# *Borg Panels Facility*

*Environmental Noise Monitoring*

*Quarter 1 2021*

*Prepared for*

*Borg Manufacturing Pty Ltd*

Global Acoustics

Noise and Vibration Analysis and Solutions

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# Borg Panels Facility

## Environmental Noise Monitoring
## Quarter 1 2021

Reference: 21013_R01
Report date: 31 March 2021

### Prepared for

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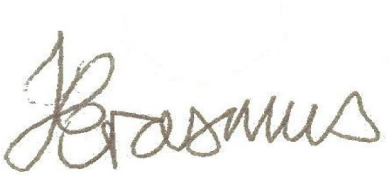

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# Appendices

# 1 INTRODUCTION

## 1.1 Background

Global Acoustics was engaged by Borg Manufacturing Pty Ltd to conduct a noise survey of operations and construction at the Borg panel manufacturing facility (Borg) near Oberon, NSW. The purpose of the survey was to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the day period of 3 March 2021 at four monitoring locations around Borg.

## 1.2 Monitoring Locations

Monitoring locations are detailed in Table 1.1 and shown in Figure 1. It should be noted that Figure 1 shows the actual monitoring position, not the location of residences.

*Table 1.1: ATTENDED MONITORING LOCATIONS*

| Report Descriptor | Monitoring Location |
|---|---|
| NM1 | Oberon Caravan Park |
| NM2 | Intersection of Pine Street and Herborn Street |
| NM3 | 127 Hazelgrove Road |
| NM4 | Intersection of Tasman Street and Earl Street |

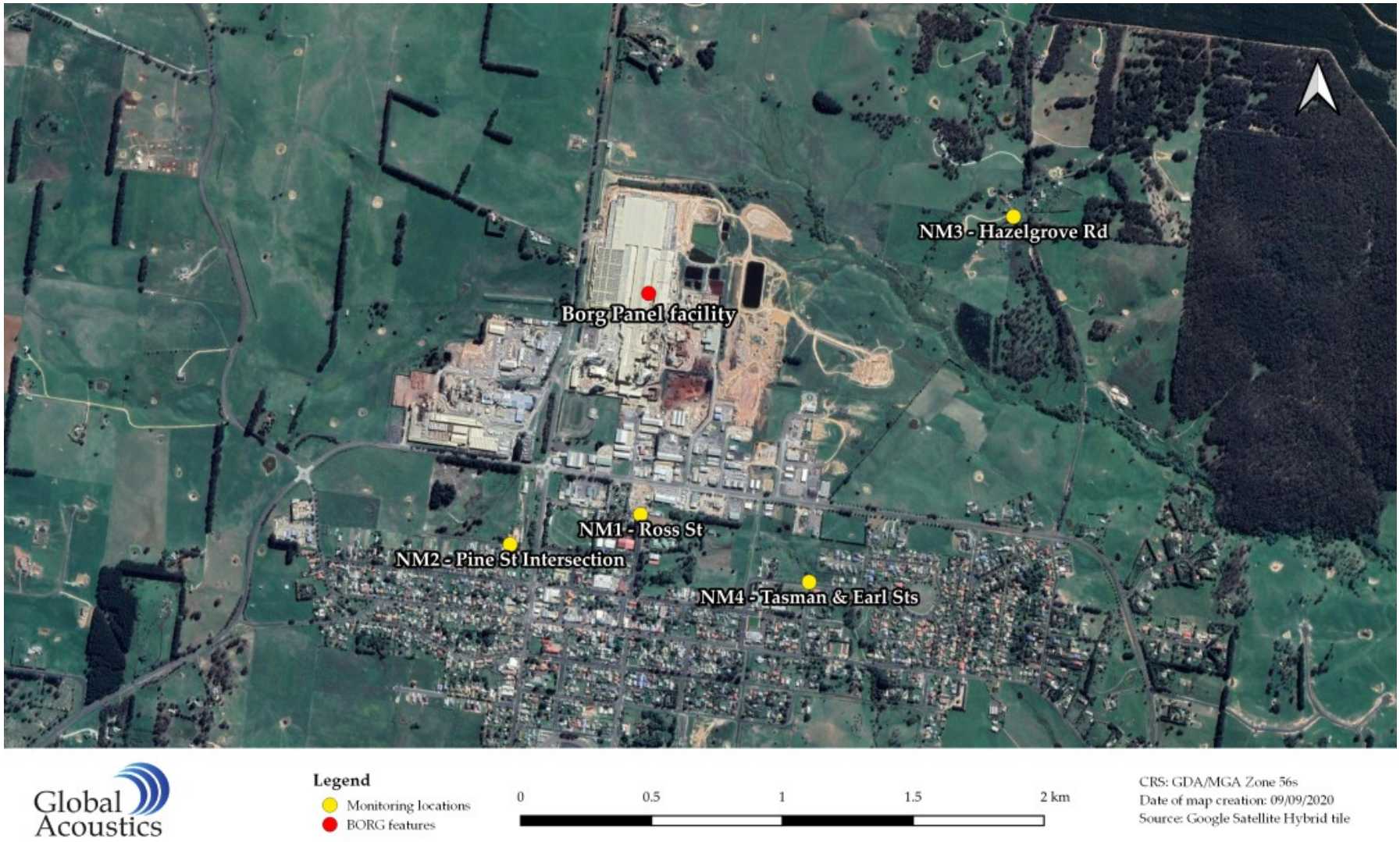


**Figure 1: Attended Noise Monitoring Locations**

## 1.3 Terminology & Abbreviations

Some definitions of terms and abbreviations which may be used in this report are provided in Table 1.2.

