

Guideline for the Management of Noise and Vibration: Construction and Maintenance Activities

EHTM Attachment 7D

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Abbreviations

Term / Acronym	Meaning
CNVMP	Construction Noise and Vibration Management Plan
Contract Documentation	Contract Scope and Technical Requirements; Functional and Operational Requirements; Contract or Project Scope
DIT – the Department	Department for Infrastructure and Transport (the Department)
EHTM	Environment and Heritage Technical Manual
EMR	Environmental Management Representative
EPA	Environment Protection Authority
High Value/ High Risk Project or Program	With reference to the Departments Project and Program Management Framework, a High Value or High Risk project or program is one that is significant to the State and/ or is valued at greater than \$100 mil.
NVMP	Noise and Vibration Management Plan
NWMP	Night Works Management Plan
Significant Project or Program	With reference to the Departments Project and Program Management Framework, a Significant project or program is one that represents significant departmental work and/ or is valued at greater than \$50 mil.

1 Introduction

The Guideline for the Management of Noise and Vibration: Construction and Maintenance Activities (the Guideline) has been developed by the Department for Infrastructure and Transport (DIT – the Department). This Guideline applies to a range of Department programs and projects including road, rail, marine and other infrastructure, as required. The Guideline applies to employees of the Department (direct or contracted) and others operating under the direction of the Department.

The purpose of the Guideline is to ensure that Contractor's consider and address the potential effects of construction and maintenance noise and vibration and undertake reasonable and practicable mitigation to avoid nuisance to the community and the environment.

This guideline forms Attachment 7D of the Environment and Heritage Technical Manual (EHTM).

Note:

The Guideline amends the attached Management of Noise and Vibration: Construction and Maintenance Activities Environmental Instruction 21.7 (the Environmental Instruction).

The Environmental Instruction has been included in the Environment and Heritage Technical Manual in its current form and will be reviewed and updated in the future, however, guidance provided below shall be taken into account when using/interpreting the Guideline.

2 Performance Outcomes

In order to meet the performance requirements under this Part, unless specified otherwise in the Contract Documentation, the following shall be achieved:

- Assessment of the potential of noise and vibration sources from construction and maintenance activities and implementation of reasonable and practicable mitigation; and
- Identification and undertaking of pre-construction and post-construction (where necessary) Property Condition Assessment based on the scope of works and the proposed demolition/construction methodology.

3 Application of the Guideline

The process to be followed for assessing noise and vibration from construction and maintenance activities is provided in the Guideline.

3.1 Departures or Amendments

The following sections of the attached Environmental Instruction are to be considered as either not applicable or amended. If not referenced below, other sections of the Environmental Instruction continue to apply in full.

Section (Version March 2017)	Application
Section 6, Night Works: Table 2 and Appendix D (Approvals)	<p>Where the Contract Documents have specified that the Contractor’s personnel is to include an appropriately qualified Environmental Management Representative (EMR), the EMR will be delegated the responsibility for approving night works for the following approvals:</p> <ul style="list-style-type: none"> • Level 1 Night Works • Level 2 Short Term Night Works <p>Where no EMR is required the approval requirements remain as per Table 2.</p>
Section 6, Night Works: Table 2 and Appendix D	Senior Environmental Management Officer or SEMO replaced with DIT Environmental Advisor
Section 6, Night Works: Table 2 and Appendix D	Contractor’s EMR (or Project Manager) to advise the Environment Protection Authority (EPA) for night works relating to rail activities and Significant/ High Value/ High Risk Projects and as required by Environmental Authorisations.
Section 6, Night Works: Table 2 Section 9.1 Construction Noise and Vibration Management Plans	Contract Specific Requirements replaced with Contract Documentation
Section 7, Consultation	Refer to the Department’s Public Affairs Unit and Contract Documentation for consultation requirements. Where no alternatives are required Section 7.1 applies.
Section 10 Approvals	<p>DPTI Senior Environmental Management Officer or SEMO and DPTI Environmental Officer replaced with DIT Environmental Advisor.</p> <p>Contractor’s EMR (or Project Manager) to advise the Environment Protection Authority (EPA) for night works relating to rail activities and Significant/ High Value/ High Risk Projects and as required by Environmental Authorisations.</p> <p>For the notification/review and/or approval of documentation for the DIT Environmental Advisor, a minimum of 10 working days applies.</p>
Throughout	DPTI replaced with DIT

4 Reporting and Deliverables

Unless specified otherwise in the Contract Documentation, the following deliverables apply to the project.

4.1 Pre-delivery Phase

During the Pre-delivery Phase of a project, reporting may be required for input into the Planning Study documentation or design reports (or similar), the *Environment and Heritage Impact Assessment* (EHIA) Report, to inform the cost estimation of the project, or to provide supporting information to Development Applications or EPA Authorisation applications.

Deliverable:

Construction Noise and Vibration Framework

Management Framework that includes:

- Results of the existing background and ambient noise level measurements, indicating the impact of the existing traffic (road/rail) on the existing noise environment;
- Predictions of noise levels from a range of expected construction activities;
- Identification of sites for Property Condition Assessments/dilapidation surveys (if applicable); and
- A procedure for the Construction Contractor to establish a Construction Noise and Vibration Management Plan (CNVMP) to manage the potential noise impacts during construction to the extent that is reasonable and practicable.

4.2 Delivery and Realisation Phase

The documentation required for construction and maintenance activities during the Delivery and Realisation Phase.

Deliverable:

Construction Noise and Vibration Management Plan

Management Plan that as a minimum includes:

- Noise level targets;
- Prediction modelling results for noise and vibration;
- Monitoring plan (locations, timing, methodology, reporting) for noise and vibration;
- Details of sites for Property Condition Assessments/dilapidation surveys (if applicable);
- Stakeholder and community engagement plan for construction activities;
- Noise and vibration mitigation measures;
- Complaint management and mitigation options; and
- Category and justification for night works (if applicable).

Where night works are to be undertaken and require approval, the following options apply.

For construction projects:

- Preparation of an 'all of Project' Night Works Management Plan (NWMP) that adequately covers all construction activities (including noise contour plans) and mitigation throughout the course of the works; or
- Preparation of a NWMP for each individual works activity on an as needs basis.

For maintenance activities:

- Preparation of a NWMP for routine maintenance activity; or
- Preparation of a NWMP for each individual maintenance activity on an as needs basis.

Deliverable:

Night Works Management Plan

Management plan incorporating above requirements or as per template provided in Appendix D of the Guideline.

AND

Deliverable:

Pre and post demolition/construction Property Condition Assessment Reports

Management of Noise and Vibration: Construction and Maintenance Activities

Environmental Instruction 21.7



Government of South Australia

Department of Planning,
Transport and Infrastructure



Government of South Australia

Department of Planning,
Transport and Infrastructure

Safety and Service Division

ENVIRONMENT Standards & Guidelines

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A handwritten signature in blue ink that reads 'Lou George'.

Lou George
Director Projects
19 May 2014

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1 INTRODUCTION

Noise and vibration impacts are an important consideration in the planning and implementation of many construction and maintenance activities. Disturbance from noisy activities and exposure to high noise and vibration levels can give rise to various problems, including speech interference; decreased work efficiency; annoyance from disruption to leisure activities such as listening to music or watching television; fatigue; stress associated with concerns relating to building damage, and importantly for works at night, sleep disruption. Vibration can result not only in human annoyance/disturbance, but also damage to buildings and other structures.

