DUKANE PTY LTD

15 March 2016

Project Number: 150515
Our Ref: DPH 150316 eltr
Fax/Email: hvtd.dav@gmail.com

Mr David Phuoc Hong
11 Huon Crescent Holsworthy
NSW 2173, Australia

Dear Sir

Re: 353-371 Delaware Road, Horsley Park, LOT: 231B, DP: 17288 -Construction of Place of Worship and ancillary structures including Meditation College and residential accommodation - Noise Assessment

1 INTRODUCTION

A noise assessment associated with the proposed development at 353-371 Delaware Road has been conducted in accordance with the requirements of Fairfield City Council being:

- *Proposal must address visual and acoustic impact upon surrounding properties.*
- *An Acoustic Report prepared by a suitably qualified acoustic consultant shall be provided. The required acoustic report shall take into account the acoustic requirements detailed within Chapter 4A of the Fairfield City Wide DCP 2013.*

This review has been assessed based on the following documentation that is to be included in the Development Application to be submitted to council.

- Architectural drawings prepared by HVTD Architecture.
- The plan of management (POM) prepared by HVTD Architecture.

Potential Noise sources that have been assessed are:

- Aircraft Noise Intrusion
- Normal Activities including Chanting (50 persons)
- Festivals of up to 150 persons
- Carpark Activities, and;
- Air conditioning.

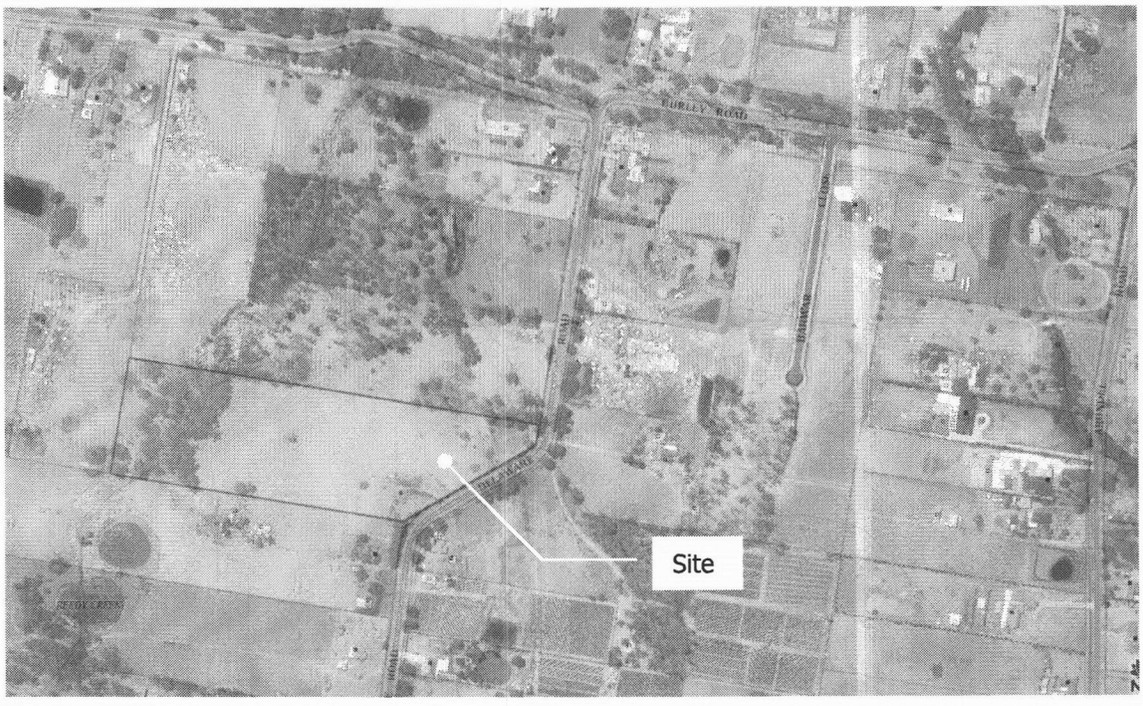
2 SITE DESCRIPTION

The site of the development is to be located at 353-371 Delaware Road, Horsley Park. This area is semi rural in nature with distant traffic noise. The area consists of residences on acreage along with industrial premises and quarries. The area is currently undergoing significant development which is evidenced by surrounding warehouse and distribution development.

