
A47 Earl Shilton Bypass

Revised Air Quality Data For 37 The Crescent and 14 Wilkinson Lane

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1.0 INTRODUCTION

- 1.1 Further to the issue of the Environmental Statement for the A47 Earl Shilton Bypass scheme in January 2003, a request was made by Blaby District Council to recalculate the Air Quality at 37 The Crescent and 14 Wilkinson Lane in accordance with the February 2003 amendment of the Design Manual for Roads and Bridges Volume 11, Section 3, Part 1.
- 1.2 The amendments to the DMRB include revisions to the emission rates used in the calculations and amendments to the air quality objectives, both in terms of concentrations and measurement criteria. The values produced in this report are therefore not directly comparable to those produced in the original Environmental Statement.
- 1.3 The conclusions of the analysis are similar to the original Environmental Statement in that after construction of the proposed bypass, the predicted pollutant levels at the properties would be below the existing levels and the objectives of the UK Air Quality Strategy.

2.0 AIR QUALITY STANDARDS

- 2.1 The revised air quality objectives are listed in Table 4 of Volume 11 Section 3 Part 1 and are summarised in Table 1 below.

Table 1
Air Quality Objectives

Pollutant	Objective		Date to be Achieved by
	Concentration *	Measured as	
Nitrogen dioxide	200 µg/m ³ (105ppb) not to be exceeded more than 18 times a year	1 hour mean	31 December 2005
	40 µg/m ³ (21ppb)	annual mean	31 December 2005
Particles (PM ₁₀)	50 µg/m ³ not to be exceeded more than 35 times a year	24 hour mean	31 December 2004
	40 µg/m ³	annual mean	31 December 2004
	20 µg/m ³	annual mean	31 December 2010
Benzene	16.25 µg/m ³ (5ppb)	running annual mean	31 December 2003
1,3-Butadiene	2.25 µg/m ³ (1ppb)	running annual mean	31 December 2003
Carbon monoxide	10 mg/m ³ (8ppb)	running 8 hour mean	31 December 2003
Lead	0.5 µg/m ³	Annual mean	31 December 2004
	0.25 µg/m ³	Annual mean	31 December 2008
Sulphur dioxide	350 µg/m ³ (132ppb) not to be exceeded more than 24 times a year	1 hour mean	31 December 2004
	125 µg/m ³ (47ppb) not to be exceeded more than 3 times a year	24 hour mean	31 December 2005
	266 µg/m ³ (100ppb) not to be exceeded more than 35 times a year	15 minute mean	31 December 2005

3.0 ASSESSMENT OF AIR POLLUTION

- 3.1 The Air Quality Assessment has been based on the recommendations of the Design Manual for Roads and Bridges (DMRB): Volume 11 - Environmental Assessment; Section 3, Air Quality (February 2003). This amendment includes a spreadsheet for calculating air quality using the DMRB screening method to estimate localised impacts on individual receptors. If the resultant concentration of any pollutant exceeds the prescribed standards, the DMRB recommends that a more thorough air quality investigation be considered.
- 3.2 The effects of air pollution on an area near a highway are complex and, in order to forecast the possible localised impacts, it is necessary to make a three-way comparison. The current air quality levels are compared with those anticipated with the Scheme (Scheme 2006) and without the Scheme (Do-Minimum 2006). The road networks for the Existing and Do-Minimum conditions are the same.
- 3.3 Background concentrations were obtained from the NETCEN 2003 Air Quality archive (www.airquality.co.uk) and are enclosed in Appendix 1.
- 3.4 Traffic flows used are as per the air quality calculations in the Environmental Statement multiplied by a factor of 24 to give the Annual Average Daily Traffic as required for input into the DMRB spreadsheet.
- 3.5 The analysis was undertaken for two properties close to the proposed bypass at the request of Blaby District Council. The properties were 37 The Crescent and 14 Wilkinson Lane.
- 3.6 The results of the analysis are summarised in Table 2 and detailed in Appendix 2. The values differ from those in the Environmental Statement due to the changes in parameters for emission values and for background concentrations. Many of the values are also calculated in a different format by the DMRB spreadsheet (e.g. $\mu\text{g}/\text{m}^3$ may be used rather than ppb).