*Table 1.2: TERMINOLOGY & ABBREVIATIONS*

| Descriptor | Definition |
|---|---|
| dB(A) | Noise level measurement units are decibels (dB). The "A" weighting scale is used to describe human response to noise. |
| $L_{Amax}$ | The maximum A-weighted noise level over a time period. |
| $L_{A1}$ | The noise level which is exceeded for 1 per cent of the time. |
| $L_{A1,1minute}$ | The noise level which is exceeded for 1 per cent of the specified time period of 1 minute. |
| $L_{A10}$ | The noise level which is exceeded for 10 percent of the time. |
| $L_{Aeq}$ | The average noise A-weighted energy during a measurement period. |
| $L_{A50}$ | The noise level which is exceeded for 50 per cent of the time and the median noise level during a measurement period. |
| $L_{A90}$ | The level exceeded for 90 percent of the time. The $L_{A90}$ level is often referred to as the "background" noise level and is commonly used to determine noise criteria for assessment purposes. |
| $L_{Amin}$ | The minimum A-weighted noise level over a time period. |
| $L_{Ceq}$ | The average C-weighted noise energy during a measurement period. The "C" weighting scale is used to take into account low-frequency components of noise within the audibility range of humans. |
| SPL | Sound pressure level. Fluctuations in pressure measured as 10 times a logarithmic scale, with the reference pressure being 20 micropascals. |
| Hertz (Hz) | The frequency of fluctuations in pressure, measured in cycles per second. Most sounds are a combination of many frequencies together. |
| AWS | Automatic weather station used to collect meteorological data, typically at an altitude of 10 metres |
| VTG | Vertical temperature gradient in degrees Celsius per 100 metres altitude. |
| Sigma-theta | The standard deviation of the horizontal wind direction over a period of time. |
| SC | Stability class (or category) is determined from measured wind speed and either sigma-theta or VTG. |
| IA | Inaudible. When site noise is noted as IA then there was no site noise at the monitoring location. |
| NM | Not Measurable. If site noise is noted as NM, this means some noise was audible but could not be quantified. |
| Day | This is the period 7:00am to 6:00pm. |
| Evening | This is the period 6:00pm to 10:00pm. |
| Night | This is the period 10:00pm to 7:00am. |

# 2 REGULATOR REQUIREMENTS AND NOISE CRITERIA

## 2.1 Development Consent

The most current development consent associated with activities at Borg is Development Consent SSD 7016 (the consent), most recently modified 22 May 2020. The sections of the consent relating to noise are reproduced in Appendix A.

## 2.2 Environment Protection Licence

Borg holds Environment Protection Licence (EPL) No. 3035 issued by the Environment Protection Authority (EPA), most recently on 4 September 2019. Relevant sections of the EPL are reproduced in Appendix A.

## 2.3 Operational Noise Management Plan

Noise monitoring requirements are detailed in the Borg Operational Noise Management Plan (ONMP) and Construction Noise Management Plan (CNMP). The most recent version of the ONMP was approved in October 2020. The most recent version of the CNMP was approved in June 2017. Relevant sections of the ONMP and CNMP are reproduced in Appendix A.

## 2.4 Noise Criteria

Noise limits are consistent between the consent and EPL and have been reproduced in Table 2.1 below.

*Table 2.1: IMPACT ASSESSMENT CRITERIA*

| Location | Day $L_{Aeq,15minute}$ dB | Evening $L_{Aeq,15minute}$ dB | Night $L_{Aeq,15minute}$ dB |
|---|---|---|---|
| All sensitive receivers | 55 | 50 | 45 |

Construction noise criteria for each monitoring location are detailed in Table 2.2 and Table 2.3.

*Table 2.2: GENERAL CONSTRUCTION NOISE LIMITS*

| Report Descriptor | Day $L_{Aeq,15minute}$ dB | Evening $L_{Aeq,15minute}$ dB | Night $L_{Aeq,15minute}$ dB |
|---|---|---|---|
| NM1 | 55 | 50 | 45 |
| NM2 | 55 | 50 | 45 |
| NM3 | 55 | 50 | 45 |
| NM4 | 55 | 50 | 45 |

*Table 2.3: ROCK/CONCRETE BREAKING NOISE LIMITS*

| Report Descriptor | Day $L_{Aeq,15minute}$ dB |
|---|---|
| NM1 | 75 |
| NM2 | 75 |
| NM3 | 75 |
| NM4 | 75 |

## 2.5 Meteorological Conditions

As described in the consent, noise generated by Borg is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy (INP), as follows:

- during rain and wind speeds greater than 3 metres/second at 10 metres above ground level; or
- stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
- stability category G temperature inversion conditions.

