

## Air Quality Assessment: Cow Lane, Reading

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July 2020



Experts in air quality  
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## Document Control

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## **Executive Summary**

The air quality impacts associated with the proposed vehicle rental premises development on land at Cow Lane in Reading have been assessed.

The assessment has demonstrated that the trip generation of the proposed development on local roads will be below published screening thresholds, thus it will not have a significant impact on local air quality.

The fleet operated by the Enterprise Rent-a-Car Ltd will also be newer and cleaner than the average on-road traffic, ensuring that emissions from the proposed development are minimised.

The overall operational air quality effects of the development are judged to be 'not significant'.

## Contents

|    |                                                     |    |
|----|-----------------------------------------------------|----|
| 1  | Introduction .....                                  | 3  |
| 2  | Policy Context and Assessment Criteria .....        | 4  |
| 3  | Assessment Approach .....                           | 11 |
| 4  | Site Description and Baseline Conditions .....      | 12 |
| 5  | Impact Assessment .....                             | 17 |
| 6  | Mitigation .....                                    | 18 |
| 7  | Conclusions .....                                   | 19 |
| 8  | References .....                                    | 20 |
| 9  | Glossary .....                                      | 22 |
| 10 | Appendices .....                                    | 24 |
| A1 | EPUK & IAQM Planning for Air Quality Guidance ..... | 25 |
| A2 | Professional Experience .....                       | 31 |

# 1 Introduction

- 1.1 This report describes the potential air quality impacts associated with the proposed vehicle rental premises development on land at Cow Lane in Reading. The assessment has been carried out by Air Quality Consultants Ltd on behalf of Enterprise Rent-a-Car Ltd.
- 1.2 The proposed development will consist of a modular building in the centre of the site with an adjacent wash bay, surrounded by approximately 50 parking spaces for rental vehicles and two spaces for car club vehicles. It lies within an Air Quality Management Area (AQMA) declared by Reading Council for exceedances of the annual mean nitrogen dioxide (NO<sub>2</sub>) objective. The development will lead to changes in vehicle flows on local roads, which may impact on air quality at existing residential properties. The main air pollutants of concern related to road traffic emissions are nitrogen dioxide and fine particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>).
- 1.3 This report describes existing local air quality conditions (base year 2018) and qualitatively considers the potential air quality impacts of the additional traffic generated by the proposed development. It has been prepared taking into account all relevant local and national guidance and regulations.

## 2 Policy Context and Assessment Criteria

- 2.1 The United Kingdom formally left the European Union (EU) on 31 January 2020; until the end of 2020 there will be a transition period while the UK and EU negotiate additional arrangements. During this period EU rules and regulations will continue to apply to the UK. All European legislation referred to in this report is written into UK law and will remain in place beyond 2020, unless amended, although there is uncertainty at this point in time as to who will enforce the requirements of some of this legislation.

### Air Quality Strategy

- 2.2 The Air Quality Strategy (Defra, 2007) published by the Department for Environment, Food, and Rural Affairs (Defra) and Devolved Administrations, provides the policy framework for air quality management and assessment in the UK. It provides air quality standards and objectives for key air pollutants, which are designed to protect human health and the environment. It also sets out how the different sectors: industry, transport and local government, can contribute to achieving the air quality objectives. Local authorities are seen to play a particularly important role. The strategy describes the Local Air Quality Management (LAQM) regime that has been established, whereby every authority has to carry out regular reviews and assessments of air quality in its area to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If this is not the case, the authority must declare an Air Quality Management Area (AQMA), and prepare an action plan which identifies appropriate measures that will be introduced in pursuit of the objectives.

### Clean Air Strategy 2019

- 2.3 The Clean Air Strategy (Defra, 2019) sets out a wide range of actions by which the UK Government seek to reduce pollutant emissions and improve air quality. Actions are targeted at four main sources of emissions: Transport, Domestic, Farming and Industry. At this stage, there is no straightforward way to take account of the expected future benefits to air quality within this assessment.

### Reducing Emissions from Road Transport: Road to Zero Strategy

- 2.4 The Office for Low Emission Vehicles (OLEV) and Department for Transport (DfT) published a Policy Paper (DfT, 2018) in July 2018 outlining how the government will support the transition to zero tailpipe emission road transport and reduce tailpipe emissions from conventional vehicles during the transition. This paper affirms the Government's pledge to end the sale of new conventional petrol and diesel cars and vans by 2040, and states that the Government expects the majority of new cars and vans sold to be 100% zero tailpipe emission and all new cars and vans to have significant zero tailpipe emission capability by this year, and that by 2050 almost every car

and van should have zero tailpipe emissions. It states that the Government wants to see at least 50%, and as many as 70%, of new car sales, and up to 40% of new van sales, being ultra-low emission by 2030.

- 2.5 The paper sets out a number of measures by which Government will support this transition, but is clear that Government expects this transition to be industry and consumer led. The Government has since announced *“plans to bring forward an end to the sale of new petrol and diesel cars and vans to 2035, or earlier if a faster transition is feasible, subject to consultation, as well as including hybrids for the first time”*. If these ambitions are realised then road traffic-related NOx emissions can be expected to reduce significantly over the coming decades, likely beyond the scale of reductions forecast in the tools utilised in carrying out this air quality assessment.

## Planning Policy

### National Policies

- 2.6 The National Planning Policy Framework (NPPF) (2019a) sets out planning policy for England. It states that the purpose of the planning system is to contribute to the achievement of sustainable development, and that the planning system has three overarching objectives, one of which is an 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”*.

- 2.7 To prevent unacceptable risks from air pollution, the NPPF states that:

*“Planning policies and decisions should contribute to and enhance the natural and local environment by...preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air quality”*.

and

*“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”*.

