

Riverside Day Nursery, Reading

Air Quality Statement

On behalf of **Reading Borough Council**

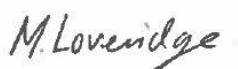


Project Ref: 36876/3001 | Rev: issued | Date: February 2016



Document Control Sheet

Project Name: Riverside Day Nursery, Reading
Project Ref: 36876/3001
Report Title: Air Quality Screening Assessment
Doc Ref: Issued
Date: February 2016

	Name	Position	Signature	Date
Prepared by:	Mark Loveridge	Graduate Engineer		February 2016
Reviewed by:	Graham Harker	Senior Associate		February 2016
Approved by:	Anthony Russell	Partner		February 2016
For and on behalf of Peter Brett Associates LLP				

Revision	Date	Description	Prepared	Reviewed	Approved
Draft	February 2016	Draft for client comments	ML	GH	AR
Issued	February 2016	Issued	ML	GH	AR

Peter Brett Associates LLP disclaims any responsibility to the Client and others in respect of any matters outside the scope of this report. This report has been prepared with reasonable skill, care and diligence within the terms of the Contract with the Client and generally in accordance with the appropriate ACE Agreement and taking account of the manpower, resources, investigations and testing devoted to it by agreement with the Client. This report is confidential to the Client and Peter Brett Associates LLP accepts no responsibility of whatsoever nature to third parties to whom this report or any part thereof is made known. Any such party relies upon the report at their own risk.

© Peter Brett Associates LLP 2016

Contents

1	Introduction	1
1.1	Proposed Development.....	1
1.2	Scope	1
2	Legislation and Policy	2
2.1	The Air Quality Strategy	2
2.2	EU Limit Values	2
2.3	Planning Policy	3
3	Methodology	6
3.1	Existing Conditions	6
4	Existing Air Quality	7
4.1	LAQM	7
4.2	Monitoring	7
4.3	Background Concentrations	8
5	Impact Assessment.....	9
5.1	Suitability of the Site	9
6	Mitigation	11
7	Conclusions	12

Tables

Table 2.1: Nitrogen Dioxide and PM ₁₀ Objectives	3
Table 4.1: Measured Nitrogen Dioxide Concentrations, 2010 - 2014	7
Table 4.2: Estimated Annual Mean Background Concentrations in 2014 (µg/m ³)	8

Appendices

Appendix A	Glossary
Appendix B	References
Appendix C	Figures

1 Introduction

1.1 Proposed Development

- 1.1.1 Reading Borough Council (RBC) has commissioned Peter Brett Associates LLP (PBA) to prepare an air quality statement to answer the planning condition associated with the relocation of Riverside Day Nursery. The condition stated that:

“No development shall commence until a scheme demonstrating sufficient mitigation to protect the development from poor air quality has been submitted to, and approved in writing by, Local Planning Authority. Reason: to protect the health of future occupants of the proposed development and in accordance with policy CS34: Pollution and Water Resources.”

- 1.1.2 The proposed development is an expansion of the ERAPA Community Centre using modular construction to accommodate Riverside Day Nursery, plus associated external works.

1.2 Scope

- 1.2.1 This report describes existing air quality within the study area and considers the suitability of the site for Riverside Day Nursery. The main air pollutants of concern regarding road traffic emissions are nitrogen dioxide (NO₂) and fine particulate matter (PM₁₀).
- 1.2.2 The assessment has been prepared taking into account all relevant local and national guidance and regulations.
- 1.2.3 The scope of the assessment has been discussed and agreed with the Air Quality Officer for RBC, Ross Jarvis.

