In Parliament – Session 2021 - 2022

HS2

High Speed Rail (Crewe – Manchester) Environmental Statement

Volume 5: Appendix SV-003-0MA01

Sound, noise and vibration

MA01: Hough to Walley's Green

Operational sound, noise and vibration report

M267

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Department for Transport

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Tables

1 Introduction

1.1.1 This report is an appendix to the sound, noise and vibration assessment relating to the Hough to Walley's Green area (MA01). This appendix presents detailed operational sound, noise and vibration levels.

1.1.2 This appendix should be read in conjunction with:

- Volume 2, Community Area reports;
- Volume 3, Route-wide effects;
- Volume 4, Off-route effects; and
- Volume 5, Appendices.

1.1.3 The sound, noise and vibration appendices comprise three sections. The first of these is an introduction to relevant policy and assessment methodology (see Volume 5, Appendix SV-001-00000); this relates to the sound, noise and vibration assessment for all areas.

1.1.4 In addition to this report for the Hough to Walley's Green area, a baseline and construction sound, noise and vibration report is set out (see Volume 5, Appendix SV-002-0MA01). This includes details of regional and local policy guidance and engagement.

1.1.5 The outcomes of the sound, noise and vibration assessments are summarised in the Volume 2, Community Area reports, including commentary regarding any likely significant effects identified in the assessment.

1.1.6 Maps referred to throughout the sound, noise and vibration appendices are contained in the Volume 2, MA01 Map Book and Volume 5, Sound, noise and vibration Map Book.

2 Scope, assumptions and limitations

2.1 Methodology

2.1.1 The methodology used for the assessment of airborne sound, ground-borne sound and vibration impacts and the determination of significant effects is defined in the Environmental Impact Assessment Scope and Methodology Report (SMR) (see Volume 5, Appendix CT-001-00001).

2.2 Assumptions

2.2.1 Route-wide assumptions are outlined in Volume 1, Section 8, and are further detailed in Volume 5, Appendix SV-001-00000. Local assumptions that apply to the assessment of operational sound, noise and vibration within this area are set out in Volume 2, Community Area report: Hough to Walley's Green (MA01), Section 13.

2.3 Limitations

2.3.1 The route-wide limitations and the approach adopted to ensure that they will not compromise the robust assessment of sound, noise and vibration are presented in Volume 5, Appendix SV-001-00000 and Volume 2, Community Area report: Hough to Walley's Green (MA01), Section 13.

3 Operational

3.1 Evaluation of impacts and effects

3.1.1 This appendix provides a quantitative assessment of operational noise and vibration impacts and effects and a qualitative assessment of likely significant effects, based on the impacts and effects identified and other local context information consistent with the scope and methodology defined for the Proposed Scheme.

3.1.2 Indirect effects arising from permanent changes in traffic patterns on the existing road and rail networks as a consequence of the Proposed Scheme are also reported in this appendix, where they would occur within the study area as defined in Volume 5, Appendix SV-001-00000.

3.1.3 Route-wide impacts, effects and significant effects associated with noise or vibration from the operation of the Proposed Scheme are reported in Volume 3, Route-wide effects.

3.1.4 Off-route effects of noise or vibration arising from the operation of the Proposed Scheme, including those likely to arise from permanent changes in traffic patterns on roads or railways outside of the study area for direct effects are reported in Volume 4, Off-route effects.

3.1.5 In undertaking the assessment of sound, noise and vibration, consistent with Environmental Impact Assessment (EIA) Directive[1] and planning practice and guidance on noise[2] a differentiation between impacts, effects, adverse effects and significant effects is made. Further information is provided in Volume 5, Appendix SV-001-00000.

3.1.6 The assessment of impacts has been undertaken at assessment locations that are representative of a number of dwellings or other sensitive receptors. The operational assessment locations employed in this assessment are presented on Volume 5, Sound, noise and vibration Map Book, Map Series SV-02.

3.1.7 Baseline sound level data have been collected at locations representative of the airborne sound-sensitive receptors and presented in Volume 5, Appendix SV-002-0MA01, Table 1.

[1] European Commission, *Environmental Impact Assessment – EIA.* Available online at: Environmental Impact Assessment - EIA - Environment - European Commission (europa.eu).

[2] Ministry of Housing Communities & Local Government (2019), *National Planning Policy Framework*. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf.

3.2 Effects arising during operation

Introduction

3.2.1 The assessment is reported first for ground-borne sound and vibration and then for airborne sound. Under each of these headings, the results of the quantitative identification of impacts, effects and significant effects are presented. The significant effects and the evidence used to support these conclusions are presented in Volume 2, Community Area report: Hough to Walley's Green (MA01), Section 13.

Avoidance and mitigation measures

3.2.2 These are set out in Volume 2, Community Area report: Hough to Walley's Green (MA01), Section 13.

Quantitative identification of impacts and effects

Ground-borne sound and vibration

3.2.3 Assessment locations defined for the quantitative assessment of impacts are shown on Volume 5, Sound, noise and vibration Map Book, Map Series SV-02. SV-02 also displays ground-borne noise and vibration impacts and any resultant significant effects.

3.2.4 For each assessment location, the assessment results for residential and non-residential receptors are presented in Table 2. Explanation of the information in Table 2 is provided in Volume 5, Appendix SV-001-00000, with the following additional notes in Table 1.

Table 1: Explanatory notes for assessment results

Symbol	Explanation
V1-V4	Type of receptor (ground-borne vibration) – (V1) vibration sensitive research and manufacturing; hospitals with vibration sensitive equipment/operations; universities with vibration sensitive research equipment/operations, (V2) hotels, hospital wards and education dormitories, (V3) offices, schools and places of worship, (V4) workshops.
G1-G4	Type of receptor (ground-borne sound) – (G1) theatres/large auditoria and concert halls, (G2) sound recording/broadcast studios, (G3) places of meeting for religious worship/courts/cinemas/lecture theatres/museums/small auditoria or halls, (G4) offices/schools/colleges/hospitals/hotels/libraries.
NA	Type of effect - Generally no adverse effect.
A	Ground-borne sound or vibration levels from the Proposed Scheme exceed Lowest Observed Adverse Effect Level (LOAEL): the significance criteria set out in Volume 5: Appendix SV-001-00000, Annex A, Section 1.3 are considered when establishing significant effects.
S	Ground-borne sound or vibration levels from the Proposed Scheme exceed Significant Observed Adverse Effect Level (SOAEL).
VDV	Vibration Dose Value.

Symbol	Explanation
~	When considered under the significance criteria set out in Volume 5: Appendix SV-001-00000, Annex A, Section 1.3, these adverse effects are not considered to be significant on a community basis.
<>	The quantitative impact methodology has identified an impact at this receptor which, based upon further qualitative receptor information, (see assessment text) does not gives rise to a significant effect.
	Where the significant effect column is highlighted in pink, then a significant effect is identified at the referenced residential community area, or individual receptor.
	For residential receptors yellow denotes a low ground-borne noise impact or a minor ground-borne vibration impact.
	For residential receptors orange denotes a medium ground-borne noise impact or a moderate ground-borne vibration impact.
	For residential receptors red denotes a high ground-borne noise impact or a major ground-borne vibration impact.
	For residential receptors dark red denotes a very high ground-borne noise impact.

