

Appendix M – Inland Rail Noise and Vibration Management Strategy



The Australian Government's priority freight rail project

**Inland Rail
Noise and Vibration Management Strategy
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1. INTRODUCTION

The Australian Government has committed to delivering the Inland Rail Programme, which is a high performance and direct interstate freight rail corridor between Melbourne and Brisbane, via central-west New South Wales and Toowoomba in Queensland.

Inland Rail is a major nation-building programme that will enhance Australia's existing national rail network and serve the interstate freight market.

The Inland Rail route, which is about 1,700 kilometres long, involves:

- Using the existing interstate rail line through Victoria and southern NSW
- Upgrading about 400 kilometres of existing track, mainly in western NSW
- Providing about 600 kilometres of new track, mainly in northern NSW and south-east Queensland.

The construction and operation of the Inland Rail programme has potential to impact the amenity of adjacent noise sensitive receivers. Rail operations, rail infrastructure maintenance and construction generate noise that can have an adverse effect on people living alongside railway lines. Noise can disturb sleep, affect speech intelligibility and cause annoyance.

The purpose of this document is to guide the management of noise and vibration for the Inland Rail programme in line with the Australian Rail Track Corporation's (ARTC) existing management practices and relevant state legislation.

2. BACKGROUND AND OBJECTIVES

2.1. Objective

The Strategy objective is to guide assessment and construction of new and upgraded infrastructure and the operation of the completed route.

The strategy:

- Incorporates existing legislation, licences and state guidelines.
- Incorporates relevant environmental strategies detailed in the Inland Rail Environmental Strategy¹.
- Aims for consistency in the management of noise and vibration between states as specified the Inland Rail Environmental Strategy. A consistent strategy will simplify the assessment process and operation of the Programme, while treating all noise sensitive receivers adjacent to Inland Rail equitably, regardless of which state they are located in.
- Integrates with existing ARTC policies and procedures.

It should be noted that the Strategy does not seek to impose operational rail noise limits or performance levels.

2.2. Preliminary Environmental Risk Assessment – Environmental Strategy

The Preliminary Environmental Risk Assessment (PERA) for the Inland Rail programme identified noise and vibration as an 'environmental indicator that poses greatest environmental risk'. Specifically, the following noise management strategies were identified in the PERA:

- Implement applicable state policy and noise levels for each state jurisdiction.

¹ Melbourne to Brisbane Inland Rail Environmental Strategy, November 2014 Parsons Brinkerhoff

- Manage noise impacts through appropriate rail alignment design and location of signals, passing loops (now referred to as crossing loops) and passing lanes in consultation with design engineers.
- Investigate expanding the Rail Noise Abatement Programme (RNAP) across all state jurisdictions and include measures to manage noise impacts to sensitive receivers from rail traffic increases which are exempt from the New South Wales Rail Infrastructure Guideline (RING).
- Manage noise complaints through liaison with rail operators to address operator specific noise complaints.
- Investigate and consider opportunities for noise control at the source to manage operational noise through engagement with federal and state governments and rail operators, possibly over time to mitigate future noise impacts (2036 and beyond).

These strategies have been incorporated into this document, either directly or through existing ARTC processes (e.g. complaint handling and liaison with operators).

3. NOISE AND VIBRATION LEGISLATION AND GUIDELINES

3.1. State guidelines summary

Existing state guidelines and licences relevant to rail noise and vibration are listed in Table 1.

Table 1 Relevant state requirements

TYPE OF NOISE	QUEENSLAND	NEW SOUTH WALES	VICTORIA
Operation <i>operation of the existing network</i>	NA ²	New South Wales Environment Protection Licence 3142	NA
Construction <i>construction of new rail infrastructure</i>	Transport Noise Management Code of Practice Volume 2 – Construction Noise and Vibration ³ , QLD TMR, 2016	Interim Construction Noise Guideline, NSW DECC, 2009	Noise Control Guidelines, EPA VIC, 2008
Maintenance <i>maintenance or renewal of rail infrastructure</i>	NA	Interim Construction Noise Guideline, NSW DECC, 2009 New South Wales Environment Protection Licence 3142	Noise Control Guidelines, EPA VIC, 2008
New rail infrastructure <i>operation of rail infrastructure projects</i>	NA	New South Wales Rail Infrastructure Noise Guideline, NSW DECC, 2009	NA

² The Queensland Rail Code of Practice – Railway Noise Management, Queensland Rail 2012 is no longer in force.

