



Annual Noise and Impact Management Plan

2018 Defqon.1 Festival

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TABLE OF CONTENTS

<u>A.</u>	<u>ABOUT THE 2018 DEFQON.1 ANNUAL NOISE AND IMPACT MANAGEMENT PLAN</u>	<u>5</u>
A.1	SYDNEY INTERNATIONAL REGATTA CENTRE.....	5
A.2	SIRC SITE.....	6
<u>B.</u>	<u>DEFQON.1 ANNUAL NOISE AND IMPACT MANAGEMENT PLAN</u>	<u>7</u>
B.1	ANNUAL NOISE AND IMPACT MANAGEMENT PLAN INTRODUCTION.....	7
B.2	PURPOSE OF THE ANNUAL NOISE AND IMPACT MANAGEMENT PLAN.....	7
B.3	ANNUAL NOISE AND IMPACT MANAGEMENT PLAN OBJECTIVES.....	7
B.4	IDENTIFICATION OF THE ANNUAL NOISE AND IMPACT MANAGEMENT PLAN MEASUREMENT LOCATIONS AND LIMIT JUSTIFICATION.....	8
B.4.1	NOISE MONITORING POSITIONS.....	8
B.4.2	NOISE MONITORING SYSTEM.....	9
B.4.3	ADDITIONAL MONITORING STATIONS.....	9
B.4.4	ADDITIONAL MOBILE SOUND LEVEL METERS.....	9
B.5	DEFQON.1 NOISE AND TIME LIMITS.....	10
B.5.1	TIME LIMITS.....	10
B.5.2	SUMMARY OF LIMITS.....	10
B.5.3	SOUND LIMIT PRECAUTIONARY MEASUREMENTS.....	11
B.6	PROPOSED NOISE ABATEMENT STRATEGIES.....	11
B.6.1	EVENT SCHEDULING.....	11
B.6.2	SOUND SYSTEM PRACTICES.....	11
B.6.3	CONTROL OF SOUND AMPLIFICATION.....	11
B.6.4	CONTROL OF MC LEVELS.....	11
B.6.5	NOISE MONITORING DURING THE EVENT.....	11
B.6.6	DESIGN GUIDELINES AND ASSESSMENT PROCEDURE FOR SOUND SYSTEMS.....	12
B.7	STAGE CONFIGURATION AND HOURS OF OPERATION.....	13
B.7.1	CROWD CONTROL AND SOFT FINISH.....	14
B.7.2	GUIDELINES FOR STAGE OPERATION.....	15
B.7.3	COMBINED EVENT SOUND OUTPUT.....	15
B.8	REPORTING.....	16
B.9	CONTROL OF NOISE SOURCES DIFFERENT TO THE AUDIO SYSTEM.....	16
B.9.1	HELICOPTER NOISE.....	17
B.9.2	ART CARS NOISE.....	19
B.10	EVENT NOTIFICATION, COMPLAINTS HANDLING AND RESPONSE.....	21
B.10.1	EVENT NOTIFICATION.....	21
B.10.2	INFORMATION AND COMPLAINTS HOTLINE.....	22
B.10.3	INFORMATION AND COMPLAINTS EMAIL ACCOUNT.....	22
B.10.4	COUNCIL COMPLAINTS COLLECTION.....	22
B.10.5	COMPLAINTS DATABASE AND REPORT.....	23

B.11	COMMUNITY ENGAGEMENT.....	23
B.11.1	ENGAGEMENT PRIOR TO DEFQON.1	23
B.11.2	ENGAGEMENT DURING EVENTS.....	23
B.11.3	ENGAGEMENT AFTER EVENTS	23
B.12	IMPLEMENTATION STRATEGY	24
B.13	REVIEW OF ANNUAL NOISE AND IMPACT MANAGEMENT PLAN	24
B.14	SUMMARY OF ANNUAL NOISE AND IMPACT MANAGEMENT PLAN	25

A. About the 2018 Defqon.1 Annual Noise and Impact Management Plan

This document was prepared by Auditoria Pty Ltd in conjunction with Q-Dance Australia to serve as the Annual Noise and Impact Management Plan for the 2018 Defqon.1 Festival, to be held at the Sydney International Regatta Centre on the 15th of September of 2018.

This document is based on strategies previously implemented and developed over the years to minimise impact to the residents while providing a good experience to festival attendants.

An addition of cars with small sound systems has been made in this edition of the festival. Predicted impacts are included in a later section.

A.1 Sydney International Regatta Centre

The Sydney International Regatta Centre (SIRC), located in Penrith, N.S.W., hosted the rowing and kayak events during the 2000 Olympic Games. At present, the facilities of the Sydney International Regatta Centre include not only the areas for aquatic activities, but also a cycle path, a café and a museum. The venue is also used for the local council's Australia Day celebration.

The Sydney International Regatta Centre has been the host of the Defqon.1 Festival for the four previous years. Defqon.1 is the largest event held at the Sydney International Regatta Centre.

This Annual Noise and Impact Management Plan sets the guidelines to minimise the impact of noise on the local residents for any of the events held at the SIRC including the annual event organised by Q-Dance Australia. The Sydney International Regatta Centre has been the host of the Defqon.1 Festival since 2009. Defqon.1 is the largest single day event held at the Sydney International Regatta Centre.

