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Environmental Noise Assessment

Ashburton Project

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12/03/21	draft 2	Included truck noise plots		
20/10/21	0	Final report		

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EXECUTIVE SUMMARY

The results of this assessment have shown that during the worst-case meteorological conditions (wind from the noise source towards the receiver), the predicted noise levels for both the construction and operational phases of the haul road and the Inland Port are compliant with the *Environmental Protection (Noise) Regulations 1997,* at all times.

As a result:

- Construction activities do not require any notification to authorities or sensitive receivers regarding noise, and can be conducted at any times including out of normal working hours;
- Noise mitigation for the Haul Road does not require further consideration and haul trucks can utilise the road at all times; and
- Noise mitigation for the operation of the Inland Port does not require further consideration and plant can be operated at all times.

1 INTRODUCTION

Mineral Resources Limited (MRL) is currently undertaking mine planning work on the Ashburton Project (the Project) located in the West Pilbara region of Western Australia. The Ashburton Project involves development of three iron ore deposits (Kens Bore, Cardo Bore East and Cochrane) via open pit mining, with associated infrastructure, a dedicated private haul road approximately 147km long from the mine area to the Port of Ashburton, a stockyard and port infrastructure within the existing Port, and offshore transhipment. The Project location is shown in *Figure 1-1*.

Figure 1-1 Project Locality

Lloyd George Acoustics has been commissioned to assess the environmental noise impacts from both the construction and operation of the private haul road and the landside port operations. The results are compared against the relevant criteria and recommendations provided on noise mitigation where appropriate.

Appendix A contains a description of some of the terminology used throughout this report.

2 CRITERIA

2.1 Construction Noise

Construction noise must comply with the *Environmental Protection Act 1986* and the *Environmental Protection (Noise) Regulations 1997* (the Regulations). Specifically within the Regulations is regulation 13, which refers to noise from construction sites and states the following:

Regulation 7 does not apply to … construction work carried out between 0700 hours and 1900 hours on any day which is not a Sunday or public holiday if the occupier of the premises … shows that –

a) The construction work was carried out in accordance with control of environmental noise practices set out in section 4 of AS 2436-2010 Guide to noise and vibration control on construction, demolition and maintenance sites;

b) The equipment used on the premises was the quietest reasonably available; and

c) If the occupier was required to prepare a noise management plan … in respect of the construction site –

i. The noise management plan was prepared and given in accordance with the requirement, and approved by the Chief Executive Officer; and

ii. The construction work was carried out in accordance with the management plan, excluding any ancillary measure.

Regulation 7 does not apply to … construction work carried out other than between the [above] hours if the occupier of the premises … shows that –

a) The construction work was carried out in accordance with control of environmental noise practices set out in section 4 of AS 2436-2010 Guide to noise and vibration control on construction, demolition and maintenance sites; and

b) The equipment used on the premises was the quietest reasonably available; and

c) The construction work was carried out in accordance with a noise management plan in respect of the construction site –

i. Prepared and given to the Chief Executive Officer not later than 7 days before the construction work commenced; and

ii. Approved by the Chief Executive Officer;

d) At least 24 hours before the construction work commenced, the occupier of the construction site gave written notice of the proposed construction work to the occupiers of all premises at which noise emissions received were likely to fail to comply with the standard prescribed under regulation 7; and

e) It was reasonably necessary for the construction work to be carried out at that time.

2.2 Operational Noise

The following criteria apply to both the haul road, being private and not open to the public, and the landside port operations.

Environmental noise in Western Australia is governed by the *Environmental Protection Act 1986*, through the *Environmental Protection (Noise) Regulations 1997* (the Regulations).

Regulation 7 defines the prescribed standard for noise emissions as follows:

"7. (1) Noise emitted from any premises or public place when received at other premises –

(a) Must not cause or significantly contribute to, a level of noise which exceeds the assigned level in respect of noise received at premises of that kind; and

(b) Must be free of –

i. tonality;

ii. impulsiveness; and

iii. modulation,

when assessed under regulation 9"

A "…noise emission is taken to significantly contribute to a level of noise if the noise emission … exceeds a value which is 5 dB below the assigned level…"

Tonality, impulsiveness and modulation are defined in Regulation 9. Noise is to be taken to be free of these characteristics if:

(a) The characteristics cannot be reasonably and practicably removed by techniques other than attenuating the overall level of noise emission; and

(b) The noise emission complies with the standard prescribed under regulation 7 after the adjustments of *Table 2-1* are made to the noise emission as measured at the point of reception.

Table 2-1 Adjustments Where Characteristics Cannot Be Removed

Where Noise Emission is Not Music			Where Noise Emission is Music	
Tonality	**Modulation**	**Impulsiveness**	**No Impulsiveness**	**Impulsiveness**
+ 5 dB	+ 5 dB	+ 10 dB	+ 10 dB	+ 15 dB

Note: The above are cumulative to a maximum of 15dB.

The baseline assigned levels (prescribed standards) are specified in Regulation 8 and are shown in *Table 2-2*.

Table 2-2 Baseline Assigned Noise Levels

Premises Receiving Noise	Time Of Day	Assigned Level (dB)		
		L_{A10}	L_{A1}	L_{Amax}
Noise sensitive premises: highly sensitive area[1]	0700 to 1900 hours Monday to Saturday (Day)	45 + influencing factor	55 + influencing factor	65 + influencing factor
	0900 to 1900 hours Sunday and public holidays (Sunday)	40 + influencing factor	50 + influencing factor	65 + influencing factor
	1900 to 2200 hours all days (Evening)	40 + influencing factor	50 + influencing factor	55 + influencing factor
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	35 + influencing factor	45 + influencing factor	55 + influencing factor
Noise sensitive premises: any area other than highly sensitive area	All hours	60	75	80
Commercial	All hours	60	75	80
Industrial	All hours	65	80	90

1. ***highly sensitive area*** means that area (if any) of noise sensitive premises comprising —
   (a) a building, or a part of a building, on the premises that is used for a noise sensitive purpose; and
   (b) any other part of the premises within 15 metres of that building or that part of the building.

As all the noise sensitive premises considered in this assessment are further than 450m from a major or secondary road and an industrial or commercial premises, the influencing factor applicable at the noise sensitive premises has been calculated as 0 dB. Therefore the baseline assigned levels shown in *Table 2-2* will apply.

