

NATIONAL INDIGENOUS DEVELOPMENT CENTRE, REDFERN

ACOUSTIC ASSESSMENT REPORT - AREA G REDESIGN

TD432-06F01 (REV 1) AREA G ACOUSTIC ASSESSMENT REPORT

18 DECEMBER 2008

Prepared for:

Indigenous Land Corporation

C/- Coffey Projects

Level 10, BT Tower, 1 Market Street

Sydney NSW 2000

Attention: Neil Gardner



DOCUMENT CONTROL

Date	Revision History	Non-Issued Revision	Issued Revision	Prepared By (initials)	Instructed By (initials)	Reviewed & Authorised by (initials)
18.12.2008	Initial Preparation	Rev 0	Rev 1	TR/GW	GW	GW

The work presented in this document was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on Australian Standard / NZS ISO 9001.

This document is issued subject to review and authorisation by the Team Leader noted by the initials printed in the last column above. If no initials appear, this document shall be considered as preliminary or draft only and no reliance shall be placed upon it other than for information to be verified later.

This document is prepared for our Client's particular requirements which are based on a specific brief with limitations as agreed to with the Client. It is not intended for and should not be relied upon by a third party and no responsibility is undertaken to any third party without prior consent provided by Renzo Tonin & Associates. The Information herein should not be reproduced, presented or reviewed except in full. Prior to passing on to a third party, the Client is to fully inform the third party of the specific brief and limitations associated with the commission.

The information contained herein is for the purpose of acoustics only. No claims are made and no liability is accepted in respect of design and construction issues falling outside of the specialist field of acoustics engineering including and not limited to structural integrity, fire rating, architectural buildability and fit-for-purpose, waterproofing and the like. Supplementary professional advice should be sought in respect of these issues.

CONTENTS

1	INTRODUCTION	4
2	PROJECT DESCRIPTION	5
2.1	Proposed Development	5
2.2	Site Description	Error! Bookmark not defined.
2.3	Assessment Requirements	6
2.4	Assessment Methodology	6
3	ACOUSTIC ASSESSMENT	7
3.1	Assessment Locations	7
3.2	Noise Criteria	8
3.3	Noise Sources	8
3.4	Noise Level Predictions	9
3.4.1	Provisions for Noise Predictions	9
3.5	Predicted Noise Level Results Discussion	10
3.5.1	Daytime (7am-6pm) Predicted Results	10
3.5.2	Evening (6pm-10pm) Predicted Results	10
3.5.3	Night (10pm-7am) Predicted Results	11
4	CONCLUSION	12
	APPENDIX A - GLOSSARY OF ACOUSTIC TERMS	13
	APPENDIX B - ASSESSMENT LOCATIONS	16
	APPENDIX C - ASSESSMENT NOISE SOURCE LOCATIONS	17

List of Tables

Table 1 – Applicable Noise Criteria for General Site Operations, dB(A)	8
Table 2 – Sporting Field Source Sound Power Levels, dB(A)	8
Table 3 –Total Site Noise Level Prediction Results, dB(A)	10

1 INTRODUCTION

Renzo Tonin & Associates were engaged to conduct an environmental noise assessment of the proposed redesign of Area G of the National Indigenous Development Centre (NIDC), Redfern. This report quantifies the noise impact from the proposed outdoor sports/recreational facility to be located on Area G (previously to be a Childcare Centre) and assesses the potential impact on neighbouring premises close to the site.

Noise emissions from the NIDC Area G development are calculated at the potentially most affected neighbouring residences and then assessed against the relevant noise criteria set out in Renzo Tonin & Associates report *TD432-01F02 (rev3) ACOUSTIC ASSESSMENT REPORT* prepared for the original application.

The work documented in this report was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on Australian Standard / NZS ISO 9001.

2 PROJECT DESCRIPTION

2.1 Proposed Development

Approval was granted by the Department for Planning for the Indigenous Land Corporation (ILC) to develop the Redfern Public School site into a National Indigenous Development Centre for Indigenous social, educational and sporting programs. The original application included the following facilities;

- Building A Existing building to be used for Exodus Redfern Tutorial Centre on the ground floor and office space for NASCA on the upper level.
- Building B Existing building to be used as a central dining/function area with offices.
- Buildings C and D Existing buildings to be used as dormitories.
- Building E To be demolished
- Building F New three level building for PCYC which will include a gym, sports court and other activity rooms along with smaller meeting and office spaces.
- Area G Murawina Child and Day Care Centres
- 25m Pool Outdoor heated swimming pool.
- Training Field Multi-purpose training field and associated seating and climbing wall.
- Parking Coach and car park facilities.

