

PF FORMATION



**HITCHCOCK ROAD SAND EXTRACTION
AND REHABILITATION PROJECT, MAROOTA**

NOISE MANAGEMENT PLAN
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PF Formation

HITCHCOCK ROAD MAROOTA

Sand Extraction and Rehabilitation Project

NOISE MANAGEMENT PLAN

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Hitchcock Road Sand Extraction and Rehabilitation Project Maroota Environmental Management Plan

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Terms and abbreviations

Term	Definition
AEMR	Annual Environmental Management Report
AHD	Australian Height Datum. The standard reference level used to express the relative elevation of various features. A height given in metres AHD is essentially the height above sea level.
Ambient	The background level at a specific location, being a composite of all sources.
Annual Average Daily Traffic	Annual average daily traffic volume representing the total traffic in both directions at a specified location calculated from mechanically obtained axle counts.
Background Noise Level	The ambient sound pressure noise level in the absence of the sound under investigation exceeded for 90 percent of the measurement period. Normally equated to the average minimum A-weighted sound pressure level.
Batter	The side slope of walls, embankments and cuttings or the degree of such slope, usually expressed as a ratio of horizontal distance to one vertical height.
Buffer	A physical barrier, structure or width of land which encloses, partially encloses or defines a particular environment. It serves to minimise the impacts of non-desirable external influences on the adjoining environment.
Bund Wall	A wall erected to prevent the escape of various emissions into the environment (liquids, noise or views).
Conservation	The management of resources in a way that will benefit both present and future generations.
Council	The Hills Shire Council.
Day	The period from 7.00am to 6.00pm on Monday to Saturday and 8.00am to 6.00pm on Sunday and public holidays.
dBA	Decibels using the A-weighted scale measured according to the frequency of the human ear.
Decibel	A scale unit used in the comparison of powers and levels of sound energy. The number of decibels is ten times the logarithm to the base of ten of the ratio of the powers.
Department	NSW Department of Planning and Environment.
DPI Water	NSW Department of Primary Industries - Water
Ecology	The relationship between living things and their environment.
Ecologically Sustainable Development	Using, conserving and enhancing the resources of the community so that ecological processes on which life depends, are maintained and the total quality of life, now and in the future, can be increased.
Ecosystem	A functional unit of energy transfer and nutrient cycling in a given place. It includes all relationships within the biotic

Term	Definition
	community and between the biotic components of the system.
Emission	Discharge of a substance to the environment.
Environment	A term for all the conditions (physical, chemical, biological and social) in which an organism or group of organisms, including humans exists.
Environmental Assessment (EA)	A formal description of a project and an assessment of its likely impact on the physical, social and economic environment. It includes evaluation of alternatives and an overall justification of the project. The EA is used as a vehicle to facilitate public comment and as the basis for analysing the project with respect to granting approval under relevant legislation.
Environment Protection Licence	A licence that allows pollution of the environment under controlled conditions regulated by the NSW EPA.
EMP	Environmental Management Plan
EPA	NSW Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979.</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000.</i>
EPL	Environment Protection Licence issued under the <i>Protection of the Environment Operations Act 1997.</i>
Equivalent Continuous Sound Level (LAeq)	The constant sound level which when operating over the same time interval as a fluctuating sound over an extended time, is equivalent to the same sound energy.
Evening	The period from 6.00pm to 10.00pm.
Excavate	Dig into natural material and remove using specialist machinery.
Extraction	A term referring to the removal of material from the earth synonymous with quarrying.
Extraction area	The land described as the extraction area in Appendix 1 of the Project Approval.
Frequency	Similar to the pitch of a musical note in sound pressure fluctuations of cycles per second (Hertz). Most sounds comprise a composite of frequencies of varying sound pressure levels in the range of 20 Hertz to 20,000 Hertz.
Front-end loader	Machine used to lift and place soil, earth, rocks and other materials within an extraction site or to load products into trucks.
Gradient	Rate of change of a given variable with distance, such as temperature or elevation.
g/m ² /month	grams per square metre per month
Greenhouse effect	Changes in climate that could occur due to increases in atmospheric concentrations of certain gases.
Impact	The effect of human-induced action on the environment.

