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PRELIMINARY AERONAUTICAL IMPACT ASSESSMENT – LIVERPOOL

Dear Ms Walter,

I refer to a request from Urbis Pty Ltd (Urbis) for advice in relation to identifying airspace height constraints associated with a Planning Proposal submission for 193 Macquarie St and 77-83 Moore St in Liverpool, collectively referred to herein as "the site". The Planning Proposal seeks to amend the Liverpool Local Environmental Plan 2008 (Liverpool LEP 2008) to relocate the site from 'Area 11' to 'Area 8' on the Floor Space Ratio (FSR) Map. The intent of the Planning Proposal is to ensure that the planning controls that apply to the site are consistent with the controls gazetted under Amendment No. 52 which apply to the broader Liverpool city centre.

The Planning Proposal is supported by concept plans demonstrating an indicative building envelope which could potentially be achieved under the proposed 'Area 8' control. These indicative concept plans are based on a potential maximum building height of up to 135.9m AHD.

Avlaw Pty Ltd, trading as Avlaw Aviation Consulting (Avlaw), has conducted a preliminary assessment of the maximum building height restrictions at the site against prescribed airspace limits. These limits exist due to necessary safety clearances (mandated in legislation) that must be provided between an aircraft and an obstacle such as a building or crane. This letter of advice provides details of the current airspace protection surfaces covering the site and the table below summarises the findings of the assessment.

Bankstown Airport	
Airspace Surface	*Height*
Obstacle Limitation Surfaces - Conical Surface	123-128m AHD
Circling Minima Surface obstacle clearance height	135.9m AHD
Procedures for Air Navigation Services - Aircraft Operations (RWY 11C/29C Standard Instrument Departure)	137.55m AHD at the north-eastern corner of the site

The critical (i.e. lowest) airspace protection surface which covers the site is the Conical Surface of the Bankstown Airport Obstacle Limitation Surfaces (OLS), which rises across the site from nominally 123-

128m AHD. The indicative concept plans are based on a potential maximum building height of up to 135.9m AHD which is above this surface and therefore will require assessment and approval from aviation authorities before proceeding.

Above the OLS, the next lowest airspace protection surface is the Circling Minima Surface obstacle clearance height for Bankstown Airport which is 135.9m AHD. Above this, the next lowest airspace protection surface over the site is the Procedures for Air Navigation Services - Aircraft Operations (PANS-OPS) Standard Instrument Departure (SID) for the Bankstown Airport which is shown on the Bankstown Airport 2019 Master Plan as less than 135.9m AHD across the site. However, the accurate updated PANS-OPS SID Surface height calculated from first principles for the applicable SID instrument departure on RWY 11C/29C is 137.55m AHD at the north-eastern corner of the site and rises to the south-west. An increase to the potential maximum building height of up to 135.9m AHD is therefore lower than the PANS-OPS SID Surface and the same height as the Circling Minima Surface. Penetration of the Circling Minima Surface and the PANS-OPS SID Surface for temporary construction crane(s) should be avoided wherever possible and would need detailed justification if they were to be penetrated. Any approvals for penetration of the PANS-OPS can only be applied for on a temporary basis and are capped at a maximum of three (3) contiguous months. Therefore, Urbis should consider the vertical buffer required for cranes needed to complete construction of a 135.9m AHD building early in the planning process to make every effort to remain below the Circling Minima Surface and minimise the aeronautical impacts associated with the development.

With respect to helicopter operations, Avlaw has determined that the airspace protected under National Airport Safeguarding Framework (NASF) - Guideline H for strategically important helicopter landing sites does not limit the currently proposed building height as approaches and departures are clear of the site. Other helicopter operations at Bankstown Airport have also been assessed and do not introduce any additional more restrictive limitations than those already identified for established helicopter flight paths to and from Bankstown Airport.

In summary, provided temporary construction cranes and the overall building height inclusive of plant room and ancillary features (e.g. towers, masts, building maintenance unit (BMU) when in operation etc.) all remain below the Circling Minima Surface, then aviation approval should be given. In the event Urbis require a penetration of the Circling Minima Surface to complete construction, it is Avlaw's assessment that this will significantly increase the complexity of the application and there is a potential that the crane(s) may not be approved by aviation stakeholders, although a limited 3-month penetration of the Circling Minima Surface might be possible if supported by a detailed aeronautical impact assessment.