The scale of the noise or vibration impact from construction and maintenance activities depends upon a number of social, environmental and economic considerations including:

- existing background noise level;
- distance between the site and the area likely to be affected by the works;
- noise and vibration levels generated by the works;
- nature of the receivers where the noise and/or vibration is to be heard/felt i.e. a high percentage of noise sensitive land uses¹ near the works area;
- the timing and duration of the works; and
- the nature of the noise, e.g. audible pure tone components or impulsive character and/or carrying out activities with ground impacts.

2 PURPOSE AND APPLICATION OF THE INSTRUCTION

The purpose of this Environmental Instruction is to establish the noise mitigation and consultation requirements for infrastructure works and maintenance to ensure:

- the impact of work (particularly night work) on adjacent receivers is minimised; and
- a structure is provided for compliance with legislative requirements.

It applies to DPTI staff and contractors undertaking infrastructure works and maintenance where such works may impact on adjacent noise sensitive receivers. Appropriate noise mitigation measures must be implemented at all times to minimise disturbance from construction activities, and specific additional measures are required when work is programmed outside of normal construction hours (ie 7.00am – 7.00pm Monday to Saturday and 9.00am – 7.00am Sunday and public holidays).

This Environmental Instruction does not apply to:

- works undertaken in areas where there are no sensitive receivers, and
- emergency works.

This Environmental Instruction is to be utilised in conjunction with DPTI Operational Instructions and Standards for other requirements of road works, including traffic management and worker safety. Refer to www.dpti.sa.gov.au/standards/tass.

¹ For a definition of noise sensitive receivers, refer to Glossary.

3 LEGISLATIVE REQUIREMENTS

Noise

Although Section 22 of the *Environment Protection (Noise) Policy 2007* specifically excludes road, rail and public infrastructure construction work from Division 1 of the Policy (which deals with construction noise), the department and its contractors still have a responsibility under Section 25 of the *Environment Protection Act 1993* to have a “duty of care” to not pollute the environment through noisy activities:

“a person must not undertake an activity that pollutes, or might pollute, the environment unless the person takes all reasonable and practicable measures to prevent or minimise any resulting environmental harm.”

This Environmental Instruction provides a structure for compliance with this “duty of care”.

Night Works

With the exception of emergency works, the vast majority of works on roads are undertaken during daylight hours. In the metropolitan area, work times are limited due to the requirement to maximise traffic flows during peak periods to avoid congestion. On more heavily trafficked roads the disruption to traffic can be minimised and longer, more productive work periods can be achieved if work is undertaken during night time hours. Similarly, with rail upgrades, work is often required at night to minimise disruption to public transport services.

The South Australian Environment Protection Authority (EPA) considers night work to be between 7.00pm and 7.00am Monday to Saturday and between 7.00pm and 9.00am on Sunday and public holidays. There are additional requirements to minimise noise and vibration impacts during these hours. This is reflected in the lower noise level targets and different approval requirements specified in this document.

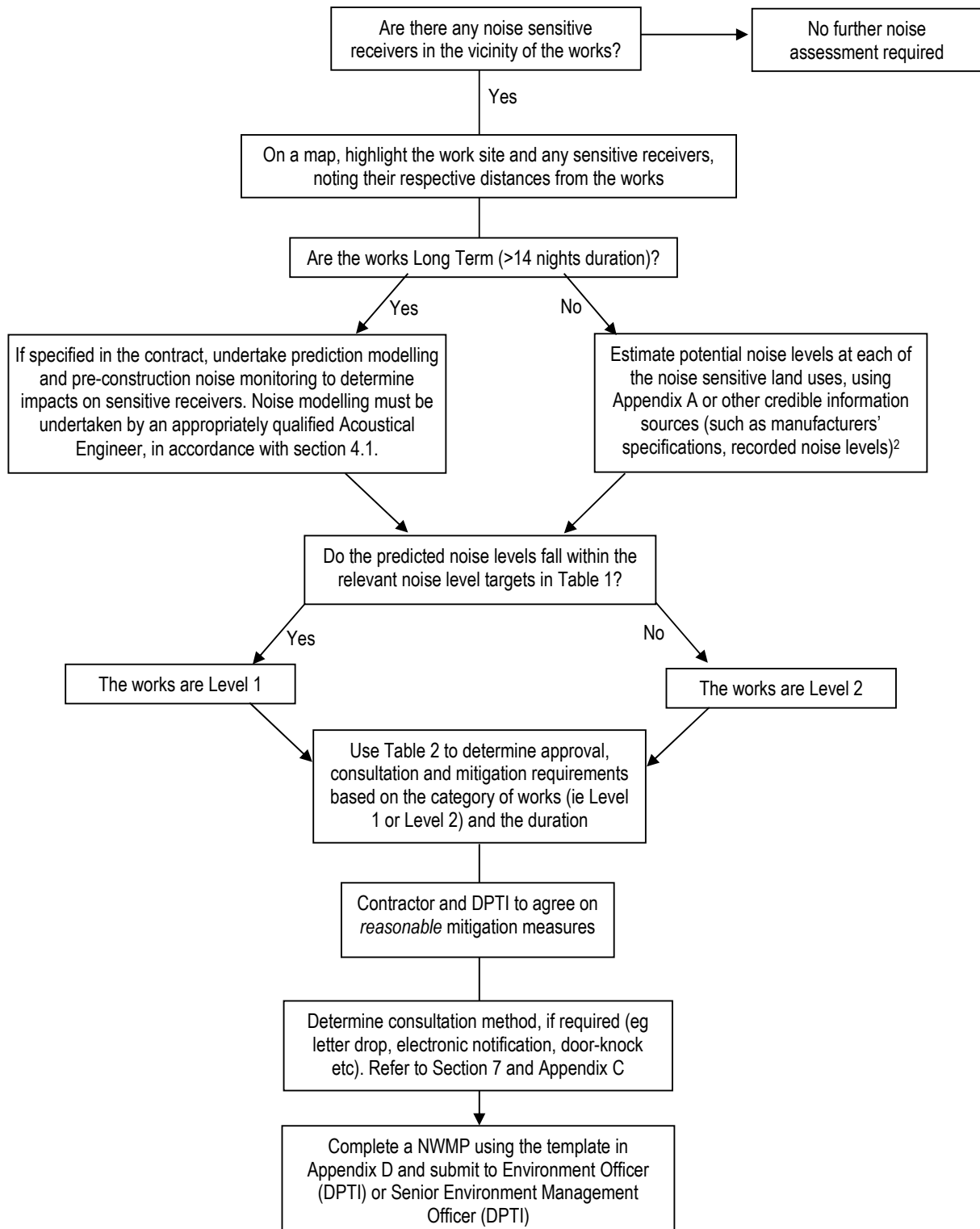
Vibration

There are currently no statutory limits for vibration. However, the Environment Protection Act 1993 includes vibration in the definition of ‘noise’, and as such, the general duty of care applies as above. Also, under common law, the Department or its Contractors can be held liable if construction/ maintenance activities result in vibration-induced damage to property.

