WEST YAMBA
LOCAL HELIPAD

Planning Proposal

20th April 2015

Prepared by Johnston Enterprises Australia Pty Ltd

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VH-ENE

To: The General Manager

Clarence Valley Shire Council

Attention: David Morrison – Strategic Planner CVC

David.Morrison@clarence.nsw.gov.au

Dear Sir,

We are pleased to submit this Planning Proposal to Clarence Valley Shire Council for the continuation of a helipad use on Lot 51 DP 751395 Golding Street Yamba. We thank you for the input and advise from your strategic planning team and look forward to further discussing the report and any comments, recommendations or changes you may have.

NAME	ORGANISATION	ROLE
Norman Johnston Principal **M: 0431 969 932**	**Johnston Enterprises Australia Pty Ltd.** **PO Box 230 Jannali NSW 2226**	**Project Director and Planning Adviser.** *Exclusive CV Council contact on this Planning Proposal.*
Neil Garrard	**Kahuna No 1 Pty Ltd**	**Representative of Land Owner and Company.**
For JE Australia Pty Ltd	**Geoarc Consulting Pty Ltd**	**Aviation Operations Response Statement**

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Johnston Enterprises Australia Pty Ltd is representing the owners of Kahuna No 1 Pty Ltd on this land use continuation matter. J/E Australia is a privately owned company that is fully controlled by its Company Directors and has been operating in Australia and overseas since 2007. During this time it has evolved into a boutique high level advisory group that has diversified its professional advice and services in the fields of Major Development, Planning, Economic Analyses, Special Economic Zones, Policy and Infrastructure & Transit Oriented Value Capture. The Company Director has many years of local and international experience in this area of expertise, running major public organizations at CEO level.

Executive Summary

Johnston Enterprises Australia Pty Ltd has pleasure in submitting this Planning Proposal (PP) on behalf of Kahuna No 1 Pty Ltd the land owner and current user of the existing helipad facility – on Lot 51 DP 751395 Golding Street Yamba, NSW 2464.

This PP should be read in conjunction with the Development Application (DA) for the continuation of the helipad use on the subject site.

This document is intended to explain the effect of a proposed amendment to the current local environmental plan (LEP) based on a detailed examination of the facts and supporting material and in so doing sets out the justification for the Council making this minor amendment to the current CVCLEP 2011. There has been a professional consideration of the operation status of the current facility for some 7 years, the noted lack of community complaints, its wider potential benefit in the case of Emergency Medical Services (EMS) and the technical advice required to support this application which has been prepared with the input of leading companies in their particular field of expertise.

We understand that the Planning Proposal (PP) is the first step in preparing a minor amendment to the LEP to allow the continuation of the current use and is part of a series of considerations and further community input into this process by CVC. It will hopefully provide the basis for support to the minor amendment and be agreed by Council and the NSW Department of Planning.

We ask that you consider these important points:

- The existing use has been in operation for some seven (7) years as a result of a DA 2008/0481 approved by Clarence Valley Council on 26th of August 2008. It has operated without complaint over that period and within the limitations of the approval.
- The helipad is used for the transport of a child (family member) with a critical illness requiring emergency medical care and is limited to seven (7) trips per week and it is also available for family members.
- The helipad facility is currently available and will remain available for wider emergency medical evacuation should this be required and is able to transport people who may have critical injuries at night – due to CASA approved lighting around the landing facility.
- The use was subject to a cessation clause in the original DA approval, upon zoning of the land to R1 Residential, however it has been established in this Planning Proposal that the land will not be required for that purpose over the next 15 – 20 years due to the balance of Urban Release Lands (URL) at West Yamba some 95% of holdings, not including this smaller site.
- In terms of the overall objectives outlined in various Strategic Plans, which led to WYURA being established as an Urban Release Area, the current site represents less than 3.58% of the future population projections of 2,400 residents – over the next 20 years.
- As such it is a relatively insignificant part of the Urban Release Area (URA) and has to be serviced separately.
- In relation to the current use as a helipad all helicopter flight paths are flown in accordance with the detailed Acoustic Report and the Aviation Operations Response Statement that cover both the Eastern Flight Path and the Western Flight Path. There are no residential over-fly areas.
- While we don't recommend the current zoning changing, we have recommended that this helipad use be a Scheduled use against this Lot 51 DP751395 as part of the existing land use classification.
- When a subdivision application for the future residential use of the land is lodged and registered, then upon registration this current use should cease.

Overall we ask that the Planning Proposal be supported. This is on the basis of its responsible operation over the past 7 years, its use as a medical evacuation facility and the wider benefit to the community, and societal advantages we have discussed in the PP that support for the future use continuing.

We request that Council (by supporting the zoning change) seek Gateway approval from the NSW Department of Planning for the scheduled use continuing. Then once adopted we request the Council formally consider the Development Application for the continuation of the helipad use on the subject site.

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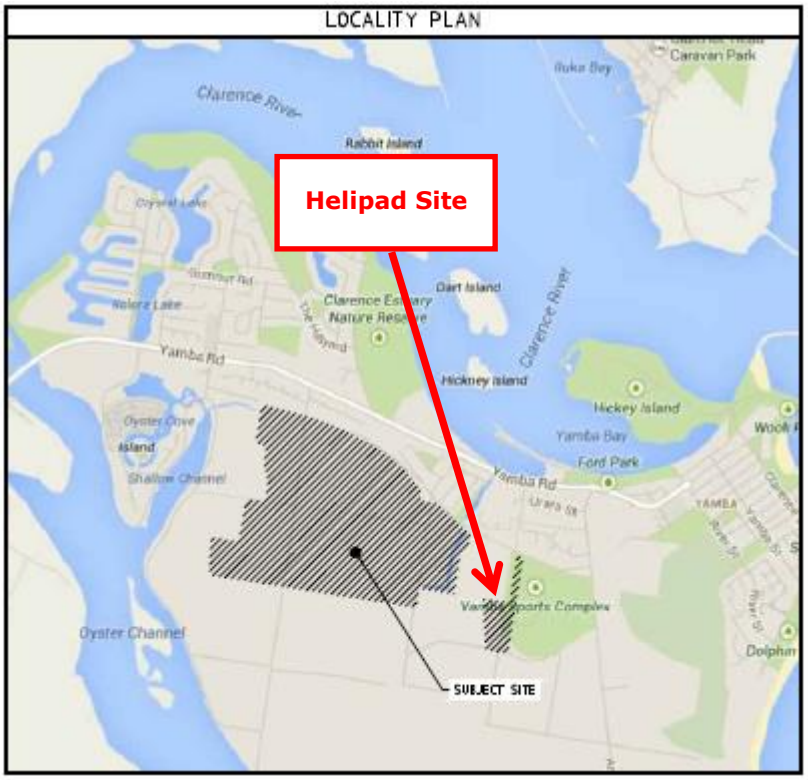
Executive Summary:

Background

Site Location

The subject site, for the Planning Proposal (which has been operating as a helipad for the past seven years) is Lot 51 DP 751395 Golding Street Yamba NSW 2464. The land in question can be identified below:

West Yamba URA (Black) & Heli Pad Site (Red)



The site is in a reasonably remote setting with open space surrounding the land and typically coastal bush setting. It has road access corridors to the north and south east, via Freeburn Street which are available to the Yamba community and those living further south at Angourie. It does not have a residential character as yet and it will be many years before residential development encroaches on this part of Yamba.

- It has a relatively flat topography, and is isolated being surrounded by bushland and industrial land making it a very suitable location for this type of land use.
- Over $2million has been spent on established infrastructure which supports the helipads current operation.
- Over 12 test flights were undertaken to determine the suitability of the location and the best access and flight paths to avoid noise conflict with neighbours and residential areas.
- A large Machinery and Storage Shed has been built to store necessary material for the Helicopter Agausta 109 maintenance.
- HLS lighting which meets Guidelines of the CAAP 92-2 (1) and approved by CASA standards and enabling evening flights.
- All weather helipad capable of servicing modern twin engine helicopter services.
- Location of these facilities away from neighbouring areas to avoid noise impacts and to meet the noise standard guidelines adopted in the "Fly neighbourly Guide".

Purpose of the Planning Proposal

This Planning Proposal is intended to outline the rationale behind a request for an amendment to the existing CV Local Environmental Plan (LEP) 2011 by way of a Scheduled Use for a helipad on Lot 51 DP 751395 Golding Street Yamba NSW. The rezoning of the land in 2011 has meant that the existing use is now prohibited under the R1 zoning. This together with a "sunset clause" from the Council Minutes dated 26th August 2008 (P.93) terminated the current use – refer below:

"A sunset clause will be imposed on any development consent given, which will stipulate the use of the allotment for the purpose of a helipad is to cease upon the gazettal of the subject, or any adjoining land, being zoned to a residential zone." CVC Resolution: 26/8/2008.

The Planning and Operational Rationale in summary is:

- The subject land while now zoned residential – will not be required for residential purposes for the next 15 – 20 years and as such will not impact on the strategic planning initiatives of the CVC – nor delay/impact any land release opportunities.
- There are substantial holdings available within the first stage land release for the WYURA to supply residential land for the next 15 – 20 years. Over 95ha's of the total 121ha's is available in this first stage release area alone.
- The subject land is geographically removed from the major release area and requires separate servicing and investment into catalyst infrastructure, making it un-economic to develop in the short term having regard to the low number of lots generated from this area – which is less than 50.
- The helipad is predominantly used for the emergency medical care of a family member, who requires urgent access to hospitalization and specialist care. Nothing has changed from the original "purpose" outlined in the development approval dated August 2008.
- A letter from the current attending GP will ratify this need – under separate cover.
- The use of the site as a helipad is limited to 7 movements per week, again consistent with the original approval.
- The use as a helipad is however available for emergency medical evacuation to the general public and wider community and has CASA approved night lighting which allows for this to happen on a 24 hour basis.
- A Comprehensive 'Aviation Operation Response Statement' was completed with the original development approval and is attached. They relate to the operation of "an Agusta 109 Grand with Pratt & Whitney C207 engines" which is the same Helicopter operating the facility since the establishment in 2008.
- There have been no recorded noise objections that we (as owner/operators) are aware of and none to our knowledge reported to CVC in the 7 year period of operation from the site.
- This has resulted from the location of the helipad landing area to the south of the subject site as recommended in the noise consultancy and further by the natural buffer generated by the E3 Environmental Management zones surrounding the site.
- In addition the existing flight corridors have been maintained and minimize the disruption to residential land users to the north and east of the site through avoiding those areas.
- There are no residential over fly areas in flight corridors approaching Yamba.
- Over $2million has been spent establishing the Helipad using CASA approved Guidelines for the site works, lighting, building and maintenance areas and helipad landing area.

The current process has followed that outlined in the Department of Planning's publication "A guide to preparing Planning Proposals" (Department of Planning, 2012). We indeed welcome input in addition to local community comment as we firmly believe our Planning Proposal is of benefit to all parties mentioned.

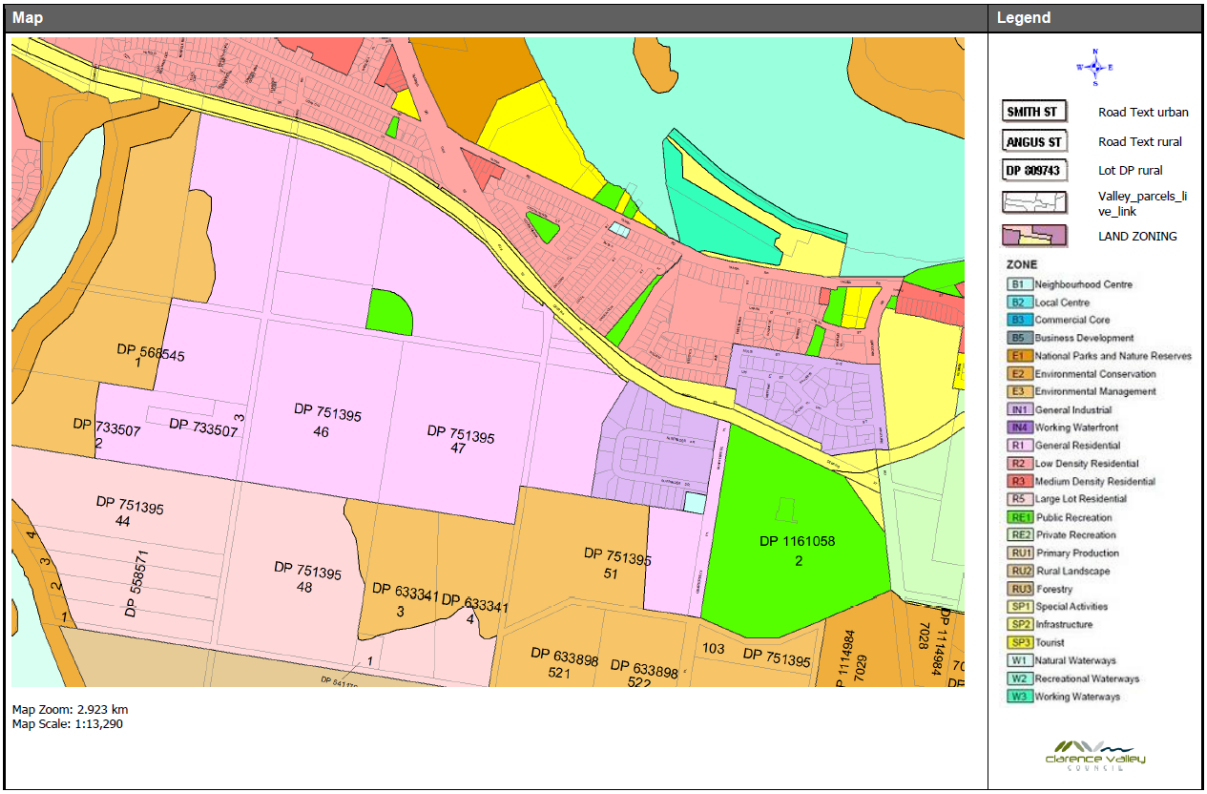
Zoning

The site is zoned part R1 General Residential and part E3 Environmental Management under the CV Local Environmental Plan 2011, no 701. The site where the helipad currently operates is wholly within the R1 Residential zone.

Objectives of zone (R1 General Residential)

- To provide for the housing needs of the community.
- To provide for a variety of housing types and densities.
- To enable other land uses that provides facilities or services to meet the day to day needs of residents.

West Yamba Zoning Map – LEP 2011, no 701



History of Planning Approvals – subject land

The site was originally approved as a helipad by DA 2008/0481 - Clarence Valley Council on 26th of August 2008. At the time of the determination a condition was placed on the DA approval to require that the approved use was to cease when the land was zoned for future residential purposes.

Conditions and Notice of Determination are attached at Appendix 1. A Construction Certificate followed the original approval to establish machinery and storage shed – details outlined below:

PURPOSE	TITLE AND USE	DETAILS
Purpose: Permission to establish a helipad landing site under Part 4 EP&A Act (1979).	Part Lot 51 DP 751395 Golding Street Yamba NSW.	DA No. 2008/0481 CVC Date: 26/8/2008
Purpose: Machinery and Storage Shed under s 81A (5) of the EP&A Act (1979).	Part Lot 51 DP 751305 Golding Street Yamba NSW.	DA No 2006/1100 CVC Date: 20th December 2006

The Development Approval for the helipad did require at the time additional information in the form of acoustic testing and details associated with flight paths and helicopter landing information.

To address these requirements the applicant lodged the following:

- An Aviation Operations Response Statement prepared by Geoarc Consulting Pty Ltd &
- A helipad operations Acoustic Report prepared by The Acoustic Group Pty Ltd.

Both reports made recommendations on the siting and operations of the helipad and were adopted at the time. Nothing has changed in the past 7 years and the operation of the landing site has met all conditions of approval and no complaints lodged. In addition the same Helicopter as was used in the twelve test flights which formed part of the acoustical examination, is the same aircraft used today, an Agusta 109 Grand with Pratt & Whitney C207 engines.

Copies of both Reports appear at Appendix 2 & 3 and detail the extensive "operations" and "Acoustic" work completed. To confirm, the helicopter has operated consistently with these 'Reports' and there are no changes to the parameters required for the continuation of the current use.

As indicated below the site is in a remote setting, surrounded by Bushland zoned for Environmental Management purposes and most likely to remain with this zoning for many years. The site has access via an unmade road which is the southern end of Freeburn Street, off Deering Street. The "road handle" to the north of the subject site, is currently owned by Council.

PLANNING PROPOSAL

Part 1 - Objectives or intended Outcome

Planning Proposal Objective

The objective or the intended outcome of the planning proposal is**:**

To enable a helipad to continue to operate on Lot 51 DP 751395 Golding Street Yamba NSW 2464 whilst the land is not required for urban land release and such use remains compatible with encroaching urban development.

This is intended to give effect to:

- Allowing the current helipad use to be a permitted use within the CV LEP 2011
- Enabling the continuation of the existing Helipad land use while the location is compatible with surrounding land uses.
- Enabling the use to serve a medical evacuation role for the family member and also serve as a community asset for the wider Yamba and Maclean communities.
- Recognize the existing constraints on the subject land in relation to the timing of separate infrastructure requirements and remote location which means the site is well removed from the draft Services Plan for WYURA.
- Recognises the value of the $2m investment in works that has gone into the establishment of the Helipad on the subject site.

At present the site does not form part of Stage 1 of the WYURA DCP. Stage 1 comprises some 90ha's and is located just west of the helipad site and accessed by way of a separate road system. It is accessed by an unformed road at the southern end of Freeburn Street which Council have advised my client on 1/9/2008 that it will be named Quarterdeck Place.

In view of this situation, the subject land will not be developed for at least 15 years due to the need to economically develop the majority of WYURA lands and the payment of the necessary infrastructure and services. It is therefore the intended outcome for this site to be residential in the longer term and as such when a development application for a residential subdivision is registered over the land the current use should cease.

Existing Helipad Site (Established) in the Bushland setting

Part 2 - Explanation of Provisions

How the intended outcome is achieved – **Objective One**

The Objective/Intended outcome will be achieved by amending the CV LEP 2011 in the following way:

1. Amend Schedule 1 by adding 'helipad' as an 'additional permitted use' on part of the land:

"5. Use of certain land at Golding Street Yamba

(1) This clause applies to land at Golding Street Yamba being Part Lot 51 DP 751395, identified as "1" on the Additional Permitted Land Use Map.
(2) Development for the purposes of a helipad is permitted with the consent of the Council".

2. Inserting definition in the Dictionary of the LEP as follows:

"Additional permitted uses map means the CV LEP 2011 Additional Permitted Uses Map".

3. Preparing an Additional Permitted Uses Map to indicate the part of Lot 51, DP 751395 in which the helipad will be a permissible use;

Next Steps:

Following the formal consideration of the Planning Proposal, by both Council and the NSW Department of Planning – it will be necessary to lodge a development application (DA) with Clarence Valley Council seeking approval for the continuation of the existing use as a helipad.

Clarence Valley Local Environmental Plan 2011: Part 4 Development Application for a Local Development.

The next step will involve lodging a Development Application (now underway) with the Clarence Valley Council for the use and operation of a helipad on Lot 51 DP 751395 subject to Objective 1 being supported by Clarence Valley Council and passing through Gateway and endorsed by the NSW Department of Planning.

Part 3 - Justification

SECTION A – NEED FOR THE PLANNING PROPOSAL

Q1: Is the planning proposal a result of any strategic study or report?

No. The LEP does not permit a helipad due to the R1 Residential Zone and the fact that it has also been designated as an urban release area in the LEP. There is also a fundamental association between the Councils current residential planning strategy work which is identifying future urban release areas to meet population targets for the Shire and the timing for the release of those lands. This Planning Proposal however represents a solution to a particular land use problem that serves a critical need.

Q2: Is the planning proposal the best means of achieving the objectives or intended outcomes, or is there a better way?

Yes. The current use is now a prohibited use for the site and no existing use rights appear to apply. After discussions with Council's strategic planning team we believe that the solution put forward in the Planning Proposal is sensible and meets short to medium term objectives. This is without compromising the mid to long term objectives of the Region and the Council's intention with respect to land release, sustainability drivers, contemporary urban planning and community interests – particularly the interests of the local area in the event of a medical emergency that requires air lift support.

Q3: Is there a net community benefit?

Yes. A formal community benefit test has not been undertaken at this stage though the key considerations of such a test have been considered. We believe the solution will satisfy and prove to have a Net Community Benefit and again would welcome Councils support of this Planning Proposal to move to that stage if it is considered necessary.

SECTION B – RELATIONSHIP TO STRATEGIC PLANNING FRAMEWORK

Q4: Is the Planning Proposal consistent with the objectives and actions contained within the applicable Regional or Sub Regional Strategy?

Yes. The Planning Proposal is consistent with the Sub Regional Strategy – for the Mid North Coast Region.

The Mid North Coast Regional Strategy:

Assessment: This is a 25 year land use planning strategy which identifies key objectives for the Mid North Coast Region. One of which is the need for 59,600 new dwellings to meet regional growth expectations untill 2031. As indicated, while the underlying land use is Residential R1 under the CV LEP 2011, it is not available or able to be used for residential purposes – the same applies to the neighbouring Caravan Park, which is also operating a viable alternate tourism use – notwithstanding it's new zoning.

As with the Caravan Park the land also falls within the nominated urban release area – although the helipad site is well removed physically from the major land release of West Yamba and has to be serviced with infrastructure separately. Because of this the land does not represent a short to medium term strategic asset under the strategy for future residential development for the reasons outlined in the Planning Proposal. The Planning Proposal is therefore consistent with the key objectives of the Regional Strategy.

The Regional Strategy will not be impacted by the continuation of the current use over time and actually supports the concept of having key infrastructure and transport options available as population grows and where there are tourist peaks. The stated allowance by the owner to provide community access to use the helipad facility in the case of medical emergencies, and this being available over 24 hours – makes this a unique and critical transit facility.

When urban encroachment does start to occur, the current land use can be converted to a residential use, once a development application for a 'Residential Subdivision' is registered – the use can then terminate.

The Clarence Valley Economic Development Strategic Plan 2006:

The Clarence Valley Region generates $1.42B (2002/3) in gross regional product according to the Economic Development Strategic Plan. The helipad will contribute positively to this through:

- Providing a value adding land use.
- Adding to the existing infrastructure transport options and
- Supporting local stakeholders, through a "positive, welcoming community".

Kahuna No 1 P/L is an International Company with local officers in Queensland and Yamba which support local employment. The Company has strong links to the United States of America and their presence in Yamba adds to the competitive strengths of the Region.

CV Local Environmental Plan (LEP) 2011:

The Strategic and Statutory Planning Framework to which the Planning Proposal relates involves the 'West Yamba' urban release area WYURA. It was established from State, Regional and Local Planning strategies and policies. The principal guiding document is the new CV LEP 2011 No 701 Part 6 - which is the fundamental driver of local planning initiatives for the WYURA. At present there are no plans for infrastructure provision in relation to the Scheduled land, so the Planning Proposal will not prejudice this framework.

Relevant Aims of the CV LEP 2011:

a) To provide a mix of housing, including affordable housing, to meet the needs of the community.

Assessment: It is considered that the land currently available in Stage 1 of the WYURA will provide a mix of housing lots sufficient to meet the needs of an expanding Yamba community for the next 15 – 20 years. This will ensure an adequate supply of affordable housing is available for future generations and assist in meeting population growth forecasts **without** the use of this area of land – the subject of the Planning Proposal.

b) To provide adequate access and services to development carried out in accordance with this plan.

Assessment: The subject site is situated on the periphery of both the WYURA and the Yamba business district and is surrounded by land zoned for 'Environmental Management' purposes. Being on the periphery is a suitable location for the land use and it is served by an unmade road which is an extension of Freeburn Street.

In addition flight corridors have been designed to avoid any over flying of existing residential areas. The Land Zoning Map attached to the LEP zones the land R1 General Residential. No change to this zoning is proposed in this submission. We believe the Planning Proposal maintains and supports the current settlement pattern of the Yamba Township and supports the lands use as a Helipad over the mid to long term.

c) To protect key infrastructure and ensure adequate integration of infrastructure and development.

Assessment: More than any other aim, this principle is supported by the Planning Proposal put forward for the subject land. You cannot fragment infrastructure servicing across two release areas – economically. To put infrastructure and services into this area is far more expensive on a per lot basis than it is to supply infrastructure and services to some 800+ lots in the Stage 1 release area of the WYURA. You cannot integrate the infrastructure either as the land is

buffered by open space and environmental bushland, and infrastructure services all run off Yamba Road and into Carrs Drive as the principal access route. This Stage 2 land is well removed from that Services Strategy.

Zone R1 General Residential – CV LEP 2011:

There is no change proposed to the current zoning of the subject land. It is considered that the subject site (Lot 51) will remain as a Helipad for some, (if supported) and when the use is redundant over time will become consistent with the future residential character and be economical to service with appropriate infrastructure:

Assessment: There will be little if any impact on the residential supply & character of the future WYURA subdivision layout as it is well removed from the subject land and separated by semi-rural and bushland communities. Over time this land will become available for future residential development and will meet the objectives of the zone. The current adjoining land uses will actually serve to minimise any conflict between the two areas and any future land use and property development within neighbouring zones where the major supply of residential land is available.

CV Residential Zones (DCP) 2011

The aim of the plan is to support and complement Clarence Valley Local Environmental Plan 2011 (CV LEP 2011) and to encourage well designed, high quality development within residential zones in the Clarence Valley.

Assessment: This is a comprehensive DCP already adopted by CVC in December of 2011. As such is explains and guides in some detail the residential subdivision of land and the proposed new mix of residential lot sizes. As the subject land forms part of WYURA it is subject to Part 6 of the LEP which requires a DCP to be prepared, prior to any future residential development. That WYURA DCP has been prepared in draft and is due for exhibition in April 2015. Once the exhibition is completed the new DCP will form an Annexure to the existing Residential DCP, as is common with other release areas in Clarence Valley Region. None of this will impact the current use of the subject site as a Helipad continuing for some time.

Q5: Is the Planning Proposal consistent with the local Council's Strategic Plan (Our Community Plan 2015 – 2024) or other Local Strategic Plan?

Yes. The Clarence Valley Shire Council (CVC) has undertaken a number of key strategic planning initiatives over the past several years, which were aimed at improving and guiding the long term planning needs of the Mid North Coast Region. This was particularly so when it came to future residential lands and associated subdivision of land, in particular the land known as the West Yamba Urban Release Area (WYURA).

"Our Community Plan 2015 – 2024" outlines the community's expectations for the Council and its administration over the next decade. It highlights what the Community's expectations are and there is nothing in this Planning Proposal that conflicts with those expectations. In fact the Planning Proposal does offer another piece of transport infrastructure – that while private has been offered to the Local Community as an emergency air transit asset.

In terms of land use planning, the Council's strategic planning has been a long term process that led to the April 2010 urban zone over the West Yamba lands. This work included the West Yamba Local Environmental Study (LES) and subsequent LES review. The work was also consistent with the 1999 Clarence Valley Settlement Strategy.

This resulted in WYURA which occupies approximately 121ha's and is proposed to be staged for development of strategic land holdings over the next 20 years. A comprehensive Development Control Plan (DCP) guiding the release of those lands is proposed for Exhibition in April 2015. While the helipad site forms part of the WYURA it is only 4% of the total land release and is actually physically separated from the majority of land holdings.

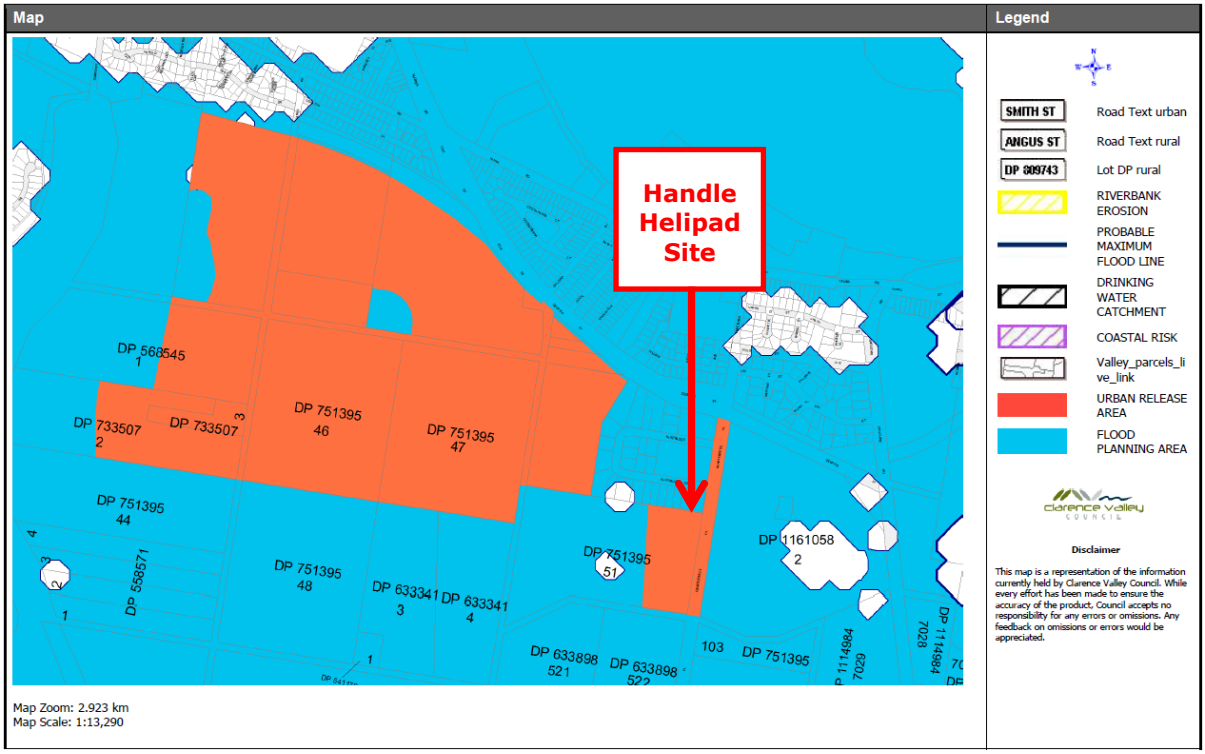
The actual helipad site is well removed from the large release area and would be required to be separately serviced with infrastructure. With WYURA capable of providing new housing for up to 2,400 residents over the next 20 years, the likelihood of the helipad site being required in the short to medium term is remote.

Most of the proposed urban release lands within WYURA are contained within the large area shown in red in the WYURA Release Area shown below, this comprises over 95% of the land area or 118ha's and will form the first stage and major supply of residential lots for the next 15 – 20 years – based on annual take up rates.

The area known as Lot 51 DP 751395 (The helipad site) will form part of a later second stage in the WYURA. This area includes the existing Caravan Park and the helipad site forming approximately 20ha's in total and unlikely to be considered for any re-development in the short to medium term or 15 to 20 years.

The CVC has chartered the strategic direction and form of development in the Clarence Valley for the next 25 years, including a plan identifying all the new urban release areas in various parts of the region to accommodate future residential growth. The land the subject of the PP has been operating as a helipad since 2008 without problem and is limited by conditions of consent to only 7 movements per week. The land in question will not be needed for residential land use for the foreseeable future.

WYURA – Land included in the Urban Release Area and Subject Site



Q6: Is the Planning Proposal consistent with applicable State Environmental Planning Policies?

Yes. The Planning Proposal is consistent with applicable State Environmental Planning Policies (SEPP's) and a review of any minor variations is attached at Appendix 4.

Q7: Is the Planning Proposal consistent with applicable Ministerial Directions (S.117 Directions)?

Yes. The Planning Proposal is consistent wiith applicable S 117 Directions and a review is attached at Appendix 5. Where any minor discrepancy applies is noted in the review.

SECTION C – ENVIRONMENTAL SOCIAL AND ECONOMIC IMPACT

Q8: Is there any likelihood that critical habitat or threatened species populations or ecological communities or their habitats will be adversely affected as a result of the proposal?

No. While a Flora & Fauna study has been completed over the subject land, the location of the helipad is on lands which are cleared and developed – for the current use – helipad. This part of the land holds no populations of threatened species or protected habitats.

Q9: Are there any other likely environmental affects as a result of the Planning Proposal and how are they proposed to be managed?

No. The current land use has been in place since 2008. There has been no known objections to the use and its operation over that period and any possible environmental affects (noise) have been well managed and will continue to be managed through the restriction to a maximum of 7 air craft movements in any one week – being continued.

Q10: Has the Planning Proposal adequately addressed any social and environmental affects?

Yes. When the original development application was lodged, a number of key studies were undertaken. These include:

- Aviation Operations Response Statement – flightpaths & proposed helicopter landing site, August 7 2008 and,
- Proposed helipad operations, the Acoustic Group pty ltd, 31st july 2008.

When the development was completed it needed to comply to the standards and regulations set down in these "Reports" as a condition of development consent. This was done and has contiinued to be observed by the operators over the past 8 years of helipad use – leading to the minimal or non – existant community objection to the current use over that period.

Helipad landing pad (with lights) and surrounding Bushland

Recent Environmental Studies:

In addition as part of the WYURA, the site was also the subject of a number of other environmental studies. We have sought advice from key technical experts – in their respective fields. This has enabled us to ascertain an accurate assessment of the constraints present at the time of both establishing the use and also the current environmental effects. The design solution for the helipad operation complements the current environmental and social conditions, being somewhat remote from residential areas and isolated by the current road access arrangements. As indicated the Planning Proposal is supported by the necessary technical studies and investigations completed in association with the original approval and still relevant as the operating air craft (used as a basis for the studies) has not changed. We would like to be notified if any more studies are required either by CVC or through the NSW Planning Departments Gateway process.

We remain of the opinion that no further environmental or land-use studies are necessary as they have been completed as part of the Draft DCP for WYURA and further the use has been in operation for several years without problem. This covers studies such as:

- Flood Study
- Vegetation Management and Ecological Assessment
- Bushfire Assessment and Report
- Storm/water design incorporating WSUD (Water Sensitive Urban Design)
- Acoustic Assessment (aircraft noise) and Report
- Aboriginal and Archaeological Assessment and Report
- Traffic Assessment and Report
- Community Consultation (about to be underway)
- Services and Infrastructure Plan
- Road Hierarchy Plan
- Staged Development Plan

SECTION D – STATE & COMMONWEALTH INTERESTS

Q11: Is there adequate public infrastructure for the Planning Proposal?

Yes. The current helipad use requires minimal infrastructure requirements – other than clear landing platform and the provision of underground electricity, both of which have been provided to regulatory standards.

Electricity Cable – laid in original development approval

Q12: What are the views of the State and Commonwealth public authorities consulted in accordance with the Gateway Determination?

State and Commonwealth Public Authorities have not been formally involved in this Planning Proposal as it is yet to receive Gateway Approval. However when the original Development Application was approved in 2008, substantial investigative work was completed and is attached to this document. This includes an "Aviation Procedures – Guidelines for Aircraft Use" prepared as a Companion Guide specifically for West Yamba and the Helipad operations from the site. These Guidelines have continued to be the operating procedures for the site over the past 7 years and will continue should this PP be supported. At this stage there does not appear to be any issues of interest to the Commonwealth Authorities.

Part 4 - Mapping

As discussed in the "Explanation of Provisions" section, the minor change to the CV LEP 2011 would also require the insertion of an "Additional Permitted Uses Map" into the suite of LEP Maps and this would need to be referred to in the Dictionary of the LEP as follows:

"**Additonal Permitted Uses Map** – means the Clarence Valley LEP 2011 Additional Permitted Uses Map".

There are two new Maps required and these are outlined below:

Additional Permitted Uses Map 1 & 2: Lot 51 DP 751395

Part 5 – Community Consultation

It is considered that community consultation for the planning proposal (PP) should comprise an exhibition period of not less than 28 days. Those dwellings which are within 500m of the site should be notified and any other relevant parties.

To facilitate this process a joint DA/PP has been lodged with CVC and the DA has been advertised in relation to the proposed continuation of the helipad land use on the subject site.

Part 6 – Project Timeline

The Planning Proposal should be finalised within 6 months of receiving a gateway determination from the Department of Planning. As a development approval cannot be obtained before the rezoning is in place, it is important to the owners that the process does flow and a timeline is in place – which would allow continuation of the land use and if so appropriate conditions to be incorporated.

Part 7 - Conclusion

Nothing in this Planning Proposal will inhibit the growth of an additional 94,000 people over the coming years who will call the Mid North Coast Region home by 2031. This will require 59,600 new homes and nearly 50,000 new jobs. (Mid North Coast Regional Strategy 2009) Currently the Region offers its residents significant choice in terms of lifestyle, employment and investment opportunities. The main purpose of the regional strategy is to support and manage growth while ensuring that the rural and environmental settings that characterise the region are not compromised.

The Planning Proposal does not prejudice the key aims of the Regional Strategy outlined below and does not impact achieving the Yamba & Maclean regions economic growth projections, which for WYURA include:

- Provide up to 1,000 new homes, providing a housing mix for the 2,400 additional people in the Yamba district by 2031.
- Increase the amount of housing within existing Yamba & Maclean centres and the choice of housing particularly for smaller households and an ageing population.
- Manage the environmental impact of settlement by focusing new development in the major regional centres while retaining key agricultural and flood constrained areas.
- Ensure an adequate supply of land to support economic growth and provide for the projected 50,000 jobs.
- Promote important primary industry resources, water resources, and environmental diversity, tourism and employment opportunities.

In conclusion, it is considered that the minor change to the CV LEP to allow the continuation of the helipad use on the subject land will not result in any adverse impact on the wider strategic objectives of the Region. The current use generates 3 Full Time Equivalent (FTE) positions for 50% of their time – generating 1.5 FTE jobs in the area. The long term additional provision of housing (through the underlying zoning) allows for the land to be redeveloped should the helipad no longer be required. This will create an added land bank supply of potential housing in the longer term as nominated in the draft WYURA DCP 2015, which should go on public exhibition shortly.

Importantly, there are no adverse environmental consequences associated with the Planning Proposal and there are no impacts on the Council's strategic objectives for the area. There were no objections to the use over the past 7 years of operation and finally the continuation of the current use will preserve and maintain a very important community transport and emergency medical evacuation facility – capable of 24 hour operation.

Norman W Johnston

MBA, MTCP, BA Diploma, Cert Portfolio Planning/Accounting
Professional Government Advisers
NSW Preferred Tender Status
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JOHNSTON ENTERPRISES
(AUSTRALIA) PTY LTD

APPENDIX 1

15 September 2008

Harrison Shepherd Pty Ltd
PO Box 397
YAMBA NSW 2464

NOTICE OF DETERMINATION OF APPLICATION

Pursuant to Section 81(1)(a) of the Environmental Planning and Assessment Act, 1979

Application No:	DA2008/0481
Applicant:	Harrison Shepherd Pty Ltd
Owner:	Kahuna No 1 Pty Ltd
Property Address:	Golding Street YAMBA NSW 2464
Legal Description:	Lot 51 DP 751395
Development Proposal:	Use of land as Helipad

DEVELOPMENT CONSENT

Notice is given that Council has considered your application for the subject development. The determination of the application is an **"operational"** consent.

The Development Application has been determined by:

Consenting to the development with conditions.

Determination of the application was made:
By Council at its meeting of 26 August 2008

Determination Date:

15 September 2008

Approved Plans and Documentation
THE DEVELOPMENT SHALL COMPLY WITH THE PLANS LODGED WITH THE APPLICATION AND AS MAY BE AMENDED BY THE FOLLOWING CONDITIONS OF CONSENT AND/OR BY AMENDED PLANS AND DETAILS.

Definitions

Applicant means Harrison Shepherd Pty Ltd or any party acting upon this consent.

