Development manual planning scheme policy (PSP)
SC6.4.19 Noise and vibration

Index

SC6.4.19.1 Introduction

(1) Purpose

The purpose of this section is to:

(a) provide information to developers and other related parties for use during the planning, construction, and operational stages of a development;

(b) provide guidance on preparing a noise or vibration impact assessment report; and

(c) ensure that development is managed in a way which prevents nuisance from the effects of noise and vibration on the health, community well-being and quality of life of an individual or the community, and wildlife.

(2) Terminology

Unless noted otherwise all terms have the same meaning as given in the most recent version of the *Environmental Protection Act 1994*, the E*nvironmental Protection Regulation 2019*, the *Environmental Protection (Noise) Policy 2019* and the relevant standards. If a definition given in the relevant standards is inconsistent with the Act or Regulation, the Act or Regulation prevails to the extent of the inconsistency.

Background creep	A progressive increase in background noise levels due to new noise generatingactivities locating in an area.

(3) References and source documents:

Reference and source documents that must be read in conjunction with this section are as follow:

(a) Australian Standards:

AS1055.2	*Acoustics – Description and measurement of environmental noise – Part 2: Application to specific situations.*
AS2107	*Acoustics – Recommended design sound levels and reverberation times for building interiors.*

(b) Austroads:

AP-R277/05	*Modelling, Measuring and Mitigating Road Traffic Noise Guide to Road Design Part 6B: Roadside Environment.*

(c) Queensland Authorities and Legislation:

Department of Transport and Main Roads	*Development on land affected by environmental emissions from transport*
Department of Transport and Main Roads	*Road Traffic Noise Management: Code of Practice*

Department of Transport and Main Roads, *MRTS15 - Noise Fences*

Department of Communities, Housing and Digital Economy	*Queensland Development Code MP Part 4.4 – Buildings in a Transport Noise Corridor*
Department of Environment and Science	*Noise Measurement Manual 2020*
Department of Environment and Science	*Environmental Protection (Noise) Policy 2019* (EPP Noise)

SC6.4.19.2 Noise and vibration – definition

Noise is often described as unwanted sound and, by its very nature, can cause varying degrees of nuisance. Some sounds are considered to be annoying by some people but not by others. However, in general, the louder the sound, the greater the annoyance or nuisance caused.

The nature and character of a sound, even at low levels, may also cause annoyance. Sound can have a number of characteristics and can be described in many ways. It is not possible to fully categorise every form of sound.

However, this policy is intended to provide guidance for the majority of commonly experienced sounds. "Noise" has become synonymous with "sound" in common language. In this policy, noise will generally mean sound.

Furthermore, sound is defined in Queensland legislation to include vibration and therefore levels of acceptable vibration are also included.

SC6.4.19.3 Development assessment

Preventing noise problems is always better than attempting to rectify noise impacts after the development and trying to resolve problems may not be always possible and can be costly. The management hierarchy under the *Environment Protection (Noise) Policy 2019* (EPP Noise) is "to the extent that is reasonable to do so".

(1) Firstly – avoid; or

(2) Secondly – minimise; or

(3) Lastly – manage.

Council encourages development that is sympathetic to the amenity of a location and minimises the occurrence of background creep. Where proposed uses are likely to increase noise levels at a locality, or be affected by existing noise sources, a noise (and vibration) impact assessment may be required or requested by Council during the development application phase.

If the noise impact assessment report reveals that the proposed use or activity has the potential to create nuisance or exceed project noise trigger levels listed in this policy below, the application will need to demonstrate by way of a noise (and vibration) control plan how the environmental values (noise) will be enhanced or protected to meet the standard as part of any submission for an operational works permit, or a compliance permit.

SC6.4.19.4 Noise and vibration impact assessment

(1) Subdivision layouts

Subdivision layouts must be designed to ensure that setbacks for habitable structures are not less than 3m from the of acoustic mounds and acoustic fences over 1.8m.