Term	Definition
Infrastructure	Supporting installations and services supplying the needs of a project.
Land	Land means the whole of a lot or contiguous lots owned by the same landowner in a current plan registered at NSW Land & Property Information at the date of the approval.
Landform	A specific feature of the landscape or the general shape of the land.
Mitigation measures	Measures put in place to reduce an impact.
Modelling	Use of mathematical equations to simulate and predict real events and processes.
Monitoring	Regular measurement of components of the environment to understand their condition and establish if necessary standards are being met.
Minister	NSW Minister for Planning and Environment or delegate.
Night	The period from 10.00pm to 7.00am on Monday to Saturday and 10.00pm to 8.00am on Sunday and public holidays.
OEH	Office of Environment and Heritage
Privately owned land	Land not owned by a public agency or the proponent or its related companies.
Preferred Project Report	The proponent's Preferred Project Report dated September 2008 prepared by DFA Consultants as modified in the Proponent's email to the Department of Planning and Environment on 18 November 2008.
Process plant	Equipment used to clean and separate sand into various sizes.
Project	The development as described in the EA.
Proponent	PF Formation or its successors in title.
Receptor	An environmental modelling term used to describe a map reference point where the impact is predicted. A sensitive receptor is a home, work place, school or other place where people spend some time. An elevated receptor is a point above ground level.
Rehabilitation	Preparation of a final landform following extraction and its stabilisation with vegetation.
Response to Submissions	The proponent's response to issues raised in submissions dated March 2008 prepared by DFA Consultants and subsequent submissions to the Department of Planning dated 27 August 2008.
RL	Reduced level, usually in metres to an arbitrary datum.
RMS	Roads and Maritime Services
Sand	Sediment comprising particles ranging between 0.063mm and 2mm.
Sandstone	A fine grained rock of sedimentary origin composed primarily of sand-sized particles (0.06 to 2 mm).

Term	Definition
Secretary	Secretary (formerly Director-General) of the Department of Planning and Environment or delegate.
Stakeholder	An individual or group with an interest in the proposal.
Statement of Commitments	The proponent's commitments in Appendix 3 of the Project Approval.
Stockpile	Mound used to store material.
Stormwater	Rainwater which runs off catchments following rain events. The untreated water is carried into creeks, rivers and lakes.
Strategy A, Strategy B	The alternative rehabilitation proposals described in the Preferred Project Report. Strategy A has been selected.
Topography	The physical relief and contours of the area.
TSC Act	NSW Threatened Species Conservation Act.
Wash plant	Equipment designed to wash unwanted sized materials from the product.

Chapter One

INTRODUCTION

Approval Condition 8 of **Schedule 3** requires the preparation and implementation of a noise management plan. This is to include details of the way in which the noise performance of the project would be monitored together with a noise monitoring protocol for evaluating compliance with the relevant noise limits in the approval. It is also to include an assessment (including modelling) of additional reasonable and feasible noise mitigation measures that would be implemented to ensure that noise emissions at all stages of the project comply with the noise impact criteria in **Table 2.1**.

Noise relating to the project would be generated from two principal sources: on-site activities including extraction of sand, transport to the slurry plant and processing; and on-road transport of the product to market by truck along adjacent public roads. Both these could potentially have impacts on adjacent residential and other properties. Noise generated by activities relating to the Hitchcock Road site would also have cumulative impacts in combination with that generated by local sand mining activities undertaken by other operators.

Noise monitoring of site-related activities has been undertaken and regularly reported for over ten years. A long term data set is therefore available. No complaints about noise have been received from the local community over the monitoring period.

Current monitoring procedures and reporting protocols will be amended, where necessary, to reflect the requirements of the relevant approval conditions.

Chapter Two

APPROVAL REQUIREMENTS

The approval contains a number of conditions relating to the monitoring and management of potential noise impacts. These are:

Schedule 3 Condition 5 Operational noise assessment criteria

The proponent shall ensure that the noise generated by the project does not exceed the noise impact assessment criteria in **Table 2.1** at any residence or on more than 25 percent of any privately-owned land.

Table 2.1 Noise impact assessment criteria

Noise assessment location	Day	Night	
	L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	L _{A1} (1 minute)
R1 - Hammond	41	35	45
R2 - Hitchcock	40	35	45
R5 - Pignataro	42	35	45
R6 - Camilleri	40	35	45
R7 – Maroota Public School	36(L _{Aeq} (1 hour))	N/A	N/A
R8 - Portelli	39	35	45
R9 - Young	39	35	45
R10 - Tomatola	39	35	45

Table 2.1 Notes

- To determine compliance with the L_{Aeq}(15 minute) noise limits, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impracticable, alternative means of determining compliance may be accepted (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise level where applicable.
- To determine compliance with the L_{A1}(1 minute) limit, noise from the project is to be measured at one metre from the dwelling façade.
- The noise limits apply under meteorological conditions of:
 - wind speed up to 3m/s at 10m above ground level;
 - temperature inversion conditions of up to 3 degrees C/100m and wind speed up to 2m/s at 10m above the ground;
 where the wind velocity and temperature gradients are determined to be relevant to the project site in accordance with the NSW Industrial Noise Policy.
- The Secretary may relax the noise limits in **Table 2.1** for any property where the proponent has an agreement with the relevant owners to generate higher noise levels and the proponent has advised the Department in writing of the terms of this agreement.