Advice to Applicant

Council in determining the subject application requests you to take note of the following advice and where pertinent to convey the advice to future owners or tenants:

1. No clearing of trees, shrubs or vegetation is to be carried out without obtaining any necessary approval from the Catchment Management Authority (CMA) or the Clarence Valley Council.

2. Where the 7 movement limit is consistently exceeded, Council will require a further Development Application, and that development will be considered as Designated Development under *Schedule 3* of the *Environmental Planning and Assessment Regulation 2000*.

3. Should the applicant be unable to provide the accoustic audit within the time frame stipulated, because access is denied to the adjoining property, then Council will accept extrapolation of data from the nearest boundary.

4. The Accoustic Report and the Aviation Operations Response Statement relates to the use of the helipad by an Agusta 109 "Grand". Where it is proposed to use a different helicopter, additional information will need to be submitted to verify that the noise generated by the helicopter, and the manner in which it can be flown, is equal to or less than that of the Agusta 109 "Grand".

Conditions of Consent

1. The development is to be completed in conformity with the *Environmental Planning & Assessment Act 1979* and its *Regulation*, and being generally in accordance with the Statement of Environmental Effects prepared by Harrison Shepherd Pty Ltd, the Information Response Statement submitted by Urbis Pty Ltd (containing the Accoustic Report prepared by The Accoustic Group Pty Ltd, and the Aviations Operatons Response Statement (as amended) prepared by Geoarc Consulting) or where modified by conditions of this consent.

2. An acoustic audit will be required within 60 days of the date appearing at the top of this Notice of Determination, to verify that the mitigating measures recommended by the Acoustic Report, are being adhered to and have had the effect anticipated in the Accoustic Report. Where the applicant cannot verify that the Intrusive Noise Criteria is achieved, (ie. measurements taken within 30m of the adjoining dwelling), then the use is to cease until such time as the proposal is modified, or mitigating measures devised that will prove compliance. Such modifications or additional mitigating measures will need to be approved by Council.

3. The use of the allotment for the purpose of a *helipad* is to cease upon the rezoning and gazettal of the subject, or adjoining land, to a residential zone.

4. No more than seven flight movements in any one week are permitted from the subject land. A movement is one take off or one landing. Any movement in excess of this may only occur in the event of an emergency aeromedical evacuation. Verification from the attending medical doctor, that such an emergency existed, is to be submitted to Council as soon as practicable after the event occurred.

5. The landing site is to be located not less than 60m north of the area that was originally indicated as the helipad adjacent to the existing shed.

6. The helicopter and flight paths are to be flown in accordance with the Acoustic Report and the Aviation Operations Response Statement (cited as Appendix A and B (as amended) in the information submitted with the DA) with specific reference to the following:

EASTERN FLIGHT PATH

Using the directional guidance set out in the Acoustic Report, the helicopter lifts to the hover with its nose pointing south to reduce noise effect, and turns left and departs on a straight line to the east without the need for any turns on departure. The departure and arrivals are over obstacle clear areas well in accord with the CAAP 92-2(1).

WESTERN FLIGHT PATH

The helicopter nose is pointed to the south before lift off, and then at the hover, commences a turn to the right to align on a magnetic bearing of 250 degrees for take off over obstacle free gradient well in accord with the CAAP 92-2(1), curving right in accordance with the CAAP 92-2(1) to a magnetic bearing of 240 degrees, before establishing on the final flight path centre line of 268 degrees magnetic. Where it parallels the original western flight path centre line and commences climb out to the west, at an altitude higher than previously prescribed, thereby further reducing airborne noise on this path and proximity to the Caravan Park.

The arrival sequence is the reverse with the helicopter terminating with its nose pointing to the south.

In accordance with the recommendations of the Acoustic Report by the Acoustic Group dated 31s July 2008, the proposed flight paths are amended as depicted in the Acoustic Report at **Appendix G** (below).

APPENDIX G: **Alternative Helicopter Landing Site and Flight Tracks**

7. The following Operational Procedures are to be observed for the site:

- All landings and takes offs will be from the northern helipad – not the landing site in front of the hangar
- There shall be no aerial transfers from the helipad landing site to or from the hangar
- The transfer of the helicopter to the hangar (and reverse) is by use of a tractor or similar, with the helicopter engines shutdown during such transfer.
- The eastern flight path is a straight approach to a hover above the landing site and then a left turn to the south so that prior to wheels down the helicopter shall be placed in a hover with the nose oriented in a southerly direction.
- The western flight path is a straight in approach towards the hanger and then a curved approach to the landing site when above the cleared area to a hover above the landing site and then a right turn to the south so that prior to wheels down the helicopter shall be placed in a hover with the nose oriented in a southerly direction
- A take off to the east will prior to start up, have the helicopter positioned with the nose oriented in a southerly direction. After lift off to a hover the helicopter will conduct a right turn in the hover and the climb out to the east.
- A take off to the west will prior to start up have the helicopter positioned with the nose oriented in a southerly direction. After lift off to a hover the helicopter will conduct a left turn in the hover and then climb out to the south west and curve to

intersect with the nominated western flight path.

8. The operation of the helipad is restricted to daylight (sunrise to sunset) hours only. The helipad may only be used outside of daylight hours in the event of an emergency aeromedical evacuation. Verification, from the attending medical doctor, that such an emergency existed is to be submitted to Council as soon as practicable after the event occurred.

9. The helipad is restricted to private use only, and may not be used for any commercial purpose.

Reasons

1. To ensure that the development does not prejudice the future development of the locality.

2. To ensure compliance with the Maclean Local Environmental Plan 2001.

3. To enable Council to confirm that the operation of the helipad will not adversely impact on the adjoining landowners, by requiring an audit of operations.

Right of Appeal and Validity of Consent

Section 82A of the Act provides that you may request a review of your determination by Council. The review must be requested within 12 months of the date of this notice and must be accompanied by the prescribed fee.

Section 97 of the Act provides that you have a right of appeal to the Land and Environment Court against Council's decision in the matter, exercisable within 12 months after receipt of this notice.

Consent becomes effective from the consent validation date. Section 95 of the Act provides for the period of validity of consent, and it is the applicant's responsibility to ensure that commencement of the development is carried out within the prescribed period. The consent period for this application will be five (5) years.

If you require further information in regard to this notice of determination please contact Heidi Naylor of Council's Environmental and Economic Services on (02) 6643 0200.

Yours faithfully,

Heidi Naylor
Planning Services Coordinator

JOHNSTON ENTERPRISES
(AUSTRALIA) PTY LTD

APPENDIX 2

AVIATION OPERATIONS RESONSE STATEMENT

Application No: DA2008/0481

PROPOSED HELICOPTER LANDING SITE

YAMBA WEST
NEW SOUTH WALES

Ref: md08/0481 CVC

Prepared For: **Neil Garrard Building Contractors Pty Ltd on behalf of Kahuna Pty Ltd**

Prepared By: **Geoarc Consulting Pty Ltd**

In Association With: **URBIS**

CONTENTS

Document Control

Version	Date	Approved
1	July 28, 2008	Geoarc Consulting

1.0 INTRODUCTION

This report is to be read in conjunction with a document provided to Council by Harrison Shepherd Pty Ltd of 28 Wooli St, Yamba dated May 2008 which provides a Statement of Environmental Effects for a proposed Helicopter Landing Site (HLS) upon Lot 51, DP751395, Golding Street, Yamba.

This report will address itself to the Aviation aspects and concerns raised in Council's letter Ref:md08/0481 CVC dated 07 July 2008 (Appendix C). Any background information or environmental and planning aspects of this HLS proposal are to be referred to the Harrison Shepherd Statement document.

On behalf of a request made by Mr. Neil Garrard, a visit was made by Robert Ward of Geoarc Consulting (Aviation Consultants) and John Venn of URBIS (Town Planning Consultants) to the subject site on Friday July 18, 2008.

This visit afforded the Consultants an appraisal of the proposed site on the ground, followed by a high level aerial flight to appraise the overall facility and fight paths, plus an operational observation of the aircrew by Ward during the resultant flight over a 2 hour flying period.

My first impressions from the ground were that this was a well planned and constructed facility and adjoining machinery shed, with large open fenced areas free of obstructions to facilitate the operation of a helicopter in safety, whilst providing security to its own self and a high degree of privacy throughout the local environment.

The attention to detail was evident in the planning and set out of the HLS in accordance with the Civil Aviation Advisory Publication CAAP 92-2 (1), the use of embedded and low impact lighting about the HLS and adjoining shed, and the siting of the Landing and Lift Off Area (LLA), the Ground Effect Area (GEA), the Final Approach and Take Off Area (FATO) and the adoption of the departing and arriving Flight Paths to facilitate the safety of the operation and avoidance of any noise sensitive areas.

During this ground visit and subsequent measurements taken at the site, I have satisfied myself that this proposed HLS more than meets the spirit and guidelines laid down in the CAAP and, " having regard to all the circumstances of the proposed landing or take-off (including the prevailing weather conditions) the aircraft can land at, or takeoff from, the place in safety". (Extract of Civil Aviation Regulation 92 (1)).

The high level aerial inspection also revealed the privacy of the subject site, and the ability of the Flight Paths to be located over unpopulated areas, clear areas and areas of significant vegetation currently unused.

This report will now seek to address the concerns of Council and the Community response in accordance with the document at Appendix C.

2. AVIATION MATTERS TO BE ADDRESSED

Council has raised the following matters to be addressed:
(The following Paragraphs are numbered in accordance with Council document)

1. Noise assessment
2. Lighting
3. Flight Paths and Weather
4. Flight Altitudes and Weather
5. Safety of Aircraft and Crew Experience
6. CAAP 92-2 (1) with respect to the proposed HLS
7. Movements and Usage (Added by Author - Paragraph 7)

3. NOISE ASSESSMENT

It is not proposed to address noise measurements or noise signatures in detail in this report, as that will be undertaken as required by Council, by a suitably qualified consultant, but it is important for Council to understand noise issues around a helicopter and the ways in which the noise emission can be satisfactorily reduced by:

a. Use of a helicopter with reduced noise values e.g. the subject helicopter
b. Sound piloting techniques using promulgated Noise Abatement Procedures at Appendix B
c. Design of Flight Paths and HLS to reduce noise impacts

The noise emission from most modern helicopters is generated mainly by the tail rotor, then the engine and exhaust, thence the main rotor system, and the interaction of aerodynamic forces and atmosphere acting upon these devices, creating types of noise and pressure waves, audible to, and sensed by the human ear.

The Agusta 109 “Grand” is a modern designed twin engine helicopter with proven reliability, redundancy systems and reduced noise emissions as seen by the Table below.
(Table 1 – Reference to “Statement of Environmental Effects Page 7 “)

a. Use of a helicopter with reduced noise values

TABLE 1. Agusta A109 Grand Noise Emission levels (Manufacturer)

Flight Condition Max. Gross Wt.	Agusta Grand Max Decibel	ICAO Permitted Decibel	Difference
Take Off	90.5	92.0	- 1.5 db
Fly-Over	88.4	90.0	-1.6 db
Approach	91.2	95.0	-3.8 db

It can be readily seen from the Table above, that the Agusta Grand more than meets the requirements of the strict ICAO (International Civil Aviation Organisation) decibel noise levels.

As per Images 1 and 2, the modern development of the Agusta Grand can be shown to meet noise issues, and the images show the swept design of the tail and main rotors which lead to dramatic noise reduction as evidenced in Table 1.

IMAGE 1. Tail Rotor

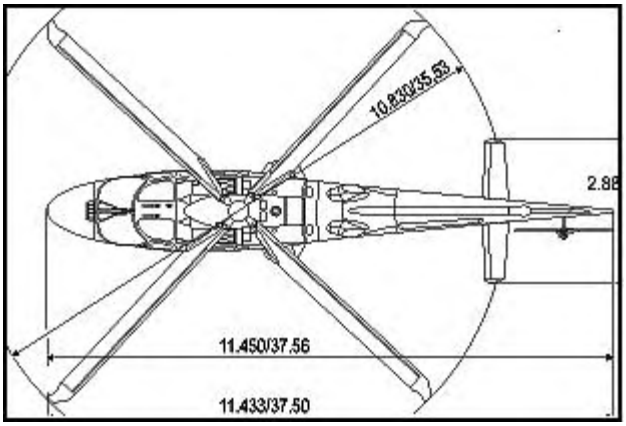


IMAGE 2. Main Rotor

b. Sound piloting techniques using promulgated Noise Abatement Procedures

The operation of the helicopter is safely and responsibly carried out by highly qualified aircrew who will adhere in their Company Operations Procedures to the Recommendations and Guidance of the Helicopter Association International promulgated document " Fly Neighbourly Guide" tabled at Appendix B, and as referenced in the "Statement of Environmental Effects Page 6 – Yamba Noise Abatement".

The Fly Neighbourly Guide document is in worldwide and Australian use for the guidance of pilots for the effective reduction of helicopter noise during operations.

c. Design of Flight Paths and HLS to reduce noise impacts

Flight Path design along with the HLS placement will further enhance noise abatement issues. The Flight Paths and HLS design are documented at Sections 5 and 9 respectively.

4.0 LIGHTING

HLS

All lighting is installed as per the CAAP in that the FATO (Final Approach and Take Off Area) and the Ground Effect Area (GEA) contained within the FATO, are marked by a combination of white and green omni directional embedded lead-in lights and floodlighting.

The short air taxi route between the GEA and the adjacent concrete Landing and Lift Off Area (LLA) is defined by blue low intensity LED lights at equal spacing along the concrete apron.

These embedded low intensity LED lights radiate upwards with little illumination spill laterally and only serve to mark a boundary. The FATO lights are more of a rigid structure strategically placed, and emit a guidance light with little omni directional radiation spill beyond the immediate area of the light, though clearly visible to a pilot .

The planning of this facility has ensured that all normal or emergency operations at night as required, ensure that the lighting intensity is such so as not to distract or hamper the pilot in command during taxi, hover and approach/departure procedures. It is therefore difficult to imagine that there would be long range external lighting intensity impact on adjoining properties.

FLOODLIGHTING

The CAAP suggests a combination of markings and floodlighting for the FATO and GEA. (Ref: CAAP 92-2 (1) Page 7.)

The LLA is adjacent to the FATO and GEA and as such is defined to offer the pilot safety in the initial and final stages of a night take off or landing.

As per IMAGE 3, a row of 3 low emission 250 Watt metal halide security floodlights has been set to provide illumination from the western side of the shed to the western edge of the concrete apron or LLA. They have been placed at a level to illuminate from the building down and outwards to the west, only far enough to illuminate the surface area of the LLA. They are a hooded Pierlite floodlight (IMAGE 4) and the attached Lux diagram giving radiation values of these lights by actual testing, gives an indication as to the low impact value of these lights on any surrounding area.

Once again, the lighting design is such as to aid the pilot in operations, rather than being a distraction and hindrance.

PILOT ACTIVATED LIGHTING

An essential component of night operations if required is for the pilot in command to have control over the lighting facilities. This ensures lighting is available to him/her on demand, and available as required, with the lighting extinguished on earliest and safest completion of the night operation.

For example, if the helicopter was inbound to the HLS after dark, at the optimal distance commensurate with safety, the pilot in command would activate the HLS night lighting by a tone command through a mobile phone in the aircraft. The lights activated would be the FATO, GEA and LLA low intensity lighting, along with the illuminated wind sock to give landing directions, and the LLA floodlighting on the western side of the shed.
Once the aircraft has come to rest, the lights are extinguished by another tone command

from the mobile phone in the aircraft. At no time are the lights allowed to remain on longer than necessary e.g. timer, and there always will be a responsible person at the HLS to support the night operation.

Similarly, for any night departure, the lights would be activated only at commencement of the flight at engine start to the safe departure of the helicopter from the HLS. These procedures will be promulgated in the helicopter "Aircrew Read and Initial" manual.

EXPECTED DURATION TIMES OF LIGHTING ACTIVATION

Using the information supplied by the pilot in command with respect to the start- to - departure and arrival- to- shut down times from the "Statement of Environmental Effects – Page 4 ", the following Table 2 gives an accurate estimate of the maximum duration of any lights activated at the HLS.

Bearing in mind that only 7 movements are permitted weekly, the table also shows the maximum time the lights may be activated in any given week, **IF** all permitted movements were undertaken at night, which is quite doubtful. These activation intervals may also be assessed against other known light illumination times and intensity in the local area e.g. adjoining sports ovals and complex.

TABLE 2. Ref. "Statement of Environmental Effects Page 4."

Situation	**Enter Flight Path**	**Land**	**Shut down**	**TOTAL**	**WEEKLY**
Arrival	00'	02'	0.5'	2.5'	10'
Situation	**Start Up**	**Take Off**	**Leave Circuit**	**TOTAL**	
Departure	00'	03'	01'	4.0'	12'
TOTAL TIME					**22'**

IMAGE 3. Floodlights

IMAGE 4. Hooded Floodlight

WINDSOCK LIGHT

To meet the suggestions of the CAAP, a pilot activated illuminated windsock is to be placed adjacent to the landing area, and illuminated for night operations.

Following standard aerodrome lighting practice, it is proposed to mount the windsock on the North West corner of the shed with 2 small floodlights downward facing, illuminating only the wind sock. There will be minimal impact on the local environment with these downward facing lights and the duration of the activation as per Table 2.

IMAGE 5. Proposed Windsock location

Windsock 4 ft yellow 1.5
Made with the attention to quality and detail these wind indicators are smaller versions of our windsocks. Made with highly durable, lightweight, rip-stop material our wind indicators are perfect for those smaller tasks, including indicating wind direction for chemical spraying and farming applications.

IMAGE 5a. Description of windsock available from Skyshop stores

LIGHTING SURVEY

A Lighting Survey to determine the radiation or light spill value of the HLS on adjoining property was carried out by Geoarc Consulting Pty Ltd on the night of July 21, 2008, commencing after dark at 1750 hrs (Civil Aviation Last Light is recorded at 1734 hrs).

The instrument used was a Topcon Illumination Meter Model IM-2D S/N 425086 with a calibration validity date of 26/7/08. Measurements were taken in the vertical and horizontal planes and at chest height (1.2m) at the Applicant's boundaries due to the high grass, and at ground and chest (1.2m) levels within the HLS compound.

It was evident at an early stage with the measurements taken at the Southern and Northern boundaries of 00.0 lux (Figure 1), that there was no light spill evident or able to be measured at the client boundaries nearest any Residential or Industrial area to the south or north. It wasn't until the Illumination meter was within a radius of 50 metres from the shed in a vertical measurement position, and just 35 metres in a horizontal measurement position that the first readings of 0.1 lux were obtained.

See Images 6 and 7 to indicate the visible light detected of the hangar by a digital camera at the far southern boundary (Image 6) and the near western boundary (Image 7) within the HLS compound. A Lux is described as the measurement unit of illuminance or brightness and is used in photometry as a measure of the intensity of light.

IMAGE 6. At Southern Boundary - C

IMAGE 7. 50m west of shed

FIGURE 1 Location of 00.0 Lux readings taken at the Applicant's boundaries

It can therefore be seen that there is no lighting impact affecting amenity at any of the subject site's boundaries, and its greatest intensity is noticeable only directly under the floodlights, with its directionality facing to the west, the intensity of which even then reduces to a nil reading at 50 metres with vertical instrumentation readings, and just 35 metres with horizontal instrumentation readings.

The attached Table 3 gives the comparative values of a lux compared to known objects. As there was inadequate light spill to record any lux measurement at the subject site boundary as marked as Point A and B, C and D, and with reference to Table 3, it can be deduced that the light spill from the HLS and hangar would equal to a moonless clear night, with the earliest light response recording of 00.1 lux at 50 metres from the building being equated to a half moon on a clear night, with the highest reading directly under the central floodlight (Corrected to 184 lux) being equated to a semi lighted business office.

TABLE 3. Lux Values

Illuminance	Addt.	Example
0.00005 lux	50 µlx	Starlight
0.0001 lux	100 µlx	Moonless overcast night sky
0.001 lux	1 mlx	Moonless clear night sky
0.01 lux	10 mlx	Quarter Moon
0.25 lux	250 mlx	Full Moon on a clear night[13]
1 lux	1 lx	Moonlight at high altitude at tropical latitudes[14]
3 lux	3 lx	Dark limit of civil twilight under a clear sky[15]
50 lux	50 lx	Family living room[16]
80 lux	80 lx	Hallway/Toilet[16]
100 lux	1 klx	A brightly lit office
400 lux	4 klx	Sunrise or sunset on a clear day
1000 lux	1 klx	Typical TV studio lighting
32000 lux	32 klx	Sunlight on an average day (min.)
100000 lux	100 klx	Sunlight on an average day (max.)

The attached detailed Lux surveys (Figures 2 and 3), indicate the lux values around the HLS and shed, and the Images indicate the light emission from the southern boundary and on the western side of the HLS.

FIG 2. Horizontally measured Lux values around the subject site

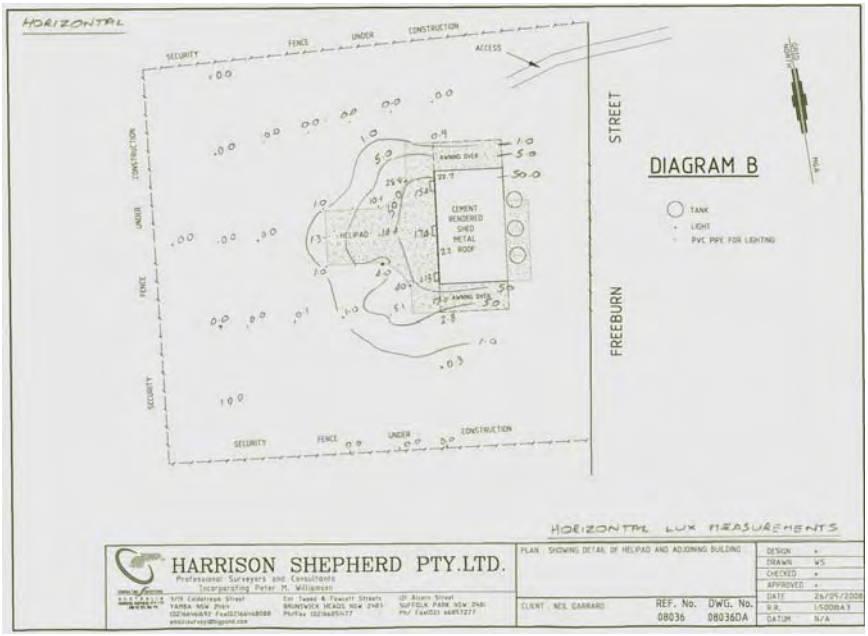
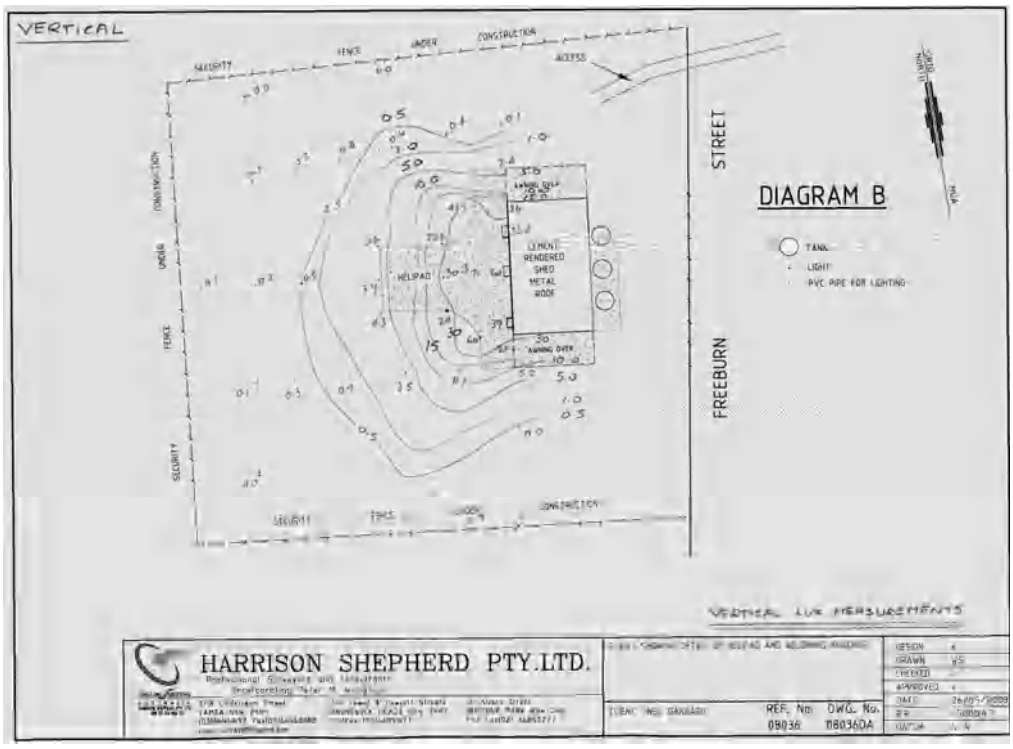


FIG. 3 Vertically measured Lux values around the subject site



Energy Requirements

There will be no energy requirements by day.

The energy requirements at night will be the HLS perimeter lights, the lighted windsock light and the adjacent 250 watt floodlights.

These lights are required to be of an intensity so they can be sighted by the pilot entering the circuit, and being a Pilot Activated Lighting System (PAL) will only be illuminated for intermittent timed periods in isolated instances where the HLS is required for use after dark.

5.0 FLIGHT PATHS

A Flight Path is defined as: A specific course taken by an aircraft with a width through the sky considered to be 4 times the rotor diameter of the helicopter in use

Two flight paths are available for use at the HLS and are authorised for use by helicopters in Visual Meteorological Conditions (VMC) by day and night.

Western Flight Path

The Western Flight Path commences at the HLS, the centre line of which extends outward on a Magnetic bearing of 310 Degrees. This initial path is curved to the left " to avoid obstacles or take advantage of a more advantageous approach or departure path". (Ref: CAAP 92-2 (1) Page 6.)

The horizontal splays of the HLS diverge from the FATO perimeter at 10 degrees to the horizontal until they meet the flight corridor which has a width of 4 rotor diameters of the

helicopter in use at a vertical height of 500 feet above the LLA level. (44 metres in the case of the Agusta A109 Grand)

The helicopter continues climb on to the Flight Path centreline on a Magnetic bearing of 268 Degrees, at a gradient and speed commensurate with its safety performance and its Noise Abatement Procedures to a minimum height of 1,500 feet above mean seal level (AMSL) to intercept Oyster Channel. At this point, it will leave the Flight Path to continue climb for Northern or Southern destinations. The total distance traversed during the approach or departure is 2.5 kms and takes two minutes to complete. (Ref Statement of Environmental Effects Page 4 Para (1) and (2)).

The reciprocal procedure is observed for the Approach on a Magnetic bearing of 088 Degrees at a minimum entry height of 1,500 feet at Oyster Channel. The initial approach speed at this entry point is 110 knots (200 kph).

A Noise Abatement descent is commenced by reducing the helicopter's indicated air speed (IAS) gradually from 110 knots to 65 knots (120 kph) at a descent rate of 400 feet per minute in the distance between Oyster Channel and south abeam the Caravan Park, to be south abeam the Caravan Park at a minimum height of 1,000 feet above mean sea level. The elapsed time for this particular segment is 81 seconds.

The descent continues further past the Caravan Park, with the helicopter speed being reduced further to 45 knots (80 kph) and a descent rate of 1,500 feet per minute being established, to meet the FATO splay at a minimum 500 feet on the western boundary of the subject site, with the final approach being curved right in accordance with the CAAP to align with the HLS on a Magnetic bearing of 130 Degrees. This particular segment takes 22 seconds to complete.

On the final approach segment, over the subject property, the helicopter slows further to 35 knots (65 kph) with a descent rate of 1,500 feet per minute until it establishes itself in the hover at 20 feet above the GEA and then taxies to the LLA for landing and shut down . This final segment takes 17 seconds to complete plus another 10 seconds to hover taxi and land.

This approach profile, which is well within the performance capability of the helicopter, ensures that at any time of emergency, the helicopter can fly away or land forward safely to the HLS, and also ensures the reduction of blade noise as per the Fly Neighbourly Guidelines at Appendix B, with the entire approach to landing and shutdown taking two minutes and ten seconds to complete.

Table 4a indicates the approach profile with respect to altitudes, distances, rates of descent and elapsed times.

Eastern Flight Path

The Eastern Flight Path commences at the HLS, the centre line of which extends outward on a Magnetic bearing of 006 Degrees. This initial path is curved to the right " to avoid obstacles or take advantage of a more advantageous approach or departure path". (Ref: CAAP 92-2 (1) Page 6)

The horizontal splays of the HLS diverge from the FATO perimeter at 10 degrees to the horizontal until they meet the flight corridor which has a width of 4 rotor diameters of the helicopter in use at a vertical height of 500 feet above the LLA level. (44 metres in the case of the Agusta Grand)

The helicopter continues climb on to the Flight Path centreline on a Magnetic bearing of 088 Degrees, at a gradient and speed commensurate with its safety performance and its Noise Abatement Procedures to a minimum height of 1,500 feet above mean seal level (AMSL) to intercept the Coast at Pippy Beach. At this point, it will leave the Flight Path to continue climb for Northern or Southern destinations. The total distance traversed during the approach or departure is 2.0 kms and takes less than two minutes to complete. (Ref Statement of Environmental Effects Page 4 Para (1) and (2)) and below.

The reciprocal procedure is observed for the Approach on a Magnetic bearing of 268 Degrees at a minimum entry height of 1,500 feet at Pippy Beach. The initial approach speed at this entry point is 110 knots (200 kph).

A Noise Abatement descent is commenced by reducing the helicopter's indicated air speed (IAS) gradually from 110 knots to 65 knots (120 kph) at a descent rate of 500 feet per minute in the distance between Pippy Beach and the Angourie Road, to be over the Angourie Road at a minimum height of 1,000 feet above mean sea level. The elapsed time for this particular segment is 61 seconds.

The descent continues further over the cleared sports oval area, with the helicopter speed being reduced further to 45 knots (80 kph) and a descent rate of 1,500 feet per minute being established, to meet the FATO splay at a minimum 500 feet on the eastern boundary of the subject site, with the final approach being curved left in accordance with the CAAP to align with the HLS on a Magnetic bearing of 186 Degrees. This particular segment takes 22 seconds to complete.

On the final approach segment, over the subject property, the helicopter slows further to 35 knots (65 kph) with a descent rate of 1,500 feet per minute until it establishes itself in the hover at 20 feet above the GEA and then taxies to the LLA for landing and shut down . This final segment takes 20 seconds to complete plus another 10 seconds to hover taxi and land.

This approach profile, which is well within the performance capability of the helicopter, ensures that at any time of emergency, the helicopter can fly away or land forward safely to the HLS, and also ensures the reduction of blade noise as per the Fly Neighbourly Guidelines at Appendix B, with the entire approach to landing and shutdown taking one minute and fifty three seconds to complete.

Table 5a indicates the approach profile with respect to altitudes, distances, rates of descent and elapsed times.

There may be occasions when there could be variations to the Flight Path Guide and these instances will arise when the pilot requires to over fly the HLS to verify ambient wind and weather conditions and then intercept the Flight Path Centre Line most favoured for those conditions at a distance and a height considered prudent with respect to safety, environmental conditions, ambient conditions and in all instances not at a height lower than that prescribed under CAR 157. (See Section 6 – Flight Altitudes Page 14)

The integrity of these Flight Paths is ensured by the depiction and description of the Approach and Departure Procedures in the Company Operations Manual to be lodged with the Civil Aviation Safety Authority and the "Aircrew Read and Initial" Manual relevant to this site as referenced by the Pilots in Command.

Flight Paths (Take off and Landing Gradient)

Vertical Flight profiles, unlike those used for fixed wing aeroplanes of an optimal gradient of 3 degrees, may vary with the versatility of the helicopter type, aircraft loading, ambient weather conditions and noise abatement procedures.

The helicopter in use has been specifically designed to combine turbine engine power and reliability plus a highly reduced helicopter (tail rotor) noise signature which will complement the HLS operations. The increased gradients for approach and departure are therefore well within the capability of the helicopter type to be used in safety

Accordingly, both flight paths have been designed with safety and noise abatement as two prime tenets with “Normal Approach” profiles made at approximately 5 to 10 degrees, and a “Noise Abatement Approach” made at an approach gradient of between 12 and 18 degrees. It is to be noted that a Normal Approach will also meet the Noise Abatement criteria called for in the operating guidelines. (See Appendix B)

Downward visibility during the approach may be one of the limiting factors for certain helicopters during the conduct of a steep approach, however the helicopter types considered for use have excellent all round visibility and the flight paths have been safely designed to offer an optimal flight regime with respect to aircraft safety, ambient conditions and optimal noise abatement techniques.

Departure profiles may be steeper than approach gradients because downward visibility is not the limiting factor, as upward visibility on most helicopter types is unrestricted.

Note. The pilot in command is responsible for the safe operation of the aircraft and those personnel under his care. Whilst the guidance of the Flight Paths above is intended for most operations, the pilot in command reserves the right as to the final disposition of the aircraft along or outside the Flight Path in the interests of safety and noise abatement.
The CAAP is specific with reference to the requirement of the pilot having sound piloting skills and the display of sound airmanship to complete the operation, so as to “ having regard to all the circumstances of the proposed landing or take-off (including the prevailing weather conditions), the aircraft can land at, or take-off from, the place in safety.”

TABLE 4. Western Flight Path Table of Check Points and IMAGE 8

POSITION	DIST	ALTITUDE	GRADIENT Deg.	REMARKS
Oyster Channel	2.5 km	1,500’ Min.	-8 deg	Entry Point
Caravan Park	0.75 km	1,000’	- 12 Deg	Abeam
Final Leg	0.4 km	700’	-18 Deg	Right Turn
HLS	0.0 km	20’	Level	Termination

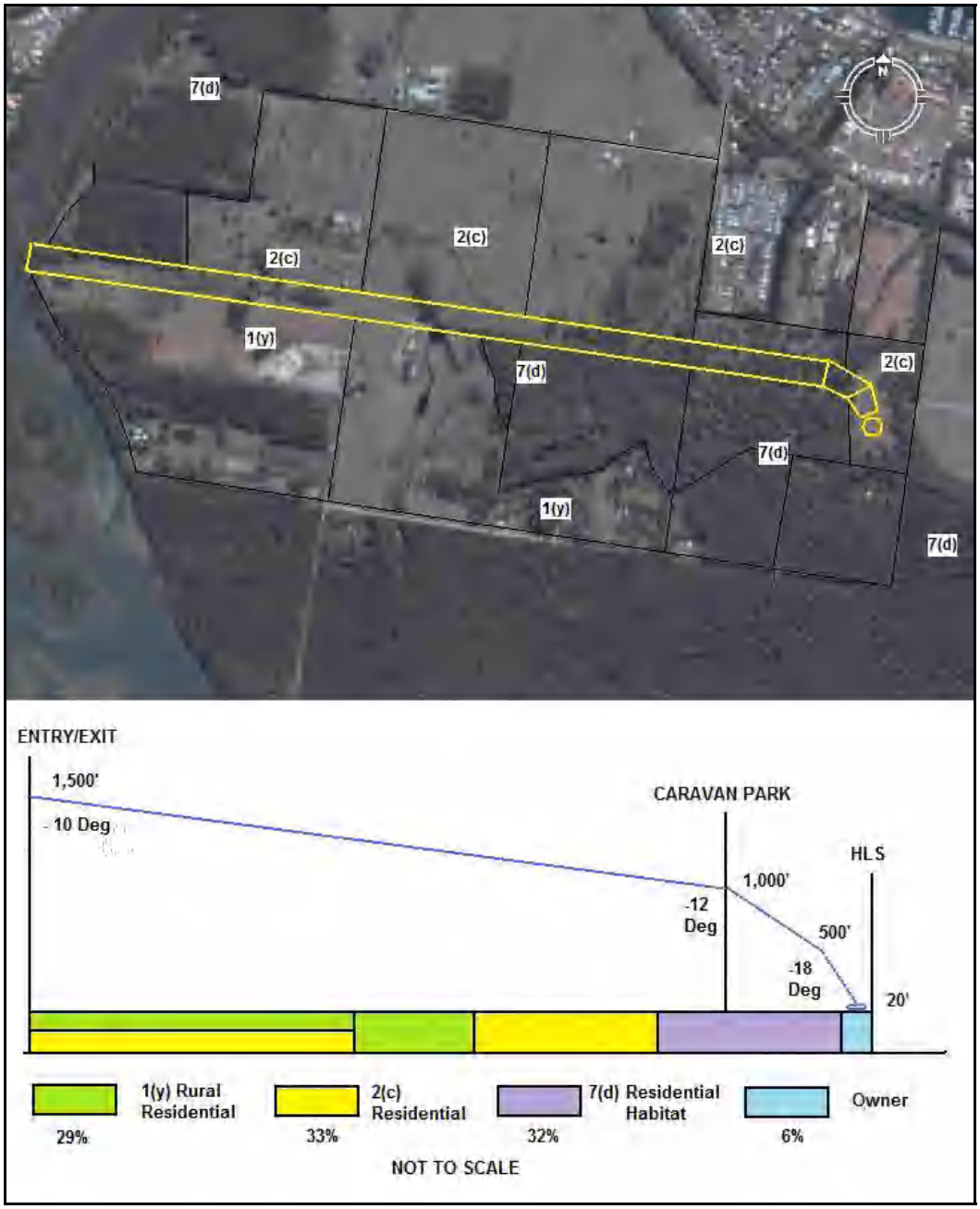


TABLE 4a Western Flight Path Noise Abatement Approach

POSITION	DIST	ALTITUDE	IAS	DESCENT	SEGMENT TIME
Oyster Channel	2.5 km	1,500' Min.	110 knots	00 fpm	00"
Abeam Caravan Pk	0.75 km	1,000' Min.	65 knots	400 fpm	81"
West Boundary	0.35 km	700'	50 knots	1,500 fpm	22"
Final Leg	0.20 km	500'	45 knots	1,500 fpm	17"
HLS	0.00	20'	Hover	Level	10"
TOTAL TIME					**130 "**

TABLE 5. Eastern Flight Path Table of Check Points and IMAGE 9.

