

Blackwattle Bay
State Significant Precinct

Attachment 40:

Aeronautical Impact Assessment

June 2021



Blackwattle Bay State Significant Precinct Study Area: Aeronautical Impact Assessment

Version 1.1.2 FINAL

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Document Title: **Blackwattle Bay State Significant Precinct Study Area:
Aeronautical Impact Assessment**

Purpose / Abstract: *This report has been prepared by Strategic Airspace (StratAir) and on behalf of Infrastructure NSW (iNSW), to form part of the Blackwattle Bay State Significant Precinct Study (SSP Study). The SSP Study seeks a rezoning for new planning controls for Blackwattle Bay (previously known as the Bays Market District), located on the south-western side of Pymont.*

It documents the assessment of the Precinct Plan proposed against the regulated airspace height constraints over the Study Area to inform the planning process. The airspace constraints are examined in relation to the maximum building envelope proposed and the additional airspace that would be required for cranes necessary to enable the development.

Regardless of the detailed design scenario finally adopted, the SSP Study specifies that no building envelope will exceed the applicable Obstacle Limitation Surface (OLS) height limit of 156m Australian Height Datum (AHD). This means that no building will require a prior aviation-related airspace height approval under the Airports (Protection of Airspace) Regulations (APAR).

Further, the next most limiting airspace heights (the PANS-OPS surface heights) are so high that all cranes that would eventually be required for construction could operate without infringing these limits, and thus future applications for these would be considered approvable under APAR. Such applications, where required, would not need to be made until the relevant time prior to construction.

In summary, the Precinct Plan proposed will not have any adverse impact on the safety, efficiency or regularity of current and future air transport operations to/from Sydney Airport. Thus, from an aeronautical impact standpoint, there is no technical impediment to approval of the Blackwattle Bay SSP.

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1. Executive Summary

This aeronautical impact assessment report has been prepared by Strategic Airspace (StratAir) and on behalf of Infrastructure NSW (iNSW), to form part of the Blackwattle Bay State Significant Precinct Study (SSP Study). The SSP Study seeks a rezoning for new planning controls for Blackwattle Bay, located on the south-western side of Pyrmont.

The outcome of the State Significant Precinct process will be a new planning framework that will enable further development applications for the renewal of the Precinct, connected to the harbour and centred around a rejuvenated Sydney Fish Market. The framework will also provide for new public open spaces including a continuous waterfront promenade, community facilities, and other compatible uses.

As the new Sydney Fish Market has already been approved (June 2020), the focus of the Study Area assessed in this report is the eastern side of Blackwattle Bay (as depicted in Figure 1 below) where buildings of greater height are proposed in the Precinct Plan.



Figure 1 — The Blackwattle Bay Study Area & the Aeronautical Assessment Area of Focus

This report has been prepared having regard to the SSP Study requirements issued by the NSW Department of Planning, Industry and Environment (DPIE) as they relate to aeronautical considerations and the Prescribed Airspace of Sydney Airport. It examines the current regulated airspace height limits constraints overhead the Study Area that are related to aviation airspace protection requirements and which would:

- a) Trigger the requirement to apply for an airspace height approval;
- b) Constrain the maximum permissible building envelope heights; and
- c) Constrain the maximum permissible heights for cranes that would be required to enable construction of the proposed development.

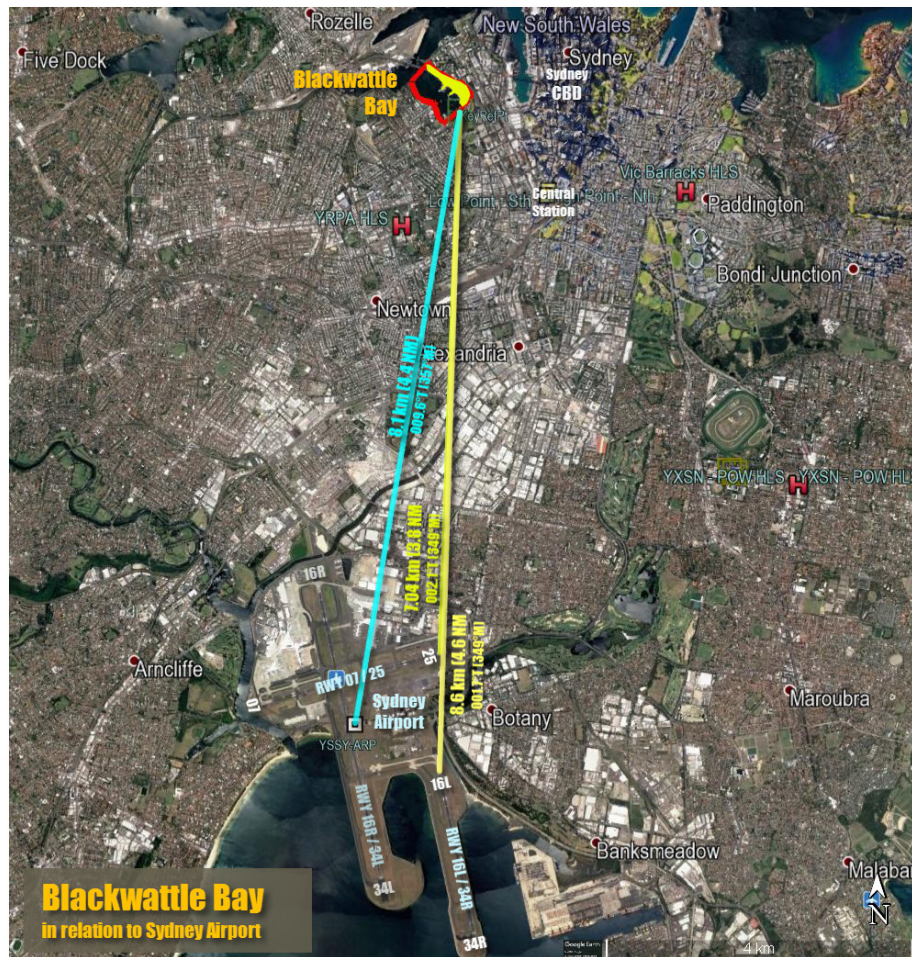


Figure 2 — Blackwattle Bay SSP in relation to Sydney Airport (Small Format)

From an aeronautical impact point of view, the Study Area is located approximately 8.4km (4.5NM) from the airport, midway between the straight-in flight paths to the closest runways. The Study Area is:

- Subject to Obstacle Limitation Surface (OLS) height limits which over the site is a horizontal limit of 156m Australian Height Datum (AHD).
OLS heights can be considered threshold heights; any building or crane which would exceed the relevant height would need to gain airspace height approvals from the Commonwealth Department of Infrastructure, Transport, Regional Development and Communications (DITRDC), under the Airports (Protection of Airspace) Regulations (APAR) prior to construction or erection.
- Constrained by PANS-OPS procedures, which impose various sloping surfaces across the Study Area.
PANS-OPS surface heights are based on the heights related to the protection requirements of the various PANS-OPS Instrument Flight Procedures for Sydney Airport. These define the potential maximum permissible heights for buildings (including all overruns) under the APAR, except where another aviation safety-related airspace constraint is lower. Cranes would also be permitted up to these surface heights.
- Constrained by a Radar Terrain Clearance Chart (RTCC) surface, a horizontal surface constraint which is higher than the applicable PANS-OPS height limits.
Cranes which would exceed the PANS-OPS surface heights may be permitted up to but not exceeding the RTCC surface height, but with operational conditions (including maximum operating durations).

Regardless of the detailed design scenario finally adopted, **the maximum height of the tallest building envelope(s) in the planning proposal will NOT exceed 156m AHD.**

The relevant airspace constraints overhead the Study Area are summarised in the following table.

