

**NOISE MANAGEMENT PLAN  
SHOALHAVEN STARCHES PTY LTD  
BOLONG ROAD, BOMADERRY**



**Prepared by: The Acoustic Group**  
**Report : 40.3849.R55A:ZSC**  
**Original: 31/10/2009**  
**Revised: 7/9/2010 (Attachment 3 added)**

---

**20-22 FRED STREET, LILYFIELD, 2040, NSW, AUSTRALIA**  
ph: (612) 9555 4444    fx: (612) 9555 4442    tag1@acoustics.com.au  
A.B.N. 73 082 704 701

**THE ACOUSTIC GROUP**

**NOISE MANAGEMENT PLAN  
SHOALHAVEN STARCHES PTY LTD  
BOLONG ROAD, BOMADERRY**

**TABLE OF CONTENTS**

**1. Introduction ..... 1**  
**2. Implementation of Noise Reduction Program ..... 2**  
**3. Acoustic Criteria ..... 4**  
**4. Industrial Noise Policy ..... 7**  
**5. Application of the Noise Management Plan ..... 10**  
**6. Conclusion ..... 14**

**List of Attachments**

Site and Measurement Locations ..... Attachment 1  
Brief Response to Noise Conditions ..... Attachment 2  
Noise Management ..... Attachment 3  
Curriculum Vitae – Steven Cooper Director ..... Attachment 4



## **NOISE MANAGEMENT PLAN**

### **SHOALHAVEN STARCHES, BOMADERRY**

#### **1. Introduction**

Pursuant to Section 75J of the Environmental Planning & Assessment Act 1997, the Department of Planning has issued conditions of consent with respect to an ethanol plant expansion at the Shoalhaven Starches plant at Bomaderry near Nowra.

The conditions of approval involve a consolidation of various approvals and consents issued for the plant by requiring all existing development consents and project approvals for the site to be surrendered within 12 months of the approval. In Schedule 3 of the Project Approval (consolidated consent) under a heading of “Specific Environmental Conditions”, Conditions 11 to 14 inclusive fall under a sub-heading of “Noise” with Condition 14 requiring the preparation of a Noise Management Plan.

In the Definitions to the Project Approval, “Project” is:

*The development described in the EA, which includes the continued implementation of all existing and approved development on site*

By way of clarification if the noise conditions are not read in-conjunction with the definitions in the Project Approval there could be some confusion as to the application of the noise conditions to the entire site or a specific project.

Accordingly on the basis of a Noise Management Plan relating to the entire site, where “Project” or “project” appears in Conditions 11- 14 (inclusive), it relates to the entire site and not an individual plant or alteration to a plant. Similarly so as to be consistent with SPCC/EPA/DECC/DECCW documentation for the site in this Noise Management Plan “Project” and the “site” are interchangeable.



Condition 11 is a standard DECCW condition previously applied to the site for Construction Activities and there is no difference to the current practice employed on the site.

Condition 12 is the same as the noise conditions contained on the current DECCW Licence for the site.

As the site (Project) complies with the noise conditions specified in the DECCW Licence (as a result of extensive noise reduction programs) the current Noise Reduction Program (that is in accordance with Chapter 10 of the DECCW's *Industrial Noise Policy*) results in parts b), c) and d) of Condition 14 having been in operation for a number of years.

Accordingly the Noise Management Plan requires identification of the existing Noise Reduction Program that has operated at the Shoalhaven Starches Bombaderry site for some time.

## 2. Implementation of the Noise Reduction Program

The site has, since the early 1990s, been the subject of Noise Reduction Programs to reduce noise emissions from the site to accord with acoustic criteria specified by the NSW Environment Protection Authority pertaining to night time operations and noise impact upon residential locations in Bombaderry, Nowra and Terara.

As part of the Noise Reduction Programs various sections of the plant that were in operation in 1994 no longer exist on the subject site. As a result of various expansions/projects implemented on the site all of those projects have incorporated acoustic design criteria issued by the EPA (defined as DECC on the Project Approval but now DECCW) with noise design goals for new projects being significantly below the site's overall night time design target that has been the subject of compliance testing since the early 1990s.



Under an Environment Protection Licence No. 883 issued by the EPA/DECC, Condition M12 requires noise monitoring to be conducted at representative receiver locations in Bomaderry, Terara and Nowra at or around July and January each year with Condition L6.2 specifying noise targets that have been in existence since 1994, arising from night time compliance monitoring conducted with and without the plant operating.

As a result of various plant upgrades carried out upon the site that have incorporated replacement of existing equipment with quieter equipment (in accordance with Chapter 10 of the EPA's *Industrial Noise Policy*), and the decommissioning of old plants and replacement with new plants, the site has been found to comply with the proposed conditions of consent (Condition 12) when testing has been carried out in the night time period of 10pm to 7am.

Accordingly, having obtained compliance with the noise design targets nominated for the site, Shoalhaven Starches Pty Limited has formed the view they have met the acoustic design criteria set out in their Noise Reduction Program. Therefore any Noise Management Plan represents a continuation of the philosophy for any additional plant that may be incorporated on the subject site (in accordance with the INP) and maintain the monitoring as currently required.

Whereas all of the noise assessments conducted by various acoustical consulting organisations (Richard Heggie & Associates Pty Limited, Acoustic Dynamics Pty Limited, Steven Cooper Acoustics Pty Limited and The Acoustic Group Pty Limited) have assessed noise emission from the site and conducted compliance testing with respect to night time operations, Condition 12 of the consolidated consent seeks to apply the noise limits derived for night time operations on a 24 hour basis.