- 2.8 More specifically on air quality, the NPPF makes clear 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”.*

- 2.9 The NPPF is supported by Planning Practice Guidance (PPG) (Ministry of Housing, Communities & Local Government, 2019b), which includes guiding principles on how planning can take account of the impacts of new development on air quality. The PPG states that:

*“Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with 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”.*

- 2.10 Regarding plan-making, the PPG states:

*“It is important to take into account air quality management areas, Clean Air Zones and other areas including sensitive habitats or designated sites of importance for biodiversity where there could be specific requirements or limitations on new development because of air quality”.*

- 2.11 The role of the local authorities through the LAQM regime is covered, with the PPG stating that a local authority Air Quality Action Plan *“identifies measures that will be introduced in pursuit of the objectives and can have implications for planning”.*

- 2.12 Regarding the need for an air quality assessment, the PPG states 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”.*

- 2.13 The PPG sets out the information that may be required in an air quality assessment, making clear 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”.*

- 2.14 The PPG also provides guidance on options for mitigating air quality impacts, as well as examples of the types of measures to be considered. It 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. It is important that local planning authorities work with applicants to consider appropriate mitigation so as to ensure new development is appropriate for its location and unacceptable risks are prevented”.*

### **Local Policies**

- 2.15 The Reading Borough Local Plan (Reading Borough Council, 2019b) sets out how Reading will develop up to 2036. It includes policy EN15 on air quality, the relevant part of which states:

*“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”.*

## **Air Quality Action Plans**

### **National Air Quality Plan**

- 2.16 Defra has produced an Air Quality Plan to tackle roadside nitrogen dioxide concentrations in the UK (Defra, 2017); a supplement to the 2017 Plan (Defra, 2018a) was published in October 2018 and sets out the steps Government is taking in relation to a further 33 local authorities where shorter-term exceedances of the limit value were identified. Alongside a package of national measures, the 2017 Plan and the 2018 Supplement require those identified English Local Authorities (or the GLA in the case of London Authorities) to produce local action plans and/or feasibility studies. These plans and feasibility studies must have regard to measures to achieve

the statutory limit values within the shortest possible time, which may include the implementation of a Clean Air Zone. There is currently no straightforward way to take account of the effects of the 2017 Plan or 2018 Supplement in this assessment; however, consideration has been given to whether there is currently, or is likely to be in the future, a limit value exceedance in the vicinity of the proposed development. This assessment has principally been carried out in relation to the air quality objectives, rather than the EU limit values that are the focus of the Air Quality Plan.

### **Local Air Quality Action Plan**

- 2.17 Reading Borough Council has declared a single AQMA for exceedances of the annual mean nitrogen dioxide objective. The AQMA covers Reading Town Centre, areas along the major radial road routes into Reading (including J11 of the M4 motorway) and along the railway lines where they pass through built-up areas. The Council has since developed an Air Quality Action Plan (Reading Borough Council, 2016) which sets out what actions the Council intends to take to address air quality issues in the AQMA and across the borough generally, and to work towards meeting the nitrogen dioxide air quality objectives.

### **Assessment Criteria**

- 2.18 The Government has established a set of air quality standards and objectives to protect human health. The 'standards' are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The 'objectives' set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations (2000) and the Air Quality (England) (Amendment) Regulations (2002).
- 2.19 The UK-wide objectives for nitrogen dioxide and PM<sub>10</sub> were to have been achieved by 2005 and 2004 respectively, and continue to apply in all future years thereafter. The PM<sub>2.5</sub> objective is to be achieved by 2020. Measurements across the UK have shown that the 1-hour nitrogen dioxide objective is unlikely to be exceeded at roadside locations where the annual mean concentration is below 60 µg/m<sup>3</sup> (Defra, 2018b). Therefore, 1-hour nitrogen dioxide concentrations will only be considered if the annual mean concentration is above this level. Measurements have also shown that the 24-hour mean PM<sub>10</sub> objective could be exceeded at roadside locations where the annual mean concentration is above 32 µg/m<sup>3</sup> (Defra, 2018b). The predicted annual mean PM<sub>10</sub> concentrations are thus used as a proxy to determine the likelihood of an exceedance of the 24-hour mean PM<sub>10</sub> objective. Where predicted annual mean concentrations are below 32 µg/m<sup>3</sup> it is unlikely that the 24-hour mean objective will be exceeded.

- 2.20 The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Defra explains where these objectives will apply in its Local Air Quality Management Technical Guidance (Defra, 2018b). The annual mean objectives for nitrogen dioxide and PM<sub>10</sub> are considered to apply at the façades of residential properties, schools, hospitals etc.; they do not apply at hotels. The 24-hour mean objective for PM<sub>10</sub> is considered to apply at the same locations as the annual mean objective, as well as in gardens of residential properties and at hotels. The 1-hour mean objective for nitrogen dioxide applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations and pavements of busy shopping streets.
- 2.21 EU Directive 2008/50/EC (The European Parliament and the Council of the European Union, 2008) sets limit values for nitrogen dioxide, PM<sub>10</sub> and PM<sub>2.5</sub>, and is implemented in UK law through the Air Quality Standards Regulations (2010). The limit values for nitrogen dioxide are the same numerical concentrations as the UK objectives, but achievement of these values is a national obligation rather than a local one. In the UK, only monitoring and modelling carried out by UK Central Government meets the specification required to assess compliance with the limit values. Central Government does not normally recognise local authority monitoring or local modelling studies when determining the likelihood of the limit values being exceeded, unless such studies have been audited and approved by Defra and DfT's Joint Air Quality Unit (JAQU).
- 2.22 The relevant air quality criteria for this assessment are provided in Table 1.