Table 1 — Summary — Study Area Key Airspace Height Constraints

Height Limits (AHD)	Height Limit Detail	Comment
156m	OLS Outer Horizontal Surface	<p>AIRSPACE APPROVAL THRESHOLD HEIGHT limit (depicted in Figure 7, p13)</p> <p>Any development or construction activity or structure (eg, crane) that would exceed the relevant OLS height across the Study Area would require a prior 'airspace height' approval from the Department of Infrastructure, Transport, Regional Development and Communications under the Airports (Protection of Airspace) Regulations (or APAR).</p> <p>The planned building envelopes will not exceed this height and will therefore NOT require prior airspace approval.</p> <p>Cranes which would exceed this height would require prior approval under APAR — however, this does not preclude approval of the rezoning proposal.</p> <p>After construction, any building which exceeds 110m above ground must be reported as a Tall Obstacle to Airservices.</p>
~245 – ~260m	Various PANS-OPS — Sloping Surface	<p>The PANS-OPS surfaces define the maximum permissible building height that would be approved by the aviation authorities in the relevant areas (see Figure 8, p14)</p> <p>Cranes which would remain below the relevant PANS-OPS height limit (at its location) would be permitted but would require prior approval under APAR where the height would exceed the OLS.</p>

As no building proposed within the SSP Study will exceed the OLS height, it would not be necessary to gain airspace approval under the APAR for the building developments.

Cranes which would not exceed the OLS height would not require prior airspace approval. For those that would, the vertical margin between the maximum building height proposed and the PANS-OPS height limits over the Study Area is sufficiently large that cranes eventually required for construction would not infringe the PANS-OPS height limits, which means that future crane height applications would be considered approvable under the APAR.

Taking these factors into consideration, as well as the location of the Study Area in relation to the Airport and the nearby Sydney CBD, we consider that **the Precinct Plan as proposed will not have any adverse impact on the safety, efficiency or regularity of current and future air transport operations to/from Sydney Airport.**

Thus, from an aeronautical impact standpoint, there is no technical impediment to approval of the Blackwattle Bay SSP.

2. Background

Blackwattle Bay presents a significant opportunity for urban renewal across 10.4 hectares of predominantly government owned land less than 1km from the Sydney CBD. NSW Government is investigating the delivery of a Metro Station in Pyrmont and has recognised the potential to transform the Pyrmont Peninsula with a new 20-year vision and planning framework through the Pyrmont Peninsula Place Strategy.

In 2015 NSW Government recognised The Bays Precinct as one of the highest potential urban transformation sites in Australia with the release of The Bays Precinct, Sydney Transformation Plan. Following this, the Minister for Planning recognised the renewal of Blackwattle Bay and the broader Bays Precinct as a matter of State planning significance and to be investigated for rezoning through the State Significant Precinct (SSP) process. Study Requirements for the Blackwattle Bay investigation area (formerly known as 'Bays Market District') were issued by the Minister on 28 April 2017.

A critical part of Blackwattle Bay's revitalisation and vision has been NSW Government's decision to relocate the Sydney Fish Market from its existing location on Bank Street to the head of Blackwattle Bay. This was sought through a State Significant Development Application (SSDA) process and approved in June 2020. The new Sydney Fish Market was designed alongside the baseline Blackwattle Bay studies to ensure that key aspects of the project are consistent with the vision and objectives for Blackwattle Bay.

The outcome of the State Significant Precinct process will be a new planning framework that will enable further development applications for the renewal of the Precinct, connected to the harbour and centred around a rejuvenated Sydney Fish Market. The framework will also provide for new public open spaces including a continuous waterfront promenade, community facilities, and other compatible uses.

2.1 Blackwattle Bay State Significant Precinct

The Blackwattle Bay SSP Investigation Area ('Study Area') encompasses the land and water area, known as Blackwattle Bay, between Bank Street and the Glebe foreshore shown in Figure 3 below. The land is located within the City of Sydney local government area (LGA).

The land within the Study Area is approximately 10.4 hectares (ha) in size. It is largely government owned land containing the Sydney Fish Market (wholesale and retail), recreation and boating operations and facilities. There are three privately owned sites including a concrete batching plant operated by Hymix, wholesaler of seafood Poulos Brothers and Celestino. The Blackwattle Bay land area wraps around the southern and eastern edges of Blackwattle Bay and is bounded by Bridge Road to the south and Bank Street to the east. The Western Distributor road / Anzac Bridge is located adjacent to the eastern boundary before traversing over the northern section of the site. The water area of Blackwattle Bay is approximately 21 hectares.



Source: FJMT

Figure 3 — Blackwattle Bay Study Area

2.2 Rezoning Proposal

The SSP Study is proposing to rezone Blackwattle Bay with a new planning framework and planning controls to enable its future urban renewal.

The proposal is based on a Blackwattle Bay Precinct Plan ('Precinct Plan') which provides a conceptual layout to guide development of planning controls for the precinct and has informed this assessment. The Precinct Plan is shown in Figure 4 below. The Precinct Plan provides overarching guidance about how an area should be developed based on local character and place, current and future demographics, economic and social trends, cultural and environmental considerations, and urban renewal aspirations and needs regarding land use, community recreation, transportation, housing, and jobs.

Once the Study Area is rezoned and the new planning controls are in place, future development will need to seek development approval through the relevant approval pathway. This will include detailed development proposals and further associated environmental, social and economic assessments.

The proposal responds to the Study Requirements issued for Blackwattle Bay (formerly Bays Market District) by the Department of Planning and Environment in April 2017.



Source: FJMT

Figure 4 — Final Precinct Plan

2.3 A Future Blackwattle Bay

NSW Government recognises the extraordinary opportunity in revitalising Blackwattle Bay, to deliver an authentic, vibrant and sustainable place connected to Sydney's iconic harbour.

Urban renewal must be both responsive and complementary to the new Sydney Fish Market as well as the local community and the Bay's rich identity and history. Within the next 15 years, the new Sydney Fish Market is expected to attract 6 million visitors annually, it will be one of Sydney's most visited areas and must have diverse uses and offerings to enhance its interest and vibrancy from day to night. A new foreshore promenade connecting Blackwattle Bay to Rozelle Bay and Woolloomooloo is also a key outcome of the urban renewal of the SSP Study Area.

2.4 Vision and Principles

Principles for a future Blackwattle Bay were formed through extensive community consultation in August 2017. These were further developed in 2019, together with a vision for the precinct. Both are provided below. These have guided the development of the Precinct Plan and will continue to guide future development proposals within the Study Area.

Vision:

“Blackwattle Bay offers an extraordinary opportunity to reconnect the harbour, its surrounding neighbourhoods and the city; to showcase Sydney's living culture and stories of Country; to build an inclusive and iconic waterfront destination that celebrates innovation, diversity and community.”

Principles:

1. Improve access to Blackwattle Bay, the foreshore and water activities for all users
2. Minimise additional shadowing to Wentworth Park and Glebe Foreshore (in mid-winter) and create new places with comfortable conditions for people to enjoy.
3. Pursue leading edge sustainability outcomes including climate change resilience, improved water quality and restoration of natural ecosystems.
4. Prioritise movement by walking, cycling and public transport.
5. Balance diverse traffic movement and parking needs for all users.
6. Link the Blackwattle Bay precinct to the City, Glebe Island and White Bay and other surrounding communities and attractors.
7. Mandate Design Excellence in the public and private domain.
8. Integrate housing, employment and mixed uses to create a vibrant, walkable, mixed use precinct on the city's edge.
9. Maintain and enhance water uses and activities.
10. Allow for co-existence and evolution of land uses over time.
11. A place for everyone that is inviting, unique in character, socially inclusive and affordable.
12. Expand the range of recreational, community and cultural facilities.
13. Plan for the future community's education, health, social and cultural needs.
14. Deliver development that is economically, socially, culturally and environmentally viable.
15. Embed and interpret the morphology, heritage and culture of the site to create an authentic and site responsive place.
16. Foster social and cultural understanding and respect to heal and grow relationships.

