INFORMATION ON SAFETY PROCESSES AND

NOISE MANAGEMENT ON

THE PROPOSED INCREASE IRON ORE HAULAGE

TASK AT ESPERANCE

1. Introduction

The purpose of this document is to provide information on ARG's:

- safety processes and
- environmental impacts and mitigating strategies,.

for it's iron transport operation in Esperance.

ARG proposes to transport 8 million tonnes per annum of iron ore along existing railway between Koolyanobbing and Esperance under contract for Portman.

2. Management System

2.1 ARG's Policies – Environmental, Safety

Copies of the Environment and Rail Safety Policies are attached.

2.2 Commitments

ARG is committed to the following actions:

- Monitoring potential impacts of the railway operation, in particular the issues of safety, noise and dust.
- Implementation of appropriate remedial actions, where necessary and practical, in consultation with affected parties.

2.3 Procedures and Operational Guidelines

ARG has procedures in place to cover all aspects of safe train operation and guidelines to minimize train braking noise near the Esperance Wharf.

2.4 Rules for warning horn operation.

There is a requirement to sound signal on certain occasions for safety reasons to meet ARG's WestNet Rule (Refer the attached document, Rule 27 of the Australian Railroad Group 'WestNet Rules").

Train drivers must comply with this Rule while driving trains.

Q Class Locomotives are employed in the movement of trains from ARG's Terminal at Esperance to Esperance Wharf and these have been design to meet the noise emitting criteria shown in Railways Of Australia, Manual Of Engineering Standards And Practices Section 13.4 'Environmental And Performance Requirement. A copy of this document is attached.

2.5 Rollingstock - Maintenance

All Rollingstock is maintained to original equipment manufacturers' requirements.

2.6 Noise Regulations

Environmental Protection (Noise) Regulations 1997 stipulates that in Part 1 – Preliminary under clause 3(b) that nothing in these regulations applies to noise emissions from trains or aircraft. However, the EPA has prepared draft guidelines relating to train noise and ARG is adopting practices aimed at meeting those guidelines on a voluntary basis.

3. Description of Train operation

3.1 Route

The rail route from Koolyanobbing to Esperance is shown in Figure 1.

3.2 Scheduling

Train scheduling is base on a two cycle principle, where each cycle contains two trains and each train operation is 180^0 out of phase with each other. It is planned to, in one of the cycles to have a train being loaded and the other train being unloaded. While in the other train cycle, have one loaded train travelling to Esperance and the other train empty travelling to Koolyanobbing.

3.3 Effects of increased iron ore freight

The increase in iron ore transport to 8 mtpa, which will require triple header trains.

There are numerous broad level operational factors that underlie train scheduling. These include the origin and destination of the freight, railway gauge, railway design, the availability and haulage capacity of locomotives in the operational fleet and client requirements.
Scheduling is also constrained by the requirements to fit in with other rail traffic. The constraint is greatest for the Koolyanobbing to Kalgoorlie section which handles rail traffic between Western Australia and other States as well as mainline services. The mainline schedules are subject to unpredictable changes, which are liable to affect the schedules for the iron ore trains.
The configuration that will be used to accommodate the increasing iron ore tonnages are four triple headers comprising three Q-class locomotives. Other classes of locomotives will only be used as backup where Q-class locomotives are unavailable due to emergency or breakdown situations, for example.
The number of wagons will normally be 126.
There will be 18 iron ore deliveries to Esperance per week.
In order to minimise the night-time noise impacts at Esperance, all iron ore train movements will, wherever feasible, be scheduled into and out of Esperance Yard between 0530 and 2200 hours.

4. Environmental Issues

4.1 Noise

- The calculated noise levels for the 8 mtpa trains are: $L_{Aeq,Day}$ 53 dB(A) and $L_{Aeq,Night}$ 52 dB(A).

All reasonable and practicable effort will be taken to reduce these values by:

- Maintaining Rollingstock to OEM specification.
- Train Crew Training – Train crew are biannually assessed on train handling skills and if it is necessary drivers are given additional training if the assessments shows weaknesses in driver technique.

