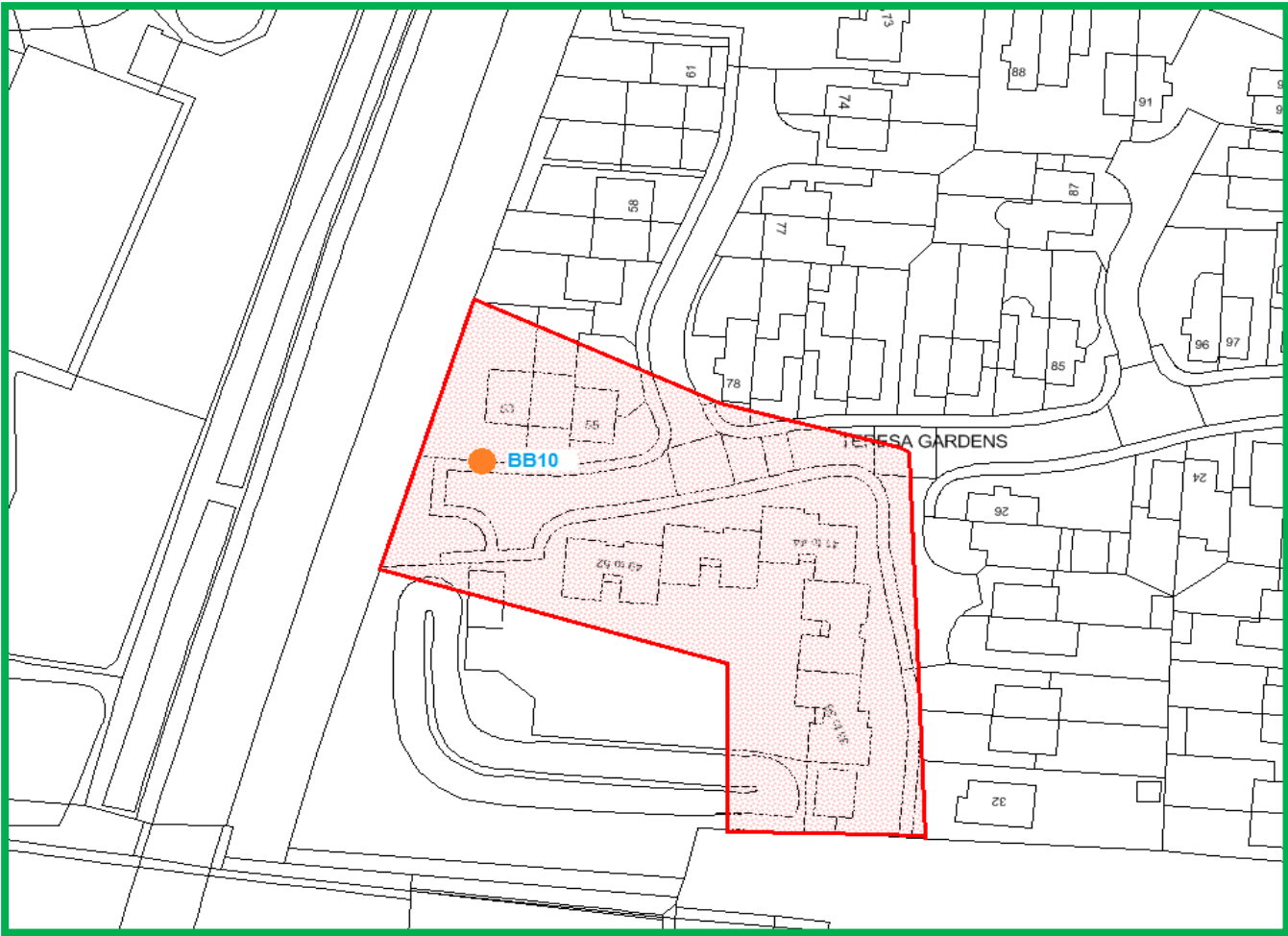


Figure 2.1 (3) AQMA 3-Tyle Kiln Cottage, Goffs Oak

Including: TUBE 18: Jones Road, EN7 5JB (BB25)

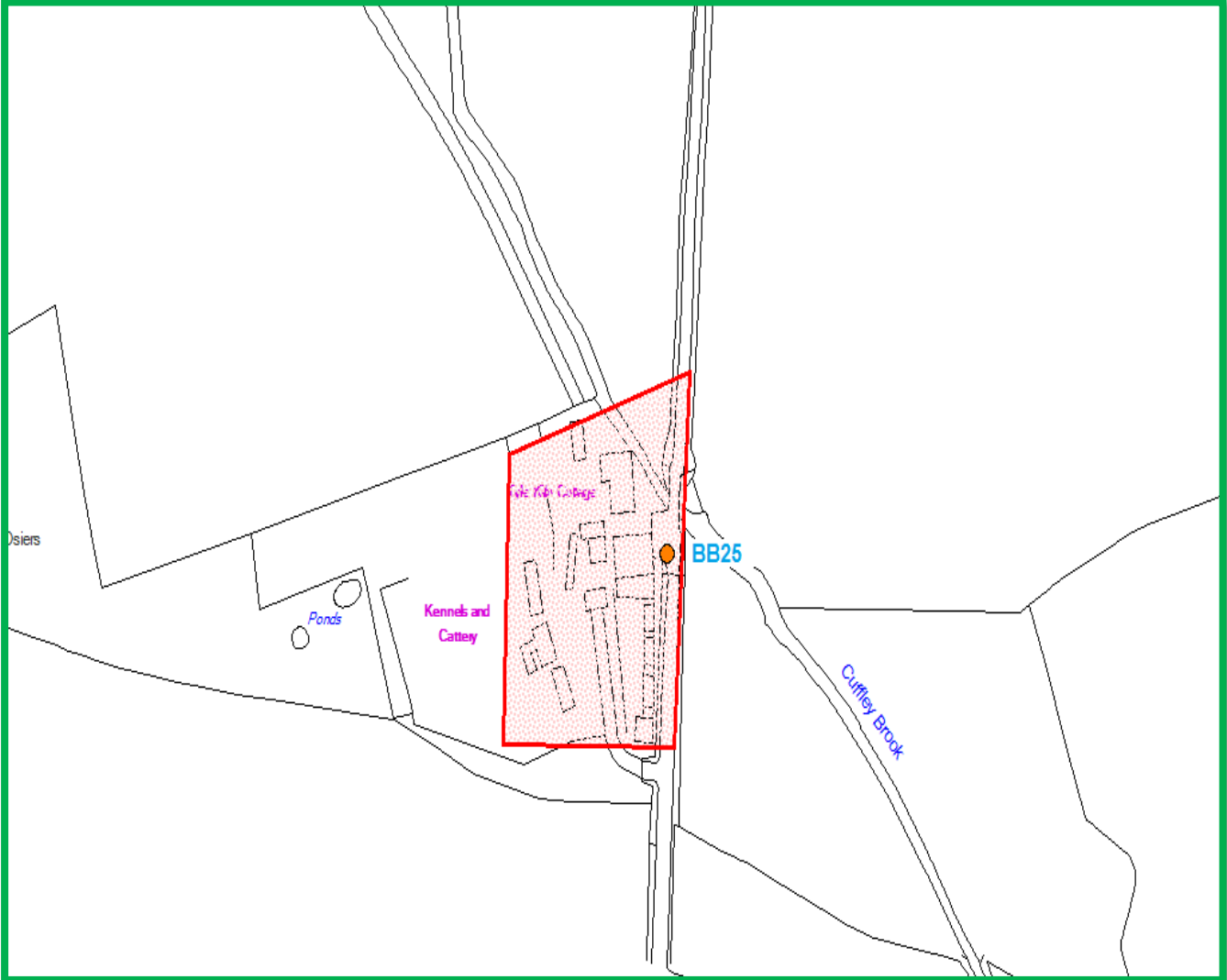


Figure 2.1 (4) AQMA 4- Eleanor Cross Road/Monarch's Way, Waltham Cross

Including: TUBE 12: Eleanor Cross Road, (BB21)

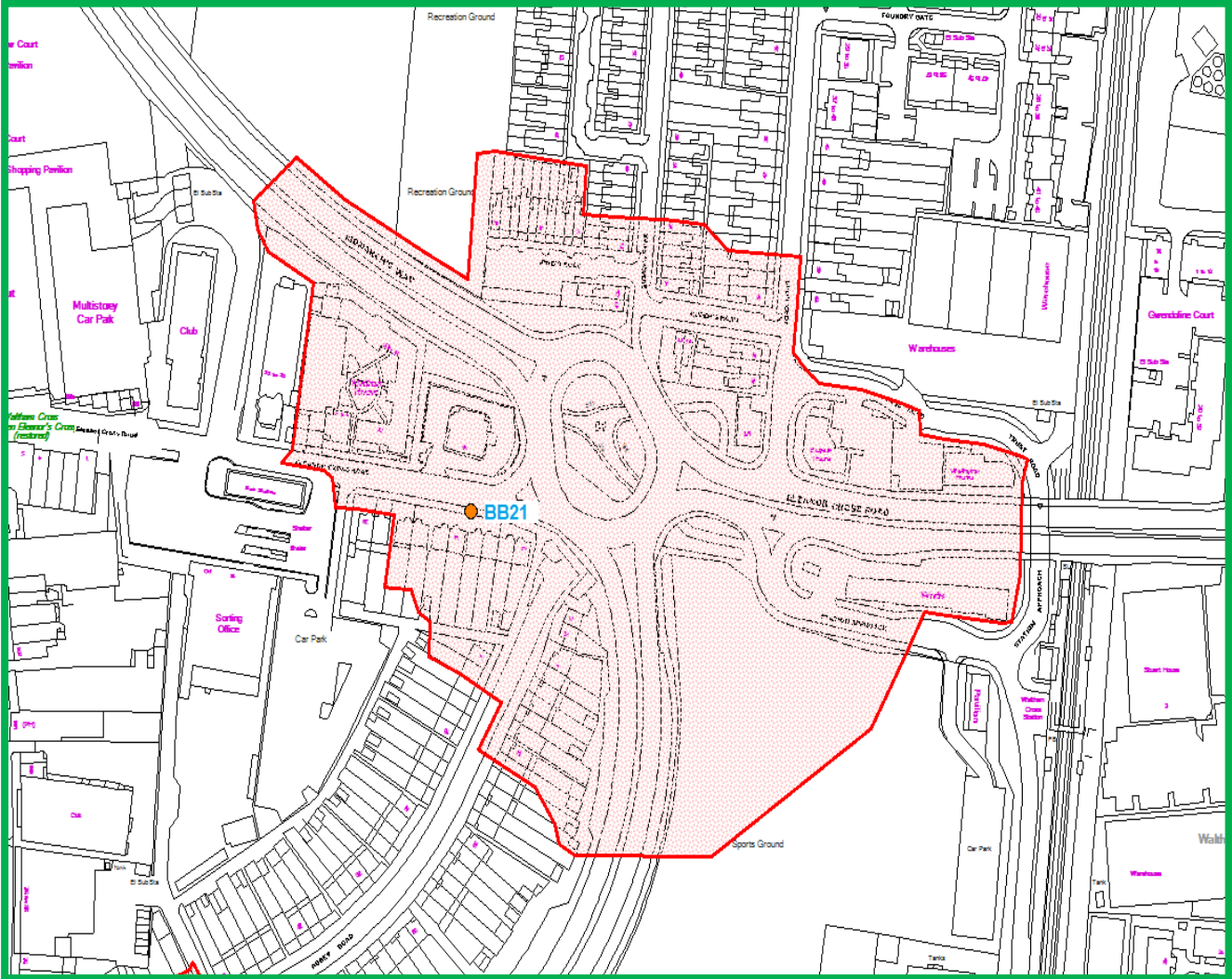
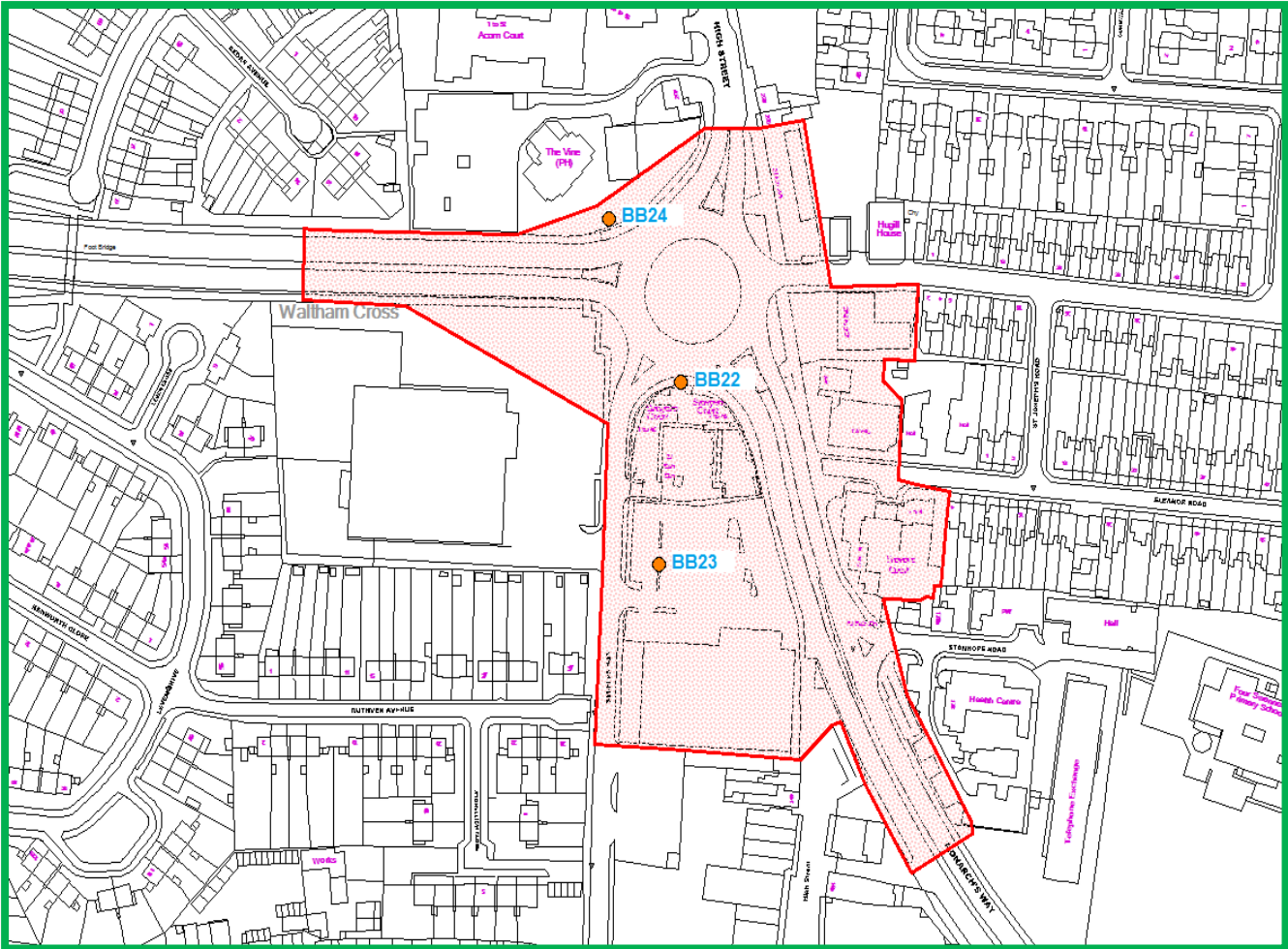


Figure 2.1 (5) AQMA 5-Monarch's Way/Winston Churchill Way, Waltham Cross
Including: TUBE 9: Sturlas Way, (BB22), TUBE 10: Wicks car park, (BB23) and
TUBE 11: Winston Churchill Way, (BB24)



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Figure 2.1 (6) AQMA 6-Great Cambridge Road (A10)

Including: **TUBE 5:** 100 Great Cambridge Road (**BB09**), **TUBE 21:** 214 Great Cambridge Road (**BB28**), **TUBE 27:** Farm Close, (**BB34**), **TUBE 28:** 86 College Road (**BB35**), **TUBE 32 :** College Rd/Goffs Churchgate Academy (**BB39**), **TUBE 19:** A10/College Road Junction (**BB40**), **TUBE 33:** 37 Beltona Gardens (**BB41**) and **TUBE 34 :** 48 Hobbs Close (**BB42**)

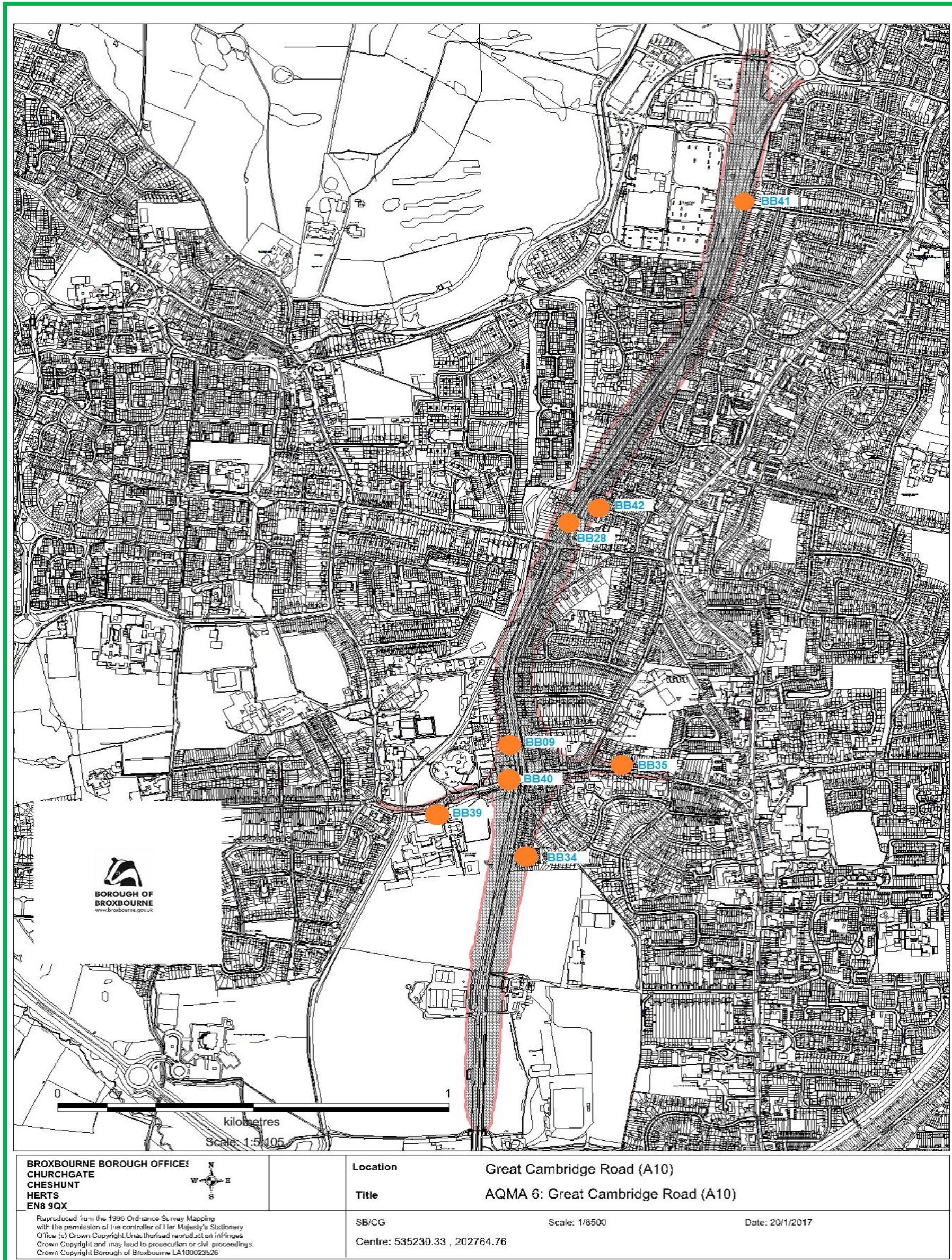
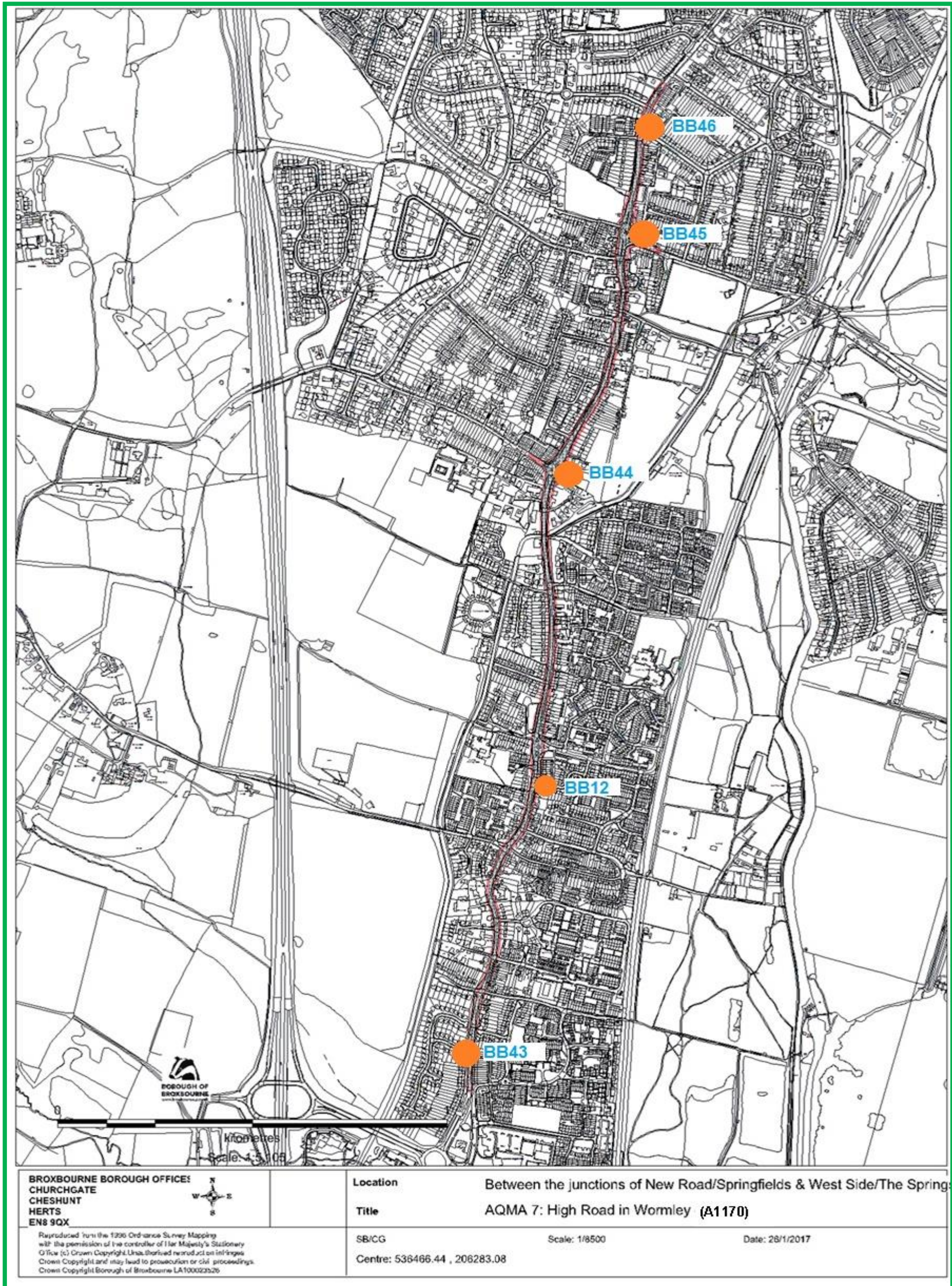


Figure 2.1 (7) AQMA 7-High Road in Wormley (A1170)

Including: TUBE 4: 15 High Road (BB12), TUBE 35: 24 Westside (BB43), TUBE 36: High Road/Bell Lane Roundabout (163 High Road) (BB44), TUBE 37: High Road/Station Road Junction (BB45) and TUBE 38: High Road/Springfields Junction (BB46)



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

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

"The report is well structured, detailed, and provides the information specified in the Guidance, using the latest template.

