

Location



Preliminary Aeronautical Assessment: Edgecliff Centre, NSW

v1.0 FINAL

31-Aug-2020



Prepared by Consultants:



Strategic Airspace Pty Limited
ABN: 60 097 857 415

PO Box 253, Bondi Junction NSW 1355
Australia

Tel: +61.2. 8957 2278

Email - Attn: Cathy.PakPoy@StrategicAirspace.com

Client:



This document was prepared by **Strategic Airspace** Pty Limited on behalf of client **Longhurst**
Copyright © Strategic Airspace Pty Limited, 2020

All Rights Reserved. No part of this document or its entirety may be divulged, commercialised, translated, reproduced and/or copied in any form or by any means without the express and prior written permission of the copyright holder.

Whilst this document has been prepared using all due and customary care, StratAir reserves the right to correct any errors, omissions or misrepresentations.

The authorised recipient of this document is hereby granted permission to use the contents of this document and to make and transmit copies in a secure manner for the purposes of evaluation or the report contents; liaison with relevant State and/or international authorities for the purposes of verification, regulatory and operational impact, and/or approvals; and any pursuant negotiation with StratAir as part of its procurement process.

In the event of translation for this purpose and any discrepancies between the translated and original versions, this original text will prevail.

Contents

1. Introduction & Executive Summary	1
2. The Project	3
2.1 Proposed Development	3
2.2 Site Location & Context	3
2.2.1 Reference Coordinate & Relation to Sydney Airport.....	3
2.2.2 Relationship to Sydney Airport & Key Runways.....	4
3. Aeronautical Height Analysis	4
3.1 Obstacle Limitation Surfaces (OLS)	4
3.2 PANS-OPS Surfaces Analysis	5
3.2.1 Approach Procedure Surfaces.....	5
3.2.2 Minimum Sector Altitude (MSA) Surfaces.....	6
3.2.3 Departure Procedure Surface Limits.....	6
3.2.4 Summary of PANS-OPS & MSA Height Constraints.....	6
3.3 Radar Terrain Clearance Chart (RTCC) Surfaces	6
3.4 Other Height Assessment Considerations	7
4. Maximum Effective Heights for Buildings and Cranes	8
4.1 Airspace Height Application Considerations	8
5. Conclusion	8

Tables

Table 1-1: Summary of Applicable Surface Height Limits & Height Approvability Implications	2
Table 2-1: Project Site Reference Coordinate	4
Table 2-2: Site in Relation to Sydney Airport & Relevant Runways	4
Table 3-1: PANS-OPS Departure Height Limits	6
Table 3-2: Summary of PANS-OPS & MSA Height Limits	6
Table 3-3: Other Height Limitations Assessed	7
Table 5-1: Summary of Applicable Surface Height Limits & Height Approvability Implications	8

