Design Manual for Roads and Bridges

Sustainability & Environment
Appraisal

LA 111
Noise and vibration

(formerly HD 213/11, IAN 185/15)

Revision 2

Summary
This document sets out the requirements for assessing and reporting the effects of highways noise and vibration from construction, operation and maintenance projects. The document has been updated to correct time periods in Tables 3.12 and 3.49.1, update the references for speed pivoting requirements in Appendix A2, and to clarify other requirements following feedback received.

Application by Overseeing Organisations
Any specific requirements for Overseeing Organisations alternative or supplementary to those given in this document are given in National Application Annexes to this document.

Feedback and Enquiries
Users of this document are encouraged to raise any enquiries and/or provide feedback on the content and usage of this document to the dedicated Highways England team. The email address for all enquiries and feedback is: Standards_Enquiries@highwaysengland.co.uk

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Release notes

Version	Date	Details of amendments
2	May 2020	Revison 2 (May 2020) The document has been updated to correct time periods in Tables 3.12 and 3.49.1, update the references for speed pivoting requirements in Appendix A2, and to clarify other requirements following feedback received. Revision 1 (February 2020) Update to Wales National Application Annex. Revision 0 (November 2019) LA 111 replaces HD 213/11 and IAN 185/15. This full document has been re-written to make it compliant with the new Highways England drafting rules.

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Foreword

Publishing information

This document is published by Highways England.

This document supersedes HD 213/11, which is withdrawn. This document supersedes the noise advice within IAN 185/15 on the assessment of link speeds and generation of vehicle data into 'speed-bands'.

This document also makes provision for requirements outlined within EU Directive 2011/92/EU as amended by 2014/52/EU [Ref 1.N].

Contractual and legal considerations

This document forms part of the works specification. It does not purport to include all the necessary provisions of a contract. Users are responsible for applying all appropriate documents applicable to their contract.

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Introduction

Background

The construction, operation and maintenance of highway projects can lead to changes in noise and vibration levels in the surrounding environment.

Environmental assessment provides a framework for assessing and managing the noise and vibration effects associated with construction, improvement, use and maintenance of motorways and all purpose trunk roads.

This document aligns with Directive 2011/92/EU as amended by 2014/52/EU [Ref 1.N].

This document sets out the requirements for noise and vibration assessments from road projects, applying a proportionate and consistent approach using best practice and ensuring compliance with relevant legislation.

Assumptions made in the preparation of this document

The assumptions made in GG 101 [Ref 15.N] apply to this document.

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Abbreviations and symbols

Abbreviations

Abbreviation	Definition
BNL	Basic noise level
CRTN	Calculation of road traffic noise
DMFY	Do-minimum future year scenario
DMOY	Do-minimum opening year scenario
DSFY	Do-something future year scenario
DSOY	Do-something opening year scenario
EMP	Environmental management plan
END	Environmental Noise Directive
HDV	Heavy duty vehicles
HGV	Heavy goods vehicles
km/h	Kilometres per hour
LOAEL	Lowest observed adverse effect level
m	Metres
m/s	Metres per second
PPV	Peak particle velocity
RSI	Road surface influence
SOAEL	Significant observed adverse effect level

Symbols

Symbol	Definition
dB	Decibels
dB(A)	A-weighted noise levels

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Terms and definitions

Terms and definitions

Term	Definition
Absorptive noise barrier	A noise barrier that has an absorptive lining.
Ambient noise	Ambient noise is the total sound in a given situation at a given time usually composed of sound from many sources, near and far.
A-weighting	In addition to its non-linear amplitude response, the human ear has a non-linear frequency response; it is less sensitive at low and high frequencies and most sensitive in the mid range frequencies. NOTE 1: The A-weighting is applied to measured sound pressure levels so that these levels correspond more closely to the subjective response. NOTE 2: A-weighted noise levels are often expressed in dB(A).
Baseline scenario	A description of the state of the environment without implementation of the project.
Basic noise level	The basic noise level (BNL) is a measure of source noise as defined in Appendix A.
Calculation of road traffic noise	The technical memorandum that describes the procedures for calculating noise from road traffic CRTN [Ref 3.N].
Construction noise assessment	An assessment which compares predicted noise levels from construction tasks to ambient noise levels at nearby noise sensitive receptors.
Construction vibration assessment	An assessment of magnitude of predicted vibration from construction activities.
Decibel	The unit of measurement used for sound pressure levels and noise levels quoted in decibels (dB). NOTE 1: The decibel scale is logarithmic rather than linear; the threshold of hearing is zero decibels while, at the other extreme, the threshold of pain is about 130 decibels. NOTE 2: These limits are seldom experienced and typical levels lie within the range of 30 dB(A) (a quiet night time level in a bedroom) to 90 dB(A) (at the kerbside of a busy road).
Diversion route	A set of approved routes to follow in case of closure of motorway / major A-roads.
Do-minimum	Scenario without the project.
Do-something	Scenario with the project.
Environmental Noise Directive quiet area	A location formally designated as an 2002/49/EC [Ref 10.N] (END) quiet area.
Facade sound level	Sound level that is determined 1 metre (m) in front of a window or door in a facade.

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Terms and definitions (continued)

Term	Definition
Free-field sound level	The sound level which is measured or calculated, in the open, without any reflections from nearby surfaces except the ground.
Future year	The 15th year after opening.
Insertion loss	A measure of the effectiveness of noise control devices such as silencers and enclosures. NOTE: The insertion loss of a device is the difference, in dB, between the noise level with and without the device present.
L_{A10}	The A-weighted sound level, in dB, that is exceeded 10% of the measurement period. NOTE: This is the standard index used within the UK to describe traffic noise.
$L_{A10,18hr}$	The noise level, in dB, that is exceeded 10% of the time between 0600 and 2400.
L_{Aeq}	The equivalent continuous sound level (L_{Aeq}) is the level of a notional steady sound, which at a given position and over a defined period of time, would have the same A-weighted acoustic energy as the fluctuating noise.
L_{Amax}	The maximum A-weighted level measured during a given time period.
L_{night}	A facade noise index derived from the $L_{A10,18hr}$ using the TRL conversion method TRL PR/SE/451/02 [Ref 7.N].
$L_{night,outside}$	For the purpose of night-time noise assessment, the $L_{night,outside}$ is the equivalent continuous sound level $L_{Aeq,8hr}$ for the period 23:00 to 07:00 hours assessed outside a dwelling and is free-field.
Long-term	Noise change based on the +15 year assessment (for example Do-minimum opening year scenario (DMOY) against Do-minimum future year scenario (DMFY) and DMOY against Do-something future year scenario (DSFY)).
Lowest observed adverse effect level	Level above which adverse effects on health and quality of life can be detected.
Noise	Unwanted sound.
Noise mapping	The production of computer software generated maps showing how the predicted levels of outdoor noise vary with location.
Noise modelling	Software to predict noise levels. NOTE: This can be undertaken either by specialist software to provide a 3D representation of the project and nearby noise sensitive receptors or a simple spreadsheet.
Noise monitoring	Measurement of noise levels.

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Terms and definitions (continued)

Term	Definition
Noise sensitive receptor	Receptors which are potentially sensitive to noise. NOTE: Examples include dwellings, hospitals, healthcare facilities, education facilities, community facilities, END quiet areas or potential END quiet areas, international and national or statutorily designated sites, public rights of way and cultural heritage assets.
Non-project noise change	Noise change based on the DMOY against DMFY scenario, with no project implementation.
Point source attenuation	A source of noise/sound that radiates from a single point, decreasing by 6dB every time the distance between the source and receiver is doubled.
Sensitive buildings	Dwellings, including those that are listed, hospitals, healthcare facilities, education facilities or other buildings where noise or vibration can cause disturbance to people using the buildings.
Opening year	The first year of operation.
Operational noise assessment	An assessment to determine the operational noise impacts and effects of a road project.
Potential END quiet area	A location with potential to be formally designated as a END quiet area, but not officially designated as such.
Reflective noise barrier	A noise barrier that reflects noise.
Short-term	Noise change based on parallel assessment year (for example DMOY against Do-something opening year scenario (DSOY)).
Significant observed adverse effect level	The level above which significant adverse effects on health and quality of life occur.
Vibration	A to-and-fro motion which oscillates about a fixed equilibrium position.
Vibration sensitive receptor	Receptors which are potentially sensitive to vibration. NOTE: Examples include dwellings, hospitals, healthcare facilities, education facilities, community facilities, buildings containing vibration sensitive equipment and cultural heritage assets.

