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FROGS HOLLOW SPORTS AVIATION

Noise Assessment for Proposed Flight School

16 October 2017

NGH ENVIRONMENTAL PTY LTD

TJ958-01F01 Noise Assessment (r2)

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1 Introduction

Renzo Tonin & Associates was engaged by NGH Environmental to undertake a noise assessment for the proposed recreational flight school to be located in Southern NSW approximately 9km south of Bega, NSW and 16km northwest of Merimbula. Noise impacts from the operation of recreational aircrafts at the proposed flight school will be addressed in accordance with the NSW 'Industrial Noise Policy' (INP) and as part of the submission to Bega Valley Shire Council.

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. Appendix A contains a glossary of acoustic terms used in this report.

2 Project Description

2.1 Background Information

The proposed recreational flight school is to be located at the existing Frogs Hollow Airstrip in Bega Valley on an existing airfield that is currently used as a landing ground by a recreational aviation club. The existing airfield has two (2) active runways, namely the Main and the Secondary runway as shown in Figure 1.

The flight school would provide recreational flight training packages including aviation training and onsite accommodation and meals. Aircraft hangars, aircraft repairs and servicing, classrooms, ancillary offices, retail premises and staff accommodation would also be located onsite.

At full operation, the flight school is proposed to use both runways and cater for up to 1,200 students per year, with approximately 120 staff and a maximum of 40 aircrafts onsite. The flight school will be using three (3) different aircrafts for training purposes during each student's stay at the college.

Appendix B presents the site plan of the proposed flight school.

2.2 Noise Issues

The following noise issues related to the operation of the proposed flight school have been identified as potentially impacting the nearest sensitive receivers:

- Take-off and landing of recreational aircrafts from Frogs Hollow Airfield;
- Recreational aircrafts flying circuits around the airfield at Frogs Hollow; and
- Recreational aircrafts taxiing and moving around the airfield.

It is understood that the aircrafts will follow designated circuits around the airfield with no special manoeuvres or aerobatics.

It is noted that mechanical plant for air-conditioning and ventilation facilities are potential noise sources; however, due to the relatively large distances of the closest receivers to the proposed site, it is not expected there will be a significant noise impact from the mechanical plant. Nevertheless, in-principle noise management measures are provided for mechanical plant in Section 4.4.2.

2.3 Hours of Operation

The flight school will be operating during the following standard daytime hours:

- Monday to Saturday: 7:00am to 6:00pm
- Sunday and public holidays: 8:00am to 6:00pm

2.4 Noise Catchment Areas

The nearest affected receivers were identified through aerial maps and during a site visit and have been grouped into Noise Catchment Areas (NCAs), as follows:

NCA 1 – East of Subject Site
Residential properties located to the east of the subject site and across the Princes Highway.

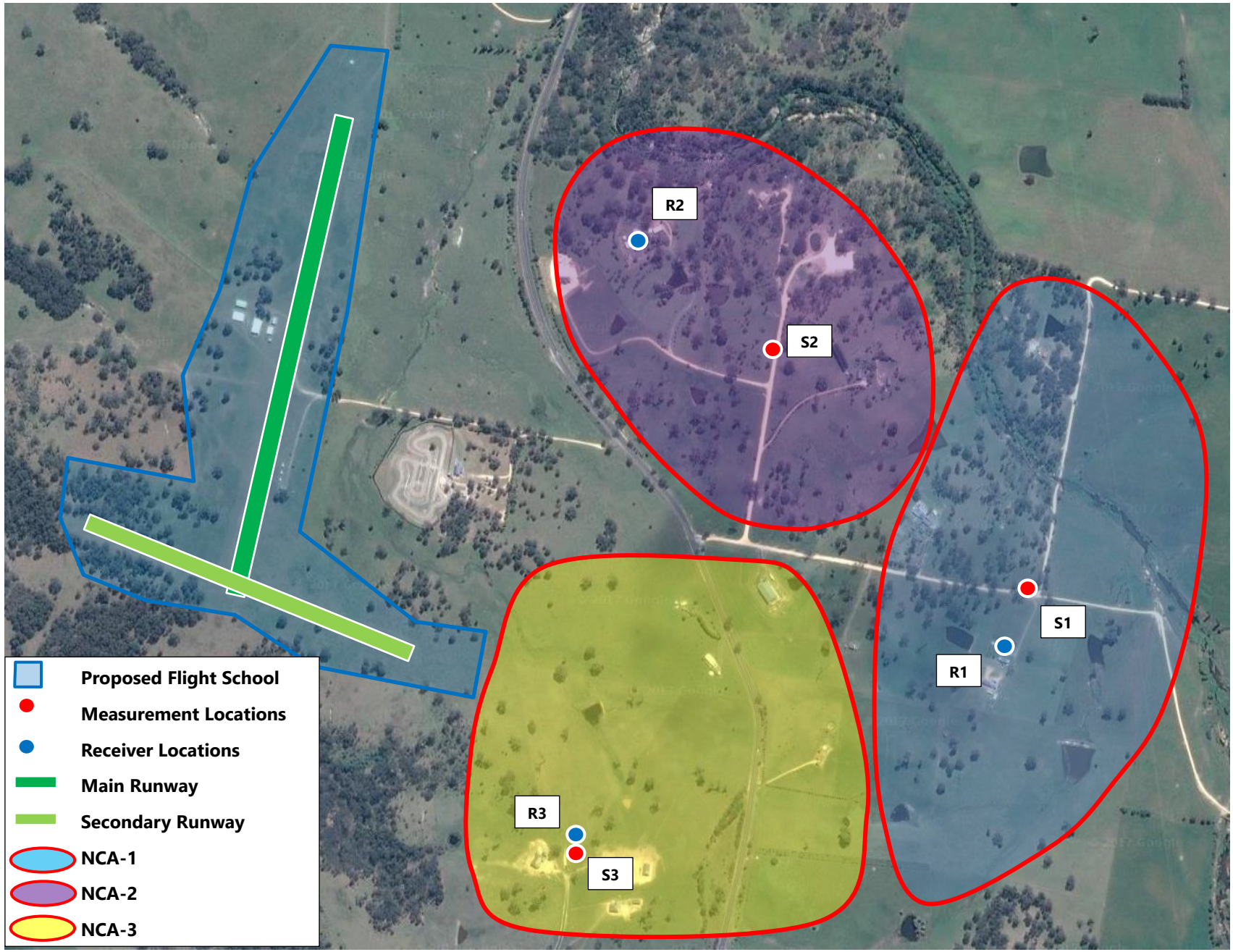
NCA 2 – Northeast of Subject Site
Residential properties located to the northeast of the subject site and across the Princes Highway.

