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HS2

High Speed Rail (Crewe – Manchester) Environmental Statement

Volume 5: Appendix SV-003-0MA04

Sound, noise and vibration

MA04: Broomedge to Glazebrook

Operational sound, noise and vibration report

M270

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High Speed Rail (Crewe – Manchester) Environmental Statement

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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 Broomedge to Glazebrook area (MA04). 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 Broomedge to Glazebrook area, a baseline and construction sound, noise and vibration report is set out (see Volume 5, Appendix SV-002-0MA04). 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 Volume 2, MA04 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: Broomedge to Glazebrook (MA04), 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: Broomedge to Glazebrook (MA04), 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-002-0MA04, 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: Broomedge to Glazebrook (MA04), Section 13.

Avoidance and mitigation measures

3.2.2 These are set out in Volume 2, Community Area report: Broomedge to Glazebrook (MA04), 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	
617515	Warrington Lane, Lymm	-	0.10	0.06	-	4	NA	R	T	-	-	-	-	
617526	Wet Gate Lane, Lymm	-	0.12	0.07	-	2	NA	R	T	-	-	-	-	
617544	Rose Cottage, Paddock Lane, Warburton	-	0.08	0.04	-	1	NA	R	T	-	-	-	-	
617626	Rose Cottage, Dam Head Lane, Rixton	-	0.03	0.02	-	1	NA	R	T	-	-	-	-	
618117	Wet Gate Lane, Lymm	-	0.15	0.09	-	3	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 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 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 **									
617500	Agden Park Lane, Lymm	38	32	58/--	53	47	52	51	45	-2	-2	A	17	R	T	-	-	-	-	
617501	Higher Lane, Lymm	41	35	62/--	63	58	63	62	57	-1	-1	A	1	R	T	H	-	-	-	
617502	Higher Lane, Lymm	36	30	56/--	63	58	63	62	57	-1	-1	NA	28	R	T	H	-	-	-	
617503	Higher Lane, Lymm	38	31	57/--	64	59	64	63	58	-1	-1	NA	1	R	T	H	-	-	-	
617506	Agden Brow, Lymm	46	39	67/--	55	50	55	55	50	0	0	A	12	R	T	-	-	-	-	
617507	Broomedge Farm Cottages, Burford Lane, Lymm	40	34	59/--	49	44	49	49	44	0	0	A	2	R	T	-	-	-	-	
617510	Agden Lane Farm, Agden Lane, Lymm	55	49	80/--	52	47	52	57	51	4	4	S	1	R	T	-	-	-	NI	MA04-O-C1
617511	Agden Lane, Lymm	55	49	80/--	51	46	51	56	50	5	4	S	3	R	T	-	-	-	NI	MA04-O-C1

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 **									
617515	Warrington Lane, Lymm	55	48	76/--	47	41	46	55	49	9	8	A	4	R	T	-	-	-	-	MA04-O-C1
617516	Burford Lane, Lymm	41	34	60/--	44	39	44	45	40	1	1	A	13	R	T	-	-	-	-	
617517	Spring Lane, Lymm	54	47	75/--	47	41	46	54	48	8	7	A	3	R	T	-	-	-	-	MA04-O-C1
617518	Spring Lane, Lymm	51	45	74/--	44	38	43	52	46	8	7	A	2	R	T	-	-	-	-	MA04-O-C1
617521	Warrington Lane, Lymm	54	47	74/--	<40	31	<40	54	47	>14	17	A	1	R	T	L	-	-	-	~
617523	Bradshaw Lane, Lymm	45	38	66/--	44	38	43	47	41	4	3	A	12	R	T	-	-	-	-	#
617524	Spring Lane, Lymm	59	52	80/--	42	36	41	59	52	17	17	S	1	R	T	-	-	-	NI	MA04-O-C2
617526	Wet Gate Lane, Lymm	54	47	76/--	<40	32	<40	54	47	>14	15	A	2	R	T	L	-	-	-	MA04-O-C2