In support of the assessment provisions specified in the Townsville City Plan, a noise (and/or vibration) impact assessment report is likely to be required in situations where:

(a) a new development is proposed that will create significant noise (e.g., new industry, or commercial premises with refrigeration, air conditioning or exhaust equipment); or

(b) a new noise sensitive development is proposed in an area where existing noise sources are present (e.g., an existing industrial site, or a future or existing major road, is located nearby); or

(c) a new development will generate a significant amount of traffic noise, i.e., traffic volumes increase by around 3000 vehicles per day or more (determined by a Traffic Study Assessment); or

(d) building work including rock breaking, drilling, or piling or other noisy activities are proposed; or

(e) it is reasonably required by Council in order to complete a proper assessment of the proposed development.

The assessments are to be undertaken by a suitably qualified and experienced acoustic practitioner (e.g., a member of the Australian Acoustical Society, the Institution of Engineers, the Association of Australian Acoustical Consultants, or a person with other appropriate professional qualifications).

(2) Noise impact assessment report

Information provided in an assessment report should include at least the following:

(a) Background:

(i) the name and qualifications or experience of the person(s) preparing the assessment;

(ii) the project description, including proposed or approved hours of operation; and

(iii) the relevant guideline or policy that has been applied.

(b) Noise impact assessment process

A noise impact assessment report is to describe the existing acoustic environment, present the future forecasted acoustic environment, assess impacts using direct comparisons to noise criteria and describe the noise impact control measures that will be applied by the development.

A noise impact assessment report is to contain the following information as relevant to the specific assessment, although there may be circumstances that warrant further content:

(i) description and location of sensitive uses, zones that may be affected by noise emissions from the development or description and location of existing noise emission sources if the development is a sensitive use;

(ii) description of, and justification for, the noise model and algorithms used to predict the propagation of noise from the noise sources relevant to the development;

(iii) noise model configuration and justification for the model configuration;

(iv) include a comprehensive and representative an inventory of all the proposed and existing noise emission sources relevant to the development;

(v) the sound power level or sound pressure level, how often it occurs, duration and operating times of each noise source;

(vi) the characteristics of each noise source, including low frequency, vibration, tonal or impulsive characteristics;

(vii) whether each noise source produces steady sound or non-steady sound;

(viii) model input data and the representativeness, accuracy and resolution of the input data, including noise source sound power levels, operating hours of each noise source, ground cover assumptions, topography assumptions, road gradient where relevant, reflections from buildings and acoustic fences and noise source and receiver heights;

(ix) methods and assumptions for calculating the effectiveness of noise impact control measures, including the predicted attenuation from shielding from buildings, acoustic fences, fences, walls, mounds or enclosures;

(x) details of noise model calibration method and results;

(xi) assumptions and uncertainties associated with the noise modelling;

(xii) noise modelling results for the relevant assessment period(s), including day (07:00 - 18:00), evening (18:00 - 22:00) and night (22:00 - 07:00) periods, presented in tabular and graphical form, including contours overlayed on a map or aerial photograph to scale;

(xiii) details of modifying factor adjustments (tonality, impulsiveness, or low-frequency content);

(xiv) where measuring existing noise sources, details of noise monitoring equipment, field calibration, location and results; including:

1. noise sample times and measurement intervals;
2. weather conditions during measurement, including wind speed, wind direction and rainfall;
3. adjustments for reflecting surfaces where relevant;
4. table summary of measured noise levels;
5. graphical presentation of measured noise levels using 15-minute intervals, for each noise descriptor; and
6. site photograph indicating the position of the noise monitoring equipment.

(xv) a site plan to scale showing:

1. the location of the noise sources assessed;
2. the location of the sensitive uses and/or sensitive zones that may be impacted by noise from the development, or where the development is for a sensitive use, the location of existing noise sources that may impact the development;
3. the location of noise monitoring equipment used in the assessment;
4. the location of existing or proposed structures, including but not limited to buildings and acoustic fences; and
5. the location of any earth mounding, cuttings or other significant topographical features.