POSITION	DIST	ALTITUDE	GRADIENT Deg.	REMARKS
Pippy Beach	2.0 km	1,500' Min.	- 10 Deg	Entry Point
Angourie Road	0.8 km	1,000' Min.	- 10 Deg	Golf Course West
Sports Oval	0.55 km	700'	-10 Deg	Western Edge
Final Leg	0.30 km	500'	- 18 Deg	Left Turn
HLS	0.00	20'	Level	Termination

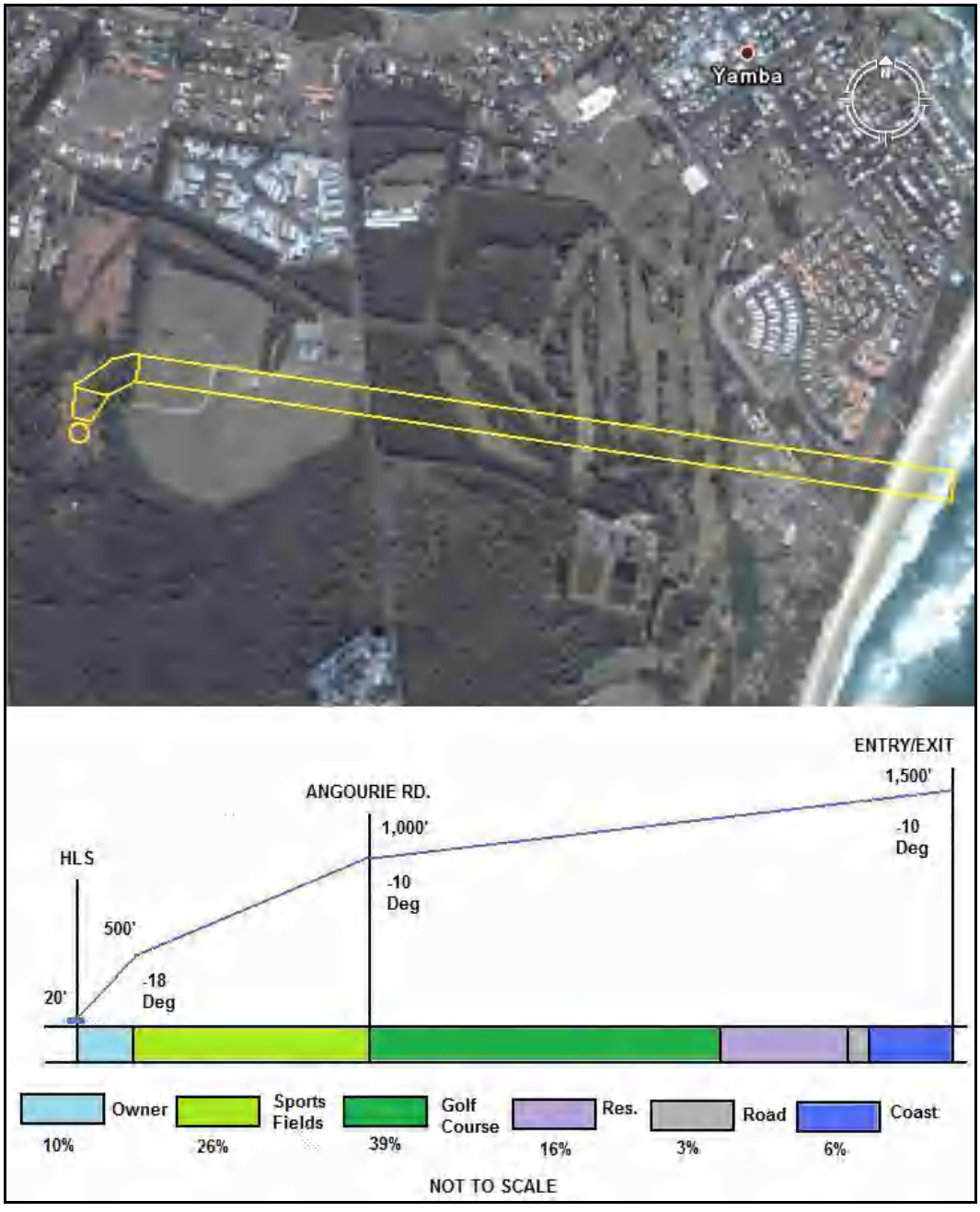


TABLE 5a Eastern Flight Path Noise Abatement Approach

POSITION	DIST	ALTITUDE	IAS	DESCENT	SEGMENT TIME
Pippy Beach	2.0 km	1,500' Min.	110 knots	00 fpm	00"
Angourie Road	0.8 km	1,000' Min.	65 knots	500 fpm	61"
Sports Oval	0.55 km	700'	45 knots	1,500 fpm	22"
Final Leg	0.30 km	500'	35 knots	1,500 fpm	20"
HLS	0.00	20'	Hover	Level	10"
TOTAL TIME					**113 "**

With reference to Council's concern in their response document of 07 July 2008, Paragraph 3, "Council requests confirmation from your clients that such flight paths can be adhered to in general weather conditions (e.g. strong winds and the like), or under what weather conditions they would need to be modified".

It is proposed that the two flight paths above be accepted by the Client to enable flexibility in differing wind conditions, although the predominant wind direction is mostly south easterly at Yamba, and short of a full meteorological study at the proposed site, a combination of usage of these flight paths and the ability of the subject helicopter to operate safely in a "downwind" condition of up to 15 knots (Ref "Statement of Environmental Effects – Pilot Email – page 4"), will ensure that Council's concerns are addressed, and only in rare occurrences of stronger winds overcoming the safe downwind acceptance envelope of the subject helicopter, would any variance to the flight path be made, with " all effort made to avoid the noise sensitive area as much as possible". (Principal Pilot quote – Statement of Environmental Effects Page 4)

Any modification needed to be made to any of the flight paths through the exigencies of wind and weather would be of a temporary and isolated nature only, based on the number of movements allowed and the isolated incidence of inclement weather at the subject site.

Where the pilot in command considered, by evaluation of "and, having regard to all the circumstances of the proposed landing or take-off (including the prevailing weather conditions), " that the operation could not be commenced or completed in safety, then the operation would be cancelled.

IMAGE 10 Pilot appraisal of abnormal wind operation

Information previously submitted to Council by Power Point Presentation

6.0 FLIGHT ALTITUDES

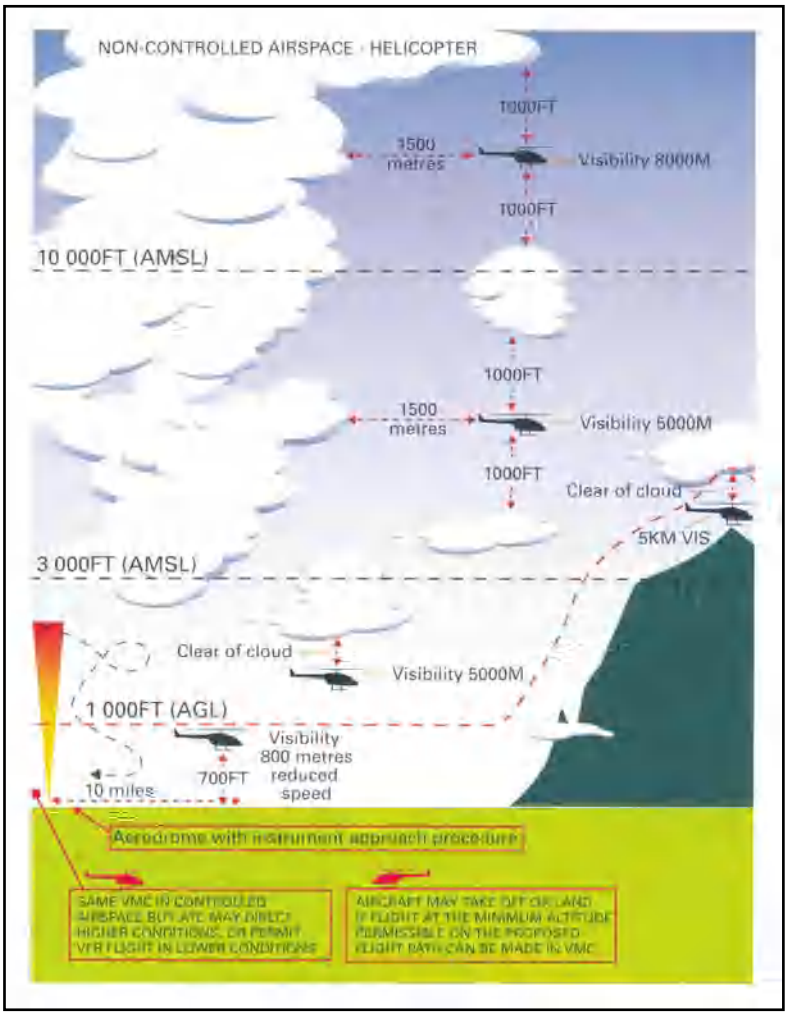
(a) Day Flights
Minimum altitudes for civil helicopters in Australia under Civil Aviation Regulation 157 is 1,000' above the highest obstacle within a radius of 300 metres over a "city, town or populous area": and 500 feet above the highest obstacle within a 300 metre radius outside populous areas.

This Regulation does not apply if: (to name those relevant to the subject site)

(a) through stress of weather or any other unavoidable cause it is essential that a lower height be maintained; or
(b) the aircraft is flying in the course of actually taking-off or landing at an aerodrome

(b) Flights at Dark or under Instrument Meteorological Conditions (IMC)
The minimum altitude for civil helicopters at night and under the Instrument Flight Rules (IFR) is 1,000 feet above the highest obstacle within a 10 nautical mile radius of the aircraft, unless, where the obstacle has been positively identified as having been passed, then the aircraft may descend to the next Lowest Safe Altitude (LSALT) for the Flight Route or enter the circling area of the HLS for the purpose of take off or landing. (Refer CAR 174B)

FIGURE 4. Diagram of Visual Flight Guide Rules



Note. Helicopter VMC operations at the subject site are prohibited in the Zone between the ground and 1,000' AGL as depicted in Figure 4.
Figure 4 shows a pictorial diagram of the Flight Rules pertaining to helicopters in Visual Meteorological Conditions (VMC). This extract is from the Visual Flight Guide extracted from the Aeronautical Information Publication (AIP) available to and required to be used by all aircrew in Australia.

The subject helicopter operates at the subject site within the bounds of the 1,000' and 3,000' AMSL zone as depicted on the diagram. As can be seen, the requirements are quite specific with respect to the safe operation of the helicopter during any meteorological conditions affecting flight, such as:

Visibility - Required to be 5,000 metres or greater
Cloud - Clear of cloud

Other factors influencing helicopter flight and which fall in to the category above are:

Visibility affected by: Fog, Sea Mist, Mist, Rain, low cloud, thunderstorm and cyclonic activity.
Safe Altitudes in the enroute and landing and take off phase affected by low cloud.
Wind conditions: Requiring alert by Air Services Australia as a SIGMET (Significant Meteorological Event) which occasions e.g.

winds of such strength as to create turbulence which can affect the safe operation of a helicopter.

Whenever any of these events occur, and should the operation not be able to meet the basic Visual Flight Guide parameters above, the operation of the helicopter will be cancelled under the Visual Flight Rules.

As entry for a landing or departure for take off at the subject site involves the same Visual Meteorological Conditions under the VFR, then the same factors above apply and the intended helicopter operation will be cancelled if any of the requirements above can not be met.

The flight paths are located considering both safety and noise abatement requirements. It is important to note however, that the pilot in command is responsible for the safe operation of the aircraft and those personnel under his care. Whilst the guidance of the Flight Paths is intended for the majority of operations, the pilot in command reserves the right as to the final disposition of the aircraft along or outside the Flight Path in the interests of safety and noise abatement.

Additionally, and even though CAR 157 indicates helicopter flight is possible at less than the stated parameters under certain conditions, the Principal Pilot has stated that " unless the minimum altitudes at the Flight Path entry and departure points of 1,500' AMSL can be achieved, for whatever reason, then the arriving or departing operation will be cancelled.

This requirement is to be noted in the Company "Aircrew Read and Initial " Document.

7. AIRCRAFT SAFETY

Based on the data available from the Publication – "Survey of Accidents to Australian Civil Aircraft 1988" (Appendix D), it can be shown that 72% of helicopter accidents occurred outside the projected confines of a Helicopter Landing Site given at 8km, with only 6% occurring within 3 km (the eastern and western extents of the Flight Paths prescribed for use at the subject site) and only 8% occurring within 8 km.

As an 8 kilometre radius circle contains an area of over 200 square kilometres, it is impossible to assess the risk of any given location being subjected to a helicopter accident.

Data from the Survey of Accidents to Australian Civil Aircraft 1988 lists loss of control as the first occurrence in 4% of helicopter accidents. Given the infrequency of the occurrence vis-à-vis the overall accident rate, it could be said that the chance of being injured or killed by an out of control helicopter is so slight as to be virtually impossible to measure, particularly as flight over *existing* Residential Areas on the Western and Eastern Flight Paths is nil % and 16% respectively.

Nor can it be said that "loss of control" accidents would be more likely to occur as a result of helicopter landings at the subject site, than as a result of other aircraft overflying the site on descent to Ballina or traversing the local area.

Emergencies involving helicopters may be caused by engine failure (26% of first occurrences), drive component failure (5% of first occurrences), main or tail rotor failure (7% of first occurrences), or fuel exhaustion (5.5% of first occurrences). These statistics involve a mix of piston and turbine engine types, whereby the more reliable turbine engine type helicopter will be used at the subject site.

As the highest degree of helicopter emergencies involved engine failures in all helicopter engine types (26% of first occurrences), it can be shown by reference to Bureau of Air Safety Investigation statistics existing up to 1988, that there is no indication to support the theory that helicopter operations are more prone to engine failure during take off and landing phases than the en-route phase.

The helicopter type to use this site is the twin engine Agusta A109 Grand. Whilst many of the statistics above hold true with respect to component failures of main rotor, tail rotor, drive component, fuel exhaustion and loss of control, the same cannot be said for engine failure due to the safety redundancy of two engines of this particular helicopter. As the primary single cause of emergency in the first occurrence of all the statistics presented is of engine failure (26%) , the commitment by the Applicant to the use of a modern twin engine helicopter at the site removes all concerns over this issue due to the ability of the helicopter to remain aloft or complete a normal landing or take off in the unlikely event of an engine failure.

The Agusta A109 Grand also operates in a “rejected take-off” category, in that in the event of an engine failure, a normal take off may be performed in safety. This offers “accountability” for the helicopter and operations at the site, in so much that in any phase of flight, at Gross Weight, the helicopter integrity and that of its occupants, and therefore third party personnel and property is assured.

It can therefore be shown that as only 8% of helicopter accidents occur within an 8 kilometre radius of a landing site, that the incidence of an engine failure in the approach and take off phases of flight is quite minute, and negligible with respect to twin engine safety, particularly when taking in to consideration the low incidence of Residential Areas lying below both Flight Paths.

On the Western Flight Path during the initial approach phase, the helicopter does not descend markedly below 1,500 feet over the proposed Residential, Rural Residential and Residential Habitat area until abeam the Caravan Park where further descent is commenced to meet the HLS Centre Line at the Applicant’s property.
For operations of a twin engine helicopter type, the redundancy of the power plant system would enable the pilot to continue with the approach to a safe landing, or abort the approach and fly to a more suitable location e.g. Palmers Island Aerodrome.
On the Eastern Flight Path during the initial approach phase, the helicopter intercepts the Coast at Pippy Beach at a minimum 1,500’ to commence a descent towards Angourie Road, maintaining a minimum of 1,000’ over the Aboriginal Residential Reserve and Golf Course, before further descending over the clear Sports Fields to intercept final at a minimum of 500’ at the centre line of the HLS at the Owner’s property. 16% of the Flight Path is traversed over this reserve at a height greater than stipulated in Civil Aviation Regulation 157.

For operations of a twin engine helicopter type, the redundancy of the power plant system would enable the pilot to continue with the approach to a safe landing, or abort the approach and fly to a more suitable location e.g. Palmers Island Aerodrome.

It should also be noted the commitment the Applicant has made to the management of any risk by the proposed operation of the multi engine Agusta 109 Grand helicopter at the subject site, giving proven safety redundancy.

The ATSB (Australian Tranport Safety Bureau) has made a statement in 2004 indicating that helicopter accidents are trending down, and have reduce markedly since 1979, with a 33% decrease in the accident rate between 2001 and 2003.

(REF: **AVIATION RESEARCH PAPER BE04/73**

ATSB Light Utility Helicopter Safety in Australia June 2004)

The reasons for this safety record are considered to be:

(1) Improvement in helicopter technology leading to increased reliability and redundancy in power plants and helicopter systems
(2) Increase in the training and experience requirements by CASA of helicopter pilots leading to better skills, airmanship, safety awareness and judgement
(3) A greater awareness by Manufacturers, Regulatory bodies and pilots as to the unique specialities of helicopters, and the subsequent improvement to technology, regulation and technique improving modern safety standards.
(4) Responsible action taken by Operators to equip with modern reliable helicopters and safety checking (self regulation) methods of that equipment and personnel.

The twin engine redundancy and accountability of the subject helicopter has given the helicopter a higher passenger survivability rating in most instances than aeroplanes, and is an inherent asset in its design. It was further shown that systems failure was minimal and consequent exposure of risk to persons on the ground of any of these failures was almost impossible to measure.

Agusta A109 Grand

Year of Manufacture -2006

Powerplant - 2 x Pratt & Whitney 815 shp computer controlled engines. Hydraulic control back up system. Gross Weight 3,200 kgs. Cruise speed 288 kph (155 knots) Retractable undercarriage. Fuel used is Jet A1 kerosene.
Low emission levels. Newly developed noise reduction main and tail rotors.

IMAGE 11. The Applicant's Agusta A109 Grand VH-CTC hovering at Palmers Island Aerodrome.

8. AIRCREW EXPERIENCE

The Civil Aviation Safety Authority has set stringent requirements for the safe operation of aircraft within Australia and the appropriate licencing, medical standards and experience and currency levels of all Australian pilots.

As an example, for a pilot to hold the privileges of an Australian Commercial Pilot's Licence, he/she must have demonstrated the following:

a. A fitness level enabling the holding of a Class 1 Medical Certificate revalidated by stringent aviation medical tests annually
b. Meet the requirements of holding an endorsement for the aircraft type to be operated, and be tested each 90 days, 6 months, annually and bi annually in accordance with CASA legislation and the types of licences, approvals and ratings held
c. Regular reviews of proficiency for renewal of licences and ratings

The following is the mandate given to the Civil Aviation Safety Authority by Regulation for the safe operation of aircraft in Australia:

Operation and Safety

Under the requirements of the Civil Aviation Act 1988 and the Civil Aviation Regulations 1988, the Civil Aviation Safety Authority has been established and is empowered to conduct the following relevant functions:

a. To conduct the safety regulation of civil air operations in Australian Territory. Civil Aviation Act 1988 Section 9 (1) (a)

By means that include and are not limited to:

(1) Developing and promulgating appropriate, clear and concise aviation safety standards; Civil Aviation Act 1988 Section 9 (1) ©
(2) Developing effective enforcement strategies to ensure compliance with aviation safety standards; Civil Aviation Act 1988 Section 9 (1) (d)
(3) Issuing Certificates, licences, registrations and permits; Civil Aviation Act 1988 Section 9 (1) (e)
(4) Conducting comprehensive aviation industry surveillance; Civil Aviation Act 1988 Section 9 (1) (f)
(5) Conduct regular reviews of the system of civil aviation safety; Civil Aviation Act 1988 Section 9 (1) (g)

b. In exercising its powers and performing its functions, CASA must regard the safety of air navigation as the most important consideration; Civil Aviation Act 1988 Section 9A (1)

Subject to subsection (1) above, CASA must exercise its powers and perform its functions in a manner that ensures that, as far as is practicable, the environment is protected from:

- The effects of operation and use of aircraft; and
- The effects associated with the operation and use of aircraft Civil Aviation Act 1988 Section 9A (2)

c .With further reference to Civil Aviation Act 1988 Section 9 (1) (d), CASA have established a demerit points scheme which is described as:

Offences to which demerit points scheme applies

(1) All offences under CAR and CASR that are specified as strict liability offences are prescribed as offences to which Division 3D (Demerit points scheme) of Part 3 of the Act applies.
(2) The number of points that are incurred in relation to an offence to which that Division applies are as follows:
    (a) If the maximum penalty for the offence is 10 penalty units or less – 1 demerit point:
    (b) If the maximum penalty for the offence is more than 10 penalty units but less than 26 penalty units – 2 demerit points:
    (c) If the maximum penalty for the offence is 26 penalty units or more – 3 demerit points.

Civil Aviation Safety Regulations Division 13.K.2 13.370 (1) & (2)

d. To regulate Civil Aviation to ensure that:

(1) A person must not operate an aircraft being reckless as to whether the manner of operation could endanger the life of another person.
(2) A person must not operate an aircraft being reckless as to whether the manner of operation could endanger the person or property of another person.

Civil Aviation Act 1988 Section 20A (1) & (2)

e. To enforce Regulations by detailing General Offences and Penalties associated with those Offences:

The owner, operator, hirer (not being the Crown) or pilot of an aircraft commits an offence if he or she:

(1) Operates an aircraft or permits the aircraft to be operated; and
(2) The operation of the aircraft results in a contravention of subsection 20A (1).

Penalty: **Imprisonment for 5 years**.

Civil Aviation Act Division 3 Section 29 (3) (a) & (b).

By implementation of the Civil Aviation Act, it can be seen quite clearly that the Civil Aviation Safety Authority is devolving much of the responsibility associated with aircraft operation to the Owner, Operator and pilot in command.

These changes reflect a swing away from restrictive pre-requisites, toward an operational environment where the responsibility for the safety of operations will be further placed with the Owner, Operator and pilot in command.

In this regard, it is the Authority's intention to ensure Operator compliance with the Civil Aviation Act and the Civil Aviation Regulations through an ongoing legislative and operational surveillance programme.

The ongoing surveillance programme addresses itself to a close examination of an Operator's performance standard generally in the following areas:

1. Pilot currency, recency and endorsement of types

2. Validity and currency of Flight Licence and Medical Certificate

3. Examination of Air Operator's Certificate, restrictions, exemptions and relevant approvals, and of the Company Operations Manual.

4. Inspection of appropriate office facilities and relevant operational documents and charts

5. Examination of pilot flight and duty times correlated against the pilot's flying log book and the aircraft recorded flight times.

6 Study of the Maintenance Releases of the aircraft sampled over a twelve month period including flight times of the aircraft correlated against the pilot data in (5) above, and any maintenance endorsements made.

7 Examination of the HLS, its facilities and lighting, approach and departure paths, and the

scale of emergency equipment available on site.

8 Examination of the helicopter in use. Its integrity and compliance with Airworthiness Directives, its operational readiness with respect to documentation, charts and flying facilities on board, and the scale, currency and location of emergency equipment carried on board.

9. The surveillance as to the adequate standard and training of crew associated with the operation of the aircraft, either in it or around it.

10. The carrying out of independent drug and alcohol testing to ensure Operator and pilot/crew compliance with newly enacted Drug and Alcohol Legislation in Aviation.

11. The monitoring and inspection of Operator security measures with respect to aircraft use at aerodromes and the security standard of operating crew.

All these measures and those previously mentioned are responsibly addressed to ensure an ongoing operational monitoring programme while at the same time, addressing itself and the rectification thereof, to any deficiencies which may arise in the continuing safe operation of the helicopter and the associated environment.

As an example of the experience level of the Principal Pilot, who will train other appropriately experienced and qualified personnel in the use of the Agusta A109 Grand and the HLS procedures at the subject site, he has flown man types of single and multi engine helicopters in a civil and military environment over the previous 20 years, within Australia and beyond its shores.

He holds appropriate qualifications for the helicopter type and is suitably rated to undertake VFR, Night VFR or IFR Operations on the helicopter. He also holds a rating to train other pilots to an appropriate standard, and therefore more than meets the basic qualifications and experience required by CASA and his Employer. If we were able to equate his experience levels in flying hours in a complex multi engine helicopter to say, a Specialist Council Officer dealing in attention seeking complex design or machinery systems, then that experience, and also that of the pilots to be used at the subject site, would equate to the full time operation by the specialist of the complex system for a period of 3 continuous working years.

NOTE. In the 40 years I have held an Australian Pilot's Licence, I am unaware of any other Industry Body more regulated, tested or surveyed than the Aviation Community of Australia, and consider the qualifications, experience and currency levels of the aircrew undertaking operations at the Yamba HLS to be more than adequate for the operations at hand, and following an observational sortie with them over a period of 2 hours on July 18, 2008, consider them to be highly qualified and experienced individuals, as will others who follow under the tutelage and guidance of the Principal Pilot. (Ed)

9. HELICOPTER LANDING SITE

As indicated by the Detail Survey undertaken by Harrison Shepherd Pty Ltd (Figure 4), and my own observations and horizontal and vertical measurements taken at the subject site on July 18, 2008, I can confirm that the HLS meets the guidelines as laid down in the Civil Aviation Advisory Publication CAAP 92-2 (1) and can be used as a Standard Helicopter Landing Site under the Guide.

This document is tabled at Appendix A, but in short, has the following meaning:

Commonwealth Civil Aviation Safety Authority Regulations

(a) General

The Civil Aviation Safety Authority has developed a number of Civil Aviation Regulations regarding the landing and take off of helicopters and the use of places as aerodromes for the operation of those helicopters. These requirements have been summarised below:

i). The pilot of a helicopter operating to, from or at an HLS should ensure that:
- the HLS is clear of all:
  - persons, other than persons essential to the helicopter operation; and
  - objects and animals likely to be a hazard to manoeuvring the helicopter, other than
  - objects essential to the helicopter operation; and
  - no person outside the helicopter, other than a person essential to the operation is within 30 metres of the helicopter; and
  - appropriate permission from the owners and authorities has been given; and
  - where a helicopter may be required to be operated with a rejected take off or landing
  - capability, and the performance requirements of the particular flight manual detail greater or additional requirements concerning the FATO,GEA, LLA or the approach and departure paths than those set out in these guidelines, then the greater and/or additional requirements should be met.

ii). A person must not land an aircraft on, or engage in conduct that causes an aircraft to take off from any place unless, the place is suitable for use as an aerodrome for the purposes of the landing and taking-off of aircraft and having regard to all the circumstances of the proposed landing or take-off (including the prevailing weather conditions), the aircraft can land at, or take-off from, the place in safety.

iii). The type of HLS authorised for use at this site under the Civil Aviation Regulations is a Standard Type HLS.

(b) Standard HLS

In addition to the requirements of (i) and (ii) above, the Standard HLS must consist of a Final Approach and Take Off Area (FATO), a Ground Effect Area (GEA), and a Landing and Lift Off Area (LLA). The size of these areas is dependent on the helicopter type in use at the subject site.

General. Since a standard HLS is intended to be used for all types of operations both day and night under helicopter VMC, it should satisfy the following guidelines:

- **The FATO**, at minimum, should have a circular area with a diameter equal to twice the length of the helicopter, when the rotor(s) are turning (2 x'L'), which is free of obstacles likely to interfere with the manoeuvring of the helicopter.
- **The GEA**, at minimum, should have either a circular area with a diameter equal to the diameter of the main rotor of the helicopter; alternatively if the helicopter is of the tandem rotor type the GEA should be a rectangular area equal to the length of the helicopter and the width equal to the rotor diameter. Further, the GEA should be within the FATO with the overall slope not to exceed 7.5 degrees (1:8 vertical to horizontal).
- **The LLA**, at minimum, should have an area equal in size to the undercarriage contact points plus one metre on all sides; if the LLA is not within the FATO, an air taxiing route

with a width equal to twice the main rotor diameter of the helicopter should be provided between the LLA and the FATO. The LLA should be a cleared and stable area capable of bearing twice the gross weight of the helicopter. If on a building, the LLA should also be capable of accepting the static and dynamic loads involved. Overall slope of the LLA, in any direction, should not exceed the maximum slope landing capability of the helicopter.

- **The approach and departure path** should extend outwards from the edge of the FATO as indicated in Fig 1 and have an obstacle free gradient of 7.5 degrees (1:8 vertical to horizontal) measured from the edge of the FATO to a height of 500 feet above the LLA level. This path may be curved left or right to avoid obstacles or take advantage of a more advantageous approach or departure path.

The following additional requirements are to be met if a helicopter is to land at, or take off from, a Standard HLS at night:

Night Operations. For night operations the following additional guidelines are suggested:

Lighting. The edge of the FATO should be defined by either omni directional white lights which project no more than 25 centimetres above the level of the HLS and are spaced no more than eight metres apart or by a combination of markings and floodlighting. However, where this is not practicable, the GEA should be so defined.

Wind velocity information. An accurate means of assessing the HLS wind direction and speed should be provided. This may be accomplished either by an illuminated wind direction indicator located in an unobstructed area visible to approaching/departing helicopter pilots, or by any other suitable means such as radio communication with a responsible person located on or in proximity to the HLS.

Approach guidance. When it is considered essential that an accurate approach path be achieved due to obstacles, the direction of approach should be indicated by at least two omni directional green lights, or by one white lead-in light positioned as indicated in Fig 2.

Any **air taxiing route**, as recommended for day operations, should have a minimum width equal to three times the main rotor diameter of the helicopter, and depending on the operational demands be marked by either blue edge or green centre line lights spaced at 15 metre intervals, or be floodlit.

All lights, except any air taxiing route lights, should be visible from least 5 KM in clear conditions. (Refer CASA Document CAAP 92- 2 (1) (Civil Aviation Advisory Publication)

TABLE 6. CAAP 92 -2 (1) Agusta A109 Dimensions

Helicopter	Rotor Diameter	Overall Length	Approach Departure	FATO	GEA	LLA	Air Taxi
A109	11.0	13.04	44.0	26.1	11.0	8 x 5	22.0 D
							33.0 N

FIGURE 4 HLS Detail Survey

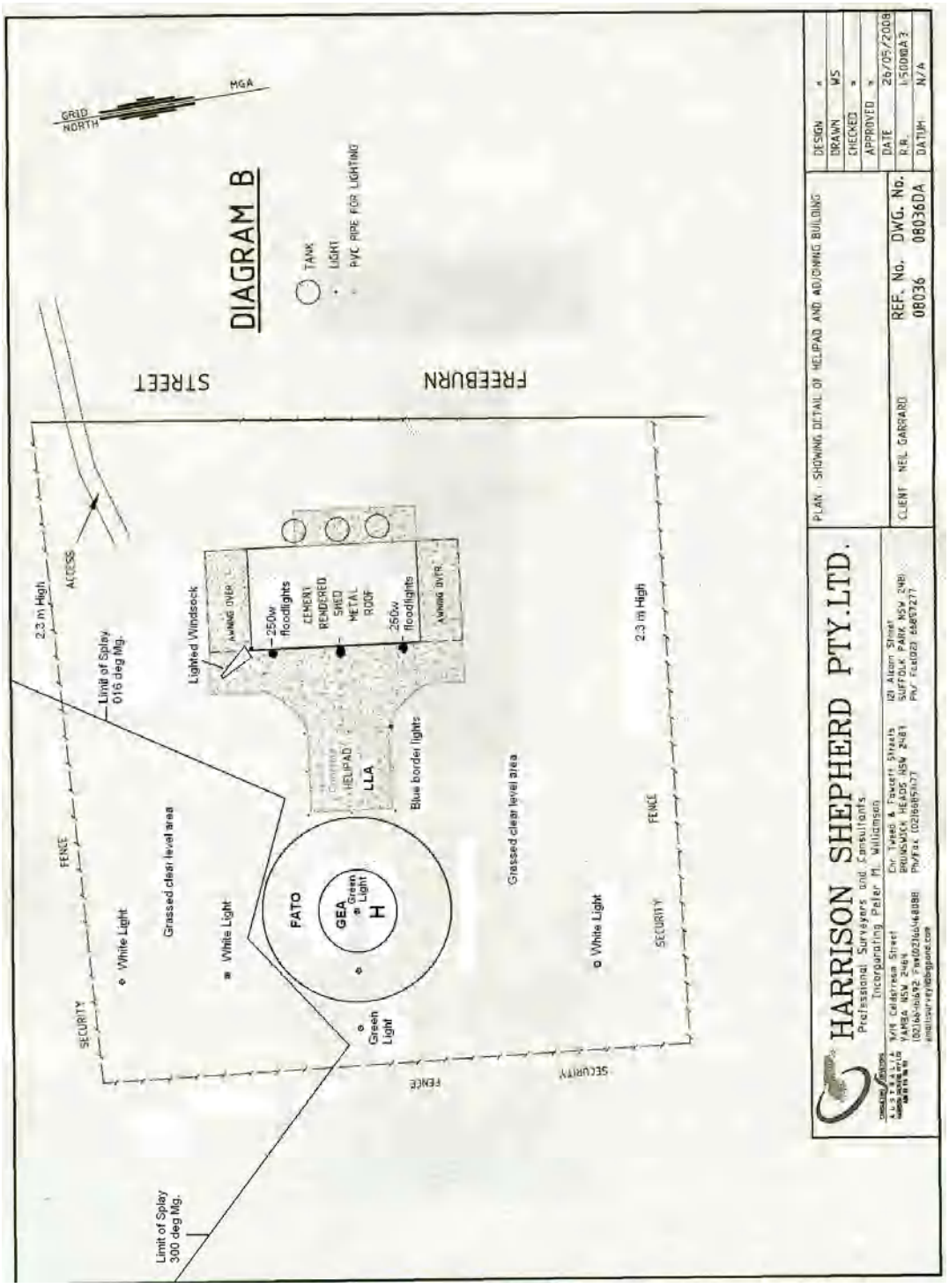
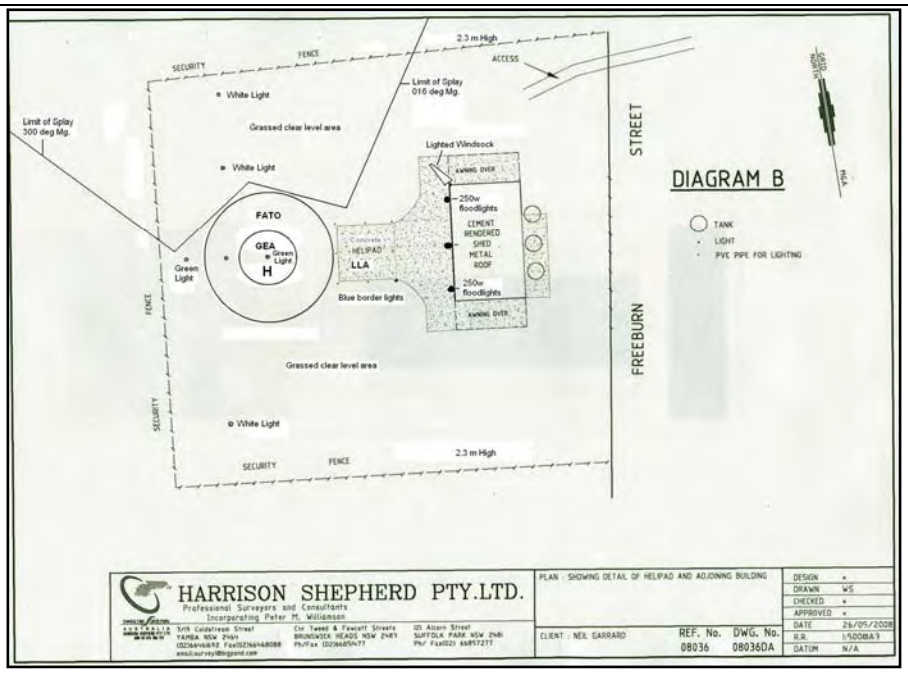


TABLE 7. Example of HLS Register available to EMS Helicopters

HELCOPTER LANDING SITE REGISTER **DESIGNATOR: YAMW** **Lat S 29 26 41.0 E 153 20 43.1**
KAHUNA PTY LTD **HLS DESCRIPTION FORM**
HLS: YAMBA WEST TYPE: STANDARD NVFR: YES
LOCATION: 1.2 nm West of Yamba Township
APPROACH PATH: From East or West 268/088 Deg Magnetic
Final to HLS – 158 Deg Magnetic
DEPARTURE PATH: To East or West 088/268 Deg Magnetic
HLS to Depart – 338 deg Magnetic
DIMENSION OF ABOVE: In excess CAAP 92-2 (1)
GROUND EFFECT AREAS: Grass - Level In excess CAAP 92-2 (1)
LLA SURFACE & SLOPE: Concrete with grass surround - no slope
ELEVATION: 20' AMSL
HAZARDS & OBSTRUCTIONS: Security Fence – High trees to south and west, shed to east
RESTRICTIONS OR CONDITIONS: Caution Residential Overflight and Noise sensitive area directly South
CONTACT FOR APPROVAL: Capt. Richard Ainsworth 0407 267 081



Date Verified: 18/7/08 By Whom: Geoarc Consulting

10. MOVEMENTS AND USAGE

MOVEMENTS

Being in the care of responsible aircrew and Management, it is considered highly unlikely that the number of movements stated by Council and promulgated by State Government, would be intentionally exceeded, save for Emergency Use, either by the Applicant or by others (See Section 10 – Movements and Usage)

However, to meet Council and Community concerns, the Applicant's Principal Pilot maintains a Daily Flight Record which details the daily operations of the helicopter with respect to take off and landing times, crew carried, trip segment, landing areas and any other pertinent data. These records are kept with the helicopter and on the Company premises at the Gold Coast Airport and are available to Council for scrutiny on request to the Applicant or Principal Pilot.

All pilots operating the helicopter for the Applicant are required to maintain these records.

This will enable Council, if required, to verify the usage of the HLS within the stated number of movements per week.

The Principal Pilot also maintains the right to undertake the necessary checking and training by Day or Night of himself or pilots under his control within the stated number of movements.

USAGE

As a Community minded gesture, it is the intent, with the concurrence of Council, to enable Emergency Medical Service (EMS) helicopters access to the proposed HLS in times of emergency.

The situations in which the HLS may be used by EMS helicopters are:

a. Transport of personnel with life threatening injuries or illness
b. Bush Fire surveillance and Hazard Control
c. Evacuation of personnel
d. A Search and Rescue Base during periods of maritime and land based searches and recovery

This HLS adequately meets the physical dimensions of the emergency helicopter types which may use the HLS as described in the CAAP.

The Organisations and helicopter types that may use the facility in times of emergency are:

1. Westpac Helicopter Rescue Service – Lismore

   2 x AS 365 Dauphin Twin Engine helicopters

2. Westpac Helicopter Rescue Service – Cararra, Gold Coast

   1 x AS 350 D Squirrel helicopter – Single Engine

3. Careflight Safety Services – Gold Coast Airport

   1 x AS 350 B Squirrel Helicopter – Single Engine

   1 x Bell 412 Twin Engine helicopter

11. CONCLUSION

It can be concluded by reference to the detail contained in the previous Chapters, that the concerns of Council and the Community response can be met.

It has been shown by statistical evidence and by reference to the appropriate guidelines, and by the professional capability of the aircrew and responsible attitude of the Applicant, that safe and responsible operations can be carried out at the subject site.

The report can be summed up as per:

1. Noise Issues. Obviously to be tested by a Professional Consultant, but it has been shown that with sound pilot techniques, the use of the Fly Neighbourly Guide and the quality of the helicopter in use, that any noise issues can be addressed and mitigated.

2. HLS lighting. Shown to have short term and minimal impact on the subject site.

3. Flight Paths. The prescription of the Flight Paths gives a guarantee as to the safe operation of the helicopter along those paths which have been designed for the flexibility of use in varying meteorological conditions, whilst being responsibly orientated with respect to the environment and noise abatement techniques. It must be noted however, that dependent on the conditions being encountered, the pilot in command reserves the right as to the final disposition of the aircraft with respect to safety. These times would be of a temporary and isolated nature.

4. Altitude and Weather conditions. Although the Flight Paths and entry heights are prescribed, and the over flight, landing and take off operations are regulated in accordance with the Civil Aviation Regulations and the Visual Flight Rules, it is intended by the Operator to exceed those requirements, and where their own greater prescribed requirements in terms of meteorological conditions can not be met, then the operation will be cancelled.

5. Integrity of helicopter and flight crew. The operator will use a “state of the art” modern technology twin engine helicopter affording the highest safety standard in terms of system redundancy, and coupled with the professional standard of the aircrew overseen by the Principal Pilot, ensures the safest possible outcome to a relatively low usage facility.

6. HLS. The HLS is approved in accordance with and meets the guidelines of the CAAP 92-2 (1). The 30 metre rule with respect to persons not essential to the operation, is to be strictly observed at the site.

7. Movements and Usage. The daily Flight Record kept by the Helicopter Pilot will provide a logged record of the helicopters movement, and thus allay any concerns the Council may have of over exceeding any movement numbers imposed as a condition of use. It is also the intention of the Operator to enable a community benefit to be enjoyed with the usage of the facility by Emergency Services as required, who currently use a lower standard HLS in the local residential area.

