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Noise Scheme of Assessment consultation responses – comments by Brian Hemsworth

Following submission by ERM of the final Noise Scheme of Assessment on 24th March a number of representations from members of the public have been referred to me for comment. I have examined this correspondence and now provide additional comments concerning the main topics raised. None of the correspondence I have seen causes me to change the conclusion stated in my Report of 18th March 2015.

A. Vegetation removal

I am not aware of any recent reports about noise reduction from the presence of small trees and bushes in the propagation path which would supersede the following. International Standard ISO 9613 "Attenuation of sound during propagation outdoors" when discussing ground attenuation factors identifies two ground types: **hard ground,** which is reflecting and includes paving, water, ice, concrete and other ground surfaces having a low porosity; and **porous ground,** which is absorptive and includes ground covered with grass, trees and other vegetation and other ground surfaces suitable for the growth of vegetation such as farming land.

The losses due to distance for porous ground are higher than those for hard ground but there is no distinction between tree covered ground and grass covered ground. "Porous" and hard ground are options for ground cover referred to in CRN. Aylor ("Reduction by vegetation and ground" Journal of the Acoustical Society of America Vol 51 includes a statement, "research on propagation through trees has produced greatly conflicting results. It is clear though that trees are more beneficial aesthetically than acoustically. A band of trees several hundred feet deep is required to achieve a significant attenuation"

B. Higher Noise Barriers are needed

My previous note of 26th April says in part 3 "The performance of noise barriers is controlled (a) by the height of the barrier above the line of sight between the source and the receiver……." A 2.5m high barrier relative to the railhead is unlikely to be effective in reducing motive power noise which is 4m above the railhead. At the majority of sites in Section H it is unlikely that at the proposed speed of trains the noise energy from the Class 66 locomotives on power in the down direction will be higher than the rolling noise from all the other trains. 2.5m high barriers can reduce the noise from the major noise source. Higher noise barriers will give greater reduction but other factors such as Health and Safety and visual impact will be more of an issue with higher noise barriers. The statements made on page 20 of the NSoA and associated Box 5.1 are appropriate and I have no reason to dispute them. However, I note that the 2nd April letter from NR indicates that some location specific modifications might be possible as part of the final detailed design.

C. At Source Mitigation

Throughout Section H the major noise source is rolling noise, which is a combination of wheel - radiated and track - radiated noise. Tuned absorbers

were developed by the Silent Freight and Silent Track EU funded projects in the late 1990s. I was coordinator for both of these projects and was present at the track tests on the developed products in 1999. Tuned wheel absorbers can reduce wheel radiated noise by up to 7 dBA but do not reduce track radiated noise; conversely tuned rail absorbers can reduce rail radiated noise by up to 7 dBA but do not affect wheel radiated noise. The application of either, in isolation, will only reduce total rolling noise if the noise from the component treated is the dominant noise source.

Generally on UK's railways track noise is higher than wheel noise but is not normally so dominant that the reduction in track noise is carried over to total noise. It is therefore likely that the introduction of tuned rail absorbers would give a reduction in total rolling noise of up to 3 dBA. This may be sufficient when attempting to achieve a noise level based target but in practice the change would be hardly audible. Wheel absorbers are unlikely to be effective since they would have to be applied to every wheel of every vehicle likely to use the new line. This effectively means treatment to the whole vehicle fleet in the UK would be necessary.

D. Modelling Uncertainty

"Calculation of Railway Noise 1995" (CRN) has been the railway noise prediction model used in this project. CRN was developed by a Technical Group of the Department of Transport to support the Noise Insulation (Railways and Other Guided Transport Systems) Regulations 1995. It is the compulsory model to be used for assessing eligibility for sound insulation under the Regulations.

That eligibility is assessed using the noise levels predicted by the model. If the Regulation thresholds are predicted to be exceeded, that property is deemed eligible and an offer for sound insulation can be made. In the calculation for eligibility there is no allowance for "uncertainty" or standard deviation of the predicted levels. The same principles have been followed in the assessment of project noise levels against the levels in the Noise and Vibration Mitigation Policy.

Some comments refer to limitations in the prediction model , for example effects of topography, ground type and switches and crossings. This is not the case, since the model used includes all the necessary elements of train design and operation, track design (including switches and crossings) and local topographical features. The NSoA defines correction terms used when these are necessary.

E. Monitoring

Some correspondents have questioned ERM's proposals for a single monitoring programme NSoA page 33). In order to confirm or otherwise the predictions made in the NSoA it is not necessary to wait until the full service is in operation. All that is needed are noise measurements for the passage of every type of train that are expected to be part of the final service. From this the train noise source assumptions and propagation characteristics for those trains can be obtained and the prediction model modified as necessary. Taking account of the expected

full train service will then allow comparison with the thresholds in the NVMP and additional mitigation (if required) to be introduced.

Such a monitoring programme therefore uses a combination of measurement and modelling to assess the project noise levels against the thresholds in the NVMP. This is the approach outlined by ERM and I consider this to be appropriate.

F. Noise and Vibration Assessments should not be separate

Noise and Vibration are dealt with separately because

- They are produced by separate aspects of railway operation
- They are propagated in different ways
- They are measured and assessed using different parameters
- Mitigation options are different e.g. line side noise barriers do not reduce vibration; resilient trackforms do not reduce airborne noise.
- Train/track conditions influence noise and vibration in different ways

That being so, the need is to ensure that fundamental assumptions about rolling stock, train frequency, topography etc are the same for both noise and vibration assessment purposes. Additionally, care is needed to ensure that mitigation proposals for noise do not adversely affect vibration and vice versa.
I consider that the mitigation proposed in the NSoA will not affect vibration.

G. Effect of Speed

One correspondent referred to the potential increase in speed from 70 to 75mph The policy regarding speed limits (restrictions) is of course a matter for Network Rail and should be answered by them. However, I have calculated the result of changing speed in the CRN model for Section H. Further to my earlier note on the effect of train speed, I have looked at the effect of increasing the speed of all trains to 75 mile/h (120 km/h)

I used receptor SOA10 (15 Sheriffs Drive) in my earlier analysis and have done so again. The modelling indicates that again at these higher speeds rolling noise will dominate motive power noise. With the increase in speed the daytime LAeq will increase by about 0.8 dB with or without a noise barrier. At night the increase in LAeq will be about 0.5 dB with and without a noise barrier.

H. General Comments-

These notes should be read in conjunction with my earlier notes dated 26 April 2015-05-12

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