AVLAW
AVIATION CONSULTING

Aeronautical Impact Assessment

Wollongong Private Hospital Development

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Aeronautical Impact Assessment: Wollongong Private Hospital Development

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V1 DRAFT	25/05/2025	Amin Hamzavian Peter Simpson	First draft for client review
V2 DRAFT	15/09/2025	Peter Simpson	Revised detail 12-storey hospital proposal Review of R234 R244 airspace for $D_{16.7}$ aircraft.
V3 DRAFT	28/11/2025	Peter Simpson	Editorial review
V1 FINAL	02/12/2025	Amin Hamzavian Peter Simpson	SEARs added to Executive Summary Stakeholder Engagement inserted as Section 6
V2 FINAL	09/02/2026	Amin Hamzavian Peter Simpson	DPHI comments incorporated into Section 4

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Executive Summary

Executive Summary

Avlaw Aviation Consulting Pty Ltd (Avlaw) has been engaged by 360 Property Agency (our Client) to complete an aeronautical study of the proposed Wollongong Private Hospital (WPH) Development Project on the flightpaths and associated operational airspace associated with the medical transport heliport serving Wollongong Base Hospital (WBH).

This report has been prepared to address Item 24 of the site-specific SEARs which relate to the aviation discipline whilst noting that the WPH development does not propose the inclusion of a HLS:

- If the development proposes a Helicopter Landing Site (HLS), assess its potential impacts on the flight paths of any nearby airport, airfield or HLS.
- If the site contains or is adjacent to a HLS, assess the impacts of the development on that HLS.

This report also addresses the modified SEARs issued to our Client on 10 November 2025, which stated the following with respect to the aviation discipline:

- Demonstrate how the development (construction, final built form impacts and operation of the development) would impact on the safe and efficient operation of the Wollongong Hospital HLS, including discussion pf construction methods (cranes) and any potential impacts to helicopter flight approach and departure pathways.
- Provide evidence of consultation with NSW Health and other relevant representative entities regarding Wollongong Hospital HLS operations and helicopter operations, including details of any information provided by the Applicant to these representatives during consultation and the response received.
- Provide detailed assessment, prepared by a suitably qualified aviation professional, in relation to the forecast impacts of the proposed construction and operation of Wollongong Hospital helicopter flight paths and related air space.

This report presents details of the analysis undertaken by Avlaw which includes:

- The current configuration of airspace serving the WBH heliport relative to the current built form of the Wollongong Private Hospital;
- The analysis of site-specific wind data and associated usability of current flightpath tracks against nominated crosswind velocity limits in support of helicopter air ambulance flights operating in Performance Class 1;
- A review of the WPH development plans and the operational area for construction cranes relative to the boundaries of the operational airspace associated with the existing helicopter flightpath tracks serving the WBH heliport;
- Identification of a proposed clockwise rotation of the south-west flightpath track alignment to ensure construction cranes for the WPH development remain outside of the operational airspace for helicopters serving the WBH heliport; and

The analysis undertaken by Avlaw has identified that operational airspace associated with the current south-west flightpath track overlies the site boundary of the Wollongong Private Hospital

and that construction cranes for the WPH development project will penetrate the operational airspace for the current flightpath track alignment.

The analysis undertaken by Avlaw indicates that a ten-degree northerly (clockwise) rotation of the current south-west flightpath track and associated operational airspace will ensure the WPH construction cranes can operate clear of the operational airspace for medical transport helicopters serving the Wollongong Base Hospital heliport.

The Avlaw assessment of the obstacle environment for the WBH heliport has also identified that the operational airspace for the current south-west flightpath track includes tall trees that extend above the design gradient nominated by the Civil Aviation Safety Authority for obstacle-free airspace associated with helicopters operating in Performance Class 1.