It is noted the assigned noise levels are statistical levels and therefore the period over which they are determined is important. The Regulations define the Representative Assessment Period (RAP) as *a period of time of not less than 15 minutes, and not exceeding 4 hours*, which is determined by an *inspector* or *authorised person* to be appropriate for the assessment of a noise emission, having regard to the type and nature of the noise emission. An *inspector* or *authorised person* is a person appointed under Sections 87 & 88 of the *Environmental Protection Act 1986* and include Local Government Environmental Health Officers and Officers from the Department of Environment Regulation. Acoustic consultants or other environmental consultants are not appointed as an *inspector* or *authorised person*. Therefore, whilst this assessment is based on a 4 hour RAP, which is assumed to be appropriate given the nature of the operations, this is to be used for guidance only.

Under regulation 3, nothing in the Regulations applies to the following noise emissions –

(a) noise emissions from the propulsion and braking systems of motor vehicles operating on a road;

(b) noise emissions from a safety warning device, other than a reversing alarm, fitted to a motor vehicle operating on a road;

(c) noise emissions from trains or aircraft (other than model aircraft and trains operating on railways with a gauge of less than 70cm);

(d) noise emissions from a safety warning device fitted to a train or vessel;

(e) noise emissions from an emergency vehicle as defined in the Road Traffic Code 2000 regulation 3(1);

(f) noise emissions from the propulsion system or the movement through the water of a vessel operating in water other than water on private premises;

(g) noise emissions –

(i) from a device for warning pedestrians installed at a pedestrian crossing on a road; or

(ii) from a device for warning of the passage of a train installed at a level crossing; or

(iii) from a safety warning device fitted to a building as a requirement of the Building Code as defined in the *Building Regulations 2012* regulation 3; or

(iv) for the purpose of giving a warning required under the *Mines Safety and Inspection Regulations 1995* regulation 8.26,

if every reasonable and practicable measure has been taken to reduce the effect of the noise emission consistent with providing an audible warning to people;

(h) noise emissions from –

(i) a reversing alarm fitted to a motor vehicle, mobile plant, or mining or earthmoving equipment; or

(ii) a startup or movement alarm fitted to plant,

if

(iii) it is a requirement under another written law that such an alarm be fitted; and

(iv) it is not practicable to fit an alarm that complies with the written law under which it is required to be fitted and emits noise that complies with these Regulations;

(i) noise emissions from an engine, equipment, machinery or plant on a vessel while the vessel is in a port.

Port is defined in either the *Port Authorities Act 1999* section 3(1) or the *Shipping and Pilotage Act 1967* section 3.

A road is defined in the Environmental Protection Act 1986 as "....*any highway, road or street open to, or used by the public*...."

3 METHODOLOGY

3.1 Site Measurements

To determine the noise emissions from haul trucks travelling along the private haul road, noise measurements of trucks using the haul road for the MRL Koolyanobbing mine site was undertaken. It is our understanding that the haul trucks used for the Project will be the same type as those used on the Koolyanobbing mine.

Under the Regulations, there are certain requirements that must be satisfied when undertaking measurements and are defined in Regulations 19, 20, 22 and 23 and Schedule 4. In undertaking the measurements, these have been satisfied, specifically noting the following:

- The sound level meter a used was a Rion Type NA-28 (S/N: 1270693)
- This equipment holds current laboratory certificates of calibration that are available upon request. The equipment was also field calibrated before and after and found to be within +/- 0.5 dB.
- The microphone was fitted with a standard wind screen.
- The microphone was located 1.2 metres above ground level and at least 3.0 metres from reflecting facades (other than the ground plane).

Measurements were recorded on 12th December 2020, between 1.30 p.m. and 3.00 p.m. Meteorological conditions at the time was a moderate positive (from the haul road towards the microphone) wind.

Between the source and measurement location, the ground was open bush.

Background noise was measured and was greater than 30 dB below the noise from the trucks and therefore did not influence the measurement results.

3.2 Noise Modelling

For the assessment of both the haul road and the Landside Port, computer modelling has been used to predict noise levels at each nearby receiver as shown in *Figure 3-1*. The advantage of modelling is that it is not affected by background noise sources and can provide the noise level for various weather conditions and operating scenarios if necessary.

The software used was *SoundPLAN 8.2* with the CONCAWE algorithms selected. These algorithms have been selected as they include the influence of wind and atmospheric stability. Input data required in the model are:

- Meteorological Information;
- Topographical data;
- Ground Absorption; and
- Source sound power levels.

Figure 3-1 Noise Sensitive Receivers Considered in the Modelling

3.2.1 Meteorological Information

Meteorological information utilised is provided in *Table 3-1* and is considered to represent worst-case conditions for noise propagation. At wind speeds greater than those shown, sound propagation may be further enhanced, however background noise from the wind itself and from local vegetation is likely to be elevated and dominate the ambient noise levels.

Table 3-1 Modelling Meteorological Conditions (CONCAWE)

Parameter	Night (1900-0700)	Day (0700-1900)
Temperature (°C)	15	20
Humidity (%)	50	50
Wind Speed (m/s)	3	4
Wind Direction*	All	All
Pasquil Stability Factor	F	E

* Note that the modelling package used allows for all wind directions to be modelled simultaneously.

It is generally considered that compliance with the assigned noise levels needs to be demonstrated for 98% of the time, during the day and night periods, for the month of the year in which the worst-case weather conditions prevail. In most cases, the above conditions occur for more than 2% of the time and therefore must be satisfied.

3.2.2 Topographical Data

Topographical data was based on that publicly available from *GoogleEarth* in the form of spot heights.

3.2.3 Ground Absorption

Ground absorption varies from a value of 0 to 1, with 0 being for an acoustically reflective ground (e.g. water or bitumen) and 1 for acoustically absorbent ground (e.g. grass). As the area is predominantly light scrub, a value of 0.60 has been used as an average across the study area.

3.2.4 Source Sound Levels

The sound power levels used in the modelling are provided in *Tables 3-2 and 3-3*.