2 Legislation and Policy

2.1 The Air Quality Strategy

- 2.1.1 The Air Quality Strategy (2007) establishes the policy framework for ambient air quality management and assessment in the UK. The primary objective is to ensure that everyone can enjoy a level of ambient air quality which poses no significant risk to health or quality of life. The Strategy sets out the National Air Quality Objectives (NAQOs) and Government policy on achieving these objectives.
- 2.1.2 Part IV of the Environment Act 1995 introduced a system of Local Air Quality Management (LAQM). This requires local authorities to regularly and systematically review and assess air quality within their boundary, and appraise development and transport plans against these assessments. The relevant NAQOs for LAQM are prescribed in the Air Quality (England) Regulations 2000 and the Air Quality (Amendment) (England) Regulations 2002.
- 2.1.3 Where an objective is unlikely to be met, the local authority must designate an Air Quality Management Area (AQMA) and draw up an Air Quality Action Plan (AQAP) setting out the measures it intends to introduce in pursuit of the objectives within its AQMA.
- 2.1.4 The Local Air Quality Management Technical Guidance 2009 (LAQM.TG(09); Defra, 2009), issued by the Department for Environment, Food and Rural Affairs (Defra) for Local Authorities provides advice as to where the NAQOs apply. These include outdoor locations where members of the public are likely to be regularly present for the averaging period of the objective (which vary from 15 minutes to a year). Thus, for example, annual mean objectives apply at the façades of residential properties, whilst the 24-hour objective (for PM₁₀) would also apply within the garden. They do not apply to occupational, indoor or in-vehicle exposure.

2.2 EU Limit Values

- 2.2.1 The Air Quality Standards Regulations 2010 implements the European Union's Directive on ambient air quality and cleaner air for Europe (2008/50/EC), and includes limit values for NO₂. These limit values are numerically the same as the NAQO values but differ in terms of compliance dates, locations where they apply and the legal responsibility for ensuring that they are complied with. The compliance date for the NO₂ EU Limit Value was 1 January 2010, five years later than the date for the NAQO.
- 2.2.2 Directive 2008/50/EC consolidated the previous framework directive on ambient air quality assessment and management and its first three daughter directives. The limit values remained unchanged, but it now allows Member States a time extension for compliance, subject to European Commission (EC) approval.
- 2.2.3 The UK has a time extension for compliance of the daily PM₁₀ limit value in London until the end of 2011. Despite many areas of the UK not being compliant with the annual average NO₂ limit value, the UK has decided not to seek an extension to the compliance date for this pollutant. This was on the basis that it could not be guaranteed that the UK would be compliant by the latest date allowable under the Directive (1 January 2015).
- 2.2.4 The Directive limit values are applicable at all locations except:
- Where members of the public do not have access and there is no fixed habitation;
 - On factory premises or at industrial installations to which all relevant provisions concerning health and safety at work apply; and
 - On the carriageway of roads; and on the central reservations of roads except where there is normally pedestrian access.

Human Health Assessment Criteria

- 2.2.5 The NAQOs for NO₂ and PM₁₀ set out in the Air Quality Regulations (England) 2000 and the Air Quality (England) (Amendment) Regulations 2002 are shown in **Table 2.1**.

Table 2.1: Nitrogen Dioxide and PM₁₀ Objectives

Pollutant	Time Period	Objective
Nitrogen dioxide (NO ₂)	1-hour mean	200µg/m ³ not to be exceeded more than 18 times a year
	Annual mean	40µg/m ³
Particulate matter (PM ₁₀)	24-hour mean	50µg/m ³ not to be exceeded more than 35 times a year
	Annual mean	40µg/m ³

- 2.2.6 The objectives for NO₂ and PM₁₀ were to have been achieved by 2005 and 2004, respectively, and continue to apply in all future years thereafter. Analysis of long term monitoring data suggests that if the annual mean NO₂ concentration is less than 60µg/m³ then the one-hour mean NO₂ objective is unlikely to be exceeded where road transport is the main source of pollution. This concentration has been used to screen whether the one-hour mean objective is likely to be achieved (Defra, 2009).

2.3 Planning Policy

National Policy

- 2.3.1 The National Planning Policy Framework was published in March 2012. This sets out the Government's planning policies for England and how they are expected to be applied. In relation to conserving and enhancing the natural environment, paragraph 109 states that;

"The planning system should contribute to and enhance the natural and local environment by.... preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability."

- 2.3.2 Paragraph 124, also states that;

"Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan."

- 2.3.3 Paragraph 203 goes on to say;

"Local planning authorities should consider whether otherwise unacceptable development could be made acceptable through the use of conditions or planning obligations. Planning obligations should only be used where it is not possible to address unacceptable impacts through a planning condition."