## 2.6 Modifying Factors

The EPA 'Noise Policy for Industry' (NPfI, 2017) was approved for use in NSW in October 2017. For assessment of modifying factors, the NPfI immediately superseded the 'Industrial Noise Policy' (INP, 2000), as outlined in the EPA document 'Implementation and transitional arrangements for the Noise Policy for Industry' (2017). Assessment and reporting of modifying factors has been undertaken in accordance with Fact Sheet C of the NPfI.

# 3 METHODOLOGY

## 3.1 Overview

Attended environmental noise monitoring was conducted in general accordance with Australian Standard AS1055 'Acoustics, Description and Measurement of Environmental Noise', relevant NSW EPA requirements, and the Borg ONMP and CNMP. Meteorological data was obtained from the Borg automatic weather station (AWS) which allowed correlation of atmospheric parameters with measured noise levels.

## 3.2 Attended Noise Monitoring

During this survey, attended monitoring was undertaken during the day period at each location. The duration of each measurement was 15 minutes. Atmospheric condition measurement was also undertaken at each monitoring location.

This survey presents noise levels gathered during attended monitoring that are the result of many sounds reaching the sound level meter microphone during monitoring. Received levels from various noise sources were noted during attended monitoring and particular attention was paid to the extent of Borg's contribution, if any, to measured levels. At each receptor location, Borg's $L_{Aeq,15minute}$ and $L_{A1,1minute}$ (in the absence of any other noise) was measured directly, where possible, or, determined by frequency analysis.

If the exact contribution of the source of interest (in this case Borg) cannot be established, due to masking by other noise sources in a similar frequency range, but site noise levels are observed to be well below (more than 5 dB lower than) any relevant criterion, a maximum estimate of the potential contribution of the site might be made based on other measured site-only noise descriptors in accordance with Section 7.1 of the NPfI. This is generally expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may also be used in this report. When site noise is noted as IA, no site noise was audible at the monitoring location. When site noise is noted as NM, this means some noise was audible but could not be quantified. If site noise was NM due to masking but estimated to be significant in relation to a relevant criterion, we would employ methods (e.g. measure closer and back calculate) to determine a value for reporting.

All sites noted as NM in this report are due to one or more of the following reasons:

- Site noise levels were extremely low and unlikely, in many cases, to be even noticed;
- Site noise levels were masked by another relatively loud noise source that is characteristic of the environment (e.g. breeze in foliage or continuous road traffic noise) that cannot be eliminated by moving closer; and/or
- It was not feasible, nor reasonable to employ methods such as move closer and back calculate. Cases may include, but are not limited to, rough terrain preventing closer measurement, addition/removal of significant source to receiver shielding caused by moving closer, and meteorological conditions where back calculation may not be accurate.

A measurement of $L_{A1,1minute}$ corresponds to the highest noise level generated for 0.6 second during one minute. In practical terms this is the highest noise level, or $L_{Amax}$, received from the site during the entire measurement period (i.e. the highest level of the worst minute during the 15 minute measurement).

Often extraneous noise events (for example, road traffic pass-bys and dogs) interfere with the measurement of site noise levels in the frequency range of interest. Where required, the sound level meter is paused during these occurrences to aid in quantification of the site only $L_{Aeq,15minute}$ level.

## 3.3 Modifying Factors

All measurements were evaluated for potential modifying factors in accordance with the NPfI. Specific methodology for assessment of each modifying factor is outlined in Fact Sheet C of the NPfI.

Assessment of modifying factors is undertaken at the time of measurement if the site was audible and directly quantifiable, such that the site-only $L_{Aeq}$ was not "NM" or less than a maximum cut off value (e.g. "<20 dB" or "<30dB").

If applicable, modifying factors have been reported and added to measured site-only $L_{Aeq}$ noise levels when meteorological conditions satisfied requirements for site noise criteria to be applicable. Low-frequency modifying factors have only been applied to site-only $L_{Aeq}$ levels if Borg was the only contributing low-frequency noise source.

## 3.4 Monitoring Equipment

Table 3.1 lists the equipment used to measure environmental noise levels. Calibration certificates are provided in Appendix B.

*Table 3.1: ATTENDED NOISE MONITORING EQUIPMENT*

| Model | Serial Number | Calibration Due Date |
|---|---|---|
| Rion NA-28 sound level meter | 30131882 | 08/02/2023 |
| Pulsar 105 acoustic calibrator | 78226 | 08/02/2023 |

# 4 RESULTS

## 4.1 Total Measured Noise Levels

Overall noise levels measured at each location during attended measurements are provided in Table 4.1.

