

Noise Impact Assessment St Anthony's School 390 Feez Street, Norman Gardens

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Prepared for:

Tony Madden Architects & Interiors Pty Ltd

3/171 Bolsover St

Rockhampton QLD 4700

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ROCKHAMPTON REGIONAL COUNCIL

These plans are approved subject to the current conditions of approval associated with Development Permit No. D 188-2014

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Executive Summary

This report has been prepared by Savery & Associates Pty Ltd for Tony Madden Architects & Interiors Pty Ltd to investigate the noise impact from the proposed Prep and Kindergarten buildings and associated car parking areas at St Anthony's School located at 390 Feez Street, Norman Gardens QLD 4701.

The purpose of the report is to assess the noise impact of the proposed development to the school site upon the adjacent residential dwellings in accordance with the Rockhampton Regional Council (RRC) Noise Nuisance Guidelines and the Environmental Protection (Noise) Policy (EPP Noise) 2008.

The report concludes that the proposed new Prep and Kindergarten buildings with the associated relocated children play areas and the proposed extension of the car parking areas at St Anthony's School may be constructed and operated to comply with the noise requirements of the RRC and the EPP Noise.

The noise impact assessment showed that noise emissions from the relocated children play areas occur only for 40 minutes per day and have been predicted to be 49dBA LAeq,adj,1hr and complies with the acoustic quality objectives presented in EPP Noise. It is expected that play times will be supervised at all times, thus controlling noise emissions from the play areas. Therefore no noise mitigation measures are required.

Noise emissions from the extended car parking areas will occur for only an hour before and after normal school hours and are expected to be similar to the noise emissions from the current car parking areas. Car park supervision and speed control measures, such as speed humps, are expected to be implemented. Therefore no additional noise mitigation measures are required.

The air-conditioning plant for the proposed Prep and Kindergarten buildings must be selected and installed to meet a combined noise level of 47dBA at the nearby residential dwellings. Noise testing is recommended to ascertain the noise emissions from the air-conditioning plants after installation. Acoustic enclosures or barriers may be investigated, if required.



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1 Introduction

Savery & Associates Pty Ltd have been commissioned by Tony Madden Architects & Interiors Pty Ltd to conduct a noise impact assessment of the proposed Prep and Kindergarten buildings and associated car parking areas at St Anthony's School located at 390 Feez Street, Norman Gardens QLD 4701. The local authority is Rockhampton Regional Council (RRC). An aerial photograph of the site is shown in Figure 1.

The purpose of the report is to assess the noise impact of the proposed development on the school site upon the adjacent residential dwellings in accordance with the RRC *Noise Nuisance Guidelines* and the *Environmental Protection (Noise) Policy (EPP Noise) 2008*.

2 Proposed development

St Anthony's School currently comprises of 5 building blocks, Block A to E, and 3 car parking areas, C1, C2 (for staff) and C3, as shown in Figure 1 and Figure 2. C1, C2 and C3 can accommodate up to 55, 28 and 9 cars respectively.

The school also comprises of a couple of outdoor playgrounds including sand pits, covered play areas and a basketball court. Boundary mesh fences and wooden fences currently separate the school compound and the neighbouring residential dwellings.

The development firstly involves demolishing the existing Prep building and toilets on Block B and relocating the existing undercover play area and sand pits as indicated in Figure 2 to accommodate the new proposed buildings.

The new proposed Prep and Kindergarten buildings, including a new undercover play area and sand pit, will be located to the south and south-east of the school compound at approximately 20m from the southern boundary fence of the school as shown in Figure 3.

Air-conditioning plants are expected to be installed at ground level for the proposed buildings. However the exact locations of the air-conditioning plants have yet to be determined.

Car parking areas are also proposed to be upgraded to accommodate more vehicles:

- C1: 55 increased to 97 bays;
- C2 (for staff): 28 increased to 37 bays; and
- C3: 9 increased to 19 bays.

The potential noise sources associated with the proposed development impacting upon nearby residential dwellings include:

- Children play area activities;
- Activities from upgraded car parking areas; and
- New Prep and Kindergarten buildings air-conditioning plants.

