HIGHWAYS AGENCY

DD28

A453 Widening
M1 Junction 24 to A52 Nottingham

SUMMARY
PROOF OF EVIDENCE
AIR QUALITY

BY

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Inquiry commencing 10/11/09

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1. Introduction

1.1 My name is Matthew Holford. I am an Associate Director with WYG Environment where I specialise in delivering consultancy services in air quality and environmental noise. I hold a Bachelor of Science in Environmental Science and a Masters Degree in Integrated Environmental Management. I am a member of the Chartered Institute of Environmental Health and I am a Chartered Environmental Health Practitioner. I have fourteen years experience in the fields of environmental air quality and noise.

1.2 I have fourteen years experience in the fields of environmental air quality monitoring and assessment. I have been involved in the environmental assessment of the proposed A453 widening scheme since January 2008.

2. Assessment Methodology

2.1 In order to assess the air quality effects of the proposed A453 scheme WYG undertook a number of different air quality assessments based on the methods described in the Design Manual of Roads and Bridges Volume 11, Section 3, Part 7 [DD176] and those contained in the Department for Transport "Transport Analysis Guidance" (webTAG) Environmental Objectives 3.3.3 to 3.3.5 [DD70-DD72]. Three different assessments were carried out based on the local, regional and greenhouse gas units outlined in the webTAG guidance. A further detailed assessment was also carried out in general accordance with the methods described in Local Air Quality Management Technical Guidance TG(03)[DD55].

2.2 The local and detailed air quality assessments were undertaken using atmospheric dispersion modelling software. A baseline dispersion model was produced to represent air quality conditions in 2006. The model results were compared against data obtained from a 12 month air quality survey and local authority air quality surveys and the model was adjusted in order to ensure the modelled and monitored results correlated well. The model was then used to predict road traffic emissions in the 2012 opening year of the proposed A453 widening scheme for the 'do minimum' and 'do something' scenarios. The assessments were used to predict the changes in total emissions of nitrogen dioxide and respirable particulates and to predict the changes in exposure of relevant receptors to these pollutants.

2.3 A regional air quality assessment was undertaken by calculating the predicted difference in emissions of nitrogen oxides, carbon dioxide, respirable particulate and total hydrocarbons in the 'do minimum' and 'do something' scenarios. The

assessment used the approved DMRB regional impact assessment spreadsheet to calculate changes in total emissions of all pollutants.

2.4 A strategic air quality assessment was undertaken by calculating the change in annual emissions of carbon dioxide over a 60 year period from the opening year of the scheme. The assessment was undertaken using the Transport Users Benefit Appraisal model.

3. Assessment Results

3.1 The local air quality assessment predicted that exposure to respirable particulates at 12,587 receptors will reduce with an increase in exposure at 5,043 properties. The Overall Assessment Score for respirable particulate indicates that the overall effect of the scheme is likely to reduce net receptor exposure. Nitrogen dioxide exposure at 13,304 receptors is predicted to reduce with an increase in exposure at 6,080 properties. The Overall Assessment Score for NO_2 indicates that the overall effect of the scheme is likely to increase net receptor exposure.

3.2 The local air quality assessment illustrates that a relatively large number of properties in the region can expect to benefit from small reductions in exposure to NO_2 and respirable particulates, whilst a smaller number of properties – predominantly within the A453 corridor itself, will have proportionately larger increases in exposure.

3.3 The detailed local air quality assessment concluded that the annual average National Air Quality Objective of not exceeding 40 $\mu g/m^3$ for both nitrogen dioxide and respirable particulate is predicted to be achieved at all receptors along the A453 corridor both with and without the proposed scheme. The highest predicted annual average NO_2 level is 23.98 $\mu g/m^3$ and the highest predicted respirable particulate level is 21.65 $\mu g/m^3$. On the basis that neither of the annual average Objectives are predicted to be exceeded it is my opinion that the scheme will have no significant effect on the health of the community as a whole.

3.4 Nine Air Quality Management Areas have been designated by local authorities on the regional road network surrounding the A453 scheme. These have been designated due to predicted exceedences of the annual average National Air Quality Objective for nitrogen dioxide at residential receptors. Of these AQMAs, five are predicted to experience improvements in air quality as a result of the A453 scheme, while four are predicted to be adversely effected. On the basis of the results from the detailed assessment of effects on the AQMAs it is my opinion that the overall effect of the scheme on local air quality is neutral.

3.5 The regional air quality assessment concludes that emissions of nitrogen oxides (NOx) from traffic on roads affected by the scheme is predicted to be 47 tonnes (3%) less 'with' the A453 scheme than 'without' in 2012. Emissions of total hydrocarbons (THC) from traffic on roads affected by the scheme are predicted to be 8 tonnes (3.41%) less 'with' the A453 scheme than 'without'. Emissions of carbon monoxide (CO) from traffic on roads affected by the scheme are predicted to be 40 tonnes (2.6%) less with the A453 scheme than 'without'.

3.6 The strategic air quality assessment concludes that the scheme will increase CO_2 emissions in 2012 by 688 tonnes when comparing the 'do-something' scenario to the 'do-minimum'. This represents an increase of 0.05% in carbon emissions in the opening year. Across the 60 years of the scheme, the TUBA model predicts an increase of CO_2 emissions of 77,697 tonnes when comparing the 'do-something' scenario to the 'do-minimum'. This represents an increase of 0.079% in carbon emissions over a 60-year lifespan.

3.7 The TUBA model provides as robust a method for calculating carbon emissions as is currently available. However, it is not sufficiently flexible to fully predict the effect of congestion on carbon emissions. The TUBA model assumes that traffic moves at a steady state speed. In congested conditions, driving behaviour is much more based on a cycle of acceleration and deceleration, which produces relatively higher emissions per unit distance travelled than steady state driving. By reducing congestion, the scheme will result in a reduction in non steady state driving conditions and will therefore result in reduced emissions. It is my opinion that the way the TUBA model calculates greenhouse gas emissions from traffic means that this likely reduction in emissions is not fully accounted for by the model, resulting in an overly pessimistic prediction of carbon emissions.

4. CONCLUSIONS

4.1 In conclusion, it is my opinion that the overall effect of the scheme on air quality is neutral. The main adverse effect is that carbon dioxide emissions will increase. However, no new receptors will be exposed to breaches of National Air Quality Standards, air quality will improve in five out of nine areas where the Standards are currently exceeded and more residential properties will have reductions in exposure to traffic emissions than will have increases in exposure. model provides as robust a method for calculating carbon emissions as is currently available. However, it is not sufficiently flexible to fully predict the effect of congestion on carbon emissions. The TUBA model assumes that traffic moves at a steady state speed. In congested

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