### 3. Acoustic Criteria

The Shoalhaven Starches Bomaderry site was the subject of acoustic audits in 1993 and 1994 by Richard Heggie & Associates Pty Limited as a result of identification by the NSW Environment Protection Authority of noise from the mill impacting upon residential receivers with noise emission levels greater than the general concept of background plus 5 dB(A).

Questions were raised by the EPA and Richard Heggie & Associates Pty Limited in relation to the “true” background level of the area in that the plant operates on a continuous basis and therefore there were limited windows of time from which the “true” ambient background level could be obtained.

From 22 December 1993 to 5 January 1994 there was a total shutdown of the site. This permitted ambient monitoring to be conducted at that time to establish the background level from which acoustic criteria to form the company’s on-going Noise Reduction Program could be established.

Report K71-S5 from Richard Heggie & Associates Pty Limited dated 8 February 1994 provides the results of unattended noise logging, supplemented by attended measurements to reveal that the previously assumed background level of 30 dB(A), which was used to develop noise control design goals prior to that investigation, were amended to be 38 dB(A) for Bomaderry and 33 dB(A) on the southern river bank opposite the plant.

The report identified that the assessment of the background level related to the period between midnight and 5am and specifically eliminated ambient background levels under high wind. The report did not identify background levels that would apply during the day and evening periods. Examination of the logger graphs in the report indicates (as expected) the background levels during the day with the plant shutdown were higher than that at night for locations in Bomaderry and Nowra. There were no unattended logger results for Terara at Nobblers Lane.



The Richard Heggie & Associates report identifies that the night time noise emission from the plant (in 1994) was significantly greater than the background level but did not discuss noise emission levels during the day or evening periods, or criteria for those periods.

At the time the noise criteria were derived the noise policy document utilised by the EPA was their *Environmental Noise Control Manual* which only had two periods of assessment being day and night and utilised a noise target goal of background plus 5 dB(A), where the background was expressed as an L90 level and the noise under consideration from the site was expressed as an L10 level.

In light of the ambient background levels that exist during the day time period it was impossible in the 1990s (and more so at this point in time) to measure the plant's noise contribution at residential receivers during the daytime. Accordingly all compliance monitoring conducted by the various acoustical consultants retained by Shoalhaven Starches utilised monitoring during the period of midnight and 5am for the purpose of determining noise emission from the site not being masked by distant traffic.

Noise logger noise monitoring in September/October 2002 for the PRP7 project confirmed the position that for the Nowra and Bomaderry locations the daytime background level were higher than at night, whilst the Terra location (being removed from traffic) is generally similar in the day and night.

The PRP7 acoustic assessment stated on page 4:

As the ambient noise varies throughout the day the permissible noise emission from a site may vary. The EPA Licence for the Shoalhaven Starches Plant is based upon the minimum ambient background levels that generally tend to occur at night, whereas the construction activities are to occur in the daytime only.

The current EPA Licence conditions relate to criteria derived from night time ambient measurements and the EPA Environmental Noise Control Manual (the "ENCM") that utilised the concept of an average maximum ( $L_{10}$ ) noise level versus the average minimum ( $L_{90}$  background) level.



Condition L6.3 of the EPA License states:

The LA<sub>10 (15 minute)</sub> sound pressure level contribution generated from the premises must not exceed the following levels when measured at or near the boundary of any residential premises:

- 38 dB(A) at locations in Terara on the south side of the Shoalhaven River;
- 38 dB(A) at locations in Nowra on the south side of the Shoalhaven River;
- 42 dB(A) at locations in Meroo Street, Bomaderry; and
- 40 dB(A) at other residential locations in Bomaderry.

Compliance testing conducted on a regular basis on behalf of the Mill has found noise emission from the premises satisfies the EPA criteria as a result of implementation of various noise controls associated with previous expansion works on the Shoalhaven Starches site. In order to ensure that there is no increase in noise emission from the subject premises, with respect to the noise criteria nominated by the EPA in License Condition 6.3, the design goal for such additional plant should be at least 10 dB below the criteria nominated by the EPA.

The PRP7 acoustic assessment was also required (by the EPA) to consider the influence of weather effects on the propagation of noise from the plant. Examination of weather data was undertaken to ascertain the 30% occurrence threshold identified in the *Industrial Noise Policy*. The assessment considered the change in propagation for the PRP7 project under 8 different weather scenarios that has continued to be of assistance in determining the plant's contribution for the prevailing weather conditions during compliance testing. Compliance testing was a condition of approval and was evaluated on a sound power basis, discussed below.



#### 4. Industrial Noise Policy

In the late 1990s the EPA reviewed their *Environmental Noise Control Manual* and prepared a draft *Stationary Noise Policy* to identify a revision of acoustic policy for industrial premises.

The draft *Stationary Noise Policy* was the subject of a public review, and internal EPA reviews prior to being issued as the *Industrial Noise Policy* document in January 2000.

In the INP document the former L10 descriptor was replaced by the  $L_{eq}$  descriptor with two separate components being used for assessment purposes. At residential boundaries an intrusive noise target of Rating Background Level (RBL) plus 5 dB(A) was applied as an  $L_{eq}$  level over 15 minutes whilst a separate criteria identified as the amenity criterion related to a noise level contribution as an  $L_{eq}$  level for day, evening and night time periods where the amenity criteria was the  $L_{eq}$  level recorded over that entire period. The acceptable amenity criteria set out in Table 2.1 of the INP show a difference in the amenity noise target of 5 dB between evening and night time periods, and then a difference of 10 dB between day and evening periods for urban and suburban areas, but only 5 dB difference for rural areas.