Table 2: Operational ground-borne sound and vibration levels, noise and vibration impacts and effects for residential and non-residential receptors

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s$^{1.75}$ Night-time (23:00 – 07:00	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
610025	Brierley Primary School, Mirion Street, Crewe	34	0.09	0.04	-	1	NA	V3, G4	T	-	-	-	-	
610026	The Wharf Residence, Thomas Street, Crewe	36	0.11	0.06	-	2	A	R	T	-	-	-	-	MA01-O-C1
610063	Broad Street, Crewe	29	0.06	0.03	-	50	NA	R	T	-	-	-	-	
610065	Sandown Road, Crewe	27	0.05	0.02	-	13	NA	R	T	-	-	-	-	
610068	Sandown Road, Crewe	29	0.05	0.03	-	28	NA	R	T	-	-	-	-	
610069	North Street, Crewe	30	0.06	0.03	-	61	NA	R	T	-	-	-	-	
610077	Broughton Road, Crewe	30	0.06	0.03	-	93	NA	R	T	-	-	-	-	
610085	Padstow Close, Crewe	-	0.04	0.02	-	80	NA	R	T	-	-	-	-	
610091	Wareham Drive, Crewe	-	0.04	0.02	-	50	NA	R	T	-	-	-	-	
610093	Somerley Close, Crewe	-	0.04	0.02	-	45	NA	R	T	-	-	-	-	
610104	Bowland Croft, Crewe	-	0.04	0.02	-	7	NA	R	T	-	-	-	-	
610113	Haweswater Avenue, Crewe	-	0.11	0.06	-	5	NA	R	T	-	-	-	-	
610115	Buttermere Drive, Crewe	-	0.10	0.05	-	7	NA	R	T	-	-	-	-	
610125	Aysgarth Avenue and Perry Fields, Crewe	-	0.11	0.05	-	9	NA	R	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s$^{1.75}$ Night-time (23:00 – 07:00	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
610148	Parkfield Farm, Middlewich Road, Minshull Vernon	-	0.01	0.02	-	1	NA	R	T	-	-	-	-	
610292	Middlewich Street, Crewe	31	0.07	0.03	-	23	NA	R	T	-	-	-	-	
610307	Audley Street, Crewe	30	0.06	0.03	-	54	NA	R	T	-	-	-	-	
610341	Hythe Avenue, Crewe	-	0.04	0.02	-	27	NA	R	T	-	-	-	-	
610342	Bowland Croft, Crewe	-	0.05	0.02	-	7	NA	R	T	-	-	-	-	
610343	Wharfedale Avenue, Crewe	-	0.05	0.02	-	13	NA	R	T	-	-	-	-	
610344	Haweswater Avenue, Crewe	-	0.12	0.06	-	8	NA	R	T	-	-	-	-	
610345	Wharfedale Avenue, Crewe	-	0.06	0.03	-	7	NA	R	T	-	-	-	-	
610347	Buttermere Drive, Crewe	-	0.11	0.06	-	7	NA	R	T	-	-	-	-	
610348	Bleasdale Road, Crewe	-	0.07	0.04	-	7	NA	R	T	-	-	-	-	
610349	Aysgarth Avenue, Crewe	-	0.10	0.05	-	9	NA	R	T	-	-	-	-	
610392	Crossway, Crewe	27	0.04	0.02	-	45	NA	R	T	-	-	-	-	
610509	Maplins Moss Place, Crewe	-	0.19	0.10	-	31	NA	R	T	-	-	-	-	
610512	Barn Meadow Way, Crewe	-	0.17	0.08	-	20	NA	R	T	-	-	-	-	
610513	Kays Croft Drive, Crewe	-	0.16	0.08	-	29	NA	R	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s$^{1.75}$ Night-time (23:00 – 07:00	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
610530	Crewe Lyceum Theatre, Heath Street, Crewe	19	0.02	0.01	-	1	NA	G1	T	-	-	-	-	
610600	Broughton Road, Crewe	45	0.30	0.15	-	1	S	R	T	-	-	-	-	MA01-O-C1
610601	Broughton Road, Crewe	48	0.41	0.20	-	2	S	R	T	-	-	-	-	MA01-O-C1
610603	North Street, Crewe	39	0.15	0.08	-	1	A	R	T	-	-	-	-	MA01-O-C1
610604	Hazel Grove, Crewe	47	0.36	0.18	-	2	S	R	T	-	-	-	-	MA01-O-C1
610605	Hazel Grove, Crewe	39	0.16	0.08	-	1	A	R	T	-	-	-	-	MA01-O-C1
610606	Hazel Grove, Crewe	41	0.21	0.11	-	1	A	R	T	-	-	-	-	MA01-O-C1
610607	Hazel Grove, Crewe	46	0.35	0.18	-	2	S	R	T	-	-	-	-	MA01-O-C1
610608	Hazel Grove, Crewe	41	0.20	0.10	-	1	A	R	T	-	-	-	-	MA01-O-C1
610609	Hazel Grove, Crewe	44	0.27	0.14	-	2	A	R	T	-	-	-	-	MA01-O-C1
610610	Hazel Grove, Crewe	46	0.34	0.17	-	2	S	R	T	-	-	-	-	MA01-O-C1
610611	Hazel Grove, Crewe	44	0.28	0.14	-	1	A	R	T	-	-	-	-	MA01-O-C1
610612	Hazel Grove, Crewe	42	0.21	0.11	-	1	A	R	T	-	-	-	-	MA01-O-C1
610613	Hazel Grove, Crewe	40	0.18	0.09	-	7	A	R	T	-	-	-	-	MA01-O-C1
610614	Hazel Grove, Crewe	46	0.33	0.17	-	2	S	R	T	-	-	-	-	MA01-O-C1
610615	Chapelmere Court, Crewe	46	0.33	0.16	-	2	S	R	T	-	-	-	-	MA01-O-C1
610616	Chapelmere Court, Crewe	40	0.18	0.09	-	1	A	R	T	-	-	-	-	MA01-O-C1

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s$^{1.75}$ Night-time (23:00 – 07:00	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
610617	Hazel Grove, Crewe	40	0.17	0.09	-	1	A	R	T	-	-	-	-	MA01-O-C1
610618	Chapelmere Court, Crewe	41	0.20	0.10	-	1	A	R	T	-	-	-	-	MA01-O-C1
610619	Chapelmere Court, Crewe	46	0.32	0.16	-	2	S	R	T	-	-	-	-	MA01-O-C1
610620	Hazel Grove, Crewe	46	0.32	0.16	-	2	S	R	T	-	-	-	-	MA01-O-C1
610621	Chapelmere Court, Crewe	42	0.23	0.11	-	1	A	R	T	-	-	-	-	MA01-O-C1
610622	Chapelmere Court, Crewe	39	0.16	0.08	-	1	A	R	T	-	-	-	-	MA01-O-C1
610623	Hazel Grove, Crewe	45	0.30	0.15	-	2	S	R	T	-	-	-	-	MA01-O-C1
610624	Hazel Grove, Crewe	44	0.27	0.14	-	2	A	R	T	-	-	-	-	MA01-O-C1
610625	Hazel Grove, Crewe	45	0.29	0.15	-	2	S	R	T	-	-	-	-	MA01-O-C1
610626	Hazel Grove, Crewe	45	0.31	0.16	-	2	S	R	T	-	-	-	-	MA01-O-C1
610627	Broad Street, Crewe	40	0.17	0.08	-	2	A	R	T	-	-	-	-	MA01-O-C1
610628	Hazel Grove, Crewe	39	0.15	0.08	-	1	A	R	T	-	-	-	-	MA01-O-C1
610629	Broad Street, Crewe	45	0.29	0.15	-	10	S	R	T	-	-	-	-	MA01-O-C1
610630	Broad Street, Crewe	41	0.18	0.09	-	3	A	R	T	-	-	-	-	MA01-O-C1
610631	Broad Street, Crewe	43	0.24	0.12	-	9	A	R	T	-	-	-	-	MA01-O-C1
610632	Broad Street, Crewe	45	0.28	0.14	-	2	S	R	T	-	-	-	-	MA01-O-C1
610633	Broad Street, Crewe	41	0.19	0.10	-	1	A	R	T	-	-	-	-	MA01-O-C1