Architectural drawings provided by Tony Madden Architects & Interiors are attached in Appendix B for reference.



3 Ambient noise environment

3.1 Methodology

A site inspection was conducted at St Anthony's School and existing ambient noise levels were measured over a minimum period of twenty-four hours at two locations on the east and west boundaries of the school compound which may be potentially impacted by the proposed development. The locations of the noise loggers were:

- Location 1 North-west of Block C at the corner of the school compound; and
- Location 2 South of car park C3.

The noise loggers were installed on Wednesday 25th March 2015 around midday and collected after 24 hours. The locations of the noise loggers are shown in Figure 1.

Monitoring was undertaken using ARL Ngara Type 1 noise loggers (Location 1: S/N 8780AF; Location 2: S/N 8780FF) with audio recording which measured and recorded noise levels and one-third octave frequency spectra continuously for the duration of the monitoring period. Instrumentation calibration was checked before and after monitoring using a Cirrus CR515 Calibrator (S/N 64297) and found to be within tolerance relative to the NATA certified calibrator. The weather conditions during the monitoring period were observed to be no periods of rainfall and light breeze.

The downloaded noise data was subsequently post-processed to provide noise data for the standard daily time periods. The measured background noise level, L_{A90}^{-1} , applicable to the day-time period at each monitoring location are summarised in Table 1.

Table 1:	ckground noise level, LA90	
L	ocation	Day (7am - 6pm)
Lo	ocation 1	40
Lo	cation 2	42

The monitoring results for each location are shown graphically in Appendix C.

 $^{^{1}}$ $L_{\rm A90}$ represents the A-weighted noise levels exceeded for 90% of the time period, often referred to as the background noise level.



4 Noise assessment criteria

4.1 Rockhampton Regional Council Noise Nuisance Guidelines

Noise emissions from air-conditioning plants of the proposed development will be assessed in accordance with the Rockhampton Regional Council's (RRC) *Noise Nuisance Guidelines* which is based on the Environment Protection Act (EPA) 1994. The objectives of the guidelines which are relevant to the proposed development include:

- Prevent unwanted noise from negatively affecting a person's health and well-being through annoyance, sleep interference, stress, loss of productivity and a general reduction in the quality of life; and
- Minimise noise complaints from residential or commercial properties.

The relevant noise criteria for air-conditioning equipment contained in the RRC Noise Nuisance Guidelines are shown in Table 2.

Table 2: RRC Noise Nuisance Guidelines – Noise criteria

Category Prohibited times and Noise criteria

Must not use or permit the use:

Air conditioning equipment

a. from 7am to 10pm on any day, if the noise is more than 5dBA above background noise levels; or

b. before 7am or after 10pm on any day, if the noise is more than 3dBA above background.

4.2 Environmental Protection (Noise) Policy (EPP Noise) 2008

The RRC Noise Nuisance Guidelines do not contain noise criteria for noise emissions from school playground activities or car parking activities. The EPP Noise 2008, however, presents acoustic quality objectives to maintain the qualities of the acoustic environment that are conducive to human health and wellbeing, including by ensuring a suitable acoustic environment for individuals. The recommended acoustic quality objectives for dwellings are shown in Table 3.

Table 3: Acoustic quality objectives for dwellings

Sensitive receptor	Applicable time	Acoustic quality objectives (measured at the receptor) in dBA		
	periou	$L_{ m Aeq,adj,1hr}$	${ m L_{A10,adj,1hr}}$	$\mathbf{L}_{\text{A1,adj,1hr}}$
Dwelling (Outdoor)	Day-time	50	55	65
Dwelling (Indoor)	Day-time	35	40	45



5 Noise impact assessment

5.1 Noise sensitive receptors

Residential dwellings are located around the school compound. The play areas and the air-conditioning plants associated with the proposed Prep and Kindergarten buildings may impact upon the residential dwellings. The proposed car park extensions may also impact upon nearby residential dwellings.