Road Traffic Noise

Harbour Road runs along side the railway and ends up at the Wharf. This road is a main arterial road and carries heavy haul trucks that contribute to the adverse environmental impact in this area. Accordingly noise levels at residences dominated by road traffic in addition to the influence of street general ambient noises.

4.2 Dust

Iron ore is transported from Koolyanobbing in open wagons. The potential for airborne dust is greatest immediately after the wagons have been loaded and the train departs from Kooyanobbing. This is because air movements above the surface of the load easily dislodge the newly exposed smaller particles. As the surface weathers however, the potential for dust generation is greatly reduced. Moister causes aggregation and cementing of the smaller particles to larger ones, cause the surface to ‘crust’.

The train travels at low speed whilst in Esperance which reduces the potential for dust emissions. The Esperance Port Authority operates a wagon washing system which is used, as necessary, to wash down the empty wagons before departure.

The above criteria for dust control will not change due to increased train length.

5. Safety

5.1 ARG must comply with the Rail Safety Act 1998 and associated Regulation. These documents specify that Owners and Operators of

Railways must have Operational Procedures and Systems in place to run a safe railway. To ensure this is done the Office Of Rail Safety conducts compliance audits to verify that the procedures and systems are complied with each year.

6. Management Objectives

Controls to minimise the noise and dust impact on the environment currently implements by ARG include:

- Scheduling train movements outside 2200 to 0700 hours where possible.
- Ensuring the rail line is adequately maintained to minimise wagon jolting.
- Maintaining Rollingstock to original equipment manufacturers' recommendations.
- Improve driver training in noise reduction.
- Investigate other operational procedures to reduce noise when it is evident that it practicably reasonable and achievable without being detrimental to the operation and safety.
- Document and investigate the cause of all train noise complaints received from the public.
- Conducting operations within the boundaries of the Esperance Port Authority in accordance with the Esperance Port Authority's EMP.
- Ensure that there is no significant visual staining by iron ore dust at towns on the rail route from Koolyanobbing to Esperance.
- Train crews and other operational staff will continue ongoing visual assessment of iron ore dust emissions from wagons and staining along the transport route and document their observations.

Conduct testing of the environment when there is as considered requirement.

ARG is committed to the following corporate objectives:

1. minimising adverse environmental impacts in accordance with ARG's environmental policy (attached)by taking all reasonable and practicable steps to reduce adverse impacts from its train operations to acceptable levels.

2. being the safest railway in Australia.

ENVIRONMENTAL POLICY

The Australian Railroad Group is committed to managing its business operations and activities in an environmentally responsible manner with an emphasis on achieving sustainable development and protection of the environment.

As a major national rail transport organisation, ARG recognises that its operations involve risks to the environment and will therefore take all reasonable and practicable measures in line with legal obligations and community expectations to ensure adverse environmental impacts are prevented or minimised.

To achieve this ARG will:

- comply with all relevant Environmental legislation and statutory requirements;
- establish and maintain an environmental management system based on AS/NZS 14001;
- establish objectives and targets for continual improvement in environmental performance;
- provide appropriate training and resources;
- ensure that areas of significant environmental risk, such as hazardous materials, land degradation and community impact are appropriately managed;
- contribute to sustainable development by the responsible use of natural resources and recycling waste materials where feasible;
- prevent pollution and minimise emissions to the environment as far as reasonably practicable;
- take appropriate action to rehabilitate and/or mitigate environmental harm we may have caused by our operations;
- communicate this policy to and consult with employees, contractors and other relevant parties as appropriate.

Environmental protection is both an individual and shared responsibility. All managers, supervisors, employees and contractors are accountable for protecting the environment from potential risks and impacts of operations and activities under their control. ARG will ensure that they follow established safe systems and procedures of work and take all reasonable care to ensure their own safety and that of the environment.

Mike Mohan
Chief Executive Officer
Australian Railroad Group

RAIL SAFETY POLICY

The Australian Railroad Group (ARG) is committed to the provision of transport services which maintain the highest possible levels of safety for its employees, customers and the community.

The ethos at ARG is that accidents can be prevented by adherence to sound systems and processes, and that every member of the organisation shall strive to achieve best practice standards for safety.