Whilst a rotation of the south-western flightpath track would facilitate the construction of the Wollongong Private Hospital Development, a permanent rotation of the flightpath alignment is recommended by Avlaw as an enhancement to the operational airspace for the heliport through the provision of a better obstacle environment than that associated with the current R-234° southwest flightpath track alignment.

2

Current configuration of airspace for the Wollongong Base Hospital heliport

Current configuration of airspace for the Wollongong Base Hospital heliport

Avlaw has Identified the boundaries of the operational airspace for the medical transport heliport serving Wollongong Base Hospital (WBH) with reference to aerial imagery published by the Nearmap utility, operational parameters published on the helipads.org website, details of the satellite-based instrument flight approach procedure published by Airservices Australia and a site visit conducted on 08 April 2025.

Figure 1 presents a Nearmap image showing the WBH heliport and the boundary of the Wollongong Private Hospital site.

Figure 1: Relative location of heliport and R-234° track and WPH and WBH hospitals

The Nearmap imagery shows the surface markings on the heliport which include two flightpath track alignment arrows, one aligned with the 009° radial (022° True North), and one aligned with the 234° radial (247° True North). The published Instrument Flight Procedure incorporates a final approach track aligned with the 032° radial (045° True North).

The flightpath track on the south-west of the heliport (R-234°) and the associated operational airspace is the primary area of interest for this aeronautical study as the airspace boundary for helicopters operating on the south-west track overlies the Wollongong Private Hospital site.

The operational airspace for a nominated flightpath track is defined by parameters nominated by the International Civil Aviation Organisation and incorporated in the heliport planning and design Advisory Circular AC139.R-01 published by the Australian Civil Aviation Safety Authority.

The airspace is a trapezoidal shape with the inner edge coincidental with the heliport safety area boundary and the lateral sides diverging at 15% (8.53°) to an overall width of ten times the rotor diameter of the design helicopter. The safety area boundary is a circle with a radius equal to the design helicopter D-value and the inner edge of the operational airspace is tangential to the safety area with a length of twice the D-value.

The operational airspace for the WBH heliport identified by Avlaw is based on a design helicopter with a D-value, the largest overall dimension with rotors turning, of 16.7 metres reflecting the D-value of the Leonardo AW139, the primary medical transport helicopter currently operating in New South Wales. Accordingly, the inner edge of the operational airspace for the WBH heliport has a length of 33.4 metres located 16.7 metres from the heliport centre with the lateral boundary of the airspace splaying at 15% (8.53°) to an overall width of 138 metres, ten times the design helicopter rotor diameter.

Figure 2 shows the boundary of the $D_{16.7}$ operational airspace associated with the R-234° track, noting that the southern boundary of the airspace overlies the Wollongong Private Hospital site.

Figure 2: Lateral extent of operational airspace for R-234° track relative to WPH site

The operational airspace indicates the region associated with a nominated flightpath track alignment to provide clear air for the helicopter which will track along the centre of the nominated region. The width of the airspace region as defined by international standards ensures the helicopter can operate safely clear of obstacles whilst accounting for anticipated minor tracking variations associated with crosswinds or other ambient conditions. It is noted that whilst the southern boundary of the standard airspace region extends over the WPH site boundary, the likelihood of a helicopter operating off track and in that region of the airspace envelope is remote.

The date-stamped Nearmap imagery indicates that the surface markings for the WBH heliport were painted in the period between August and November 2024. The background to the identification of the R-234° alignment for the south-western flightpath track is not known at the time of preparing this report. It was observed during the Avlaw site inspection on 08 April 2025 however that the nominated track alignment places a group of tall trees within the associated boundary of the operational airspace as indicated in Figure 3. It was also noted that a northerly rotation of the nominated track would provide obstacle free airspace for a south-western flightpath track.