Schedule 3 Condition 6 Cumulative noise criteria

The proponent shall take all reasonable and feasible measures to ensure that the noise generated by the project combined with the noise generated by other extractive industries does not exceed the following amenity criteria on any privately owned land, to the satisfaction of the Secretary.

- $L_{Aeq(11 \text{ hour})}$ 50 dB(A) – Day
- $L_{Aeq(4 \text{ hour})}$ 45 dB(A) – Evening
- $L_{Aeq(9 \text{ hour})}$ 40 dB(A) – Night

Schedule 3 Condition 7 Operating hours

The proponent shall comply with the operating hours in **Table 2.2**.

Table 2.2 Operating hours

Activity	Day	Time
Construction work	Monday - Friday	7.00am to 6.00pm
	Saturday	8.00am to 1.00pm
	Sunday and public holidays	None
Quarrying and processing including overburden removal	Monday – Saturday	7.00am to 6.00pm
	Sunday and public holidays	None
Product transportation	Monday – Saturday	6.00am to 6.00pm
	Sunday and public holidays	None
Maintenance	Monday – Saturday	7.00am to 6.00pm
	Sunday and public holidays	None

Table 2.2 Notes

- *Product transportation prior to 7.00am is restricted as per **Condition 8 of Schedule 2**.*
- *Maintenance activities may be conducted outside the hours in **Table 2.2** provided that the activities are not audible at any residence beyond the boundary of the site.*
- *This condition does not apply to the delivery of material if that delivery is required by police or other authorities for safety reasons and/or the operation or personnel or equipment are endangered. In such circumstances, notification is to be provided to EPA and the affected residents as soon as possible or within a reasonable period in the case of emergency.*

Schedule 3 Condition 8 Noise management plan

The proponent shall prepare and implement a Noise Management Plan for the project to the satisfaction of the Secretary. This plan shall be prepared in consultation with EPA and include details of how the noise performance of the project would be monitored and include a noise monitoring protocol for evaluating compliance with the relevant noise limits in this approval. It is also to include an assessment (including modelling) of additional reasonable and feasible noise mitigation measures that would be implemented to ensure that noise emissions at all stages of the project comply with the noise impact criteria in **Table 2.1**.

A draft copy of this plan will be provided to the EPA for review and comment. Furthermore, ongoing consultation with OEHL via written correspondence (eg. Email),

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electronic correspondence (eg. Website) and verbal correspondence (eg. CCC meetings) will be continually undertaken. OEH will be invited to attend an annual CCC meeting.

A copy of the Landscape Management Plan will be made publicly available on the PF Formation website.

Note: The EA predicted that receiver locations R5, R6, R9 and R10 would exceed the applicable noise criteria by between 2 and 5 decibels during worst case operations.

Schedule 3 Condition 9

If the additional noise mitigation measures identified in Condition 8 are not able to reduce noise levels to within 2 decibels of the impact assessment criteria in **Table 2.1** then, upon receiving a written request from the applicable landowner, the Proponent shall implement additional noise mitigation measures such as double glazing, insulation and/or air conditioning at any residence on the land in consultation with the landowner. These additional mitigation measures must be reasonable and feasible.

If, within 3 months of receiving the request from the landowner, the Proponent and the landowner cannot agree on the measures to be implemented or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

Chapter Three

OBJECTIVES OF THE PLAN

The objectives of the noise management plan are to minimise the impacts of noise resulting from quarry operations and related truck movements on the local community and achieve compliance with all relevant legislation, approval conditions and guideline assessment criteria.

Chapter Four

STAKEHOLDER CONSULTATION

Stakeholders include government agencies and authorities including the Department of Planning and Environment and The Hills Shire Council and members of the community particularly Maroota landowners and residents who may be directly affected by the impacts of the operations on the Hitchcock Road site.