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1. Scope

Aspects covered

1.1 The requirements in this document shall be applied to the assessment, reporting and management of environmental effects, specifically changes in noise and vibration emissions, from the delivery of projects.

1.2 Environmental assessments shall describe the effects of changes in noise and vibration emissions in accordance with the wider requirements and advice provided in:

1) LA 101 [Ref 14.N] Introduction to environmental assessment;
2) LA 102 [Ref 19.N] Screening projects for Environmental Impact Assessment;
3) LA 103 [Ref 18.N] Scoping projects for environmental assessment; and
4) LA 104 [Ref 12.N] Environmental assessment and monitoring

1.3 The environmental assessment must, in line with the 2014/52/EU [Ref 1.N] describe the likely significant effects of proposed projects on the environment resulting from the emissions of noise and vibration.

1.4 Environmental assessment of noise and vibration emissions shall include likely significant effects from:

1) construction noise;
2) construction vibration; and
3) operational noise.

NOTE *Operational vibration is scoped out of the assessment methodology as a maintained road surface will be free of irregularities as part of project design and under general maintenance, so operational vibration will not have the potential to lead to significant adverse effects.*

1.5 The assessment of noise and vibration shall inform the assessment of other environmental factors, where appropriate.

Implementation

1.6 This document shall be implemented forthwith on all projects involving construction, improvement and maintenance of motorways and all purpose trunk roads on the Overseeing Organisations' motorway and all-purpose trunk roads according to the implementation requirements of GG 101 [Ref 15.N].

Use of GG 101

1.7 The requirements contained in GG 101 [GG 101 [Ref 15.N] shall be followed in respect of activities covered by this document.

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2. Principles and purpose

2.1 During options identification, the level of detail of a noise and vibration assessment shall be proportionate to the quality of data available and the risk of likely significant effects occurring.

NOTE *Scoping assessments can identify and focus the assessment on the risk of likely significant environmental effects occurring for route options.*

2.2 The assessment shall determine and report likely significant effects on sensitive buildings within the relevant study areas.

2.2.1 For cultural heritage resources, the impact of noise and or vibration on the people living in buildings should be included within the noise and vibration assessment.

2.3 The assessment of whether noise and/or vibration levels generated by the project gives rise to, or contributes to, a likely significant effect shall be undertaken and reported within the following documents:

1) LA 108 [Ref 2.N] for receptors containing biodiversity resources;
2) LA 107 [Ref 16.N] for receptors containing landscape resources;
3) LA 106 [Ref 8.N] for receptors containing cultural heritage resources;
4) LA 112 [Ref 17.N] for receptors containing community recreational facilities.

2.3.1 For cultural heritage resources the impact of noise and vibration on the building itself, or its setting, should be included within the cultural heritage assessment - see LA 106 [Ref 8.N].

Baseline scenario

2.4 The baseline scenario shall be defined and described in accordance with LA 104 [Ref 12.N].

2.5 The assessment shall predict:

1) construction noise levels and comparison with the baseline at noise sensitive receptors within the construction noise study area;
2) construction vibration levels and comparison with the baseline at vibration sensitive receptors within the construction vibration study area;
3) operational noise levels and changes from the baseline at noise sensitive receptors within the operational noise study area.

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3. Assessment methodology

Construction noise assessment

Scoping

3.1 The scoping assessment shall report on the following questions to gain an understanding of the need to undertake further assessment:

1) does construction noise generated by the project have the potential to adversely affect any noise sensitive receptors?;
2) are there any noise receptors where there would be a reasonable stakeholder expectation that a construction noise assessment would be undertaken?

NOTE *An example of reasonable stakeholder expectation that a construction noise assessment would be required is where works are not noisy enough to give rise to adverse effects at the noise sensitive receptors, but will be visible from the receptor and/or last for many weeks.*

3.2 Scoping assessments shall be based on existing available information.

3.3 Where the response to one or more of the scoping assessment questions is 'yes', further assessment shall be undertaken.

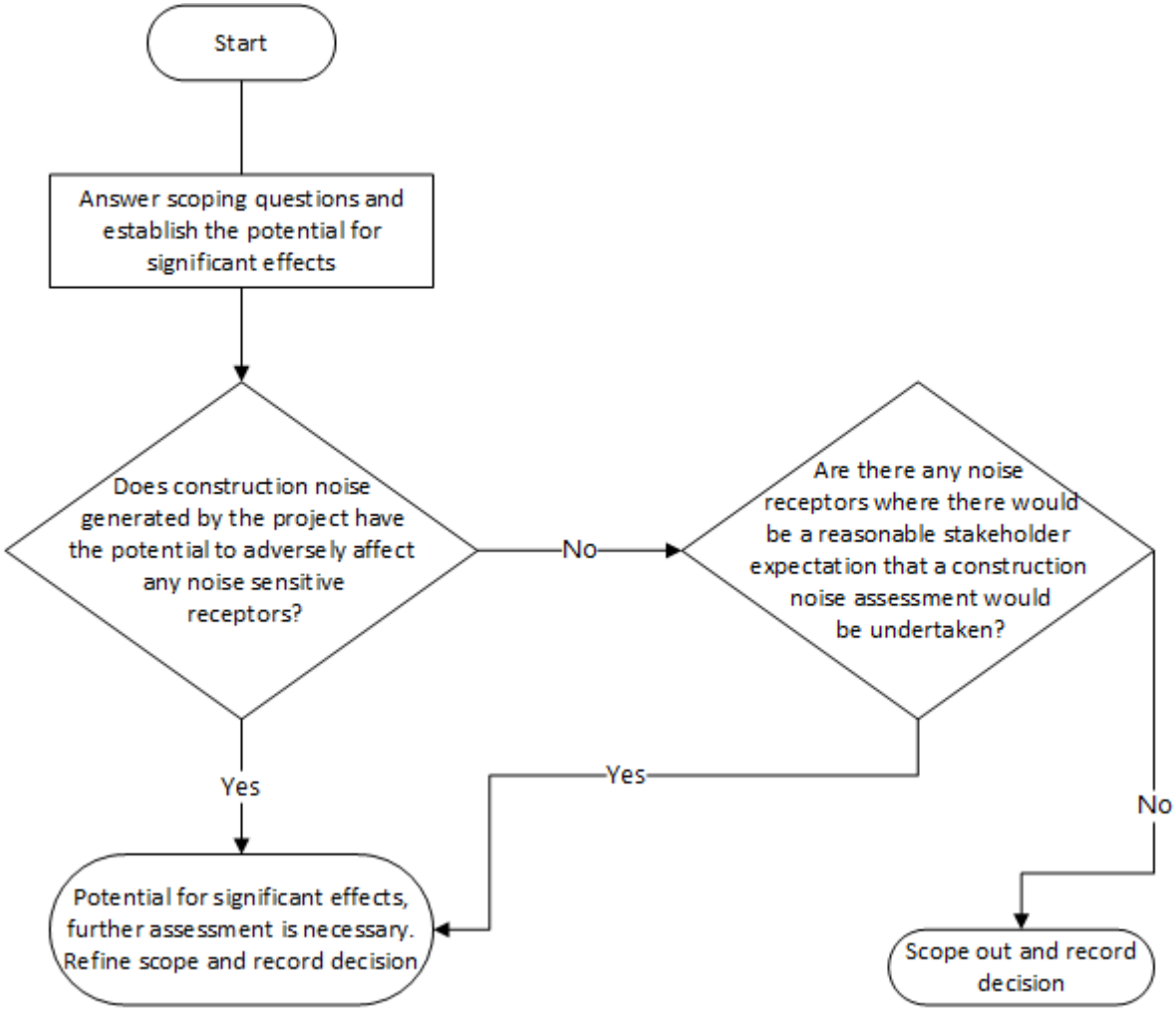
3.4 The scoping assessment shall follow the process illustrated in Figure 3.4N.

NOTE *The flow diagram in Figure 3.4N illustrates the scoping process for construction noise.*

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Figure 3.4N Scoping process for construction noise



Study areas

3.5 A construction noise study area shall be defined, where the need for further assessment has been established to include all noise sensitive receptors:

1) that are potentially affected by construction noise;
2) in areas where there is a reasonable stakeholder expectation that a construction noise assessment will be undertaken.

NOTE 1 A study area of 300m from the closest construction activity is normally sufficient to encompass noise sensitive receptors.

NOTE 2 Variations in the study area can be defined for individual projects.