8. The proposed HLS has demonstrated full compliance with the applicable Local, State and Federal Regulations.

12.0 Terms in Order of Use

The Act

HLS	Helicopter Landing Site
EIAS	Environmental Impact Assessment Statement
AMSL	Above Mean Se Level
AGL	Above Ground Level
VTC	Visual Terminal Chart
ERSA	Enroute Supplement of Australia
ATC	Air Traffic Control
AA	Air Services Australia
FATO	Final Approach and Take Off Area
GEA	Ground Effect Area
LLA	Landing and Lift Off Area
AIP	Aeronautical Information Publication
CAAP	Civil Aviation Advisory Publication
VMC	Visual Meteorological Conditions
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions
NVFR	Visual Flight Rules – Night
IFR	Instrument Flight Rules
CAA	Civil Aviation Act
CAO	Civil Aviation Orders
CAR	Civil Aviation Regulations
nm	Nautical Mile – approximates 1.852 kms
kms	Kilometres
LSALT	Lowest Safe Altitude
PIC	Pilot in Command
AusSAR	Australian Search and Rescue
OCTA	Outside Control Area
CASA	Civil Aviation Safety Authority
ATSB	Australian Transport Safety Bureau
RNAV	Area Navigation
GNSS	Global Navigation Satellite System
ICAO	International Civil Aviation Oganisation

12.1 DEFINITIONS

Aerodrome	A defined area of land or water intended to be used wholly or in part for the arrival, departure and movement of aircraft
Autorotation	Is the phenomenon which results in the rotation of and lift generation by a rotorcraft's primary rotor through purely aerodynamic forces
Circuit	A defined area about an aerodrome or HLS wherein an aircraft commences an approach sequence, or enters whilst in the process of taking off, prior to setting course
Circling Area	An area enabling a circling procedure to be undertaken prior to landing. Normally 3nm around the aerodrome.
Flight Path	A specific course taken by an aircraft with a width through the sky considered to be 4 times the rotor diameter of the helicopter in use
Flight Profile	The general vertical representation of aircraft travel
Flight Route	The general horizontal representation of aircraft travel
Helicopter Landing Site	A place that is used as an aerodrome for the purposes of the landing and taking-off of helicopters
Night	The period of time between the end of evening civil twilight and the beginning of morning civil twilight
Operations Manual	A document required under the Civil Aviation Act 1988 to define the requirements and procedures under which an aviation operator conducts flying operations
Aviation Procedures Manual	A document used by the Operator to prescribe the usage of the HLS with respect to the helicopter type, safety operations, Flight Paths and Noise Abatement Procedures

END OF REPORT

ROBERT C. WARD

DIRECTOR
GEOARC CONSULTING PTY LTD

July 22, 2008

APPENDIX A

CIVIL AVIATION SAFETY AUTHORITY AUSTRALIA

Advisory Publication
January 1996

The information contained in this publication is advisory only. There is no legal requirement to observe the details as set out. The Civil Aviation Regulations detail the legal requirements that must be complied with in relation to use of areas for take-off and landing by a helicopter. While there may be a number of methods of ensuring that the requirements of the Civil Aviation Regulations are met, this CAAP sets out criteria which ensures compliance with the Regulations. The CAAP must be read in conjunction with the Civil Aviation Regulations.

Contents ...

CAAP 92-2 (1)

Guidelines for the establishment and use of helicopter landing sites (HLS)

References

This CAAP should be read in conjunction with

- Civil Aviation Regulations 92, 93, 233 and 235
- Civil Aviation Orders
- Aeronautical Information Publication

Purpose of this CAAP

Civil Aviation Regulation 92 (1) states that: "An aircraft shall not land at, or take-off from, any place unless: ...(d) the place....is suitable for use as an aerodrome for the purposes of the landing and taking-off of aircraft; and, having regard to all the circumstances of the proposed landing or take-off (including the prevailing weather conditions), the aircraft can land at, or take-off from, the place in safety."

Regulation 92 (1) does not specify the method of determining which "circumstances", other than the prevailing weather conditions, should be considered in any particular case. These matters are the responsibility of the pilot in command and, in some circumstances, are shared with the aircraft operator.

These guidelines set out factors that may be used to determine the suitability of a place for the landing and taking-off of helicopters. Experience has shown that, in most cases, application of these guidelines will enable a take-off or landing to be completed safely, provided that the pilot in command:

- has sound piloting skills; and
- displays sound airmanship.

Status of this CAAP

This is the second issue of CAAP 92-2, CAAP 92-2(0) should be removed and destroyed.

Additional copies of this CAAP may be obtained from:

Airservices Australia
Publications Centre
715 Swanston Street
Carlton VIC 3053

Definitions and other expressions

The following definitions may be used in this CAAP:

'Air Taxi' means the airborne movement of a helicopter at low speeds and at heights normally associated with ground effect.

'Air Transit' means airborne movement of a helicopter that is:

- for the purpose of going from one place within a HLS to another place within the HLS;
- at or below 100 feet above the surface of the HLS; and
- at speeds greater than those used in air taxiing.

'Approach and Departure Path' means the track of a helicopter as it approaches or takes off and departs from the FATO of a HLS.

'Basic HLS' means a place that may be used as an aerodrome for infrequent, opportunity and short term basis for all types of operations, other than RPT, by day under helicopter VMC.

'Building' includes any elevated structure on land, whether or not fixed to land.

'Final Approach and Take Off Area' (FATO) in relation to a HLS, means an area of land or water over which the final phase of the approach to a hover or landing is completed and from which the take off manoeuvre is commenced.

'Final Approach' means the reduction of height and airspeed to arrive over a predetermined point above the FATO of a HLS.

'Ground Effect Area' (GEA) in relation to a HLS, means an area that provides ground effect for a helicopter rotor system.

'Ground Taxiing' means movement of a helicopter under its own power and on its undercarriage wheels.

'Helicopter VMC' means VMC in relation to helicopters as detailed in AIP.

'Helicopter Landing Site' (HLS) means a place that may be used as an aerodrome for the purposes of landing or taking off of helicopters.

'Land' in relation to a helicopter, means lower the helicopter to bring the undercarriage in contact with the surface.

'Length' ('L') in relation to a helicopter, means the total length of the helicopter including its rotor(s) when they are turning.

'Licensed Aerodrome' means a place that is licensed as an aerodrome under the Civil Aviation Regulations.

'Lift Off' in relation to a helicopter means raise the helicopter into the air.

'Landing and Lift Off Area' (LLA) in relation to a HLS, means an area within the HLS on which helicopters land and lift off.

'Marine HLS" means a place that may be used as an aerodrome on a ship other than an offshore resource ship.

'Midship HLS' means a marine HLS the centre of the FATO of which lies on the ship's longitudinal axis.

'Movement' means a landing or a lift off of a helicopter.

'Offshore Resource Platform' means a platform, whether fixed or floating, used in connection with the recovery of natural resources and that is operating in a part of the sea that is within Australian Territory.

'Offshore Resource Ship' means a ship used in connection with the recovery of natural resources and that is operating in a part of the sea that is within Australian Territory.

'Place' includes a place on land, on a building, on the surface of water, on a structure, whether fixed or floating, wholly or partly above the surface of water or on a ship.

'Ship's Side HLS' means a marine HLS that is located on the side of a ship.

'Standard HLS' means a place that may be used as an aerodrome for helicopter operations by day or night.

'Take off' in relation to a helicopter means accelerate to and commence climb at the relevant climb speed.

An expression that is defined in the Civil Aviation Act, the Civil Aviation Regulations or the AIP has, when used in this CAAP, the same meaning as it has in those publications.

Factors that should be considered prior to using an HLS

The pilot of a helicopter operating to, from or at an HLS should ensure that:

- the HLS is clear of all:
  - persons, other than persons essential to the helicopter operation; and
  - objects and animals likely to be a hazard to manoeuvring the helicopter, other than objects essential to the helicopter operation; and
- no person outside the helicopter, other than a person essential to the operation is within 30 metres of the helicopter; and
- appropriate permission from the owners and authorities has been given; and
- where a helicopter may be required to be operated with a rejected take off or landing capability, and the performance requirements of the particular flight manual detail greater or additional requirements concerning the FATO, GEA, LLA or the approach and departure paths than those set out in these guidelines, then the greater and / or additional requirements should be met.

A helicopter must not land at, or take-off from a HLS that is located within controlled airspace unless:

- helicopter VMC exists;
- two way VHF radio communications with the appropriate ATS unit are established; and
- the appropriate ATC clearances have been received.

If a proposed HLS is to be located near a city, town or populous area or any other area where noise or other environmental considerations make helicopter operations undesirable, such an HLS may be affected by the provisions of the *Commonwealth Environment*

Protection (Impact of Proposals) Act 1974 and parallel State legislation. There may be other local legislation affecting the siting of HLS's or aerodromes.

Recommended criteria for a basic and standard HLS

BASIC HLS

A basic HLS should:

- be large enough to accommodate the helicopter safely;
- have a surface capable of withstanding the static and dynamic loads imposed by the helicopter; and
- only be used for day operations under helicopter VMC.

STANDARD HLS

General. Since a standard HLS is intended to be used for all types of operations both day and night under helicopter VMC, it should satisfy the following guidelines:

- **The FATO**, at minimum, should have a circular area with a diameter equal to twice the length of the helicopter, when the rotor(s) are turning (2 x 'L'), which is free of obstacles likely to interfere with the manoeuvring of the helicopter.
- **The GEA**, at minimum, should have either a circular area with a diameter equal to the diameter of the main rotor of the helicopter; alternatively if the helicopter is of the tandem rotor type the GEA should be a rectangular area equal to the length of the helicopter and the width equal to the rotor diameter. Further, the GEA should be within the FATO with the overall slope not to exceed 7.5 degrees (1:8 vertical to horizontal).
- **The LLA**, at minimum, should have an area equal in size to the undercarriage contact points plus one metre on all sides; if the LLA is not within the FATO, an air taxiing route with a width equal to twice the main rotor diameter of the helicopter should be provided between the LLA and the FATO. The LLA should be a cleared and stable area capable of bearing twice the gross weight of the helicopter. If on a building, the LLA should also be capable of accepting the static and dynamic loads involved. Overall slope of the LLA, in any direction, should not exceed the

maximum slope landing capability of the helicopter.

- **The approach and departure path** should extend outwards from the edge of the FATO as indicated in Fig 1 and have an obstacle free gradient of 7.5 degrees (1:8 vertical to horizontal) measured from the edge of the FATO to a height of 500 feet above the LLA level. This path may be curved left or right to avoid obstacles or take advantage of a more advantageous approach or departure path.

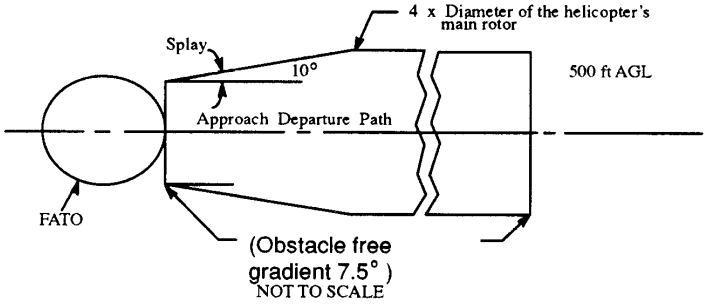


Figure 1

Buildings. For operations from a **standard HLS** that is located on a building the following additional guidelines are suggested:

- **Markings**. The HLS should be painted with markings indicating the undercarriage ground contact limit points on which the helicopter may be positioned without compromising clearance requirements.
- **The LLA** should be indicated by an aiming point painted on the HLS (this may take any form such as a circle, letter or logo).
- The **edge** of the FATO should be indicated by a 40 centimetre wide stripe painted on the HLS.
- A whole number (termed the **indicator number**) should be painted on the HLS with the helicopter's weight, expressed in Kg, calculated by multiplying the indicator number by 1000.
- **Drainage facilities** should be provided to prevent the collection, the spreading or falling of liquids onto other parts of the building.
- **Safety net**. As a means of avoiding risk of death or injury to passengers, crew and other personnel the outer edge of the HLS should be protected by a safety net, or similar device, that is at least 1.5 metres wide and does not project more than 25 centimetres above the HLS at its outer edge.

- **Access**. The HLS should be sited with separate primary and emergency personnel access routes with both routes located as far apart as practicable.
- **Fire extinguishers**. The HLS should be equipped with at least two carbon dioxide fire extinguishers each with a minimum capacity of 4.5 Kg; one extinguisher should be positioned at each of the primary and emergency personnel access routes.
- **A wind direction indicator** should be positioned on the HLS in an unobstructed area so that it is readily visible to helicopter pilots when approaching / departing the HLS.

Night Operations. For night operations the following additional guidelines are suggested:

- **Lighting**. The edge of the FATO should be defined by either omni directional white lights which project no more than 25 centimetres above the level of the HLS and are spaced no more than eight metres apart or by a combination of markings and floodlighting. However, where this is not practicable, the GEA should be so defined.
- **Wind velocity information.** An accurate means of assessing the HLS wind direction and speed should be provided. This may be accomplished either by an illuminated wind direction indicator located in an unobstructed area visible to approaching / departing helicopter pilots, or by any other suitable means such as radio communication with a responsible person located on or in proximity to the HLS.
- **Approach guidance**. When it is considered essential that an accurate approach path be achieved due to obstacles, the direction of approach should be indicated by at least two omni directional green lights, or by one white lead-in light positioned as indicated in Fig 2.
- Any **air taxiing route**, as recommended for day operations, should have a minimum width equal to three times the main rotor diameter of the helicopter, and depending on the operational demands be marked by either blue edge or green centre line lights spaced at 15 metre intervals, or be floodlit.
- **All lights**, except any air taxiing route lights, should be visible from at least 5 KM in clear conditions.

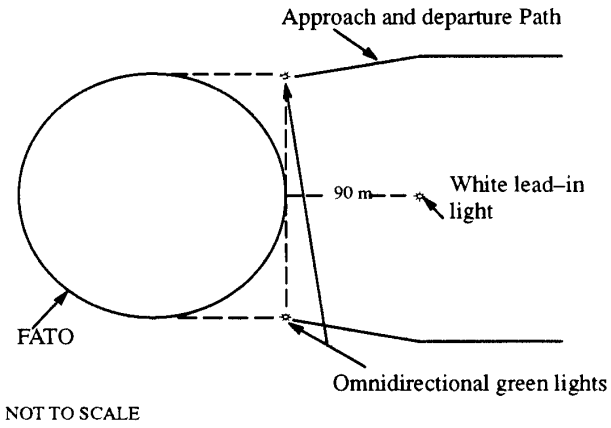


Figure 2

Recommended criteria for an offshore HLS

The landing area on either an offshore resource platform or offshore resource ship is generally referred to as an 'offshore HLS'.

General. Since an offshore HLS may be used for all types of operations both day and night under helicopter VMC, it should satisfy the following guidelines:

- **The FATO/GEA**, at minimum, should be a circular area equal to the overall length of the helicopter when the rotor(s) are turning ('L'). It should be capable of providing **ground effect** while the helicopter is hovering. Also the FATO should be capable of safely accepting the static and dynamic loads involved during the operation. Further, the FATO should be free of obstacles likely to interfere with the manoeuvring of the helicopter as well as having an obstacle limitation area. This obstacle limitation area should have an obstacle free gradient of 26.5 degrees (1:2 vertical to horizontal), see Figs 3 & 4.

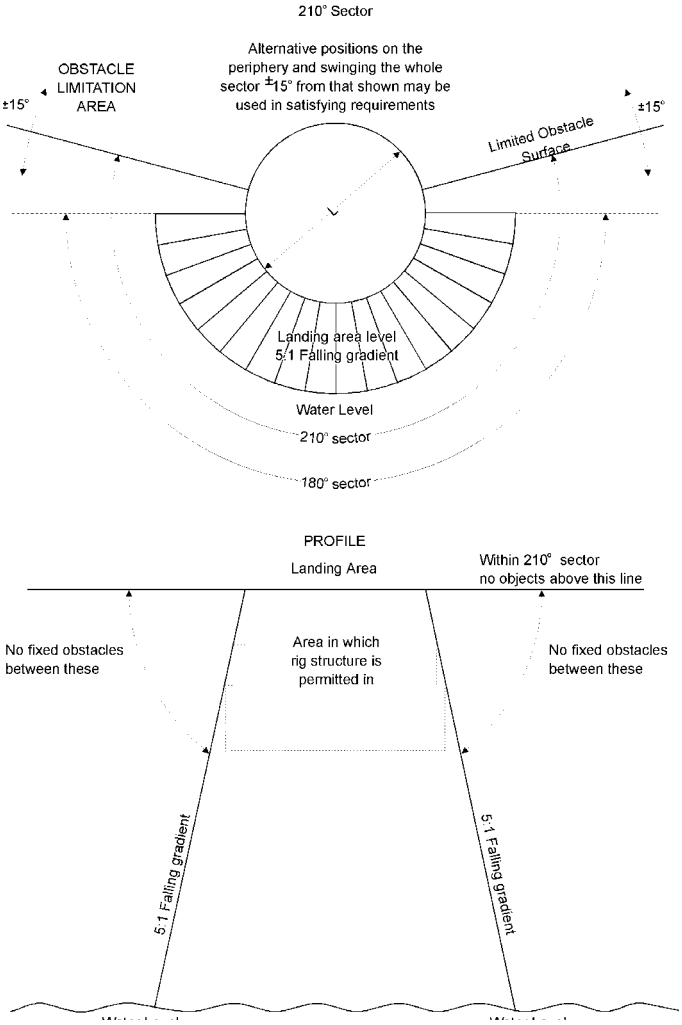


Figure 3

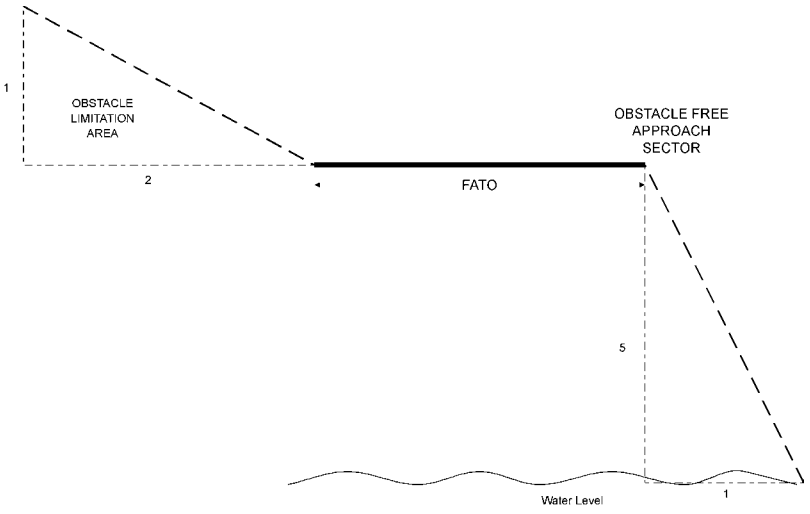


Figure 4

The **LLA**, at minimum, should be a circular area equal to 1.5 times the greatest dimension of the helicopter's undercarriage gear with the surface being non slip.

- **The approach and departure obstacle-free sector** should subtend an arc of 210 degrees centred on the rear or opposite edge of the FATO and extend outwards to a distance compatible with the one-engine inoperative capability of the most critical helicopter that the helideck is intended to serve. The surface should be a horizontal plane level with the elevation of the helideck. Over an arc of 180 degrees, passing through the centre of the FATO, the surface should descend outwards from the edge of the FATO with a gradient of five (5) units vertically to one (1) unit horizontally to the water level. At water level, the surface should then extend out at a distance compatible with the take-off space required for the most critical helicopter that is intended to use the helideck. See Figs 3 & 4.
- **Markings**. The HLS should be painted with 40 cm wide markings as follows:
  - to indicate the limits to which the undercarriage surface contact points may be positioned without compromising clearance requirements;
  - an aiming circle six metres in diameter; and
  - a stripe marking the edge of the FATO.
- **Drainage facilities** should be provided to prevent the collection, the spreading or falling of liquids onto other parts of the platform or vessel concerned.
- **Safety net**. As a means of avoiding risk of death or injury to passengers, crew and other personnel the outer edge of the HLS should be protected by a safety net, or a similar device, that is at least 1.5 metres wide and does not project more than 25 centimetres above the HLS at its outer edge.
- **Access**. The HLS should be sited with separate primary and emergency personnel access routes with both routes located as far apart as practicable.
- **Fire extinguishers**. The HLS should be equipped with at least two carbon dioxide fire extinguishers each with a minimum capacity of 4.5 Kg; one extinguisher should be positioned at each of the primary and emergency personnel access routes.

- **A wind direction indicator** should be positioned on the HLS in an unobstructed area so that it is readily visible to helicopter pilots approaching / departing the HLS.

Night Operations. For night operations to / from an off shore HLS the following additional guidelines are recommended:

- **Lighting**. The edge of the FATO should be marked by omni-directional white lights spaced no more than 5 metres apart, with a minimum of 10 lights. They should project not more than 25 centimetres above the level of the HLS;
- any obstructed sector should be marked by a row of red coloured omni directional lights;
- the HLS should be floodlit;
- any lights on the platform or vessel that may interfere with a helicopter pilot's vision during an approach / departure to / from the HLS should be adequately shielded.
- **Wind velocity information.** An accurate means of assessing the HLS wind direction and speed should be provided. This may be accomplished either by an illuminated wind direction indicator located in an unobstructed area visible to approaching / departing helicopter pilots, or by any other suitable means such as radio communication with a responsible person located on or in proximity to the HLS.

Recommended criteria for a marine HLS

Since a marine HLS may be used for all types of operations by day and night under helicopter VMC, it should generally conform to the following guidelines.

Midship HLS. For a midship located HLS:

- **The FATO**, at minimum, should be a circular area equal in diameter to the overall length of the helicopter when the rotor(s) are turning ('L'). Lines should be marked on the deck of the vessel as indicated by the lines A and B in Fig 5. There should be no obstacles in the area between these lines which protrude more than 25 centimetres above the surface of the vessel. Further, in front of and behind the FATO there should be obstacle limitation areas extending from these lines as shown in Fig 5. Each obstacle limitation area should have an obstacle free gradient of 11.5 degrees (1:5 vertical to horizontal) as shown in Fig 6.

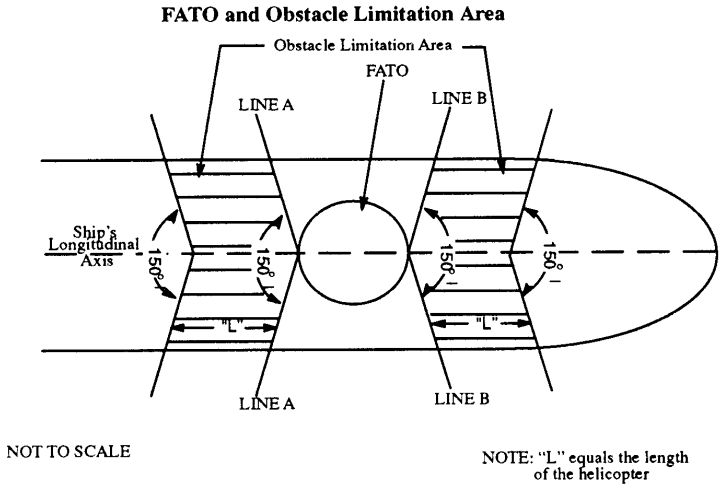


Figure 5

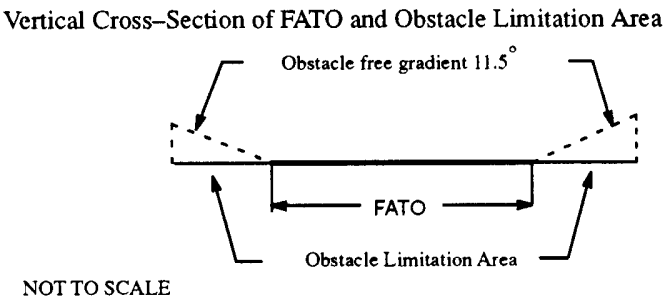


Figure 6

- **The GEA**, at minimum, should be a circular area with a diameter equal to the helicopter's main rotor diameter and is to be entirely within the FATO.
- **The LLA** should be entirely within the FATO and be capable of safely accepting the static and dynamic loads of the operation as well as have a non slip surface.

Ship's Side HLS. For a ship's side located HLS:

- **The FATO**, at minimum, should have an 'L' value as prescribed for the midship HLS and be an area with a shape and size as shown in Fig 7. There should not be obstacles within the FATO that protrude more than 25 centimetres above the vessel's deck. Further, there should be an obstacle limitation area around the FATO with an obstacle free gradient of 20 degrees (1:3 vertical to horizontal) as shown in Fig 8.

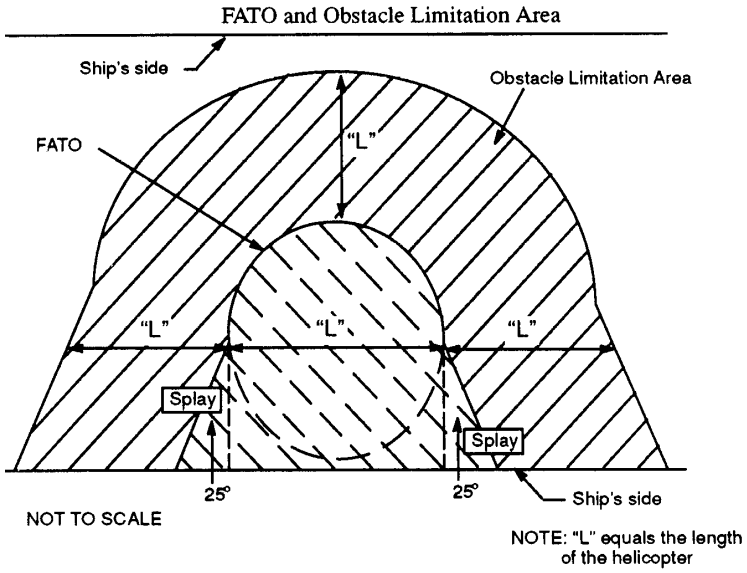


Figure 7

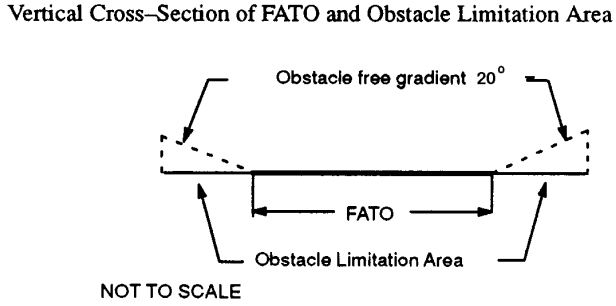


Figure 8

- **The GEA** , at minimum, should be a circular area with a diameter equal to the helicopter's main rotor diameter and is to be entirely within the FATO.
- **The LLA** should be entirely within the FATO and be capable of safely accepting the static and dynamic loads of the operation as well as have a non slip surface.
- **Approach and Departure Paths.** The 180 degree sector obstacle free surface profile, applicable to the Offshore HLS, is also recommended for the Marine HLS. The surface descent profile is to be taken from the edge of the ship's deck.
- **Markings**. In operations from a marine HLS, the following additional markings are recommended:
  - a white coloured painted circle, centred on the FATO, but broken in three places by the letter ‘D’ and followed by the figures (in metres) indicating the rotor diameter of the largest helicopter expected to use the HLS;

  - a yellow aiming circle, centred on the FATO, with a diameter of six metres; and
  - a white coloured painted letter ‘H’ in the centre of the aiming circle.
- **Wind velocity information.** An accurate means of assessing the HLS wind direction and speed should be provided. This may be accomplished either by a wind direction indicator located in an unobstructed area visible to approaching / departing helicopter pilots, or by any other suitable means such as radio communication with a responsible person located on or in proximity to the HLS.

Night Operations. For night operations from a marine HLS the following additional guidelines are recommended:

- the HLS should be floodlit; and
- any lights on the ship that may interfere with the helicopter pilot's vision during approach to or departure from the HLS, or during winching or sling loading operations should be adequately shielded.
- **Wind velocity information.** An accurate means of assessing the HLS wind direction and speed should be provided. This may be accomplished either by an illuminated wind direction indicator located in an unobstructed area visible to approaching / departing helicopter pilots, or by any other suitable means such as radio communication with a responsible person located on or in proximity to the HLS.

APPENDIX B

Fly Neighborly Guide

Produced by the Fly Neighborly Committee

Helicopter
Association
International

I Fly Neighborly

Revised February 1992

Fly Neighborly Guide

prepared by the
Helicopter Association International
Fly Neighborly Committee

Revised February 1992

Pilot Training

Scope

The scope of the pilot training program includes:

- initial and recurrent flight training for pilots,
- the incorporation of noise data into flight manuals,
- preparing and distributing specific helicopter noise data,
- preparing and distributing recommended noise abatement procedures,
- organizing and holding operator and manufacturer seminars, and
- providing environmental and supervisory personnel training courses.

Basic Guidelines for Pilot Training

Public acceptance for our helicopter operations can be obtained in several ways. One is noise abatement. Crew training in noise abatement procedures is therefore vital. The following guidelines for noise abatement training are suggested:

- Select training teams for ground and flight training, usually two or three people who have extensive metropolitan operations experience.
- Standardize presentations.
- Maintain complete files of all persons trained.
- Circulate critique or comment sheets at all meetings or training sessions, and stress that all suggestions, ideas and comments will be considered.
- Make the necessary changes in training and publications that result from the feedback.
- Maintain an open-door policy to all participants, flight crews and the public.
- Determine the effect of this training on the public. Has it been positive or negative?
- Record all complaints and include all relevant details, such as the time, date, location, altitude, or weather.
- Follow up with proficiency training every six months. Emphasize the importance of public contacts, and the necessity of good community relations.
- Expand these guidelines to cover local needs.

Basic Guidelines for Noise Abatement

Although this section offers a number of noise abatement techniques, here are a few simple guidelines to remember:

- Avoid noise-sensitive areas altogether when possible. Instead, follow:
  - — high ambient noise routes such as highways, or
  - — unpopulated routes such as waterways.

If you must fly near noise-sensitive areas:

- maintain an altitude of at least 1000 feet where possible,
- reduce your speed if you are flying above normal cruising speed,
- observe low-noise speed and descent settings,
- avoid sharp maneuvers,
- use high takeoff and descent profiles, and
- vary your route—repetition is annoying.

It has also been reported that flights conducted down arterials in noise-sensitive areas are less likely to generate complaints than routes that visually intrude on people's privacy, such as those that cross residential backyards.

Recommended Noise Abatement Procedures

Advisory Circular AC91.36C
Department of Transportation
Federal Aviation Administration
Washington, D.C.

March 19, 1982

Subject: VFR Flight Near Noise-Sensitive Areas

1. PURPOSE. This advisory circular encourages pilots making VFR flights near noise-sensitive areas to fly at altitudes higher than the minimum permitted by regulation and on flight paths which will reduce aircraft noise in such areas.

2. CANCELLATION. Advisory Circular 91.36A, VFR Flight Near Noise-Sensitive Areas, dated July 19, 1974, is cancelled.

3. BACKGROUND.

a. The Federal Aviation Administration continually receives complaints concerning low-flying aircraft over noise-sensitive areas. These complaints have prompted requests for regulatory action prohibiting low-altitude flight over identified noise-sensitive locations. We believe that a satisfactory solution can be realized by means of a pilot/industry cooperative endeavor rather than through the regulatory process.

b. Increased emphasis on improving the quality of the environment requires continued effort to provide relief and protection from aircraft noise.

c. Excessive aircraft noise can result in discomfort, inconvenience, or interference with the use and enjoyment of property, and can adversely affect wildlife. It is particularly undesirable near outdoor assemblies of persons, churches, hospitals, schools, nursing homes, noise-sensitive residential areas, and National Park Areas which should be preserved as important historic, cultural, and natural aspects of our national heritage.

d. Adherence to the practices described below would be a practical indication of pilot concern for environmental improvement, would build support for aviation, and forestall possible regulatory action.

4. VOLUNTARY PRACTICES.

a. Avoidance of noise-sensitive areas, if practical, is preferable to overflight at relatively low altitudes.

b. Pilots operating fixed- and rotary-wing aircraft under VFR over noise-sensitive areas should make every effort to fly not less than 2,000 feet above the surface, weather permitting, even though flight at a lower level may be consistent with the provisions of FAR 91.79, Minimum Safe Altitudes.

Typical of noise-sensitive areas are: outdoor assemblies of persons, churches, hospitals, schools, nursing homes, residential areas designated as noise-sensitive by airports or by an airport noise compatibility plan or program, and National Park Areas (including Parks, Forest, Primitive Areas, Wilderness Areas, Recreation Areas, National Seashores, National Monuments, National Lakeshores, and National Wildlife Refuge and Range Areas).

c. During departure or arrival from/to an airport, climb after takeoff and descent for landing should be made so as to avoid prolonged flight at low altitudes near noise-sensitive areas.

d. This procedure does not apply where it would conflict with ATC clearances or instructions or where an altitude of less than 2,000 feet is considered necessary by a pilot in order to adequately exercise his or her primary responsibility for safe flight.

5. COOPERATIVE ACTIONS. Aircraft operators, aviation associations, airport managers, and others are asked to assist in implementing the procedures contained herein by publicizing them and distributing information regarding known noise-sensitive areas.

R. J. Van Vuren
Director, Air Traffic Service

How to Operate Helicopters More Quietly

The following sections were also written by Charles Cox, a research project engineer with Bell Helicopter. In these sections, Mr. Cox explains how light and medium-weight

helicopters can be flown as quietly as possible. Although the information offered by Mr. Cox may be somewhat specific to Bell helicopters, the general information he offers applies to the operation of all helicopters.

Noise Abatement Flight Procedures for Light Helicopters

In general, you can eliminate the most offensive sounds of the 206A helicopter by keeping it out of the slap region shown in Figure 7 (see Appendix A). This is not always possible, of course, and when the slap regions cannot be avoided, fly through them as quickly as possible. There are also other methods of reducing helicopter noise, and you should use them when you can, whether you are flying within the slap boundary or not.

Routes and Airspeeds

- Fly at the highest practical altitude when approaching metropolitan areas.
- Select a route into the terminal over the least populated area.
- Follow major thoroughfares or railway roadbeds.
- Avoid flying low over residential and other densely populated areas.
- If you must fly over such areas, maintain a cruise speed of approximately 95 knots.
- Select the final approach route with due regard to the type of neighborhood surrounding the terminal, and the neighborhood's sensitivity to noise. Assess this sensitivity beforehand for each terminal. Some guidelines are:
  - — Keep the terminal between the helicopter and the most noise-sensitive building or area on approach.
  - — If the terminal is surrounded by noise-sensitive areas, approach at the steepest practical glide slope.
  - — Avoid flying directly over hospitals, nursing homes, schools, and other highly noise-sensitive facilities.
  - — If the terminal is in or near a noise-sensitive area, use the noise-abatement approach and landing technique described below and illustrated in Figure 1.

Approach and Landing

1. When commencing approach, follow one of these two procedures:
   a. First establish a rate of descent of at least 500 fpm.
   b. Then reduce airspeed while increasing the rate of descent to at least 800 fpm.

   or:

   a. Hold the rate of descent to less than 200 fpm while reducing airspeed to about 57 knots.
   b. Then increase the rate of descent to at least 800 fpm.

2. At a convenient airspeed between 50 and 80 knots, set up an approach glide slope while maintaining the 800 fpm or greater rate of descent.
3. Increase the rate of descent if the main rotor tends to slap, or if you want a steeper glide slope.
4. As you approach the flare, reduce the airspeed to below 60 knots before decreasing the rate of descent.
5. Execute a normal flare and landing, decreasing the rate of descent and airspeed appropriately.

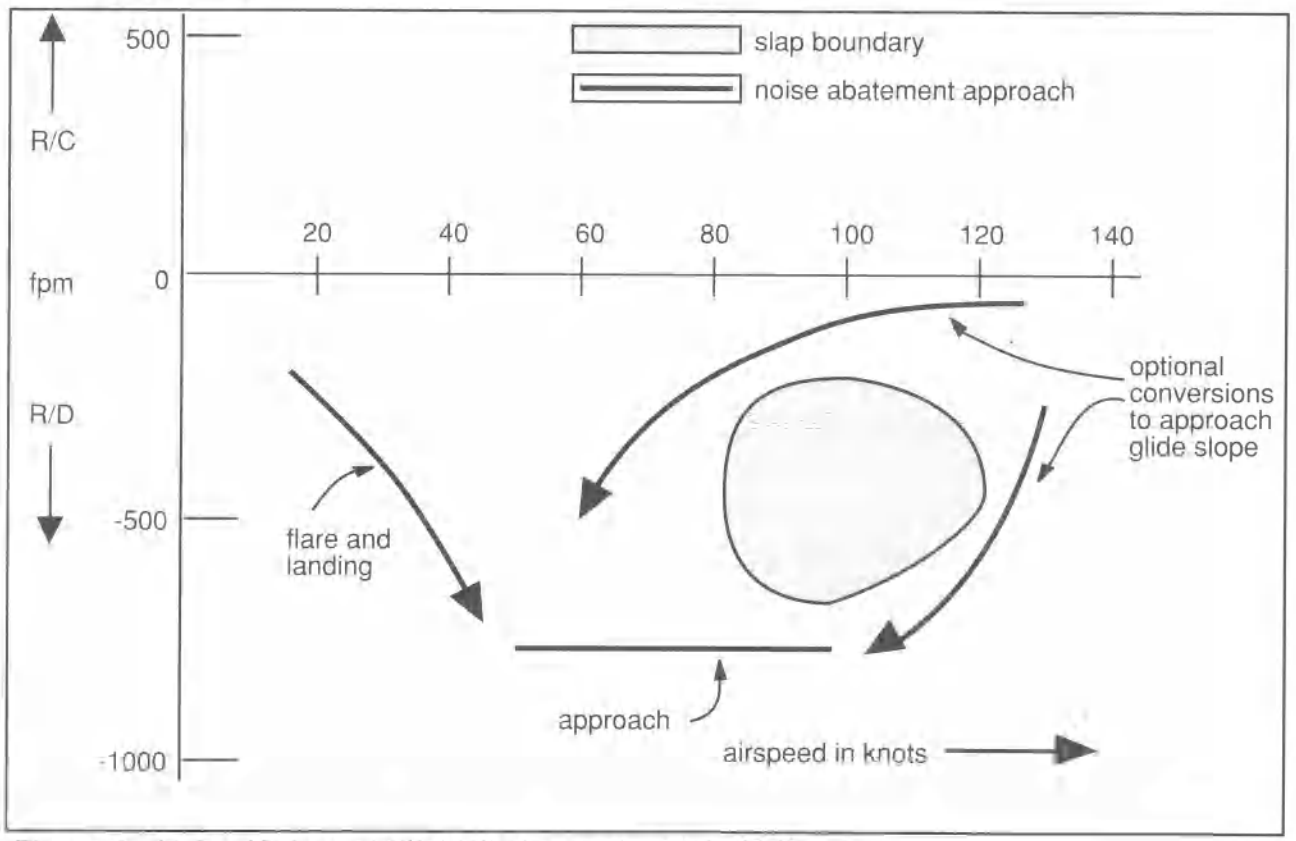


Figure 1. *Noise Abatement Flight Technique for Light Helicopters*

The basic difference between this approach technique and a normal one is that this one avoids blade slap. Both procedures give approximately the same airspeed during the approach, but the quieter technique uses a glide slope that is a few degrees steeper. Once you have made the transition from cruise to the approach glide slope, you can tailor your airspeed and rate of descent to fit local conditions, avoid unsafe regimes, and still guarantee minimum noise.

Departure

Takeoffs are reasonably quiet operations, but you can limit the total ground area exposed to helicopter sound by using a high rate of climb and making a smooth transition to forward flight. Your departure route should take you over areas which are the least sensitive to noise.

Maneuvers

Avoid rapid, high *g* turns, as a general rule. When the flight operation requires turns, perform them smoothly. Be smooth in all other maneuvers also.