NCA 3 – Southeast of Subject Site
Residential properties located to the southeast of the subject site.

It is noted that the existing residential property located to the north of the primary runway will be acquired as part of the flight school and will be used for accommodating the maintenance personnel for the flight school.

Figure 1 provides details of the site, surrounds and NCA locations.

Figure 1 – Site, Surrounds, NCAs and Measurement Locations



3 Existing Noise Environment

Background noise varies over the course of any 24-hour period, typically from a minimum at 3am in the morning to a maximum during morning and afternoon traffic peak hours. Therefore, the NSW 'Industrial Noise Policy' (INP – Environment Protection Authority NSW 2000) requires that the level of background and ambient noise be assessed separately for the daytime, evening and night-time periods. The NSW INP defines these periods as follows:

- **Day** is defined as 7:00am to 6:00pm, Monday to Saturday and 8:00am to 6:00pm Sundays & Public Holidays.
- **Evening** is defined as 6:00pm to 10:00pm, Monday to Sunday & Public Holidays.
- **Night** is defined as 10:00pm to 7:00am, Monday to Saturday and 10:00pm to 8:00am Sundays & Public Holidays.

3.1 Noise Measurement Locations

Noise measurements are ideally carried out at the nearest or most potentially affected locations surrounding a development. An alternative, representative location should be established in the case of access restrictions or a safe and secure location cannot be identified. Furthermore, representative locations may be established in the case of multiple receivers as it is usually impractical to carry out measurements at all locations surrounding a site.

The short-term measurement locations are outlined in Table 1 and shown in Figure 1.

Table 1 – Noise Measurement Locations

ID	Address	Description
S1	25 Frogs Hollow Lane, Frogs Hollow	Noise measurements were undertaken on the roadside of Frogs Hollow Lane adjacent to the driveway entrance to this property and in the free-field. The noise measurement location is considered representative of residential receivers in NCA 1.
S2	33 Moorlands Lane, Frogs Hollow	Noise measurements were undertaken on the roadside of Moorlands Lane and in the free-field. The noise measurement location is considered representative of residential receivers in NCA 2.
S3	14 Newlyns Place, Frogs Hollow	Noise measurements were undertaken at the driveway entrance to the property and in the free-field. The noise measurement location is considered representative of residential receivers in NCA 3.

3.2 Short-Term Noise Measurement Results

Short-term background and ambient noise measurements were undertaken between 12:00pm and 1:30pm on Monday 18th September 2017, in order to quantify the existing surrounding noise environment. Since the proposed recreational flight school will operate during the day period, only the day period will be assessed from herein.

The equipment used for noise measurements was an NTi Audio Type XL2 precision sound level analyser which is a class 1 instrument having accuracy suitable for field and laboratory use. The instrument was calibrated prior and subsequent to measurements using a Bruel & Kjaer Type 4231 calibrator. No significant drift in calibration was observed. All instrumentation complies with IEC 61672 (parts 1-3) '*Electroacoustics - Sound Level Meters*' and IEC 60942 '*Electroacoustics - Sound calibrators*' and carries current NATA certification (or if less than 2 years old, manufacturers certification).

A summary of the short-term background and ambient noise measurement results is presented in Table 2 below.

Table 2 – Measured Background L_{90} and Ambient L_{eq} Noise Level Results, dB(A)

Location	Measured Noise Level		Comments on measured noise levels
	L_{A90}	L_{Aeq}	
Monday 18 September 2017			
S1 – 25 Frogs Hollow Lane	29	39	Noise environment dominated by natural sounds (eg. birds, insects, etc) and considered representative of receivers in NCA 1.
S2 – 33 Moorlands Ln	35	41	Noise environment dominated by natural sounds (eg. birds, insects, etc) and traffic noise from the Princes Highway and considered representative of receivers in NCA 2.
S3 – 14 Newlyns Place	36	40	Noise environment dominated by natural sounds (eg. birds, insects, etc) and traffic noise from the Princes Highway and considered representative of receivers in NCA 3.

The identified receivers surrounding the subject site are all classified as rural under INP guidelines. Based on page 24 of the INP, where background noise levels are less than 30dB(A), the minimum applicable background noise level is recommended to be set at **30dB(A)**. Therefore, this minimum background noise level has been adopted for Location S1, where the background L_{90} noise level was measured to be 29dB(A).

4 Operational Noise Assessment

4.1 Operational Noise Criteria

Noise impact from general operation of the proposed flight school is assessed against the NSW Industrial Noise Policy (INP). The assessment procedure in terms of the INP has two components:

- Controlling intrusive noise impacts in the short-term for residences; and
- Maintaining noise level amenity for particular land uses for residences and other land uses.

4.1.1 Intrusive Noise Criteria

According to the INP, the intrusiveness of a noise source may generally be considered acceptable if the equivalent continuous (energy-average) A-weighted level of noise from the source (represented by the L_{Aeq} descriptor) does not exceed the background noise level measured in the absence of the source by more than 5dB(A). The intrusiveness criterion is applicable to residential premises only.

The intrusiveness criterion is summarised as follows:

- **$L_{Aeq,15minute} \leq$ Rating Background Level (RBL) plus 5dB**

Based on the measured background noise levels the applicable intrusiveness criterion for each NCA are presented in the following table.