A.2 SIRC Site

The SIRC is comprised of a large area that includes various lakes and grounds. The area that holds the larger events is the larger island in the middle of the lake. Figures 1 and 2 show the site, as well as a detail of the main island. The site boundary is highlighted as it is of importance to the following sections of this document.



Figure 1. SIRC site with boundary highlighted in red and island area framed in black.



Figure 2. Main island detail.

B. Defqon.1 Annual Noise and Impact Management Plan

B.1 Annual Noise and Impact Management Plan Introduction

This Annual Noise and Impact Management Plan has been developed by Auditoria Pty Ltd in conjunction with Q-Dance Australia to be implemented by Q-Dance Australia for Defqon.1. This plan is based on previous versions of this plan, prepared by Auditoria Pty Ltd and SLR Consulting Australia Pty Ltd and implemented in previous years.

B.2 Purpose of the Annual Noise and Impact Management Plan

The purpose of the Annual Noise and Impact Management Plan is to minimise the impact of noise produced by the sound reinforcement systems, mechanical services, amusements and other sources of noise related to the staging of Defqon.1. The Annual Noise and Impact Management Plan provides the guidelines to be followed by the event's organisers working with the authorities, SIRC and the Penrith City Council.

B.3 Annual Noise and Impact Management Plan Objectives

The objectives of this Annual Noise and Impact Management Plan are to minimise noise impact on the local residents by:

- Complying with the noise limits set in this Annual Noise and Impact Management Plan following the limits prescribed by Penrith City Council,
- Complying with the time limits set in this Annual Noise and Impact Management Plan following the limits prescribed by Penrith City Council,
- Implementing strategies to reduce noise as outlined in this Annual Noise and Impact Management Plan,
- Monitor noise and report for the event as required in this Annual Noise and Impact Management Plan,
- Review of previous Annual Noise and Impact Management Plans to improve its effectiveness.

B.4 Identification of the Annual Noise and Impact Management Plan Measurement Locations and Limit Justification

The noise limits for the Defqon.1 event in previous years, have been based on measurements at the SIRC boundary. This was established in 2009 with the intention of allowing the festival to operate as intended, based on the existing residential footprint. The nearest residents are at a considerable distance compared to other similar events. This allows us to monitor the festival at appropriate points in all directions with better efficacy. An additional sound level limit was introduced in 2015 to restrict noise emissions at receivers.

The noise and time limits are established taking into account the social significance of the event, its frequency and the impact on the local residents. Acoustic measurements have been conducted in the past and are also taken into consideration to understand potential impacts to nearby residents.

B.4.1 Noise Monitoring Positions

As with the previous events, five measurement positions on the site boundary will be used as required by the 2018 Annual Noise and Impact Management Plan. In addition, two portable sound level meter shall be provided to conduct measurements as required at nearby residential areas. The location of the five loggers is shown below.