**Table 1: Air Quality Criteria for Nitrogen Dioxide, PM<sub>10</sub> and PM<sub>2.5</sub>**

| Pollutant                                        | Time Period  | Objective                                                          |
|--------------------------------------------------|--------------|--------------------------------------------------------------------|
| Nitrogen Dioxide                                 | 1-hour Mean  | 200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year |
|                                                  | Annual Mean  | 40 µg/m <sup>3</sup>                                               |
| Fine Particles (PM <sub>10</sub> )               | 24-hour Mean | 50 µg/m <sup>3</sup> not to be exceeded more than 35 times a year  |
|                                                  | Annual Mean  | 40 µg/m <sup>3</sup> <sup>a</sup>                                  |
| Fine Particles (PM <sub>2.5</sub> ) <sup>b</sup> | Annual Mean  | 25 µg/m <sup>3</sup>                                               |

<sup>a</sup> A proxy value of 32 µg/m<sup>3</sup> as an annual mean is used in this assessment to assess the likelihood of the 24-hour mean PM<sub>10</sub> objective being exceeded. Measurements have shown that, above this concentration, exceedances of the 24-hour mean PM<sub>10</sub> objective are possible (Defra, 2018b).

<sup>b</sup> The PM<sub>2.5</sub> objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

### Screening Criteria for Road Traffic Assessments

- 2.23 Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM)<sup>1</sup> recommend a two-stage screening approach (Moorcroft and Barrowcliffe et al, 2017) to determine whether emissions from road traffic generated by a development have the potential for significant air quality impacts. The approach, as described in Appendix A1, first considers the size and parking provision of a development; if the development is residential and is for fewer than ten homes or covers less than 0.5 ha, or is non-residential and will provide less than 1,000 m<sup>2</sup> of floor space or cover a site area of less than 1 ha, and will provide ten or fewer parking spaces, then there is no need to progress to a detailed assessment. The second stage then compares the changes in vehicle flows on local roads that a development will lead to against specified screening criteria. Where these criteria are exceeded, a detailed assessment is required, although the guidance advises that *“the criteria provided are precautionary and should be treated as indicative”*, and *“it may be appropriate to amend them on the basis of professional judgement”*.

### Assessment of Significance

- 2.24 There is no official guidance in the UK in relation to development control on how to describe air quality impacts, nor how to assess their significance. The approach developed jointly by EPUK and IAQM (Moorcroft and Barrowcliffe et al, 2017) has therefore been used. The guidance recommends that the overall significance of the air quality impacts is determined using professional judgement. Full details of the EPUK/IAQM approach are provided in Appendix A1. The approach includes elements of professional judgement, and the experience of the consultants preparing the report is set out in Appendix A2.

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<sup>1</sup> The IAQM is the professional body for air quality practitioners in the UK.

### 3 Assessment Approach

#### Existing Conditions

- 3.1 Information on existing air quality has been obtained by collating the results of monitoring carried out by the local authority. Background concentrations have been defined using the 2017-based national pollution maps published by Defra (2020a). These cover the whole of the UK on a 1x1 km grid.
- 3.2 Whether or not there are any exceedances of the annual mean EU limit value for nitrogen dioxide in the study area has been identified using the maps of roadside concentrations published by Defra (2020b) (2020c), as well as from any nearby Automatic Urban and Rural Network (AURN) monitoring sites (which operate to EU data quality standards). These maps are used by the UK Government, together with the AURN results, to report exceedances of the limit value to the EU. The national maps of roadside PM<sub>10</sub> and PM<sub>2.5</sub> concentrations (Defra, 2020c), which are available for the years 2009 to 2018, show no exceedances of the limit values anywhere in the UK in 2018.

#### Road Traffic Impacts

- 3.3 The first step in considering the road traffic impacts of the proposed development has been to screen the development and its traffic generation against the criteria set out in the EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017), as described in Paragraph 2.23 and detailed further in Appendix A1. Where impacts can be screened out there is no need to progress to a more detailed assessment.

## 4 Site Description and Baseline Conditions

- 4.1 The proposed development is located adjacent to Safestore Self Storage off Cow Lane, to the west of Reading town centre, as shown in Figure 1. The site is bounded by Cow Lane, railway lines and Safestore Self Storage. The nearest existing residential properties are off Cow Lane on the opposite side of the adjacent railway lines.



**Figure 1: Site Location**

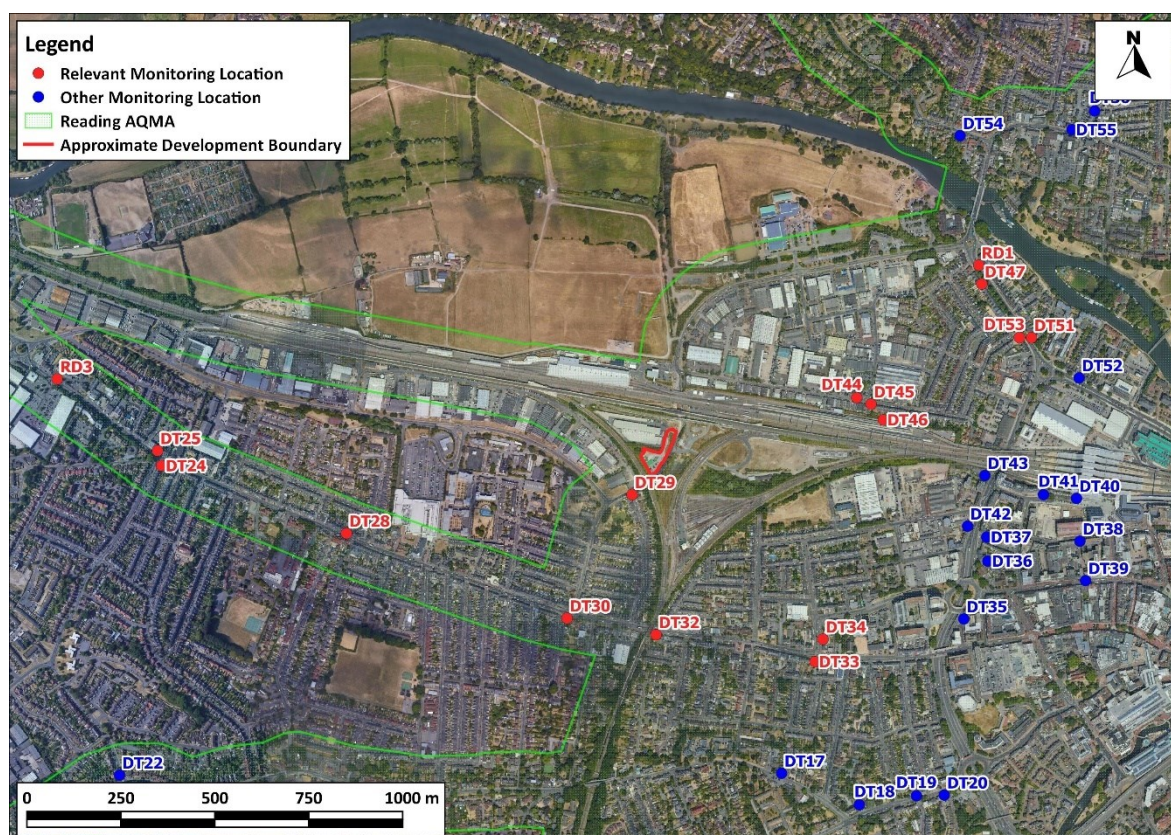
Imagery ©2020 Google.