4 NOISE PROCEDURE

Figure 1 outlines the procedure for assessing the level of noise impact from infrastructure works, determining what approvals are needed and the associated mitigation measures.

Figure 1: Noise assessment procedure



² If further information is required, noise levels from machinery can be sourced from the manufacturers or their data sheets. Noise levels are normally expressed as sound power level (Lw). AS2436-1981 provides details on how to relate these levels to the acoustic levels experienced by the receiver

4.1 Noise level targets

Table 1 establishes the noise level targets for short, medium and long term works. If the predicted noise levels fall within the target(s), the works are considered 'Level 1'. If the predicted noise levels exceed the target(s), the works are considered 'Level 2'. Required documentation and mitigation measures for Level 1 and Level 2 works are set out in Table 2.

Table 1: Noise Level Targets

(For infrastructure works adjacent to noise sensitive uses (based on NZS 6803:1999 "Acoustics – Construction Noise"))

Day of the week	Time Period	Duration of impacts					
		Short Term Works (dBA) Up to 2 nights		Medium Term Works (dBA) 3 – 14 nights		Long Term Works (dBA) Exceeds 14 nights	
		Leq, 15min	L _{max}	Leq, 15min	L _{max}	Leq, 15min	L _{max}
Weekdays	0600-0700	65	75	60	75	55	75
	0700-1900	See EPA Information Sheet "Construction Noise"					
	1900-2200	75	90	70	85	65	80
	2200-0600	45	75	45	75	45	75
Saturday	0000-0700	45	75	45	75	45	75
	0700-1900	See EPA Information Sheet "Construction Noise"					
	1900-2400	45	75	45	75	45	75
Sunday & Public Holidays	0000-0900	45	75	45	75	45	75
	0900-1900	See EPA Information Sheet "Construction Noise"					
	1900-2400	45	75	45	75	45	75

Where background noise levels are greater than the noise level targets in Table 1, the target level then becomes the background noise level for the time period under consideration.

4.2 Noise Modelling and Pre-construction Monitoring

Prediction modelling is required for long-term night works (>14 nights duration) near sensitive receivers to estimate and effectively manage the impacts of extended works. Noise modelling must be undertaken by an appropriately qualified Acoustical Engineer, defined as a person eligible for membership of the Australian Institute of Engineers and the Australian Acoustical Society.

The following factors must be considered in the modelling process:

- All noise sources related to the works;
- Location of noise sources;
- Source noise levels including sound power levels and height of noise source, either manufacturers information or measured levels (in accordance with AS1055);
- Location of all noise sensitive receivers that may be affected by the works;
- Site features, such as topography, buildings or geographical features, that affect noise or propagation;
- Predominant meteorological conditions that may affect noise propagation;
- Stages of works including the machinery required during each stage and their running times; and
- Background noise levels (pre-construction noise levels at noise sensitive receivers must be measured in accordance with DPTI's Road Traffic Noise Guidelines).

All assumptions used in the modelling and predictions must be included in the assessment along with reasons why they have been used for validation purposes.

4.3 Noise Mitigation Considerations

Noise levels can be most effectively reduced by a whole of project outlook, with mitigation considered during all stages of the project, from planning to construction. Where construction or maintenance works will be undertaken adjacent to sensitive uses, all *reasonable and feasible* options for mitigating noise impacts must be considered.

The cost and effort involved in implementing noise mitigation measures are to be proportionate to the level of impact and the duration of the works. For instance, it would not be considered reasonable to require the installation of a noise barrier for short term works. Factors to consider when selecting reasonable measures include:

- Noise mitigation benefits (amount of noise reduction provided, number of people protected);
- Cost of mitigation (cost of mitigation versus benefit provided);
- Affect on the efficiency of construction program
- Community views (aesthetic impacts and community wishes); and
- Potential for a mitigation measure to reduce noise during construction as well as from road traffic after the project is complete.

4.3.1 Basic Noise Mitigation Measures

Wherever construction or maintenance work may have an impact on noise sensitive receivers, the following measures must be undertaken, where reasonable and feasible:

- Schedule work that creates the most noise during normal construction hours.
If this is not possible, this type of work should be scheduled early in the night to minimise the impact on adjacent residents. Planing machines or other high noise machines, or activities that cause high L_{Amax} noise events should be avoided after 11:00 pm;
- Program night works to limit the number of consecutive nights receivers are impacted, and to provide respite from sleep disturbance, e.g. where sensitive receivers are exposed to noise levels 50-60dB(A) it may be appropriate to restrict night works to 3 consecutive nights, followed by 4 nights respite; where noise levels are greater than 60dB(A) restrict night works to 2 consecutive nights, followed by 5 nights respite;
- Substitute noisy plant or processes for quieter, lower impact alternatives such as:
 - bored piling or vibratory drivers as alternatives to impact piling;
 - hydraulic or chemical splitters as alternatives to impact rock breaking; and
 - electrical power instead of diesel or petrol;
- Ensure all plant is properly maintained e.g. silencers and enclosures are intact, rotating plants are balanced, loose bolts are tightened, frictional noise is reduced through lubrication; and cutting noise reduced through keeping cutting equipment sharp;
- Check equipment brought to site to ensure it complies with specifications, either by noise assessment or by obtaining information from suppliers;

- Operate plant so as to minimise noise impacts, e.g. use minimum power required to complete the task;
- Avoid causing peak noise events by dropping equipment/materials from a height or into trucks. Use sound dampening material to cover the surfaces on to which any materials must be dropped and if this is not possible it is recommended that properly constructed chutes be used. Where machines are fitted with engine covers, these are to be kept closed when the machine is in use;
- Take care to site noisy equipment away from noise-sensitive areas. Plant known to emit noise strongly in one direction is to be orientated so that the noise is directed away from noise-sensitive areas;
- Locate site access roads and site compounds as far away as possible from noise sensitive receptors;
- Plan truck movements to avoid residential streets where possible;
- Avoid leaving engines idling at the site unless absolutely necessary. Machines which are used intermittently shall be shut down in the intervening periods or throttled down to a minimum;
- Minimise the reversing of vehicles to reduce the noise from reversing signals;
- Use broadband or directional reversing beepers which comply with ISO 9533;
- Ensure that the difference in volume between the reversing warning devices and the base machine noise level (at maximum governed speed under no load at any given test location) is minimised (in accordance with International Standard ISO9533:1989), and ensure that warning devices are no more than 5 dB above the Australian Standard level;
- Ensure that loaders and Bobcats fitted with articulated buckets are rubber lined at contact points, so that that noise levels are minimised during release of materials;
- Ensure that tailgates are cleared and locked at the point of unloading;
- Stiffen any loose panels to stop unnecessary vibration noise;
- Avoid using vehicle warning devices (such as horns) as signalling devices;
- Operate two way radios at the minimum effective volume, and avoid shouting or whistling at the site;
- When work is complete, minimise the noise of packing up plant and equipment and departing from the site.

4.3.2 Advanced Noise Mitigation Measures

Where construction or maintenance work is likely to have a significant impact on sensitive receivers over a long term period, the following measures (*in addition* to the basic noise mitigation measures), must be implemented, where reasonable and feasible:

- Any noise walls or architectural treatments that are to be incorporated into the final design should be constructed early in the construction phase, to screen sensitive receivers from construction noise;
- Enclose stationary noise sources (such as jack-hammering, welding, drilling etc or fixed plant such as compressors or generators). Acoustic enclosures can be made of 6 mm plywood or loaded vinyl sheeting on simple timber framing, with the inside lined with 50mm of sound absorption material (e.g. perforated foil faced fibreglass) to prevent a build-up of reverberant noise within the enclosure. There must not be any gaps at joints or corners.