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 **									
617528	Wet Gate Lane, Lymm and committed development (Map Book ref: MA04/088)	45	39	65/--	49	43	48	51	44	1	1	A	22	CD-R	T	-	-	-	-	
617529	Wet Gate Lane, Lymm	48	42	67/--	<40	31	<40	48	42	>9	11	A	3	R	T	L	-	-	-	MA04-O-C2
617530	Chaise Meadow, Lymm	41	35	61/--	46	42	48	47	42	1	1	A	115	R	T	-	-	-	-	
617532	Boarded Barn Farm, Birchbrook Road, Lymm	38	31	59/--	51	45	50	51	45	0	0	A	1	R	T	-	-	-	-	
617533	Lower Carr Green Farm, Carr Green Lane, Warburton	49	42	68/--	<40	<30	<40	49	42	>9	>13	A	1	R	T	L	-	-	-	~
617534	Birchbrook Road, Lymm	40	34	63/--	66	60	65	66	60	0	0	A	29	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 **									
617536	Bridge Farm, Carr Green Lane, Warburton	40	34	60/--	<40	33	<40	42	36	>3	4	A	1	R	T	L	-	-	-	#
617537	Carr Green Lane, Warburton	46	40	66/--	<40	<30	<40	46	40	>7	>10	A	3	R	T	L	-	-	-	~
617538	Old Mill Close, Lymm	43	36	65/--	48	41	46	49	42	1	1	A	19	R	T	-	-	-	-	
617539	Dunham Road, Warburton	41	35	59/--	63	57	62	63	57	0	0	A	2	R	T	H	-	-	-	
617540	Dunham Road, Warburton	43	37	61/--	49	41	45	56	49	7	8	A	2	R	T	-	-	-	-	#
617541	Bent Lane, Warburton	47	41	65/--	53	47	52	53	46	-1	-1	A	7	R	T	-	-	-	-	
617542	Dunham Road, Warburton	46	39	63/--	49	41	45	51	45	2	4	A	3	R	T	-	-	-	-	#
617543	Paddock Lane, Warburton	53	46	71/--	60	54	59	53	47	-7	-7	A	1	R	T	-	-	-	-	MA04-O-C3

