

NOISE & VIBRATION

MANAGEMENT GUIDELINES



CITY OF MELBOURNE

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INTRODUCTION



Construction and building works are a fundamental part of a growing and changing city like Melbourne.

However, construction works need to be controlled so that noise doesn't become a nuisance for our visitors, residents and businesses.

As development continues and the City of Melbourne's population grows, construction noise may affect a greater number of people in our municipality.

For these reasons, the construction industry needs to respond by appropriately managing noise and vibration issues.

This set of guidelines outlines the City of Melbourne's standards around noise and vibration management, providing a measurable standard of what is acceptable. It seeks to balance the needs of the construction industry with reasonable community expectations.

These guidelines include a range of information such as ways to monitor, manage and measure noise, legislative requirements, and the City of Melbourne's approach to noise assessments, project planning and permit requirements.



Noise is sound that is loud, unpleasant or causes a disturbance. Noise is not the same for all people, sounds that are acceptable to some people may not be tolerated by others. Noise can have a significant impact on the health and wellbeing of people, and is linked to hearing damage, stress, sleep disturbance, reduced work performance and general poor health.

The City of Melbourne expects builders/contractors to implement all feasible and reasonable measures to control noise, and consult with the community to keep noise levels within an acceptable limit. The City of Melbourne may require these standards to be formalised in a Noise and Vibration Management Plan.

Noise management encompasses all aspects of a building project including the demolition, excavation and construction phases. It extends to works on site and in the public domain as well as peripheral activities such as trucks accessing a site.

Construction companies are advised to make contact with the City of Melbourne in the initial stages of a project to plan for noise management.

Objectives

The objectives of these guidelines are to:

- provide guidance on noise management for building works
- outline the City of Melbourne's expectations for noise and vibration management

- balance the needs of the construction industry with reasonable community expectations
- ensure that builders/contractors identify and apply all feasible and reasonable measures to manage noise and consult with the community
- provide a measurable standard for the assessment and control of noise and vibration from construction sites within the City of Melbourne.

Developers are required to consult with neighbouring and affected properties in the immediate vicinity of a site before and during the construction period to keep local residents, and any other parties that may be affected, informed of the type, duration and location of works and their potential impact on the local area.

Scope

These guidelines present information pursuant to Council's Activities Local Law 2009, Part 9 Building Works (Nuisance Abatement). This local law applies to works on commercial and residential sites, including construction, demolition and excavation works.

NOTE: Any reference to a Local Law, Act or Regulation includes reference to any subsequent amending Local Law, Act or Regulation.

The guidelines specifically apply to building works as defined in Council's Activities Local Law 2009. Under Local Law, building works 'includes works, activities, events and practices for, or in connection with, the construction, alteration, demolition or removal of a building'. The requirements do not apply to civil infrastructure works such as bridges, freeways and tram or train track works. They do not include the use of tools for minor maintenance works, hobbies or arts activities in commercial or residential properties. Depending on the nature of these activities and the site where they take place, noise that is causing a nuisance may be assessed by Council's environmental health officers using the relevant health and environment regulations.

Disclaimer

These guidelines have been compiled and issued to provide general guidance for compliance with provisions of Activities Local Law 2009, Part 9 Building Works (Nuisance Abatement). While the guidelines specify minimum requirements for noise and vibration control, they are not intended to be, and should not be treated as, an exhaustive statement of legal, technical and other factors involved in the interpretation and specification of acoustic measures.

Accordingly, the City of Melbourne expressly disclaims all liability for errors and omissions of any kind whatsoever whether negligent or otherwise or for any loss, damage, injury or other consequences that may arise from any person's reliance on these guidelines.

Noise is not the same for all people, sounds that are acceptable to some people may not be tolerated by others.

Definitions

Builder/contractor:

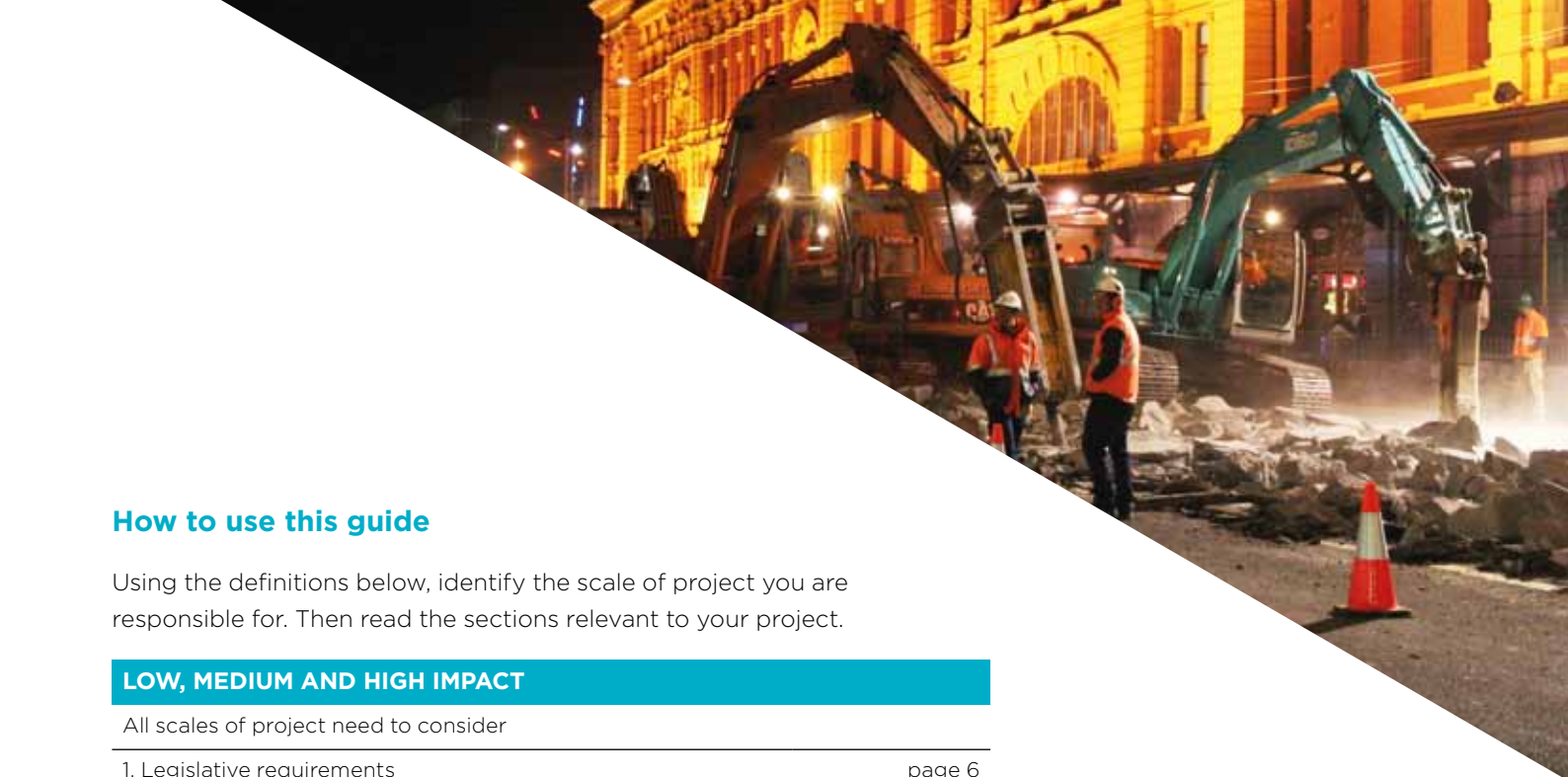
A person who is engaged in building works.

Building works: Includes works, activities, events and practices for, or in connection with, the construction, alteration, demolition or removal of a building.

Low impact project: Includes minor project works by an owner/builder, such as internal residential and commercial renovations, usually of a short duration where building activity is not likely to cause significant noise or vibration emissions.

Medium impact project: Includes construction of new residential dwellings, multi-storey renovations or demolition of buildings by an independent builder/contractor.

High impact project: Includes extensive long-term works such as construction of a multi-storey development, substantial building demolition or major excavation including piling works.



How to use this guide

Using the definitions below, identify the scale of project you are responsible for. Then read the sections relevant to your project.