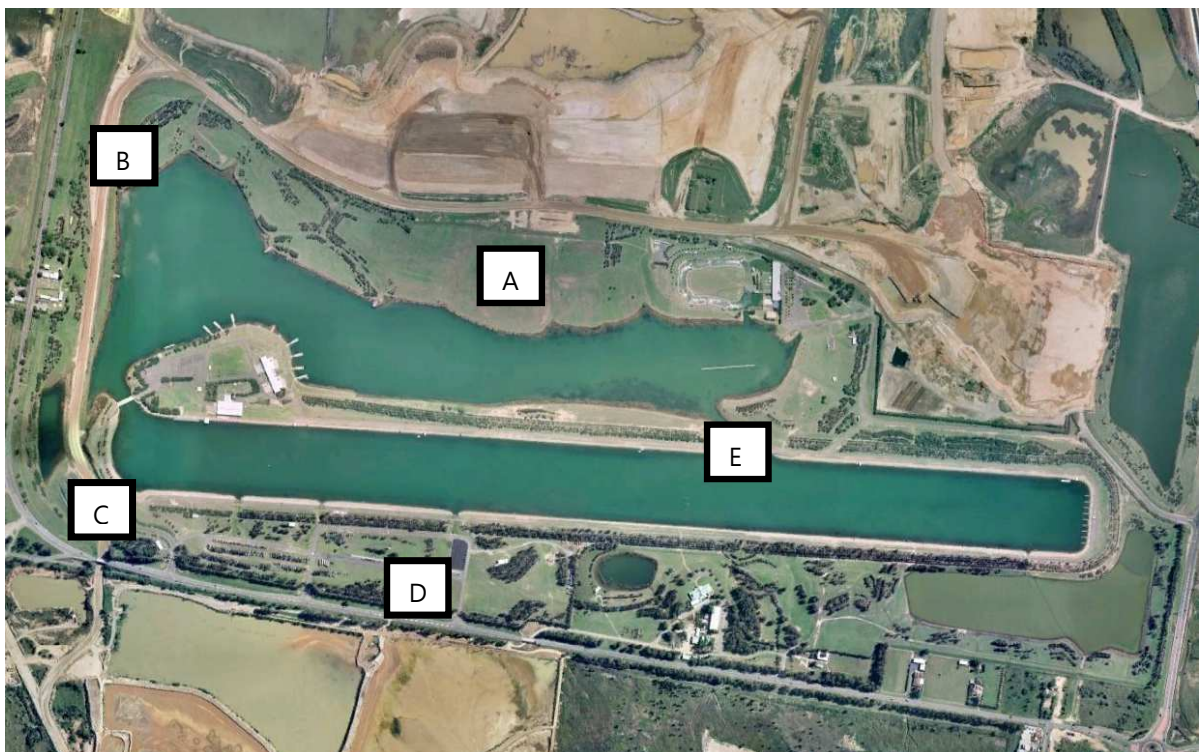


Figure 3. Defqon.1 measurement locations

B.4.2 Noise Monitoring System

The noise monitoring system proposed for this Annual Noise and Impact Management Plan is a system comprised of monitoring stations located at each of the Noise Monitoring Positions. Each station includes:

- A Class 1 measuring device capable of outputting A-weighted, C-weighted and Z-weighted SPL measurements as well as one-third octave band data simultaneously.
- SPLNet networked sound pressure level interface,
- Next-G broadband network interface,
- Weather data recording in at least one position; including wind direction and speed, humidity, temperature and barometric pressure,
- Rechargeable battery system with ground support for the measurement station.

In order to make any appropriate sound level changes the stations will communicate wirelessly to the central logging computer. This will give Auditoria and Q-Dance the ability to gather data in real time and make any decisions regarding the sound systems.

B.4.3 Additional Monitoring Stations

An additional two SPLNet monitoring units will be deployed at Mt. Riverview and Yellow Rock. These units will provide real time monitoring for these areas, which can be time consuming to reach. The final locations for the loggers will be determined on the day and placed away from nearby noise sources. Comments on common noise sources in the area will be recorded at the time of installation. If a breach is recorded, an attended measurement will be made as these units in the past have been highly affected by local sources. Advice to the event's organisers will be given in case the principal source of noise in the area is identified as the sound systems from the festival.

B.4.4 Additional Mobile Sound Level Meters

An additional two hand held Class 1 sound level meter will be used to monitor levels at nearby residences. A handheld sound level meter will be deployed to ensure appropriate levels during the first hour of operation of all stages at locations in Cranebrook, Castlereagh, Emu Heights, Waterside Estate and Penrith. A second measurement will be carried out at sunset to ensure appropriate levels are met. This sound level meter will remain in the vicinity of the site to respond to noise complaints.

Due to time-consuming access to the Mount Riverview and Yellow Rock areas an additional mobile sound level meter will be deployed to take measurements at the times proposed above and to remain in the vicinity to respond to complaints in the area.

B.5 Defqon.1 Noise and Time Limits

The following noise and time limits apply to the Defqon.1 event

B.5.1 Time Limits

The time limits for Defqon.1 are as follows:

- **Event:** The use of sound amplification systems shall not commence before 10AM and shall not finish after 11:59PM. (Special noise limits apply to the one hour period from 10AM to 11AM and the two-hour period between 10PM and 11:59PM).
- **Sound Check and Rehearsals:** Noise during sound checks and rehearsals shall be kept to an absolute minimum. Sound checks and rehearsals shall not commence before 10AM and shall not finish after 06PM. All sound checks will be conducted on Friday the 14th of September.

B.5.2 Summary of Limits

The following limits are proposed for the Defqon.1 event:

- A maximum sound pressure level (SPL) at the boundary as measured in logger locations A to D of 90 dB(A) and 110 dB(C).
- A maximum sound pressure level (SPL) at the boundary as measured in logger location E of 80 dB(A) and 100 dB(C).
- An additional maximum sound pressure level (SPL) as measured in any residential location of 70 dB(A) and 90 dB(C).
- All sources playing ambient and live music from 10AM to 11AM and from the conclusion of the main show in each stage to midnight to be inaudible at any residential location.

B.5.3 Sound Limit Precautionary Measurements

It is recommended that while the levels are being monitored notices should be made to the sound system operators when the levels reach 5dB and 3dB below the limits set in this section. This ensures that appropriate actions are taken, avoiding breaches on the limits established.

B.6 Proposed Noise Abatement Strategies

B.6.1 Event Scheduling

Defqon.1 is an annual event and the time between events will be no shorter than 10 months apart. This event will be only held during Saturdays.

B.6.2 Sound System Practices

Q-Dance has engaged Auditoria to ensure that proper sound system design practices are carried out. Careful planning shall be incorporated in the design of the different sound systems in order to provide appropriate audience coverage and sound levels while at the same time minimising noise outbreaks to local residences.

The sound systems shall be operated by qualified personnel.

B.6.3 Control of Sound Amplification

Q-Dance, with advice from Auditoria, will retain ultimate control of the levels caused by any of the sound systems used in the event. This ensures that Q-Dance can lower the level of any of the elements of the sound amplifications system in response to breaches in sound levels.

B.6.4 Control of MC Levels

It is advised that all stages incorporate independent level control for the music and MC's microphones. This will give Q-Dance the ability to control the level of independent elements of the mix as required. Additionally, MCs will not be allowed to operate after 10 PM.