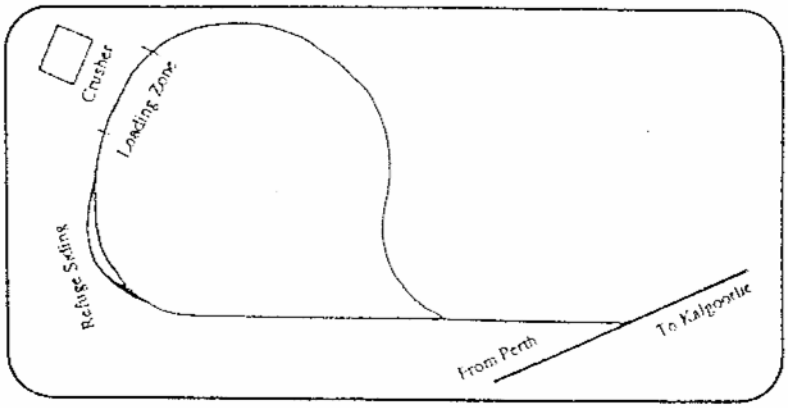
Consistent with this goal, it is the fundamental responsibility of us all to ensure the safety of the network for the benefit of other employees, customers and the community.

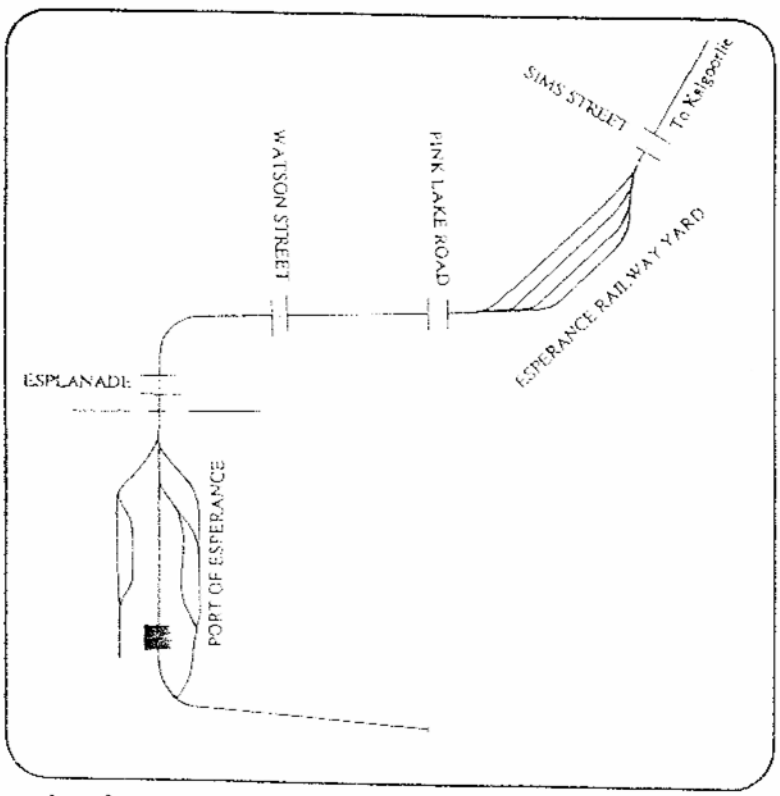
To ensure that Australian Railroad Group achieves this commitment, high priority will continue to be focused on demonstrating compliance to the requirements of Australian Standard AS 4292 Part 1 and the provision of effective risk management strategies.

Mike Mohan
Chief Executive Officer
Australian Railroad Group

ROUTE MAP KOOLYANOBBING - ESPERANCE

Inset 1
KOOLYANOBBING
BALLOON LOOP IRON ORE SIDING





Inset 2
ESPERANCE

Schematic View of
Track and Level Crossings

Australian Railroad Group

WestNet Rules

DIVISION 4
SOUND SIGNALS

27. SOUND SIGNALS TO BE GIVEN ON CERTAIN OCCASIONS

(1) Where a train or on track machine(s) is approaching a pedestrian or vehicular level crossing, whether during shunting operations or otherwise, the Driver must sound the horn at such a distance from the crossing, appropriate to the speed of travel, as to give ample warning of the approach of the train or on track machine(s).