LOW, MEDIUM AND HIGH IMPACT

All scales of project need to consider

| | |
|--|---------|
| 1. Legislative requirements | page 6 |
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| 3. Applying designated sound levels | page 14 |
| 4. Council's approach to noise assessments | page 18 |

MEDIUM AND HIGH IMPACT

Medium and high impact projects may need to supply:

| | |
|---|---------|
| 5. Noise and Vibration Management Plans | page 22 |
|---|---------|

HIGH IMPACT

High impact projects may require:

| | |
|--------------------|---------|
| 6. Acoustic advice | page 26 |
|--------------------|---------|

All Projects - low, medium and high impact

1. Legislative requirements
2. Key noise management practices
3. Applying Designated Sound Levels
4. Council's approach to noise assessments

Medium and high impact

5. Noise and Vibration Management Plans

High impact

6. Acoustic advice



1

LEGISLATIVE REQUIREMENTS

1.1 Activities Local Law 2009 (Local Law)

All building works within the City of Melbourne are required to comply with the Activities Local Law 2009.

Part 9 Building Works (Nuisance Abatement) of the 'Local Law'. Under the Local Law, Council requires people undertaking building works to:

- give notice to Council before undertaking works (48 hours notification)
- work within permitted hours
- submit and have approved by Council a Construction Management Plan (including a Noise and Vibration Management Plan) when requested prior to commencement

- undertake building works in a manner that does not cause a nuisance, which may include adherence to sound and vibration levels designated by Council.

All projects are required to work within Council's prescribed hours. These are:

For general building works:

- 7am and 7pm Monday to Friday, and
- 8am and 3pm on Saturday.

NOTE: Council may prescribe different hours for works in Docklands.

For owner/builder type works, where the person carrying out the works is the owner or occupier and no other person is engaged for fee or reward:

- 7am and 7pm Monday to Friday
- 8am and 6pm on Saturday
- 9am and 6pm on Sunday.

It is important to recognise that even within these hours there are groups in the community that may be more sensitive to noise at certain times.

Although not specifically precluded, building works on public holidays or days when events of special social significance are planned should not be undertaken in a manner that impacts on public activities. This could constitute a nuisance and may be regarded as a breach of the Local Law.



1.2 Environment Protection Act 1970

Section 48a of the Environment Protection Act 1970 makes it an offence to cause unreasonable noise from any residential premises. Residential noise may be unreasonable at any time of the day, depending on its volume, intensity, duration, time, place and other circumstances.

Noise is sound that is loud, unpleasant or causes a disturbance.

1.3 Residential noise regulations

The Environment Protection (Residential Noise) Regulations 2008 apply to all residential properties, including sites under development. The regulations list specific types of equipment and times when their use is not permitted.

The relevant equipment includes internal combustion engines, powered and electrical equipment including power tools, chain or circular saws, gas or air compressors, pneumatic power tools, hammers and any other impacting tool or grinding equipment.

The prohibited times apply when the noise can be heard from inside a habitable room of another residential premises.

- Monday to Friday: before 7am and after 8pm
- Weekends and public holidays: before 9am and after 8pm.

It is important to note that some equipment may still be too loud even when used during the appropriate times.

1.4 Health Act 2008

Council can also take action under the Nuisances Provisions of the Public Health and Wellbeing Act 2008.



2

KEY NOISE MANAGEMENT PRACTICES FOR LOW, MEDIUM AND HIGH IMPACT PROJECTS

This section outlines six broad strategies to help builders/contractors manage noise from a construction site:

- 2.1 Community consultation
- 2.2 Complaint resolution
- 2.3 Work scheduling and respite periods
- 2.4 Universal work practices
- 2.5 Plant and equipment
- 2.6 Site planning, barriers and layout

2.1 Community consultation

Community consultation is an essential part of managing noise from a construction project. Builders/contractors should aim to:

- establish good working relationships with community stakeholders such as nearby residents and businesses

- give and receive feedback on construction activity and performance during a project
- discuss the community's concerns and be proactive in complaint resolution.

As part of a community consultation strategy, neighbouring premises should be given written notification of the project. The information should outline the type and duration of works, likely noise impacts, and provide contact details for feedback and/or complaints resolution.

The minimum notification period is 48 hours before noisy work is scheduled. Longer notification periods of a week or more may apply to work likely to exceed the City of Melbourne's regulation noise levels (see section 3: Designated Sound Levels) or at the start of a project.

Methods of notification for noisy works and ongoing communication about project progress can include:

- letterbox drops
- meetings
- individual contact
- a website (for larger projects)
- a regular newsletter with site news, project planning etc, or
- direct emails to all stakeholders.

In some areas, provision of multi-lingual notification may be required.

2.2 Complaint resolution

A person may have experienced noise disturbance for some time before they approach the builder/contractor. The builder/contractor should respond respectfully to a complaint and implement all feasible and reasonable measures to address the issue.



It is particularly important to respond when the complaint refers to disturbed sleep and/or noise that is tonal (beeping, metal-on-metal), impulsive (hammering, pile driving) or low frequency (truck engine, heavy machinery).

High impact projects should have a readily accessible contact point such as a 24-hour toll-free information and complaints line. The builder/contractor should call back as soon as possible, and then maintain communication about how the issue is to be resolved.

The complaint management process should be well documented, with details about the following:

- the noise/s in question
- the time of the complaint and the person making it
- the person dealing with the complaint and what they plan to do

- how resolution of the complaint is to be communicated to the person who made the complaint, the community and the Council
- who should be contacted if the complaint cannot be resolved, and
- the time taken for responses.

2.3 Work scheduling and respite periods

Scheduling noisy works to provide respite and avoid sensitive times is a vital part of responsible noise management.

The following are examples of sensitive times that may require special consideration:

- a childcare centre with regular children's sleep periods
- an office needing to organise meetings

- a school conducting exams
- a restaurant with lunchtime trading.

The builder/contractor should firstly consult with affected parties, such as the examples given above, and arrange appropriate periods of respite from noise. The scheduled respite times should then be communicated to the relevant people.

This kind of communication may also help the builder/contractor identify times when people are not using a site (such as an office on the weekend).

On a typical weekday, more frequent respite periods should be provided where possible, especially during very noisy works. For example, a break of 15-20 minutes for every hour of jack-hammering may be a suitable way to manage noise impacts.

Consider the option of relocating people for short periods of time, such as when high noise levels from construction occur at night and there is no other feasible or reasonable way to reduce noise levels.

In some cases a builder/contractor will have to weigh up the benefits of avoiding sensitive periods against the increased costs and additional time taken on the job. Explaining the various options to affected parties will help develop a fair and balanced approach.

In general, the instance and duration of noisy works should be minimised. This is particularly important for night and other out-of-hours works.

2.4 Universal work practices

A number of easy-to-implement work practices can help reduce noise complaints.

2.4.1 General practices – particularly important at night or during sensitive times

Some general construction activities can be carried out in the following ways:

- Minimise metal-on-metal contact: Bins, skips and chutes can be lined with material such as carpet, which helps deaden the sound of metal and other waste disposal.
- Avoid dropping items from a height: When an item is dropped from a height, the resulting noise is louder than if it were put in place directly.

- Use equipment sensibly: Turn off equipment when not in use. Throttle settings should be reduced if possible.
- Encourage appropriate staff conduct: Staff should not use loud radios and/or stereos outdoors during sensitive times, such as early in the morning in a residential area. Shouting or inappropriate language, loud talking and slamming vehicle doors should be avoided.
- Use PAs appropriately: If a PA is on site it should be used sensibly and in moderation. Avoid broadcasting telephone calls through the PA.
- Manage truck noise: Noise from trucks is a common issue, especially near residences. Scheduling and management of truck movements is important to reduce issues associated with reversing beepers, engine noise and general off-site activity.

2.4.2 Contract specification and staff training

When a builder/contractor has made noise reduction commitments, staff need to be made aware of them. Workers and sub-contractors need to be trained to follow noise management practices. Toolbox meetings may be an effective way to do this.

Embedding noise management requirements, and the responsibilities for breaches, in tenders, employment contracts or sub-contractor agreements can be an effective tool for pro-active noise management. This ensures that responsibility for noise rests with all people involved.

