

*To members of the West Area Planning Committee, for Agenda Item 3 of the meeting on 21 February, 2017.*

I am sorry to give you more reading for this meeting. But I feel I must draw your attention to an important gap in the information provided to you so far. I know you will want to be fully informed for such an important planning decision, affecting literally hundreds of Oxford residents.

The Network Rail case for refusing to deploy ‘at source’ noise mitigation (the most obvious form of which would be ‘SilentTrack’ rail dampers) is based primarily on cost. The benefit-to-cost ratio (BCR) is claimed to be so low as to make their use ‘not reasonably practicable’.

I have explained to Oxford City Council that NR’s prediction of BCR is unreliable for the EWR context. The real BCR achievable with rail dampers is likely to be higher. My advice to Oxford City Council making this point is referred to in the Planning Officers’ report for Agenda Item 3 of the meeting (see pages 14, 20), but was omitted from the Public Reports pack for this meeting. Since this matter is so crucial to your deliberations, I append it for your information – see below.

After I submitted my advice, the Council invited responses from NR and Arup. NR continue to insist the range 2.5-3dB<sup>1</sup> is a ‘reasonable estimate’ of the noise reduction achievable from SilentTrack, but provide no justification. Arup go along with the 2.5dB figure, on the basis of one paper they admitted in an earlier ‘independent’ report to the Council (Arup report H04-OB, P.5) had been provided to them by NR, *apparently* supporting such a low figure. It is a research paper by Prof David Thompson and colleagues at the Institute of Sound and Vibration Research at Southampton University where SilentTrack was developed. Since the NR and Arup opinions became public, Prof Thompson has pointed out<sup>2</sup> that the 2.5dB figure quoted from his paper has been taken out of context. It relates to a study for a Franco-German project, where German rolling stock was simulated, running on tracks fitted with German (Schrey and Veit) rail dampers. Because the wheels of UK rolling stock are designed to radiate substantially less noise than their German equivalent, noise reduction from SilentTrack (which attenuates only noise from the track and not from the wheels) would be expected to be much higher on UK tracks. Prof Thompson estimates 4.4dB<sup>3</sup> would have been obtained in that study for UK rolling stock. Thus the claim that SilentTrack would provide only ‘2.5-3dB’ noise reduction in the EWR context remains unsubstantiated. On the basis of UK-relevant evidence, this figure seems to me misleadingly low.

Paul Buckley  
(Emeritus Professor of Engineering Science, University of Oxford)

---

<sup>1</sup> All noise levels referred to in ‘dB’ here and in the Appendix are ‘A-weighted’ noise levels, which allow for the frequency-dependence of human sensitivity to noise, as is usual in professional discussions of noise.

<sup>2</sup> Professor D.J.Thompson, private communication, January 2017.

<sup>3</sup> This corresponds to a 70% reduction in noise power, which would be perceived by a typical person as a roughly 25% reduction in noise intensity.

## Appendix

Comments for Oxford City Council on ERM document *EMR Phase 1: Sections H and I/1 Supplementary Statement responding to additional points made by OCC and consultees on whether the installation of rail damping is 'not reasonably practicable'*

To: Fiona Bartholomew

From: Paul Buckley

23 December, 2016

I understand that planning application 16/02507/CND will be considered by Oxford City Council's West Area Planning Committee (WAPC) on 24 January 2017. This seems to be a renewed application for OCC to approve the Noise Scheme of Assessments (NSoAs) for Sections H and I/1 of East West Rail Phase 1 (EWRP1), but *without* three conditions that were previously attached. One of these conditions is Condition 2: the requirement to submit proposals for rail dampening. WAPC has, of course, already considered and refused a request to remove Condition 2 at its meeting of 13 September 2016. So far as I am aware, the only new information provided to OCC since then in support of the removal of Condition 2, is this ERM 'Supplementary Statement'. Therefore it will be of crucial importance to WAPC's deliberations.

I have written previously to point out how unconvincing is the case made in the Supplementary Statement (see my comments of 9 November 2016 displayed on OCC's planning website). However, since then further evidence has come to light, revealing that ERM's Supplementary Statement is not only unconvincing: it is seriously misleading in some important respects. My reason for writing now is to alert you and your colleagues at OCC to this danger. In the following two areas in particular, it relies on claims inconsistent with known facts, leading to a flawed conclusion that SilentTrack would not be 'reasonably practicable' in the Oxford portion of EWRP1.

1. An essential plank of ERM's argument is their claim that the sound reduction benefit to be expected from SilentTrack, expressed in terms of the sound measure  $L_{A,eq}$ , is only 2.5-3dB, '*based on the available evidence*': e.g. see Section 1.2. This is a grossly misleading representation of the facts. Usage of SilentTrack to date has been almost entirely confined to continental Europe, giving a range of levels of noise reduction: some indeed are as low as this. But there are differences between rolling stock used in different countries. For *UK* rolling stock running on current *UK* track, such as the EWRP1 track, expert opinion is that a higher level of noise reduction can reasonably be expected: 5dB<sup>4</sup> or 6dB<sup>5</sup>. These opinions are based on the limited available UK evidence, which has shown 5dB<sup>6</sup> or 6dB<sup>7</sup> being achieved in practice.

