

Rochdale Holdings Pty Ltd A.C.N. 009 049 067 trading as:

HERRING STORER ACOUSTICS

Suite 34, 11 Preston Street, Como, W.A. 6152
P.O. Box 219, Como, W.A. 6952

Telephone: (08) 9367 6200
Facsimile: (08) 9474 2579
Email: hsa@hsacoustics.com.au



ALLAN HERRING M.I.E. AUST. M.A.A.S.
LYNTON STORER M.A.I.E.A. M.A.A.S.
TIM REYNOLDS M.I.E. AUST. M.A.A.S.

PEER REVIEW

OF

**PROPOSED FORTESCUE METALS GROUP
PORT AND RAILWAY FACILITY, PORT HEDLAND
NOISE IMPACT ASSESSMENT**

BY

HERRING STORER ACOUSTICS

FOR

ENVIRON AUSTRALIA PTY LTD

JULY 2004

OUR REF: 3453-2-04141

CONTENTS

- 1.0 INTRODUCTION
- 2.0 CONCLUSION
- 3.0 REVIEW OF DRAFT REPORT
 - 3.1 Section 2 – Definitions
 - 3.1.1 Section 2 Readability Review
 - 3.2 Section 3 – Noise Level Criteria
 - 3.2.1 Section 3 Readability Review
 - 3.2.2 Section 3 Technical Aspects Review
 - 3.3 Section 4 – Railway Noise
 - 3.3.1 Section 4 Readability Review
 - 3.3.2 Section 4 Technical Aspects Review
 - 3.4 Section 5 – Description of the Existing Noise Environment
 - 3.4.1 Section 5 Readability Review
 - 3.4.2 Section 5 Technical Aspects Review
 - 3.5 Section 6 – Noise Prediction Methodology
 - 3.5.1 Section 6 Readability Review
 - 3.5.2 Section 6 Technical Aspects Review
 - 3.6 Section 7 – Results
 - 3.6.1 Section 7 Readability Review
 - 3.7 Section 8 – Noise Level Contour Maps
 - 3.7.1 Section 8 Readability Review
 - 3.8 Section 9 – Comparison of Results Against Regulations
 - 3.8.1 Section 9 Readability Review
 - 3.9 Section 10 – Discussion
 - 3.9.1 Section 10 Readability Review
 - 3.9.2 Section 10 Technical Aspects Review
 - 3.10 Section 11 – Conclusion
 - 3.10.1 Section 11 Readability Review

1.0 INTRODUCTION

Environ Australia Pty Ltd commissioned Herring Storer Acoustics (HSA), to undertake a peer review of the noise impact assessment undertaken by Lloyd Acoustics of the proposed Fortescue Metals Group (FMG) port and railway facility. Information provided consisted of the:

- Draft Report (FMG Draft Noise Report 2.pdf) received via email (hereafter referred to as FMG DR).
- SoundPlan noise model project (FMG Port and Rail Facility) received via CD.

Other documentation considered in the review were:

- *Environmental Protection (Noise) Regulations 1997* (the regulations).
- *EPA Guidance for Road and Rail Transportation Noise (EPA Guidance for the Assessment of Environmental Factors No. 14)*.
- EPA Bulletin 1066 (*Hope Downs Iron Ore Project – Rail and Port Facility*).

This review is presented in order of the FMG DR and provides comments from both a readability and technical standpoint. The comments with regards to the readability are not related to any technical considerations but are considered important for document understanding by non-technical readers.

2.0 CONCLUSION

The FMG DR concludes that the proposed FMG port facility will:

- *Comply with the regulations during the daytime;*
- *Exceed the regulations by 4 dB during the evenings and Sundays/Public Holidays between 0700 to 1900; and*
- *Exceed the regulations by 9 dB(A) during the night-time period.*

The methodology and modelling technique leading to the above conclusions is generally accepted; refer Section 3 of this report for more detail.

In Bulletin 1066, which relates to the proposed Hope Downs Iron Ore Project, the EPA acknowledged that Port Hedland requires special consideration and set the allowable noise levels as those shown below in Table 2.1.