The builder/contractor should develop a one-page summary of general practices for noise management and, if applicable, Noise and Vibration Management Plan requirements (see section 5: Noise and Vibration Management Plans, page 22) and clearly display this on site. Operating hours, delivery times, truck routes, and extra considerations for works during sensitive times could also be included in the summary. Workers should be reminded about these commitments regularly.

2.4.3 Monitoring

The builder/contractor should periodically check the site and local area for noise problems and actively manage noise issues before and as they arise.

2.5 Plant and equipment

All builders/contractors should endeavour to use low-noise, well-maintained equipment where feasible and reasonable. Deciding to use low-noise equipment in the early stages of a project can be of considerable benefit in reducing noise, especially for medium and high impact projects.

2.5.1 Selecting equipment

Consideration of equipment noise levels should be part of each stage of project planning and contract specification.

The builder/contractor should look at different types of equipment that do the same job and compare the noise level data. Noise emission labels are often provided on equipment and can be used to assist in this process. Investigate high-quality mufflers, acoustic

enclosures, low-noise tool bits/ blades and inquire from suppliers about lower-noise equipment.

2.5.2 Alternative equipment

Compressors for pneumatic equipment can often cause problem noise levels and should be silenced, enclosed and located appropriately. Hydraulic or electrical equipment may be a viable alternative.

Electrical equipment can also be used to replace diesel or petrol engines. Care must be taken with the location of any generators and supply lines.

Impacts from noisy excavation and demolition works can be reduced by alternative work methods. Alternatives to rock-breaking include hydraulic splitters for rock and concrete, hydraulic jaw crushers, and rock and concrete sawing. Smaller rock breakers/ excavators are generally preferable to larger machines, although the impact of increased time on the job should also be considered.

2.5.3 Maintenance

A key commitment for any project (which should be included within contract specifications) is to ensure that:

‘equipment is not operated if maintenance or repairs would eliminate or significantly reduce a characteristic of noise resulting from its operation’.

This means that equipment should be in good working order, and where there is a fault or maintenance issue creating the noise, it must be dealt with before it is used.

Builders/contractors should regularly check the condition of mufflers, enclosures and air lines, for example, to make sure they are in good working order and that there are no gaps or leaks. An ongoing inspection and maintenance process should be established for long-term projects.

Hired equipment that is causing excessive noise in a manner that is not typical for the equipment should be returned to the supplier.

2.5.4 Alternatives to traditional ‘beeper’ alarms

The traditional ‘beeper’ alarms for mobile equipment can create a nuisance during projects where there is a lot of movement (such as prolonged use of scissor lifts) or if works are being conducted at night.

Some examples of alternatives that are less noisy include:

- ‘Smart alarms’ that adjust their volume depending on the ambient level of noise. These are particularly useful during operations in quieter suburban areas, where other noise on the site is less, or when works take place during quieter periods such as early morning.
- ‘Broadband’ or ‘quacker’ alarms. These emit a less annoying sound and are more directional. This means the sound is focused to the area of concern and is less likely to travel to noise-sensitive areas.

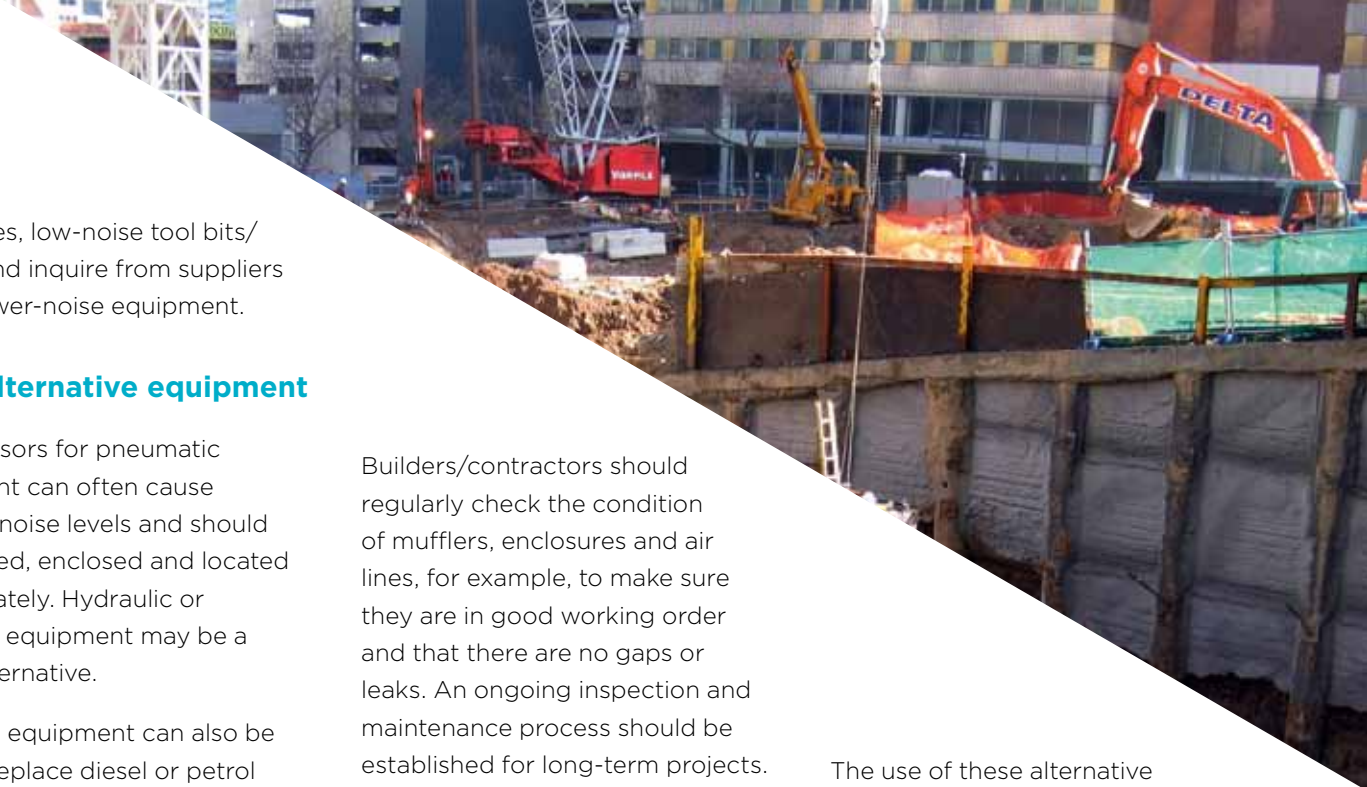
The use of these alternative technologies must be:

- determined by a competent person based on an assessment of the site, its conditions and on the machines involved
- compatible with the machines so it does not adversely affect their operation
- accompanied by specific procedures for installation and maintenance to ensure correct operation
- communicated to all site staff to ensure they are aware of the new alarm and how it works.

The requirements of relevant occupational health and safety legislation must be complied with in all cases.

2.6 Site planning, barriers and layout

In many projects, noise can be managed by appropriately arranging site orientation and operations. These principles need to be addressed during early project stages, when there is greater flexibility to plan for noise management.





2.6.1 Managing noise from trucks and mobile equipment

On larger sites, the layout should be arranged to avoid the need for truck reversing. Drive-through parking and deliveries with a one-way thoroughfare is one method that should be investigated.

Site vehicle entrances should be located away from sensitive areas, namely residences, as beeping and engine noise from truck movements is a common issue in the early morning.

Where appropriate, an area away from residential dwellings should be nominated for off-site truck parking when vehicles arrive before site opening hours. Council may require that trucks wait away from the site in a less sensitive area or other areas/options may be suggested depending on the nature of the site. For larger projects, traffic controllers can be used to direct trucks that arrive out of approved times or to instruct drivers to turn off their engines when stationary.

At an early stage, the builder/contractor should designate a truck route that minimises noise impacts and clearly communicate to drivers the requirements for arrival times, vehicle movements, idling reduction and general conduct, and/or include these requirements as a condition of contract.

Deliveries to construction sites should be scheduled to occur only within the allowed times. Fewer vehicles with larger loads, rather than a number of smaller vehicles, can help reduce noise impacts. Options may be limited by site access and scale, with larger sites usually providing a greater level of flexibility.