1. *The Council have responded to previous recommendations by:*
 - *Commissioning a source apportionment exercise and draft AQAP*
 - *Providing additional monitoring within AQMA6 and AQMA7.*

2. *There appears to be some misunderstanding in relation to the designation of monitoring sites with respect to relevant exposure for exceedances of UK Air Quality Objectives. Exceedances of the UK air quality objectives only apply where there is relevant exposure as determined by the averaging period of the air quality objective. For example, following the LAQM 2009 Technical Guidance (Defra, 2009), the annual mean NO₂ objective would apply at all locations where members of the public might be regularly exposed, e.g. building facades of residential properties, schools, hospitals and care homes. For the purposes of monitoring for LAQM, monitoring locations that are considered representative of relevant exposure are generally considered as e.g. building facades of residential properties, schools, hospitals and care homes for assessing annual mean NO₂. Thus, for exposure alongside a busy road, it is considered reasonable to select the façade of residential properties closest to the road as a representative location to assess exposure for pollutants with a 24-hour or annual mean objective.*

3. *On this basis the designations of monitoring sites should be carefully considered, as it appears that a number of the monitoring sites listed in Table A.2 are not in fact representative of relevant exposure for assessment of the annual mean for nitrogen dioxide. This may be particularly relevant with regard to sites that are showing exceedances that are outside of current AQMAs, sites BB01,29,36,37.*

4. *There are some errors in the calculation of annualisation factors in Appendix C. Using the figures provided in the tables:*

The bias adjustment factor for Essex Road is 45.6 (Not 46.4)

The bias adjustment factor for Jun Burford St/Dinant Link Road is 54.5 (not 52.4)

The bias adjustment factor for St Catherine School is 23.0 (not 22.8) All these errors appear to have occurred due to rounding previous steps in the calculations.

These results should be adjusted accordingly.

5. *The decision over the steps toward revocation remain with the Council. Guidance is available at the Defra LAQM webpages at: <https://laqm.defra.gov.uk/review-and-assessment/declare-or-revoke-aqmas/declare-revoke-aqma.html> and reference to the relevant sections in LAQM TG(16), para 3.46-3.48; 5.10; 6.02-6.03. The guidance makes clear that in most circumstances, a Detailed Assessment is expected as a basis for a decision to revoke.*

6. *The situation with AQMA 2 is noted, we note that there is only a single monitoring point used to review the status of this AQMA, when there are other properties that are located closer to the M25. We suggest that other sites should be considered before a decision is made to revoke based on evidence from a single monitoring site. There is similar uncertainty over the relevance of site BB25 being the only site used to validate AQMA3, we suggest a similar review should take place for AQMA3.”*

- With respect to point 2 above, all sites have been reviewed in conjunction with LAQM Technical Guidance (TG16). Subsequently a distance correction has been applied to the 2016 results for those sites which were in exceedance of 40 µg/m³, so that they are representative of relevant exposure. The 2017 ASR has therefore been updated with the additional calculations and results. A distance correction has also been applied to those locations which were within 10% of the 40 µg/m³ annual objective i.e. 36 µg/m³, within this report. Please see Table A.3. The distance correction was calculated via the “*NO2-Fall-Off-With-Distance-from-Roads-Calculator-v4.1 (1)*”, and was applied to locations not representative of relevant exposure.
- In order to address point 3, Environmental Health has reviewed its diffusion tube network and has relocated monitoring locations BB01, BB17 and BB24, so as to enable the collection data which is representative of relevant exposure, which will be discussed further within the next ASR. BB29 was designated to provide baseline data, in anticipation of the Brookfield Development, its relocation is therefore not necessary, as such there is no relevant exposure within 50m of this site. BB36 was relocated in March 2017 as the previous location at was not representative of relevant exposure.
- With respect to point 4, the annualisation factors have been recalculated, following the example within Box 7.10 on page 7-56 of Defra’s Technical Guidance (TG16). The Council notes that despite following this example, there appears to be differences with the annualisation figures provided within the feedback and the Council’s recalculations. For transparency the full updated annualisation calculations have been updated within the 2017 ASR.

- Point 5 will be addressed by providing a report in relation to monitoring evidence, which draws from previous year's data and analysis, for those monitoring locations within AQMAs 2 & 3, in line with Para 3.49 of LAQM Technical Guidance (TG16) February 2018. It is anticipated the report will be completed in July 2018. Paragraphs 5.10; 6.02-6.03 of TG16 does not relate to Local Authorities in England, therefore their reference within the 2017 ASR feedback are not relevant with respect to the Borough of Broxbourne.
- Following on from the comments within point 6, the Council has reviewed whether there are any other potential monitoring points within AQMA 2 and AQMA 3. Both AQMAs cover a small geographical area, making the consideration of alternative monitoring points challenging. AQMA 2 is located adjacent to the M25 Holmesdale Tunnel with the entry/exit point falling towards its Western end. Whilst there are some properties within AQMA 2, which are closer to the Tunnel on it's Northern approach, notably No's 32 and 33 Teresa Gardens, they are located around 81 metres from the entry/exit point. There were no other viable locations within AQMA 3 due to its small area and carrying out monitoring closer to the M25 at this location is not possible due to the inherent safety risks.

The Borough of Broxbourne has taken forward a number of direct measures during the current reporting year of 2017 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

The Borough of Broxbourne expects the following measures to be completed over the course of the next reporting year:

- The retrofitting of additional buses operating within Waltham Cross, with Selective Catalytic Reduction Technology.
- Update the council's interactive webpage to include AQMA s 6 and 7.
- The full roll out of the Air Quality text alert system.
- Provide additional comments with respect to the emerging draft Local Plan.
- Expanding the Borough's nitrogen dioxide diffusion tube network, to provide additional monitoring locations within AQMAs 6 and 7.

The Borough of Broxbourne's priorities for the coming year are to develop an Air Quality Action Plan for AQMAs 1,4,5,6 & 7. The Borough also intends to revoke AQMA 2 and AQMA 3 further to sustained compliance with the Air Quality Objectives for nitrogen dioxide at these locations.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, The Borough of Broxbourne anticipates that further additional measures not yet mentioned will be required in subsequent years to achieve compliance and enable the revocation of AQMAs 1, 4, 5, 6 and 7.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	The Council will continue to inspect all of its authorised processes to ensure compliance. Authorisations will be updated as and when appropriate so that operation conditions are up to date.	Environmental Permits	Other	Borough of Broxbourne	N.A.	Existing	Number of Part B Installations inspected and meeting compliance	Reduced emissions of nitrogen dioxide, PM10s & PM2.5'S	Environmental permits updated and maintained within database	Ongoing	N.A.
2	The Council will continue to educate residents and businesses to use smokeless fuel or an approved appliance for smokeless combustion.	Public Information	Via other mechanisms	Borough of Broxbourne	N.A.	Existing	Usually via reactive complaints, with records maintained.	Reduced vehicle emissions	Advisory Letters reviewed and updated	Ongoing	N.A.
3	The Council will continue to promote alternatives to domestic bonfires. We will encourage residents to recycle or compost as much waste as possible or dispose of it responsibly at a civic amenity site	Public Information	Via other mechanisms	Borough of Broxbourne	N.A.	Existing	Usually via reactive complaints, with records maintained.	Reduced vehicle emissions	Advisory Letters reviewed and updated	Ongoing	N.A.

Borough of Broxbourne

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
4	The Council will continue to enforce the Clean Air Act 1993 and encourage local businesses to dispose of waste in a responsible manner, so as to prevent dark smoke bonfires.	Public Information	Other	Borough of Broxbourne	N.A.	Existing	Usually via reactive complaints, with records maintained.	Reduced emissions of PM10s & PM2.5'S	Advisory Letters reviewed and updated	Ongoing	N.A.
5	The Council will continue play an active role in the Hertfordshire and Bedfordshire Air Quality Monitoring Network (Herts & Beds) and the north London cluster group.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Borough of Broxbourne	N.A.	Existing	Policies, relationships and processes in place to ensure air quality is considered wherever relevant.	N.A.	Continued participation of meetings	Ongoing	N.A.
6	Require developers to undertake an air quality assessment (AQA) for planning applications associated with increased transport and boiler emissions and provide an air pollution mitigation plan where necessary.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Borough of Broxbourne	N.A.	Existing	Number of planning applications assessed and regulated through AQAs	Reduced vehicle emissions & Emissions from Boilers	Ongoing	Ongoing	N.A.

Borough of Broxbourne

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
7	Require developers to submit construction management plans, for the control of dust associated with excavation, demolition and construction.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Borough of Broxbourne	N.A.	Existing	Number of Construction Management Plans and monitoring requirements included for relevant developments	Reduced emissions of PM10s & PM2.5'S	Ongoing	Ongoing	N.A.
8	Continue to use planning conditions and obligations to require developers to adopt measures which will reduce transport emissions such as requesting travel and business plans, and installing electric vehicle recharging infrastructure.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Borough of Broxbourne	N.A.	Existing	Number of sites with cycle parking facilities. Number of sites with EV charging points. Number of sites with travel plans.	Reduced vehicle emissions associated with developments	Ongoing	Ongoing	N.A.
9	Disseminate up to date information about air quality.	Public Information	Via the Internet	Borough of Broxbourne	N.A.	Annually	Number of visits to Broxbourne's air quality webpages and email and telephone queries.	N.A.	Results of the No2 Diffusion tube network are updated annually on the air quality England website. The diffusion tube results for 2016 and 2017 will be uploaded after the submission of the updated 2017 ASR & 2018 ASR.	Completed Annually	N.A.

Borough of Broxbourne

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
10	Implement "Text Alert" system as a joint project with the "Herts & Beds Air Quality Network"	Public Information	Via other mechanisms	Hertfordshire County Council, Herts and Beds Stakeholders & Borough of Broxbourne	2015	July/August-18	Uptake of public subscribed to the system.	N.A.	The previously planned Text Alert system between Hertfordshire County Council and District Councils was abandoned due to ongoing logistical/ software challenges. However 11 District Councils within the Herts & Beds Air Quality Network decided to award Ricardo a contract to implement an Air Pollution Notification System. Further details will follow within the next ASR.	Ongoing	Software/IT solutions required in order to facilitate the full roll out.

Borough of Broxbourne

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
11	Seek funding for air quality projects from The Department for Transport (DFT)	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	Borough of Broxbourne & DFT	Apr-16	Aug-16	Number of buses retrofitted with Selective Catalytic Reduction Technology.	Reduced vehicle emissions	The Borough of Broxbourne was successful in bidding funds from the DFT'S Clean Bus Technology fund. Green Urban completed the retrofitting low emission technology to an additional three busses belonging to Trustybus based at Waltham Cross in 2017.	Ongoing	Logistical challenges in retrofitting vehicles whilst ensuring minimal disruption of service.
13	Workplace Pool Cars & Working From Home	Promoting Travel Alternatives	Workplace Travel Planning	Borough of Broxbourne	N.A.	Existing	Reduced Traffic volumes within the Borough	Reduced vehicle emissions	The Council has in place a car pool which may be utilised by members of staff, therefore negating the need to drive in to work. A working from home scheme has also been established.	Ongoing	N.A.

Borough of Broxbourne

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
14	Review and update the Council's Website with respect to Air Quality	Public Information	Via the Internet	Borough of Broxbourne	May-2017	October-17	Updated webpages	N.A.	The interactive map on the council's Website was updated in 2017 to include the maps of AQMA's 6 and 7.	November 2017	N.A.
15	Emerging Local Plan	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Borough of Broxbourne	2016	2019	Updated Local Plan & Associated Planning Policies	Reduced vehicle emissions	Further consultation on Broxbourne Borough Council's draft Local Plan took place in 2017.	Ongoing	N.A.
16	Promoting Cycling	Alternatives to private vehicle use	Other	Sustrans & Borough of Broxbourne	N.A.	Existing	Number of visits to Broxbourne's Cycling webpage.	Reduced vehicle emissions	Ongoing- (Routes & Maps for Cycling are periodically produced/updated by Sustrans	Ongoing	N.A.
17	Air Quality Action Plan	Other	Other	Borough of Broxbourne	2016	Sep-17	Updated Air Quality Action Plan	Reduced nitrogen dioxide	Source Apportionment and updated modelling have been applied to AQMAs 1,4,5,6 & 7. The first Steering Group meeting was held in August 2017.	Ongoing	N.A.

Borough of Broxbourne

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
18	Provide comments with respect to Highways England M25, junction 25 improvement scheme	Transport Planning and Infrastructure	Other	Borough of Broxbourne	Jan-17	Feb-17	Views and results were published within the Public Consultation Report which is available on the Highways England website	Reduced emissions of nitrogen dioxide, PM10s & PM2.5'S	Completed	Completed	N.A.
19	Provide comments with respect to the consultation of Defra's "national plan for tackling nitrogen dioxide in our towns and cities"	Other	Other	Borough of Broxbourne	May-17	Jun-17	Summary of responses published online by Defra	Reduced emissions of nitrogen dioxide	Completed	Completed	N.A.
20	Draft AIR QUALITY PLANNING GUIDANCE DOCUMENT (SPD) (to support the Local Plan)	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Borough of Broxbourne	Feb-17	N.A.	Updated Planning Guidance	Reduced emissions of nitrogen dioxide	Ongoing	Ongoing	The SPD requires discussion and feedback with Planning and will be discussed further within the next ASR

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
21	Year of The Environment Initiative, which included promoting environmentally friendly lifestyles and organising initiatives centred around six themes, including Air Quality. (Encouraging residents to walk and cycle rather than drive to reduce pollution and benefit their health and wellbeing)	Promoting Travel Alternatives	Other	Borough of Broxbourne	Oct-16	2017	Number of visits to Broxbourne's Year of the Environment webpage, numbers of email and telephone queries.	Reduced vehicle emissions	Completed	Dec-17	N.A.

Note: The Borough of Broxbourne declared an additional two AQMAs, these being AQMAs 4 and 5 and Extended AQMA 1 in March 2016. A further two AQMAs were declared in May 2017 these being AQMAs 6 and 7. Subsequently Measures will be reviewed and updated, within the Air Quality Action Plan 2017.

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

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

PM_{2.5}s can penetrate deeply into the lung, irritate and corrode the alveolar wall, and consequently impair lung function.

Evidence from urban sites and the limited number of rural background measurement sites indicates that regional (rural) background concentrations make a considerable contribution to the overall mass of PM_{2.5} in urban areas, accounting for around 60-80% of the background concentrations in the major urban areas of southern England⁵.

The main traffic sources of PM_{2.5} are exhaust emissions from diesel vehicles (cars, light goods vehicles and heavy goods vehicles), together with tyre wear, brake wear and road surface abrasion from all vehicles .

Many local authorities do not presently monitor PM_{2.5} concentrations within their local authority area; PM_{2.5} is still not incorporated into LAQM Regulations, and therefore there is no statutory requirement to review and assess PM_{2.5} for LAQM purposes. Whilst an increase in PM_{2.5} monitoring across the UK is desirable given the links to the Public Health Outcomes Framework, it is also recognised that the costs involved can be prohibitive .

The Borough of Broxbourne monitored for PM_{2.5}s at two locations within it's area up to October 2017. Section 3.2.3 includes additional information with respect to PM_{2.5}s.

The Borough of Broxbourne has carried out several measures to improve it's Air Quality as outlined within table 2.2, with some of these measures having an impact upon PM_{2.5}s. However such measures are subject to review and will be updated within the forthcoming Air Quality Action Plan.

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

The Borough of Broxbourne does not operate any AURN sites. The nearest AURN sites are located in Haringey Roadside and London Haringey Priory Park South.

3.1.2 Non-Automatic Monitoring Sites

The Borough of Broxbourne undertook non- automatic (passive) monitoring of nitrogen dioxide at 38 sites during 2017.in Appendix A shows the details of the sites.

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

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, “annualisation” and distance correction. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO₂)

Following on from the expansion of the diffusion tube network in 2016, additional tubes were again added to the network in 2017, in response to the declaration of Air Quality Management Area 6 (Great Cambridge Road (A10)) and Air Quality Management Area 7 (High Road in Wormley (A1170)). The data obtained from these new monitoring locations will enable the Borough of Broxbourne to evaluate the long term impact of it's Air Quality Action Plan. The following sites were therefore added: **BB40** (A10/College Rd Junction, Cheshunt), **BB41** (37 Beltona Gardens, Cheshunt), **BB42** (48 Hobbs Close, Cheshunt), **BB43** (24 Westside, Turnford), **BB44** (High Road/Bell Lane Roundabout Broxbourne), **BB45** (High Road/Station Road Junction, Broxbourne) and **BB46** (High Road/Springfields Junction, Broxbourne).

The 2017 monthly diffusion tube mean values, are provided within Appendix B. The NO₂ diffusion tube monitoring results indicate that the annual mean objective of 40µg/m³ was exceeded at 5 locations. Please see below for a summary of Exceedances.

Exceedance Summary

- **BB05:** Arlington Crescent-Waltham Cross (Adjacent to the M25)-(Hourly & Annual) and within **AQMA 1**
- **BB11:**35 High Street-Waltham Cross -(Annual) and within **AQMA 1**
- **BB21:**36 Eleanor Cross Road- Waltham Cross-(Annual) and within **AQMA 4**
- **BB28:** 214 Cambridge Rd, Cheshunt -(Annual) **AQMA 6**

Table A.3 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³.

Table A.3 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³. Further to the feedback from Defra with respect to the 2017 ASR, results for 2016 and 2016 have also been distance corrected within Table A.3 and B.1.

For diffusion tubes, the full 2017 dataset of monthly mean values is provided in Appendix B.

3.2.2-3.2.3 Particulate Matter (PM₁₀) and (PM_{2.5})

The Borough of Broxbourne does not operate any AURN stations for PM_{2.5} and PM₁₀ concentrations.

The Borough of Broxbourne, received funding from Public Health at Hertfordshire County Council in order to obtain two AQMesh Pods in July 2015. The AQMesh pods are small battery operated air quality monitoring devices which can be set up to monitor several key Air Pollutants. The two pods which were installed received data for PM_{2.5} and PM₁₀ up to September 2017 and were located within **AQMA 4** at Eleanor Cross Road, Waltham Cross and within **AQMA 6** at the junction of College Road/Great Cambridge Road (A10), Cheshunt.

The pods initially received data in October 2015 and analysis of the data up to October 2017, indicated that the PM₁₀ Air Quality objective was not being breached. The PM_{2.5} objective of 25 µg.m⁻³ referenced in the National air quality objectives and the European Directive limit and target values for the protection of human health⁶ have also not been exceeded.

3.2.4 Sulphur Dioxide (SO₂)

No SO₂ monitoring is carried out within the Borough of Broxbourne.

Appendix A: Monitoring Results

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

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
BB01*	Turners Hill, Cheshunt	Roadside	535935	202172	NO ₂	NO	42	4	NO	2.2
BB04	43 Winford Drive Broxbourne	Suburban	536954	206416	NO ₂	NO	5	2	NO	2.3
BB05	Arlington Crescent, Waltham Cross	Roadside	536213	200020	NO ₂	YES	15.5	8	NO	1.6
BB07	Molesworth, Hoddesdon	Suburban	537336	210497	NO ₂	NO	9	1	NO	2.3
BB09	100 Great Cambridge Rd	Roadside	535310	202374	NO ₂	YES	12.4	3.5	NO	2.3
BB10	Teresa Gardens, Waltham Cross	Urban Background	535392	200128	NO ₂	YES	5	69	NO	2.3
BB11	35 High Street, Waltham Cross	Roadside	536051	200090	NO ₂	YES	6.5	7.8	NO	2.3
BB12	15 High Rd, Wormley	Roadside	536608	205769	NO ₂	YES	12.5	2	NO	2.3
BB16	10 Colthurst Gardens	Urban Background	538548	209565	NO ₂	NO	7	1	NO	2.3
BB17*	Parkside, Waltham Cross	Urban Background	536194	200096	NO ₂	YES	7	39	NO	2.3
BB18	20 Mylne Close, Cheshunt	Roadside	535505	203740	NO ₂	NO	8.5	2.5	NO	2.3

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
BB19	Great Stockwood Road	Suburban	532916	204110	NO ₂	NO	11	1.5	NO	2.3
BB20	1 The Chase, Goffs Oak	Suburban	531955	203075	NO ₂	NO	10	0.3	NO	2.3
BB21	36 Eleanor Cross Rd, Waltham Cross	Roadside	536292	200374	NO ₂	YES	5	2	NO	2.3
BB22	Sturlas Way, Waltham Cross	Roadside	535999	200747	NO ₂	YES	3	3	NO	2.3
BB23	Wickes Car Park	Other	536002	200692	NO ₂	YES	13	20	NO	2.4
BB24*	Winston Churchill Way	Roadside	535995	200819	NO ₂	YES	23	3	NO	2.4
BB25	Jones Road, Goffs Oak	Other	531543	200840	NO ₂	YES	68	41	NO	2.3
BB26	Travelodge A10	Roadside	535234	200692	NO ₂	NO	215	4	NO	2.3
BB27	59 College Road, Cheshunt	Roadside	535743	202232	NO ₂	NO	3	1.5	NO	2.3
BB28	214 Cambridge Rd, Cheshunt	Roadside	535448	202959	NO ₂	YES	11.5	3	NO	2.3
BB29	Brookfield Allotments	Roadside	535893	204228	NO ₂	NO	N.A.	2	NO	2.3
BB30	Winnipeg Way, Turnford	Suburban	536014	204820	NO ₂	NO	24	1	NO	2.3
BB31	Wormley Sports Club, Church Lane	Rural	536033	205804	NO ₂	NO	360	68	NO	2.3
BB32	11 Baas Hill Close, Broxbourne	Suburban	536039	206764	NO ₂	NO	14	1	NO	2.3

Borough of Broxbourne

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
BB33	High Leigh Farm, Box Lane	Roadside	536189	208837	NO ₂	NO	22	4	NO	1
BB34	Farm Close, Cheshunt	Roadside	535332	202039	NO ₂	NO	5.8	16	NO	2.3
BB35	86 College Rd, Cheshunt	Roadside	535553	202274	NO ₂	YES	10	3.5	NO	2.3
BB36	Essex Rd at rear of 6 Parrotts Field Hoddesdon	Roadside	537745	209049	NO ₂	NO	15	2	NO	2.4
BB37	Junction of Burford St/Dinant Link Rd	Kerbside	537466	209112	NO ₂	NO	19.5	0.5	NO	2.3
BB38	St Catherines School, Hoddesdon	Urban Centre	537457	208945	NO ₂	NO	19	0.5	NO	2.4
BB39	College Rd/Goffs Churchgate Academy, Cheshunt	Roadside	535107	202160	NO ₂	YES	40.5	1	NO	2.3
BB40	A10/College Rd Junction, Cheshunt	Roadside	535314	202244	NO ₂	YES	6.5	2	NO	2.5
BB41	37 Beltona Gardens, Cheshunt	Suburban	535910	203822	NO ₂	YES	4	17	NO	2.3
BB42	48 Hobbs Close, Cheshunt	Suburban	535516	202989	NO ₂	YES	3	22	NO	2.5
BB43	24 Westside, Turnford	Roadside	536434	205004	NO ₂	YES	11	1.5	NO	2
BB44	High Rd/Bell Lane Roundabout Broxbourne	Roadside	536673	206608	NO ₂	YES	2	8	NO	2

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
BB45	High Rd/Station Rd Junction, Broxbourne	Roadside	536847	207237	NO ₂	YES	5	0.5	NO	2.4
BB46	HighRd/Springfields Junction, Broxbourne	Roadside	536883	207545	NO ₂	YES	5.9	1.3	NO	2

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property & All locations where members of the public might be regularly exposed).

(2) N/A if not applicable.

(3) Sites marked * require relocating closer to relevant exposure.

(4) Necessary updates were made to Distances to Relevant Exposure and to the kerb of nearest road after their review in 2017.