TABLE 2.1 – NOISE CONDITIONS SET BY EPA IN BULLETIN 1066

Noise Sensitive Premises in Port Hedland	Assigned L _{A10} Level, dB
West of Crowe	50
East of Crowe Street	44

The FMG DR further concludes that noise from the proposed FMG facility complies with Table 2.1 and is therefore likely to be considered acceptable.

This conclusion is considered reasonable given the high noise levels from the existing BHP operations and that the Department of Environment (DoE) has previously supported projects with similar predicted exceedances. Consideration may also need to be given to not significantly contribute to the levels of Table 2.1. Also, Bulletin 1066 made the following comments:

Ideally, future proposals for the Town of Port Hedland area will need to demonstrate that their individual noise emissions will be at a level that will not compromise a longer term strategy that aims to reduce cumulative noise emissions to more acceptable levels for the community.

With the above in mind, it is considered that the proponent reduce emissions as far as is reasonably practicable. The main noise sources are the Shiploaders and associated Conveyor.

As such, the proponent should demonstrate that the sound power levels (SWL) in the noise model are the quietest reasonably available. Based on our experience, particularly at the Esperance Port, it is believed that modern Shiploaders may be able to achieve a lower SWL and the proponent should investigate the practicabilities of this with suppliers. Table 2.2 below compares the sound power level of a recent shiploader and that assumed in the modelling.

TABLE 2.2 – COMPARISON OF SHIPLoader SOUND POWER LEVELS, dB

Description	Octave Band Centre Frequency (Hz)								dB(A)
	31.5	63	125	250	500	1k	2k	4k	
SWL in FMG Model	140	134	128	124	118	115	110	97	121
SWL of Modern Shiploader	118	116	112	112	109	105	101	96	111

It can be seen from the above that there is a significant difference in the lower frequencies. The SWL put forward may not be appropriate in this instance, due to required differences, for instance higher capacity. However, items such as enclosing the drives and power packs, meshing gears, using machined and balanced conveyor idlers and having rubber-lined chutes at transfer points should be investigated. It may be found that although the SWL noted above for a 'modern' shiploader cannot be achieved, a significantly reduced SWL can be achieved compared to that used in the FMG model.

In terms of the Conveyor, the assumed sound power level is of a relatively low level and would likely already require machined and balanced idlers. The practicalities of enclosing or semi-enclosing the Shiploader Conveyor should be investigated. The conveyors in Esperance were fully enclosed in sheetmetal walkways. If a full enclosure is not practicable in this instance, a semi-enclosure with high-density insulation to the underside should be investigated.

As the proponent is likely to exceed the assigned noise levels, an application to vary these in accordance with regulation 17 will be required.

Noise from trains is exempt from the regulations and is instead controlled through policy or guidance documents. The FMG DR mentions the *EPA Guidance for Road and Rail Transportation Noise (EPA Guidance for the Assessment of Environmental Factors No. 14)* and also the outcomes of previous projects concluding that an appropriate criteria is an $L_{Aeq,8hour}$ of 55 dB. Noise from the proposed trains is predicted to comply with the nominated criteria.

Although the $L_{Aeq,8hour}$ 55 dB criteria has been used for previous projects, the FMG DR should examine the predicted noise levels against the EPA Guidance document. With respect to assessment against the Guidelines, HSA has summarised the relative information in Table 2.3.

TABLE 2.3 – PREDICTED $L_{Aeq,8hour}$ VALUES, dB

Location	Existing Predicted Noise Level ¹	FMG Predicted Noise Level	Total Future Predicted Noise Level	Increase in Noise Level – Existing to Future
Port Hedland ²	33 (N0) ³	35	37	4
Wedgefield	39 (N0)	43	45	6
South Hedland	38 (N0)	40	42	4
White Hills	39 (N0)	48	48	9

Notes:

1. The existing noise level assumes both HDMS & BHP trains.
2. Crowe Street.
3. In brackets is the noise amenity rating of the EPA Guidance document.

Section 5.3.2 of the EPA Guidance document puts forward an allowable noise level increase, based on the rating of the noise level prior to the proposal. In this instance, the existing Noise Amenity Ratings are all N0 (the lowest possible) and therefore, the allowable noise level increase is the greater of 4 dB or the highest range of N0, being 40 dB $L_{Aeq,8hour}$. Based on these criteria, the noise from trains is excessive at Wedgefield and White Hills.