The noise criteria contained in the licence for Shoalhaven Starches even after the issue of the INP were still expressed in terms of an LA10 level and the Project Approval noise condition still maintains that descriptor, although technically speaking if the assessment is under the INP document the descriptor should be changed to an  $L_{eq}$  and one should provide both an intrusive criterion and an amenity criterion for each of the relevant time periods at the reference monitoring locations.



The *Industrial Noise Policy* sets out in Table 2.2 modifications that would apply to new noise sources forming part of the industrial noise with respect to maintaining compliance with an amenity noise target. If noise from an existing industrial premise is at the acceptable noise level then Table 2.2 nominates a design target of 8 dB below the acceptable noise level or if the total industrial noise  $L_{eq}$  is greater than or at 2 dB above the acceptable level and the existing noise level is likely to decrease in the future then the noise target for assessment purposes becomes the acceptable noise level minus 10 dB.

In general acoustic terms when adding noise sources together if a new noise source is 10 dB or more below the existing noise level then the cumulative impact of both the existing and new noise source will not give rise to any increase in noise. This is the fundamental basis that has been applied since 2000 to any alterations or additions to the Shoalhaven Starches plant and fully complies with the methodology identified in Chapter 10 of the INP “applying a policy to existing industrial premises”.

The Shoalhaven Starches concept of a noise target of at least 10 dB below the night time noise targets became the design goal in their Pollution Reduction Program that in turn became conditions of consent. The PRP7 project had noise criteria for the project (which was the subject of integrated development application No. 223-7-2002) 10 dB below the licence conditions covering the entire operation of the site.

For the Short Mill project in 2007 the noise design targets were set at 14 dB(A) below the licence conditions which is well below the INP suggested noise target.

For the Ethanol Upgrade project acoustic assessment, conducted in June 2008, the noise target for that project was specified at 15 dB(A) below the DECCW licence noise limits representing a further safety margin with respect to the DECCW noise limits.

Any individual plant items that require replacement rather than an upgrade or new plant follow the procedure in Chapter 10 of the INP to ensure that the noise from the new plant item is no greater than and preferably less than the equipment that it replaces.



In view of the design contribution for new plants being well below the DECCW noise limits it is impossible to ascertain the resultant contributions at the residential receivers. As previously approved by the EPA/DECC the compliance determination of such a project is carried out by determining an effective sound power level in accordance with International Standard ISO 8297 (*Acoustics – Determination of sound power levels of multisource industrial plants for evaluation of sound pressure levels in the environment – Engineering method*) and assessing the resultant contribution using the EPA approved *Environmental Noise Model*, as described in the various Environmental Assessments for projects carried out at the Shoalhaven Starches site.

Accordingly, following the implementation of Pollution Reduction Programs 4 and 7, the noise criteria specified for Short Mill and the Ethanol Upgrade projects complied with the company's Noise Reduction Program criteria. These design targets were fully in accordance with the INP intrusive and amenity noise goals, the methodology set out in Chapter 10 of the INP, and the night time licence noise conditions for the overall site.

The above information confirms the current Noise Reduction Program and compliance monitoring required by the DECCW licence addresses the matters discussed in Condition 14 of the Project Approval. The specification of new plants to be more than 10 dB below the DECCW limits maintains compliance with the overall noise criteria, whilst the regular monitoring confirms compliance and/or any remedial investigations that would be required in the event of non-compliance.

In the event of any complaints from residents concerning noise emissions additional testing has been carried to investigate such complaints. One such complaint in Bomaderry found the source of noise disturbance (attributed to the plant) to be the night time cleaning of trains at the designated cleaning location south east of the station.

As to the application of night time criteria for the day/evening period as being appropriate in terms of the INP document, that is a matter that has been discussed with the DECCW, as described below.



## 5. Application of the Noise Management Plan

The content of Condition 14 is expressed in what one would expect for a new project and not necessarily applicable to a site that complies with the noise conditions, in that noise impacts, noise control measures etc have already been addressed by the company. Therefore in relation to Conditions 14 and the Noise Management Plan we note the following.

The company has a Noise Reduction Policy that has been implemented since the early 1990s to reduce noise emission from the site to achieve night time noise targets of background plus 5 dB(A) where the noise targets are based upon background levels recorded during the Christmas shutdown in 1993.

There has been no review of the ambient background level of the site whilst a shutdown is in progress since that point in time as the emphasis of monitoring was to achieve the Noise Reduction Program noise targets, and one could not be aware of the true background until the plant complied with the noise targets.

As part of a Noise Management Plan it would appear that some 15 years after the noise targets had been derived it would be appropriate during plant shutdowns (that may occur over a number of days) to undertake noise monitoring to ascertain the true background level that exists in the Nowra, Bomaderry and Terara area to determine the validity or otherwise of the noise targets.

It is noted however, that a total shutdown of the site for extended periods is rare as there are multiple sources of electrical power to the site and the nature of production requires continuous operation.

It is a common situation in urban and suburban areas that over a period of years the ambient background levels will marginally increase as a result of additional traffic and residential expansion.



With measurements of ambient noise levels, with the plant in shutdown mode, then noise conditions for the critical night time period can be reviewed and, based on such measurements appropriate criteria both in terms of an intrusive noise goal and an amenity noise goal can be determined for the day and evening periods.

As part of an internal review of the Noise Management Plan it was identified that the site no longer has extended shutdown periods. Following consultation with the DECCW it is proposed that during planned night time shutdowns the Company will seek to undertake such monitoring (where feasible) so as to determine the appropriateness or otherwise of noise limits, but also to provide a basis for comparison with the plant in operation, as this cannot be undertaken at the present point in time because the plant operates on a continuous basis.

