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HS2

High Speed Rail (Crewe – Manchester) Environmental Statement

Volume 5: Appendix SV-003-0MA06

Sound, noise and vibration

MA06: Hulseheath to Manchester Airport Operational sound, noise and vibration report

M272

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MA06: Hulseheath to Manchester Airport

Operational sound, noise and vibration report

M272

Department for Transport

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1 Introduction

1.1.1 This report is an appendix to the sound, noise and vibration assessment relating to the Hulseheath to Manchester Airport area (MA06). 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 Hulseheath to Manchester Airport area, a baseline and construction sound, noise and vibration report is set out (see Volume 5, Appendix SV-002-0MA06). 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, MA06 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: Hulseheath to Manchester Airport (MA06), 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: Hulseheath to Manchester Airport (MA06), 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-002-0MA06, 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: Hulseheath to Manchester Airport (MA06), Section 13.

Avoidance and mitigation measures

3.2.2 These are set out in Volume 2, Community Area report: Hulseheath to Manchester Airport (MA06), 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 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, 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	
612705	Ashlar, Back Lane, Knutsford	-	0.10	0.07	-	1	NA	R	T	-	-	-	-	
612718	Stock Farm (Holiday Let), Ashley Road, Ashley	-	0.12	0.07	-	1	NA	G4/V 2	T	-	-	-	-	
612730	Moss House Farm, Thowler Lane, Millington	-	0.05	0.03	-	1	NA	R	T	-	-	-	-	
612741	Sunbank Lane, Ringway	-	0.09	0.06	-	1	NA	R	T	-	-	-	-	
612789	Cherry Tree House (Office), Cherry Tree Lane, Rostherne	-	0.11	0.07	-	1	NA	G4/V 3	T	-	-	-	-	
612880	Hale Road, Hale Barns	-	0.04	0.03	-	1	NA	R	T	-	-	-	-	
613030	Back Lane, Ashley	-	0.11	0.07	-	1	NA	R	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	0	0	0	0
Non-residential properties				0