Delaware Road is a relatively quiet road with distant traffic noise from the M7 (1.8 kms) and M4 (1.2 kms) along with ancillary roads being audible at the site.

The following figure shows the site and surrounds.

Figure 2-1 Site Aerial



Source: Department of Lands

Nearest residential receivers have been identified as:

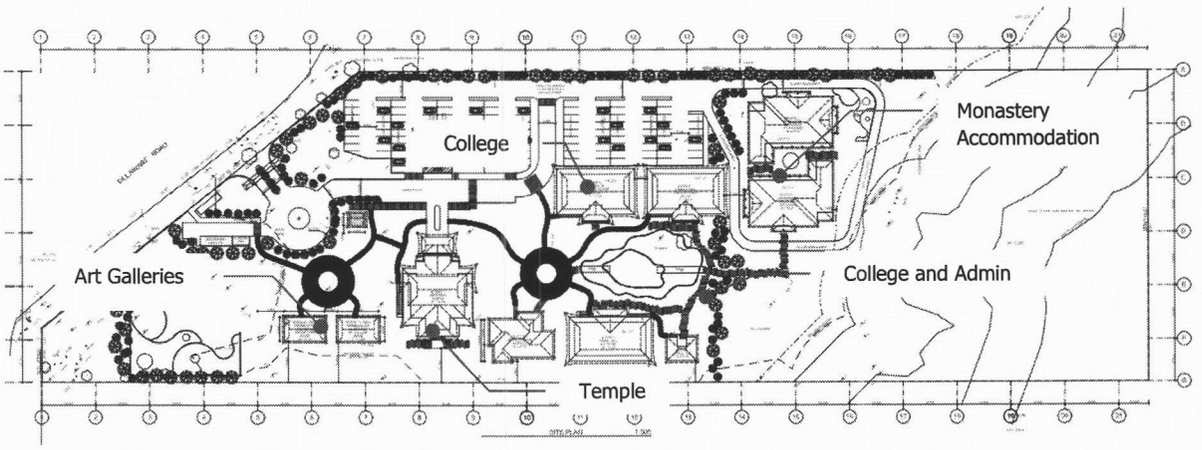
- Southern Residence at 321-351 Delaware Road – 34 metres from the site boundary.
- South Eastern Residence at 192-210 Delaware Road – 32 metres from the site boundary.
- Northern Residence at 373-387 Delaware Road – 80 metres from the site boundary.

The development is proposed to consist of the following:

- On grade carpark
- 2 Buddhist Art Galleries
- Admin Buildings
- Temple Building
- Dining Hall and Kitchen
- Training College
- 2 residential buildings for Monks and Nuns

Figure 2-2 shows the proposed development.

Figure 2-2 Proposed Site Plan



3 NOISE SOURCES AND ACTIVITIES

Based on a review of the architectural drawings and the POM the following potential noise sources have been identified:

- Air conditioning plant,
- Normal temple activities,
- Special Events, and;
- Traffic and Carpark noise generated by the use of the development.

The normal hours of Temple activities are;

- 7 am and 9 pm Monday to Saturday.
- 9 am and 5 pm on Sundays.

During these hours, visitors are welcome to come to the site and engage in personal meditation. Three sessions of meditation are proposed being 7am to 9am, 2 pm to 4 pm and 7 pm to 9 pm., formal meditation ceremonies are conducted under the guidance of the resident monk.

It is envisaged that a maximum of 30 persons will attend on weekdays, whilst up to 50 may attend on weekends. During these activities no amplified music or sound system is proposed.

Special events are envisaged to have up to 150 persons, where 2 gongs will signal the end of the event. A microphone may be used to guide attendees during meditation.

The potential impact on the acoustic amenity of surrounding residential receivers has been reviewed separately in the following sections.