In view of noise criteria specified for individual projects being less than the ambient night time background level at residential receivers the method of compliance testing with design noise emission limits cannot be undertaken at residential receivers but must follow the format of determining the sound power level on site and then utilise the same calculation procedures/methods for the prediction of noise which in all cases has used the EPA approved ENM program.

Compliance testing of pollution reduction programs and approved projects has utilised the measurement of the sound power of individual items in accordance with the relevant Australian Standards or for an entire plant (example distillation column where measurements are not able to be conducted inside the plant) the procedure follows the ISO Standard 8297 for such measurements.

At the present point in time the licence issued by the DECC requires monitoring on a six monthly basis with respect to noise levels at residential receivers and, in view of the existing ambient noise levels, that monitoring can only be conducted during the night time period in that ambient noise levels in the day would make it impossible to determine a noise contribution at residential receivers.

Therefore at the present point in time for the purpose of managing noise from the subject site the emphasis has been on night time operations which represents the critical period for noise disturbance to residential receivers.



In the intervening period we would see that such monitoring would still continue.

Similarly as Shoalhaven Starches have identified in their various development applications the acoustic compliance methodology is by way of sound power level to determine the contribution at residential receivers then we would see that as part of the Noise Management Plan such compliance testing of individual projects would still maintain that accepted practice.

The EPA/DECCW licence identifies that the intent of the licence is to achieve compliance with the noise targets for the majority of the time, which is reflected in Section 2.1 of the INP that identifies the intrusive noise impact approach is aimed to achieve compliance with the intrusive noise criterion for at least 90% of the time periods over which annoyance reactions can occur.

The condition 14 seeking an investigation to reduce noise impact is not required for the Project Approval, as the entire site complies with the DECCW noise licence conditions. The Noise Reduction Program (incorporated into this Noise Management Plan) already has a mechanism for ensuring there is no increase in noise from replacement plant items and preferably a reduction in emission levels.

The acoustics studies accompanying the PRP 7 project, the Short Mill project and the Ethanol Upgrade identified the variation in propagation that may occur under different weather conditions by way of the ENM program which is required to be assessed under the INP to ascertain if such conditions apply for the majority of the time and therefore would be included in any prediction methodologies, just as it is included in the compliance checking, currently at 6 monthly intervals.

The concept of conducting annual sound power level measurements of an entire plant is a complex and costly exercise in view of the many noise sources, varying degrees of in-plant shielding and the need to determine individual sound level contributions, or a perimeter method of overall plant assessment. Such testing would appear to be irrelevant in terms of a Noise Management Plan where there is already an undertaking to conduct such an exercise as part of the commissioning for the specific items of plant associated with a dedicated project.



If the night time attended monitoring at residential receivers indicated any breach of the noise limits (taking into account the prevailing weather conditions at the time) or the Company was in receipt of noise complaints from residents (of which we are instructed there have been none for a considerable number of years) then such actions would become a trigger for investigation and/or consideration of potential remedial action after the source of noise disturbance or exceedance had been identified.

In relation to monitoring of specific noise sources we note that the concept for the development of new plants is to provide the appropriate noise control measures from the outset and rather than add-on enclosures for noise control have generally designed the buildings to contain the sound with speed limiters for cooling towers (at night) and standard silencers or similar on fan discharges and air inlets.

One of the issues in terms of the Noise Management Plan that requires consideration in responding to part d) of Condition 14 is a form of monitoring noise from discharge ducts associated with gluten dryers where over a period of time there can be a build up of flour product that downgrades the acoustic performance of the attenuator and therefore requires the fan to be taken offline for the purpose of cleaning and/or replacement of such elements. Such monitoring requires identification of readily accessible locations in proximity to the fan discharges and determination of a tolerance limit for such noise emission. This will require a specific program to permit the fan(s) to be turned on and off whilst still having the normal existing acoustic environment occurring.

The only noise sources that are subject to deterioration of the control measures are the gluten fan discharges and the Noise Management Plan requires inclusion of these items as part of the onsite monitoring (as suggested in the consolidated conditions of consent) to ascertain noise emission levels that are then correlated by way of the sound power calculation and attended monitoring procedures to provide an indication of compliance with the noise limits, i.e. there are no other specific plant items requiring on-going monitoring to assess a reduction in the attenuation of the noise controls.



## 6. Conclusion

The Project Approval issued by the Department of Planning for the Shoalhaven Starches plant at Bomaderry requires the surrendering of all development consents that have been issued for the site, that include for various projects noise emission limits significantly more stringent than the overall site noise criteria that have been the subject of compliance testing since early 1990s during the period of midnight to 5am at various residential reference locations.

The wording of Condition 14 appears to apply more to a project/plant that has not already achieved compliance with the specified noise limits.

Following the implementation of various Noise Reduction Programs/Pollution Reduction Programs, and replacement of existing plant as part of new projects, the noise emission from the site has been found to comply with the night time noise targets obtained from the EPA licence conditions that were developed in early 1994.

Therefore in terms of the Noise Management Plan in our opinion the plant is satisfying those noise targets and the basic requirements of the Noise Management Plan is to implement a method of maintaining compliance and to incorporate additional mechanisms to supplement the attended monitoring.

Whilst there have been significant advances in terms of computerised monitoring, the reality of such monitoring requires the monitoring microphones to be located relatively close to the subject plant and such results to be correlated with field measurements taking into account the substantial distance to residential receivers and the propagation of sound over the river, together with the influence of various weather conditions.