Planning Practice Guidance

- 2.3.4 Planning Practice Guidance (PPG) was published in March 2014 to support the National Planning Policy Framework. Paragraph 001, Reference 32-001-20 of the PPG provides a summary as to why air quality is a consideration for planning;

“...Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with EU Limit Values. It is important that the potential impact of new development on air quality is taken into account in planning where the national assessment indicates that relevant limits have been exceeded or are near the limit....The local air quality management (LAQM) regime requires every district and unitary authority to regularly review and assess air quality in their area. These reviews identify whether national objectives have been, or will be, achieved at relevant locations, by an applicable date....If national objectives are not met, or at risk of not being met, the local authority concerned must declare an air quality management area and prepare an air quality action plan.....Air quality can also affect biodiversity and may therefore impact on our international obligations under the Habitats Directive.....Odour and dust can also be a planning concern, for example, because of the effect on local amenity.”

- 2.3.5 Paragraph 002, Reference 32-002-20140306, of the PPG concerns the role of Local Plans with regard to air quality;

“....Drawing on the review of air quality carried out for the local air quality management regime, the Local Plan may need to consider;

- *the potential cumulative impact of a number of smaller developments on air quality as well as the effect of more substantial developments;*
- *the impact of point sources of air pollution..; and*
- *ways in which new development would be appropriate in locations where air quality is or likely to be a concern and not give rise to unacceptable risks from pollution. This could be through, for example, identifying measures for offsetting the impact on air quality arising from new development including supporting measures in an air quality action plan or low emissions strategy where applicable.”*

- 2.3.6 Paragraph 005, Reference 32-005-20140306, of the PPG identifies when air quality could be relevant for a planning decision;

“....When deciding whether air quality is relevant to a planning application, considerations could include whether the development would;

- *significantly affect traffic in the immediate vicinity of the proposed development site or further afield. This could be by generating or increasing traffic congestion; significantly changing traffic volumes, vehicle speed or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; adds to turnover in a large car park; or result in construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more;*
- *introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; or extraction systems (including chimneys) which require approval under pollution control legislation or biomass boilers or biomass-fuelled CHP plant; centralised boilers or CHP plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area;*
- *expose people to existing sources of air pollutants. This could be by building new homes, workplaces or other development in places with poor air quality;*
- *give rise to potentially unacceptable impact (such as dust) during construction for nearby sensitive locations; and*

- *affect biodiversity. In particular, is it likely to result in deposition or concentration of pollutants that significantly affect a European-designated wildlife site, and is not directly connected with or necessary to the management of the site, or does it otherwise affect biodiversity, particularly designated wildlife sites.”*

2.3.7 Paragraph 007, Reference 32-007-20140306, of the PPG provides guidance on how detailed an assessment needs to be;

“Assessments should be proportionate to the nature and scale of development proposed and the level of concern about air quality, and because of this are likely to be locationally specific.”

2.3.8 Paragraph 008, Reference 32-008-20140306, of the PPG provides guidance on how an impact on air quality can be mitigated;

“Mitigation options where necessary will be locationally specific, will depend on the proposed development and should be proportionate to the likely impact....Examples of mitigation include;

- *the design and layout of development to increase separation distances from sources of air pollution;*
- *using green infrastructure, in particular trees, to absorb dust and other pollutants;*
- *means of ventilation;*
- *promoting infrastructure to promote modes of transport with low impact on air quality;*
- *controlling dust and emissions from construction, operation and demolition; and*
- *contributing funding to measures, including those identified in air quality action plans and low emission strategies, designed to offset the impact on air quality arising from new development.”*

2.3.9 Paragraph 009, Reference 32-009-20140306, of the PPG provides guidance on how considerations about air quality fit into the development management process by means of a flowchart. The final two stages in the process deal with the results of the assessment;

“Will the proposed development (including mitigation) lead to an unacceptable risk from air pollution, prevent sustained compliance with EU limit values or national objectives for pollutants or fail to comply with the requirements of the Habitats Regulations.” If Yes:

“Consider how the proposal could be amended to make it acceptable or, where not practicable, consider whether planning permission should be refused.”

Local Policy

2.3.10 The RBC Core Strategy was adopted in January 2008 with alterations being made and adopted in January 2015. The Core Strategy sets out the Council's adopted planning strategy for the Borough. It sets out how planning and development will achieve the Reading 2020 Vision for the town. The core strategy provides a framework for how Reading can grow in a sustainable way in the future (Reading Borough Council, 2015)

2.3.11 Within the Core Strategy Policy CS34: *Pollution and Water* states that development will only be permitted where it would not be damaging to the environment through air, land, noise or light pollution (Reading Borough Council, 2015).

Air Quality Action Plan

2.3.12 RBC has declared one AQMA within the area therefore the Council have a responsibility to produce an Air Quality Action Plan (AQAP). The last AQAP was published in 2009 (Reading Borough Council, 2009).