Coordinates updated via <http://gridreferencefinder.com/>

Table A.3 – Annual Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2017 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2013	2014	2015	2016	2017
BB01	Roadside	Diffusion Tube	91.6	91.6	52.2	44.3	41.2	44.8	39.1
BB04	Suburban	Diffusion Tube	100	100	25.3	20.2	23.7	20	18.9
BB05	Roadside	Diffusion Tube	66.6	66.6	79.3	76.7	53.3	60.7	65.6
BB07	Suburban	Diffusion Tube	100	100	22.9	30.9	20	21	20.5
BB09	Roadside	Diffusion Tube	100	100	69.7	75.1	48.5	54.3	50.7
BB10	Urban Background	Diffusion Tube	100	100	32.1	37.9	34.1	34.1	33.7
BB11	Roadside	Diffusion Tube	100	100	74.9	73.1	39.1	43.6	42.4
BB12	Roadside	Diffusion Tube	100	100	53.4	56.8	37.3	40.2	37.9
BB16	Urban Background	Diffusion Tube	100	100	28.5	24.3	20.5	26.2	22.2
BB17	Urban Background	Diffusion Tube	100	100	47.8	53.5	37.6	38.4	38.8
BB18	Roadside	Diffusion Tube	100	100	27.6	28	19.1	20.2	19.6
BB19	Suburban	Diffusion Tube	100	100	26.6	25.2	19.5	20.7	20.5
BB20	Suburban	Diffusion Tube	100	100	25.8	32.6	17	20.7	20.5
BB21	Roadside	Diffusion Tube	100	100	53.7	64	47.7	48.5	48.1
BB22	Roadside	Diffusion Tube	91.6	91.6	49.5	56.1	37.2	41.2	42.6
BB23	Other	Diffusion Tube	100	100	44.7	44.9	28.9	29.5	34.8
BB24	Roadside	Diffusion Tube	100	100	66.1	63.4	43.7	45.4	48
BB25	Other	Diffusion Tube	100	100	N.A.	N.A.	24.3	23.9	25.9

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Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2017 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2013	2014	2015	2016	2017
BB26	Roadside	Diffusion Tube	100	66.6	N.A.	N.A.	32.1	58.1	67.1
BB27	Roadside	Diffusion Tube	100	100	N.A.	N.A.	32.1	37.4	38.6
BB28	Roadside	Diffusion Tube	100	100	N.A.	N.A.	67.3	73.3	71.2
BB29	Roadside	Diffusion Tube	100	100	N.A.	N.A.	47.3	44.7	37.2
BB30	Suburban	Diffusion Tube	100	100	N.A.	N.A.	31.4	27.3	26.9
BB31	Rural	Diffusion Tube	100	100	N.A.	N.A.	23.3	23.4	22
BB32	Suburban	Diffusion Tube	100	100	N.A.	N.A.	26.5	23.8	21.7
BB33	Roadside	Diffusion Tube	100	100	N.A.	N.A.	20.6	19	18.1
BB34	Roadside	Diffusion Tube	100	100	N.A.	N.A.	33.4	36.6	37.7
BB35	Roadside	Diffusion Tube	100	100	N.A.	N.A.	32.6	33.2	36.1
BB36	Roadside	Diffusion Tube	70	58.3	N.A.	N.A.	N.A.	46.8	39.6
BB37	Kerbside	Diffusion Tube	100	100	N.A.	N.A.	N.A.	55	54.2
BB38	Urban Centre	Diffusion Tube	91.6	91.6	N.A.	N.A.	N.A.	23	25.7
BB39	Roadside	Diffusion Tube	100	16.6	N.A.	N.A.	N.A.	N.A.	25.1
BB40	Roadside	Diffusion Tube	100	25	N.A.	N.A.	N.A.	N.A.	42
BB41	Suburban	Diffusion Tube	100	25	N.A.	N.A.	N.A.	N.A.	33.3
BB42	Suburban	Diffusion Tube	100	25	N.A.	N.A.	N.A.	N.A.	32.7
BB43	Roadside	Diffusion Tube	100	25	N.A.	N.A.	N.A.	N.A.	38.1
BB44	Roadside	Diffusion Tube	100	25	N.A.	N.A.	N.A.	N.A.	27
BB45	Roadside	Diffusion Tube	33.3	8.3	N.A.	N.A.	N.A.	N.A.	26
BB46	Roadside	Diffusion Tube	100	25	N.A.	N.A.	N.A.	N.A.	30

- Diffusion tube data has been bias corrected**
- Annualisation has been conducted where data capture is <75%**
- If applicable, all data has been distance corrected for relevant exposure**

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

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

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

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2017

Table B.1 – NO₂ Monthly Diffusion Tube Results - 2017

Site ID	NO ₂ Mean Concentrations (µg/m ³)												Annual Mean		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.89) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
BB01	69.16	49.6	47.24	40.76	37.19	45.4	38.85	35.44	41.9	35.31	42.08	X	43.9	39.1	N.A.*
BB04	43.13	29.96	24.52	17.34	15.56	15.14	14.6	17.56	19.26	23.32	25.33	8.67	21.2	18.9	N.A.
BB05	112.74	100.49	80.53	X	X	106.22	X	X	79.43	65.79	47.24	77.71	83.8	65.6	54.8
BB07	44.09	28.11	21.8	20.27	15.22	16.64	16.04	20.1	20.3	23.73	25.2	25.34	23.1	20.5	N.A.
BB09	88.87	67.68	55.81	44.66	56.68	57.76	55.04	49.88	62.16	48.44	47.31	49.16	57	50.7	37.7
BB10	51.86	48.98	41.98	30.17	26.68	36.96	30.51	35.34	29.74	35.68	40.13	45.99	37.8	33.7	N.A.
BB11	72.72	59.34	47.38	42.24	43.81	53.24	37.61	40.03	45.41	41.11	40.2	48.96	47.7	42.4	40.1
BB12	62.93	50.49	39.18	41.42	32.59	40.27	38	35.85	40.41	46.13	41.68	42.41	42.6	37.9	26.2
BB16	40.73	31.06	27.7	20.49	18.96	16.65	12.45	20.6	23.79	27.92	27.89	30.74	24.9	22.2	N.A.
BB17	62.51	56.76	42.27	39.34	34.07	43.21	36.09	40.47	41.88	42.43	37.95	46.31	43.6	38.8	N.A.*
BB18	36.38	27.92	23.52	16.67	18.02	16.22	18.9	16.51	17.99	22.05	23.19	26.36	22	19.6	N.A.
BB19	41.25	26.12	24.27	19.34	16.68	18.24	18.43	18.91	19.83	24.87	23.12	25.86	23.1	20.5	N.A.
BB20	47.15	28.76	25.89	16.65	15.2	15.68	16.74	18.27	20.1	23.11	24.05	24.3	23	20.5	N.A.
BB21	72.12	66	55.08	49.9	43.13	59.72	47.92	47.89	56.02	47.84	47.16	55.32	54	48.1	40
BB22	72.27	55.08	48.6	45.02	37.9	45.58	39.64	43.45	46.85	X	48.46	43.66	47.9	42.6	39.3

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BB23	63.52	49.67	40.7	35.43	31.57	34.46	28.33	33.25	36.87	35.2	38.62	41.64	39.1	34.8	N.A.
BB24	75.03	59.22	57.55	47.79	39.95	53.63	43.09	46.94	49.74	48.34	70.36	55.68	53.9	48	N.A.*
BB25	38.38	38.03	32.86	25.81	16	25.81	25.13	26.15	29.45	30.95	25.76	35.3	29.1	25.9	N.A.
BB26	95.32	83.53	69.21	73.82	55.56	77.7	56.94	62.59	X	X	X	X	71.8	<u>67.1</u>	N.A.*
BB27	71.56	52.49	45.54	39.12	33.52	42.02	32.98	34.9	42.02	40.75	42.23	42.9	43.3	38.6	32.9
BB28	107.35	88.15	71.48	87.48	70.71	93.42	70.55	71.99	83.46	63.42	70.73	81.02	80	<u>71.2</u>	49.2
BB29	55.84	50.19	42.04	38.25	39.9	42.64	36.43	36.08	40.7	36.8	40.04	43.32	41.9	37.2	N.A.*
BB30	46.64	41.65	35.16	25.81	22.26	22.21	23.53	25.38	28.51	27.53	26.69	36.88	30.2	26.9	N.A.
BB31	39.43	29.67	27.59	21.85	19.07	18.21	16.38	21.91	21.95	23.87	27.81	29.51	24.8	22	N.A.
BB32	48.66	31.35	25.37	19.62	17.17	17.43	16.74	13.52	23.07	23.52	27.76	28.58	24.4	21.7	N.A.
BB33	37.12	23.85	22.5	16.52	15.36	15.48	15.24	17.3	17.02	18	22.7	23.17	20.4	18.1	N.A.
BB34	58.39	47.44	43.69	39.44	32.48	36.32	35.54	39.82	41.93	44.21	43.4	45.55	42.4	37.7	34.8
BB35	69.03	48.74	40.75	34.64	31.5	37.63	34.26	34.02	35.56	37.05	42.79	40.97	40.6	36.1	29.2
BB36	X	X	51.42	35.92	24.61	X	37.27	38.35	41.68	X	43.55	X	39	39.6	27.3
BB37	91.71	67.6	60.15	55.7	43.92	62.62	59.78	51.41	63.37	57.99	70.53	46.89	61	54.2	28.7
BB38	47.94	33.18	X	25.33	21.89	19.65	20.4	22.46	25.96	28.42	35.36	37.55	28.9	25.7	N.A.
BB39	X	X	X	X	X	X	X	X	X	X	34.32	38.1	36.2	25.1	N.A.
BB40	X	X	X	X	X	X	X	X	X	X	47.1	69.45	49.97	55.5	42
BB41	X	X	X	X	X	X	X	X	X	38.54	43.84	49.61	44	33.3	N.A.
BB42	X	X	X	X	X	X	X	X	X	38.18	46.6	44.89	43.2	32.7	N.A.
BB43	X	X	X	X	X	X	X	X	X	44.86	39.66	50.13	44.9	34	N.A.
BB44	X	X	X	X	X	X	X	X	X	31.08	38.38	37.49	35.7	27	N.A.
BB45	X	X	X	X	X	X	X	X	X	X	X	34.41	34.4	26	N.A.
BB46	X	X	X	X	X	X	X	X	X	35.81	43.24	40.05	39.7	30	N.A.

- Local bias adjustment factor used
- National bias adjustment factor used
- Annualisation has been conducted where data capture is <75%

Notes:

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

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

(1) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure.

(3) The diffusion tube result for BB22 in October was 7.86 µg/m³, which when compared to other results in 2017 appears to be spurious. Therefore this result has not been included.

(4) BB36 was originally located behind 100 Stortford Road, on Essex Road, however this tube was moved to the rear of 6 Parrots Field in March 2017 as was not representative of relevant exposure.

(5) Sites marked * were not distance corrected for the following reasons- BB01 & BB17 did not have similar elevations with respect to measuring horizontally from the kerb, whereas the receptor at BB24 was more than 20m further from the kerb than the diffusion tube. These sites have since been relocated which will be discussed within the next ASR. BB26 was decommissioned in September 2017 as was not representative of relevant exposure. BB29 was designated to provide baseline data, in anticipation of the Brookfield Development, as such there is no relevant exposure within 50m of this site.

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

In 2017 the Diffusion tubes were supplied and analysed Gradko International Ltd. The preparation method used is 20% TEA in water. The laboratory follows the procedures set out within the Practical Guidance.

2017 Bias Adjustment Figure = 0.89

National Diffusion Tube Bias Adjustment Factor Spreadsheet							Spreadsheet Version Number: 03/18				
Follow the steps below in the correct order to show the results of relevant co-location studies										This spreadsheet will be updated at the end of June 2018	
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods										LAQM Helpdesk Website	
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet											
This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.											
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.							Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.				
Step 1:		Step 2:	Step 3:	Step 4:							
Select the Laboratory that Analyses Your Tubes from the Drop-Down List		Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor ³ shown in blue at the foot of the final column.							
If a laboratory is not shown, we have no data for this laboratory.		If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data	If you have your own co-location study then see footnote ⁴ . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953							
Analysed By ¹		Method <small>To make your selection, choose All from the pop-up list</small>	Year ² <small>To make your selection, choose All</small>	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m ³)	Automatic Monitor Mean Conc. (Cm) (µg/m ³)	Bias (B)	Tube Precision ⁵	Bias Adjustment Factor (A) (Cm/Dm)
Gradko		20% TEA in water	2017	R	Gateshead Council	12	36	37	-2.7%	G	1.03
Gradko		20% TEA in water	2017	R	Gateshead Council	12	29	25	17.5%	G	0.85
Gradko		20% TEA in water	2017	R	Gateshead Council	12	34	35	-5.3%	G	1.06
Gradko		20% TEA in water	2017	R	LB Hounslow	12	65	54	22.2%	G	0.82
Gradko		20% TEA in water	2017	R	LB Hounslow	12	53	53	10.6%	G	0.90
Gradko		20% TEA in water	2017	B	LB Hounslow	11	28	30	-6.0%	G	1.06
Gradko		20% TEA in water	2017	R	LB Hounslow	11	43	34	28.8%	G	0.78
Gradko		20% TEA in water	2017	B	LB Hounslow	9	38	33	14.3%	G	0.87
Gradko		20% TEA in water	2017	R	LB Hounslow	11	52	42	24.4%	G	0.80
Gradko		20% TEA in water	2017	UB	Liverpool	11	20	17	15.2%	G	0.87
Gradko		20% TEA in water	2017	R	North Ayrshire Council	12	26	21	23.2%	G	0.81
Gradko		20% TEA in water	2017	R	South Gloucestershire Council	12	25	23	10.3%	G	0.91
Gradko		20% TEA in water	2017	KS	Marylebone Road Intercomparison	12	101	79	28.6%	G	0.78
Gradko		20% TEA in water	2017		Overall Factor³ (34 studies)				Use		0.89

Annualisation

Monitoring locations BB05, BB26, BB36 and BB39 to BB46 had fewer than 9 months' worth of data, so were therefore subject to annualisation. The tubes were annualised following the Example within Box 7.10 on page 7-56 of Defra's Technical Guidance (TG16) February 2018. After annualisation, the tubes were corrected for bias.

28 Arlington Crescent, Waltham Cross

Start Date	End Date	B1 (Am)	BB305	B1 when BB05 is available (Pm)
4 th January	1 st February	52.86	112.74	52.86
1 st February	1 st March	32.02	100.49	32.02
1 st March	29 th March	27.43	80.53	27.43
29 th March	26 th April	22.54	X	X
26 th April	31 st May	20.51	X	X
31 st May	28 th June	17.94	106.22	17.94
28 th June	2 nd August	16.83	X	X
2 nd August	30 th August	21.15	X	X
30 th August	27 th September	24.19	79.43	24.19
27 th September	1 st November	27.20	65.79	27.20
1 st November	6 th December	38.09	47.24	38.09
6 th December	3 rd January 18	32.56	77.71	32.56
Average		27.8	83.8	31.5

(Am/Pm) = 0.88 Therefore $83.8 \times 0.88 = 73.7$

Bias Adjustment = $73.7 \times 0.89 = 65.6$

Travelodge (A10), Cheshunt

Start Date	End Date	B1 (Am)	BB26	B1 when BB26 is available (Pm)
4 th January	1 st February	52.86	95.32	52.86
1 st February	1 st March	32.02	83.53	32.02
1 st March	29 th March	27.43	69.21	27.43
29 th March	26 th April	22.54	73.82	22.54
26 th April	31 st May	20.51	55.56	20.51
31 st May	28 th June	17.94	77.7	17.94
28 th June	2 nd August	16.83	56.94	16.83
2 nd August	30 th August	21.15	62.59	21.15
30 th August	27 th September	24.19	X	X
27 th September	1 st November	27.20	X	X
1 st November	6 th December	38.09	X	X
6 th December	3 rd January 18	32.56	X	X
Average		27.8	71.8	26.4

(Am/Pm) = 1.05 Therefore $71.8 \times 1.05 = 75.4$

Bias Adjustment = $75.4 \times 0.89 = 67.1$

Essex Road at the rear of 6 Parrotts Field, Hoddesdon

Start Date	End Date	B1 (Am)	BB36	B1 when BB36 is available (Pm)
4 th January	1 st February	52.86	X	X
1 st February	1 st March	32.02	X	X
1 st March	29 th March	27.43	51.42	27.43
29 th March	26 th April	22.54	35.92	22.54
26 th April	31 st May	20.51	24.61	20.51
31 st May	28 th June	17.94	X	X
28 th June	2 nd August	16.83	37.27	16.83
2 nd August	30 th August	21.15	38.35	21.15
30 th August	27 th September	24.19	41.68	24.19
27 th September	1 st November	27.20	X	X
1 st November	6 th December	38.09	43.55	38.09
6 th December	3 rd January 18	32.56	X	X
Average		27.8	39	24.4

(Am/Pm) = 1.14 Therefore $39 \times 1.14 = 44.5$

Bias Adjustment = $44.5 \times 0.89 = 39.6$

College Rd/Goffs Churchgate Academy, Cheshunt

Start Date	End Date	B1 (Am)	BB39	B1 when BB39 is available (Pm)
4 th January	1 st February	52.86	X	X
1 st February	1 st March	32.02	X	X
1 st March	29 th March	27.43	X	X
29 th March	26 th April	22.54	X	X
26 th April	31 st May	20.51	X	X
31 st May	28 th June	17.94	X	X
28 th June	2 nd August	16.83	X	X
2 nd August	30 th August	21.15	X	X
30 th August	27 th September	24.19	X	X
27 th September	1 st November	27.20	X	X
1 st November	6 th December	38.09	34.32	38.09
6 th December	3 rd January 18	32.56	38.1	32.56
Average		27.8	36.2	35.3

(Am/Pm) = 0.79 Therefore $36.2 \times 0.79 = 28.6$

Bias Adjustment = $28.6 \times 0.89 = 25.5$

A10/College Rd Junction, Cheshunt

Start Date	End Date	B1 (Am)	BB40	B1 when BB40 is available (Pm)
4 th January	1 st February	52.86	X	X
1 st February	1 st March	32.02	X	X
1 st March	29 th March	27.43	X	X
29 th March	26 th April	22.54	X	X
26 th April	31 st May	20.51	X	X
31 st May	28 th June	17.94	X	X
28 th June	2 nd August	16.83	X	X
2 nd August	30 th August	21.15	X	X
30 th August	27 th September	24.19	X	X
27 th September	1 st November	27.20	47.1	27.20
1 st November	6 th December	38.09	69.45	38.09
6 th December	3 rd January 18	32.56	49.97	32.56
Average		27.8	55.5	32.6

(Am/Pm) = 0.85 Therefore $55.5 \times 0.85 = 47.2$

Bias Adjustment = $47.2 \times 0.89 = 42$

37 Beltona Gardens, Cheshunt

Start Date	End Date	B1 (Am)	BB41	B1 when BB41 is available (Pm)
4 th January	1 st February	52.86	X	X
1 st February	1 st March	32.02	X	X
1 st March	29 th March	27.43	X	X
29 th March	26 th April	22.54	X	X
26 th April	31 st May	20.51	X	X
31 st May	28 th June	17.94	X	X
28 th June	2 nd August	16.83	X	X
2 nd August	30 th August	21.15	X	X
30 th August	27 th September	24.19	X	X
27 th September	1 st November	27.20	38.54	27.20
1 st November	6 th December	38.09	43.84	38.09
6 th December	3 rd January 18	32.56	49.61	32.56
Average		27.8	44	32.6

(Am/Pm) = 0.85 Therefore $44 \times 0.85 = 37.4$

Bias Adjustment = $37.4 \times 0.89 = 33.3$

48 Hobbs Close, Cheshunt

Start Date	End Date	B1 (Am)	BB42	B1 when BB42 is available (Pm)
4 th January	1 st February	52.86	X	X
1 st February	1 st March	32.02	X	X
1 st March	29 th March	27.43	X	X
29 th March	26 th April	22.54	X	X
26 th April	31 st May	20.51	X	X
31 st May	28 th June	17.94	X	X
28 th June	2 nd August	16.83	X	X
2 nd August	30 th August	21.15	X	X
30 th August	27 th September	24.19	X	X
27 th September	1 st November	27.20	38.18	27.20
1 st November	6 th December	38.09	46.6	38.09
6 th December	3 rd January 18	32.56	44.89	32.56
Average		27.8	43.2	32.6

(Am/Pm) = 0.85 Therefore $43.2 \times 0.85 = 36.7$

Bias Adjustment = $36.7 \times 0.89 = 32.7$

24 Westside, Turnford

Start Date	End Date	B1 (Am)	BB43	B1 when BB43 is available (Pm)
4 th January	1 st February	52.86	X	X
1 st February	1 st March	32.02	X	X
1 st March	29 th March	27.43	X	X
29 th March	26 th April	22.54	X	X
26 th April	31 st May	20.51	X	X
31 st May	28 th June	17.94	X	X
28 th June	2 nd August	16.83	X	X
2 nd August	30 th August	21.15	X	X
30 th August	27 th September	24.19	X	X
27 th September	1 st November	27.20	44.86	27.20
1 st November	6 th December	38.09	39.66	38.09
6 th December	3 rd January 18	32.56	50.13	32.56
Average		27.8	44.9	32.6

(Am/Pm) = 0.85 Therefore $44.9 \times 0.85 = 38.2$

Bias Adjustment = $38.2 \times 0.89 = 34$

High Rd/Bell Lane Roundabout (163 High Rd) Broxbourne

Start Date	End Date	B1 (Am)	BB44	B1 when BB44 is available (Pm)
4 th January	1 st February	52.86	X	X
1 st February	1 st March	32.02	X	X
1 st March	29 th March	27.43	X	X
29 th March	26 th April	22.54	X	X
26 th April	31 st May	20.51	X	X
31 st May	28 th June	17.94	X	X
28 th June	2 nd August	16.83	X	X
2 nd August	30 th August	21.15	X	X
30 th August	27 th September	24.19	X	X
27 th September	1 st November	27.20	31.08	27.20
1 st November	6 th December	38.09	38.38	38.09
6 th December	3 rd January 18	32.56	37.49	32.56
Average		27.8	35.7	32.6

(Am/Pm) = 0.85 Therefore $35.7 \times 0.85 = 30.3$

Bias Adjustment = $30.3 \times 0.89 = 27$

High Rd/Station Rd Junction, Broxbourne

Start Date	End Date	B1 (Am)	BB45	B1 when BB45 is available (Pm)
4 th January	1 st February	52.86	X	X
1 st February	1 st March	32.02	X	X
1 st March	29 th March	27.43	X	X
29 th March	26 th April	22.54	X	X
26 th April	31 st May	20.51	X	X
31 st May	28 th June	17.94	X	X
28 th June	2 nd August	16.83	X	X
2 nd August	30 th August	21.15	X	X
30 th August	27 th September	24.19	X	X
27 th September	1 st November	27.20	X	X
1 st November	6 th December	38.09	X	X
6 th December	3 rd January 18	32.56	34.41	32.56
Average		27.8	34.4	32.6

(Am/Pm) = 0.85 Therefore $34.4 \times 0.85 = 29.2$

Bias Adjustment = $29.2 \times 0.89 = 26$

High Rd/Springfields Junction, Broxbourne



Start Date	End Date	B1 (Am)	BB46	B1 when BB46 is available (Pm)
4 th January	1 st February	52.86	X	X
1 st February	1 st March	32.02	X	X
1 st March	29 th March	27.43	X	X
29 th March	26 th April	22.54	X	X
26 th April	31 st May	20.51	X	X
31 st May	28 th June	17.94	X	X
28 th June	2 nd August	16.83	X	X
2 nd August	30 th August	21.15	X	X
30 th August	27 th September	24.19	X	X
27 th September	1 st November	27.20	35.81	27.20
1 st November	6 th December	38.09	43.24	38.09
6 th December	3 rd January 18	32.56	40.05	32.56
Average		27.8	39.7	32.6

(Am/Pm) = 0.85 Therefore $39.7 \times 0.85 = 33.7$

Bias Adjustment = $33.7 \times 0.89 = 30$

Distance Correction (2017)



TUBE 6: 28 Arlington Crescent, WX, EN8 7RN (BB05)

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	8	metres
Step 2	How far from the KERB is your receptor (in metres)?	16	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	20.5	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	65.6	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	54.8	µg/m ³



TUBE 5: 100 Great Cambridge Road, Cheshunt, EN8 9ES. (BB09)

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	3.5	metres
Step 2	How far from the KERB is your receptor (in metres)?	14.7	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	17.2	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	50.7	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	37.7	µg/m ³



TUBE 8: 35 High Street, WX, EN8 7AB. (BB11)

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	7.8	metres
Step 2	How far from the KERB is your receptor (in metres)?	10.6	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	20.5	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	42.4	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	40.1	µg/m ³



TUBE 4: 15 High Road, Wormley, EN10 6HT. (BB12)

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	2	metres
Step 2	How far from the KERB is your receptor (in metres)?	15.5	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	13.5	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	37.92	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	26.2	µg/m ³



TUBE 12: Eleanor Cross Road, WX, EN8 7LD (BB21)

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	2	metres
Step 2	How far from the KERB is your receptor (in metres)?	7	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	20.5	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	48.1	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	40.0	µg/m ³



TUBE 9: Sturlas Way, WX, EN8 7BF. (BB22)

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	3	metres
Step 2	How far from the KERB is your receptor (in metres)?	6	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	24.4	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	42.6	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	39.3	µg/m ³



TUBE 20: 59 College Road, Cheshunt EN8 9LS (BB27)

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	1.5	metres
Step 2	How far from the KERB is your receptor (in metres)?	5	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	17.2	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	38.6	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	32.9	µg/m ³



TUBE 21: 214 Great Cambridge Road, Cheshunt, EN8 0NB. (BB28)

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	3	metres
Step 2	How far from the KERB is your receptor (in metres)?	14.5	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	17.2	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	71.2	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	49.2	µg/m ³



TUBE 27: Farm Close, Cheshunt, EN8 8PD (BB34)

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	16	metres
Step 2	How far from the KERB is your receptor (in metres)?	21.8	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	17.2	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	37.7	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	34.8	µg/m ³



TUBE 28: 86 College Road, Cheshunt EN8 9NN (BB35)

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	3.5	metres
Step 2	How far from the KERB is your receptor (in metres)?	13.5	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	17.2	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	36.1	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	29.2	µg/m ³