Consultation with these stakeholders will be undertaken in four ways:

- Direct contact with the relevant government authorities in the preparation of the monitoring programs and management plans required for the assessment of the environmental performance of site operations and subsequent review and assessment of the various reports detailing this performance.
- Direct contact with those members of the community as required to provide information on site activities in areas where they could be affected.
- Indirect contact with the local community and other interested parties by provision of all relevant project documentation and monitoring data on the PF Formation website in compliance with **Conditions 10 and 11 of Schedule 5** of the Project Approval.
- Establishment of a Community Consultative Committee as required by **Condition 9 of Schedule 5** of the Project Approval. This will be the continuation of the existing Liaison and Review Committee which meets twice a year to review the status of operations on the site and respond to community concerns. The committee comprises representatives of The Hills Shire Council and PF Formation, community members and occasional invited members of relevant government agencies. It is chaired by a representative of The Hills Shire Council.

Chapter Five

COMPLAINTS MANAGEMENT

Activities on the site and the transport of the extracted material from it have the potential to result in impacts on the local community. These may give rise to complaints regarding the project. It is important that any complaints received are handled and addressed in an appropriate manner. The following complaints management procedure will be followed:

- Each complaint received will be recorded on the complaints register. This will include details of the complainant, the nature of the complaint and the date and time received;
- The nature of the complaint will be addressed by the Quarry Manager/Environmental Manager and any measures required to mitigate its effects identified and implemented;
- The appropriate record sheet will be signed-off by the relevant manager once the identified measures are completed;
- Monitoring will be undertaken, if necessary, to confirm the source of the complaint and its subsequent mitigation;
- A copy of the relevant complaints record will be made available to the CCC and the complainant, on request. A summary of all complaints received, if any, will be presented at each CCC meeting and reported in the relevant AEMR; and
- A copy of the complaints register will be provided to the EPA as part of the annual licence reporting.

Chapter Six

DISPUTE RESOLUTION

Condition 1 of **Schedule 4** requires that if environmental monitoring indicates that impacts generated by the project are greater than the relevant assessment criteria, the Secretary and the affected landowners and/or existing or future tenants must be notified and the relevant monitoring results provided to these parties until the results show that the project is complying with the relevant criteria.

Condition 2 of **Schedule 4** enables a landowner of privately owned land who considers that quarry operations are exceeding the impact assessment criteria to request PF Formation in writing for an independent review of the impacts of the project. If the Secretary is satisfied that an independent review is warranted, PF Formation will undertake the following within 3 months of the Secretary's advice:

- consult the landowner to determine the nature of their concerns;
- commission a suitably qualified, independent specialist, approved by the Secretary to conduct monitoring on the land to determine whether the project is complying with the relevant criteria in Schedule 3 and identify the source(s) and scale of any impact on the land and the contribution of the project to that impact; and
- provide a copy of the independent report to the Secretary and the landowner.

If the independent review determines that the quarry operations are complying with the relevant criteria in **Schedule 3**, PF Formation will discontinue the review following approval of the Secretary.

If the independent review determines that the quarry operations are not complying with the relevant criteria in **Schedule 3** and that these operations are primarily responsible for the non-compliance, PF Formation will undertake the following:

- implement all reasonable and feasible measures, in consultation with the landowner, to ensure that the project complies with the relevant criteria; and
- conduct further monitoring to determine whether these measures ensure compliance; or
- secure an agreement with the landowner to allow exceedances of the relevant criteria in Schedule 3.

If additional monitoring subsequently determines that the quarry operations are complying with the relevant criteria in Schedule 3, PF Formation will discontinue the review following approval of the Secretary. If an agreement with the landowner cannot be achieved, PF Formation or the landowner may refer the matter to the Secretary for resolution. If the matter cannot be resolved within 21 days, the Secretary will refer the matter to an Independent Dispute Resolution Process. This process is shown on **Figure 6.1**.

If the results of the independent review are disputed by the landowner, either PF Formation or the landowner may refer the matter to the Secretary for resolution. If the matter cannot be resolved within 21 days, the Secretary will refer the matter to an Independent Dispute Resolution Process.