(2) Where two trains or on track machines are approaching any level crossing at or about the same time, the Driver must repeat the warning blasts continuously, until the train or on track machine(s) has reached the crossing.

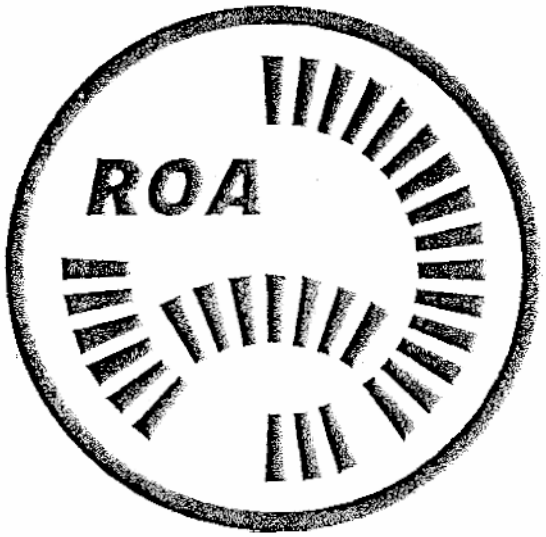
(3) A Driver must sound any required blasts distinctly, and with intensity, duration or repetition, proportionate to the distance at which the warning is required to be heard, and the circumstances under which it is being used.

(4) The Driver of a special train or of an on track machine which is run at short notice or a train or on track machine(s) running in advance of timetable time or of a train or on track machine(s) running late must sound the horn when approaching all places where a good and distant view cannot be obtained (so as to warn employees working on the line, and others, of the approach of the train or on track machine(s)).

(5) The following sound signals by means of the horn will be used by Drivers.

(a) *One long whistle* denoting	-	Warning, challenge or approaching a vehicle or pedestrian level crossing.
(b) *One short whistle* denoting	-	Acknowledgment or moving off.
(c) *Two short whistles* denoting	-	Setting back.
(d) *Three short whistles* denoting	-	Danger-Stop.
(e) *Continuous whistling* indicates	-	Assistance required.

(6) Before moving a railcar or locomotive, the horn will be sounded to give notice, except in the Urban Electrified Area it will not be necessary for Electric Multiple Units to sound the horn when moving off from platforms that do not have, at grade, a vehicle or pedestrian level crossing in advance of the platform.



RAILWAYS OF AUSTRALIA

MANUAL OF ENGINEERING

STANDARDS AND PRACTICES

INCORPORATING ENGINEERING AND OPERATIONAL STANDARDS AND PRACTICES APPLICABLE TO THE DESIGN, CONSTRUCTIONS AND OPERATION OF THE RAILWAY ROLLING STOCK FOR INTERSYSTEM USE

ISSUED UNDER THE AUTHORITY OF THE

RAILWAYS OF AUSTRALIA COMMITTEE

FIRST ISSUED SEPTEMBER 1992

13.4 ENVIRONMENTAL AND PERFORMANCE REQUIREMENTS

Compliance with these requirements is mandatory.

13.4.1 NOISE

13.4.1.1 Statutory Requirements

The locomotive shall satisfy all applicable State and Commonwealth Statutory Requirements in relation to noise levels.

13.4.1.2 Internal and External Noise Level Requirements

(a)Internal noise levels within the drivers' cabin shall be measured at the driver's ear level in accordance with AS 1269 Hearing Conservation Code. Internal noise levels shall not exceed the values shown in Table 13.2 under all operating conditions. Internal noise levels at infrasonic frequencies shall not exceed the 1/3 octave band limits shown in Table 13.1. Allowable levels in 1/3 octave bands between specified centre frequencies shall be determined by linear interpolation.

TABLE 13.1

INFRASOUND LIMITS

1/3 Octave Band Centre Frequencies	1 Hz	5 Hz	10 Hz	20 Hz
Sound Pressure Levels(re 2 x10^{-5}Pa)	132 dB	126 dB	123 dB	120 dB

(b) External noise emanating from the locomotive shall be measured in accordance with AS 2377 Methods for the Measurement of Airborne Sound from Railborne Vehicles and shall not exceed the values shown in Table 13.2.