Noise Abatement Flight Procedures for Medium Helicopters

In general, you can eliminate the most offensive noise of the 204B, 205A, 212, and other medium helicopters by keeping them out of the slap regions shown in Figures 8 and 9 (see Appendix A). This is not always possible, of course, and when the slap regions cannot be avoided, fly through them as quickly as possible. There are also other methods of reducing helicopter noise, and you should use them when you can, whether you are flying within the slap boundary or not.

Routes and Airspeeds

- Fly at the highest practical altitude when approaching metropolitan areas.
- Select a route into the terminal over the least populated area.
- Follow major thoroughfares or railway roadbeds.
- Do not exceed 110 knots when within five miles of suburban areas.
- Within three miles of densely populated areas, maintain a cruise speed of approximately 100 knots, and reduce rpm to the minimum allowed by the flight manual of the particular helicopter.
- Select the final approach route with due regard to the type of neighborhood surrounding the terminal, and the neighborhood's sensitivity to noise. Assess this sensitivity beforehand for each terminal. Some guidelines are:
  - — Keep the terminal between the helicopter and the most noise-sensitive building or area on approach.
  - — If the terminal is surrounded by noise-sensitive areas, approach at the steepest practical glide slope.
  - — Avoid flying directly over hospitals, nursing homes, schools, and other highly noise-sensitive facilities.
  - — If the terminal is in or near a noise-sensitive area, use the noise-abatement approach and landing technique described below and illustrated in Figure 2.

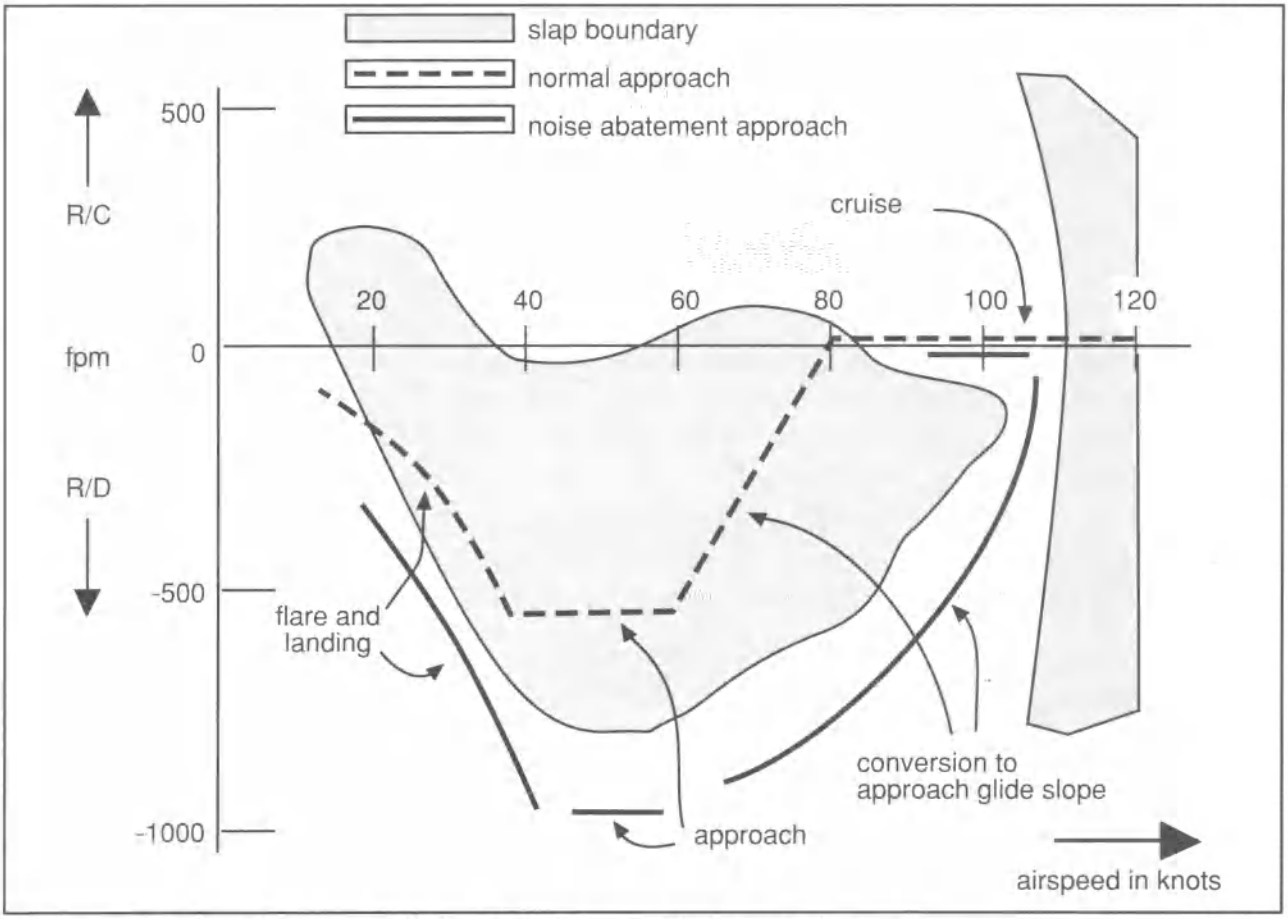


Figure 2. *Noise Abatement Flight Technique for Medium Helicopters*

Approach and Landing

1. When commencing approach, begin descent at a rate of at least 200 fpm before reducing airspeed.
2. Then reduce airspeed while increasing the rate of descent to about 800 fpm.
3. At a convenient airspeed between 50 and 80 knots, set up an approach glide slope while maintaining the 800 fpm rate of descent.
4. Increase the rate of descent if the main rotor tends to slap, or if you want a steeper glide slope.
5. As you approach the flare, reduce the airspeed to below 50 knots before decreasing the rate of descent.
6. Execute a normal flare and landing, decreasing the rate of descent and airspeed appropriately.

The basic difference between this quieter approach technique and a normal one is that you begin your descent before reducing your airspeed. Both procedures give approximately the same airspeed during the approach, but the quieter technique uses a glide slope that is a few degrees steeper. Once you have made the transition from a

cruise to the approach glide slope, you can tailor your airspeed and rate of descent to fit local conditions, avoid unsafe regimes, and still guarantee minimum noise.

This noise-abatement flight technique reduces the ground area exposed to a given noise level by as much as 80 percent. Figure 3 shows this for a conventional straight-in approach.

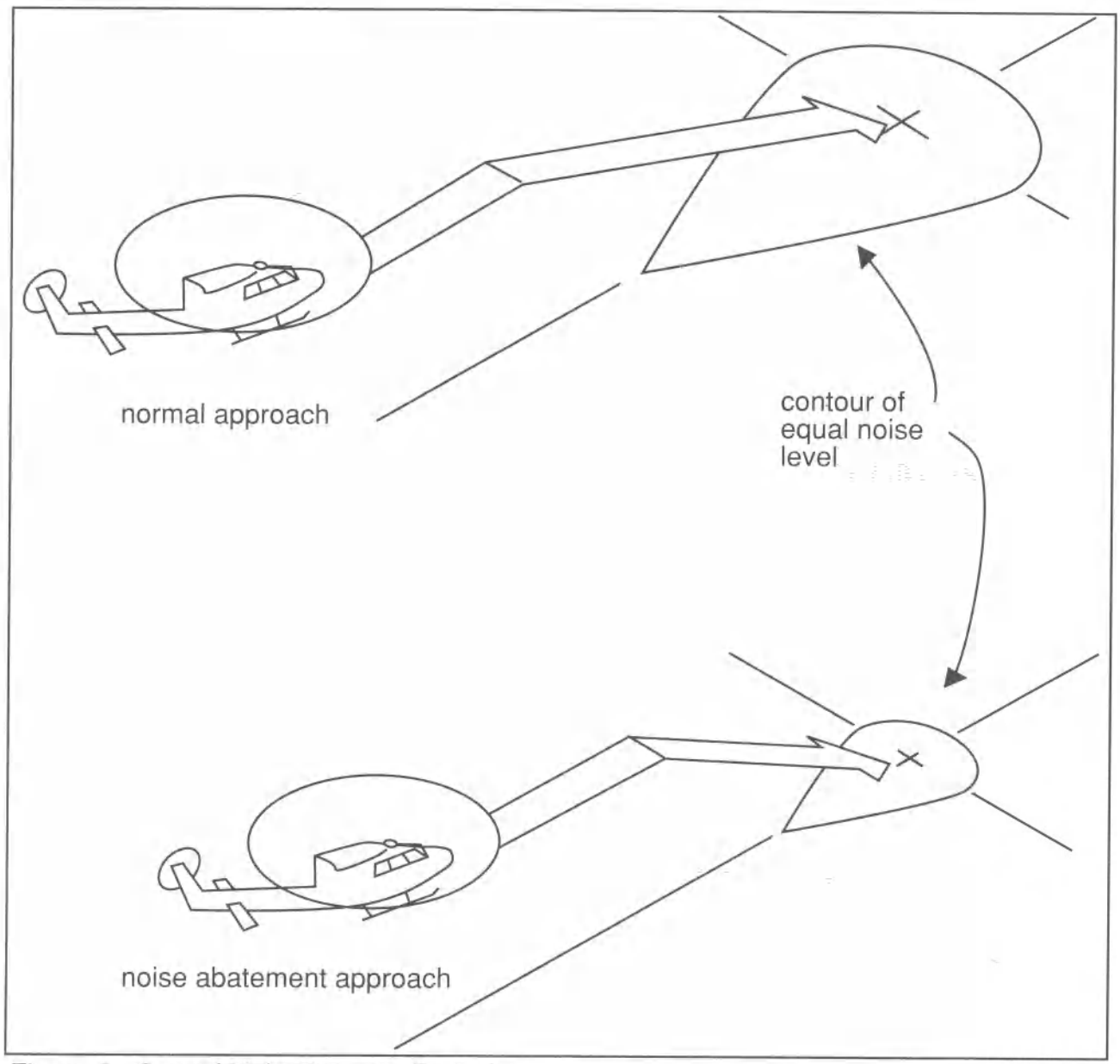


Figure 3. *Ground Noise Exposure Footprint*

Departure

Takeoffs are reasonably quiet operations, but you can limit the total ground area exposed to helicopter sound by using a high rate of climb and making a smooth

transition to forward flight. Your departure route should take you over areas which are least sensitive to noise.

Maneuvers

Avoid rapid, high *g* turns, as a general rule. When the flight operation requires turns, perform them smoothly. Be smooth in all other maneuvers, also.

Manufacturers' Noise Abatement Procedures

The Fly Neighborly program requires the cooperation and support of helicopter manufacturers as well. While pilots and operators have the greatest influence in the short-term, manufacturers can also have an impact by disseminating information and engaging in longer-term research efforts.

HAI requests that manufacturers promote noise abatement in helicopter flight by investigating and publishing piloting techniques to reduce sound footprints and mitigate objectionable sound levels for each model of helicopter.

HAI further requests that manufacturers integrate these techniques into pilot training, and publish the resulting information. Specifically, HAI requests that manufacturers:

- publish general piloting techniques in industry publications and training manuals,
- publish piloting techniques for each model of aircraft in the unapproved or supplemental section of their aircraft flight manuals, and
- supply appropriate manuals, charts, or pamphlets for use in public hearings or presentations.

The following section presents noise abatement procedures for specific models of aircraft. This information represents all of the data currently available from these manufacturers. As new data becomes available, it will be distributed for inclusion in this document.

The back of this handbook lists contact names, addresses, and phone numbers for various helicopter manufacturers. If noise abatement procedures for the helicopter you fly are not included below, you may wish to contact the manufacturer directly.

NOTE The procedures specified on the following pages are manufacturers' recommendations for flying in the quietest manner possible. They are to be construed as advisory guidelines only. If differences arise between these noise abatement procedures and standard operating procedures, fly according to standard operating procedures.

Above all, if flying according to these noise abatement procedures conflicts with operating the aircraft in a safe manner, then all safety-related procedures take precedence.

Aerospatiale AS350, AS355, AS365, and AS332

General	Maximum distance and altitude separation from noise-sensitive areas is the most effective means of noise abatement. Control movement should be gradual and smooth. Noise exposure is lower in front of than behind the helicopters.
Takeoff and Climb	Climb at the best rate of climb in order to reach altitude as soon as possible.
Enroute and Cruise	Where possible, maintain a minimum altitude of 500 feet above ground level.
Approach and Landing	Approach and descend as steeply as possible.

Operator Program

Introduction

The Fly Neighborly program attacks the problem of helicopter noise on three fronts: pilot training, flight operations planning, and public education and acceptance. These three areas are interrelated: planning flight operations with an eye to noise abatement can have a major positive impact on both the pilot training program, and public acceptance.

The information presented in this section provides only a broad outline of the possible actions helicopter operators can take. Operators are encouraged to expand this outline by applying knowledge of their own geographical area of operations, the nature of their businesses, and the local climate of opinion with regard to helicopter operations.

Company Policy

Implement a company policy aimed at reducing the sound levels produced by the operation of your aircraft or other equipment. As part of this policy, implement a broad-based complaint prevention program. Such a voluntary program is necessary to preclude the eventual implementation of restrictive and mandatory federal, state, or local laws, regulations, or ordinances.

To formulate this policy, identify and evaluate current and possible future problems. To assure its acceptance and success, make your commitment to your policy clear, in order to generate such change as may be necessary in the attitudes' of pilots and other personnel.

Company Operations

In order for company policy to have any meaning, companies should formulate and implement specific guidelines.

Formulate Guidelines

Guidelines are intended to assist flight crews and flight operations personnel to formulate responsible mission profiles without infringing on operational reality. They are not, however, provided as a substitute for good judgment on the part of the pilot. They must also not conflict with federal aviation regulations, air traffic control instructions, or aircraft operating limitations. The noise abatement procedures outlined by these guideline should be used when consistent with prudent and necessary mission

requirements. The safe conduct of flight and ground operations remains the primary responsibility.

- Enroute operations:
  - Maintain an altitude of 1000 feet above ground level or higher when possible. Complaints are significantly reduced when operating above this level. The reverse is also true.
  - Vary routes in order to disperse the aircraft sound.
- Terminal operations:
  - Restrict hours or frequency of operations as appropriate. Minimize early or late flights on holidays and weekends.
  - Limit ground idling in noise-sensitive areas.
  - Minimize flashing landing lights in residential areas at night.
- Establish procedures for each sensitive route or terminal.
- Provide flight crews with noise abatement procedures for each model of aircraft.

Implement Guidelines

- Publish all guidelines and procedures in a flight operations manual or similar document.
- Train flight crews and flight operations personnel as appropriate:
  - Indoctrinate with basic attitudes in ground school.
  - Train in noise abatement procedures for each model of aircraft to be flown.
  - Emphasize awareness and recognition of sensitive routes and terminals.
  - Establish a requirement that noise abatement procedures must be considered in recurrent company flight checks.
- Assign responsibility and authority for the company program to an appropriate person.

Review and Revise

Establish periodic reviews of company policy and programs to respond to changes in the regulatory climate or operational conditions. Revise your policy and programs as necessary.

Public Acceptance

Scope

The scope of the public acceptance program includes:

- engendering media support,
- promoting positive public relations, and
- enacting a program to prevent or resolve complaints from the public.

Media Support

The purposes of engendering media support are to:

- develop favorable and active helicopter-related media coverage, and
- provide valid information concerning helicopter operations as necessary.

Media sometimes concerned with news of helicopter-related activities include general circulation newspapers, television and radio news, trade journals, and the magazines or newsletters of international, national, state, and regional helicopter associations.

To engender awareness and support in these media, you can take a number of actions:

- Provide press releases to trade journals and local newspaper, radio, and television news editors concerning any Fly Neighborly seminars that your local branch of the Fly Neighborly Committee may sponsor.
- Support a continuing campaign with the trade journals to keep the rotary-wing community aware of the Fly Neighborly program.
- Support a continuing campaign with the general press to make the public aware of the Fly Neighborly program, and the benefits of helicopter transport.
- Stage demonstrations and press conferences addressing specific local issues such as heliports, high-rise evacuation, police services, search and rescue services, emergency medical evacuation, fire-fighting, and the benefits of helicopter transportation to the general public.

requirements. The safe conduct of flight and ground operations remains the primary responsibility.

- Enroute operations:
  - — Maintain an altitude of 1000 feet above ground level or higher when possible. Complaints are significantly reduced when operating above this level. The reverse is also true.
  - — Vary routes in order to disperse the aircraft sound.
- Terminal operations:
  - — Restrict hours or frequency of operations as appropriate. Minimize early or late flights on holidays and weekends.
  - — Limit ground idling in noise-sensitive areas.
  - — Minimize flashing landing lights in residential areas at night.
- Establish procedures for each sensitive route or terminal.
- Provide flight crews with noise abatement procedures for each model of aircraft.

Implement Guidelines

- Publish all guidelines and procedures in a flight operations manual or similar document.
- Train flight crews and flight operations personnel as appropriate:
  - — Indoctrinate with basic attitudes in ground school.
  - — Train in noise abatement procedures for each model of aircraft to be flown.
  - — Emphasize awareness and recognition of sensitive routes and terminals.
  - — Establish a requirement that noise abatement procedures must be considered in recurrent company flight checks.
- Assign responsibility and authority for the company program to an appropriate person.

Review and Revise

Establish periodic reviews of company policy and programs to respond to changes in the regulatory climate or operational conditions. Revise your policy and programs as necessary.

Public Relations

The purposes of engaging in public relations activities are to:

- develop awareness in the community of the benefits of helicopter transportation,
- develop awareness of the Fly Neighborly program, and
- develop support for the voluntary Fly Neighborly program, as administered by the helicopter community, in lieu of governmental regulation.

In order of their general importance and effectiveness, public relations activities can be undertaken in conjunction with:

- governmental agencies concerned with aviation such as federal, state, or local agencies, the FAA, or state aeronautics commissions;
- other governmental agencies not particularly concerned with aviation, such as regional planning commissions, economic development commissions, the National League of Cities, or the U.S. Council of Mayors;
- service clubs and professional organizations such as local Rotary or Kiwanis Clubs, the National Association of Aviation Officials, the Airport Operators Council International, or the National Fire Protection Association;
- nongovernmental economic development agencies such as chambers of commerce, regional economic development councils, or merchant associations;
- direct public contact;
- environmental organizations such as Greenpeace, the Sierra Club, or federal or state environmental protection agencies; and
- local civic organizations.

You can improve public relations by influencing government agencies concerned with aviation in the following ways:

- Participate in public hearings.
- Provide professional testimony as appropriate.
- Conduct flight demonstrations.
- Conduct one-on-one campaigns.
- Submit petitions and letters.

Place speakers on the agendas of national and international meetings and conferences of government agencies not especially concerned with aviation.

Place speakers at local meetings of service clubs and professional organizations. Solicit their sponsorship of heliports based on the Fly Neighborly program as civic projects to promote public service.

Demonstrate to economic development agencies how helicopter transportation benefits the community, and present data to show the economic viability of helicopter transportation.

Provide information to environmental organizations. Do not immediately assume they are hostile to your operations. Instead, emphasize the positive environmental aspects of helicopter operations, such as the fact that they are involved in search and rescue operations for hikers or workers injured in remote areas, and that they provide access to such areas without the need to pave over ground for landing strips.

Provide speakers to civic organizations to provide information about helicopter operations. Contact them to promote support for heliport development efforts.

In many cases, you can contact the public directly to promote helicopter operations. If you are conducting a Fly Neighborly seminar or an industry display, open it to the public when feasible. Provide displays and demonstrations in such public areas as local shopping malls. Provide the occasional courtesy ride when possible. And finally, do not neglect the opportunity to buttonhole social or professional contacts in your local community to counter misinformation or build support.

Preventing and Responding to Complaints

Helicopter operations are undeniably noisy, and the bulk of this manual is concerned with techniques designed to minimize the problem. The following figure shows the relationship between how much noise people are exposed to, and how annoyed they are likely to get.

Helicopter operators can do a bit more to prevent noise complaints, and the section below details how. However, even the best-run operations will get some complaints, and the section that follows will provide some guidelines for how to respond.

Complaint Prevention

A significant number of noise-related complaints can be prevented in the first place, given a certain degree of sensitivity, foresight, and commitment on your part.

Prevent complaints by assessing the environmental compatibility of potential landing facilities. Select those most suitable from a safety, operational, and environmental point of view.

Implement a public acceptance program.

- When contemplating site licensing, identify, contact, and try to influence potential sources of opposition before the hearing.
- Initiate or support presentations, seminars, or displays to educate the public about the value of helicopter transport.

Educate your customers about noise abatement procedures, in order to prevent or minimize conflicts between their expectations and company policy.

Coordinate operations personnel and flight crews, so that flights that would unnecessarily violate company policy are not assigned.

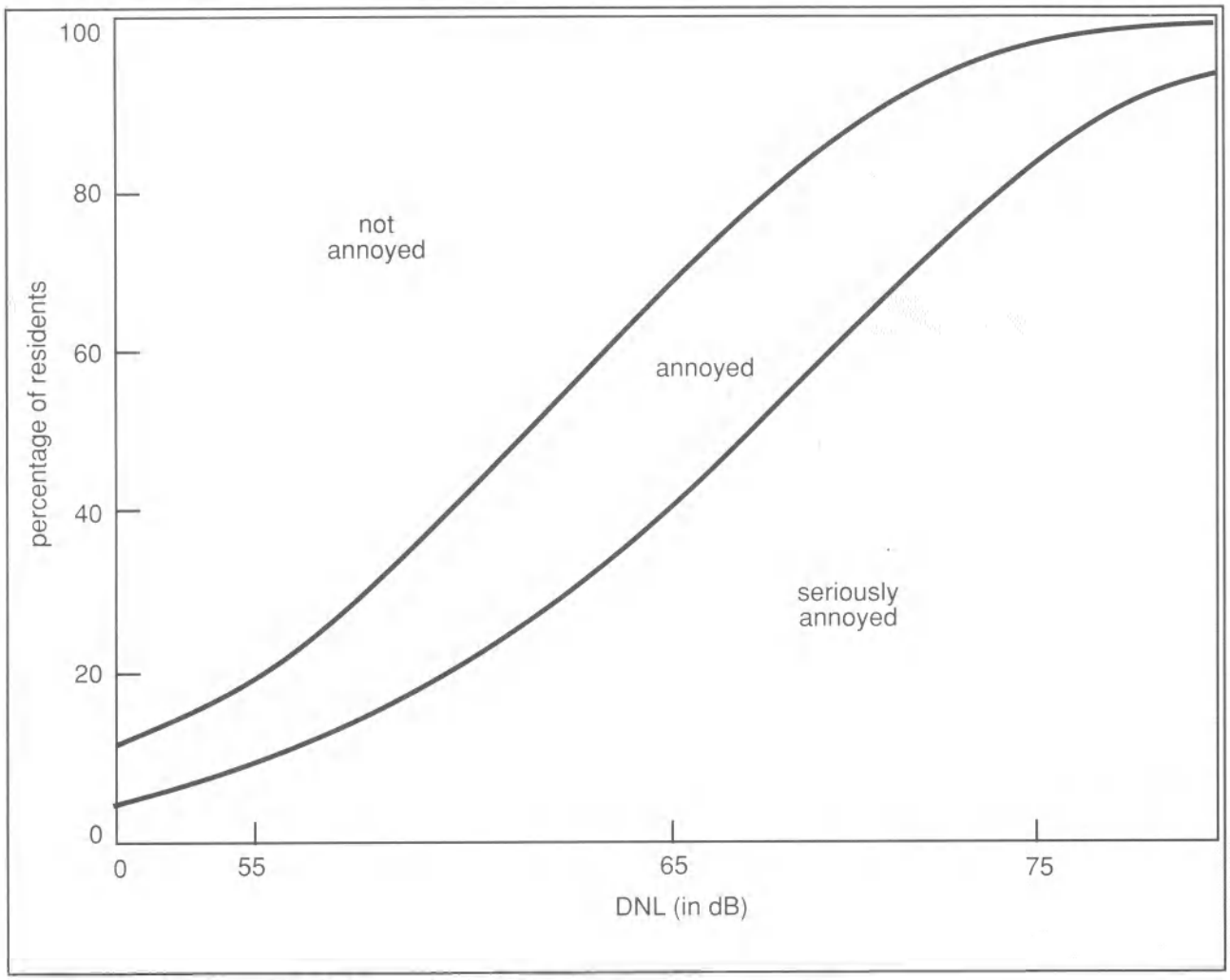


Figure 4. *Relationship Between Noise Exposure and Annoyance*

Handling Noise Complaints

Although earlier sections of this manual offer information concerning noise-abatement techniques, it is unlikely that you will be able to avoid all noise complaints. Because some complaints are inevitable, how you handle such complaints is also important to the success of the Fly Neighborly program.

When someone complains about a noisy overflight by a fixed-wing aircraft, it is often because the pilot has violated FAA regulations. However, helicopter-generated complaints can result even when no FAA regulations have been violated. A helicopter can annoy people on the ground while it is well above the prescribed altitude minimums.

The resulting problem is not simple. If someone calls the FAA or a state agency and offers routine information such as the aircraft registration number, colors, or type, it is

likely that he or she will be told that the aircraft was not in violation of any regulation, and that therefore nothing can be done. If callers are not able to offer routine information, chances are they will be told nothing can be done even if a violation has occurred. In either case, the results are the same: an angry, frustrated member of the community will probably not be particularly supportive of any current or future helicopter- or heliport-related issues.

The helicopter user community has a real, financial interest in assuring that all complaints are appropriately addressed. Conventional channels for complaints are demonstrably insufficient. Therefore, a number of regional helicopter associations have started to operate their own complaint lines. These lines offer state, federal and local agencies another option when they receive complaint calls about legal and proper operations. The agencies can pass the complaint along to the regional association, or provide the complainant with the telephone number of the complaint line. The complaint line can then listen to the caller and determine what, if anything, can be done.

Such programs offer a number of benefits:

- Regional associations can often identify an aircraft with much less information than other agencies require.
- Associations can ensure that each issue is addressed and, when possible, satisfy the complainant.

The back of this handbook lists addresses and phone numbers of the various regional affiliates of HAI. You may wish to contact your local affiliate to see if a helicopter noise complaint line is currently available in your area.

If you receive such a complaint, how can you address it?

1. The most effective way to deal with the complaint is to contact the complaining party personally. When you do, avoid being defensive, argumentative, or opinionated. Try sincerely to understand the other person's point of view, and avoid hostile confrontations. Sometimes merely listening politely can improve the situation.
2. Furthermore, evaluate the problem thoroughly, and follow through. Was the pilot aware of the problem? Was there something the pilot could have done to avoid it? Is it likely to recur? Contact the pilot or the operator to determine the facts. Consult this guide, and other sources of noise-abatement information, to determine how best to improve the situation.
3. Finally, respond sincerely to the caller. Tell him or her what you learned, and what is being done to avoid the situation next time.

Of course, the best way to handle complaints is to avoid them in the first place. If you can anticipate a problem with a certain operation, contact the likely complainant before the operation begins. Explain to him or her the purpose, timing, and duration of the operation, and its likely impact upon the area. People like to feel that they have some

control over their lives, often just a simple courtesy call in the beginning can save you hours of trouble and nuisance later.

The section below provides one example of noise-related problems resulting from the establishment of a heliport in a downtown area, and the noise-abatement program that was put into effect to improve the situation.

An Example: The Portland Public Heliport Noise Abatement Program

In 1989, the city of Portland, Oregon and the Northwest Rotorcraft Association decided to build a heliport to provide direct air access to downtown Portland. During hearings to approve the facility, concern was expressed about the resulting noise increase in the area surrounding the heliport. In response to this concern, the following noise abatement program was put into effect.

Noise Abatement

Pilots are requested to utilize the following noise abatement procedures whenever possible. Of course, it is the pilot's responsibility on each flight to determine the actual piloting techniques necessary to maintain safe flight operations.

1. *Flight Paths:* Maintain approach and departure paths over river and freeways. Avoid residential neighborhoods, the McCormick Pier Apartments, the convention center towers, and the piers for the Steel Bridge. Approach and depart over the Morrison, Broadway, and Grand Avenue bridges. [A map is provided with those features marked.]
2. *Steep Departure:* Depart at Vy (best rate of climb) when possible.
3. *Steep Approach:* Use steep approach angle when possible (PLASI is set for a 10° approach).
4. *Night Operations:* Avoid night approach from the north, as it passes near the McCormick Pier Apartments.
5. *Minimize Ground Operations:* Minimize the duration of warm-up or cool-down periods (typically two to three minutes). Do not idle at the heliport for prolonged periods.
6. *Avoid High Noise Regime:* Most helicopters have a high noise regime near a descent profile of 70 knots at 300 fpm. [Figures 7, 8, and 9] from Bell Helicopters indicate the extent of this high noise regime. Pilots can avoid descent through this area by initiating the descent at a higher speed than normal.
7. *Gradual and Smooth Control Inputs:* Gradual and smooth control inputs result in reduced noise impact.
8. *Avoid Steep Turns:* Avoidance of steep turns results in reduced noise impact.
9. *Enroute Altitude:* Whenever possible maintain 2000 feet above ground level over residential neighborhoods and other noise-sensitive properties, as per FAA AC 91-36 "VFR Flight Near Noise-Sensitive Areas."

10. *Fly Neighborly:* Refer to the HAI Fly Neighborly program for additional information on how to minimize helicopter noise impact.

    Citizen concerns about helicopter noise emanating from the Portland Heliport should be brought to the attention of the Northwest Rotorcraft Association by calling 286-0927. All noise complaint calls will be logged. If the caller can identify the helicopter involved, follow-up calls will be made to the involved helicopter pilot and then back to the concerned citizen.

    The Bureau of General Services maintains a Portland Heliport Noise Abatement Committee. When noise issues at the heliport cannot be easily resolved, the committee will be convened to assist in the resolution process, and the logs reviewed for pertinent information.

    As concerns noise abatement of helicopter traffic in other parts of the city, it is noted that the Port of Portland has developed a plan of preferred helicopter flight routes for use in the greater Portland metropolitan area, especially as concerns helicopter traffic to and from Portland International Airport and Portland Hillsboro Airport.

Appendix A: About Helicopter Noise

Introduction

This section describes the source of helicopter noise and how it is affected by the weather. It also provides reference information on the noise certification procedures for helicopters, and charts showing the takeoff, flyover, and approach noise levels for a variety of helicopter models.

The following section was written by Charles Cox, a research project engineer with Bell Helicopter. In it, he explains the causes of helicopter noise. Although the information offered by Mr. Cox may be somewhat specific to Bell helicopters, the general information he offers applies to the operation of all helicopters.

Helicopter Noise

When you start operating a helicopter in new territory, you add a new spectrum of sound to the usual noise environment. If that territory is a municipality, thousands of people will hear the new sounds and know where they are coming from. How they react depends upon physical, economic, and psychological factors, but one thing is certain: they will react strongly, adversely, and actively if the sound is too irritating, if it represents something that seems to threaten their safety and well-being, or if they cannot see how the noisemaker benefits them. Although it is up to operators to educate the public about the safety and usefulness of the helicopter—and to equip the aircraft with sound-suppressing devices when these are available and necessary—pilots can make the public less hostile to the helicopter (and to the operator's arguments about its safety and community service) by flying in such a way as to make the sound of the aircraft as unintrusive as possible.

Figures 5 and 6 show helicopter noise levels, and illustrate where helicopters of various weights fit into the overall noise picture. The units of the vertical scale represent, to some extent, the degree to which a sound annoys an average human listener. We cannot say what sound level will make an individual complain to the authorities. Instead, we show on the figures the sound level of a diesel locomotive and a truck or motorcycle. You can compare this with the sound of the helicopter and draw your own conclusions.

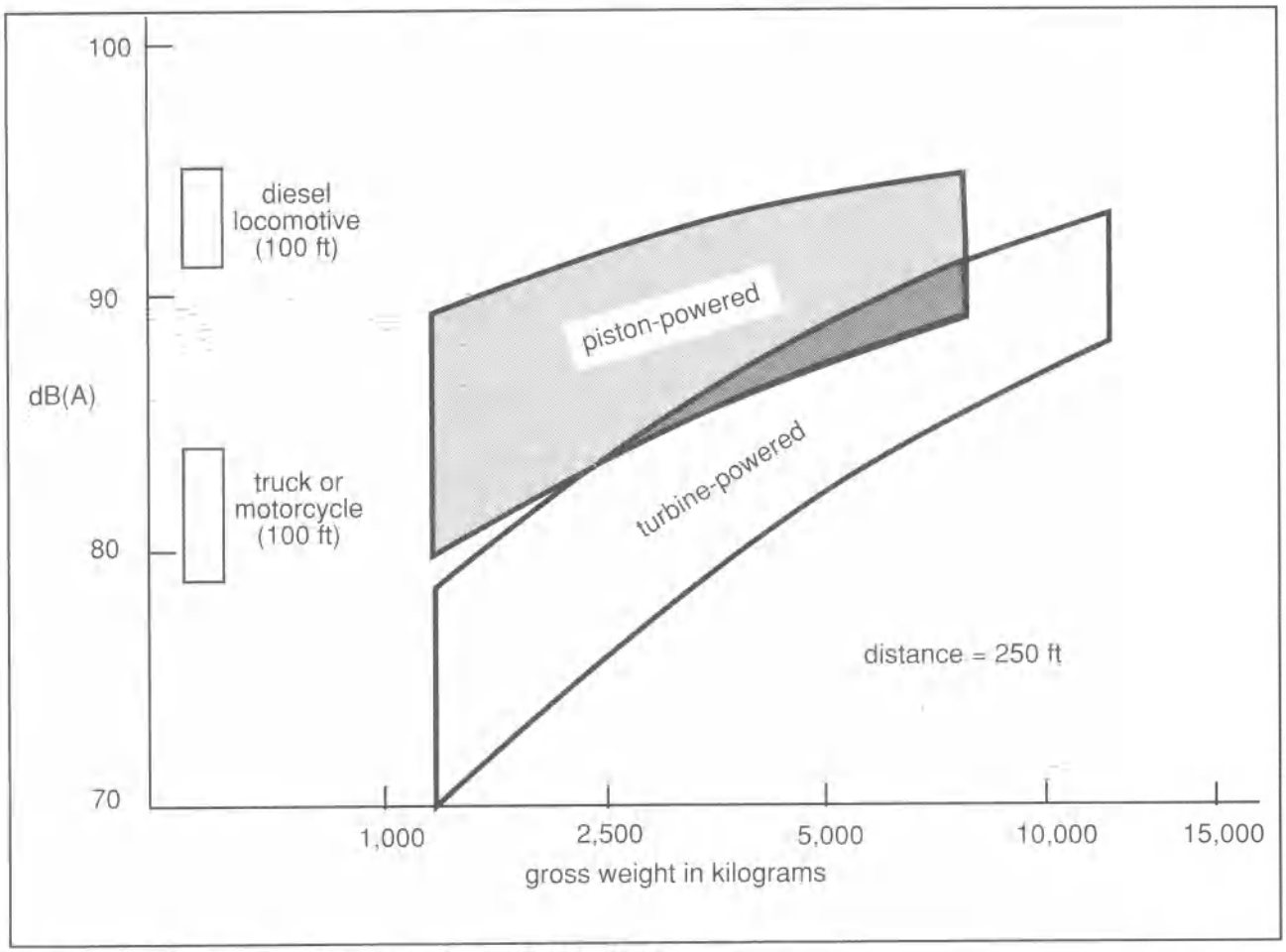


Figure 5. *Helicopter Noise Levels in dB(A) Units*

Notice that the noise level of a helicopter is a function of the type of power plant. Turbine-powered helicopters are quieter than piston-powered ones with unmuffled engine exhausts, and produce sounds no louder than those of familiar surface transportation vehicles.

Notice also that the noise level of a helicopter at a given gross weight covers a range. This is true not only for helicopters in general, but also for a particular helicopter—the particular one you may find yourself flying, for example. What pilots need to know is how to fly a helicopter, given a certain gross weight, in the lower portion of this range of sound levels—at least when you are flying near people whom noise might bother. This section discusses the conditions that produce higher noise levels during the operation of light turbine-powered helicopters such as the Bell Model 206A, or medium turbine-powered helicopters such as Bell Models 204B, 205A, and 212, and describes flight techniques that can help you avoid them. It also discusses methods to muffle the sound of light piston-powered helicopters such as the Bell Model 47.

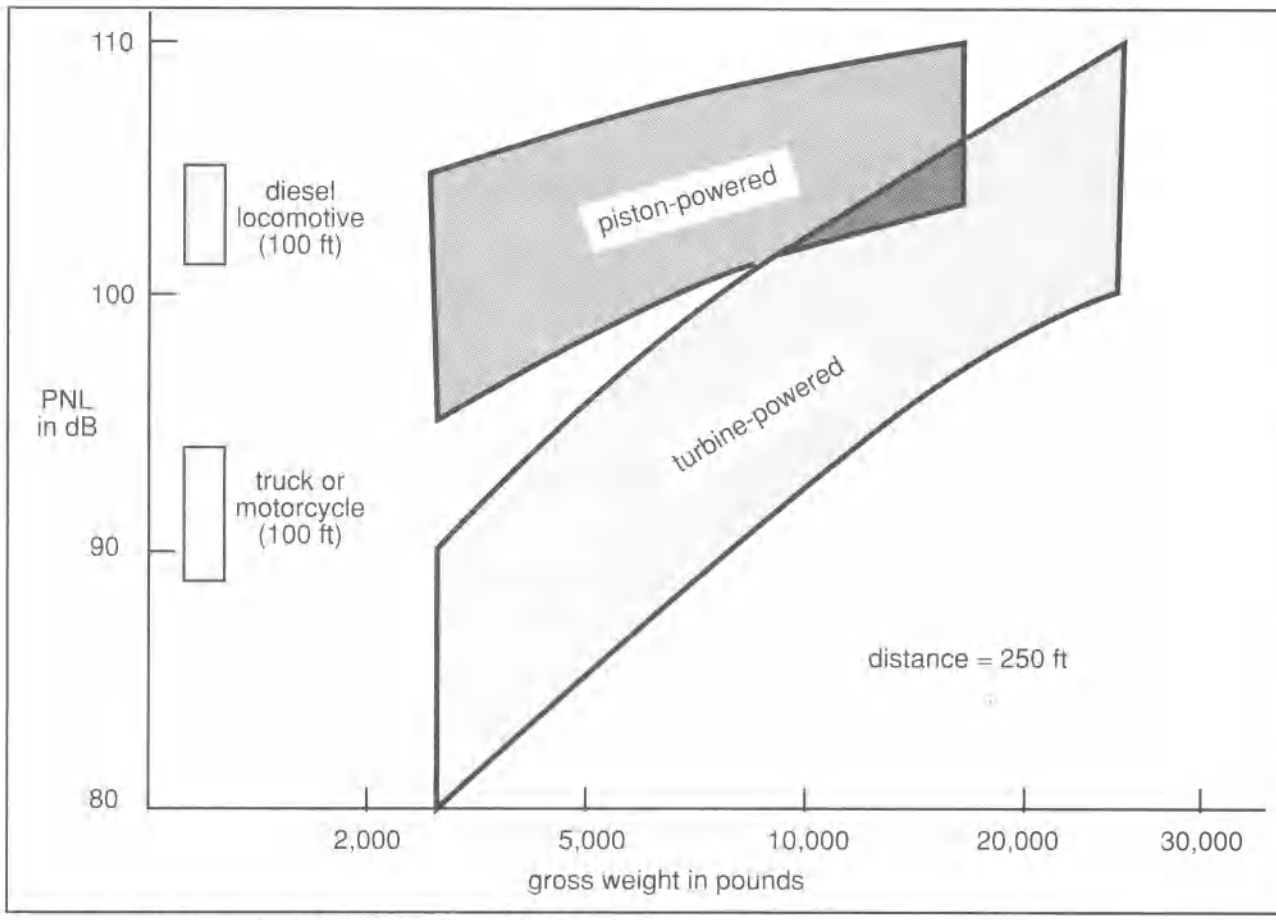


Figure 6. *Helicopter Noise Levels in PNdB Units*

The following discussion distinguishes between light and medium helicopters. *Light* helicopters are defined to be those helicopters weighing 5000 pounds gross, or less. *Medium* helicopters are defined to be those helicopters weighing 5000 to 12,000 pounds gross.