However the use of Area G as a Childcare Centre is no longer proceeding. Instead the area is planned to accommodate a split two level outdoor/recreational facility as follows;

- the 'upper' area located on the eastern side has approximately 25 x 20 metres of available space and is proposed to provide a non-standard basketball court/futsal pitch facility; and
- the 'lower' area located at the western side has approximately 18 x16 metres of available space and is proposed to provide a low level ropes activity play area.

Both levels are on an even grade but are at differing base levels.

2.2 Assessment Requirements

The Redfern Public School site has been declared as a State Significant site and Development consent is regulated by the NSW Department of Planning (DOP). This report forms part of the Environmental Assessment that is to be lodged.

The Director General's Environmental Assessment Requirements 'Section 75F of the Environmental Planning and Assessment Act 1979' set out general and key guidelines for the assessment of the proposal however did not set out specific acoustic requirements for the development or acoustic privacy guidelines for existing residential premises in proximity to the site.

Therefore our assessment has referred to both standard noise guidelines issued by the NSW Department of Environment and Climate Change (DECC) and the City of Sydney Council.

2.3 Assessment Methodology

In order to assess the potential noise impact from subject proposal the following methodology was used;

- Identify nearest most potentially affected receiver locations to the subject site.
- Use noise goals criteria established from our previous report *TD432-01F02 (rev3) ACOUSTIC ASSESSMENT REPORT*
- Using predictive noise modelling, determine the extent of noise impact from the proposed usage on nearby residential premises.
- Identify where noise emission from the site may exceed the relevant criteria.
- Where noise emission from the site may exceed the relevant criteria provide recommendations to reduce noise impacts from the site.

3 ACOUSTIC ASSESSMENT

3.1 Assessment Locations

The nearest residential receiver locations potentially impacted by noise emission from the proposed Area G outdoor sports/recreational facility development were identified as;

- Location A1 128 George Street – South Eastern Building

Three Storey apartment building located approximately 10m from the proposed upper outdoor sports/recreational facility located on Area G, separated by the driveway for the residential development.

Each level of apartments has a balcony located on the south western corner of the building. Another balcony at level 3 is located at the eastern end of the southern façade.

- Location A2 139 George Street

Three storey apartment building located on the corner of George Street and Albert Street, approximately 22m from the proposed upper outdoor sports/recreational facility located on Area G.

- Location A3 Terraces on Eastern side of George Street (141 – 151)

Two storey terraces located approximately 20m from the eastern boundary of the proposed upper outdoor sports/recreational facility located on Area G, on the opposite side of George Street

- Location A4 128 George Street – South Western Building

Apartments facing Renwick Street, located approximately 15m to the north of the proposed lower outdoor sports/recreational facility located on Area G.

Three levels of apartments with balconies located on the south western corner of the building at levels 1 and 2.

- Location A5 126 Renwick Street

Two storey premises located approximately 10m to the west of the proposed lower outdoor sports/recreational facility located on Area G.

The assessment locations are shown in Appendix B and are identified as A1 – A5.

3.2 Noise Criteria

With respect to noise goals for the development, reference has been made to the original application report [ref: Renzo Tonin & Associates Report TD432-01F02 (rev3)]. The following has been reproduced.

Noise Guide For Local Government

In the absence of specific noise criteria for such facilities we have taken guidance from the Noise Guide for Local Government (NGLG) for the assessment of noise emission from general site operations.

The NGLG sets out noise criteria in terms of the intrusiveness criterion which is defined as:

- $L_{Aeq\ 15\ minute}$ is less than or equal to the rating background level plus 5 dB(A)

The $L_{Aeq\ 15\ minute}$ is assessed at the most-affected point on or within the residential property boundary, or, if that is more than 30 metres from the residence, at the most-affected point within 30 metres of the residence. The intrusiveness criterion is applied only to on-site noise emission.

Table 1 below sets out the Noise criteria that have been adopted for this assessment.

Table 1 – Applicable Noise Criteria for General Site Operations, dB(A)

Location	Intrusiveness Criteria $L_{Aeq,15min}$		
	Day	Evening	Night
A1	57	54	51
A2 – A5	52	51	45

We note that intrusiveness criteria is based on the rating background noise levels (RBL's) for the long-term monitoring period.