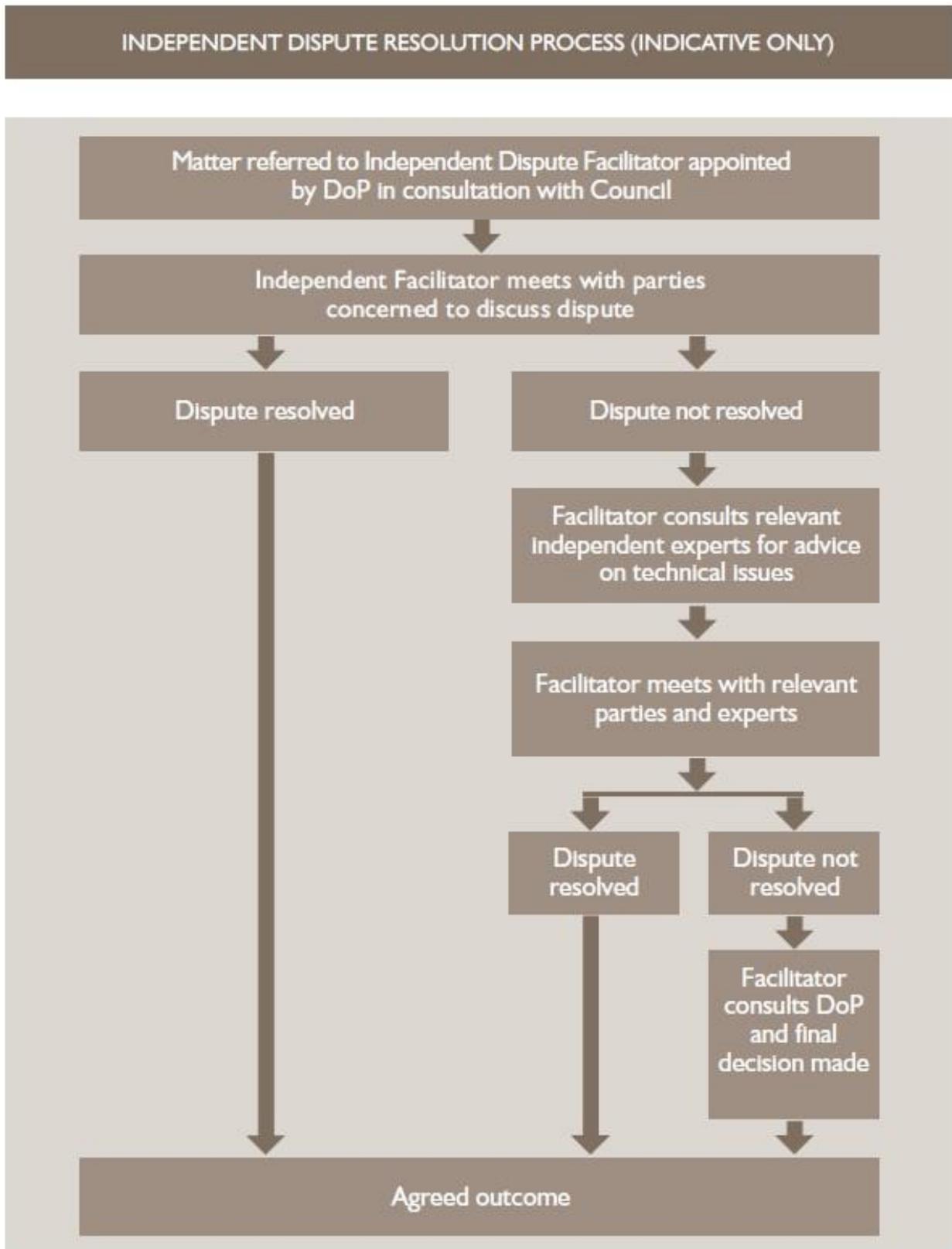


Figure 6.1
INDEPENDENT DISPUTE RESOLUTION PROCESS

Chapter Seven

MANAGEMENT OF CUMULATIVE IMPACTS

A number of other sand extraction operations take place on sites in the Maroota area adjacent to the Hitchcock Road site. This leads to cumulative impacts relating predominantly to operational noise, generation of air pollutants and truck movements.

The present approval is based on no increase in activity on the Hitchcock Road site, both annual extraction totals and truck movements being limited to the same level as the previous consent. Cumulative noise impacts are limited by specific assessment criteria (see **Condition 6** in **Schedule 3**) and a limit on total daily truck movements. Similar limits apply to other sand extraction operations in the area.

The amenity criterion in the Industrial Noise Policy requires that the LAeq (period) level does not exceed the specified acceptable or maximum noise level appropriate for the particular locality and land use. This is aimed at restricting the potential increase in amenity noise levels known as background creep.

