

# **Guidelines**

## **Construction and Demolition Noise Controls for Development and Redevelopment Sites**

### **Introduction**

This guide may provide the basis for an environmental code of practice concerned with noise from construction and demolition activities as they affect persons living in the surrounding neighbourhood. Whilst this guide acknowledges a desire to protect all persons from excessive noise, it is to some extent governed by what is currently considered to be noise sensitive premises.

Construction and demolition works pose different problems of noise control compared with most other types of industrial activity, since:

- they are mainly carried out in the open;
- they are of temporary duration though in built-up areas they may cause great disturbance while they last;
- the noise they make arises from many kinds of plant and machinery, both fixed and mobile, that present difficult and costly measures for noise mitigation
- the noise they make arises from many different activities, and its intensity and character may vary greatly at different phases of the work;
- the sites cannot be divorced by planning control, as factories can, from areas which are sensitive to noise.

Much of the noise from construction and demolition sites is caused by machinery and in the last few years increased mechanisation has meant the use of more powerful and potentially noisier machines. It is now widely recognised that the noise levels generated are unacceptable in many instances and that reductions are necessary for the benefit of both the industry and the public.

It is essential that planners, developers, architects and engineers all play their part in avoiding potentially excessive noise levels. They should give careful consideration to the design of the proposed project, the processes and equipment implied by the design, and the phasing of operations. It is important to ensure that the design keeps to a minimum the number of operations that are likely to be particularly noisy.

It will be necessary to determine the expected level of neighbourhood construction noise. The developer, architect and engineer will need to know whether the processes, which they intend using, are likely to be permitted. An early consultation should be sought with the Waste and Pollution Management section, Environment Protection Agency, in order to ascertain any limits likely to be required.

The Waste and Pollution Management section will endeavour to ensure that the noise level limits they are proposing are workable. Account will be taken of other remedial measures and their effect; in particular, the potential for adoption of AS 2436-1981 under the Building Act 1996. Furthermore, when permanent barriers are a feature of the final design, consideration should be given to their early construction so as to provide protection during construction operations.

Measures are listed here which those concerned in the development and execution of construction can adopt to ensure that good environmental practice is employed with regard to the minimisation of offsite noise emissions. Any such measures should also have due regard to occupational health and safety requirements as defined under the Work Health Act.

Discussion on appropriate legislation, terminology, estimation techniques of noise from sites, monitoring, sound levels from plant, noise sources, and noise mitigation techniques can be sought

from the Waste and Pollution Management. Useful references are given in appendix A.

## Notice to Developers

### General

The intention at each stage of the project should be to reduce levels of construction, maintenance and demolition noise by the most practicable means. Such measures should take into account various considerations, such as:

1. site layout, e.g. Location of static noise sources and use of site buildings, material dumps, and the like as *ad hoc* barriers;
2. types of construction, maintenance and demolition machinery or processes likely to be used, and whether alternative types or techniques would achieve less noisy operations;
  - (i.) specific measures such as the use of silencers, mufflers, shielding, sheds, barriers; and
  - (ii.) the hours of working and consideration of the effects on the neighbourhood and on persons working on site, account being taken of the nature of land use in the area, duration of works and the effect of lengthening work periods on other nuisances which affect the neighbourhood, e.g. dust, odours.

**NOTE:** Where work continues outside of normal working hours, 7 AM to 7 PM Weekdays and 9 AM to 6 PM Sundays and Public Holidays, and is in or near to a residential area, work should be programmed so that offsite vehicles need not visit the site at inappropriate hours. Where large quantities of overburden are to be removed, for example, it is common practice to provide night-time storage areas for soil and debris that have failed to be removed from site prior to the end of normal working hours.

### Design Stage

All available information should be assessed in order to consider the implications of noise. The design of the project will have considerable influence on the contractor's use of the site. It will partially determine where such items as haulage roads, batching plants and generators will be sited. Where a number of contractors are to be working on a site it is necessary to plan overall site operations to ensure that each contractor is aware of their obligation to minimise noise emissions.

### Site Conditions

Site conditions should be thoroughly investigated in order to consider methods of working which minimize site noise and reduce the possibility of changes in methods caused by unforeseen circumstances.

### Site Layout

A survey of the immediate surroundings should be carried out to determine the location of the noise-sensitive areas. Design and subsequent planning of construction, maintenance and demolition operations should take into account the special requirements of the noise-sensitive areas, and identify what level and type of noise mitigation would be best suited. It may be necessary for the contractor carrying out the work to seek the assistance of a noise consultant in these matters.

In conjunction with the responsible authorities, preferred off-site vehicle routes should be established which keep access traffic away from noise-sensitive areas, such as dwellings, hospitals and schools.

At the time of the preliminary surveys any noise restrictions to be applied should be established and advice sought from the Waste and Pollution Management, Environment Protection Agency.

## **Tender Stage**

Site conditions should be thoroughly investigated and reported in the Tender documents, along with proposed methods of working which minimise site noise and reduce the possibility of changes in working practice caused by meeting unforeseen circumstances. The survey of the immediate area will indicate the location of noise sensitive areas.

Any noise restrictions to be applied should be included in the Tender documents. Careful design of the site layout can limit the spread of noise. At the same time as the issuance of a building permit is sought (Building Act 1996) or at a similar stage, advice should be sought from the Environment Protection Agency as to the need for any approvals under respective legislation

Both the tender and contract documents should define, where feasible, the;

- potential activities to be undertaken ie rock breaking or earth moving; .
- working practices, including work schedules;
- equipment to be used and potential noise emissions (predicted or previously measured in the case of machinery noise);
- details of any noise controls to be implemented;
- any procedures to be adopted for monitoring noise emissions and any
- complaint response procedures to be adopted.

