



Air Quality Assessment	
Watlington Street, Reading	
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1 Introduction

- 1.1.1 Air Quality Assessments Ltd (AQA) has been commissioned c/o Napier Clarke to undertake an air quality assessment for a proposed residential development of six apartments at 111A Watlington Street, Reading (location shown in **Figure 1**).
- 1.1.2 Reading Borough Council has declared Reading Town Centre and the major radial routes into Reading an Air Quality Management Area (AQMA) for exceedances of the annual mean nitrogen dioxide (NO₂) objective and the application site lies within this area.
- 1.1.3 This report describes the existing air quality conditions in proximity to the site and considers the effect of the proposed development on local air quality and existing air quality on new receptors at the development. The main air pollutants of concern related to road traffic are nitrogen dioxide (NO₂) and fine particulate matter (PM₁₀ and PM_{2.5}).
- 1.1.4 The assessment has been prepared taking into account all relevant local and national guidance and regulations.

2 Air Quality Legislation and Policy

2.1. EU Limit Values

- 2.1.1 The European Union's Directive on ambient air quality and cleaner air for Europe (European Parliament, Council of the European Union, 2008) set legally binding limit values for NO₂, PM₁₀ and PM_{2.5}. The Air Quality Standards Regulations 2010 (The Stationary Office, 2010) implement the EU Directive limit values in English legislation. Achievement of the limit values is a national obligation rather than a local one.
- 2.1.2 The limit values are the same as the objective values (see **Table 1**); however, the compliance dates differ, and the limit values apply at all locations (apart from where the public does not have access, where health and safety at work provisions apply and on the road carriageway). The PM₁₀ and NO₂ limit value applied from 2005 and 2010 respectively, whereas the PM_{2.5} limit value applied from 2015.
- 2.1.3 The United Kingdom left the European Union on 31st January 2020; however, EU legislation will continue to operate in UK law during the transition period, which will last until the end of December 2020.

2.2. Clean Air Strategy

- 2.2.1 Part IV of The Environment Act 1995 required the UK Government to prepare an Air Quality Strategy which includes standards and objectives for air quality and sets out measures which are to be taken by local authorities and the government in order to achieve those objectives. The Clean Air Strategy provides an overview of the actions that the government will take to improve air quality and promises new legislation that will tackle air pollution (Defra, 2019).
- 2.2.2 Standards are the concentrations of pollutants in the atmosphere, below which there is a minimum risk of health effects or ecosystem damage; they are set with regard to scientific and medical evidence. Objectives are the policy targets set by the Government, taking account of economic efficiency, practicability, technical feasibility and timescale, where the standards are expected to be achieved by a certain date.
- 2.2.3 Part IV of the Environment Act 1995 also describes the system of Local Air Quality Management (LAQM), which requires every local authority to carry out regular review and assessments of air quality in its area. Where an objective has not been, or is unlikely to be achieved, the local authority must declare an AQMA, and prepare an action plan which sets out appropriate measures to be introduced in pursuit of the objectives.
- 2.2.4 The objectives for NO₂ and PM₁₀, as prescribed by the Air Quality (England) Regulations 2000 and the Air Quality (England) (Amendment) Regulations 2002 (The Stationary Office, 2000; The Stationary Office, 2002), are shown in **Table 1**. The objectives for PM₁₀ and NO₂ were to have been achieved by 2004 and 2005 respectively, and continue to apply in all future years thereafter. The PM_{2.5} objective, also shown in **Table 1**, was to be achieved by 2020; however, there is no obligation for local authorities to try to meet the PM_{2.5} objective, and it is not included in the Regulations.

Table 1: The Objectives for NO₂, PM₁₀ and PM_{2.5}

Pollutant	Concentration Measured As	Objective
NO₂	1-hour Mean	200 µg/m ³ not to be exceeded more than 18 times a year
	Annual Mean	40 µg/m ³
PM₁₀	24-hour Mean	50 µg/m ³ not to be exceeded more than 35 times a year
	Annual Mean	40 µg/m ³
PM_{2.5}	Annual Mean	25 µg/m ³

2.2.5 The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed for a period of time appropriate to the averaging period of the objective. Examples of where the objectives should apply are provided in the Local Air Quality Management Technical Guidance (Defra, 2016) issued by the Department for Environment, Food and Rural Affairs (Defra). The annual mean NO₂ and PM₁₀ objectives should apply at the building façades of residential properties, schools, hospitals, care homes etc.; they should not apply at the building façades of places of work, hotels, gardens or kerbside sites. The 24-hour mean PM₁₀ objective should apply at all locations where the annual mean objective applies, as well as the gardens of residential properties and hotels. The 1-hour mean NO₂ objective should apply at all locations where the annual and 24-hour mean objectives apply, as well as at kerbside sites where the public have regular access, e.g. the pavements of busy shopping streets.

