Commonly Applied Construction Noise Mitigation Measures and Considerations for Noise Reduction

The measures below have been adapted from the New South Wales Construction Noise Guideline (August 2008 draft for consultation), Department of Environment and Climate Change, New South Wales, Australia.

General Mitigation Measures

- Include in tenders, employment contracts, subcontractor agreements and work method statements clauses that assure the minimization of noise and compliance with directions from management to minimize noise.

- Give preference to the use quieter technology or other mitigation measures rather than lengthening construction duration (i.e. it is not recommended to lower noise by having fewer pieces of equipment running at a time thereby leading to extended construction duration).

- Regularly train workers and contractors (such as at toolbox talks) to use equipment in ways that minimize noise.

- Ensure that site managers periodically check the site, nearby residences and other sensitive receptors for noise problems so that solutions can be quickly applied.

- Avoid the use of radios and stereos outdoors and the overuse of public address systems where neighbours can be affected.

- Avoid shouting, and minimize talking loudly and slamming vehicle doors.

- Keep truck drivers informed of designated vehicle routes, parking locations, acceptable delivery hours and other relevant practices (e.g. minimizing the use of engine brakes and periods of engine idling).

Night-time Mitigation Measures

- Avoid the use of equipment that generates impulsive noise.
- Minimize the need for reversing alarms.
- Avoid dropping materials from a height.
- Avoid metal-to-metal contact on equipment.
- If possible, schedule truck movements to avoid residential streets.
- Avoid mobile plant clustering near residences and other sensitive receptors.
- Ensure that periods of respite are provided in the case of unavoidable maximum noise level events.

Consultation and Notification

The community is more likely to be understanding and accepting of project noise if related information is provided and is frank, and does not attempt to understate the likely noise level, and if commitments are respected.

Notification Before and During Construction
Provide advance notification to people concerning construction duration, defining activities that are expected to be noisy and their expected duration, what noise mitigation measures are being applied, and when noise respite periods will occur.

For night-time work, receptors may be informed in two stages: two weeks prior to construction and then two days before commencement.

Provide information to neighbours before and during construction through media such as letterbox drops, meetings or individual consultation. In some areas, the need to provide notification in languages other than English may be considered. A Web site may also be established for the project.

Use a site information board at the front of the site with contact details, hours of operation and regular information updates.

Facilitate contact with people to ensure that everyone can see that the site manager understands potential issues, that a planned approach is in place, and that there is an ongoing commitment to minimize noise.

Plant and Equipment
In terms of both cost and results, controlling noise at the source is one of the most effective methods of minimizing the noise impacts from any construction activities.

Quieter Methods
Examine and implement, where feasible and reasonable, alternatives to rock-breaking work methods such as hydraulic splitters for rock and concrete, hydraulic jaw crushers, chemical rock and concrete splitting, and controlled blasting such as penetrating cone fracture.

Consider alternatives to diesel and gasoline engines and pneumatic units such as hydraulic or electric-controlled units where feasible and reasonable. When there is no electricity supply, consider using an electrical generator located away from residences.

Examine and implement, where feasible and reasonable, alternatives to transporting excavated material from underground tunnelling off-site at night-time. (i.e. stockpile material in an acoustically treated shed during the night and load out the following day).

Examine and implement, where feasible and reasonable, alternatives to pile driving using a diesel hammer, such as hydraulic hammer, hydraulic press-in, or vibratory pile driver.

To reduce the impact of backup alarms, examine and consider implementing, where feasible and reasonable, ambient sensitive backup alarms, signal workers, turning circles and side loading/unloading trucks.

Quieter Equipment
Examine different types of machines that perform the same function and compare the noise level data to select the least noisy machine (i.e. rubber-wheeled tractors can be less noisy than steel-tracked tractors).

Pneumatic equipment is traditionally a problem. Consider selecting super-silenced compressors, silenced jackhammers and damped bits where possible.

When renting (or purchasing) equipment, select quieter pieces of plant and construction equipment where feasible and reasonable. As well, select the most effective mufflers, enclosures and low-noise tool bits and blades. Always seek the manufacturer's advice before making modifications to any equipment to reduce noise.

Reduce throttle settings and turn off equipment when it is not being used.