4 AMBIENT NOISE LEVELS

The site was attended on Saturday 25 April to inspect the area. During the visit a background noise measurement was conducted between 3:04 pm and 3:16 pm where a background noise level of 38 dBA was measured. In addition a review of other major development assessments in the area indicated that a nightime noise level of 32 dBA is a conservative noise level to adopt for assessment purposes.

Accordingly the following intrusive noise objectives, consistent with the EPA noise guide for local government, have been established:

- Day (7am to 6 pm) 43 dBA
- Evening (6 pm to 10 pm) 37 dBA
- Night (10 pm to 7 am) 37 dBA

5 NOISE ASSESSMENT

The following section details the assessment of potential noise sources at the residences surrounding the proposed temple. The residences to the south and south east are closest to the site therefore compliance at these residences will result in compliance at all surrounding residences.

5-1 Mechanical Services Noise

Whilst much of the development will be naturally ventilated any mechanical plant, such as air conditioners, has the potential to impact on surrounding residences. At this early stage the details and location of plant are not known. Therefore any services should be designed to meet the noise objectives of this report. Measures such a judicious location and selection of plant along with engineering noise controls will adequately control noise from the site.

The following conditions are recommended to ensure any potential noise emissions from the site are addressed.

> **Noise Criteria** - All plant should be designed so that noise from the mechanical plant during operation when measured at the nearest residential boundary does not exceed the noise criteria detailed in Section 4 during operation. This is consistent with the recommendations of the NSW EPA.

Therefore it is recommended, should approval for development be granted, this requirement be adopted as a condition of consent whereby actual plant that is selected in the detailed design stage is assessed with respect to this criteria.

5.2 Temple Activities

A review of the Plan of Management (POM) indicates that normal temple activities will consist of up to 50 persons. In the case of special events, which are to occur several times a year, up to 150 persons will attend the temple. These special events are proposed in the daytime and will involve chanting and possibly amplified speech within the temple.

Noise levels at the nearest residences have been predicted based on:

- Source Noise Levels,
- Areas of open doors / windows, and
- Distance Attenuation.

5-3 Predicted Noise Levels at Residences associated with Normal Operations

The normal activities involve reading of Scriptures, chanting and silent meditation. The noise associated with the meditation ceremonies is that of one person speaking and others chanting.

Typically noise from a person speaking in a raised voice will be in the order of 68 dBA at 1 metre. For purposes of assessment we have assumed that all 50 persons are chanting in a raised voice with the doors and windows of the temple building facing residences all open.

In this scenario the following noise $L_{Aeq(15\ min)}$ noise levels are predicted:

- Northern Residence 35 dBA
- Southern Residence 40 dBA
- South Eastern Residence 38 dBA

The predicted noise level at the southern residence exceeds the evening intrusive noise goal. Therefore it is recommended that in the evening the southern doors and windows be closed after 6 pm in the evening when group chanting activities occur. Adopting this measure will result in predicted noise levels reducing to 33 dBA.

All other doors and windows can remain open during chanting without adversely impacting on the acoustic amenity of surrounding residences.

5-4 Predicted Noise Levels associated with Special Events

Special events are to occur several times a year. Up to 150 persons are to attend the temple during these events and the use of loudspeakers is proposed. As such there is potential for acoustic impact at adjacent residences.

Based on a worst case scenario of 150 persons chanting in a raised voice the following noise $L_{Aeq(15\ min)}$ noise levels are predicted:

- Northern Residence 40 dBA
- Southern Residence 45 dBA
- South Eastern Residence 43 dBA

The predicted noise levels at all identified residences exceed the established evening noise objective, in addition daytime objectives may be exceeded at the southern residence. Therefore it is recommended that the doors and windows may need to be closed, in the evening after 6 pm, when large group chanting or festive activities occur in the temple.

In the case of loudspeakers we have assumed the noise from the loudspeaker will to be 10 dBA above chanting noise levels. This level of sound would ensure that the speaker's voice could be clearly heard over the chanting.

Therefore noise levels at the boundary with the doors open, chanting and speakers operating would be up to:

- Northern Residence 50 dBA
- Southern Residence 55 dBA
- South Eastern Residence 53 dBA

These noise levels also exceed the noise criteria at all identified residences and will require management when a PA system are used continuously in the Temple.