1. Airspace Height Controls

As a signatory to the *Chicago Convention 1944*, Australia adopts International Civil Aviation Organisation (ICAO) Standards and Recommended Practices (SARPs) with respect to airspace which define sets of invisible surfaces above the ground around an airport. The airspace above these surfaces forms the airport's prescribed airspace which in the case of Bankstown Airport refers to the airspace above that which is defined as its OLS and PANS-OPS.

2. Airspace Approval Process

Part 12 of the *Airports Act 1996* (Act) and the *Airports (Protection of Airspace) Regulations 1996* (Regulations) establish a framework for the protection of airspace at and around airports. The Act defines any activity resulting in an intrusion into an airport's prescribed airspace to be a "controlled activity" that cannot be carried out without approval from aviation stakeholders. Controlled activities include the following:

- permanent structures, such as buildings, intruding into the prescribed airspace;
- temporary structures such as cranes intruding into the prescribed airspace; or
- any activities causing intrusions into the prescribed airspace through glare from artificial light or reflected sunlight, air turbulence from stacks or vents, smoke, dust, steam or other gases or particulate matter.

The Regulations differentiate between short-term (not expected to continue longer than 3 months) and long-term controlled activities. The Regulations allow for the airport operator to approve short-term penetrations of the OLS under delegation from **the Department of Infrastructure, Transport, Regional Development and Communications (Department)** following consultation with the Civil Aviation Safety Authority (CASA) and Airservices Australia.

With respect to long-term penetrations, the airport operator is required to invite the following stakeholders to assess or comment on an application if there is an intrusion into prescribed airspace:

- **CASA** for an assessment of the impact on aviation safety;
- **Airservices Australia** for assessments of proposals resulting in a penetration of surfaces including PAPI, PANS-OPS etc.;
- **the local council authority** responsible for building approvals; and
- **the Department of Defence** in the case of joint-user airports.

The final approving authority for all short-term penetrations of the PANS-OPS and long-term penetrations of the OLS is the Department as specified in the Act and the Regulations. In making its determination, the Department is required to assess the respective assessments of the airport operator, Airservices Australia and CASA. The Department cannot approve short-term penetrations of the PANS-OPS without the support of the airport operator (in this instance, Bankstown Airport Limited or BAL) and also cannot approve long-term penetrations of the OLS in the event CASA's assessment is not supportive of the application. It should be noted that long term intrusions of the PANS-OPS surface are prohibited.

The information required in the application must include:

- a description of the proposed controlled activity (building construction, crane operation etc.)
- its precise location (street address and grid reference)
- if the controlled activity consists of the erection of a building or structure:
    - the proposed maximum height of the structure above the Australian Height Datum (including any antennae, towers, BMU etc.), and
    - the proposed maximum height of any temporary structure or equipment (e.g. cranes) intended to be used in the erection of the structure

Each penetration of prescribed airspace has to be assessed against the effect on published Departure and Approach procedures and other matters. These include published survey data and Air Traffic Control (ATC) procedures and practices, including compatibility with the promulgated ATC Radar Terrain Clearance Chart (RTCC) that is used to safely vector aircraft in instrument meteorological conditions (non-visual). Each proposal has to be checked for proximity to published procedures to ensure statutory tolerances and safety buffers are maintained. The tolerances vary according to the type of navigation or aid being utilised and cover vertical, lateral and longitudinal criteria.

The approval process requires separate assessments of the permanent building structure and temporary construction crane(s). Applications can be made in advance of planning approval for both, however aviation stakeholders will require detailed architectural drawings to be provided prior to completing its assessment.

Timing to assess applications varies depending on the complexity of the assessment and the workload within the respective agencies at the time of receipt. Avlaw's experience suggests proponents should allow at least three (3) months for BAL, Airservices Australia, CASA and the Department to conduct their own assessments in succession. Avlaw recommends that applications for both building and temporary structures be made as early as possible.

Carrying out a controlled activity without approval is an offence under Section 183 of the Act 1996 and is punishable by a fine of up to 250 penalty units. It is an offence under Section 185 of the Act to contravene any conditions imposed on an approval. Under Section 186 of the Act it is an offence not to give information to the airport operator that is relevant to a proposed controlled activity.