2.3. Planning Policy

National Policies

2.3.1 The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these should be applied (Ministry of Housing, Communities & Local Government, 2019). It provides a framework within which locally-prepared plans for development can be produced. It states that the purpose of the planning system is to contribute to the achievement of sustainable development and includes an overarching environmental objective:

“to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.”

2.3.2 The NPPF states that:

“Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well

as the potential sensitivity of the site or the wider area to impacts that could arise from the development."

2.3.3 With specific reference to air quality, the NPPF states that:

"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."

2.3.4 The NPPF goes on to say that:

"The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."

2.3.5 The NPPF is supported by Planning Practice Guidance (PPG) (DCLG, 2019). The PPG states that:

"The Department for Environment, Food and Rural Affairs carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with relevant Limit Values. It is important that the potential impact of new development on air quality is taken into account where the national assessment indicates that relevant limits have been exceeded or are near the limit, or where the need for emissions reductions has been identified."

2.3.6 The PPG goes on to state that:

"Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity."

2.3.7 The PPG also sets out the information that may be required in an air quality assessment, stating that:

"Assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific."

- 2.3.8 It also provides guidance on options for mitigating air quality impacts, and makes clear that:

“Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact.”

- 2.3.9 The Reading Local Plan includes Policy EN15: Air Quality, which states (Reading Borough Council, 2019a):

“Development should have regard to the need to improve air quality and reduce the effects of poor air quality.

i. Development that would detrimentally affect air quality will not be permitted unless the effect is to be mitigated. The following criteria should be taken into account:

- Whether the proposal, including when combined with the cumulative effect of other developments already permitted, would worsen air quality;*
- Whether the development is within, or accessed via, an Air Quality Management Area; and*
- Whether it can be demonstrated that a local worsening in air quality that would not detrimentally affect human health or the environment would be offset by an overall improvement in air quality, for instance through reduction in the need to travel.*

ii. Where a development would introduce sensitive uses (such as residential, schools and nurseries, hospitals, care facilities) into, or intensify such uses within, an Air Quality Management Area, detrimental effects on that use will be mitigated. Mitigation measures should be detailed in any planning application. If there are significant detrimental effects that cannot be mitigated, the application should be refused.

iii. Where required, planning obligations will be used to secure contributions to measures to tackle poor air quality or for air quality monitoring.”

Air Quality Action Plan

- 2.3.10 Reading Borough Council has developed an Air Action Plan for the AQMA (Reading Borough Council, 2016). The Action Plan sets out measures that the council intends to implement in order to help meet the objectives.

3 Methodology

3.1. Existing Conditions

3.1.1 Information on existing air quality within the study area has been collated from the following sources:

- The results of monitoring and the most recent publicly available LAQM Air Quality Annual Status Report published Reading Borough Council (Reading Borough Council, 2019b);
- Current exceedances of the annual mean NO₂ EU limit value identified using maps of roadside concentrations published by Defra (Defra, 2020a)¹; and
- Background pollutant concentration maps published by Defra (Defra, 2020b).

3.2. Road Traffic Impacts

3.2.1 Guidance for air quality and planning officers within local authorities, and developers and consultants involved in air quality assessments, has been published by Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) in Land-Use Planning & Development Control: Planning for Air Quality (EPUK and IAQM, 2017). . The guidance sets out criteria to help establish when an air quality assessment is likely to be considered necessary.

3.2.2 For impacts of existing air quality in new development, the requirement for an assessment should be based on professional judgement, taking into account:

- the background and future baseline air quality and whether this will be likely to approach or exceed the values set by air quality objectives;
- the presence and location of Air Quality Management Areas as an indicator of local hotspots where the air quality objectives may be exceeded;
- the presence of a heavily trafficked road, with emissions that could give rise to sufficiently high concentrations of pollutants (in particular NO₂), that would cause unacceptably high exposure for users of the new development; and
- the presence of a source of odour and/or dust that may affect amenity for future occupants of the development.