3.6 A diversion route study area shall be defined where a project requires full carriageway closures during the night (23:00-07:00) to enable construction works to take place.

3.7 A diversion route study area shall be defined to include a 25m width from the kerb line of the diversion route.

NOTE 1 When full carriageway closures are implemented at night on major roads, traffic using those roads is diverted onto local roads that normally experience lower traffic levels at night.

NOTE 2 The sudden change of traffic levels on diversion routes, as a result of night time closures, is highly likely to cause disturbance to receptors next to (within 25m of) the road.

NOTE 3 It is possible to calculate changes in noise levels due to diversion routes, but it is not a proportionate approach, as it would require significant work in additional traffic modelling and noise calculations that would be highly likely to confirm that disturbance would occur.

3.8 A construction traffic study area shall be defined to include a 50m width from the kerb line of public roads with the potential for a increase in baseline noise level (BNL) of 1 dB(A) or more as a result of the addition of construction traffic to existing traffic levels.

Baseline

3.9 Construction noise baseline shall be determined via one or more of the following methods:

1) noise measurements, based upon actual survey data;
2) predicted noise levels (noise model outputs);
3) existing noise mapping undertaken by public bodies or as part of other developments.

3.10 The scope of the assessment of the extent and quality of data required to determine the baseline noise environment shall be proportionate and include:

1) the risk of a likely significant effect occurring;
2) the stage of development of the project;
3) the availability of previously collected data.

3.10.1 Noise monitoring, specifically for the purposes of construction noise baseline data collection, should only be undertaken where data from other sources is not sufficient to enable production of a proportionate construction noise assessment.

NOTE Additional methodology on predicting construction noise can be found in BS 5228-1 [Ref 5.N].

Determining significance

3.11 Lowest observable adverse effect level (LOAEL) and significant observable adverse effect level (SOAEL) shall be established and reported within the environmental assessment for all noise sensitive receptors within the construction activity study area, with reference to baseline noise levels.

3.12 The LOAEL and SOAEL shall be established in accordance with Table 3.12:

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Table 3.12 Construction time period - LOAEL and SOAEL

Time period	LOAEL	SOAEL
Day (0700-1900 weekday and 0700-1300 Saturdays)	Baseline noise levels $L_{Aeq,T}$	Threshold level determined as per BS 5228-1 [Ref 5.N] Section E3.2 and Table E.1 BS 5228-1 [Ref 5.N]
Night (2300-0700)	Baseline noise levels $L_{Aeq,T}$	Threshold level determined as per BS 5228-1 [Ref 5.N] Section E3.2 and Table E.1 BS 5228-1 [Ref 5.N]
Evening and weekends (time periods not covered above)	Baseline noise levels $L_{Aeq,T}$	Threshold level determined as per BS 5228-1 [Ref 5.N] Section E3.2 and Table E.1 BS 5228-1 [Ref 5.N]

NOTE *Where specific local circumstances mean that an alternative method of setting LOAEL and SOAEL for noise sensitive receptors is more appropriate, the alternative method can be submitted as a departure from standards to the Overseeing Organisation for approval.*

3.13 Construction noise levels shall be calculated at selected locations which are representative of all noise sensitive receptors in the study area.

3.13.1 Calculations may be undertaken at a selection of noise sensitive receptors, or at varying distances from each activity, to represent all receptors in the study area.

3.14 The calculation of construction noise levels shall follow the methodology in BS 5228-1 [Ref 5.N] and include the following sources where they are present:

1) construction plant in use on the project;
2) construction compounds;
3) traffic on haul roads not part of the public highway;

3.15 Construction traffic BNL increases shall be calculated for roads within the construction traffic study area.

3.16 Magnitude of impact of construction noise, shall be determined in accordance with Table 3.16:

Table 3.16 Magnitude of impact and construction noise descriptions

Magnitude of impact	Construction noise level
Major	Above or equal to SOAEL +5dB
Moderate	Above or equal to SOAEL and below SOAEL +5dB
Minor	Above or equal to LOAEL and below SOAEL
Negligible	Below LOAEL

3.17 Magnitude of impact at noise sensitive receptors of construction traffic shall be determined in accordance with Table 3.17.

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Table 3.17 Magnitude of impact at receptors

Magnitude of impact	Increase in BNL of closest public road used for construction traffic (dB)
Major	Greater than or equal to 5.0
Moderate	Greater than or equal to 3.0 and less than 5.0
Minor	Greater than or equal to 1.0 and less than 3.0
Negligible	Less than 1.0

3.18 For diversion routes used at night, a major magnitude of impact for construction noise impact shall be determined at any noise sensitive receptors within the diversion route study area.

3.19 Construction noise and construction traffic noise shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:

1) 10 or more days or nights in any 15 consecutive days or nights;
2) a total number of days exceeding 40 in any 6 consecutive months.

NOTE 1 *It is more appropriate to use the specified timescales for highway construction, which are taken from BS 5228-1 [Ref 5.N] section E.4, rather than the '1 month or more' timescale included within E.3.3 of BS 5228-1 [Ref 5.N] due to the transient nature of most highway construction work.*

NOTE 2 *Where specific local circumstances mean that an alternative method for determining significance is more appropriate, the alternative method can be submitted as a departure from standards to the Overseeing Organisation for approval.*

3.20 The following shall be reported in the environmental assessment:

1) data sources used;
2) assumptions applied during use of data;
3) the risk of any inaccuracies or errors within the data, or any modifications or assumptions made, leading to the assessment drawing incorrect conclusion;.
4) locations of noise sources and noise sensitive receptors.

NOTE *Instruction on allowing for uncertainty in Environmental Impact Assessment is provided in LA 104 [Ref 12.N].*

Design and mitigation

3.21 Two types of construction noise mitigation shall be incorporated into the design of the construction of the project as follows:

1) best practice noise mitigation techniques to minimise the generation and impact of noise applied to all construction activities;
2) specific noise mitigation measures to reduce the noise impact from activities which result in moderate or major magnitude of effect.

3.21.1 Best practice noise mitigation techniques should include the following measures:

1) training of site personnel to raise awareness of noise and nearby noise sensitive receptors;
2) provision of information to the public on expected construction noise, including duration, especially to those likely to be exposed to moderate and major magnitude of effect.

NOTE *Examples of best practice construction noise techniques are presented in the following references:*

1) best practicable means as defined in BS 5228-1 [Ref 5.N];
2) guidance presented in BS 5228-1 [Ref 5.N];

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3) *information within industry specific schemes such as: Considerate Constructors Scheme Best Practice Hub Considerate Contractor (Website) [Ref 1.I].*

3.22 The implications of the use of specific mitigation measures on cost and construction timescales shall be determined and reported to the Overseeing Organisation.

3.22.1 Specific noise mitigation measures for sources other than diversion routes may include:

1) specification of the use of noise reduction construction methods, for example: specifying the use of rotary rather than driven piling;
2) provision of measures to reduce the noise reaching noise sensitive receptors, for example: installation of temporary barriers;
3) restriction of some activities to less sensitive times, for example: restricting piling activity to the daytime only;
4) providing noise insulation to houses, or temporarily rehousing local residents.

3.22.2 Specific noise mitigation measures for diversion routes may include:

1) use of more than one diversion route for different closures, to reduce the exposure of individual noise sensitive receptors;
2) providing noise insulation to residents along the diversion routes.

3.23 Specific noise mitigation measures shall only be included within the project if they are practicable as defined in BS 5228-1 [Ref 5.N].

NOTE *Advice relating to the practicability of specific mitigation measures can be sought from project sponsors and or those responsible for determining the construction methodology for the project.*

3.24 Where a specific noise mitigation measure is not practicable, as defined in BS 5228-1 [Ref 5.N], the measure shall not be included within the project design for the purposes of the construction noise assessment.

3.25 Specific noise mitigation measures included within the project shall be listed in the assessment and included within the construction stage of the environment management plan for the project.

Construction vibration assessment

Scoping

3.26 The scoping assessment shall report on the following scoping assessment questions to gain an understanding of the need to undertake further assessment:

1) does vibration from construction have the potential to adversely affect any vibration sensitive receptors?;
2) does the scale of the development or type of construction mean that there will be a reasonable stakeholder expectation that a construction vibration assessment would be undertaken at any vibration sensitive receptors?

NOTE *An example of reasonable stakeholder expectation that a construction vibration assessment would be required is where works are unlikely to generate enough vibration to give rise to adverse effects at the vibration sensitive receptors, but be visible and/or audible from the receptor and/or last for many weeks.*

3.27 Where the response to one or more of the scoping assessment questions is 'yes', the scoping assessment shall make a recommendation on the scope of further assessment.