Table 3 – Intrusiveness Noise Criteria, dB(A)

NCA	Address	Applicable Noise Criteria – $L_{Aeq, 15\ min}$
NCA1	25 Frogs Hollow Lane, Frogs Hollow	30 + 5 = **35**
NCA2	33 Moorlands Lane, Frogs Hollow	35 + 5 = **40**
NCA3	14 Newlyns Place, Frogs Hollow	36 + 5 = **41**

4.1.2 Amenity Noise Criteria

The INP amenity criteria are designed to maintain noise level amenity for particular land uses, including residential and other land uses. The INP recommends base acceptable noise levels for various receivers, including residential, commercial, industrial receivers and other sensitive receivers in Table 2.1 of the INP. Noise from new sources need to be designed such that the cumulative effect does not produce levels that would significantly exceed the criterion.

Table 4 – INP Amenity Criteria, dB(A)

Type of Receiver	Indicative Noise Amenity Area	Time of Day	Recommended $L_{Aeq(Period)}$ Noise Level	
			Acceptable	Recommended Maximum
Residence	Rural	Day	50	55
		Evening	45	50
		Night	40	45

Notes: 1. Daytime 7.00 am to 6.00 pm; Evening 6.00 pm to 10.00 pm; Night-time 10.00 pm to 7.00 am

2. On Sundays and Public Holidays, Daytime 8.00 am - 6.00 pm; Evening 6.00 pm - 10.00 pm; Night-time 10.00 pm - 8.00 am.

3. The L_{Aeq} index corresponds to the level of noise equivalent to the energy average of noise levels occurring over a measurement period.

Given that the noise from the aircrafts experienced at the sensitive receiver locations occur occasionally throughout the day period and the intrusiveness criteria for each NCA are more stringent than the amenity criterion for the day period, the intrusiveness criteria will be assessed against from herein. Compliance with the intrusiveness criteria would also result in compliance with the amenity criteria.

4.2 Operational Noise Sources

It is proposed that the recreational flight school would use the existing runways (ie. the Main and the Secondary runways) and utilise four (4) designated flight circuits as shown in Figure 2. Each proposed flight circuit will have a predetermined designated flight profile, as detailed in Figure 3.

Figure 2 – Designated Flight Circuits

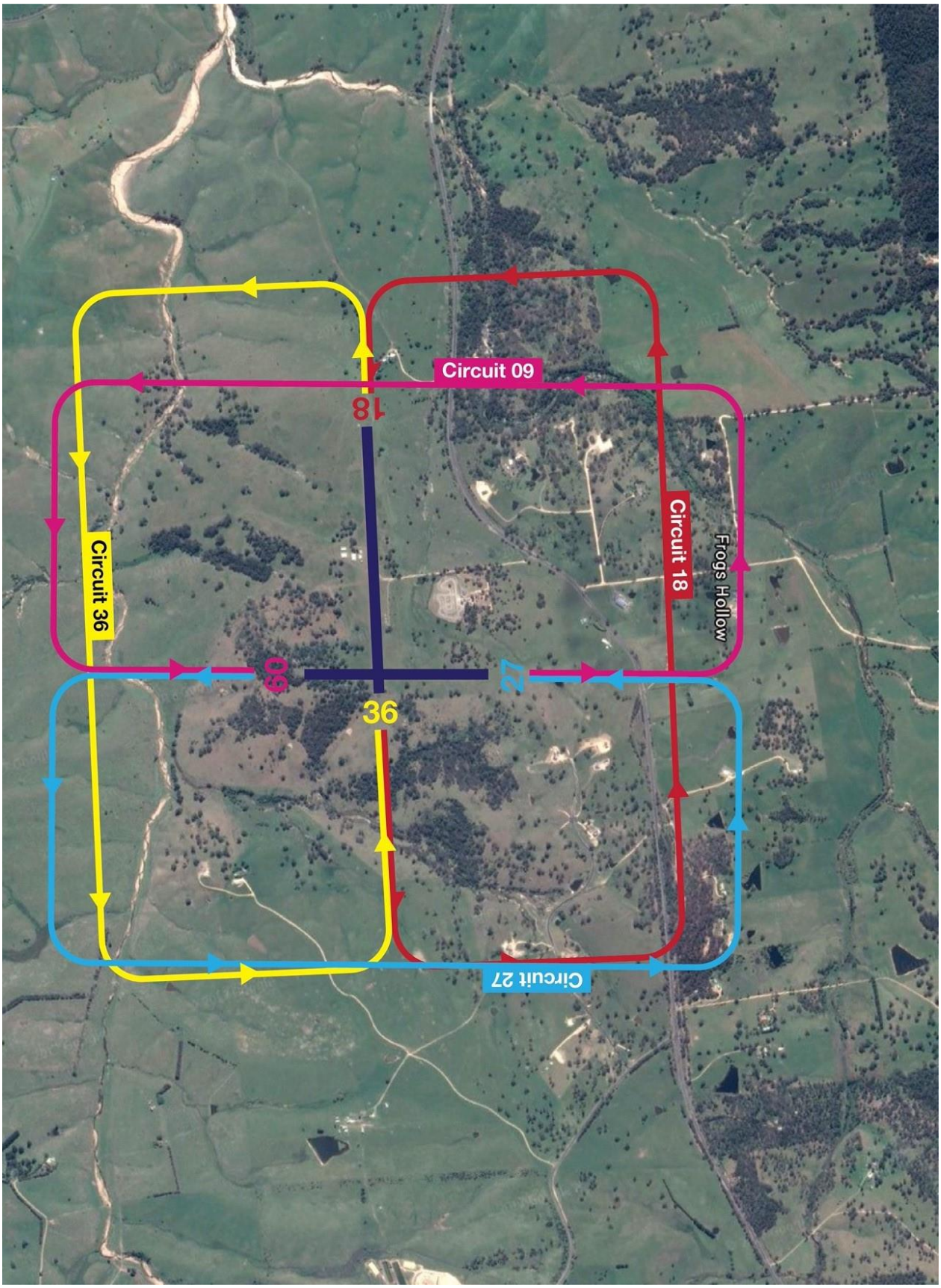
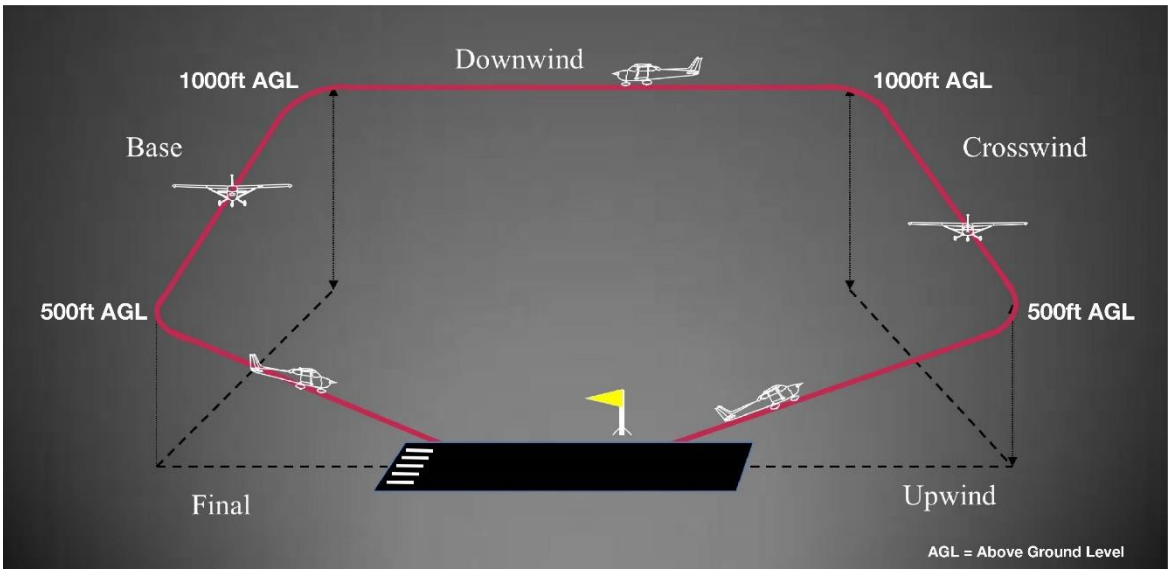