³ Applies where a Compliance Management Plan is sought under 477G of *Transport Infrastructure Act 1994*.

TYPE OF NOISE	QUEENSLAND	NEW SOUTH WALES	VICTORIA
Fixed infrastructure ⁴	Queensland Environmental Protection (Noise) Policy Schedule 1 – Acoustic Quality Objectives, 2008	New South Wales Industrial Noise Policy, NSW EPA 2000	State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1 (SEPP N-1)
New developments adjacent to existing freight railways	State Development Assessment Provisions (SDAP) Module 1 for Community Amenity V1.10 QLD Department of Infrastructure, Local Government and Planning, 2016	Development Near Rail Corridors and Busy Roads – Interim Guideline NSW Department of Planning 2008	NA
Vibration			
New rail infrastructure operation of rail infrastructure projects	NA	Assessing Vibration: a technical guideline, NSW DEC 2006	NA
Construction construction of new rail infrastructure	Transport Noise Management Code of Practice Volume 2 – Construction Noise and Vibration ⁵	Assessing Vibration: a technical guideline	NA
Maintenance maintenance or renewal of rail infrastructure	NA	Assessing Vibration: a technical guideline	NA

3.2. Operational rail noise

Table 1 indicates that noise and vibration from the operation of a railway is not regulated by a specific guideline or licence in Queensland or Victoria. Below is a summary of state based operational rail noise management across the Programme.

3.2.1. Queensland

The *Queensland Environment Protection Act 1994* (EP Act) Schedule 1 Part 1 excludes ‘noise from the ordinary use of a busway, light rail or rail transport infrastructure’ from the definition of environmental nuisance. However, the *Environmental Protection Act 1994* prescribes a general environmental duty to undertake all reasonable and practicable measures to prevent or minimise environmental harm. The *Environment Protection (Noise) Policy 2008*,

⁴ Applies to non-train noise from fixed infrastructure (e.g. tunnel ventilation or maintenance activities from a yard). It does not apply to level crossing bells.

⁵ Applies where a Compliance Management Plan is sought under 477G of Transport Infrastructure Act.

Acoustic Quality Objectives do not apply to activities listed in Schedule 1 Part 1 of the Queensland *Environmental Protection Act 1994* (i.e. noise from rail transport infrastructure).

3.2.2. New South Wales

In New South Wales, ARTC holds an Environment Protection Licence (EPL) for railway systems activities under the *Protection of the Environment Operations Act 1997*. The EPL contains requirements for operational noise (Conditions L2, L2.1), maintenance and construction noise (Condition O4). EPL 3142 is available at www.epa.nsw.gov.au. Noise management in New South Wales will therefore be guided by ARTC's EPL.

3.2.3. Victoria

The Victorian *Environment Protection Act 1970* states that 'objectionable noise' is an offence (Part 8, Section 48), and the State Environmental Protection Policy (SEPP) 'Control of noise from Commerce Industry and Trade' regulates operational noise associated with fixed infrastructure sites including stations, maintenance facilities and stabling yards. No specific requirements exist for the operation of a railway.

3.3. Voluntary programmes

ARTC have developed a Rail Noise Abatement Programme (RNAP) for existing operational sections of the Inland Rail that have experienced significant growth in rail traffic attributable to the Inland Rail programme. The aim of the RNAP is to provide noise abatement to residents affected by rail noise in a fair and sustainable way. This programme is available to locations on the Inland Rail route following the commencement of train operations from Melbourne to Brisbane.

4. NOISE MANAGEMENT

4.1. Construction noise and vibration

Assessment of construction noise and vibration arising from the upgrading of existing sections of track as well as the establishment of new track in greenfield locations, will be guided by the relevant state guidelines and licences listed in Table 1.

Assessment of construction vibration in Victoria should be undertaken using the British Standards⁶. Potential for structural damage should be assessed using German Standard DIN 4150-3:1999 across all States

For NSW projects, specific guidance can be found in the *NSW Construction Noise and Vibration Management Framework, ARTC 2017*. The Framework provides a Programme specific approach to addressing construction noise and vibration aspects of relevant NSW guidelines.

