



PRELIMINARY AERONAUTICAL IMPACT ASSESSMENT

MOD 9 for Central Barangaroo



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Publication Title

Preliminary Aeronautical Impact Assessment – MOD 9 for Central Barangaroo

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**Executive
Summary**

Executive Summary

Avlaw has been requested for advice in relation to potential aeronautical limitations associated with the proposed development located on the site comprising the Central Barangaroo Development, Hickson Road, Barangaroo NSW, referred to herein as “the site”.

Avlaw Pty Ltd, trading as Avlaw Aviation Consulting (Avlaw), notes that the Central Barangaroo proposal includes a taller tower building in Block 7 to 73.7m AHD and associated construction crane activity to 163.7m AHD.

Avlaw has conducted a preliminary assessment of the maximum building height restrictions at the site against prescribed airspace limits which exist due to necessary safety clearances (mandated in legislation) that must be provided between an aircraft and an obstacle.

Avlaw’s assessment is based on the property boundaries and proposed building heights provided by the Central Barangaroo Developer, Obstacle Limitation Surfaces (OLS) requirements, Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS) limitations, Radar Lowest Sector Altitude (RLSALT)/Radar Terrain Clearance Chart (RTCC) sector boundaries, transit/approach/take-off routes used by Aeromedical Emergency Service providers and satellite imagery.

This advice provides details of the current airspace protection surfaces covering the site and the table below summarises the findings of the assessment:

Sydney Airport	
Airspace Surface	Height
Obstacle Limitation Surfaces - Outer Horizontal Surface	156m AHD
Procedures for Air Navigation Services - Aircraft Operations	320-330m AHD
Radar Terrain Clearance Chart	335m AHD

The critical (i.e. lowest) airspace protection surface which covers the site is the Outer Horizontal Surface of the OLS which will be penetrated temporarily by a construction crane and therefore be considered a controlled activity and required approval before being carried out. Consent for construction will be sought as part of a future detailed development application the required controlled activity approval will be sought as part of this application.

The principle of “shielding” applies at the site meaning that any building or temporary construction crane that falls below a 10 per cent downward slope from the adjacent Crown Sydney Hotel Resort will not be considered to be introducing any additional hazard from an aviation perspective. The shielding height over the site that is 240 metres horizontally from the Crown Sydney Hotel Resort will be 251m AHD.

Avlaw also notes the proposed development at Central Barangaroo is not impacted upon by protection under the National Airport Safeguarding Framework (NASF) for strategic helicopter landing sites.

In summary, the proposed maximum building height increase in Block 7 will not be considered an obstacle from an aviation perspective as it does not penetrate any airspace

protection surfaces applicable to operations at Sydney Airport. The future development of the site under the proposed modifications to the Concept Plan will require a construction crane to a height of 163.7m AHD. This will penetrate the Sydney Airport OLS and will therefore require approval before being carried out. The principle of shielding will apply with respect to the crane as it falls in the shadow of the Crown Sydney Hotel Resort and should therefore receive aviation approval.



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Site Location

Site Location

The site is located in Central Barangaroo which is immediately to the north of the Crown Sydney Hotel Resort.