2.5 The Aeronautical Study in the Context of the SSP Process

The SSP Requirements issued for Blackwattle Bay by the then Department of Planning and Environment in 2017 stipulated that the Proposal consider the potential impacts of the Precinct on Sydney Airport's current and future airspace as defined by height limitation layers including OLS, PANS-OPS and Navigation Surfaces.

These requirements and references to where they are addressed in the report are in Table 2 below.

Table 2 — Study Requirements Checklist

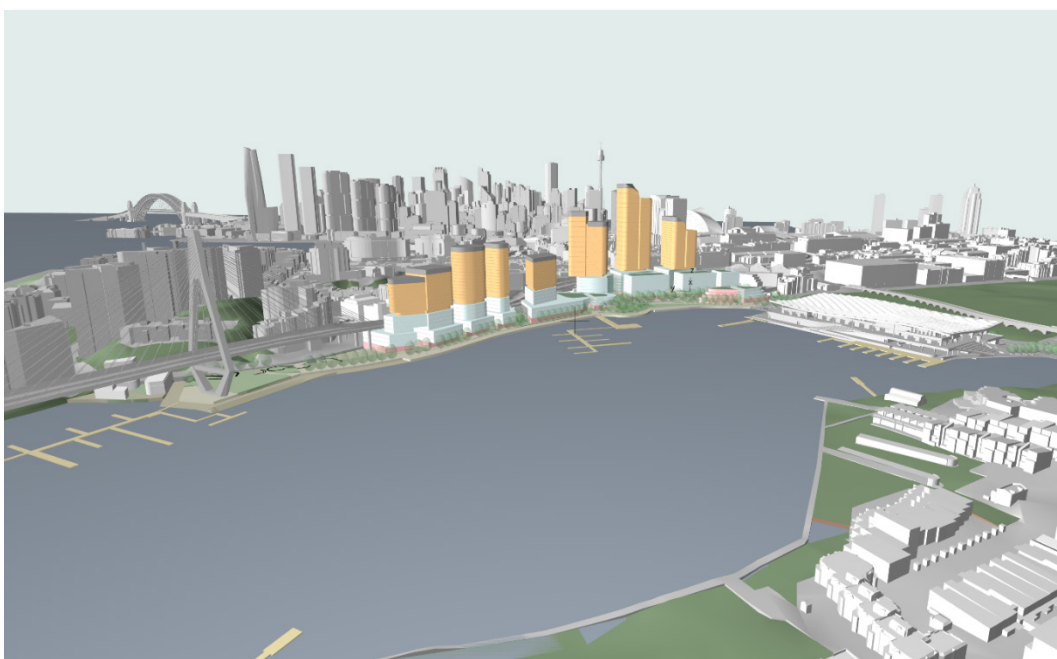
Item	Requirement	Reference
24.1	Review relevant background information, including the Sydney Airport Master Plan 2033* to understand the current and proposed future operations of Sydney Airport, as relevant to the precinct. <i>* Updated to review most recent, the 2039 Master Plan</i>	Sections 5.1 (p13), 5.2 & 5.2.1 (p14) and 5.3 (p15)
24.2	Identify and clearly map the OLS, PANS OPS and any other relevant Sydney Airport height limitation layers, including consideration of Navigation Aid Surfaces.	Sections 5.1 (p13), 5.2 / 5.2.1 (p14) and 5.3 (p15)

<i>Item</i>	<i>Requirement</i>	<i>Reference</i>
24.3	Translate these layers into a maximum height for permanent structures (eg, buildings) and temporary structures (eg, cranes). Engage a building methodology specialist to translate this information into maximum building envelope height planes.	Sections 5.1 (p13), 5.2 / 5.2.1 (p14), 5.3 (p15) and 5.4 (p17) Table 1 (p3), Table 3 (p15), Table 5 (p17)
24.4	Advise on other measures, if necessary, to ensure the precinct does not have an adverse impact on the operations of Sydney airport, eg lighting, reflective surfaces etc.	Based on the maximum heights proposed — not applicable
24.5	Advise on the pathway required to secure approval from relevant bodies, eg Airservices Australia, as part of subsequent development application processes, including for temporary structures such as cranes.	Sections 4.2.1 (p11), 4.2.2 (p11) and 4.2.4 (p12) Section 5.4, Table 5 (p17)
24.6	Certify that subject to any recommended measures, the precinct proposal will not have an adverse impact on the operations of Sydney Airport.	Sections 5.4 (p17) and 6 (p18)

3. Introduction

This aeronautical impact assessment report has been prepared by Strategic Airspace (StratAir) and on behalf of Infrastructure NSW (iNSW), to form part of the Blackwattle Bay State Significant Precinct Study (SSP Study). The SSP Study seeks a rezoning for new planning controls for Blackwattle Bay, located on the south-western side of Pyrmont.

The outcome of the State Significant Precinct process will be a new planning framework that will enable further development applications for the renewal of the Precinct, connected to the harbour and centred around a rejuvenated Sydney Fish Market. The framework will also provide for new public open spaces including a continuous waterfront promenade, community facilities, and other compatible uses.



Source: FJMT

Figure 5 — Aerial Perspective of the Blackwattle Bay Study Area

This report provides a comprehensive investigation of applicable airspace constraints to address a part of the Study Requirements and support the development of a new planning framework for Blackwattle Bay.

The airspace constraints are examined in relation to the maximum building envelopes proposed and the additional airspace that would be required for cranes necessary to enable development in the Study Area. The focus of the Study Area assessed in this report is the eastern side of Blackwattle Bay (as depicted in Figure 1, p1) where buildings of greater height are proposed.

4. Aeronautical Impact Context

4.1 Location of the Study Area

The Study Area lies to the north-north-east of Sydney Airport, approximately 8.1 km (4.4 Nautical Miles, NM) from the aerodrome reference point (ARP).

