M60/M62/M66 Simister Island Interchange

TR010064

ENVIRONMENTAL STATEMENT APPENDICES

APPENDIX 11.4 CONSTRUCTION NOISE CALCULATIONS

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ENVIRONMENTAL STATEMENT APPENDICES
APPENDIX 11.4 CONSTRUCTION NOISE CALCULATIONS

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LIST OF TABLES

Appendix 11.4 Construction noise calculations

1.1 Introduction

1.1.1 This appendix presents the results from the construction noise calculations for the Scheme.

1.1.2 Section 1.2 of this appendix presents the construction baseline and impact threshold levels used in the assessment. The tables in Section 1.3 list the expected construction activities within each area of the Scheme. It also lists the expected time of the day when these activities may take place, together with the predicted construction noise level at a horizontal distance of 10m from the works.

1.1.3 The tables within Section 1.4 of this appendix then list the expected plant that will be used for used for each activity, together with the source sound level. Section 1.5 then presents the highest calculated noise level at any receptor in each phase, and where appropriate gives a count of the number of receptors above threshold levels for construction noise.

1.1.4 A glossary of terminology in relation to noise and vibration is provided in Appendix 11.1: Introduction to Acoustics of the Environmental Statement Appendices (TR010064/APP/6.3).

1.2 Construction baseline

1.2.1 The measured noise levels have been used to determine Lowest Observed Adverse Effect Level (LOAEL) and Significant Observed Adverse Effect Level (SOAEL) levels for the construction assessment. The results from a fifth noise measurement location (N5 Cowl Gate Farm) have not been used as weather conditions were not ideal for environmental noise surveys, with rainfall during a high proportion of the survey period making the results unrepresentative. Tables 1.1 to 1.3 summarise the applicable LOAEL and SOAEL levels at each location, with the measurement locations shown on Figure 11.1b: Noise Monitoring Locations and Areas of Application of Construction Noise Effect Levels of the Environmental Statement Figures (TR010064/APP/6.2). The LOAELs and SOAELs have been applied to receptors in areas around each measurement location, as shown in Figures 11.3 to 11.6 of the Environmental Statement Figures (TR010064/APP/6.2).

Table 1.1 Daytime baseline at measurement locations

ID	Location and description	Daytime measured $L_{Aeq,T}$, free-field decibel (dB)	Equivalent Façade $L_{Aeq,T}$ dB	BS 5228-1 Assessment Category	LOAEL	SOAEL
N1	Droughts Lane, south-east quadrant of M60 J18	61.2	64	B	64	70
N2	Corday Lane, south-west quadrant of M60 J18	63.8	67	B	67	70
N3	Conisborough Place, alongside M60 between J17 to J18	65.4	68	C	68	75
N4	Marston Close, north-west quadrant of M60 J18	58.3	61	A	61	65

Table 1.2 Night-time baseline at measurement locations

ID	Night-time measured $L_{Aeq,T}$, free-field dB	Equivalent Façade $L_{Aeq,T}$ dB	BS 5228-1 Assessment Category	LOAEL	SOAEL
N1	56.1	59	>C	59	61
N2	59.9	63	>C	63	66
N3	61.3	64	>C	64	67
N4	54.6	58	>C	58	61

Table 1.3 Evening and weekend baseline at measurement locations

ID	Night-time measured $L_{Aeq,T}$, free-field dB	Equivalent Façade $L_{Aeq,T}$ dB	BS 5228-1 Assessment Category	LOAEL	SOAEL
N1	59.1	62	>C	62	66

ID	Night-time measured $L_{Aeq,T}$, free-field dB	Equivalent Façade $L_{Aeq,T}$ dB	BS 5228-1 Assessment Category	LOAEL	SOAEL
N2	62.6	66	>C	66	71
N3	64.3	67	>C	67	70
N4	55.8	59	>C	59	62

1.3 Construction activities by phase of works

Table 1.4 provides a list of the main working phases in different areas, allowing the assessment to be broken down into the areas where different construction activities are taking place. The expected timing of the works in relation to day/night-time is also given as well as the expected timing of the main works in each phase. Works phasing are subject to change during the construction phase, however the risk of changes to plant and/or methods resulting in material differing results is considered to be minimal due to early discussions with the contractor.

Table 1.4 Main construction working phases/areas and timescales

Working area ID	Phase and area of works	Time periods of works	Approximate time period
A	Mobilisation and demobilisation	Day and night	Q4 2025, Q1 2029 to Q2 2029
B	Online works J17-J18 central reserve	Day and night	Q2 2028 to Q4 2028
C	Online works J17-J18 CW hard shoulder (HS)	Day and night	Q1 2026 to Q2 2027
D	Online works J17-J18 ACW HS	Day and night	Q1 2027 to Q2 2028
E	Online works M66 Central Reserve	Day and night	Q1 2026 to Q3 2026
F	Online works M66 verges	Day and night	Q3 2026 to Q2 2028
G	Online works M62 westbound to M60 SB	Day and night	Q3 2026 to Q4 2026
H	Online works M60 J18 ACW off-slip/free-flow link/mainline	Day and night	Q3 2028 to Q4 2028
I	Online works Central Reserve J18-19	Day and night	Q1 2028 to Q3 2028
J	Online works M60 J18 roundabout	Night	Q3 2028 to Q4 2028
K	Offline works M66 southbound (SB) diverge	Day and night	Q1 2026 to Q2 2028
L	Offline works Northern Loop	Day	Q1 2026 to Q1 2028
M	Offline works north-west (NW) quadrant	Day	Q1 2026 to Q3 2028
N	Offline works south-west (SW) quadrant	Day and night	Q4 2026 to Q1 2028
O	Simister Pike Fold Bridge	Day	Q1 2027 to Q4 2027
P	Simister Pike Fold Viaduct	Day and night	Q2 2026 to Q3 2028

1.3.2 Tables 1.5 to 1.13 list the construction activities currently planned to be undertaken in different phases and working areas of the Scheme together with the calculated noise level at a standard 10m from the closest edge of the work area, with plant arranged between 0-10m of any work area. The column indicating the likely timing of the works is based on best estimates and is subject to change. An activity marked as being undertaken during the day and night will not necessarily have an equal split of working time in these two periods.