4.1.1. Blasting

Assessment of human comfort/structural damage for airblast overpressure will be undertaken in accordance with Australian Standard AS2187.2:2006 and ANZEC *Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration 1990*. There may also be other state based requirements (e.g. Queensland EP Act Section 440ZB or New South Wales Environment Protection Licence).

⁶ British Standards BS 5228-2:2009 or BS 6472-1:2008 – whichever is deemed most relevant

4.2. Operational noise and vibration from new rail infrastructure

4.2.1. NSW

NSW is currently the only state on the Inland Rail route that has a guideline for noise (air and ground borne) from new freight rail infrastructure projects. In NSW, noise from new rail infrastructure projects associated with Inland Rail will be assessed under the Rail Infrastructure Noise Guideline (RING).

4.2.2. QLD and VIC

The Inland Rail programme will adopt Inland Rail noise trigger levels for the assessment of operational noise for new and redeveloped rail proposals in both Queensland and Victoria (derived from the NSW RING), while incorporating any additional State specific requirements. The use of a consistent approach across the states aligns with the Inland Rail Environmental Strategy and provides the Inland Rail programme with certainty around the assessment process.

Airborne will be assessed in accordance with Tables 2 and 3. The noise levels in Tables 2 and 3 refer to noise at the receiver location and refer only to noise from rail transportation sources. Where predictions indicate that the trigger levels in Tables 2 and 3 are likely to be exceeded, feasible and reasonable mitigation measures are to be assessed, investigated and considered to reduce the predicted noise levels.

Airborne noise levels for residential land uses are detailed in Table 2. 'Residential' land use typically means any residential premises and includes aged-care facilities and caravan parks incorporating long-term residential use.

Table 2 Airborne noise trigger levels for residential land use

TYPE OF DEVELOPMENT	NOISE TRIGGER LEVELS DB(A) (EXTERNAL) ¹	
	Day (7 am–10 pm)	Night (10 pm–7 am)
New rail line development ¹	Predicted rail noise levels exceed:	
	60 $L_{Aeq(15h)}$ OR 80 L_{AFmax}	55 $L_{Aeq(9h)}$ OR 80 L_{AFmax}
Redevelopment of existing rail line ²	Development increases existing $L_{Aeq(15h)}$ ³ rail noise levels by 2 dB or more, or existing L_{Amax} rail noise levels by 3 dB or more and predicted rail noise levels exceed:	
	65 $L_{Aeq(15h)}$ OR 85 L_{AFmax}	60 $L_{Aeq(9h)}$ OR 85 L_{AFmax}

¹ A new rail line development is a rail infrastructure project on land that is not currently an operational rail corridor

² A redeveloped line is a development on land that is within an existing operational rail corridor, where a line is or has been operational or is immediately adjacent to an existing operational rail line which may result in the widening of an existing rail corridor

³ $L_{Aeq(period)}$ means $L_{Aeq(15h)}$ for the day-time period and $L_{Aeq(9h)}$ for the night-time period

Table 3 contains the airborne rail noise trigger levels applicable to sensitive land uses other than residential.

Table 3 Airborne noise trigger levels for sensitive land uses

OTHER SENSITIVE LAND USES	NOISE TRIGGER LEVELS DB(A) (WHEN IN USE)	
	New rail line development ¹	Redevelopment of existing rail line ²
	Resulting rail noise levels exceed:	Development increases existing rail noise levels by 2 dB(A) or more in L_{Aeq} for that period and resulting rail noise levels exceed:
Schools, educational institutions and child care centres	40 $L_{Aeq(1h)}$ internal	45 $L_{Aeq(1h)}$ internal
Places of worship	40 $L_{Aeq(1h)}$ internal	45 $L_{Aeq(1h)}$ internal
Hospital wards	35 $L_{Aeq(1h)}$ internal	40 $L_{Aeq(1h)}$ internal
Hospitals other uses	60 $L_{Aeq(1h)}$ external	65 $L_{Aeq(1h)}$ external
Open space – passive use (e.g. parkland, bush reserves)	60 $L_{Aeq(15h)}$ external	65 $L_{Aeq(15h)}$ external
Open space – active use (e.g. sports field, golf course)	65 $L_{Aeq(15h)}$ external	65 $L_{Aeq(15h)}$ external

¹ A new rail line development is a rail infrastructure project on land that is not currently an operational rail corridor