As the predicted noise levels do comply with the $L_{Aeq,8hour}$ 55 dB criterion and precedence has been set in similar projects, the noise from trains is likely to be acceptable, however it is considered that the detail above regarding the EPA Guidance document should be included in the report. The proponent should provide comment with regards to the practicabilities of changing the rail alignment or other control techniques in order to comply with the Guidelines, particularly in relation to the White Hills area.

3.0 REVIEW

This review is presented in order of the FMG DR. Note there were no comments with regards to Section 1.

3.1 Section 2 – Definitions

3.1.1 Section 2 Readability Review

- Item iii notes that the symbol for linear sound pressure level is dB(L), however Table 6.6 uses dB(lin) – one should be changed for consistency.

- Items v and vi both state that the respective parameter is considered to represent the intrusive noise level, however it is 'normal' for this description to be applicable to the L_{A10} parameter only.

3.2 Section 3 – Noise Level Criteria

3.2.1 Section 3 Readability Review

- In 3.1, the *Environmental Protection (Noise) Regulations 1997* should be in italics, consistent with the *Environmental Protection Act 1986*.
- Table 3.1
 - Has a different font for the third time period.
 - Has both dB(A) and L_{A10} etc, only one A should be used.
 - Has two "+ IF" shown, however this applies to all or otherwise these two should be removed. If the "IF" is to remain, the abbreviation IF should be shown in the paragraphs above the table.
 - The fourth time period should read "2200 hours ... "
- It should be noted that the adjustments in Table 3.2 are cumulative to a maximum of 15 dB.
- A map showing the assessment locations would be useful.

3.2.2 Section 3 Technical Aspects Review

- The regulations apply penalties for intrusive characteristics only where it is impracticable to remove these characteristics, as noise is required to be free of such characteristics. The paragraph under Table 3.1 could be reworded such as "If these characteristics do exist and cannot be practicably removed, then the measured ..."
- In accordance with Schedule 3 Part 2c, the assigned noise levels are to be rounded to the nearest dB – applicable to Table 3.3.
- The wording describing the "significantly contributing" clause of the regulations should be examined. This clause does not only apply where the noise level is already being exceeded, but also applies where the introduction of a new industry causes the combined noise level to result in an exceedance.

3.3 Section 4 – Railway Noise

3.3.1 Section 4 Readability Review

- The ICC criteria should be re-worded. It states that the $L_{Aeq,day}$ and $L_{Aeq,night}$ noise levels from rail should be within the range 50 dB to 60 dB and 45 dB to 55 dB respectively. Presumably it is acceptable to be less than the minimum values. Possible rewording could be "External daytime criteria for new transportation infrastructure near existing residential development should be no more than 60 dB $L_{Aeq,Day}$ and ideally no more than 50 dB $L_{Aeq,Day}$ " and similarly for the night criterion.

3.3.2 Section 4 Technical Aspects Review

- The draft *EPA Guidance for Road and Rail Transportation Noise* is mentioned, however no detail is given. For completeness, and since the other criteria used is not official DoE policy, it is considered that the impact of this criteria should be considered. Using the results of the noise modelling, Table 3.1 below was developed by HSA.

TABLE 3.1 – PREDICTED $L_{Aeq,8hour}$ VALUES, dB

Location	Existing Predicted Noise Level ¹	FMG Predicted Noise Level	Total Future Predicted Noise Level	Increase in Noise Level – Existing to Future
Port Hedland ²	33 (N0) ³	35	37	4
Wedgefield	39 (N0)	43	45	6
South Hedland	38 (N0)	40	42	4
White Hills	39 (N0)	48	48	9

Notes:

1. The existing noise level assumes both HDMS & BHP trains.
2. Crowe Street.
3. In brackets is the noise amenity rating of the EPA Guidance document.

Section 5.3.2 of the EPA Guidance document puts forward an allowable noise level increase, based on the rating of the noise level prior to the proposal. In this instance, the existing Noise Amenity Ratings are all N0 (the lowest possible) and therefore, the allowable noise level increase is the greater of 4 dB or the highest range of N0, being 40 dB $L_{Aeq,8hour}$. Based on these criteria, the noise from trains exceeds at Wedgefield and White Hills.