Table 1.5 Construction activities and calculated noise levels during Mobilisation

Activity		Likely timing of works in working area A Day (D) / Night (N) / Both (B)	$L_{Aeq,T}$ at 10m, dB
Mob1	Establish temporary working compounds	D	79.0
Mob2	Mobilise traffic management for enabling works	N	76.3
Mob3	Site clearance	N	78.6
Mob4	Highways widening for compound access/egress	B	77.6
Mob5	Earthworks (topsoil strip, earthworks, calling/subbase)	D	85.2
Mob6	Drainage	D	79.0
Mob7	Lighting, kerbing, fencing	D	85.5
Mob8	Accommodation foundations	D	82.4
Mob9	Pavement and white lining	D	83.2
Mob10	Lift in accommodation units	D	80.0
Mob11	Fit out accommodation units	D	78.9
Mob12	Establish fencing	D	85.8
Mob13	Site vegetation clearance	B	97.5

Activity		Likely timing of works in working area A Day (D) / Night (N) / Both (B)	$L_{Aeq,T}$ at 10m, dB
Mob14	Traffic Management for mobilisation works	B	76.7
Mob15	Utility Diversions	B	82.3

Table 1.6 Construction activities and calculated noise levels during Demobilisation

Activity		Likely timing of works in working area A Day (D) / Night (N) / Both (B)	$L_{Aeq,T}$ at 10m, dB
Mob16	Remove temporary traffic management	N	79.1
Mob17	Demobilisation from site and reinstatement	D	84.2

Table 1.7 Construction activities and calculated noise levels during online works M60 J17-J18

Activity		Likely timing of works in working area Day (D) / Night (N) / Both (B)			$L_{Aeq,T}$ at 10m, dB
		(B) M60 J17-18 central reserve (CR)	(C) M60 J17-18 clockwise (CW) hard shoulder (HS) & Verge	(D) M60 J17-18 anti-clockwise (ACW) HS & Verge	
On1	Install/Remove traffic management	N	N	N	82.1
On2	Site clearance	B	B	B	84.9 day 78.4 night
On3	Earthworks (excavation and capping/subbase)	B	B	B	79.3
On4	Drainage	B	B	B	79.0

Activity		Likely timing of works in working area Day (D) / Night (N) / Both (B)			$L_{Aeq,T}$ at 10m, dB
		(B) M60 J17-18 central reserve (CR)	(C) M60 J17-18 clockwise (CW) hard shoulder (HS) & Verge	(D) M60 J17-18 anti-clockwise (ACW) HS & Verge	
On5	Surface water channel	B	B	B	78.9
On6	Concrete Barrier	B	-	-	78.9
On7	Pavement and white lining	B	N	B	79.8
On8	Gantry foundation works	B	B	B	80.4
On9	Retaining wall	-	B	B	84.5
On10	Gravity wall	-	B	B	81.2
On11	Technology	-	B	B	83.2
On12	Traffic signs	-	B	B	80.9
On13	Street lighting	-	B	B	78.9
On14	Vehicle Restraint System (VRS)	-	D	D	85.6
On15	New gantry installation	-	N	N	80.0
On16	Topsoiling	-	D	B	81.3
On17	Landscaping	-	D	B	85.3
On18	Environmental barrier works	-	-	B	85.0

Table 1.8 Construction activities and calculated noise levels during online works M66

Activity		Likely timing of works in working area Day (D) / Night (N) / Both (B)				$L_{Aeq,T}$ at 10m, dB
		(E) M66 CR	(F) M66 NB verge thru' J18	(F) M66 SB verge thru' J18	(F) M66 SB verge J18 approach	
On1	Install/Remove traffic management	N	N	N	N	82.1
On2	Site clearance	B	B	B	N	84.9 day 78.4 night
On3	Earthworks (excavation and capping/subbase)	B	D	D	D	79.3
On4	Drainage	B	B	B	B	79.0
On5	Surface water channel	B	B	B	B	78.9
On7	Pavement and white lining	B	B	N	N	79.8
On8	Gantry foundation works	-	B	B	-	80.4
On11	Technology	-	B	B	B	83.2
On12	Traffic signs	-	D	D	D	80.9
On13	Street lighting	B	B	B	B	78.9
On14	VRS	-	B	B	D	85.6
On15	New gantry installation	-	N	N	-	80.0
On17	Landscaping	-	B	B	D	85.3
On19	Existing Gantry Demolition	N (2 nights)	-	-	-	83.3

Activity		Likely timing of works in working area Day (D) / Night (N) / Both (B)				$L_{Aeq,T}$ at 10m, dB
		(E) M66 CR	(F) M66 NB verge thru' J18	(F) M66 SB verge thru' J18	(F) M66 SB verge J18 approach	
On20	Sheet piling for piers	-	N	-	-	87.3

Table 1.9 Construction activities and calculated noise levels during remaining online works

Activity		Likely timing of works in working area Day (D) / Night (N) / Both (B)				$L_{Aeq,T}$ at 10m, dB
		(G) M62 WB to M60 CW	(H) M60 ACW J18 off-slip/free flow link/ mainline	(I) M60 CR J18-19	(J) M60 J18 roundabout	
On1	Install traffic management	N	N	N	N	82.1
On2	Site clearance	B	B	B	N	84.9 day 78.4 night
On3	Earthworks widenings	D	B	B	-	79.3
On4	Drainage	N	B	B	-	79.0
On5	Surface water channel	N	B	B	-	78.9
On7	Pavement and white lining	D<10	N<10	B<10	N	79.8
On12	Traffic signs	D<10	-	-	N	80.9
On13	Street lighting	-	-	-	N	78.9
On14	VRS	D<10	B<10	-	-	85.6

Activity		Likely timing of works in working area Day (D) / Night (N) / Both (B)				$L_{Aeq,T}$ at 10m, dB
		(G) M62 WB to M60 CW	(H) M60 ACW J18 off-slip/free flow link/ mainline	(I) M60 CR J18-19	(J) M60 J18 roundabout	
On17	Landscaping	-	-	-	N	85.3
On21	Existing gantry modification works	-	D<10	-	-	80.2

Table 1.10 Construction activities and calculated noise levels during online finishing works

Activity in working area		Likely timing of works in working area Day (D) / Night (N) / Both (B)	$L_{Aeq,T}$ at 10m, dB
On22	(E) M66 Concrete central reserve barrier	N (20 nights)	78.9
On23	(B/C/D) Final surfacing and white lining M60	N (10 nights)	83.4
On23	(E/F) Final surfacing and white lining M66	N (10 nights)	83.4

Table 1.11 Construction activities and calculated noise levels during offline works