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	0	0	0	0
Non-residential properties			0	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 Volume 5: Appendix SV-001-00000, Annex A 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 Volume 5: 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 and 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.
IDNA	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 Volume 5: Appendix SV-001-00000, Annex A, 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 **									
612666	Breach House Lane, Mobberley	37	32	50/51	54	51	56	54	51	0	0	NA	2	R	T	-	-	-	-	
612667	Breach Cottage, Breach House Lane, Mobberley	41	36	56/57	54	47	51	54	47	0	0	NA	1	R	T	-	-	-	-	
612683	Birtles Farm, Ashley Road, Ashley	42	37	56/57	44	39	43	46	41	2	2	NA	1	R	T	-	-	-	-	
612685	Lower House Farm, Mobberley Road, Ashley	51	46	66/67	45	39	43	52	47	8	8	A	1	R	T	-	-	-	-	~
612689	Castle Mill Lane, Ashley	40	34	53/53	53	51	53	53	51	0	0	NA	4	R	T	-	-	-	-	
612690	Brickhill Lane, Ashley	50	45	64/64	53	51	53	55	52	2	1	A	2	R	T	-	-	-	-	
612693	Lamb Lane, Ashley	51	46	67/67	46	41	45	52	47	6	7	A	2	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 **									
`612699	Shaw Green Farm, Marsh Lane, Rostherne	40	35	56/56	46	40	45	46	40	0	1	NA	1	R	T	-	-	-	-	
612701	Ashley Road, Ashley	48	43	62/63	51	46	51	52	47	1	1	A	2	R	T	-	-	-	-	
612702	Mill Lane, Ashley	40	35	59/59	55	52	56	55	52	0	0	A	7	R	T	-	-	-	-	
612703	Hunters Close, Castle Mill Lane, Ashley	48	42	63/63	61	56	61	60	56	0	0	A	1	R	T	H	-	-	-	
612705	Ashlar, Back Lane, Knutsford	57	52	70/71	45	39	44	57	52	12	13	A	1	R	T	-	-	-	-	~
612707	Millington Hall Lane, Millington	43	38	58/59	55	50	55	55	50	0	0	A	4	R	T	-	-	-	-	
612708	Chapel House Farm, Castle Mill Lane, Ashley	56	51	65/66	56	51	56	57	52	1	1	A	1	R	T	-	-	-	-	
612711	Mobberley Road, Ashley	57	52	72/73	55	50	55	58	52	3	2	A	2	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 **									
612713	Back Lane Farm, Back Lane, Ashley	54	48	70/71	42	36	41	54	49	12	13	A	1	R	T	-	-	-	-	~
612716	Birkinheath Cottage, Birkinheath Lane, Ashley	47	42	64/64	49	43	48	51	45	2	3	A	1	R	T	-	-	-	-	~
612719	Back Lane, Ashley	49	44	60/61	51	45	50	53	47	2	2	A	4	R	T	-	-	-	-	
612720	Millington Hall Lane, Millington	46	41	63/64	52	50	53	53	50	1	0	A	2	R	T	-	-	-	-	
612721	School House, Back Lane, Ashley	49	44	65/66	54	49	54	55	50	1	1	A	1	R	T	-	-	-	-	
612722	Hunters Moon, Rostherne Lane, Rostherne	41	36	46/47	55	49	54	56	51	2	2	NA	1	R	T	-	-	-	-	
612724	Briddon Weir Farm, Birkinheath Lane, Ashley	43	38	62/63	49	43	48	49	43	0	0	A	1	R	T	-	-	-	-	
612725	Ashley Road, Ashley	49	44	67/67	54	48	52	54	48	0	1	A	6	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 **									
612726	Castle Mill Lane, Ashley	45	40	58/59	63	57	62	62	57	-1	-1	A	2	R	T	H	-	-	-	
612727	Bucklow Manor Care Home, Chester Road, Bucklow Hill	38	33	53/53	64	59	64	64	59	0	0	NA	1	R	T	H	-	-	-	
612728	Egerton Moss, Ashley	48	44	66/67	67	62	67	55	51	-11	-11	A	6	R	T	H	-	-	-	MA06-O-C1
612729	Back Lane, Ashley	48	43	64/65	55	50	55	55	50	0	0	A	1	R	T	-	-	-	-	
612730	Moss House Farm, Thowler Lane, Millington	59	54	76/77	51	46	51	60	55	9	9	A	1	R	T	-	-	-	-	MA03-O-C4[4]

[4] The majority of dwellings within this community are located in the Pickmere to Agden and Hulseheath area (MA03). For further information see Volume 2, Community Area report: Pickmere to Agden and Hulseheath (MA03), Section 13 and Volume 5: Appendix SV-002-0MA03.