Tube 29: Essex Rd, behind 6 Parrots Field, Hoddesdon (BB36)

Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	2	metres
Step 2	How far from the KERB is your receptor (in metres)?	17	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	15.1	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	39.6	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	27.3	µg/m ³



TUBE 30: Junction of Burford Street/Dinant Link Road, Hoddesdon. (BB37)

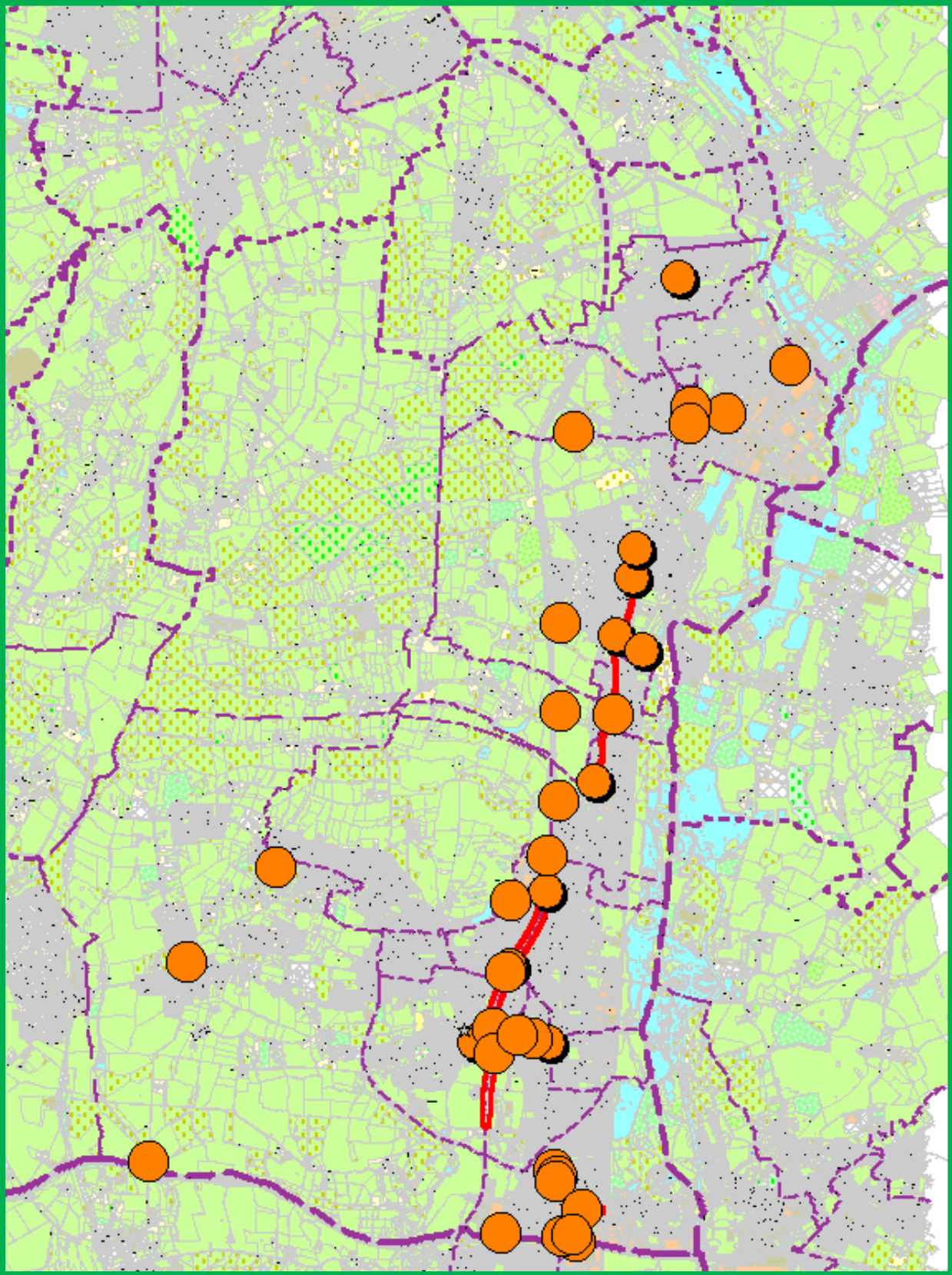
Enter data into the red cells

Step 1	How far from the KERB was your measurement made (in metres)?	0.5	metres
Step 2	How far from the KERB is your receptor (in metres)?	20	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	15.1	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	54.2	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	28.7	µg/m ³

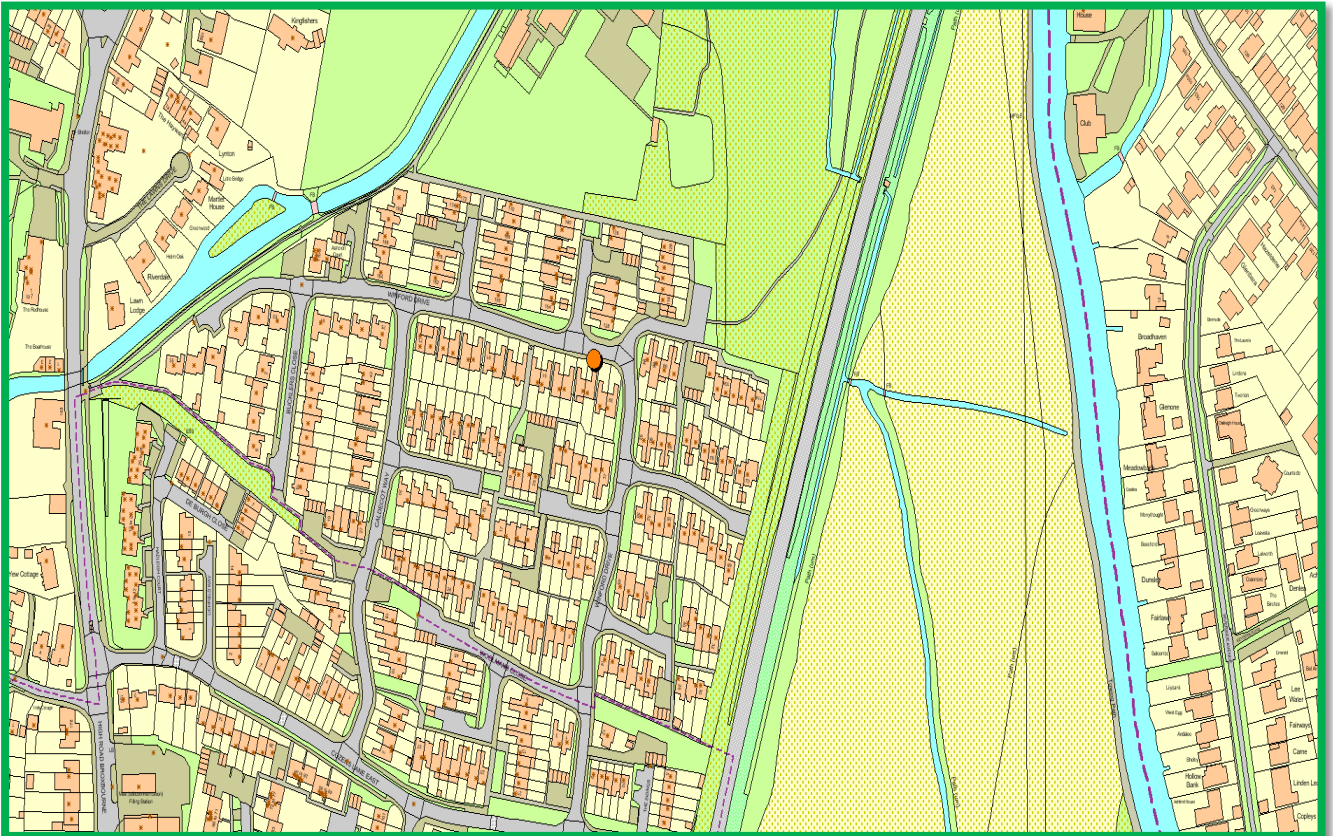
TUBE 19:A10/College Rd Junction, Cheshunt. (BB40)

 BUREAU VERITAS			
<u>Enter data into the red cells</u>			
Step 1	How far from the KERB was your measurement made (in metres)?	2	metres
Step 2	How far from the KERB is your receptor (in metres)?	8	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	17.2	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	42	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	33.9	µg/m ³

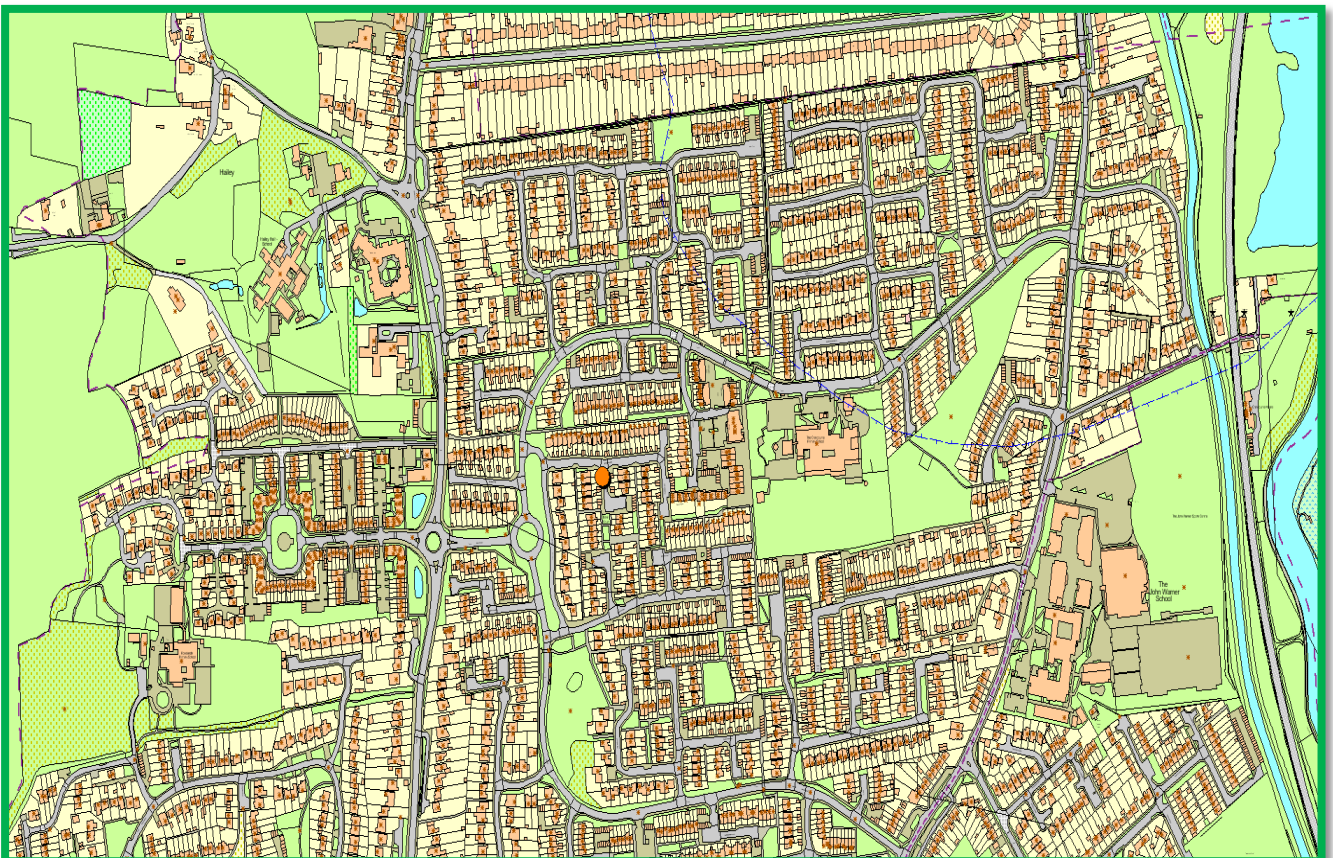
Appendix D: Map(s) of Monitoring Locations



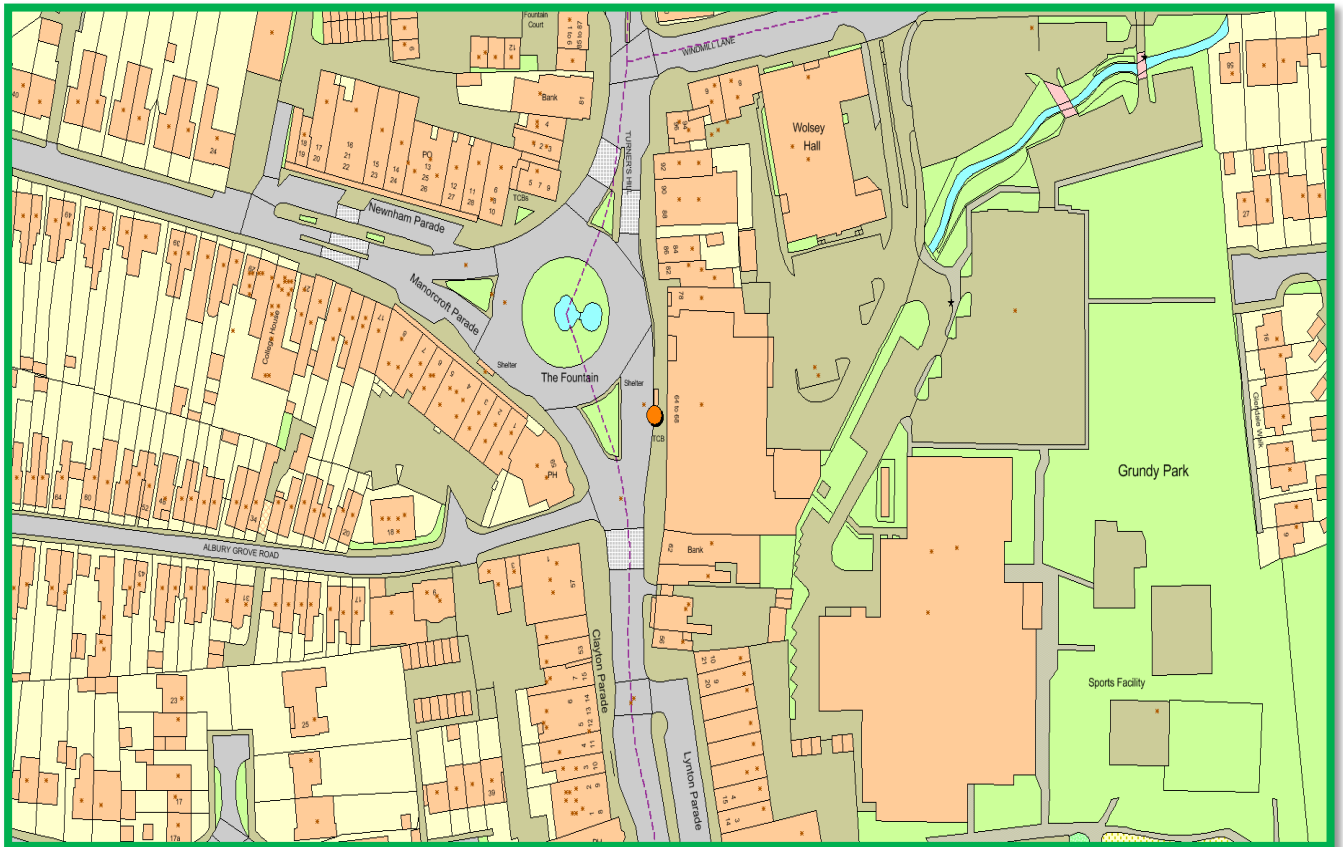
TUBE 1: 43 Winford Drive, Broxbourne, EN10 6PL. (BB04)



TUBE 2: 2 Molesworth, Hoddesdon. (BB07)



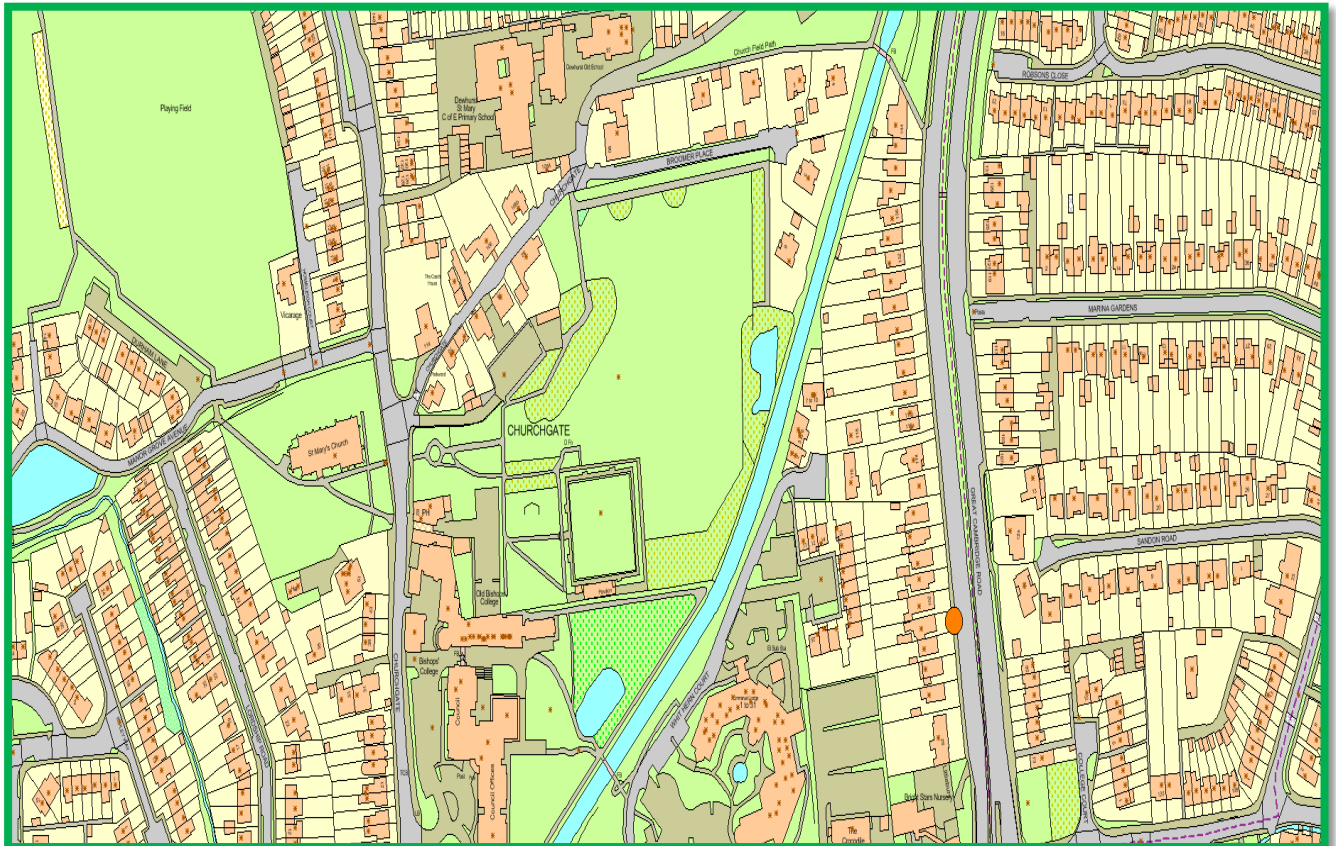
TUBE 3: Turners Hill, Cheshunt, EN8 8LQ. (BB01)



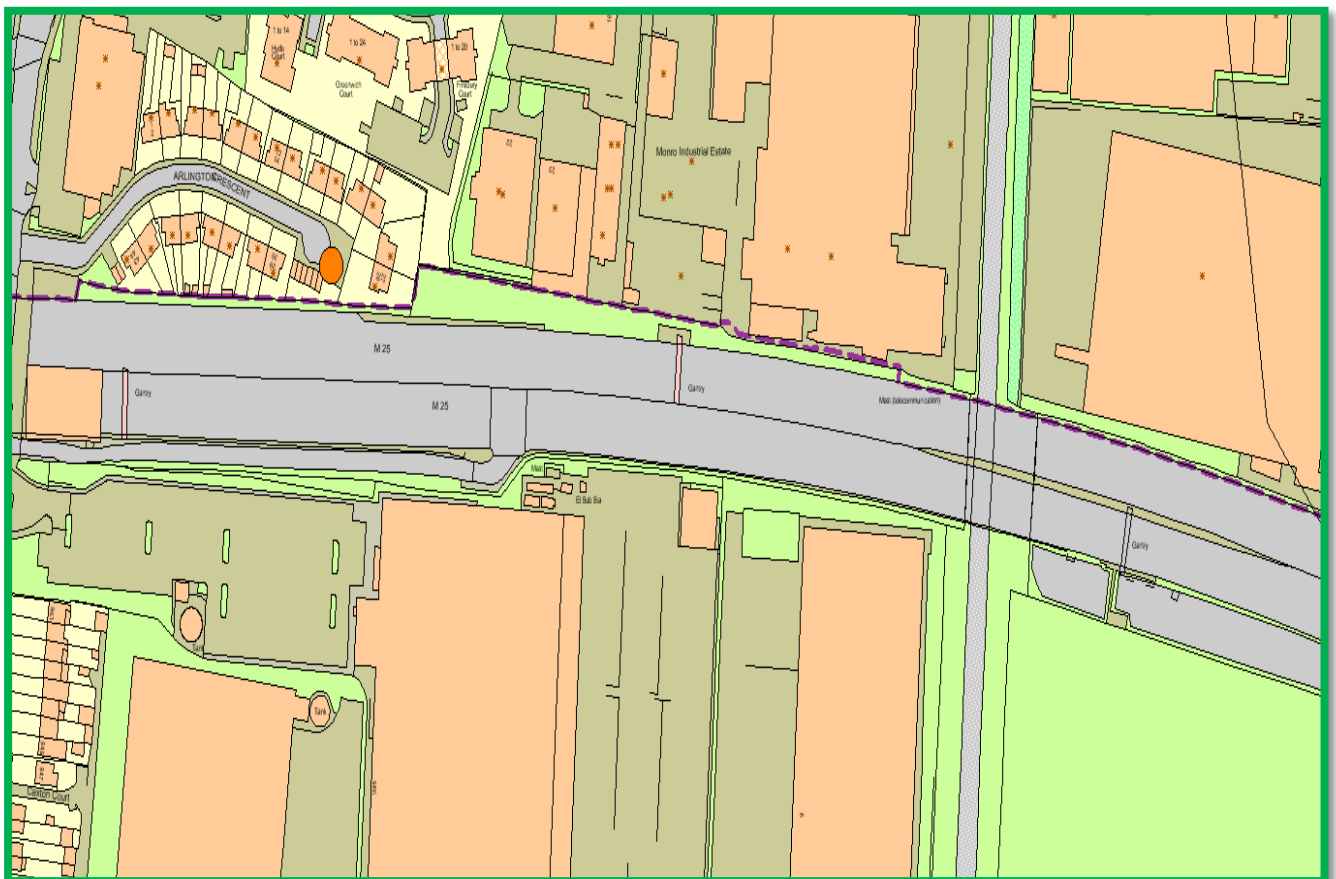
TUBE 4: 15 High Road, Wormley, EN10 6HT. (BB12)



