A16.4 Impact and Significance Criteria

1 Noise Impact and Significance

1.1 Introduction

1.1.1 This appendix provides technical support for the impact and significance criteria presented in Chapter 16 (Traffic Noise and Vibration) of the Environmental Statement.

1.1.2 Consistent with the parent EU Directive, the Environmental Impact Assessment (Scotland) Regulations 1999 (Part III Roads) require the identification of significant effects (both positive and negative), as the Environmental Statement must provide a description of the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects.

1.1.3 The critical requirement therefore is to identify likely significant effects.

1.1.4 The likely significant effects identified for a project are key because:

- under the EU Directive, they drive the need to consider mitigation and the efficacy of any mitigation proposed; and
- they are material considerations brought to the attention of the decision makers in the ES.

2 Approach to Noise Impact and Significance

2.1 Criteria adopted for the Proposed Scheme

2.1.1 Recent revisions to Design Manual for Roads and Bridges (HA 205/08, Highways Agency et al 2008) make clear that, whilst linked, environmental impacts and effects are different.

2.1.2 Following the DMRB guidance, the noise assessment for the proposed scheme uses the following definitions:

- Noise Impact: a change in the noise climate (i.e. a change in noise in the area outside and around a receptor or group of receptors).
- Noise Effect: the effect on the receptor, and its use, subject to the predicted noise impact. The noise effect is therefore linked to the magnitude of the impact, the nature of the receptor and hence how the impact will affect the receptor and its use.

2.1.3 It is then necessary to determine whether an effect on a receptor or cumulative noise effect on a group of receptors constitutes a significant effect in the context of the project. This identification of significant effects takes into account matters such as the type of receptor, its use and its current environment. For residential receptors the assessment focuses on communities and considers matters such as the proportion of a community subject to the noise impact in addition to the magnitude of the impact.

2.1.4 The updated DMRB noise chapter (HA 213/08, Highways Agency et al 2008) notes:

"..a classification is only provided for the magnitude of impact, as currently the methodology has not been developed to assign a significance according to both the value of a resource and the magnitude of an impact. …. the Designer is best suited to determine this using professional judgment on a project by project basis."

2.1.5 Also there is no established UK guidance which clearly defines criteria for the assessment of significant effects arising from road traffic noise. The following sections therefore set out the background to the criteria applied to the proposed scheme.

3 Noise Impact

3.1 Evaluation

3.1.1 As discussed above, the starting point for identifying significant noise effects is evaluating the magnitude of noise impact in an area around noise sensitive receptors.

3.1.2 As defined in DMRB (HA 213/08, Highways Agency et al 2008) the change in noise level climate brought about by a scheme is used as the basis for evaluating noise impact.

3.1.3 Under DMRB the magnitude of a noise impact is defined by a series of noise change categories with an associated semantic scale (refer to Table 1).

Table 3.1: Magnitude of Noise Impact Criteria from DMRB

Noise Change [dB(A)]	Magnitude of Impact
0	No change
0.1 – 0.9	Negligible
1.0 – 2.9	Minor
3.0 – 4.9	Moderate
5.0 +	Major

3.2 Significance Criteria

3.2.1 The starting point for evaluating a significant effect on a receptor or receptors is to evaluate whether the magnitude of the noise impact (in the area around the receptor/receptors) is in itself potentially significant - i.e. impacts with a magnitude lower than the 'potential significant' threshold would not usually give rise to the identification of significant effects regardless of other considerations; e.g. number of receptors, receptor sensitivity and project context.. There are exceptions to this general rule, for example, any potential qualification under Noise Insulation (Scotland) Regulations.

3.2.2 Noise calculations have been undertaken to evaluate the noise impact around every residential receptor within the study area.

3.2.3 DMRB (HA 213/08, Highways Agency et al 2008) notes that:

- even for those most sensitive to short term change in noise, a change of less than 1dB is imperceptible and hence is a negligible impact on the environment;
- following a change in traffic flow, perceptible changes have been reported in the short-term for traffic noise changes as small as 1dB(A). This is based on research of community response to noise indicating that people can be more sensitive to the abrupt noise change soon after opening of a new or altered scheme; but
- that this heightened sensitivity to noise change is a temporary effect and the longer-term noise nuisance level after a number of years reverts to the 'steady state' level. Also, research suggests that the reported sensitivity to small changes in noise levels (less than 3dB) may be coloured by factors other than noise (Baughan and Huddart, 1993).

3.2.4 Following this last point, the updated DMRB noise chapter provides guidance on the threshold for potential significance, where clause 3.42 notes that:

"A change of 1 dB(A) in the short-term (e.g. when a project is opened) is the smallest that is considered perceptible. In the long-term a 3dB(A) change is considered perceptible, and such an increase should be mitigated if possible."