The nearest residential dwellings to the proposed Prep and Kindergarten activities are located to the south and south-east of the school compound on Thomas St and Langford St (R1) as indicated in Figure 1. The residential dwellings at R1 are a combination of lowset and highset buildings.

Residential dwellings located to the west of the school compound on Feez St and Agnew Ave (R2) may be affected by the proposed extension of the main car park (C1). Similarly residential dwellings located to the south of the school compound on Langford St (R3) may be affected by the extension of the future 37 bay car park (C2). The proposed new bitumen car park (C3) located to the east of the school may affect residential dwelling located to the east and southeast (R4).

5.2 Children play areas

Noise emissions from the relocated undercover play area and sand pit such as children playing, shouting and crying may cause noise nuisance.

The nearest residential dwellings on the south-eastern side of the school compound (R1) are located at approximately 32m from the closest relocated play areas. In comparison, the current play areas, soon to be relocated, are located at similar distances to the same affected residential dwellings.

St Anthony's School advised that there are currently two 20-minute allocated play time slots per school day. The first one is between 11.30am and 11.50am and the second one is between 1.50pm and 2.10pm. Children are normally only allowed to use the play areas at those nominated times which account for 40 minutes in total per school day. The covered play areas may also be used intermittently for classroom activities.

Since the RRC Noise Nuisance Guidelines do not contain noise criteria for noise emissions from school playground activities, the acoustic quality objectives recommended by EPP Noise for dwellings will be used as a guideline.

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A suitable measurable acoustic parameter to describe school playground activities is L_{Aeq} , which is the equivalent continuous A-weighted noise level which has the same acoustic energy as the actual time varying noise level. The recommended EPP Noise day-time noise limits for dwellings (outdoor) is 50dBA L_{Aeq,adi, lbr}².

5.2.1 Results and discussion

Noise modelling was conducted to predict the noise levels from children play area noise at R1. Noise sources from Savery & Associates noise database were used in the model for the assessment. The noise source level and predicted noise levels are summarised in Table 4.

Source and predicted noise levels - Children play areas

Receiver location	Noise source description	Approx. distance – Source to receiver	Noise source level, L _{Aeq}	Predicted noise level at receiver, L_{Aeq}
	Children playing and calling outdoor at the sand pit area located in front of the proposed Kindergarten block	32m		55
R1	Children playing and calling outdoor in the middle of the proposed Prep block	43m	65dBA at 10m	52
	Children playing and calling outdoor at the front of the proposed Kindergarten block	33m		46*
Note:	* Predicted noise level includes conservative no building as it acts as a shield from the children play		of -9dBA from	the Kindergarter

The noise modelling shows that R1 will experience a maximum noise level of 55dBA L_{Aeq} from the children play areas. The predicted noise level will be experienced for two 20-minute periods each school day.

Using the measured background noise level of 42dBA at Location 2 and a +3dBA adjustment noise level for the impulsiveness characteristic of children playing, the maximum predicted

² L_{Aeq,adj,1hr} is the adjusted equivalent continuous A-weighted noise level which has the same acoustic energy as the actual time varying noise level for a duration of 1 hour.

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noise level for the children play areas at the most affected residential dwelling is $49 dBA L_{Aeq,adj,1hr}$.

Comparing the predicted levels with the EPP noise limits of 50dBA $L_{Aeq,adj,1hr}$, compliance is achieved at the most affected residential dwelling by 1dB.

Furthermore, during the site inspection, current children play areas (soon to be relocated) were observed to be located at similar distances from the nearest residential dwellings compared to the proposed future play area locations. Noise levels currently experienced at the residential dwellings from the children play areas would hence be similar to the predicted noise levels of $49dBA\ L_{Aeq,adj,1hr}$.

It is expected that during play times, children will be supervised by staff at all times. The behaviour of the children and noise emissions are thus expected to be controlled.

Noise mitigation measures are therefore not required to control noise emissions from the children play areas.

5.3 Car parking

The car parks, C1, C2 and C3, on the school premises are currently in use. However the noise impact of the car park upgrades may cause noise nuisance such as door slams, engine starts, car horns, tyre noise, etc.