The Source of the Sound

The acoustical signature of a helicopter is partly due to the modulation of sound by the relatively slow-turning main rotor. This modulation attracts attention, much as a flashing light is more conspicuous than a steady one. The modulated sound is often referred to as *blade slap*.

For a typical medium helicopter, blade slap occurs during high-speed forward flight when a main rotor blade enters the compressible-flow region on the side of the advancing blade. The blade's airloads fluctuate, often quite rapidly. These fluctuations cause shock waves that generate noise. This typically occurs at airspeeds above about 100 knots.

At lower speeds, or for a typical light helicopter, blade slap occurs when a blade intersects its own vortex system or that of another blade. When this happens, the blade experiences locally high velocities and rapid angle-of-attack changes. This can

momentarily drive a portion of the blade into compressibility and possibly shock stall, both of which produce aerodynamic loading variations. Either or both mechanisms generate sound.

For a typical light helicopter, the mechanisms described above occur during partial power descents. For a typical medium helicopter, they can occur in low-speed level flight, during partial power descents, or in turns.

Figure 7, a chart of blade slap regions as functions of airspeed, rate of climb (R/C), and rate of descent (R/D), shows the conditions under which you can expect the Model 206A to produce this sound. As you can see, maximum blade slap occurs at airspeeds between 75 and 95 mph, and rates-of-descent between 300 and 600 fpm. The *slap boundary* for your particular helicopter may be somewhat larger than that shown, because the main rotor may slap intermittently when it encounters wind gusts, or during a rapid transition from one flight condition to another. Although the sound produced at these descent rates is not extremely loud to crew members inside the helicopter, they can ordinarily recognize it, and thereby define the slap boundaries for their particular helicopter. Of course, people on the ground hear the blade slap grow more intense as the helicopter descends.

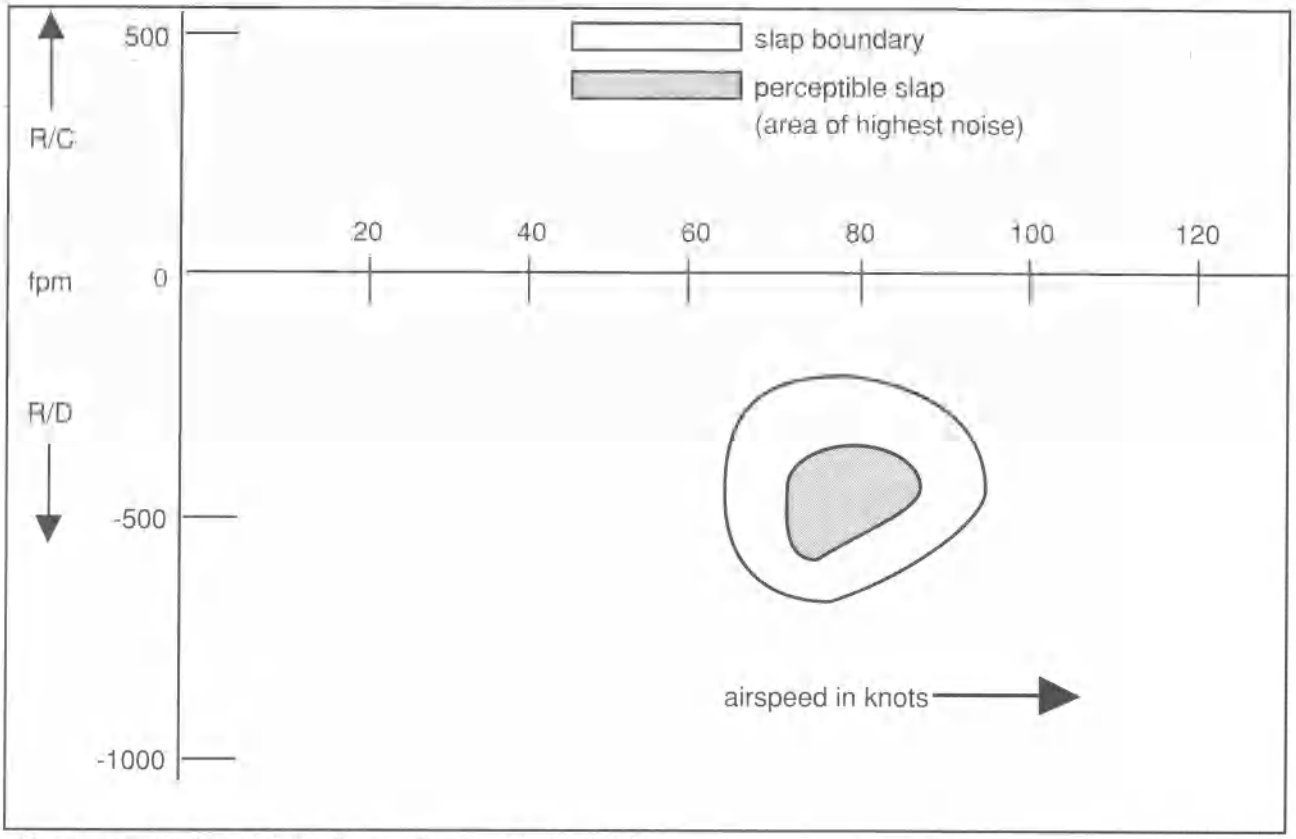


Figure 7. *Noisy Flight Operations—Light Helicopters*

Figures 8 and 9 show the conditions under which you can expect Models 204B, 205A, and 212 to get noisy, giving blade slap regions as functions of airspeed, rate-of-climb (R/C), rate-of-descent (R/D), and *g* loading during turns.

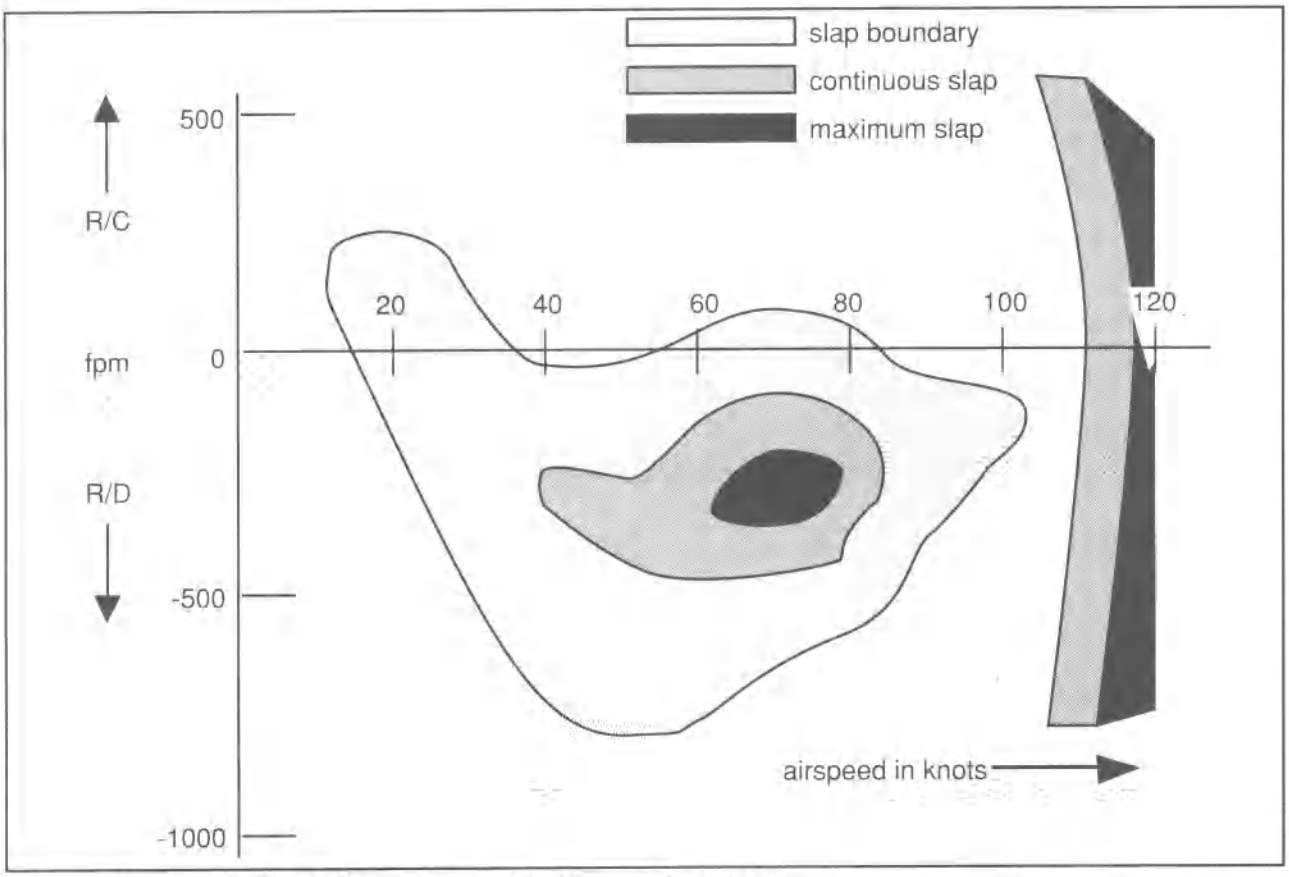


Figure 8. *Noisy Flight Operations—Medium Helicopters*

In general, the flight conditions described below are associated with more noise than normal for medium helicopters.

Low-Speed Level Flight and Partial Power Descents

In low-speed level flight, the main rotor slaps to some degree at airspeeds between 10 and about 85 knots. The worst condition is approximately between 60 and 80 knots, at these speeds the rotor slaps almost continuously. At other airspeeds it slaps intermittently, an action that can be triggered by wind gusts and by transitions from slight climbs to descents.

Maximum blade slap occurs during partial power descents, at airspeeds between 60 and 80 knots and rates of descent between 200 and 400 fpm. Engine torque pressure usually varies from 10 to 25 psi. This blade slap is caused by the blade interacting with the wake. Although the noise produced at these descent rates is not extremely loud to crew members inside the helicopter, they can usually recognize it and define the slap boundaries for their particular helicopter. Of course, people on the ground hear the blade slap grow more intense as the helicopter descends.

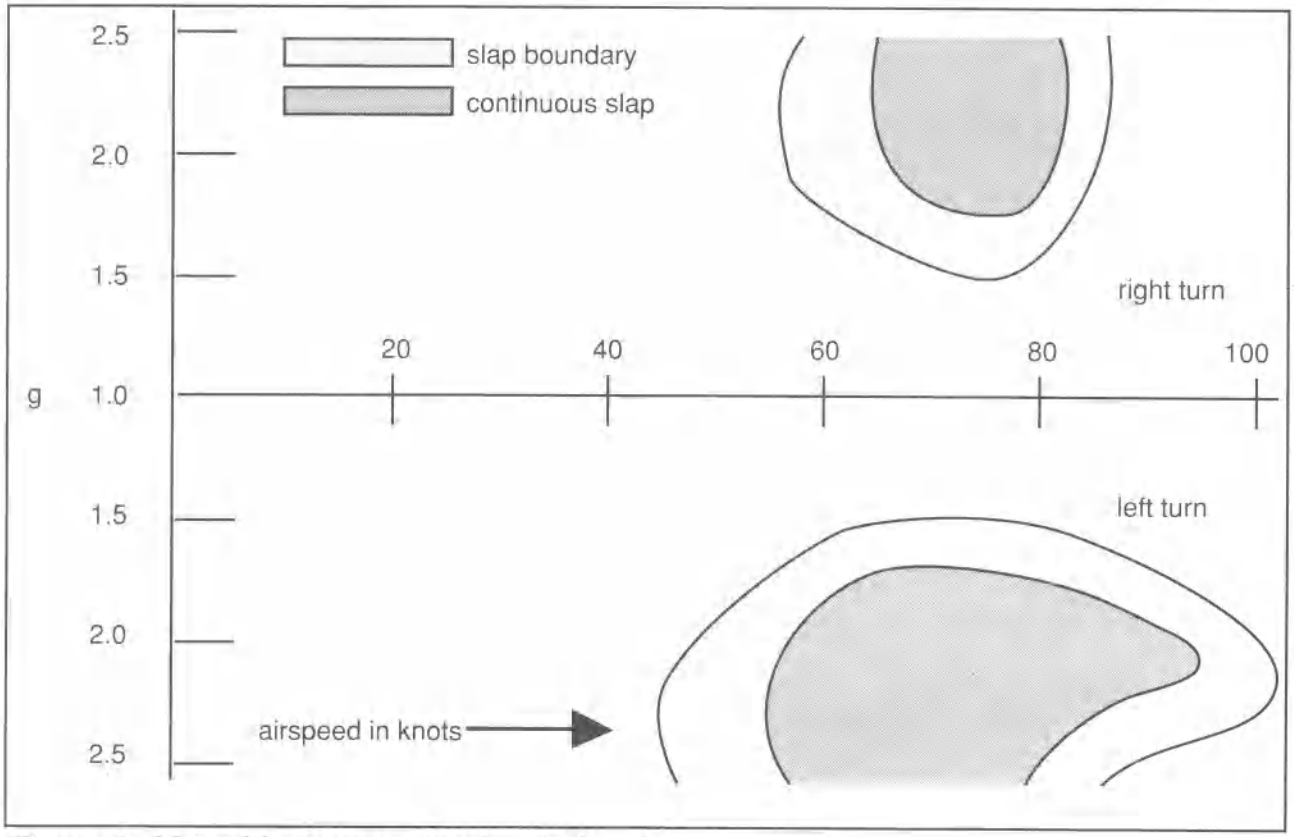


Figure 9. *Noisy Maneuvers—Medium Helicopters*

Cruise Airspeeds

At airspeeds above about 100 knots, blade slap intensifies; at these speeds, it sounds louder to people on the ground than it does during any other flight condition of the medium helicopter. Unfortunately, the crew members do not hear it that way, because this blade slap propagates primarily forward of the helicopter instead of spreading spherically.

Maneuvers

Blade slap also occurs during constant speed turns if turn rates are too high. Here the main rotor blade and wake interact in much the same manner as in partial power descents. As Figure 9 shows, continuous blade slap occurs in turns that exceed 1.5*g*, with airspeeds between 50 and 90 knots in a left turn, and between 40 and 110 knots in a right turn. There is little difference in the intensity of the noise in right or left turns once the critical *g* is reached. The crew can easily hear this sound.

Muffling

The engine noise of the piston-powered helicopter may be its loudest or most annoying sound, especially if the pilot uses the noise-abatement flight techniques to reduce blade slap. The best way to reduce the amount of sound coming from a piston engine is to install a muffler. Mufflers, however, impose penalties on the helicopter and increase its operating cost. The question then becomes one of how little muffling (how small a

penalty) makes the helicopter socially acceptable for a given operation. This depends on how close to populated areas the helicopter must fly, the background noise levels in those areas, and how sensitive they are to noise. Figure 10 shows the intensities of various background noise generators, and the range of sound intensities emanating from piston-powered helicopters.

Naturally, you will want to use the lightest, cheapest muffler that will keep you out of trouble. If the operations are in remote, sparsely populated areas, or in areas of medium to heavy surface traffic, a muffler is probably unnecessary. If unmuffled operations bring sporadic complaints, then you will want a light muffler—perhaps one that can be installed and removed easily, and used only on those missions which take the helicopter close to sensitive areas. Operations in densely populated residential districts or which occur during the quiet hours of the night may require heavy muffling.

A light muffler can be mounted directly on the exhaust stacks. It reduces noise by an order of magnitude, while penalizing the performance of the helicopter only slightly. It removes the objectionable barking sound characteristic of unmuffled piston engines.

A larger muffler must be mounted on the fuselage structure because the exhaust stacks cannot support it; there may not always be room for it on the stacks, anyway. Flexible metal hoses connect the muffler to the exhaust stacks. Its mounts can be so designed that they will accommodate any one of a number of different mufflers, each to quiet the engine to a different level (and penalize it correspondingly).

As of this writing, several mufflers are available for piston-powered helicopters. (For example, Bell has a stack-mounted muffler available as a kit for the Model 47.)

As you run into more and more strenuous objections to noise, look to mufflers as part of the answer. Helicopter manufacturers and independent companies have continuing programs to produce mufflers that will keep you in your neighbors' good graces.

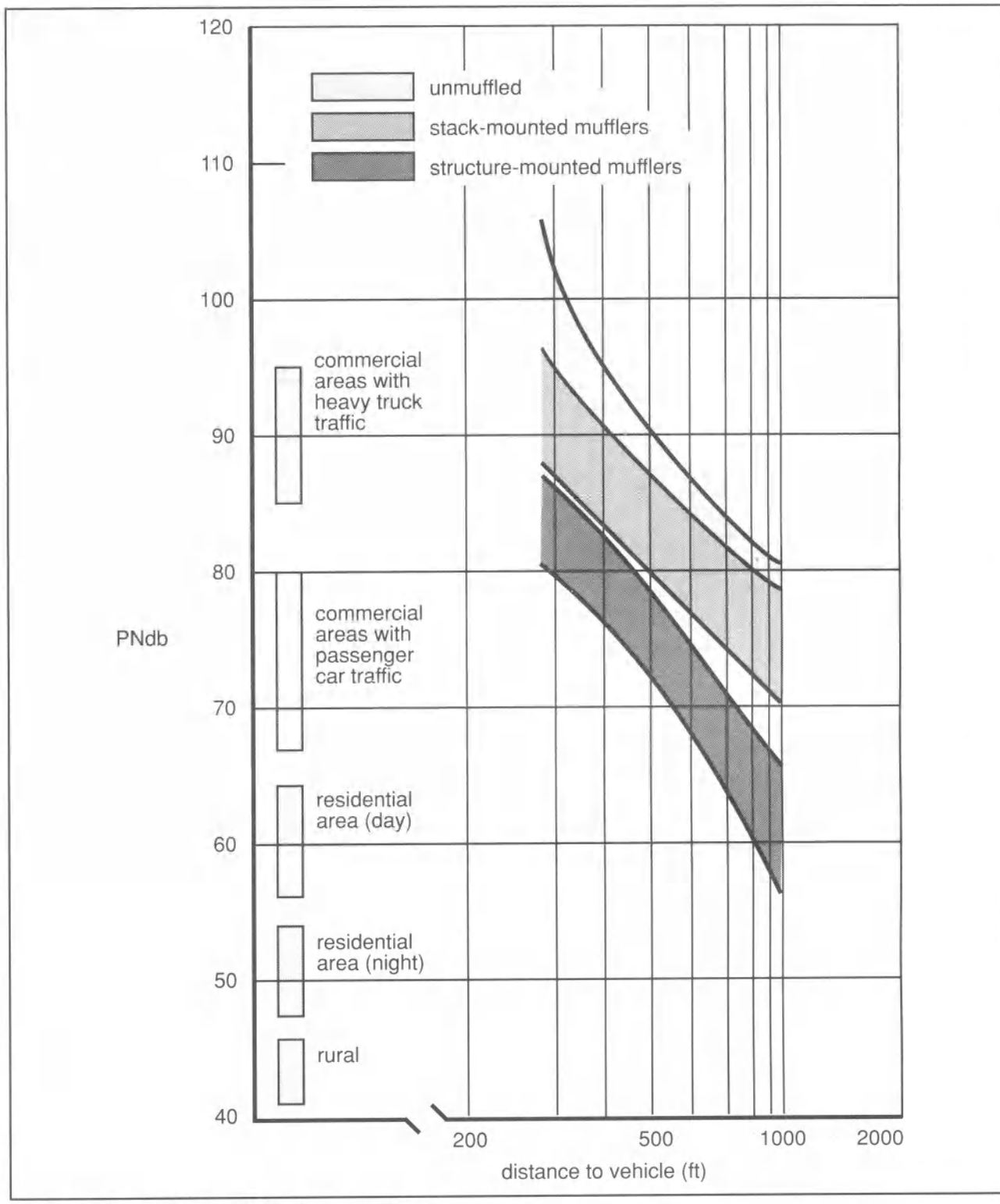


Figure 10. *Exhaust Noise Suppression*

Weather

Although you cannot control the weather, you may be able to adapt your flight schedule to take advantage of meteorological conditions that can help you minimize noise. The two weather factors most useful in this respect are wind and temperature. They are helpful because they affect the propagation of sound, and vary throughout the day in a more or less predictable manner.

Wind has two effects on sound. It carries it in the direction towards which it is blowing, and it makes a background noise of its own that, in high winds, tends to reduce the annoyance of helicopter sound.

In inland areas, surface winds are generally stronger during the daytime, reaching a maximum in midafternoon, and weaker at night. In coastal regions, land and sea breezes (caused by the tendency of land to heat and cool more rapidly than water) give a different diurnal pattern, beginning to blow shortly after sunrise (sea breeze) and sunset (land breeze). You can use these winds to increase the acceptability of your helicopter by flying downwind of densely populated areas and by scheduling the majority of flights after noon near especially noise-sensitive areas.

Temperature likewise has two effects upon sound. One is the tendency of warm air to be more turbulent than cold air, and therefore to disperse sound and decrease its nuisance effect. But the major effect of temperature depends upon the temperature gradient—the change in temperature with altitude. The normal gradient is negative: temperature decreases with altitude.

Because sound travels faster in warmer air, in atmosphere with the normal gradient the lower part of a sound wave tends to outrun the upper part, so that sound propagation effectively curves upward and away from the populace. The negative gradient reaches a maximum in the late morning or just after noon, and is more intense during summer months. This means that it is of some value to schedule flights to and from noise-sensitive areas during the warmer parts of the day.

At certain times, however, there may be an inversion in the atmosphere—a layer of air from a few hundred to a few thousand feet thick in which the temperature increases with altitude. The inversion reverses the normal curvature of sound propagation, turning an abnormally high portion of the sound energy back toward the ground. The most severe inversions usually occur at night and in the early morning. These, then, are times when the sound of the helicopter will have the most adverse effect upon people on the ground.

A third meteorological item that affects the propagation of sound is humidity. But its direct effect—it attenuates high frequency portions of the sound spectrum—is of little importance. As visible moisture, it is important as an indicator: on overcast days of fog, drizzle, or light snow, temperature and wind gradients are generally small, resulting in increased sound propagation. Of all the many combinations of atmospheric conditions, that which does least to reduce the sound of a passing helicopter is a windless, cold, overcast morning. At such times, use the noise-abatement flight techniques.

Although the environment is not, strictly speaking, a meteorological subject, it might be well to mention here that the ground environment has much to do with how offensive the helicopter sound is. The background noise (the sound environment) of residential areas reaches its lowest level between late evening and early morning. In warm weather, people are apt to be relaxing out of doors in the evening and on weekends. It is at these times that people are most conscious and resentful of noise intrusion, and therefore at these times you should be most reluctant to fly noisily near residential areas.

Helicopter Noise Reference

The following figures are offered as reference material for helicopter users to determine the noise level that can be expected, given a specific aircraft type and gross weight.

Figures 12, 13, and 14 are for helicopter noise levels measured in ICAO flight conditions. All values are indicated in Effective Perceived Noise Level (EPNL dB). (See the glossary in the back of this guide for definitions of sound metrics as well as other terminology.)

Figure 11 shows the placement of sound monitoring devices for noise certification procedures. During takeoff, level flyover, and approach, three microphones located at the specified distances and angle from the helicopter monitor the helicopter noise.

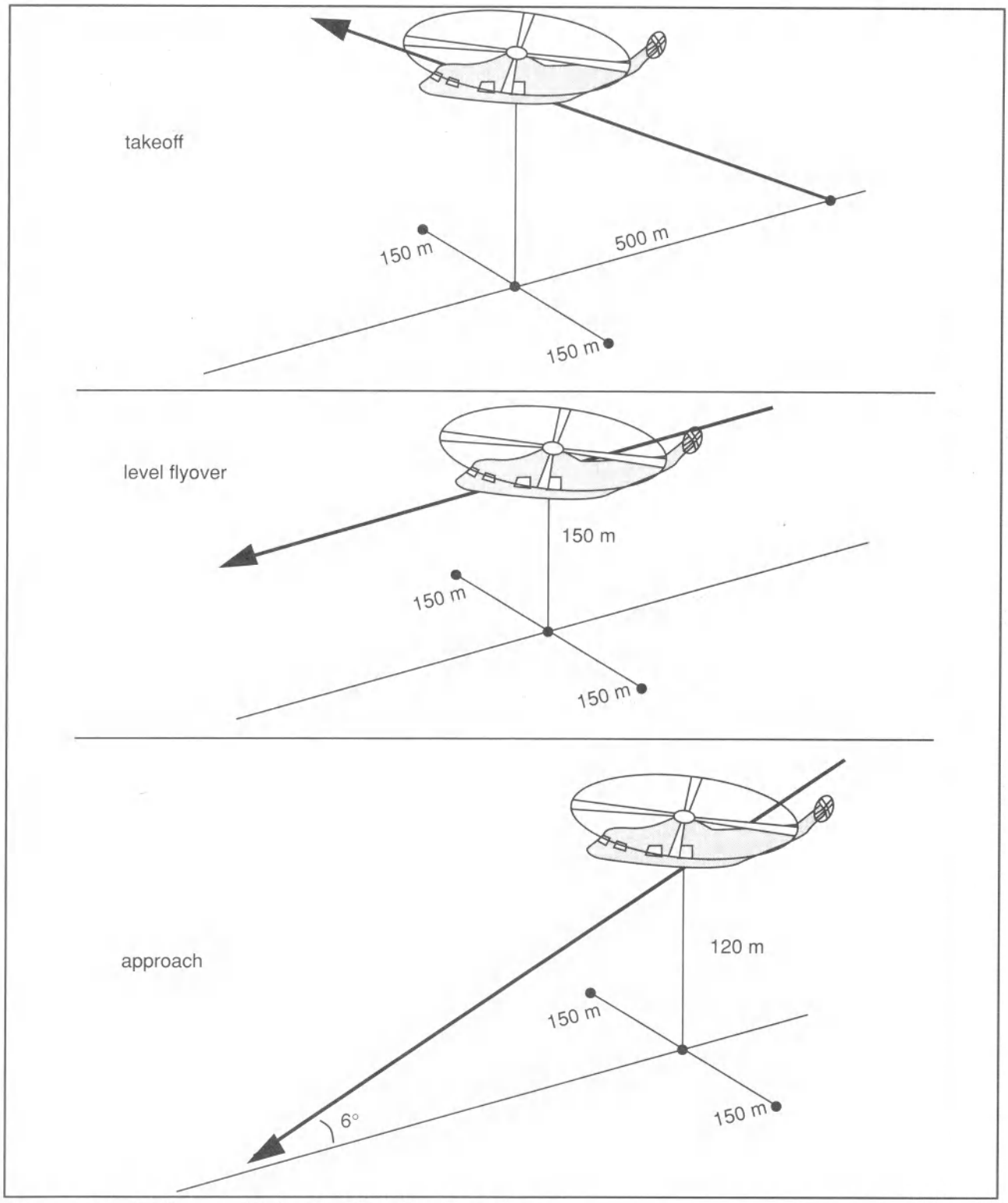


Figure 11. *Helicopter Noise Certification Procedures*

Figure 12 indicates noise levels for takeoff, assuming that the helicopter is stabilized at maximum takeoff power, and at is climbing at the best rate of climb along a path starting from the rotation point located 1640 feet forward of the flight reference point, at a height of 65 feet above the ground, as shown in Figure 11.

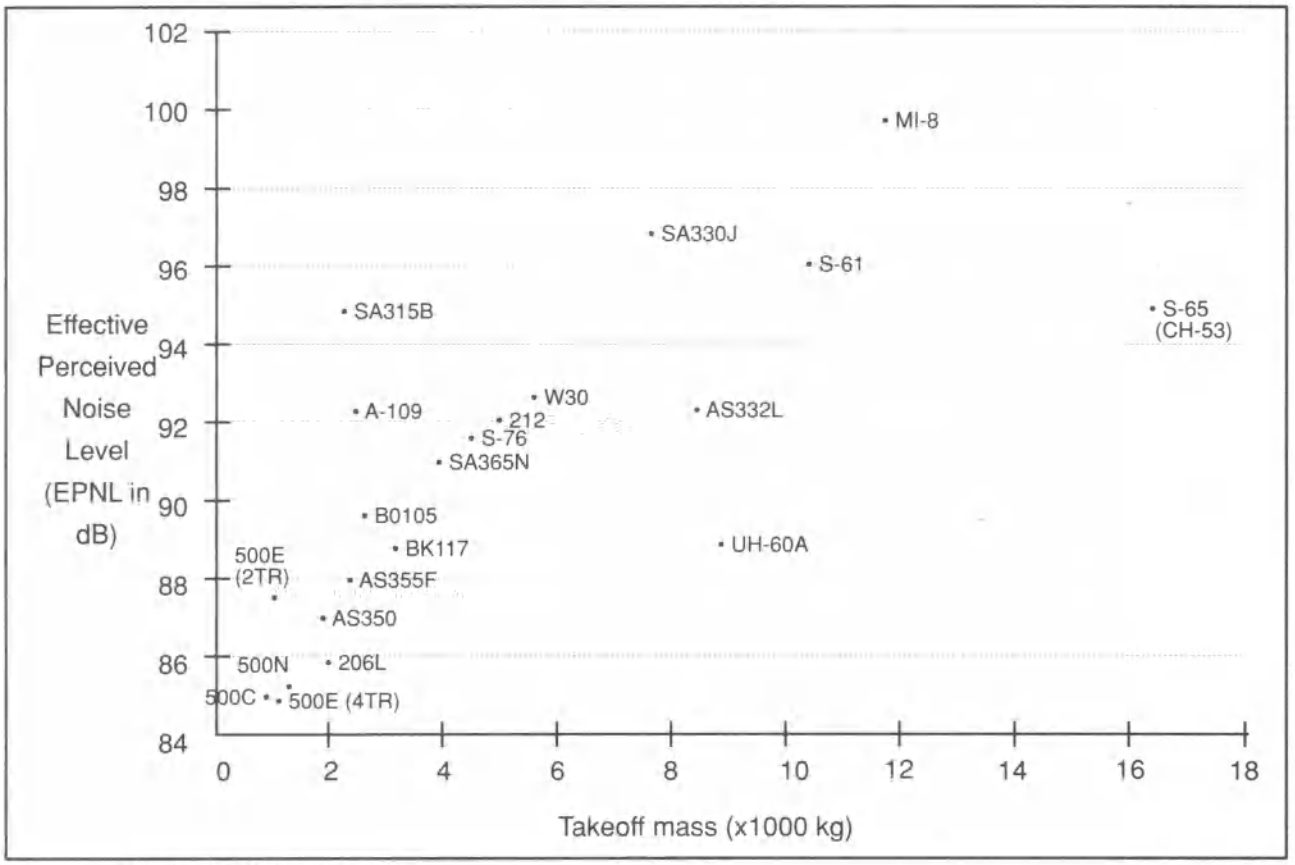


Figure 12. *Takeoff Noise Levels*

Figure 13 indicates noise levels for overflight, assuming that the helicopter is in cruise configuration (90% of VH), and stabilized in level flight above the flight path reference point at a height of 500 feet, as shown in Figure 11.

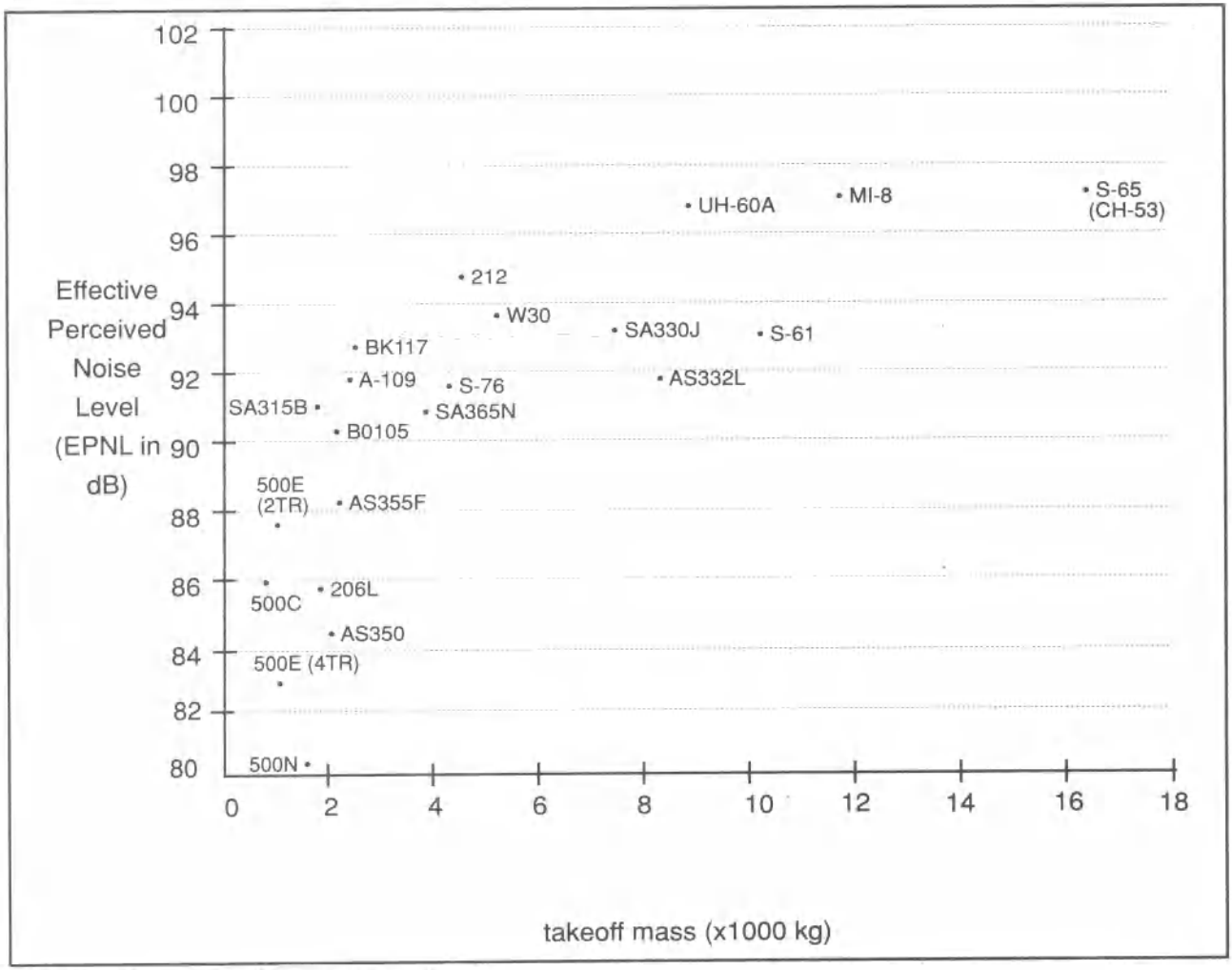


Figure 13. *Level Flyover Noise Levels*

Figure 12 indicates noise levels for takeoff, assuming that the helicopter is stabilized at maximum takeoff power, and at is climbing at the best rate of climb along a path starting from the rotation point located 1640 feet forward of the flight reference point, at a height of 65 feet above the ground, as shown in Figure 11.

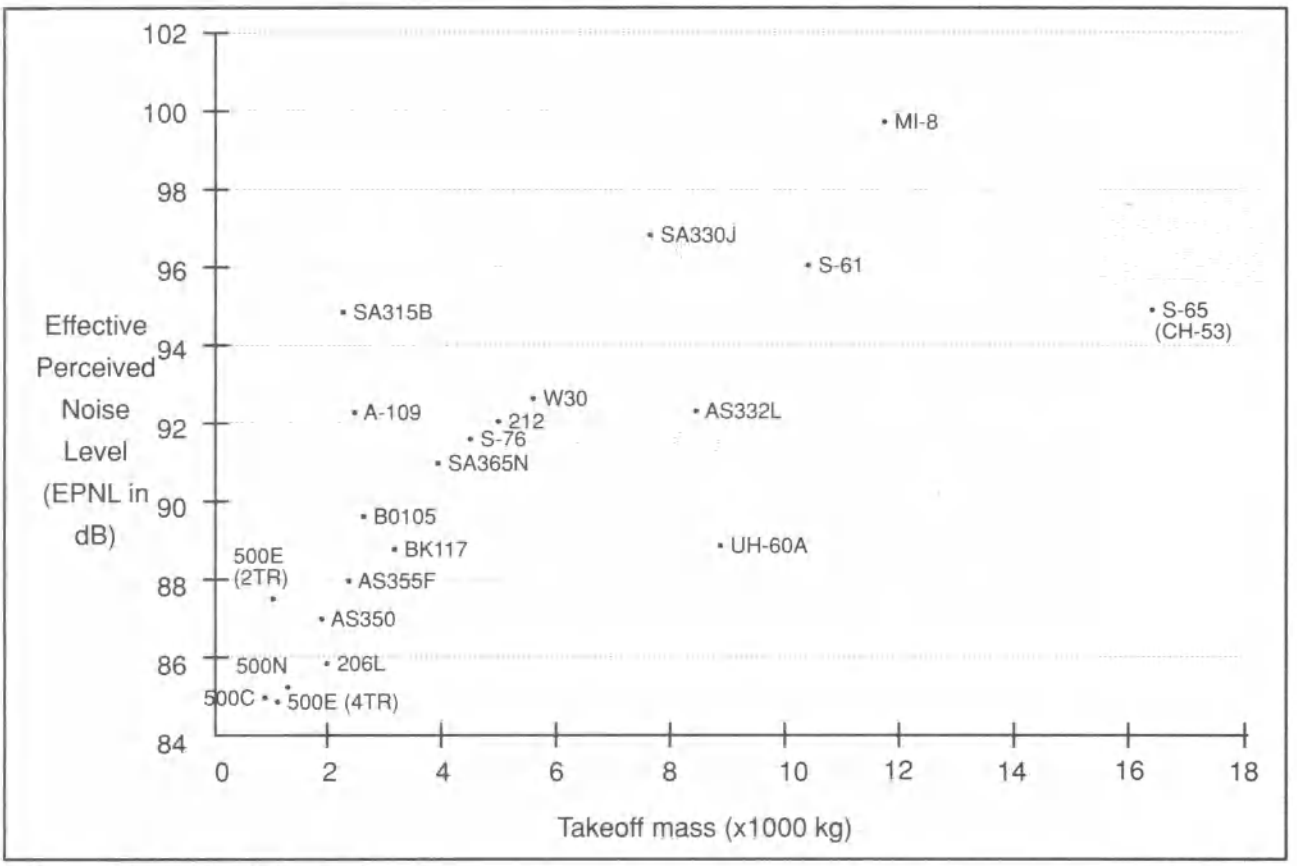


Figure 12. *Takeoff Noise Levels*

Figure 14 indicates noise levels for landing approach, assuming that the helicopter is stabilized in its landing configuration (90% of VH), and following a 6° approach path, passing above the flight path reference point at a height of 396 feet, as shown in Figure 11.