Figure 3 – Designated Flight Profile



The flight school will be using three (3) different types aircrafts for training purposes, namely the "Bantam", "Trike" and "Brumby". The aircraft that will be used predominantly throughout the flight training will be the "Bantam".

The test aircraft used in this assessment was fitted with a Rotax Type 912/ 80hp (UL/A/F) engine which is considered to be the most powerful and loudest engine to be used in the proposed aircrafts. Therefore, the measurement results used in this assessment are considered to be conservative and represent a worst case scenario.

Attended noise measurements were undertaken on Monday 18th September 2017, in order to quantify the aircraft noise at each measurement location (S1, S2 and S3). Two test flights were completed for each designated flight circuit (see Figure 2); and the noise generated by the aircraft flybys during each flight circuit were measured at the measurement locations (S1, S2 and S3). The measurement results and the equivalent noise level of one (1) aircraft flyby integrated / corrected over a 15 minute period (ie. $L_{Aeq,15min}$) are summarised in Table 5 below.

Table 5 – Aircraft Noise Measurement Results

Location	Circuit ID	Measurement No.	$L_{Aeq(Period)}$, dB(A)	Event Duration (seconds)	$L_{Aeq,15min}$, dB(A)[1]
Location S1	Circuit 18	1	46	70	35
		2	44	95	34
	Circuit 36	1	Noise inaudible		
		2	Noise inaudible		
	Circuit 09	1	52	95	42
		2	Disrupted Measurement - Not used		
		3	53	120	44
	Circuit 27	1	36	50	24
		2	34	45	21
	Taxiing on The Runway	Noise inaudible			
Location S2	Circuit 18	1	44	35	30
		2	40	95	30
	Circuit 36	1	Noise inaudible		
		2	Noise inaudible		
	Circuit 09	1	48	105	39
		2	48	79	38
	Circuit 27	1	38	11	19
		2	Disrupted Measurement - Not used		
	Taxiing on The Runway	Noise inaudible			

Location S3	Circuit 18	1	43	280	38
		2	42	200	35
	Circuit 36	1	41	40	27
		2	Disrupted Measurement		
	Circuit 09	1	50	70	39
		2	Disrupted Measurement		
		3	Disrupted Measurement		
	Circuit 27	1	44	30	29
		2	43	35	29
	Taxiing on The Runway	Noise inaudible			

Notes: 4. Equivalent LAeq,15min noise level based on measurement results

4.3 Operational Noise Assessment

Based on the calculated equivalent $L_{Aeq,15min}$ noise levels for a single aircraft presented in Table 5, the highest equivalent $L_{Aeq,15min}$ noise level for each flight circuit at each NCA is assessed against the established noise criteria with results presented in Table 6.

Table 6 – Assessment of Equivalent $L_{Aeq,15min}$ Noise Levels, dB(A)

NCA	Circuit	Noise Criteria	Equivalent $L_{Aeq,15min}$ Noise Level[1]	Complies?
NCA 1 (Location S1)	Circuit 18	*35*	35	Yes
	Circuit 36	*35*	Noise inaudible	Yes
	Circuit 09	*35*	**44**	**No**
	Circuit 27	*35*	24	Yes
NCA 2 (Location S2)	Circuit 18	*40*	30	Yes
	Circuit 36	*40*	Noise inaudible	Yes
	Circuit 09	*40*	39	Yes
	Circuit 27	*40*	19	Yes
NCA 3 (Location S3)	Circuit 18	*41*	38	Yes
	Circuit 36	*41*	27	Yes
	Circuit 09	*41*	39	Yes
	Circuit 27	*41*	29	Yes

Notes: 1. Based on highest measured noise level for one aircraft measured at the measurement location representative of the corresponding NCA

2. **Bold** font represents exceedance of the applicable noise criteria

Results presented in Table 6 above indicate that the equivalent $L_{Aeq,15min}$ noise levels for each flight circuit generally complies with the applicable noise criteria at each NCA. However, during aircraft flybys along Flight Circuit 09, noise levels were measured to exceed the applicable noise criteria by 9dB(A) at receivers within NCA 1.