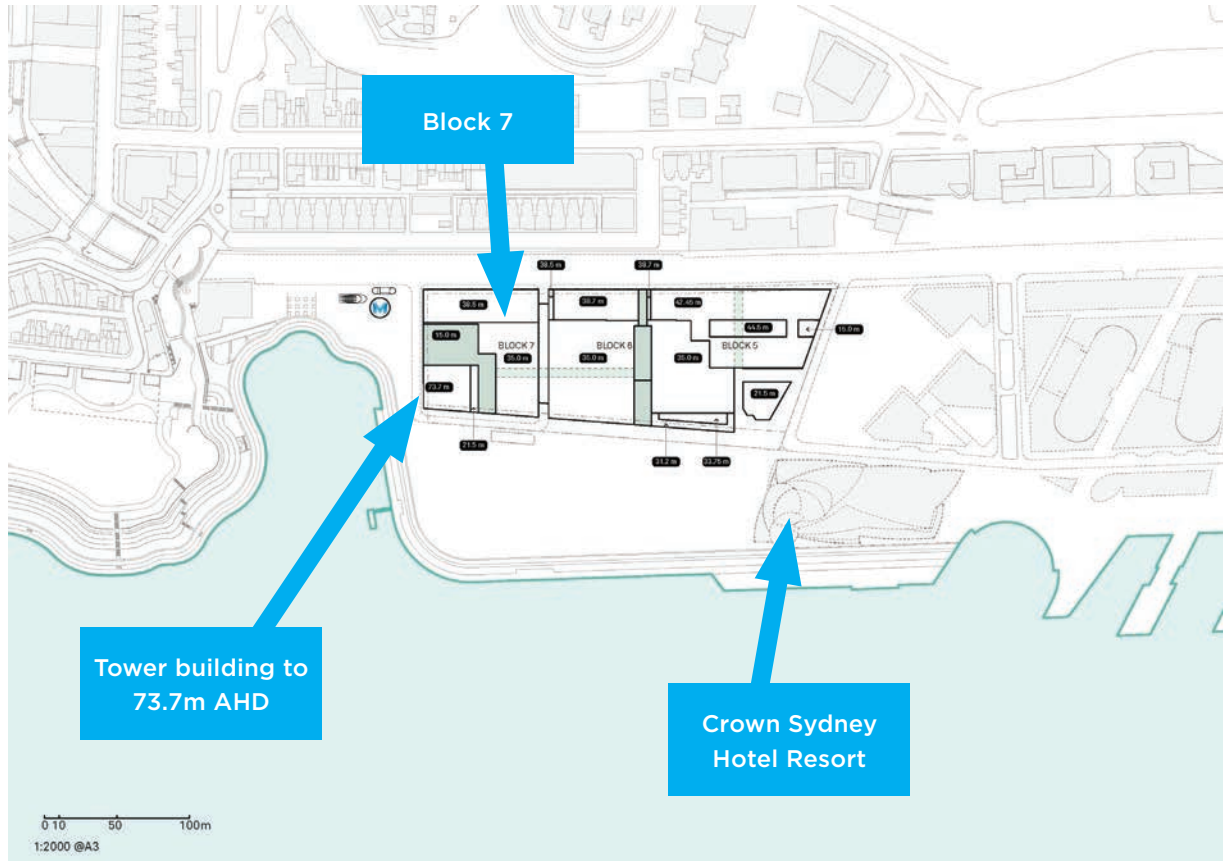


Figure 1: Central Barangaroo boundaries identifying the proposed Block 7 maximum building height



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**Airspace Height
Controls**

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. With respect to the site's proximity to Sydney Airport, the following airspace protection surfaces have been "declared" by the Department of Infrastructure, Transport, Cities and Regional Development (Department) and are therefore enshrined in legislation as each airport's Prescribed Airspace:

- » OLS;
- » PANS-OPS surfaces;
- » Radar Terrain Clearance Chart (RTCC)/Radar Lowest Sector Altitude (RLSALT) surfaces; and



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**Airspace
Approval Process**

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" and requires that controlled activities cannot be carried out without approval. 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, Cities and Regional Development** (Department) following consultation with the Civil Aviation Safety Authority (CASA) and Airservices Australia (Airservices).

With respect to long-term penetrations (e.g. a building penetrating the OLS), 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** 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 and CASA. The Department cannot approve short-term penetrations of the PANS-OPS without the support of the airport operator and also cannot approve long-term penetrations of the OLS in the event CASA's assessment is not supportive of the application.

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, scaffolding) 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 relating to the management and use of airspace surrounding airports. These include published survey data and Air Traffic Control (ATC) procedures and practices, including compatibility with the promulgated ATC 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 by aircraft and cover vertical, lateral and longitudinal criteria.

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 believes this will be a straight forward application but nonetheless based on our experience suggest proponents allow approx. three (3) months for SACL, Airservices Australia, CASA and the Department to conduct their own assessments in succession.

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.



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**Preliminary
Aeronautical
Impact Assessment
Findings**

Preliminary Aeronautical Impact Assessment Findings

Based on the site location provided, interrogation of satellite imagery, OLS requirements, PANS-OPS limitations as well as RTCC stipulations, Avlaw's assessment of the heights of airspace protection surfaces covering the site and the respective clearance/penetration of each by the proposed building heights across the site are tabulated on the following page.

Sydney Airport			
Airspace Surface	Height	Central Barangaroo Site	
		Clearance/Penetration (building @ 73.7m AHD)	Clearance/Penetration (crane @ 163.7m AHD)
OLS	156m AHD	-82.3m	+7.7m
PANS-OPS	320 to 330m AHD rising SW to NE	-246.3m to -256.3m	-156.3m to -166.3m
RTCC	335.28m AHD	-261.58m to -271.58m	-171.58m