Table 2
Localised Air Quality Assessment

Location	Scenario	CO (mg/m^3)		Benzene ($\mu\text{g}/\text{m}^3$)	NO ₂ ($\mu\text{g}/\text{m}^3$)	PM ₁₀ ($\mu\text{g}/\text{m}^3$)	
		Annual Mean	Max*	Annual Mean	Annual Mean	Annual Mean	Days > 50
37 The Crescent	2001	0.34	3.4	0.53	29.01	22.11	6.48
	2006 DM	0.22	2.2	0.40	24.84	20.19	3.64
	2006 S	0.23	2.3	0.41	25.96	20.62	4.21
14 Wilkinson Lane	2001	0.37	3.7	0.55	30.09	22.58	7.32
	2006 DM	0.23	2.3	0.41	25.67	20.55	4.11
	2006 S	0.23	2.3	0.41	25.57	20.47	4.00
STANDARDS			10	16.25	40	40	35

* Conversion factor of 10 applied to Annual Mean to give estimated maximum value

- 3.7 The results of the analysis are considered in detail below. As anticipated for each location, the existing air pollution levels are higher than the 2006 scenario. This is because, despite the higher traffic flows forecast in the year 2006, vehicle emissions are expected to be much lower due to technological advances and more stringent legislation.
- 3.8 Inspection of Table 2 shows concentrations of benzene and carbon monoxide considerably below the prescribed standards in the existing situation. In 2006 it is predicted that these levels will be lower both without the proposed scheme and after the bypass is opened.
- 3.9 The levels of NO₂ are currently within accepted standards. The assessment indicates that at the time of scheme opening these levels will be below current values both with the bypass or under Do Minimum conditions.
- 3.9 The levels of particulate matter (PM₁₀) are within the standards at 2001 for the two properties. The assessment for 2006 shows that in both the do minimum and the scheme scenarios these levels will reduce further. The values for PM10 calculated in the original Environmental Statement used the 99th %ile of 24hr values as this was the objective level at the time. The new spreadsheet based approach calculates the Annual Mean figures and the number of days that a 24 hour mean of greater than 50µg/m³ is exceeded for a direct comparison with the revised objectives.

4.0 CONCLUSIONS

- 4.1 This assessment has been undertaken using the latest standards in the Design Manual for Roads and Bridges Volume 11, Section 3, Part 1, which was revised in February 2003. The calculations have been undertaken using the DMRB Screening Method spreadsheet V1.01.
- 4.2 The traffic flows used in this Air Quality assessment are the highest forecasts for 2006 and represent the worst case conditions.
- 4.3 Although traffic flows are forecast to increase, estimates of localised air pollution in the opening year of 2006 are generally well within current recognised air quality standards required in the DMRB assessment. In all locations, the Scheme would provide lower emissions than the current situation. The most significant factor contributing to this improvement is progressively stricter legislation that has been introduced since the early 1970s to reduce vehicle exhaust emissions.

APPENDIX 1

Background Concentrations

BACKGROUND CONCENTRATION LEVELS

	2001	2003	2004	2005	2006*
NO _x (ug/m ³)	51	-	-	42.4	40.79*
NO ₂ (ug/m ³)	29	-	-	25.5	24.83*
Benzene (ug/m ³)	0.528	0.471	-	-	0.40*
Particles PM10 (ug/m ³)	22.1	-	21.1	-	20.19*
CO (mg/m ³)	0.342	-	-	-	0.22*
1,3-butadiene (ug/m ³)	0.208	0.2	-	-	0.13*

* Conversions to 2006 values carried out using year adjustment calculator on the NETCEN website www.airquality.co.uk

Background data extracted from the LAQM section of the NETCEN website. Data taken from the Blaby DC spreadsheet for OS grid reference 445500, 296500

APPENDIX 2

Local Air Quality Assessment