Such a project to determine the resultant contribution from locations near or around the perimeter of the plant is an ambitious project in terms of providing any technical confidence in utilising such criteria to determine noise contributions at residential receivers.



Near field monitoring is an accepted practice for determining the sound emission from a plant which is more easily converted to an effective sound power level with respect to various residential receivers.

Apart from the expense of such monitoring equipment, the calibration and verification of such results is an involved process and would take some time to provide a degree of confidence/tolerance to achieve the intent of such monitoring.

The noise limits identified in the consolidated conditions of consent do not accord with the *Industrial Noise Policy*, which utilises a  $L_{eq}$  descriptor over 15 minutes during the day, evening and night periods, and also a  $L_{eq}$  descriptor for each entire period of day, evening or night.

As part of the Noise Management Plan it is recommended that during planned night time shutdowns attended and unattended monitoring occur at/or near the residential reference locations to determine the ambient background level in the absence of the plant. Comparison with the plant in a shutdown period and the plant in operation can ascertain the appropriate noise limits that would apply to the Shoalhaven Starches site when expressed in the criteria utilised in the INP, which has been EPA/DECCW noise assessment policy since the issue of that document.

It would appear appropriate that in addition to supplementary attended monitoring that would arise as a result of this Noise Management Plan that consideration be given to a review of the overall noise emission levels and the “true” ambient background level obtained during plant shutdowns on a five or ten yearly basis, rather than what would now occur to be some 15 years after the last assessment.

There is no doubt by comparing the noise situation in 1990 to 2009 that a very significant reduction in noise from the Shoalhaven Starches site has occurred and this corresponds with the elimination of noise complaints in relation to the operation of the plant. The review of documentation required for the preparation of this Noise Management Plan assessment has also revealed that Shoalhaven Starches has taken a proactive approach in addressing noise both in terms of operation and construction in that we understand over the last three projects the company has **not received any** noise complaints in terms of construction activities.



There is no doubt that upon reviewing the position of Shoalhaven Starches with respect to noise reduction programs and design and implementation of various upgrades that noise has been considered from the outset with the full intent to comply with the night time noise targets that have been in place since 1994 and since the mid 1990s have been found in general to be in compliance.

The attached map identifies the monitoring locations used for current testing and the second attachment identifies a brief response to Conditions 11 – 14 on the Consolidated Conditions.

Yours faithfully,

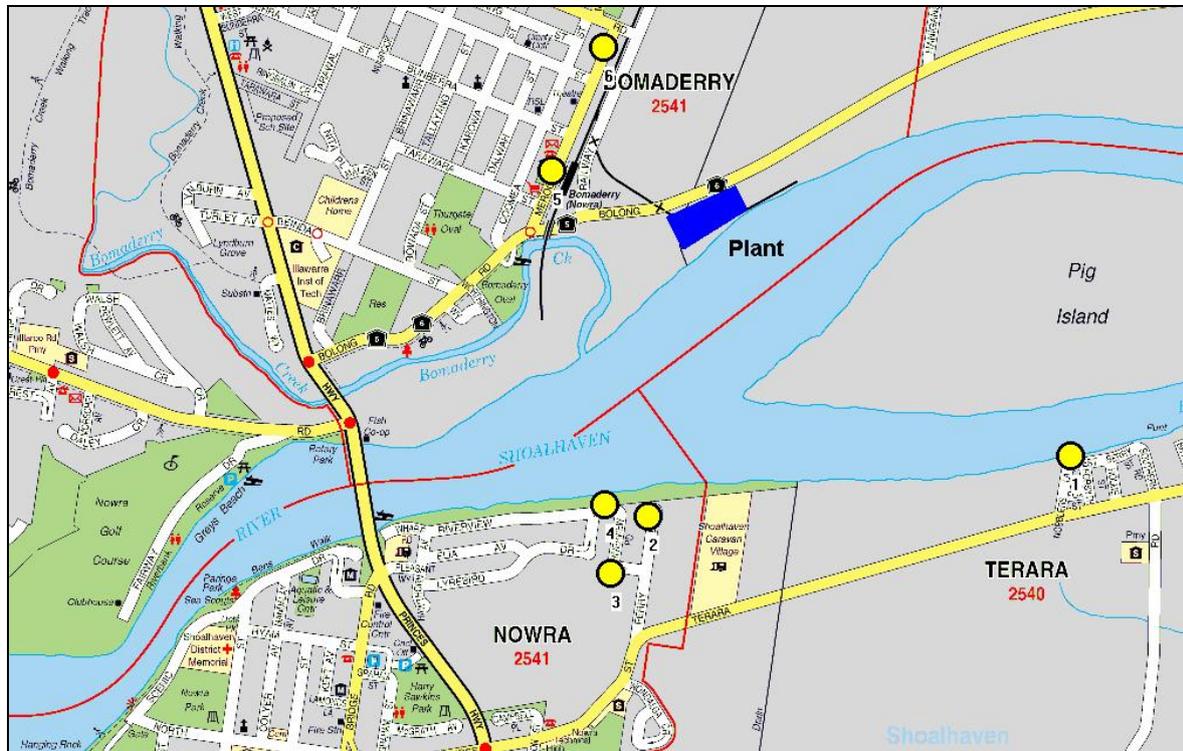
**THE ACOUSTIC GROUP PTY LTD**



**STEVEN E. COOPER**



**ATTACHMENT 1: Site and Measurement Locations**



## **ATTACHMENT 2: Brief Response to Noise Conditions**

For Conditions 11 – 14 inclusive the reference to Project and project is taken to mean the entire site, and DECC is taken to mean DECCW.