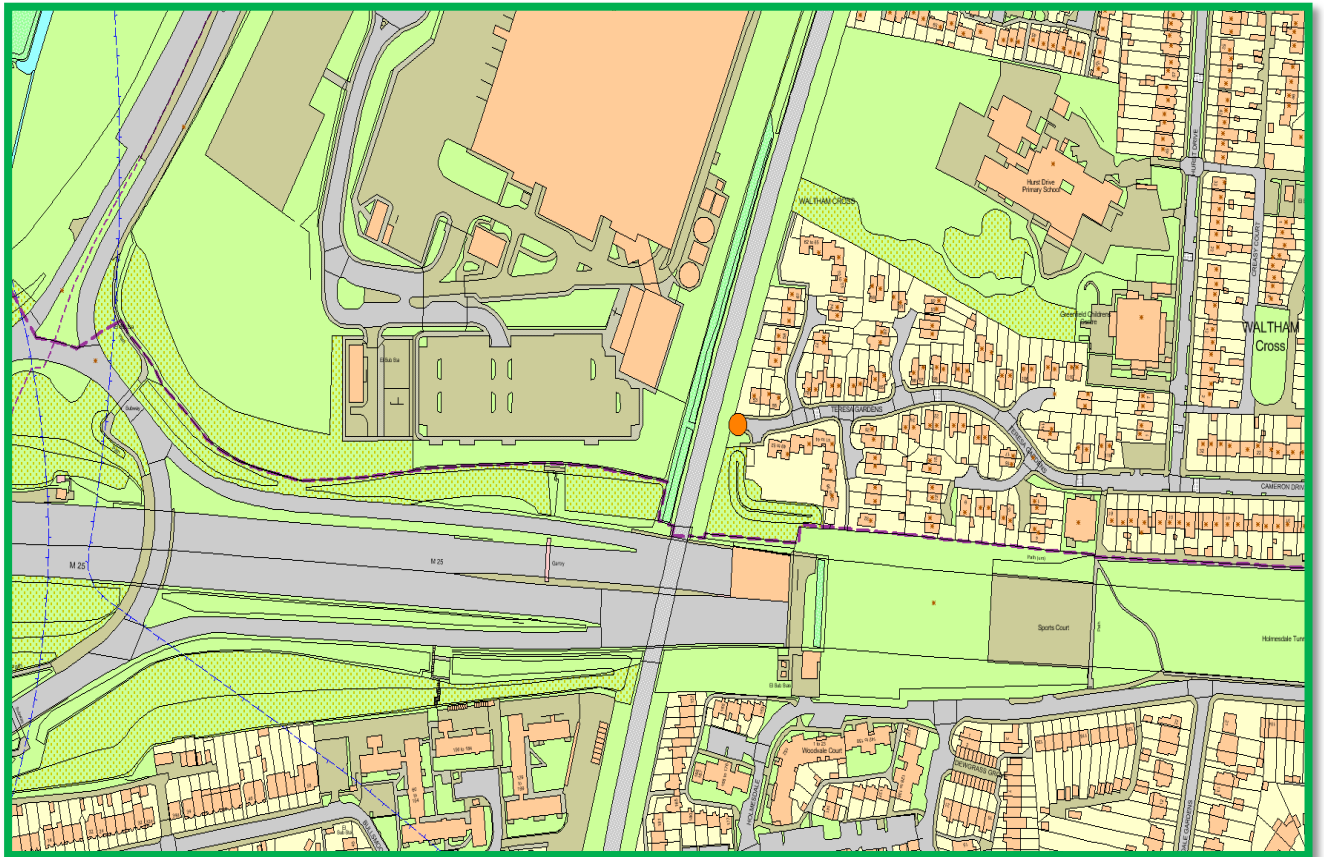
TUBE 5: 100 Great Cambridge Road, Cheshunt, EN8 9ES. (BB09)



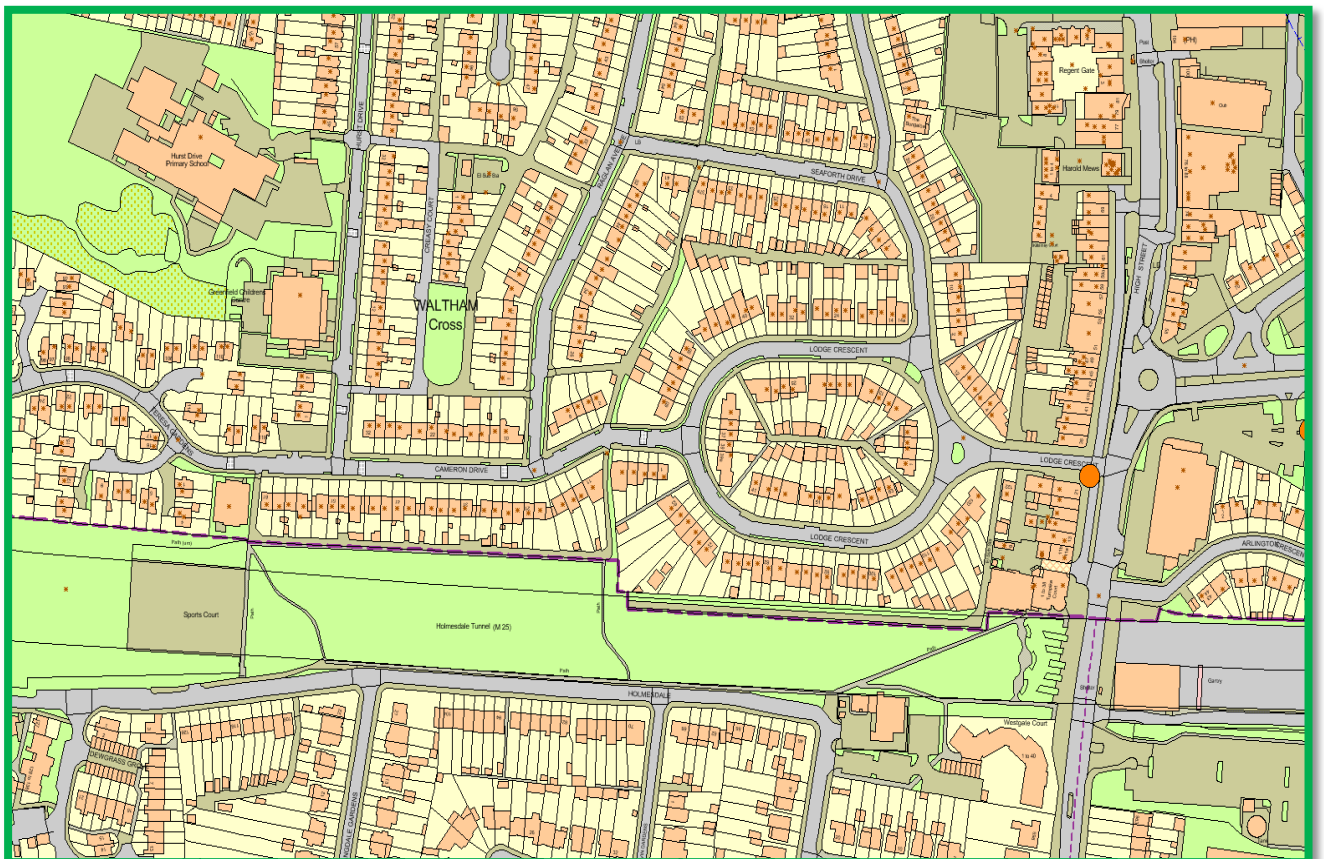
TUBE 6: 28 Arlington Crescent, WX, EN8 7RN (BB05)



TUBE 7: 53 Teresa gardens, WX, EN8 8EG. (BB10)



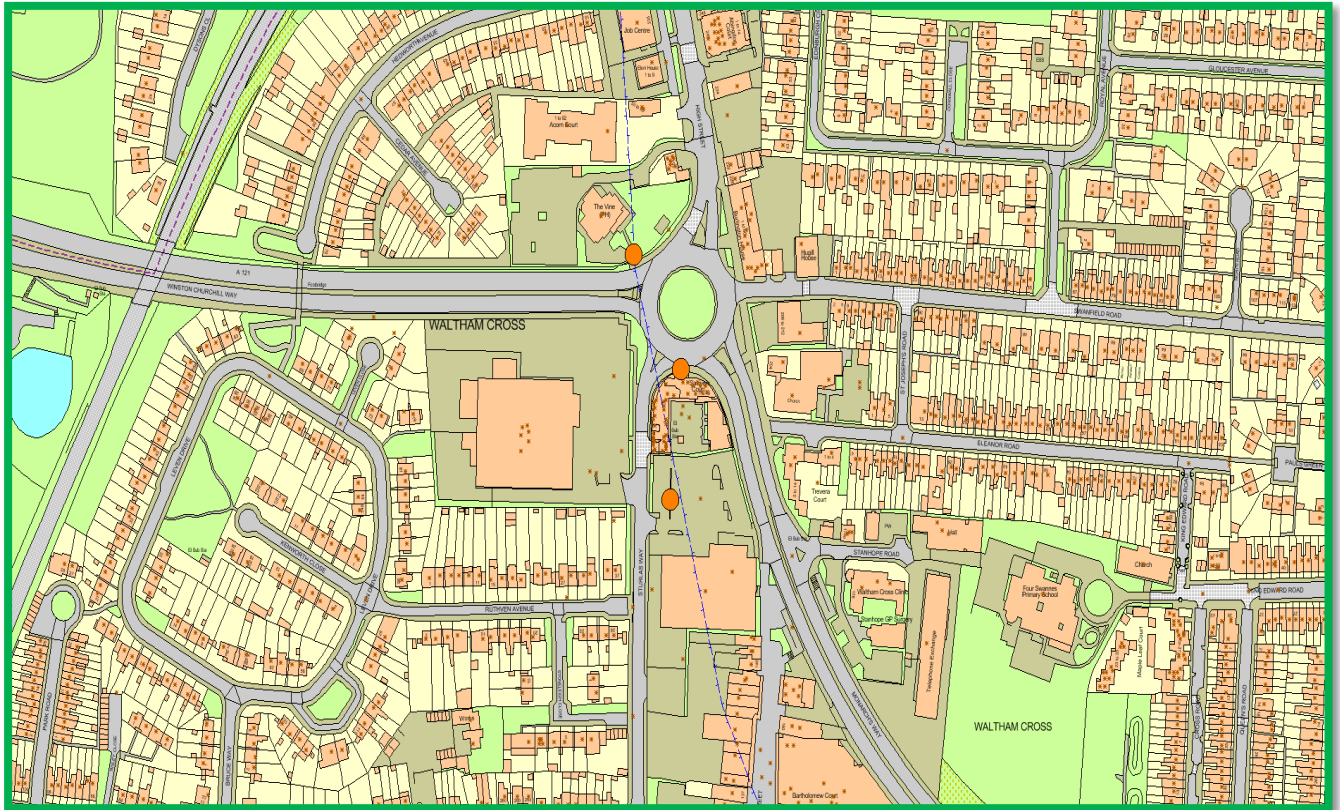
TUBE 8: 35 High Street, WX, EN8 7AB. (BB11)



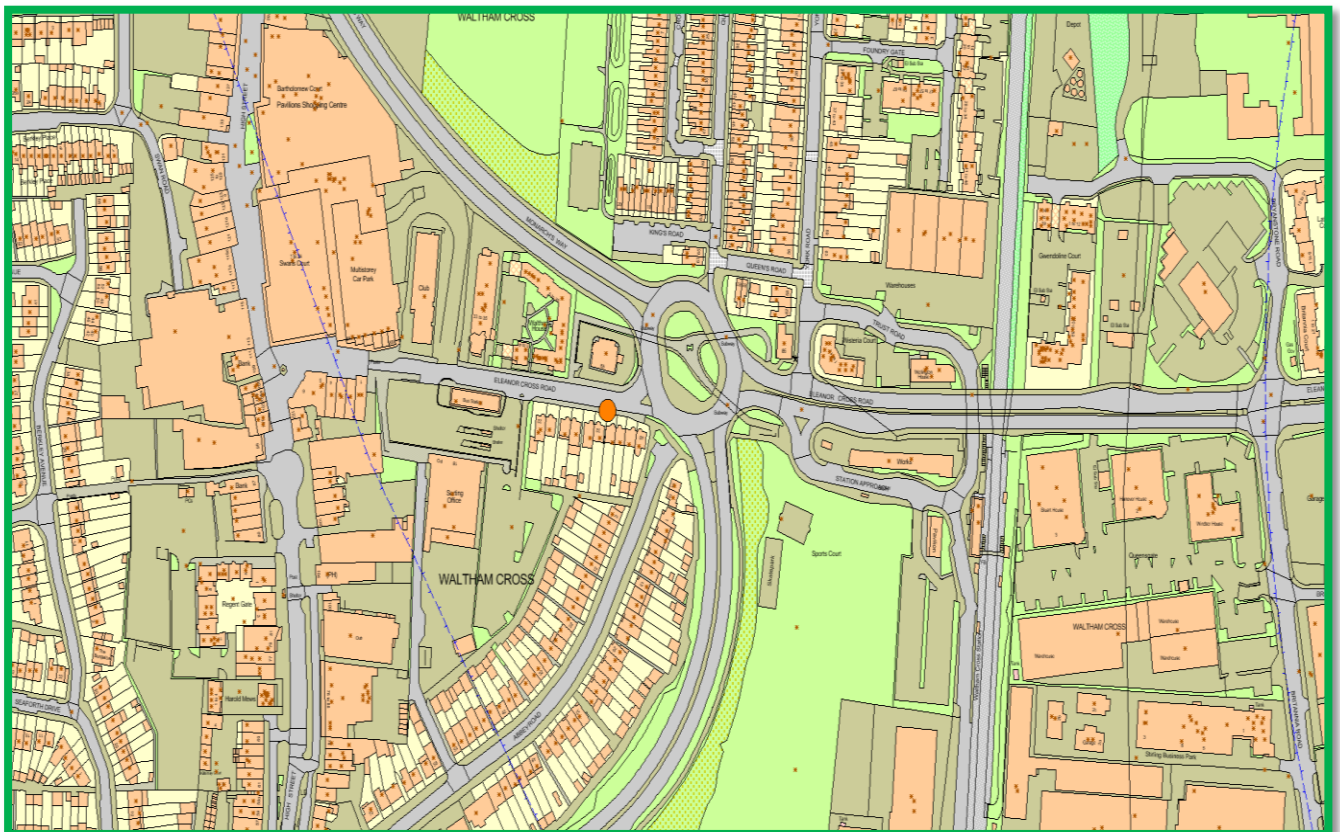
TUBE 9 (MIDDLE): Sturlas Way, WX, EN8 7BF. (BB22)

TUBE 10 (BOTTOM): Wicks car park, WX, EN8 7BF. (BB23)

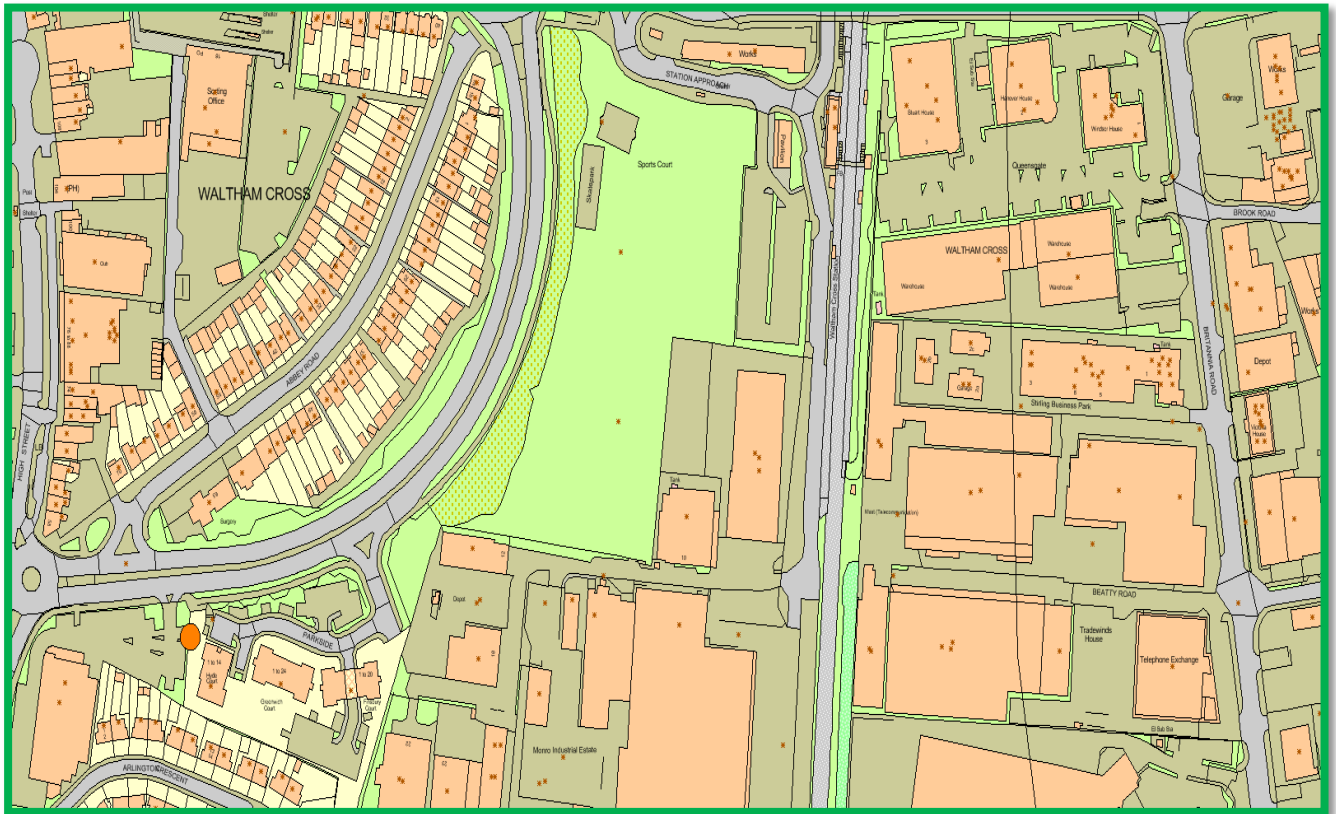
TUBE 11 (TOP): Winston Churchill Way, WX, EN8 7BF. (BB24)



TUBE 12: Eleanor Cross Road, WX, EN8 7LD (BB21)



TUBE 13: Parkside, Waltham Cross, EN8 7TH (BB17)



TUBE 14: Great Stockwood Road, EN7 (BB19)



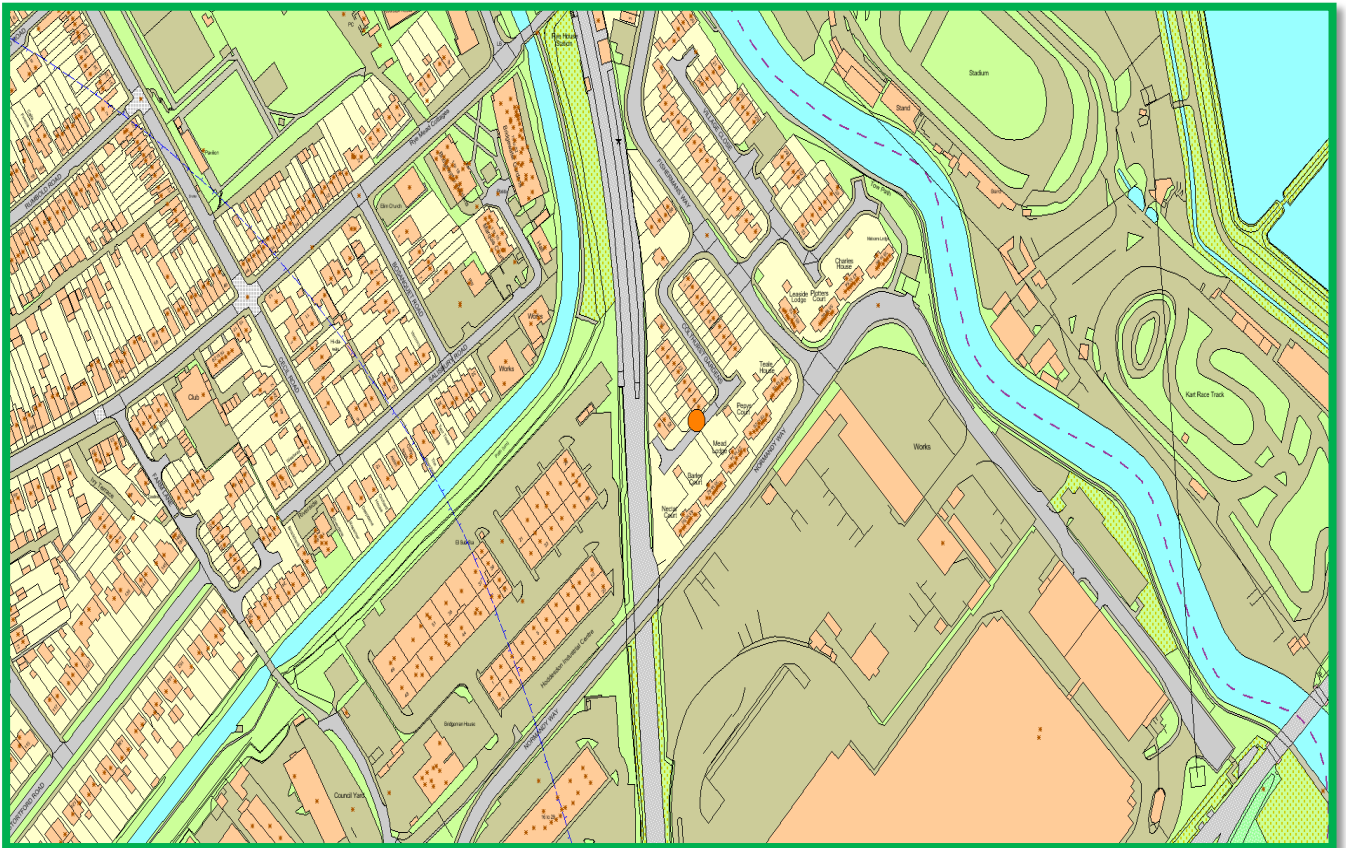
TUBE 15: 1 The Chase, Goffs Oak, EN7 9PB (BB20)



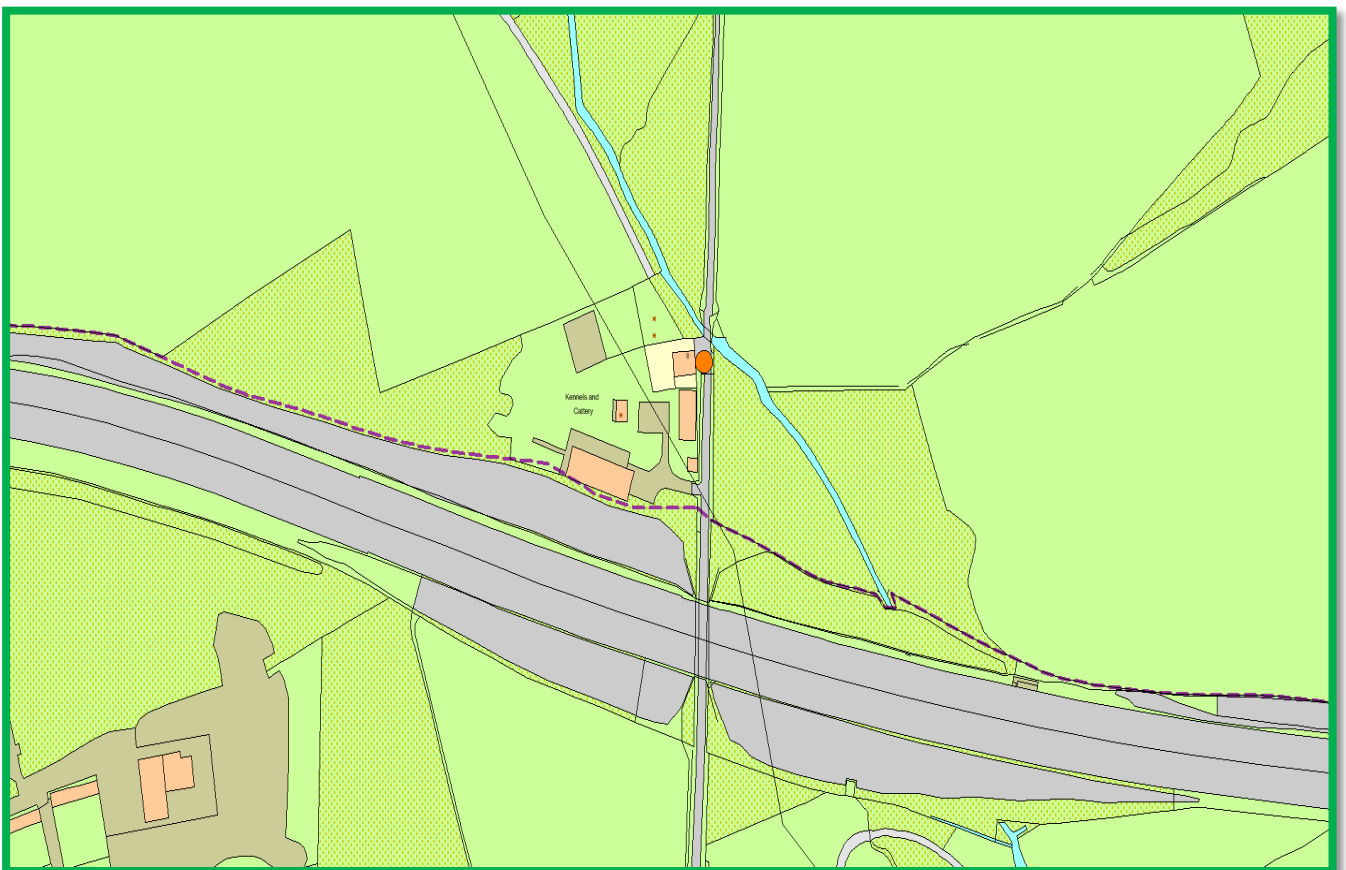
TUBE 16: 20 Mylne Close, Cheshunt, EN8 OPS. (BB18)