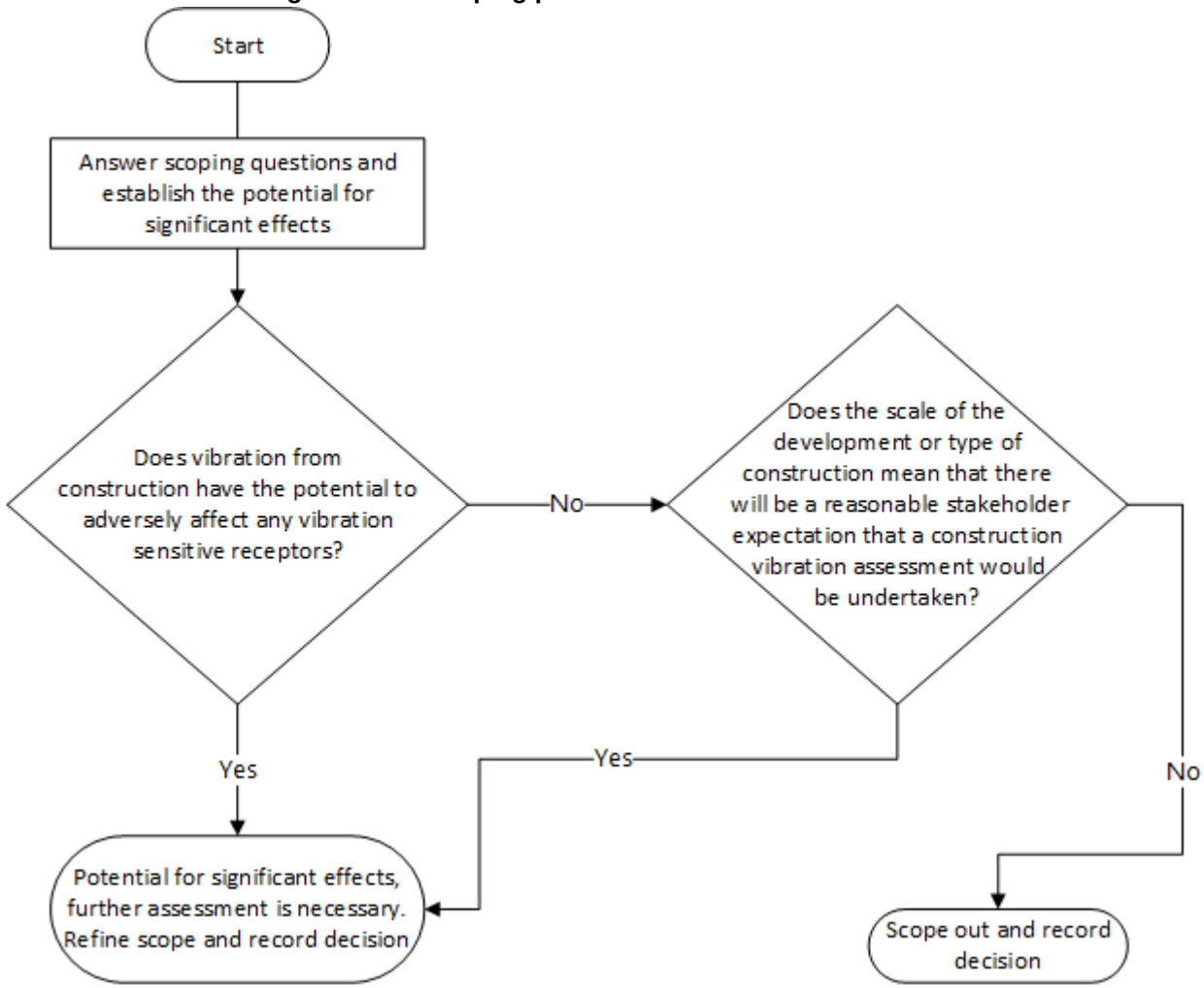
3.28 Scoping assessments shall be based on reasonably available information.

NOTE *The flow diagram in Figure 3.28N illustrates the scoping process for construction vibration.*

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Figure 3.28N Scoping process for construction vibration



Study area

3.29 Where the need for further assessment has been established, a vibration study area shall be defined to include all:

1) vibration sensitive receptors that are potentially affected by construction vibration;
2) vibration sensitive receptors in areas where there is a reasonable stakeholder expectation that a construction vibration assessment will be undertaken.

NOTE 1 A study area of 100m from the closest construction activity with the potential to generate vibration is normally sufficient to encompass vibration sensitive receptors.

NOTE 2 Variations in the study area can be defined for individual projects.

Baseline

3.30 The construction vibration baseline shall be assumed to be zero due to the absence of construction work prior to project commencement.

Determining significance

3.31 Where the need for further assessment has been established, the LOAEL and SOAEL for construction vibration shall be set as follows:

Table 3.31 Construction vibration LOAELs and SOAELs for all receptors

Time period	LOAEL	SOAEL
All time periods	0.3mm/s PPV	1.0mm/s PPV

NOTE Where specific local circumstances mean that an alternative method of setting LOAEL and SOAEL for vibration sensitive receptors is more appropriate,the alternative method can be submitted as a departure from standards to the Overseeing Organisation for approval.

3.32 Where the need for further assessment has been established, the prediction methodology presented in BS 5228-2 [Ref 6.N] shall be used to to calculate construction vibration levels for all activities with the potential to adversely affect vibration sensitive receptors.

3.33 Magnitude of impact shall be determined in accordance with Table 3.33:

Table 3.33 Vibration level - magnitude of impact

Magnitude	Vibration level
Major	Above or equal to 10 mm/s PPV
Moderate	Above or equal to SOAEL and below 10 mm/s PPV
Minor	Above or equal to LOAEL and below SOAEL
Negligible	Below LOAEL

3.34 Construction vibration shall constitute a likely significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:

1) 10 or more days or nights in any 15 consecutive days or nights; or
2) a total number of days exceeding 40 in any 6 consecutive months.

NOTE The duration timescales are used to retain consistency with those used in the construction noise assessment.

3.35 The following shall be reported in the environmental assessment:

1) data sources used;

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2) assumptions applied during use of data;
3) vibration levels at source - in line with the methodology provided in BS 5228-2 [Ref 6.N];
4) the risk of any inaccuracies or errors within the data, or any modifications or assumptions made, leading to the assessment drawing incorrect conclusions;
5) locations of vibration sources and vibration sensitive receptors;
6) the risk of structural damage due to construction vibration, with reference to criteria set out in BS 7385-2 [Ref 13.N].

NOTE 1 Instruction on allowing for uncertainty in Environmental Impact Assessment is provided in LA 104 [Ref 12.N].

NOTE 2 Human response to vibration occurs at much lower vibration levels than would be required to cause damage to buildings.

Design and mitigation

3.36 Two types of construction vibration mitigation shall be incorporated into the design of the construction of the project as follows:

1) best practice vibration mitigation techniques to minimise the generation and impact of vibration applied to all construction activities;
2) specific vibration mitigation measures to reduce the vibration impact from activities which result in major or moderate impacts.

3.36.1 Best practice should include the following measures:

1) selection of construction method and plant to minimise vibration generated;
2) training of site personnel to raise awareness of vibration and nearby vibration sensitive receptors;
3) provision of information to the public on expected construction vibration, including duration, especially to those likely to be exposed to moderate and major impacts.

NOTE Examples of best practice construction vibration techniques are presented in the following references:

1) best practicable means as defined in BS 5228-2 [Ref 6.N];
2) guidance presented in BS 5228-2 [Ref 6.N];
3) information within industry specific schemes such as Considerate Constructors Scheme Best Practice Hub Considerate Contractor (Website) [Ref 1.I].

3.37 The implications of the use of specific mitigation measures on cost and construction timescales shall be determined and provided to the Overseeing Organisation.

3.37.1 Specific vibration mitigation measures may include:

1) restrictions on construction method to reduce vibration;
2) restrictions of some activities to less sensitive times, for example, restricting piling activity to the daytime only;
3) temporarily rehousing local residents.

3.38 Specific vibration mitigation measures shall only be included within the project if they are practicable as defined in BS 5228-2 [Ref 6.N].

3.39 Where a specific mitigation measure is not practicable as defined in BS 5228-2 [Ref 6.N], the measure shall not be included within the project design for the purposes of the construction vibration assessment.