B.6.5 Noise Monitoring During the Event

Noise monitoring will follow the strategy used in previous events. All noise monitoring strategies are aimed at providing early warnings that can be communicated to the organisers of the festival. Proper communication shall be ensured between stages and noise monitoring personnel to issue early warnings of breach in levels. This system will be implemented and monitored by Auditoria who will be in direct communication with Q-Dance. Q-Dance holds the ultimate control of sound levels on-site.

B.6.6 Design Guidelines and Assessment Procedure for Sound Systems

The following strategies shall be implemented in order to minimise the noise impact of the sound reinforcement systems on local residents:

- Sound system design practices shall take into account the design of sound systems with appropriate audience coverage and appropriate sound level. This is done in order to minimise the spill of energy towards unwanted areas and at the same time provide the patrons with a pleasant experience.
- Measurement at the proposed locations in the boundary and in the residential locations shall be implemented as detailed in this plan.
- The consultant preparing the event report shall conduct a systematic subjective assessment of all the different sound systems for inclusion in the event's report. This will help evaluate any possible situations where the measurement data does not provide enough information to identify issues with the sound systems.
- All data will follow good record keeping practices in order to ensure that the data can be used as a future reference. The data shall include air temperature, relative humidity, wind speed, wind direction and barometric pressure captured at regular intervals not more than 10 mins.

B.7 Stage Configuration and Hours of Operation

The Defqon.1 event will hold five stages of different sizes. The configuration of stages is presented in the figure below marked with blue and purple circles, numbered 1 to 5.

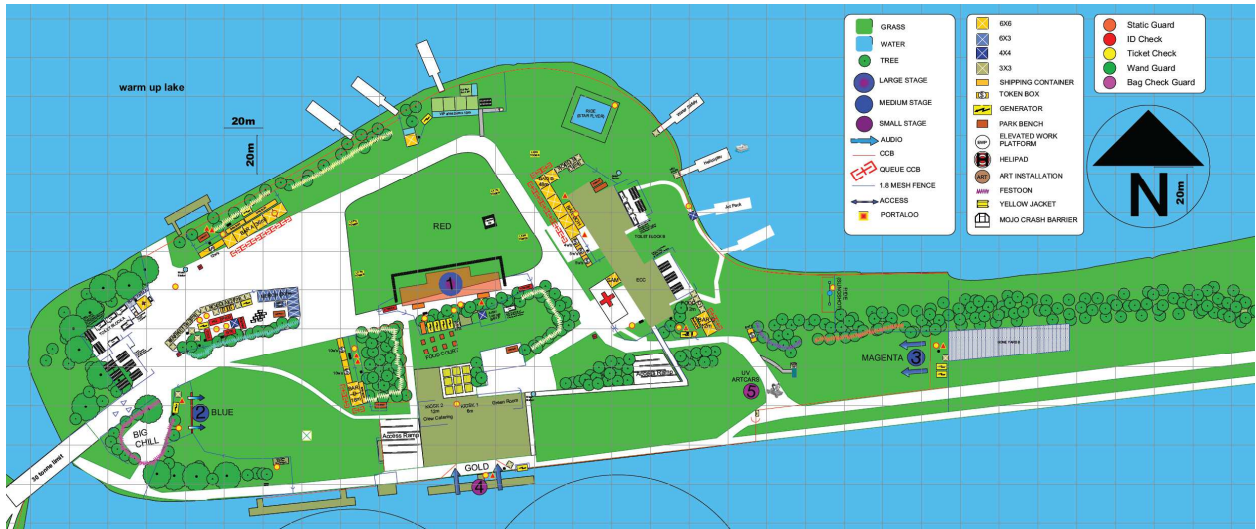


Figure 4. Defqon.1 stage configuration

The hours of operation for each stage are presented in the table below.

Stage Colour	Stage Number	Type	Hours of Operation
Red	1	Main	Ambient Music 10AM-11AM
			Main Show 11AM-10PM
			Ambient Music 10PM-11:59PM
Blue	2	Medium	Ambient Music 10AM-11AM
			Main Show 11AM-11PM
			Ambient Music 11PM-11:59PM
Magenta	3	Medium	Ambient Music 10AM-11AM
			Main Show 11AM-11PM
			Ambient Music 11PM-11:59PM
Gold	4	Grand-stand	Ambient Music 10AM-11PM
			Main Show 12PM-9PM
			Ambient Music 9PM-11:59PM
UV	5	Small	Ambient Music 10AM-11PM
			Main Show 12PM-10PM
			Ambient Music 10PM-11:59PM

Table 1. Stages operational times

B.7.1 Crowd Control and Soft Finish

Q-Dance has an extensive crowd management plan which covers many issues including strategies to minimise noise of patron entry and egress from the SIRC. Part of this strategy specifically relating to sound management is the hours of featured entertainment after the end of the main show on the main stage at 10 PM leading to an hour of music (until 11 PM) at lower levels or soft finish. The hours of entertainment between 10PM and 11 PM are intended to slow the egress of patrons from the SIRC by running some of the smaller stages at a lower level. Additional ambient music from stages is played at very low levels until 12 PM. This ambient music is inaudible at any of the residential locations. For this edition of the festival two stages will act as soft finish stages. These are the Blue and Magenta stages. These additional hours have proven successful in the past. In order to minimise sound disturbance at nearby residences, more stringent noise levels are applied for this hour, also detailed in this document.