Based on the doors being standard 40 mm solid core door and glazed elements being 6 mm glass noise levels with amplified speech and chanting, the following noise levels at residences;

- Northern Residence 32 dBA
- Southern Residence 34 dBA
- South Eastern Residence 32 dBA

Therefore the adoption of the above measures, will result in compliance with all day and evening noise criteria during special events.

5-5 Recommendations on Temple Operation.

The following measures are recommended to mitigate any adverse noise impact at residences.

- Use the lowest practical volume setting on the loudspeakers.
- During normal events southern doors after 6 pm (along with any windows on the western facade) are to be closed. These measures should be monitored by Temple Staff to ensure that the acoustic amenity of nearby residences is protected.
- During special events ensure that all windows and doors of the temple are to be closed after 6 pm.
- Improved 6 mm laminated glass is recommended on the windows to the main temple.
- Implement, as part of the POM, community consultation with residences so that they are informed of special events. In addition a contact at the site should be made available so that should any complaints arise the management can respond to issues.

6 TRAFFIC AND CARPARK NOISE

6-1 Traffic Noise Criteria

Noise Criteria for assessment of road traffic noise are set out in the NSW Government's *NSW Road Noise Policy (RNP)*. Table 6-1 sets out the assessment criteria for residences to be applied to particular types of project, road category and land use.

Table 6-1 Traffic Noise Criteria extracted from the NSW *RNP*

Road category	Type of project/land use	Assessment criteria – dB(A)	
		Day (7 a.m.–10 p.m.)	Night (10 p.m.–7 a.m.)
Freeway/ arterial/ sub-arterial roads	1. Existing residences affected by noise from **new** freeway/arterial/sub-arterial road corridors	$L_{Aeq,\ (15\ hour)}$ 55 (external)	$L_{Aeq,\ (9\ hour)}$ 50 (external)
	2. Existing residences affected by noise from **redevelopment** of existing freeway/arterial/sub-arterial roads 3. Existing residences affected by **additional traffic** on existing freeways/arterial/sub-arterial roads generated by land use developments	$L_{Aeq,\ (15\ hour)}$ 60 (external)	$L_{Aeq,\ (9\ hour)}$ 55 (external)
Local roads	4. Existing residences affected by noise from **new** local road corridors 5. Existing residences affected by noise from **redevelopment** of existing local roads 6. Existing residences affected by **additional traffic** on existing local roads generated by land use developments	$L_{Aeq,\ (1\ hour)}$ 55 (external)	$L_{Aeq,\ (1\ hour)}$ 50 (external)

In summary, the noise level goals at residential receivers on Delaware Road, for this project, based on the *RNP* are:

- $L_{Aeq,1hr}$ day 55 dBA; and
- $L_{Aeq,1hr}$ night 50 dBA

In addition, where the above criteria are already exceeded as a result of existing traffic the policy notes:

> *"For existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic noise level should be limited to 2 dB above that of the corresponding 'no build option'".*

Review of traffic volumes from the traffic consultants, (Hemanote Consultants – Traffic and Parking Impact Assessment dated June 2015), indicates the current traffic volumes on Delaware Road on a typical weekday are as follows:

- 30 vehicles per hour during the morning peak (between 7:15am and 8:15am)
- 41 vehicles per hour during the afternoon peak (between 3:00pm and 4:00pm)

The estimated traffic generation from the proposed development is as follows:

- Temple worship area - peak traffic volume of 25 vehicles per hour (on a normal weekday)
- Admin officer – 9 to 10 vehicle trips per peak hour (on a normal weekday)
- Residence for monks & nuns – 2 to 3 vehicle trips per hour (as the majority of monks/nuns don't drive).
- Dining hall – estimated 50 to 60 vehicle trips (during a special event – outside of the normal operation hours of the other uses on the site)

Noise predictions at residence along Delaware Road have been conducted for PM peak traffic noise levels at the nearest residences have been predicted using the *Calculation of Road Traffic Noise (CORTN)* traffic noise prediction technique based on a "worst-case" assumption that all traffic travels south from the access driveway. We have assumed 79 (42 existing PM plus 38 additional) car movements in an hour for normal events and 101 (41 existing PM and 73 additional) for special events. Based on these "worst case" flows the flowing traffic noise levels are predicted for the daytime period:

- Normal Events 53.3 dBA (L_{eq1hr})
- Special Events 54.4 dBA (L_{eq1hr})

It is noted that compliance with the traffic noise goal is achieved even for special events.