---

<sup>4</sup> Professor D.J.Thompson, private communication, December 2016.

Please note that the list of authors of this UK evidence<sup>3,4,5,6</sup> includes names already well known to OCC: *all* the main sources of advice received by OCC concerning compliance of the EWR scheme with Condition 19 are there - Chris Jones, Brian Hemsworth, and Oliver Bewes of Arup.

2. A key assumption made by ERM is that noise levels calculated using SoundPlan software, and presented in the NSoAs, are reliable predictions of future noise levels when EWRP2 is in operation. We now know there are at least two reasons for doubt.

*Firstly*, the input data used by ERM in SoundPlan are based on noise levels from various types of rolling stock given in the 1995 Department of Transport document *Calculation of Railway Noise*, modified where necessary to accommodate some more recent types - see Appendix D of the Noise Scheme of Assessment (NSoA). Thus the data relate to rolling stock running on UK railway tracks of 1995 and earlier. It might be expected that these data would provide a cautious prediction for new tracks, because newly laid track will be smoother and therefore generate less noise. However, in an important study published recently, this was shown **not** to be the case. When old UK track was replaced by new UK track, noise levels generated by trains were found to *increase* substantially: by 4dB<sup>8</sup>. The explanation for this is that new UK track (including the EWRP1 track) is supported on pads that are much softer compared to those used in the 1990s. The noise-amplifying effect of lower pad stiffness is found to outweigh considerably the difference in track smoothness. The SoundPlan predictions produced by ERM neglect this, and will therefore be seriously in error; most likely under-predicting noise levels by 4dB.

*Secondly*, there is inevitable uncertainty in results of the computations carried out within SoundPlan, as in any numerical modelling of complex physical processes. An estimate of the degree of uncertainty in this case can be obtained simply by comparing predictions made with two different versions of SoundPlan itself, using the same input data. The two versions of the NSoA produced by ERM for Section H of EWRP1 allow this comparison to be made: the December 2014 (original) version and the March 2015 (revised) version, which used different versions of SoundPlan (versions 7.1 and 7.3 respectively). Noise contours shown in the two versions of the NSoA are clearly not identical: they deviate by a few dB in many locations. Considering the predictions of  $L_{A,max}$  for the 26 properties listed, the mean difference in values of predicted  $L_{A,max}$  between the original and revised versions is 2dB – the revised values always being lower than the original.

---

<sup>5</sup> B.Hemsworth, *Noise reduction at source: EU Funded Projects*, European Workshop on *Railway noise in urban areas: Possible noise reduction measures*, Pisa, November 2006.

<sup>6</sup> O.Bewes *Assessment of the benefit of rail dampers installed in Blackfriars Station: a Technical Note* for Arup, May 2014.

<sup>7</sup> D.J.Thompson, C.J.C.Jones, T.P.Waters, D.Farrington *A tuned damper device for reducing noise from railway track*, *Applied Acoustics* **68** (2007) 43-57.

<sup>8</sup> M.Toward, G.Squicciarini, D.Thompson, *Damping down noise* Rail Professional, February 2014, pp 83-85.

Consequently, combining both the known error and the uncertainty, SoundPlan predictions of future noise levels given in the final NSoAs for the different sections of EWRP1 can reasonably be expected to be *too low* by at least 4dB, and may be too low by 6dB.

## Consequences

These errors in ERM's submission are critical. The primary argument given in the Supplementary Statement for SilentTrack being 'not reasonably practicable' is the cost relative to benefits: expressed as the Benefit-to-Cost ratio (BCR). ERM employ the 'WebTAG' method to monetise the predicted benefit from using SilentTrack. The combination of both errors – *under*-prediction of noise reduction provided by SilentTrack and *under*-prediction of prevailing noise levels in the absence of Silent Track – cause the monetised value of the benefit to be under-predicted by WebTAG, by a substantial margin. This causes all BCR values presented by ERM to be substantially under-predicted: they should not be trusted.

Another argument given in the Supplementary Statement is that some track-side houses have been provided with noise insulation, where they should not have been if SilentTrack were used, since their noise exposure would be reduced below the threshold justifying provision of noise insulation. However, this argument is false. ERM's error in the predicted noise level without SilentTrack (say 4-6dB) is approximately balanced by ERM's error in the predicted benefit from SilentTrack (say 5dB), so that if correct numbers were used, the predicted final noise level *with* SilentTrack would be close to those currently predicted *without* SilentTrack: i.e. the two errors approximately cancel when predicting residual noise levels. Hence there is unlikely to be any significant effect on the selection of properties qualifying for noise insulation.

In conclusion, the Supplementary Statement from ERM is deeply flawed in several important respects. It would not be a credible basis on which to remove the condition requiring deployment of SilentTrack or similar rail dampers.