Based on a sound level 10 m from stage of 110 db(C), the following table provides predicted levels at the locations of interest.

Residential Area	L _{eq} dB(A)	L _{eq} dB(C)
Cranebrook	31	51
Waterside Estate	33	53
Emu Plains	34	54
Emu Heights	37	57
Mt. Riverview	29	49
Yellow Rock	20	40
Castlereagh	32	52

Table 2. Expected levels for soft finish

B.7.2 Guidelines for Stage Operation

In this section, we propose levels to limit the output of stages during the event. The proposed levels are based on calculations that were performed when Auditoria was engaged to investigate the output of the event in 2009 and recalculated to understand the output of the event in 2014. Those calculations have been revised based on the proposed stage layout. It was found that the stage configuration has not changed significantly since 2014 and the proposed levels are still relevant.

Guidelines for levels for each one of the stages when measured 20 metres from the front of the stage are included in the following table.

Stage Colour	Stage Number	Type	SPL Max
Red	1	Main	Restricted by overall output
Blue	2	Medium	106 dB(A)/116 dB(C)
Magenta	3	Medium	106 dB(A)/116 dB(C)
Gold	4	Grand-stand	106 dB(A)/116 dB(C)
UV	5	Small	106 dB(A)/116 dB(C)

Table 3. Defqon.1 stage level operation guidelines

Additionally, and as stated above, the soft-finish stages are restricted to an output of 110 dB(C).

B.7.3 Combined Event Sound Output

It is expected that the combined sound output for the 2018 will be equivalent to the output of the previous events if the recommended measures are put into effect. We have reviewed the stage plans and sound systems to make this assertion.

B.8 Reporting

The nominated acoustic consultant is responsible for conducting measurements and providing a report to the Q-Dance within 10 working days. The report shall include:

- Feedback on sound system design and possible ways to improve.
- Detailed data of noise monitoring.
- Details of incidence and duration of any noise breach captured by the monitoring units.
- Details of any noise complaints received by the Noise Complaint Hotline established for the event.
- Details of any noise complaints received via email on the information and complaints email account.
- Details of any noise complaints received by the Penrith City Council and actions taken to correct them.

This report needs to integrate the information gathered from the measurements and the noise complaints. This report will serve as the basis for the revision of the Annual Noise and Impact Management Plan.

B.9 Control of Noise Sources Different to the Audio System

Whilst the sound systems will provide the majority of the sound energy, there are other sources of noise which will contribute to the sound levels at the boundary and at local residences. These other sound sources include:

- Mechanical Services Sound Sources. Examples of these are the power generators used in the events. Q-Dance use silenced generators in order to minimise the noise levels.
- Crowd Noise. Q-Dance has a significant crowd management plan which addresses managing the noise from patrons during the entry, event times and egress.

B.9.1 Helicopter Noise

Q-Dance has contracted a supplier to provide user-paid helicopter joy rides. Three helicopters will be used and will provide 12 flights per hour. The helicopters used will be two AS350 Squirrels and one EC120 Colibri or Bell 206 Jetranger. To mitigate the impact on residents, only modern aircraft is used and the services shall be limited to operation between 11AM and 6:00PM.

Sound levels at residential areas have been predicted based on the sound power and spectrum of a typical helicopter and the expected flight path. The characteristics of the helicopter in terms of sound power and height have also been taken into account at the landing area. The following table describes sound power levels used for the calculations.

Helicopter Operation	Sound Power Level dB(A)
Flying	127
Landing	132

Table 4. Defqon.1 stage level operation guidelines

The following figure shows the calculated L_{eq} A-weighted levels during the operation of helicopters during the festival.