(xvi) a comparison of the measured and predicted source noise levels, including modifying factor adjustments to the noise criteria;

(xvii) a description of the noise impact control measures necessary to achieve the noise assessment levels, including hours of operation, acoustic fences, enclosures and dwelling insulation and including details of the construction materials and the design;

(xviii) the noise level to be achieved at the specific location at the site that is necessary for achieving the noise criteria at a sensitive use or zone;

(xix) conclusions;

(xx) recommendations; and

(xxi) references.

SC6.4.19.5 Assessment of existing acoustic environment

(1) General

The following information is to be included in the noise impact assessment report for the assessment of the existing acoustic environment:

(a) A qualitative description of the existing acoustic environment.

(b) Description of the noise monitoring equipment and procedures used to assess the existing acoustic environment.

(c) A site plan to scale showing:

(i) the location of any existing noise sources that may contribute to the existing acoustic environment including roads, railways, airports, industry, and commercial premises etc;

(ii) the location of the sensitive uses or zones that may be impacted by noise from the development, or where the development is for a sensitive use, the location of existing noise sources that may impact the development;

(iii) the location of noise monitoring equipment used to assess the existing acoustic environment, including distance to any existing noise source that may contribute to the existing acoustic environment;

(iv) the location of existing or proposed structures, including but not limited to buildings, acoustic fences, walls and fences; and

(v) the location of any earth mounding, cuttings or other significant topographical features.

(d) Site photograph indicating the position of the noise monitoring equipment.

(e) Details of noise monitoring equipment field calibration results.

(f) Noise monitoring results including:

(i) sample times and measurement intervals;

(ii) weather conditions during measurement including wind speed, wind direction and rainfall;

(iii) adjustments for reflecting surfaces where relevant;

(iv) description of noise sources that make up the existing acoustic environment and discussion of extraneous noise and any effect it may have on the results;

(v) table summary of measured sound pressure levels and results;

(vi) graphical presentation of measured sound pressure levels using 15-minute intervals and including the L_{Amax}, L_{Aeq} and L_{A90} noise descriptors;

(vii) methodology used for predicting sound pressure levels at locations other than at those monitored; and

(viii) electronic version of the logged data.

(g) Rating background levels using 10th percentile method relevant to the development for day, evening, and night periods for the most affected use.

(h) Existing ambient sound pressure levels, including L_{Amax} and L_{Aeq} for day, evening, and night periods for the most affected use.

(i) Quantify the contribution of existing transport noise (road, rail, aircraft), industry/commerce in L_{Amax}, L_{Aeq}11hr, L_{Aeq}4hr, L_{Aeq}9hr for day, evening, and night, respectively.

SC6.4.19.6 Noise assessment levels

(1) General

The project noise trigger level provides a benchmark or objective for assessing a proposal or site. It is not intended for use as a mandatory requirement. The project noise trigger level is a level that, if exceeded, would indicate a potential noise impact on the community, and so 'trigger' a management response; for example, further investigation of mitigation measures. The project

noise trigger level is the lower (i.e., the more stringent) value of the intrusive noise level and amenity noise level.

(2) Intrusive noise level

Intrusive noise levels require that L_{Aeq},15-minute noise levels from the site during the relevant operational periods (I.e., day, evening, and night) do not exceed the rating background level by more than 5 dB. The intrusive criteria outlined was established primarily to deal with individual development applications. In the case of multiple developments, such as a new industrial area, a strategic approach should be implemented to ensure an equitable share of the remaining available allocation of noise for each industrial development is achieved.

(3) Amenity noise level

Assessment of amenity is based on noise levels specific to the land use as per the table 'Maximum Recommended Amenity of Noise Levels'. The ambient noise level within an area from all industrial noise sources combined should remain below the recommended amenity noise levels where feasible and reasonable specified in the table below. To ensure that industrial noise levels (existing and new) remain within the recommended amenity noise levels for an area, the amenity noise level applies for each new source of industrial noise as follows:

Amenity noise level for industrial developments = recommended amenity noise level listed in the below table minus 5 dB(A)