Figures

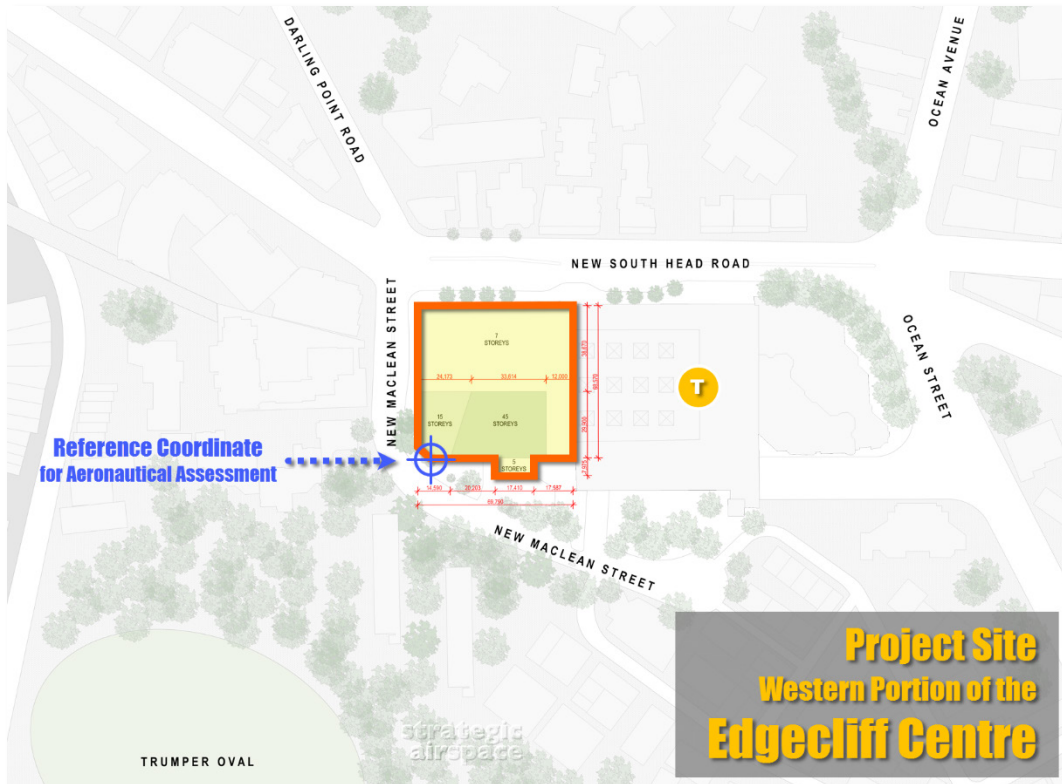
Figure 1-1: The Proposed Development Site	1
Figure 2-1: Project Site in relation to Sydney Airport.....	3
Figure 3-1: Site in relation to the Sydney Airport OLS.....	4
Figure 3-2: Site in relation to the Sydney Airport PANS-OPS Approach Surfaces Chart.....	5
Figure 3-3: Site in relation to the Sydney Airport RTCC Surfaces.....	7

1. Introduction & Executive Summary

Strategic Airspace (StratAir) has been commissioned by Longhurst to examine the aviation-related airspace height impacts overhead a proposed development site at Edgecliff Centre, Edgecliff NSW. The site is approximately 9.1 km (4.93 Nautical Miles (NM)) north-north-east of Sydney Airport's Aerodrome Reference Point. This is depicted in Figure 2-1 (p3).

The proposed building envelope, within the context of the Edgecliff Centre, and the reference coordinate used for the aeronautical assessment, are illustrated in the figure below. The planned maximum height of the proposed building envelope is 195m AHD¹.

Figure 1-1: The Proposed Development Site



Source: FJMT Drawing 1202 (19/6/2020): Site Plan – Proposed Envelope

The aeronautical impact assessment examines the proposed development in relation to the prescribed airspace of Sydney Airport and the Commonwealth Airports (Protection of Airspace) Regulations 1996 (APAR) — specifically, whether or not an aviation-related airspace height approval is required under the APAR, and the potential for approvability of the proposal under these regulations.

The approval authority for any application under the APAR is the Commonwealth Department of Infrastructure, Transport, Regional Development and Communications (DITRDC). Primary referral agencies and key stakeholders are Sydney Airport, the Civil Aviation Safety Authority (CASA, the regulator), Airservices Australia (the air navigation service provider), and major transport airline operators.

Conditions for approvability expressed in the regulations are based on the maximum development height in relation to the prescribed airspace of the airport, as well as other

¹ All airspace heights are expressed in Metres, Australian Height Datum (AHD). In planning terms, this is the equivalent of a height expressed as an RL in metres.

potentially influencing factors, the final arbiter being a judgement by CASA, the airport and DITRDC as to whether or not the proposal would or would not adversely affect the safety, regularity and efficiency of current and future air transport operations at the airport.