4.4 Recommendations

The following recommendations provide in-principle noise control solutions to maintain noise compliance at the residential receivers. This information is presented for the purpose of Council approvals process and cost planning and shall not be used for construction unless otherwise approved in writing by the acoustic consultant. Assistance of an acoustic consultant must be sought at the detailed design phase of these works to provide the necessary design details and specifications.

Before committing to any form of construction or committing to any contractor, advice should be sought from an acoustic consultant to ensure that adequate provisions are made for any variations which may occur as a result of changes to the design and form of construction.

The advice provided here is in respect of acoustics only. Supplementary professional advice may need to be sought in respect of fire ratings, structural design, buildability, fitness for purpose and the like.

4.4.1 Management Measures

To determine the maximum number of aircraft movements in a 15 minute period, the equivalent $L_{Aeq,15min}$ noise levels presented in Table 6 have been scaled and results are presented in Table 7 below. The maximum number of aircraft movements are based on the assumption that only one flight circuit will be used in a 15 minute period.

Table 7 – Maximum Number of Aircraft Movements in a 15 Minute Period

NCA	Circuit	Equivalent $L_{Aeq,15min}$ Noise Level[1]	Noise Criteria	Maximum Number of Movements	$L_{Aeq,15min}$ Noise Level for Maximum Number of Movements	Complies?
NCA 1 (Location S1)	Circuit 18	35	35	1	35	Yes
	Circuit 36	Noise inaudible	35	–	–	Yes
	Circuit 09	44	35	0	–	**No**
	Circuit 27	24	35	7	32	Yes
NCA 2 (Location S2)	Circuit 18	30	40	7	39	Yes
	Circuit 36	Noise inaudible	40	–	–	Yes
	Circuit 09	39	40	1	39	Yes
	Circuit 27	19	40	7*	28	Yes
NCA 3 (Location S3)	Circuit 18	38	41	2	40	Yes
	Circuit 36	27	41	7	36	Yes
	Circuit 09	39	41	1	39	Yes
	Circuit 27	29	41	7	38	Yes

* It was noted that the maximum number of movements per 15min, would not be more than seven (7) as per proposed operations.

Based on the results presented in the above table, a summary of the recommended maximum number of aircraft movements to achieve noise compliance for each flight circuit in a 15-minute period is presented in Table 8 below.

Table 8 – Recommended Number of Aircraft Movements in a 15 Minute Period

Flight Circuit	Recommended Number of Movements
Circuit 18	1
Circuit 36	7
Circuit 09	0
Circuit 27	7

Due to the relatively large distances of the nearest affected receivers to the subject site, aircraft noise during the taxiing and movement around the airfield was inaudible at the closest receivers, which was evident during the short-term attended measurements as presented in Table 5. Therefore, various aircraft activities on the ground at the airfield are not expected to impact the nearest affected receivers and as such, no further mitigation measures are required.

Results presented in Table 8 indicate that the aircraft flybys along all Flight Circuits, compile with the applicable noise criteria at each NCA except for flybys along Flight Circuit 09. During aircraft flybys along Flight Circuit 09, noise levels exceed the applicable noise criteria at receivers within NCA 1 which are located on the eastern side of the Secondary Runway. Although the Secondary Runway cannot be used for normal operation of Flight Circuit 09, this runway can be used for emergency landings with no limit on the of maximum number of aircraft landings in a 15 minute period as no affected residential receiver is identified on the western side of this runway.

4.4.2 Mechanical Plant

As details for mechanical plant are not available at this stage of the development, the following in-principle noise mitigation measures are provided for mechanical plant servicing the proposed facility. It is recommended that a more detailed assessment be undertaken during the detailed design stage of the project when schedules of mechanical plant are known.

- Acoustic assessment of mechanical services equipment will need to be undertaken during the detail design phase of the development to ensure that they shall not either singularly or in total emit noise levels which exceed the noise limits specified in Section 4.
- Mechanical plant noise emission can be controllable by appropriate mechanical system design and implementation of common engineering methods that may include any of the following:
  - procurement of 'quiet' plant;
  - strategic positioning of plant away from sensitive neighbouring premises, maximising the intervening shielding between the plant and sensitive neighbouring premises;
  - commercially available silencers or acoustic attenuators for air discharge and air intakes of plant;
  - acoustically lined and lagged ductwork;

  - acoustic screens and barriers between plant and sensitive neighbouring premises; and/or
  - partially enclosed or fully enclosed acoustic enclosures over plant.

- Mechanical plant shall have their noise specifications and their proposed locations checked prior to their installation on site.

5 Conclusion

Renzo Tonin & Associates has completed an assessment of environmental noise impact from the proposed flight school to be located at Frogs Hollow in the Bega Valley in Southern NSW. Noise impact from the proposed flight school upon potentially affected receivers have been quantified and compared to the noise guidelines set by NSW Industrial Noise Policy.

Operational noise during a single aircraft flight movement was assessed against the relevant noise criteria and was determined to generally comply. However, exceedance of the noise criteria during a particular flight circuit was determined at one NCA. Therefore, in-principle noise management measures in the form of establishing the number of aircraft movements to maintain noise compliance during each proposed flight circuit were recommended.

Furthermore, in-principle noise mitigation measures for mechanical plant servicing the proposed flight school were also recommended.