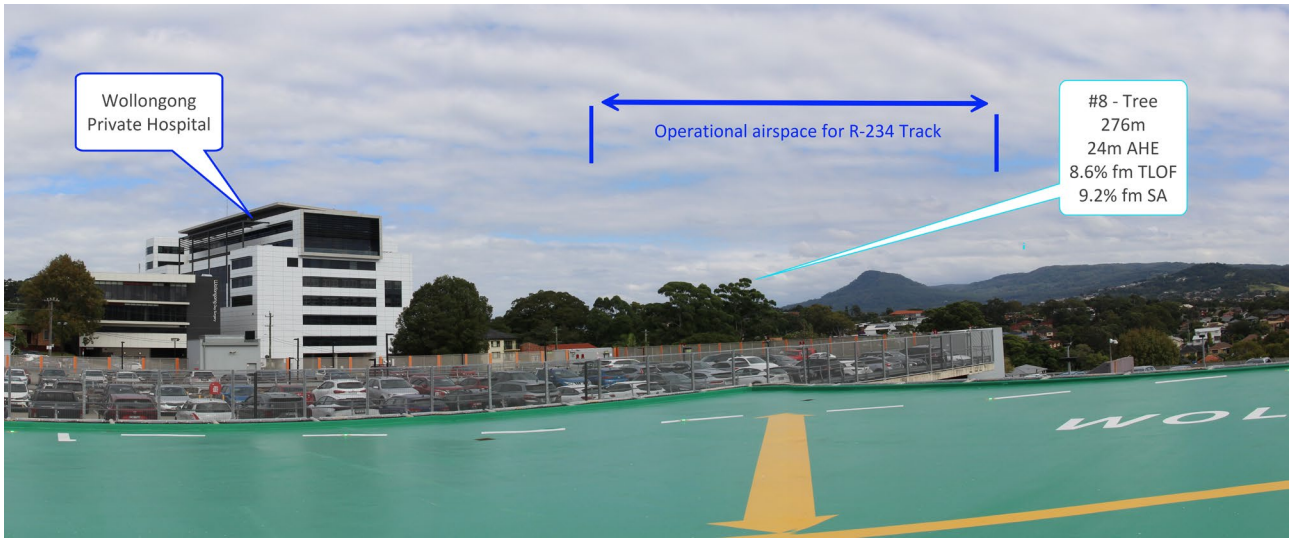

Figure 3: Operational Airspace for R-234° Track

A survey of the existing obstacle environment around the WBH heliport was undertaken during the Avlaw site visit using an inclinometer and a range finder with the results processed following the visit. The resultant details of the trees aligned with the R-234° track are included in Figure 3 to indicate the distance and gradient of the trees relative to the centre of the heliport and relative to the Obstacle Limitation Surface (OLS) gradient from the heliport safety area boundary. It is noted as a comparison that the ICAO/CASA design gradient for an OLS serving helicopters operating in Performance Class 1 is 4.5%.

Performance Class 1 refers to the highest level of operational safety whereby the helicopter is fully accountable through all phases of flight with one engine inoperative (OEI). In relation to flights in the immediate vicinity of a heliport, a helicopter operating in Performance Class 1 with an OEI situation is able to land at the heliport or fly away clearing all obstacles within the operational airspace for the helicopter track with a minimum vertical separation nominated by the helicopter operator.

3

Analysis of site-specific wind data and flightpath usability

Analysis of site-specific wind data and flightpath usability

Avlaw has undertaken an analysis of site-specific wind data sourced from the meteorological module of The Air Pollution Model (TAPM) to identify the usability of flightpath tracks against nominated cross wind velocity limitations. TAPM is a development by the CSIRO with a primary purpose of modelling the atmospheric dispersal of plumes and includes a meteorological module that provides site specific wind data based on historic records of synoptic weather and a range of other relevant databases including terrain.

Figure 4 shows the hourly average wind speed and direction data for a five-year period expressed as a wind rose and Figure 5 presents the wind data points in speed bands.