- Install temporary acoustic screens, at least 2.1 metres high and constructed from a solid material weighing at least 10 kg/m². Screens shall be located as close as possible to either the noise source or receiving location. The screen must not have air gaps or openings at joints, and care should be taken to ensure that a barrier does not transfer a problem from one receiver to another by reflecting noise. On site screening may be achieved by locating temporary structures such as site offices and other temporary buildings between the noise generating areas and the noise sensitive receptors.

Refer to AS 2436 – 1981 “Guide to Noise Control on Construction, Maintenance and Demolition Sites” for further information on mitigation measures.

4.4 Noise monitoring during works

Where identified in Table 2, or if specified in the Contract, monitoring of noise levels during works is to be undertaken at specified sensitive receivers to ensure that noise management practices are functioning adequately for the duration of the works.

Monitoring locations and times must be selected so as to provide an accurate picture of the noise impacts, with at least one survey during high-noise activities and, where appropriate, additional surveys in response to complaints.

5 VIBRATION PROCEDURE

Vibration impacts can be separated into two categories, comprising levels at which the vibration might be felt to cause annoyance and concern (typically in the order of 0.35 – 0.5 mm/s), and levels at which building or infrastructure damage might occur.

Historically, the Department has received relatively few complaints relating to human annoyance from vibration. Therefore, this Environmental Instruction focuses on the effects of vibration on structures. However, it is important to consider vibration impacts on human health and reduce them wherever feasible. AS2670.2 “Evaluation of human exposure to whole-body vibration” provides further information on the effects of vibration on humans.

Unless otherwise specified in the Contract, the Contractor is responsible for appropriate vibration management, including ensuring that construction and maintenance activities do not cause vibration induced damage to structures, buildings or services located within or near the work site, and implementing a monitoring regime to enable post construction verification that vibration levels at all potentially affected structures did not exceed the relevant guideline values (described below).

5.1 Vibration Guideline Values

As there is no Australian Standard that provides recommended levels relating to structural damage, the German Standard DIN 4150-3 “Structural Vibration Part 3 – Effects of vibration on structures” (knet [10763887](#)) is used.

A case study undertaken by Resonate Acoustics in 2015 demonstrated the effects of vibratory roller induced vibration on a typical 100 year old Adelaide residence, concluding that the criteria specified in DIN 4150-3 are appropriate for residential dwellings located in the Adelaide region.

Tables 1 and 2 of DIN 4150-3 present guideline values for evaluating the effects of vibration on buildings/structures and buried pipework respectively. These guideline values represent the upper limits for ‘safe’ levels of ground vibration, ie vibration levels which will not result in structural damage. If vibration levels exceed these ‘safe’ limits, there is the *potential* for structural damage, although the levels are considered conservative.

5.2 Establishing the expected vibration levels and risk of damage

In order to predict whether there is potential for vibration-induced damage, the person undertaking the vibration assessment must identify and map the location and distance to structures (particularly heritage-listed structures) in relation to the construction works.

Once the distance to nearby structures is known, the person undertaking the vibration assessment must determine potential vibration levels at these structures during various construction or maintenance activities (using Appendix B or other credible sources, such as plant manufacturers’ specifications or recorded levels). It is important to recognise that vibration levels are influenced by the local site and geographical conditions. Therefore the levels in Appendix B are only approximate, and may need to be verified through pre-construction monitoring.

5.2.1 Comparing expected vibration levels against the guideline values

Once the predicted vibration levels have been established for relevant distances from the site, the person undertaking the vibration assessment must determine whether there is potential for vibration-induced damage, by comparing the predicted vibration levels against the relevant guideline values in DIN4150-3.

When assessing the potential for damage to underground pipes, the person undertaking the vibration assessment must consider the age of the pipes. The guideline values provided in DIN 4150-3 assume that pipes have been manufactured and laid using current technology. If that is not the case, consultation with the owners of the pipework regarding 'safe' vibration levels is recommended.

Table 2 establishes the necessary approvals and management measures if the vibration levels are predicted to exceed the target levels.

5.3 Managing the risk of vibration-induced damage

Pre-construction vibration monitoring, dilapidation surveys and monitoring during works are all possible methods of managing the risk of vibration-induced damage and potential damage claims. If the Principal has undertaken or made arrangements for dilapidation surveys and/or monitoring, this will be specified in the contract. However, it should not be assumed that this has been done.

The Contractor has liability for and shall bear all costs associated with any damage caused to existing structures, buildings and services as a result of any construction/ maintenance activity. This extends to responding to any claims of vibration induced damage, which may involve providing evidence that vibration levels associated with construction activities were insufficient to cause damage. It is therefore the Contractor's decision how to manage the risk of vibration-induced damage, and what, if any, surveys or monitoring shall be undertaken.

5.3.1 Pre-construction vibration monitoring

Pre-construction vibration modelling can be used to refine the predicted vibration levels (as these can vary significantly depending on local site and geographical conditions) and can assist in determining the level of risk to structures and whether dilapidation surveys are warranted for structures and/or pipework in the vicinity of the works.

Pre-construction monitoring can occur prior to, or at the beginning of the works, and should comprise vibration level measurements of the expected construction/ maintenance activities at a range of distances for a location that is indicative of the geological and topographical conditions of the site.

5.3.2 Pre-construction dilapidation survey

Where desktop estimates or pre-construction monitoring indicates that vibration levels from construction activities will exceed the guideline values in DIN4150-3, a dilapidation survey of all potentially affected structures may be undertaken to enable post-construction verification that construction activities did not cause structural damage.

A dilapidation survey report must include as a minimum:

- a visual inspection of all buildings and structures (more specifically all internal and external walls, ground level floors and external pavements, all connections of other structures above ground level and their connection at ground level and any exposed foundations);
- photographs of all cracks and/or defects observed;
- a record of the location of all cracks and/or defects observed, and measurements of the crack width/defect size.

The Contractor may undertake close-out surveys for all structures at the conclusion of construction/ maintenance works, or individually, in response to complaints. Close-out surveys must record any changes from the initial survey, as well as the likely cause of the change.

5.3.3 Vibration monitoring

Monitoring of vibration levels during the works may be undertaken for two main reasons:

- to inform project staff when structural damage thresholds are approached, enabling them to stop work before damage occurs and modify construction processes accordingly;
- to verify whether structural damage to buildings in the vicinity is likely to have been caused by construction activities (in the event that a claim is made).

Monitoring locations and times must be selected so as to provide an accurate picture of the vibration impacts, with at least one survey during high-vibration risk activities and, where appropriate, additional surveys in response to complaints. Ongoing monitoring should provide the ability to automatically dial into the results on a regular basis, and to alert project staff if trigger levels² for vibration damage are exceeded (eg via audible, visual or email/text message alarms).

Monitoring must be undertaken in accordance with DIN4150-3 "Structural Vibration Part 3 – Effects of vibration on structures". An appropriately qualified Acoustical Engineer, defined as a person eligible for membership of the Australian Institute of Engineers and the Australian Acoustical Society, must undertake the monitoring.