Other considerations, such as safety and traffic impacts, will apply when looking at truck access and routes.

2.6.2 Location of plant and equipment

The builder/contractor should aim to locate plant and equipment away from sensitive sites, thereby maximising the distance from affected parties. When plant and equipment needs to be located close to noise sensitive areas, restricting the hours of operation should be considered.

In some cases, it may be possible for noisy fabrication work to be done off site and transported to the site at a later date.

2.6.3 Use the site to shield sources of noise

When noisy works involve demolition or excavation, there may be opportunities to use existing building structures as a shield for noise. For example, during early demolition stages it

may be possible to leave sections of an existing building façade/ structure in place, acting as a barrier between noisy works and the noise-sensitive areas.

Similar benefits may be gained if permanent walls are built to act as a noise barrier.

Temporary barriers can also be constructed and existing site materials or hoarding may be useful in this regard.

Any walls left in place to provide an acoustic/noise management or other associated benefit must be structurally sound and stable in accordance with current engineering principles and requirements.

2.6.4 General principles for barriers – breaking ‘line of sight’

Barriers should be used to break the ‘line of sight’ between the noisy works and the noise-sensitive areas (when looking towards the noise source from the location receiving the noise).

Barriers should be located as close as possible to the noise source or sensitive receiver. There should be no gaps or openings at joints in the barrier material and barriers need to be sufficiently dense. In general, material weighing at least 10kg/m² should be used.

Barriers also need to be sufficiently high and wide, as sound can carry around the structure. In cases where the affected location is in a high-rise development, barriers may not be useful, as the height will not be enough to break ‘line of site’ to the noise received.

Short, straight barriers will allow sound to pass around the ends. Therefore, barriers around a stationary noise source should be constructed with a length at least 10 times greater than its height. For shorter barriers, it may help to bend or wrap the barrier around the equipment.

Acoustic sheds should be considered for very noisy operations where it is possible to contain the plant and equipment. As with barriers, the shed should be of sufficient density and suitable construction, with seals on doors and internal treatments to reduce noise reverberation. Ventilation and general occupational health and safety requirements also need to be considered.

It is important to recognise that large reflecting surfaces, such as concrete or glass walls, may increase noise levels, as the sound can ‘bounce’ off and be magnified. The builder/contractor should avoid placing equipment in locations where reflected noise will increase noise exposure.

Barriers and acoustic sheds may be most useful to high-impact projects, where the cost is justified as the works can be done faster or with greater flexibility.

2.6.5 More information

For more information please consult the following:

- EPA Noise Control guidelines, Publication 1254, section 2
- EPA Publication 480 – Best Practice Environmental Management – Environmental Guidelines for Major Construction Sites
- Australian Standard AS2436-2010 – Guide to noise and vibration control on construction, demolition and maintenance and demolition sites.



3

APPLYING DESIGNATED SOUND LEVELS FOR LOW, MEDIUM AND HIGH IMPACT PROJECTS

Designated Sound Levels (DSLs) form a general noise standard that Council applies to construction works within the City of Melbourne.

Council applies DSLs according to the circumstances in which the noise is generated and the type of construction project creating the noise.

Under the Activities Local Law 2009, Part 9 Building Works (Nuisance Abatement), an officer may determine that noise is a 'nuisance', based on a comparison of the site's noise measurements to a DSL, and/or because of its character, intensity, duration and the time and circumstances in which it is emitted.

Builders/contractors need to be aware of Council's DSLs, and they may also need to provide Council with a detailed assessment of noise by an acoustic consultant (see section 6: Acoustic Advice, page 26).

DSLs can be used as:

- baseline acceptable noise levels, above which builders/contractors are expected to demonstrate a higher level of noise management
- a noise investigation and enforcement tool for Council
- a benchmark for high impact projects requiring acoustic assessment.

3.1 Estimating noise from sites

Builders/contractors should assess noise levels for noise-management purposes and benchmark against Council's DSLs.

Australian Standard AS2436-2010 provides a technical framework to estimate noise from construction sites. Some simplified information derived from AS2436-2010 is presented in table 1 on the next page.

Please note: the sound levels indicated in table 1 are based on equipment operating at ground level and should only be used to provide a general impression of a project's likely noise impacts.



Factors such as the height of equipment or type of ground surface will affect outcomes. Large reflective surfaces and barriers, such as concrete or glass walls, may increase noise levels as the sound can 'bounce off' and be magnified.

When an accurate estimate of noise is required, builders/contractors should seek advice from an acoustic consultant.

QUICK REFERENCE - ACOUSTIC TERMINOLOGY

The following is a quick reference to the terminology used to estimate sound levels:

| | |
|--------------|---|
| db(A) | Unit of overall noise level, in A weighed decibels. The A-weighting approximates the average human response over the entire frequency range. This unit is often used in combination with the descriptors below. |
| Leq | Commonly referred to as the average noise level. This is the constant sound level over a period of time which is equivalent in total sound energy to the time-varying sound level measured over the same time period. |
| L90 | Commonly referred to as the background noise level. This is the sound pressure level that is equal to or exceeded for 90% of the time interval considered in the absence of the noise under investigation. |

TABLE 1: APPROXIMATE SOUND LEVELS FROM EQUIPMENT OPERATING AT GROUND LEVEL

| EQUIPMENT | DISTANCE 15M | DISTANCE 30M | DISTANCE 60M |
|--|------------------|------------------|------------------|
| | Approx dBA level | Approx dBA level | Approx dBA level |
| Concrete Mixer | | | |
| Petrol 2kW | 57 - 61 | 51 - 55 | 45 - 49 |
| Diesel | < 87 | < 81 | < 75 |
| Compactors | | | |
| 220kW | 85 - 92 | 79 - 86 | 73 - 80 |
| Compressors | | | |
| Standard 3.5 to 4.5m ³ /min | 59 -74 | 53 - 68 | 47 - 62 |
| Standard 17m ³ /min | 76 - 87 | 70 -81 | 64 - 75 |
| Cranes | | | |
| 20kW tower | 72 - 76 | 66 - 70 | 60 - 64 |
| 10-tonne truck mounted | 86 - 88 | 80 - 82 | 74 - 76 |
| Dump truck | | | |
| 20 tonne | 70 - 75 | 64 - 69 | 58 - 63 |
| 25 tonne, 120kW | < 82 | < 76 | < 70 |
| Dumpers | | | |
| 1.5 tonne | 62 - 82 | 56 - 76 | 50 - 70 |
| 3 tonne | < 81 | < 75 | < 69 |
| Excavators | | | |
| 200 - 300kW | 82 - 86 | 76 - 80 | 70 - 74 |
| Generators | | | |
| 250 kVA | 80 - 87 | 74 - 81 | 68 - 75 |
| Loaders (Tracked) | | | |
| 200 - 300kW | 86 - 90 | 80 - 84 | 74 - 78 |
| Piling | | | |
| Single air hammer | 86 - 107 | 80 - 101 | 74 - 95 |
| Rotary bored | 80 - 92 | 74 - 86 | 68 - 80 |
| Vibratory system (sheet piles) | 87 - 98 | 81 -92 | 75 - 86 |
| Pumps | | | |
| Concrete pumps | 70 - 75 | 64 - 69 | 58 - 63 |
| Rock Breakers | | | |
| Hydraulic | 78 - 87 | 72 - 81 | 66 - 75 |
| Pneumatic > 75mm diameter | 92 - 108 | 86 - 102 | 80 - 96 |
| Rock Drills | | | |
| Tractors | 64 - 77 | 58 - 71 | 52 - 65 |
| | 78 -79 | 72 - 73 | 66 - 67 |
| Trucks | | | |
| Concrete mixer | 75 - 84 | 69 - 78 | 63 - 72 |
| Power Tools | | | |
| Electric drill | < 62 | < 56 | < 50 |
| Hammer drill | 69 - 80 | 63 - 74 | 57 - 68 |
| Grinder | 69 - 74 | 63 - 68 | 57 - 62 |
| Pneumatic breaker | | | |
| 14kg standard | 80 -84 | 74 - 78 | 68 - 72 |
| Silenced | 68 - 76 | 62 - 70 | 56 - 64 |
| Pneumatic breaker | | | |
| 27kg standard | 88 - 91 | 82 - 85 | 76 - 79 |
| Silenced | < 86 | < 80 | < 74 |
| Chainsaw | 73 - 94 | 67 - 88 | 61 - 82 |

3.1.1 Other considerations for noise assessments

Apart from assessing actual noise levels, it is important to consider the character of the noise. Some examples of noise that can be annoying to people include:

- tonal noise, which refers to noise such as beeping, grinding, drilling or sawing
- impulsive noise, which refers to noise such as hammering, pneumatic equipment, excavation and rock breaking

- low frequency noise, which refers to deep or 'bass heavy' noise from equipment such as heavy machinery or idling truck engines.