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 **									
617544	Rose Cottage, Paddock Lane, Warburton	55	48	73/--	68	62	67	55	48	-13	-13	A	1	R	T	H	-	-	-	MA04-O-C3
617545	The Old Rectory, Wigsey Lane, Warburton	36	29	55/--	40	33	<40	41	35	1	1	NA	1	R	T	L	-	-	-	
617547	Warburton Lane, Warburton	51	45	67/--	68	61	66	61	54	-7	-7	A	1	R	T	H	-	-	-	MA04-O-C3
617548	Werburgh Close, Lymm	46	39	65/--	48	40	46	51	43	3	3	A	7	R	T	-	-	-	-	#
617549	Bridge Road, Warburton	42	36	62/--	51	44	49	51	45	1	1	A	16	R	T	-	-	-	-	
617550	Park Road, Warburton	49	43	70/--	<40	32	<40	50	43	>10	11	A	1	R	T	L	-	-	-	~
617551	Warburton Lane, Warburton	43	37	63/--	64	57	62	64	57	0	0	A	9	R	T	H	-	-	-	
617552	Warburton Bridge Road, Rixton	35	28	54/--	50	44	49	50	44	0	0	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 **									
617553	Warburton Park Farm Cottage, Park Road, Warburton	53	46	73/--	<40	32	<40	53	47	>13	15	A	1	R	T	L	-	-	-	~
617554	Lighthouse Farm, Moss Lane, Warburton	38	31	56/--	45	38	43	46	39	1	1	NA	1	R	T	-	-	-	-	
617556	Brook Farm Close, Partington	39	33	58/--	54	47	52	54	47	0	0	A	5	R	T	-	-	-	-	
617557	Brook Farm, Manchester Road, Rixton	37	30	54/--	57	51	56	57	51	0	0	NA	1	R	T	-	-	-	-	
617558	Manchester Road, Rixton	39	32	56/--	64	58	63	64	58	0	0	NA	1	R	T	H	-	-	-	
617559	Oak Road, Partington	40	34	57/--	45	38	47	46	39	1	2	NA	23	R	T	-	-	-	-	
617561	Oak Road, Partington	43	37	60/--	40	33	<40	44	38	5	5	A	19	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 **									
617562	Oak Road, Partington	45	39	64/--	40	33	<40	46	40	6	6	A	10	R	T	L	-	-	-	#
617563	Oak Road, Partington	43	36	60/--	40	33	<40	44	38	5	5	A	35	R	T	L	-	-	-	#
617564	Tulip Road, Partington	38	31	57/--	49	42	47	49	42	0	0	NA	126	R	T	-	-	-	-	
617565	Lancashire Road, Partington	40	34	59/--	45	38	47	46	39	1	1	A	71	R	T	-	-	-	-	
617566	Oak Road, Partington	44	38	63/--	<40	32	<40	45	39	>6	7	A	20	R	T	L	-	-	-	#
617567	Oak Road, Partington	46	39	64/--	<40	33	<40	46	40	>7	7	A	8	R	T	L	-	-	-	#
617569	Manchester Road, Rixton	43	37	62/--	66	60	65	66	60	0	0	A	165	R	T	H	-	-	-	
617570	Marsh Brook Close, Rixton	39	33	56/--	46	40	45	47	40	1	1	NA	29	R	T	-	-	-	-	
617571	Oak Road, Partington	44	37	61/--	40	33	<40	45	38	5	5	A	20	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 **									
617572	Cheshire Road, Partington	42	35	59/--	<40	32	<40	43	37	>4	4	A	54	R	T	L	-	-	-	#
617573	Manchester Road, Rixton	45	39	64/--	61	55	60	61	55	0	0	A	11	R	T	H	-	-	-	
617575	Moss Side Lane, Rixton	35	29	53/--	47	43	48	47	43	0	0	NA	50	R	T	-	-	-	-	
617576	Manchester Road, Rixton	47	40	65/--	62	56	61	62	56	0	0	A	9	R	T	H	-	-	-	
617577	Briar Avenue, Rixton	45	38	63/--	45	39	44	48	42	3	3	A	30	R	T	-	-	-	-	#
617579	Elm Road, Rixton	40	34	56/--	41	35	40	43	37	2	2	NA	80	R	T	L	-	-	-	
617580	Cherry Walk, Partington	42	36	60/--	48	40	47	49	41	1	1	A	98	R	T	-	-	-	-	
617581	Manchester Road, RIxton	48	41	66/--	58	51	56	58	52	0	0	A	10	R	T	-	-	-	-	
617585	Millbank Hall Farm, Lock Lane, Partington	51	44	70/--	<40	31	<40	51	44	>11	13	A	1	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 **									
617586	Dawlish Close, Rixton	47	40	65/--	53	48	53	54	48	1	1	A	25	R	T	-	-	-	-	
617588	School Lane, Rixton	41	35	63/--	<40	30	<40	42	36	>3	6	A	41	R	T	L	-	-	-	#
617589	Myrtle Road, Partington	42	36	60/--	48	40	47	49	41	1	1	A	21	R	T	-	-	-	-	
617590	Manchester Road, Rixton	48	41	66/--	56	51	56	57	51	1	0	A	10	R	T	-	-	-	-	
617591	St Helen's Close, Rixton	50	43	69/--	63	57	62	63	57	0	0	A	7	R	T	H	-	-	-	
617592	Holly Walk, Partington	38	32	56/--	48	40	47	48	41	0	1	NA	217	R	T	-	-	-	-	
617593	School Lane, Rixton	45	39	63/--	58	52	57	58	52	0	0	A	54	R	T	-	-	-	-	
617594	The Weint, Rixton	47	41	66/--	47	41	46	50	43	3	2	A	11	R	T	-	-	-	-	
617596	School Lane, Rixton	45	38	65/--	41	35	40	46	39	4	4	A	14	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 **									
617597	Forest Gardens, Partington	44	38	61/--	46	40	45	48	42	2	2	A	52	R	T	-	-	-	-	
617600	Manchester Road, Rixton	50	44	70/--	56	50	55	56	50	0	0	A	3	R	T	-	-	-	-	
617601	Dam Lane, Rixton	47	41	66/--	48	41	46	48	41	0	0	A	8	R	T	-	-	-	-	
617602	Black Swan, Rixton with Glazebrook, Warrington	50	44	70/--	53	46	51	54	47	1	1	A	1	CD-R	T	-	-	-	-	
617603	Lock Lane, Partington	41	35	59/--	48	42	47	49	43	1	1	A	138	R	T	-	-	-	-	
617604	Mytholme Avenue, Cadishead	47	41	65/--	56	49	54	56	50	1	1	A	12	R	T	-	-	-	-	
617606	Liverpool Road, Cadishead	44	38	63/--	57	50	55	57	50	0	0	A	4	R	T	-	-	-	-	
617607	Dam Lane, Rixton	48	42	71/--	54	48	53	49	42	-6	-6	A	4	R	T	-	-	-	-	MA04-O-C4