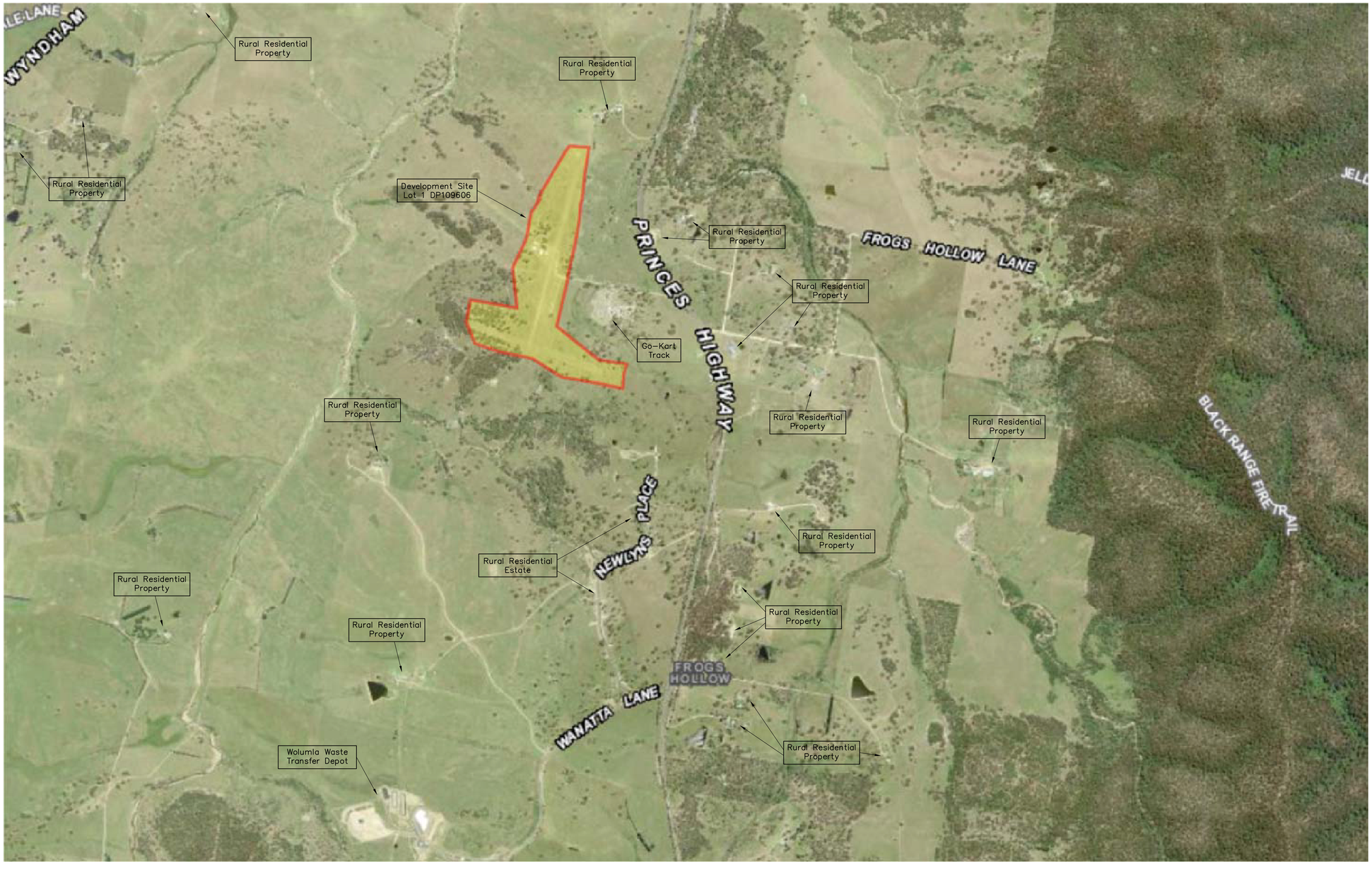
APPENDIX A Glossary of Terminology

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

Adverse weather	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).
Ambient noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
Assessment period	The period in a day over which assessments are made.
Assessment point	A point at which noise measurements are taken or estimated. A point at which noise measurements are taken or estimated.
Background noise	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).
Decibel [dB]	The units that sound is measured in. The following are examples of the decibel readings of every day sounds: 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 CBD mall 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
dB(A)	A-weighted decibels. The A- weighting noise filter simulates the response of the human ear at relatively low levels, where the ear is not as effective in hearing low frequency sounds as it is in 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.
dB(C)	C-weighted decibels. The C-weighting noise filter simulates the response of the human ear at relatively high levels, where the human ear is nearly equally effective at hearing from mid-low frequency (63Hz) to mid-high frequency (4kHz), but is less effective outside these frequencies.
Frequency	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.
Impulsive noise	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.
Intermittent noise	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 L90 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.
Reflection	Sound wave changed in direction of propagation due to a solid object obscuring its path.
SEL	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.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound absorption	The ability of a material to absorb sound energy through its conversion into thermal energy.
Sound level meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound pressure level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
Sound power level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Tonal noise	Containing a prominent frequency and characterised by a definite pitch.