13.4.1.3 Tonality

Both internal and external noise shall be non tonal. All measurements shall be assessed for tonality unless otherwise specified. Evaluation shall be on the basis of 1/3 octave analysis as follows:

(a) No third octave band below 160 Hz shall exceed 15 dB above either adjacent band.

(b) No third octave band in the range 160 Hz to 400 Hz shall exceed 8 dB above either adjacent band.

(c) No third octave band above 400 Hz shall exceed 5 dB above either adjacent band.

In addition, unless otherwise stated, the overall linear noise level shall not exceed the overall A - weighted noise level by more than 15 dB.

TABLE 13.2

SPECIFIED NOISE LEVELS

Noise Levels in A-weighted Sound Pressure Levels re 2×10^{-5} Pa					
	Operating Condition	Speed	External Location	External Noise Limit	Drivers Cab Internal Noise Limit
1	Idle with compressor, radiator fans and air cond. operating at maximum load occurring at idle.	Stationary	15m contour	70 dB(A) max 82 dB lin.max	70 dB(A) max
2	All other throttle settings under self load with compressor, radiator fans and air cond. operating	Stationary	15m contour	87 dB(A) max 95 dB lin.max	75 dB(A) max
3	Brake equipment & annunciators	Stationary	-	-	85 dB(A) max
4	Main Horn	Stationary	200 m	88 dB(A) min	85 dB(A) max
5	Low Horn	Stationary	100 m	85 dB(A) min 90 dB(A) max	85 dB(A) max
6	Idle	0 - 50 km/h	15 m from centreline	80 dB(A) max	75 dB(A) max
7	All service conditions	0 - 80 km/h	15 m from centreline	85 dB(A) max	75 dB(A) max (85 dB(A) under Cond. 4)
8	In service	N/A	N/A	N/A	80 dB(A) Leq

Notes:

(a) All levels quoted in table 13.2 are with the doors and windows closed and air conditioning operating at full cooling load.

(b) Maximum allowable internal levels with windows open shall not exceed 5 dB(A) above the allowable levels with windows closed.

(c) 15 m contour is developed as per the 7.5 m contour in AS 2377 Appendix A.

(d) The external noise limits for Condition 2 assume a contribution of approximately 2 dB(A) from fans operating for self loading purposes.

13.4.1.4 **Noise Test Procedure**

13.4.1.4.1 **General Conditions**

External and internal noise from the locomotive shall be measured with equipment and environmental conditions as defined in AS 2377 Methods of Measurement of Airborne Sound from Railbound Vehicles for both stationary and pass by tests.

For Leq measurements a personal noise dosimeter to AS 2399 or equivalent integrating sound level meter shall be used.

13.4.1.4.2 **External Noise Measurements**

(a) Stationary measurements shall be carried out according to AS 2377 Appendix A to determine the location of the most significant noise sources on the locomotive. These measurements shall be conducted under Operating Conditions 1, 2 and 3 detailed in Table 13.2. It is sufficient to report these results in dB(A) without tonal assessment or 1/3 octave spectra provided dB (lin.) levels are also reported.

(b) Measurements shall be made on 15 m contours developed as per the 7.5 m contours of AS 2377 with microphone height of 1.5 m above rail level. The measurement points shall be perpendicular to the centre of the locomotive on both sides and at any other points on the 15 m contour corresponding to the maximum linear or A - weighted level in (a) above.

These measurements shall be conducted under Operating Conditions 1, 2, and 3 as detailed in Table 13.2. These results shall be reported in full including 1/3 octave spectra and tonal assessment.

(c) The warning horns shall be measured with the locomotive stationary in an unobstructed area with no significant reflecting objects within 50 m of the line of sight between the microphone and the locomotive. Wind speed shall not exceed 10 m/s during testing.

The horns shall maintain the levels stipulated in Table 13.2 for a 30 second continuous blast. Tonal assessment shall not be applied to horn assessments.