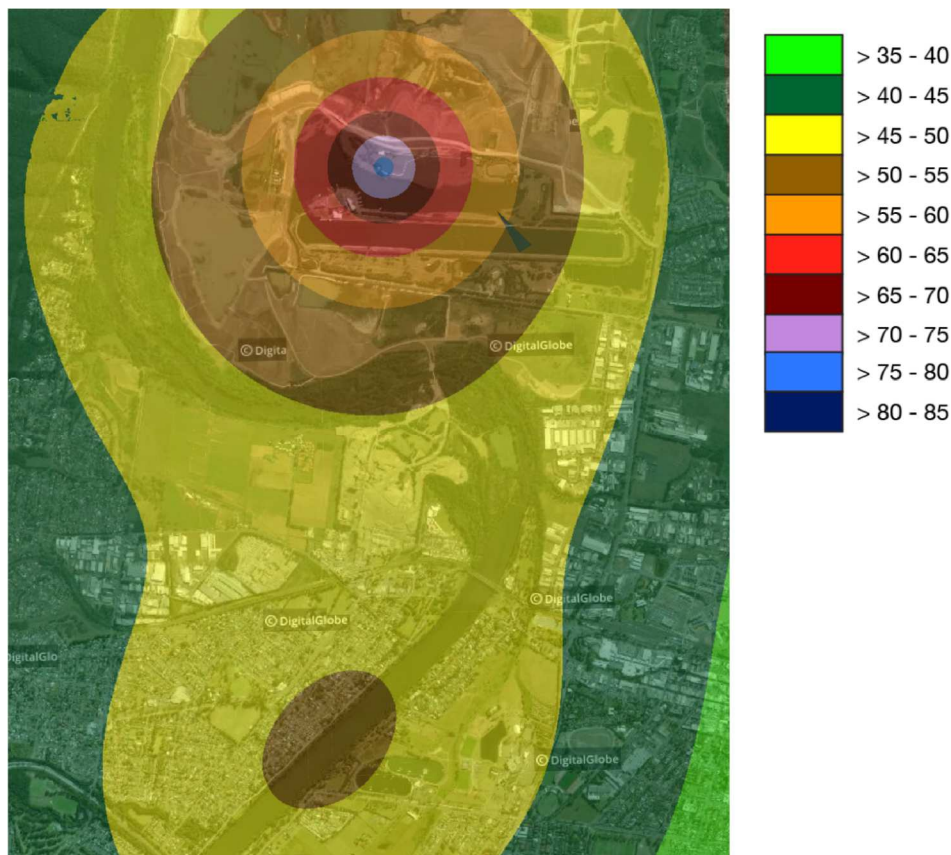


Figure 5. Predicted sound levels for helicopter operation

The following table includes worst case scenarios for the locations around the site.

Residential Area	L_{eq} dB(A)
Cranebrook	50
Waterside Estate	53
Emu Plains	50
Emu Heights	45
Mt. Riverview	41
Yellow Rock	38
Penrith	49
Leonay	50
Castlereagh	51

Table 5. Helicopter noise worst case scenario levels at residential areas

B.9.2 Art Cars Noise

An addition to this festival is the use of mobile cars with small sound systems, referred to as Art Cars. These will be operational and moving from 11:40 to 19:45. There are three cars with the same loudspeaker system configuration. The Art Cars will follow paths outlined in the image below.

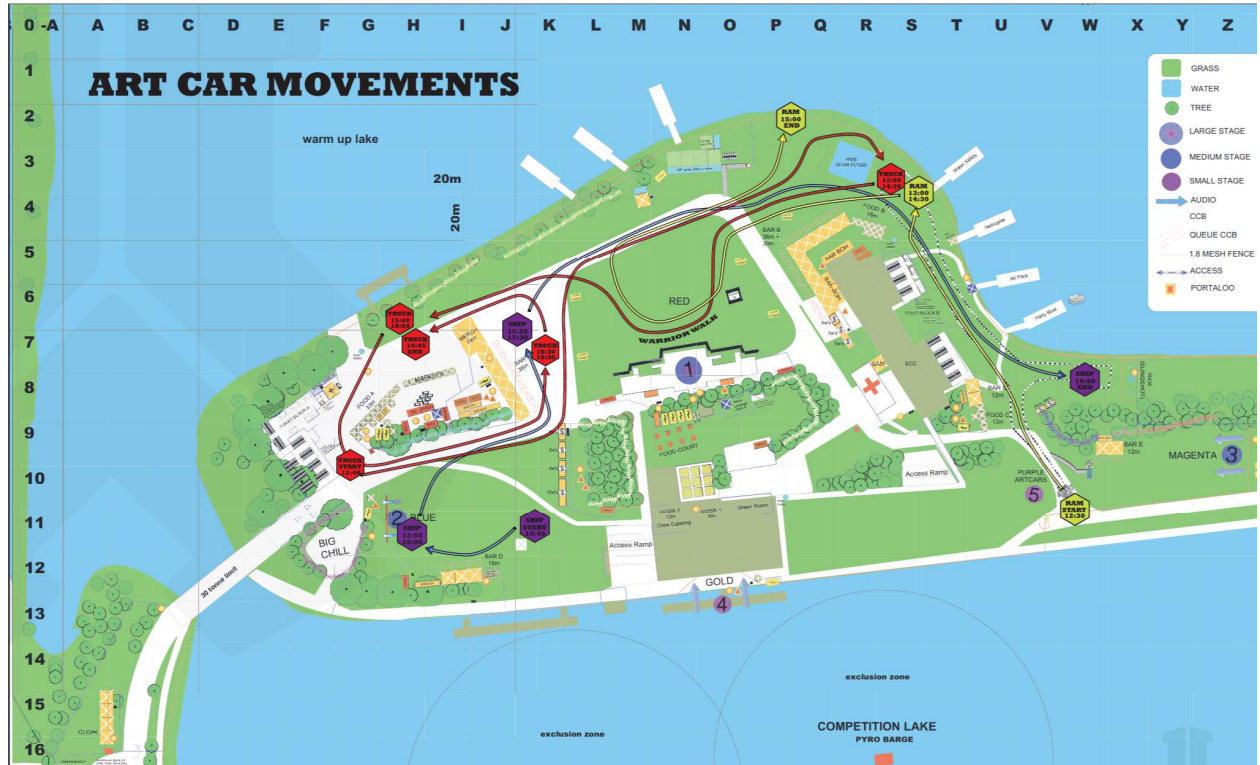


Figure 6. Art Cars movement routes

Sound levels at residential areas have been predicted based on the sound power and spectrum of the proposed sound systems and music content. We have calculated a worst case scenario in which the three vehicles are operational and affecting all areas.

The following figure shows the calculated L_{eq} A-weighted levels during the operation of Art Cars during the festival.

