A46 Coventry Junctions (Walsgrave) Scheme number: TR010066

6.3 Environmental Statement Appendices

Appendix 11.4 Model Validation Report

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ENVIRONMENTAL STATEMENT APPENDICES
Appendix 11.4 Model Validation Report

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Table of contents

1. Baseline model validation - Do-Minimum Opening Year 1
1.2. Model validation 1
2. Post operational assessment validation 3
2.1. Operational noise assessment 3

Tables

Table 1-1 : Comparison of noise measurements and predictions (DMOY scenario) .. 1
Table 1-2: Speed corrections for position CRTN 3 2

1. Baseline model validation - Do-Minimum Opening Year

1.1. Methodology

1.1.1. The noise model was validated utilising the data collected during the survey undertake between February and March 2024. Details of this survey are set out in Environmental Statement (ES) Appendix 11.3 (Baseline Noise Survey) (**TR010066/APP/6.3**).

Shortened CRTN Survey

1.1.2. The $L_{A10,3h}$ was calculated for the measurement positions CRTN 1, CRTN 2 and CRTN 3. This was then corrected to $L_{A10,18h}$ using the methodology set out in the guidance document Calculation of Road Traffic Noise (CRTN).

1.2. Model validation

1.2.1. The calculated levels were then compared against the predicted road traffic noise index for the Do-Minimum Opening Year (DMOY) scenario. This comparison is shown in Table 1-1

Table 1-1 : Comparison of noise measurements and predictions (DMOY scenario)

Noise monitoring positions	Representative noise source	Predicted dB $L_{A10,18hr}$ (DMOY model output)	Calculated dB $L_{A10,18hr}$ (noise survey)	Difference dB $L_{A10,18hr}$
CRTN 1	A46 north of existing Walsgrave Junction	80.1	80.5	0.4
CRTN 2	A46 south of existing Walsgrave Junction	74.4	72.7	-1.7
CRTN 3	B4082	67.8	74.4	6.6

1.2.2. The above comparison shows that there is very good correlation between the predicted and measured noise levels at measurement positions CRTN 1 and CRTN 2, with a difference of no more than 3dB $L_{A10,18hr}$.

1.2.3. It should be noted that there will rarely be perfect agreement between predicted and measured noise levels due to the comparison of relatively short-term measurement data against predicted noise levels using annual average traffic data. The measured noise levels are influenced by the local traffic conditions and the meteorological conditions at the time of the survey. In addition, the CRTN prediction method assumes light downwind propagation to every prediction point in the model. This is unlikely to occur in reality at all measurement positions. This can result in some variation between measured noise levels and predicted baseline noise levels.

1.2.4. At location CRTN 3 the difference between the modelled and the calculated noise level is greater than 3dB $L_{A10,18hr}$. A review of the model and further analysis of the traffic data within the model indicates that this difference is largely due to a difference in speed.

1.2.5. The traffic data provided assumes that traffic flows on the B4082 at an average speed of 53kph (33mph), due to the regular periods of slower and stationary traffic along this road.

1.2.6. When higher speeds were input into the model (using the same AAWT traffic flow and %HGV) the resultant noise levels at location CRTN 3 increased. Assuming the traffic would be travelling at a speed equivalent to the speed limit of the road (96kph/60mph) the difference between the modelled and calculated decreases to 2.3 dB $L_{A10,18hr}$.

1.2.7. Observations made during the measurements indicated very limited periods of slow traffic, with traffic flowing freely on both sides of the carriageway. This variation is therefore considered to be a factor of the speed pivoted data used within the model data rather than a geometric inaccuracy.

Table 1-2: Speed corrections for position CRTN 3

Speed	Predicted dB $L_{A10,18hr}$ (DMOY model output)	Calculated dB $L_{A10,18hr}$ (Noise survey)	Difference dB $L_{A10,18hr}$
53kph (As model)	67.8	74.4	6.6
71kph (44mph)	69.7	74.4	4.7
80kph (50mph)	70.7	74.4	3.7
96kph (60mph)	72.1	74.4	2.3

1.2.8. On the basis of the above, the modelled results are considered robust for representing the Do-minimum opening year scenario and no amendments to the road traffic noise model were considered necessary.

2. Post operational assessment validation

2.1. Operational noise assessment

2.1.1. Subsequent to the baseline modelling validation the full noise model was built. Traffic flow data was provided by the transport modelling team and an assessment of potential operational impacts was undertaken. The results of the modelling were analysed and presented in the format set out in Design Manual for Roads and Bridges (DMRB) LA 111 Noise and Vibration.

2.1.2. Given the nature of the works being undertaken, there was a level of expectation regarding the noise levels and need for mitigation, especially in the vicinity of the residential receptor at Hungerley Hall Farm. However, the results of the assessment indicated that no noise mitigation, other than that embedded within the scheme, would be needed to mitigate the predicted operational effects.

2.2. Additional model validation steps

2.2.1. As the noise model produced unexpected results, additional internal checks were undertaken to confirm the results and determine their cause. These are summarised as below:

- Geometric (topographic) data of the Do-Something scenario was confirmed through discussions with a highway engineer within the project team.
- Traffic flow data was re-processed from initial steps and then reapplied to the model. No changes to the results originally produced were required.
- A final full check from a colleague also familiar with the software package was also undertaken. No areas of concern that required update were identified.

2.2.2. The model underwent an additional review with the project Technical Advisors (TA), who suggested further checks to determine if the results were being driven by the traffic data or by the new topography. Their email indicated the following:

'We have been through a fairly comprehensive list of checks of the model but have not spotted any obvious issues. Helen has obviously implemented some rigorous checks already but we can understand the counterintuitive nature of the results. We have suggested a few additional sense checks….but overall it's a very well put together model'.

2.2.3. The checks proposed by the TA required all of the traffic data to be removed and replaced by a single noise level, which would be the same on every road. The results of this would enable the likely cause of the unexpected results to be determined.

2.2.4. Using the single noise level test, the model was re-calculated with the results indicating at Hungerley Hall Farm there would be an increase of 6dB in the short term as a result of the scheme.

2.2.5. These results are more in-line with the noise changes expected as a result of the implementation of the scheme. Based upon this, the following conclusions could be drawn:

- The changes in noise level are mainly influenced by the changes in traffic flow and reduction in speed on the mainline carriageway of the A46. Noise levels generated by vehicles are further reduced though the use of low noise surfacing.
- Although the changes to topography influence the change in noise level, they have less of an impact than other changes resulting from the scheme implementation.