*Table 4.1: MEASURED NOISE LEVELS – QUARTER 1 2021*[1]

| Location | Start Date and Time | $L_{Amax}$ dB | $L_{A1}$ dB | $L_{A10}$ dB | $L_{Aeq}$ dB | $L_{A50}$ dB | $L_{A90}$ dB | $L_{Amin}$ dB |
|---|---|---|---|---|---|---|---|---|
| NM1 | 03/03/2021 14:28 | 65 | 56 | 50 | 48 | 46 | 43 | 40 |
| NM2 | 03/03/2021 14:48 | 68 | 55 | 48 | 46 | 45 | 43 | 40 |
| NM3 | 03/03/2021 13:45 | 56 | 45 | 41 | 40 | 40 | 38 | 35 |
| NM4 | 03/03/2021 14:09 | 56 | 49 | 46 | 44 | 44 | 42 | 40 |

*Notes:*

1. *Levels in this table are not necessarily the result of activity at Borg.*

## 4.2 Modifying Factors

Measured site-only levels were assessed for the applicability of modifying factors in accordance with the NPfI and methodology described in Section 3.3.

There were no modifying factors, as defined in the NPfI, applicable during the survey.

## 4.3 Attended Noise Monitoring

Table 4.2 compares measured $L_{Aeq,15minute}$ levels from Borg with the project specific noise criteria.

*Table 4.2: $L_{Aeq,15minute}$ GENERATED BY BORG AGAINST CRITERIA – QUARTER 1 2021*

| Location | Start Date and Time | Wind Speed m/s | Stability Class | Criterion dB | Criterion Applies?[1] | Borg $L_{Aeq,15min}$ dB[2] | Exceedance[3,4] |
|---|---|---|---|---|---|---|---|
| NM1 | 03/03/2021 14:28 | 2.1 | A | 55 | Yes | 43 | Nil |
| NM2 | 03/03/2021 14:48 | 2.3 | A | 55 | Yes | IA | Nil |
| NM3 | 03/03/2021 13:45 | 1.6 | A | 55 | Yes | 33 | Nil |
| NM4 | 03/03/2021 14:09 | 1.6 | A | 55 | Yes | 36 | Nil |

*Notes:*

1. *Noise criteria apply under all meteorological conditions except those detailed in Section 2.5;*
2. *Site-only $L_{Aeq,15minute}$ attributed to Borg, including modifying factors if applicable;*
3. *Bold results in red indicate exceedance of criterion (if applicable); and*
4. *NA in exceedance column means atmospheric conditions outside conditions specified, therefore criterion was not applicable.*

## 4.4 Atmospheric Conditions

Atmospheric condition data measured by the operator during each measurement using a Kestrel hand-held weather meter is shown in Table 4.3. The wind speed, direction and temperature were measured at approximately 1.8 metres. Attended noise monitoring is not undertaken during rain, hail, or wind speeds above 5 m/s at microphone height.

*Table 4.3: MEASURED ATMOSPHERIC CONDITIONS – QUARTER 1 2021*

| Location | Start Date and Time | Temperature ° C | Wind Speed m/s | Wind Direction ° Magnetic North[1] | Cloud Cover 1/8s |
|---|---|---|---|---|---|
| NM1 | 03/03/2021 14:28 | 22 | 1.2 | 360 | 4 |
| NM2 | 03/03/2021 14:48 | 23 | 0.7 | 300 | 5 |
| NM3 | 03/03/2021 13:45 | 22 | 0.0 | - | 4 |
| NM4 | 03/03/2021 14:09 | 21 | 1.3 | 270 | 4 |

*Notes:*

1. *"-" indicates calm conditions at monitoring location.*

Meteorological data used for compliance assessment is sourced from the Borg AWS.

# 5 SUMMARY

Global Acoustics was engaged by Borg Manufacturing Pty Ltd to conduct a noise survey of operations and construction at the Borg panel manufacturing facility (Borg) near Oberon, NSW. The purpose of the survey was to quantify and describe the acoustic environment around the site and compare results with specified limits.

Attended environmental noise monitoring described in this report was undertaken during the day period of 3 March 2021 at four monitoring locations around Borg.

Borg operations complied with the relevant criteria during the Quarter 1 2021 survey at all monitoring locations. Criteria may not always be applicable due to meteorological conditions at the time of monitoring.

**Global Acoustics Pty Ltd**

# APPENDIX

## *A REGULATOR DOCUMENTS*

# A.1 DEVELOPMENT CONSENT SSD 7016

**NOISE**

**Hours of Work**

B13. The Applicant must comply with the hours detailed in **Table 1**, unless otherwise agreed in writing by the Secretary.

***Table 1: Hours of Work***

| Activity | Day | Time |
|---|---|---|
| Earthworks and Construction | Monday – Friday<br>Saturday | 7 am to 7 pm<br>8 am to 1 pm |
| Operation | Monday – Sunday | 24 hours |

B14. Works outside of the hours identified in Condition B13 may be undertaken in the following circumstances:
(a) works that are inaudible at the nearest sensitive receivers;
(b) works agreed to in writing by the Secretary;
(c) for the delivery of materials required outside these hours by the NSW Police Force or other authorities for safety reasons; or
(d) where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm.