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s$^{1.75}$ Night-time (23:00 – 07:00	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
610634	Cross Way, Crewe	44	0.26	0.13	-	7	A	R	T	-	-	-	-	MA01-O-C1
610635	Cross Way, Crewe	39	0.15	0.08	-	3	A	R	T	-	-	-	-	MA01-O-C1
610636	Greenacres, Crewe	40	0.17	0.09	-	3	A	R	T	-	-	-	-	MA01-O-C1
610637	Lime Street, Crewe	37	0.13	0.06	-	1	A	R	T	-	-	-	-	MA01-O-C1
610638	Greenacres, Crewe	44	0.26	0.13	-	2	A	R	T	-	-	-	-	MA01-O-C1
610639	Greenacres, Crewe	44	0.26	0.13	-	26	A	R	T	-	-	-	-	MA01-O-C1
610641	Greenacres, Crewe	44	0.25	0.13	-	12	A	R	T	-	-	-	-	MA01-O-C1
610642	Haslemere Way Crewe	43	0.24	0.12	-	4	A	R	T	-	-	-	-	MA01-O-C1
610644	Craneborne Road, Crewe	43	0.24	0.12	-	16	A	R	T	-	-	-	-	MA01-O-C1
610645	Cranborne Road, Crewe	41	0.20	0.10	-	3	A	R	T	-	-	-	-	MA01-O-C1
610646	Sherborne Court Neurological Centre, Sherborne Road, Crewe	43	0.24	0.12	-	1	A	R	T	-	-	-	-	MA01-O-N6
610647	Middlewich Street, Crewe	44	0.25	0.13	-	1	A	R	T	-	-	-	-	MA01-O-C1
610648	Middlewich Street, Crewe	44	0.26	0.13	-	2	A	R	T	-	-	-	-	MA01-O-C1
610649	Middlewich Street and Ridgeway Street, Crewe	43	0.23	0.12	-	11	A	R	T	-	-	-	-	MA01-O-C1
610650	Audley Street, Crewe	41	0.19	0.09	-	2	A	R	T	-	-	-	-	MA01-O-C1

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s$^{1.75}$ Night-time (23:00 – 07:00	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
610651	Middlewich Street, Crewe	44	0.27	0.13	-	1	A	R	T	-	-	-	-	MA01-O-C1
610652	Middlewich Street, Crewe	44	0.27	0.14	-	3	A	R	T	-	-	-	-	MA01-O-C1
610653	Middlewich Street, Crewe	44	0.27	0.14	-	2	A	R	T	-	-	-	-	MA01-O-C1
610654	Middlewich Street and Audley Street, Crewe	43	0.24	0.12	-	6	A	R	T	-	-	-	-	MA01-O-C1
610656	Henry Street, Crewe	40	0.17	0.09	-	4	A	R	T	-	-	-	-	MA01-O-C1
610657	Sheppard Cls, Crewe and Wallis Street, Crewe	43	0.25	0.12	-	5	A	R	T	-	-	-	-	MA01-O-C1
610658	Brierley St, Crewe	43	0.24	0.12	-	2	A	R	T	-	-	-	-	MA01-O-C1
610659	Brierley St, Crewe	43	0.24	0.12	-	19	A	R	T	-	-	-	-	MA01-O-C1
610660	Earle Street, Crewe	43	0.24	0.12	-	12	A	R	T	-	-	-	-	MA01-O-C1
610661	Earle Street, Crewe	43	0.23	0.12	-	5	A	R	T	-	-	-	-	MA01-O-C1
610662	Basford Rd, Crewe	39	0.16	0.08	-	2	A	R	T	-	-	-	-	MA01-O-C1
610663	Best Western Crewe Arms Hotel, Nantwich Road, Crewe	44	0.25	0.13	-	1	A	V2, G4	T	-	-	-	-	MA01-O-N1
610664	Eurosales Centre and Eurocard Centre (Offices), Herald Park, Herald Drive, Crewe	44	0.27	0.13	-	2	A	V3, G4	T	-	-	-	-	MA01-O-N2

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s$^{1.75}$ Night-time (23:00 – 07:00	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
610666	Bentley Manor Care Home, Sherborne Road, Crewe	43	0.24	0.12	-	1	A	R	T	-	-	-	-	MA01-O-N5
610667	Chuff Chuff Building (Mixed-use commercial), Middlewich Street, Crewe	44	0.27	0.14	-	1	A	V3,G2	T	-	-	-	-	MA01-O-N3
610671	Brierley Street, Crewe	40	0.16	0.08	-	1	A	R	T	-	-	-	-	MA01-O-C1
610672	Mirion Street, Crewe	27	0.05	0.02	-	1	NA	R	T	-	-	-	-	
610673	Earle Street, Crewe	26	0.04	0.02	-	3	NA	R	T	-	-	-	-	
610674	No 57 Mirion House (Hotel), Earle Street, Crewe	32	0.08	0.04	-	1	NA	V2, G4	T	-	-	-	-	
610675	Earle House (Hotel), Earle Street, Crewe	38	0.14	0.07	-	1	NA	V2, G4	T	-	-	-	-	
610676	Broad Street, Crewe	44	0.28	0.14	-	14	A	R	T	-	-	-	-	MA01-O-C1
610677	Cross Way, Crewe	37	0.13	0.07	-	18	A	R	T	-	-	-	-	MA01-O-C1
610680	Cooperative Funeral Services (Offices), Middlewich Street, Crewe	43	0.28	0.15	-	1	A	V3/G3	T	-	-	-	-	MA01-O-N4
610700	Middlewich Street, Crewe	31	0.07	0.03	-	7	NA	R	T	-	-	-	-	
610701	Middlewich Street, Crewe	27	0.05	0.02	-	8	NA	R	T	-	-	-	-	

Assessment location		Impact criteria				Significance criteria								Significant effect
Reference	Area represented	Ground-borne sound level dB L_{pASmax}	VDV m/s$^{1.75}$ Daytime (07:00 – 23:00)	VDV m/s$^{1.75}$ Night-time (23:00 – 07:00	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
610738	Bradfield Road, Crewe and committed development (Map book ref: MA01/143)	30	0.06	0.03	-	1	NA	R	T	-	-	-	-	
610742	Abbey Place, Crewe	28	0.05	0.03	-	55	NA	R	T	-	-	-	-	
610822	Middlewich Street Dental Practice, Middlewich Street, Crewe	27	0.05	0.02	-	1	NA	V2, G4	T	-	-	-	-	
610824	Crewe Heritage Trust (Museum), Vernon Way, Crewe	25	0.04	0.02	-	1	NA	V3, G3	T	-	-	-	-	

Ground-borne sound and vibration impact summary

3.2.5 The operational ground-borne noise and vibration impacts identified in Table 2 are summarised in Table 3 and Table 4.