Table SC6.4.19.1 - Maximum Recommended Amenity of Noise Levels For All Sources

Receiver	**Noise Amenity Area**	**Time of Day**	**Maximum recommended amenity noise level for all sources $L_{Aeq\ 15\ minutes}$, dB(A)**
Residence	**Rural** - an area with an acoustical environment that is dominated by natural sounds, having little or no road traffic noise and generally characterised by low background noise levels	Day	50
		Evening	45
		Night	40
	Suburban - an area that has local traffic with characteristically intermittent traffic flows or with some limited commerce or industry. This area often has the following characteristic: evening ambient noise levels defined by the natural environment and human activity.	Day	55
		Evening	45
		Night	40
	Urban – an area with an acoustical environment that: is dominated by 'urban hum' or industrial source noise has	Day	60
		Evening	50
		Night	40

	through traffic with characteristically heavy and continuous traffic flows during peak periods is near commercial districts or industrial districts has any combination of the above or where 'urban hum' means the aggregate sound of many unidentifiable, mostly traffic and/or industrial related sound sources.		
Hotels, motels, caretakers' quarters, holiday accommodation, permanent resident caravan parks	See column 4	See column 4	5 dB(A) above the recommended amenity noise level for a residence for the relevant noise amenity area and time of day.
School classroom – internal	All	Noisiest 1-hour period when in use.	35 (internal)
Hospital ward	All	Noisiest 1-hour	35 (internal) 50 (external)
Place of worship		When in use	40 (internal)
Area specifically reserved for passive recreation (e.g. national park	All	When in use	50
Active recreation area (e.g. school playground, golf course)	All	When in use	55
Commercial premises	All	When in use	65
Industrial premises	All	When in use	70
Industrial interface (applicable only to residential noise amenity areas)	All	All	Add 5 dB(A) to recommended noise amenity area

Editor's Notes -

(1) The levels represent outdoor levels except where otherwise stated. Where internal amenity noise levels are specified, they refer to the noise level at the centre of the habitable room that is most exposed to the noise and apply with windows opened sufficiently to provide adequate ventilation. In cases where the gaining of internal access for monitoring is difficult, then external noise levels 7dB(A) above the internal levels apply.

(2) For residences, the amenity noise levels apply at the reasonably most-affected point on or within the residential property boundary or, if this is more than 30 metres from the residence, at the reasonably most-affected point within 30 metres of the residence.

(3) In areas where traffic flow is continuous and noise from industrial sources is inaudible or difficult to measure due to a high level of road traffic noise, and where the $L_{Aeq, (period), traffic}$ noise level is more than 10 dB above the amenity noise criteria levels presented in the above table, the amenity noise criteria is replaced by $L_{Aeq, (period), traffic}$ minus 10 dB. This becomes the new amenity noise criteria level for the receiver.

(4) This requirement should not be read to infer that the noise limit only applies at the 'reasonably worst affected location'.

(5) In assessing amenity noise levels at commercial or industrial premises, the noise level is to be assessed at the reasonably most-affected point on or within the property boundary.

(6) The amenity criteria outlined was established primarily to deal with individual development applications. For multiple developments, such as a new industrial area, a strategic approach should be implemented to ensure the amenity objectives are not compromised and an equitable share of the remaining available allocation of amenity-related noise for each industrial development is achieved.

(4) Project noise trigger level

The project noise trigger level is the lower (i.e., the more stringent) value of the intrusiveness noise level and amenity noise level of the above points. The L_{Aeq} is determined over a 15-minute period for both intrusive and amenity noise levels and over an assessment period (day, evening and night). To standardise the time periods for the intrusive and amenity noise levels, this policy assumes that the L_{Aeq},15 minutes will be taken to be equal to the L_{Aeq}, period +3 decibels (dB), unless robust evidence is provided for an alternative approach for the particular project being considered.

(5) Comparison to project noise trigger levels and where these levels are exceeded

(a) Where the project noise trigger levels are forecast to be exceeded after the application of noise impact control measures, the noise impact assessment report is to include the following:

(i) Justification that there are no technically and economically feasible noise impact control measures that can be applied to the development to enable achievement of the criteria.