(d) Pass by noise shall be measured in accordance with AS 2377 Paragraph 9 with the microphone positioned 15 m from the track centreline and 1.5 m above rail level on both sides of the track. These measurements shall be made under the following conditions:

Idle at approximately 40 km/h.
Idle at approximately 80 km/h.
Full power at approximately 40 km/h.
Full dynamic brake at the speed where maximum dynamic braking is developed.
Full power at approximately 80 km/h.
Minimum reduction brake application from 30 km/h with the microphone position at approximately the mid point of the stopping distance.
Full service brake application from 30 km/h with the microphone position at approximately the mid point of the stopping distance.
The brake application tests above shall be conducted using an automatic brake application.

13.4.1.4.3 **Internal Noise Measurements**

Internal Noise measurements shall be made in accordance with AS 1269 Section 2.6.4.1 with the air conditioning operating at full cooling capacity and all doors and windows closed.

With the locomotive stationary noise and infrasound measurements shall be made under Operating Conditions 1, 2, 3, 4, and 5 as described in Table 13.2. These measurements shall include all throttle settings and representative brake equipment operations including a full service application. The horns shall be tested with the main reservoir fully charged.

The Leq measurement, Operating Condition 8, shall be based on a minimum 4 hour sample with stationary time not exceeding 20%.

13.4.2 RIDE QUALITY

13.4.2.1 Ride Index Limits

The locomotive shall be provided with a suspension system such that no dynamic instability of the locomotive body or bogies occurs at any running speed. The ride quality shall be maintained with

the running gear in any service condition.

The ride index shall not exceed the limits specified in Table 13.4.

TABLE 13.3

RIDE INDEX LIMITS

Track Class (Note 1)	Speed (km/h)	Ride Index (Note 2)	
		Vertical	Lateral (Note 3)
FRA Class 4	115	2.5	2.5
	130	2.8	2.8

Note 1: Track parameter data shall be supplied representing typical sections of track to allow consistent and repeatable modelling of locomotive ride performance.

Note 2: For transient conditions which occur during acceleration, deceleration, shunting or at crossovers vertical or lateral acceleration shall not exceed 0.3 g (2.94 m/s) in the 0 - 20 Hz band.

Note 3: Hunting tendencies are to be avoided where hunting is defined as greater than 0.5 Hz sinusoidal lateral oscillations of the wheelset resulting in lateral headstock accelerations of greater than 0.15 g sustained for longer than 2.5 seconds.

The ride index shall be calculated using the algorithm defined in Section 13.4.2.2.

13.4.2.2 **Ride Index Algorithm**

The ride index algorithm is implemented as follows:

Acceleration data is weighted by the function:

$$R_i = 7.07\ (V_i)^{0.1}$$

where the i-th value refers to the peak amplitude of a frequency component derived from an FFT analyser.

The function V_i is defined as follows:

Frequency Range (Hz)	V_i (Vertical)	V_i (Lateral)
0 - 6	$0.32\ fa^3$	$4.32\ a^3$
6 - 20	$400\ a^3/f^3$	$650\ a^3/f^3$
20+	a^2/f	a^2/f

where f = frequency, (Hz)

a = amplitude, g peak (1 g = 9.8 m/s^2)

The total ride index is calculated from the i values by:

$$RI_{total} = [\Sigma_{i=1}^{i=n} (RI_i)^{10}]^{0.1}$$

Notes:

1. Frequency analysis will utilise FFT analysis of at least 400 lines with 0.25 Hz resolution. Data shall be averaged over 32 averages to minimise statistical error. 16 averages is acceptable for comparative evaluations only.

2. Analysis shall be restricted to the 0.5 to 50 Hz band.

3. Weighting filters implementing the above weightings are acceptable provided:

   (a) integration is performed over 10-15 second periods.
   (b) the integrated values are recorded over at least 3 km of track and reported as a mean and sample variance.

4. Data for analysis shall come from samples at substantially constant speed (variance ± 5 km/h).

13.4.2.3 **Ride Quality Testing**

All ride quality testing shall be conducted with the accelerometers mounted as close as possible to the bogie centre pivot on the locomotive floor.
Locomotive ride quality testing shall be performed under the following guidelines:

(a) Accelerometers of appropriate sensitivity shall be utilised for measurement of ride parameters.

(b) The locomotive ride shall be tested at speeds up to maximum operating speed on suitable track for which track condition parameters will be established prior to testing.

(c) Analysis of the acceleration recordings shall be based on 10 second periods (minimum) over the entire test section.