**Construction Noise Management Plan**

B15. The Applicant must prepare a Construction Noise Management Plan (CNMP) for the Project to manage construction noise. The plan must form part of the CEMP required by Condition C1 and must:
(a) be prepared by a suitably qualified and experienced noise expert;
(b) be approved by the Secretary prior to the commencement of construction of the Project;
(c) describe procedures for achieving the noise limits in **Table 2**;
(d) describe the measures to be implemented to manage noisy works such as rock/concrete breaking activities, in close proximity to sensitive receivers;
(e) include strategies that have been developed with the community for managing noisy works;
(f) describe the community consultation undertaken to develop the strategies in e) above; and
(g) include a complaints management system that would be implemented for the duration of the Project.

**Operational Noise Limits**

B16. The Applicant must ensure that noise generated by the Development does not exceed the noise limits in **Table 2.**

***Table 2: Noise Limits dB(A)***

| Location | Day<br>$L_{Aeq(15\ minute)}$ | Evening<br>$L_{Aeq(15\ minute)}$ | Night<br>$L_{Aeq(15\ minute)}$ |
|---|---|---|---|
| All sensitive receivers | 55 | 50 | 45 |

***Note:*** *Noise generated by the Development is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.*

**Noise Mitigation**

B17. The Applicant must ensure all noise attenuation measures already installed for the Existing Development are maintained in good working order for the life of the Development.

**Operational Noise Management Plan**

B18. Within 6 months of the date of this consent, the Applicant must prepare an Operational Noise Management Plan (ONMP) for the Existing Development, to manage operational noise to the satisfaction of the Secretary. The ONMP must form part of the OEMP required by Condition C4 and be prepared in accordance with Condition C9. The ONMP must:

(a) be prepared by a suitably qualified and experienced noise expert;

(b) describe the measures that will be implemented to minimise noise from the Existing Development including:

(i) all reasonable and feasible measures being employed on site;
(ii) maintain equipment to ensure it is in good order;
(iii) traffic noise is effectively managed;
(iv) the noise impacts of the Existing Development are minimised during any meteorological conditions when the noise criteria in this consent do not apply;
(v) compliance with the relevant conditions of this consent;

(c) includes a noise monitoring program that:

(i) must be carried out until otherwise agreed to in writing by the Secretary;
(ii) is capable of evaluating the performance of the Existing Development; and
(iii) includes a protocol for determining exceedances of the relevant conditions of this consent and responding to complaints; and

(d) include a procedure for implementing noise mitigation measures, should the Applicant be directed by the EPA or the Secretary, or should non-compliances be detected.

B19. Prior to the commencement of operation of the Project, the Applicant must update the ONMP required under Condition B18, to incorporate the Project and its management, to the satisfaction of the Secretary. The updated plan must be prepared in accordance with the requirements of Condition B18, and must incorporate the following:

(a) description of the noise monitoring program to measure the performance of the Development against this consent and the EPL; and

(b) description of any additional measures that would be implemented for the Development to ensure compliance with the noise limits in Condition B16 and the EPL.

(c) details of the noise attenuation measures for the gas turbine and ancillary equipment associated with the particleboard material handling area.

(d) details of the noise attenuation measures for the materials handling equipment approved for installation and operation under SSD-7016-Mod-3.

**Noise Verification**

B20. Within 3 months of commencement of operation of the Project, the Applicant must undertake a noise verification study for the Development to the satisfaction of the Secretary. The study must:

(a) be undertaken by a suitably qualified expert;

(b) include an analysis of compliance with noise limits specified in Condition B16;

(c) demonstrate achievement of the sound power levels in Table 12 of the *Borg Panels Timber Panel Processing Facility Noise and Vibration Impact Assessment*, dated May 2016 and prepared by Global Acoustics;

(d) include an outline of management actions to be taken to address any exceedances of the limits specified in Condition B16; and

(e) describe the contingency measures in the event management actions are not effective in reducing noise levels to an acceptable level.

Within 1 month of completing the study, the Applicant must submit a report outlining the findings of the study to the Secretary and the EPA.

B20A. Within three months of the commissioning of the gas turbines and ancillary equipment, the Applicant must undertake a noise verification study for the Development to the satisfaction of the Secretary. The study must:

(a) be undertaken by a suitably qualified expert; and

(b) include an analysis of compliance with noise limits specified in Condition B16;

(c) include an outline of management actions to be taken to address any exceedances of the limits specified in Condition B16; and

(d) describe the contingency measures in the event management actions are not effective in reducing noise levels to an acceptable level.

B20B Within three months of commissioning the materials handling equipment approved for installation and operation under SSD-7016-Mod-3, the Applicant must undertake a Noise Verification Study for the Development to the satisfaction of the Secretary. The Study must:
(a) be undertaken by a suitably qualified expert;
(b) include an analysis of compliance with noise limits specified in Condition B16;
(c) include an outline of management actions to be taken to address any exceedances of the limits specified in Condition B16; and
(d) describe the contingency measures in the event management actions are not effective in reducing noise levels to an acceptable level.