Table 1-1: Summary of Applicable Surface Height Limits & Height Approvability Implications

Limiting Surface	Height Limit (m AHD)	Clearance / Penetration (m AHD)	APAR Implication — based on Proposed Max Development Height of 195m AHD
OLS	156	- 39	The development would infringe the OLS and thus would require prior height approval under the APAR.
RTCC	243	48	The development would, at its maximum proposed height, be clear of (below) the most limiting of the PANS-OPS and RTCC surface heights — and thus would be considered approvable under the APAR.

The key facts and assessment results are:

- The Outer Horizontal Surface is the limiting Obstacle Limitation Surface (OLS) across the entire site. The proposed development would infringe (penetrate) the OLS.
 - The infringement of the OLS would trigger the requirement for a height approval under the APAR prior to construction (but usually prior to approval of or as a consent condition of DA).
 - A building higher than the OLS is approvable under the APAR but may be subject to certain conditions — these generally involve the installation of aviation hazard ('obstacle') lights on the top of the building(s).
- The maximum permissible building height over the proposed site relates to the most restrictive of the PANS-OPS and the Radar Terrain Clearance Chart (RTCC) surfaces — in this case the RTCC surface.
 - As the maximum height of the proposed development would be well below the limiting surface height, under the APAR it can be considered technically approvable.
- In terms of assessing the feasibility of construction, there is ample room for cranes to operate at a maximum height that would not exceed the height constraint of the limiting surface — so potential crane implications will not adversely affect the assessment of a height application for the proposed works. Note that an application for cranes do not need to be included in any height application for the proposed development; however, approval for cranes under the APAR must be obtained prior to their erection.
- There are no other factors that have been assessed which would prejudice the approvability of the proposed development under the APAR.
- Given the type of the limiting PANS-OPS surface and the proximity of the site to the RWY 07 landing threshold and the nominal centre of the straight-in / straight-out flight path for RWY 07/25 (the extended runway centreline), it is highly likely that Sydney Airport, other aviation stakeholders and the approving authority DITRDC, would not agree to cranes which would infringe the heights of the PANS-OPS surface.

Taking these factors into consideration, there is no technical impediment to approval of the proposed works under the APAR.

Disclaimer: The assessment has been made based on plans provided by the Proponent. Final coordinates were not available; coordinates for this assessment were digitised from best-fit geo-referenced images and as such all height clearances provided herein are advisory and only as accurate as the coordinates used. As such, height assessments have been done on a conservative basis.