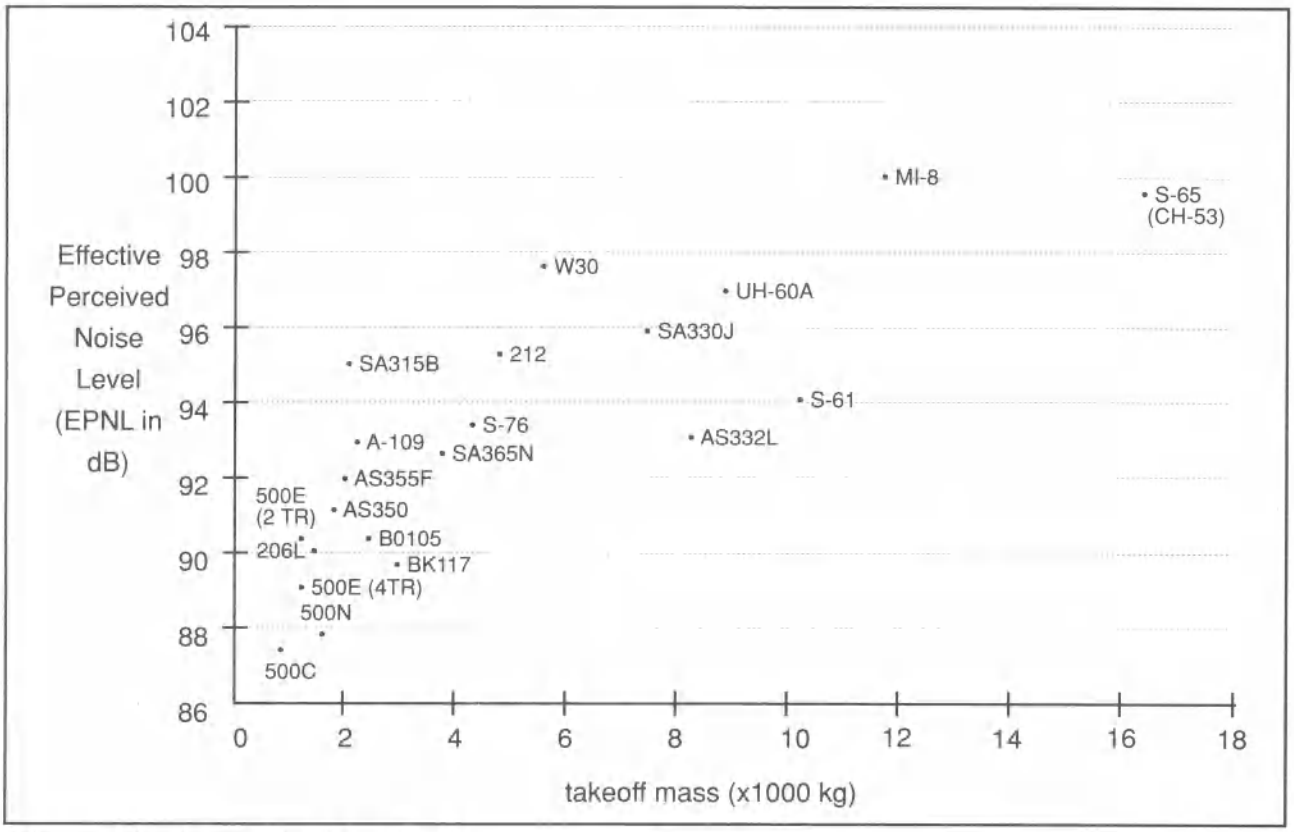


Figure 14. *Approach Noise Levels*

The general relationship between noise level and helicopter weight is shown in Figure 15.

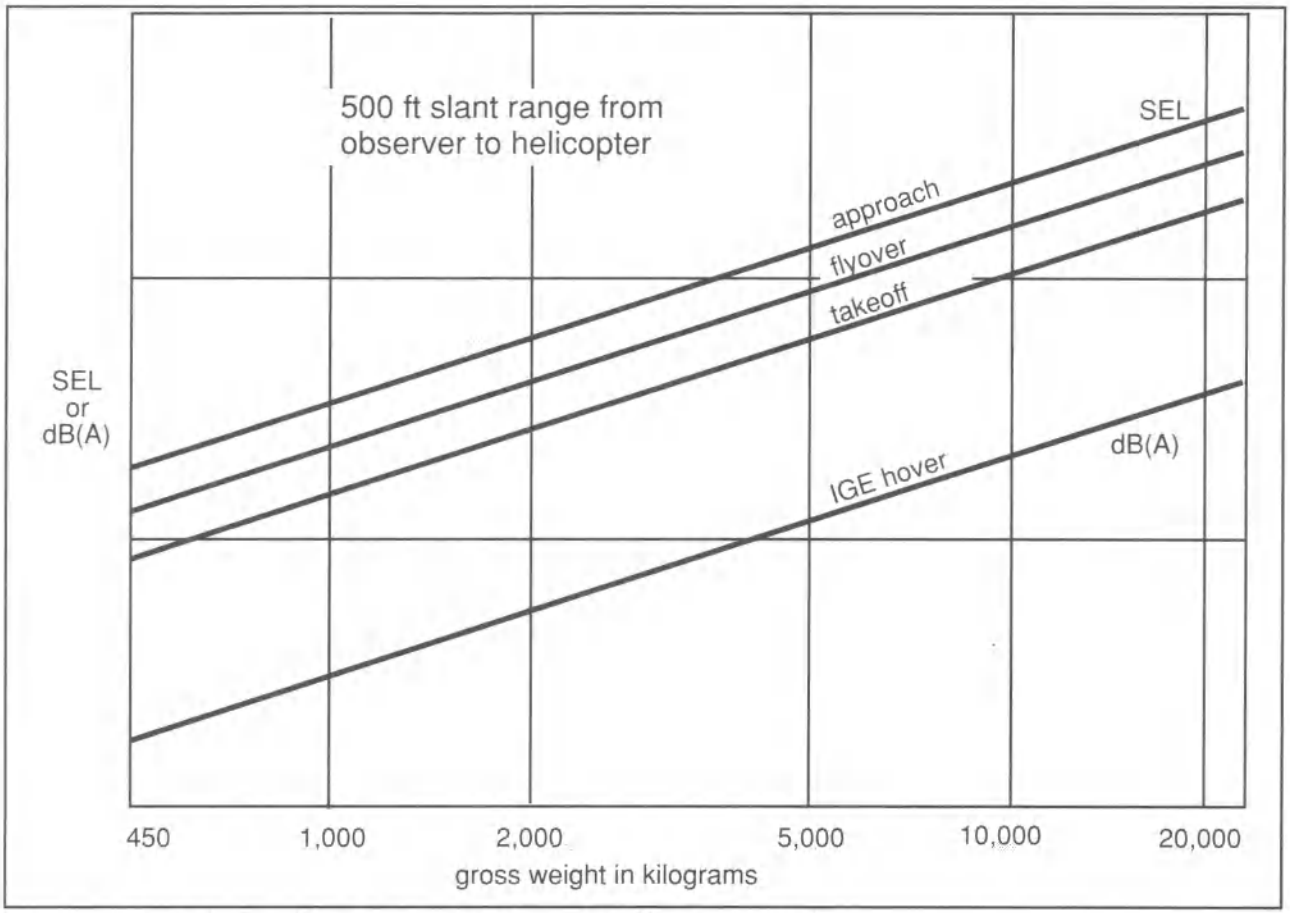


Figure 15. *Relationship Between Noise and Helicopter Weight*

What do these noise levels mean? The following table provides some basis for comparison between the helicopter noise in the figures above, and other, familiar noises.

Table 1. *Illustrative Noises*

dB(A)	Overall Level	Community (Outdoor)	Home or Industry (Indoor)	Human Judgment of Loudness
130	uncomfortably loud	military jet aircraft takeoff from aircraft carrier at 50 ft (130)		
120			oxygen torch(121)	120 dB(A) 32 times as loud
110	very loud	turbofan aircraft at takeoff power at 200 ft (118)	riveting machine (110) rock-and-roll band (108-114)	110 dB(A) 16 times as loud
100		jet flyover at 1000 ft (103)		100 dB(A) 8 times as loud
90		power mower (95) motorcycle at 25 ft (90)	newspaper press (97)	90 dB(A) 4 times as loud
80	moderately loud	car wash at 20 ft (89) diesel truck at 40 mph at 50 ft (84) high urban ambient sound (80)	food blender (88) milling machine (85) garbage disposal (80)	80 dB(A) twice as loud
70		passenger car at 65 mph at 25 ft (77)	living room music (76) TV audio, vacuum cleaner (70)	***Reference*** 70 dB(A)
60		air conditioning unit at 100 ft (60)	electric typewriter at 10 ft (64) dishwasher (rinse) at 10 ft (60) conversation (60)	60 dB(A) 1/2 as loud
50	quiet	large transformers at 100 ft (50)		50 dB(A) 1/4 as loud
40		bird calls (44) lower limit of urban ambient sound (40)		40 dB(A) 1/8 as loud
10	just audible	dB(A) scale interrupted		
0	threshold of hearing			

Figure 16 also provides some basis for comparing helicopter noise to other familiar noises.

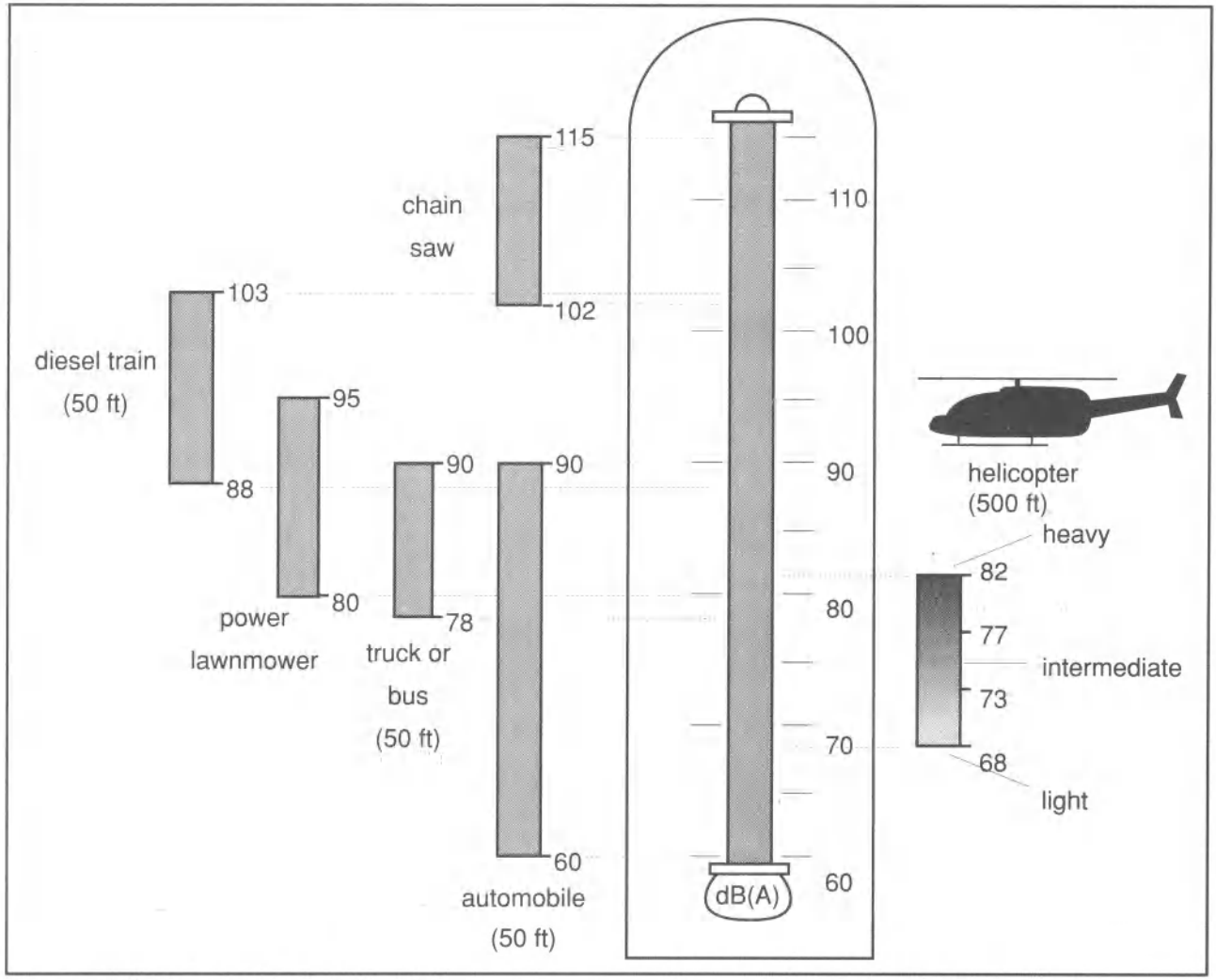


Figure 16. *Comparison of Sounds*

Glossary

The acronyms used in this handbook are defined below.

dB Decibels, the basic unit for measuring the loudness of sounds.

dB(A) A-weighted sound level, a sound pressure level that has been weighted to reduce the influence of low and high frequency extremes. Unweighted sound pressure level does not correlate well with human assessment of the loudness of sounds. Therefore, various weightings are added to sound level meters to attenuate low and high frequencies in accordance with accepted equal loudness contours. One of these weightings is designated as the "A" weighting; it correlates well with people's subjective judgments of sound loudness, and is currently used for noise certification of small propeller-driven aircraft. In FAA Advisory Circular 36-3C it is used as the basis for airport access restrictions that discriminate solely on the basis of noise level.

DNL Day-night sound level, a single-number measure of community noise exposure, introduced to help predict the effects on a population of the average long-term exposure to environmental noise. It is based on the equivalent sound level (Leq), but corrects for night-time noise intrusion: a ten-decibel correction is applied to noises heard between 10 P.M. and 7 A.M. to account for the increased annoyance of noises heard at night.

DNL uses the same energy equivalent concept as Leq. The specified time integration period is 24 hours. For assessing long-term exposure, the yearly average DNL is the specified metric in the FAA FAR Part 150 noise compatibility planning process.

EPNL Effective perceived noise level, a measure of complex aircraft flyover noise, expressed in decibels, that approximates human annoyance responses. It corrects for the duration of the flyover and the presence of audible pure tones and discrete frequencies such as the whine of a jet aircraft. The EPNL is used by the FAA as the noise certification metric for large transport and turbojet airplanes and helicopters.

fpm Feet per minute, a measure used for the rate of climb or rate of descent of an aircraft.

KIAS Knots indicated air speed, a measure of the speed of an aircraft.

Ldn See DNL.

Leq Equivalent sound level, expressed in decibels—the energy average noise level (usually A-weighted) integrated over some specified time. The purpose of Leq

	is to provide a single-number measure of noise level averaged over some period of time.
mph	Miles per hour, a measure of speed.
PNL	Perceived noise level, a rating of noisiness used in assessing aircraft noise, expressed in decibels. PNL is computed from sound pressure levels measure in octave or one-third octave frequency bands. An increase of ten decibels in PNL is equivalent to doubling the perceived noisiness. Currently, this measure is used by the FAA and foreign governmental agencies in the noise certification process for all turbojet-powered aircraft, and large propeller-driven transports.
R/C	Rate of climb, how fast an aircraft is ascending.
R/D	Rate of descent, how fast an aircraft is descending.
RRPM	rotor revolutions per minute, how fast an aircraft rotor is turning.
SEL	Sound exposure level, a measure, expressed in decibels, of the effect of duration and magnitude for a single event. In typical aircraft noise model calculations, SEL is used in computing aircraft acoustical contribution to the equivalent sound level (Leq) and the day-night sound level (DNL).
VH	Maximum compressor power.
VI	Takeoff decision speed.
Vy	Speed for best rate of climb.

Agusta A109/A and A109/A II

General

Maximum distance and altitude separation from noise-sensitive areas is the most effective means of noise abatement.

Control movement should be gradual and smooth.

Noise exposure is:

- lower behind than forward of the helicopter,
- lower on the left side than on the right side of the helicopter,
- lower to the sides of the flight path than directly underneath, and
- lower upwind than downwind of the helicopter.

Takeoff and Climb

Take off into the wind.

Climb at the best rate of climb in order to reach altitude as soon as possible.

Avoid a maximum power climb over noise-sensitive areas, when possible.

Enroute and Cruise

When crossing noise-sensitive areas, limit airspeed to 130 knots.

Plan routes to keep noise-sensitive areas on the left side of the helicopter.

Where possible, maintain a minimum altitude of 1,500 feet above ground level.

Approach and Landing

The speed of approach should be approximately 60 knots throughout the descent, until just before landing.

Use a steeper than normal approach—an angle of approximately 12-15° is best. This is almost the angle used for autorotation.

Do not increase the power until you are within 100 feet of the ground. Then flare and increase the power as for a normal landing.

Plan the approach and landing to keep noise-sensitive areas to the left of the helicopter.

Avoid descending directly over noise-sensitive areas.

Comments

Cruising speed for the Agusta is 140-150 knots. The helicopter is very noisy at this speed. Speeds below 130 knots are noticeably quieter to people on the ground.

APPENDIX C

Reference: md08/0481 CVC:
Contact: Heidi Naylor
Your Reference:

07 July 2008

Harrison Shepherd Pty Ltd
PO Box 397
YAMBA NSW 2464

Additional Information Required

Application No:	DA2008/0481
Development Proposal:	Use of land as Helipad
Property Address:	Golding Street YAMBA NSW 2464
Legal Description:	Lot 51 DP 751395

I refer to your Application, which was received by Council on 02 Jun 2008. Council apologises for the delay in requesting this information, however, as the exhibition period has expired, Council is now in a position to request specific information to the address the issues raised in the submissions received.

Council, pursuant to Clause 54 of the Environmental Planning & Assessment Regulation 2000 requests that the following information be provided within 21 days of the date of this letter:

1. A noise assessment undertaken by a suitably qualified consultant. This assessment should specifically refer to the type of helicopter to be used, and the anticipated noise impact as would be experienced within the locality, particularly by the adjoining residence located on Lot 522.
2. Details of any lighting required for the helipad, its strength, directionality and expected impact on the adjoining residence.
3. Whilst the Statement of Environmental Effects identifies general flight paths that will avoid known residences and residential areas, Council requests confirmation from your clients that such flight paths can be adhered to in general weather conditions (eg. strong winds and the like), or under what weather conditions they would need to be modified.
4. The altitude that the helicopter is flown has a bearing on noise and privacy issues. It is understood that the helicopter will be flown at the maximum safe altitude as determined by the pilot. Please elaborate on what altitude this would generally be, and under what weather conditions that this altitude would need to be reduced.
5. Concern has been expressed in the submissions received regarding the safety of the aircraft, and the qualifications of the flight crew. Please provide evidence that all necessary licences etc are in place with the relevant authority.
6. Please confirm that the proposed helipad will conform to the following Advisory Guidelines from *CAAP 92-2 (1) — Guidelines for the establishment and use of helicopter landing sites (HLS).*

Concern has been expressed in the submissions received that the flight movements will exceed 7 per week, which will make the proposed development designated development, and thus Council should require an Environmental Impact Statement.

Council's understanding is that the establishment of the helipad is desirable due to ongoing medical issues experienced by your client's son, however, obviously, the movements will be for other purposes too, such as general transportation for the family. All of these movements must fall within the 7 movements per week, otherwise the development is defined as Designated Development and will require the submission and assessment of an Environmental Impact Statement.

Council at this time is not anticipating that your client will exceed this number, however, if it is your clients intention to exceed 7 movements per week, then an EIS should be prepared and submitted as soon as possible.

Should the information not be provided within the specified period, it will be taken that the information will not be provided and Council will determine the application.

You may request Council in writing to extend the period to provide the information if there are good reasons why further time is requested.

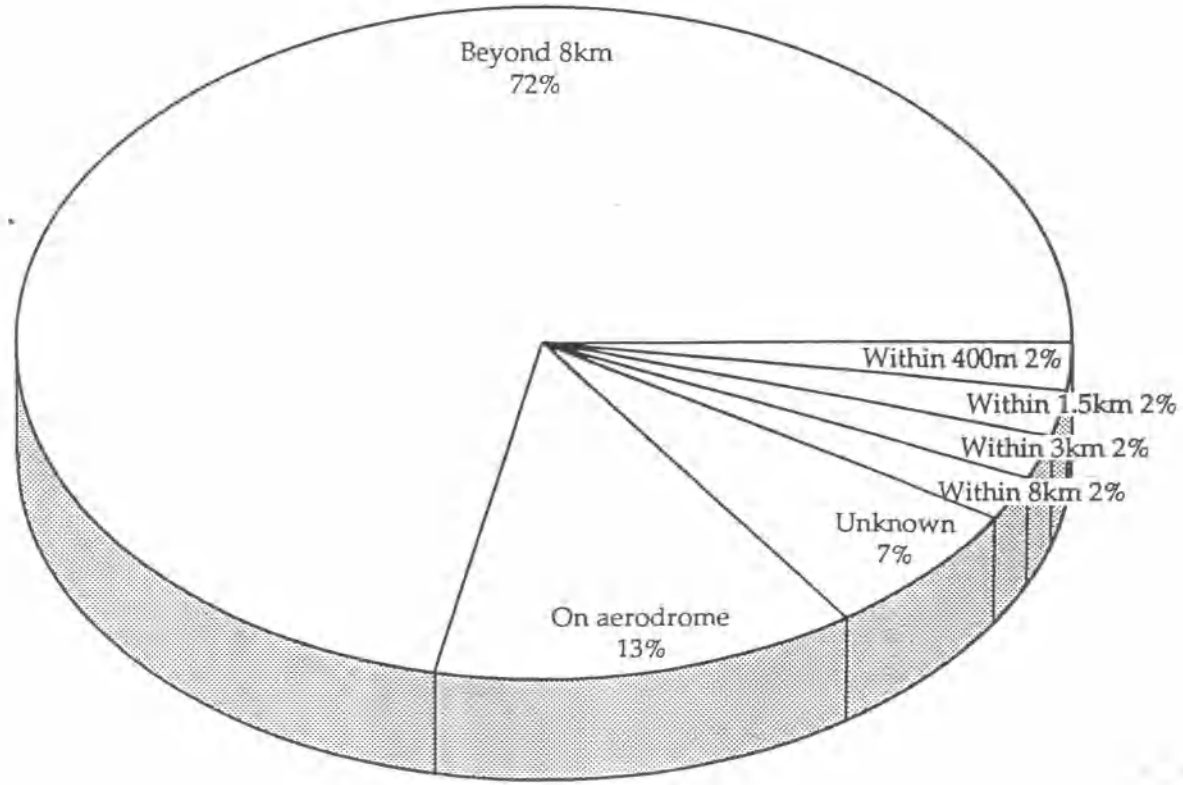
If you require further information please contact Heidi Naylor of Council's Environment and Economic Department on 6643 0200 between 8.30 am and 11.00 am.

Yours faithfully

Heidi Naylor
Planning Services Coordinator

APPENDIX D

Aerodrome proximity (rotary wing aircraft)



APPENDIX E

Robert Charles Ward
PO Box 5003
Daisy Hill Q. 4127

Residential Address
95 Daisy Hill Road
DAISY HILL Q 4127

Date of Birth: **14/8/1947**
Place: **Ipswich, Queensland**
Marital Status: **Married**

ROBERT C. WARD

CAREER HISTORY

1964 – 1993	**Draftsman, Engineering, Mining and Aerial Surveyor** **Australia, Papua New Guinea, Europe, England and Africa**
1969 - 1976	**Australian Pilot's Licence**
1976 – 1981	**Commercial Helicopter Pilot – Commercial Aeroplane Pilot** **Australian Stock Breeders** **Sunshine Coast Rescue – Chief Pilot** **Seaworld Aviation** **Pacific Helicopters – PNG** **Rotor Work Helicopters – PNG** **Hookway Aviation** **Island Air Helicopters**
1981 – Date	**Airline Transport Pilot (Helicopters) – Commercial Aeroplane Pilot** **Chief Pilot - Nine Network Australia**
2004 – Date	**Head – Aviation Safety Management Committee Nine Network** **Audit Assessment and Safety Management**

Licence Number: **101788**
Experience: **Less than 300 hrs Aeroplane – Single engine, retractable**
13, 327 hours Helicopter Experience
Single engine – Reciprocating 2,250 hrs
Single engine – Turbine 10,852 hrs
Multi engine – 25 hrs

Ratings held: **Floats, sling load, mustering, NVFR –ADF,VOR, GPSN**
Additional Training: **Aviation Risk Management, Crew Resource Management, HUET, Dangerous Goods**

ASSOCIATIONS

1982 – 1993	**Executive Council - Helicopter Association of Australia** **Member – Australian Federation of Air Pilots** **Member – Association of Technician Surveyors** **Associate – Association of Surveyors – Papua New Guinea** **Associate – Guild of Surveyors – London**

OTHER

Managing Director
Geoarc Consulting Pty Ltd - 1991

Navigation Software and Mapping Specialists
HLS Infrastructure Planning and Development

INFRASTRUCTURE AND PLANNING PROJECTS 1982 - 2008

1. **Helicopter Noise Standards – Australia. Establishment of bench mark noise levels for commercial helicopters**
2. **Compilation of the Helicopter Infrastructure Guidelines with the Division of Environment – Queensland Government Helipad Establishment Guidelines**
3. **Draft Management Plan – The Great Sandy Region (Fraser Island)**
4. **Compilation with the Division of Environment of the Whale Watching Guidelines – Helicopter**
5. **Draft Management Plan – Gold Coast Heliports – Southport to Coolangatta**
6. **Project Assessment – Queensland Government Brisbane River Helipad**
7. **Kingaroy Skyport Proposal**
8. **Establishment of the Beaumont Helicopter Landing Site – The Gap, Brisbane Plan compilation, site surveys, noise testing, infrastructure planning**
9. **Commercial Helipad Proposal – "Gwingana" – Upper Tallebudgera Valley**
10. **Software developer of the GEOARC ™ Mapping Software used to laser and video map the Telstra Cable Network throughout Australia. Mapping projects include Telstra and BHP.**
11. **2007 - Initial assessment of the Vision Tower rooftop HLS and Stamford Plaza marine HLS – Brisbane**
12. **2007/08 – Planning approval and Development of Marina Quays HLS Hope Island, Fish Developments and Buckler HLS's at Sovereign Islands.**
13. **2008 – Assessment of Consolidated Properties proposed HLS at Brett's Wharf, Hamilton.**

CONSULTING PARTNERS

John Venn Consulting and URBIS Town Planning – Brisbane
Town Planners, helipad infrastructure planners, Legal and Town Planning appellant and Impact Assessment Statements and submissions

All details correct as at 21 July 2008.

Robert C. Ward

JOHNSTON ENTERPRISES
(AUSTRALIA) PTY LTD

APPENDIX 3

THE ACOUSTIC GROUP PTY LTD
CONSULTING ACOUSTICAL & VIBRATION ENGINEERS

PROPOSED HELIPAD OPERATIONS

LOT 51 DP75139, YAMBA

38.4740.R1A:ZSC

Prepared for: *Urbis*
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Date: *31st July, 2008*

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CONTENTS

APPENDICES

1.0 INTRODUCTION

The purpose of this report is to present the results and findings of an acoustic investigation in relation to the proposed helipad operations at Lot 51 DP751395 off the proposed Freeburn Street at Yamba, New South Wales.

Testing was carried out on site on Saturday, 26th July, 2008 utilising an Agusta A109S helicopter to provide actual measurement result for the assessment of noise impact associated with the use of the proposed helipad.

2.0 THE PROPOSAL

The proposed helicopter operations is to occur at a newly constructed helipad located on the eastern side of Lot 51 DP 751395 and is located near the proposed road identified as Freeburn Street, Yamba. The helipad is ancillary to a private residential dwelling.

The helipad is to be utilised for landing and takeoffs with the aforementioned Agusta A109S.

As a consequence of the proposed helicopter operations it is necessary under the NSW DECC (containing the EPA) to evaluate the noise impact whilst the helicopter was on the ground. With respect to noise impacts arising from the operation of the helicopter in the air, such operations are controlled/assessed by Air Services Australia as part of their general assessment for suitability of a site with respect to obstacle free gradient assessment of flight track/profiles to accord with the various regulations applicable to such landing sites and noise criteria under two different scenarios.

We are instructed that the proposal seeks to have up to 7 movements per week.

3.0 ACOUSTIC CRITERIA

Previously helicopter noise assessments fell under the criteria issued by the NSW EPA and covered both noise emissions when the helicopter was in the air and noise emission whilst the helicopter is on the ground**.**

However that situation has altered with the NSW Department of Environment and Climate Change ("DECC") now only governing noise emitted from the helicopter when on the ground, with such noise being assessed in terms of the EPA's *Industrial Noise Policy* document. The EPA criteria is identified as the "intrusive noise target" which assesses noise from the helicopter as an Leq level over a 15 minute period at any residential boundary, or for large properties at the residential boundary or 30 m envelope from the residence, whichever is closer to that residence.

AirServices Australia administers helicopter operations whilst in the air and in populous areas utilises the Aircraft Noise Exposure system (ANEF-Aircraft Noise Exposure Forecast) which predicts noise levels over a one year average.

In rural areas AirServices Australia consider a planning principal document for new flight paths whereby it is recommended if the $L_{(eq\ 24hr)}$ is less than 40 dB(A), then aircraft/helicopter noise is not an issue. An AirServices Australia Fly Neighbourly Guide recommends a Leq level between 40 and 50 dB(A) when assessed as a 24 hour level assessed adjacent to residential dwellings.

These noise criteria are different to noise targets utilised for previous helipad assessments in New South Wales and therefore may cause confusion for persons researching or reviewing (previous approvals) without a proper understanding of the acoustic criteria that now apply. Accordingly the following explanation is required to address this potential confusion as the EPA have not publicly addressed the change in helicopter noise assessment procedures.

In 1982 the NSW State Pollution Control Commission ("SPCC") advised the helicopter industry that on a noise basis they legally had control over helicopter operations and introduced noise criteria that covered both operations on the ground and in the air. The SPCC criteria were in guideline (Chapter 165) contained in the *Environmental Noise Control Manual*.

The SPCC helicopter noise criteria were based upon the aircraft noise acceptability target of 20 ANEF for a heliport having 50 movements per day where both the Leq target of 55 dB(A) and the maximum level of 82 dB(A) were mathematically related to the 20 ANEF value for the number of movements nominated. The SPCC cited the approximate relationship of ANEF +35 = Leq dB(A) as previously used (and continued to be used) by the Department of Aviation/Civil Aviation Authority/AirServices Australia.

Persons experienced with the Leq formula in the SPCC guideline would be aware the formula is mathematically incorrect. For high usage helipads the formula provides a point at which the higher the number of movements the Leq level would be reduced below the ambient Leq level, which is impossible. Therefore the Leq must be expressed as a contribution (as confirmed by the Sydney CBD Commission of Inquiry – discussed below) and exclude the ambient Leq component in the SPCC helicopter Leq formula.

To our knowledge all the Land and Environment Court matters pertaining to helicopters (from 1982 up until last year) were assessed against the SPCC recommended noise criteria.

Therefore Councils and residents, if relying upon previous Land & Environment Court Judgments (up until last year), would be unaware of the circumstances in relation to noise assessments for helicopter landing sites and may well assume there is a requirement under EPA criteria for noise testing/assessment of helicopter flight paths under the ENCM guidelines.

One possible scenario as to the EPA not publicly advising the ENCM guidelines were invalid, could be that as a result of the (NSW) EPA's incorrect guidelines quite a significant number of helicopter applications that had been refused on the basis of noise, and Court cases that were run principally on noise matters in the Land & Environment Court, were all conducted on a false premise and therefore, the (NSW) EPA could be subject to a very substantial damages claim by the Helicopter Industry. Whilst this is a possible scenario, it can at this time only be considered hypothetical because the (NSW) EPA have declined to provide a copy of the legal advice in 1982 that they controlled all helicopter operations or the advice in 1998 that they only have control when helicopters are on the ground.

3.1 Noise Criteria for Helicopters on the Ground

The matter of the more recent DECC (EPA) noise criteria for helicopter noise was placed in the public domain as a result of an application for a helipad at Capertee, north of Lithgow and the subsequent NSW Land & Environment Court case of *Mark Lilley – v- Council for the City of Lithgow* (Proceeding No. 10390 of 2007).

In the above matter the DECC confirmed to the Applicant (for the preparation of the acoustic report to accompany the DA) that the ENCM guideline for helicopters did not apply. The DECC specified for the helipad application the standard intrusive noise criteria from their *Industrial Noise Policy* document.

Therefore for consistency with the Lilley matter the DECC should require the helicopter operations when on the helipad to comply with the intrusive goal (for individual movements), and the amenity goal (for the total number of movements in a day whilst on the helipad).

If acoustic criteria for helicopter operations when on the helipad have been established then what criteria would be used when the helicopter is airborne?

3.2 Noise Criteria for Helicopters in the Air

In the Commission of Inquiry (1993) into the Sydney CBD Heliport, the Commissioner (with the technical assistance of Mr. D. Craig) was critical of the SPCC guideline (formula issue described above) and utilised an assessment criteria for residential receivers based on a helicopter contribution (in the air) of 20 ANEF (referenced back to the Australian Standard for aircraft noise AS2021) that was in turn approximated to a helicopter Leq contribution of 55 dB(A).

In the use of a 20 ANEF criterion as a maximum acceptable exposure limit for aircraft operations it can be stated that such a noise exposure limit applies to persons already pre-exposed to aircraft noise (AS2021). Persons not already exposed to aircraft noise would have a lower threshold of acceptable exposure limit (such as 13 ANEF as proposed in the Second Sydney Airport draft EIS). For a new helicopter application this could suggest a Leq contribution of 48 dB(A) as acceptable.

AirServices Australia have also issued a document "*Environmental Principles and Procedures for Minimising the Impact of Aircraft Noise*" ("Environmental Principles") which was referred to by the Court in the Lilley matter for the relatively quiet environment of the various areas around Capertee when removed from the main highway.

There are 10 Principles provided in the AirServices Australia Environmental Principles document for the design of flight paths and operational procedures that may be adopted to minimise noise.

Principle 5 indicates that aircraft noise is not considered significant when selecting preferred options if it is less than 40 dB(A) $L_{Aeq,24hr}$ and there are less than 50 overflights per day.

Principle 6 indicates that no residential area should receive more than 60 dB(A) $L_{(Aeq,24\ hr)}$, whilst a Fly Neighbourly Guide issued by AirServices Australia provides a recommended range of 40 – 50 dB(A) $L_{(Aeq,\ 24hrs)}$.

In the Lilley matter it was agreed between the acoustic experts that airborne helicopter operations that gave rise to a contribution not exceeding 40 dB(A) would, for quiet areas removed from the highway, not generate a significant disturbance. In the Lilley decision the Senior Commissioner chose a 40 dB(A) $L_{(eq,\ 24\ hr)}$ criterion for such location, but accepted a higher design level (due to the higher ambient level) adjacent to main roads.

As a result of the above discussion, the acoustic criteria for the subject helipad should be:

a) Noise from the helicopter when on the helipad arising from the start up, idle, power up (prior to, and up to the skids/wheels leaving the HLS) and landing (from touching the HLS until shutdown) are to comply with the intrusive goal of background + 5 dB(A) when measured at any residential boundary, or 30 metre envelope around a dwelling whichever is closer to the residence.
b) Noise from the airborne component of the helicopter operations shall comply with a $L_{(Aeq,24hr)}$ 40 dB(A) limit when assessed at any residential dwelling removed from main roads or less than 50 dB(A) for residences adjacent the main road (Yamba Road).

4.0 ACOUSTIC ASSESSMENT

On the afternoon of Saturday 26th July, 2008 a series of sound level measurements were conducted at position 70 metres to the south of the Helipad (location A), and two residential boundary locations that are south (location 1) and northwest (location 2) of the Helipad.

In view of the need to differentiate between helicopter noise as a result of the helicopter being on the ground versus in the air, an observer was positioned 70 metres to the south of the Helipad to record the absolute time at which the helicopter wheels touched the ground or left the ground during the testing.

Noise monitors utilised Bruel & Kjaer Modular Sound Level Meters Type 2260 with Time Splice logging software BZ7206. The reference calibration of each meter was checked prior to and after measurements using Bruel & Kjaer Calibrator Type 4231 and did not exhibit any significant shift.

The time splice capabilities of each meter was utilised to record the A-weighted noise level over time at a rate of 10 samples per second. The time clocks on the Bruel & Kjaer meters were synchronised with each other and one of the Bruel & Kjaer meters was utilised by the observer in proximity to the helipad (location A).

Testing was first conducted utilising with measurements being carried out at location 1 and location A for four takeoff and landings to and from the west. Location 1 is on the southern boundary of the site and is approximately 90 metres from the residence on the adjoining block to the subject site.

Following completion of four takeoffs and landings from the Helipad the meter at location A was relocated to a position along the north western/northern boundary of the site identified as location 2 in Appendix A. This location is in proximity to the southern boundary of the Caravan Park and would only be impacted by the airborne component for the western flight path.

Four flights were the conducted of the helicopter taking off and landing to and from the west. At location 2, whilst the helicopter was audible but did not generate measurable increases above the background noise level, measurable increases were recorded during the western overflight that is south of location 2.

Following completion of the measurements at location 2, the meter was then repositioned at location A and four takeoffs and landings to and from the east were carried out.

Appendix A sets out the site location and the measurement locations used for our testing and the noise monitoring locations are represented as location A, location 1 and location 2.

Appendix B identifies the test flight tracks that were utilised.

A residential property approximately 90 metres to the south of location 1 would represent the nearest residence to the Helipad.

Appendix C sets out the results of noise measurements for the two residential reference locations where each noise event has been broken up into an airborne component and a ground component. It is noted that flight movements 5-8 inclusive are not included for Location 1 as no observer were present to identify the exact time for wheels down or wheels up.

The measurement results in Appendix C are obtained by the use of the Bruel &Kjaer Evaluator Type 7820 program which permits marking of helicopter movements and expanding the time signal so as to determined both a maximum and a sound exposure level (SEL).

Appendix D sets out a sample of the time splice graphs at the monitoring location near the helipad (location A) and that recorded at location 1.

For the purpose of noise assessment the idle time of the helicopter would be longer than that utilised in the test procedure as one is seeking to conduct such tests in an efficient manner and there is no need for extended idling periods once the helicopter has landed and gone to flat pitch idle, so as to identify the time signature of the next activity.

From the results in Appendix C the logarithmic average of the relevant noise component is obtained for each flight movement/path that had been recorded so as to permit the calculation of the ground borne component for assessment against the INP intrusive noise goal. Whilst the idle period of the subject helicopter for both the shut down following the initial landing and the start-up prior to the first take off were less than 90 seconds in our analysis we have utilised the typical time period of two minutes allocated for engine stabilisation of turbine powered helicopters.

Table 1 below the sets out the sound exposure level (SEL) associated with the measurement result at location 1 and the resultant 15 minute Leq contribution applicable to a landing with engine stabilisation prior to shut down, or an engine stabilisation with a takeoff.

Table 1: Ground Borne Noise Contribution – Leq 15 minutes

Location	Flight Path	Landing SEL (dB(A)	Idle SEL dB(A)	Takeoff SEL dB(A)	$L_{eq\ 15\ minutes}$ dB(A)
1	West	81.9	86.8	-	58.5
1	West	-	86.8	89.6	61.9
1	East	81.7	86.8	-	58.5
1	East	-	86.8	88.0	61.0

The residential dwelling located on the property immediately to the south of location 1 is set back from its northern boundary and therefore would be subject to additional distance attenuation and additional attenuation due to the dense foliage between the boundary and the residence as it was impossible to see the residence from location1. It is not unreasonable, on a conservative basis, to allocate an attenuation of at least 6 dB for this residence from that recorded at location 1.

Appendix E sets out the results of ambient background measurements recorded at location 1 on the afternoon and night of Thursday 24th July, 2008, with ambient measurements recorded on the day of the helicopter test (Saturday 26th July, 2008). For the first set of measurements the ambient background level of 49 dB(A) was affected by rain and is not considered valid in this assessment.