Noise above this level is considered to be significantly detrimental to speech, and may be deemed a nuisance if appropriate noise management and consultative actions are not put in place.

3.2 How to apply Designated Sound Levels (DSLs)

Council's DSLs are set to allow for a 'minimum to moderate level of interference with normal activities involving speech'. This level represents the upper limit for reasonable impacts.

TABLE 2: WHEN DSLS ARE APPLICABLE TO A PROJECT AND WHAT ACTIONS NEED TO BE TAKEN

| WORKS AND HOURS | ACTION LEVEL | BASIS AND ACTIONS |
|---|--|---|
| <p>Upper DSL outdoor assessments</p> <p>Conducted within Standard Hours under Activities Local Law section 9.5 or 9.6 as appropriate.</p> | <p>75dB(A) Leq</p> <p>Measured at the façade of the affected building.</p> | <p>These levels indicate the point at which noise may have an unreasonable interference with activities involving speech. All feasible and reasonable efforts should be made to reduce noise to within these levels.</p> |
| <p>Upper DSL indoor assessments</p> <p>Conducted within Standard Hours under Activities Local Law section 9.5 or 9.6 as appropriate.</p> <p>For structure-borne noise, alternate working methods to reduce noise may not be available. Therefore operating hours and the degree to which the noise exceeds the DSL needs consideration. Flexible scheduling and periods of respite should be emphasised.</p> | <p>55dB(A) Leq</p> <p>Indoors with windows closed: for structure-borne noise or where there is no representative outdoor location.</p> | <p>For works with noise exceeding these levels, an explanation of the need to undertake works, careful scheduling, provision of periods of respite and close communication with affected parties will be required.</p> <p>Council is likely to undertake further action the noise exceeds these levels and the builder/contractor has not correctly identified impacts or demonstrated an appropriate level of noise management and community consultation.</p> |
| <p>General works outside normal hours</p> <p>Conducted during non-standard hours</p> | <p>Council does not use DSLs to manage general works outside of standard hours.</p> | <p>After-hours permits may be issued depending on the reason for working outside of standard hours, the type of works, the history of the site performance and the location of the site in relation to different sensitive uses.</p> <p>It may be considered most appropriate to undertake works outside of standard hours to find a compromise that minimises impacts on all affected sites, for examples, where there are local businesses but no residents in the area.</p> <p>Conditions to manage noise are placed on permits, such as community notification, quiet work practices and staff conduct. Permits may be revoked or adjusted in response to community complains and/or inappropriate conduct.</p> |



4

COUNCIL'S APPROACH TO NOISE ASSESSMENTS FOR LOW, MEDIUM AND HIGH IMPACT PROJECTS

Council regularly undertakes noise measurements at building sites within the City of Melbourne and compares these to its Designated Sound Levels (DSLs). These measurements may be done in response to a noise complaint or as part of proactive monitoring.

A decision by Council to undertake noise measurements will depend on the nature of the noise, expected duration, the type of overall project and any complaints received. Once a noise measurement is taken, Council will make a judgement as to how strictly it will apply the DSL.

Depending on the circumstances, Council may choose to apply the DSL as a means of determining 'nuisance' and enforcing the Local Law, or it may use the measurement as a general guide to nuisance and/or to assess whether

further noise management is expected from the site.

In cases where the builder/contractor has applied 'a reasonable level of noise management', minor fluctuations are not likely to result in a determination of nuisance.

Conversely, application of the DSL may be more stringent where the noise has strong tonal or impulsive characteristics, or occurs during sensitive hours without proper justification.

Without limiting the ability of Council to exercise judgement, general factors to consider in the application of DSLs are:

- time of works (with regard to sensitive periods such as 7am to 9am for residents or 12pm to 2pm for restaurants as

described in section 4.3: Noise Sensitive Zones and noise levels)

- tonal qualities such as those from beeping, grinding or metal-on-metal contact
- impulsive characteristics such as noise from impact equipment, hammer drills, jackhammers, rock breakers etc
- strong low-frequency components such as noise from idling engines that affect sleeping areas
- the duration of the noise
- the land zoning and local context in which the noise occurs
- protected special uses such as medical uses or audio production facilities



- the level of noise management exercised by the builder/contractor, including community consultation.

Council policy clearly states that a greater level of noise management is required for works exceeding DSLs, in order to demonstrate that due care has been taken in planning, operations and community consultation.

It is not the intention of Council to adopt an approach that relies on noise measurements in every case. Many of the techniques used to manage construction noise involve common sense and non-technical approaches such as scheduling of works or location of equipment.

Therefore Council's general approach focuses on finding practical solutions to the management of noise in the first instance.

Some noise-affected areas may already have high noise levels due to typical activities within the premises. Examples include bars or cafés where noise from people may exceed construction noise. These types of premises may be able to tolerate higher construction noise levels, which Council will consider when making an assessment.

4.1 General nuisance assessments

Council may not need a noise measurement to determine the existence of a nuisance.

For example, a nuisance decision without a noise measurement might be made where 'a special use' is affected, such as a medical facility, aged care facility, crèche or school.

Other examples of when a nuisance may exist without measurement is when offensive noise occurs early in the morning or late at night, and the builder/contractor has not demonstrated sufficient justification for the works, has not attempted to explore quieter working practices, or has not appropriately notified affected parties. Works on public holidays or during recognised public events may also be considered a nuisance, particularly where proper management measures have not been implemented.

4.2 Enforcement by Council

Council may take further action if noise exceeds DSLs or Council has determined a nuisance exists and the builder/contractor has not demonstrated an appropriate level of noise management and community consultation.

Actions may include greater community consultation, provision of respite periods, adjustment of work hours, change in work practices, submission of more detailed noise management information, submission of an acoustic assessment, a requirement to cease works, or issuing of an infringement notice.

Legal action may follow where a notice or an infringement has been served and the proponent has not adequately responded.

4.3 Noise Sensitive Zones and noise levels

Noise Sensitive Zones are used to help noise assessments and determination of DSLs in a number of ways:

- The zones provide a framework for managing noise impacts, undertaking acoustic assessment and predicting noise levels for a project.

- The typical sensitive periods for a 'use' will be considered by Council when making a noise assessment and measurement.
- For high-impact projects, the zones are used to determine DSLs at various locations.

4.3.1 Area for consideration and noise levels

The area for consideration is provided as a general guide for assessing sites sensitive to noise, community notification and project planning. Projects will generally not be required to assess noise for all uses within the area. An assessment at the closest or most affected sites will usually suffice.

TABLE 3: NOISE SENSITIVE ZONES

| ZONE | LAND USES | TYPICAL SENSITIVE PERIODS | LIKELY AREA FOR CONSIDERATION |
|--------------------------|---|---|--------------------------------|
| Sensitive Zone 1: | Residential buildings, homes, hotels and motels | 7am–9am, Mon–Fri 8am–10am, Sat–Sun | Within 200m from site boundary |
| Sensitive Zone 2: | Crèches, schools, hospital wards, nursing homes and other noise sensitive areas identified by Council | Case specific, will require consultation with the affected premises | Within 100m from site boundary |
| Sensitive Zone 3: | Office buildings | Will generally be equally sensitive during typical hours (9am–5pp, Mon–Fri) | Within 50m from site boundary |
| Sensitive Zone 4: | Restaurants or cafes | 12pm–2pm for lunchtime trade | Within 50m from site boundary |



These requirements are a guide and do not preclude additional requirements where particular sensitive groups are affected by construction activity. Council reserves the right to restrict the hours of operation for certain types of works with respect to sensitive uses.