2. The Project

2.1 Proposed Development

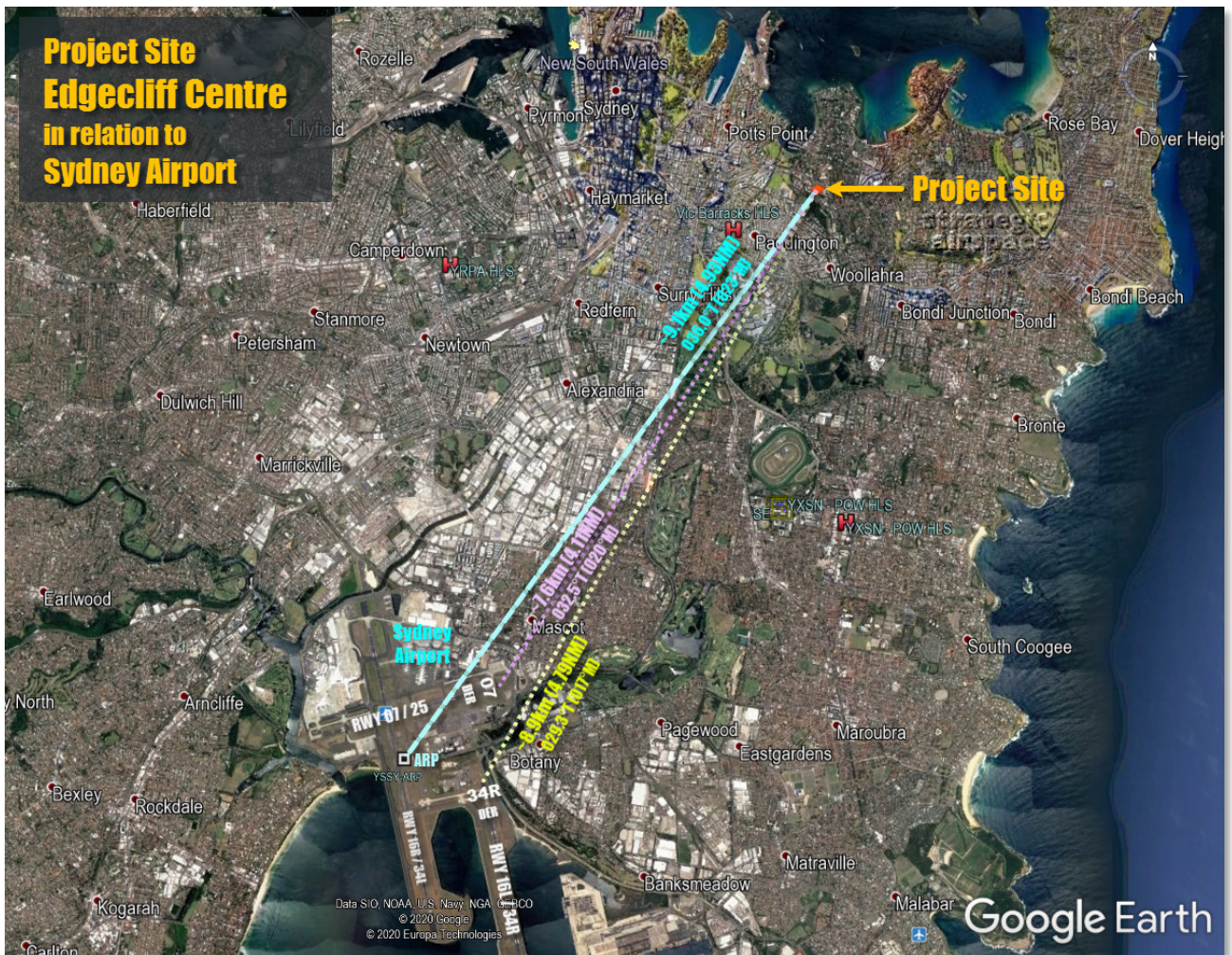
The proposed development is located above the western part of the existing Edgecliff Centre, adjacent to the Edgecliff Train Station below-ground. The building envelope is depicted in Figure 1-1 (p1).

The planned maximum height of the proposed building envelope is 195m AHD.

2.2 Site Location & Context

The site is approximately 9.1 km (4.93 Nautical Miles (NM)) north-north-east of Sydney Airport's Aerodrome Reference Point (ARP).

Figure 2-1: Project Site in relation to Sydney Airport



2.2.1 Reference Coordinate & Relation to Sydney Airport

The site reference coordinate used for the aeronautical assessment is the point closest to the Airport Reference Point (ARP). The location of this point indicated in Figure 1-1 (p1) and documented in Table 2-1 below.

Table 2-1: Project Site Reference Coordinate

Reference	Latitude S	Longitude E	MGA94 (Z56) Easting	Northing
Reference Coordinate	33° 52' 45.94"	151° 14' 06.44"	336,777.600	6,249,811.088

The Reference Coordinate has been digitised based on imagery of the site geo-referenced in GoogleEarth.

2.2.2 Relationship to Sydney Airport & Key Runways

The closest and most relevant runway ends are the eastern end of short cross runway, RWY 07/25, and the northern end of the eastern parallel runway, RWY 16L/34R.