All available techniques should be used to minimize the potential level of noise to which people in the neighbourhood and workers are exposed.

On those parts of the site where high levels of noise are likely to occur, and where mitigation is either impractical or impossible due to restrictions imposed by other legislation, contractors should seek exemptions, where applicable. Where there is any doubt the tenderer should seek clarification from the Waste and Pollution Management section of the Environment Protection Agency.

A tenderer should be satisfied that the proposed methods of working and phasing of operations will meet any legislative requirements or best practice and should be clear about their position in relation to any relevant noise policy and legislation before commencing construction and or demolition works. The tenderer will need to check that the proposals put forward by sub contractors are similarly acceptable.

## **Construction and Demolition Stages**

Noise levels on the site should be monitored regularly, particularly if different machinery is used or changes in the design of the works are introduced. Responsible persons should also check on neighbourhood noise levels.

- All available techniques should be used to minimise the level of noise to which workers and people in the area are exposed. Measures that should be taken include the following.
- A program of works to minimise noise including the possibility of using soil dumps and other intermediate stages of construction as noise barriers, etc. (See also Appendix B)
- Specific measures such as the use of silencers, mufflers, shielding, sheds, barriers.
- Planning the hours of working and considering the effects on the neighbourhood and on persons working on site, taking into account the nature of landuse in the area, duration of works and the effect of lengthening works period on other nuisances which affect the neighbourhood, such as dust etc.
- Ensuring the adoption of quieter types of construction, best practicable available plant, reasonable hours of working for noisy operations and economy and speed of operations

Where exemption is sought to continue work throughout the twenty four hours of the day and is in a residential area, work should be programmed where appropriate, so that off site vehicles need not visit the site between the hours of 7 PM and 7 AM.

### **Community Consultation**

It is important for all personnel on construction, maintenance and demolition sites to maintain good relations with their neighbours and to respect the rights of these neighbours to live or work nearby without being subjected to unnecessary or unreasonable noise. Where possible, all noisy operations should be carried out at a time to cause the least annoyance to neighbours. If noisy operations must be carried out, then a responsible person should maintain liaison between the neighbouring community and the developer. This person should inform the public at what time to expect noisy operations and also inform the developer of any special needs of the public. Consultation and cooperation between the developer and his neighbours and subsequent minimisation of uncertainty and rumour can help to reduce adverse reaction to noise.

### **Training**

Personnel including sub contractors should be informed about the need to reduce noise and about the hazards of excessive noise. As part of their training, they should also be advised on the following:

- the proper use and maintenance of tools and equipment;
- the positioning of machinery on site;
- avoidance of general construction and demolition noise;
- protection of persons against noise;
- the operation of sound measuring equipment (selected personnel). Special attention should
- be given to the use and maintenance of noise control equipment for tools and equipment, in addition to the use and maintenance of hearing protection. All persons issued with hearing protection should be instructed in its use, care and maintenance.

The training program should make it clear that there are several ways in which the worker can help himself to protect his hearing. For example, the worker can help himself:

- by using and maintaining measures adopted for noise control; and
- by reporting defective noise control equipment to the foreman or supervisor

## Appendix A: References

Waste Management and Pollution Control Act 1998	Building Act 1996
Work Health Act 1998	Work Health (Occupational Health and Safety) Regulations 1996
Summary Offences Act 1998	AS 2436-1981 Guide to Noise Control On Construction, Maintenance and Demolition Sites

## Appendix B: Controlling the spread of noise

### Methods of control

If noisy processes cannot be avoided then the amount of noise reaching the listener should be limited. Two ways of doing this are either to increase the distance between noise source and listener or to introduce noise reduction screens. For a fuller explanation contractors should review Appendix C of AS 2436-1981.

If structures such as stores, site offices and other temporary buildings are situated between the noisiest part of the site and the nearest dwellings, some of the noise emission from the site can be reduced. Storage of building materials between the noise source and any noise sensitive area may also provide useful screening and the same is true of partially completed or demolished buildings. Where such noise barriers are not practicable a worthwhile reduction in noise can be obtained by siting the plant behind mounds or hillocks of earth. The mound should be as close as possible to the noise source.

Water pumps and generators, which often operate on a 24-hour basis, are unlikely to be a source of noise nuisance by day but can create problems at night. They should therefore be effectively screened either by being sited behind a noise barrier or by being positioned in a trench or a hollow in the ground. In such cases, however, adequate ventilation should also be ensured.

Long, temporary earth embankments can provide quite an effective noise screen for mobile equipment moving, for example, on a haulage road. When the earthworks are complete the earth mounds should be removed if possible with smaller, quieter excavators. In many cases it will not be practicable to screen earth moving operations effectively but it may be possible to partially shield construction plant or to build in at the early stages protective features ultimately required to screen traffic noise. Where earth noise barriers are not a practical proposition due to lack of space, consideration should be given to the possibility of constructing temporary screens from wood or any of the materials.

The usefulness of a noise barrier will depend upon its length, effective height, its position relative to the source and to the listener and the material from which it is made. A barrier designed to reduce noise from a moving source should extend beyond the last property to be protected to a distance of not less than ten times the shortest measurement from the property to the barrier. A barrier designed to reduce noise from a stationary source should, where possible, extend to a distance beyond the direct line between the noise source and the receiver to a distance equal to ten times the effective barrier height.