3.2.3 For impacts of development on the local area, a two-stage approach is suggested, with the first stage intended to screen out small developments, and developments considered likely to have insignificant air quality effects. The full criteria are shown in **Appendix A1**. The EPUK/IAQM guidance is clear that:

"If none of the criteria are met, then there should be no requirement to carry out an air quality assessment for the impact of the development on the local area, and the impacts can be considered as having an insignificant effect."

3.2.4 A qualitative assessment of the air quality impacts associated with the development has been undertaken based on the scale of the development, the distance of the development from emissions sources and the existing air quality. The criteria in the EPUK/IAQM guidance and professional judgement have been used to screen the

¹ There are no exceedances of the PM₁₀ limit values.

requirement for a full air quality assessment, with the professional experience of the consultant preparing this report set out in **Appendix A2**.

4 Baseline Conditions

4.1. EU Limit Values

- 4.1.1 The Reading AURN monitoring site measures background concentrations approximately 1km to the east of the application site. Annual mean NO₂ concentrations measured at the AURN site ranged from 22-34µg/m³ between 2014 and 2018 and the EU limit value is achieved.
- 4.1.2 London Road (A4), approximately 40m to the south of the application site, is included in modelling undertaken by Defra. The Defra modelling predicts an annual mean NO₂ concentration of 21.4µg/m³ on London Road in 2020 and the EU limit value is achieved.

4.2. LAQM Review and Assessment

- 4.2.1 Reading Borough Council has declared Reading Town Centre and the major radial routes into Reading an Air Quality Management Area (AQMA) for exceedances of the annual mean NO₂ objective.
- 4.2.2 Reading Borough Council has concluded that it is highly unlikely concentrations of PM₁₀ or PM_{2.5} exceed the objectives at any location in the borough.

4.3. Local Air Quality Monitoring

- 4.3.1 Reading Borough Council also operates a roadside automatic monitoring site on London Road and a large number of diffusion tube monitoring sites. Data from the automatic monitor and diffusion tube monitoring sites located within 1km of the application site are shown in **Table 2**, **Table 3**, **Table 4**, and **Table 5**. The monitoring locations shown in **Figure 1**.
- 4.3.2 Annual mean NO₂ concentrations at roadside sites within 1km of the application site and at the London Road automatic monitoring site ranged from 28 to 49µg/m³ between 2014 and 2018 (**Table 2**). Exceedances of the annual mean NO₂ objective have been measured at two of the diffusion tube monitoring sites. The data show a decreasing trend in annual mean NO₂ concentrations between 2014 and 2018 and by 2018 the objective was achieved at all locations, when roadside concentrations ranged from 28 to 38µg/m³. Measurements across the UK have shown that there is a risk of exceedances of the 1-hour NO₂ objective where the annual mean concentration is above 60 µg/m³ (Defra, 2016). Annual mean diffusion tube measurements between 2014 and 2018 have not exceeded 60 µg/m³; therefore, it is unlikely that the 1-hour objective has been exceeded.
- 4.3.3 Background annual mean NO₂ concentrations ranged from 22 to 34µg/m³ between 2014 and 2018 (**Table 2**).
- 4.3.4 No exceedances of the 1-hour mean NO₂ objective have been measured at the automatic monitoring sites (**Table 3**).
- 4.3.5 No exceedances of the objectives for PM₁₀ or PM_{2.5} have been measured at the automatic monitoring sites (**Table 4** and **Table 5**).

Table 2: Measured Annual Mean NO₂ Concentrations ^a

Site ID in Figure 1	Location	Site Type ^b	Annual Mean (µg/m ³)				
			2014	2015	2016	2017	2018
Automatic Monitor							
Reading AURN	Reading Old Cemetery	UB	27	22	34	29	26
RD4	London Road	R	-	-	32	28	30
Diffusion Tubes							
DT01	Kings Oak Flats; Queens Road	R	38	33	33	31	32
DT09	276 Kings Road	R	37	33	32	32	30
DT10	10-20 Hieatt Close	R	38	34	32	32	31
DT14	102 Whitley Street	R	36	32	29	30	28
DT15	Red Cow; Southampton Street	R	45	38	38	35	38
DT16	44 Crown Street	R	43	36	37	35	34
DT26	Sidmouth Street - Trinity Hall	R	-	-	-	-	37
Objective			40				

a Exceedances are shown in bold.

b R = Roadside, UB = Urban Background.