The school advised that the busy periods of use of the car parking areas are during children drop-off and pick-up times which usually occur between 7.45am and 8.45am, and between 2.30pm and 3.30pm respectively.

5.3.1 Discussion

The character of car parking noise may be described as being of short duration. A suitable measurable acoustic parameter to describe car parking noise is L_{Amax} , which is the maximum A-weighted noise level of an event. The L_{Amax} parameter quantifies short duration noise events such as door slams, engine starts, car horns, tyre noise, voices, etc.

Increasing the number of bays of the car parking areas does not increase the maximum noise level of a car parking noise event. The proposed new car parking bays are also located at similar distances from the school's boundary compared to the current bays. The noise levels experienced at the nearby residential dwellings from the new car parking bays are therefore expected to be similar to the current noise levels experienced at the nearest residential dwellings.

It is expected that car parking areas are always supervised during drop-off and pick-up times by the school's staff. Also, speed control measures, such as speed humps, along the driveways are expected to be installed to control driving behaviour.

As such, no noise mitigation measures are required to control noise emissions from the upgraded car parking areas.



5.4 Air-conditioning plant

The locations of the air-conditioning plants for the proposed Prep and Kindergarten buildings have yet to be determined. However maximum noise limits in accordance with the RRC Noise Nuisance Guidelines may be recommended to prevent noise nuisance. The air-conditioning plants are expected to be used only during the normal hours of operation of the school, which is from approximately 7.30am to 4.00pm during weekdays. The most affected residential dwellings are located to the east of the proposed buildings at location R1 as shown in Figure 1.

The noise criteria and the evaluated noise limit contained in RRC Noise Nuisance Guidelines are presented in Table 5.

Table 5: RRC noise criteria and evaluated noise limit for air-conditioning plants

Receptor	RRC noise criteria –	Background noise level,	Evaluated noise	
Receptor	7am to 10pm (dBA)	L_{A90} (dBA)	limit (dBA)	
Location 2	L _{A90} + 5	42	47	

The air-conditioning plants for the proposed Prep and Kindergarten buildings must be selected and installed to meet a combined noise level of 47dBA at the nearby residential dwellings at R1.

Noise testing is recommended to ascertain the noise emissions from the air-conditioning plants after installation. Acoustic enclosures or barriers may be investigated, if required.

6 Conclusions

It is concluded that the proposed new Prep and Kindergarten buildings with the associated relocated children play areas and the proposed extension of the car parking areas at St Anthony's School located at 390 Feez Street, Norman Gardens QLD 4701, may be constructed and operated to comply with the noise requirements of Rockhampton Regional Council and the EPP Noise 2008.

Noise emissions from the relocated children play areas occur only for 40 minutes per day and have been predicted to be 49dBA $L_{Aeq,adj,1hr}$ and complies with the acoustic quality objectives presented in EPP Noise. It is expected that play times will be supervised at all times, thus controlling noise emissions from the play areas. Therefore no noise mitigation measures are required.

Noise emissions from the extended car parking areas will occur for only an hour before and after normal school hours and are expected to be similar to the noise emissions from the current car parking areas. Car park supervision and speed control measures, such as speed humps, are expected to be implemented. Therefore no additional noise mitigation measures are required.

The air-conditioning plant for the proposed Prep and Kindergarten buildings must be selected and installed to meet a combined noise level of 47dBA at the nearby residential dwellings at R1. Noise testing is recommended to ascertain the noise emissions from the air-conditioning plants after installation. Acoustic enclosures or barriers may be investigated, if required.