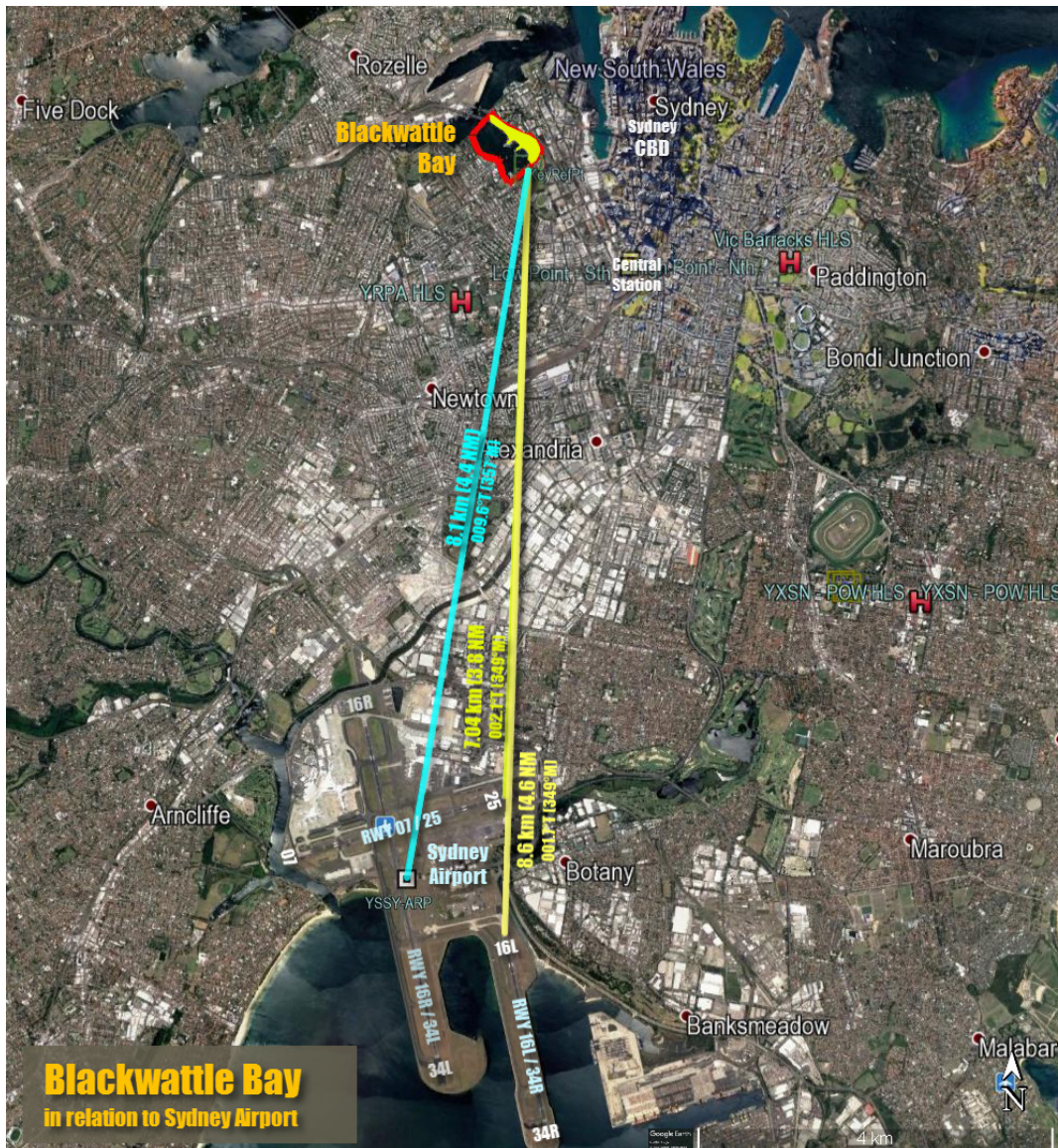


Figure 6 — The Study Area in relation to Sydney Airport (Large Format)

The reference point used for measurement from the airport is the southern-most corner of the area of aeronautical impact assessment within the Study Area — as indicated in Figure 6 above.

Other key measurement references are:

- In relation to Runway (RWY) 16L/34R, the eastern parallel runway
 - ~8.6 km (4.6 NM) at 001.7°T from the threshold of Runway (RWY)16L
- In relation to Runway (RWY) 07/25, the short cross-runway
 - ~7 km (3.8 NM) at 002.1°T from the threshold of RWY 25

The other airports in the Sydney Basin are too distant from the Study Area to have any impact on the airspace overhead it.

4.2 Methodology

The methodology used to determine the maximum building height (or minimum airspace height limitation) above the development site takes into consideration each of the following.

4.2.1 Airspace Regulations

The Study Area is subject to the Airports (Protection of Airspace) Regulations (APAR), under the Commonwealth's Airports Act, 1996), because of its proximity to Sydney Airport and because of its proposed height. These regulations define both: how building height limitations due to airspace safety can be determined; and the process for gaining approval of the SSP Proposal and development application for future buildings under the regulations.

The Prescribed Airspace Regulations, and their impact upon building height limitations, are described below.

4.2.2 Prescribed Airspace

Prescribed airspace, under these regulations, includes at minimum:

- **Obstacle Limitation Surfaces (OLS)**
 - The OLS surfaces are used to identify buildings and other structures that may have an impact upon the safety or regularity of aircraft operations at an airport. This impact depends upon both the type of operations at the aerodrome and which OLS surfaces are penetrated by a (proposed) building or structure.
 - The OLS are flat and rising (invisible) surfaces around the airport. They are based on the geometry of the airport and its runways and therefore they rarely change.
 - If a permanent building development (or temporary crane) that is proposed at a height that will penetrate (exceed) the height limit of an OLS surface, then an application must be made to the Commonwealth Department of Infrastructure, Transport, Regional Development and Communications (DITRDC) — via the closest airport, and with copies to any other potentially affected airport — for an airspace height approval prior to construction of the permanent development &/or erection of the temporary crane obstacle. Such applications should demonstrate the proposed building development does not penetrate or adversely affect surfaces protecting instrument flight procedures (PANS-OPS surfaces); radar vectoring; navigation infrastructure; or anything else that might affect the safety or regularity of operations at the airport.
- **PANS-OPS Surfaces**
 - PANS-OPS surfaces represent the protection surfaces for published instrument flight procedures to and from the airport. These surfaces comprise flat, sloping and complex surface components.
 - PANS-OPS surfaces must not be penetrated by either permanent or temporary buildings or structures. However, for a variety of reasons, PANS-OPS surfaces can and do change over time.
 - As flight procedures are changed from time to time (usually by Airservices), the PANS-OPS Surface Plan published by an airport may not reflect the current situation — which is why we not only reference the airport's plans but also review the published charts for current (or pending) instrument flight procedures and evaluate the associated PANS-OPS height limits. The regulations also make a provision for any factor which may be deemed to adversely affect the safety, regularity or efficiency of aircraft operations at an airport. In light of this, it is necessary to consider the following factors.

■ Other Considerations

- **Sydney Airport's Declared Airspace Plans** additionally include:
 - Radar Terrain Clearance Charts (RTCC), which depict the areas and height limits related to the Minimum Vector Altitudes (MVAs) used by Air Traffic Controllers when vectoring aircraft;
 - Lighting and visual guidance protection plans — used for approach guidance by aircraft, especially at night and in times of poor visibility; and
 - Navaid and radar evaluation / protection surface plans.
- **Other Factors**
 - Protection for other Instrument Flight Procedure surfaces, where the procedures are not classified as PANS-OPS and/or have been omitted from Sydney Airport's declared PANS-OPS surfaces charts. These may include a variety of Required Navigation Procedures (RNP).
 - Airline Engine-Out (Contingency) Take-Off Splays (as per Civil Aviation Order 20.7 1b)
These are generally assessed independently by the airlines as part of their own evaluations of any given airspace height application, but it is prudent to evaluate any potential impact in advance.
 - Other miscellaneous factors that may be considered as potential safety issues by any of the key stakeholders, and the Civil Aviation Safety Authority (CASA) in particular.
- Note: Airspace that is approved by the Department of Infrastructure, Transport, Regional Development and Communications (DITRDC) as Declared Airspace is considered part of an airport's Prescribed Airspace.

4.2.3 Note about Heights: Australian Height Datum (AHD) vs Above Ground Level (AGL)

All 'heights' provided in this document are elevations expressed in metres in the Australian Height Datum (AHD) — and thus they are true elevations, and NOT heights above ground level (AGL). For estimating maximum development heights AGL, the ground elevation^{AHD} should be subtracted from the airspace height limits^{AHD}.

Note also for aviation-related airspace height limits, any building height approval under the Airports (Protection of Airspace) Regulations is regarded as inclusive of the building itself plus all rooftop furniture and overruns (plant buildings, lift risers, etc).

For this assessment it is assumed that the building envelopes described in the SSP Study include all overruns and rooftop furniture.