NOTE Advice relating to the practicality of specific mitigation measures can be sought from project sponsors and or those responsible for determining the construction methodology for the project.

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3.40 Specific vibration mitigation measures shall be listed in the assessment and included within the construction part of the environmental management plan (EMP) for the project.

Operational noise assessment

Scoping

3.41 The scoping assessment shall report on the following scoping assessment questions to gain an understanding of the need to undertake a further noise assessment:

1) is the project likely to cause a change in the BNL of 1dB $L_{A10,18hr}$ in the do-minimum opening year (DMOY) compared to the do-something opening year (DSOY)?;
2) is the project likely to cause a change in the BNL of 3dB $L_{A10,18hr}$ in the do-something future year (DSFY) compared to the DMOY?;
3) does the project involve the construction of new road links within 600m of noise sensitive receptors?;
4) would there be a reasonable stakeholder expectation that an assessment would be undertaken?

NOTE *An example of reasonable stakeholder expectation that an operational noise assessment would be required is where works involve changes to infrastructure but are not expected to give rise to significant environment effect, such as smart motorway projects.*

3.42 Where the response to one or more of the scoping assessment questions is 'yes', the scoping assessment shall make a recommendation on the scope of further assessment.

3.43 Scoping assessments shall be based on available information.

Study area

3.44 Where the need for further assessment has been established, an operational study area shall be defined within the scoping assessment to include:

1) noise sensitive receptors that are potentially affected by operational noise changes generated by the project, either on the route of the project or other roads not physically changed by the project;
2) noise sensitive receptors in areas where there is a reasonable stakeholder expectation that noise assessment is undertaken.

NOTE 1 *An operational study area defined as the following can be sufficient for most projects, but it can be reduced or extended to ensure it is proportionate to the risk of likely significant effects:*

1) the area within 600m of new road links or road links physically changed or bypassed by the project;
2) the area within 50m of other road links with potential to experience a short term BNL change of more than 1.0dB(A) as a result of the project.

NOTE 2 *Variations in the study area can be defined for individual projects.*

Baseline

3.45 The operational noise baseline shall be determined from do-minimum noise levels in each assessment year.

3.45.1 Noise monitoring should be used to inform baseline noise modelling results and to provide data for public consultation purposes.

NOTE *Validation of baseline can be undertaken by comparing modelled noise levels to measured noise levels, using corrections to take account of expected changes in traffic levels between the date of monitoring and the date of the baseline.*

3.46 Where noise monitoring is undertaken, it shall follow the procedures set out in BS 7445-1 [Ref 9.N].

3.47 Noise monitoring data shall only be valid when it is undertaken during periods when:

1) wind speed is less than 5m/s;

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2) there is no precipitation and road surfaces are dry.

3.48 Noise equipment used for monitoring shall be class 1 following the specification in IEC 61672 [Ref 11.N].

Determining significance

3.49 LOAELs and SOAELs shall be set for all noise sensitive receptors within the study area, for time periods when they are in use.

NOTE For example, schools are typically not in use at night when they are closed, so only daytime LOAELs and SOAELs are required to be set for typical schools.

3.49.1 LOAELs and SOAELs should be set out in accordance with Table 3.49.1 for all noise sensitive receptors:

Table 3.49.1 Operational noise LOAELs and SOAELs for all receptors

Time Period	LOAEL	SOAEL
Day (06:00-24:00)	55dB $L_{A10,18hr}$ facade	68dB $L_{A10,18hr}$ facade
Night (23:00-07:00)	40dB $L_{night,\ outside}$ (free-field)	55dB $L_{night,\ outside}$ (free-field)

3.50 LOAELs and SOAELs shall be modified where it is proportionate and merited by local circumstances which can include, but are not limited to:

1) noise sensitive receptors that have reduced sensitivity to noise or vibration e.g., sensitivity to noise is reduced if receptors have good noise insulation;
2) noise sensitive receptors that have an increased sensitivity to noise or vibration e.g., if a building is regularly used by people with hearing impairments, it is likely to be more sensitive to the users, as noise affects speech intelligibility at lower levels than it would for those with non-impaired hearing.

NOTE 1 Modification can be proportionate where it has the potential to change the assessment of likely significant effects.

NOTE 2 Examples of receptors with good noise insulation can include properties that have been included within Highway Authority insulation schemes, or newer properties that have noise insulation to reduce road noise incorporated into their design (evidence to support the latter can be found in planning application documents for developments).

3.51 Noise change due to the project shall be determined at noise sensitive receptors within the study area, during the periods for which LOAELs and SOAELs have been set, for:

1) Short term: DMOY compared against the DSOY;
2) Long-term: DMOY compared against the DSFY;
3) Non-project noise change: do-minimum future year (DMFY) compared against the DMOY.

3.51.1 Noise level changes may be determined through:

1) calculation of noise levels at each individual noise sensitive receptor; or
2) calculation of noise levels at a sample of noise sensitive receptors representative of all noise sensitive receptors.

3.51.2 Noise level changes may be determined by:

1) comparing noise levels calculated at noise sensitive receptors using CRTN [Ref 3.N] calculations as modified by Appendix A;
2) Comparing of BNL change of road links using the methodology in Appendix A.

NOTE 1 CRTN [Ref 3.N] calculations of noise levels change at noise sensitive receptors are likely to be required within 600m of new road links or roads physically changed by the project.

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NOTE 2 *Calculations of BNL change are likely to be required for noise sensitive receptors not covered by calculations of noise level change, and within 50m of road links where noise levels change by 1dB(A) in the short term or 3dB(A) in the long term.*

NOTE 3 *Where BNL changes show likely significant effects for noise sensitive receptors along road links, it can be appropriate to extend CRTN [Ref 3.N] calculations to include these road links.*

3.52 Traffic data used for noise calculations shall be subject to the speed pivoting process set out in Appendix A.

NOTE *The speed pivoting process is normally undertaken by traffic engineers who are responsible for preparing traffic models for road projects.*

3.53 Where the noise sensitive receptor is a building, the facade used to calculate noise change shall be chosen as follows:

1) the facade with the greatest magnitude of noise change;
2) where the greatest magnitude of noise change is equal on more than one facade, the facade experiencing the greatest magnitude of noise change and highest do-something noise level.

NOTE *The greatest magnitude of change is likely to occur on the facade facing the new or changed stretch of road, or facades facing road links leading directly to major junctions, but this is not always the case, particularly at buildings close to junctions.*

3.54 The magnitude of change shall be defined in accordance with Table 3.54a for short term and Table 3.54b for long term:

Table 3.54a Magnitude of change - short term

Short term magnitude	**Short term noise change (dB $L_{A10,18hr}$ or L_{night})**
Major	Greater than or equal to 5.0
Moderate	3.0 to 4.9
Minor	1.0 to 2.9
Negligible	less than 1.0

Table 3.54b Magnitude of change - long term

Long term magnitude	**Long term noise change (dB $L_{A10,18hr}$ or L_{night})**
Major	Greater than or equal to 10.0
Moderate	5.0 to 9.9
Minor	3.0 to 4.9
Negligible	less than 3.0

3.55 A summary of noise level changes shall be presented as Table 3.55a and 3.55b.

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Table 3.55a Operational noise reporting table for noise assessment - short-term

Project:					
Scenario/Comparison:					
		Daytime		Night-time	
Change in noise level dB(A)		Number of dwellings	Number of other noise sensitive receptors	Number of dwellings	Number of other noise sensitive receptors
Increase in noise level dB $L_{A10,18hr}$ / L_{night}	<1.0				
	1.0 - 2.9				
	3 - 4.9				
	>5				
No Change	0				
Decrease in noise level dB $L_{A10,18hr}$ / L_{night}	<1.0				
	1.0 - 2.9				
	3 - 4.9				
	>5				

Table 3.55b Operational noise reporting table for noise assessment - long-term

Project:					
Scenario/Comparison:					
		Daytime		Night-time	
Change in noise level		Number of dwellings	Number of other noise sensitive receptors	Number of dwellings	Number of other noise sensitive receptors
Increase in noise level dB $L_{A10,18hr}$ / L_{night}	<3				
	3.0 - 4.9				
	5 - 9.9				
	>10+				
No Change	0				
Decrease in noise level dB $L_{A10,18hr}$ / L_{night}	<3				
	3.0 - 4.9				
	5 - 9.9				
	>10+				

3.56 Noise level changes at each noise sensitive receptor within the study area (including any BNL calculations) shall be reported.

