

READING FRIENDS OF THE EARTH

WRITTEN REPRESENTATION

HIGHWAYS ENGLAND'S RESPONSE

1. *Environment Hearings – 9th and 10th February 2016*

1.1 *Section A: Noise and Vibration*

Question 3: Enhanced Noise Mitigation Study (ENMS):

I supported Dr. Jorgensen's comment that the area close to Paddick Drive, Lower Earley, should be considered for noise screening. I said there is a BMX track and a newly-planted Community Orchard very close to the M4 at that location.

I also asked how much the additional marginal cost of improved standards of noise screening (e.g. 3.5 m instead of 2.5 m) would cost in context of the Smart M4 scheme as a whole.

Highways England Response

1.1.1 Increasing the barrier height from 2.5m to 3.5m would not necessarily lead to any perceptible improvement in the standard of noise screening at the locations in question. Highways England's response to Dr Jorgensen's Deadline VI written representation, submitted at Deadline VII, stated:

"The way a noise barrier works is quite complex, the noise reduction provided depending on a number of factors in addition to the height of the barrier. These include the distance from the barrier to the receptor and the noise contributions of other roads in the locality. The further away the receptor is from the noise barrier, the smaller is the noise reduction provided by the noise barrier.

The locations Dr Jorgensen refers to (Adwell Drive, Paddick Drive, and Barn Croft) are over 300 metres from the M4 motorway and the location of the requested extended barrier. Additionally, the B3270 (which makes a noise contribution at these locations) lies close to these locations, whilst the M4 motorway is further away. For this reason, expected noise reductions at these locations resulting from the noise barrier extension would be minimal. Consequently, no such extension is proposed in this location."

1.1.2 Further, it should be noted that with the mitigation as proposed, there will be minor/moderate noise reductions to this area, as shown on Sheet 4 of Drawing 3 in the Enhanced Noise Mitigation Study Report submitted at Deadline VII.

1.1.3 With regards to the cost associated with increasing the height of the proposed barriers from 2.5m to 3.5m, Highways England submitted a technical note on this topic at Deadline VII, Appendix A to the Environment (Noise) Issue Specific Hearing Summary.

1.2 Section B: Visual Impact

Question 4i: Choice of LEDs:

I expressed disappointment at HE's assertion that they would use 'neutral white' LEDs. These have quite high blue spectral content.

In my opinion the technology is evolving rapidly and the power consumption differential is said to be down to around 3%. I urged HE to reconsider and re-assess the option of 'warm white' LEDs.

There is growing literature on the subject, in addition to my comments at Deadline IV, including:

- A US Government Report <http://www1.eere.energy.gov/buildings/ssl/pdfs/true-colors.pdf>
- And a paper from the Campaign for Dark Skies "Modelling Light Pollution for Highways Agency Environmental Policy" <http://www.noao.edu/education/files/Modelling%20Light%20Pollution%20for%20Highways%20Agency%20Environmental%20Policy.pdf> which concluded:
 - "The increasing use of blue rich LED lighting should be discouraged." And
 - "Much lower colour temperature, 3000K, is recommended by the International Dark Sky Association."

Highways England Response

1.2.1 Highways England addressed these points in its written summary of the oral representations made at the Issue Specific Hearing into the Environment. Highways England has chosen neutral white light emitting diodes ("LEDs") as they provide an "intermediate" colour appearance, which is most suitable for the strategic road network. BS 5489, which is the code of practice for the design of road lighting, defines the correlated colour temperature for "intermediate" colour appearance in Table 1, which is reproduced below:

Table 1 Light source colour appearance groups

Colour appearance	Correlated colour temperature, T _{CP} (K)
Warm	<3,300
Intermediate	3,300 to 5,300
Cool	>5,300

2. Comments on HE response to WR3_RFoE_M4_J3_12_PINS at Deadline VI

2.1 Section 1: Benefits of Lower Speeds

I was interested to see it expressed (HE 1.1.13) that possible speed restrictions (e.g. to 50 mph or 60 mph instead of 70 mph) would have little effect on traffic flows or emissions during peak hours because maximum speeds were expected to be restricted to this sort of level during peak hours to manage congestion.