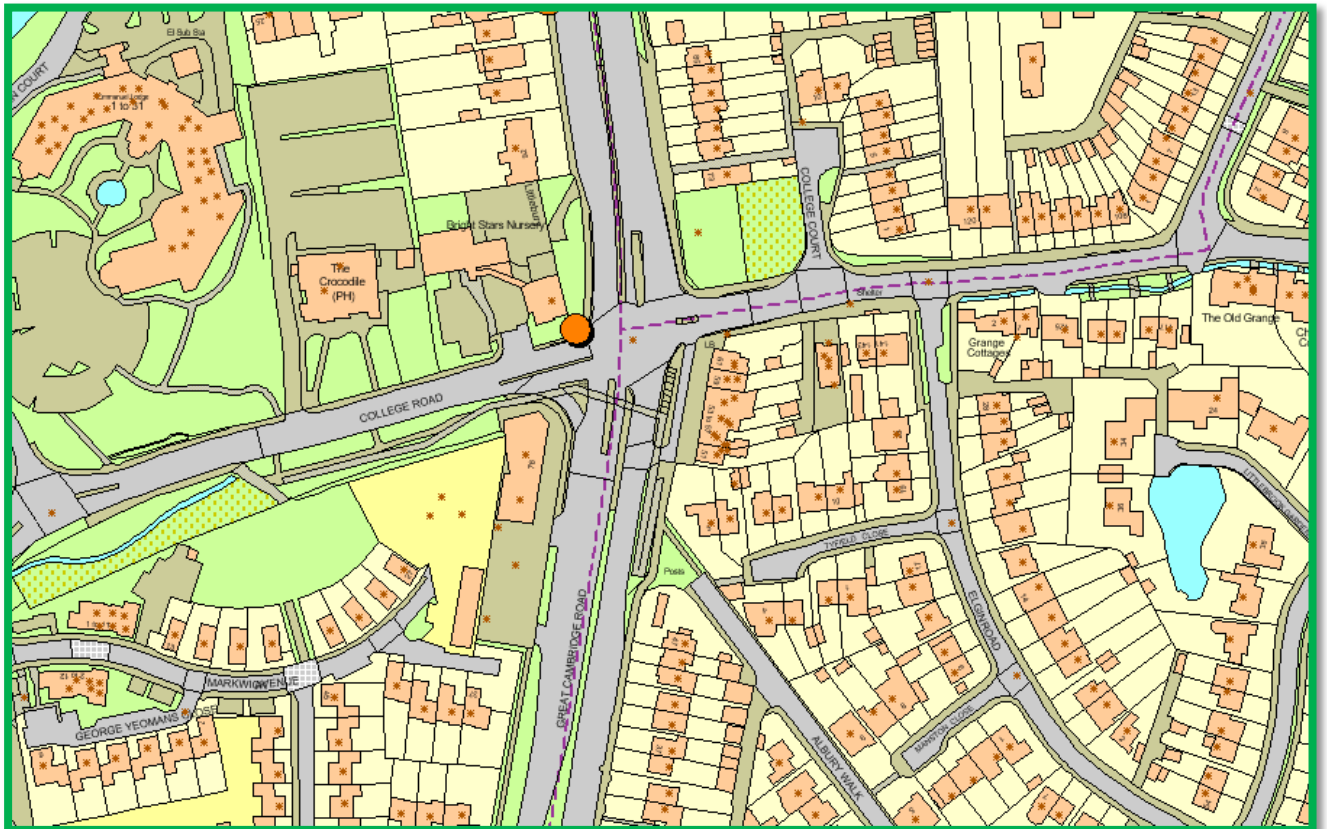
TUBE 17: 10 Colthurst Gardens, Hoddesdon, EN11 0GA. (BB16)



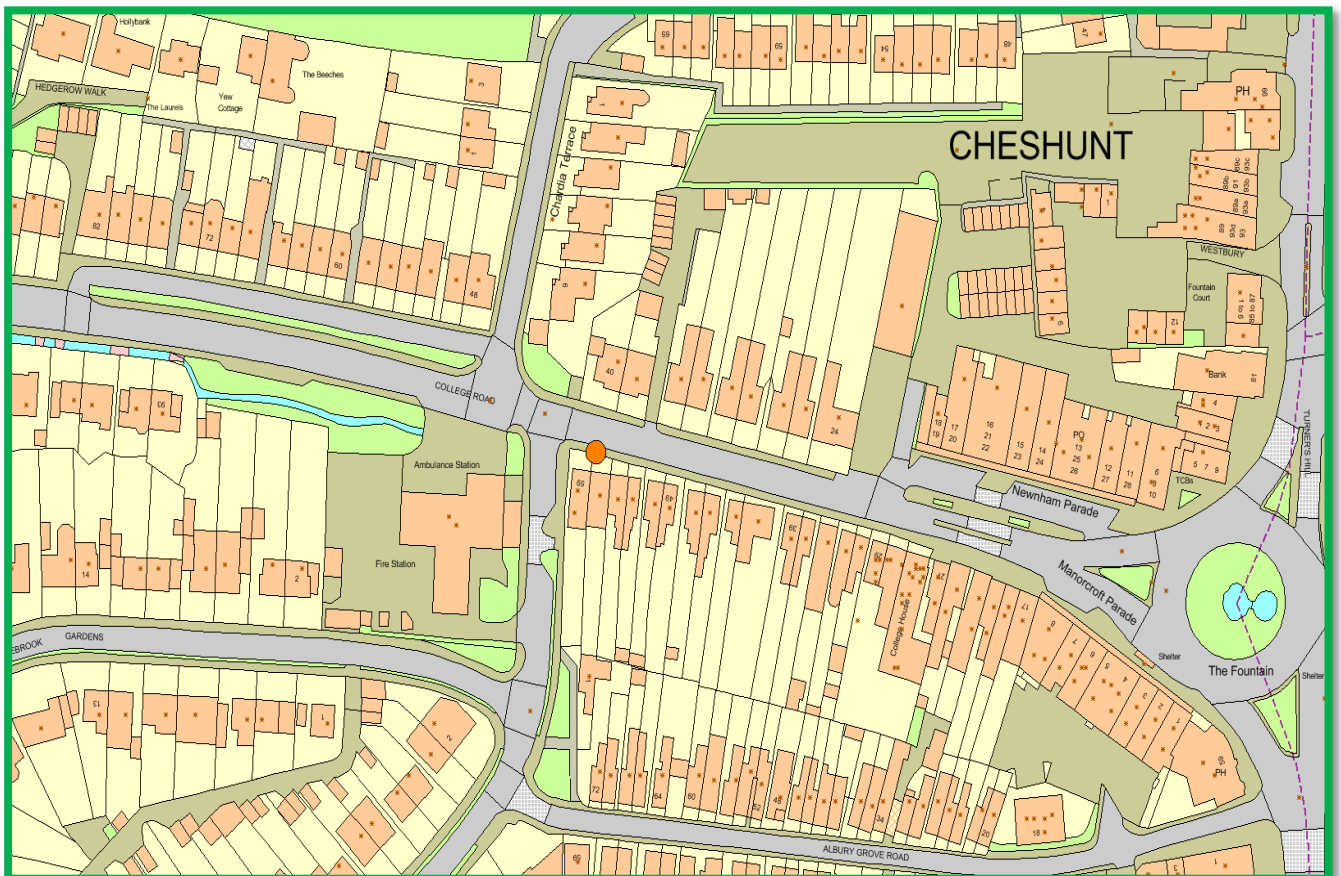
TUBE 18: Jones Road, EN7 5JB (BB25)



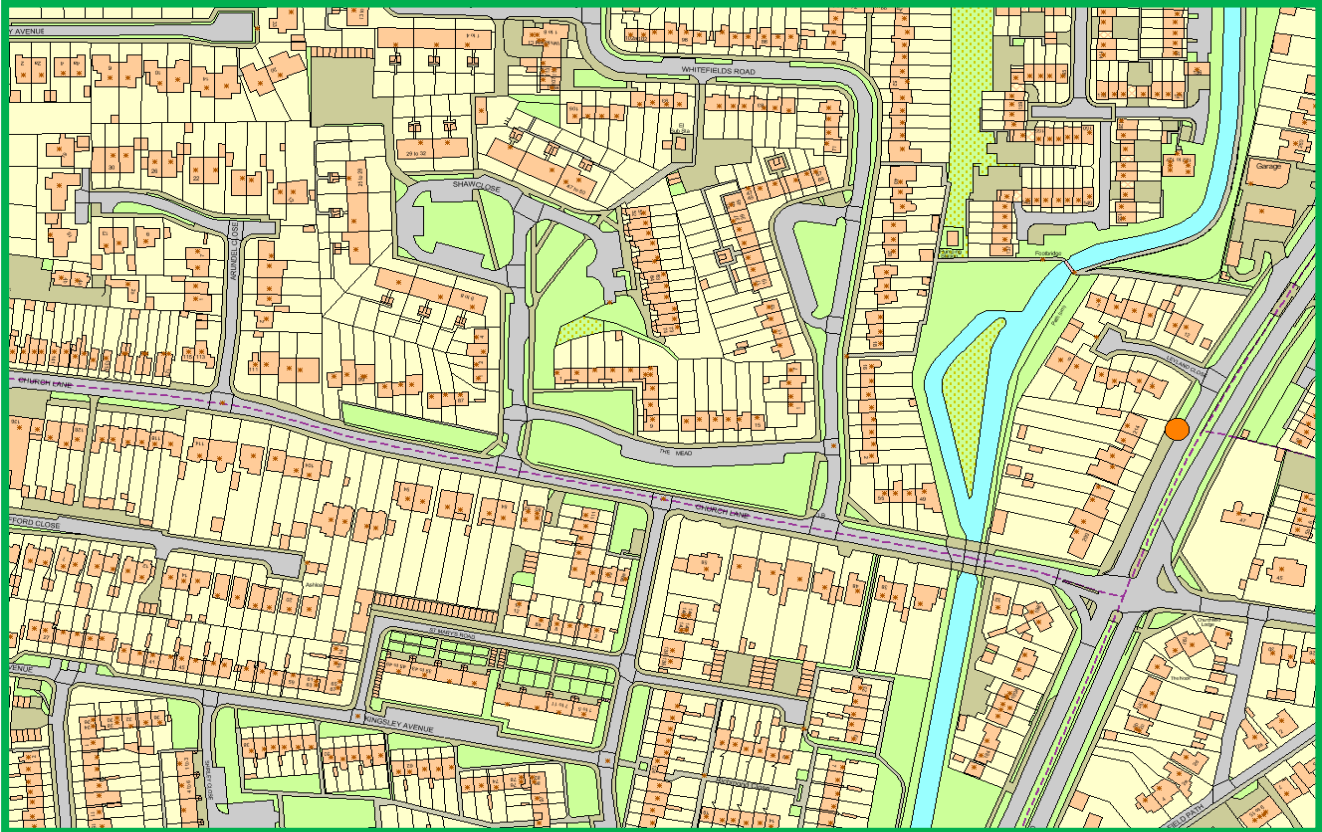
TUBE 19: A10/College Rd Junction, Cheshunt. (BB40)



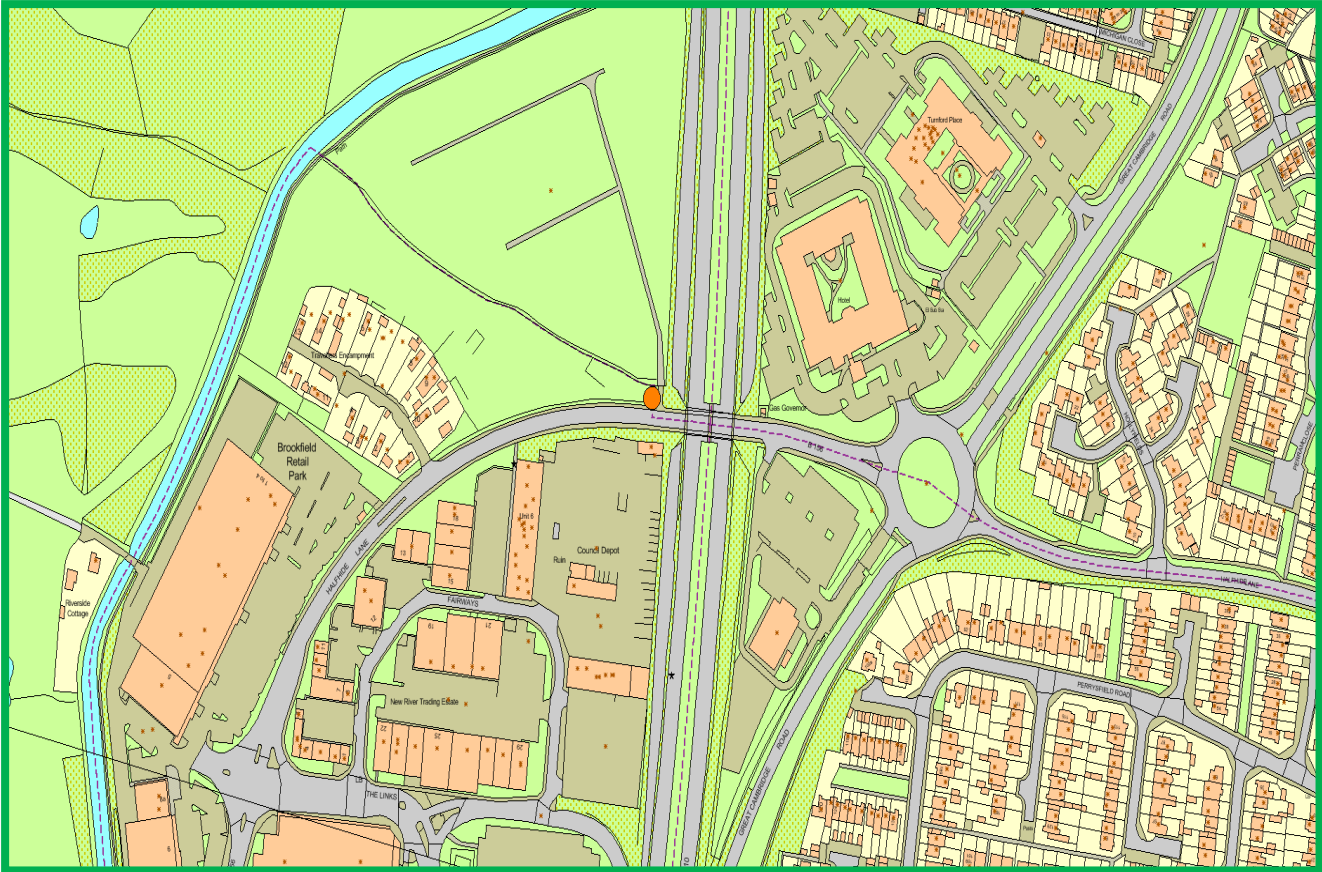
TUBE 20: 59 College Road, Cheshunt EN8 9LS (BB27)



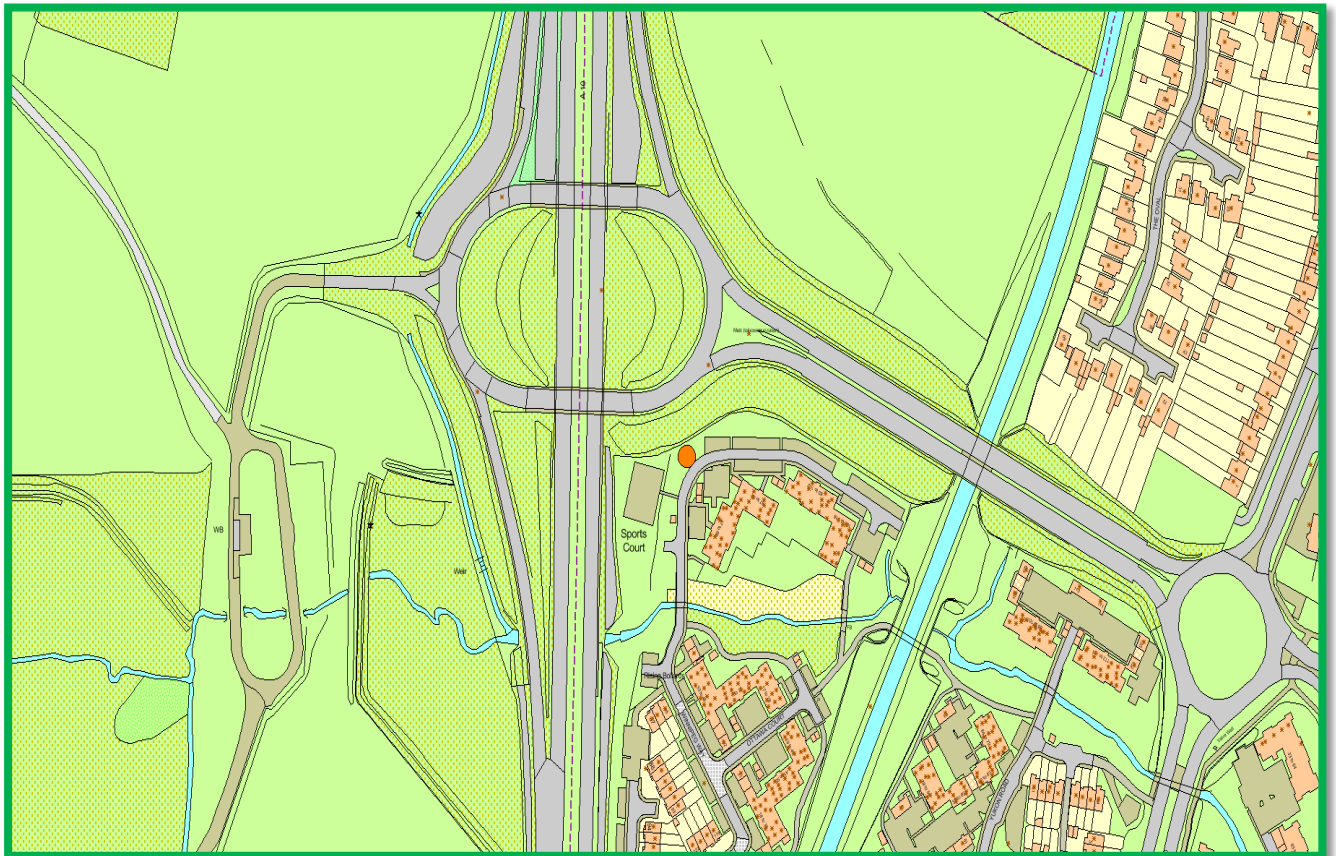
TUBE 21: 214 Great Cambridge Road, Cheshunt, EN8 0NB. (BB28)



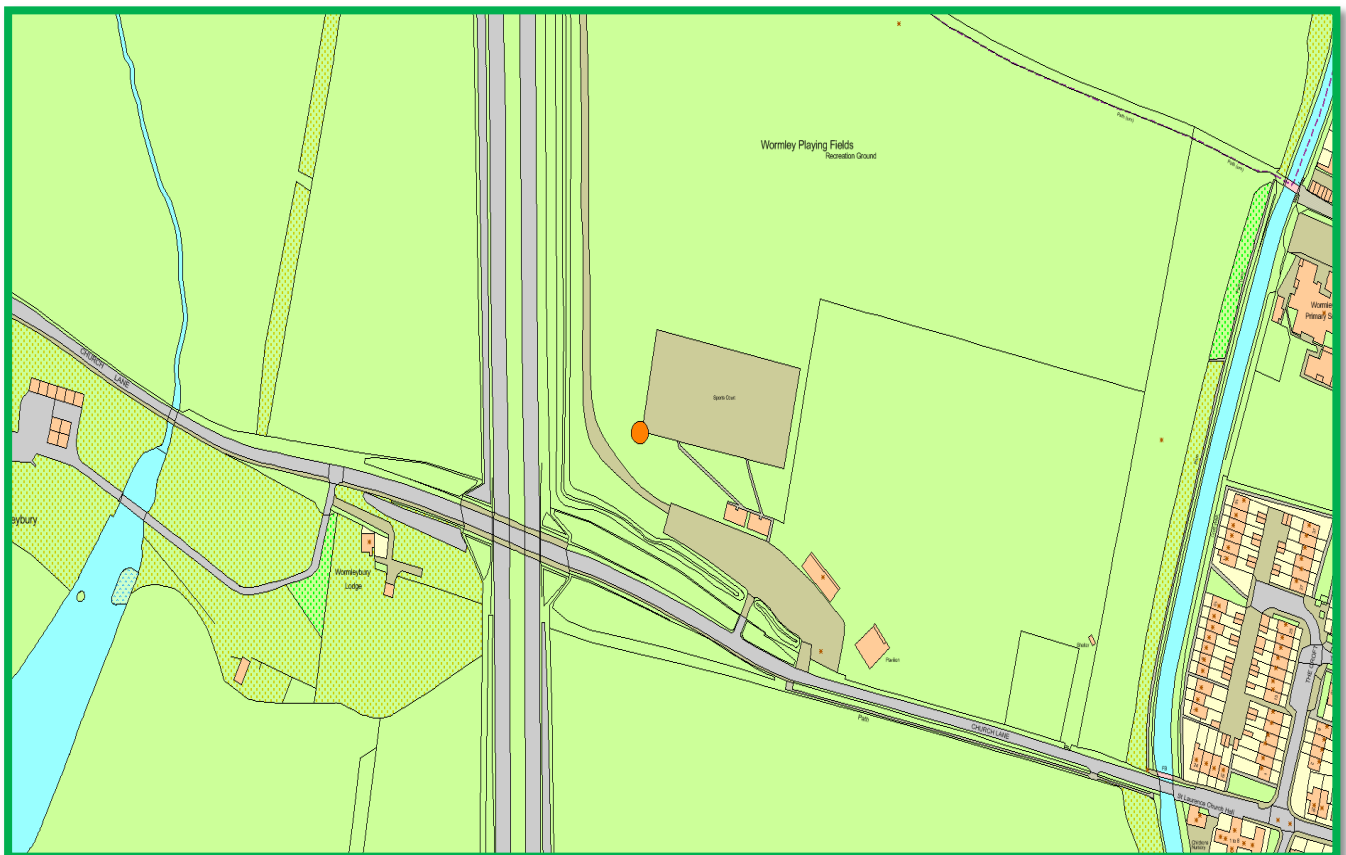
TUBE 22: Brookfield Allotments/Halfhide Lane EN8 0NL. (BB29)



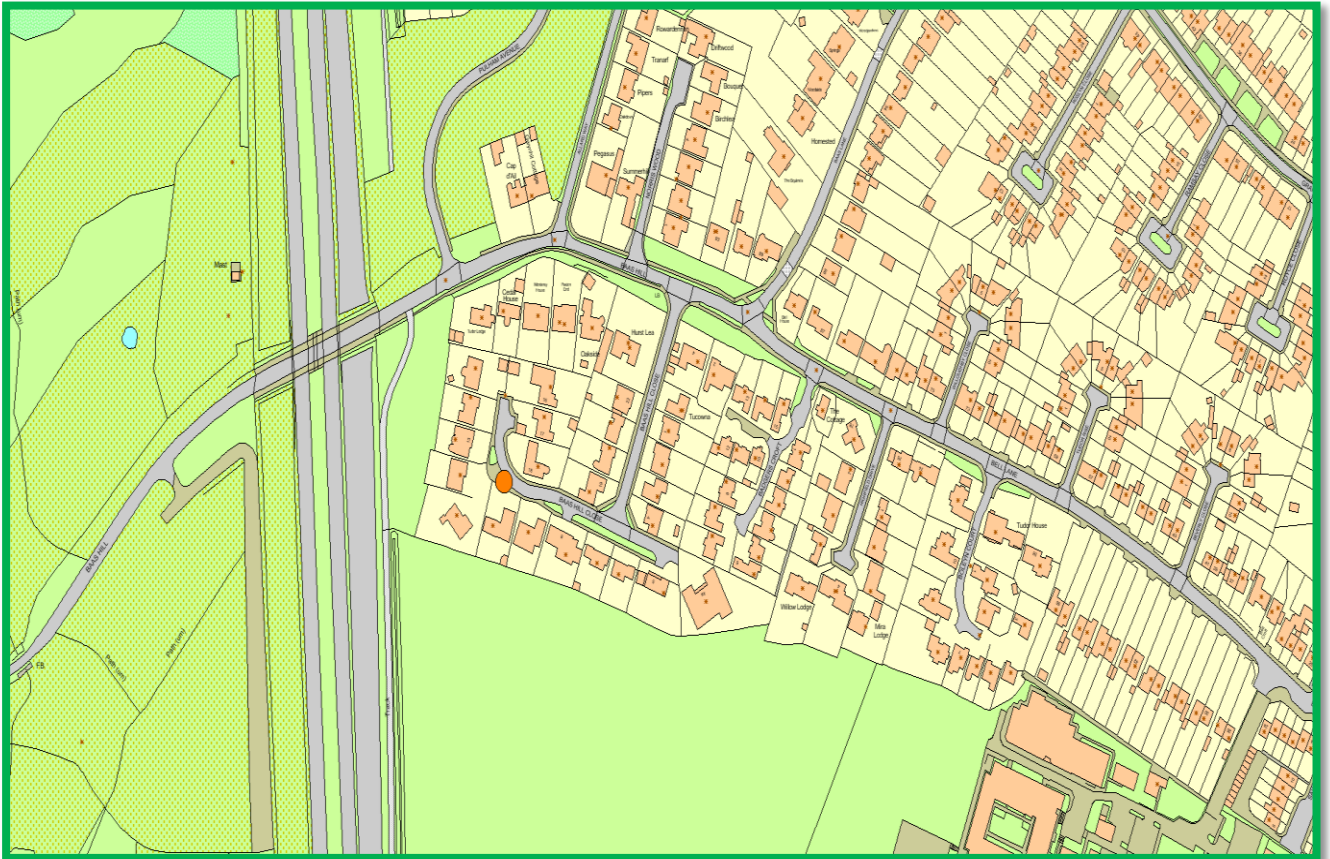
TUBE 23: Winnipeg Way, Turnford, EN10 6FH. (BB30)