Table 3: Summary of operational ground-borne noise impacts

Property type	Number of ground-borne noise impacts			
	Low	Medium	High	Very high
Residential properties	30	198	35	0
Non-residential properties				6

Table 4: Summary of operational ground-borne vibration impacts

Property type	Number of ground-borne vibration impacts			
	Minor	Moderate	Major	Risk of building damage
Residential properties	201	2	0	0
Non-residential properties			1	0

Airborne sound: direct impacts and effects

3.2.6 The direct effects from the operation of the Proposed Scheme as well as any new, amended or altered roads or railway lines, which are identified as part of the scheme, are presented in Table 6 for residential receptors and Table 7 for non-residential receptors.

3.2.7 The assessment information, impact criteria and significance criteria for the assessment of the incorporated mitigation case at residential and non-residential receptors are presented in Table 6 and Table 7 respectively. The results should be considered in conjunction with the information contained in Volume 5, Sound, noise and vibration Map Book, Map Series SV-02.

3.2.8 Explanation of the information in Table 6 and Table 7 is provided in Volume 5, Appendix SV-001-00000, with the following additional notes in Table 5.

Table 5: Explanatory notes for operational assessment results

Symbol	Explanation
	Where the significant effect column is marked, then a significant effect is identified at the referenced group of dwellings, or individual residential or non-residential receptor.
	Yellow denotes a minor impact at a residential building. A minor impact is identified where the "Proposed Scheme only (year 15 traffic)" is greater than LOAEL, and either the change is ≥3dB – <5dB, or where a high baseline is identified during the corresponding period the change is ≥1dB – <3dB.
	Orange denotes a moderate impact at a residential building. A moderate impact is identified where the "Proposed Scheme only (year 15 traffic)" is greater than LOAEL, and either the change is ≥5dB – <10dB, or where a high baseline is identified during the corresponding period the change is of ≥3dB – <5dB.
	Red denotes a major impact at a residential building. A major impact is identified where the "Proposed Scheme only (year 15 traffic)" is greater than LOAEL, and either the change is ≥10dB, or where a high baseline is identified during the corresponding period the change is of ≥5dB.
	Green denotes a beneficial impact at a residential building. A beneficial impact is identified where the relevant baseline value is greater than LOAEL and the change is of >3dB.

Symbol	Explanation
*	Day - $L_{pAeq,07:00 - 23:00}$.
**	Night - $L_{pAeq,23:00 - 07:00}$.
***	Max - L_{pAFmax}. In the 'Proposed Scheme only' column where two train noise level values are presented. The first value represents the highest maximum noise level from HS2 services. The second value is provided where there are additional services (Northern Powerhouse Rail) operating on the HS2 Scheme and where maximum noise levels from additional services are anticipated to be higher than from HS2 services. In the 'Without Proposed Scheme' column, the value is the arithmetic average $L_{pAFmax,5min}$ as presented in the corresponding baseline technical appendix. For further information refer to Volume 5: Appendix SV-001-00000.
****	Where the Proposed Scheme modifies an existing source, i.e. road or railway realignments, the *Proposed Scheme only* and *(Opening year baseline + Year 15 traffic)* levels in the table include the sound from the modified source.
A	Sound levels from the Proposed Scheme exceed LOAEL: the significance criteria set out in Appendix SV-001-00000, Annex A, Section 1.3 are considered when establishing significant effects.
B	For non-residential receptors further detail about the type of effect is set out in the text of Appendix SV-001-00000.
CD	Committed Development. The 'Area represented' column contains information about the potential number of impacts included in the development.
A1 – A4	Type of receptor (airborne sound) - (A1) large and small auditoria; concert halls, sound recording & broadcast studios and theatres (A2) places of meeting for religious worship, courts, cinemas, lecture theatres, museums and small auditoria or halls, (A3) schools; colleges; hospitals, hotels and libraries (A4) offices and amenity spaces.
H	High existing ambient sound level. Defined as >65dB $L_{Aeq, day}$ and/or >55dB $L_{Aeq, night}$.
L	Low existing ambient sound level. Defined as <42dB $L_{Aeq, day}$ and/or <32dB $L_{Aeq, night}$.
LD	Landscape receptor.
NA	Sound levels from the Proposed Scheme do not exceed LOAEL, therefore generally no adverse effect.
NI	The receptor is predicted to qualify for mitigation, which shall be provided to the specification defined in the Noise Insulation (Railways and other Guided Rail Systems) Regulations 1996[3].
R	Residential receptor.
RM	Residential mooring.
S	Sound levels from the Proposed Scheme exceed SOAEL: noise insulation therefore provided.
T	Type of receptor: Typical.
+	The use and sensitivity of this non-residential receptor or land use is very sensitive to noise and has been included in the detailed assessment (presented in Volume 2) where there is a change less than 3dB. In each case specific information is presented in an associated footnote.
#	A change of 3dB or greater has been identified however, the assessment methodology only defines an impact where the absolute sound level from the Proposed Scheme is greater or equal to 50dB $L_{pAeq,07:00 - 23:00}$ during the daytime or 40dB $L_{pAeq,23:00 - 07:00}$ at night. At the receptor denoted the absolute level condition is not met and therefore no impact is identified.
~	When considered under the significance criteria set out in Annex A, Section 1.3 Volume 5: Appendix SV-001-00000, these adverse effects are not considered to be significant on a community basis.

[3] *The Noise Insulation (Railway and Other Guided Transport Systems) Regulations 1996*. Her Majesty's Stationery Office, London.

Symbol	Explanation
$	The impact methodology for non-residential receptors includes a screening criterion for A1 building use of 50dB $L_{pAeq,07:00-23:00}$ and 50dB $L_{pAeq,23:00-07:00}$, A2 building use of 50dB $L_{pAeq,07:00-23:00}$, A3 building use of 50dB $L_{pAeq,07:00-23:00}$, and 45dB $L_{pAeq,23:00-07:00}$ and for A4 building use 55dB $L_{pAeq,07:00-23:00}$. At the receptor denoted, the screening criteria is met but a change of 3dB or greater has not been identified and therefore no impact is identified. Further information is provided in Volume 5: Appendix SV-001-00000.
<>	The quantitative impact methodology has identified an impact at this receptor which, based upon further qualitative receptor information, (see assessment text) does not gives rise to a significant effect.