The data indicates the 25m-metre AGL winds at the Wollongong Base Hospital heliport site have a strong dominance of winds from due west with an average speed of 7.17 knots (13.3 kph) with 95.8% of the winds having an average speed of less than 12.5 knots (23.2 kph).

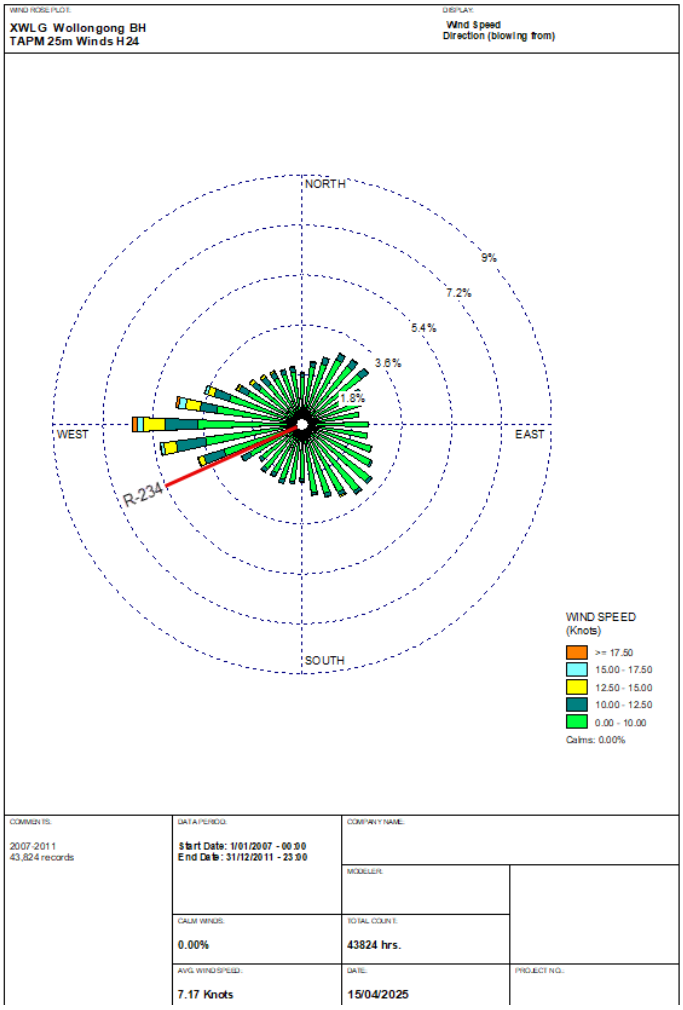

Figure 4: TAPM 25m AGL wind rose

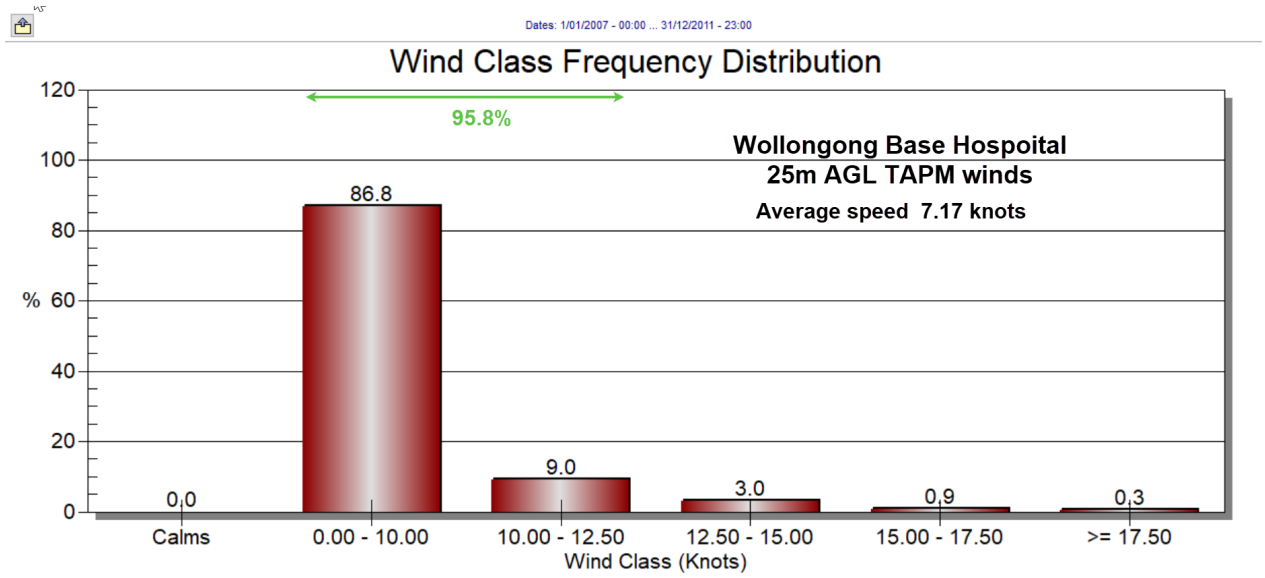

Figure 4: Distribution of TAPM 25m AGL winds by speed

The TAPM wind data at 50-metres AGL indicates a similar pattern of westerly dominance of winds with an average speed of 9.14 knots (16.9 kph) and 85.2% of winds less than 12.5 knots

The analysis of the TAPM 25m AGL wind data relative to the R-234° (247°T) track indicates that wind events in the South-west arc 155°T- 335°T represent 53.6% of the wind events identified in the TAPM modelling for the Wollongong Base Hospital location. The analysis has also identified that the overall usability of winds in the South-west arc 155°T- 335°T exceeds the 95% benchmark for helicopters operating in Performance Class 1 as indicated in Table 1.

The aeronautical study undertaken by Avlaw has identified that potential operational benefits exist for helicopters serving the Wollongong Base Hospital through a northerly rotation of the R-234° track to avoid the existing tall trees as shown in Figure 3. As discussed later in this report, a ten-degree northerly