Activity		Likely timing of works in working area Day (D) / Night (N) / Both (B)				$L_{Aeq,T}$ at 10m, dB
		(K) M66 SB Diverge	(L) Northern Loop	(M) NW Quadrant	(N) SW Quadrant	
Off1	Temporary haul roads & pre-earthworks (Embankment 6c layer Northern Loop)	D	-	-	-	86.3
Off1	Temp works for viaduct, east abutment, embankment	-	D	-	-	86.3

Activity		Likely timing of works in working area Day (D) / Night (N) / Both (B)				$L_{Aeq,T}$ at 10m, dB
		(K) M66 SB Diverge	(L) Northern Loop	(M) NW Quadrant	(N) SW Quadrant	
Off1	Temporary haul roads and pre-earthworks, topsoil strip, ground improvement, temp works for west abutment.	-	-	D	-	86.3
Off1	Temporary haul roads & pre-earthworks drainage, satellite compound and Pond 5 temp works.	-	-	-	D	86.3
Off2	Earthworks (topsoil strip, peat excavation, embankment widening, pond excavation)	D	-	-	-	85.1
Off2	Earthworks (embankment, pond excavation)	-	-	D	-	85.1
Off2	Earthworks (topsoil strip excavation of Pond 4, topsoil strip and excavation Pond 5)	-	-	-	D	85.1
Off3	Ground improvement	D	D	-	-	81.1
Off4	Ground monitoring equipment	D	D	-	-	85.7
Off5	Install / remove temporary surcharge	D	D	-	-	89.1
Off6	Temp works for Simister Pike Fold Bridge structure	D	-	-	-	86.1
Off7	Works outside of structures footprint	D	D	D	D	86.3
Off8	Tie-in works at north/south diverge points	D	-	-	-	85.3
Off9	Embankments at structures plug	D	-	-	-	86.5

Activity		Likely timing of works in working area Day (D) / Night (N) / Both (B)				$L_{Aeq,T}$ at 10m, dB
		(K) M66 SB Diverge	(L) Northern Loop	(M) NW Quadrant	(N) SW Quadrant	
Off9	Box cut, capping and subbase	-	D	D	-	86.5
Off10	Box cut, capping & subbase M66	D	-	-	-	85.7
Off11	Topsoiling & verge	D	D	D	D	85.7
Off12	Drainage	D	D	D	D	80.9
Off13	Surface water channel	D	D	D	-	81.8
Off14	VRS	D	D	D	D	85.1
Off15	Pavement works	D	D	D	-	89.6
Off16	Surface course	D	D	D	-	86.9
Off17	Traffic signs	D	D	D	D	84.2
Off18	Road Markings	D	D	D	-	81.6
Off19	Lighting & motorway communications	D	D	D	D	83.5
Off20	Landscaping (finishing)	B	D	D	B	84.5
Off21	Vegetation clearance	-	-	D	-	88.1

Table 1.12 Construction activities and calculated noise levels during (O) Simister Pike Fold Bridge structures works

Activity		Likely timing of works Day (D) / Night (N) / Both (B)	$L_{Aeq,T}$ at 10m, dB
St1	Piling	D	84.4
St2	Formwork Reinforced Concrete (FRC) to abutment pile caps and walls	D	84.0
St3	Beam installation	D	84.5
St4	Diaphragm walls	D	81.7
St5	Bridge deck construction	D	84.4

Table 1.13 Construction activities and calculated noise levels during (P) Simister Pike Fold Viaduct structures works

Activity		Likely timing of works Day (D) / Night (N) / Both (B)	$L_{Aeq,T}$ at 10m, dB
St6	Piling works to piers	B	81.8
St1	Piling works to abutments	D	84.4
St2	FRC to pile caps and walls	B	84.0
St7	Beam delivery and installation (weekends only)	N	83.7
St4	Diaphragm walls	N	81.7
St5	Bridge deck construction	N	84.4

1.4 Construction plant

1.4.1 The tables in this section list the assumed plant for each activity identified in Section 1.3 of this appendix. The calculations undertaken have used the method contained in BS 5228-1:2009+A1:2014 (British Standards Institution, 2014).

1.4.2 The 'Plant Description' in the second column are the descriptors given in BS 5228-1:2009+A1:2014 (British Standards Institution, 2014). Where no reference is provided in the tables the information is from a source other than BS 5228 (e.g. manufacturers data, measured levels). Some minor works, both in terms of duration and noise level produced, are excluded from the lists and subsequent assessment. The tables contain those items of plant likely to be in close proximity to a receptor and can therefore be considered for the noise calculations to be a largely single homogenous source for the type of works described.

1.4.3 The calculations assume that the noisiest items of plant will be working at the closest point to each receptor (at a standard distance of 10m), allowing for spacing of additional plant items away from receptors (at a standard distance ranging between 10-20m). In each activity in the tables below the plant has been listed from the assumed closest plant items to a receptor, to the furthest away. In practice plant would be spread out over a wider area of work than has been assumed. For the times of operation of the construction works themselves, activity time has been assumed to be 75% during each shift, allowing for breaks.

1.4.4 Ground cover has been assumed to be acoustically hard at all locations, which is likely to overestimate noise levels where there are some areas of soft ground between construction works and receptors. However, as most of the surrounding area is urban, this is considered to be representative of most receptors. Screening between construction activities and receptors has been considered within the assessment for receptors either side of the M60 between J17 and J18 where there are existing barriers either side of the road. In these locations a correction of -5dB has been applied, based on these barriers providing partial screening to all plant working in the online sections. In the event that any of these barriers need to be temporarily removed during construction then temporary screening will be erected at the edge of the worksite.