Table 6: Operational airborne sound, noise impacts and significant effects: residential receptors

Assessment location		Impact criteria									Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
610053	Singleton Avenue, Crewe	<30	<20	<40/--	63	61	64	62	60	-1	-1	NA	11	R	T	H	-	-	-	
610056	Greenacres, Crewe	<30	<20	<40/--	64	62	65	63	61	-1	-1	NA	28	R	T	H	-	-	-	
610057	Davenport Street, Crewe	<30	<20	<40/--	65	63	66	64	62	-1	-1	NA	10	R	T	H	-	-	-	
610058	Crossway, Crewe	<30	<20	<40/--	48	45	48	47	44	-1	-1	NA	21	R	T	-	-	-	-	
610059	Broad Street, Crewe	<30	<20	<40/--	67	65	67	66	63	-1	-1	NA	4	R	T	H	-	-	-	
610060	Lime Street, Crewe	<30	<20	<40/--	66	64	67	65	63	-1	-1	NA	12	R	T	H	-	-	-	
610061	Crossway, Crewe	<30	<20	<40/--	48	43	44	48	42	0	-1	NA	22	R	T	-	-	-	-	
610062	Broad Street, Crewe	<30	<20	<40/--	64	62	64	63	60	-1	-1	NA	27	R	T	H	-	-	-	
610063	Broad Street, Crewe	<30	<20	<40/--	68	60	65	68	60	0	0	NA	50	R	T	H	-	-	-	

Assessment location		Impact criteria									Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
610064	Hazel Grove, Crewe	<30	<20	<40/--	56	54	57	55	53	-1	-1	NA	38	R	T	-	-	-	-	
610065	Sandown Road, Crewe	<30	<20	<40/--	64	62	65	63	61	-1	-1	NA	13	R	T	H	-	-	-	
610066	Lingfield Drive, Crewe	<30	<20	51/--	45	40	42	45	39	0	-1	NA	112	R	T	-	-	-	-	
610067	Hazel Grove, Crewe	<30	<20	<40/--	50	47	50	50	46	-1	-1	NA	30	R	T	-	-	-	-	
610068	Sandown Road, Crewe	<30	<20	50/--	64	62	65	63	61	-1	-1	NA	28	R	T	H	-	-	-	
610069	North Street, Crewe	<30	<20	49/--	51	45	48	51	45	0	0	NA	61	R	T	-	-	-	-	
610070	North Street, Crewe	<30	<20	44/--	52	47	49	51	47	0	-1	NA	8	R	T	-	-	-	-	
610072	Farrier Court, Crewe	<30	<20	47/--	50	44	48	50	43	0	0	NA	81	R	T	-	-	-	-	
610073	Sandown Road, Crewe	<30	<20	50/--	52	47	49	51	46	-1	-1	NA	94	R	T	-	-	-	-	

Assessment location		Impact criteria									Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
610074	Adderley Close, Crewe	30	22	53/--	48	41	45	48	41	0	0	NA	175	R	T	-	-	-	-	
610075	Broughton Road, Crewe	51	48	54/--	54	50	51	54	50	0	0	A	5	R	T	-	-	-	-	
610076	Stoneley Road, Crewe	34	32	50/--	60	53	58	60	53	0	0	NA	24	R	T	-	-	-	-	
610077	Broughton Road, Crewe	46	44	53/--	63	55	60	63	55	0	0	A	113	R	T	H	-	-	-	
610078	Conway Close, Crewe	50	47	56/--	52	49	51	51	48	-1	-1	A	44	R	T	-	-	-	-	
610079	Bidvale Way, Crewe	40	38	54/--	45	40	41	45	40	0	0	NA	36	R	T	-	-	-	-	
610080	Falcon Drive, Crewe	35	31	52/--	64	57	62	64	57	0	0	NA	21	R	T	H	-	-	-	
610081	Sheringham Drive, Crewe	39	35	54/--	50	43	47	50	43	0	0	NA	69	R	T	-	-	-	-	

Assessment location		Impact criteria										Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
610082	Conway Close, Crewe	64	62	55/--	65	63	66	64	62	-1	-1	S	18	R	T	H	-	-	NI[4]	
610083	Broughton Road, Crewe	46	43	57/--	54	48	50	53	47	0	-1	A	22	R	T	-	-	-	-	
610084	Stoneley Road, Crewe	36	32	55/--	52	45	49	52	45	0	0	NA	13	R	T	-	-	-	-	
610085	Padstow Close, Crewe	60	57	61/--	61	58	61	60	57	-1	-1	S	80	R	T	H	-	-	NI[5]	
610086	Broughton Road, Crewe	42	38	58/--	57	50	55	57	50	0	0	A	30	R	T	-	-	-	-	
610087	Broughton Road, Crewe	46	43	59/--	47	43	46	47	43	0	0	A	2	R	T	-	-	-	-	

[4] Only 10 dwellings estimated to qualify for noise insulation at this location. For more information see the Volume 2, Community Area Report: Hough to Walley's Green (MA01), Section 13.

[5] Only eight dwellings estimated to qualify for noise insulation at this location. For more information see the Volume 2, Community Area Report: Hough to Walley's Green (MA01), Section 13.

Assessment location		Impact criteria										Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
610088	Stoneley Road, Crewe	36	32	54/--	49	42	46	49	42	0	0	NA	3	R	T	-	-	-	-	
610089	Cromer Drive, Crewe	42	37	58/--	43	39	41	44	39	1	0	A	121	R	T	-	-	-	-	
610090	Broughton Road, Crewe	44	41	59/--	46	42	44	46	42	0	0	A	17	R	T	-	-	-	-	
610091	Wareham Drive, Crewe	56	53	62/--	56	54	57	56	53	-1	-1	A	50	R	T	-	-	-	-	
610092	Mablins Lane, Crewe	39	33	56/--	65	58	63	65	58	0	0	NA	215	R	T	H	-	-	-	
610093	Somerley Close, Crewe	54	52	63/--	55	53	55	55	52	-1	-1	A	45	R	T	-	-	-	-	
610094	Hurn Close, Crewe	43	39	59/--	45	40	41	46	40	1	0	A	67	R	T	-	-	-	-	
610095	Race Farm, Waldrons Lane, Crewe	36	32	55/--	57	50	54	57	50	0	0	NA	1	R	T	-	-	-	-	
610096	Broughton Road, Crewe	45	40	62/--	50	44	47	51	44	0	0	A	10	R	T	-	-	-	-	

Assessment location		Impact criteria										Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
610098	Groby Road, Crewe	34	30	52/--	62	55	60	62	55	0	0	NA	3	R	T	H	-	-	-	
610099	Broughton Road, Crewe	44	38	62/--	61	53	58	61	53	0	0	A	9	R	T	-	-	-	-	
610100	Parkstone Drive, Crewe	45	39	61/--	63	56	61	63	56	0	0	A	26	R	T	H	-	-	-	
610101	Broughton Road, Crewe	47	42	64/--	50	45	46	51	44	1	0	A	3	R	T	-	-	-	-	
610104	Bowland Croft, Crewe	56	53	69/--	63	61	63	58	54	-5	-7	A	7	R	T	H	-	-	-	MA01-O-C2
610105	Broughton Road, Crewe	46	41	64/--	52	45	49	53	46	1	0	A	1	R	T	-	-	-	-	
610107	Waldrons Lane, Crewe	41	35	60/--	55	47	52	55	48	0	0	A	5	R	T	-	-	-	-	
610110	Waldrons Lane, Crewe	44	38	63/--	47	41	44	48	41	1	1	A	1	R	T	-	-	-	-	
610112	Ash Cottage, Waldrons Lane, Crewe	42	36	60/--	55	48	53	55	48	0	0	A	1	R	T	-	-	-	-	