B21. Should the noise verification study indicate the Development has not complied with the noise limits in Condition B16 and applicable EPL requirements, or where the verification indicates that greater impacts than predicted in the EIS may arise, a detailed investigation and an outline of any management measures necessary to prevent exceedances must be submitted to the Secretary and the EPA, as part of the study.

B26. Within 3 months of commissioning the two cogeneration units, the Applicant, in consultation with the EPA, must undertake post-commissioning noise monitoring of the cogeneration units to demonstrate the operation of the cogeneration units do not exceed the noise criteria at sensitive receivers as described in Section 7.0 of *Gas Fire Co-generators Noise Impact Assessment* prepared by Vipac Engineers and Scientists, dated 2 July 2015.

Within 1 month of completing the study, the Applicant must submit a report outlining the findings of the study to the Secretary and the EPA.

B27. Should the post-commissioning emissions verification study indicate the two cogeneration units have not demonstrated compliance with the NIA, a detailed investigation and an outline of any management measures necessary to prevent exceedances must be submitted to the Secretary and the EPA, as part of the study.

**Noise**

Attenuation, as detailed in the NIA, will be implemented as follows:

- Conti 1 Dryer Fan air intake redesigned and the fan speed reduced to minimise noise generated. A sound power reduction from LAeq 121 dB to 114 dB or better is required.
- Booster fan will receive additional insulation and a reduction in fan speed. A sound power reduction from LAeq 116 dB to 109 dB or better is required.
- Main fibre transport fan will have a concrete enclosure constructed around it. A sound power reduction from LAeq 110 dB to 104 dB or better is required.

In short, the approach taken by Borg to mitigate noise is based on a number of factors:

1. Continuation of the use of mobile chippers (that is, not to enclose the mobile chippers). However, these are backup items (only to be used when enclosed, electric chippers are not operational), and will not be used in enhancing met conditions.
2. Implementation of additional noise mitigation measures to minimise noise generated by equipment, as detailed above.
3. Provision of sound attenuation structures and enclosures to other equipment where appropriate.

Irrespective of the above, Borg undertakes to meet the existing plant sound power reductions specified in the NIA. If the proposed attenuation measures to the existing plant are found to be insufficient in achieving these reductions, additional works will be undertaken.

## *A.2 ENVIRONMENT PROTECTION LICENCE*

### L4 Noise limits

L4.1 Noise from the premises must not exceed:
a) 55 dB(A) $L_{Aeq(15\ minute)}$ during the day (7am to 6pm); and
b) 50 dB(A) $L_{Aeq(15\ minute)}$ during the evening (6pm to 10pm); and
c) at all other times 45 dB(A) $L_{Aeq\ (15\ minute)}$, except as expressly provided by this licence.

Where $L_{Aeq}$ means the equivalent continuous noise level – the level of noise equivalent to the energy-average of noise levels occurring over a measurement period.

L4.2 To determine compliance with condition L4.1, noise must be measured at or computed for Oberon High School or any other noise sensitive locations (such as a residence/school). A modifying factor correction must be applied for tonal, impulsive or intermittent noise in accordance with the "NSW Industrial Noise Policy (EPA, January 2000)".

L4.3 The noise limits set out in condition L4.1 apply under all meteorological conditions except for the following:

a) Wind speeds greater than 3 metres/second at 10 metres above ground level; or
b) Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
c) Stability category G temperature inversion conditions.

L4.4 For the purpose of condition L4.3:

a) Data recorded by the meteorological station identified as EPA Licence Point 26 must be used to determine meteorological conditions; and
b) Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.

### M7 Other monitoring and recording conditions

M7.1 Noise monitoring to determine compliance with condition L4 must be carried out at least once annually during the day, evening, and night time hours specified by L4.1 at the location(s) specified under condition L4.2 or at the nearest residence, and be undertaken in accordance with Australian Standard AS 2659.1 (1998) Guide to use of sound measuring equipment - portable sound level meters, and the compliance monitoring guidance provided in the NSW Industrial Noise Policy.

# *A.3 OPERATIONAL NOISE MANAGEMENT PLAN*

## 7.3 Attended Noise Monitoring

Attended noise monitoring is preferred to the use of noise loggers when determining compliance with prescribed limits as it allows the most accurate determination of the contribution, if any, to measured noise levels by the source of interest.

Operational noise impacts are potentially greatest at night when background levels are typically low and the allowable levels are correspondingly low, and, this is the period when noise propagation enhancement is most likely.

### 7.3.1 Compliance Monitoring

It is proposed to conduct compliance monitoring for the Existing Development at each location once per year during the day, evening and night periods (pending weather and operational constraints) with results compared to noise criteria in **Table 3**. Compliance monitoring should be conducted during the winter period as this season represents the likely worst-case season due to temperature inversions.

Any exceedance of a noise criterion recorded during regular attended noise monitoring is to be investigated. The acoustic consultant undertaking the attended monitoring is to contact the Environment Officer as soon as practicable to advise of the recorded results. If exceedance of limits is demonstrated follow-up monitoring is to be undertaken within one week of the exceedance. The regular monitoring frequency will be resumed if no further exceedances are measured.