² A redeveloped line is a development on land that is within an existing operational rail corridor, where a line is or has been operational or is immediately adjacent to an existing operational rail line which may result in the widening of an existing rail corridor

For both new and redeveloped rail projects, the noise trigger levels listed in Tables 2 and 3 should be evaluated at the following points in time:

1. Proposal: the individual project to which the planning conditions apply
 - o no build proposal and build proposal.
2. Melbourne to Brisbane rail operations (anticipated 2025): the estimated time at which through connection between Brisbane and Melbourne is anticipated
 - o no build through connection and build through connection within the proposal footprint.
3. Design year (e.g. 2040): a future scenario that reflects the normal operation of the Inland Rail programme
 - o no build design year and build design year within the proposal footprint.

Assessment of the three scenarios above will ensure that the impacts from both the individual proposal and Inland Rail programme are considered.

4.2.3. Vibration

Potential vibration associated with the operation of new rail infrastructure should be assessed under the relevant state guideline (see Table 1), or the Standards listed in Section 4.2 of this document.

4.2.4. Ground borne noise

Ground borne noise associated with the operation of new and upgraded rail infrastructure in NSW will be assessed in accordance with RING. In Victoria and Queensland it will be assessed under the relevant state guidelines and/or accepted industry practices in the absence of guidelines.

4.3. Operational noise and vibration from fixed infrastructure

Noise and vibration from fixed infrastructure (e.g. tunnel extraction fans) should be assessed in accordance with the relevant state guidelines specified in Table 1.

4.4. Cumulative impacts

New infrastructure works are not proposed along the entirety of the Inland Rail route. Consequently there will be areas on the route that may not require a noise or vibration assessment despite being exposed to increased rail movements as a result of proposals on other parts of the alignment.

ARTC will apply a RNAP to address this issue. This is a voluntary programme available to residential dwellings adjacent to existing operational rail corridors that have experienced significant growth in train movements as a direct result of the Inland Rail Programme.

Eligibility of individual residents for the RNAP is assessed against noise levels, length of residency and other requirements to determine if noise abatement is feasible and reasonable. The RNAP applies once significant growth has occurred and will therefore be available to eligible residents once Inland Rail operations commence.

Operation and maintenance of the completed network will be undertaken in accordance with ARTC's current policies, licences and Environmental Management System (EMS).

4.5. Operational noise and vibration abatement

The Inland Rail programme will undertake assessments to determine feasible and reasonable noise abatement to residents meeting the triggers for new or upgraded rail infrastructure (Section 4.2) or via the RNAP.

Any noise abatement required following assessment under the criteria specified in Section 4.2 will be in place prior to the commencement of Melbourne to Brisbane train operations of the Inland Rail.

5. STRATEGY REVIEW

This Strategy will be reviewed by ARTC at regular intervals and to incorporate changes to legislation or state guidelines.

6. CONCLUSION

This Strategy guides noise and vibration management for construction, assessment of new and upgraded infrastructure and the operation of the completed Inland Rail route.

In most cases, relevant state guidelines will prescribe the management of noise and vibration on the Inland Rail programme. However, where state specific guidance is absent, this Strategy has identified noise and vibration levels to enable assessment and management of potential impacts from the construction and operation of the Inland Rail.

APPENDIX A TERMS AND DEFINITIONS

TERM	DEFINITION
ARTC	Australian Rail Track Corporation. Australian Government-owned corporation tasked with developing a 10 year program to implement Inland Rail
EMS	Environmental Management System
EPA	Environment Protection Authority
EP Act	<i>Environmental Protection Act 1994</i>
EPL	Environment Protection Licence
Feasible	Relates to engineering considerations, what can practically be built (e.g. safety, access, site constraints).
Receiver	A premises that is subject to construction noise or vibration. Premises may be noise sensitive (e.g. dwellings, hospitals, places of worship).
PERA	Preliminary Environmental Risk Assessment
Reasonable	Selecting reasonable measures from those that are feasible involves judging whether the overall noise benefits outweigh adverse social, economic and environmental effects including the cost of the measure.
RING	New South Wales Rail Infrastructure Noise Guideline
RNAP	Rail Noise Abatement Program
SEPP	State Environmental Protection Policy
SDAP	State Development Assessment Provisions

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