6-2 Carpark Operation

It is understood that the maximum usage of the carpark will occur during special events and that the on site parking will accommodate all cars. This being the case up to 150 cars may access the site during these events whereby up to 60 car movements may occur in an hour.

Access to the site is to be along Delaware Road. In the case of the carpark itself it is noted that the carpark is adjacent to the Southern residence. A preliminary review indicated the need for an acoustic fence on the boundary therefore this item has been included in or assessment.

Noise levels at the Southern residence have been predicted to be 43 dBA based on the following;

- ❖ Source Sound Power Levels of 94 dBA (15 cars in 15 minutes)
- ❖ Less 10 dBA (1.8 m barrier/ fence)
- ❖ Less 41 dBA (distance attenuation 46 metres from carpark to yard)

It is noted that compliance with the daytime intrusive criterion of 43 dBA is indicated. Therefore it is recommended that a minimum 1.8 m high boundary fence be installed along the length of the boundary of the carpark and the southern residence. This fence should have acoustic properties, that is; there are no gaps in the fence.

Suitable materials are:

- Lapp and Capped timber fence with an additional middle timber rail.
- Metal sheeting at least 1 mm thick.
- Fibre cement sheeting (9 mm thick) or plywood sheeting (15 mm thick).
- Any other material that provides an acoustic rating of at least Rw 28.

7 WESTERN SYDNEY AIPPORT

The draft EIS for Western Sydney Airport was released on Monday 19 October 2015. The EIS presents ANEC noise contours for the one runway and two runway phases of the proposed airport.

Whilst the EIS seeks approval for Stage 1 of the airport (being one runway at 2030 forecast), it also provides planning contours for the two runway operational scenario, nominally in 2063. The following Figures 7-1 and 7-2 show the single runway ANEC noise contours for the 2030 and 2050 periods along the subject site.

Figure 7-1 ANEC Contours 2030

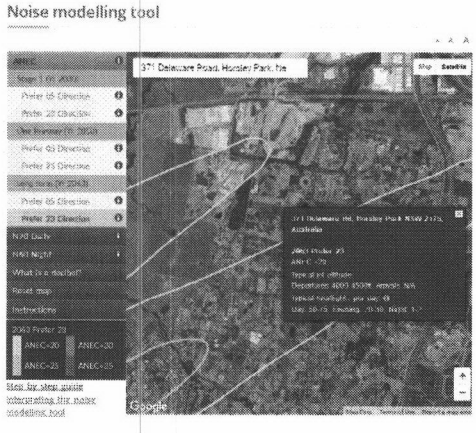
Figure 7-2 ANEC Contours 2050

It can be seen from these figures that the subject site is outside the ANEC 20 contour in all cases.

Figures 7-3 and 7-4 show the two runway (2063) ANEC contours for both the preferred 05 and 23 directions.

Figure 7-3 ANEC Contours 2063 – 05 Prefer

Figure 7-4 ANEC Contours 2063 – 23 Prefer



It can be seen from the above figures that the subject site is outside the ANEC 20 noise contour in all cases for the two runway operational scenario. As such, in accordance with AS2021:2015 *Acoustics— Aircraft noise intrusion— Building siting and construction,* the site is classified as acceptable for all proposed uses on the site. That is, no special treatment for aircraft noise is required under the requirements of the standard.

8 AIRCRAFT NOISE ATTENUATION

Not withstanding the findings of the previous section with regard to the Western Sydney Airport accommodation associated with the development must comply with the requirements of Chapter 4A of the Fairfield City Wide DCP 2013.

