Appendix 8.3

Summary of Assumptions for Railway Noise Predictions

Appendix 8.3 Summary of Assumptions for Railway Noise Predictions

Summary tables of Northampton Gateway SRFI and non-SRFI passenger and freight train movements

Note that the stated values for Northampton Gateway (NGW) SRFI trains are for 2-way movements (i.e. the values shown include an arrival movement and a departure movement for each NGW SRFI train) and have been rounded to nearest whole number where necessary. For example, in the 2043 DS daytime scenario, 16 trains arrive at the SRFI and 16 trains depart the SRFI, with the total of 32 movements shown in the last column of the table. The NGW SRFI trains utilise the Northampton Loop.

Table 1 Train movements during daytime period (06:00 – 00:00)

LINE / SOURCE		TRAIN TYPE	No of Trains of each type								Overall Number of Passenger or Freight Trains						
			DM 2017	**DM 2021**	**DS 2021**	**DM 2033**	**DS 2033**	**DM 2043**	**DS 2043**		**DM 2017**	**DM 2021**	**DS 2021**	**DM 2033**	**DS 2033**	**DM 2043**	**DS 2043**
NORTHAMPTON LOOP	Pass.	Class 319	8	8	8	8	8	8	8	Pass.	116	116	116	152	152	152	152
		Class 350	108	108	108	144	144	144	144								
	Freight	Class 66 intermodal	20	24	24	36	36	48	48	Freight	30	38	38	56	56	72	72
		Class 90	6	8	8	12	12	14	14								
		Class 66 bulk	4	6	6	8	8	10	10								
NGW SRFI	Freight	Class 66			4		14		24	Freight			6		20		32
		Class 90			2		6		8								
WEST COAST MAIN LINE	Pass.	Class 390 Pendolino	314	314	314	314	314	314	314	Pass.	350	350	350	350	350	350	350
		Class 350	24	24	24	24	24	24	24								
		Class 325 (Class 319 used for predictions)	8	8	8	8	8	8	8								
		Class 92	4	4	4	4	4	4	4								

Appendix 8.3 Summary of Assumptions for Railway Noise Predictions

Table 2 Train movements during night-time period (00:00 – 06:00)

LINE / SOURCE		TRAIN TYPE	No of Trains of each type								Overall Number of Passenger or Freight Trains						
			DM 2017	DM 2021	DS 2021	DM 2033	DS 2033	DM 2043	DS 2043		DM 2017	DM 2021	DS 2021	DM 2033	DS 2033	DM 2043	DS 2043
NORTHAMPTON LOOP	Pass.	Class 319								Pass.	8	8	8	10	10	10	10
		Class 350	8	8	8	10	10	10	10								
	Freight	Class 66 intermodal	6	8	8	12	12	14	14	Freight	10	12	12	20	20	24	24
		Class 90	2	2	2	4	4	4	4								
		Class 325 (Class 319 used for predictions)	2	2	2	4	4	6	6								
NGW SRFI	Freight	Class 66			4		12		18	Freight			4		16		24
		Class 90					4		6								
WEST COAST MAIN LINE	Freight	Class 66 intermodal	8	10	10	14	14	20	20	Freight	12	14	14	22	22	28	28
		Class 90	2	2	2	4	4	4	4								
		Class 66 bulk	2	2	2	4	4	4	4								

Other input data assumptions

- All rail is assumed to be continuously welded and on ballast;
- Ballast corrections have been applied where appropriate based on track alignment;
- Corrections for diesel freight locomotives being either rolling or at full-power on different sections of track have been based on information provided by the rail consultant; and
- Typical speeds for both passenger and freight trains on different sections of track have been based on information provided by the rail consultant.

Note that while two types of freight locomotive have been assumed for the predictions of railway noise as advised by the rail consultant (Class 66 Diesel and Class 90 Electric as shown in Tables 1 and 2 above), it is likely that other types of locomotive that produce lower levels of noise will be used for some of the freight movements, in terms of both NGW SRFI and non-NGW SRFI rail traffic.

Appendix 8.3 Summary of Assumptions for Railway Noise Predictions

Input assumptions for assessment of impact of night-time maximum levels

- Single event level (SEL) values at each assessed receptor determined from the noise model for each train type (see note regarding freight locomotive types on previous page);
- Duration of each train pass-by determined from attendance on-site combined with speed information and length of train. In general, this resulted in 4 seconds for passenger trains, and between 23 and 45 seconds for freight trains depending on whether they were travelling up a gradient;
- L_{Amax} value determined using the following relationship: L_{max} = 0.973*SEL – 3.9*log(tp), where *tp* is the duration of the train pass-by in seconds. This relationship has its origins in the work associated with the West Coast Main Line upgrade of c 1998 – 2002 and is assumed to provide results in terms of L_{Amax} with a 'fast' response;
- Relationship between probability of a noise induced awakening for a given L_{Amax} level taken from Figure 2 of the paper "Health effects from high-speed railway noise – a literature review", Fenech et al, Internoise 2013;
- Figure 2 of that paper uses an external L_{Amax} with a 'slow' response and an assumed 15 dB(A) reduction for the attenuation of sound through a partially open window;
- A difference of 4 dB(A) was assumed between maximum levels with a 'fast' response compared with a 'slow' response ('fast' has the higher value);
- As a more cautious approach, 12 dB(A) was the assumed attenuation through a partially open window for the assessment;
- Each L_{Amax} value was adjusted by a reduction of 1 dB(A) (minus 4 dB(A) for correcting from 'fast' to 'slow' response; plus 3 dB(A) for correcting for the reduced attenuation assumed for a partially open window);
- For closed windows, a reduction of 25 dB(A) was assumed;
- In that case, each L_{Amax} value was adjusted by a reduction of 14 dB(A) (minus 4 dB(A) for correcting from 'fast' to 'slow' response; minus 10 dB(A) for correcting for the increased attenuation assumed for a closed window).