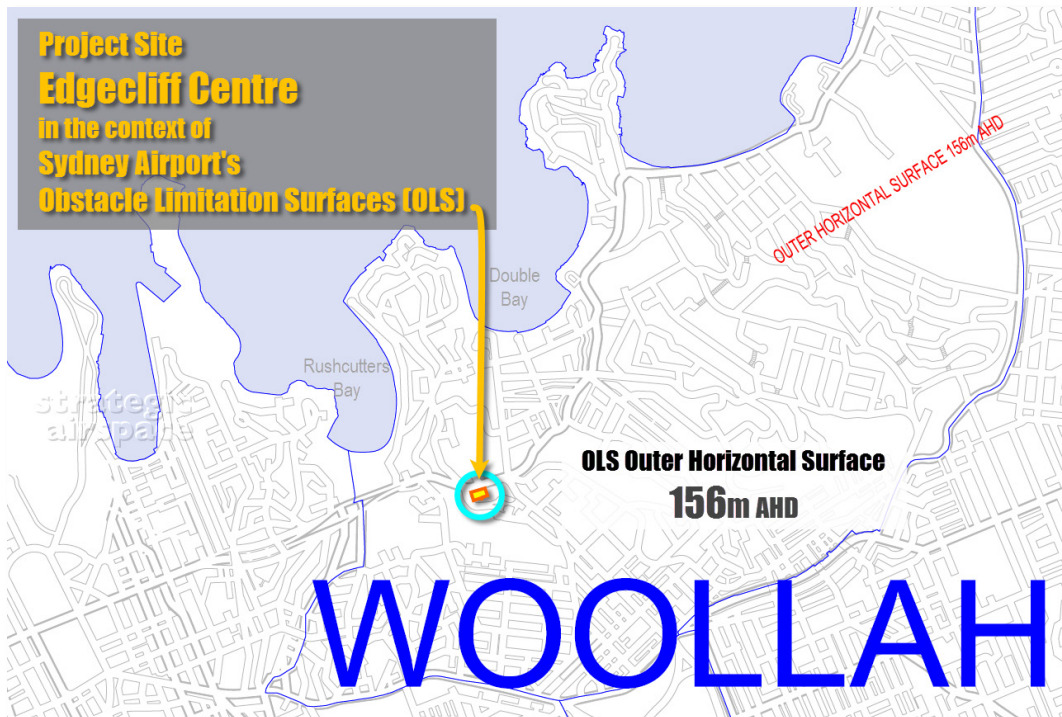
Table 2-2: Site in Relation to Sydney Airport & Relevant Runways

Reference Point	Distance Metres (m)	Nautical Miles (NM)	Bearing from... True (°T)	... in Degrees Magnetic (°M)
Aerodrome Reference Point (ARP)	9127	4.93	036.0	023
RWY 34R Departure End of RWY (DER)	8862	4.79	029.3	017
RWY 07 DER	7613	4.11	032.5	020

3. Aeronautical Height Analysis

3.1 Obstacle Limitation Surfaces (OLS)

Figure 3-1: Site in relation to the Sydney Airport OLS



Source: SACL 2018 OLS Chart

The OLS height limit above the site is determined by the Outer Horizontal Surface. The location of the site in relation to the OLS is depicted in Figure 3-1.

At a maximum proposed elevation of 195m AHD, the building envelope would penetrate the OLS by 39m.