The potential for the simultaneous operation of adjoining developments to exceed the acceptable and maximum noise amenity criteria has been assessed on a worst case scenario basis by adding the intrusive noise levels from the approved Lot 198 project and the Hitchcock Road proposal together with the approved noise limits from the licence conditions for other quarries in the area. This assumes that all projects simultaneously emit their maximum noise levels to a common receiver during non-adverse or adverse weather conditions.

This assessment indicated that the cumulative noise emissions of the development at Hitchcock Road and its adjoining developments would be below the relevant acceptable amenity criteria for industrial noise during the daytime and night time periods at all eight assessment locations.

Cumulative noise emissions generated by the proposal and adjoining developments would be below the relevant acceptable amenity criteria for industrial noise (non-transport) impacts during the daytime and night time periods at all assessment locations.

If the re-modelling of the cumulative noise impacts of sand mining operations at Maroota indicated that the appropriate criterion was expected to be exceeded at any of the nominated locations, an assessment would be carried out to determine the source of the increase and if this was found to be the result of activities on the Hitchcock Road site, an action plan would be prepared and implemented to reduce noise impacts to a level where compliance with the criterion was achieved.

Chapter Eight

NOISE MONITORING PROCEDURES

8.1 Introduction

PF Formation conducted operator-attended noise measurements on a monthly basis at four residential locations adjacent to the Hitchcock Road site from April 1996 for over 10 years. In addition, unattended noise logging was undertaken in August 1995, January 1999 and July 2004 at up to ten locations in the vicinity of the site. No noise issue was identified.

In general, noise measurement procedures were guided by the requirements of AS 1055.1-1997, *Acoustics - Description and measurement of environmental noise – General procedures* and the *NSW Industrial Noise Policy*.

All acoustic instrumentation employed throughout the monitoring program was designed to comply with the requirements of AS 1259.2-1990, *Sound Level Meters – Integrating - Averaging* and carries current NATA or manufacturer calibration certificates. Instrument calibration was checked before and after each measurement survey, with the variation in calibrated levels not exceeding ± 0.5 dBA.

8.2 Operational noise assessment criteria

Noise assessment criteria relating to the operation of the Hitchcock Road site and the process plant on Lot 198 DP752025 are contained in **Condition 6 of Schedule 3** of the Project Approval and comply with relevant EPA guidelines. PF Formation will operate the project in a manner that ensures that noise generated by the quarry does not exceed the criteria set out in **Table 2.1** at nominated monitoring locations.

8.3 Noise sources and controls

Noise would be generated on those parts of the site where extraction and subsequent rehabilitation is taking place in addition to that generated by the process plant at fixed locations and truck movements along the internal haul road. Noise would vary depending on the location of some of these activities at any one time. Noise levels would be similar to those currently experienced as the scale and intensity of the development would not change.

Noise would also be generated by the movement of trucks transporting the product to market along the public roads adjacent to the site.

The following operational procedures will be adopted to control the generation of noise from site-related activities.

- Hours of operation identified in **Condition 7 of Schedule 3** will be observed; no trucks or equipment will enter the site before 6.00am or leave after 6.00pm except the number of trucks entering or leaving the site between 6.00am and 7.00am will be restricted to 10 per day.
- All drivers will be subject to a safety induction which will incorporate a requirement to refrain from using engine brakes and making unnecessary noise that may disturb Maroota residents.

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- Extraction and processing activities will only be undertaken between 7.00am and 6.00pm Monday to Saturday with no operations on Sunday and public holidays.
- All equipment used on site will be regularly serviced and monitored to ensure that the sound power levels for each unit of plant and equipment remains at or below the level set out in **Table 8.1**.
- Panels and covers of silenced plant will be kept shut and plant and equipment switched off when not in use.
- A speed limit of 20 kph will apply to truck movements on the internal haul road which will be regularly regraded to limit body noise from empty trucks travelling on this road.
- The use of quacker type reversing alarms will be limited to that required for safety reasons.

Table 8.1 Plant and equipment sound power levels (dBA 10⁻¹² Watts)¹

Description	1/1 octave band centre frequency (Hz)										Overall SWL
	31	63	125	250	500	1k	2k	4k	8k	16k	
CAT D9L Dozer	109	111	120	119	120	114	114	119	106	104	120
CAT 730 Dump Truck	104	124	125	119	117	112	108	104	106	104	117
CAT 330CL Excavator	102	119	120	108	111	102	102	100	100	92	110
CAT 633D Scraper	123	118	123	122	119	116	116	111	112	103	121
CAT D6D Dozer	110	123	114	109	110	111	108	116	107	99	118
CAT 966F Loader	105	113	116	108	110	109	108	100	94	90	113
Slurry Plant	117	113	109	105	106	106	103	102	97	91	110

Note 1: Noise measurement procedures were undertaken in compliance with the requirements of AS 2012.1-1990 *Acoustics – Measurement of airborne noise emitted by earth-moving machinery and agricultural tractors – stationary test condition – Determination of compliance with limits for exterior noise*.