Noise Impact Assessment

Appendix A - Figures



Figure 1: Aerial photograph of site



Current buildings blocks and car parking areas Figure 2:

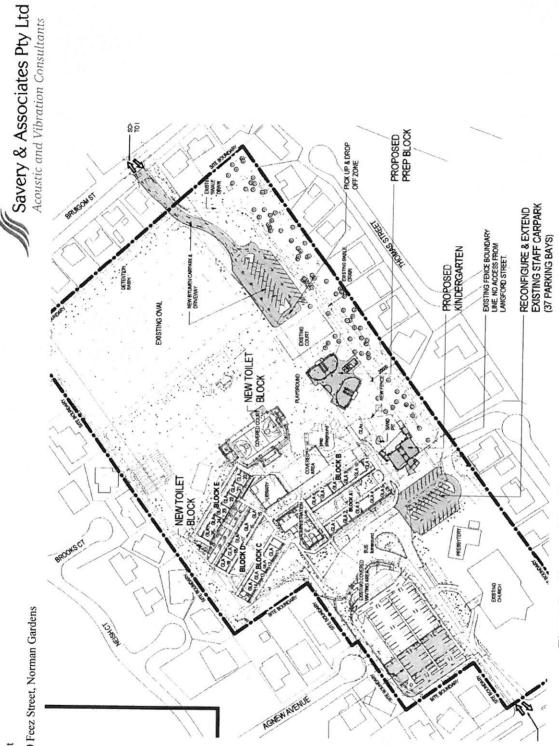
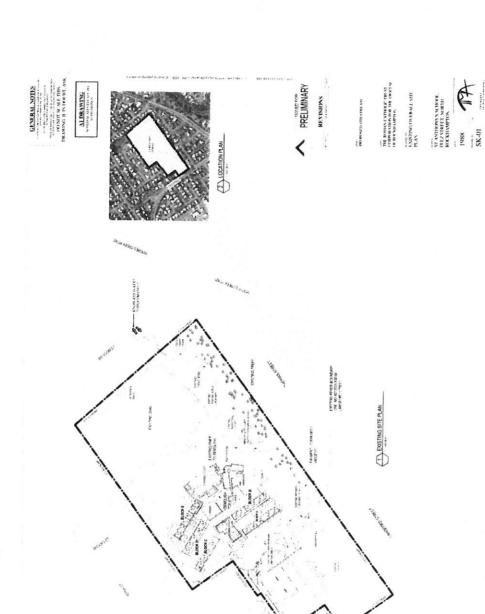


Figure 3: Proposed locations of new Prep and Kindergarten buildings

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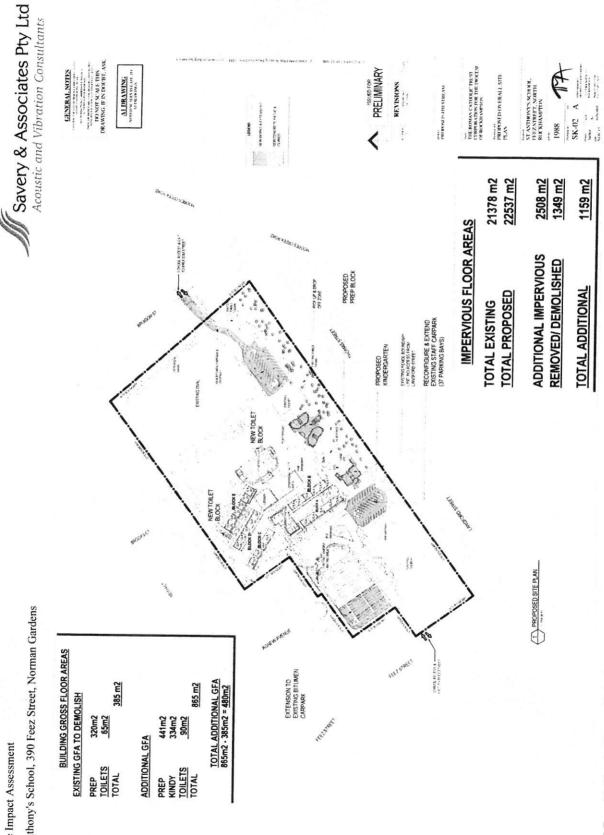
Appendix B - Architectural drawings