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 **									
617608	Mytholme Avenue, Cadishead	47	40	65/--	51	45	50	53	46	1	1	A	13	R	T	-	-	-	-	
617609	Liverpool Road, Cadishead	44	37	62/--	61	54	59	61	54	0	0	A	18	R	T	-	-	-	-	
617610	Dam Lane, Rixton	50	43	73/--	53	47	52	50	44	-3	-4	A	10	R	T	-	-	-	-	MA04-O-C4
617612	Dam Lane, Rixton	51	44	74/--	46	40	45	51	44	5	5	A	1	R	T	-	-	-	-	~
617614	Rosebank Road, Cadishead	46	39	64/--	47	41	46	49	43	2	2	A	16	R	T	-	-	-	-	
617616	Glazebrook Lane, Glazebrook	47	41	66/--	68	62	67	68	62	0	0	A	6	R	T	H	-	-	-	
617617	Victory Road, Cadishead	43	36	61/--	44	38	43	46	40	2	2	A	51	R	T	-	-	-	-	
617621	Carlton Way, Glazebrook	39	33	58/--	44	38	43	46	39	1	1	A	55	R	T	-	-	-	-	
617622	Dam Lane, Rixton	47	41	65/--	63	57	60	63	57	0	0	A	17	R	T	H	-	-	-	
617623	Bank Street, Glazebrook	43	36	63/--	52	45	50	53	46	0	1	A	5	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 **									
617624	Bank Street, Glazebrook	47	40	65/--	54	44	48	55	46	1	2	A	17	R	T	-	-	-	-	
617625	Glazebrook Lane, Glazebrook	44	37	63/--	49	42	47	50	44	2	1	A	26	R	T	-	-	-	-	
617626	Rose Cottage, Dam Head Lane, Rixton	59	53	81/--	54	50	54	60	54	6	4	S	1	R	T	-	-	-	NI	~
617628	Bank Street, Glazebrook	49	43	68/--	50	44	47	52	46	3	3	A	3	R	T	-	-	-	-	~
617629	Norfolk Close, Cadishead	37	30	55/--	42	36	40	43	37	1	1	NA	74	R	T	-	-	-	-	
617630	Glazebrook Lane, Glazebrook	41	34	59/--	55	49	55	55	49	0	0	A	22	R	T	-	-	-	-	
617631	Dam Head Lane, Glazebrook and committed development (Map book ref: MA04/112)	44	37	62/--	55	50	52	56	50	0	0	A	20	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 **									
617632	Glazebrook Meadows, Glazebrook Lane, Glazebrook	39	33	57/--	58	51	56	58	52	0	0	NA	1	R	T	-	-	-	-	
617639	Glazebrook Lane, Glazebrook	42	36	62/--	50	43	51	51	44	1	1	A	9	R	T	-	-	-	-	
617641	Glazebrook Lane, Glazebrook	41	34	60/--	66	59	64	66	59	0	0	A	24	R	T	H	-	-	-	
617642	Glazebrook Lane, Glazebrook	55	49	74/--	45	39	44	56	49	10	10	A	2	R	T	-	-	-	-	~
617644	Glazebrook Lane, Glazebrook	38	32	57/--	63	56	61	63	56	0	0	NA	22	R	T	H	-	-	-	
617645	Glazebrook Lane, Glazebrook	41	35	60/--	55	48	53	55	48	0	0	A	5	R	T	-	-	-	-	
617651	Little Woolden Hall, Holcroft Lane, Culcheth	34	27	50/--	46	40	45	46	40	0	0	NA	1	R	T	-	-	-	-	
617998	Hamilton Avenue, Cadishead	38	32	56/--	42	35	40	43	37	2	2	NA	322	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 **									
618065	Mill Lane, Lymm and committed development (Map book ref: MA04/127)	42	36	60/--	46	42	48	48	42	1	1	A	14	CD-R	T	-	-	-	-	
618066	School Lane, Rixton	44	37	64/--	40	34	<40	45	39	5	4	A	14	R	T	L	-	-	-	#
618077	Glazebrook Lane, Glazebrook	53	47	72/--	50	43	48	54	48	5	5	A	1	R	T	-	-	-	-	~
618078	Dunham Road, Warburton	50	43	68/--	64	58	63	51	44	-13	-13	A	1	R	T	H	-	-	-	MA04-O-C3
618079	Glazebrook Lane, Glazebrook	48	42	69/--	45	38	43	50	43	5	5	A	1	R	T	-	-	-	-	~
618112	Carr Green Lane, Warburton	42	35	62/--	<40	31	<40	43	36	>3	6	A	4	R	T	L	-	-	-	#
618116	Park Road, Warburton	43	37	62/--	48	40	46	49	42	1	2	A	21	R	T	-	-	-	-	
618117	Wet Gate Lane, Lymm	53	47	76/--	43	36	41	53	47	11	11	A	3	R	T	-	-	-	-	MA04-O-C2