rotation of the south-western flightpath track also ensures the operational airspace for the heliport remains clear of the construction cranes for the Wollongong Private Hospital development. The TAPM wind data indicates that winds in the 165°T-SW-345°T arc associated with the R-244° track represent 53.0% of all the wind events but retain an overall usability in excess of the 95% benchmark as indicated in Table 1.

Table 1 presents the usability analysis for the R-234° and R-244° track options against a range of crosswind speed values with nil tailwind, reflecting the wind conditions for flights operating in Performance Class 1.

Heliport usability against crosswind speeds				
Flightpath Track	10 knots (18.5 kph)	12.5 knots (23.1 kph)	15 knots (27.8 kph)	17.5 knots (32.4 kph)
R-234° (247° TN)	97.16%	99.44%	99.91%	100%
R-244° (257° TN)	97.80%	99.68%	99.95%	100%

Table 1: Relative usability of TAPM-derived site winds on southwest flightpath tracks

4

Development Plans for the Wollongong Private Hospital

Development Plans for Wollongong Private Hospital

The proposed Wollongong Private Hospital Development includes a twelve-storey expansion of the hospital within the boundaries of the hospital site. The existing hospital buildings have an upper elevation of 78.5 metres AHD, and the expanded hospital increases that height by 12.8 metres to 91.3 metres AHD as indicated in Figure 6.