Source: Richard Heggie Associates 2004

8.4 Monitoring programs

The proposed monitoring programs and procedures including locations, methods, frequency, and reporting are described in **Chapter 9**.

8.5 Response to non-compliance

If an exceedance of the noise assessment criteria set out in **Table 2.1** is identified, the following procedures will be instituted:

Confirmation of exceedance

A check will be made of the monitoring data to confirm that an error has not been made in recording or analysing the result. If this is the case, the process will continue to the next stage. If any uncertainty arises in relation to the available results, further monitoring will be undertaken to confirm the outcome of the assessment.

Reporting non-compliance

Exceedance of the relevant criterion by less than 5dB(A) will require the preparation of a corrective action plan. Details of the proposed corrective actions will be made available to the relevant parties. If requested by the Secretary, PF Formation will commission an independent consultant to undertake a review of site operations and/or truck movements together with their noise-related impacts and incorporate any recommendations into the corrective action plan.

If the exceedance of the relevant criterion is in excess of 5dB(A), the results of the independent review, if requested by the Secretary, will be used as the basis for establishing an acceptable agreement between PF Formation and the affected landowner. This may comprise the initiation of a corrective action plan or the preparation of an agreement between PF Formation and the affected landowner over continued exceedance of the noise criterion.

Corrective action

Noise at the site of the measured exceedance will be reassessed. If additional measurements indicate no exceedance of the relevant criterion, no further action will be undertaken but the site will be identified in the event of a future non-compliance. If the new measurements confirm the exceedance of the criterion, further action will be required.

PF Formation will prepare a plan of action to return the noise impacts of site operations and/or truck movements to compliance. This will document the corrective measures to be undertaken, frequency and scale of these measures and the results expected from their implementation. Details of the action plan will be included in the relevant AEMR and will be reported to the Secretary and EPA, if required. The affected landowner or resident will also be notified of the action plan.

Continuing monitoring and assessment

Noise at the site of the measured exceedance will be reassessed during and following the implementation of the corrective measures in order to demonstrate a return to compliance with the relevant criteria. PF Formation will provide quarterly monitoring results to the affected landowner or resident and the EPA until the results show a consistent return to compliance. During this period, regular consultation will be maintained with the affected landowner or resident to assist in determining the effectiveness of the corrective measures.

If the noise levels continue to exceed the nominated criteria at a particular location, PF Formation will attempt to develop an agreement with the landowner for signed acceptance of the exceedance of the relevant noise criterion. The agreement will specify a noise level below which the agreement would cease to apply.

PF Formation will notify the affected landowner, the Secretary, the EPA and other government agencies together with local stakeholders of a return to compliance following the successful implementation of the action plan or, alternatively, the establishment of an agreement between PF Formation and the affected landowner.

Continued non-compliance

If exceedance of the relevant noise criterion continues and PF Formation is unable to achieve an agreement with the affected landowner, the situation will be referred to the Secretary and an Independent Dispute Resolution Process, as set out in **Condition 1** of **Schedule 4** of the Project Approval, will be instituted.

Reporting

The recorded exceedance, corrective actions and noise reassessment will be reported to the CCC and included in the relevant AEMR.

8.6 Responsibilities

PF Formation is responsible for the management of the project in a manner which achieves the environmental outcomes set out in the approval conditions. The project team members responsible for the implementation of the EMP have been nominated although these may be changed with approval over the life of the approval. Their responsibilities are:

Quarry manager - responsible for the day to day activities on the extraction and process sites.

Environmental manager - responsible for the environmental management of the activities on the extraction and process sites.

Each person with responsibilities (as identified above) will hold a controlled copy of the EMP.

Site inspections during operations, the assessment of environmental impacts and the performance of mitigation measures will be carried out regularly by a nominated **environmental manager**. Such inspections will be documented in a standard format and a copy submitted to the **quarry manager**. Issues arising from these inspections will be addressed immediately. Overall environmental performance will be addressed at management meetings as appropriate.