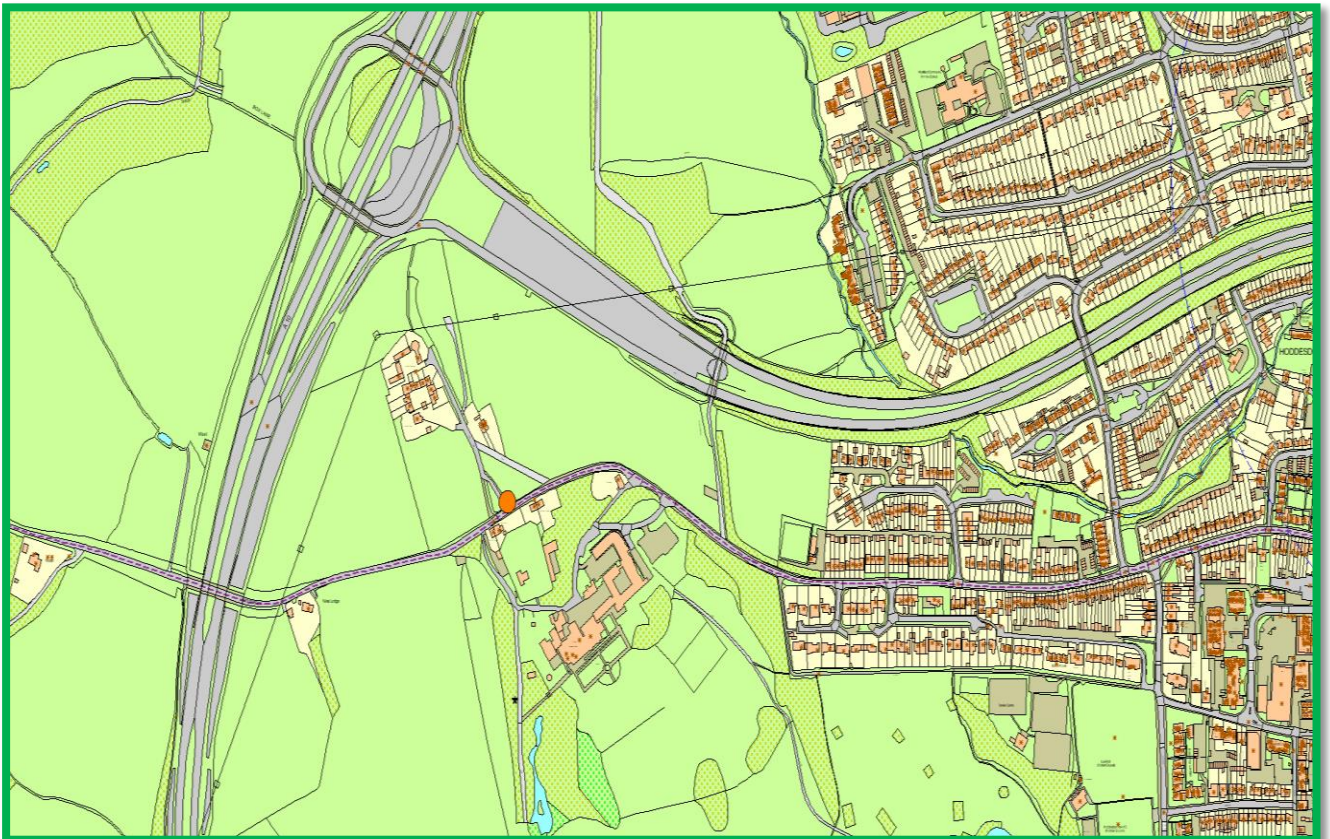
TUBE 24: Wormley Sports Club, Church Lane, EN10 7QE, (BB31)



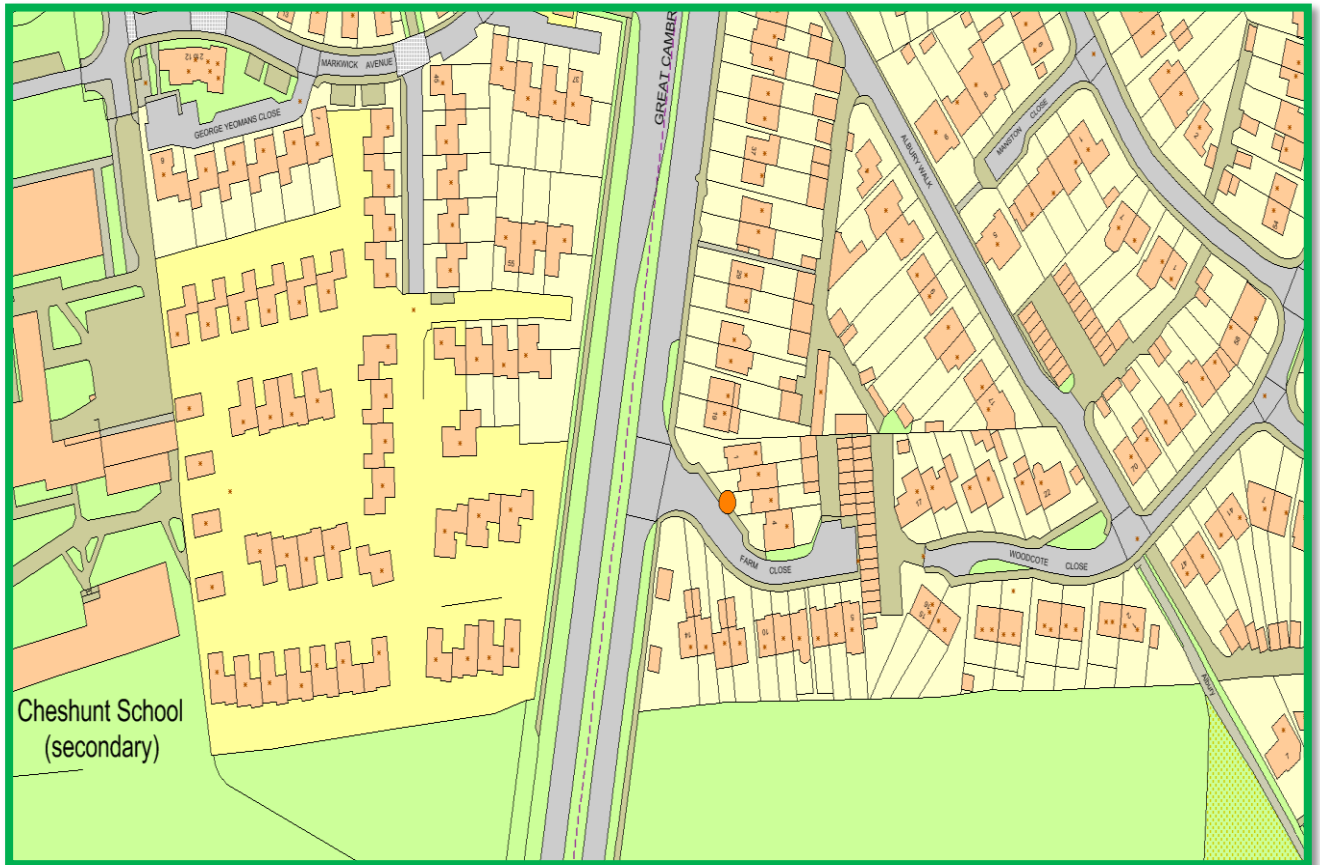
TUBE 25: 11 Baas Hill Close, Broxbourne, EN10 7EU. (BB32)



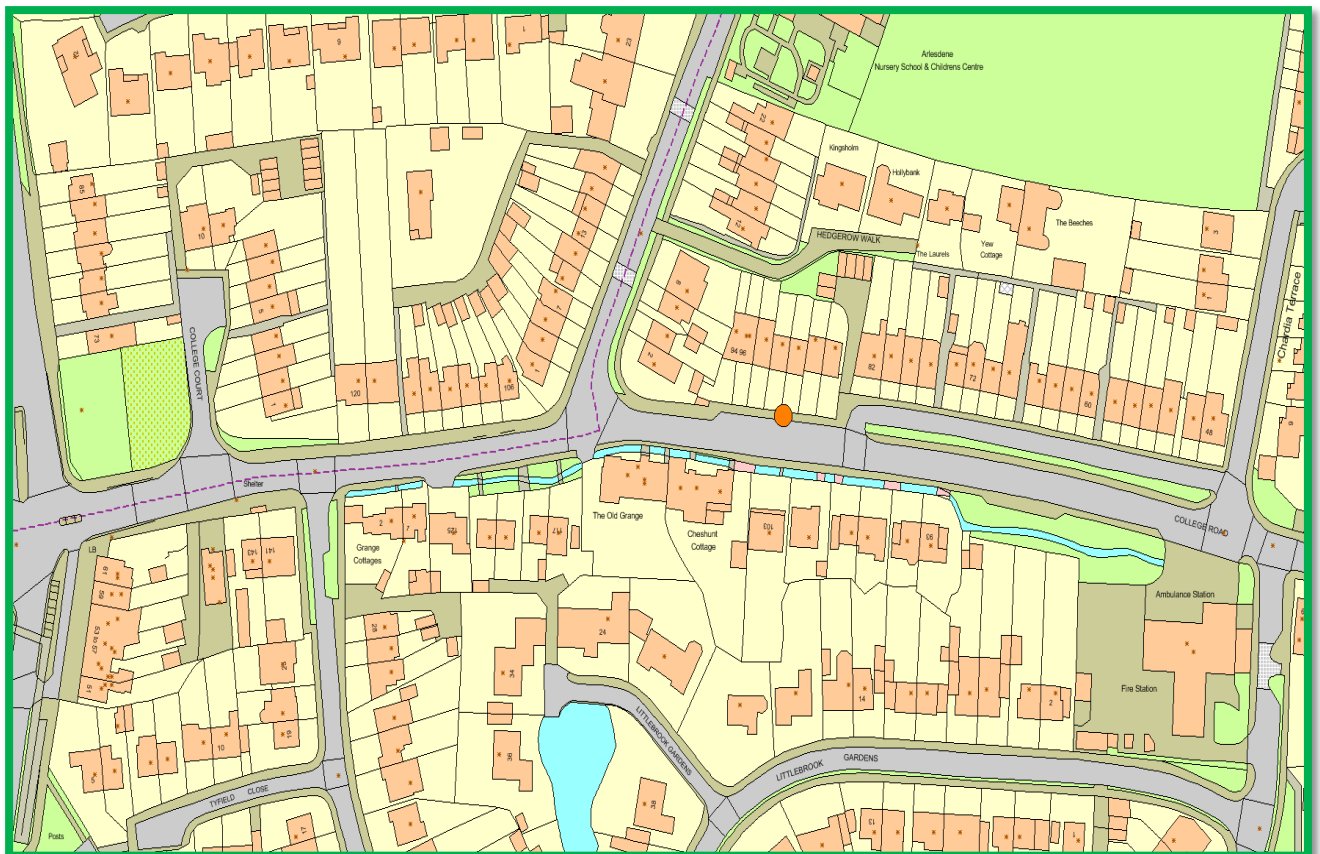
TUBE 26: High Leigh/Box Lane (BB33)



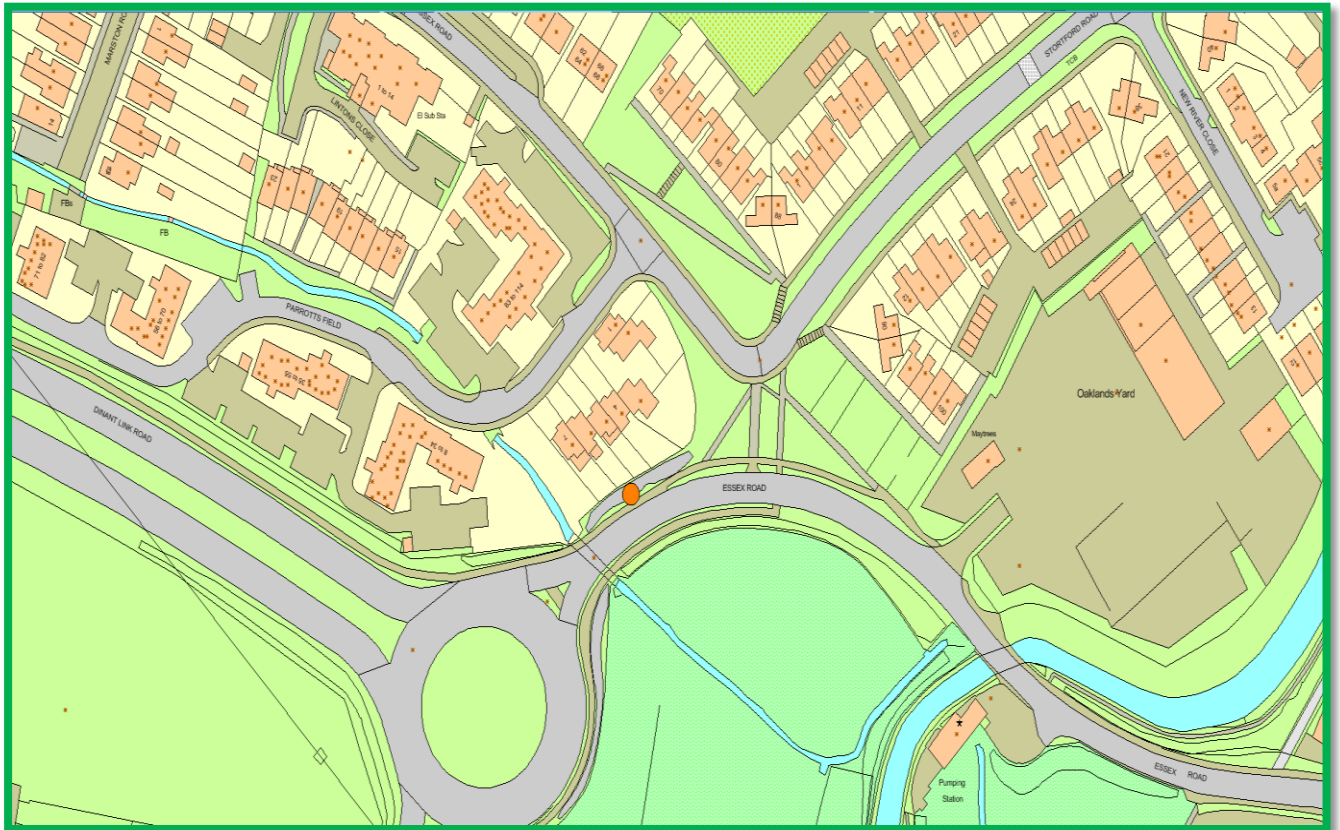
TUBE 27: Farm Close, Cheshunt, EN8 8PD (BB34)



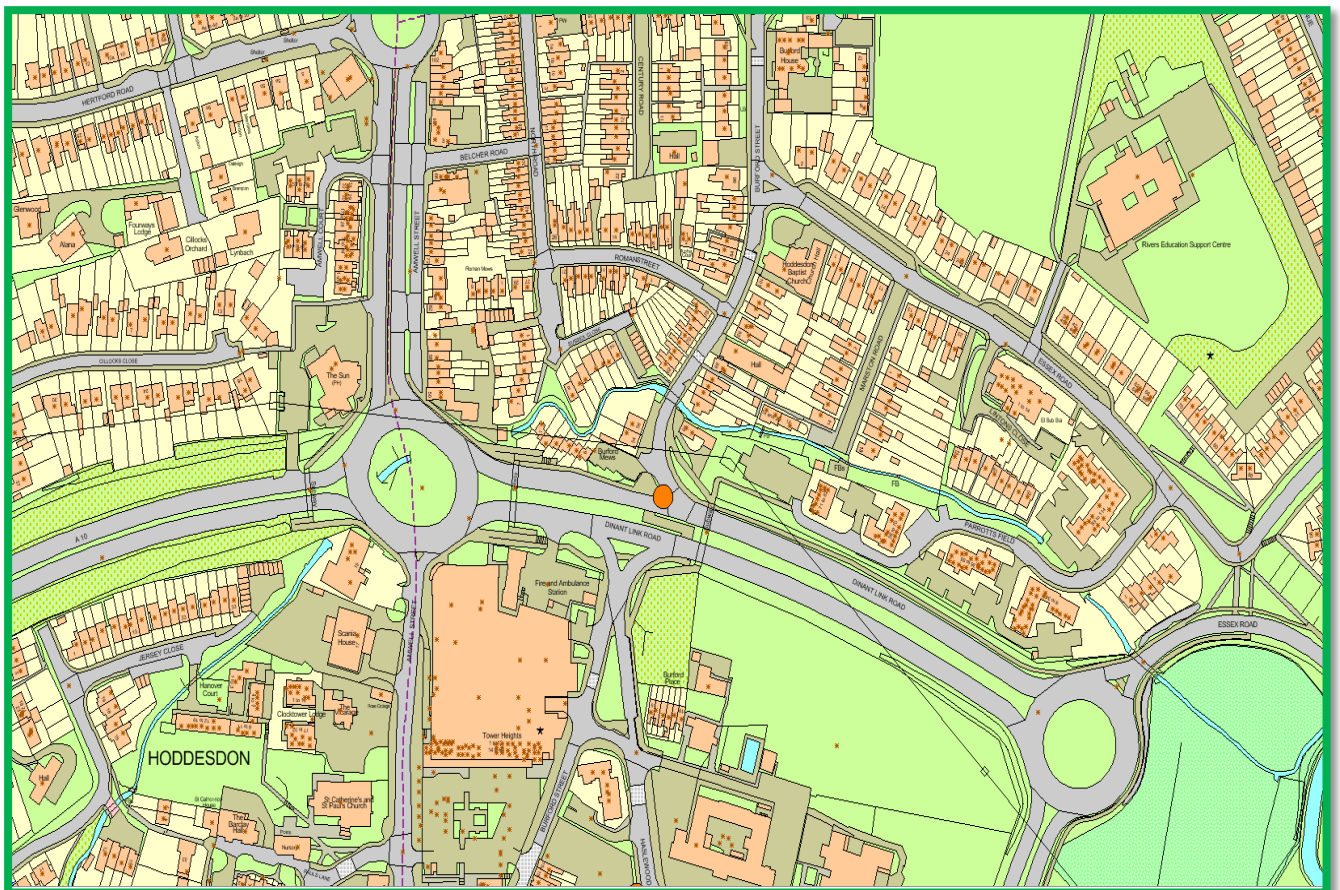
TUBE 28: 86 College Road, Cheshunt EN8 9NN (BB35)



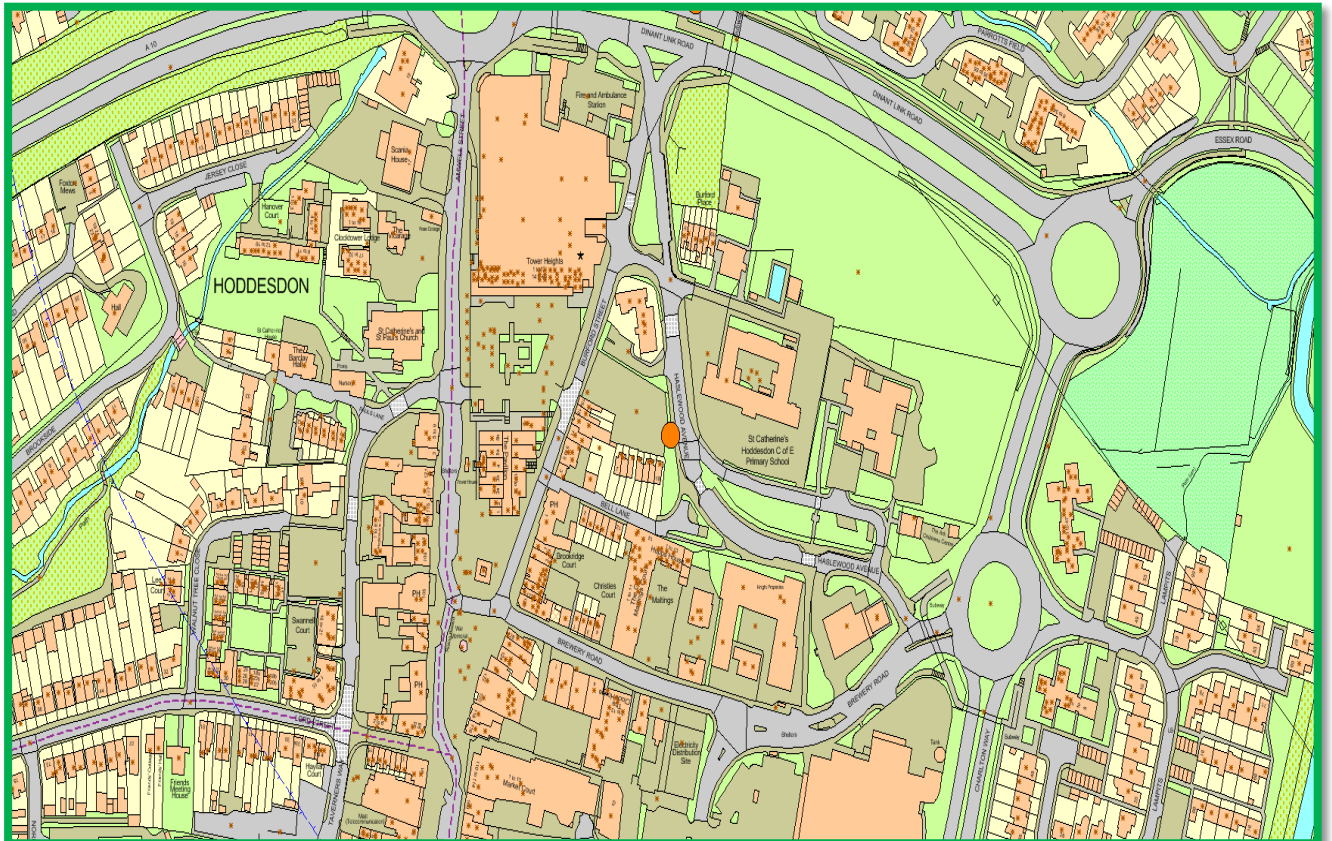
Tube 29: Essex Rd, behind 6 Parrots Field, Hoddesdon (BB36)



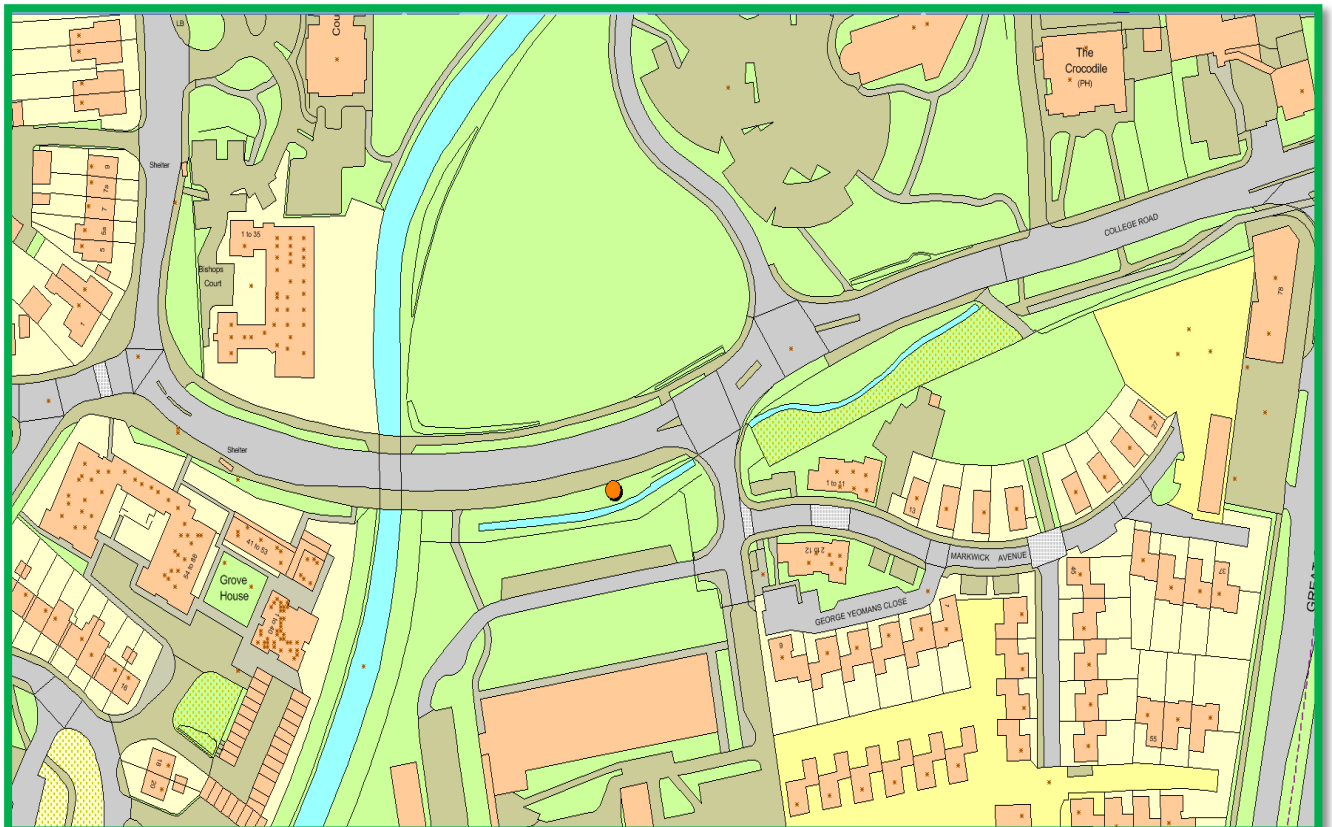
Tube 30: Junction of Burford St/Dinant Link Road, Hoddesdon (BB37)