Table 3-2 Construction Source Sound Power Levels, dB

Description	Octave Band Centre Frequency (Hz)								Overall dB(A)
	63	125	250	500	1k	2k	4k	8k	
Front-End Loader	102	112	104	105	104	102	98	93	**109**
Idling/Slow Moving Truck	94	97	92	84	88	88	85	79	**93**
Skid Steer Loader	97	100	89	91	86	83	77	77	**92**
Roller	116	114	104	102	104	102	98	92	**109**
Vibratory Roller	117	117	106	103	105	102	100	95	**111**
Pavement Machine	117	118	114	110	108	107	103	99	**114**
Excavator	105	115	106	99	96	87	80	73	**104**
Tracked Mobile Crane	101	99	94	95	102	94	86	76	**103**
Grinding	144	130	124	113	100	115	117	116	**124**

Table 3-3 Operational Source Sound Power Levels, dB

Description	Octave Band Centre Frequency (Hz)								Overall dB(A)
	63	125	250	500	1k	2k	4k	8k	
Hauk Truck at 80km/h	121	117	116	113	108	101	93	89	**114**
Closed Conveyors	85	83	78	75	71	68	61	58	**77/m**
Conveyor Transfer	110	112	114	120	112	103	92	84	**118**
Conveyor Drive	102	106	104	105	107	96	93	92	**109**
Haul Truck Slow	116	113	106	97	92	92	89	79	**103**
Bottom dump	118	102	93	92	94	91	92	86	**100**
Air Extraction	112	110	104	100	97	90	90	79	**102**
CAT 966 Front-End Loader	99	101	111	106	111	108	103	99	**112**
Power Station	133	132	131	119	111	106	103	99	**118**

With regards to the above, please note the following:

- It is assumed that all noise sources are present simultaneously, being a conservative approach;
- The sound level of the haul truck at 80 km/h, represents the maximum noise level, with all other sources representative of the L_{10} level;
- The height of the haul truck is assumed to be 1.5m above ground level.

4 RESULTS

4.1 Site Measurements

Typical noise levels of a truck pass-by at a distance of 24 m from the edge of the haul road are shown below in *Figure 4-1*. From the results of the measurements of 14 truck pass-bys, the sound power level and spectrum was determined and is shown in *Table 4-1*.

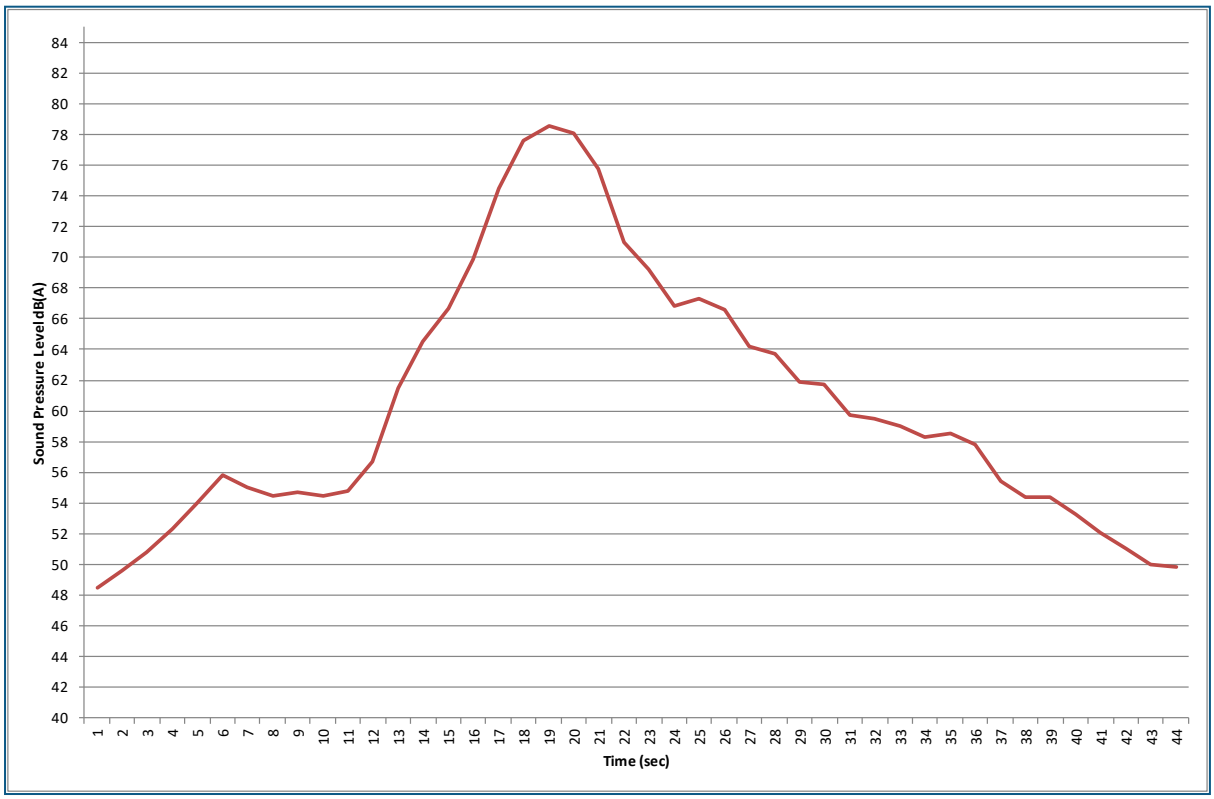


Figure 4-1 Typical Truck Pass-by Noise Levels at 24m from the Haul Road

Table 4-1 Calculated Sound Power Levels from Truck Movements, dB

Description	Octave Band Centre Frequency (Hz)								Overall dB(A)
	63	125	250	500	1k	2k	4k	8k	
Hauk Truck at 80km/h	121	117	116	113	108	101	93	89	**114**

The above data has been used in the noise modelling of the haul road

4.2 Noise Modelling

4.2.1 Haul Road Construction Noise

Noise from construction activities for the haul road has been modelled to each of the noise sensitive premises located in the vicinity of the Project route. The results, presented in *Table 4-2,* assume all plant is operating simultaneously, which is considered a very conservative scenario, and the wind is blowing from the noise source towards the receiver.