3. Preliminary Aeronautical Impact Assessment

Based on the site location provided, interrogation of satellite imagery, OLS requirements and PANS-OPS limitations, Avlaw has identified the heights of the most relevant airspace protection surfaces covering the site, above which an aviation approval is required:

- the Conical Surface of the OLS is ranges from 123-128m AHD, rising from the East (refer to Figure 1 on the following page); and
- the PANS-OPS (RWY 11C/29C SID) is 137.55m AHD at the north-eastern edge of the site and rises towards the south-west (refer to Figures 2, 3 and 4 on the following pages); and
- the Circling Minima obstacle clearance height is a horizontal plane at 135.9m AHD (refer Figure 5 on the following pages).

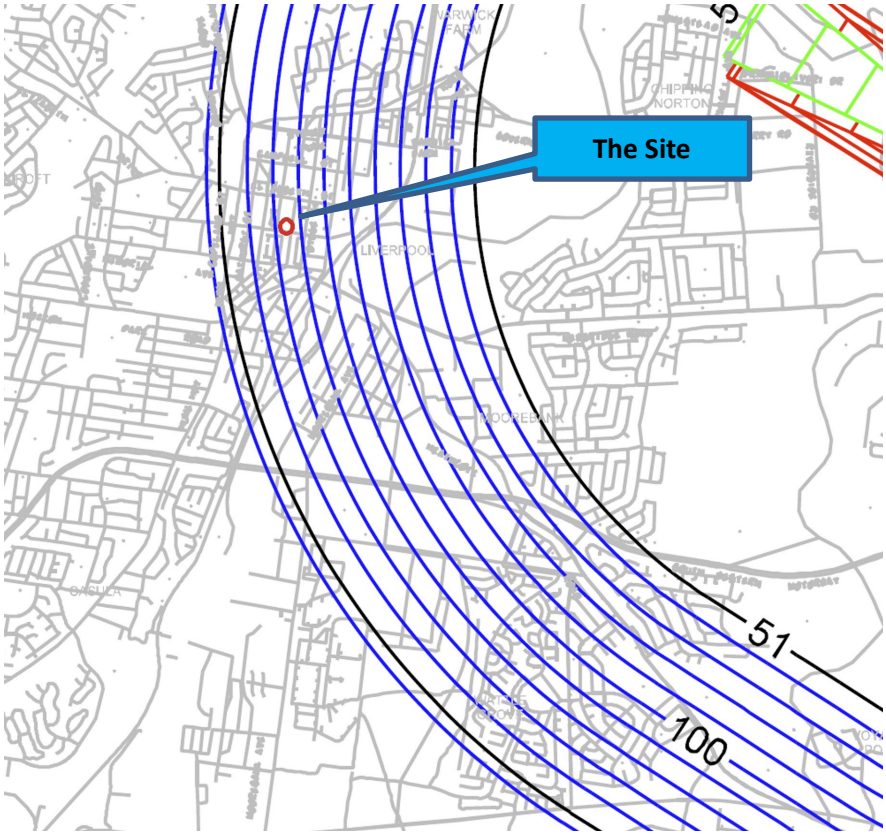

Figure 1: Extract from OLS Chart provided by Bankstown Airport

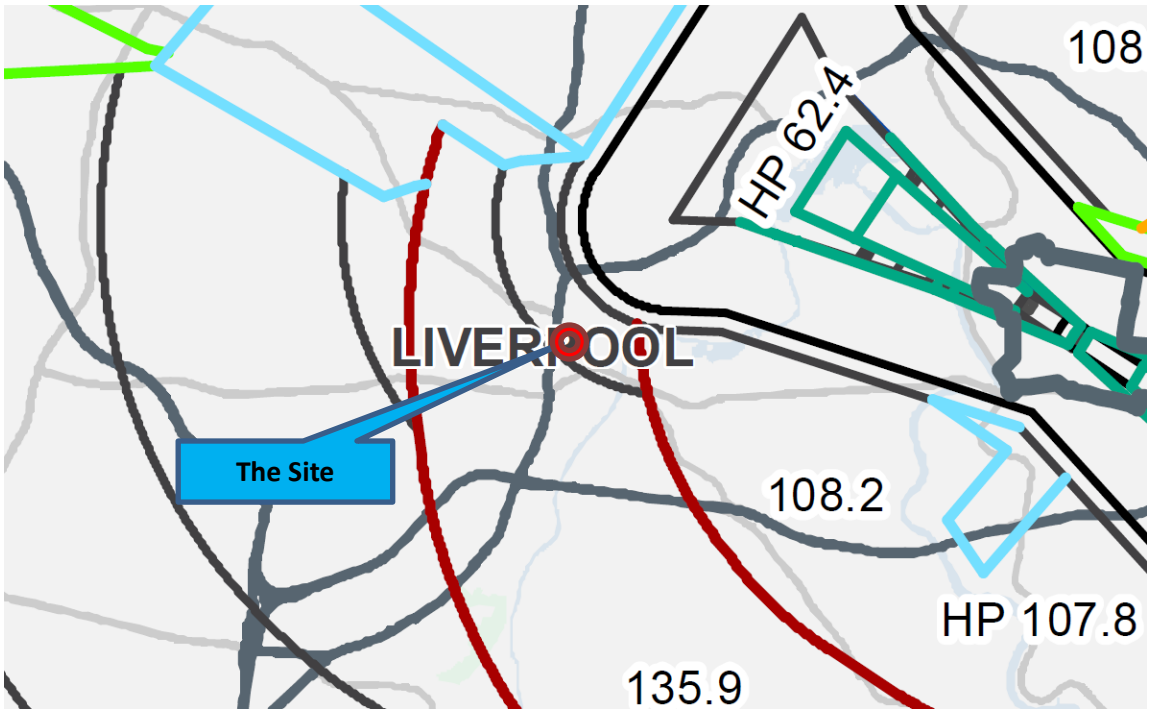

Figure 2: Extract from PANS-OPS Chart (2019 Master Plan)