### Air Quality Management Areas

- 4.2 Reading Borough Council has investigated air quality within its area as part of its responsibilities under the LAQM regime. In September 2006, the Council declared six AQMAs, but these were revoked in September 2009 and replaced by a single AQMA which covers perceived and actual exceedances. The extent of the declared AQMA in the vicinity of the proposed development is shown in Figure 1.
- 4.3 In terms of PM<sub>10</sub>, Reading Borough Council has concluded that there are no exceedances of the objectives. It is, therefore, reasonable to assume that existing PM<sub>10</sub> levels will not exceed the objectives within the study area.

## Local Air Quality Monitoring

- 4.4 Four automatic monitoring stations operated within Reading in 2018, two of which are within 2 km of the proposed development. Reading Borough Council also operates a number of nitrogen dioxide monitoring sites using diffusion tubes prepared and analysed by Gradko (using the 50% TEA in acetone method). These include one site deployed along Cow Lane adjacent to the residential properties nearest the proposed development. Results for the nearby monitoring sites most relevant to this assessment (i.e. along those roads most likely to be used by development-generated traffic) for the years 2014 to 2018 have been extracted from Reading Borough Council's 2019 Annual Status Report (Reading Borough Council, 2019a) and are summarised in Table 2. The monitoring locations are shown in Figure 2.



**Figure 2: Monitoring Locations**

Imagery ©2020 Google.

**Table 2: Summary of Nitrogen Dioxide (NO<sub>2</sub>) Monitoring (2014-2018) <sup>a</sup>**

| Site No.                                      | Site Type | Location           | 2014 | 2015 | 2016 | 2017 | 2018 |
|-----------------------------------------------|-----------|--------------------|------|------|------|------|------|
| Automatic Monitors - Annual Mean (µg/m³)      |           |                    |      |      |      |      |      |
| RD1                                           | Roadside  | Caversham Rd       | 41   | 38   | 39   | 37   | 40   |
| RD3                                           | Roadside  | Oxford Rd          | 35   | 31   | 30   | 28   | 28   |
| Objective                                     |           |                    | 40   |      |      |      |      |
| Automatic Monitors - No. of Hours > 200 µg/m³ |           |                    |      |      |      |      |      |
| RD1                                           | Roadside  | Caversham Rd       | 0    | 1    | 0    | 0    | 7    |
| RD3                                           | Roadside  | Oxford Rd          | 0    | 0    | 0    | 1    | 0    |
| Objective                                     |           |                    | 18   |      |      |      |      |
| Diffusion Tubes - Annual Mean (µg/m³)         |           |                    |      |      |      |      |      |
| DT24                                          | Roadside  | 689 Oxford Road    | 45   | 40   | 40   | 41   | 37   |
| DT25                                          | Roadside  | 744 Oxford Road    | 55   | 47   | 46   | 42   | 47   |
| DT28                                          | Roadside  | 494 Oxford Road    | 38   | 35   | 37   | 32   | 35   |
| DT29                                          | Roadside  | Cow Lane Bridges   | 37   | 31   | 32   | 33   | 29   |
| DT30                                          | Roadside  | 327 Oxford Road    | 49   | 43   | 40   | 40   | 39   |
| DT32                                          | Roadside  | 281 Oxford Road    | 48   | 45   | 44   | 45   | 42   |
| DT33                                          | Roadside  | 165 Oxford Road    | 51   | 47   | 44   | 47   | 42   |
| DT34                                          | Roadside  | 10 Trinity Place   | 32   | 31   | 31   | 29   | 32   |
| DT44                                          | Roadside  | 50 Cardiff Rd      | 36   | 32   | 29   | 30   | 28   |
| DT45                                          | Roadside  | 125 Cardiff Road   | 33   | 32   | 28   | 28   | 23   |
| DT46                                          | Roadside  | Railway Depot      | 42   | 39   | 35   | 34   | 27   |
| DT47                                          | Roadside  | 197 Caversham Road | 43   | 39   | 35   | 36   | 34   |
| DT51                                          | Roadside  | 108 Caversham Road | 48   | 41   | 41   | 40   | 42   |
| DT53                                          | Roadside  | 131 Caversham Road | 47   | 40   | 36   | 36   | 35   |
| Objective                                     |           |                    | 40   |      |      |      |      |

<sup>a</sup> Exceedances of the objectives are shown in bold.

- 4.5 The monitor nearest the proposed development, at Cow Lane Bridges, has consistently measured annual mean nitrogen dioxide concentrations below the objective. However, there are locations along the local road network where the objective continued to be exceeded in 2018. A downward trend is, though, apparent across most of the monitoring sites, suggesting that by the time the proposed development is operational, it would be reasonable to expect concentrations to be lower than they were in 2018.
- 4.6 The data from the two automatic monitors suggests that there is little risk of an exceedance of the 1-hour mean nitrogen dioxide objective in the area, as does all of the annual mean concentrations at the diffusion tube sites being below 60 µg/m<sup>3</sup>.