Table 1.14 Mobilisation, plant assumed during works

Activity	BS5228 Ref	Plant Description	Single Plant $L_{Aeq,T}$ dB @ 10m	Quantity
Mob1 Compound works	C2.34	Site van	80	1
	C4.6	6t Dumper	79	1

Activity	BS5228 Ref	Plant Description	Single Plant $L_{Aeq,T}$ dB @ 10m	Quantity
	C8.20	Tipper lorry	79	1
	C5.27	3t Vibratory roller	67	1
	C4.10	13t Wheeled excavator	66	1
Mob2 / Mob14 / Mob16 Traffic management	C2.34	Site van	80	2
	C2.34	Impact protection vehicle	80	1
Mob3 Site clearance	C2.34	Site van	80	1
	C8.20	Tipper lorry	79	1
	C4.53	HIAB (Truck with crane)	77	1
	C4.67	Mini excavator	74	1
Mob4 Highway widening	C4.53	HIAB	77	2
	C4.67	Mini tracked excavator	74	1
	C5.27	Vibratory roller	67	1
Mob5 Earthworks	C6.28	Dozer	85	1
	C8.16	Dump truck	81	2
	C2.34	Site van	80	1
	C2.38	Roller	73	1
	C2.20	Tracked excavator	68	1
Mob6 Drainage	C2.34	Site van	80	1

Activity	BS5228 Ref	Plant Description	Single Plant $L_{Aeq,T}$ dB @ 10m	Quantity
	C8.20	Tipper	79	1
	C4.6	Dumper	79	1
	C2.7	Tracked excavator	70	1
	C5.27	Vibratory Roller	67	1
Mob7 Lighting/kerbing/fencing	Manufacturer's data	Post rammer	85	1
	C2.34	Lorry	80	3
	C2.41	Vibratory plate	80	1
	C4.6	Dumper	79	4
	C8.20	Tipper lorry	79	3
	C4.67	Mini excavator	74	2
Mob8 Accommodation foundations	C2.34	Site van	80	1
	C4.6	Dumper	79	2
	C8.20	Tipper lorry	79	1
	C4.67	Mini excavator	74	1
Mob9 Pavement and white lining	C5.21	Vibratory roller	80	2
	C2.34	Site van	80	4
	C2.14	Tracked excavator	79	1
	C4.6	Dumper	79	1

Activity	BS5228 Ref	Plant Description	Single Plant $L_{Aeq,T}$ dB @ 10m	Quantity
	C5.31	Asphalt paver	77	1
Mob10 Lift in accommodation units	C2.34	Site van	80	2
	C8.20	Tipper lorry	79	1
	C4.59	MEWP (Scissor lift)	78	1
	C4.43	Wheeled mobile crane	70	1
Mob11 Fit out accommodation units	C2.34	Site van	80	4
	C8.20	Tipper lorry	79	2
Mob12 Fencing	C2.34	Site van	80	2
	Manufacturer's data	Post rammer	80	2
	C8.20	Unimog tipper	79	2
Mob13 Site clearance	Manufacturer's data	Mulcher	97.7	2
	Manufacturer's data	Chipper	92	2
	C2.34	Site van	80	2
	C8.20	Unimog tipper	79	2
	C8.20	Tipper lorry	79	2
	C2.7	Excavator	70	2
Mob15 Utility diversions	C2.41	Vibratory plate	80	1
	C2.34	Site van	80	2

Activity	BS5228 Ref	Plant Description	Single Plant $L_{Aeq,T}$ dB @ 10m	Quantity
	C4.6	Dumper	79	2
	C8.20	Tipper lorry	79	2
	C4.44	Directional drill	77	1
	C4.67	Mini excavator	74	2
Mob17 Reinstatement	C6.28	Dozer	85	1
	C8.20	Tipper lorry	79	1
	C2.20	Tracked excavator	68	1

Table 1.15 Online works, plant assumed during works

Activity	BS5228 Ref	Plant Description	Single Plant $L_{Aeq,T}$ dB @ 10m	Quantity
On1 Traffic management	C2.34	Traffic management vans	80	2
	C2.34	Impact protection vehicle	80	1
	C4.57	Forklift	67	1
On2 Site clearance	Manufacturer's data	Post rammer (only used during daytime)	85	1
	C2.34	Site van	80	1
	C8.20	Tipper lorry	79	2
	C4.6	Dumper	79	1
	C2.7	Mini tracked excavator	70	1
On3 Earthworks	C2.34	Site van	80	1

Activity	BS5228 Ref	Plant Description	Single Plant $L_{Aeq,T}$ dB @ 10m	Quantity
	C8.20	Tipper lorry	79	1
	C4.6	Dumper	79	1
	C5.25	Vibratory roller	75	1
	C4.10	Excavator	66	1
On4 Drainage	C2.34	Site van	80	2
	C8.20	Tipper lorry	79	1
	C4.6	Dumper	79	1
	C2.7	Tracked excavator	70	1
	C5.27	Roller	67	1
On5 Surface water channel	C2.34	Site van	80	2
	C8.20	Tipper lorry	79	2
	Manufacturer's data	Slipformer	64	1
On6 Concrete barrier	C2.34	Site van	80	2
	C8.20	Tipper lorry	79	2
	Manufacturer's data	Slipformer	64	1
On7 Pavement and white lining	C5.21	Vibratory roller	80	2
	C2.34	Site van	80	4
	C2.34		80	1

Activity	BS5228 Ref	Plant Description	Single Plant $L_{Aeq,T}$ dB @ 10m	Quantity
	C4.82	14t white liner (only used during night-works)	56	1
	C2.14	Tracked excavator	79	1
	C8.20	Tipper lorry	79	3
	C5.30	Paver	75	1
On8 Gantry foundations	C2.34	Site van	80	1
	C4.6	Dumper	79	1
	C8.20	Tipper lorry	79	2
	C4.59	MEWP	78	1
	C3.17	Small piling rig	76	1
	C4.10	Excavator	66	1
On9 Retaining walls	C3.8	Sheet piling rig	88	1
	C2.41	Vibratory plate	80	1
	C2.34	Site van	80	1
	C8.20	Tipper lorry	79	2
	C4.6	Dumper	79	1
	C4.10	Excavator	66	1
On10 Gravity walls	C2.41	Vibratory plate	80	1

Activity	BS5228 Ref	Plant Description	Single Plant $L_{Aeq,T}$ dB @ 10m	Quantity
	C2.34	Site van	80	1
	C8.20	Tipper lorry	79	2
	C4.6	Dumper	79	1
	C5.25	Vibratory roller	75	1
	C4.10	Excavator	66	1
On11 Technology	C2.34	Lorry	80	3
	C2.41	Vibratory plate	80	1
	C8.20	Tipper lorry	79	1
	C4.6	Dumper	79	1
	C4.67	Mini tracked excavator	74	1
On12 Traffic signs	C2.34	Site van	80	1
	C8.20	Tipper lorry	79	1
	C4.59	MEWP (scissor lift)	78	1
	C4.53	HIAB (lorry with lifting boom)	77	1
	C4.67	Mini tracked excavator	74	1
On13 Street lighting	C2.34	Site van	80	1
	C8.20	Tipper lorry	79	1
	C4.59	MEWP (scissor lift)	78	1