Table 3: Exceedance Statistics for the 1-hour Mean NO₂ Objective ^a

Site ID	Location	Site Type	Number of Hours > 200 µg/m ³				
			2014	2015	2016	2017	2018
Reading AURN	Reading Old Cemetery	UB	0	0	4	0	0
RD4	London Road	R	-	-	0	0	0
Objective			18				

a R = Roadside, UB = Urban Background.

Table 4: Summary of PM₁₀ Monitoring Data ^a

Site ID	Location	Site Type	2014	2015	2016	2017	2018
Annual Mean (µg/m³)							
Reading AURN	Reading Old Cemetery	UB	14	12	13	12	13
RD4	London Road	R	-	-	19	18	17
Objective			40				
Number of Days > 50 µg/m³							
Reading AURN	Reading Old Cemetery	UB	0	0	3	3	1
RD4	London Road	R	-	-	2	3	1
Objective			35				

^a R = Roadside, UB = Urban Background.

Table 5: Summary of PM_{2.5} Monitoring Data ^a

Site ID	Location	Site Type	2014	2015	2016	2017	2018
Annual Mean (µg/m³)							
Reading AURN	Reading Old Cemetery	UB	10	7	9	10	7
Objective			25				

^a UB = Urban Background.



4.4.1 Estimated background concentrations at the application site, obtained from the national maps published by Defra, are shown in **Table 6**. The background concentrations are well below the objectives.

Grid Square	NO ₂	PM ₁₀	PM _{2.5}
472500,173500	22.7	16.8	11.7
Objective	40	40	25

5 Air Quality Assessment

Impact of the Development

- 5.1.1 The proposed development will consist of just six apartments with no parking provided at the site. The increase in traffic due to the proposed development will be significantly less than 100 daily movements; therefore, with regard to the screening criteria for developments within an AQMA, set out in **Appendix A1**, detailed assessment of the air quality impacts of the development on the surrounding area should not be required.

Impact on the Development

- 5.1.2 Watlington Street is a lightly trafficked residential street. Apart from the junction with London Road, vehicular access to Watlington Street is restricted; therefore, emissions from vehicles using Watlington Street will be negligible.
- 5.1.3 The application site is located approximately 38m from London Road. Monitoring data from diffusion tube sites located on London Road (DT16) and the London Road automatic monitoring site indicate that annual mean NO₂ concentrations on the A4 (Crown Street and London Road) ranged between 28 and 43µg/m³ between 2014 and 2018; however, no exceedances have been measured since 2014.
- 5.1.4 Pollutant concentrations decrease rapidly with distance from source. Defra have published an NO₂ Fall-off with Distance Calculator (v4.2) to estimate annual mean NO₂ concentrations at receptor locations close to monitoring sites, but at a different distance from the kerb (Defra, 2020b). Assuming an annual mean background NO₂ concentration of 22.7µg/m³ (**Table 6**) and a measured annual mean NO₂ concentration of 43µg/m³ (highest measured concentration between 2014 and 2018 at an A4 monitoring sites, **Table 2**), the predicted annual mean NO₂ concentration at the application site would be 30.2µg/m³, which is well below the objective. The output from the NO₂ Fall-off with Distance Calculator is shown in **Figure 2**.
- 5.1.5 Based on the results of local monitoring data and the predicted concentration using the NO₂ Fall-off with Distance Calculator, and with regard to the IAQM screening criteria, it is considered that air quality at the proposed development will be acceptable and that a detailed assessment should not be required.



Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	4	metres
Step 2	How far from the KERB is your receptor (in metres)?	38	metres
Step 3	What is the local annual mean background NO ₂ concentration (in µg/m ³)?	22.7	µg/m ³
Step 4	What is your measured annual mean NO ₂ concentration (in µg/m ³)?	43	µg/m ³
Result	The predicted annual mean NO ₂ concentration (in µg/m ³) at your receptor	30.2	µg/m ³

Warning: your receptor is more than 20m further from the kerb than your monitor, treat result with caution

Figure 2: NO₂ Fall-off with Distance Calculator Output

6 Mitigation

- 6.1.1 The screening assessment has shown that the air quality impacts will be insignificant, and no mitigation should be required.