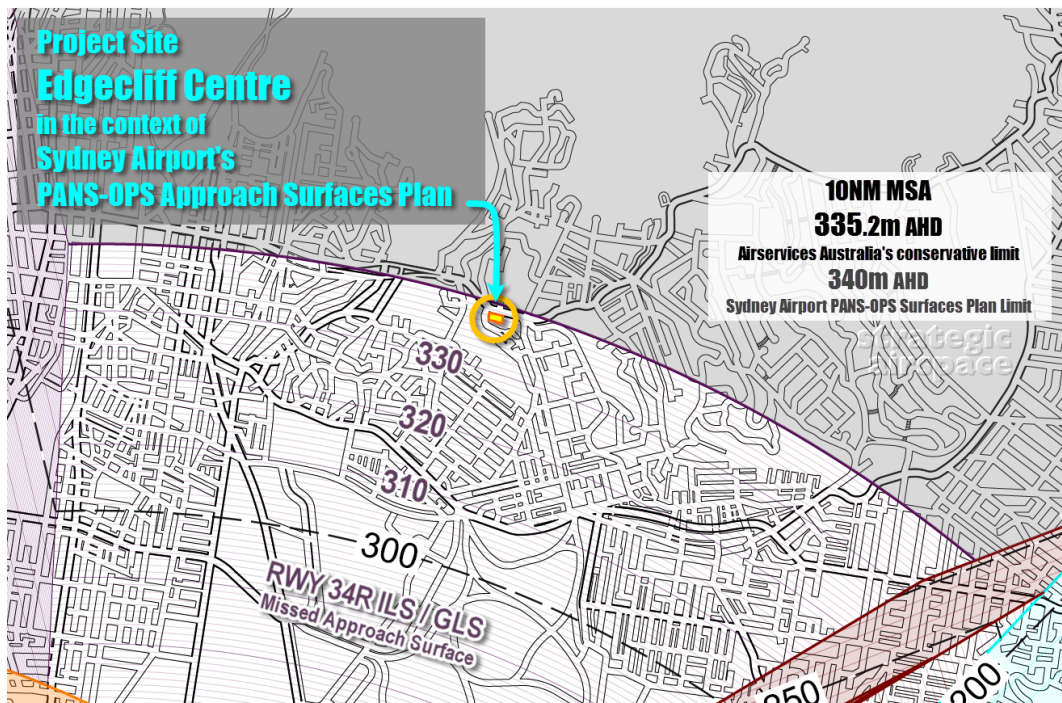
Under the Airports (Protection of Airspace) Regulations (APAR) the penetration of the OLS may be approvable provided certain provisions are complied with (these generally involve the installation of aviation hazard lights on the extremities of the building). APAR applications are determined by the Commonwealth Department of Infrastructure, Transport, Regional Development & Communications (DITRDC).

This means that any permanent or temporary structure that would infringe this surface by exceeding this height would require an airspace height approval as a controlled activity under the Airports (Protection of Airspace) Regulations (APAR) prior to building construction or erection of the temporary structure (eg, crane). Any height APAR approval for a building would be inclusive of overruns (such as lift cores, plant rooms, other rooftop furniture and so on). Further, where relevant, it is most likely that a height approval under the APAR would be required before or as a condition of approval of a Development Application (DA) for the planning proposal.

3.2 PANS-OPS Surfaces Analysis

The lowest of all PANS-OPS surface heights over the site — whether related to approach (and related missed approach) or departure procedures — normally define the maximum heights permissible for building developments (except where other airspace surfaces or potential aviation impacts are considered more constraining). Permanent structures such as buildings are not permitted to penetrate PANS-OPS surfaces. Under APAR, the maximum permissible airspace height is also taken to include any rooftop features such as lift overruns, plant rooms, parapet walls, signage and antennae, and any other rooftop furniture and features.

Figure 3-2: Site in relation to the Sydney Airport PANS-OPS Approach Surfaces Chart



Source: SACL 2018 PANS-OPS (Approach) Surfaces Chart

3.2.1 Approach Procedure Surfaces

Evaluation of Sydney Airport's Declared Airspace PANS-OPS Surfaces which document their prescribed airspace related to Approach Procedures show that the missed approach

related to the RWY34R ILS/GLS precision approach procedures is the most constraining of the approach procedures. As illustrated in Figure 3-2 above, the limit due to this sloping surface is approximately 337m AHD.

