

Subject Advice on rail dampers for Oxford City Council

Date 5 January 2017

Job No/Ref H05-OB

- [1] Oxford City Council (OCC) has sought advice from Arup relating to planning Condition 2 of 15/00956/CND which relates to the use of ‘Tata SilentTrack’ in Section H of the East West Rail Link phase 1 (EWR) scheme and Condition 2 of 15/03503/CND, which relates to its use on Section I.
- [2] Tata SilentTrack is a type of ‘rail damper’ which is a mitigation measure for reducing train noise. Arup have experience of evaluating the performance of this mitigation measure during the planning, design and construction stages of rail projects which include High Speed 2 and the Network Rail Thameslink Programme.
- [3] On 2 September 2016 Arup provided OCC with answers¹ to specific questions about the performance of rail dampers and the effect that these measures could have on mitigation and insulation proposals defined in the two Noise Scheme of Assessments (NSoA) for section H and Section I. Our advice informed, in part, OCCs response to Network Rail.
- [4] On the 28 October 2016 Network Rail provided a supplementary statement responding to further points made by OCC. The supplementary statement made reference to our advice and in some cases challenged statements made. OCC have requested that we respond to additional questions relating to NRs supplementary statement.

1 Response to Supplementary Statement submitted by ERM in respect of Network Rail’s applications to remove Condition 2 of 15/00956/CND and 15/03503/CND

- [5] Using the excerpts below and other relevant content OCC have requested that we comment on key items in the Supplementary Statement, as follows:

1.1 At source mitigation measures (Section 1.2, p.5)

“Table 1.1 responds on the relevance of the at source noise mitigation measures identified in Table 1 of the Arup Technical Note prepared for OCC, 2 September 2016 which forms Appendix 4 of the WAPC Committee Report of 13 September 2016, and identifies where these are applied in Sections H and I/I.

In summary, the majority of measures suggested by Arup are not relevant to the local conditions to this type of project, or in the case of noise barriers, noise insulation and maintenance, the measures are already being implemented. The only measure referred to which is within NR’s power to provide, and which is not being proposed because, in Network Rail’s view, it is not reasonably practicable is rail dampers in the form of SilentTrack”

- [6] In H04-OB we set out different railway noise control measures which could be applied at source in specific circumstances to mitigate noise (Table 1 of H04-OB).
- [7] We agree that many of the measures outlined in H04-OB are not relevant to the EWR Scheme. Our brief was to set out recognised mitigation measures in general, not to identify

¹ H04-OB_issue_1 – 2 September 2016.

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measures which should necessarily be considered by NR in the context of the planning conditions under consideration.

1.2 Effect of Silent Track where insulation has been applied (Section 1.2, p7)

“Arup, in Section 6 of its Technical Note, considers that were rail damping to be installed with noise barriers in situ, there would be a beneficial effect of removing the need to provide non-statutory noise insulation at a number of properties. Arup states in paragraph 36 that ‘Rail dampers could therefore have the beneficial effect of removing the need to provide non-statutory noise insulation, according to the NVMP, at six receptors in Section H and two receptors in Section I’.

NR disputes this point and the analysis on which Arup has based its conclusions. It is fundamentally inappropriate to describe the outcome that some properties would no longer be eligible for noise insulation as a benefit. This is because the result of providing noise insulation is to reduce the noise within the properties by substantially more than the reduction provided by SilentTrack. If the Arup logic were followed through, the net effect of providing SilentTrack rather than noise insulation would be to increase noise exposure within those buildings otherwise eligible for noise insulation under the NVMP. This is the result of the fact that provision of noise insulation and ventilation allows for windows to be kept closed which increases noise insulation by 10 dB(A) or more, whereas the effect of SilentTrack, based on the available evidence is 2.5 to 3 dB(A).”

[8] In paragraph 33 of H04-OB we set out the reasons why source based mitigation measures are preferred to transmission based measures, why source based and transmission based measures are preferable to sound insulation and why sound insulation measures should be regarded as a last resort. The reasons are:

- All else being equal, the benefits of noise reduction measures at source are universal i.e. not limited to particular directions or orientation;
- The installation of noise insulation is intrusive and its take up cannot be relied upon (the rate of uptake of offers is typically in the order of 50% but can vary significantly from scheme to scheme);
- The benefits of noise insulation are time limited and are not permanent and the noise reduction provided by secondary glazing diminishes over time.