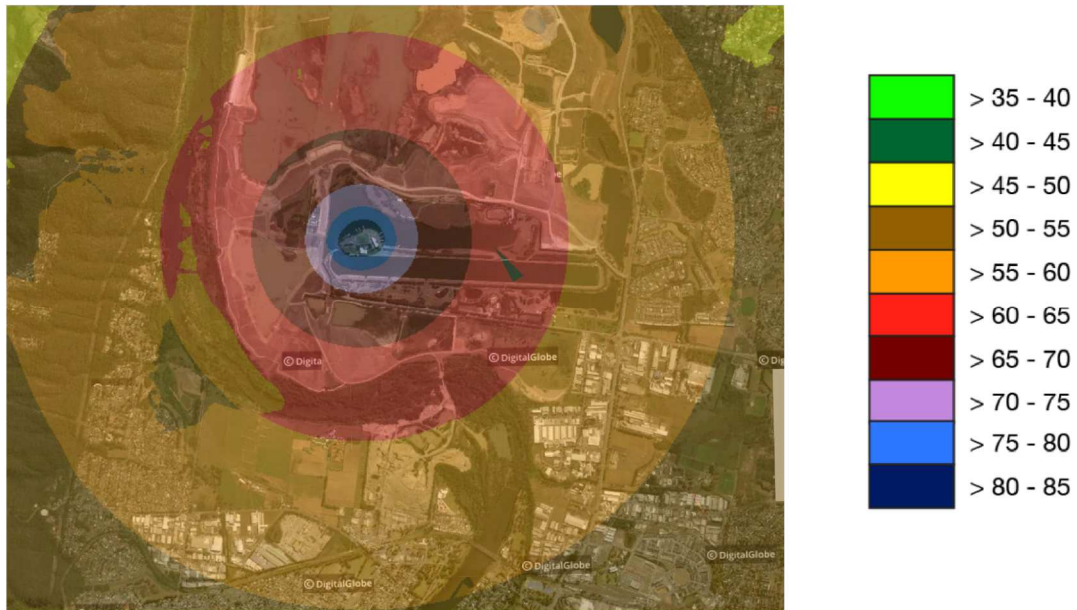


Figure 7. Predicted sound levels for Art Cars operation

The following table includes worst case scenarios for the locations around the site.

Residential Area	L_{eq} dB(A)
Cranebrook	56
Waterside Estate	57
Emu Plains	56
Emu Heights	59
Mt. Riverview	56
Yellow Rock	49
Penrith	56
Leonay	49
Castlereagh	54

Table 6. Art Cars noise worst case scenario levels at residential areas

Based on this we do not expect the Art Cars to have a significant contribution in levels towards residential areas compared to the output of the larger systems. It should also be noted that their contribution is limited by the loggers in the perimeter and any possible adverse impacts will be mitigated.

B.10 Event Notification, Complaints Handling and Response

B.10.1 Event Notification

Local residents shall be advised two to three weeks in advance of the event. Letters shall be delivered to the residents within the areas identified in this section.

The event notification letter shall include:

- The name of the event.
- The location and date of the event.
- The expected commencement and end time.
- Telephone number for the information and complaints hotline.
- Email address for any suggestions or complaints.

The following suburbs shall be notified:

- Penrith
- Cranebrook
- Emu Heights
- Mt. Riverview
- Castlereagh
- Yellow Rock
- Warrimoo
- Winmalee

The following figure shows the extent of the areas to be notified.

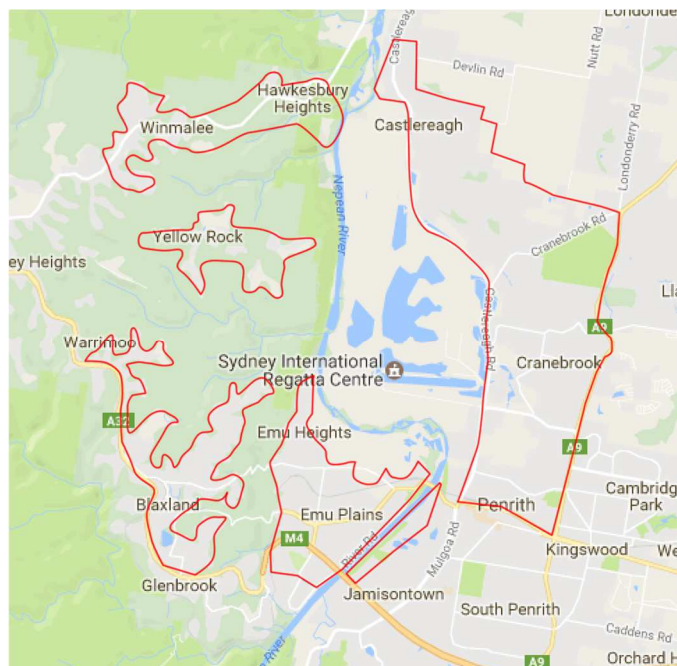


Figure 8. Areas surrounding the festival site to be notified

B.10.2 Information and Complaints Hotline

An information and complaints hotline shall be established to operate during the day of the event. This will operate starting one hour prior to the start of the event to one hour after the end of the event.