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 **									
618202	Paddock Lane, Warburton	45	39	67/--	63	53	58	63	53	0	0	A	6	R	T	-	-	-	-	
618203	Paddock Lane, Warburton	47	41	68/--	57	47	52	57	48	0	1	A	1	R	T	-	-	-	-	
618204	Paddock Lane, Warburton	44	38	65/--	57	46	51	57	46	0	0	A	4	R	T	-	-	-	-	
618205	Warburton Lane, Warburton	48	42	67/--	62	56	61	62	55	0	0	A	1	R	T	H	-	-	-	
618206	Warburton Lane, Warburton	48	41	66/--	63	56	61	55	49	-8	-8	A	2	R	T	H	-	-	-	MA04-O-C3
618207	Dunham Road, Warburton	48	41	65/--	61	55	60	61	54	-1	-1	A	2	R	T	H	-	-	-	
618208	Warburton Lane, Warburton	49	42	67/--	56	49	54	51	45	-5	-5	A	2	R	T	-	-	-	-	MA04-O-C3
618218	Milverton Farm, Dam Lane, Rixton	45	38	62/--	42	36	40	46	40	4	4	A	6	R	T	-	-	-	-	#
618220	Paddock Lane, Warburton	56	50	68/--	66	58	63	62	54	-4	-3	A	1	R	T	H	-	-	-	MA04-O-C3