3.3 Noise Sources

Sound power Level (L_w) measurements from our database and library files were used for the purpose of this assessment. Noise levels of different sporting activities and children playing are set out in Table 2 below and are considered representative of the type of activities expected in Area G.

Table 2 – Sporting Field Source Sound Power Levels, dB(A)

Noise Source	Overall dB(A)	Octave Band Centre Frequency - Hz								
		31.5	63	125	250	500	1k	2k	4k	8k
Basketball Court ¹	93	89	91	91	92	90	89	85	75	67
Tennis Court*	90	39	61	66	74	80	88	81	72	66
Kindergarten children outdoors	90	-	35	55	77	86	86	77	67	48

Noise Source	Overall dB(A)	Octave Band Centre Frequency - Hz								
		31.5	63	125	250	500	1k	2k	4k	8k

Note: 1. Each noise source location 'N1', 'N2', 'N3' and 'N4' in appendix C contains the following noise spectrum. The upper area contains 'N1' and 'N2' to give a total sound power level of 93dB(A), and the lower area contains 'N3' and 'N4' to give a total sound power level of 93dB(A).

* Includes 5dB correction for impulsive character of noise

It is relevant to note that our noise level predictions have used the basketball court noise level as a worst case scenario and therefore has been used for both the upper and lower outdoor sports/recreational facility area noise source levels. The noise source locations for our assessment are shown in Appendix C and are identified as 'N1', 'N2', 'N3' and 'N4'.

3.4 Noise Level Predictions

3.4.1 Provisions for Noise Predictions

The following Preliminary architectural drawings prepared by Tonkin Zulaikha Greer Architects Pty. Ltd. have been referenced for this report and are the basis of noise predictions from the development;

- C-1 Area G – SITE PLAN
- C-2 Area G – GEORGE ST ELEVATION
- C-3 AREA G – NORTH ELEVATION
- C-4 AREA G – RENWICK ST ELEVATION
- C-5 AREA G - SECTION

It is noted that provision of some acoustic absorptive treatment to the northern faced of Building F has been incorporated into the noise model to reduce reflected noise back onto the northern residential locations. Specific recommendations as to the acoustic treatment are proposed to be finalised during the detailed design phase of the development.

Noise emission from operational activities associated with Area G outdoor sports/recreational facility at the NIDC, have been undertaken using SoundPLAN Version 6.2 noise modelling software using the Industrial Module. Calculations were made in accordance with ISO9613 and takes into account topography of the site, relative heights of receivers and noise sources, transmission loss of building facade elements, and acoustic loss due to distance and intervening structures.

Using the noise source levels set out in Table 2 and the noise sources set out in Renzo Tonin & Associates report *TD432-01F02 (rev3) ACOUSTIC ASSESSMENT REPORT* prepared for the original application, the following sources were defined in the noise model:

- With respect to Area G outdoor sports/recreational facility, noise sources were input as omni-directional point sources and located 1.5m above the ground at four locations distributed over the 'upper' and 'lower' outdoor areas (see Appendix C).

Table 3 below sets out the noise prediction results at each residential assessment location identified previously in Section 3.1 along with noise generated from the approved use of the

NIDC development (as previously assessed). The approved use includes noise from the PCYC Building F, PCYC pool noise and sporting field noise.

Table 3 –Total Site Noise Level Prediction Results, dB(A)

Location	Storey	Predicted Level dB(A)	Criteria		
			Daytime (7am – 6pm)	Evening (6pm – 10pm)	Night (10pm – 7am)
A1 - 128 George Street – South Eastern Building	Ground	55	57	54	51
	1	58	57	54	51
	2	57	57	54	51
A2 - 139 George Street	Ground	47	52	51	45
	1	48	52	51	45
	2	50	52	51	45
A3 - Terraces on Eastern side of George Street (141 – 151)	Ground	50	52	51	45
	1	52	52	51	45
A4 - 128 George Street – South Western Building	Ground	40	52	51	45
	1	44	52	51	45
	2	49	52	51	45
A5 - 126 Renwick Street	Ground	46	52	51	45
	1	52	52	51	45

3.5 Predicted Noise Level Results Discussion

3.5.1 Daytime (7am-6pm) Predicted Results

The noise level prediction results presented in Table 3 indicate compliance with the day time period (7am-6pm) at all assessment locations, with the exception of location 'A1', for all noise generated by the NIDC development. Location 'A1' is predicted to marginally exceed the day time noise level criteria by 1dB. The noise source contributing to the exceeded level at Location 'A1' is the proposed upper outdoor sports/recreational facility located on area G in the NIDC development. In order to reduce noise impacts to location 1 a significant increase in noise wall height would be required (greater than 5m). It is not considered practical or reasonable to provide such a structure for the 1dB exceedance.