Activity	BS5228 Ref	Plant Description	Single Plant $L_{Aeq,T}$ dB @ 10m	Quantity
	C4.53	HIAB (lorry with lifting boom)	77	2
	C4.67	Mini tracked excavator	74	1
On14 VRS	Manufacturer's data	Post rammer	85	1
	C2.34	Lorry	80	1
	C8.20	Tipper lorry	79	3
	C4.67	Mini tracked excavator	74	1
	C4.6	Dumper	79	1
On15 Gantry installation	C2.34	Site van	80	1
	C4.59	MEWP (scissor lift)	78	1
	C4.53	Crane	70	1
On16 Topsoiling	C8.20	Tipper lorry	80	1
	C4.6	Dumper	79	1
	C2.34	Site van	79	1
	C5.25	Vibratory roller	75	1
	C4.19	Excavator	66	1
On17 Landscaping	C6.38	Tractor and bowser	83	1
	C4.74	Rotavator	80	2
	C8.20	Tipper lorry	80	2

Activity	BS5228 Ref	Plant Description	Single Plant $L_{Aeq,T}$ dB @ 10m	Quantity
	C2.34	Site van	80	1
	C4.67	Mini excavator	74	1
On18 Environmental Barrier	Manufacturer's data	Post rammer	85	1
	C2.34	Site van	80	1
	C8.20	Tipper lorry	79	1
	C4.53	HIAB (lorry with lifting boom)	77	1
	C2.7	Excavator	70	1
On19 Gantry demolition	C2.34	Site van	80	2
	C8.20	Tipper lorry	79	2
	C4.6	Dumper	79	1
	C4.59	MEWP (scissor lift)	78	1
	C4.10	Excavator	66	1
On20 Sheet piling for piers	C3.8	Piling Rig	88	1
	C2.34	Site van	80	1
	C4.6	Dumper	79	1
	C8.20	Tipper lorry	79	1
	C2.7	Excavator	70	1
	C3.7	Power pack	70	1

Activity	BS5228 Ref	Plant Description	Single Plant $L_{Aeq,T}$ dB @ 10m	Quantity
On21 Gantry modification	C2.34	Site van	80	2
	C4.59	MEWP (scissor lift)	78	2
	C3.29	55t Crane	70	1
On22 Concrete central reserve	C2.34	Site van	80	2
	C8.20	Tipper lorry	79	2
	Manufacturer's data	Slipformer	64	1
On23 Final surfacing and white lining	C5.7	Road planer	82	1
	C4.82	14t white liner (only used during night-works)	56	1
	C2.34		80	
	C5.21	Vibratory roller	80	2
	C2.34	Site van	80	4
	C8.20	Tipper lorry	79	3
	C2.14	Tracked excavator	79	1
	C5.30	Paver	75	1

Table 1.16 Offline works, plant assumed during works

Activity	BS5228 Ref	Plant Description	Single Plant $L_{Aeq,T}$ dB @ 10m	Quantity
Off1 Temporary haul roads and pre-earthworks	C6.28	Dozer	85	1
	C6.38	Tractor and bowser	83	1

Activity	BS5228 Ref	Plant Description	Single Plant $L_{Aeq,T}$ dB @ 10m	Quantity
	C2.34	Site van	80	1
	C8.20	Tipper	79	1
	C5.25	6t Roller	75	1
	C2.32	20t Dumper	74	3
	C2.38	13t Roller	73	1
	C2.20	Excavator	68	1
Off 2 Earthworks	C6.28	Dozer	85	1
	C6.38	Tractor and bowser	83	1
	C2.34	Site van	80	1
	C8.20	Tipper	79	1
	C2.32	20t Dumper	74	3
	C2.20	Tracked excavator	68	1
Off 3 Ground improvement	C2.14	Ground improvement rig	79	1
	C2.34	Site van	80	1
	C8.20	Tipper	79	1
Off 4 Ground monitoring equipment	C4.69	Drilling rig	85	2
	C2.34	Site van	80	1
	C2.32	Dumper	79	3

Activity	BS5228 Ref	Plant Description	Single Plant $L_{Aeq,T}$ dB @ 10m	Quantity
	C8.20	Tipper	79	1
	C4.65	Excavator	71	1
Off 5 Temporary surcharge install/remove	C6.28	Dozer	85	2
	C6.38	Tractor and bowser	83	1
	C2.34	Site van	80	1
	C8.20	Tipper lorry	79	1
	C2.32	Dumper	74	4
	C2.20	Excavator	68	1
Off 6 Temporary works for Pike Fold Bridge	C6.28	Dozer	85	1
	C6.38	Tractor and bowser	83	1
	C2.32	Dumper	74	3
	C2.38	13t roller	73	1
	C2.20	Excavator	68	1
Off 7 Works outside of structures footprint	C6.28	Dozer	85	1
	C6.38	Tractor and bowser	83	1
	C2.34	Site van	80	1
	C4.6	3t dumper	79	1
	C8.20	Tipper lorry	79	1

Activity	BS5228 Ref	Plant Description	Single Plant $L_{Aeq,T}$ dB @ 10m	Quantity
	C5.25	6t roller	75	1
	C4.67	6t excavator	74	1
	C2.32	Dumper	74	3
	C2.38	13t roller	73	1
	C2.20	Excavator	68	1
Off 8 Tie-in works at diverge points	C6.28	Dozer	85	1
	C6.38	Tractor and bowser	83	1
	C2.41	Small compacting plate	80	1
	C2.34	Site van	80	1
	C8.20	Tipper lorry	79	1
	C5.25	6t roller	75	1
	C2.32	Dumper	74	3
	C2.38	13t roller	73	1
	C5.25	6t roller	75	1
	C2.7	13t excavator	70	1
	C2.20	25t excavator	68	1
Off 9 Box capping and subbase	C6.28	Dozer	85	1
	C6.38	Tractor and bowser	83	1

Activity	BS5228 Ref	Plant Description	Single Plant $L_{Aeq,T}$ dB @ 10m	Quantity
	C2.41	Small compacting plate	80	1
	C2.34	Site van	80	1
	C8.20	Tipper lorry	79	1
	C5.25	6t roller	75	1
	C2.32	Dumper	74	3
	C2.38	13t roller	73	1
	C2.7	13t excavator	70	1
	C2.20	25t excavator	68	1
Off 10 Box capping and subbase M66	C6.28	Dozer	85	1
	C6.38	Tractor and bowser	83	1
	C2.34	Site van	80	1
	C8.20	Tipper lorry	79	1
	C5.25	6t roller	75	1
	C2.32	Dumper	74	3
	C2.38	13t roller	73	1
	C2.20	25t excavator	68	1
Off 11 Topsoiling and verge	C6.28	Dozer	85	1
	C6.38	Tractor and bowser	83	1