At 1.1.4 HE state: “In relation to air quality, lower speed limits on the M4 could lead to a reduction in emissions of NO_x, particulates and CO₂. However, as noted below, this could also lead to displacement of traffic onto other routes and an associated increase in emissions of these pollutants along those roads and at nearby sensitive receptors.”

- *Presumably outside peak hours these ‘other routes’ would be less congested than at peak hours, so problems of congestion and pollution would be less severe than at peak hours, so there might well be a net benefit.*

I note that at 1.1.10 HE state: “it is concluded that imposing speed limits on the M4 would not result in substantial reductions in car trips.” Meaning no substantial modal shift would be expected.

Highways England Response

2.1.1 The air quality effects of the M4 Junctions 3 to 12 Smart Motorway scheme (the “Scheme”) have been assessed in line with best practice to minimise uncertainty and significant air quality effects are not predicted overall and nor is a compliance risk in relation to EU Limit Values predicted, as set out in Table 6.22 of Chapter 6 of the Environmental Statement (“ES”) (Application Document Reference 6-1, APP-146). On this basis, air quality mitigation, such as speed restrictions, is not proposed for the operational phase of the Scheme.

2.1.2 Whilst speed control for environmental reasons is not required, as described above, in principle extending speed control across the Scheme may have a benefit to sensitive

receptors along the route but, as noted by Reading Friends of the Earth, additional capacity on the adjacent local road network may result in the rerouting of traffic onto these routes and so could impose a disbenefit on these locations. Therefore, there can be no certainty as to whether there would, or would not, be a net air quality benefit from this type of proposal.

2.1.3 The explanation as to why no substantial modal shift is expected in response to a reduction in speed limit is set out in paragraphs 1.1.7 to 1.1.11 of Highways England's response to Reading Friends of the Earth's written representation at Deadline VI (REP6-17). The M4 traffic model contains 'elasticity' relationships whose validity has been demonstrated through the use of realism tests. Based on these relationships it was stated in paragraph 1.1.9 that "*it can be demonstrated that for a 10% increase in journey time, there would be a 0.88% decrease in car trips.*"

2.1.4 Translating this to the M4, as explained in paragraph 1.1.10 of the above submission, by applying a speed limit of 60mph (a reduction of 14% from the national limit), there would be an increase in journey times of 17% and a corresponding decrease in car trips of 165 cars per hour, which is not considered to be a significant reduction. From this it was concluded that imposing speed limits on the M4 would not result in substantial reductions in car trips.

2.2 Section 2: Climate Change

In comments 2.2.1 and 2.2.2 HE refer to the requirements of the NPS. As the Panel has pointed out (in Section E Question 11 g) and h) of the February Environmental Hearing Questions) HE also has environmental duties under the terms of its licence.

I accept the HE criticism at 2.5.1 that my estimate of CO₂ emissions per vehicle at 2.5 was not appropriate. It was based on a misunderstanding of the areas modelled.

However I maintain that the scale and growth of road transport emissions in the 'wider air quality area' (tabulated in 2.3) is significant and unacceptable.

Highways England Response

2.2.1 Highways England's position concerning the compliance of the Scheme with respect to the National Policy Statement for National Networks ("NN NPS") and carbon emissions remains unchanged and is considered to be consistent with the requirements of the NN NPS, as previously described in response to the Reading Friends of the Earth written representation at Deadline VI (REP6-17).

2.2.2 Highways England understands that the Examining Authority has requested further clarification with respect to carbon matters from the Department for Transport, as shown by

the recent Rule 17 letter submission (<http://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/projects/TR010019/2.%20Post-Submission/Procedural%20Decisions/Request%20for%20further%20information.pdf>).

2.3 Section 3: Impact on Journey Times

In 3.1 of my input I said: “The issue is whether the proposed infrastructure can cope with maximum projected traffic growth both on and off the motorway, or whether a different strategy would be better.”

The figures provided by HE at 3.3.1 for ‘Modelled Trips’ and ‘Total Journey Time’, while correct in themselves, do not relate to the same sets of journeys and so cannot be used to calculate average journey times – the purpose for which I had requested data at 3.3.

HE have provided the following outputs of modelling of Time, Distance, Number of Vehicles and Speed for the wider network (Tables A-30 and A-5 of the Traffic Forecasting Report) and I have calculated the Average Trip Time from these figures.