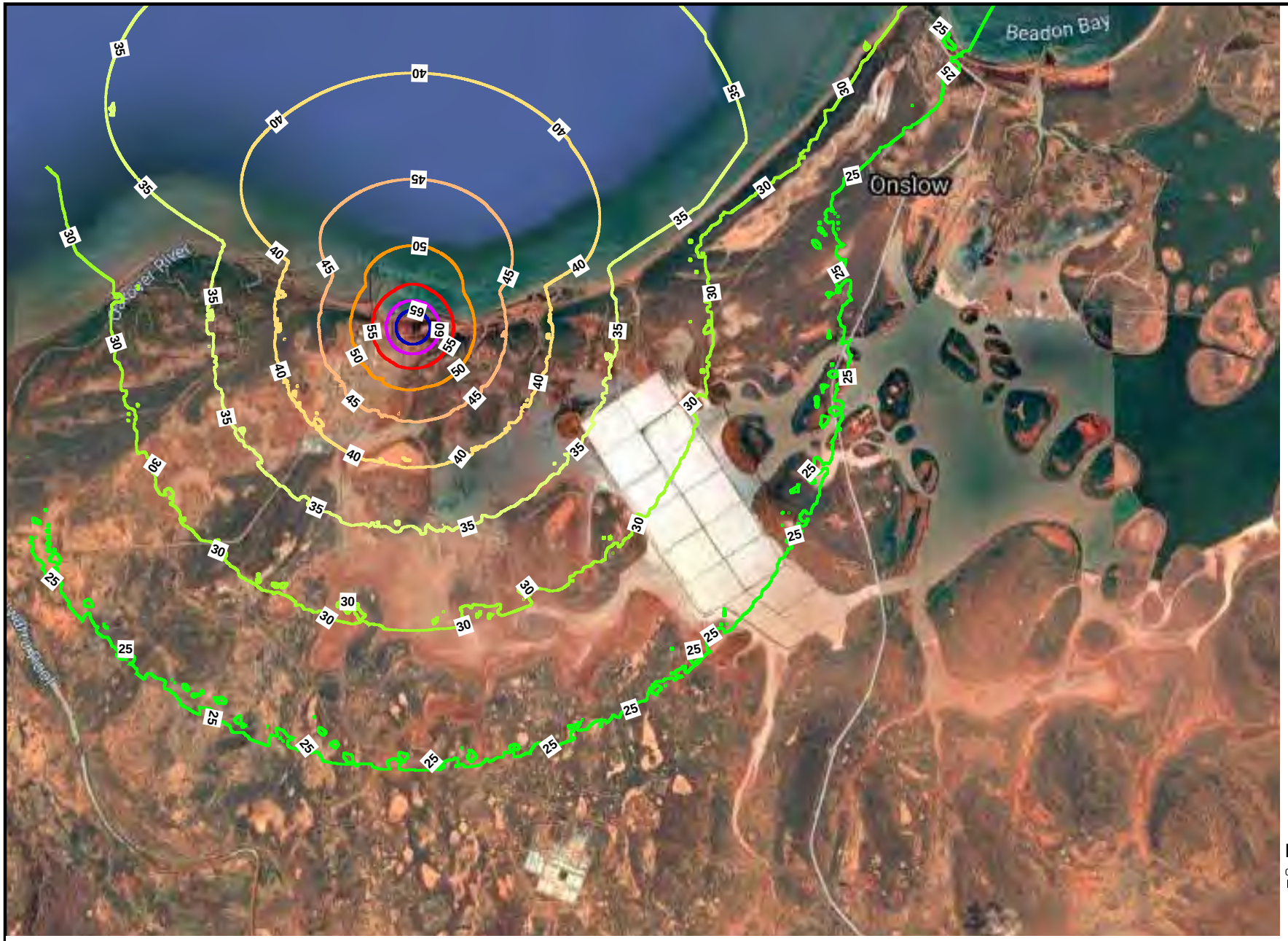
Table 4-2 Predicted Noise Levels from the Haul Road Construction

Receiver	Predicted Noise Level L_{A10} dB	Assigned Noise Level L_{A10} dB	Comments
Red Hill Station Homestead	<30	35	Predicted noise levels are below the assigned levels.
Peedamulla Station Homestead & Campground	31	35	Predicted noise levels are below the assigned levels.
Aboriginal Law Ground	34	35	Predicted noise levels are below the assigned levels.
Chevron Accommodation Village	47	65	Predicted noise levels are below the assigned levels.
Wheatstone Facility	<30	65	Predicted noise levels are below the assigned levels.

4.2.2 Inland Port Construction

The closest receiver to the construction works is the Wheatstone Facility. The predicted noise levels at this location, assuming the worst-case meteorological scenario is 54 L_{A10} dB, which is compliant with the industrial assigned level of 65 L_{A10} dB. Predicted noise levels to other locations, including Onslow is provided in *Figure 4-2.*

Figure 4-2



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Predicted L_{A10} Noise Levels from the Construction of the Inland Port

Wind from All Directions

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4.2.3 Haul Road Operation

The noise from trucks travelling along the haul road has been modelled to each of the noise sensitive premises located in the vicinity of the Project route. The results are presented in *Table 4-3,* and assume the wind is blowing from the haul road towards the receiver.