Condition 11 - same as previous approvals

Condition 12 – noise limits on DECCW Licence although now expressed as Day/Evening/Night. Limits expressed as LA10, although INP uses LAeq

Condition 13 – same as previous approvals

- Condition 14
- a) Noise Management Plan prepared by Steven Cooper B.Sc (Eng), M.Sc (Arch), FIE (Aus), MAAS, MINCE, Principal of The Acoustic Group Pty Ltd
  - b) Current project complies with conditions of consent (as tested at night) and sound power (on site) assessment. Additional plant/upgrades are in accordance with Shoalhaven Starches Noise Reduction Program/Chapter 10 of INP such that new plant has design noise contribution significantly below ambient background level.
  - c) trigger levels for remedial action are any non-compliance of residential boundary testing, and any noise complaints from residents
  - d) program inclusions:
    - investigation of ways to reduce noise impacts for the project - not applicable (refer to item 14b above)
    - monitoring of project by attended monitoring in residential areas at night, on site noise monitoring of occupational noise limits and plant upgrade sound power limits, with the introduction of supplementary monitoring for gluten dryer discharges.



## **ATTACHMENT 3: Noise Management**

### **1. Community Consultation**

The Community Consultation process includes:

- Public Meetings
- Distribution of Fact Sheets
- Community Consultation Committee meetings on site

### **2. Complaints Handling Procedure**

There is a complaints line 1300300104 which is answered 24hrs/day 365 days/year.

Community Complaints are directed to either:

- The Environmental and Technical Manager
- The Farm Manager
- The Site Manager

The noise complaints will be investigated and the appropriate action taken.

### **2. Complaints Register**

All complaints are recorded in a Complaints Register.

### **3. Protocol for Exceedence**

When a noise exceedence occurs it will be investigated by the Environmental and Technical Manager with support by others.



The corrective action may include a change to Plant operations, resetting of a device, engineering attention depending on the source of the noise exceedence.

In all cases the corrective action will be taken as quickly as possible.

## **5. Triggers for Corrective Action**

There are a number of triggers e.g.

- Unusual Sources
- Complaints
- Measurements on site and off site
- New Plant

## **6. Corrective Action**

Unusual sounds and complaints will be dealt with as described in item 4 above.

## **7. Measurements on site and off site**

Off Site measurements are carried out by a professionally qualified Acoustic Engineer twice per year at six (6) nominated sites as shown in Attachment 1. The measurements must meet the Environmental Protection Licence conditions and are reported to the DECCW.

Additional off site measurements will be taken if deemed necessary.

On site measurements are taken on new plant after commissioning or where additional measurements are required.



New Plant is designed with sufficient margin so it does not exceed the site licence limits at the nominated off site receptors.





## CURRICULUM VITAE

### STEVEN E. COOPER - DIRECTOR

**DATE OF BIRTH:** 15 June 1952

**QUALIFICATIONS:** Bachelor of Science Engineering  
(Electrical) 1978, University of NSW  
  
Master of Science (Architecture) 1990,  
University of Sydney

**MEMBERSHIPS:** Member, Australian Acoustical Society  
  
Fellow, Institution of Engineers, Australia  
Chartered Professional Engineer  
  
Member, Institute of Noise Control Engineering  
  
Member of Standards Association of Australia  
Committee AV/10 – Whole Body Vibration (1986 to  
present), Committee EV/11 – Aircraft & Helicopter  
Noise (1986 to present), AV/4 – Architectural  
Acoustics (1996 – 2000), and Committee EV/10/4 –  
Railway Noise (1998 to October 2007)  
  
NSW Division, Australian Acoustical Society  
Membership Committee since 1978 to 1997

**EXPERIENCE:** The Acoustic Group Pty Ltd  
Incorporated in 2003  
  
Steven Cooper Acoustics Pty Ltd  
Incorporated in 1995  
  
James Madden Cooper Atkins Pty Ltd  
Incorporated in 1981  
  
James A. Madden Associates Pty Ltd  
Appointed Associate Director 1980  
Appointed Associate 1979  
Appointed Engineer 1978

---

**20-22 FRED STREET, LILYFIELD, 2040, NSW, AUSTRALIA**

ph: (612) 9555 4444    fx: (612) 9555 4442    tag1@acoustics.com.au  
A.B.N. 73 082 704 701

**THE ACOUSTIC GROUP**

The Acoustic Group was formed to provide specialised services and research in Acoustics and Vibration and draws on the considerable experience of Mr. Cooper from his position from 1982-1995 as Principal and Partner of James Madden Cooper Atkins and from 1995-2004 as Principal of Steven Cooper Acoustics. His particular areas of acoustical expertise include machine and vibration monitoring, acoustical design of auditoria, studios and entertainment venues, traffic and helicopter noise, laboratory instrumentation, precision analysis system, legal assignments and expert witness.

He has considerable experience in vibration measurement and assessment in industry for both Machinery Operating Condition and Occupational Exposure Levels.

His experience in the measurement and assessment of noise emission from industry and licensed premises is extensive having produced numerous assessment reports and noise control designs for clients, statutory bodies and courts. He has been an invited Guest Lecturer on Noise Assessment to NSW Policy Academy for their Noise Familiarisation Course run by the State Pollution Control Commission, a guest lecturer for the Faculty of Architecture at the University of NSW, and a lecturer on noise issues for seminars/workshops run by the Australian Industries Group and the Australian Environment Network.