Assessment location		Impact criteria										Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
610113	Haweswater Avenue, Crewe	55	51	72/--	63	61	64	55	51	-7	-10	A	5	R	T	H	-	-	-	MA01-O-C2
610114	Warmingham Road, Crewe	47	41	66/--	48	42	45	50	43	2	1	A	8	R	T	-	-	-	-	
610115	Buttermere Drive, Crewe	56	51	72/--	63	61	64	56	51	-7	-10	A	7	R	T	H	-	-	-	MA01-O-C2
610116	Kents Lane, Crewe	48	41	68/--	45	39	41	50	42	5	3	A	3	R	T	-	-	-	-	~
610117	Lambourn Drive, Crewe	44	37	61/--	<40	34	<40	45	38	>5	3	A	26	R	T	L	-	-	-	#
610118	White Lion Hotel, Warmingham Road, Crewe	45	38	62/--	48	41	45	50	42	2	1	A	1	R	T	-	-	-	-	
610119	Warmingham Road, Crewe	44	37	60/--	64	56	61	64	56	0	0	A	14	R	T	H	-	-	-	
610120	Aysgarth Avenue, Crewe	48	42	63/--	46	43	46	49	42	3	-1	A	25	R	T	-	-	-	-	
610121	Warmingham Road, Crewe	44	38	61/--	54	47	51	54	47	0	0	A	18	R	T	-	-	-	-	

Assessment location		Impact criteria										Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
610122	Newstead Farm, Moss Lane, Leighton	42	37	57/--	52	46	51	52	46	0	0	NA	1	R	T	-	-	-	-	
610123	Thornfields, Crewe	45	39	63/--	41	38	41	46	39	5	1	A	21	R	T	L	-	-	-	#
610124	Moss Lane, Leighton	42	36	59/--	41	37	40	43	37	3	0	A	4	R	T	L	-	-	-	#
610125	Aysgarth Avenue and Perry Fields, Crewe	56	52	72/--	63	62	65	56	52	-7	-10	A	9	R	T	H	-	-	-	MA01-O-C2
610126	Perry Fields, Crewe	50	44	66/--	50	47	50	50	44	0	-3	A	25	R	T	-	-	-	-	
610127	Groby Road, Crewe	38	32	55/--	46	46	51	57	50	11	4	NA	4	R	T	-	-	-	-	#
610129	Moss Farm, Moss Lane, Leighton	43	38	59/--	40	36	<40	44	38	3	2	A	1	R	T	L	-	-	-	#
610131	High Doon, Moss Lane, Leighton	44	38	61/--	52	46	51	52	46	0	0	A	1	R	T	-	-	-	-	

Assessment location		Impact criteria										Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
610132	Moss Lane, Minshull Vernon	48	43	66/--	45	43	46	49	43	3	0	A	2	R	T	-	-	-	-	
610133	Warmingham Road, Warmingham	41	35	55/--	52	49	55	59	51	7	3	NA	4	R	T	-	-	-	-	#
610134	Moss Cottage, Moss Lane, Crewe	47	41	61/--	47	44	48	50	45	3	1	A	1	R	T	-	-	-	-	
610135	Warmingham Road, Warmingham	39	33	54/--	52	49	55	68	61	16	12	NA	3	R	T	-	-	-	-	#
610136	Moss Lane Farm, Warmingham Road, Warmingham	40	34	55/--	50	43	48	51	43	0	0	NA	1	R	T	-	-	-	-	
610137	Moss Lane, Minshull Vernon	47	41	64/--	45	43	46	48	42	3	-1	A	4	R	T	-	-	-	-	
610139	Moss Farm, Moss Lane, Warmingham	49	42	65/--	47	44	48	51	44	4	0	A	1	R	T	-	-	-	-	

Assessment location		Impact criteria										Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
610142	Drury Lane, Crewe	48	41	63/--	47	44	48	50	45	3	1	A	3	R	T	-	-	-	-	
610145	Drury Lane, Crewe	42	35	61/--	43	40	48	46	41	3	1	A	2	R	T	-	-	-	-	#
610146	Middlewich Road, Minshull Vernon	43	37	59/--	45	38	42	47	40	2	2	A	7	R	T	-	-	-	-	
610147	Four Crofts, Middlewich Road, Minshull Vernon	44	37	58/--	55	48	53	55	48	0	0	A	1	R	T	-	-	-	-	
610148	Parkfield Farm, Middlewich Road, Minshull Vernon	67	63	83/--	64	62	65	67	63	3	0	S	1	R	T	H	-	-	NI	~
610149	Moat House Farm, Middlewich Road, Minshull Vernon	45	37	59/--	55	48	53	55	48	0	0	A	1	R	T	-	-	-	-	
610151	The Woodlands, Nantwich Road, Minshull Vernon	50	43	65/--	50	43	47	52	45	3	2	A	1	R	T	-	-	-	-	~

Assessment location		Impact criteria										Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
610153	Nantwich Road, Minshull Vernon	57	49	73/--	45	43	45	57	49	12	7	A	3	R	T	-	-	-	-	~
610155	Nantwich Road, Minshull Vernon	50	43	65/--	63	56	61	64	56	0	0	A	17	R	T	H	-	-	-	
610156	Brookhouse Lane, Minshull Vernon	45	38	58/--	66	58	63	66	58	0	0	A	2	R	T	H	-	-	-	
610157	Walleys Green, Minshull Vernon	51	44	66/--	59	52	57	60	53	1	1	A	5	R	T	-	-	-	-	
610158	Brookhouse Lane, Minshull Vernon	47	40	63/--	65	57	62	65	57	0	0	A	4	R	T	H	-	-	-	
610160	Nantwich Road, Minshull Vernon	54	47	70/--	46	42	43	54	47	8	5	A	2	R	T	-	-	-	-	~
610162	Park Hall Farm, Wimboldsley, Middlewich and committed development (Map Book ref: MA01/145)	63	55	80/--	47	45	47	63	55	16	10	S	1	CD-R	T	-	-	-	NI	~

Assessment location		Impact criteria										Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
610163	Newfield Farm, Nantwich Road, Minshull Vernon	53	46	64/--	52	46	50	54	47	2	2	A	1	R	T	-	-	-	-	
610164	Weaverbank Cottage, Nantwich Road, Minshull Vernon	67	60	70/--	70	63	68	67	60	-3	-3	S	1	R	T	H	-	-	NI	
610166	Greenacres, Nantwich Road, Minshull Vernon	46	40	59/--	43	38	40	47	41	4	3	A	1	R	T	-	-	-	-	~
610340	Holbury Close, Crewe	48	43	64/--	51	46	47	52	46	1	0	A	20	R	T	-	-	-	-	
610341	Hythe Avenue, Crewe	54	51	65/--	56	52	54	55	51	0	-1	A	27	R	T	-	-	-	-	
610342	Bowland Croft, Crewe	56	53	72/--	65	63	66	57	54	-8	-9	A	7	R	T	H	-	-	-	MA01-O-C2
610343	Wharfedale Avenue, Crewe	49	44	65/--	51	48	50	50	45	0	-3	A	13	R	T	-	-	-	-	