3.5.2 Evening (6pm-10pm) Predicted Results

The results shown in Table 3 indicate that compliance can be achieved during the evening time period (6pm-10pm) at the assessment locations 'A2' and 'A4' for all noise generated by the NIDC development. However, assessment locations 'A3' and 'A5' are predicted to marginally exceed the evening time period criteria by 1dB but exceeded by 4dB at Location 'A1'.

The controlling noise source contributing to the exceeded level at Location 'A1' and 'A3' is the upper court of Area G. Given the level of exceedance at Location A1 and required noise walls to reduce noise impacts, it is recommended that use of the area be restricted to 6pm.

With respect to Location A5, closure of the upper court would reduce total site noise to the required 51dB(A).

3.5.3 Night (10pm-7am) Predicted Results

The results in Table 3 indicate that all assessment locations will exceed the night time (10pm-7am) criteria by up to 6dB for all noise generated by the upper and lower areas of the outdoor sports/recreational facility located at area G in the NIDC development. It is therefore recommended for the outdoor courts to be closed during the night time period.

4 CONCLUSION

Renzo Tonin & Associates has completed an assessment of environmental noise impact from the proposed redesign of Area G of the National Indigenous Development Centre to be located at the Redfern Public School site. Noise impact from the proposed redevelopment upon potentially affected residential receivers, has been quantified and compared to the relevant noise criteria set out in Renzo Tonin & Associates report *TD432-01F02 (rev3) ACOUSTIC ASSESSMENT REPORT* prepared for the original application.

On the basis of our assessment we recommend the following operating times for the Area G outdoor activity areas;

- The upper court (eastern) is recommended to be restricted to the daytime period (7am-6pm); and
- The lower court (western) is recommended to be restricted to the day and evening period (7am-10pm).

APPENDIX A - GLOSSARY OF ACOUSTIC TERMS

The following is a brief description of the technical terms used to describe noise to assist in understanding the technical issues presented.

<i>Adverse Weather</i>	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).														
<i>Ambient Noise</i>	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.														
<i>Assessment Period</i>	The period in a day over which assessments are made.														
<i>Assessment Point</i>	A point at which noise measurements are taken or estimated. A point at which noise measurements are taken or estimated.														
<i>Background Noise</i>	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L₉₀ noise level (see below).														
<i>Decibel [dB]</i>	<p>The units that sound is measured in. The following are examples of the decibel readings of every day sounds:</p> <table><tr><td>0dB</td><td>The faintest sound we can hear</td></tr><tr><td>30dB</td><td>A quiet library or in a quiet location in the country</td></tr><tr><td>45dB</td><td>Typical office space. Ambience in the city at night</td></tr><tr><td>60dB</td><td>Martin Place at lunch time</td></tr><tr><td>70dB</td><td>The sound of a car passing on the street</td></tr><tr><td>80dB</td><td>Loud music played at home</td></tr><tr><td>90dB</td><td>The sound of a truck passing on the street</td></tr></table>	0dB	The faintest sound we can hear	30dB	A quiet library or in a quiet location in the country	45dB	Typical office space. Ambience in the city at night	60dB	Martin Place at lunch time	70dB	The sound of a car passing on the street	80dB	Loud music played at home	90dB	The sound of a truck passing on the street
0dB	The faintest sound we can hear														
30dB	A quiet library or in a quiet location in the country														
45dB	Typical office space. Ambience in the city at night														
60dB	Martin Place at lunch time														
70dB	The sound of a car passing on the street														
80dB	Loud music played at home														
90dB	The sound of a truck passing on the street														