Attended compliance monitoring is to be undertaken by a suitably qualified noise expert. Appropriate techniques should be applied to determine noise contributions from the Existing Development in isolation (in the absence of all extraneous noise sources). These techniques could include, but are not limited to:

- Pausing the sound level meter during extraneous noise events, for example, when a dog is barking or road traffic noise is clearly audible and affecting the measurements;
- Using frequency filtering techniques where certain frequencies of noise are excluded from the measurements; or
- Using other noise descriptors such as $L_{A90}$ or $L_{A50}$ to filter extraneous noise events.

The Existing Development should be fully operational at the time of monitoring.

Operational noise performance is reported as detailed in **Section 9**.

## 7.4 Monitoring Locations

Four representative locations have been chosen for monitoring as summarised in **Table 6**. Refer to **Figure 2** for these locations.

**Table 6 – Noise Monitoring Locations**

| Location ID | Monitoring Location |
|---|---|
| NM1 | Oberon Caravan Park |
| NM2 | Intersection Pine Street and Herborn Street |
| NM3 | 127 Hazelgrove Road |
| NM4 | Intersection Tasman Street and Earl Street |

Noise management levels for each monitoring location are provided in **Table 3**. Where these are exceeded from operational noise sources, the exceedance should be investigated (as discussed in **Section 9**) to determine the cause and any necessary mitigation.

## 7.5 Meteorological Conditions

Monitoring should be undertaken on days of light winds (<5 m/s) and no rain. Wind speed is to be monitored using a hand held wind speed monitor. Rain and too much wind will elevate the noise level. If there is no choice but to monitor in inclement weather, note the conditions.

Meteorological data is obtained from the Borg Panels weather station (EPA Identification Point 26). This data allows correlation of atmospheric parameters and measured noise levels. Atmospheric condition measurement at ground level is also undertaken during attended monitoring.

# 10 ONMP Review

In accordance with Development Consent SSD 7016 Condition C10, this ONMP will be reviewed and if necessary revised within 3 months of an:

- Approval of a modification;
- Submission of an incident report under Condition C13;
- Approval of an Annual Review under Condition C11; or
- Completion of an audit under Condition C15.

Revisions to the ONMP will be submitted to the Secretary DP&E for approval.

## A.4 CONSTRUCTION NOISE MANAGEMENT PLAN

# 5 Construction Noise Management Levels

Construction activities will be undertaken simultaneously with regular operation of the existing site. Borg propose to generally restrict site noise emission from both construction and operational tasks combined to comply with operational noise criteria conditioned in Development Consent SSD 7016 and EPL 3035.

Following consideration of the ICNG (**Section 2.6**), Development Consent (SSD 7016) conditions (**Section 2.2**), EPL 3035 (**Section 2.4**) and the measured background noise levels (refer Global Acoustics, May 2016), **Table 6** summarises the Noise Management Levels (NMLs) for all residential receivers.

**Table 6 – Operation and Construction Noise Management Levels**

| Location | Activity | Day (7am-6pm) LAeq (15 min) | Evening (6pm-10pm) LAeq (15 min) | Night (10pm-7am) LAeq (15 min) |
|---|---|---|---|---|
| All residential receivers | General Construction | 55 | 50 | 45 |
| | Rock/ Concrete Breaking | 75 | | |

Work outside approved construction hours are not expected, however unforeseen constraints relating to delivery of materials or equipment, or other technical requirements, may see some activities undertaken outside approved hours. Where required, out of hours works will be undertaken to meet the noise management levels in **Table 6**.

Development Consent SSD 7016 Condition B14 requires non-standard construction hour work to be inaudible at the nearest sensitive receivers. The Development Consent takes precedence over the ICNG and will be adopted in this plan.

In this instance, "inaudible" means the activity is not discernible from general operation activities.

## 7.2 Monitoring Frequency

### 7.2.1 Compliance Monitoring

The following compliance monitoring, to be undertaken during construction by a suitably qualified noise expert, is recommended for the project:

- Periodic attended noise monitoring at the potentially most affected residences during the day period, with a frequency of once per quarter, during the construction phase of the Project; and
- If exceedance of limits is demonstrated, additional mitigation controls are to be implemented, and follow-up monitoring undertaken within one week of the exceedance.

Construction noise performance is reported as detailed in **Section 10**.

## 7.3 Monitoring Locations

Four representative locations have been chosen for monitoring as summarised in **Table 8**. Refer to **Figure 2** for these locations.

**Table 8 – Noise Monitoring Locations**

| Location ID | Monitoring Location |
|---|---|
| NM1 | Oberon Caravan Park |
| NM2 | Intersection Pine Street and Herborn Street |
| NM3 | 127 Hazelgrove Road |
| NM4 | Intersection Tasman Street and Earl Street |

Noise management levels for each monitoring location are provided in **Table 6**. Where these are exceeded by construction-related noise sources, the exceedance should be investigated (as discussed in **Section 10**) to determine the cause and any necessary mitigation.