4.3.2 Typical sensitive periods and noise levels

There are also periods within standard working hours (defined under section 9.5 and 9.6 of the Activities Local Law 2009) where noise has a greater impact on sensitive sites. (e.g. residential uses during the sensitive early morning period).

For all projects, planning of activities should attempt to minimise noise during sensitive periods as far as reasonably possible. When planning a high-impact project with input from an acoustic consultant, predictions of noise levels can be used to indicate what activities are most likely to be an issue, which may help in terms of project coordination and avoid impacts during sensitive periods.

4.3.3 Procedure for measurements

Noise measurements by Council follow the above guidelines as well as technical procedures set out in Section 7.1: Noise measurement procedures, page 30.

4.4 Vibration assessments

An acoustic consultant may be required to undertake vibration assessments for projects with an identified risk of creating vibration that negatively impacts on nearby buildings or infrastructure, or negatively affects people within nearby buildings.

Vibration assessments may also be required in response to a complaint or concerns expressed about damage to nearby buildings or infrastructure.

Vibration assessments may include predictive analysis, assessments during trial operations, or ongoing monitoring.

4.4.1 Procedure for measurements

Technical measurements are set out in Section 7.1.1: Measurement procedures and duration measurement descriptor, page 30.

5

NOISE AND VIBRATION MANAGEMENT PLANS FOR MEDIUM AND HIGH IMPACT PROJECTS

The Activities Local Law 2009, Part 9 Building Works (Nuisance Abatement) outlines requirements for a person to notify Council before they carry out building works. If requested, a Construction Management Plan (CMP) must be submitted and approved by Council before building works begin.

5.1 What is a Noise and Vibration Management Plan?

A Noise and Vibration Management Plan (NVMP) may be required as a component of a CMP. An NVMP:

- identifies works that have the potential for noise or vibration impacts
- identifies noise-sensitive sites in the locality
- examines work practices and assesses means to reduce noise

- outlines communication and community consultation commitments for a project
- may contain acoustic assessment and the advice of an acoustic consultant
- embeds a formal commitment to manage noise as part of a CMP.

The level of detail expected in an NVMP will depend mainly on the scale, duration, hours and type of works employed in a project.

An NVMP may only require community notification and work scheduling. However, medium to high impact projects may also require assessment of individual work practices while high impact projects will generally require input from an acoustic consultant as part of project planning and often during project delivery.

As part of a CMP, an NVMP may be requested in the following circumstances:

- by Council's Planning and Building Branch department or by the responsible authority under the planning scheme when assessing a planning application
- where Council identifies works that have the potential to substantially interfere with community amenity, or
- in response to a noise complaint received when works begin.

5.2 Council's requirements at project 'planning stages'

Different levels of information on noise and vibration management will be required during each stage of a project. A proactive approach on the part of the builder/contractor is needed from the outset, as well as flexibility



to adopt new measures and respond to issues as they arise during works' stages.

Builders/contractors can achieve a good relationship with the community and the Council if noise management is included as part of early project planning. A clearly thought-out approach to noise management will help set reasonable expectations for the community and the Council, helping to minimise issues when works commence.

5.2.1 Planning permit stage

Council recognises that when a planning application is received and planning permit approval is given for a construction project, only very basic information may be known about how the site will be managed and how works will be undertaken.

Therefore, at the planning permit stage, an applicant will be required to provide a general project

overview. This overview will need to include basic descriptions of how noise management will be considered as part of each works' stage (equipment selection, site layout, work practices or acoustic advice if applicable) and a commitment to the further development of noise management practices as the project progresses. This information will form part of the project's CMP and be submitted to Council.

The commitment to provide more detailed or specific information as it becomes available will usually be formalised within an NVMP though a condition:

'to provide detailed information on noise management for each stage of works as soon as is practicable after the appointment of the principal contractor for each stage of works, and before the commencement of those works'.

5.2.2 Project planning and design

As a project develops, principal contractors may be commissioned for each stage of development (as applicable to the project), including demolition, excavation and construction. It is important that noise management is discussed as part of the contract specification for each stage of works. High impact works should be identified, alternatives explored and measures planned to mitigate noise.

During the project planning stage, specific work practices should be developed in a way that is considerate of noise and vibration impacts. The principal contractor should assess the potential noise impacts of specific work practices as knowledge develops about each aspect of the project. Council expects that all feasible and reasonable measures be put in place to control noise and

vibration. Feasibility relates to what is practical and reasonable to implement in relation to the balance of costs and benefits, taking into account community views.

Decisions at this stage can include an agreement to include low-noise working techniques and equipment. Commitments can also be made to develop specific noise management processes as the project develops. Significant noise management processes should be factored into project costing.

If acoustic advice is sought at this stage it can be properly integrated into the working program.

Cost efficiencies can be gained when acoustic advice and related processes are included as a proactive rather than reactive measure.

5.2.3 What information should be submitted to Council?

At the project planning and design stage, an applicant is required to provide further detail and specific commitments on how noise management will be embedded into each stage of works.

This information should be presented as:

- an assessment of which works are at higher risk of creating a noise or vibration impact, with reference to duration, hours, type of works and proximity to sensitive locations

- an explanation of how all feasible and reasonable measures have been put in place to control noise
- detail on any elements that are likely to remain as outstanding issues once noise control strategies have been put in place
- related community notification and consultation processes, including general contact and notification/consultation specific to the periods of higher impact works.

Where applicable, the assessment and noise control strategies should be explained in relation to Council's Designated Sound Levels.

This information should be submitted to Council as an expansion / addition to the Construction Management Plan. Ongoing discussions and feedback from Council are encouraged as the Noise and Vibration Management Plan is developed.

5.3 Council's expectations through works' stages

Building works may include demolition, excavation and construction stages. Commitments established during planning, and formalised through contract specification, should provide a clearly defined framework for site practices and responsibilities.

During works' stages the builder/contractor is expected to monitor work practices (and noise levels if applicable), review practices as

required, respond to complaints appropriately and notify/consult with the community as periods of very noisy works arise.

If a complaint is received about noise or vibration once works begin, the builder/contractor and/or Council will refer to the NVMP to see if conditions are being followed and take action as appropriate.

5.3.1 Case scenarios

Example 1: After attending a complaint about noise from idling trucks on a medium impact construction project, Council referred to the project's NVMP. It was a condition of the plan for truck drivers to turn off engines when not in use. The principal contractor had included this requirement in sub-contract specifications, which helped them to manage the issue quickly.

Example 2: After attending a complaint about noise from an air compressor, Council found the unit was in a poor state of maintenance and had a hole in its exhaust, which was creating the noise issue.

A condition of the project's NVMP was 'that equipment should not be operated if maintenance or repairs would eliminate or significantly reduce a characteristic of noise resulting from its operation'.

Council directed that use of the equipment be ceased until repairs were made or a replacement was sourced. The principal contractor decided to rent a replacement for the duration of the project.

5.3.2 When might a builder/contractor want to amend an Noise and Vibration Management Plan during works stages?

A builder/contractor may wish to amend an NVMP during works' stages for the following reasons:

- issues may arise that require further attention in terms of noise management, such as new or changed work procedures
- components of working procedures may not be developed until general works begin
- significant community concern occurs as the project develops
- complications may prevent some noise management commitments being met, or
- new noise sensitive uses may be established during the project.

5.3.3 How should new NVMP information be submitted to Council?

Council's Activities Local Law 2009, (section 9.3) states that a Construction Management Plan may be modified with the consent of the Council. Modifications to the NVMP should be discussed with Council and amendments submitted in writing for approval.

5.3.4 When might Council request an NVMP during works' stages?

Council may request additional noise and vibration management information during works' stages. Typical reasons may include the following:

- an NVMP may not have been requested earlier

- significant community concern is received as the project develops, particularly in relation to sensitive hours
 - Council is not satisfied that previously submitted information sufficiently addresses work and community consultation requirements
 - Council identifies errors or omissions in the management plan, or
 - noise complaints are received and the attending officer believes the source of the noise or vibration requires further attention due to its level, character, duration or timing.
- Council may also include a request for the recommendations of an appropriately qualified and experienced acoustic consultant. (see section 6: Acoustic advice).