Activity	BS5228 Ref	Plant Description	Single Plant $L_{Aeq,T}$ dB @ 10m	Quantity
	C2.34	Site van	80	1
	C8.20	Tipper lorry	79	1
	C2.32	Dumper	74	3
	C2.20	25t excavator	68	1
Off 12 Drainage	C2.41	Vibratory plate	80	1
	C2.34	Site van	80	1
	C4.6	Dumper	79	2
	C8.20	Tipper lorry	79	2
	C5.25	6t Roller	75	1
	C2.7	13t excavator	70	1
	C2.20	Excavator	68	1
Off 13 Surface water channel	C2.34	Site van	80	2
	C8.20	Tipper lorry	79	2
	C4.67	3t excavator	74	1
	Manufacturer's data	Slipformer	64	1
Off 14 VRS	Manufacturer's data	Post rammer	85	1
	C2.34	Site van	80	1

Activity	BS5228 Ref	Plant Description	Single Plant $L_{Aeq,T}$ dB @ 10m	Quantity
	C8.20	Tipper lorry	79	3
	C4.6	Dumper	79	1
	C4.67	3t excavator	74	1
Off 15 Pavement works	C5.21	Pavement roller	80	2
	C2.34	Site van	80	4
	C2.14	Excavator	79	1
	C8.20	Tipper van	79	3
	C5.31	Paver	77	1
Off 16 Surface Course	C5.7	Planer	82	1
	C5.21	Pavement roller	80	2
	C2.34	Site van	80	4
	C2.14	Excavator	79	1
	C8.20	Tipper van	79	3
	C5.31	Paver	77	1
Off 17 Traffic signs	C2.41	Compactor plate	80	2
	C2.34	Site van	80	1
	C4.6	6t dumper	79	2
	C8.20	Tipper van	79	1

Activity	BS5228 Ref	Plant Description	Single Plant $L_{Aeq,T}$ dB @ 10m	Quantity
	C4.53	HIAB (lorry with lifting boom)	77	1
	C5.25	6t roller	75	2
	C2.7	Excavator	70	2
Off 18 Road markings	C2.34	White liner	80	1
	C4.82		56	
	C2.34	Site van	80	1
	C8.20	Tipper van	79	1
Off 19 Lighting and motorway communications	C2.41	Compactor plate	80	2
	C2.34	Site van	80	2
	C8.20	Tipper van	79	2
	C4.6	6t dumper	79	2
	C4.59	MEWP (scissor lift)	78	1
	C4.53	HIAB (lorry with lifting boom)	77	1
	C5.25	6t roller	75	2
	C2.7	Excavator	70	2
Off 20 Landscaping (finishing)	C6.38	Tractor and bowser	83	1
	C4.74	Tractor (rotavator)	80	1
	C2.34	Site van	80	1

Activity	BS5228 Ref	Plant Description	Single Plant $L_{Aeq,T}$ dB @ 10m	Quantity
	C8.20	Tipper van	79	2
	C4.67	Mini tracked excavator	74	1
	C4.88	Water pump (hydroseeding)	68	1
Off 21 Vegetation clearance	Manufacturer Data	Chipper	92	2
	C2.34	Site van	80	2
	C8.20	Tipper	79	2
	C8.20	Tipper van	79	2
	Manufacturer Data	Mulcher	76	2
	C2.7	Excavator	70	2

Table 1.17 Structures works, plant assumed during works

Activity	BS5228 Ref	Plant Description	Single Plant $L_{Aeq,T}$ dB @ 10m	Quantity
St1 Piling	C2.34	Site van	80	2
	C3.21	80t Piling rig	79	1
	C8.20	Tipper van	79	1
	C4.6	Dumper	79	1
	C4.46	Crane	67	1
	C4.10	Excavator	66	1
St 2 FRC to pile caps and walls	C2.34	Site van	80	3

Activity	BS5228 Ref	Plant Description	Single Plant $L_{Aeq,T}$ dB @ 10m	Quantity
	C8.20	Tipper van	79	3
	C4.59	MEWP (scissor lift)	78	2
	C3.29	Crane	70	1
	C4.24	Concrete wagon	67	1
St 3 Beam installation	C2.34	Site van	80	5
	C8.20	Tipper van	79	3
	C4.59	MEWP (scissor lift)	78	2
	C3.30	100t Crane	70	1
	C4.50	500t Crane	71	1
	C2.35	Telescopic handler	71	1
St 4 Diaphragm walls	C2.34	Site van	80	1
	C8.20	Tipper van	79	2
	C3.29	Crane	70	1
	C2.7	Excavator	70	1
	C4.24	Concrete wagon	67	1
St 5 Deck construction	C2.34	Site van	80	5
	C8.20	Tipper lorry	79	3
	C4.59	MEWP (scissor lift)	78	2

Activity	BS5228 Ref	Plant Description	Single Plant $L_{Aeq,T}$ dB @ 10m	Quantity
	C2.35	Telescopic handler	71	1
	C4.24	Concrete wagon	67	1
	C4.46	Crane	67	1
St 6 Piling to piers	C2.34	Site van	80	2
	C3.21	50t Piling rig	79	1
	C8.20	Tipper lorry	79	1
	C4.6	Dumper	79	1
	C4.46	Crane	67	1
	C4.10	Excavator	66	1
St 7 Beam delivery	C2.34	Site van	80	5
	C8.20	Tipper van	79	3
	C4.59	MEWP (scissor lift)	78	2
	C2.35	Telescopic handler	71	1
	C3.30	100t Crane	70	1
	C4.50	1,000t Crane	67	1

1.5 Construction calculation results

1.5.1 A summary of the highest predicted construction noise level at the façade of any receptor during the construction phases are presented in Table 1.18 to Table 1.31. Where the SOAEL is predicted to be exceeded, a count of the number of receptors above SOAEL is also included.