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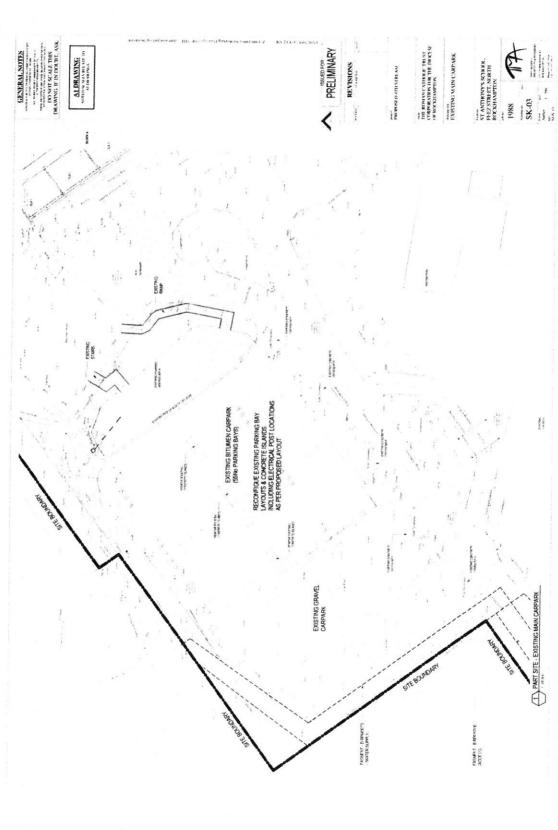
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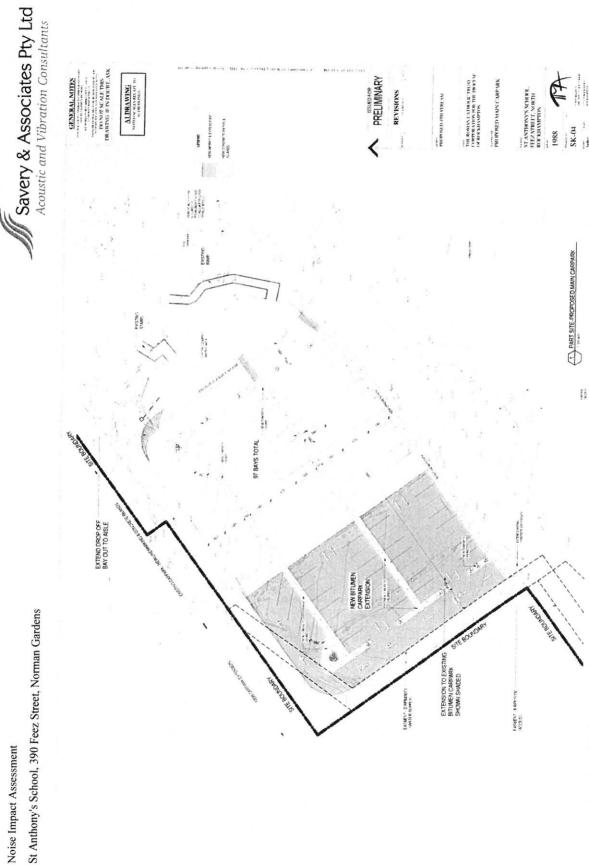


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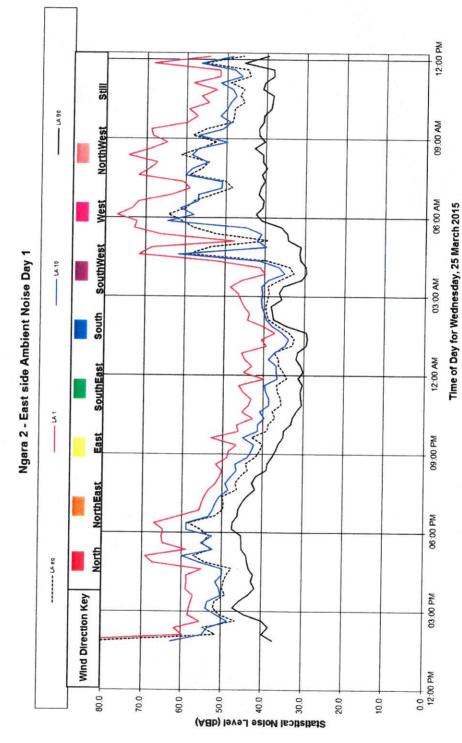
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Appendix C - Noise monitoring results