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 **									
612731	Lower Thornsgreen Farm, Back Lane, Ashley	48	43	63/63	53	47	52	54	49	1	1	A	1	R	T	-	-	-	-	
612735	Ashley Road, Ashley	48	43	64/65	63	58	63	52	47	-10	-11	A	5	R	T	H	-	-	-	MA06-O-C1
612738	Sycamore Cottage, Ashley Road, Ashley	50	46	67/67	57	52	57	53	49	-3	-3	A	1	R	T	-	-	-	-	MA06-O-C1
612739	Castle Mill Lane, Ashley	44	39	59/59	56	50	55	56	50	0	0	A	2	R	T	-	-	-	-	
612740	Birkin House, Birkinheath Lane, Ashley	50	45	70/70	53	47	52	53	48	0	1	A	1	R	T	-	-	-	-	
612741	Sunbank Lane, Ringway	57	52	73/74	55	48	53	59	54	5	5	A	1	R	T	-	-	-	-	~
612743	Cow Lane, Ashley	47	42	64/64	65	59	64	65	59	0	0	A	12	R	T	H	-	-	-	
612749	Sunbank Lane, Ringway	47	42	61/61	53	47	52	56	50	3	3	A	4	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 **									
612750	Castle Mill Lane, Ashley	43	38	57/58	61	56	61	61	55	0	0	A	7	R	T	H	-	-	-	
612753	Millington Lane, Millington	43	38	54/55	53	47	52	53	48	0	1	NA	6	R	T	-	-	-	-	
612754	Millington Hall Lane, Millington	46	41	62/62	49	44	49	51	46	2	2	A	3	R	T	-	-	-	-	
612759	Mere Covert Cottage, Cherry Tree Lane, Rostherne	46	41	64/64	54	48	53	54	49	1	1	A	1	R	T	-	-	-	-	
612762	Keepers Cottage, Sunbank Lane, Ringway	43	38	58/58	59	53	58	60	54	0	0	A	1	R	T	-	-	-	-	
612763	Rivershill Gardens, Hale Barns	46	41	65/65	62	55	60	62	56	0	0	A	25	R	T	H	-	-	-	
612764	Newhall Cottages, Millington Lane, Millington	45	40	58/59	51	46	51	52	47	1	1	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 **									
612765	Haslemere Avenue, Hale Barns	46	41	64/64	60	54	59	60	54	0	0	A	27	R	T	-	-	-	-	
612766	Thowler Lane, Millington	48	43	64/66	53	51	56	52	48	-2	-3	A	3	R	T	-	-	-	-	
612769	Ridge Avenue, Hale Barns	44	39	61/62	55	49	54	56	49	1	1	A	21	R	T	-	-	-	-	
612771	Warburton Drive, Hale Drive	44	39	56/57	58	52	57	58	52	0	0	NA	18	R	T	-	-	-	-	
612773	Bankside, Hale Barns	43	37	57/58	55	49	54	55	49	0	0	A	22	R	T	-	-	-	-	
612775	Dobb Hedge Close, Hale Barns	41	36	57/57	55	49	54	55	49	0	0	NA	31	R	T	-	-	-	-	
612776	Ryecroft Farm, Ashley Mill Lane, Ashley	49	44	67/68	60	54	59	61	54	0	1	A	1	R	T	-	-	-	-	
612781	Cherry Tree Lane, Rostherne	57	52	63/64	60	54	59	60	55	1	1	A	2	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 **									
612782	Warburton Close, Hale Barns	45	40	56/57	56	50	55	57	51	1	1	A	29	R	T	-	-	-	-	
612784	Carrwood, Hale Barns	39	34	56/57	49	43	48	49	43	0	1	NA	39	R	T	-	-	-	-	
612787	Ashley Hall, Ashley Road, Ashley	40	35	53/53	52	46	51	52	46	0	0	NA	1	R	T	-	-	-	-	