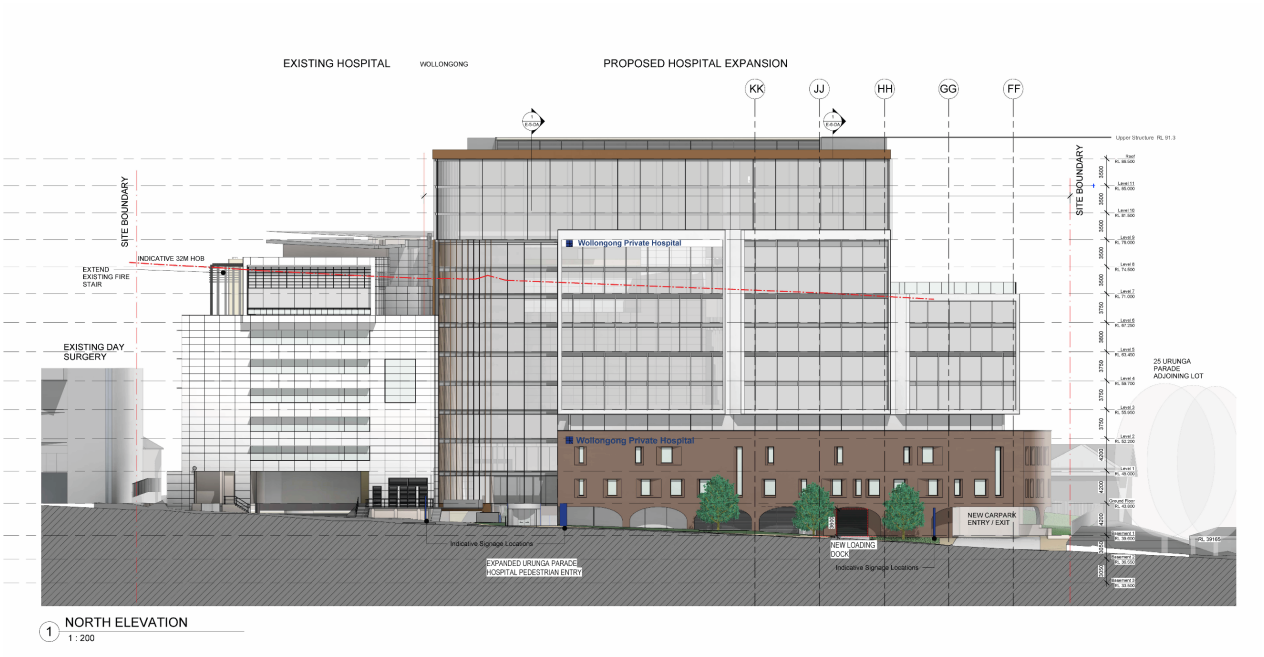

Figure 5: North Elevation of Wollongong Private Hospital Development

The north-west corner of the WPH site is currently occupied by single-storey houses at an elevation that is below the elevation of the operational airspace for the WBH heliport which does not affect the operational safety or efficiency of helicopters operating to and from the WBH heliport.

The footprint of the proposed WPH development extends over most of the WPH site, including the north-west corner as indicated in Figure 7, with the proposed Level 7 courtyard area having an elevation similar to that of the adjacent airspace - based on a standard Category-A gradient of 4.5 % rising from the heliport TLOF area.

The analysis undertaken by Avlaw indicates the potential conflict between the proposed hospital development and the operational airspace for the WBH heliport can be eliminated relatively simply with a 10-degree rotation of a south-western flightpath track to an alignment of R-234°.

It is noted as discussed in Section 5 of this report that the nominated 10-degree rotation of the south-western flight path track not only removes the potential conflict with the hospital development, it establishes operational airspace that is not affected by the tall trees shown in Figure 3 and provides a separation between the WPH construction cranes and helicopter operations.

Figure 7: Extent of Ground Level footprint of the Wollongong Private Hospital Development

The twelve-level tower block element of the WPH development is located on the northern boundary of the site as indicated in Figure 8, noting the inclusion of a Level 7 rooftop garden on the western side.

Figure 6: Wollongong Private Hospital Development Level 7 footprint

5

Assessment of construction crane operations relative to adjacent airspace

Assessment of construction crane operations relative to adjacent airspace

As a multi-storey development, the WPH project will need to utilize a tower crane during the construction phase. The location and type of crane to be used for the development is not defined at this stage and the analysis of construction crane options has included both luffing jib and hammerhead types.