The ambient background measurement of 41 dB(A) recorded later that night was influenced by frogs and other nocturnal insects. Eliminating the abnormally high background level in the 4kHz octave band to be similar to or slightly below that recorded in the 2kHz octave band would suggest a true ambient background level at night more in the order of 37 dB(A).

During the ambient measurements on the Saturday the background levels were similarly found to be affected by insects such that on removing the 2kHz and 4kHz octave band results the day time background level for location one would be more in the order of 36 dB(A).

Taking the results in Table 1 and the additional distance/shielding attenuation then on the daytime ambient background level that was recorded on site the EPA intrusive noise criteria would be satisfied at the residence to the south. However if one excludes the insects and frog noise recorded at location 1 to identify on a conservative basis the true background level then the ground borne component for the subject helicopter would not comply with the intrusive noise target.

If the hanger for the helicopter had been located on the southern side of the helipad then that hanger position would have provided a greater degree of attenuation than the situation with no hanger, as experienced during our testing. The provision of an acoustic barrier/wall on the southern side of the helipad can reduce the ground borne noise component with the height of the barrier/wall dependent upon the relative location of the barrier/wall with respect to the helicopter whilst on the helipad.

Table 2 below sets out the necessary height of a single wall element on the southern side of the helipad having a relative distance from the edge of the helicopter for a nominated height to achieve compliance with the EPA intrusive noise target.

Table 2: Barrier Height Above Ground

Distance From Helicopter (m)	Barrier Height Above Ground (m)
25	8
15	7
10	6.5

As noted above there was no measurable increase above the background level at location 2 when the helicopter was on the ground and therefore the EPA intrusive noise target would be easily satisfied at that location and no additional controls would be required with respect to occupants of the caravan park north of location 2.

With respect to the air borne noise contribution, Table 3 below sets out the calculated $L_{(eq,24\ hours)}$ contribution on the basis of one landing and one take off per day utilising the same flight path.

Table 3: Air Borne Noise Contribution – Leq 24 hours

Location	Flight Path	Landing SEL (dB(A))	Takeoff SEL dB(A)	$L_{eq\ 15\ minutes}$ dB(A)
1	West	95.5	90.5	47.5
1	East	92.7	98.4	45.0
2	West	87.0	88.2	41.3

For the airborne noise contribution at location 1 the additional distance attenuation to the residence to the south would on a conservative basis be not less than 6 dB(A), thereby resulting in a contribution for the eastern flight path less than 40 dB(A) whilst the western flight path would be slightly above 40 dB(A). We have been instructed that the preferred flight path for the subject helipad is the flight path to the east.

The provision of a barrier/wall on the western side of the helipad, or relocation of the hangar to be on the southern side of the helipad, would reduce the airborne noise component to location 1 and also to the residence to the south resulting in an $L_{(eq,24hours)}$ below 40 dB(A).

For the over fight measurements at location 2 the use of the western flight path of both a landing and takeoff would realise a contribution slightly above 40 dB(A), whilst for the eastern flight path due to the additional attenuation afforded by the use of that flight path the contribution would be significantly less than 40 dB(A).

5.0 ALTERNATIVE LANDING SITE/FLIGHT PATHS

For the current configuration of the Helipad and flight paths the noise testing established non-compliance with the EPA's INP intrusive noise criteria and necessitates additional acoustic controls.

Based on our extensive testing and design of helipad flight paths and specific testing of a Agusta A109A for the Sydney CBD Heliport application we have reviewed the directivity coefficients associated with the helicopter obtained from the testing, together with the directivity coefficients from version 7 (the latest version) of the Integrated Noise Model ("INM").

The principal noise source of the helicopter, when in the ground borne phase is the turbine exhaust. By keeping the nose of the helicopter pointing in a southerly direction there is a significant reduction in the ground borne noise component in the order of 15 dB(A) when compared with the exhaust noise propagation when side on, as per the tested flight path. The directivity attenuation for a duct of $0.4m^2$ can be seen in the EPA Directivity Loss Chart in Chapter 207-1 of their Environmental Noise Control Manual.

If the landing site is relocated not less than 60 metres north of the existing helipad then there will be additional distance attenuation such that the cumulative reduction due to directivity and distance attenuation would from Table 1 result in compliance with the intrusive noise target for the nearest house to the south if the helicopter shutdown (or started up) on the new helipad.

From our evaluation of the test result we do not see that the new landing site would result in an increase in ground borne noise levels at location 2.

The requirement to shutdown or start up on the new helipad would require the use of a small tractor (similar to a tow-master) to move the helicopter between the helipad to the hangar.

The use of a helipad to the north of the current location would provide for quieter airborne noise levels by reason of having the helicopter flying directly to a hover over the helipad and then conducting a pedal turn to line the nose of the helicopter in a southerly direction. The elimination of the curved flight path for the current eastern flight path would noticeably reduce the measured level.

For the western flight path the existing track from the western boundary of the site would remain in place (i.e. no change with respect to location 2) with the final stage of the flight path being a curve into the landing site (see Appendix G).

Accordingly the following procedure would be required as part of the operational procedures for the subject site:

- All landings and takes offs will be from the northern helipad – not the landing site in front of the hangar
- There shall be no aerial transfers from the helipad landing site to or from the hangar.
- The transfer of the helicopter to the hanger (and reverse) is by use of a tractor or similar, with the helicopter engines shutdown during such transfer.
- The eastern flight path is a straight in approach to a hover above the landing site and then a left turn to the south so that prior to wheels down the helicopter shall be placed in a hover with the nose oriented in a southerly direction.
- The western flight path is a straight in approach towards the hanger and then a curved approach to the landing site when above the cleared area to a hover above the landing site and then a right turn to the south so that prior to wheels down the helicopter shall be placed in a hover with the nose oriented in a southerly direction.
- A take off to the east will prior to start up the have the helicopter positioned with the nose oriented in a southerly direction. After lift off to a hover the helicopter will conduct a right turn in the hover and then climb out to the east.
- A take off to the west will prior to start up the have the helicopter positioned with the nose oriented in a southerly direction. After lift off to a hover the

helicopter will conduct a left turn in the hover and then climb out to the south west and curve to intersect with the nominated western flight path.

In our experience the use of the northern landing site, nominated alternative tracks and the above procedures would reduce the airborne noise levels from those obtained during our testing.

6.0 CONCLUSION

An acoustic compliance test of an Agusta A109S helicopter landing and taking off at the helipad located on Lot 51 DP751395 off Freeburn Street at Yamba has been undertaken.

From the measurements conducted on-site additional attenuation is required with respect to the property immediately to the south so as to achieve compliance with the EPA intrusive noise criterion. Relocation of the hangar to the southern side of the helipad to provide additional acoustic shielding, or the provision of a dedicated acoustic barrier/wall is required to achieve technical compliance with the intrusive noise target. A barrier/wall should be of solid masonry construction to provide adequate attenuation and also the necessary support with respect to any wind loading generated by the helicopter.

An assessment of the noise component associated with the subject helicopter proposal when airborne reveals the provision of the aforementioned relocation of the hangar or provision of a dedicated acoustic barrier/wall would result in an $L_{(eq,24\ hours)}$ contribution below the 40 dB(A) level considered by AirServices Australia to not generate a noticeable noise impact.

The use of the preferred eastern flight path would create an insignificant noise impact at the caravan park north of location 2.

If the hangar was to be relocated to the southern side of the helipad and one could expect a lower noise level for the subject helipad as the curved flight path associated with the eastern flight path would no longer be needed and therefore would achieve a lower time period for exposure of the helicopter when airborne and over the subject property.

We note that if the assessment had been undertaken on the old EPA helicopter noise criteria (Chapter 165 of the ENCM) the maximum noise level at the 30 metre envelope for the residence to the south would have satisfied the 82 dB(A) criteria and the operation of two movements a day would have a satisfied the 55 dB(A) Leq criteria.

However, the ENCM criteria no longer prevails and to achieve compliance with the INP intrusive noise criteria we have proposed relocating the helicopter landing site further to the north and requiring the helicopter when operating in the ground borne component (i.e. EPA criteria) to maintain the noise in a southerly direction. With the additional distance attenuation and directivity attenuation obtained by our recommended procedures the INP intrusive noise targets would be satisfied and the airborne noise contributions would be lower than calculated for the residence to the south (and similar to those provided for the caravan park) and therefore easily satisfy the AirServices Australia recommended Leq limit of 40 dB(A).

THE ACOUSTIC GROUP PTY LTD

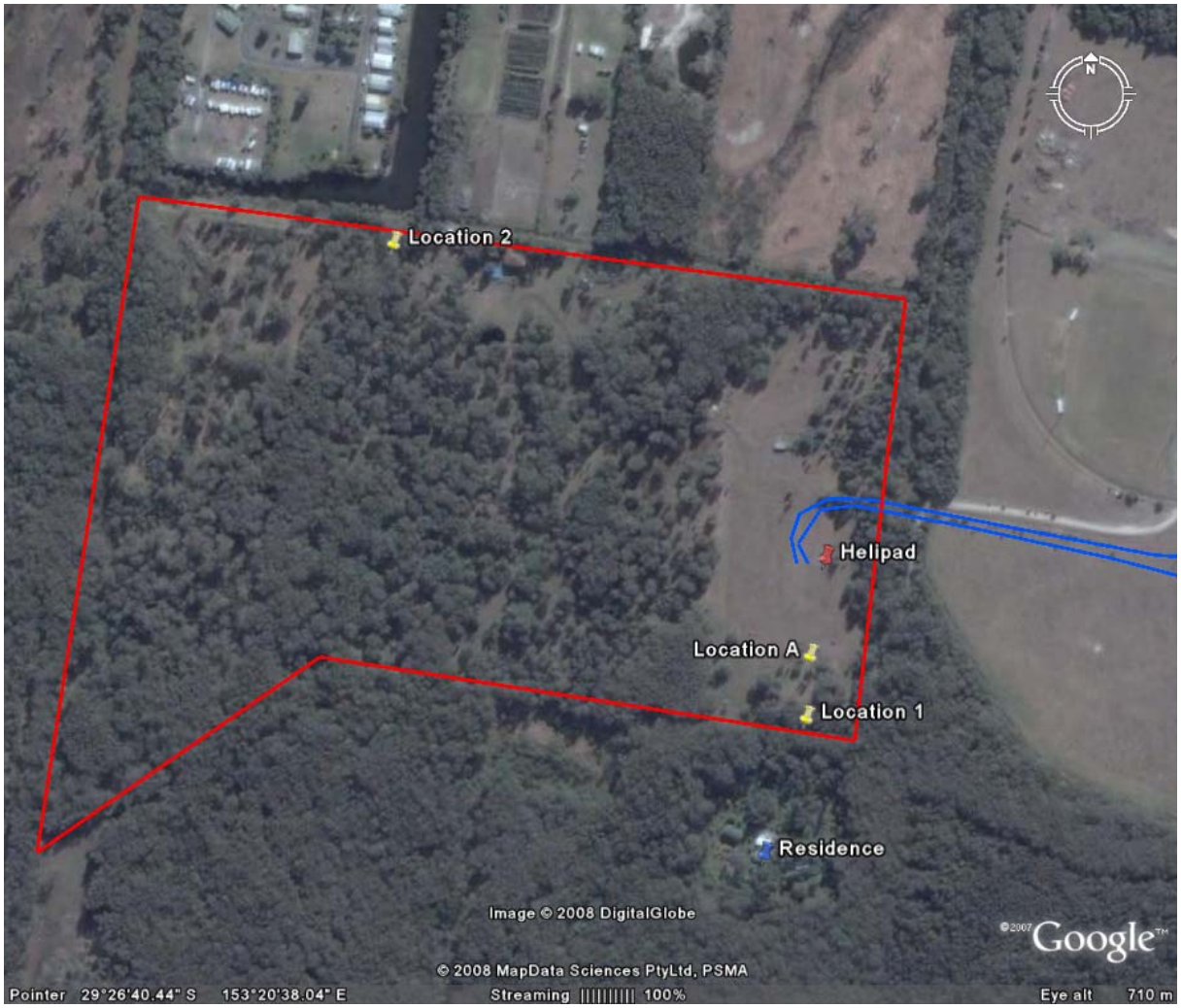
STEVEN E. COOPER

APPENDIX A: Site and Measurement Locations

APPENDIX B: Test Flight Tracks

Take-off and landings to and from the west:

Take-off and landings to and from the east:



APPENDIX C: Measurement Results

Location 1:
Ground Borne Component

		Takeoff - Power up			Landing - Power down			Landing - Idle		
Flight #	**Direction**	**Leq**	**Duration**	**SEL**	**Leq**	**Duration**	**SEL**	**Leq**	**Duration**	**SEL**
-	East				68.0	50	85.0			
1	West	73.3	84	92.6	70.5	18	83.1	65.3	39	81.2
2	West	73.7	28	88.2	69.8	13	80.9	65.4	51	82.5
3	West	71.6	29	86.2	69.9	16	82.0	66.1	42	82.4
4	West	73.5	33	88.7	71.6	9	81.2	66.0	37	81.7
9	East	71.8	74	90.5	69.7	14	81.1	65.6	32	80.7
10	East	72.7	23	86.4	71.0	10	81.0	66.4	31	81.3
11	East	72.6	25	86.6	70.8	16	82.8	65.9	23	79.5
12	East	73.3	25	87.2	71.5	10	81.5	66.5	40	82.5
-	East	73.1	36	88.7						
Log Ave(1-4)	**West**	-	-	**89.6**	-	-	**81.9**	-	-	**82.0**
Log Ave (9-12)	**East**	-	-	**88.0**	-	-	**81.7**	-	-	**81.1**
Log Ave (1-12)	-	-	-	**88.9**	-	-	**81.8**	-	-	**81.6**
Log Ave(Total)	-	-	-	**88.9**	-	-	**82.3**	-	-	**81.6**

Air Borne Component

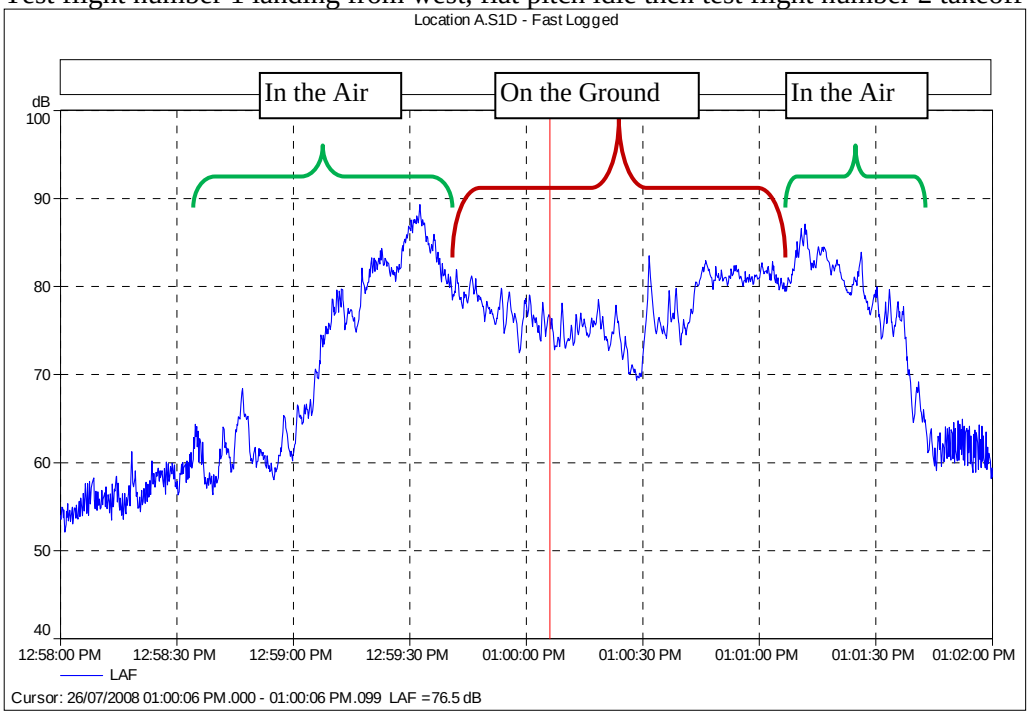
		Takeoff			Landing		
Flight #	**Direction**	**Leq**	**Duration**	**SEL**	**Leq**	**Duration**	**SEL**
-	East	-	-	-	75.1	88	94.5
1	West	70.3	22	83.7	76.7	67	94.9
2	West	74.7	42	91	76.7	65	94.9
3	West	75.7	48	92.5	77.8	61	95.7
4	West	74.8	39	90.8	78.5	60	96.2
9	East	73.9	35	89.3	73.8	75	92.6
10	East	73.9	37	89.6	74.1	74	92.8
11	East	73.1	37	88.8	73.8	70	92.3
12	East	73.1	46	89.7	74.4	71	92.9
-	East	73.1	40	89.2	-	-	-
Log Ave(1-4)	**West**	-	-	**90.5**	-	-	**95.5**
Log Ave (9-12)	**East**	-	-	**89.4**	-	-	**92.7**
Log Ave (1-12)	-	-	-	**90.0**	-	-	**94.3**
Log Ave(Total)	-	-	-	**89.9**	-	-	**94.3**

Location 2:
Air Borne

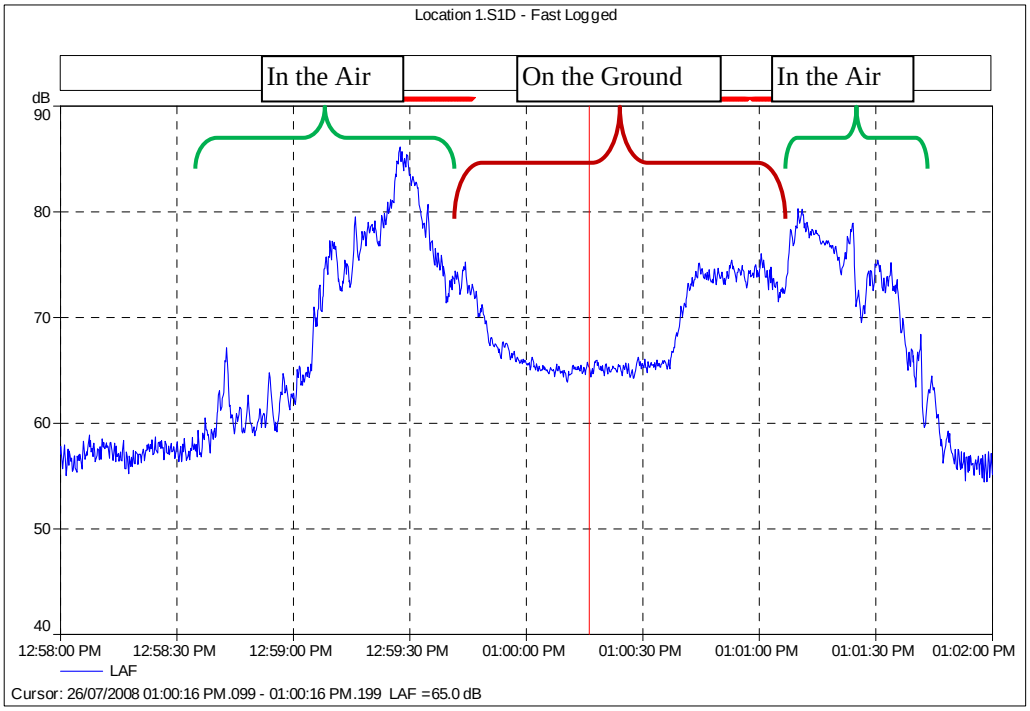
	Takeoff to West			Landing from West		
Flight Number	**Leq**	**Duration**	**SEL**	**Leq**	**Duration**	**SEL**
5	68.8	115	89.4	69.2	67	87.5
6	68.7	61	86.5	67.5	83	86.7
7	71.1	60	88.9	67.2	79	86.1
8	69.4	66	87.6	69.4	66	87.6
Log Average	-	-	**88.2**	-	-	**87.0**

APPENDIX D: Sample Time Splice

Test flight number 1 landing from west, flat pitch idle then test flight number 2 takeoff to east.



Location 1



Location 2

APPENDIX E: Ambient Background Measurement Results

15 minute ambient measurement results Thursday 24th July, 2008. (Rain affected data)

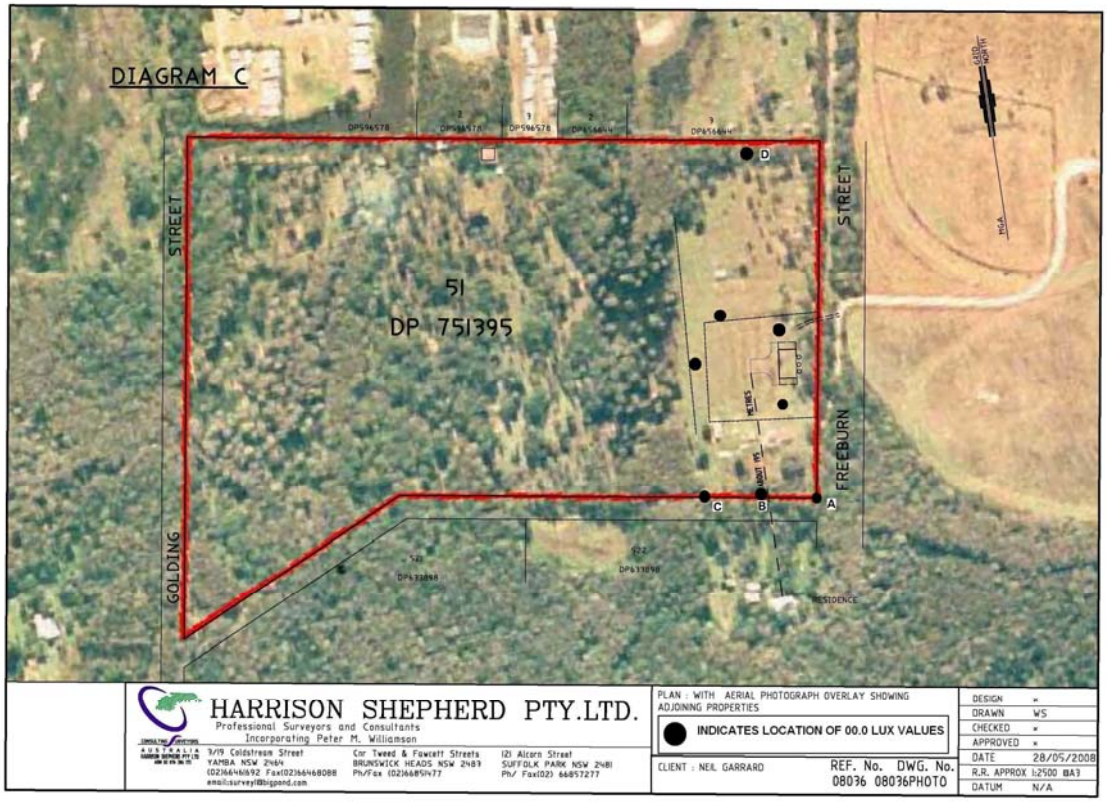
				Octave Band Centre Frequency (Hz)								
Location	**Time**	**Descriptor**	**dB(A)**	**31.5**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
1	15:47	Leq	52	54	52	50	42	41	44	48	46	42
		L90	49	51	48	43	38	38	41	43	43	39
2	16:24	Leq	49	51	52	50	42	37	37	41	45	33
		L90	47	49	47	41	35	33	31	38	44	25

				Octave Band Centre Frequency (Hz)								
Location	**Time**	**Descriptor**	**dB(A)**	**31.5**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
1	22:33	Leq	42	52	47	41	37	35	31	33	39	25
		L90	41	50	45	39	35	33	28	31	37	19
2	22:05	Leq	51	54	48	44	40	40	39	42	48	36
		L90	50	48	45	41	37	36	35	41	47	28

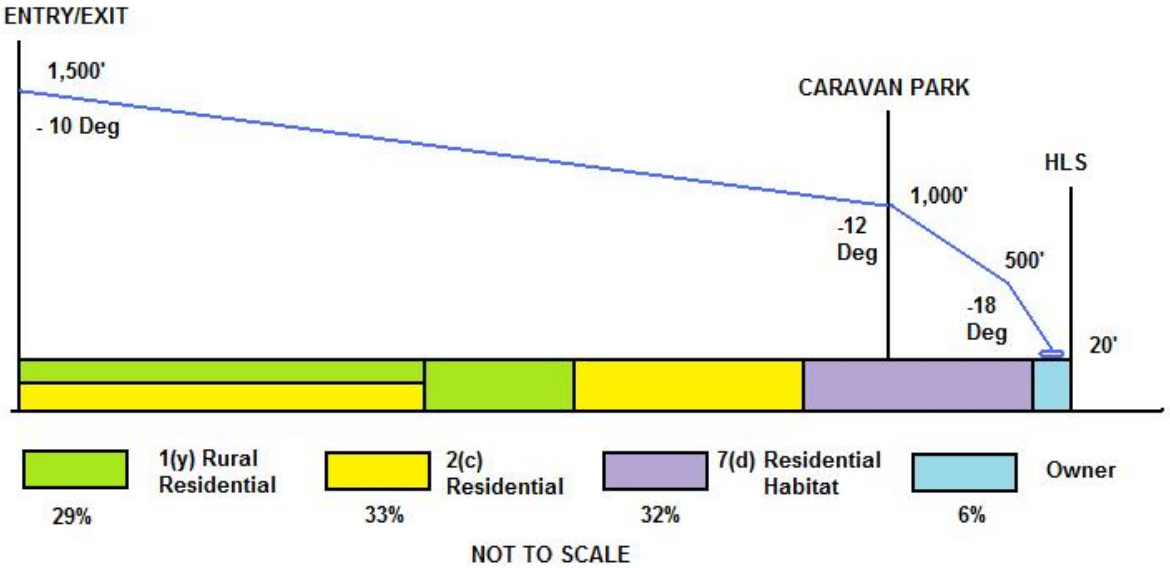
15 minute ambient measurement results Saturday 26th July, 2008. (Heavily influenced by frogs and insects – see 2 kHz and 4 kHz)

				Octave Band Centre Frequency (Hz)								
Location	**Time**	**Descriptor**	**dB(A)**	**31.5**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
1	12:30	Leq	58	49	43	35	28	26	27	51	55	31
		L90	57	47	39	31	25	23	25	49	54	29
1	13:58	Leq	57	53	49	43	36	33	28	50	54	34
		L90	53	50	42	37	29	26	24	46	51	27

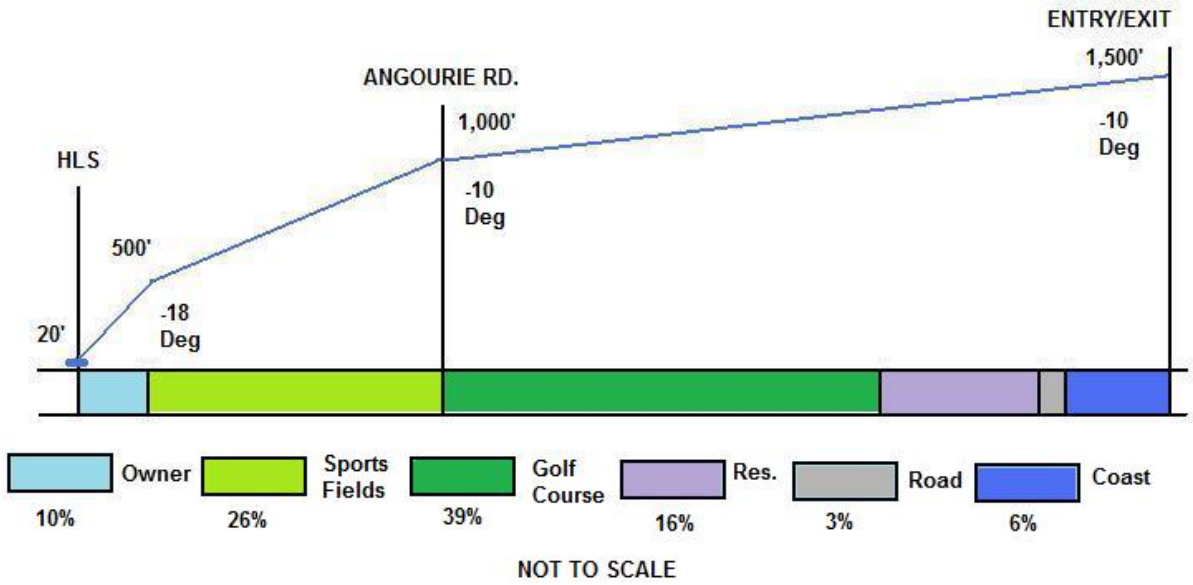
APPENDIX F: Helipad Site and Proposed Flight Tracks



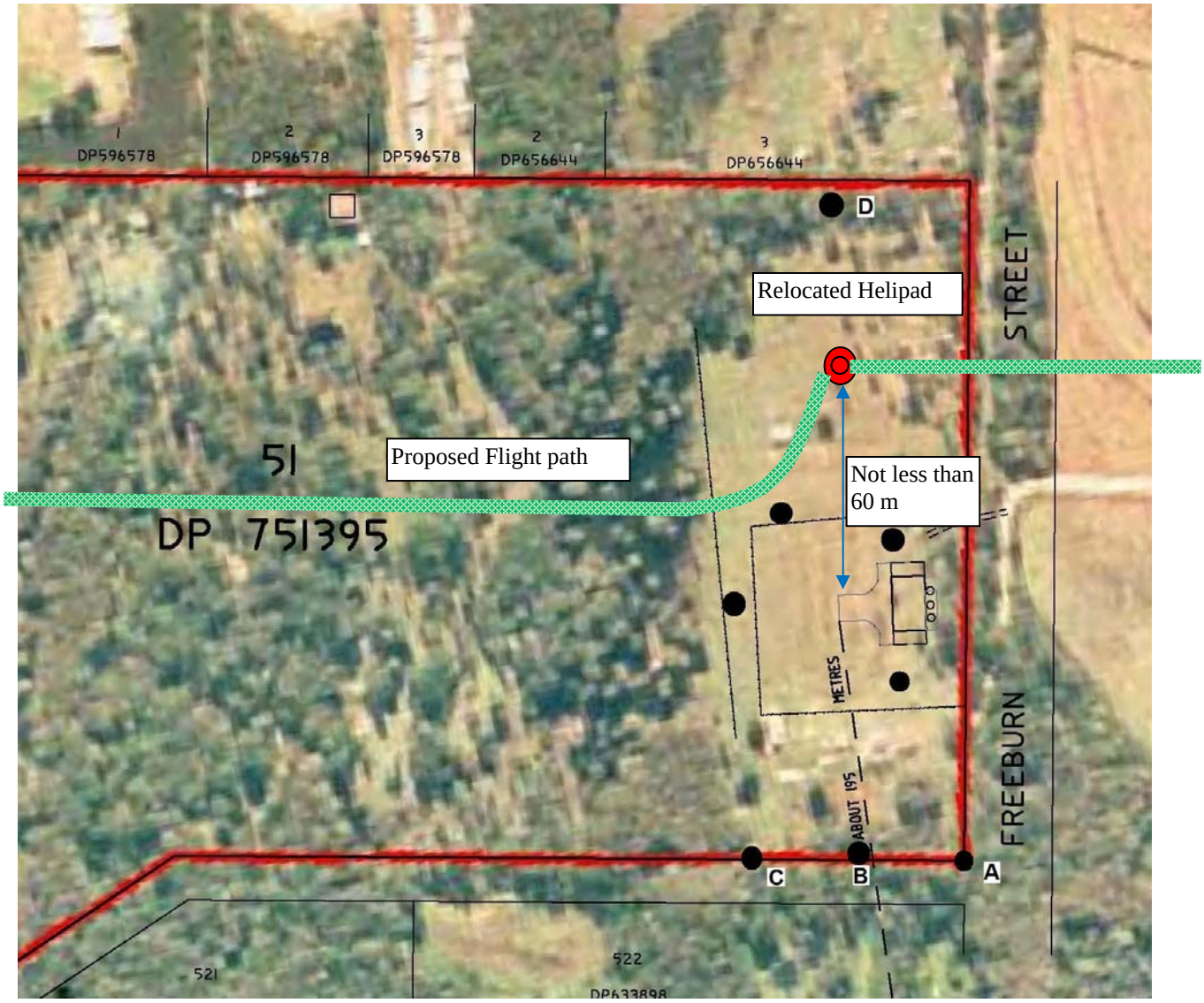

7(d)
2(c)
2(c)
2(c)
2(c)
1(y)
7(d)
7(d)
1(y)
7(d)
N


ENTRY/EXIT
1,500'
- 10 Deg
CARAVAN PARK
HLS
1,000'
-12
Deg
500'
-18
Deg
20'
1(y) Rural Residential
29%
2(c) Residential
33%
7(d) Residential Habitat
32%
Owner
6%
NOT TO SCALE


Yamba
N


ENTRY/EXIT
1,500'
ANGOURIE RD.
1,000'
-10
Deg
HLS
-10
Deg
500'
-18
Deg
20'
Owner
10%
Sports
Fields
26%
Golf
Course
39%
Res.
16%
Road
3%
Coast
6%
NOT TO SCALE

APPENDIX G: Alternative Helicopter Landing Site and Flight Tracks



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APPENDIX 4

SEPP CHECKLIST

Appendices

Appendix no 4 – Consistency with SEPP's

State Environmental Planning Policy (SEPP)	Consistency
SEPP No.1 Development Standards	N/A
SEPP No.4 Development without consent and Complying	N/A
SEPP No.6 Number of Storeys in a building	N/A
SEPP No.10 Retention of low cost rental accommodation	N/A
SEPP No.14 Coastal Wetlands	N/A
SEPP No 15 Rural Landsharing Communities	N/A
SEPP No.19 Bushland in Urban Areas	N/A
SEPP No.21 Caravan Parks	N/A
SEPP No.22 Shops and Commercial Premises	N/A
SEPP No.26 Littoral Rainforests	N/A
SEPP No.29 Western Sydney Recreation Area	N/A
SEPP No.30 Intensive Agriculture	N/A
SEPP No.32 Urban Consolidation	N/A
SEPP No.33 Hazardous and Offensive Development	N/A
SEPP No.36 Manufactured Home Estate	N/A
SEPP No.39 Spit Island Bird Habitat	N/A
SEPP No.41 Casino Entertainment Complex	N/A
SEPP No.44 Koala Habitat Protection	N/A
SEPP No.47 Moore Park Showground	N/A
SEPP No.50 Canal Estate Development	N/A
SEPP No.52 Works in Land & Water Management areas	N/A
SEPP No.53 Metropolitan Residential Development	N/A
SEPP No.55 Remediation of Land	N/A
SEPP No.59 Central Western Sydney Regional Open Space	N/A
SEPP No.60 Exempt and Complying Development	N/A
SEPP No.62 Sustainable Agriculture	N/A
SEPP no.64 Advertising & Signage	N/A
SEPP No.65 Design Quality – Residential Flat Development	N/A
SEPP No.70 Affordable Housing (Revised Scheme)	N/A

SEPP No.71 Coastal Protection	Consistent. The development is of a minor nature and already in operation. It will not impact any of the stated "Aim's" of the Policy and if concurrence is required it is requested that a delegated authority apply.
SEPP (Affordable Rental Housing) 2009	N/A
SEPP (Building Sustainability Index BASIX) 2004	N/A
SEPP (Exempt & Complying Development Codes) 2008	N/A
SEPP (Housing for Seniors & People with a Disability) 2004	N/A
SEPP (Infrastructure) 2007	N/A
SEPP (Kosciuszko National Park - Alpine Resorts) 2007	N/A
SEPP (Major Development) 2005	N/A
SEPP (Mining Petroleum & Extractive Industries) 2007	N/A
SEPP (Rural Lands) 2008	N/A
SEPP (Sydney Region Growth Centers) 2006	N/A
SEPP (Temporary Structures) 2007	N/A
SEPP (Western Sydney Employment Area) 2009	N/A
SEPP (Western Sydney Parklands) 2009	N/A

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APPENDIX 5

SECTION 117 DIRECTIONS CHECKLIST

Appendix 5 – Consistency with Section 117 Directions

MINISTERIAL DIRECTIONS	COMMENT
1. EMPLOYMENT AND RESOURCES 1st July 2009	
1.1 Business and Industrial Zones	N/A
1.2 Rural Zones	N/A
1.3 Mining Petroleum Production & Extractive Industry's	N/A
1.4 Oyster Aquaculture	N/A
1.5 Rural Lands	N/A
2. ENVIRONMENT AND HERITAGE 1st July 2009	
2.1 Environment Protection Zone	Consistent. Part of the subject site is zoned E3 Environmental Management under CVC LEP 2011. However the location of the helipad is wholly within the area zoned for future residential purposes does not encroach on any E3 zoned land.
2.2 Coastal Protection	N/A
2.3 Heritage Conservation	N/A
2.4 Recreation Vehicle Access	N/A
3. HOUSING, INFRASTRUCTURE AND URBAN DEVELOPMENT 1st July 2009	
3.1 Residential Zones	Consistent, although the land is zoned R1 under CVC LEP 2011, there is no infrastructure in place to service the proposed land use. The land also requires fill and it is unlikely that this will be developed in the short term as it forms the second stage of the Draft DCP – which is 15 – 20 years away.
3.2 Caravan Parks and Manufactured Home Estates	N/A
3.3 Home Occupations	N/A
3.4 Integrating Land Use and Transport	N/A

3.5 Development near Licensed Aerodromes	Consistent. The area is a private Helipad, though available to the community. There is no chance of residential encroachment as the parcel falls under the one ownership, Kahuna No 1 P/L. The current use has been thoroughly investigated and an "Aviation Procedures – Guideline's for Aircraft Use" prepared in June 2008 as part of the original development approval.
3.6 Shooting Ranges	N/A
4. HAZARD AND RISK 1st July 2009	
4.1 Acid Sulphate Solis	Inconsistent. However the development is of a minor nature only and because it is a continuation of an existing use, no disturbance of acid Sulphate soils is proposed. The Guideline (1998) state they were developed for proponents likely to disturb acid Sulphate soils – no plan to disturb soils exists with this use.
4.2 Mine Subsidence and Unstable Land	N/A
4.3 Flood Prone Land	Consistent. The land is flood prone and has had extensive flood modelling completed as part of the Draft DCP. It will require fill before any future residential development. The current use as a Helipad however is not affected.
4.4 Planning for Bush Fire Protection	Consistent. The site was established for the current use in 2008 and as such the assessment and compliance with this Direction occurred under the original Development Approval: DA 2008/0481.
5. REGIONAL PLANNING 1st July 2009	
5.1 Implementation of Regional Strategies	Consistent. This land is contained within the Mid North Coast Regional Strategy area but does not impact the objectives of that Strategy.
5.2 Sydney Drinking Water Catchments	N/A
5.3 Farmland of State & Regional Significance – Mid North Coast	N/A
5.4 Commercial and Retail Development along the Pacific Highway, North Coast	N/A
5.8 Second Sydney Airport; Badgerys Creek	N/A

6. LOCAL PLAN MAKING 1st July 2009	
6.1 Approval and referral requirements	Consistent. Not proposing any consultation. No referral requirements, other than what might be determined/specified by the Gateway consideration.
6.2 Reserving land for public purposes	N/A
6.3 Site specific provisions	Consistent. What a relevant planning authority must do if this direction applies: Clause (4) "A planning proposal that will amend another environmental planning instrument in order to allow a particular development proposal to be carried out must either: (a) allow that land use to be carried out in the zone the land is situated on,". This Planning Proposal will allow the helipad use to be considered on its merits on the subject site.
7. METROPOLITAN PLANNING 1st February 2010	
7.1 Implementation of the Metropolitan Strategy	N/A