(ii) A description of the predicted nature and scale of the noise impact on sensitive uses in accordance with the methodologies in this section, to enable an analysis of impact versus benefit of the development.

(b) In certain circumstances it may be demonstrated that the effect of the proposed noise source is minimal where the existing environment has a more significant impact and has similar characteristics (e.g. where the development may produce occasional vehicle noise at a location where the sensitive use is exposed to existing frequent road traffic noise).

(6) Potential for sleep disturbance

The potential for sleep disturbance from maximum noise level events from a premises during the night-time period needs to be considered. Sleep disturbance is considered to be both awakenings and disturbance to sleep stages.

L_{Amax} assessment only applies to 'specified noise sources' which are defined as impact noises; hammering; loading/unloading; dropping items; beepers, alarms, bells, phones, sirens; power tools; valve releases; air brakes; door slamming. Note - People noise and vehicle pass-by noise (engine, exhaust, induction, tyres) are specifically excluded. Where the subject development can satisfy the following three maximum noise level event trigger levels no additional assessment or evaluation of sleep disturbance is required:

(a) L_{Aeq},15min 40 dB(A) 1 metre from the façade or the existing rating background level plus 5 dB, whichever is the greater.

(b) The arithmetic average of the maximum levels from up to 15 single events over a given night-time period L_{AFmax} 52 dB(A) 1 metre from the façade or the existing rating background level plus 15 dB, whichever is the greater.

(c) The absolute highest LAFmax 60 dB(A) 1 metre from the façade or the existing rating background level plus 15 dB, whichever is the greater.

(7) Low-frequency noise

Low-frequency noise requires the C-weighting assessment as it offers a more appropriate method to assess low-frequency noise. All energy down to 10Hz should be considered. This assessment may often not be required where the noise being considered does not involve a significant contribution from low frequencies. Some specific source examples where low frequency should be considered are: gas turbines; boilers; forced draft and induced draft fans; shakers on hoppers; vibratory screens; wind farms; solar farm inverters; power stations or generators; night clubs or uses that provide amplified music.

Table SC6.4.19.2 - Criteria Location Low Frequency Noise Criteria ($L_{Ceq,adj}$,T)

Use	Day ($L_{Ceq,adj}$,11h)	Evening ($L_{Ceq,adj}$,4hr)	Night ($L_{Ceq,adj}$,9hr)
Residential (External)	65 dB(C)	65 dB(C)	60 dB(C)
Commercial (External)	75 dB(C)	75 dB(C)	70 B(C)

SC6.4.19.7 Noise and vibration control plans

Where an impact assessment demonstrates that noise is likely to exceed thresholds contained within the *Environmental Protection (Noise) Policy 2019* or other relevant document or Australian Standard, a noise (and vibration) control plan will need to be submitted.

Editor's Note - The noise assessment should have regard to the following:

Queensland Development Code Part 4.4 – Buildings in a Transport Noise Corridor. Australian Standards AS1055.2 and AS2107; *or* Department Environment and Science, *Noise Measurement Manual 2020* or *Environmental Protection Act 1994* and *Environmental Protection (Noise) Policy 2019* (EPP Noise), or Department of Transport and Main Roads Road, *Traffic Noise Management – Code of Practice.*

Editor's Note - Where in the vicinity of an airport, detailed designs showing how construction can ameliorate noise impacts are to be submitted in accordance with AS2107.

SC6.4.19.8 Information to include in a control plan

Information to include in a control plan is outlined in Table SC6.4.19.3.