As the WPH development extends over the majority of the WPH site as shown in Figure 7, the potential locations for the construction crane tower are limited with the rear of the adjacent housing block and the lift shafts within the hospital development identified as potential locations.

Whilst the types of cranes to be used are not yet identified, reference to manufacturers data for typical construction cranes indicates the crane boom may exceed 73 metres and that maximum length has been used to undertake an assessment of crane operations relative to the operational airspace for the WBH heliport.

As indicated in Figure 2 and other images above, the operational airspace for the existing R-234° track extends over the north-west corner of the WPH site. Figure 9 shows the extent of penetration into the R-234° operational airspace created by a maximum length crane boom radiating from the potential locations at the rear of the adjacent residential block and alternatively, within the WPH lift core.

Figure 7: Operating area for 73-metre crane booms relative to the R-234° airspace

The analysis undertaken by Avlaw has confirmed that the WPH development and construction crane boom will extend into the operational airspace for the WBH heliport R-234° south-western track.

The analysis has also identified however that a 10-degree northerly rotation of the R-234° flightpath track to a R-244° alignment will provide operational benefits for the medical transport helicopters as discussed above and ensure the WPH construction cranes operate outside of the airspace associated with the R-244° flightpath track.

Figure 10 indicates the extent of the operational airspace for the R-244° flightpath track viewed from the centre of the heliport.

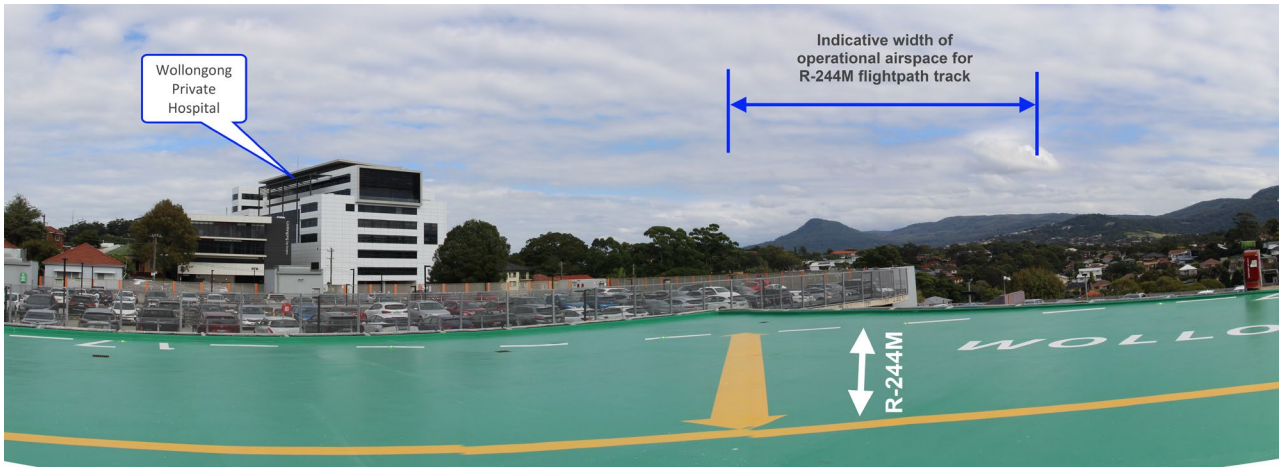

Figure 8: indicative extent of operational airspace for the R-244° flightpath track

The R-234° flightpath track alignment has been identified by reference to the alignment of the yellow flightpath alignment guidance marking painted on the WBH heliport surface as evident in the vertical imagery published by Nearmap.com. The track alignment is not identified in any publicly available documents and does not have flightpath track guidance lighting installed. On the basis that the nomination, assessment and adoption of a flightpath track is the responsibility of the Pilot in Command in conjunction with the helicopter operator, a change on the southwest track alignment appears to be a relatively simple task of painting a new yellow flightpath track guidance marking and painting over the current marking with the adoption of the realigned track by the helicopter air ambulance operators.