- 4.7 The automatic monitoring sites also measure PM<sub>10</sub> concentrations. Results for the years 2014 to 2018 are summarised in Table 3; concentrations in the more recent years have been well below the objectives, suggesting little risk of an objective exceedance in the area. The nearby monitors do not measure PM<sub>2.5</sub> concentrations, but the highest concentration measured at the Reading New Town urban background AURN monitor in the east of Reading in the years 2014 to 2018 was 10 µg/m<sup>3</sup>, suggesting that concentrations are likely to be well below the objective across Reading (as road traffic normally contributes only a fraction of total PM<sub>2.5</sub> concentrations even at roadside sites, with concentrations primarily being influenced by background contributions).

**Table 3: Summary of PM<sub>10</sub> Automatic Monitoring (2014-2018) <sup>a</sup>**

| Site No.                                          | Site Type | Location     | 2014                 | 2015  | 2016 | 2017 | 2018 |
|---------------------------------------------------|-----------|--------------|----------------------|-------|------|------|------|
| PM <sub>10</sub> Annual Mean (µg/m <sup>3</sup> ) |           |              |                      |       |      |      |      |
| RD1                                               | Roadside  | Caversham Rd | 33                   | 28    | 20   | 23   | 24   |
| RD3                                               | Roadside  | Oxford Rd    | 20                   | 23    | 22   | 21   | 23   |
| Objective                                         |           |              | 40                   |       |      |      |      |
| PM <sub>10</sub> No. Days >50 µg/m <sup>3</sup>   |           |              |                      |       |      |      |      |
| RD1                                               | Roadside  | Caversham Rd | 31(51)               | 8(41) | 5    | 7    | 3    |
| RD3                                               | Roadside  | Oxford Rd    | 3                    | 7     | 3    | 8    | 2    |
| Objective                                         |           |              | 35 (50) <sup>b</sup> |       |      |      |      |

<sup>a</sup> Exceedances of the objectives are shown in bold.

<sup>b</sup> The 90.4<sup>th</sup> percentile of daily means is provided in parentheses where data capture was <85%.

## Exceedances of EU Limit Value

- 4.8 The Reading New Town urban background AURN monitoring site, located some 3.2 km to the east of the proposed development, has measured concentrations well below the annual mean nitrogen dioxide limit value in all of the years 2014 to 2018. Defra's predicted roadside concentrations for 2018 (Defra, 2020b) identify an exceedance of the limit value along the section of the A329 between the A33 and the A4155. The maps predict that this road will become compliant in 2022. As such, there is only the risk of a limit value exceedance in the vicinity of the proposed development if it is operational in the years 2021 and 2022.
- 4.9 As discussed in Paragraph 2.16, Defra has produced an Air Quality Plan (Defra, 2017) to tackle roadside nitrogen dioxide concentrations in the UK. Within this Plan, Reading Borough Council is identified as having limit value exceedances in or beyond 2017, but not beyond 2020, thus the Plan does not require the authority to undertake any further action. However, a High Court judgement (Royal Courts of Justice, 2018) declared the Plan unlawful with regard to its application to the 45 local authority areas in which exceedances are projected beyond 2017, but not beyond 2020. The judgement required the 33 local authorities where exceedances are projected beyond 2018, of which Reading Borough Council is one, to also "*develop and implement a plan designed*

*to deliver compliance in the shortest time possible*". It is understood that Reading is intending to use bus retrofitting to bring forward compliance.

## Background Concentrations

- 4.10 Estimated background concentrations in the study area have been determined for 2018 using Defra's 2017-based background maps (Defra, 2020a). The background concentrations are set out in Table 4 and are all well below the objectives. The range presented is that across all of the 1x1 km grid squares within the area shown in Figure 2.

**Table 4: Estimated Annual Mean Background Pollutant Concentrations in 2018**

| Year       | NO <sub>2</sub> | PM <sub>10</sub> | PM <sub>2.5</sub> |
|------------|-----------------|------------------|-------------------|
| 2018       | 14.9 – 27.7     | 14.9 – 16.8      | 10.4 – 11.8       |
| Objectives | 40              | 40               | 25 <sup>a</sup>   |

<sup>a</sup> The PM<sub>2.5</sub> objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

## 5 Impact Assessment

- 5.1 Enterprise Rent-a-Car Ltd has advised that the proposed development is expected to handle approximately 97 car rentals in an average week, equating to 194 total rental car trips (97 out, 97 back in). Enterprise Rent-a-Car Ltd also offer a pick-up/drop-off service, meaning that each of those rentals could potentially result in four additional trips (a car going out to collect the customer, then bringing them back to the rental facility, then the same again to drop the customer off after they have returned the rental vehicle). While every customer is unlikely to use this service, if it is conservatively assumed that they do, then the proposed development will generate a total of 582 trips per week, which is 83 per day, on average. Even allowing for staff trips to and from work, the proposed development would generate fewer than 100 vehicle trips per day.
- 5.2 The EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017) recommends a screening threshold for within an AQMA of 100 Annual Average Daily Traffic (AADT) on any one road (see Paragraphs A1.7 to A1.10 in Appendix A1). If the proposed development generates fewer than 100 vehicle trips per day, on average, then there is no risk of it causing an increase greater than this on any one section of road (especially as traffic can be expected to distribute both north and south on Cow Lane). Thus, the potential impact of road traffic emissions generated by the proposed development can be screened as insignificant.
- 5.3 It is also important to note that the vehicles rented by Enterprise Rent-a-Car Ltd can be expected to have lower emissions than the 'average' car. The average age of the rental fleet is less than 12 months, thus all of the traditional combustion engine vehicles can be expected to achieve the latest Euro 6 emissions standard. Enterprise Rent-a-Car Ltd also operates a large proportion of hybrid and electric vehicles when compared to the typical national fleet, further reducing the emissions from the vehicles. The EPUK/IAQM screening thresholds were first recommended in 2015, when very few vehicles (if any) would have met the Euro 6 emissions standard, and there were few hybrid or electric vehicles. Therefore, 100 'average' vehicles in 2015, on which the screening criterion in the guidance is based, would generate considerably higher pollutant emissions than 100 Enterprise Rent-a-Car Ltd vehicles. This further emphasises that the proposed development will not significantly affect local air quality.