5.4 Vibration mitigation considerations

Where vibration damage targets are predicted to be exceeded, design/construction alternatives must be considered.

If this is not feasible, then all practical and feasible mitigation measures must be employed to minimise the impacts, including:

- using plant that can achieve a similar outcome with less vibration, or modification of existing equipment to reduce vibration power levels (eg reducing compactor displacement setting);
- mounting high speed vibrating plant on rubber mounts where practicable;

² Trigger levels act as a warning that guideline values (or damage target levels) are being approached. The trigger level should be less than the guideline value (or damage target level)

- operating vibrating plant at the maximum practicable distance to a sensitive location;
- balancing variable speed vibrating plant and operating at speeds that do not produce resonances (excessive felt vibration in the ground or plant, compared to other speeds of operation);
- reducing piling hammer drop distance
- training construction/ maintenance workers in the correct use of machinery and equipment to minimise vibration;
- maintaining machinery and equipment and keeping in good order.

6 NIGHT WORKS

All construction and maintenance works proposed outside of normal construction hours (with the exception of emergency works, short term works that fall within the target noise levels in Table 1, and works in areas where there are no sensitive receivers) require documented justification for undertaking the works at night, as well as noise mitigation options and consultation with affected parties. This must be provided in the form of a Night Works Management Plan (NWMP). For works that require another piece of documentation, the NWMP may be incorporated into the overall Construction Noise and Vibration Management Plan for the project.

A NWMP template is provided in Appendix D.

6.1 Justification for Night Works

Undertaking infrastructure works at night can be considered appropriate if any of the following situations occur:

Social:

- high daytime traffic volumes on the road on which the works are to be undertaken lead to worker safety considerations; and
- major disruptions to the network, public transportation, and emergency services would be caused by not undertaking the works at night. This is particularly applicable to rail projects, where daytime line closure can result in considerable inconvenience to passengers.

Economic:

- a high level of disruption to adjoining land uses if works are undertaken during business hours;
- considerable economic implications for the project if works are not undertaken at night;
- a window of opportunity to undertake work will only be provided by other stakeholders during the night time, e.g. works on or over rail lines.

Environmental:

- a low percentage of or no adjoining land uses effected by the works are noise or vibration sensitive.

Table 2: Documentation and Approval Requirements

	NOT A MAJOR PROJECT								MAJOR PROJECT (Day and/or Night)
	DAYTIME (WORK WITHIN NORMAL CONSTRUCTION HOURS)		NIGHT WORKS - ADDITIONAL REQUIREMENTS FOR WORKS OUTSIDE OF NORMAL CONSTRUCTION HOURS						
	ONLY NOISE IMPACTS ARE ANTICIPATED (ie no vibration)	WORKS WITH VIBRATION IMPACTS (regardless of duration and timing)	SHORT TERM (up to 2 nights)		MEDIUM TERM (3-14 nights)		LONG TERM (more than 14 nights)		
If predicted vibration levels are above guideline values for damage to buildings/ structures and/or pipework (DIN4150-3)		LEVEL 1	LEVEL 2	LEVEL 1	LEVEL 2	LEVEL 1	LEVEL 2		
DOCUMENTATION	Not required If noise sensitive uses are adjacent the worksite, consider notification.	CNVMP, including: • Predicted vibration levels • Risk management plan, including: - Vibration mitigation measures - Vibration monitoring plan (if monitoring is to be undertaken), including locations, timing, methodology, reporting Identification of sites for dilapidation surveys (if dilapidation survey are to be undertaken) - Consultation plan - Complaint mitigation options	Not required.	NWMP, including: • Justification for night works • Category of works • Consultation plan • Mitigation measures	NWMP, including: • Justification for night works • Category of works • Consultation plan • Mitigation measures	NWMP, including: • Justification for night works • Category of works • Consultation plan • Mitigation measures • Complaint mitigation options	NWMP, including: • Prediction modelling results • Monitoring plan (locations, methodology, reporting) • Justification for night works • Category of works • Consultation plan • Mitigation measures	NWMP, including: • Prediction modelling results • Monitoring plan (locations, methodology, reporting) • Justification for night works • Category of works • Consultation plan • Mitigation measures • Complaint mitigation options	CNVMP, including • Prediction modelling results for noise and vibration • Monitoring plan (locations, timing, methodology, reporting) for noise and vibration • Identification of sites for dilapidation surveys (if applicable) • Full consultation plan • Noise and vibration mitigation measures • Complaint mitigation options • Category and justification for night works (if applicable)
APPROVALS	No approval required	Provide CNVMP to SEMO at least 10 working days prior to works commencing	No approval required*. For night works on rail corridors, notify the EO 5 days prior.	Provide NWMP to EO for approval at least 5 working days prior to night works commencing SEMO to notify EPA for rail activities beyond routine maintenance.*	Provide NWMP to SEMO for approval at least 5 working days prior to night works commencing SEMO to notify EPA for rail projects*	Provide NWMP to SEMO for approval at least 5 working days prior to night works commencing SEMO to notify EPA for rail projects*	Provide CNVMP to SEMO at least 10 working days prior to works commencing SEMO to notify EPA for rail projects*	Provide CNVMP to SEMO at least 10 working days prior to works commencing SEMO to notify EPA for all Long Term Level 2 projects*	Provide CNVMP to SEMO at least 20 working days prior to works commencing, to allow for endorsement of noise and vibration targets from EPA* SEMO to notify EPA for all major projects*
MODELLING/ MONITORING	Not required	Unless otherwise specified in the Contract, the Contractor is to decide on risk management approach, including whether to undertake pre-construction monitoring and monitoring during works.	Not required	Not required	Monitoring may be required if complaints are received	Monitoring may be required if complaints are received	Prediction modelling required Monitoring required during works. Exceedence of noise targets will necessitate modification and resubmission of CNMP	Prediction modelling required Monitoring required during works.	Prediction modelling required If predicted vibration levels exceed target levels for damage to structures and/or pipework, pre-construction monitoring will be required to measure actual vibration levels Monitoring required during construction phase.
CONSULTATION	Not required. If noise sensitive uses are adjacent the worksite, consider notification.	As per consultation plan (in approved CNVMP)	Not required	Consultation required in accordance with section 7 of this instruction	Consultation required in accordance with section 7 of this instruction	Consultation required in accordance with section 7 of this instruction	Consultation required in accordance with section 7 of this instruction	Consultation required in accordance with section 7 of this instruction	Full consultation plan required (including night works consultation in accordance with section 7 of this instruction, if applicable)
MITIGATION	See EPA Information Sheet " Construction Noise "	All practical and feasible vibration mitigation measures	Not required	Basic noise mitigation Ensure that lighting does not shine directly onto residences or approaching vehicles	As specified in contract documentation Ensure that lighting does not shine directly onto residences or approaching vehicles	Basic noise mitigation Ensure that lighting does not shine directly onto residences or approaching vehicles	Basic noise mitigation Ensure that lighting does not shine directly onto residences or approaching vehicles	Advanced noise mitigation Ensure that lighting does not shine directly onto residences or approaching vehicles	Advanced noise mitigation package All practical and feasible vibration mitigation strategies Where night works are proposed, ensure that lighting does not shine directly onto residences or approaching vehicles

LEVEL 1: Predicted noise levels are **below** targets in Table 1
 LEVEL 2: Predicted noise levels are **above** targets in Table 1

CNVMP: Construction Noise and Vibration
 NWMP: Night Works Management Plan

EO: Environment Officer (DPTI)
 EPA: Environment Protection Authority (South Australia)

SEMO: Senior Environmental Management Officer (DPTI)

* Some rail projects require a licence under S36 of the EP Act. In these instances specific conditions regarding the management of noise and vibration may be attached to the licence, and formal approval of NWMPs may be required. For major projects and rail projects that do not require a licence under the EP Act, this type of approval is not mandatory. However, the EPA has requested to be consulted on any planned night works so that they can assess whether the proposed works comply with S25 of the EP Act. For very minor rail maintenance works and upgrades, the EPA may not need to be consulted - contact the SEMO for clarification

7 CONSULTATION

Good consultation with sensitive receivers and other groups likely to be impacted by construction noise and/or vibration is critical. Consultation is mandatory for most projects that involve night works.