612788	Green Gate, Hale Barns	41	36	56/56	51	45	50	52	46	1	1	NA	95	R	T	-	-	-	-	
612794	Boothbank House, Millington Lane, Millington	43	38	64/64	50	46	51	51	46	1	1	A	1	R	T	-	-	-	-	
612798	Marlfield Road, Hale Barns	42	37	53/53	52	46	51	53	47	0	1	NA	53	R	T	-	-	-	-	
612799	Marlfield Road, Hale Barns	43	38	53/54	52	46	51	53	46	1	1	NA	12	R	T	-	-	-	-	
612803	Coe Lane, Millington	52	47	65/66	55	50	55	56	51	2	2	A	2	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 **									
612807	Reddy Lane, Millington	39	34	56/57	53	49	54	54	50	1	1	NA	4	R	T	-	-	-	-	
612810	Green Gate, Hale Barns	39	33	50/51	50	44	49	51	45	1	1	NA	70	R	T	-	-	-	-	
612811	Burnside, Hale Barns	50	44	59/60	57	50	55	58	52	1	1	A	17	R	T	-	-	-	-	
612817	Burnside, Hale Barns	45	39	54/54	51	45	50	52	46	1	1	NA	19	R	T	-	-	-	-	
612818	Warren Drive, Hale Barns	42	37	52/53	50	44	49	50	44	0	0	NA	14	R	T	-	-	-	-	
612824	Hale Road, Hale Barns	56	50	57/58	58	52	57	57	51	-1	-1	A	14	R	T	-	-	-	-	
612825	High Elm Road, Hale Barns	39	34	48/49	51	45	50	52	46	1	1	NA	80	R	T	-	-	-	-	
612827	Reddy Lane, Millington	39	34	60/61	64	59	64	64	59	0	0	A	3	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 **									
612830	Yarwood Heath Farm, Bow Lane, Bowdon	44	39	58/58	58	52	57	58	52	0	0	A	1	R	T	-	-	-	-	
612831	Coe Lane, Millington	43	38	52/53	62	57	62	62	57	0	0	NA	6	R	T	H	-	-	-	
612832	Hasty Lane, Ringway	52	46	58/59	55	49	54	57	51	2	2	A	7	R	T	-	-	-	-	
612836	Hasty Lane, Ringway	50	44	56/57	66	60	65	66	60	0	0	A	2	R	T	H	-	-	-	
612843	Reddy Lane, Millington	39	34	60/61	57	52	57	60	56	4	4	A	2	R	T	-	-	-	-	#
612845	Pool Bank Farm, Bow Lane, Bowdon	38	33	53/53	53	47	52	53	47	0	0	NA	1	R	T	-	-	-	-	
612849	Brooks Drive, Hale Barns	41	36	49/49	50	44	49	50	44	0	0	NA	30	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 **									
612851[5]	Reddy Lane, Little Bollington	41	35	62/63	50	45	50	50	45	0	0	A	8	R	T	-	-	-	-	
612854	Brooks Drive, Hale Barns	42	37	48/49	51	45	50	51	45	-1	0	NA	3	R	T	-	-	-	-	
612855	Thorley Lane, Ringway	66	60	51/53	68	61	66	69	63	2	2	S	1	R	T	H	-	-	NI	~
612858	Shay Lane, Hale Barns	52	46	47/48	62	58	63	64	59	1	1	A	8	R	T	H	-	-	-	~
612859	Roaring Gate Lane, Ringway	50	44	48/49	70	64	69	70	64	0	0	A	1	R	T	H	-	-	-	
612860	Roaring Gate Lane, Hale	40	34	42/43	59	53	58	59	53	0	0	NA	5	R	T	-	-	-	-	
612880	Hale Road, Hale Barns	56	50	63/64	55	49	54	59	53	5	5	A	1	R	T	-	-	-	-	~
612883	Burnside, Hale Barns	46	41	57/58	55	49	54	56	50	1	1	A	8	R	T	-	-	-	-	