He is the acknowledged leader in the measurement, assessment and design of helipad/heliport operations, aircraft noise assessments, and is a major contributor to various Australian Standards. Mr. Cooper is the recipient of an Engineering Excellence Award in the Environment Category from the Institution of Engineers in 1997 for the TRW No. 2 Forge Project.

Projects in which he has been involved include the ICI Botany Complex (Noise and Vibration), APM Matraville Paper Mill (Site noise control), Manildra Flour Mill, Sydney CBD, Granville & Gosford Heliports, ANEF Validation and NPD testing for F111, FA-18 aircraft, Iroquois, Squirrel, Sea King, Sea Hawk, Blackhawk, Super Seasprite and Tiger helicopters, acoustical assessments for Licensed Premises, Studios, Auditorias etc.

## **PAPERS & PUBLICATIONS**

“Design for Noise Reduction – Dual Occupancies” 5th Annual Conference, Local Government Planners Association of NSW, November 1979

“Is Exposure to High Levels of ‘Rock’ Music a Major Health Hazard to Patrons and Staff” 10th International Congress on Acoustics – Sydney, July, 1980

“Hornsby Shire’s General Sound Insulation Code for Residential Flat Buildings” 10th International Congress on Acoustics – Sydney, July, 1980

“Archiving Reproducing Piano Rolls” 10th International Congress on Acoustics – Sydney, July, 1980

“Road Traffic Noise and Local Government Controls”, Graduate School of the Built Environment, University of NSW, February, 1981



“Noise Levels of Rock Music and Possible Effects on Young People’s Hearing”  
Scientific Meeting NSW Division, Australian Acoustical Society, April, 1981

“Noise Assessment of Licensed Premises” NSW Police Noise Familiarisation Course,  
Policy Academy Sydney, July, 1981

“Noise Effects on Staff in Entertainment Venues” Australian Live Theatre Council,  
May, 1983

“Noise Pollution” Shout – August 1987, Journal of the Registered Clubs Association  
of NSW

“The Roles and Needs of Expert Witnesses”, Development, Local Government and  
Environmental Seminar for Sly & Russell, Sydney, November, 1987

“Noise Limits for Helicopters”, “Helicopters Noise and the Community”, “Flight  
Techniques to Reduce Noise”, Helicopter Noise Seminar – NSW Branch of the  
Helicopter Association of Australia, April, 1988

“Intensity Measurements of the Ampico/Duo Arts Parts 1 & 2” The AMICA News  
Bulletin (USA), Vol 25 No. 4, July, 1988

“Community Perceptions, Case Studies and Control of Noise” – Australian  
Conservation Foundation – Sydney Branch, September, 1988

“Helicopter Noise Assessment”, Australian Acoustical Society Conference, Victor  
Harbour, South Australia, November, 1988

“Noise Considerations for the Establishment of Helipads/Heliports”, Rotortech ‘89,  
Sydney, October, 1989

“An Investigation of the Alternatives to Sabine’s Equation in the Determination of  
Absorption Coefficients using the Room Method”, Master of Science Thesis,  
University of Sydney, March, 1990

“Noise Control – Decibels per dollars. A Practical Approach”, The Stock Feed  
Manufacturers’, Association of Australia Conference, Canberra, March, 1990

“Community Response to Aircraft & Helicopter Noise – Proposed PhD Research”,  
Technical Meeting of the Australian Acoustical Society, NSW Division being a  
Review of Acoustics Research at Sydney University, May, 1991

“A Practical Method for the Assessment of Noise Controls for Aircraft Noise  
Intrusion”, Second Sydney Airport Coalition Public Meeting, Petersham Town Hall,  
Sydney, September, 1991

“Are Regulatory Noise Limits in Australia Exterminating the Helicopter Industry?”,  
Inter-Noise 91, Sydney, December, 1991



“Consideration of Alternative Acoustic Criteria for Assessment of Aircraft Noise in Wilderness & National Park Areas”, Progress Report of Noise Criteria Working Group, Blue Mountains Fly Neighbourly Advice, July, 1994

“Are Regulatory Noise Limits in Australia Exterminating the Helicopter Industry?”, Second Pacific International Conference on Aerospace Science & Technology, Melbourne, March, 1995

“Sound Proofing of a Forge”, Acoustics Australia, Vol 26 (1998), No 2

“AS2021 – What Does it Mean Now?”, Australian Mayoral Aviation Council Conference 1998

“Upgraded Plants and Retrospective Application of Modified Noise Criteria – Case Studies”, Australian Industry Group, January, 1999

“Revision of Australian Standard AS2021”, Airport Operators Conference, Melbourne, May, 1999

“Living with Your Neighbour’s Noise”, Neighbourhood Disputes Seminar, LAAMS, Sydney, May, 2000

“What Triggers the New EPA Noise Policies – Tips & Traps”, Australian Environment Business Network Noise Pollution Seminar, June, 2001

“Practical Environment Management – Noise Issues”, Australian Environment Business Network Environment Management Practitioners Workshop, August 2002, November 2002, February 2003, May 2003, August 2003

“Environmental Issues Management – Noise”, Australian Industries Group Practical Methods and Technologies Seminar, October, 2002

“The INM Program is a much better program than HNM for helicopter modelling, but ...”, SAE A-21 Helicopter Noise Working Group Meeting, Las Vegas, March, 2004

“Noise Certification, is the Helicopter Industry selling itself short?”, HeliExpo 2004, Las Vegas, March, 2004

“Derivation & Use of NPD Curves for the INM”, Helicopter Noise Workshop, American Helicopter Society Conference, June, 2005

“Problems with the INM: Part 1 – Lateral Attenuation”, Noise of Progress Acoustics Conference 2006, New Zealand