If several sessions of night works are planned over the duration of a project, it is beneficial to notify sensitive receivers of this upfront in a letter that outlines the likely programme of works, any reasons why the programme might change (eg hot weather may mean that additional early starts are necessary), and the method of notification (ie whether residents will receive individual letters for every night works event).

For night works requiring consultation, the minimum requirements are shown below. Depending on the type of impact and the timing and duration of the works, additional consultation may be undertaken at the discretion of the project manager (eg media release, Local Council consultation).

7.1 Minimum consultation requirements³:

- Notification (via letter drop, door knock, electronic media etc) of all businesses/residents likely to be impacted by the works. Notification shall occur at least 3 days prior to the works commencing and shall include the following information:
 - Contact name and number of the Project Manager/Community Engagement Officer and/or the Site Supervisor for any questions before work commences or complaints during the work;
 - Location of the work;
 - The type of work;
 - The duration of work and the envisaged effect on adjacent residences and/or businesses;
 - Hours of operation;
 - An outline of site noise mitigation measures.

Examples of Notification letters are included as Appendix C. Notification of rail maintenance activities occurs via the [Rail maintenance calendar](#) and via text message/email to residents who are subscribed to the electronic notification system (contact DPTI.RailMaintenance@sa.gov.au).

- Advance notice roadworks signs: For road projects, advance notice roadworks signs shall be placed at either end of the worksite, preferably 3 or more days prior to works commencing.

8 COMPLAINT MITIGATION

A complaints register must be maintained for the site, including the date and nature of the complaint and the response to the complaint. A contact phone number must be made available to nearby noise sensitive receivers so that contact can be made at any time during the works. The contact person should have an adequate level of responsibility to respond to the complaint.

³ Note that these consultation requirements are in addition to the requirement to notify DPTI's Traffic Control Centre of planned roadworks.

Table 2 specifies the circumstances where consideration must be given to complaints mitigation. All reasonable and feasible mitigation measures should be considered (refer to Section 4.3). Monitoring of noise and/or vibration levels may also be required in response to a complaint. The procedures for monitoring are set out in Sections 4.4 (noise) and 5.3.3 (vibration).

Details of all complaints received should be forwarded to the SEMO for entry in the Noise Management Database.

9 DOCUMENTATION

The level of assessment and approvals required for each type of project are shown in *Table 2: Documentation and Approval Requirements*. Infrastructure works have been categorised into two broad categories: major projects and other projects (including maintenance work). Whereas all major projects require comprehensive documentation and detailed modelling and monitoring, the requirements for other projects and maintenance work depend largely on the nature of the impact (ie whether it involves vibration impacts and/or noise impacts) and whether night works are proposed.

Note that where more than one piece of documentation is required, these can be combined. For example, if a project requires a Construction Noise and Vibration Management Plan and a Night Works Management Plan, the Night Works Management Plan can be incorporated into the Construction Noise and Vibration Management Plan.

9.1 Construction Noise and Vibration Management Plans

Construction Noise and Vibration Management Plans (CNVMPs) are documents that illustrate the expected noise and/or vibration levels from proposed construction processes, how these are likely to impact on sensitive receivers in the area, what mitigation measures will be implemented to minimise impacts, and how the community will be kept informed of the works. This document shall also incorporate a Night Works Management Plan, if construction works are proposed outside of normal construction hours.

CNVMPs must be prepared by an appropriately qualified Acoustical Engineer (defined as a person eligible for membership of the Australian Institute of Engineers and the Australian Acoustical Society), unless otherwise specified by the Principal.

A CNVMP is mandatory for all major projects, and for all works which are predicted to exceed the guideline values in DIN4150-3. The requirements for these plans are set out in Table 2.

A CNVMP is not mandatory for projects which involve only noise impacts, where construction or maintenance work is undertaken during normal construction hours. In these cases, the requirement to prepare a CNVMP is at the discretion of the project manager, with input from the environmental staff assigned to the project. The specific requirements for these plans will be set out in the Contract Specific Requirements.

See Knet #[1445537](#) and activate the 'CNVMPs NWMPs' tab, or contact the Environment Group on telephone (08) 8343 2398 for examples of NWMPs which have been incorporated into overall CNVMPs (eg #[3719230](#) and #[3764181](#)).

10 APPROVALS

NWMPs for Short Term works shall be provided to the DPTI Environmental Officer at least five working days prior to commencement of night works.

NWMPs for all works other than Short Term shall be provided to the DPTI Senior Environmental Management Officer (SEMO) at least five working days prior to commencement of night works.

CNVMPs shall be provided to the SEMO prior to the commencement of works (typically as part of the Contractor's Environmental Management Plan), or at least ten working days prior to commencement of night works or works which have vibration impacts.

Senior Environmental Management Officer

Phone: 08 8343 2398

Extension: 22398

For long term night works, major projects and rail projects with noise and/or vibration impacts (beyond routine maintenance), the SEMO is responsible for notifying the EPA of the works with at least five working days notice.

11 GLOSSARY

Acoustic Engineer is defined as a person eligible for membership of the Australian Institute of Engineers and the Australian Acoustical Society.

Ambient noise level is the background noise level when extraneous noise and the construction noise is removed. This is described using the LA90 descriptor.

A-weighting is an adjustment made to the sound pressure level measurement to approximate the response of the human ear.

Construction works include the erection, installation, alteration, repair, maintenance, cleaning, painting, renewal, removal, excavation, dismantling, demolition or addition to any infrastructure, or any work in connection to any of these things. Construction works occur on a site for a limited period of time only.

dB is the abbreviation for decibel – a unit of sound measurement. It is equivalent to 10 times the logarithm (to base 10) of the ratio of a given sound pressure to a reference pressure.

Emergency works are those works immediately needed to prevent the loss of lives and/or property and/or harm to the environment, and include immediately needed repairs to infrastructure.

Feasible and reasonable measures. Feasibility relates to engineering consideration and what is practical to build: reasonableness relates to the application of judgement in arriving at a decision, taking into account the following factors:

- Noise mitigation benefits (amount of noise reduction provided, number of people protected);
- Cost of mitigation (cost of mitigation versus benefit provided);
- Affect on the efficiency of construction program
- Community views (aesthetic impacts and community wishes); and
- Potential for a mitigation measure to reduce noise during construction as well as from road traffic after the project is complete.