3 Methodology

3.1 Existing Conditions

- 3.1.1 Information on existing air quality has been obtained by collating the results of monitoring carried out by RBC. Background concentrations for the site have been defined using the national pollution maps published by Defra. These cover the whole country on a 1x1 km grid (Defra, 2015).
- 3.1.2 For this assessment it has been agreed with the Air Quality Officer that the Defra nitrogen dioxide distance calculator could be used to estimate pollutant concentrations within the proposed development site. This calculator enables the pollutant concentrations at one distance from a road to be translated to a different distance.

4 Existing Air Quality

4.1 LAQM

- 4.1.1 RBC has investigated air quality within its area as part of its responsibilities under the LAQM regime, to date, one AQMA has been declared within Reading. The AQMA covers the central area of Reading and the main arterial roads. The site lies within the AQMA, although pollutant concentrations are only elevated alongside the main roads.

4.2 Monitoring

Nitrogen Dioxide

- 4.2.1 There are two automatic monitoring stations within close proximity of the development. The AURN monitoring station is approximately 230 m from the site and the RD2 monitoring location is located approximately 615 m from the site. The Council also deploys NO₂ diffusion tubes at a number of locations. There are two diffusion tubes in close proximity to the site. Site 5 (162 London Road) is approximately 100m from the site and site 61 (419 London Road) is approximately 140m from the site. Data for these sites are presented in **Table 4.1** and the locations are shown in **Figure 1**.

Table 4.1: Measured Nitrogen Dioxide Concentrations, 2010 - 2014

Site ID	Site Type	Within AQMA	Annual Mean (µg/m³)				
			2010	2011	2012	2013	2014
Automatic Stations							
Reading Kings Road ^a	R	Y	53	53	54	61	49
AURN ^b	Urban Background	Y	26	27	25	27	27
Diffusion Tubes							
162 London Road ^c	R	Y	42	43	45	46	49
419 London Road ^c	R	Y	38	39	45	48	45
Objective			40				

R = Roadside

Exceedances shown in bold.

^a Data taken from Air Quality England <http://www.airqualityengland.co.uk/>

^b Data taken from the RBC 2013 Progress Report and Defra website.

<https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs> 2015 USA not currently available.

^c Data taken from 2014 diffusion tube results provided by RBC. 2015 USA not currently available.

- 4.2.2 NO₂ concentrations at the monitoring sites adjacent to the main roads are above the objective and have remained fairly constant over the 2010 to 2014 period.
- 4.2.3 Data from the AURN site confirms that background concentrations away from the main road are much lower. The concentrations at the AURN site are likely to be more representative of NO₂ concentrations at the Riverside Day Nursery site.

Particulates

- 4.2.4 There is no PM₁₀ monitoring carried out in close proximity to the site.

4.3 Background Concentrations

- 4.3.1 In addition to measured concentrations, estimated background concentrations for the site have been obtained from the national maps published by Defra ([Table 4.2](#)).
- 4.3.2 The background concentrations are all below the relevant objectives in 2014. The estimated NO₂ concentration is only slightly lower than the measured AURN concentration.

Table 4.2: Estimated Annual Mean Background Concentrations in 2014 (µg/m³)

Year	NO _x	NO ₂	PM ₁₀
2014	39.0	24.8	19.3
Objective	-	40	40

5 Impact Assessment

5.1 Suitability of the Site

- 5.1.1 Measured NO₂ concentrations at the nearest roadside monitoring sites show that concentrations were above the relevant objective between 2010 and 2014 (**Table 4.1**), however the sites are located much closer to the road than the Riverside Day Nursery site and therefore concentrations at the Riverside Day Nursery site are expected to be much lower.
- 5.1.2 In order to estimate the concentrations at the proposed site the Defra nitrogen dioxide distance calculator has been used. When receptors are further from the kerb than the monitor, it is recommended that the receptor and monitor should be within 20 m of each other. The calculator has therefore initially been run at a distance of 21 m from the kerb of the road in order that it remains within its valid range of use.
- 5.1.3 The calculations show that the predicted annual mean NO₂ concentrations at both monitoring locations would be below the objective concentrations at a distance of 21 m from the kerb of London Road. Given that the Riverside Day Nursery site is approximately 50 m from the kerb of London Road, the annual mean NO₂ concentrations will be much lower than shown in the calculations.