TABLE 4: STAGES OF DEVELOPMENT AND THE NOISE MANAGEMENT PROCESS

| STAGE OF DEVELOPMENT | NOISE MANAGEMENT PROCESS FOR A NOISE AND VIBRATION MANAGEMENT PLAN (AS PART OF A CMP) | |
|---|---|--|
| Planning Permit approval | Conceptual discussion Commitment to general approach: 'to provide detailed information on noise management for each stage of works as soon as is practicable after the appointment of the principal contractor for each stage of works; and before the commencement of those works'. | |
| Project Planning stage | Development of concepts Listing more specific processes | |
| Design stage | Embedding practices Builder/contractor encouraged to include practices in contract specification/costing etc. | |
| Demolition Excavation Construction | Proactive From builder/contractor <ul style="list-style-type: none"> • Review of practices • Response to complaints • Monitoring of practices/ noise • Communication strategies with residents | Reactive From Council or builder/contractor <ul style="list-style-type: none"> • Responding to complaints • Checking against NVMP commitments • Noise measurements |
| Occupancy Permit (Completion of all noisy works) | From Council <ul style="list-style-type: none"> • Site inspections • Noise readings • Discussions with builder/contractor | |
| | Proactive <ul style="list-style-type: none"> • Seek feedback from stakeholders (incl Council) • Review acoustic reports (if applicable) • Identify measures that did and did not meet expectations • Incorporate learnings into next projects | |



6

ACOUSTIC ADVICE FOR HIGH IMPACT PROJECTS

High-impact projects have the potential to generate greater levels of noise for a longer period of time.

For these projects Council will usually require submission of an Noise and Vibration Management Plan (NVMP) that includes acoustic advice as a key component.

Acoustic advice may include examination of noise reduction methods, prediction of noise levels and comparison to Council's Designated Sound Levels (DSLs), detail on noise control limitations, measurement of noise and measurement of background noise levels.

6.1 When is acoustic advice required?

A builder/contractor might seek acoustic advice as a proactive component of project planning, or as a means to resolve complaints after works begin. Council prefers the proactive approach as it tends to yield the best outcomes in terms of flexibility and cost efficiency for the project.

Council expects managers of high impact projects to engage an acoustic consultant as a matter of course during project development. Although Council may specifically request the commissioning of an acoustic consultant, it generally encourages acoustic advice as an integral part of planning for any high impact project.

Any new development deemed significant enough for the planning application to be processed by a relevant authority other than Council, should include acoustic advice as part of project planning and development.

There are cases when Council will approve short-term works and acoustic assessment is considered unnecessary. In these cases, the approach for upper DSL outdoor and indoor assessments and general works would be used (see section 3.2: How to apply Designated Sound Levels (DSLs), page 17, table 2).

TABLE 6: DESIGNATED SOUND LEVELS (DSL)S) AND RELATED ACTIONS FOR HIGH-IMPACT PROJECTS REQUIRING ACOUSTIC ASSESSMENT

| WORKS AND HOURS | ACTION LEVEL | BASIS AND ACTIONS |
|--|--|---|
| <p>Baseline DSL Standard Hours under Activities Local Law section 9.5</p> <p>7am to 7pm Monday to Friday, 8am to 3pm Saturday</p> | <p>$L_{90} + 10\text{dB(A)}$ Leq (Zone 1,2)</p> <p>$L_{90} + 15\text{dB(A)}$ Leq (Zone 3,4)</p> <p>(Measured at the façade of the affected building)</p> | <p>Works generating noise below these levels would generally not require additional noise management and community consultation. General notification and noise sensitive work practices are still expected, including informing the community of work periods and a contact point for complaints.</p> <p>When the predicted or measured noise level is above this point, the builder/contractor should implement additional measures to minimise noise. They should demonstrate to Council that all feasible and reasonable measures have been put into place to minimise impact and should exercise additional community consultation during these periods of works.</p> |
| <p>Baseline DSL Non standard hours</p> <p>7pm to 10pm Monday to Friday, 3pm to 10pm Saturdays, 9am to 6pm Sundays and public holidays</p> <p>Requires permit from Council, including operational conditions. Issued with consideration for history of complaints and site conduct.</p> | <p>$L_{90} + 10\text{dB(A)}$ Leq (Zone 1,2)</p> <p>$L_{90} + 5\text{dB(A)}$ Leq (Zone 1,2)</p> <p>$L_{90} + 15\text{dB(A)}$ Leq (Zone 4)</p> <p>(Measured at the façade of the affected building)</p> | <p>Works during these hours are generally discouraged. When a project demonstrates a need to work during these hours for extended periods, all feasible and reasonable measures should be implemented to reduce noise to this level. More substantial expectations apply to what is reasonable for noise management during night periods.</p> <p>Other than special circumstances, Council is unlikely to approve ongoing works that exceed this level. If approved due to special circumstances, the builder/contractor should communicate closely with affected people. Direct negotiation may be required if works will exceed the DSL. Council may facilitate this process.</p> |
| <p>Baseline DSL Night period</p> <p>10pm to 7am Monday to Friday, 10pm to 8am Friday/Saturday, 6pm to 9am Saturday/Sunday and around public holidays</p> <p>Requires a permit from Council, including operation conditions. Issued with consideration for history of complaints.</p> | <p>$L_{90} + 5\text{dB(A)}$ Leq (Zone 1,2)</p> <p>(Measured at the façade of the affected building)</p> | <p>Works during these hours are generally discouraged. When a project demonstrates a need to work during these hours for extended periods, all feasible and reasonable measures should be implemented to reduce noise to this level. More substantial expectations apply to what is reasonable for noise management during night periods.</p> <p>Other than special circumstances, Council is unlikely to approve ongoing works that exceed this level. If approved due to special circumstances, the builder/contractor should communicate closely with affected people. Direct negotiation may be required if works will exceed the DSL. Council may facilitate this process.</p> |

6.2 Project planning and design

As project planning develops, it may become evident that acoustic advice is needed due to elements such as:

- significant community concern
- extended periods of demolition
- a proposal to include works such as pile driving or rock breaking
- noisy works during evening or weekend periods
- works during the night
- close proximity to sensitive sites and a need to balance noise impacts, or
- works being undertaken that pose a risk of vibration or structure-borne noise impacts.

6.3 Works' stages

When noise management information has to be submitted in response to community concern during works' stages, Council may also request the inclusion of advice from an acoustic consultant. Typically, a request for acoustic information would occur for high-impact projects in the following circumstances:

- Council is concerned the builder has submitted information that does not explore all reasonable options for noise control.
- The project has a significant vibration component that is likely to continue for a number of days.
- Noise or vibration is affecting a sensitive use such as a recording studio or hospital.
- Noise levels exceed those prescribed by Council by a significant margin.

6.4 What should acoustic advice achieve?

Acoustic advice may be useful in a number of ways. Ongoing input from an acoustic consultant will assist decision-making processes, help to provide reasonable and tangible targets for noise reduction and ensure that appropriate noise control measures are introduced.

Engaging an acoustic consultant as part of project planning can help demonstrate to Council and the community that noise has been adequately considered and addressed.

Acoustic advice can bring another level of expertise to a project and can help with decisions about the cost/benefit of noise or vibration reduction measures such as:

- scheduling of noisy works
- work practices, such as choice of piling technique
- equipment selection
- noise screens, such as height, design and mass of screens and barriers.

Acoustic consultants can calculate noise and vibration exposure for sensitive sites using Council's DSLs. Alternatively, they can determine project-specific target noise levels based on background noise measurements and Council criteria.

This process can be used to determine which works comply with the noise criteria and which works pose risks once all feasible measures have been put in place. Once these high-risk works and their likely impacts have been identified, the acoustic consultant can work with the builder/contractor to identify:

- appropriate work scheduling arrangements to minimise noise impacts
- which types of noisy works cannot reasonably be controlled further and may require additional public consultation or negotiation
- a noise monitoring arrangement suitable for the project.

For long-term or very noisy works where there are a number of noise-sensitive sites, analysis by an acoustic consultant may help to determine a 'balanced impact' approach to noise. An acoustic consultant can assess the level of noise experienced at various locations on a site and suggest measures such as screening or scheduling of works, so that one location is not unreasonably exposed.