Impulsive noise is noise with a high peak of short duration, or a sequence of high peaks.

L_{eq} for the purpose of this document represents the A-weighted equivalent continuous (energy average) A-weighted sound pressure level of only the construction works under consideration over a 15 minute period and excludes other noise sources such as industry, road or rail traffic, and community sources.

L_{max} for the purpose of this document represents the A-weighted maximum noise level from only the construction works under consideration, measured using the “fast” time response on a sound level meter.

Long term works include construction work at any one location with a duration exceeding 14 nights.

Low frequency noise contains major components in the low-frequency range (20 Hz to 250 Hz) of the frequency spectrum.

Medium term works include construction work at any one location for more than two nights and less than 14 nights duration.

Night work is considered to be between 1900 hours (7.00 pm) and 0700 hours (7.00 am).

Noise sensitive uses, for the purposes of this Environmental Instruction, include short and long term residential uses, aged care facilities, hospital wards, churches/ places of worship, educational institutions and noise sensitive commercial and industrial uses such as childcare facilities, entertainment venues, recording studios, laboratories etc.

Short term works include construction work at any one location for up to two nights.

Tonal noise is noise containing a prominent frequency and characterised by a definite pitch.

12 REFERENCES

General

- Standards Australia AS 1055.1-1997, *ACOUSTICS-DESCRIPTION AND MEASUREMENT OF ENVIRONMENTAL NOISE-PART 1, GENERAL PROCEDURES*
- Standards Australia AS 1742.3-2002, *MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES-TRAFFIC CONTROL DEVICES FOR ROAD WORKS*
- Standards Australia AS 1906.4-1997, *RETRO-REFLECTIVE MATERIALS AND DEVICES FOR ROAD TRAFFIC CONTROL PURPOSES – HIGH VISIBILITY MATERIALS FOR SAFETY GARMENTS*
- Standards Australia AS 2436-2010, *GUIDE TO NOISE CONTROL ON CONSTRUCTION, MAINTENANCE AND DEMOLITION SITES*
- Standards Australia AS 2670.2-1990, *EVALUATION OF HUMAN EXPOSURE TO WHOLE-BODY VIBRATION*
- Standards New Zealand NZS 6803:1999, *ACOUSTICS - CONSTRUCTION NOISE*
- International Standard ISO 9533 *EARTH MOVING MACHINERY – MACHINE MOUNTED AUDIBLE TRAVEL ALARMS AND FORWARD HORNS – TEST METHODS AND PERFORMANCE CRITERIA*
- German Standard DIN 4150-3, *STRUCTURAL VIBRATION PART 3: EFFECTS OF VIBRATION ON STRUCTURES* (*knet* [10763887](#))

DPTI Code of Technical Requirements for the Legal Use of Traffic Control Devices.

DPTI Field Guide Traffic Control Devices for Workzone Traffic Management.

DPTI SA Standards for Workzone Traffic Management.

Field Guides/Handbooks associated with AS 1742.3-2002

Resonate Acoustics (2015) 'Case Study of damage effects to residential buildings caused by vibratory compaction equipment', url: https://www.acoustics.asn.au/conference_proceedings/AAS2015/papers/p119.pdf, knet 10531210

SA EPA Environmental Protection (Noise) Policy 2007

SA EPA Guidelines for the use of the Environment Protection (Noise) Policy 2007

Machinery Noise Levels

Hydraulic splitters for rock and concrete – www.diacore.com.au

Chemical rock and concrete splitting – <http://www.taminternational.com.au>

A case study of piling methods on WA Government WorkSafe website – <http://www.safetyline.wa.gov.au/pagebin/pg000152.htm>

The German environmental label scheme Blue Angel – http://www.blauer-engel.de/englisch/navigation/body_blauer_engel.htm

UK Construction Industry Board, Considerate Constructor Scheme – www.ccscheme.org.uk

Appendix A: Typical Noise Levels from Construction Activities

The following Construction Noise Levels are generalised values of construction machinery and equipment that have either been collected during monitoring of various construction works, or taken from Australian Standard 2436. To calculate noise levels at distances not shown below, use $L_{eq} = L_{eq}(15m) - 20 \log(r/r_0)$.

Equipment	Sound Pressure Level dB(A)									
	7m		20m		50m		100m		200m	
	L_{eq} (15min)	L_{max}	L_{eq} (15min)	L_{max}	L_{eq} (15min)	L_{max}	L_{eq} (15min)	L_{max}	L_{eq} (15min)	L_{max}
Asphalt planer (17t)	85		76		68		62		56	
Asphalt planer (3t)	71		62		54		48		42	
Asphalt rotomill	86	86	77	77	69	69	63	63	57	57
Asphalt Truck/Sprayer	81	81	72	72	64	64	58	58	52	52
Backhoe	79	83	70	74	62	66	56	60	50	54
Batch Plant	91	90	82	81	74	73	68	67	62	61
Bobcat (skid-steer loader)	85		76		68		62		56	
Bored Piling Rig	89	92	80	83	72	75	66	69	60	63
Bulldozer (large)	92	95	83	86	75	78	69	72	63	66
Bulldozer (small)	90	93	81	84	73	76	67	70	61	64
Chainsaw (4-5hp)	89	92	80	83	72	75	66	69	60	63
Cherry picker	80		71		63		57		51	
Compactor	88		79		71		65		59	
Compound blade friction saw[1]	88	90	79	81	71	73	65	67	59	61
Compressor (silenced)	76		67		59		53		67	
Concrete Pump	80	84	71	75	63	67	57	61	51	55
Concrete Saw	93	93	84	84	76	76	70	70	64	64
Concrete Truck	84	85	75	76	67	68	61	62	55	56
Concrete Vibrator	78	80	69	71	61	63	55	57	49	51
Crane	88	90	79	81	71	73	65	67	59	61
Delivery Truck	83	88	74	79	66	71	60	65	54	59
Dump Truck	83	90	74	81	66	73	60	67	54	61
Dump Truck (50t) - loaded	76	90	67	81	59	73	53	67	47	61
Dump Truck (50t) - unloaded	83	90	74	81	66	73	60	67	54	61
Tracked Excavator (5t)	77		68		60		54		48	
Tracked Excavator (45t)	83	90	74	81	66	73	60	67	54	61
Forklift	81		72		64		58		52	
Front End Loader	88	90	79	81	71	73	65	67	59	61
Generator	78	81	69	72	61	64	55	58	49	52
Grader	85	90	76	81	68	73	62	67	56	61
Gritblaster	104		95		87		81		75	
Hand tools (electric)	77		68							
Hand tools (pneumatic)	91		82							
Hand-held vibrating compactor	83		74		66		60		54	
Hydraulic drill (machine mounted)	88		79		71		55		49	
Jackhammer	96		87		79		73		67	
Line Driller	89	99	80	90	72	82	66	76	60	70
Loader dumping and flattening ballast	75	85	66	76	58	68	52	62	46	56
Loader loading ballast (Volvo L90E with BBS-Tek reversing beepers)	81	92	72	83	64	75	58	69	52	63
Loader moving with full bucket	76		67	70	59		53		47	
Mobile Crane	88	91	79	82	71	74	65	68	59	62
Movable lighting			60	60						
Oxy cutting of rail			59	73						
Paver	89	91	80	82	72	74	66	68	60	62
Percussive drill (machine mounted)	91		82		74		68		62	
Piling Rig	91	113	82	104	74	96	68	90	62	84
Piling (bored)		86		77		69		63		57
Piling (impact)										
Pneumatic Jackhammer	88	90	79	81	71	73	65	67	59	61
Pneumatic Tyred Roller	86	86	77	77	69	69	63	63	57	57
Power Pack	78	81	69	72	61	64	55	58	49	52
Profiler	89	93	80	84						
Rail Saw	97		88		80		74		68	
Regulator[2]	97	99	88	90	80	82	74	76	68	70
Road Truck	83	88	74	79	66	71	60	65	54	59
Rock breaker	93		84		76		70		64	
Roller	82	88	73	79	65	71	59	65	53	59
Scissor lift										
Scraper	85	98	76	89	68	81	62	75	56	69
Spreader	70	70	61	61	53	53	47	47	41	41
Tamping			72	90						
Tie cutter (rail)	91		82		74		68		62	
Tub Grinder & Mulcher (40-50hp)	91	95	82	86	74	78	68	72	62	66
Vac-truck		92		83		75		69		63
Vibrating Plates	76	90	67	81	59	73	53	67	47	61
Vibratory Rammer	83	83	74	74	66	66	60	60	54	54
Vibratory Roller	84	85	75	76	67	68	61	62	55	56
Water Cart	82	83	73	74	65	66	59	60	53	54
Welding Equipment	80	85	71	76	63	68	57	62	51	56