Table 1.18 Summary of predicted daytime construction noise impacts during (A) mobilisation and de-mobilisation

Activity	Highest predicted $L_{Aeq,T}$ dB at any receptor	Number of receptors above daytime SOAEL
Mob1	62	0
Mob3	61	0
Mob4	59	0
Mob5	68	0
Mob6	62	0
Mob7	60	0
Mob8	58	0
Mob9	66	0
Mob10	54	0
Mob11	53	0
Mob12	71	7
Mob13	80	206
Mob14	62	0

Activity	Highest predicted $L_{Aeq,T}$ dB at any receptor	Number of receptors above daytime SOAEL
Mob15	76	19
Mob17	67	0

Table 1.19 Summary of predicted night-time construction noise impacts during (A) mobilisation and de-mobilisation

Activity	Highest predicted $L_{Aeq,T}$ dB at any receptor	Number of receptors above night-time SOAEL
Mob2	61	0
Mob3	61	0
Mob4	59	0
Mob13	84	328
Mob14	62	1
Mob15	76	35
Mob16	61	0

Table 1.20 Summary of predicted construction noise impacts during daytime online works on M60 between J17 and J18

Activity	Highest predicted $L_{Aeq,T}$ dB at any receptor			Number of receptors above daytime SOAEL		
	B, J17-J18 CR	C, J17-J18 CW HS	D, J17-J18 ACW HS	B, J17-J18 CR	C, J17-J18 CW HS	D, J17-J18 ACW HS
On2	87	87	83	63	78	31
On3	71	73	71	0	2	0

Activity	Highest predicted $L_{Aeq,T}$ dB at any receptor			Number of receptors above daytime SOAEL		
	B, J17-J18 CR	C, J17-J18 CW HS	D, J17-J18 ACW HS	B, J17-J18 CR	C, J17-J18 CW HS	D, J17-J18 ACW HS
On4	71	81	72	0	18	0
On5	71	83	74	0	28	0
On6	71	-	-	0	-	-
On7	70	-	70	0	-	0
On8	71	72	72	4	6	0
On9	-	80	78	-	14	5
On10	-	68	64	-	6	0
On11	-	77	75	-	13	5
On12	-	80	71	-	16	0
On13	-	81	72	-	18	0
On14	-	87	78	-	75	7
On16	-	75	73	-	9	0
On17	-	87	78	-	141	18
On18	-	-	77	-	-	2

Table 1.21 Summary of predicted construction noise impacts during night-time on-line works on M60 between J17 and J18

Activity	Highest predicted $L_{Aeq,T}$ dB at any receptor			Number of receptors above night-time SOAEL		
	B, J17-J18 CR	C, J17-J18 CW HS	D, J17-J18 ACW HS	B, J17-J18 CR	C, J17-J18 CW HS	D, J17-J18 ACW HS
On1	77	83	74	121	99	30
On2	71	80	78	15	61	155

Activity	Highest predicted $L_{Aeq,T}$ dB at any receptor			Number of receptors above night-time SOAEL		
	B, J17-J18 CR	C, J17-J18 CW HS	D, J17-J18 ACW HS	B, J17-J18 CR	C, J17-J18 CW HS	D, J17-J18 ACW HS
On3	71	73	71	35	42	15
On4	71	81	72	28	68	24
On5	71	83	74	27	110	40
On6	71	-	-	33	-	-
On7	72	74	72	57	49	26
On8	71	72	72	44	52	14
On9	-	80	78	-	157	161
On10	-	68	64	-	34	18
On11	-	77	75	-	148	125
On12	-	80	71	-	53	2
On13	-	81	72	-	64	8
On15	-	72	71	-	38	9
On16	-	-	73	-	-	71
On17	-	-	-	-	-	-
On18	-	-	77	-	-	164

Table 1.22 Summary of predicted construction noise impacts during daytime on-line works on M66

Activity	Highest predicted $L_{Aeq,T}$ dB at any receptor				Number of receptors above daytime SOAEL			
	E, M66 CR	F, M66 NB verge thru' J18	F, M66 SB verge thru' J18	F, M66 SB verge J18 approach	E, M66 CR	F, M66 NB verge thru' J18	F, M66 SB verge thru' J18	F, M66 SB verge J18 approach
On2	77	67	62	-	19	7	0	-
On3	70	62	55	58	13	0	0	0
On4	70	62	56	63	13	0	0	0
On5	72	61	56	63	13	0	0	0
On7	67	57	56	-	0	0	-	-
On8	-	-	63	-	-	-	0	-
On11	-	-	60	66	-	-	0	1
On12	-	58	58	65	-	0	0	1 0
On13	72	65	63	63	2	6	0	0
On14	-	65	63	67	-	4	0	1
On15	-	-	58	-	-	-	0	-
On17	-	67	64	69	-	15	0	1

Table 1.23 Summary of predicted construction noise impacts during night-time on-line works on M66

Activity	Highest predicted $L_{Aeq,T}$ dB at any receptor				Number of receptors above night-time SOAEL			
	E, M66 CR	F, M66 NB verge thru' J18	F, M66 SB verge thru' J18	F, M66 SB verge J18 approach	E, M66 CR	F, M66 NB verge thru' J18	F, M66 SB verge thru' J18	F, M66 SB verge J18 approach
On1	75	63	66	66	49	18	1	1
On2	71	60	56	63	7	0	0	0
On3	70	-	-	-	28	-	-	-
On4	70	62	56	63	28	3	0	1
On5	72	61	56	63	29	1	0	1
On7	68	59	58	62	20	0	0	1
On11	-	56	-	66	-	0	-	1
On13	72	65	63	63	29	59	34	1
On14	-	-	63	-	-	-	3	-
On15	-	-	58	-	-	-	0	-
On17	-	67	64	-	-	43	1	-
On19	72	-	-	-	53	-	-	-
On20	-	63	-	-	-	16	-	-

Table 1.24 Summary of predicted construction noise impacts during daytime remaining on-line works

Activity	Highest predicted $L_{Aeq,T}$ dB at any receptor				Number of receptors above daytime SOAEL			
	G, M62 WB to M60 CW	H, M60 ACW J18 off-slip/free flow link/ mainline	I, M60 CR J18-19	J, M60 J18 roundabout	G, M62 WB to M60 CW	H, M60 ACW J18 off-slip/free flow link/ mainline	I, M60 CR J18-19	J, M60 J18 roundabout
On2	72	68	68	-	13	0	0	-
On3	67	62	62	-	0	0	0	-
On4	-	62	62	-	-	0	0	-
On5	-	62	62	-	-	0	0	-
On7	75	-	61	-	13	-	0	-
On12	68	-	-	-	0	-	-	-
On14	72	68	-	-	13	0	-	-
On21	-	59	-	-	-	0	-	-

Table 1.25 Summary of predicted construction noise impacts during night-time remaining on-line works, within 100m of motorways/outside 100m of motorways*