[9] This remains our position. It is true that the level of noise reduction provided by rail dampers is less than the “10dB(A) or more” reduction quoted by NR that can be achieved with closed windows. However the same could be said of the other mitigation measures that are being proposed in the NSOAs.

1.3 Maximum noise level (LAmax) assumptions

“Furthermore, eligibility for non-statutory noise insulation (which is by far the most common trigger for noise insulation) is usually driven by the maximum noise level parameter (LAmax) and its exceedance of the NVMP noise insulation trigger levels. However, none of the data provided by Tata for SilentTrack from the UK or any other country, provided any evidence of the reduction in maximum noise levels achievable due to the use of SilentTrack. Therefore, Arup’s analysis is based on a false assumption regarding the effect on maximum noise levels and is not valid as a result. Whilst data does exist regarding the lowering of LAeq parameter (in situations without barriers) the mechanisms which may lead to maximum noise levels could produce significantly different results. For instance, the maximum noise level from freight trains can be dominated by the traction noise from the power unit of the diesel locomotive, whereas the LAeq can be dominated by the large number of freight wagons in a freight train. The results

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could differ because for the freight locomotive, the engine noise may dominate and the overall effect of SilentTrack would be very low as a result.”

- [10] We note NRs concerns, in particular in relation to whether traction noise, rolling noise or another source of noise are the contributor to maximum noise levels. We agree that rail dampers would provide reduced benefit if noise from another source on the train was contributing to the maximum noise level. We would accept NRs points if they could confirm that the maximum noise levels presented in the NSOA are as a result of a noise source other than wheel/rail noise. With reference to the NSOA for Section H, the assessment does not identify whether the predicted maximum noise levels presented are as a result of passenger trains or freight trains or for a source other than wheel/rail noise. We note that the maximum noise level prediction methodology employed considers the importance of rolling noise differently depending on whether the train is a passenger DMU, a freight locomotive off power or a freight locomotive on power. We note that the highest maximum noise levels predicted arise from the freight locomotive off power. The NSOA makes it clear that an underlying assumption of the method is that the maximum noise levels from freight off power are a result of rolling noise and not traction noise.

1.4 Minimum length for Silent Track use

“NR has been advised by Tata that SilentTrack has to be installed over reasonably long lengths ie. over 300m to be effective. The advice from Tata is that there needs to be an overrun past properties that are to be protected. A length of 100 to 150m on either side of the property was deemed to be a suitable length”

- [11] We agree that the length of rail damper installation would need to extend either side of the properties that are to be protected. The optimal length will depend on factors such as the length of trains, distance of the properties to the railway and the ‘angle of view’ of the railway from the property. The lengths proposed by NR are reasonable for use in the cost benefit analysis presented.

1.5 Relevance of WebTAG to “reasonably practicable” test

*“WebTAG is an accepted economic appraisal tool for placing a monetary value on the environmental effects, in this case of reducing noise and the consequent effects on eg. disturbed sleep. It is the **only way** of comparing directly the financial costs and the economic benefits of a mitigation measure that only provides an environmental rather than financial return.”*

- [12] NR have undertaken an economic appraisal of the benefits of the installation of rail dampers on the EWR scheme. To do so they have employed part of the methodology set out in the DfT Transport Analysis Guidance. The analysis concludes that there is no business case for the installation of rail dampers on EWR.
- [13] WebTAG (Web-based Transport Analysis Guidance) is the Department’s transport appraisal guidance and toolkit for appraising the economic case for a scheme. Unit A3 Environmental Impact Appraisal relates to the environment and noise is contained in in this unit. Unit 3.2 describes a process which monetises the impact of various health effects resulting from noise and their application to the appraisal of infrastructure schemes. The unit includes a methodology (and excel toolkit) to calculate the valuation². TAG unit 3.2 was updated in 2015 to value noise impact based on Disability-Adjusted Life Years (DALYs) as opposed

² <https://www.gov.uk/government/publications/webtag-environmental-impacts-worksheets>

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to previous guidance which assessed the noise impact on house prices. This methodology has been used by NR.