All the calls will be handled using a consistent approach. If a complaint is received the hotline operator is responsible for obtaining and filing the following information:

- Time of the call.
- Contact details of the person making the complaint if possible.
- Location of the complaint.
- Nature of the complaint.
- Response to the complaint.

These will be reviewed by the person preparing the acoustical report and cross referenced to the measurements made during the day of the event.

For every complaint received, a person will be dispatched to the location and conduct a measurement with the mobile sound level meter. Details of the sound conditions at the complaint location will be recorded. If the sound levels are breaching the established limits, an immediate notice will be relayed to the festival organisers and levels will be immediately corrected. If a reasonable complaint is received and a corrective measure can be implemented this will be related to the festival organisers (e.g. levels of MCs). All details of complains will be logged and included in the post-event Compliance Noise Monitoring Report.

B.10.3 Information and Complaints Email Account

An information and complaints email account shall be established where the residents can communicate with the event's organisers before, during and after the event.

All the emails will be handled using a consistent approach. If a complaint is received the organisers shall reply and where possible try to obtain the following information:

- Contact details of the person making the complaint if possible.
- Location of the complaint.
- Nature of the complaint.
- Response to the complaint.

These will be reviewed by the person preparing the acoustical report and cross referenced to the measurements made during the day of the event.

B.10.4 Council Complaints Collection

Q-Dance shall contact the local council after the event to obtain information on any complaints received by the council related to the event. This will be included in the complaints database. These will also be reviewed by the person preparing the acoustical report and cross referenced to the measurements made during the day of the event.

B.10.5 Complaints Database and Report

A complaints database and report shall be provided along with the acoustical report. This database will include all the complaints received from the information and complaints hotline, the email address provided by Q-Dance and the complaints received by the council related to noise. The record of complaints shall be kept for at least five years for cross-referencing. When possible the database entries shall contain the following information:

- Complaint source (hotline, email, council).
- Date of the complaint.
- Event related to the complaint.
- Contact details of the person making the complaint if possible.
- Location of the complaint.
- Nature of the complaint.
- Response to the complaint.

B.11 Community Engagement

The local community will be an important part of the success of the Annual Noise and Impact Management Plan. The community needs shall be taken into account before, during and after Defqon.1. Their input should be reflected in the Annual Noise and Impact Management Plan updated annually.

B.11.1 Engagement Prior to Defqon.1

The community will be engaged prior to Defqon.1 every year. This will inform the residents of the upcoming event and at the same time it should let the community express any concerns they might have about the event.

B.11.2 Engagement during Events

The local community shall have access to a telephone hotline and an email address, both of which will be closely monitored by Q-Dance. All complaints and queries shall be handled immediately and the portable sound level meter will be deployed promptly to the location when a noise complaint is received.

B.11.3 Engagement after Events

The community needs to be engaged after any major events take place. A report shall be gathered including the expectations of the community for future events. Various methods can be used for this including polls, focus groups, community meetings, etc. The post event engagement method is yet to be determined but will be in accordance with the SIRC Annual Noise and Impact Management Plan.

The findings of these activities shall be incorporated in the report that will serve as the basis for the review of the Annual Noise and Impact Management Plan.

B.12 Implementation Strategy

The implementation of the Annual Noise and Impact Management Plan shall be conducted by a qualified acoustic consultant as described in this document and in accordance with the SIRC Annual Noise and Impact Management Plan.

B.13 Review of Annual Noise and Impact Management Plan

There will be an annual review of the Annual Noise and Impact Management Plan in order to assess its effectiveness in achieving its objectives. The review will include:

- An assessment of compliance with noise and time limits through analysis of the acoustical data gathered during previous Defqon.1 events.
- Review of the limits established and their ability to control noise complaints in the area.
- Review of the acoustical measurements including measuring position locations, number of measurement positions, measurement equipment, etc.
- Review of the sound system design strategies implemented.
- Review of the complaints received by the information and complaints hotline, the email addressed provided by Q-Dance and the complaints received by the Penrith City Council.
- Review of any new laws.
- Review of the requests and concerns from the local community.
- Assessment and review of the Annual Noise and Impact Management Plan based in the three previous points.

The annual review will ensure that the noise abatement strategies proposed in this document are reviewed and corrected as required and that all new legal requirements are met.

B.14 Summary of Annual Noise and Impact Management Plan

The Defqon.1 Annual Noise and Impact Management Plan has been prepared with the intention of minimising sound annoyance to the nearby residents, while at the same time providing the festival attendants a quality experience. With all possible sound sources under considerations, the plan recognises that the biggest contributor to the levels are the sound systems used, leading to appropriate sound level limiting measures to be implemented on the day of the event.

Additional sound limiting practices have been also put in place, such as limiting the hours of helicopter and water vehicle rides. A soft finish has also been implemented, helping to minimise the noise of patrons leaving the premises at the same time. Also, a complaints hotline and mobile sound level metering unit deployed on the day of the event has helped us understand more vulnerable areas to sound propagation, that have led to better sound system planning practices.

While it is difficult to predict the levels at the residences on the day, principally due to the variability in weather conditions and its effects on acoustic propagation, we trust that the measures included in this plan achieve the goals of minimising the effects of sound on nearby residences from an event that occurs only once per year.