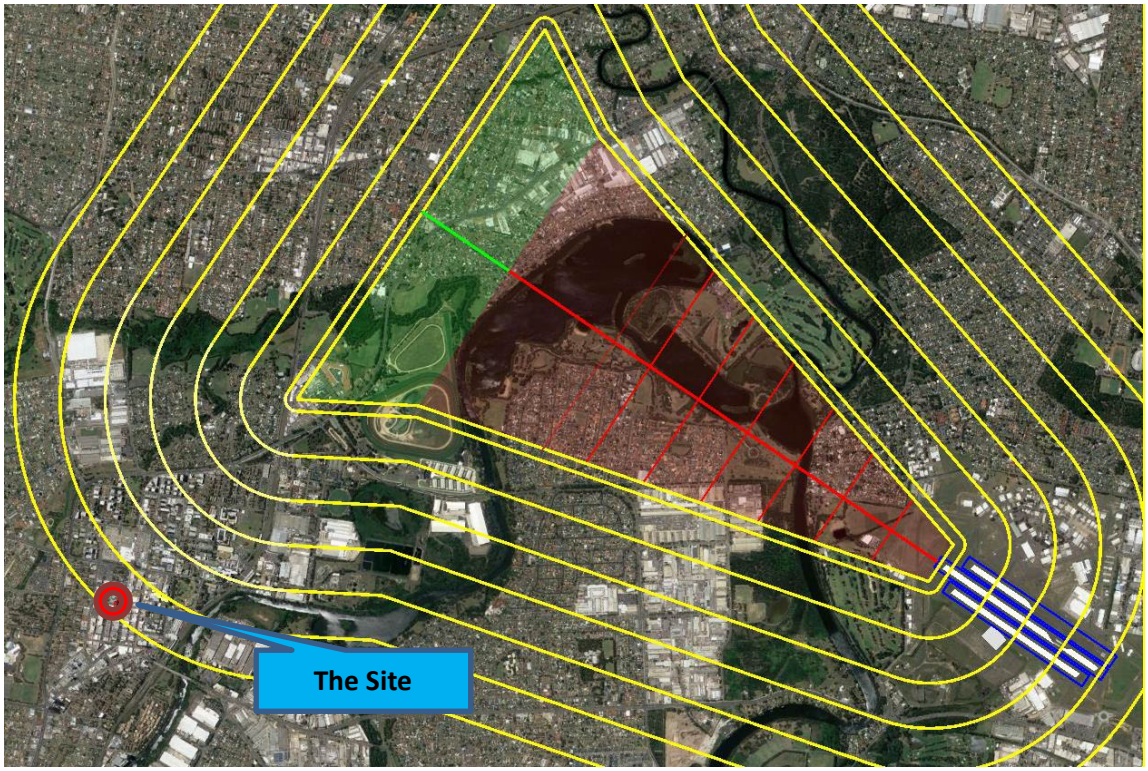

Figure 3: PANS-OPS based on calculations incorporating the Nov 2020 ICAO PANS-OPS update

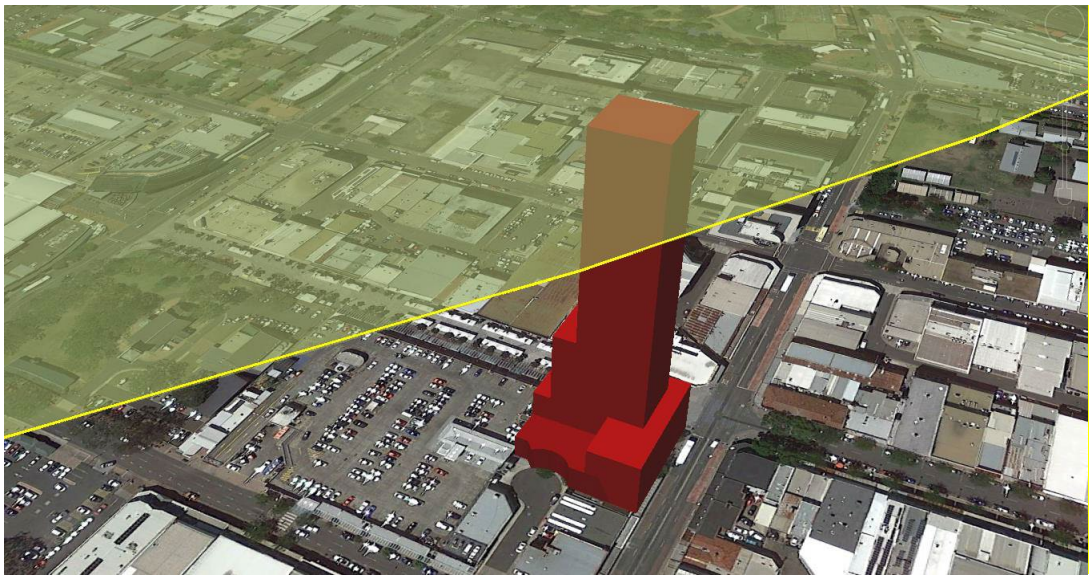

Figure 4: PANS-OPS based on calculations incorporating the Nov 2020 ICAO PANS-OPS update