Activity	Highest predicted $L_{Aeq,T}$ dB at any receptor				Number of receptors above daytime SOAEL			
	G, M62 WB to M60 CW	H, M60 ACW J18 off-slip/free flow link/ mainline	I, M60 CR J18-19	J, M60 J18 roundabout	G, M62 WB to M60 CW	H, M60 ACW J18 off-slip/free flow link/ mainline	I, M60 CR J18-19	J, M60 J18 roundabout
On1	64	65	65	71	18	16	16	20
On2	66	62	68	36	21	4	39	0
On3	-	62	62	-	-	0	0	-
On4	66	62	62	-	18	0	0	-
On5	65	62	62	-	18	0	0	-
On7	-	63	63	66	-	1	1	17
On11	-	-	-	71	-	-	-	33
On13	-	-	-	36	-	-	-	0
On14	-	68	-	-	-	39	-	-
On17	-	-	-	36	-	-	-	0

Table 1.26 Summary of predicted night-time construction noise impacts during online finishing works

Activity	Highest predicted $L_{Aeq,T}$ dB at any receptor	Number of receptors above night-time SOAEL
On22	65	19
On23 M60	77	188
On23 M66	68	20

Table 1.27 Summary of predicted construction noise impacts during daytime off-line works

Activity	Highest predicted $L_{Aeq,T}$ dB at any receptor				Number of receptors above daytime SOAEL			
	K, M66 SB Diverge	L, Northern Loop	M, NW Quadrant	N, SW Quadrant	K, M66 SB Diverge	L, Northern Loop	M, NW Quadrant	N, SW Quadrant
Off1	70	62	68	68	1	0	6	0
Off2	64	67 / 53	66	69	0	1	6	0
Off3	60	67	-	-	0	1	-	-
Off4	60	61	-	-	0	0	-	-
Off5	67	64	-	-	1	0	-	-
Off6	62	-	-	-	0	-	-	-
Off7	56	67	68 1	63	0	1	6	0
Off8	63	-	-	-	0	-	-	-
Off9	65	-	68	-	1	-	18	-
Off10	65	67	-	-	1	1	-	-

Activity	Highest predicted $L_{Aeq,T}$ dB at any receptor				Number of receptors above daytime SOAEL			
	K, M66 SB Diverge	L, Northern Loop	M, NW Quadrant	N, SW Quadrant	K, M66 SB Diverge	L, Northern Loop	M, NW Quadrant	N, SW Quadrant
Off11	65	69	72	72	1	1	34	3
Off12	62	67	60	63	0	1	0	0
Off13	58	66	57	-	0	1	0	-
Off14	68	72	62	64	1	1	0	0
Off15	69	74	76	-	1	1	89	-
Off16	64	73	63	-	0	1	0	-
Off17	61	71	68	67	0	1	13	0
Off18	60	65	61	-	0	1	0	-
Off19	61	70	57	71	0	1	0	1
Off20	70	63	68	71	1	0	17	1
Off21	-	-	63	-	-	-	0	-

Table 1.28 Summary of predicted construction noise impacts during evening off-line works

Activity	Highest predicted $L_{Aeq,T}$ dB at any receptor		Number of receptors above daytime SOAEL	
	L, Northern Loop	M, NW Quadrant	L, Northern Loop	M, NW Quadrant
Off1	62	68	1	28
Off2	67 / 53	66	1	20

Activity	Highest predicted $L_{Aeq,T}$ dB at any receptor		Number of receptors above daytime SOAEL	
	L, Northern Loop	M, NW Quadrant	L, Northern Loop	M, NW Quadrant
Off3	67	-	1	-
Off4	61	-	0	-
Off5	64	-	1	-
Off6	-	-	-	-
Off7	67	68 1	1	28
Off8	-	-	-	-
Off9	67	68	1	35
Off10	-	-	-	-
Off11	69	72	1	68
Off12	67	60	1	0
Off13	66	57	1	0
Off14	72	62	1	3
Off15	74	76	1	140
Off16	73	63	1	11
Off17	71	68	1	28
Off18	65	61	1	0
Off19	70	57	1	0

Activity	Highest predicted $L_{Aeq,T}$ dB at any receptor		Number of receptors above daytime SOAEL	
	L, Northern Loop	M, NW Quadrant	L, Northern Loop	M, NW Quadrant
Off20	63	68	0	35
Off21	-	63	1	1

Table 1.29 Summary of predicted construction noise impacts during night-time off-line works

Activity	Highest predicted $L_{Aeq,T}$ dB at any receptor		Number of receptors above night-time SOAEL	
	K, M66 SB Diverge	N, SW Quadrant	K, M66 SB Diverge	N, SW Quadrant
Off20	70	71	46	24
*Shown for receptors within 100m of motorways / more than 100m from motorways				

Table 1.30 Summary of predicted construction noise impacts during daytime (O) Simister Pike Fold Bridge structures works

Activity	Highest predicted $L_{Aeq,T}$ dB at any receptor	Number of receptors above daytime SOAEL
St1	64	0
St2	61	0
St3	60	0
St4	58	0
St5	63	0

Table 1.31 Summary of predicted construction noise impacts during evening (O) Simister Pike Fold Bridge structures works

Activity	Highest predicted $L_{Aeq,T}$ dB at any receptor	Number of receptors above daytime SOAEL
St1	64	1
St2	61	0
St3	60	0
St4	58	0
St5	63	1

Table 1.32 Summary of predicted construction noise impacts during daytime (P) Simister Pike Fold Viaduct structures works

Activity	Highest predicted $L_{Aeq,t}$ dB at any receptor	Number of receptors above daytime SOAEL
St6	68	1
St1	68	1
St2	67	1

Table 1.33 Summary of predicted construction noise impacts during night-time (P) Simister Pike Fold Viaduct structures works

Activity	Highest predicted $L_{Aeq,t}$ dB at any receptor	Number of receptors above night-time SOAEL
St6	68	3
St2	67	3
St7	68	3
St4	68	3
St5	68	3

Acronyms and initialisms

Acronym or initialism	Term
ACW	Anticlockwise
CW	Clockwise
CR	Central Reserve
dB	Decibel
FRC	Formwork Reinforced Concrete
HS	Hard shoulder
LOAEL	Lowest Observed Adverse Effect Level
NB	Northbound
SB	Southbound
SOAEL	Significant Observed Adverse Effect Level
VRS	Vehicle Restraint System

References

British Standards Institution (2014). BS 5228-1:2009+A1:2014: Code of practice for noise and vibration control on construction and open sites. Noise.