### 7.3.2 Weather Conditions

Monitoring should be undertaken on days of light winds (<5 m/s) and no rain. Wind speed is to be monitored using a hand held wind speed monitor. Rain and too much wind will elevate the noise level. If there is no choice but to monitor in inclement weather, note the conditions on the field sheet.

NMLs listed in Table 6 apply under all meteorological conditions except for the following:

- Wind speeds greater than 3 metres/second at 10 metres above ground level; or
- Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
- Stability category G temperature inversion conditions.

Weather conditions measured at the site weather station should be used to determine applicability of meteorological exclusion rules.

# APPENDIX

## *B CALIBRATION CERTIFICATES*

Acoustic Research Labs Pty Ltd
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www.acousticresearch.com.au

# Sound Level Meter
## IEC 61672-3.2013
# Calibration Certificate

**Calibration Number** C21058

| | |
|---|---|
| **Client Details** | Global Acoustics Pty Ltd<br>12/16 Huntingdale Drive<br>Thornton NSW 2322 |
| **Equipment Tested/ Model Number :** | Rion NA-28 |
| **Instrument Serial Number :** | 30131882 |
| **Microphone Serial Number :** | 04739 |
| **Pre-amplifier Serial Number :** | 11942 |

| **Pre-Test Atmospheric Conditions** | | **Post-Test Atmospheric Conditions** | |
|---|---|---|---|
| **Ambient Temperature :** | 23.5°C | **Ambient Temperature :** | 23.3°C |
| **Relative Humidity :** | 46.7% | **Relative Humidity :** | 47.7% |
| **Barometric Pressure :** | 100.28kPa | **Barometric Pressure :** | 100.25kPa |

**Calibration Technician :** Jeff Yu **Secondary Check:** Max Moore
**Calibration Date :** 8 Feb 2021 **Report Issue Date :** 9 Feb 2021

**Approved Signatory :** Ken Williams

| Clause and Characteristic Tested | Result | Clause and Characteristic Tested | Result |
|---|---|---|---|
| 12: Acoustical Sig. tests of a frequency weighting | *Pass* | 17: Level linearity incl. the level range control | *Pass* |
| 13: Electrical Sig. tests of frequency weightings | *Pass* | 18: Toneburst response | *Pass* |
| 14: Frequency and time weightings at 1 kHz | *Pass* | 19: C Weighted Peak Sound Level | *Pass* |
| 15: Long Term Stability | *Pass* | 20: Overload Indication | *Pass* |
| 16: Level linearity on the reference level range | *Pass* | 21: High Level Stability | *Pass* |

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation test performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2013.

Least Uncertainties of Measurement -

| Acoustic Tests | | Environmental Conditions | |
|---|---|---|---|
| *125Hz* | *±0.12dB* | *Temperature* | *±0.2°C* |
| *1kHz* | *±0.11dB* | *Relative Humidity* | *±2.4%* |
| *8kHz* | *±0.13dB* | *Barometric Pressure* | *±0.015kPa* |
| Electrical Tests | *±0.10dB* | | |

*All uncertainties are derived at the 95% confidence level with a coverage factor of 2.*

NATA
WORLD RECOGNISED ACCREDITATION

This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
Accredited for compliance with ISO/IEC 17025 - calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to SI units.

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

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## Sound Calibrator
**IEC 60942-2017**

# Calibration Certificate

**Calibration Number** C21059

**Client Details** Global Acoustics Pty Ltd
12/16 Huntingdale Drive
Thornton NSW 2322

**Equipment Tested/ Model Number :** Pulsar Model 105
**Instrument Serial Number :** 78226

**Atmospheric Conditions**
**Ambient Temperature :** 23.3°C
**Relative Humidity :** 47.7%
**Barometric Pressure :** 100.27kPa

**Calibration Technician :** Jeff Yu
**Calibration Date :** 08 Feb 2021
**Secondary Check:** Max Moore
**Report Issue Date :** 9 Feb 2021

**Approved Signatory :** Ken Williams

| Characteristic Tested | Result |
|---|---|
| Generated Sound Pressure Level | *Pass* |
| Frequency Generated | *Pass* |
| Total Distortion | *Pass* |

| Nominal Level | Nominal Frequency | Measured Level | Measured Frequency |
|---|---|---|---|
| 94 | 1000 | 94.02 | 1000.40 |

The sound calibrator has been shown to conform to the class 1 requirements for periodic testing, described in Annex B of IEC 60942:2017 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed..

Least Uncertainties of Measurement -

| Specific Tests | | Environmental Conditions | |
|---|---|---|---|
| *Generated SPL* | *±0.14dB* | *Temperature* | *±0.2°C* |
| *Frequency* | *±0.09%* | *Relative Humidity* | *±2.4%* |
| *Distortion* | *±0.09%* | *Barometric Pressure* | *±0.015kPa* |

*All uncertainties are derived at the 95% confidence level with a coverage factor of 2.*

* The tests <1000 kHz are not covered by Acoustic Research Labs Pty Ltd NATA accreditation.

This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
Accredited for compliance with ISO/IEC 17025 - calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to SI units.

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