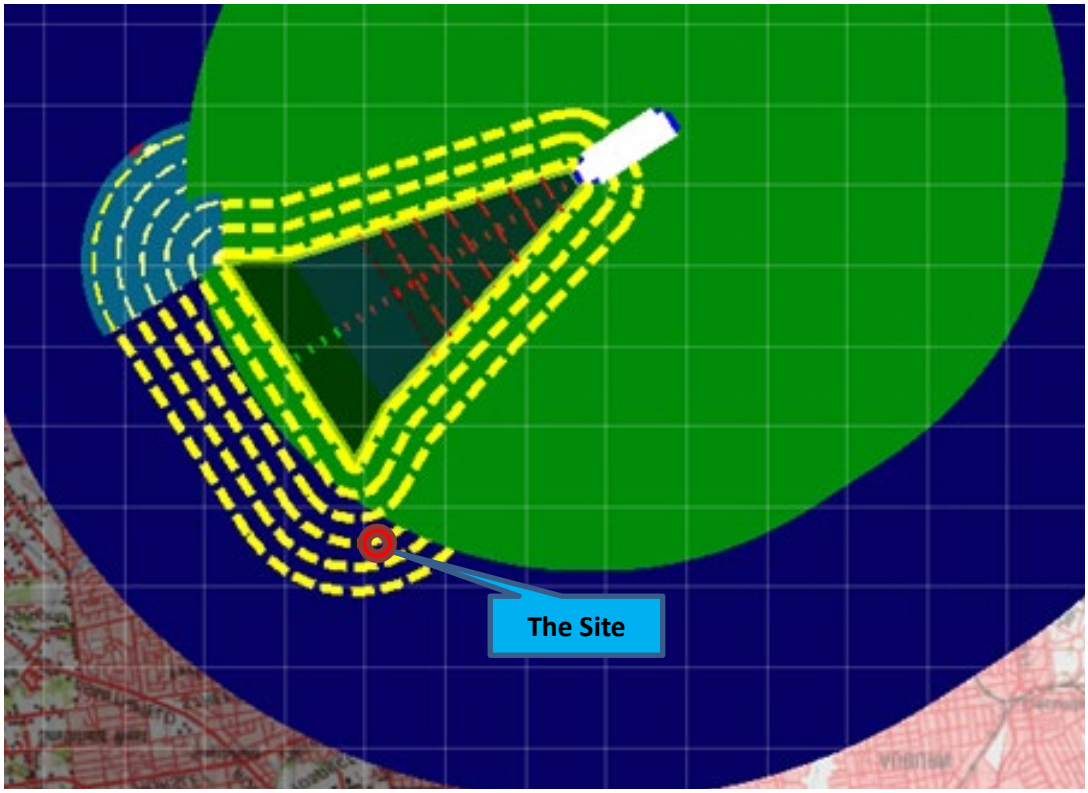

Figure 5: PANS-OPS RWY 11C/29C SID based on calculations shown in yellow with Circling Minima HP shown in blue

Details of the height of temporary structures are not know at the time of writing. Avlaw's assessment is that if they remain below the Circling Minima Surface horizontal plane at 135.9m AHD, the currently published flight operation surfaces will not be affected by the proposed indicative concept design. Should temporary construction cranes be required to penetrate the Circling Minima Surface, then a detailed aeronautical assessment will be required showing staged heights of cranes specifically identifying when penetration will occur and clearly indicating that the penetration will be capped at three (3) contiguous months.

6. Helicopter Operations

Legislation requires the pilot of a helicopter to determine the safe take-off and landing approach path that take into account factors including aircraft performance, wind direction, obstacles, and emergency landing in the event of engine failure. The helicopter operations relevant to indicative concept design have been assessed, the findings of which are summarised below.

6.1 Bankstown Airport Helicopter Operations

The nearest corner of site is located approximately 5,986m W of Bankstown Airport Aerodrome Reference Point (ARP). There are a number of prescribed helicopter transit routes published in Aeronautical Information Publication (AIP) En-Route Supplement Australia (ERSA) for helicopter operations in the Bankstown Control Zone. These are included in the Local Procedures for Bankstown Airport, containing the specific routes and prescribed altitudes to be flown. Avlaw's assessment has found that the site is clear of all specific helicopter transit routes for operations to/from Bankstown Airport.

6.2 Hospital Helipads

The NASF Guideline H regarding protection of what are being termed *Strategic Helicopter Landing Sites (SHLS)* stipulates that hospital helipads are considered as SHLS and therefore protected from obstacles being erected in close proximity to it. The guideline defines 140m wide rectangular steps in the direction of the approach/take-off area in 500m long increments until reaching 125m above the SHLS which would be protected from obstacles such as buildings and cranes. The steps, rising in 15m increments, are shown in **Figure 6** below that has been sourced from the guideline and illustrates the protection of SHLS and the heights above which it is triggered.