3.2.2 Minimum Sector Altitude (MSA) Surfaces

The MSA surface constraints are also depicted in the PANS-OPS chart currently published by Sydney Airport (see also Figure 3-2 above). The conservative limit used by Airservices Australia’s air traffic controllers (ATCs) for the 10NM Minimum Sector Altitude is 335.2m AHD, which is lower than the 340m AHD shown on Sydney Airport’s chart.

3.2.3 Departure Procedure Surface Limits

Sydney Airport’s published Declared Airspace Chart series include a chart which depicts the height constraints related to Omnidirectional Radar Departure Procedures. This chart however, published in 2015, is quite outdated and no longer relevant to the PANS-OPS instrument flight procedures (IFPs) that are currently published by Airservices Australia in the Australian Aeronautical Information Publication (AIP). Thus, the Departure Procedures were analysed based on the latest published Omnidirectional Radar Departures².

Table 3-1: PANS-OPS Departure Height Limits

Omnidirectional Departure Procedure	Height Limit (m AHD)	Description
RWY 07	~300	Based on the Non-Jet minimum turn altitude of 600ft and minimum climb gradient of 4.7% to 1500 ft.
RWY 34R	~365	Based on the Non-Jet minimum turn altitude of 500ft and minimum climb gradient of 4.8% to 1500 ft.

3.2.4 Summary of PANS-OPS & MSA Height Constraints

The following table lists the relevant surface limits for the most constraining PANS-OPS procedures by type. Those not listed in the table are either higher, or not applicable.

Table 3-2: Summary of PANS-OPS & MSA Height Limits

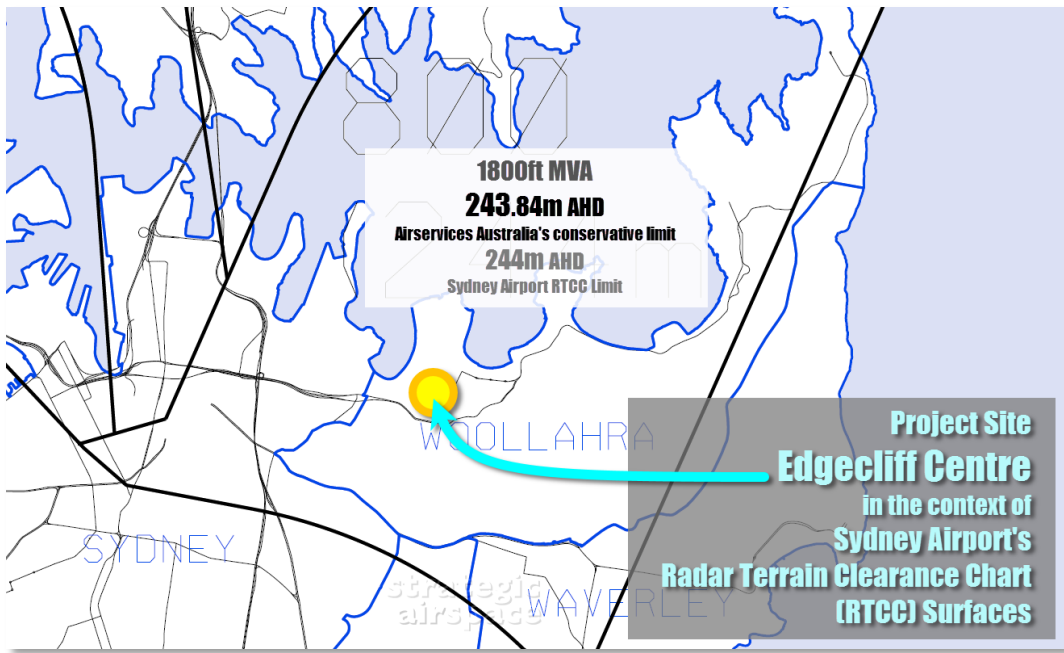
Procedure	Height Limit (m AHD)	Description
DEPARTURE Procedures — RWY 07	~300	Based on the calculated surface height related to the Omnidirectional Radar Departure from RWY07.
Minimum Sector Altitude (MSA) — 10NM Inner Sector	~335	Based on the conservative protection surface altitude used by Airservices Australia’s Air Traffic Controllers. Refer to Figure 3-2
APPROACH Procedures RWY 34R ILS/GLS Missed Approach	~337	The most constraining of the approach surfaces — as indicated by Sydney Airport’s 2018 PANS-OPS chart — is the sloping Missed Approach surface related to the RWY34R ILS/GLS precision approach procedures. Refer to Figure 3-2