7 Conclusions

- 7.1.1 The air quality impacts associated with the operation of the proposed development have been assessed.
- 7.1.2 The development will not increase traffic above the level of the IAQM/EPUK screening criteria; therefore, detailed air quality assessment should not be necessary as the proposed development will have an insignificant effect on local air quality.
- 7.1.3 Based on the results of local air quality monitoring, air quality at the proposed development will be acceptable.
- 7.1.4 The air quality effects of the development have been assessed and found to be insignificant. There should be no constraints to the development of the site for residential use with regard to air quality as the proposed development is consistent with the relevant parts of:
 - the NPPF; and
 - Policy EN15 of the Reading Local Plan.

8 References

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9 Appendices

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A1 Criteria Used to Establish when an Air Quality Assessment is Likely to be Necessary

A1.1.1 Stage 1 (criteria to proceed to Stage 2).

A. If any of the following apply:

- 10 or more residential units or a site area of more than 0.5ha;
- more than 1,000 m² of floor space for all other uses or a site area greater than 1ha

B. Coupled with any of the following:

- the development has more than 10 parking spaces
- the development will have a centralised energy facility or other centralised combustion process

Note: Consideration should still be given to the potential impacts of neighbouring sources on the site, even if an assessment of impacts of the development on the surrounding area is screened out.

A1.1.2 The Stage 2 criteria are shown in **Table A1**.

Table A1: Indicative Criteria for Requiring an Air Quality Assessment

The development will:	Indicative Criteria to Proceed to an Air Quality Assessment ^a
1. Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors. (LDV = cars and small vans <3.5t gross vehicle weight)	A change of LDV flows of: - more than 100 AADT within or adjacent to an AQMA; - more than 500 AADT elsewhere.
2. Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors. (HDV = goods vehicles + buses >3.5t gross vehicle weight)	A change of HDV flows of: - more than 25 AADT within or adjacent to an AQMA; - more than 100 AADT elsewhere.
3. Realign roads, i.e. changing the proximity of receptors to traffic lanes.	Where the change is 5m or more and the road is within an AQMA.
4. Introduce a new junction or remove an existing junction near to relevant receptors.	Applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate, e.g. traffic lights, or roundabouts.
5. Introduce or change a bus station.	Where bus flows will change by: - more than 25 AADT within or adjacent to an AQMA; - more than 100 AADT elsewhere.

The development will:	Indicative Criteria to Proceed to an Air Quality Assessment ^a
6. Have an underground car park with extraction system.	The ventilation extract for the car park will be within 20 m of a relevant receptor; coupled with the car park having more than 100 movements per day (total in and out).
7. Have one or more substantial combustion processes	Where the combustion unit is: - any centralised plant using bio fuel; - any combustion plant with single or combined thermal input >300kW; - a standby emergency generator associated with a centralised energy centre (if likely to be tested/used >18 hours a year).
8. Have a combustion process of any size	Where the pollutants are exhausted from a vent or stack in a location and at a height that may give rise to impacts at receptors through insufficient dispersion. This criterion is intended to address those situations where a new development may be close to other buildings that could be residential and/or which could adversely affect the plume's dispersion by way of their size and/or height.

a AADT = Annual Average Daily Traffic

A2 Professional Experience

Bob Thomas, BSc (Hons) PgDip MSc MEnvSc MIAQM CSci

Bob Thomas is a Director at AQA, with over thirteen years' experience in the field of air quality management and assessment. He has carried out air quality assessments for a wide range of developments, including residential, commercial, industrial, minerals and waste developments. He has been responsible for air quality projects that include ambient air quality monitoring of nitrogen dioxide, dust and PM₁₀, the assessment of nuisance odours and dust, and the preparation of Review and Assessment reports for local authorities. He has extensive dispersion modelling experience for road traffic, energy centre and industrial sources, and has completed many stand-alone reports and chapters for inclusion within an Environmental Statement. Bob has worked with a variety of clients to provide expert air quality services and advice, including local authorities, planners, developers, architects and process operators, and has provided expert witness services at public inquiry. He is a Chartered Scientist, a Member of the Institute of Air Quality Management and a Member of the Institution of Environmental Sciences.

A full CV for Bob Thomas is available at <http://aqassessments.co.uk/about>