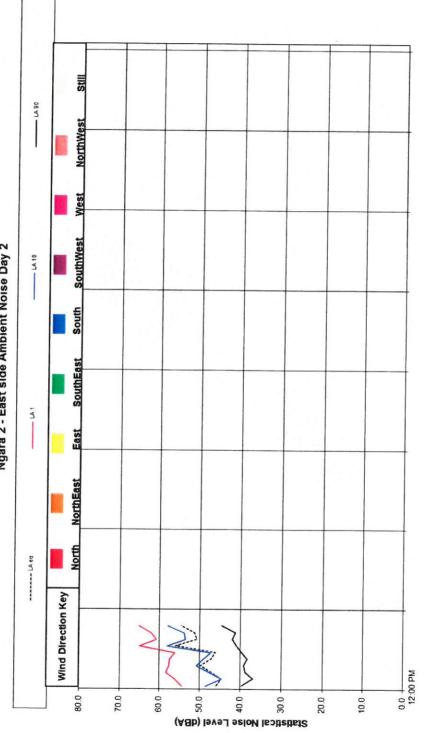
C.1 Location 1



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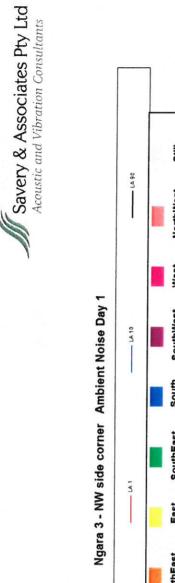


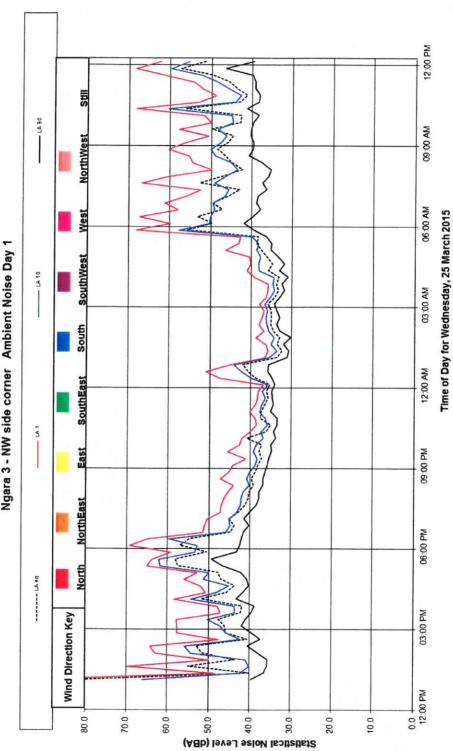
Ngara 2 - East side Ambient Noise Day 2



Time of Day for Thursday, 26 March 2015

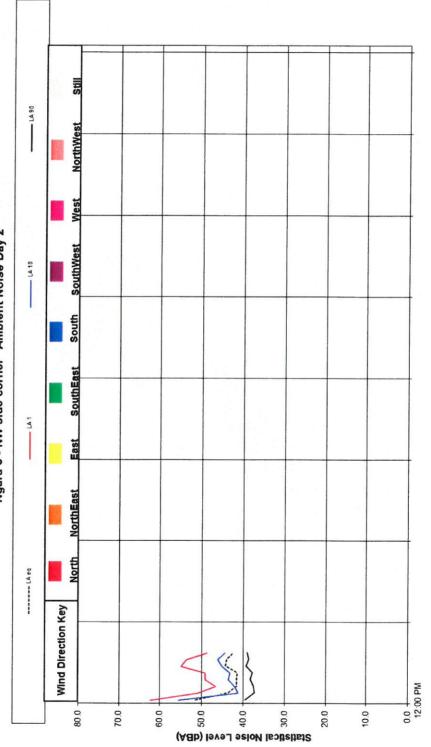
C.2 Location 2







Ngara 3 - NW side corner Ambient Noise Day 2



Time of Day for Thursday, 26 March 2015