3.56.1 Noise level changes should be reported using one or more of the following methods:

1) tables of results;
2) noise contour maps;
3) other mapping methods, for example, assigning colours to noise sensitive receptors.

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3.57 It shall be determined whether the operational noise changes constitute a likely significant effect on noise sensitive buildings as defined by the 2014/52/EU [Ref 1.N].

3.58 The initial assessment of likely significant effect on noise sensitive buildings shall be determined using Table 3.58.

Table 3.58 Initial assessment of operational noise significance

Significance	Short term magnitude of change
Significant	Major
Significant	Moderate
Not significant	Minor
Not significant	Negligible

3.59 Where the magnitude of change in the short term is negligible at noise sensitive buildings, it shall be concluded that the noise change will not cause changes to behaviour or response to noise and as such, will not give rise to a likely significant effect.

3.60 For noise sensitive receptors where the magnitude of change in the short term is minor, moderate or major at noise sensitive buildings, Table 3.60 shall be used, together with the output of Table 3.58 to determine final significance.

Table 3.60 Determining final operational significance on noise sensitive buildngs

Local circumstance	Influence on significance judgement
Noise level change (is the magnitude of change close to the minor/moderate boundary?)	1) Noise level changes within 1 dB of the top of the 'minor' range can indicate that it is more appropriate to determine a likely significant effect. Noise level changes within 1 dB of the bottom of a 'moderate' range can indicate that it is more appropriate to consider a change is not a likely significant effect.
Differing magnitude of impact in the long term to magnitude of impact in the short term	1) Where the long term impact is predicted to be greater than the short term impact, it can be appropriate to conclude that a minor change in the short term is a likely significant effect. Where the long term impact is predicted to be less than the short term it can be appropriate to conclude that a moderate or major change in the short term is not significant. 2) A similar change in the long term and non-project noise change can indicate that the change is not due to the project and not an indication of a likely significant effect.

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Table 3.60 Determining final operational significance on noise sensitive buildngs (continued)

Local circumstance	Influence on significance judgement
Absolute noise level with reference to LOAEL and SOAEL (by design this includes sensitivity of receptor)	1) A noise change where all do-something absolute noise levels are below SOAEL requires no modification of the initial assessment. 2) Where any do-something absolute noise levels are above the SOAEL, a noise change in the short term of 1.0dB or over results in a likely significant effect.
Location of noise sensitive parts of a receptor	1) If the sensitive parts of a receptor are protected from the noise source, it can be appropriate to conclude a moderate or major magnitude change in the short term and/or long term is not a likely significant effect. 2) Conversely, if the sensitive parts of the receptor are exposed to the noise source, it can be more appropriate to conclude a minor change in the short term and/or long term is a likely significant effect. 3) It is only necessary to look in detail at individual receptors in terms of this circumstance where the decision on whether the noise change gives rise to a significant environmental effect is marginal.
Acoustic context	1) If a project changes the acoustic character of an area, it can be appropriate to conclude a minor magnitude of change in the short term and/or long term is a likely significant effect.
Likely perception of change by residents	1) If the project results in obvious changes to the landscape or setting of a receptor, it is likely that noise level changes will be more acutely perceived by the noise sensitive receptors. In these cases it can be appropriate to conclude that a minor change in the short term and/or long term is a likely significant effect. 2) Conversely, if the project results in no obvious changes for the landscape, particularly if the road is not visible from the receptor, it can be appropriate to conclude that a moderate change in the short term and/or long term is not a likely significant effect.

NOTE 1 *In relation to the location of sensitive parts of the receptor, an example of a situation where sensitive parts of a receptor would be protected from the noise source would include a house with no, or very*

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few, windows of sensitive rooms facing the road, and its outdoor spaces are protected from the road by buildings.

NOTE 2 *In relation to the location of sensitive parts of the receptor, an example of a situation where sensitive parts of a receptor would be exposed to the noise source would include a house with most windows of sensitive rooms facing the road, and/or outdoor spaces facing the road.*

3.61 The number of properties affected shall not be used to justify change between the initial operational significance and the final operational significance.

3.62 The following shall be reported in the assessment:

1) data sources used;
2) assumptions applied during use of data;
3) the risk of any inaccuracies or errors within the data, or any modifications or assumptions made, leading to the assessment drawing incorrect conclusions; and
4) locations of noise sources and noise sensitive receptors.

3.63 The assessment report shall include justification for determination of significance for each noise sensitive receptor in the study area.

3.63.1 Presentation of the conclusions to determine likely significant effects on noise sensitive receptors should:

1) be succinct;
2) be grouped to aid presentation; and,
3) present clear justification if likely significant effect exists.

NOTE *There are many options for grouping noise sensitive receptors to aid presentation, these can include location, setting, similarity of noise change or other criteria.*

Operational noise management

3.64 Any mitigation measure that has the potential to mitigate or manage existing operational noise, and/or operational noise generated by a project, within a project area, shall be identified and reported within the assessment.

3.64.1 Measures to mitigate and manage operational noise may include, but are not limited to:

1) vertical or horizontal alignment of the road;
2) earth bunds to act as a noise barrier;
3) noise barriers;
4) low noise road surfacing;
5) speed limits;
6) restrictions on noisy vehicle types.

NOTE *Speed limits or restrictions on noisy vehicle types are not normally practical for use on motorways and all purpose trunk roads, as they can encourage drivers to take alternative routes, which can be less safe and result in higher noise levels for populations along the alternative routes.*

3.65 The suitability of each potential mitigation measure for use within the project area shall be determined based on the following criteria:

1) for residential noise receptors only, a comparison of the monetised noise benefit of a mitigation measure against the cost of the measure over the anticipated design life of the project;
2) the likely perceived benefit of the measure at any noise sensitive receptors;
3) the benefit of a measure in terms of elimination of likely significant effects;

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4) practicality of the measure, for example, in terms of safety considerations and engineering constraints;
5) the impact of the measure across other environmental factors, for example the visual impact of a noise barrier.

NOTE *Information received at project consultation events can help to determine the likely perceived benefit of a potential mitigation measure.*

3.65.1 The cost of mitigation measures should be determined with reference to previously installed similar measures, and include costs of installation and maintenance through its life.

3.65.2 Where the life of a mitigation measure is shorter than the assessment period, costs for replacement at the relevant intervals should be included.

3.65.3 Detailed analysis of all of the criteria should only be undertaken where it is considered that that a mitigation measure has the potential to be suitable based on all of the criteria.

NOTE *For example, where it was determined at the outset that a barrier would not be practical as there was insufficient space, there would be no requirement to undertake detailed analysis on other criteria such as value for money.*

3.66 Mitigation measures that are deemed suitable for use shall be included within the project design.

3.67 The insertion loss for each noise barrier included within the project shall be reported.

3.68 Individual noise barriers included within the project shall be designated as either:

1) reflective, where there is no potential for increased noise levels at any noise sensitive receptors due to reflections of noise from the road facing surfaces of the barrier; or
2) absorptive, where there is potential for increased noise levels at any noise sensitive receptors due to reflections of noise from the road facing surfaces of the barrier.

3.69 Where barriers included within the project are required to be absorptive, each of the absorptive barriers shall be designated as either:

1) a single barrier, where there are barriers on one side of the road; or
2) a parallel barrier, where there are barriers on both sides of the road.

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4. Monitoring and evaluation

Construction

4.1 Likely significant environmental effects from noise and/or vibration during construction shall be monitored.

4.1.1 Monitoring of likely significant effects should include one or more of the following:

1) verification that specific noise and vibration mitigation measures are in place for activities where there is potential for likely significant effects to occur in their absence;
2) measurement of noise and/or vibration;
3) checking that noise and vibration management procedures and practices are sufficient to ensure that adverse effects are no worse than set out in the assessment report.

Operation phase

4.2 Likely significant environmental effects from noise during operation shall be monitored and include:

1) ensuring mitigation measures included with the project design are incorporated with the as-built project. Where they are not included, ensuring resultant noise levels, taking account of any additional mitigation installed but not included in the assessed design, are no higher than set out in the project assessment;
2) ensuring specifications of noise mitigation measures, including barriers and low noise surfaces, meet design specifications.

NOTE *Post construction noise monitoring cannot provide a reliable gauge for whether the predicted magnitude and extent of operational adverse impacts are greater or less than those predicted in the assessment, this is due to the following reasons:*

1) the assessment is based on annual average conditions with and without the project to ensure a like-for-like comparison, which is not possible to replicate through monitoring within a reasonable timescales;
2) monitoring in the absence of the project would need to be completed before the start of the construction works, and would therefore be a number of years before the with-scheme monitoring and the assessment completed for the environmental statement is based on calculated road traffic noise levels, whereas ambient noise monitoring can be affected by other noise sources such as people, agricultural activities, military activities, aircraft etc.