Assessment location		Impact criteria										Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
610344	Haweswater Avenue, Crewe	55	51	72/--	63	61	64	56	51	-7	-10	A	8	R	T	H	-	-	-	MA01-O-C2
610345	Wharfedale Avenue, Crewe	54	49	71/--	60	58	61	54	50	-6	-9	A	7	R	T	H	-	-	-	MA01-O-C2
610346	Haweswater Avenue, Crewe	50	45	66/--	52	49	52	51	45	-1	-4	A	16	R	T	-	-	-	-	
610347	Buttermere Drive, Crewe	56	51	72/--	63	61	64	56	51	-7	-10	A	7	R	T	H	-	-	-	MA01-O-C2
610348	Bleasdale Road, Crewe	54	50	70/--	59	57	60	54	50	-5	-7	A	7	R	T	H	-	-	-	MA01-O-C2
610349	Aysgarth Avenue, Crewe	56	51	72/--	63	61	64	56	51	-7	-10	A	9	R	T	H	-	-	-	MA01-O-C2
610350	Mossfields, Crewe	44	38	61/--	41	39	41	44	38	3	0	A	21	R	T	L	-	-	-	#
610351	Haweswater Avenue, Crewe	50	44	66/--	51	48	51	50	45	0	-3	A	11	R	T	-	-	-	-	
610352	Mills Way, Leighton	46	39	61/--	40	36	<40	46	39	6	3	A	41	R	T	L	-	-	-	#

Assessment location		Impact criteria										Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
610354	Rydal Mount, Crewe	47	41	63/--	50	45	46	51	44	1	-1	A	15	R	T	-	-	-	-	
610355	Bleasdale Road, Crewe	47	41	63/--	47	43	46	48	42	1	-2	A	24	R	T	-	-	-	-	
610356	Bleasdale Road, Crewe	48	41	63/--	46	43	46	48	41	2	-1	A	38	R	T	-	-	-	-	
610357	Harris Close, Leighton	43	36	59/--	48	42	45	49	42	1	0	A	82	R	T	-	-	-	-	
610358	Beltony Drive, Crewe	40	33	56/--	40	34	<40	43	35	3	2	NA	144	R	T	L	-	-	-	#
610359	Great Tithes Place, Crewe	37	32	53/--	44	37	41	45	38	1	1	NA	105	R	T	-	-	-	-	
610360	Mablins Lane, Crewe	38	32	54/--	64	57	62	64	57	0	0	NA	43	R	T	H	-	-	-	
610361	Underwood Lane, Crewe	<30	<20	48/--	63	56	61	63	56	0	0	NA	178	R	T	H	-	-	-	
610362	Kestrel Drive, Crewe	33	29	50/--	63	56	61	63	56	0	0	NA	205	R	T	H	-	-	-	

Assessment location		Impact criteria										Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
610363	Sedgemere Avenue, Crewe	32	27	48/--	63	56	61	63	56	0	0	NA	119	R	T	H	-	-	-	
610364	Selworthy Drive, Crewe	32	28	48/--	60	52	57	60	52	0	0	NA	120	R	T	-	-	-	-	
610365	McLaren Street, Crewe	<30	<20	48/--	59	52	57	59	52	0	0	NA	207	R	T	-	-	-	-	
610366	McLaren Street, Crewe	<30	<20	48/--	63	56	61	63	56	0	0	NA	210	R	T	H	-	-	-	
610367	McLaren Street, Crewe	<30	<20	43/--	64	57	62	64	57	0	0	NA	104	R	T	H	-	-	-	
610368	Holland Street, Crewe	<30	<20	<40/--	47	41	45	47	40	0	0	NA	116	R	T	-	-	-	-	
610369	Thornfields, Crewe	44	38	61/--	40	36	<40	45	38	5	2	A	23	R	T	L	-	-	-	#
610370	Beltony Drive, Crewe	42	35	58/--	<40	33	<40	43	36	>3	3	A	23	R	T	L	-	-	-	#
610373	Parkstone Drive, Crewe	43	36	59/--	64	57	62	64	57	0	0	A	1	R	T	H	-	-	-	

Assessment location		Impact criteria									Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
610380	Broad Street, Crewe	<30	<20	<40/--	53	49	50	53	48	0	-1	NA	52	R	T	-	-	-	-	
610382	Beacconsall Close, Crewe	36	30	51/--	57	50	55	57	50	0	0	NA	188	R	T	-	-	-	-	
610383	Selworthy Drive, Crewe	<30	21	48/--	57	49	54	57	49	0	0	NA	126	R	T	-	-	-	-	
610385	Perry Fields, Crewe	51	46	67/--	52	50	53	51	46	-1	-4	A	20	R	T	-	-	-	-	
610386	Bexington Drive, Crewe	42	37	58/--	44	38	40	45	39	1	0	A	26	R	T	-	-	-	-	
610390	Stoneley Road, Crewe	34	31	53/--	63	56	61	63	56	0	0	NA	12	R	T	H	-	-	-	
610391	Broad Street, Crewe	34	30	53/--	46	39	43	46	39	0	0	NA	115	R	T	-	-	-	-	
610392	Crossway, Crewe	<30	<20	<40/--	45	40	42	45	39	0	0	NA	45	R	T	-	-	-	-	
610393	Remer Street, Crewe	<30	<20	43/--	64	57	62	64	57	0	0	NA	86	R	T	H	-	-	-	

Assessment location		Impact criteria									Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
610394	Middlewich Street, Crewe	<30	<20	42/--	62	54	59	62	54	0	0	NA	60	R	T	-	-	-	-	
610395	Abbey Place, Crewe	<30	<20	<40/--	44	38	40	43	38	0	-1	NA	110	R	T	-	-	-	-	
610404	Warmingham Road, Crewe	47	40	65/--	44	39	40	48	41	4	2	A	13	R	T	-	-	-	-	
610407	Newfield Cottage, Nantwich Road, Minshull Vernon	62	56	61/--	63	57	62	64	58	<1	<1	S	1	R	T	H	-	-	NI	
610500	Moss Lane, Leighton and committed development (Map book ref: MA01/170)	40	35	56/--	<40	34	<40	41	36	>2	2	NA	20	CD-R	T	L	-	-	-	#

Assessment location		Impact criteria									Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
610501	Moss Lane, Leighton and committed development (Map book ref: MA01/170)	41	36	57/--	<40	35	<40	42	37	>3	2	NA	20	CD-R	T	L	-	-	-	#
610502	Moss Lane, Leighton and committed development (Map book ref: MA01/170)	42	37	58/--	40	36	<40	43	38	3	2	A	20	CD-R	T	L	-	-	-	#
610503	Moss Lane, Leighton and committed development (Map book ref: MA01/170)	41	36	58/--	<40	34	<40	42	36	>2	2	A	20	CD-R	T	L	-	-	-	#

Assessment location		Impact criteria										Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
610504	Moss Lane, Leighton and committed development (Map book ref.: MA01/170)	43	38	59/--	<40	36	<40	43	38	>4	2	A	20	CD-R	T	L	-	-	-	#
610505	Moss Lane, Leighton and committed development (Map book ref: MA01/170)	40	35	57/--	<40	34	<40	42	36	>2	2	NA	100	CD-R	T	L	-	-	-	#
610506	Moss Lane, Leighton and committed development (Map book ref: MA01/170)	38	33	56/--	<40	33	<40	41	35	>2	2	NA	100	CD-R	T	L	-	-	-	