[5] For this location see Volume 5, Sound, noise and vibration Map Book: Map SV-02-312a.

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 **									
613030	Back Lane, Ashley	56	51	70/71	49	43	48	57	52	8	9	A	1	R	T	-	-	-	-	~
613035	Mereside Farm, Millington Lane, Millington	51	46	63/63	66	61	66	66	61	0	0	A	1	R	T	H	-	-	-	
613046	Ashley Road, Ashley	47	43	63/63	64	60	65	56	51	-8	-8	A	2	R	T	H	-	-	-	MA06-O-C1
613048	Sunbank Lane, Ringway	49	44	65/65	52	46	51	55	49	3	3	A	3	R	T	-	-	-	-	~
613081	Hough Green, Ashley	46	41	62/62	57	51	55	57	51	0	0	A	14	R	T	-	-	-	-	
613082	Hough Green, Ashley	47	42	64/64	56	50	54	55	49	-1	-1	A	13	R	T	-	-	-	-	
613200	Castle Mill Lane, Ashley	55	50	68/68	60	55	60	57	52	-3	-3	A	1	R	T	H	-	-	-	
613201	Primrose Farm, Mobberley Road, Ashley	42	37	56/57	52	47	52	53	47	1	1	NA	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 **									
613217	Station Yard, Ashley Road, Ashley and committed development (Mapbook ref: MA06/152 and MA06/194)	45	40	59/59	59	52	59	59	52	0	0	A	2	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 **									
612680	Sugar Brook Farm (Bed and Breakfast), Mobberley Road, Ashley	46	40	59/59	60	55	59	60	55	0	0	B	1	A3	T	H	-	-	-	
612714	Birkin Farm (Holiday Let), Ashley Road, Ashley	59	55	76/77	55	50	55	60	55	6	6	B	1	A3	T	-	-	-	-	MA06-O-N2
612718	Stock Farm (Holiday Let), Ashley Road, Ashley	63	59	80/81	55	50	55	64	59	9	9	B	1	A3	T	-	-	-	-	MA06-O-N2
612742	St Elizabeth's Church, Ashley Road, Ashley	47	43	63/64	61	56	61	52	47	-9	-9	B	1	A2	T	H	-	-	-	
612768	The Old Office, Ashley Road, Ashley	41	37	55/56	58	52	57	58	52	0	0	B	1	A4	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 **									
612789	Cherry Tree House (Office), Cherry Tree Lane, Rostherne	59	54	71/72	55	50	55	60	55	6	6	B	1	A4	T	-	-	-	-	MA06-O-N1
612800	World Cargo Centre (Lower Sensitivity Offices), Manchester Airport, Manchester	50	44	51/51	63	57	62	63	57	0	0	B	1	A4	T	H	-	-	-	
612801	The Children's Adventure Farm Trust, Boothbank Lane, Agden	41	36	62/63	57	53	58	57	53	0	0	B	1	A3	T	-	-	-	-	
612814	World Freight Terminal, Manchester Airport, Manchester	43	37	49/50	61	55	60	61	55	0	0	B	1	A4	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 **									
612816	Manchester Airport Hotels, Runger Lane, Manchester and committed development (Mapbook ref: MA06/073)	52	46	55/56	69	63	68	69	63	0	0	B	3	A3	T	H	-	-	-	$
613032	Mereside Farm Office (Lower Sensitivity Office), Millington Lane, Millington	59	54	65/66	65	60	65	65	60	0	0	B	1	A4	T	H	-	-	-	$
613079	Little Lodge and South Arden Lodge (Holiday Let), Mobberley Road, Ashley	49	44	63/63	57	52	56	57	52	1	1	B	1	A3	T	-	-	-	-	
613205	Amazon UK Services Ltd, Manchester	46	40	53/54	60	54	59	60	54	0	0	B	1	A4	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 **									
613218	Ashley Smithy Garage (Office), Mobberley Road, Ashely and committed development (Mapbook ref: MA06/203)	50	45	67/67	56	51	56	58	53	2	2	B	1	A4	T	-	-	-	-	
613219	World Logisitics Hub (Lower Sensitivity Offices), Sunbank Lane and committed development (Mapbook ref: MA06/157, MA06/158, MA06/261, MA06/072 and MA06/071)	41	36	51/52	58	52	57	59	52	0	0	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	339 (337)	1 (1)	26 (26)	7 (7)	2 (2)
Non-residential properties	N/A	N/A			3
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)			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 **				
612730	Moss House Farm, Thowler Lane, Millington (MA06/1)	59	54	76/77	51	46	51	60	55	9	9	Y	-	-	-
613042	Rostherne Mere SSSI[6]	46	41	56/56	51	46	51	52	47	1	1	-	Y	-	-
613043	Rostherne Mere SSSI	44	39	49/50	53	48	53	53	48	0	0	-	Y	-	-
613044	Rostherne Mere SSSI	46	41	59/60	51	45	50	52	47	1	1	-	Y	-	-
613045	Rostherne Mere SSSI	37	32	50/50	45	40	45	46	40	0	0	-	Y	-	-

[6] Site of Special Scientific Interest.

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