Figure 2: Summary of Preliminary Aeronautical Impact Assessment Findings

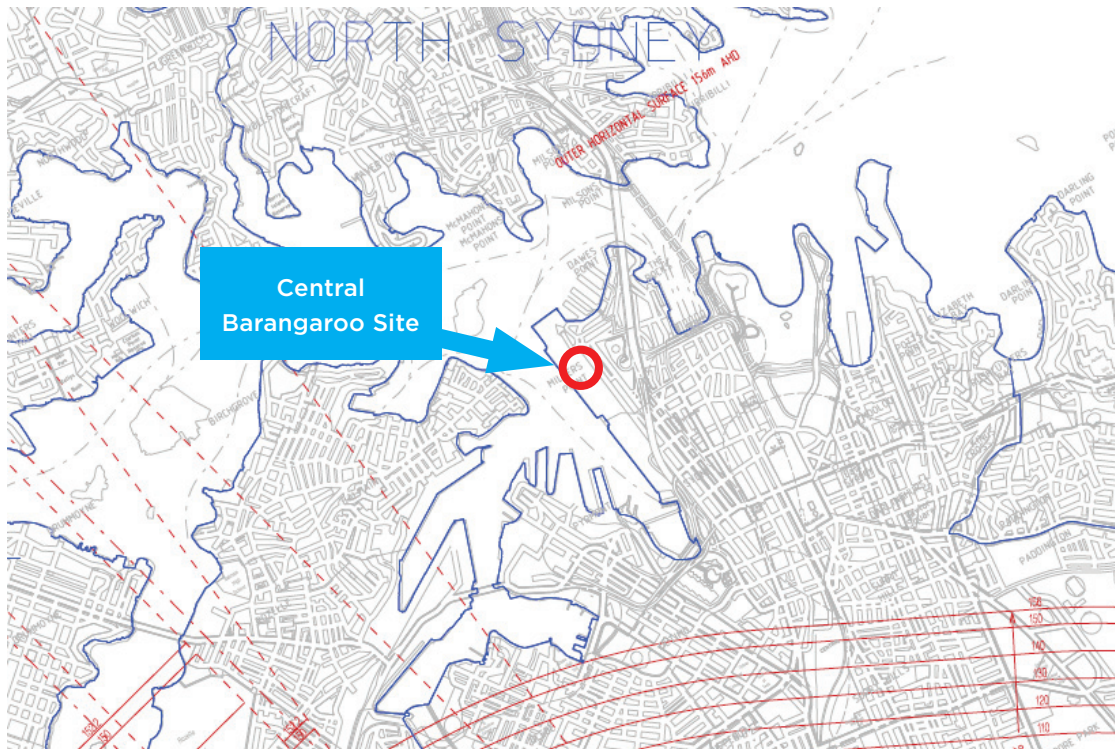


Figure 3: Extract from Sydney Airport OLS Chart, illustrating the location of the Central Barangaroo site