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5. Normative references

The following documents, in whole or in part, are normative references for this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Ref 1.N	2014/52/EU, 'Assessment of the effects of certain public and private projects on the environment'
Ref 2.N	Highways England. LA 108, 'Biodiversity'
Ref 3.N	HMSO. Department of Transport and Welsh Office. CRTN, 'Calculation of Road Traffic Noise '
Ref 4.N	Transport Research Laboratory. Abbott, P.G. TRL PR/SE/611/99, 'Calculation of road traffic noise - Extending the range of propagation.'
Ref 5.N	BSI. BS 5228-1, 'Code of practice for noise and vibration control on construction and open sites - Part 1: Noise'
Ref 6.N	BSI. BS 5228-2, 'Code of practice for noise and vibration control on construction and open sites. Vibration '
Ref 7.N	Transport Research Laboratory. P G Abbott and P M Nelson. TRL PR/SE/451/02, 'Converting the UK traffic noise index LA10,18h to EU noise indices for noise mapping'
Ref 8.N	Highways England. LA 106, 'Cultural heritage assessment'
Ref 9.N	BSI. BS 7445-1, 'Description and measurement of environmental noise. Guide to quantities and procedures'
Ref 10.N	2002/49/EC, 'Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise - Declaration by the Commission in the Conciliation Committee on the Directive relating to the assessment and management of environmental noise'
Ref 11.N	International Electrotechnical Commission . International Electrotechnical Commission. IEC 61672, 'Electroacoustics - Sound level meters - Part 1: Specifications'
Ref 12.N	Highways England. LA 104, 'Environmental assessment and monitoring'
Ref 13.N	BSI. BS 7385-2, 'Evaluation and measurement for vibration in buildings' - Part 2: Guide to damage levels from groundborne vibration'
Ref 14.N	Highways England. LA 101, 'Introduction to environmental assessment'
Ref 15.N	Highways England. GG 101, 'Introduction to the Design Manual for Roads and Bridges'
Ref 16.N	Highways England. LA 107, 'Landscape and visual effects'
Ref 17.N	Highways England. LA 112, 'Population and human health'
Ref 18.N	Highways England. LA 103, 'Scoping projects for environmental assessment'
Ref 19.N	Highways England. LA 102, 'Screening projects for Environmental Impact Assessment'

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6. Informative references

The following documents are informative references for this document and provide supporting information.

Ref 1.I	Considerate Constructors Scheme. Considerate Contractor (Website), 'Considerate Constructors Scheme Best Practice Hub ccsbestpractice.org.uk'

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Appendix A. Operation noise calculations

A1 BNL Calculations

BNL calculations are undertaken by using traffic flow, speed and HGV percentage to calculate a reference noise emission from the road link, as set out in CRTN [Ref 3.N].

A2 CRTN Modifications

Modifications to CRTN [Ref 3.N] methodology are listed as follows:

1) adopt dual source lines for all dual carriageways;
2) include reflection and screening of barriers located in the central reservation within the noise model if they equal to or more than 1.5m in height;
3) classify all vehicles with an unladen weight of less than 3.5 tonnes as light vehicles, and all vehicles with an unladen weight of greater than 3.5 tonnes as heavy vehicles;
4) use pivoted speeds, as defined below, for road links within the noise model.
5) for thin surfacing with speeds of greater than 75km/h, adopt a surface correction of the RSI, or if RSI data is not available assume an upper limit correction of -3.5dB;
6) Where speed changes from below or equal to 75km/h to above 75km/h (or vice versa) do not occur:
   a) for hot rolled asphalt surfaces, a correction of -0.5dB should be used for speeds greater than 75km/h;
   b) for brushed concrete surfacing, with speeds greater than 75km/h adopt a surface correction of: +3.5dB;
   c) for all roads with speeds of less than or equal to 75 km/h, adopt a surface correction of -1.0 dB for all surfaces;
7) Where speed changes from below or equal to 75km/h to above 75km/h (or vice versa) do occur:
   a) where the speed change is less than 15 km/h, adopt surface correction set out in modification 8 based on the DM speed in both scenarios;
   b) where the speed change is more than 15km/h, adopt the surface correction set out in modification 8 based on the speed for each scenario;
8) for roads with mixed surfaces, apply the surface correction applicable to the surface type covering the largest proportion of the road, or if two surface types cover equal proportions of the road, apply the surface correction that results in the highest magnitude of change;
9) use the equations set out in Charts 7 and 8 of CRTN [Ref 3.N] to calculate noise to a distance of 600m TRL PR/SE/611/99 [Ref 4.N] from the road. Assume distance attenuation of 3dB per doubling of distance for distances in excess of 600m;
10) where purpose built noise barriers are classed as absorptive, a reflection correction is not needed;
11) apply correction for reflection effects from opposite facades when the horizontal distance between the calculation point and the nearside kerb (d) and the horizontal distance between the source line and the opposite facade (D) meet either of the following conditions, with reference to the limits of application set out in CRTN paragraph 26.2:
   a) d < 12m and D <= 20m;
   b) 12m<d<=300m and D<=$10^{(0.825+0.4\log(d+3.5))}$.

Best available information should be used to determine where existing barriers are absorptive or reflective for the purposes of CRTN calculations.

TRL research TRL PR/SE/451/02 [Ref 7.N] provides methods to convert $L_{A10,18hr}$ to other indices. 'Method 1' requires hourly traffic flows but gives reliable results. TRL 'Method 2' has been shown in some circumstances to give large step changes and thus unreliable results.

TRL 'Method 3' provides reliable results for most UK roads. Exceptions to this can include roads where the proportion of night time traffic to day time traffic is atypical, which can occur on roads serving facilities that operate 24 hours per day, for example airports or ports.

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If TRL Method 3 is used with do-something traffic data on congestion relief projects, it has the potential to over predict increases in night-time traffic.

A3 Speed pivoting process

Speed pivoting ensures that modelled speeds from the the traffic model are consistent with observed speeds. The process can be applicable to all roads within the operational noise study area, and is implemented by the project's traffic modelling team.

The implementation of speed pivoting process should be proportionate to the stage of the assessment, e.g. it is not necessary to undertake the full speed pivoting process at early stages of a scheme, particularly where the traffic models are likely to be updated.

The speed pivoting process is set out as follows:

1) observed vehicle speeds at a link level are obtained for the traffic model base year from data sets such as TrafficMaster, GPS, mobile phone data, etc;
2) the observed speed is divided by the modelled speeds for the time period(s) considered by the noise assessment, to generate the speed pivot factor.
3) modelled link speeds in each assessment scenario are multiplied by the speed pivot factor;
4) apply pivot factor.

Where observed speeds are not available for individual links and/or particular time periods, the speed pivot factor can be estimated using the following information: the speed pivoting performance on adjacent links, the speed pivoting performance on roads with similar characteristics either in the local area or across the study area e.g. motorways, urban centre roads, single carriageways, rural roads.

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Sustainability & Environment
Appraisal

LA 111
England National Application Annex to LA 111 Noise and vibration

(formerly HD 213/11, IAN 185/15)

Revision 0

Summary
This National Application Annex sets out the Highways England specific requirements for noise and vibration.

Feedback and Enquiries
Users of this document are encouraged to raise any enquiries and/or provide feedback on the content and usage of this document to the dedicated Highways England team. The email address for all enquiries and feedback is: Standards_Enquiries@highwaysengland.co.uk

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Release notes

Version	Date	Details of amendments
0	Nov 2019	Highways England National Application Annex to LA 111.

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Foreword

Publishing information

This document is published by Highways England.

This document supersedes HD 213/11 and IAN 185/15, which are withdrawn.

Contractual and legal considerations

This document forms part of the works specification. It does not purport to include all the necessary provisions of a contract. Users are responsible for applying all appropriate documents applicable to their contract.

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Introduction

This National Application Annex sets out the Highways England specific requirements relating to the compliance with the National Networks National Policy Statement NN NPS 2014 [Ref 3.N] and the Noise Insulation Regulations [Ref 5.N] which are reported as part of the environmental assessment of noise and vibration.

Assumptions made in the preparation of this document

The assumptions made in GG 101 [Ref 2.N] apply to this document.