Assessment location		Impact criteria										Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
610507	Higher Croft Drive, Crewe and committed development (Map book ref: MA01/170)	36	30	53/--	<40	32	<40	40	33	>1	1	NA	100	CD-R	T	L	-	-	-	
610509	Maplins Moss Place, Crewe	52	48	67/--	53	50	53	52	48	-1	-2	A	42	CD-R	T	-	-	-	-	
610510	Maplins Moss Place, Crewe	46	42	61/--	46	43	46	47	42	1	-1	A	39	CD-R	T	-	-	-	-	
610512	Barn Meadow Way, Crewe	53	50	65/--	51	48	51	53	50	2	1	A	29	CD-R	T	-	-	-	-	
610513	Kays Croft Drive, Crewe	50	47	64/--	50	47	50	50	47	1	0	A	19	CD-R	T	-	-	-	-	
610514	Broughton Road, Crewe and committed development (Map book ref: MA01/210)	43	38	60/--	57	50	55	57	50	0	0	A	129	CD-R	T	-	-	-	-	

Assessment location		Impact criteria										Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
610515	Mablins Lane, Crewe	36	31	53/--	65	57	62	65	57	0	0	NA	17	CD-R	T	H	-	-	-	
610516	Moss Lane, Leighton	38	32	53/--	42	35	<40	43	36	1	1	NA	269	CD-R	T	-	-	-	-	
610518	Stable Croft Close, Crewe and committed development (Map book ref: MA01/411)	32	31	49/--	42	36	40	42	36	0	0	NA	18	CD-R	T	-	-	-	-	
610519	Stoneley Road, Crewe	34	31	52/--	45	38	42	45	38	0	0	NA	215	R	T	-	-	-	-	
610520	Broad Street, Crewe	<30	<20	<40/--	60	55	57	60	54	0	0	NA	14	CD-R	T	H	-	-	-	
610738	Bradfield Road, Crewe and committed development (Map book ref: MA01/143)	63	61	53/--	66	62	64	66	62	0	0	S	1	CD-R	T	H	-	-	NI	

Assessment location		Impact criteria										Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
610743	Moss Lane, Leighton and committed development (Map book ref: MA01/168)	42	37	58/--	40	36	<40	43	38	3	2	A	12	CD-R	T	L	-	-	-	#
610745	Aysgarth Avenue, Crewe	51	45	66/--	51	48	51	51	45	1	-3	A	11	R	T	-	-	-	-	
610750	Broughton Road, Crewe and committed development (Map book ref: MA01/210)	41	35	60/--	44	38	41	45	39	1	0	A	0	CD-R	T	-	-	-	-	
610755	Harris Close, Leighton	44	36	59/--	40	36	<40	45	37	4	2	A	78	R	T	L	-	-	-	#

Assessment location		Impact criteria									Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
610873	Moat House Farm, Middlewich Road, Minshull Vernon and committed development (Map book ref: MA01/360)	47	40	62/--	45	39	42	49	42	4	3	A	1	CD-R	T	-	-	-	-	~

Table 7: Operational airborne sound, noise impacts and significant effects: non-residential receptors

Assessment location		Impact criteria									Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
610097	Mablins Lane Community Primary School, Mablins Lane, Crewe	40	34	57/--	61	53	58	61	53	0	0	B	1	A3	T	-	-	-	-	
610138	Spring Farm Business Park (Offices), Moss Lane, Crewe	48	42	65/--	46	44	47	48	42	2	-2	B	1	A4	T	-	-	-	-	
610143	A G Building & Joinery, Five Oaks Farm (Lower Sensitivity Offices), Drury Lane, Crewe	49	42	65/--	<40	37	40	49	42	>9	5	B	1	A4	T	L	-	-	-	

Assessment location		Impact criteria									Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
610376	St. Michael's Community Academy (School), Holland Street, Crewe	<30	<20	47/--	44	37	41	44	37	0	0	B	1	A3	T	-	-	-	-	
610378	Coppenhall Methodist Church, Bradfield Road, Crewe	35	31	52/--	69	62	67	69	62	0	0	B	1	A2	T	H	-	-	-	
610379	First Steps Pre-School, Bradfield Road, Crewe	35	31	52/--	67	59	64	67	59	0	0	B	1	A3	T	H	-	-	-	
610381	Hopes and Beams (School), Broad Street, Crewe	<30	<20	<40/--	68	61	66	68	61	0	0	B	1	A3	T	H	-	-	-	

Assessment location		Impact criteria									Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
610517	Methodist Church Community Centre, North Street, Crewe	<30	<20	46/--	67	60	65	67	60	0	0	B	1	A4	T	H	-	-	-	
610528	Bright Stars Children's Day Nursery, Parkers Road, Crewe	44	38	60/--	67	59	64	67	59	0	0	B	1	A3	T	H	-	-	-	
610678	Oakfield Lodge School, Warmingham Road, Crewe	43	36	59/--	46	39	43	48	40	1	1	B	1	A3	T	-	-	-	-	

Assessment location		Impact criteria									Significance criteria								Significant effect
Reference	Area represented	Proposed Scheme only (year 15)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique features	Combined impact	Mitigation effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
610872	Moat House Farm (Offices), Middlewich Road, Minshull Vernon and committed development (Map Book ref: MA01/188)	47	40	61/--	47	41	45	50	43	2	2	B	1	A4	T	-	-	-	-	

Direct impact – summary

3.2.9 The operational airborne noise impacts identified in Table 6 and Table 7 are summarised in Table 8.

Table 8: Summary of operational airborne sound impacts

Receptor type	Numbers of impacts (Number of impacts excluding those in committed developments)				
	Above LOAEL	Above SOAEL	Impacts		
			Minor	Moderate	Major
Residential properties	1764 (1433)	23 (21)	7 (6)	2 (2)	4 (3)
Non-residential properties	N/A	N/A			0
Schools	N/A	N/A			0
Quiet areas	N/A	N/A			0

Airborne sound: indirect impacts and effects

3.2.10 The transport assessment presented in Volume 5, Appendices TR-001, TR-002, TR-003 and TR-005, has been used to identify those roads or railways within this study area where the alignment remains as at present, but a change in flow or composition is identified which is greater than the screening criteria defined in Volume 5, Appendix SV-001-00000.

3.2.11 No roads or railways which exceed the criteria defined in Volume 5, Appendix SV-001-00000 have been identified in this study area. The assessment of operational noise and vibration indicates that significant indirect effects on residential receptors are unlikely to occur in this area.

Airborne sound levels used in other assessments

3.2.12 The operational sound results contained in this document have been used by other disciplines, namely agriculture, historic environment, landscape and visual, communities and socio economics, in their assessments. This includes the information in Table 6 and Table 7. Locations of interest to these other disciplines which may not appear in Table 6 and Table 7 are presented in Table 9.

Table 9: Operational airborne sound levels for use in cross-discipline assessments

Assessment location		Impact criteria										Discipline			
Reference	Area represented	Proposed Scheme only (year 15 traffic)			Without Proposed Scheme (opening year baseline)			With Proposed Scheme (opening year baseline + year 15 traffic) ****		Change		Agriculture	Ecology	Historic environment	Landscape and visual
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **				
610148	Parkfield Farm, Middlewich Road, Minshull Vernon (MA01/18)	67	63	83/--	64	62	65	67	63	3	0	Y	-	-	-

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