This kind of approach is also useful to determine whether the benefits of implementing a noise reduction measure are outweighed by the drawbacks (such as prolonging the total duration of noisy works). Community consultation and negotiation can be aided if immediate noise reduction benefits can be compared with the overall effect for the duration of the project.

6.4.1 Noise levels and project limitations

Depending on the works involved and the location of noise sensitive uses, not all activities will feasibly or reasonably be able to meet Council's DSLs. Input from an acoustic consultant will help to demonstrate these limitations, so that a balanced approach can be achieved.

When works are proposed outside standard working hours (such as weekend, evening or night-time works), an acoustic consultant can undertake further assessments to determine which works are allowable and which pose a risk of unacceptable impacts on the community.

Engaging an acoustic consultant as part of project planning can help demonstrate to Council and the community that noise has been adequately considered and addressed.

7

NOISE MEASUREMENT PROCEDURES

This section addresses:

- measurement procedures
- requirements for acoustic consultants
- background noise assessments, and
- vibration assessments.

7.1 Noise measurement procedures

For the purposes of these guidelines, a noise sensitive room means any habitable room, workspace or otherwise sensitive area (excluding service areas, bathrooms or other similar areas) that is within a land use recognised in Council's Noise Sensitive Zones, or within a site specifically acknowledged by Council as requiring protection from construction noise under the Local Law.

7.1.1 Measurement procedures and duration

Measurement descriptor

The measured sound pressure level shall be an equivalent continuous sound pressure level with the sound level meter set on the a-weighting and time-weighting F (fast response) (laeq, t).

Time and duration of measurement

The noise under investigation should be sampled over a period sufficiently long enough to be representative of the particular works being assessed. The assessment period shall not be less than 10 minutes but may necessarily be up to 30 minutes per sample.

The measurement shall not include periods of inactivity during breakdowns, meal breaks, industry rostered days off, public holidays or other substantial stoppages or site absences.

The measurement shall not include extraneous noise that could affect the level of the noise being assessed.

Noise management from construction sites should focus on individual activities and periods of works and identify ways to better manage and communicate these. Accordingly, noise measurement should generally focus on particular activities rather than average noise levels throughout the day, although an indication of average noise levels may assist in some circumstances.

7.1.2 Measurement location

Measurement location

For the assessment of noise from building works, the microphone should be located with respect to the noise sensitive room, where the person affected by the noise is situated, and the practicality of measurement, either:



- a) near the façade of the noise-affected premises, or
- b) from a point at the façade opening (e.g. window/doors) inside the noise-affected room.

It is considered preferable to measure near the façade of the noise-affected premises by taking a measurement from a balcony or other outdoor area.

The microphone of the sound level meter should be located between a height of 1.2 metres and 1.5 metres above the ground or the floor level of interest.

Where a measurement is taken within 3.5 metres from reflecting structures, such as the façade of the building, the preferred measurement positions are 1 metre from the façade and 1.2 to 1.5 metres above the ground or each floor level of interest.

With consideration for these requirements, the microphone will be located at a point where the highest sound pressure level of the noise under investigation can be obtained.

Suitable indoor measurements, open façade, alternative locations

For indoor measurements where a window or door is the major transmission path for the noise, then it shall be fully open during the measurement and all reasonable steps should be taken to locate the microphone in or close to the opening.

Where it is not possible to take an 'open façade' measurement because the windows/doors of the building are sealed or it is not feasible to locate the microphone at the opening, all reasonable efforts should be made to undertake a measurement at a representative outdoor location.

Options may include other floors or areas in the same general part of the building with opening windows/doors, open roof areas and ground level locations. Considerations for the suitability of the measurement location include the presence of local noise sources such as roof plant/equipment, nearby traffic noise for ground measurements, or likely differences in noise level because of the effect of barriers or hoardings. For consideration of barriers, the person undertaking the assessment should consider whether 'line of sight' to the noise source in the chosen alternative location is representative of that for the noise-affected area.

Where it is not considered appropriate to undertake an external noise measurement, the procedure for indoor measurements should be followed.



Indoor measurements

Although it is generally preferential to measure outside the noise-affected premises, there are situations where a measurement taken inside the noise-affected room may be considered more appropriate. These are:

- when the noise is entering the room through the building structure or air conditioning system, rather than through windows or doors
- when it is not possible to find an outdoor location that is representative of the noise level outside the affected room
- where it is not possible to place the microphone at the opening of the façade because of access issues or because the construction does not permit opening of windows.

In these situations an internal noise measurement should be undertaken, with windows and doors closed. For these indoor measurements, the criteria of 55dB(a) leq shall be applied, instead of the 75 dB(a) leq as used for outdoor measurements. Please see table 2, page 17, for more information.

Measurements indoors should be taken in a location that is representative of the area in which the noise-sensitive use takes place. The measurement location

should be close to the centre of the room and away from any barriers or partitions that may affect the noise level.

During the measurement, all reasonable steps should be taken to suspend local activities and noise sources with the potential to interfere with the measurement. Examples include conversation, telephones, radios and printers.

Measurements indoors should be taken in a location that is representative of the area in which the noise-sensitive use takes place.

7.1.3 Measurement equipment and calibration

Measurement equipment

The equipment used should conform to the specifications for sound level meters of Class 1 or Class 2 as contained in Australian Standard AS IEC 61672.1-2004, Electroacoustics – Sound level meters.

Calibration

The sound level meter and portable sound level calibrator must be

calibrated at least every two years by a calibration laboratory as specified in AS1055.1-1997.

Field checks

The performance of the sound level meter, when in use, shall be checked periodically with a portable sound level calibrator, piston phone or other portable checking device appropriate to the sound level meter.

Calibration checks should be made before and after measurements are made. For extended measurement periods, these checks should be performed before and after each measurement sequence. The instrument shall not be switched off between checks. If the instrumentation system registers a discrepancy equal to, or greater than, 1dB between consecutive checks, any measurements in the interval between the two checks shall be considered invalid.

7.2 Vibration assessments

The following vibration levels have been designated by Council and should be adopted. For vibration levels exceeding these criteria, the acoustic consultant should submit further information detailing the degree of various risks and impacts with respect to the affected locations and uses, and

suggest approaches to managing these issues.

Alternatively, the acoustic consultant may choose to undertake assessments in accordance with an accepted standard for vibration management. The chosen standard and the general approach taken for adherence to prediction and measurement protocols should be included in a report to the builder/contractor and Council. If the predicted or measured vibration levels are in excess of the chosen standard, management actions should be implemented as appropriate to the standard and the vibration levels.

7.2.1. Designated vibration levels

The designated vibration levels are:

- Peak particle velocity level of 10mm/s when measured at the site boundary.
- Peak particle velocity level of 2mm/s when measured on a foundation, floor, wall or ceiling surface of a building located in sensitive zones 1 or 2.
- Peak particle velocity of 5mm/s when measured on a foundation, floor, wall or ceiling surface of any other adjoining building.

7.2.2. Vibration measurements

The following considerations apply to vibration measurements:

- The equipment used shall be selected by a suitably qualified acoustic consultant and shall be listed in detail in any report submitted to Council.
- All vibration equipment shall be laboratory calibrated.
- The transducer shall be mounted intimately on the surface of the building element being assessed for vibration.
- Those making the transducer selection and mounting arrangement should ensure the resonant frequencies associated with the transducer in its mounted arrangement are sufficiently different from the main frequencies experienced for the evaluation.

How to contact us

Online: melbourne.vic.gov.au

Telephone: 03 9658 9658

7.30am to 6pm, Monday to Friday
(public holidays excluded)

National Relay Service: If you are deaf, hearing impaired or speech-impaired, call us via the National Relay Service: Teletypewriter (TTY) users phone 1300 555 727 then ask for 03 9658 9658

9am to 5pm, Monday to Friday
(Public holidays excluded)

In person:

Melbourne Town Hall - Administration Building
120 Swanston Street, Melbourne

7.30am to 5pm, Monday to Friday
(Public holidays excluded)

In writing:

City of Melbourne
GPO Box 1603
Melbourne VIC 3001
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Fax: 03 9654 4854