4.2.4 About Applications for Aviation-related Airspace Height Approvals

Where required, applications under APAR must be submitted to DITRDC, at the appropriate time, through the closest relevant airport — in this case, Sydney Airport. Applications should include aeronautical impact assessment reports — such as this, but which are based on the most current plans for the proposed development available at the time. For major developments, such reports should include consideration of cranes that will be required for construction: this information will be used for assessment of the feasibility of constructing the buildings if approved at the maximum heights sought. Safety impact assessments and mitigation strategies may need to be included in the aeronautical study, depending on the nature and location of the development in relation to the airspace restrictions and other aeronautical impact factors.

Separate applications for cranes which exceed the OLS will also be required at the appropriate times during the construction period, prior to their installation and operation.

Note that applications are not required for the SSP Study.

5. Analysis

5.1 OLS Analysis

The height limit of Sydney Airport's OLS within the Study Area is defined by the Outer Horizontal Surface, which applies across the entire Area, as depicted in Figure 7 below.

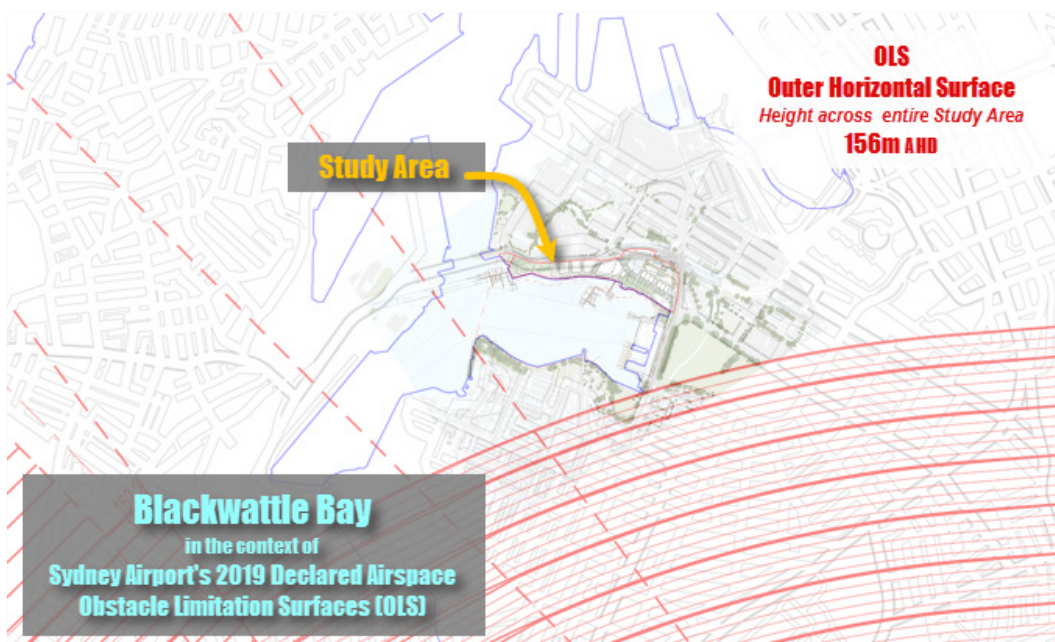


Figure 7 — Blackwattle Bay in relation to Sydney Airport's OLS

Buildings and cranes may exceed the OLS height limits, but if proposed an application for the aviation-related airspace approval must be submitted to Commonwealth Department of Infrastructure, Transport, Regional Development and Communications (DITRDC), via Sydney Airport. Failure to obtain such approval before construction commences can result in significant penalties under the Airports Act (1996), and significantly raising the risk of having a development that cannot be constructed.

Conversely, airspace height approvals are not required for any buildings or cranes that would not exceed the OLS height limits.

Note re Reporting Tall Structures

Any crane or building where the top would be higher than 100m Above Ground Level (AGL) must be reported to Airservices Australia as a Tall Structure 'obstacle' — even if it would not penetrate the OLS height.

Separate reporting is not required if a prior approval has been granted for the obstacle by DITRDC.

The Sydney Airport Master Plan to 2039 does not forecast any changes to the aerodrome that would occasion a change to the OLS. Thus, the current OLS is anticipated to remain in force for the planning and development horizon of the Blackwattle Bay SSP.

5.2 PANS-OPS Analysis

Although the tallest of the proposed buildings in the Study Area will not exceed the OLS height limit of 156m AHD, the PANS-OPS flight procedure surfaces and other height assessment considerations (refer section 5.3, p15) were also analysed so as to ascertain

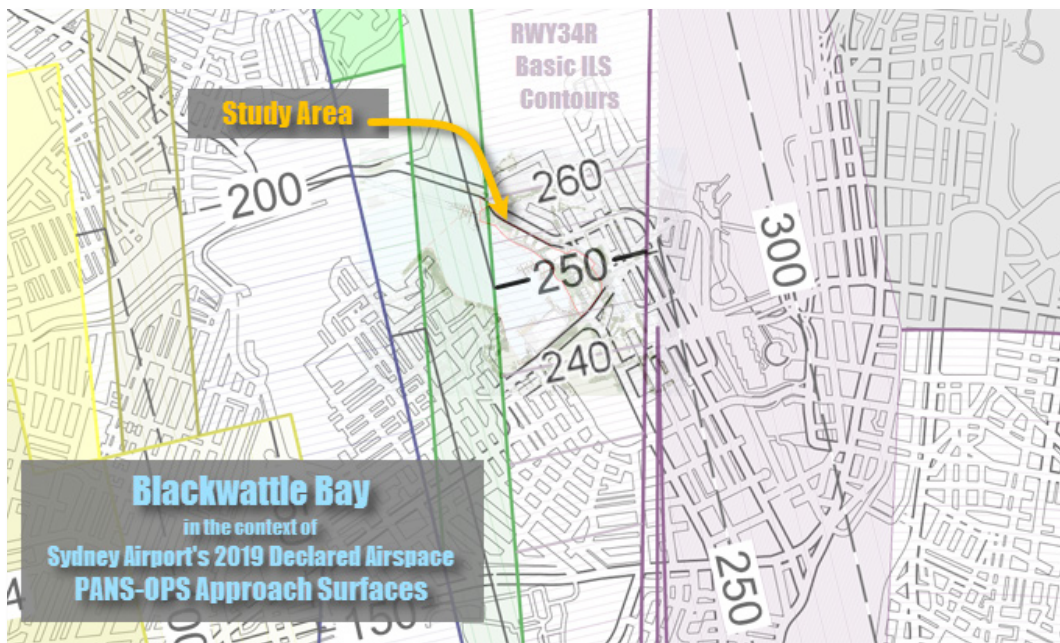
the effective height limits that would be applicable for cranes ultimately used for construction — essentially to determine potential future crane approval implications.

5.2.1 Current Procedures

In addition to reviewing the PANS-OPS Surfaces chart of Sydney Airport's Prescribed Airspace (as declared and approved by DITRDC in 2015), assessment was conducted of the following instrument (non-visual) procedure types for Sydney Airport, as published by Airservices Australia in the Australian Aeronautical Information Publication (AIP) Departure and Approach Procedures (DAP), up to Amendment 165 (effective 05-Nov-2020 to 24-Mar-2021).

- The Circling Minima and Minimum Sector Altitudes (MSAs) for existing PANS-OPS procedures
'Area' procedures, which provide protection for aircraft manoeuvring or circling within defined areas above the airport and surrounds
- The discrete minima for the Instrument Approach Procedures.
- Missed Approaches — as part of the evaluation of Approach Procedures
- The existing Standard Instrument Departure Procedures (SIDs)

Of the approach and departure procedures, only procedures that might be relevant to the Study Area are included in this report. Principally these are procedures for the eastern North-South runway, RWY 16L/34R, as well as the 'area' procedures.