Examine and consider implementing, where feasible and reasonable, the option of reducing noise from metal chutes and bins by placing damping material in the bin.

Equipment Maintenance
Regularly inspect and maintain equipment to ensure that it is in good working order, including the condition of mufflers.

For machines with enclosures, verify that doors and door seals are in good working order and that the doors close properly against the seals.

Return any leased equipment that is causing noise that is not typical for the equipment. The increased noise may indicate the need for repair.

Ensure that air lines on pneumatic equipment do not leak.

Site Mitigation Measures
Barriers and acoustic sheds are most suited to long-term fixed works as in these cases, the associated cost is typically outweighed by the overall time savings.

Plant Location
Place as much distance as possible between the plant or equipment and residences and other sensitive receptors.

Restrict areas in which mobile plants can operate so that they are away from residences and other sensitive receptors at particular times.

Locate site vehicle entrances away from residences and other sensitive receptors.

Carry out noisy fabrication work at another site (e.g. within enclosed factory premises) and then transport products to the project site.

Alternatives to Reversing Alarms
Avoid the use of reversing alarms by designing the site layout to avoid reversing, such as by including drive-through for parking and deliveries.

When applicable legislation permits, consider less annoying alternatives to the typical ‘beeper’ alarms. Examples include smart alarms that are adjustable in volume depending on the ambient level of noise, and multi-frequency alarms that emit noise over a wide range of frequencies.

Maximize Shielding
Re-use existing structures rather than demolishing and reconstructing.

Use full enclosures, such as large sheds, with good seals fitted to doors to control noise from night-time work.

Use temporary site buildings and material stockpiles as noise barriers.

Schedule the construction of permanent walls so that they can be used as noise barriers as early as possible.

Use natural landform as a noise barrier. Place fixed equipment in cuttings or behind earth berms.

Take note of large reflecting surfaces on- and off-site that might increase noise levels, and avoid placing noise-producing equipment in locations where reflected noise will increase noise exposure or reduce the effectiveness of mitigation measures.

Work Scheduling
Schedule noisy work during periods when people are least affected.

Provide Respite Periods
Consult with schools to ensure that noise-generating construction works in the vicinity are not scheduled to occur during examination periods, unless other acceptable arrangements (such as relocation) can be made.

When night work near residences cannot be feasibly or reasonably avoided, restrict the number of nights per week and/or per calendar month that the work is undertaken.

Schedule Activities to Minimize Noise Impacts
Organize work to be undertaken during the recommended standard hours where possible.

If the construction site is in the vicinity of a sports venue, consider scheduling work to avoid times when there are special events.

When work outside the recommended standard hours is planned, avoid scheduling it on Sundays or public holidays.

Schedule work when neighbours are not present (e.g. commercial neighbours, college students and school students may not be present outside business hours or on weekends).

Schedule noisy activities around times of high background noise (i.e. when local road traffic or other local noise sources are active) where possible to provide masking or to reduce the amount that the construction noise intrudes above the background noise.

Deliveries and Access

Nominate an off-site truck parking area away from residences for trucks arriving prior to gates opening and schedule deliveries only during specified periods.

Optimize the number of vehicle trips to and from the site. Movements can be organized to amalgamate loads rather than using a number of vehicles with smaller loads.

Designate access routes to the site through consultation with potentially noise-affected residences and other sensitive receptors, and inform drivers of nominated vehicle routes.

Provide on-site parking for staff and on-site truck waiting areas away from residences and other sensitive receptors. Truck waiting areas may require walls or other barriers to minimize noise.

Noise Transmission Path

Physical methods to reduce the transmission of noise between construction locations and residences or other sensitive receptors are generally suited to construction projects in which there is long-term noise exposure.

Reduce the line-of-sight noise transmission to residences and other sensitive receptors using temporary noise barriers.

Temporary noise barriers can be constructed from boarding (plywood boards, panels of steel sheeting or compressed fibre cement board) with no gaps between the panels at the site boundary. Stockpiles and shipping containers can be effective noise barriers.

Erect temporary noise barriers before work commences to reduce noise from construction as soon as possible.

Where high-rise dwellings adjoin the construction site, the height of a barrier may not be sufficient to effectively shield the upper levels of the residential building from construction noise. Find out whether this is a consideration for the project and examine alternative mitigation measures where needed.