All persons undertaking any form of work on the site subject to the EMP will be required to attend a site-specific induction. This will provide instruction in the environmental rules, procedures and processes applying to their activities on the site including those necessary to limit noise to acceptable levels.

Chapter Nine

MONITORING AND REPORTING

9.1 Introduction

Noise monitoring will be undertaken by PF Formation to demonstrate that measured levels are in compliance with the noise assessment criteria set out in **Table 9.1**. Attended monitoring will be undertaken at appropriate locations at quarterly intervals during day time, evening and night time periods. Given the long history of minimal complaints no unattended monitoring will be undertaken unless conditions change.

9.2 Monitoring locations

Due to the circumstances prevailing at Maroota where a number of sand operations are undertaken by separate companies within a relatively small area, noise monitoring locations need to be carefully chosen in order to identify the noise generated by the activities on one specific site as accurately as possible.

Appropriate monitoring locations have therefore been chosen at residences as close to the operations on the Hitchcock Road site as possible where the influence of adjacent sand extraction activities can be expected to be minimal while rejecting those which are closer to other extraction sites where the influence of activities on the Hitchcock Road site will be minimal. Such locations are also subject to noise monitoring requirements of the relevant conditions applying to other sand extraction operations and are consequently monitored and reported.

Noise impacts have also been monitored at four locations around the boundary of the Hitchcock Road site since 1996 allowing trends to be examined over a lengthy period. It is therefore appropriate to continue to monitor noise at these locations if this remains feasible as they cover all the noise assessment locations identified in Clause 5 of Schedule 3 of the Approval. The monitoring locations chosen and criteria are listed in **Table 9.1** and shown on **Figure 9.1**.

Table 9.1 Noise impact assessment monitoring locations and criteria

Noise assessment location	Other locations covered	Day	Night ₁	Night ₁
		L _{Aeq} (15 minute)	L _{Aeq} (15 minute)	LA ₁ (1 minute)
1. R9 – Young, Hitchcock Road	R10 Tornatola	39	35	45
2. R5 - Pignataro	R6 Camilleri	42	35	45
3. R3 – Fire station/Jurd	R1 Hammond and R2 Hitchcock	40	35	45
4. R7 – Maroota Public School	R6 Camilleri and R8 Portelli	36 _{(L_{Aeq}(1 hour))}	N/A	N/A

Note 1: Night time is defined as the period between 10.00pm and 7.00am. Activities on the site start at 6.00am and are completed by 6.00pm. There is no activity on the site during the evening period.



Figure 9.1
Noise impact Assessment Monitoring Locations

9.3 Noise measurements

The following noise parameters will be measured at the nominated monitoring locations.

- $L_{Aeq(15 \text{ minute})}$ noise level measured at an appropriate free-field location close to the façade of the relevant residence or other building during day time and evening hours.
- $L_{Aeq(1 \text{ minute})}$ noise level measured at an appropriate free-field location close to the façade of the relevant residence during night time hours.

Monitoring will not take place when the wind speed exceeds 3m/s at 10m above ground level or when it can be inferred that a temperature inversion exists with a strength greater than 3 degree C per 100m.

9.4 Monitoring frequency

Attended noise monitoring will be undertaken at the locations specified in **Table 9.1** at quarterly intervals during day time, and night time (6.00am to 7.00am) periods during operating hours.

Noise monitoring will also be undertaken in response to a genuine complaint about noise impacts at a specific residence or property. If the complaint is not readily resolved unattended monitoring will be undertaken.

The frequency of attended monitoring is the same as formerly practiced at the site. Given the absence of noise-related complaints over an extended period (15 years) and the prospect of this situation continuing, PF Formation will apply to the Secretary and EPA for a reduction in the frequency of such monitoring.

9.5 Data recording and reporting

The following data will be recorded at each noise monitoring location:

- Date and time-period over which the measurements were taken.
- Brief description of weather conditions during the monitoring period to be supplemented by data from the on-site weather station.
- Identification of the instrumentation used and confirmation that the meter was calibrated prior to use.
- Notes and comments on noise sources during the monitoring period.
- Name and signature of the person conducting the measurements.

The results of noise monitoring will be presented in the relevant AEMR. This will include an analysis of the monitoring results against the criteria listed in **Table 9.1**, previous monitoring results and predictions made in the EA dated November 2007. Trends in noise levels will be identified and any non-compliance noted.

The recording of an exceedance of noise criteria identified in **Table 9.1** will trigger the procedures described in **Chapter 6**.

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