### Significance of Operational Air Quality Effects

- 5.4 The operational air quality effects without mitigation are judged to be 'not significant'. This professional judgement is made in accordance with the methodology set out in Appendix A1, and is based on the assessment that the level of traffic generated by the proposed development is below the published screening threshold, thus there is no risk of significant effects.

## 6 Mitigation

### Mitigation Included by Design

6.1 The EPUK/IAQM guidance advises that good design and best practice measures should be considered, whether or not more specific mitigation is required. The proposed development incorporates the following good design and best practice measures:

- the use of a vehicle fleet that is, on average, less than a year old, and which will meet the latest, lowest, emissions standards;
- the use of a fleet that includes a high proportion of hybrid and electric vehicles; and
- the provision of two car club parking spaces and car club vehicles.

### Recommended Mitigation

6.2 The assessment has demonstrated that the proposed development will not have a significant effect on local air quality. It is, therefore, not considered appropriate to propose further mitigation measures for this development.

6.3 Mitigation measures to reduce pollutant emissions from road traffic are principally being delivered in the longer term by the introduction of more stringent emissions standards, largely via European legislation (which is written into UK law). The local air quality plan that Reading Borough Council is required to produce in order to address limit value exceedances in its area will also help to improve air quality, as will the Council's Air Quality Action Plan.

## 7 Conclusions

- 7.1 The operational impacts of increased emissions arising from the additional traffic on local roads due to the proposed development have been assessed. The trip generation of the proposed development on local roads will be below the published screening threshold, thus it will not have a significant effect on local air quality.
- 7.2 The fleet operated by the Enterprise Rent-a-Car Ltd will also be newer and cleaner than the average fleet, ensuring that emissions from the proposed development are minimised.
- 7.3 The overall operational air quality effects of the development are judged to be 'not significant', and the proposed development is judged to be compliant with policy EN15 of the Reading Borough Local Plan.

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## 9 Glossary

|                         |                                                                                                                                                                                                                                                                                                     |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>AADT</b>             | Annual Average Daily Traffic                                                                                                                                                                                                                                                                        |
| <b>AQC</b>              | Air Quality Consultants                                                                                                                                                                                                                                                                             |
| <b>AQAL</b>             | Air Quality Assessment Level                                                                                                                                                                                                                                                                        |
| <b>AQMA</b>             | Air Quality Management Area                                                                                                                                                                                                                                                                         |
| <b>Defra</b>            | Department for Environment, Food and Rural Affairs                                                                                                                                                                                                                                                  |
| <b>DfT</b>              | Department for Transport                                                                                                                                                                                                                                                                            |
| <b>EPUK</b>             | Environmental Protection UK                                                                                                                                                                                                                                                                         |
| <b>Exceedance</b>       | A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure                                                                                                                            |
| <b>EV</b>               | Electric Vehicle                                                                                                                                                                                                                                                                                    |
| <b>HDV</b>              | Heavy Duty Vehicles (> 3.5 tonnes)                                                                                                                                                                                                                                                                  |
| <b>HMSO</b>             | Her Majesty's Stationery Office                                                                                                                                                                                                                                                                     |
| <b>IAQM</b>             | Institute of Air Quality Management                                                                                                                                                                                                                                                                 |
| <b>JAQU</b>             | Joint Air Quality Unit                                                                                                                                                                                                                                                                              |
| <b>kph</b>              | Kilometres Per hour                                                                                                                                                                                                                                                                                 |
| <b>LAQM</b>             | Local Air Quality Management                                                                                                                                                                                                                                                                        |
| <b>LDV</b>              | Light Duty Vehicles (<3.5 tonnes)                                                                                                                                                                                                                                                                   |
| <b>µg/m<sup>3</sup></b> | Microgrammes per cubic metre                                                                                                                                                                                                                                                                        |
| <b>NO</b>               | Nitric oxide                                                                                                                                                                                                                                                                                        |
| <b>NO<sub>2</sub></b>   | Nitrogen dioxide                                                                                                                                                                                                                                                                                    |
| <b>NO<sub>x</sub></b>   | Nitrogen oxides (taken to be NO <sub>2</sub> + NO)                                                                                                                                                                                                                                                  |
| <b>NPPF</b>             | National Planning Policy Framework                                                                                                                                                                                                                                                                  |
| <b>Objectives</b>       | A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides |
| <b>OLEV</b>             | Office for Low Emission Vehicles                                                                                                                                                                                                                                                                    |

|                         |                                                                                                                       |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>PM<sub>10</sub></b>  | Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter       |
| <b>PM<sub>2.5</sub></b> | Small airborne particles less than 2.5 micrometres in aerodynamic diameter                                            |
| <b>PPG</b>              | Planning Practice Guidance                                                                                            |
| <b>Standards</b>        | A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal |
| <b>TEA</b>              | Triethanolamine – used to absorb nitrogen dioxide                                                                     |

## 10 Appendices

|    |                                                    |    |
|----|----------------------------------------------------|----|
| A1 | EPUK & IAQM Planning for Air Quality Guidance..... | 25 |
| A2 | Professional Experience.....                       | 31 |

## A1 EPUK & IAQM Planning for Air Quality Guidance

A1.1 The guidance issued by EPUK and IAQM (Moorcroft and Barrowcliffe et al, 2017) is comprehensive in its explanation of the place of air quality in the planning regime. Key sections of the guidance not already mentioned above are set out below.