Table 4-3 Predicted Noise Levels from the Haul Road Operation

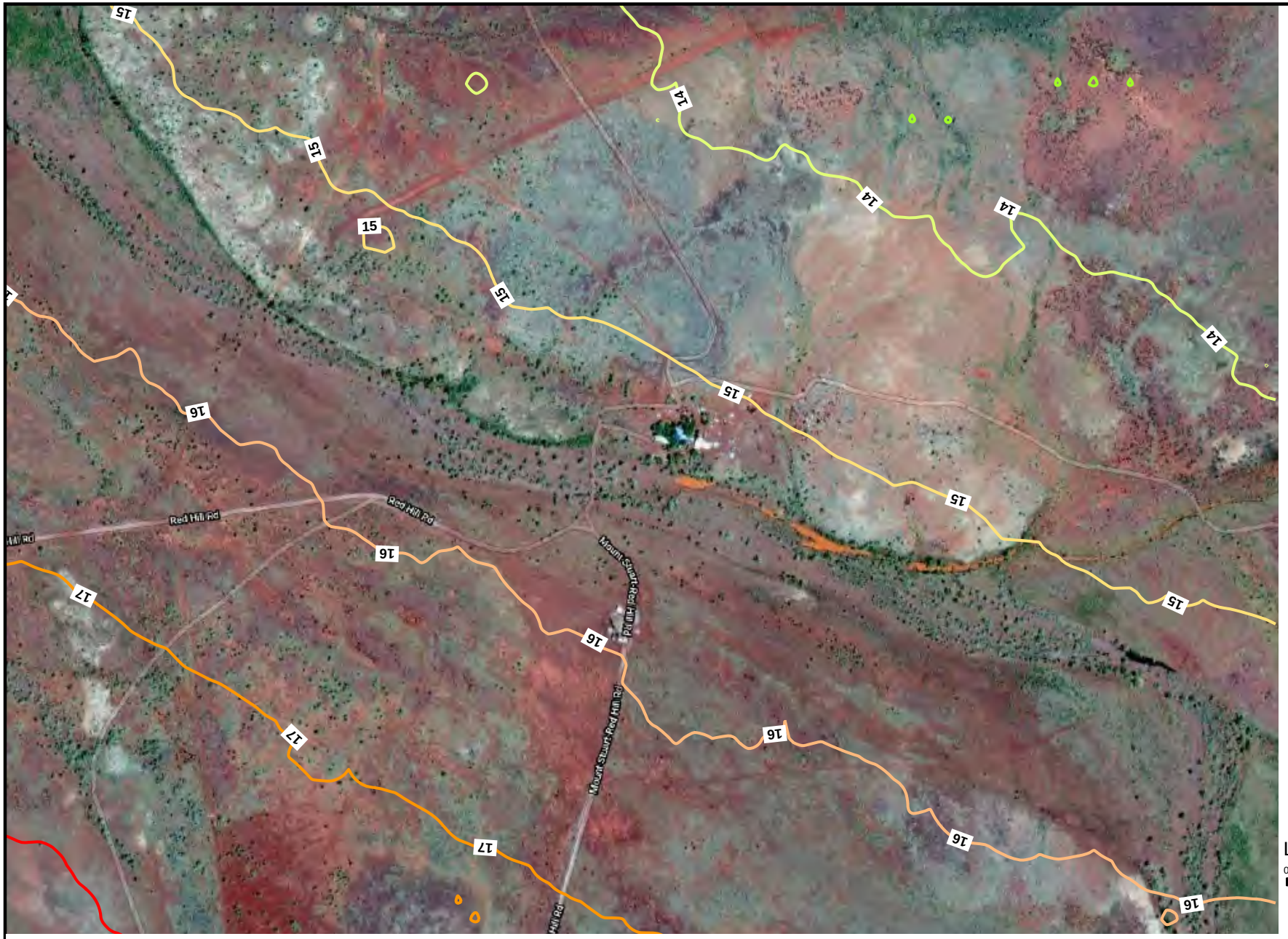
Receiver	Predicted Noise Level L_{A10} dB	Assigned Noise Level L_{A10} dB	Comments
Red Hill Station Homestead	<20	35	Predicted noise levels are below the assigned levels.
Peedamulla Station Homestead & Campground	27	35	Predicted noise levels are below the assigned levels.
Aboriginal Law Ground	31	35	Predicted noise levels are below the assigned levels.
Chevron Accommodation Village	36	65	Predicted noise levels are below the assigned levels.
Wheatstone Facility	44	65	Predicted noise levels are below the assigned levels.

The predicted L_{A10} noise levels at the Red Hill Homestead, Peedamulla Homestead, Aboriginal Law Ground and the Chevron Accommodation Village, as a result of haul trucks travelling along the haul road, are shown graphically in *Figures 4-3 to 4-6* respectively.

4.2.4 Inland Port Operation

The closest receiver to the Inland Port operations is the Wheatstone Facility. The predicted noise level at the boundary of the Wheatstone Facility, assuming the worst-case meteorological scenario, is 58 L_{A10} dB, which is compliant with the Industrial assigned level of 65 L_{A10} dB. Predicted noise levels to other locations, including Onslow is provided in *Figure 4-7.*

Figure 4-3



Length Scale

0 50 100 200 300 400 m

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Predicted L_{A10} Noise Levels at the Red Hill Homestead from Haul Trucks Operating on the Haul Road

Wind from All Directions

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Figure 4-4

Length Scale

0 30 60 120 180 240 m

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Predicted L_{A10} Noise Levels at the Peedamulla Homestead from Haul Trucks Operating on the Haul Road