Modelled performance for wider network in peak hour:

AM2	2009 Base	2022 DS (Core)	2037 DS (Core)	2037 DS (High)
Total Time (h)	251600	305600	368100	406300
Total Distance (km)	13700200	16251200	18507400	N/A
Number of Vehicles	419295	486814	548062	592698
Ave. Speed (km/h)	54.5	53.2	50.3	N/A
Ave. Trip Time (Mins)	36.0	37.7	40.3	41.1

In 3.1.1 HE said “It is to be noted that in comparison to the typical improvements in journey time along the extent of the M4 of 5-11%, the changes in journey times on the local road network are considerably less.”

The tabulated results of modelling for morning peak hour flows bear this out:

- As the number of vehicle movements rises average speed falls and average trip duration increases.

- While the effect is modest in 2022 (extra capacity almost copes with 16% increased traffic volume) by 2037 average trip time is 4 to 5 minutes (12% to 14%) longer than in 2009.

Network performance as modelled will be noticeably worse in 2037 than in 2009.

If, as some respondents fear, there will be far more demand for travel than modelled, then even higher journey times will be experienced in 2037.

The 'Smart M4' does appear to increase capacity, but if journey times in the wider network are not to increase then either traffic volumes must be reduced below those modelled (presumably affecting the business case) or additional capacity must be provided (at further cost, also affecting the business case).

The 2037 scenario showing longer journey times and higher CO₂ emissions is not an attractive vision for the future, even if air quality and noise objectives can be met.

Highways England Response

2.3.1 It is not unexpected that over time, growth in population and car ownership will lead to increased demand for travel and, all things being equal, a deterioration in the performance of the highway network. Over 99% of that increase in demand will occur irrespective of the Scheme; the balance being attributed to the minor number of induced trips arising from the Scheme. The tabulation below draws on the same sources of information (Tables A-5 and A-30 of the Traffic Forecasting Report) as used by Reading Friends of the Earth, but provides a comparison of the situation with and without the Scheme in each of 2022 and 2037 forecast years. It follows that increases in journey times across the wider network result from the general growth in traffic. The consequences of this growth will be a matter for the local highway authorities to address.

AM2 (08.00-09.00)	2022 DM (Core)	2022 DS (Core)	2037 DM (Core)	2037 DS (Core)
Total Time (PCU-hrs/hr)	304800	305600	366900	368100
Total Distance (PCU-km/hr)	16125800	16251200	18362300	18507400
Number of Trips	485877	486814	547071	548062
Ave. Speed (km/h)	52.9	53.2	50.0	50.3
Ave. Trip Time (Mins)	37.6	37.7	40.2	40.3

- 2.3.2 In each of the years there is an increase in total travel time across the network. This is expressed in PCU (Passenger Car Unit – the total number of cars, goods vehicles and buses expressed in terms of the equivalent number of cars only) hours per hour. This, therefore, is an expression of both the number of vehicle trips modelled within the hour and the time spent. There is also an increase in distance travelled. This is expressed in PCU-kilometres per hour. Again this reflects both the number of trips undertaken by vehicles and distance travelled. It is not unexpected that there is an increase in distance travelled as a result of the Scheme as some drivers, particularly those on business, will travel greater distance to save time. There is a small increase in average speed over the network although there is an average 6 second increase in average trip time.
- 2.3.3 All the above figures are drawn from statistics output from the traffic model for the whole area covered by the model, not just the Scheme. Similarly, the business case for the Scheme is also based on changes in travel time, vehicle operating costs, accidents etc. across the modelled network and the Scheme has been assessed as providing net benefits over its 60-year appraisal period.
- 2.3.4 With regards to air quality, as described above, the Scheme is considered to be compliant with the requirements of the NN NPS with respect to carbon and further information has been requested from the Department for Transport by the Examining Authority with respect to carbon emissions.
- 2.3.5 In relation to noise, Highways England confirms that the noise objectives of the Scheme will be met. With the provision of a low noise surface along the complete extent of the Scheme and the provision of a substantial number of new and replacement higher noise barriers (as detailed in the Enhanced Noise Mitigation Study Report submitted at Deadline VII), the overall noise climate within the Scheme corridor in 2037 with the Scheme in operation will be an improvement on the without Scheme scenario in 2022.