3.2.5 A long-term change of 3dB(A) or greater is therefore considered to be the threshold of potential significance. This is supported by a range of other guidance including:

- Transport Scotland, 2008, Scottish Transport Analysis Guidance – The Noise Objective, STAG Unit 3.3.2, HMSO;
- Department for Transport, 1998, A New Deal for Trunk Roads in England: Guidance on the New Approach to Appraisal, HMSO;
- Department of The Environment, 1990, Report of the Noise Review Working Party 1990, HMSO;
- Institute of Environmental Assessment, 1992, Guidelines for the Environmental Assessment of Road Traffic; and
- The Scottish Office, Development Department (1999), Planning Advice Note 56, Planning and Noise.

3.2.6 The mainstay of the Detailed Noise Assessment within DMRB is the evaluation of the long-term noise change. This is evaluated by comparing the Do-Something condition in the assessment year (the year with the highest traffic during the first 15 years of operation; assumed to be 2032 for the FRC) with the Do-Minimum condition in the baseline year (the year of opening; assumed to be 2017 for FRC). The initial indicator for significant effects (and hence requirement for mitigation) is therefore any change of 3dB(A) or more evaluated between these two conditions.

3.2.7 An assessment of the short-term change in noise levels has also been undertaken, comparing the Do-Something condition in 2017 (the baseline year and year of opening) with the Do-Minimum condition also in 2017. This assessment provides useful information as to where people may initially perceive an increase in noise nuisance – albeit not necessarily entirely due to noise[1] - even though the long term noise effect may not be significant.

3.2.8 DMRB does not advocate the use of absolute noise levels as a means of assessing noise impact or effects on receptors and the IoA/IEMA Guidance notes that relying solely on noise change may not be always appropriate. In this context, there are two sets of circumstance that in particular may warrant further consideration:

- already very noisy locations; and
- quiet areas.

3.2.9 Following the foregoing discussion, significant noise effects arising from the operation of the proposed scheme have been evaluated using the criteria set out in Table 3.2.

1 DMRB notes in paragraph A2.4 of the noise chapter that perception of changes as small as 1dB(A) after opening may be influenced by factors other than noise: *"As this noise change is equivalent to an increase of 25% or a decrease in traffic flow of 20%, this reaction may be partly attributed to an awareness of the changes in traffic rather than noise."*.

Table 3.2: Significance Criteria for Traffic Noise

Long-term Change in Noise Level $L_{A10,18h}$ (dB)	Magnitude of Impact	Initial Indicator of Significance	Criteria to Confirm Significant Effects
> 5.0	Major adverse	Potentially significant	Refer to A) and B) below
3.0 to 4.9	Moderate adverse		
1.0 to 2.9	Minor adverse	Unlikely to be significant	
0.1 to 0.9	Negligible	Not significant	
0	No Change		
-0.9 to -0.1	Negligible		
-2.9 to -1.0	Minor beneficial	Unlikely to be significant	Refer to A) and B) below
-4.9 to -3.0	Moderate beneficial	Potentially significant	
> -5.0	Major beneficial		

A) Significant Effect Criteria – Residential

3.2.10 Following Table 3.2, significant effects on residential receptors have been identified using professional judgement based on the following criteria:

- number of receptors subject to the noise impact;
- the proportion of the community within which the receptors reside subject to the impact;
- the magnitude of the impact; and
- existing absolute noise levels (particularly very noisy and quiet / tranquil areas).

3.2.11 As an example against the last bullet point, in very noisy locations potentially significant effects (which will trigger the requirement to consider mitigation) are identified where, whilst the noise change may be less than 3 dB(A), absolute noise levels for the scheme in the assessment years are predicted to exceed the threshold defined in the Noise Insulation (Scotland) Regulations. This also provides consistency with the Action Plans being drafted for existing roads under the Environmental Noise Regulations.

B) Significant Effect Criteria – Non Residential

3.2.12 Following Table 3.2, significant effects on non-residential receptors have been identified using professional judgement based on the following criteria:

- receptor use (e.g. educational, healthcare, religious buildings or community uses) and hence relevant guidance on noise (that will also take account of the sensitivity of the occupants);
- the times of use;
- the design of the receptor (e.g. windows, doors and ventilation systems) and hence ability of receptor to experience changes in external noise environment without significant change in internal noise conditions;
- the magnitude of the impact; and
- ambient noise levels (internal and external).

4 References

Baughan C J & Huddart L (1993). Effects of Traffic Noise Changes on Residents' Nuisance Ratings, Transport Research Laboratory.

Highways Agency et al., (2008). Design Manual for Roads and Bridges (DMRB) HA 205/08, Volume 11, Part 5. The Highways Agency, Scottish Government, Welsh Assembly Government and Department for Regional Development Northern Ireland.

Highways Agency et al., (2008). Design Manual for Roads and Bridges (DMRB) HA 213/08, Volume 11, Part 7. The Highways Agency, Scottish Government, Welsh Assembly Government, The Department for Regional Development Northern Ireland.