100dB The sound of a rock band

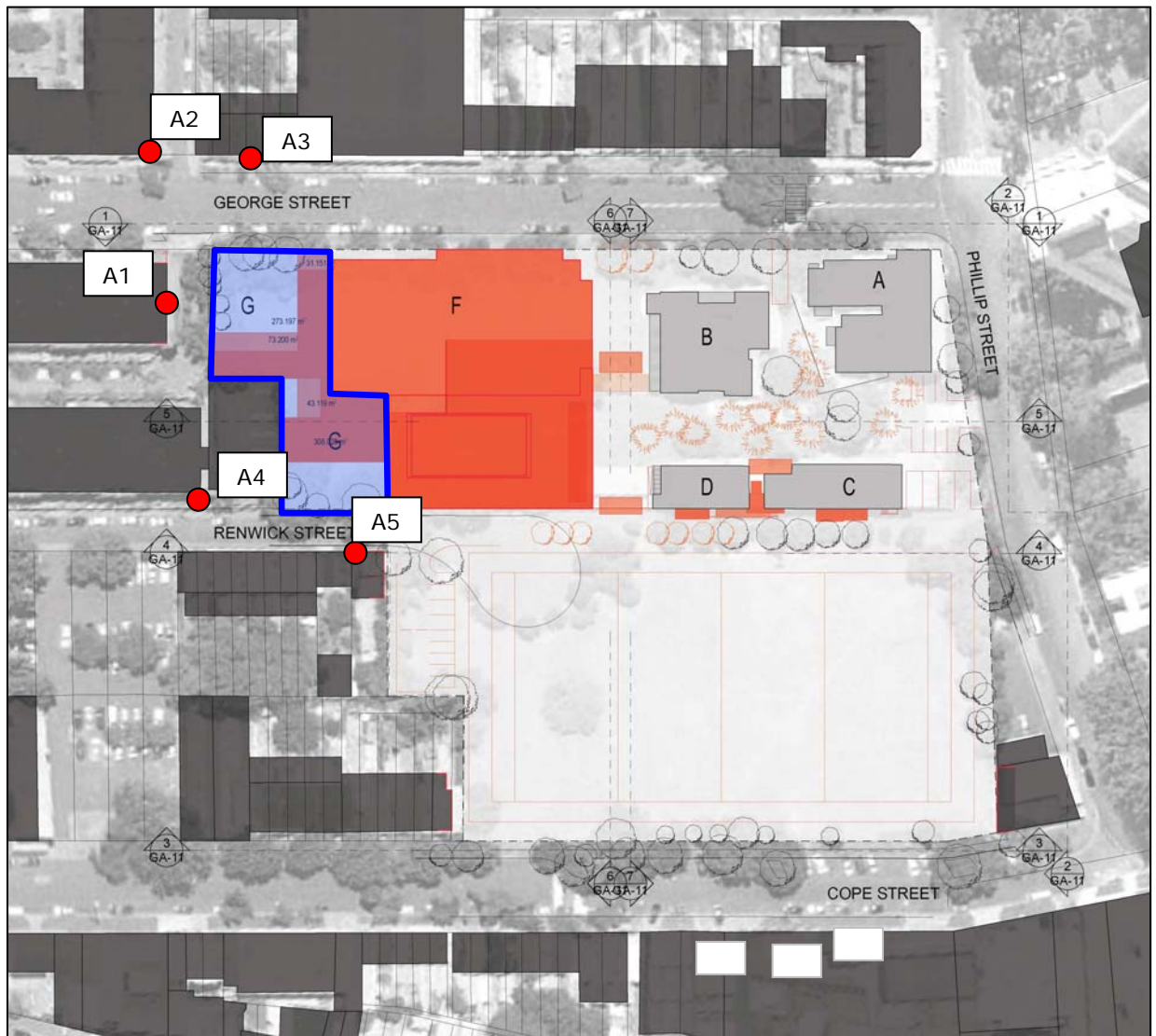
115dB Limit of sound permitted in industry

120dB Deafening

<i>dB(A):</i>	A-weighted decibels The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter.
<i>Frequency</i>	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
<i>Impulsive noise</i>	Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
<i>Intermittent noise</i>	The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.
L_{max}	The maximum sound pressure level measured over a given period.
L_{min}	The minimum sound pressure level measured over a given period.
L_1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L_{10}	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L_{90}	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L_{90} noise level expressed in units of dB(A).
L_{eq}	The "equivalent noise level" is the summation of noise events and