[1] Noise levels are measured in front of the process. Noise reduces by approx 4dB(A) if behind the process. A 1.5m barrier can provide 15dB(A) reduction

[2] The main source of noise is the ballast contacting the bin. Noise levels can be reduced if the regulator has a lined bin

Appendix B. Typical Vibration Levels from Construction Activities

Vibration levels are influenced by the actual operating condition of the plant and equipment being considered and the local site and geographical conditions. Therefore, this table should be used for indicative purposes only. Vibration level monitoring in the vicinity of a site in accordance with this Environmental Instruction should be used in lieu of this table for construction works where vibration might occur.

Activity	Typical Levels of Ground Vibration	Order of distance to achieve damage targets
Vibratory Rollers	1.5mm/s at 25m <i>Higher levels could occur at closer distances depending on local conditions and the roller operation. For a heavy roller, it is expected that damage will not occur with a minimum 12m buffer to the foundations of a standard residential building.</i>	12m
Hydraulic Rock Breakers (levels typical of a large rock breaker in hard sandstone)	4.5mm/s at 5m 1.3mm/s at 10m 0.4mm/s at 20m 0.1mm/s at 50m	10m
Compactor	20mm/s at 5m 2mm/s at 15m 0.3mm/s at 30m	15m
Excavators	0.2mm/s at 40m	15m
Ballast Tamping	6mm/s at 3m 2mm/s at 10m	10m
Truck traffic (over maintained road surfaces)	0.2mm/s at 10m	5m
Truck traffic (over irregular surfaces)	2mm/s at 10m	10m
Impact pile driving / removal	≤ 15 mm/s at distances of 15 m ≤ 9 mm/s at distances greater than 25 m Typically below 3mm/s at 50m <i>Significant changes to the vibration levels can occur based on the soil conditions and the driving energy of the hammer</i>	50m
Continuous Flight Auger (CFA) piling	Negligible vibration at distances greater than 20 m from the piling	
Bored piling	Negligible vibration at distances greater than 20 m from the piling	
Bulldozers	2mm/s at 5m 0.2mm/s at 20m	10m
Air track drill	5mm/s at 5m 1.5mm/s at 10m 0.6mm/s at 25m 0.1mm/s at 50m	10m
Jackhammer	1mm/s at 10m	10m

Appendix C: Example Notification Letters



transport

Gawler Line Maintenance advice (station cleaning program) July to December 2015

Dear Resident,

The Department of Planning, Transport and Infrastructure has scheduled regular station cleaning works at night for all stations on the Gawler Line as follows:

- 2 to 11 August 2015
- 13 to 22 September 2015
- 26 October to 4 November 2015
- 6 to 15 December 2015

These works will be undertaken, generally every 6 weeks with the dates and locations above provided as a guide only. Some changes may be required without notice depending on weather conditions, productivity and other logistical considerations.

To ensure the safety of workers and to avoid disruption to public transport users these works will be conducted at night between the hours of 12 am to 5 am.

The works involve using a hot wash machine and other hand tools for approximately one hour at each station. Every effort will be made to minimise disruptions to residents during these works, however some noise is unavoidable. You may hear sounds from the equipment used and vehicle movements.

Gawler Line train services will not be affected by these works.

These works form part of an ongoing maintenance program to ensure the comfort and safety of public transport commuters.

In addition, the department has recently developed an online calendar, which will be updated regularly to provide greater transparency of rail maintenance activities. For the latest information about rail maintenance and to access the calendar, please visit www.infrastructure.sa.gov.au/RR.

We appreciate your cooperation and patience while these important works are undertaken.

For further information about rail maintenance works, please contact Adelaide Metro on 1300 311 108 or email DPTI.RailMaintenance@sa.gov.au.

Yours sincerely

Community Engagement Team
29 July 2015

Appendix D: Template Night Works Management Plan

Project: _____ **Contractor:** _____ **Application Date:** / /

Contact Details

Primary Contact Person: _____ **Telephone:** _____ **Email:** _____

Back-up Contact Person: _____ **Telephone:** _____ **Email:** _____

Details of night works

Location: _____ Map attached, showing location of night works, location and distance of nearest sensitive receivers, letter-drop extent, and any existing barriers that may influence noise transmission

Description of works: _____

Proposed dates: _____ **Proposed timing:** _____ (for example, 1900 – 0600; or early starts 0500 – 0700)

Category and level of night works: (refer to Table 2 in DPTI Environmental Instruction 21.7)

Short term Level 1
 Medium term Level 2
 Long term

Context: (nature of any barriers between noise source and sensitive receivers, existing background noise levels if available)

Predicted noise levels (Note: sound pressure levels at various distances from the source can be calculated using knet [8386194](#) or AS2436-2010)

Plant	A-weighted sound pressure level (at nearest sensitive receiver)		Period when plant will be in use (eg 1900 – 2200)	Plant	A-weighted sound pressure level (at nearest sensitive receiver)		Period when plant will be in use (eg 1900 – 2200)
	L _{eq, 15min}	L _{max}			L _{eq, 15min}	L _{max}	

Mitigation measures

List mitigation measures that will be employed (for example, scheduling noisiest works early in the evening, using broadband reversing beepers, using rubber mounts on vibrating plant, incorporating respite days in work program)

Justification for night works

Consultation/ notification

Residents notified (attach notification letter)
 Advance notice signs
 Other: (provide details)

Monitoring

Will monitoring be undertaken? Under what circumstances/ during which activities?

Approvals

Contractor / Environment
 Planning Officer Signature: _____ Date: _____
 DPTI Senior Environmental
 Management Officer Signature: _____ Date: _____
 EPA Officer Signature:
 (if required) _____ Date: _____