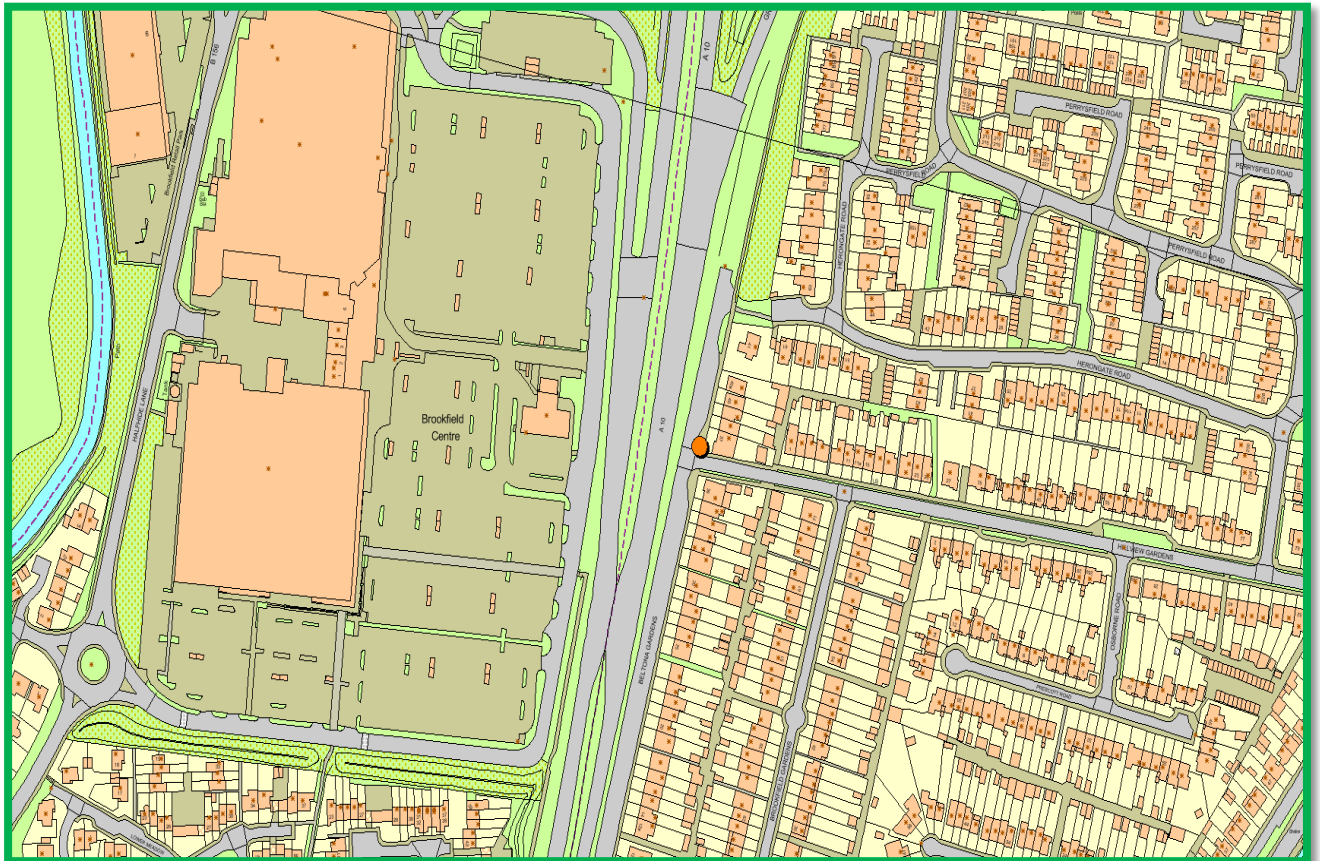
Tube 31: St Catherines School, Hoddesdon (BB38)



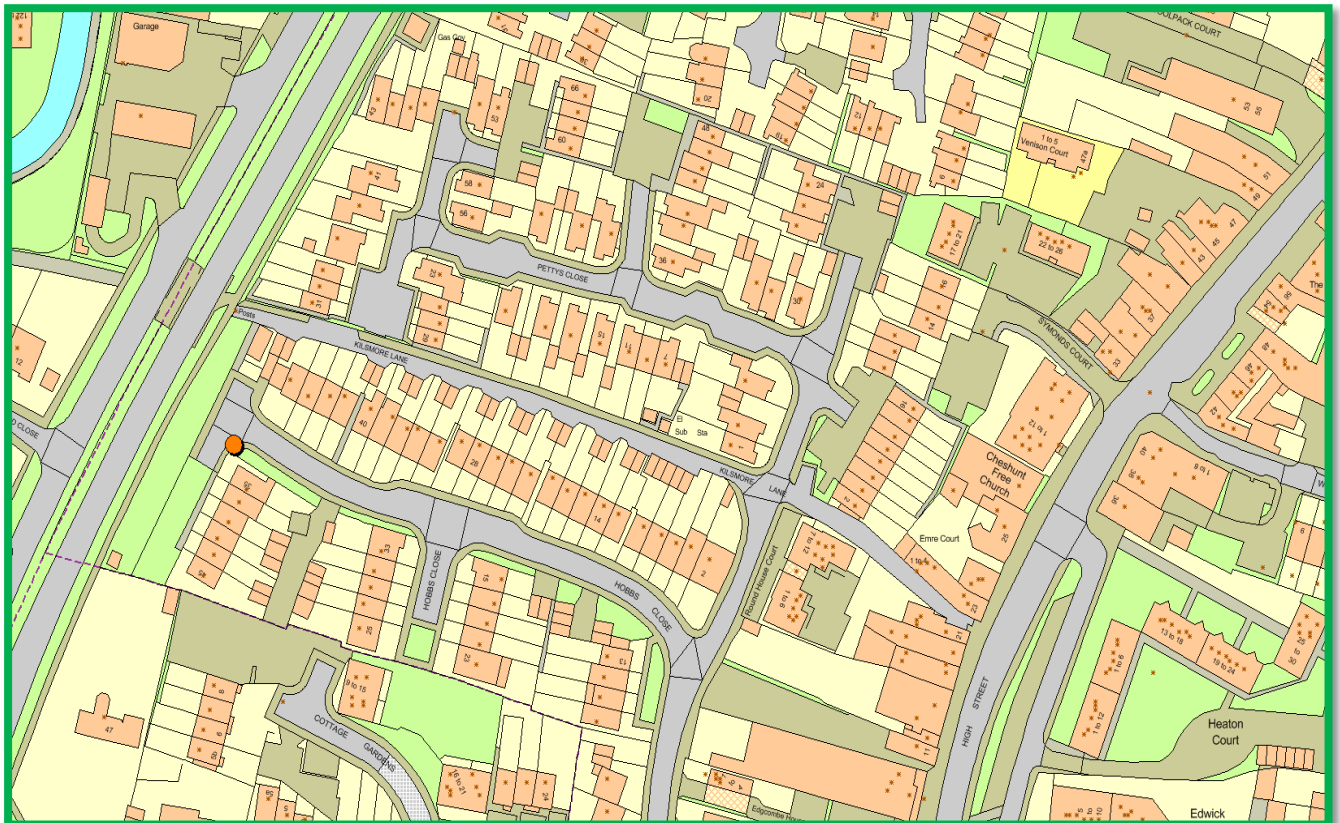
Tube 32: College Rd/Goffs Churchgate Academy, Cheshunt (BB39)



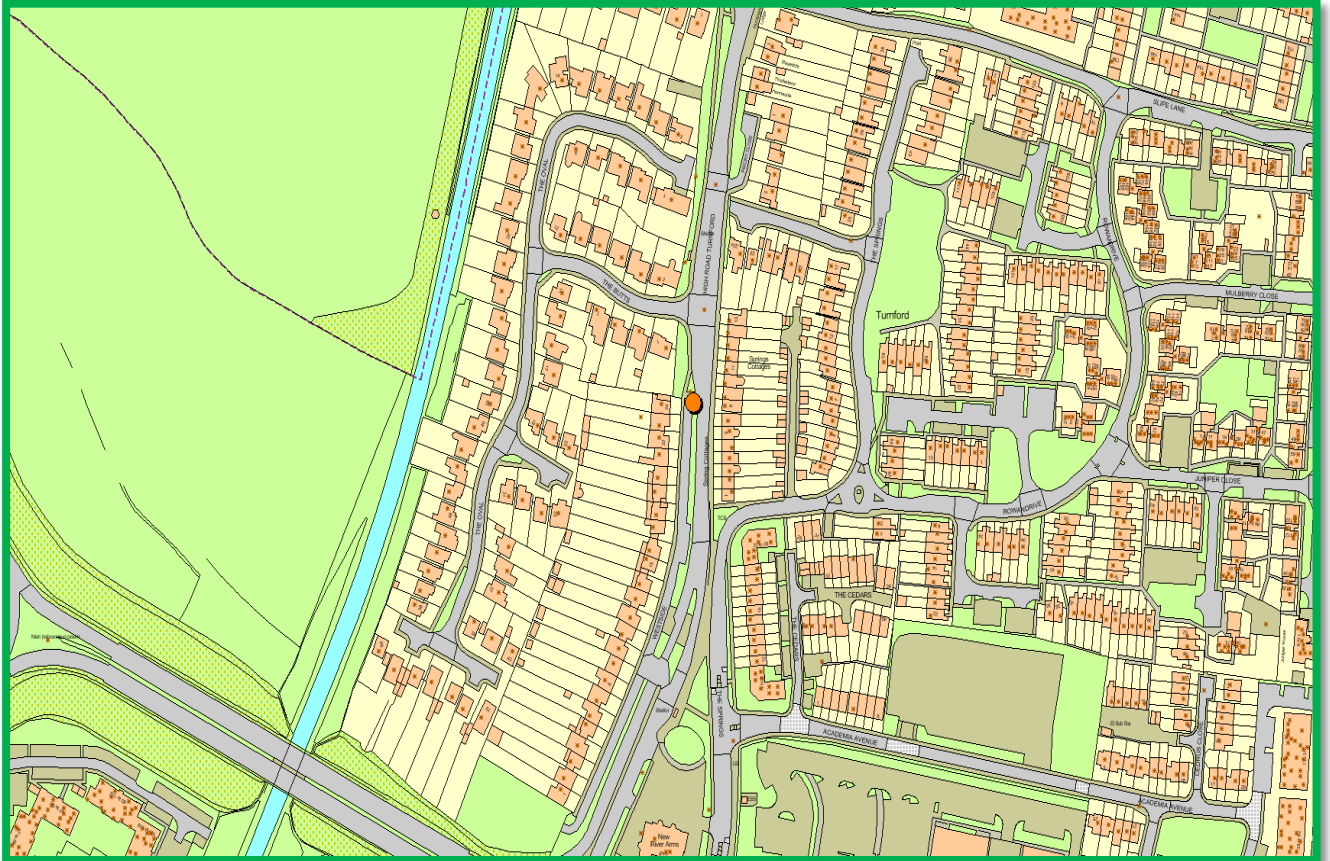
Tube 33: 37 Beltona Gardens, Cheshunt (BB41)



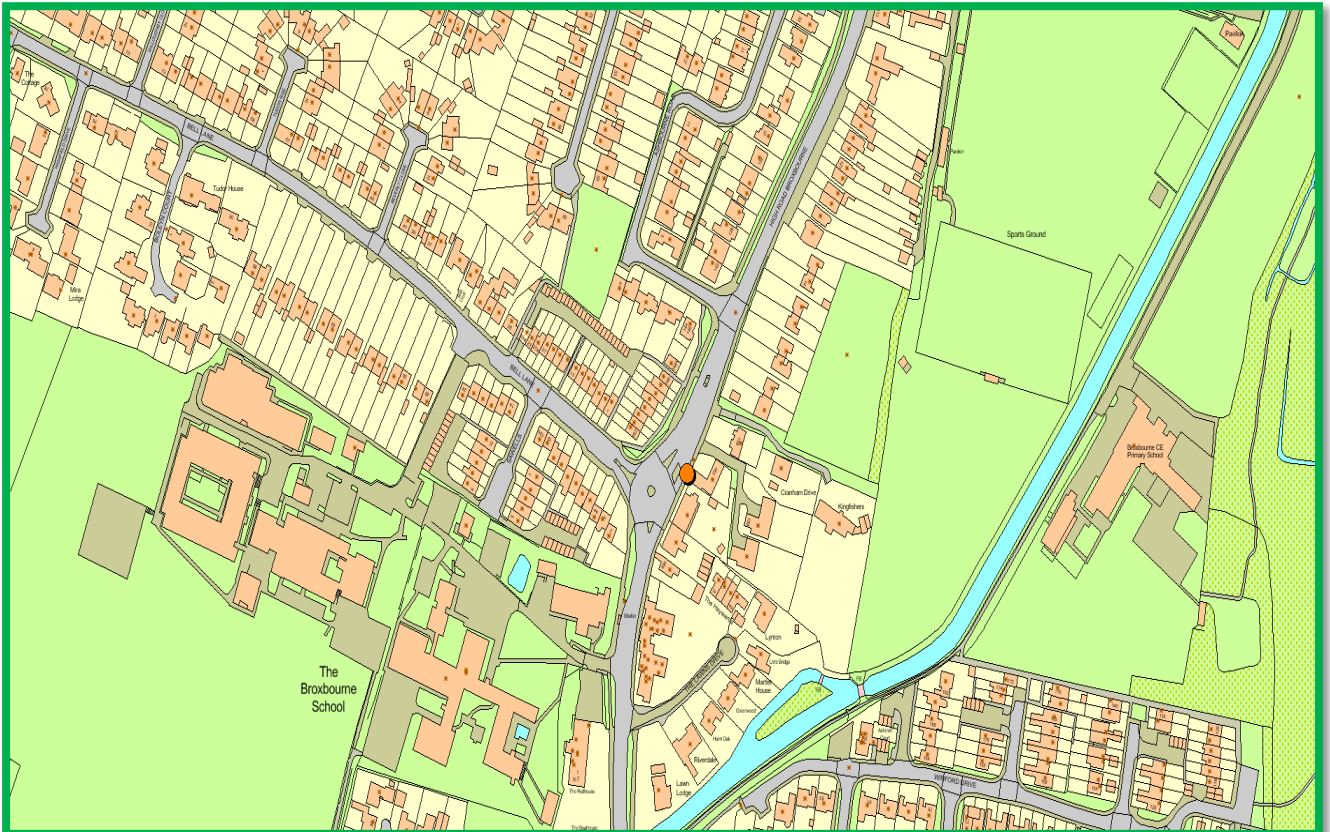
Tube 34: 48 Hobbs Close, Cheshunt (BB42)



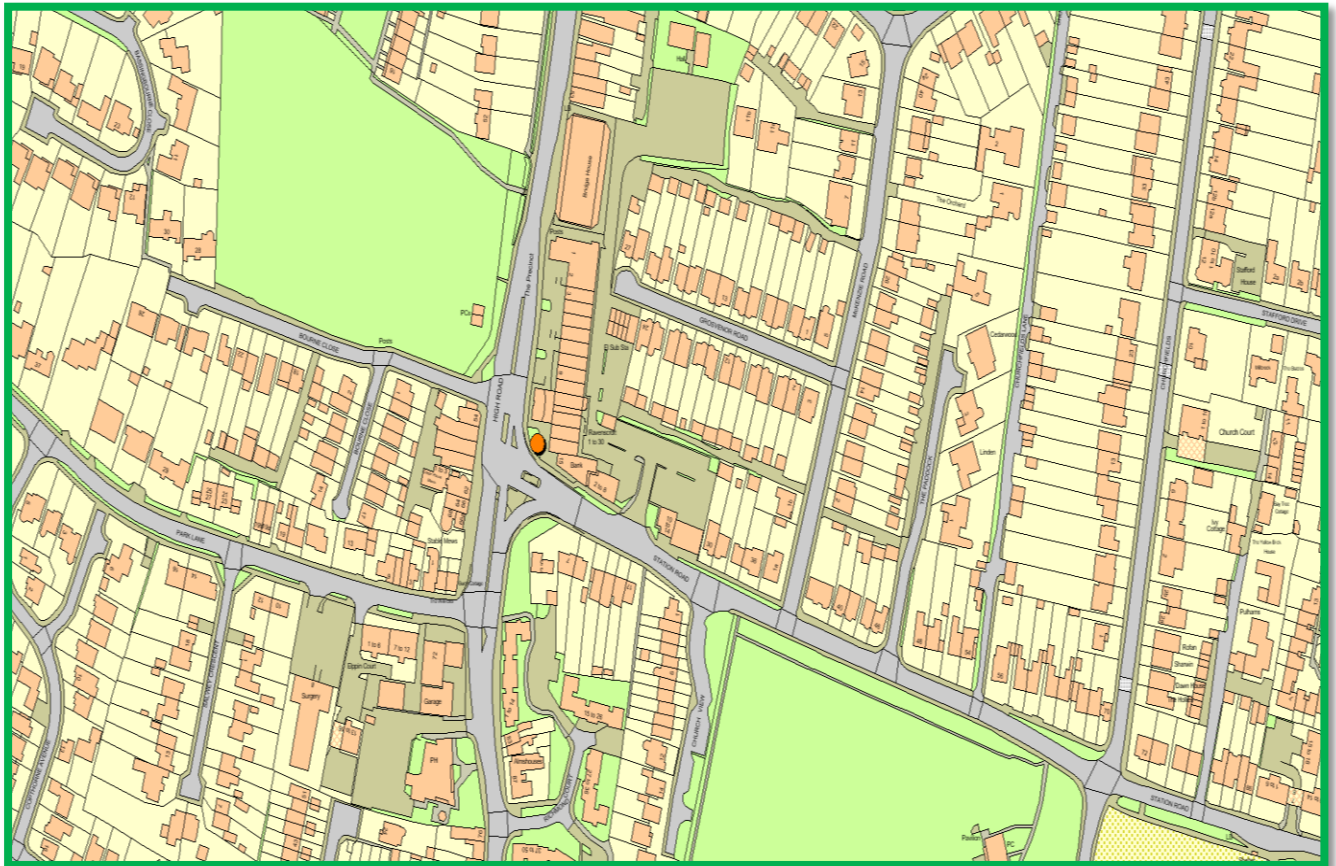
Tube 35: 24 Westside, Turnford (BB43)



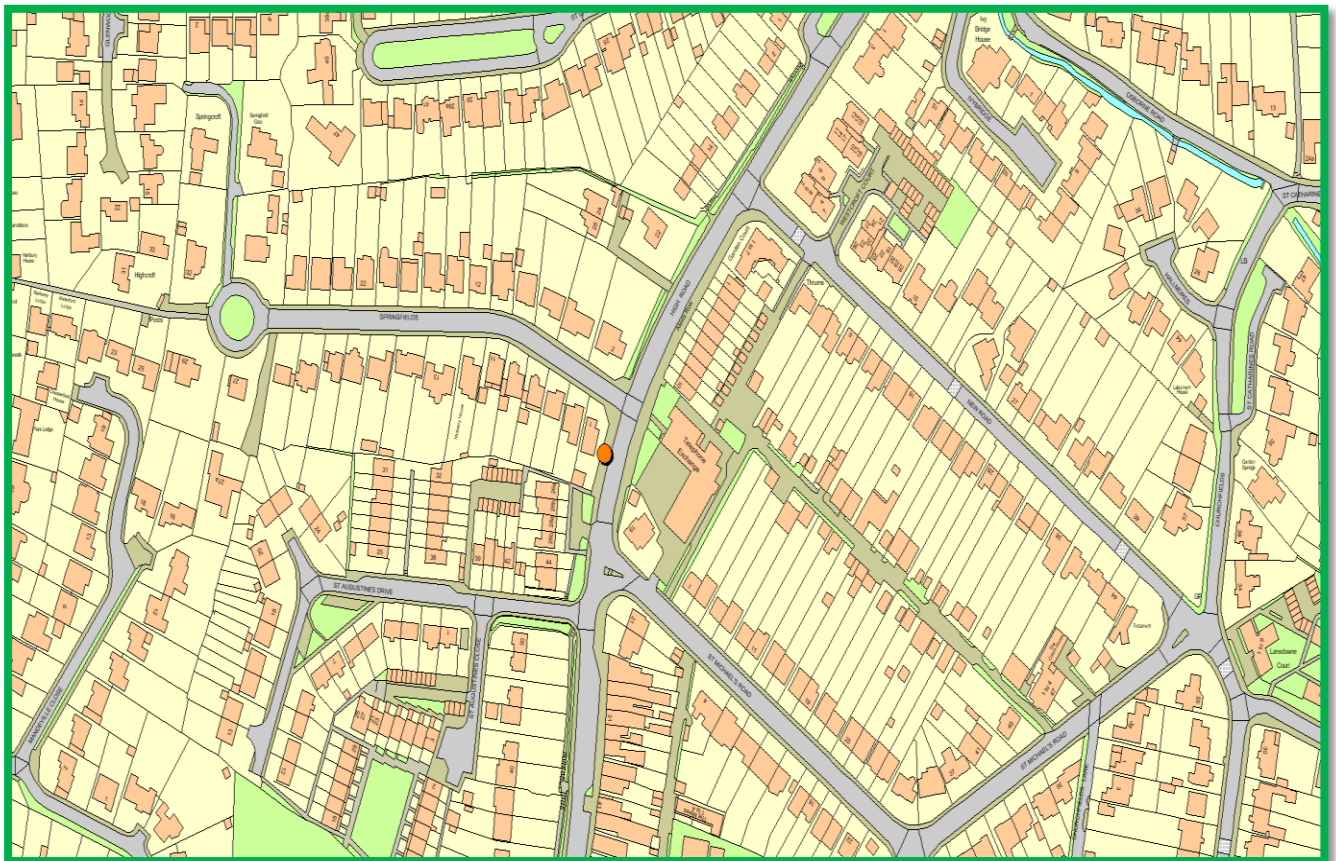
Tube 36: High Rd/Bell Lane Roundabout (163 High Rd) Broxbourne (BB44)



Tube 37: High Rd/Station Rd Junction, Broxbourne (BB45)



Tube 38: High Rd/Springfields Junction, Broxbourne (BB46)



The Council has published an Interactive Map of the Current Local Plan, which also incorporates the Air Quality Management Areas. Which can be accessed via the following link, <https://www.broxbourne.gov.uk/maps>

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

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

¹ The units are in micrograms of pollutant per cubic metre of air (µg/m³).

Glossary of Terms

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

References

- 1) Air Quality Review and Assessment Website
<http://laqm.defra.gov.uk/review-and-assessment/report-submission.html>
- 2) Defra (2016) Local Air Quality Management, Technical Guidance (TG16)
- 3) Defra (2016) Local Air Quality Management, Policy Guidance (PG16)
- 4) Borough of Broxbourne, Draft Local Plan
<http://consult.broxbourne.gov.uk/portal/planning/dlp/dlpc?pointId=3880076>
- 5) AIR QUALITY EXPERT GROUP, Fine Particulate Matter (PM2.5) in the United Kingdom, 2012.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69635/pb13837-aqeg-fine-particle-matter-20121220.pdf
- 6) National air quality objectives and European Directive limit and target values for the protection of human health.
https://uk-air.defra.gov.uk/assets/documents/Air_Quality_Objectives_Update.pdf