Table SC6.4.19.3 - Information to Include in Control Plan

	Typical actions
Community Relations **Editor's Note -** noise and vibration control plans should describe the approaches to be applied when consulting with and notifying the community where necessary. Large projects may also be required to develop acommunity relations plan which includes consultation, notification, and complaint management. Where this is the case, the following is to be included in any noise (and vibration) control plan.	(a) Identify all noise and vibration sensitive receivers. Include characteristics of, and risks exposed to, existing buildings, fences, trees, property boundaries and services (within at least 1km for blasting operations). (b) Contingency actions must be developed if the relevant noise/vibration limitswill be exceeded. (c) A complaints management system should be devised which includes corrective and preventative actions. (d) Consultation with and information supplied to nearby residents and other sensitive uses.
Hours of operation/construction schedule	Information regarding opening hours or hours of operation in accordance with therelevant planning scheme provisions. For construction hours, refer to Section SC6.4.23 Construction management, quality management, inspection and testing, Clause SC6.4.23.1 (4) Hours of work and Section 440R of the *Environmental Protection Act 1994*. Scheduling works at periods where people are least affected will also reduceimpacts and should flow on from consultation with the community (as above).
Potential noise and vibration generating activities	The choice of plant and equipment employed on the project can have a direct effect on noise and vibration levels. By selecting equipment of an appropriate size with low vibration generation characteristics, and by ensuring that the equipment is being operated correctly and that noise and vibration reduction devices are operating efficiently, the number of complaints received can be greatly reduced.

Potential noise and vibration mitigation methods	For construction, rock breaking, drilling, and/or piling the following mitigationmethods should be considered: (a) maximising the distance between the noisy activities and noise sensitive land uses; (b) undertaking noisy fabrication work offsite where possible; (c) maintaining any pre-existing barriers, or walls onsite as long as possible; (d) including construction barriers in the project design; (e) using building and stockpile materials as noise barriers during the earthworks phase which may be used in the final landscape design; and (f) installing purpose-built noise barriers, acoustic sheds, and enclosures. Road and rail noise attenuation will be considered in the following order ofpreference; a combination may also be provided: (g) a buffer between noise receptor and receiver; (h) service roads between noise receptor and receiver; (i) larger lots closest to the noise source that allow dwelling units to be setback from the noise source to achieve the applicable reduction level; (j) architectural treatments; For class 1-4 buildings see *MP 4.4 Buildings in a transport noise corridor.* (k) incorporating mounding and landscaping into the design; Noise barriers are to be provided in accordance with the principles of theDepartment of Transport and Main Roads *Code of Practice Chapter 5:* *Integrated Noise Barrier Design;* and (l) providing an acoustic fence: A detailed design is to be submitted as soon as possible in the planningprocess. Design and construction of barriers must meet MRTS15 *Noise Fences*. The acoustic fence must not be located on the road reserve, butwithin the boundary line of the abutting property. Refer to Section SC6.4.3 Standard drawings SD002, SD003 and SD004. Where acoustic reports identify that noise levels will be exceeded, all usesshould be provided with attenuation requirements designed by suitably qualified consultants that will enable the use to meet the prescribed standard.
Noise and vibration monitoring	Where appropriate in relation to the use or activity. Include details such asmonitoring equipment, standard employed, monitoring

	frequency, on-site meteorology, activity logs, and results handling procedure.

SC6.4.19.9 Construction

All construction work is to be undertaken pursuant to the *Environmental Protection (Noise) Policy (EPP (Noise))* and the *Environmental Protection Act 1994*. Construction works shall be carried out in accordance with the requirements and restrictions relating to hours of work specified in Clause SC6.4.23.1 (4).

Ground vibration levels, transmitted from the construction works, rock breaking, drilling, and piling, operating items of plant or other noisy activities shall not exceed levels that are close to the lower level of human perception nor is it to cause any damage to any adjoining buildings or infrastructure. Acceptable practices and vibration thresholds shall be determined in accordance with current Statutory Regulations.

A complaints management system should be devised which includes corrective and preventative actions. Consultation with and information supplied to nearby residents, workers and any other sensitive noise receptors is to be undertaken when vibration is known to be generated and is considered sufficient to warrant notification.

Editor's Note - The results and recommendations of reporting on noise and vibration, as detailed in Clause SC6.4.19.44 Noise and vibration impact assessment above, associated with a particular development will be required to be implemented.

The control of ground vibration as a result of blasting shall be strictly in accordance with Section SC6.4.7 Clearing, grubbing, and earthworks and any other relevant construction specifications found in SC6.4 Development manual planning scheme policy and will be solely at the risk and responsibility of the Developer.