Wind from All Directions

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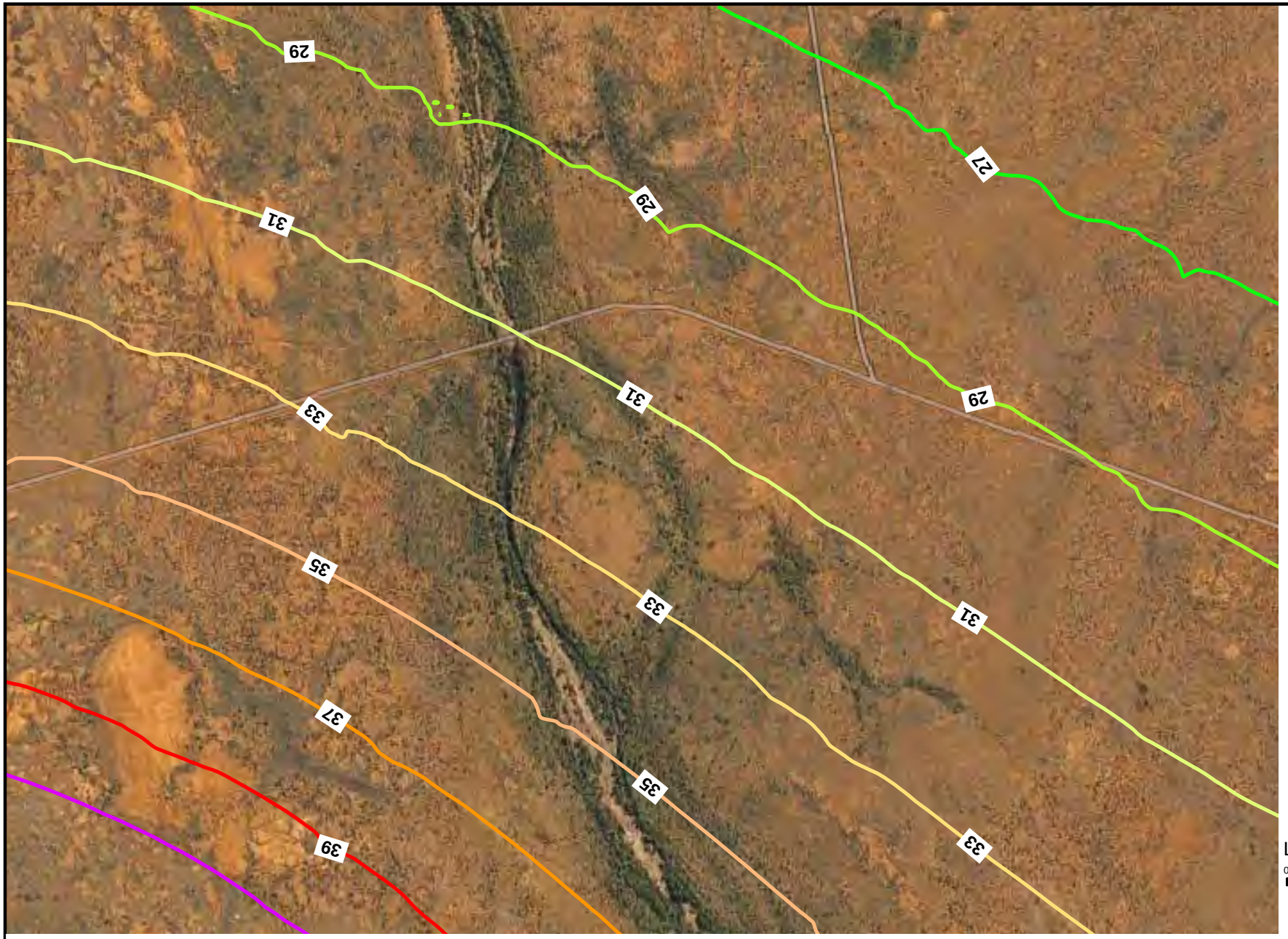
Figure 4-5



MRL Ashburton Project

Predicted L_{A10} Noise Levels at the Aboriginal Law Ground from Haul Trucks Operating on the Haul Road

Wind from All Directions

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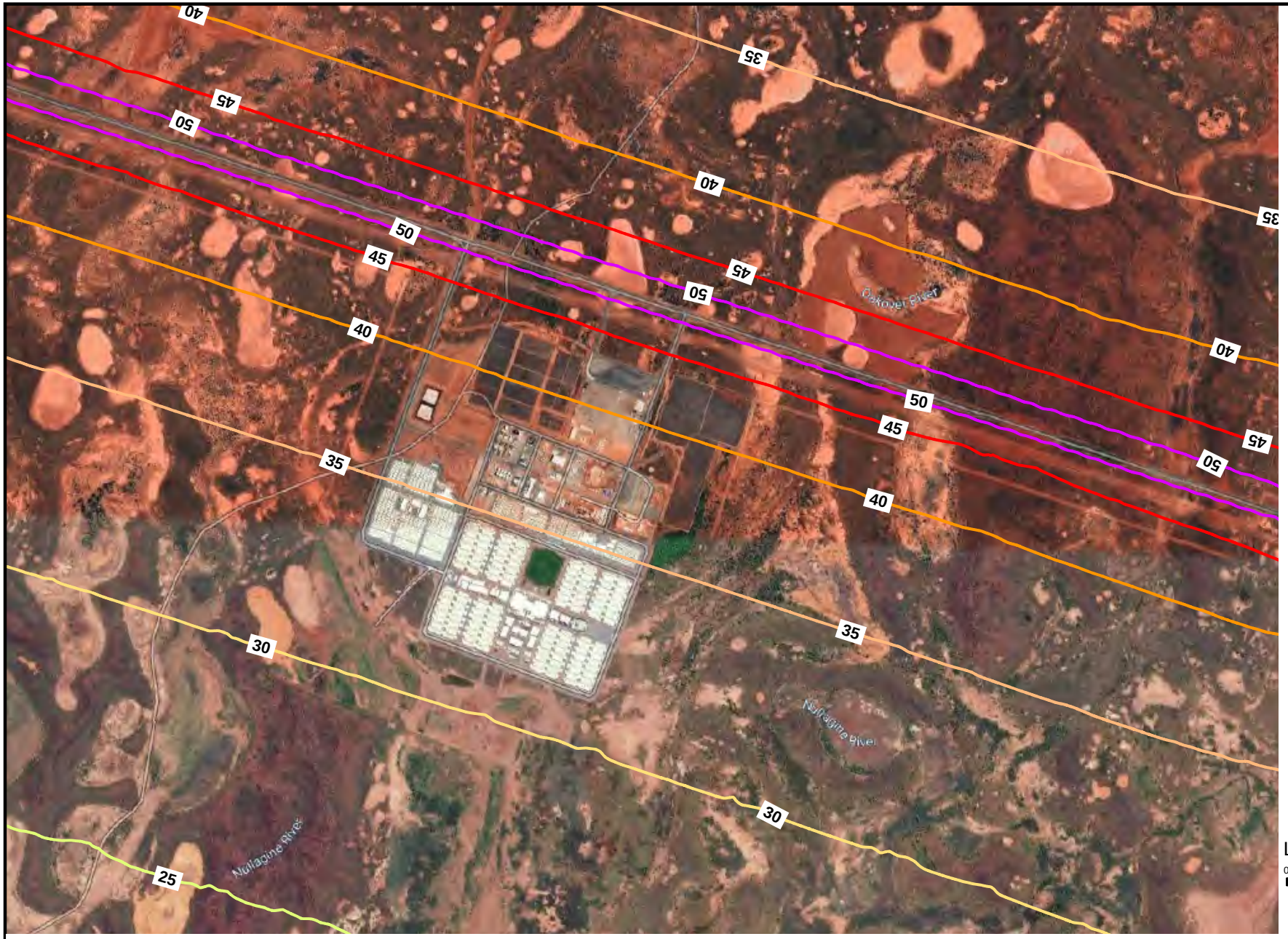
Figure 4-6