3.3 Radar Terrain Clearance Chart (RTCC) Surfaces

The RTCC sector over the site is related to the 1800ft Minimum Vector Altitude (MVA) sector used by ATCs for vectoring aircraft. This results in an RTCC surface height limit of 243.84m AHD. As the RTCC limit is lower (more restrictive) than those of the PANS-OPS surfaces, this should be considered the maximum permissible development height.

2 AIP Amendment 164 (pending), effective from 13-Aug-2020 to 04-Nov-2020

Figure 3-3: Site in relation to the Sydney Airport RTCC Surfaces



3.4 Other Height Assessment Considerations

The following table provides a brief assessment of other considerations

Table 3-3: Other Height Limitations Assessed

Procedure	Height Limit (m AHD)	Description
Navigation Infrastructure	N/A	The proposed development, based on its location and maximum building height, should not affect any current navigation infrastructure for Sydney Airport
Other Sydney Airport Declared Airspace Surfaces	N/A	The proposed development is below the protection surface areas such as the PAPI light planes and so forth.
Airlines Engine Out Procedures	N/A	Engine Out procedures (for the most relevant take-off runway ends for these procedures) are designed and maintained by each of the passenger transport aircraft operators in accordance with the relevant regulations and Civil Aviation Order (CAO 20.7.1B). Considering the location of the site, and existing obstacles along the flight paths, these contingency procedures would not be adversely affected by the proposed development.
Airspace protections for Helicopter Flight Paths to Nearby Hospitals	N/A	The site is too far from the nearest Strategic Helicopter Landing Site (SHLS): no impact.

4. Maximum Effective Heights for Buildings and Cranes

As noted above, because the RTCC limit is lower (more restrictive) than that of the most constraining PANS-OPS surface, the RTCC surface height should be considered the maximum permissible height for both the proposed development and cranes that will ultimately be required for construction.

4.1 Airspace Height Application Considerations

Application for crane(s) required for construction must be made prior to the need for such crane(s). Typically, these are made separately from the airspace height applications for buildings (or even Concept Proposal building envelopes submitted for rezoning applications), after DA consent.

However, for airspace height applications for large projects featuring tall buildings — or this specific case, for a tower building which at its maximum height may be considered by the aviation authorities to be close to the maximum height permissible — it is possible that the aviation stakeholders would require information on potential crane impact to be included in the height application for the proposed development, essentially to demonstrate the feasibility of constructing the development in the event that it was granted an airspace height approval.

5. Conclusion

Table 5-1: Summary of Applicable Surface Height Limits & Height Approvability Implications

Limiting Surface	Height Limit (m AHD)	Clearance / Penetration (m AHD)	APAR Implication — based on Proposed Max Development Height of 195m AHD
OLS	156	- 39	The development would infringe the OLS and would thus require prior height approval under the APAR.
RTCC	243	48	The development would, at its maximum proposed height, be clear of (below) the most limiting of the PANS-OPS and RTCC surface heights — and thus would be considered approvable under the APAR.

In addition to the findings summarised in the table above, it is also noted that the clearance between the top of the building envelope and the limiting RTCC surface appears to be sufficient to cater for a crane to operate without infringing the same surface constraint.

Taking these factors into consideration, **there is no technical impediment to approval of the proposed development under the APAR.**