The development will comply with the deemed to comply provisions as detailed in Table 7-1

DEEMED TO COMPLY CRITERIA	
Wall Construction	• Provide an Rw of 52dB
Roof/Ceiling Construction	• Provide an Rw of 52dB
Windows	• All bedroom windows/glass doors – 6.38mm laminated glass. Minimum Rw32. • All lounge/dining/family/kitchen/study windows/glass- 6mm glass. Minimum Rw30 • All other windows- 4mm glass. Minimum Rw25.
External Entry Doors	• Should be at least 35mm thick and of solid-core construction or 6.38mm thick laminated glass or similar. • Doors should be fitted with acoustic seals (Lorient IS7025, IS8011si or Raven RP47) to give certified Rw of at least 30dB
Plasterboard Corner Details	• Plasterboard should be well sealed.
Ventilation	• If the need for mechanical ventilation arises, consideration needs to be taken to ensure rating of external walls, windows, ceilings are not compromised.
Key: dB = decibels – measure of sound level Rw = Weighted Sound Reduction Index to rate the effectiveness of a soundproofing system or material	

Deemed to comply wall construction to be adopted consists of:

- *Brick veneer construction with all joints filled solid with mortar, timber stud frame lined with 1 layer 10mm plasterboard and 75mm R1.5 insulation batts between all studs.*
- *All plasterboard joints to be sealed taped and set.*

Deemed to comply roof construction to be adopted on this project consist of:

- *Pitched roof clad with metal sheeting, concrete or terracotta roof tiles with R3.0 insulation batts laid between ceiling joists and a medium duty sarking over all rafters to the underside of the roof tiles.*
- *The Ceiling shall be a minimum of 1 layer 13mm plasterboard with all joints sealed, taped and set.*

8 Extractive Industries

Clause 4A.5 Residential Development near Extractive Industries Clause requires that residential development within 500 metres of extractive industries requires assessment with respect to acoustic amenity.

It is noted that the residential component of the development is approximately 480 metres from the southern boundary of the Austral Bricks Quarry and some 600 metres from the beginning of the main

extractive area of the quarry. Therefore for all practical purposes the residential component is greater than the required 500 m separation zone.

In addition the following is also noted with respect to the quarry:

- Existing Residences on Burley Road are in much closer proximity that the proposed development. As such the development will not result in residential development being closer to the quarry.
- Adoption of the aircraft noise measures detailed in section 8 will also provide improved internal acoustic amenity for future residences.

Given the above facts the detailed assessment of the impact of extractive industries in not considered necessary as the separation and treatment of buildings will ensure that the future acoustic amenity of occupants will be protected.

9 CONCLUSIONS AND SUMMARY OF RECOMMENDATIONS

A noise review of the proposed Place of Worship and ancillary structures including Meditation College and residential accommodation has been conducted with respect to proposed constructions and activities. The following has been determined;

- Noise from air conditioning is unlikely to exceed established night noise criteria. A review of noise levels at detailed design stage is recommended when plant selection and location is known.
- When group chanting in the Temple occurs then the doors and windows to the southern side of the temple will need to be closed in the evening.
- Special events in the Temple that are to occur up to several times a year are likely to exceed noise criteria with doors / windows open. Therefore doors and windows should be closed during these activities and cease at 9 pm. An effective management, as detailed in the Plan of Management, is required for these events. These measures will address amplified noise associated with loudspeakers in the temple.
- Noise from traffic in unlikely to adversely impact on surrounding residences.
- In the case of carpark activities it is recommended that a 1.8 metre acoustic fence be constructed between the carpark and the southern residence. This fence will provide improved visual and acoustic amenity to this residence.
- A review of the draft Western Sydney Airport EIS ANEC noise contours indicates that the site is outside all ANEC 20 contours for each operational period.
- Deemed to comply constructions are to be adopted on accommodation to meet the requirements of Aircraft Noise Attenuation in accordance with Fairfield City Wide DCP 2013.
- Sufficient distance from extractive industries and treatment of residential areas for aircraft noise will ensure that the acoustic amenity of future occupants will be satisfactory.

Therefore it is concluded that, with the adoption of the recommended measures of this assessment, compliance with all established noise criteria is indicated and the acoustic amenity of surrounding residents will be protected.

I trust this information is sufficient for your needs. Please contact us if you have any further queries.

Yours faithfully

Dukane Pty Ltd

Brian Clarke
Director