Figure 5.1: Nitrogen Dioxide Fall Off With Distance at 162 London Road

This calculator allows you to predict the annual mean NO₂ concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.



Enter data into the yellow cells

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	6.5	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	21	metres
Step 3	What is the local annual mean background NO₂ concentration (in µg/m³)?	(Note 2)	24.8	µg/m ³
Step 4	What is your measured annual mean NO₂ concentration (in µg/m³)?	(Note 2)	49	µg/m ³
Result	The predicted annual mean NO₂ concentration (in µg/m³) at your receptor	(Note 3)	39.8	µg/m ³

Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road - see the FAQ at <http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm> for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at www.airquality.co.uk, or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

Issue 4: 25/01/11 Created by Dr Ben Marner; Approved by Prof Duncan Laxen. Contact: benmarner@aqconsultants.co.uk

Figure 5.2: Nitrogen Dioxide Fall Off With Distance at 419 London Road

This calculator allows you to predict the annual mean NO₂ concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.



Enter data into the yellow cells

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	9	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	21	metres
Step 3	What is the local annual mean background NO₂ concentration (in µg/m³)?	(Note 2)	24.8	µg/m ³
Step 4	What is your measured annual mean NO₂ concentration (in µg/m³)?	(Note 2)	45	µg/m ³
Result	The predicted annual mean NO₂ concentration (in µg/m³) at your receptor	(Note 3)	38.8	µg/m ³

Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road - see the FAQ at <http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm> for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at www.airquality.co.uk, or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

Issue 4: 25/01/11 Created by Dr Ben Marner; Approved by Prof Duncan Laxen. Contact: benmarner@aqconsultants.co.uk

- 5.1.4 As annual mean NO₂ concentrations are below the objective, other pollutant concentrations will also be below the relevant objectives as the main source of pollution in the area is road traffic emissions.

6 Mitigation

- 6.1.1 The assessment has demonstrated that annual mean NO₂ concentrations are likely to be significantly below the relevant objective within the proposed development site. Additional mitigation against poor air quality is therefore not required.

7 Conclusions

- 7.1.1 Based on measured roadside NO₂ concentrations and the distance from the kerb of the road to the Riverside Day Nursery site, there are no predicted exceedances of air quality strategy objectives within the proposed development site.
- 7.1.2 No additional mitigation is therefore required against poor air quality, as the separation distance to the road is sufficient mitigation.

Appendix A Glossary

AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
Diffusion Tube	A passive sampler used for collecting NO ₂ in the air
LAQM	Local Air Quality Management
NAQO	National Air Quality Objective as set out in the Air Quality Strategy and the Air Quality Regulations
NO ₂	Nitrogen dioxide
NO _x	Nitrogen oxides, generally considered to be nitric oxide and NO ₂ . Its main source is from combustion of fossil fuels, including petrol and diesel used in road vehicles
PM ₁₀	Small airborne particles less than 10µm in diameter
PPG	Planning Practice Guidance
RBC	Reading Borough Council

Appendix B References

Department of the Environment, Food and Rural Affairs (Defra) in partnership with the Scottish Executive, The National Assembly for Wales and the Department of the Environment for Northern Ireland (2009). *Local Air Quality Management Technical Guidance, LAQM.TG(09)*. HMSO, London.

Department of the Environment, Transport and the Regions (DETR, 2007) in Partnership with the Welsh Office, Scottish Office and Department of the Environment for Northern Ireland (2007). *The Air Quality Strategy for England, Scotland, Wales, Northern Ireland*, HMSO, London.

Department of the Environment, Food and Rural Affairs (Defra) (2015). *2011 Based Background Maps for NO_x, NO₂, PM₁₀ and PM_{2.5}*. Available: <http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2011>

Environmental Act 1995, Part IV.

Reading Borough Council (2009) '*Air Quality Action Plan*'.

Available at: <http://beta.reading.gov.uk/media/1262/Air-Quality-Action-Plan/pdf/AIR-QUALITY-ACTION-PLAN.pdf>

Reading Borough Council (2015) '*Reading Borough Local Development Framework: Core Strategy*'.

Available at: <http://beta.reading.gov.uk/media/1046/Core-Strategy-Adopted-January-2008/pdf/Core-Strategy-Adopted-Jan08-Altered-Jan15.pdf>

Appendix C Figures