### Air Quality as a Material Consideration

*“Any air quality issue that relates to land use and its development is capable of being a material planning consideration. The weight, however, given to air quality in making a planning application decision, in addition to the policies in the local plan, will depend on such factors as:*

- *the severity of the impacts on air quality;*
- *the air quality in the area surrounding the proposed development;*
- *the likely use of the development, i.e. the length of time people are likely to be exposed at that location; and*
- *the positive benefits provided through other material considerations”.*

### Recommended Best Practice

A1.2 The guidance goes into detail on how all development proposals can and should adopt good design principles that reduce emissions and contribute to better air quality management. It states:

*“The basic concept is that good practice to reduce emissions and exposure is incorporated into all developments at the outset, at a scale commensurate with the emissions”.*

A1.3 The guidance sets out a number of good practice principles that should be applied to all developments that:

- include 10 or more dwellings;
- where the number of dwellings is not known, residential development is carried out on a site of more than 0.5 ha;
- provide more than 1,000 m<sup>2</sup> of commercial floorspace;
- are carried out on land of 1 ha or more.

A1.4 The good practice principles are that:

- New developments should not contravene the Council’s Air Quality Action Plan, or render any of the measures unworkable;

- Wherever possible, new developments should not create a new “street canyon”, as this inhibits pollution dispersion;
- Delivering sustainable development should be the key theme of any application;
- New development should be designed to minimise public exposure to pollution sources, e.g. by locating habitable rooms away from busy roads;
- The provision of at least 1 Electric Vehicle (EV) “rapid charge” point per 10 residential dwellings and/or 1000 m<sup>2</sup> of commercial floorspace. Where on-site parking is provided for residential dwellings, EV charging points for each parking space should be made available;
- Where development generates significant additional traffic, provision of a detailed travel plan (with provision to measure its implementation and effect) which sets out measures to encourage sustainable means of transport (public, cycling and walking) via subsidised or free-ticketing, improved links to bus stops, improved infrastructure and layouts to improve accessibility and safety;
- All gas-fired boilers to meet a minimum standard of <40 mgNO<sub>x</sub>/kWh;
- Where emissions are likely to impact on an AQMA, all gas-fired CHP plant to meet a minimum emissions standard of:
  - Spark ignition engine: 250 mgNO<sub>x</sub>/Nm<sup>3</sup>;
  - Compression ignition engine: 400 mgNO<sub>x</sub>/Nm<sup>3</sup>;
  - Gas turbine: 50 mgNO<sub>x</sub>/Nm<sup>3</sup>.
- A presumption should be to use natural gas-fired installations. Where biomass is proposed within an urban area it is to meet minimum emissions standards of 275 mgNO<sub>x</sub>/Nm<sup>3</sup> and 25 mgPM/Nm<sup>3</sup>.

A1.5 The guidance also outlines that offsetting emissions might be used as a mitigation measure for a proposed development. However, it states that:

*“It is important that obligations to include offsetting are proportional to the nature and scale of development proposed and the level of concern about air quality; such offsetting can be based on a quantification of the emissions associated with the development. These emissions can be assigned a value, based on the “damage cost approach” used by Defra, and then applied as an indicator of the level of offsetting required, or as a financial obligation on the developer. Unless some form of benchmarking is applied, it is impractical to include building emissions in this approach, but if the boiler and CHP emissions are consistent with the standards as described above then this is not essential”.*

A1.6 The guidance offers a widely used approach for quantifying costs associated with pollutant emissions from transport. It also outlines the following typical measures that may be considered to

offset emissions, stating that measures to offset emissions may also be applied as post assessment mitigation:

- Support and promotion of car clubs;
- Contributions to low emission vehicle refuelling infrastructure;
- Provision of incentives for the uptake of low emission vehicles;
- Financial support to low emission public transport options; and
- Improvements to cycling and walking infrastructures.

## Screening

### *Impacts of the Local Area on the Development*

*“There may be a requirement to carry out an air quality assessment for the impacts of the local area’s emissions on the proposed development itself, to assess the exposure that residents or users might experience. This will need to be a matter of judgement and should take 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 nitrogen dioxide), 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”.*

### *Impacts of the Development on the Local Area*

A1.7 The guidance sets out two stages of screening criteria that can be used to identify whether a detailed air quality assessment is required, in terms of the impact of the development on the local area. The first stage is that you should proceed to the second stage if any of the following apply:

- 10 or more residential units or a site area of more than 0.5 ha residential use; and/or
- more than 1,000 m<sup>2</sup> of floor space for all other uses or a site area greater than 1 ha.

A1.8 Coupled with any of the following:

- the development has more than 10 parking spaces; and/or

- the development will have a centralised energy facility or other centralised combustion process.

A1.9 If the above do not apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area. If they do apply then you proceed to stage 2, which sets out indicative criteria for requiring an air quality assessment. The stage 2 criteria relating to vehicle emissions are set out below:

- the development will lead to a change in LDV flows of more than 100 AADT within or adjacent to an AQMA or more than 500 AADT elsewhere;
- the development will lead to a change in HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;
- the development will lead to a realigning of 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;
- the development will introduce a new junction or remove an existing junction near to relevant receptors, and the junction will cause traffic to significantly change vehicle acceleration/deceleration, e.g. traffic lights or roundabouts;
- the development will introduce or change a bus station where bus flows will change by more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere; and
- the development will have an underground car park with more than 100 movements per day (total in and out) with an extraction system that exhausts within 20 m of a relevant receptor.

A1.10 The criteria are more stringent where the traffic impacts may arise on roads where concentrations are close to the objective. The presence of an AQMA is taken to indicate the possibility of being close to the objective, but where whole authority AQMAs are present and it is known that the affected roads have concentrations below 90% of the objective, the less stringent criteria are likely to be more appropriate.