3.4 Section 5 – Description of the Existing Noise Environment

3.4.1 Section 5 Readability Review

- A map showing the measurement locations (both short and long term) would be useful.
- The amount of exceedance to the night assigned noise levels is discussed for Edgar Street, however this location does not appear in Table 3.3.
- Figures 5.1 and 5.2 not cited.

3.4.2 Section 5 Technical Aspects Review

- Noise monitoring at Edgar and Crowe Streets was undertaken during reclaiming and shiploading operations. If operation of FMG may occur when BHP is not operating, it may be beneficial to also undertake noise monitoring during this time to establish the impact of FMG under this scenario.
- More details may be useful for the short-term background noise measurements such as date, time, wind conditions, apparent sources, one-third-octave band analysis etc.

3.5 Section 6 – Noise Prediction Methodology

This section of the review combines both reviewing the FMG DR and the noise model itself.

3.5.1 Section 6 Readability Review

- The comments and/or source description seems inconsistent in Table 6.1. For instance, the comments for Stackers/Reclaimers is “Port Hedland”, whilst comments for the Crushing Plant includes the type of noise source (point). The screens source description includes the location, rather than having this in the comments column. These should be made to be consistent.
- Pasquil Stability Category shown in Table 6.5 should be Type “F”, not “G”.
- In section 6.5, it is recommended the sentence discussing the “smaller items” be re-worded, for example; “For items of plant relatively close to residences and/or more critical, such as the reclaimers or car dumpers, the sound power level ...”
- It may be more useful to show the overall dB(A) value in Table 6.6.
- Typographical error at 1kHz for Shiploader, should be “111”, not “11”.
- No heading for Table 6.7.

3.5.2 Section 6 Technical Aspects Review

Report

- Background noise level at Crowe Street is said to be 58 dB L_{A10} . Section 7 predicts a noise level of 62 dB L_{A10} . Unless there is an explainable difference (i.e. wind or operating conditions), the modelling accuracy would appear to be in the order of +/- 5 dB rather than the stated +/- 3 dB.
- Sound power level for the Shiploaders, which is one of the dominant noise sources, seems relatively high. It is considered that newer, modern Shiploaders could be designed to achieve a lower sound power level. For instance, the sound power level of a new shiploader for the Esperance Port Authority is compared to that used in the FMG model below.

TABLE 3.2 – COMPARISON OF SHIPLoader SOUND POWER LEVELS, dB

Description	Octave Band Centre Frequency (Hz)								dB(A)
	31.5	63	125	250	500	1k	2k	4k	
SWL in FMG Model	140	134	128	124	118	115	110	97	121
SWL of Modern Shiploader	118	116	112	112	109	105	101	96	111

It can be seen from the above that there is a significant difference in the lower frequencies. The SWL put forward may not be appropriate in this instance, due to required differences, for example higher capacity. However, items such as enclosing the drives and power packs, meshing gears, using machined and balanced conveyor idlers and having rubber-lined chutes at transfer points should be investigated. It may be found that although the SWL noted above for a 'modern' shiploader cannot be achieved, a significantly reduced SWL can be achieved compared to that used in the FMG model.

- The sound power level for the Conveyor seems relatively low. This is considered to be a practicably achievable noise level, however would likely require machined, balanced and well maintained idlers. The practicalities of enclosing or semi-enclosing the Shiploader Conveyor should be investigated since this is also a major noise source. The conveyors in Esperance were fully enclosed in sheet metal walkways. If a full enclosure is not practicable in this instance, a semi-enclosure with high-density insulation to the underside should be investigated.
- As the train noise is assessed against the night criterion only, the breakdown between day and night train movements should be provided in Table 6.7.

Model

- The only ground absorption in the model is for water. SoundPlan defaults to 100% ground absorption for areas where none is specified. This may result in noise levels being under-predicted. The impact of using ground absorption of 50-60% should be examined.
- Train shunting has been included as a single point source. As the train is 3.4km in length, it is worth placing a number of point sources of lower sound power level along the railway.
- Receiver heights in model appeared inconsistent with the digital ground model (DGM), and generally not 1.5 metres above ground level, as shown below in Table 3.3.