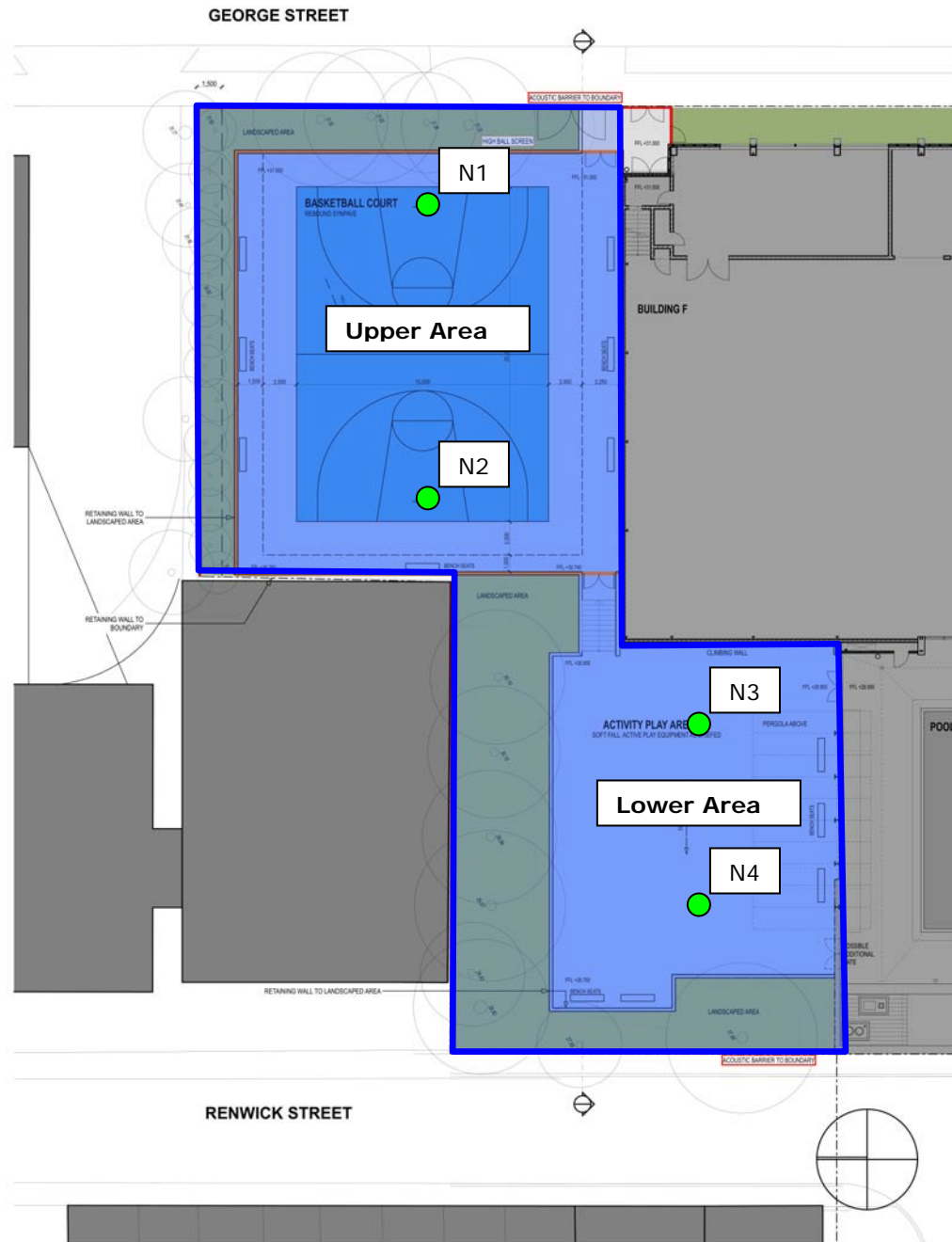
	integrated over a selected period of time.
<i>Reflection</i>	Sound wave changed in direction of propagation due to a solid object obscuring its path.
<i>SEL</i>	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain Leq sound levels over any period of time and can be used for predicting noise at various locations.
<i>Sound</i>	A fluctuation of air pressure which is propagated as a wave through air.
<i>Sound Absorption</i>	The ability of a material to absorb sound energy through its conversion into thermal energy.
<i>Sound Level Meter</i>	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
<i>Sound Pressure Level</i>	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
<i>Sound Power Level</i>	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
<i>Tonal noise</i>	Containing a prominent frequency and characterised by a definite pitch.

APPENDIX B - ASSESSMENT LOCATIONS



- - Assessment locations
- Outdoor Sports/Recreational Facility
- - Noise Source Assessment Locations

APPENDIX C - ASSESSMENT NOISE SOURCE LOCATIONS



- - Assessment locations
- Outdoor Sports/Recreational Facility
- - Noise Source Assessment Locations