Length Scale

0 100 200 400 600 800 m

MRL Ashburton Project

Predicted L_{A10} Noise Levels at the Chevron Village from Haul Trucks Operating on the Haul Road

Wind from All Directions

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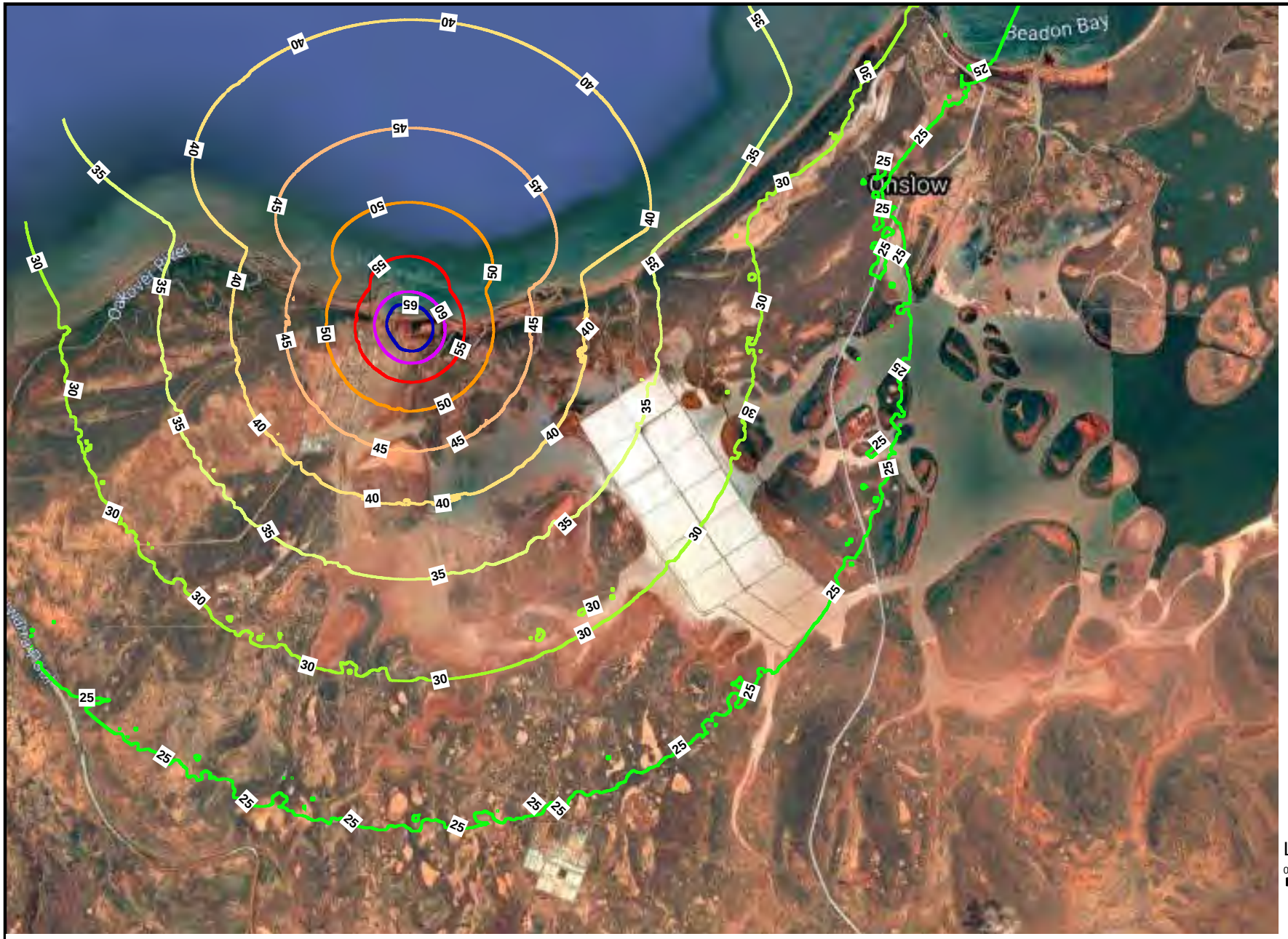
Figure 4-7



MRL Ashburton Project

Predicted L_{A10} Noise Levels from the Operation of the Inland Port

Wind from All Directions

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5 CONCLUSION

5.1 Construction Noise

The noise from construction of both the haul road and the Inland Port is predicted to comply with the assigned levels under the Regulations at all times. Therefore notification of construction activities is not required and there are no restrictions on the times that construction can be undertaken.

5.2 Haul Road Operation

The predicted noise levels from haul trucks operating along the haul road are predicted to comply with the assigned levels under the Regulations at all times. Therefore noise mitigation is not required to be considered.

5.3 Inland Port Operations

The predicted noise levels from the Inland Port operations are predicted to comply with the assigned levels under the Regulations at all times. Therefore noise mitigation is not required to be considered.

Appendix A

Terminology

The following is an explanation of the terminology used throughout this report.

Decibel (dB)
The decibel is the unit that describes the sound pressure and sound power levels of a noise source. It is a logarithmic scale referenced to the threshold of hearing.

A-Weighting
An A-weighted noise level has been filtered in such a way as to represent the way in which the human ear perceives sound. This weighting reflects the fact that the human ear is not as sensitive to lower frequencies as it is to higher frequencies. An A-weighted sound level is described as L_A dB.

Sound Power Level (L_w)
Under normal conditions, a given sound source will radiate the same amount of energy, irrespective of its surroundings, being the sound power level. This is similar to a 1kW electric heater always radiating 1kW of heat. The sound power level of a noise source cannot be directly measured using a sound level meter but is calculated based on measured sound pressure levels at known distances. Noise modelling incorporates source sound power levels as part of the input data.

Sound Pressure Level (L_p)
The sound pressure level of a noise source is dependent upon its surroundings, being influenced by distance, ground absorption, topography, meteorological conditions etc and is what the human ear actually hears. Using the electric heater analogy above, the heat will vary depending upon where the heater is located, just as the sound pressure level will vary depending on the surroundings. Noise modelling predicts the sound pressure level from the sound power levels taking into account ground absorption, barrier effects, distance etc.