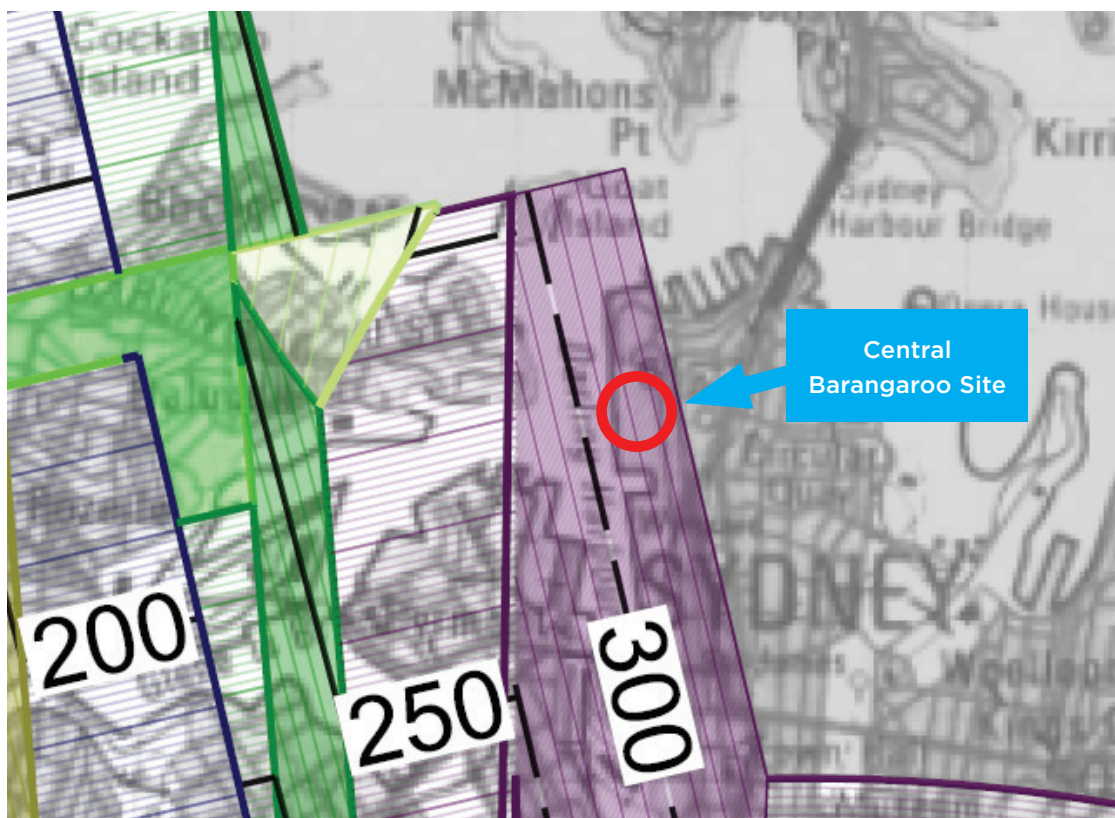


Figure 4: Extract from Sydney Airport PANS-OPS Chart illustrating the location of the Central Barangaroo site

Avlaw notes that due to proposed increase to the maximum building height for Block 7 being in close proximity to the Crown Sydney Hotel Resort that has a height of 275m AHD, then future development and associated construction crane will be “shielded” by the 10% downward slope from the top of Crown Sydney Hotel Resort. The shielding height over the site that is 240 metres from the Crown Sydney Hotel Resort will be 251m AHD. A new obstacle that is shielded by an existing obstacle can be assessed as not imposing additional restrictions to aircraft operations.

A maximum building envelope including any protrusions from a building (e.g. masts, BMU etc.) must be included in the final height of the building itself for aviation approval, as does temporary construction crane activity.

Central Barangaroo is proposed as a mixed-use multi-building development with the tallest building itself (73.7m AHD) remaining well below the OLS (156m AHD). However, the crane to be used during construction will reach a height of 163.7m AHD and therefore penetrate this surface and need approval before being carried out.



Figure 5: Elevation view image showing existing structures at Barangaroo including the Crown Sydney Hotel Resort. Image credit: Infrastructure NSW, June 2021



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**Helicopter
Operations**

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 development at the site have been assessed, the findings of which are summarised below.

6.1 Sydney Airport and Sydney Harbour Helicopter Operations

The site is located approximately 9,550 metres NE of Sydney Airport Aerodrome Reference Point. 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 Sydney Control Zone. These are included in the Coded Clearances and Operating Requirements for Sydney Airport, with the coded clearances containing the specific routes and prescribed altitudes to be flown.

The proposed development is clear of specific helicopter transit routes and shielded by Crown Sydney Hotel Resort. Even though the proposed development will result in a multi-story building structure that may be classified as an obstacle, the helicopter operations assessed are all conducted under Visual Flight Rules (VFR) whereby the pilot in command (PIC) is solely responsible for safe navigation clear of any obstacles.

6.2 Hospital Helipads

A National Airport Safeguarding Framework [NASF](#) guideline relating to the protection of airspace surrounding hospital helipads. 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 3 on the following page that has been sourced from the guideline and illustrates the protection of SHLS and the heights above which it is triggered.



Figure 6: Referral trigger for SHLS

The proposed Central Barangaroo development is outside the horizontal limits of the NASAF Guideline with respect to the closest hospitals with helipads 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.



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**Rationale for
Obtaining Approval**

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. An approval may be subject to specific conditions, which may concern how the controlled activity is carried out (e.g. hours of operation of a crane) or may require the building or structure to be marked or lit in a certain way as detailed in Manual of Standards (MOS) 139. These conditions must also be in the interests of the safety, efficiency and regularity of existing or future air transport operations. Avlaw notes that penetration of the OLS for Sydney Airport over the site at 156m AHD will trigger aviation safety assessment by CASA and Airservices Australia, and approval by the Department. The overriding case is that future development in accordance with the proposed modification to the Concept Plan will be shielded by the Crown Sydney Hotel Resort and therefore will not introduce any additional risks to aviation safety. The shielding height over the site that is 240 metres from the Crown Sydney Hotel Resort will be 251m AHD while the crane will be to a maximum of 163.7m AHD. Avlaw's assessment is that an application for crane approval should receive approval as it will not adversely affect the safety, efficiency or regularity of operations at Sydney Airport.



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**Future Controlled
Activity Approval
Requirements**

Future Controlled Activity Approval Requirements

An application seeking approval for the construction crane to a height of 163.7m AHD will be required in order for development at the site to be completed. This will be sought as part of the future detailed development application. The proposed maximum building height in Block 7 will not be considered an obstacle and therefore will not require approval from aviation authorities. As mentioned in section two (2), Avlaw's experience suggests proponents should allow approx. three (3) months for project planning purposes with respect to processing time with Sydney Airport, Airservices Australia, CASA and the Department conducting their own assessments.



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