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Abbreviations

Abbreviations

Abbreviation	Definition
LOAEL	Lowest observed adverse effect level
NN-NPS	National Policy Statement for National Networks
NPPF	National Planning Policy Framework
NPSE	Noise Policy Statement for England
SOAEL	Significant observed adverse effect level

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Terms and definitions

Terms and defintions

Term	Definition
Indicative forecast eligibility	Dwellings where changes in noise levels due to a project are forecast to result in eligibility under the Noise Insulation Regulations [Ref 5.N], that apply 1 year after the opening of a project.
Lowest observed adverse effect level	Level above which adverse effects on health and quality of life can be detected.
Noise Important Areas	Important Areas identified in the NAP(Roads) [Ref 4.N] as at risk of experiencing a significant adverse impact to health and quality of life as a result of their exposure to road traffic noise.
Significant observed adverse effect level	The level above which significant adverse effects on health and quality of life occur.

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E/1. English noise policy

E/1.1 The requirements within this National Application Annex shall apply to all projects, irrespective of the planning route.

E/1.2 The environmental assessment shall determine compliance with the relevant sections of the Noise Policy Statement for England (NPSE) NPS(E) [Ref 6.N], National Planning Policy Framework (NPPF) NPPF [Ref 1.N] and the Government's associated planning guidance on noise.

E/1.3 The environmental assessment shall report against the three aims within the National Policy Statement for National Networks (NN-NPS) NN NPS 2014 [Ref 3.N] (presented in the Table E/1.3), and demonstrate the actions taken to support delivery of each aim.

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Table E/1.3 NN-NPS Aims and associated actions

NN-NPS Aim	Action	Action applicable to all three aims
Aim 1: Avoid significant adverse impacts on health and quality of life from noise as a result of the new development. NOTE: Significant adverse noise effects occur when noise levels are above SOAEL.	1) For each receptor or group of receptors, set out the mitigation measures used to reduce noise exposure to below SOAEL; 2) Where project noise levels are not predicted to be below the SOAEL, report the reasons why noise levels could not be reduced below the SOAEL, in terms of Government policy on sustainable development.	Mitigation measures include the following: 1) measures incorporated into a project to reduce overall environmental impact, which can include, but are not limited to: project alignment, project design; and, 2) measures used solely to mitigate noise, which can include, but are not limited to, noise barriers, restrictions on the use of plant during the construction phase, or quieter road surfaces.
Aim 2: Mitigate and minimise other adverse impacts on health and quality of life from noise from the new development. NOTE: Other adverse impacts occur when noise levels are between LOAEL and SOAEL.	1) Set out measures used to mitigate and minimise other adverse impacts for all receptors or groups of receptors where project noise levels are above LOAEL; 2) Where project noise levels are not predicted to be below the LOAEL, report the reasons why noise levels could not be reduced below the LOAEL, in terms of Government policy on sustainable development.	
Aim 3: Contribute to improvements to health and quality of life through the effective management and control of noise, where possible. NOTE: Applies to all noise levels.	1) Set out mitigation measures used to improve the noise environment. 2) Where it has not been possible to contribute to improvements to health and quality of life through management of project noise levels, report the reasons why it is not possible in terms of Government policy on sustainable development.	

NOTE 1 *It is not normally possible to contribute to improvements to health and quality of life during a construction phase.*

NOTE 2 *NN-NPS states that the Secretary of State "....should not grant development consent unless satisfied that the proposals will meet the three aims [set out in requirement E/1.1], within the context of Government policy on sustainable development".*

E/1.4 The environmental assessment report shall include a list of noise mitigation that the project will deliver in Noise Important Areas.

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E/2. Noise Insulation Regulations

E/2.1 The environmental assessment shall report on the properties which are forecast to be eligible for insulation under the Noise Insulation Regulations [Ref 5.N].

E/2.1.1 An assessment of indicative forecast eligibility may be undertaken at options identification stage where routes pass through urban areas.

NOTE *The assessment of indicative forecast eligibility sets out which buildings are forecast to be eligible for either statutory or discretionary noise insulation, and in urban areas it can be appropriate to complete this at an early project stage to estimate costs of insulation, if there is potential for it to be required for large numbers of dwellings.*

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E/3. Normative references

The following documents, in whole or in part, are normative references for this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Ref 1.N	Department of Housing. NPPF, 'Communities and Local Government: National Planning Policy Framework'
Ref 2.N	Highways England. GG 101, 'Introduction to the Design Manual for Roads and Bridges'
Ref 3.N	NN NPS, 'National Networks National Policy Statement (NN NPS)' , 2014
Ref 4.N	Defra. NAP(Roads), 'Noise Action Plan: Roads'
Ref 5.N	Noise Insulation Regulations, 'Noise Insulation Regulations 1975, as amended 1988'
Ref 6.N	Defra. NPS(E), 'Noise Policy Statement for England'

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Department for Infrastructure
An Roinn Bonneagair

Sustainability & Environment
Appraisal

LA 111
Northern Ireland National Application Annex to LA 111 Noise and vibration

(formerly HD 213/11, IAN 185/15)

Revision 0

Summary
There are no specific requirements for Department for Infrastructure, Northern Ireland supplementary or alternative to those given in LA 111.

Feedback and Enquiries
Users of this document are encouraged to raise any enquiries and/or provide feedback on the content and usage of this document to the dedicated team in the Department for Infrastructure, Northern Ireland. The email address for all enquiries and feedback is: dcu@infrastructure-ni.gov.uk

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Release notes

Version	Date	Details of amendments
0	Nov 2019	Department for Infrastructure Northern Ireland National Application Annex to LA 111.

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Sustainability & Environment
Appraisal

LA 111
Scotland National Application Annex to LA 111 Noise and vibration

(formerly HD 213/11 and IAN 185/15)

Revision 0

Summary
This National Application Annex sets out Transport Scotland specific requirements for noise and vibration.

Feedback and Enquiries
Users of this document are encouraged to raise any enquiries and/or provide feedback on the content and usage of this document to the dedicated Transport Scotland team. The email address for all enquiries and feedback is: TSStandardsBranch@transport.gov.scot

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Release notes

Version	Date	Details of amendments
0	Nov 2019	Transport Scotland National Application Annex to LA 111.

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Foreword

Publishing information

This document is published by Highways England on behalf of Transport Scotland.

This document supersedes HD 213/11 and IAN 185/15, which are withdrawn.

Contractual and legal considerations

This document forms part of the works specification. It does not purport to include all the necessary provisions of a contract. Users are responsible for applying all appropriate documents applicable to their contract.

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Introduction

Background

This National Application Annex sets out Transport Scotland specific requirements for noise and vibration.

Assumptions made in the preparation of this document

The assumptions made in GG 101 [Ref 1.N] apply to this document.

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S/1. Applicability of this document

S/1.1 Transport Scotland shall be contacted for the application of LA 111 in Scotland.

NOTE *The email address is:TSStandardsBranch@transport.gov.scot.*

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S/2. Normative references

The following documents, in whole or in part, are normative references for this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Ref 1.N	Highways England. GG 101, 'Introduction to the Design Manual for Roads and Bridges'

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Llywodraeth Cymru
Welsh Government

Sustainability & Environment
Appraisal

LA 111
Wales National Application Annex to LA 111 Noise and vibration

(formerly HD 213/11, IAN 185/15)

Revision 1

Summary
This National Application Annex contains the Welsh Government specific requirements related to noise and vibration.

Feedback and Enquiries
Users of this document are encouraged to raise any enquiries and/or provide feedback on the content and usage of this document to the dedicated Welsh Government team. The email address for all enquiries and feedback is: Standards_Feedback_and_Enquiries@gov.wales

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Release notes

Version	Date	Details of amendments
1	Feb 2020	Revision 1 (February 2020) Creation of clause W/1.1 to contact Welsh Government for requirements related to noise and vibration. Revision 0 (November 2019) Welsh Government National Application Annex to LA 111.

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Foreword

This document is published by Highways England on behalf of the Welsh Government.

This document supersedes HD 213/11 and IAN 185/15, which are withdrawn.

Contractual and legal considerations

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Introduction

Background

This National Application Annex sets out Welsh Government specific requirements for noise and vibration.

Assumptions made in the preparation of this document

The assumptions made in GG 101 [Ref 1.N] apply to this document.

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W/1. Applicability of this document

W/1.1 Welsh Government shall be contacted for the application of LA 111 in Wales.

NOTE *The email address is: standards_feedback_and_enquiries@gov.wales*

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W/2. Normative references

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