- [14] NRs assessments calculate the Benefit to Cost Ratio (BCR) of installing rail dampers, taking into account the installation and replacement costs of rail dampers. The information provided by NR includes BCR calculations for multiple scenarios. In all cases the BCRs are calculated to be less than 1. On this basis it is concluded that rail dampers offer ‘poor value for money’ according to DfT’s economic appraisal methods³. NRs evidence concludes that there is no business case for the trial installation of rail dampers.
- [15] Typically WebTAG is used to assess the economic benefits of a transport scheme in its entirety (including all mitigation measures which form part of the transport scheme) and for all potential economic and environmental impacts/benefits, not just noise. DfT will consider a business case that is informed by an economical appraisal as well as other factors such as the strategic case for a project or the affordability of a scheme. Because TAG Unit 3.2 is used in NRs evidence outside its intended context, a full transport appraisal, we consider it over-simplistic to state that there is no business case for rail dampers based on a cost-benefit assessment of noise only. A complete Transport Business Case is necessary for Ministerial decisions on transport schemes. It was never the intended purpose of WebTAG to assess the costs and benefits of noise mitigation schemes let alone individual components of noise mitigation schemes.
- [16] It is, however, reasonable to use WebTAG Unit 3.2 to inform mitigation decisions. WebTAG Unit 3.2 has been used as information to inform decision making during EIA or design on projects such as High Speed Two or the A14 highway improvement scheme. There is no clear guidance on reasonable BCRs for mitigation measures when Unit 3.2 is used in this way. However, contrary to NRs evidence, in our experience it is common for DfT sponsored schemes to accept mitigation measures with BCRs of less than 1. On HS2 there are examples of proposals accepted by DfT where a BCR as low as 0.24⁴ is considered to be “*good noise benefit relative to cost*”. It is important to emphasise that the purpose of referencing this specific example from HS2 is not to recommend an appropriate BCR for assessing whether rail dampers represent good value for money, but to highlight that there are no set rules for using the webTAG unit 3.2 to inform mitigation decisions in this way. The justification for proposing mitigation measures with BCRs of less than 1 is the consideration of other factors and costs not quantified by WebTAG^{5,6}. In the local context of EWR, we would suggest that it will be for all parties to consider and agree what mitigation is reasonable and sustainable within the context of the NVMP.
- [17] We also note that NRs WebTAG assessment evaluates only one component of the proposed mitigation package (rail dampers) rather than the combined benefits of all mitigation measures set out in the NVMP and the NSOAs. If the economic benefit of the proposed noise barriers outweigh the costs, then an economic appraisal of the combination of noise

³ DfT guidance on value for money assessments - <https://www.gov.uk/government/publications/transport-business-case>

⁴ https://www.parliament.uk/documents/lords-committees/High-Speed-Rail/HOL-00700_Berkswell_Parish_Council_Promoter.pdf (reference to barrier option 2b on page 0067)

⁵ DfT’s guidance on value for money assessments [3] acknowledges that “*appraisals that are produced following WebTAG guidance do not necessarily monetise all costs and benefits of a transport intervention*” and that “*The VfM assessment should take account of quantitative and qualitative assessments of impacts in two stages*”.

⁶ Specifically for noise, the overview of Government’s Noise Economic Analysis explains that the aspects considered in a full WebTAG analysis do not include the effect of noise on the natural environment or productivity.

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barriers and rail dampers is likely to result in a BCR that is much closer to 1 than the assessment of rail dampers alone.

1.6 Revised WebTAG assessment

“In undertaking the analysis of ‘focussed approach’ to the installation of SilentTrack as proposed by Arup, we have rechecked and refined previous calculations and represented these alongside the new scenarios. These refinements relate to the reported Net Present Values [NPVs]. The refinement addresses an anomaly in early calculations which led to an overestimate of the noise benefits during the day in Section H. The methodology and assumptions otherwise remain consistent with the original analysis”

- [18] We have reviewed the revised WebTAG Unit 3.2 assessment by NR. We consider that the BCR calculation for rail dampers has been carried out appropriately.
- [19] Regarding the approach to the assessment, it is noted that the BCR of rail dampers is calculated in isolation of other mitigation measures. As described above, an economic appraisal of the combination of noise barriers and rail dampers is likely to result in a BCR that is much closer to 1 than the assessment of rail dampers alone.

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