APPENDIX B Site Plans



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Rev	Date	Comment
.	16.10.17	ISSUED FOR CONSTRUCTION

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Project

Establishment of Recreational Flight School
Frogs Hollow, 2550, NSW

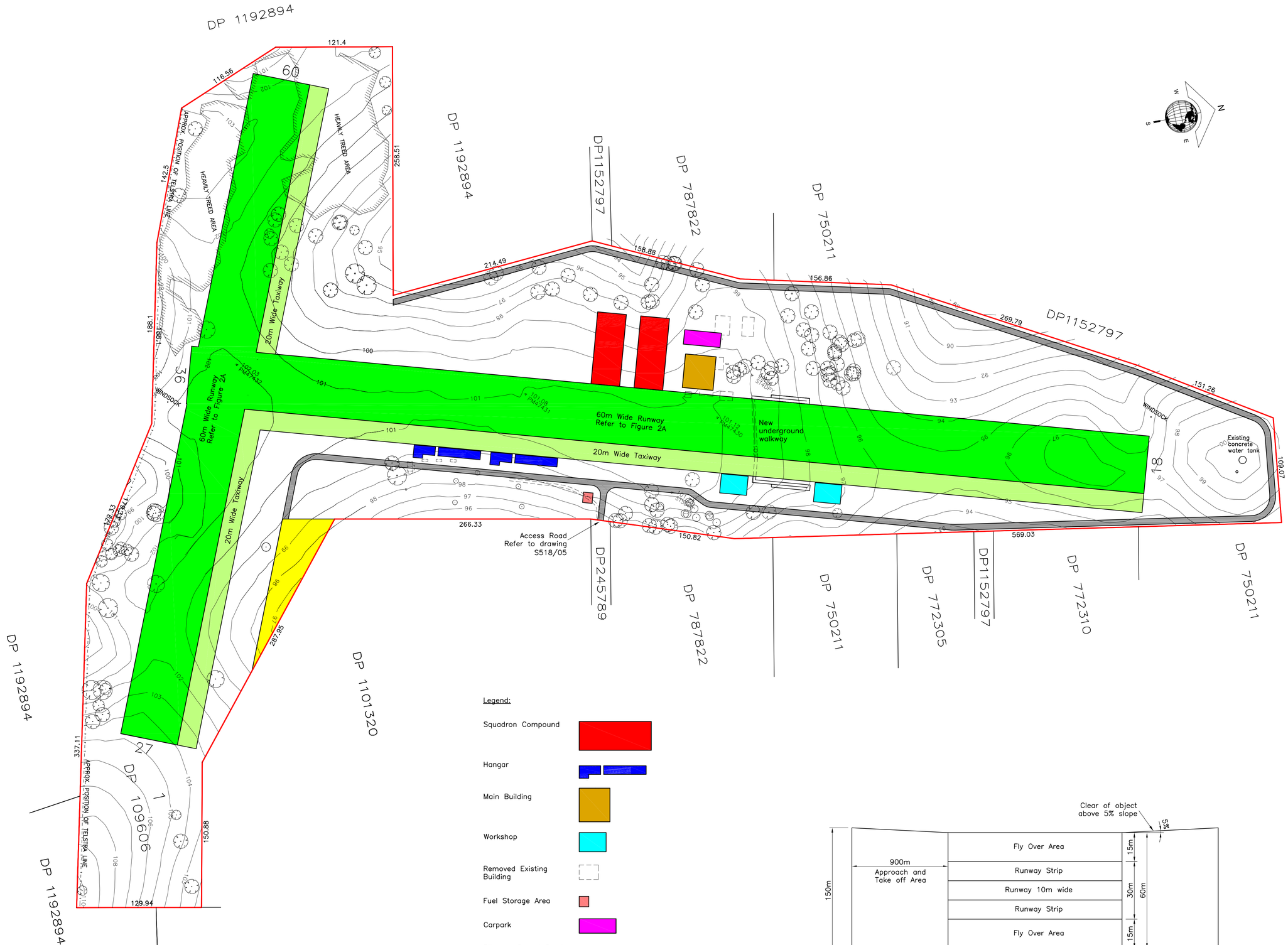
Title

Localisation Plan

Drawn by	Checked by	Date	Scale
AJH	AJH	Oct 2017	NTS

Sheet No.	Rev
S518-02	.

Cad File: \Network\Tasman Files\S518_Frogs Hollows_SAFC



Legend:

- Squadron Compound
- Hangar
- Main Building
- Workshop
- Removed Existing Building
- Fuel Storage Area
- Carpark
- Bitumen Sealed Road
- Designated Area for Relocation of Frogs Hollows AeroClub

Figure 2A – Single Engined and Centre–Line Thrust Aeroplanes not Exceeding 2000kg MTOW (day Operation)

Development Description Notes:

1. The proposed development consist of:

1a. Construction of 10 seperate Squodron Compounds. All buildings within the compounds will be single storey. Each compound will provide accomodation and infrustructure for 36 students at the same time.

1b. Construction of 10 single storey hangars. Each hangar consists of two separate units.

1c. Construction of 1 single storey main building containing kitchen and to be used for showroom, offices and diner.

1d. Construction of 2 single storey workshop buildings used for maintanance of planes.

1e. Construction of roads including new intersection between Princes Highway and access road.

1f. Construction of new bridge located along the right of way access road.

1g. Construction of required infrastructure and services.

2. The development willl be completed in 9 seperate stages. First stage will consist of construction of the main building, workshops, squadron compounds 1 and 2, hangars 1 and 2, roads and bridge (possibly intersection between Princess Highway and access road). The following 8 stages will be spread over 4 years period. Each stage will be carried out every six months until the development is completed.

3. The development will be caried out and operated in accordance with guidlines, requirements and specifications provided by Recreational Aviation Australia. Refer to Operational Manual Issue 7.1–August 2016.

4. This drawing to be read in conjunction with all relevant Architects, Engineers & Specialist drawings, sketches and specifications.