Source: Sydney Airport; Annotated by StratAir

Figure 8 — PANS-OPS Approach Procedures Height Constraints across Blackwattle Bay

The Sydney Airport Master Plan to 2039 was also reviewed for potential future impact. The Master Plan does not forecast any changes to procedures that would, to our best knowledge, make the airspace above the study area any more constraining than that resulting from analysis of the combination of the current PANS-OPS procedures and Radar Terrain Clearance Chart (RTCC) surfaces (see also section 5.3.1, p16).

Analysis determined that Blackwattle Bay is constrained by only a few procedures, the key impact being surfaces related to the Basic ILS surfaces related to the Missed Approach of the precision approach to RWY34R.

Table 3 — PANS-OPS Height Limit Summary

Procedure	Height Limit (m AHD)	Description
Circling	N/A	Not applicable — the Study Area is inside the No Circling Area.
Approaches and Missed Approaches to all Runways	~245 – ~260	The height constraints vary across the Study Area due to the interaction of various sloping surfaces. The limits here are as per the Sydney Airport chart (see Figure 8, above).
Departures	N/A	Where protection surfaces overlay the Study Area, they are higher than those related to approach and missed approach procedures.
Minimum Sector Altitude (MSA)	335.2	10NM Inner MSA of 2100ft.

Further details are provided in the following sections.

5.2.2 'Area' Procedures

A Minimum Sector Altitudes (MSAs)

The height restrictions imposed by Minimum Sector Altitudes are higher than the limits imposed by approach procedures.

B Circling Minima

The Study Area is inside the No Circling Area defined for Sydney Airport, so this aspect is not applicable to Blackwattle Bay.

5.2.3 Instrument Approaches & Missed Approaches

The height restrictions due to the instrument approach procedures vary across the site, as depicted in Figure 8 and summarised in Table 3 above.

5.2.4 Departures

The surfaces of omnidirectional departure procedures from both RWY34R and RWY07 overlay the Study Area, but the limiting heights overhead are higher than those of Approach and Missed Approach Procedures and therefore not restrictive.

5.3 Other Assessment Considerations

The following table provides a brief assessment of other considerations, based on existing prescribed airspace charts, the Sydney Airport 2039 Master Plan and related operational issues.

Table 4 — Other Assessable Height Limitations — including the RTCC MVA Limit

Procedure	Height Limit (m AHD)	Description
Radar Terrain Clearance Chart (RTCC) / Minimum Vector Altitude (MVA) Surface	335.28 Eastern Half	The surface height over the aeronautical focus area, being the eastern half of the study area, are so high that they are not limiting on the proposal. See section 5.3.1 and Figure 9 below.
Navigation Infrastructure	N/A	The Study Area is too far from the airport to affect any navigation infrastructure. No impact.

Procedure	Height Limit (m AHD)	Description
Lighting & Reflectivity	N/A	The Study Area is too far from the airport, and also effectively shielded by buildings between it and the airport, to have any negative impact on these factors.
Airlines Engine Out Procedures	N/A	Engine Out procedures (from RWY 34R, the most relevant take-off runway end) are designed and maintained by each of the passenger transport aircraft operators in accordance with the relevant regulations. The site is effectively shielded by buildings in the CBD. No impact.
Airspace protections for Helicopter Flight Paths to Nearby Hospitals	N/A	The site is not within the vicinity of any hospital-based Strategic Helicopter Landing Site (SHLS). No impact.
Visual Procedures	N/A	Not part of the prescribed airspace but evaluated in any case. The site is outside the areas defined for normal flight training and visual circuits. It is also below the normal height limits defined for any visual flight that may be used by general aviation aircraft and helicopters not using defined routes. No impact.

There are no other considerations that might limit the building height in the Study Area.

5.3.1 Radar Terrain Clearance Chart (RTCC) / Minimum Vector Altitude (MVA) Surface

The Radar Terrain Clearance Chart (RTCC) surfaces overhead the Study Area protects the airspace used by air traffic controllers as the lowest Minimum Vector Altitude (MVA) they can use for vectoring aircraft. The MVA sectors have been updated since Sydney Airport's RTCC chart was published (2015), so the assessment has been made based on updated sector information provided by Airservices Australia.

The RTCC / MVA surface height limit overhead the western portion of the aeronautical focus area of the Study Area is ~335m AHD, as depicted in Figure 9 below.

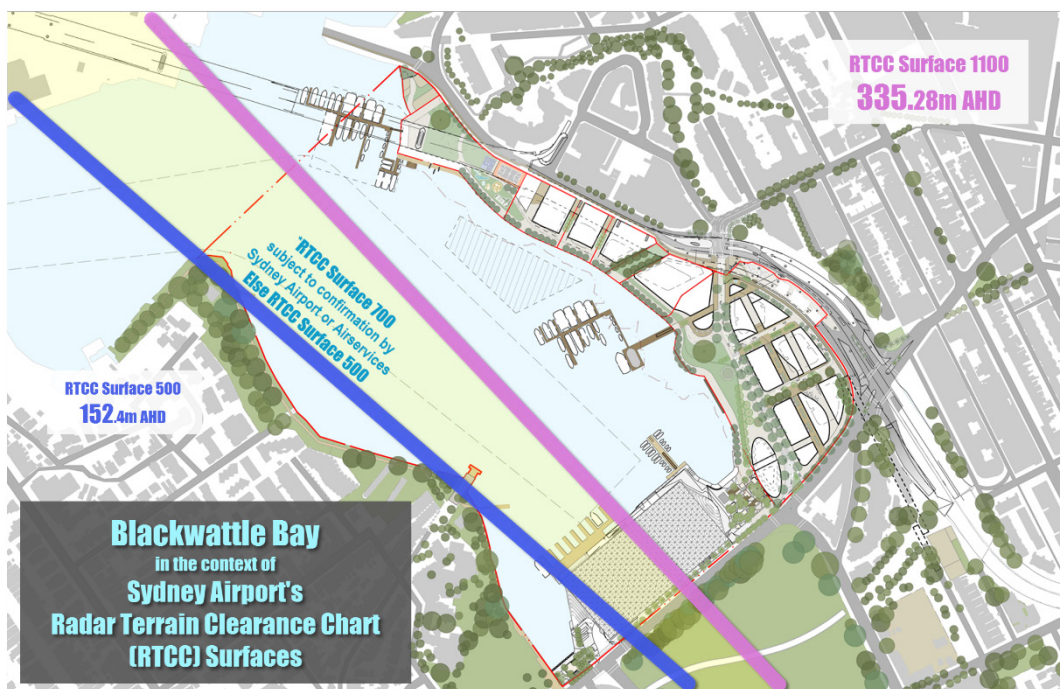


Figure 9 — Radar Terrain Clearance Chart (RTCC) Surface Height Limits

5.4 Summary of Maximum Permissible Heights

Table 5 — Summary — Study Area Airspace Height Constraints

Height Limits (AHD)	Height Limit Detail	Comment
156m	OLS Outer Horizontal Surface	<p>AIRSPACE APPROVAL THRESHOLD HEIGHT limit (depicted in Figure 7, p13)</p> <p>Any development or construction activity or structure (eg, crane) that would exceed the relevant OLS height across the Study Area would require a prior 'airspace height' approval from the Department of Infrastructure, Transport, Regional Development and Communications under the Airports (Protection of Airspace) Regulations (or APAR).</p> <p>The planned building envelopes will not exceed this height and will therefore NOT require prior airspace approval.</p> <p>Cranes which would exceed this height would require prior approval under APAR — however, this does not preclude approval of the rezoning proposal.</p> <p>After construction, any building which exceeds 110m above ground must be reported as a Tall Obstacle to Airservices.</p>
~245 – ~260m	Various PANS-OPS RWY34R Basic ILS — Sloping Surface	<p>The PANS-OPS surfaces define the maximum permissible building height that would be approved by the aviation authorities in the relevant areas (see Figure 8, p14)</p> <p>Cranes which would remain below the relevant PANS-OPS height limit (at its location) would be permitted but would require prior approval under APAR where the height would exceed the OLS.</p>
335m	Radar Terrain Clearance Chart (RTCC)	<p>The RTCC surface height is the absolute cap on crane heights that could potentially be approved aeronautical assessment focus area (see Figure 9, p16)</p> <p>Based on the maximum planned building heights, it is highly unlikely that cranes required for construction would exceed the relevant PANS-OPS surface height limits, and so the RTCC surface constraint is considered irrelevant for this planning proposal.</p>
NA	Other Surfaces	<p>The Study Area is outside any airspace protection requirements related to Sydney Airport's Navigation and Airport Lighting and Visual Guidance facilities, as well as those related to Airline Engine Inoperative contingency take-off procedures and helicopter flight paths to/from Strategic Helicopter Landing Sites.</p>

The limiting PANS-OPS heights, being the maximum permissible heights for developments in the Study Area, are significantly higher than the maximum height of any building proposed in the Study Area. These would also be the maximum height for cranes that could be approved without operating duration conditions.