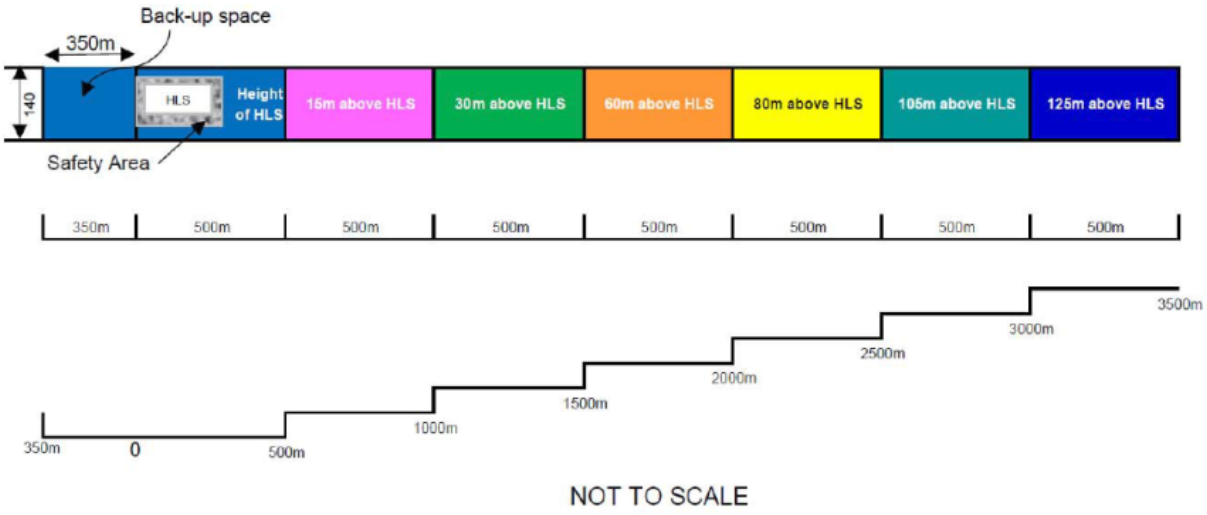

Figure 3: Referral trigger for SHLS

Liverpool Hospital has one operational helipad referred to as "Alpha" located approximately 685m north-east of the site. Even though development at the site will result in a tall permanent building with temporary structures potentially penetrating prescribed airspace, the helicopter operations at Liverpool Hospital are all conducted under VFR whereby the pilot in command (PIC) is solely responsible for safe navigation clear of any obstacles. The proposed indicative concept design is not in the direction of approach/take-off area for the Liverpool Hospital Helipads (i.e. East or West) and therefore the development for the site will not penetrate airspace protected by the guideline.

Therefore, Avlaw's assessment of helicopter operations in the vicinity of the site concludes the development will pose no increased safety risk to those that might already exist due to other obstacles in the area.

7. Rationale for obtaining approval

The Regulations require any decision by the Department to be made in the interests of the safety, efficiency or regularity of existing or future air transport operations into or out of the airport. The potential maximum building height of the proposed indicative concept design reaches a maximum of 135.9m AHD. and will therefore not penetrate the Circling Minima Surface at 135.9m AHD, nor the PANS-OPS SID Surface which is 137.55m AHD at the north-eastern corner of the site. However, the proposed changed to the planning controls for the site makes it likely that temporary penetration of the Circling Minima Surface (135.9m AHD) and the PANS-OPS SID Surface (137.55m AHD at the north-eastern corner of the site) will be required for construction to be completed. Avlaw's assessment is

that this will be a complex application process requiring detailed aeronautical assessment and safety justification that may not be approved.

In the event an approval is given, it will be subject to specific conditions concerning how the controlled activity is carried out (e.g. hours of operation of a crane) or may require the building or other structures to be marked or lit in a certain way, as detailed in Manual of Standards (MOS) 139.

8. Future controlled activity approval requirements

If all building and temporary structures including cranes at the site remain below the Circling Minima Surface (135.9m AHD) , controlled activity approvals should be given as only the OLS will be penetrated which Avlaw believe will not be problematic in this instance.

In the event approval for temporary penetration of the Circling Minima Surface and the PANS-OPS SID Surface is required, a detailed aeronautical assessment will need to be submitted to Bankstown Airport and may not be approved.

As mentioned in section two (2), Avlaw's experience suggests proponents should allow a minimum of three (3) months for project planning purposes with respect to processing time with Bankstown Airport, Airservices Australia, CASA and the Department conducting their own assessments. These assessments have taken up to seven (7) months in other instances which are deemed complex i.e. penetrations of the PANS-OPS. The preparation of a complete Aeronautical Impact Assessment should supplement the application submitted by Urbis in preparation for its DA submission.

Yours sincerely,

Amin Hamzavian
Managing Director