A1.11 On combustion processes (including standby emergency generators and shipping) where there is a risk of impacts at relevant receptors, the guidance states that:

*“Typically, any combustion plant where the single or combined NO<sub>x</sub> emission rate is less than 5 mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion. As a guide, the 5 mg/s criterion equates to a 450 kW ultra-low NO<sub>x</sub> gas boiler or a 30kW CHP unit operating at <95mg/Nm<sup>3</sup>.*

*In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates.*

*Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable”.*

- A1.12 Should none of the above apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area, provided that professional judgement is applied; the guidance importantly states the following:

*“The criteria provided are precautionary and should be treated as indicative. They are intended to function as a sensitive ‘trigger’ for initiating an assessment in cases where there is a possibility of significant effects arising on local air quality. This possibility will, self-evidently, not be realised in many cases. The criteria should not be applied rigidly; in some instances, it may be appropriate to amend them on the basis of professional judgement, bearing in mind that the objective is to identify situations where there is a possibility of a significant effect on local air quality”.*

- A1.13 Even if a development cannot be screened out, the guidance is clear that a detailed assessment is not necessarily required:

*“The use of a Simple Assessment may be appropriate, where it will clearly suffice for the purposes of reaching a conclusion on the significance of effects on local air quality. The principle underlying this guidance is that any assessment should provide enough evidence that will lead to a sound conclusion on the presence, or otherwise, of a significant effect on local air quality. A Simple Assessment will be appropriate, if it can provide this evidence. Similarly, it may be possible to conduct a quantitative assessment that does not require the use of a dispersion model run on a computer”.*

- A1.14 The guidance also outlines what the content of the air quality assessment should include, and this has been adhered to in the production of this report.

## **Assessment of Significance**

- A1.15 There is no official guidance in the UK in relation to development control on how to describe the nature of air quality impacts, nor how to assess their significance. The approach within the EPUK/IAQM guidance has, therefore, been used in this assessment. This approach involves a two stage process:

- a qualitative or quantitative description of the impacts on local air quality arising from the development; and
- a judgement on the overall significance of the effects of any impacts.

A1.16 The guidance recommends that the assessment of significance should be based on professional judgement, with the overall air quality impact of the development described as either 'significant' or 'not significant'. In drawing this conclusion, the following factors should be taken into account:

- the existing and future air quality in the absence of the development;
- the extent of current and future population exposure to the impacts;
- the influence and validity of any assumptions adopted when undertaking the prediction of impacts;
- the potential for cumulative impacts and, in such circumstances, several impacts that are described as '*slight*' individually could, taken together, be regarded as having a significant effect for the purposes of air quality management in an area, especially where it is proving difficult to reduce concentrations of a pollutant. Conversely, a '*moderate*' or '*substantial*' impact may not have a significant effect if it is confined to a very small area and where it is not obviously the cause of harm to human health; and
- the judgement on significance relates to the consequences of the impacts; will they have an effect on human health that could be considered as significant? In the majority of cases, the impacts from an individual development will be insufficiently large to result in measurable changes in health outcomes that could be regarded as significant by health care professionals.

A1.17 The guidance is clear that other factors may be relevant in individual cases. It also states that the effect on the residents of any new development where the air quality is such that an air quality objective is not met will be judged as significant. For people working at new developments in this situation, the same will not be true as occupational exposure standards are different, although any assessment may wish to draw attention to the undesirability of the exposure.

A1.18 A judgement of the significance should be made by a competent professional who is suitably qualified. A summary of the professional experience of the staff contributing to this assessment is provided in Appendix A2.

## A2 Professional Experience

### **Stephen Moorcroft, BSc (Hons) MSc DIC CEnv MEnvSc MIAQM**

Mr Moorcroft is a Director of Air Quality Consultants, and has worked for the company since 2004. He has over 35 years' postgraduate experience in environmental sciences. Prior to joining Air Quality Consultants, he was the Managing Director of Casella Stanger, with responsibility for a business employing over 100 staff and a turnover of £12 million. He also acted as the Business Director for Air Quality services, with direct responsibility for a number of major Government projects. He has considerable project management experience associated with Environmental Assessments in relation to a variety of development projects, including power stations, incinerators, road developments and airports, with particular experience related to air quality assessment, monitoring and analysis. He has contributed to the development of air quality management in the UK, and has been closely involved with the LAQM process since its inception. He has given expert evidence to numerous public inquiries, and is frequently invited to present to conferences and seminars. He is a Member of the Institute of Air Quality Management.

### **Penny Wilson, BSc (Hons) CSci MEnvSc MIAQM**

Ms Wilson is an Associate Director with AQC, with more than 19 years' relevant experience in the field of air quality. She has been responsible for numerous assessments for a range of infrastructure developments including power stations, road schemes, ports, airports and residential/commercial developments. The assessments have covered operational and construction impacts, including odours. She also provides services to local authorities in support of their LAQM duties, including the preparation of Review and Assessment and Action Plan reports, as well as audits of Air Quality Assessments submitted with planning applications. She has provided expert evidence to a number of Public Inquiries, and is a Member of the Institute of Air Quality Management and a Chartered Scientist.

### **Ricky Gellatly, BSc (Hons) CSci MEnvSc MIAQM**

Mr Gellatly is a Principal Consultant with AQC with over eight years' relevant experience. He has undertaken air quality assessments for a wide range of projects, assessing many different pollution sources using both qualitative and quantitative methodologies, with most assessments having included dispersion modelling (using a variety of models). He has assessed road schemes, airports, energy from waste facilities, anaerobic digesters, poultry farms, urban extensions, rail freight interchanges, energy centres, waste handling sites, sewage works and shopping and sports centres, amongst others. He also has experience in ambient air quality monitoring, the analysis and interpretation of air quality monitoring data, the monitoring and assessment of nuisance odours

and the monitoring and assessment of construction dust. He is a Member of the Institute of Air Quality Management and is a Chartered Scientist.