Figure 11 shows the extent of the operational airspace for a R-244° flightpath track as well as the operating area for construction cranes located in the residential block adjacent to the WPH site and alternatively in the building lift shaft. It is noted that the lift shaft location enables a shorter 65-metre boom to be used clear of the airspace for the R-244° track.

Figure 9: Operating area for construction cranes relative to the R-244° airspace

6

Aviation Stakeholder Engagement

Aviation Stakeholder Engagement

When engaged to conduct an aeronautical study associated with a proposed permanent or temporary structure, which if erected have the potential to impact aircraft operations, it is standard practice for Avlaw to engage directly with any aviation stakeholders that could be impacted or can otherwise contribute meaningfully to the overall assessment of the proposed development activities.

In the case of the assessment at the site, given the close proximity to the Wollongong Hospital HLS and the SEARS issued to our Client, engagement with NSW Health's aviation advisors (AviPro), NSW Air Ambulance and Toll Ambulance was considered important to the preparation of a thorough aeronautical study.

The engagement with each of these relevant stakeholders was completed to varying degrees of success, as some led to important conversations which revealed information not available in the public domain, whilst others unfortunately did not respond to questions raised by Avlaw to assist in the preparation of this report. Discussions initiated by Avlaw were intended to focus on two key subjects:

- The proposed development, including construction activity, and its impacts on existing flight operations at Wollongong Hospital; and
- The potential for a ten-degree rotation of the current R-234° south-western flightpath track, to enhance the obstacle-free characteristics of the airspace and which would also ensure the associated operational airspace boundaries would be clear of the built and temporary structures.

In addition to the primary flight tracks for the HLS at the Wollongong Hospital, Toll Helicopters has also been issued an approval from CASA, which enabled them to operate under Performance Class 2 with exposure. Although this was never verified by Avlaw, comments by AviPro described this approval as allowing departures to the south, which are aligned with the 'H' on the HLS. It is noted that the southern flightpath track and associated airspace is clear of the WPH structure and overflies the area east of the WPH structure and the western side of the WBH structure. Avlaw's initial attempts to speak to Toll Helicopters were positive and welcoming, however, Avlaw did not receive replies to a number of subsequent emails requesting additional details related to the CASA approval.

A summary of engagements completed with all relevant aviation stakeholders is tabulated below.

Stakeholder	Stakeholder Contact	Contacted by	Date
NSW Air Ambulance	Wayne Cannon	Marcelo Ramirez (Client's rep)	10 April 2025
AviPro	Jeff Stark	Amin Hamzavian (Avlaw)	14 April 2025
Toll Helicopters	28/11/2025	Amin Hamzavian (Avlaw)	14 April 2025 15 April 2025 12 May 2025

7

Conclusions

Conclusions

The analysis by Avlaw of the Wollongong Private Hospital Development Project and the potential interaction with the operational airspace for the heliport serving the Wollongong Base Hospital has concluded:

- Operational benefits for the medical transport helicopters serving Wollongong base Hospital are available through a ten-degree rotation of the current R-234° south-western flightpath track to enhance the obstacle-free characteristics of the airspace, which would ensure the proposed WPH development has no interaction with the helicopter air ambulance flights serving the WBH heliport no interaction between the proposed built or temporary structures at the site.
- The future as-built form of the Wollongong Private Hospital and associated construction cranes do not interfere with the operational airspace associated with the R-244° flightpath track for medical transport helicopters serving the Wollongong Base Hospital.
- A change on the southwest track alignment appears to be a relatively simple task of painting a new yellow flightpath track guidance marking and painting over the current marking with the adoption of the realigned track by the helicopter air ambulance operators.

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