As the tallest of the proposed buildings would be no higher than 156m AHD, this effectively means that there would be a margin of 89m or more above the top of the buildings for cranes. It is considered that this margin could accommodate all cranes required for construction, and therefore future applications for cranes would be considered approvable under APAR.

6. Conclusion

As all building envelopes proposed in the Blackwattle Bay Study Area will be no higher than the applicable OLS height of 156m AHD, there would be no requirement to seek aviation-related airspace height approvals for the buildings.

Cranes which would not exceed the OLS height would not require prior airspace approval. For those proposed to exceed the OLS, the vertical margin between the maximum building height proposed and the PANS-OPS height limits over the Study Area is sufficiently large that cranes eventually required for construction would not infringe the PANS-OPS height limits, which means that future crane height applications would be considered approvable under the APAR.

Taking these factors into consideration, we consider that the Precinct Plan proposed for the Study Area will not have any adverse impact on the safety, efficiency or regularity of current and future air transport operations to/from Sydney Airport.

Thus, from an aeronautical impact standpoint, there is no technical impediment to approval of the Blackwattle Bay SSP.

APPENDICES

Appendix 1 — Abbreviations

Abbreviations used in this report and/or associated reference documents, and the meanings assigned to them for the purposes of this report are detailed in the following table:

<i>Abbreviation</i>	<i>Meaning</i>
AC	Advisory Circular (document supporting CAR 1998)
ACFT	Aircraft
AD	Aerodrome
ADS-B	Automatic Dependent Surveillance – Broadcast: an aircraft location identification and tracking service facilitated by satellite signals and ground tracking stations, similar to (but more accurate than) radar
AGL	Above Ground Level (Height)
AHD	Australian Height Datum
AHT	Aircraft Height
AIP	Aeronautical Information Publication
Airports Act	Airports Act 1996, as amended
AIS	Aeronautical Information Services
ALARP	As Low As Reasonably Practicable
ALC	Airport Lease Company
Alt	Altitude
AMAC	Australian Mayoral Aviation Council
AMSL	Above Minimum Sea Level
ANEF	Australian Noise Exposure Forecast
ANSP	Airspace and Navigation Service Provider
APACL	Australia Pacific Airports Corporation Limited, owner of Melbourne and Launceston Airports
APCH	Approach
APARs, or A(PofA)R	Airports (Protection of Airspace) Regulations, 1996 as amended
ARP	Aerodrome Reference Point
AsA	Airservices Australia
ASDA	Accelerated Stop Distance Available
ATC	Air Traffic Control(ler)
ATM	Air Traffic Management
BA (Planning)	Building Application or Building Approval (Planning)
BAC	Brisbane Airport Corporation
BAL	Bankstown Airport Limited
BCC	Brisbane City Council
CAO	Civil Aviation Order
CAR	Civil Aviation Regulation
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulation
Cat	Category
CBD	Central Business District
CG	Climb Gradient
CNS/ATM	Communications, Navigation, Surveillance / Air Traffic Management
CoS	City of Sydney Council
CPA	Cairns Port Authority, Operators Of Cairns Airport
DA (Aviation)	Decision Altitude (Aviation)
DA (Planning)	Development Application or Development Approval (Planning)

<i>Abbreviation</i>	<i>Meaning</i>
DAH	Designated Airspace Handbook
DAP	Departure and Approach Procedures (published by AsA)
DEP	Departure
DER	Departure End (of the) Runway
DEVELMT	Development
DH	Decision Height
DITRDC / DITRDC / DITRDC	Department of Infrastructure, Transport, Regional Development & Communications (since Dec-2019) Formerly the Department of Infrastructure, Regional Development (& Cities) (sometimes also abbreviated as Infrastructure)
DME	Distance Measuring Equipment
Doc nn	ICAO Document Number nn
DoD	Department of Defence
DODPROPS	Dependent Opposite Direction Parallel Runway Operations
DPIE	NSW Department of Planning, Industry & Environment
EIS	Environmental Impact Study
ELEV	Elevation (above mean sea level)
ENE	East North East
ERSA	EnRoute Supplement Australia
ESE	East South East
FAF	Final Approach Fix
FACS	NSW Family & Community Services — formerly part of LaHC, but since July 2019 part of the NSW Department of Communities & Justice (DCJ)
FAP	Final Approach Point
Ft	Feet
GDA94	GDA is the Geocentric Datum of Australia. It has been implemented as the standard datum since 1994.
GLS	GNSS Landing System – a precision landing system like ILS but based on augmented GNSS using ground and satellite systems.
GNSS	Global Navigation Satellite System
GP	Glide Path
HAL	High Intensity Approach Light
HLS	Helicopter Landing Site
IAS	Indicated Air Speed
ICAO	International Civil Aviation Organisation
IFR	Instrument Flight Rules
IHS	Inner Horizontal Surface, an Obstacle Limitation Surface
ILS	Instrument Landing System, a precision approach landing system
IMC	Instrument Meteorological Conditions
iNSW	Infrastructure NSW
IPA	Integrated Planning Act 1997, Queensland State Government
ISA	International Standard Atmosphere
IVA	Independent Visual Approach
Km	Kilometres
Kt	Knot (one nautical mile per hour)
LaHC	NSW Land and Housing Corporation, part of the NSW DPIE
LAT	Latitude
LDA	Landing Distance Available

<i>Abbreviation</i>	<i>Meaning</i>
LEP	Local Environment Plan (Planning)
LLZ	Localizer
LONG	Longitude
LSALT	Lowest Safe ALTitude
M	Metres
MAPt	Missed Approach Point
MDA	Minimum Descent Altitude
MDH	Minimum Descent Height
MDP	Major Development Plan
MGA94	Map Grid Australia 1994
MOC	Minimum Obstacle Clearance
MOCA	Minimum Obstacle Clearance Altitude
MOS	Manual Of Standards, published by CASA
MP	Master Plan
MSA	Minimum Sector Altitude
MVA	Minimum Vector Altitude
NASF	National Airports Safeguarding Framework
NDB	Non-Directional Beacon
NE	North East
NM	Nautical Mile (= 1.852 km)
nnDME	Distance from the DME (in Nautical Miles)
NNE	North North East
NNW	North North West
NOTAM	NOTice to AirMen
NPR	New Parallel Runway (Project, Brisbane Airport)
OAR	Office of Airspace Regulation
OCA	Obstacle Clearance Altitude (in this case, in AMSL)
OCH	Obstacle Clearance Height
ODPROPS	Opposite Direction Parallel Runway OPERations
OHS	Outer Horizontal Surface, an Obstacle Limitation Surface
OLS	Obstacle Limitation Surface, defined by ICAO Annex 14; refer also CASA MOS Part 139
PANS-OPS	Procedures for Air Navigation – Operations, ICAO Doc 8168; refer also CASA MOS Part 173
PAPI	Precision Approach Path Indicator (a form of VGSI)
PBN	Performance Based Navigation
PRM	Precision Runway Monitor
RAAF	Royal Australian Air Force
RAPAC	Regional AirsPace users Advisory Committee
REF	Reference
RL	Relative Level
RNAV	aRea NAVigation
RNP	Required Navigation Performance
RPA	Rules and Practices for Aerodromes — replaced by the MOS Part 139 — Aerodromes
RPT	Regular Public Transport
RTCC	Radar Terrain Clearance Chart (refer also MVA)