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 **									
618240	The Drive, Lymm	38	32	57/--	49	45	51	49	45	0	0	NA	32	R	T	-	-	-	-	
618243	Dam Lane, Rixton	48	42	67/--	54	44	48	55	46	1	2	A	3	R	T	-	-	-	-	
618244	Bank Street, Glazebrook	46	39	66/--	54	44	48	55	45	1	1	A	13	R	T	-	-	-	-	
618245	Glazebrook Lane, Glazebrook	38	32	57/--	60	53	58	60	54	0	0	NA	7	R	T	-	-	-	-	
618246	Glazebrook Lane, Glazebrook	40	33	59/--	50	43	51	54	47	4	4	A	1	R	T	-	-	-	-	#
618285	Lock Lane, Partington and committed development (Map book ref: MA04/105)	44	37	62/--	53	47	52	53	47	0	0	A	550	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 **									
618286	North of Oak Road and West of Warburton Lane, Partington and committed development (Map book ref: MA04/121)	40	33	59/--	52	46	51	52	46	0	0	A	75	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 **									
617520	Lymm Marina (Offices), Warrington Lane, Lymm	56	49	76/--	<40	31	<40	56	49	>16	18	B	1	A4	T	L	-	-	-	<>
617531	Bollin Court (Offices), Mill Lane, Lymm	45	39	65/--	46	42	48	49	43	3	2	B	2	A4	T	-	-	-	-	
617535	Heatley House (Offices), Mill Lane, Lymm	44	38	65/--	46	39	44	48	42	2	2	B	2	A4	T	-	-	-	-	
617546	Old Church of St Werburgh, Bent Lane, Warburton	38	31	56/--	43	37	42	44	38	1	1	B	1	A2	T	-	-	-	-	
617560	Little Oaks Nursery, Oak Road, Partington	38	32	57/--	45	38	47	46	39	1	1	B	1	A3	T	-	-	-	-	
617568	Rixton Methodist Church, Chapel Lane, Warrington	36	29	53/--	47	43	48	57	51	10	8	B	1	A2	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 **									
617583	St Helen's CofE Primary School, Birch Road, Rixton	44	38	62/--	41	35	40	46	40	4	4	B	1	A3	T	L	-	-	-	
617595	Forest Gate Academy (Primary School), Daniel Adamson Avenue, Partington	41	35	60/--	43	37	42	45	39	2	2	B	1	A3	T	-	-	-	-	
617598	Rixton Community Hall, Manchester Road, Rixton	50	44	70/--	57	50	55	57	50	0	0	B	1	A2	T	-	-	-	-	$
617599	Church of St Helen, Dam Lane, Hollinfare	46	39	65/--	53	48	53	55	49	1	1	B	1	A2	T	-	-	-	-	
617613	EEF Ltd (Office), Glazebrook Lane, Warrington	54	47	72/--	45	39	44	54	48	9	9	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 **									
617615	Longfield Lodge Dental Practice (Office), Liverpool Road, Cadishead	40	34	58/--	54	47	52	54	47	0	0	B	1	A4	T	-	-	-	-	
617618	All Creatures Veterinary Centre (Office), Glazebrook Lane, Warrington	44	38	63/--	54	47	52	54	48	1	1	B	1	A4	T	-	-	-	-	
617638	Glazebrook Methodist Church, Glazebrook Lane, Warrington	43	37	63/--	50	43	51	50	44	1	1	B	1	A2	T	-	-	-	-	
617964	Church of St Werburgh, Bent Lane, Warburton	46	40	64/--	53	47	52	53	47	0	0	B	1	A2	T	-	-	-	-	
617965	Hollinfare Cemetery, Dam Lane, Hollinfare	49	43	69/--	47	40	45	50	44	4	3	B	1	A2	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 **									
618019	CDN Networks (Lower Sensitivity Offices), Warrington Lane, Lymm	47	41	67/--	<40	32	<40	47	41	>8	9	B	17	A4	T	L	-	-	-	
618232	Hollins Green Scout Centre, Manchester Road, Rixton	45	39	64/--	44	38	43	48	42	3	3	B	1	A2	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	2339 (1657)	6 (6)	4 (4)	16 (16)	19 (19)
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)			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 **				
617642	Glazebrook Lane, Glazebrook (MA04/20)	55	49	74/--	45	39	44	56	49	10	10	Y	-	-	-
618134	Little Woolden Moss	34	27	50/--	47	41	46	47	41	0	0	-	-	-	Y
618118	Moss Brow Farm (Livestock) (MA04/7)	56	49	75/--	50	44	49	56	49	6	5	Y	-	-	-

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