L_{ASlow}
This is the noise level in decibels, obtained using the A frequency weighting and the S (Slow) time weighting as specified in IEC 61672-1:2002. Unless assessing modulation, all measurements use the slow time weighting characteristic.

L_{AFast}
This is the noise level in decibels, obtained using the A frequency weighting and the F (Fast) time weighting as specified in IEC 61672-1:2002. This is used when assessing the presence of modulation only.

L_{APeak}
This is the greatest absolute instantaneous sound pressure in decibels using the A frequency weighting as specified in IEC 61672-1:2002.

L_{Amax}
An L_{Amax} level is the maximum A-weighted noise level during a particular measurement.

L_{A1}
An L_{A1} level is the A-weighted noise level which is exceeded for one percent of the measurement period and is considered to represent the average of the maximum noise levels measured.

L_{A10}
An L_{A10} level is the A-weighted noise level which is exceeded for 10 percent of the measurement period and is considered to represent the "*intrusive*" noise level.

L_{Aeq}
The equivalent steady state A-weighted sound level ("equal energy") in decibels which, in a specified time period, contains the same acoustic energy as the time-varying level during the same period. It is considered to represent the "average" noise level.

L_{A90}
An L_{A90} level is the A-weighted noise level which is exceeded for 90 percent of the measurement period and is considered to represent the "*background*" noise level.

One-Third-Octave Band
Means a band of frequencies spanning one-third of an octave and having a centre frequency between 25 Hz and 20 000 Hz inclusive.

L_{Amax} assigned level
Means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded at any time.

L_{A1} assigned level
Means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded for more than 1% of the representative assessment period.

L_{A10} assigned level
Means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded for more than 10% of the representative assessment period.

Tonal Noise
A tonal noise source can be described as a source that has a distinctive noise emission in one or more frequencies. An example would be whining or droning. The quantitative definition of tonality is:

the presence in the noise emission of tonal characteristics where the difference between -

(a) the A-weighted sound pressure level in any one-third octave band; and

(b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands,

is greater than 3 dB when the sound pressure levels are determined as $L_{Aeq,T}$ levels where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as $L_{A\ Slow}$ levels.

This is relatively common in most noise sources.

Modulating Noise
A modulating source is regular, cyclic and audible and is present for at least 10% of the measurement period. The quantitative definition of modulation is:

a variation in the emission of noise that —

(a) is more than 3 dB $L_{A\ Fast}$ or is more than 3 dB $L_{A\ Fast}$ in any one-third octave band;

(b) is present for at least 10% of the representative.

Impulsive Noise
An impulsive noise source has a short-term banging, clunking or explosive sound. The quantitative definition of impulsiveness is:

a variation in the emission of a noise where the difference between $L_{A\ peak}$ and $L_{A\ Max\ slow}$ is more than 15 dB when determined for a single representative event;

Major Road
Is a road with an estimated average daily traffic count of more than 15,000 vehicles.

Secondary / Minor Road
Is a road with an estimated average daily traffic count of between 6,000 and 15,000 vehicles.

Influencing Factor (IF)

$$= \frac{1}{10}(\%\ \text{Type A}_{100} + \%\ \text{Type A}_{450}) + \frac{1}{20}(\%\ \text{Type B}_{100} + \%\ \text{Type B}_{450})$$

where:

$\%\ \text{Type A}_{100}$ = the percentage of industrial land within a100m radius of the premises receiving the noise

$\%\text{TypeA}_{450}$ = the percentage of industrial land within a 450m radius of the premises receiving the noise

$\%\ \text{Type B}_{100}$ = the percentage of commercial land within a100m radius of the premises receiving the noise

$\%\text{TypeB}_{450}$ = the percentage of commercial land within a 450m radius of the premises receiving the noise

+ Traffic Factor (maximum of 6 dB)

= 2 for each secondary road within 100m

= 2 for each major road within 450m

= 6 for each major road within 100m

Representative Assessment Period
Means a period of time not less than 15 minutes, and not exceeding four hours, determined by an inspector or authorised person to be appropriate for the assessment of a noise emission, having regard to the type and nature of the noise emission.

Background Noise
Background noise or residual noise is the noise level from sources other than the source of concern. When measuring environmental noise, residual sound is often a problem. One reason is that regulations often require that the noise from different types of sources be dealt with separately. This separation, e.g. of traffic noise from industrial noise, is often difficult to accomplish in practice. Another reason is that the measurements are normally carried out outdoors. Wind-induced noise, directly on the microphone and indirectly on trees, buildings, etc., may also affect the result. The character of these noise sources can make it difficult or even impossible to carry out any corrections.

Ambient Noise
Means the level of noise from all sources, including background noise from near and far and the source of interest.

Specific Noise
Relates to the component of the ambient noise that is of interest. This can be referred to as the noise of concern or the noise of interest.

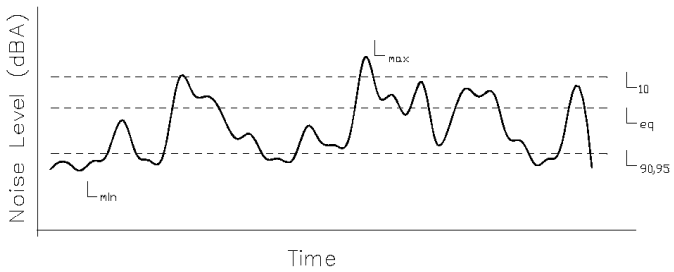
Peak Component Particle Velocity (PCPV)
The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and in one of the three orthogonal directions (x, y or z) measured as a peak response. Peak velocity is normally used for the assessment of structural damage from vibration.

Peak Particle Velocity (PPV)
The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and is the vector sum of the PCPV for the x, y and z directions measured as a peak response. Peak velocity is normally used for the assessment of structural damage from vibration.

RMS Component Particle Velocity (PCPV)
The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and in one of the three orthogonal directions (x, y or z) measured as a root mean square (rms) response. RMS velocity is normally used for the assessment of human annoyance from vibration.

Peak Particle Velocity (PPV)
The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and is the vector sum of the PCPV for the x, y and z directions measured as a root mean square (rms) response. RMS velocity is normally used for the assessment of human annoyance from vibration.

Chart of Noise Level Descriptors



Typical Noise Levels