“Problems with the INM: Part 2 – Atmospheric Attenuation”, Noise of Progress Acoustics Conference 2006, New Zealand

“Problems with the INM: Part 3 – Derivation of NPD Curves”, Noise of Progress Acoustics Conference 2006, New Zealand



“Problems with the INM: Part 4 – INM Inaccuracies”, Noise of Progress Acoustics Conference, 2006, New Zealand

“Reviewing the Role of the Expert in Land & Environment Court Cases”, NEERG Seminars, Sydney, August 2007

“JSF Aircraft Noise Issues for Australia”, F35 ESOH Working Group Meeting, Washington, September 2007

“Acoustic Experts - Noise Under Pressure?” Getting it Together in the Land & Environment Court: Compiling Joint Expert Reports, NEERG Seminars, Sydney, October 2007

“What can go wrong acoustically”, NEERG Seminar Dealing with DAs in 2009, Sydney, May 2009

“Community Response to Impulse Noise & Vibration”, Training Area Noise & Vibration Workshop, Department of Defence, Canberra, June 2009

“Acoustics & Noise”. Regulations & Implementation of DAs & SEPP65, NEERG Seminars, Sydney, March 2010

“INM Getting it to work Acoustically”, 20<sup>th</sup> International Congress on Acoustics, Sydney 2010.

“Military Aircraft Noise in the Community”, 20<sup>th</sup> International Congress on Acoustics, Sydney 2010.

“Sound Therapy Restores hearing – Fact or fiction? A personal experience of an acoustician”, 20<sup>th</sup> International Congress on Acoustics, Sydney 2010.

“Alternative Aircraft Metrics – Useful or like moving the deck chairs on the Titanic”, 20<sup>th</sup> International Congress on Acoustics, Sydney 2010.

#### **SPONSORED TECHNICAL REPORTS (Brief Selection only):**

Noise Radiation and Reduction on a Fibreglass Minesweeper – HMAS Rushcutter for Carrington Slipways P/L, JMCA Report 16.1650.R1

Occupational Vibration Exposure Levels on Euclid Dump Trucks and Coal Haulers at Utah Blackall Mine Queensland, JMCA Report 16.1648.R1-R3

Thermal Expansion and Misalignment on a Gas Turbine Alternator at Shell Clyde Refinery, JMCA Report 17.1716.R1-R3

Acoustic Appraisal and Control – ABC Perth TV & Radio Studio Complex, JMCA Report 17.1607.R3



Southern Arterial Route – Pyrmont to St. Peters for NSW Department of Main Roads, JMCA Report 16.1647.R1

Building Structure Vibration Department of Social Security, East Point Centre Computer Installation, JMCA Report 15.1542.R2

Blower House Acoustic Controls (Building and Silencer Designs) St. Marys, Quakers Hill, Glenfield, Macquarie Fields and Hornsby Heights Pollution Control Plants, JMCA Reports 10.1014 & 14.1416

The Application and Use of ANEF Contours for Aircraft Noise Control, SCA Report 25.3127.R3 for Submission to the Senate Inquiry into Aircraft Noise at KSA

An Acoustical & Vibration Investigation into Freight Rail Operations in the Hunter Valley, SCA Report 26.3387.R1-R41

TRW No 2 Forge Noise Minimisation Study, SCA Reports 26.3314.R12-R19

Acoustical Assessment, Proposed Extension of Dock Hours, Westfield Shoppingtown, Parramatta SCA Reports 28.3766.R8-R12

Noise Impact Assessment, Proposed Service Centre, Cnr Cowpasture Road & Hoxton Park Road, Hoxton Park, SCA Report 30.3934.R1

Acoustical Assessment, Proposed Extension of Operating Hours, Westfield Shoppingtown Hornsby, SCA Report 30.3928.R3

Acoustical Assessment Aircraft Operations, RAAF Williamtown and Salt Ash Weapons Range, SCA Report 32.4190.R6

Acoustical Assessment Pollution Reduction Program No. 7, Shoalhaven Starches Plant, Bomaderry, SCA Report 32.3849.R17

HMAS ALBATROSS 2013 ANEF, Derivation of NPD Curves, SCA Report 33.4185.R11

Acoustical Assessment, Proposed Residential Development, Glenning Valley, Wyong, SCA Report 33.4303.R1

Acoustic Assessment, Proposed Groundwater Cleanup Project, Botany Industrial Park, TAG Report 34.4372.R3

Acoustic Design Report, Stage 1 Development Application for Bathurst Hospital, TAG Report 35.4477.R2

Acoustic Assessment, SCT Freight Complex - Stage 1, Broogan Road, Parkes, TAG Report 36.4523.R1



Noise Disturbance in Residential Apartments as a Result of Building Expansion/Contraction, Bluewater Point Apartment Complex, Minyma, Queensland, TAG Report 36.4578.R1

Acoustic Design Report, Westfield Centrepoint Refurbishment, TAG Report 37.4472.R5

Construction Noise and Vibration Impact Assessment, Westfield Sydney City Refurbishment, TAG Report 37.4472.R6

Proposed Shao Lin Temple Development Site Near HMAS Albatross: Noise Assessment Report, TAG Report 37.4586.R1

TIGER ARH NPD Curves, TAG Report 37.4510.R15

Acoustical Assessment, Point Piper Marina, 38.4705.R9

Rail Traffic Noise Impacts, Residential Sub-division, Isedale Road, Braemar, 40.4865.R1

Acoustic Compliance Testing, New Buildings, RMAF BASE Butterworth, TAG Report 40.4386.R3