Rev	Date	Comment
.	16.10.17	ISSUED FOR DA SUBMISSION

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Project

Establishment of Recreational Flight School
Frogs Hollow, 2550, NSW

Title

Development Plan Showing Proposed Infrustructure Stage 1

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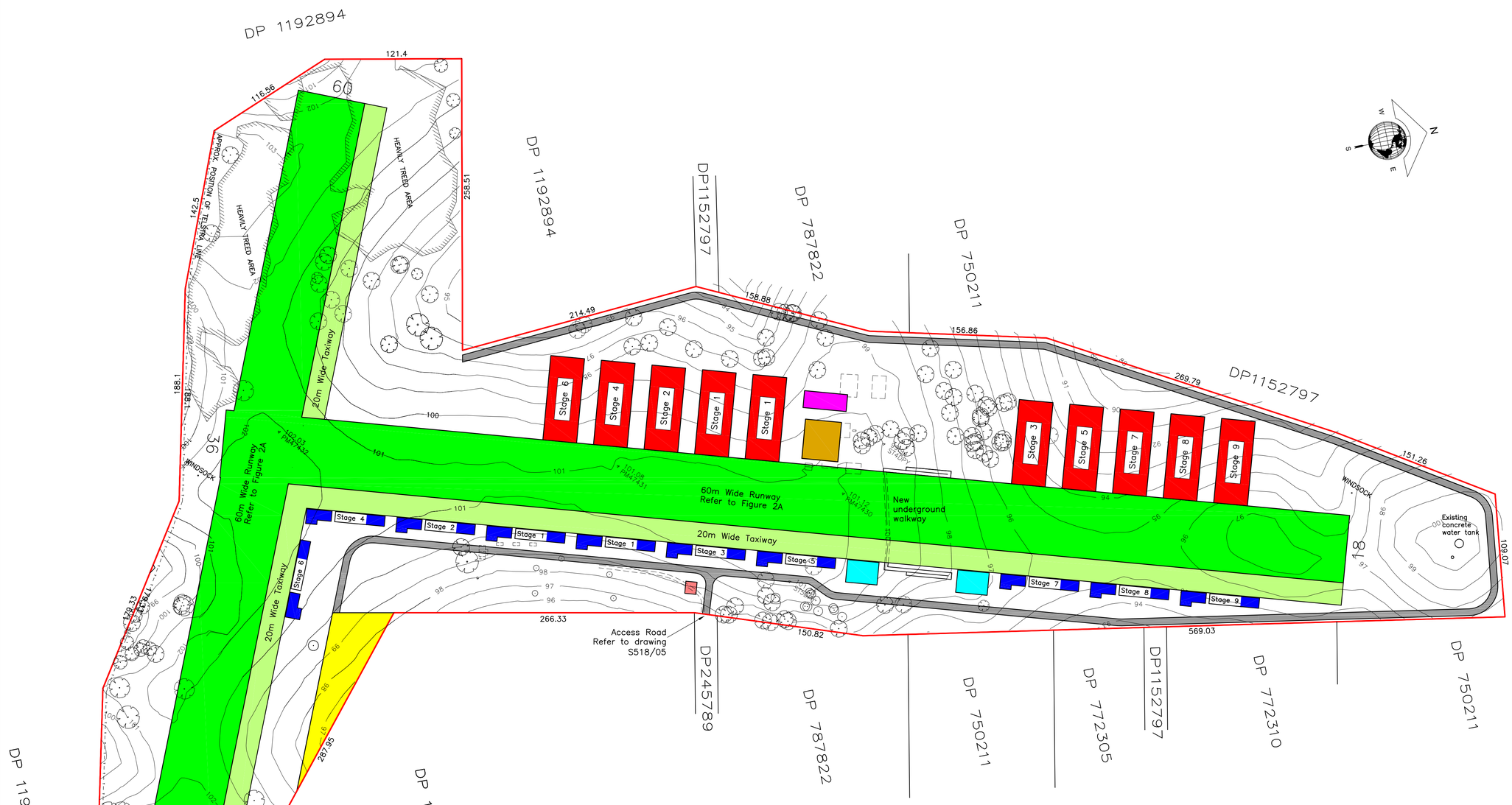

Legend:

- Squadron Compound (Stages 1–9) — Stage 1
- Hangar (Stages 1–9) — Stage 1
- Main Building (Stage 1)
- Workshop (Stage 1)
- Removed Existing Building
- Fuel Storage Area
- Carpark
- Bitumen Sealed Road
- Designated Area for Relocation of Frogs Hollows AeroClub

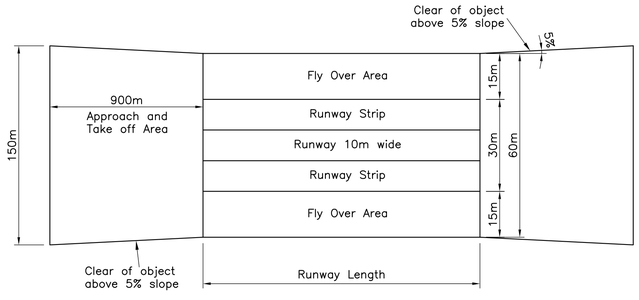

Figure 2A – Single Engined and Centre–Line Thrust Aeroplanes not Exceeding 2000kg MTOW (day Operation)

Development Description Notes:

1. The proposed development consist of:

1a. Construction of 10 seperate Squodron Compounds. All buildings within the compounds will be single storey. Each compound will provide accomodation and infrustructure for 36 students at the same time.

1b. Construction of 10 single storey hangars. Each hangar consists of two separate units.

1c. Construction of 1 single storey main building containing kitchen and to be used for showroom, offices and diner.

1d. Construction of 2 single storey workshop buildings used for maintanance of planes.

1e. Construction of roads including new intersection between Princes Highway and access road.

1f. Construction of new bridge located along the right of way access road.

1g. Construction of required infrastructure and services.

2. The development willl be completed in 9 seperate stages. First stage will consist of construction of the main building, workshops, squadron compounds 1 and 2, hangars 1 and 2, roads and bridge (possibly intersection between Princess Highway and access road). The following 8 stages will be spread over 4 years period. Each stage will be carried out every six months until the development is completed.

3. The development will be caried out and operated in accordance with guidlines, requirements and specifications provided by Recreational Aviation Australia. Refer to Operational Manual Issue 7.1–August 2016.

4. This drawing to be read in conjunction with all relevant Architects, Engineers & Specialist drawings, sketches and specifications.

Rev	Date	Comment
.	16.10.17	ISSUED FOR DA SUBMISSION

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Project

Establishment of Recreational Flight School
Frogs Hollow, 2550, NSW

Title

Development Plan Showing Proposed Infrustructure Stages 1–9

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