TABLE 3.3 – RECEIVER RELATIVE LEVELS (m)

Location ¹	DGM Ground Level	Expected Height of Receiver	Modelled Height of Receiver	Comments
Esplanade Hotel	10.1	11.6	10.5	Too low
Jetty	12.7	14.2	13.0	Too low
Test at Hedland	11.6	13.1	11.5	Too low, below ground
Logger Loc 1 RE Agent	16.4	17.9	15.0	Too low, below ground
Crowe St	17.9	19.4	16.5	Too low, below ground
Cnr Kinsmill and Dartol	15.3	16.8	15.3	Too low
Howe St near Hospital	19.3	20.8	20.5	Acceptable
Cnr Cton and More	13.1	14.6	14.0	Too low
End of More St	11.7	13.2	12.5	Too low
Wedgefield	5.4	6.9	7.5	Acceptable
South Hedland	10.9	12.4	11.5	Too low
White Hills	16.1	17.6	18.5	High

Notes:

1. Locations are as nominated in the SoundPlan model.

- If the Esplanade Hotel has more than one storey, noise levels to the highest floor should be considered.

3.6 Section 7 – Results

3.6.1 Section 7 Readability Review

- It would be useful to show the assigned noise level and exceedance amount in Tables 7.1 to 7.6.
- The source rankings are confusing, as different numbers of sources are shown at different locations. This is understood to be the result of only the significant sources being shown. If this is the case, this should be stated in the text.
- Tables 7.1 to 7.6 are in a different order to the assessment locations in Table 3.3.

3.7 Section 8 – Noise Level Contour Maps

3.7.1 Section 8 Readability Review

- Meteorological information on Figure 8.7 should be removed, as this is not relevant to the algorithms used for the prediction of rail noise.

3.8 Section 9 – Comparison of Results Against Regulations

3.8.1 Section 9 Readability Review

- It is not clear if the one-third-octave band analysis is of the existing BHP operations only, or the combined noise of all industries. It would also be useful to show the one-third-octave band analysis of the FMG plant only.

3.9 Section 10 – Discussion

3.9.1 Section 10 Readability Review

- In accordance with regulation 19, a closed window provides an additional 5 dB noise reduction compared to an open window, which should be reflected in the report, rather than the 10 dB stated.
- The final sentence under Section 10.2 has not been justified in the report. Either the international criteria should be documented in Section 4, or the sentence be removed.

3.9.2 Section 10 Technical Aspects Review

- It is considered reasonable for the same criteria in the Hope Downs project to be used in this instance. However, it should be noted that Bulletin 1066 also stated *"... future proposals for the Town of Port Hedland area will need to demonstrate that their individual noise emissions will be at a level that will not compromise a longer term strategy that aims to reduce cumulative noise emissions to more acceptable levels for the community."*

From the above, it is considered that complying with the assigned noise levels of Bulletin 1066 is insufficient without showing that the noise emissions have been reduced as far as practicable.

The main noise sources are the Shiploaders and associated Conveyor. As such, the proponent should demonstrate that the sound power levels in the noise model are the quietest reasonably available. Based on our experience, it is believed that modern Shiploaders may be able to achieve a lower sound power level and the proponent should investigate the practicabilities of this with suppliers. In terms of the Conveyor, the assumed sound power level is of a relatively low level and would likely already require machined and balanced idlers. The practicalities of enclosing or semi-enclosing the Shiploader Conveyor should be investigated.

The report should also advise the proponent that as it is considered impracticable for the noise levels to satisfy the regulations, the proponent is required to apply for a variation under regulation 17.

3.10 Section 11 – Conclusion

3.10.1 Section 11 Readability Review

- Paragraph 3 states that the predicted level at Crowe Street is 44 dB L_{A10} , which is under the assigned noise levels. This is incorrect as the assigned noise level is 43 dB L_{A10} .
- It should be noted in the final paragraph that this statement is referring to times when BHP is loading.

For: **HERRING STORER ACOUSTICS**

Terry George

5 July 2004