<i>Abbreviation</i>	<i>Meaning</i>
RWY	Runway
SACL	Sydney Airport Corporation Limited
SID	Standard Instrument Departure
SODPROPS	(Independent) Simultaneous Opposite Direction Parallel Runway Operations
SPP	State Planning Policy, Queensland (specifically SPP 1/02: Development in the Vicinity of Certain Airports and Aviation Facilities)
SSDA	State Significant Development Application
SSP	State Significant Precinct
SSR	Secondary Surveillance Radar
STAR	STandard Arrival
STODA	Supplementary Take-Off Distance Available
TAR	Terminal Approach Radar
TAS	True Airspeed
TfNSW	Transport for NSW
THR	THReshold (of Runway)
TMA	TerMinal Area
TNA	Turn Altitude
TODA	Take-off Distance Available
TORA	Take-Off Runway Available
VFR	Visual Flight Rules
VIS	Visual
VMC	Visual Meteorological Conditions
V _n	Aircraft critical velocity reference
VNAV	Vertical Navigation
VOR	Very high frequency Omni-directional Range
VSS	Visual Segment Surface
WAC	Westralia Airports Corporation, operators of Perth Airport
WAM	Wide-Area Multilateration
WNW	West North West
WSW	West South West
WGS84	World Geodetic System 1984
WSA	Western Sydney Airport – Sydney's second international airport

Appendix 2 — PANS-OPS Procedures

The latest versions of the IFPs consulted were from the current AIP Amendment 165 (effective from 05-Nov-2020 to 24-Mar-2021) — as indicated in Table 5 below.

Table 6 — PANS-OPS Instrument Flight Procedure Charts for Sydney Airport (AIP Amendment 165 – Effective 05-Nov-2020 to 24-Mar-2021)

SYDNEY (YSSY)

Name of Chart	Effective Date	(Amendment No)
AERODROME CHART PAGE 1	7-Nov-2019	(Am 161)
AERODROME CHART PAGE 2	13-Aug-2020	(Am 164)
APRON CHART - INTERNATIONAL PAGE 1	21-May-2020	(Am 163)
APRON CHART - INTERNATIONAL PAGE 2	13-Aug-2020	(Am 164)
APRON CHART - DOMESTIC PAGE 1	7-Nov-2019	(Am 161)
APRON CHART - DOMESTIC PAGE 2	13-Aug-2020	(Am 164)
APRON CHART - DOMESTIC PAGE 3	13-Aug-2020	(Am 164)
STANDARD DOMESTIC TAXI ROUTES - ARRIVALS	7-Nov-2019	(Am 161)
STANDARD DOMESTIC TAXI ROUTES - DEPARTURES	7-Nov-2019	(Am 161)
NOISE ABATEMENT PROCEDURE PAGE 1	7-Nov-2019	(Am 161)
NOISE ABATEMENT PROCEDURE PAGE 2	7-Nov-2019	(Am 161)
NOISE ABATEMENT PROCEDURE PAGE 3	7-Nov-2019	(Am 161)
NOISE ABATEMENT PROCEDURE PAGE 4	21-May-2020	(Am 163)
NOISE ABATEMENT PROCEDURE PAGE 5	21-May-2020	(Am 163)
NOISE ABATEMENT PROCEDURE PAGE 6	7-Nov-2019	(Am 161)
NOISE ABATEMENT PROCEDURE PAGE 7	7-Nov-2019	(Am 161)
NOISE ABATEMENT PROCEDURE PAGE 8	7-Nov-2019	(Am 161)
NOISE ABATEMENT PROCEDURE PAGE 9	7-Nov-2019	(Am 161)
NOISE ABATEMENT PROCEDURE PAGE 10	7-Nov-2019	(Am 161)
AIRPORT EFFICIENCY PROCEDURES	7-Nov-2019	(Am 161)
IVA USER GUIDE PAGE 1	7-Nov-2019	(Am 161)
IVA USER GUIDE PAGE 2	7-Nov-2019	(Am 161)
PRM USER INSTRUCTIONS	5-Nov-2020	(Am 165)
SID SYDNEY TWO DEPARTURE (RADAR)	21-May-2020	(Am 163)
SID RWY 34L SOUTH WEST DEP (JET)	7-Nov-2019	(Am 161)
SID RWY 16R DEENA SEVEN (JET) (RNAV)	7-Nov-2019	(Am 161)
SID RWY 34R ENTRA FIVE (JET) (RNAV)	7-Nov-2019	(Am 161)
SID RWY 07 FISHA EIGHT (JET) (RNAV)	7-Nov-2019	(Am 161)
SID RWY 16R KAMPI FIVE (RNAV)	7-Nov-2019	(Am 161)
SID RWY 16L KEVIN SIX (RNAV)	21-May-2020	(Am 163)
SID RWY 16L ABBEY THREE (JET) (RNAV)	7-Nov-2019	(Am 161)
SID RWY 34R MARUB SIX (JET) (RNAV)	7-Nov-2019	(Am 161)
SID RWY 34L RICHMOND FIVE DEP (JET)	7-Nov-2019	(Am 161)
STAR BOREE THREE A ARRIVAL (RNAV)	5-Nov-2020	(Am 165)
STAR BOREE THREE P ARRIVAL (RNAV)	5-Nov-2020	(Am 165)
STAR MEPIL THREE ARRIVAL (RNAV)	21-May-2020	(Am 163)
STAR MARLN FIVE ARRIVAL (RNAV)	21-May-2020	(Am 163)
STAR ODALE SEVEN ARRIVAL (RNAV)	21-May-2020	(Am 163)
STAR RIVET THREE ARRIVAL (RNAV)	21-May-2020	(Am 163)
ILS OR LOC RWY 07	7-Nov-2019	(Am 161)

<i>Name of Chart</i>	<i>Effective Date</i>	<i>(Amendment No)</i>
ILS OR LOC RWY 16L PAGE 1	7-Nov-2019	(Am 161)
ILS RWY 16L PAGE 2	7-Nov-2019	(Am 161)
ILS OR LOC RWY 16R PAGE 1	7-Nov-2019	(Am 161)
ILS RWY 16R PAGE 2	7-Nov-2019	(Am 161)
ILS OR LOC RWY 25	7-Nov-2019	(Am 161)
ILS OR LOC RWY 34L PAGE 1	7-Nov-2019	(Am 161)
ILS RWY 34L PAGE 2	7-Nov-2019	(Am 161)
ILS OR LOC RWY 34R PAGE 1	7-Nov-2019	(Am 161)
ILS RWY 34R PAGE 2	7-Nov-2019	(Am 161)
RNAV-Z (GNSS) RWY 07	7-Nov-2019	(Am 161)
RNAV-Z (GNSS) RWY 16L	7-Nov-2019	(Am 161)
RNAV-Z (GNSS) RWY 16R	7-Nov-2019	(Am 161)
RNAV-Z (GNSS) RWY 25	7-Nov-2019	(Am 161)
RNAV-Z (GNSS) RWY 34L	7-Nov-2019	(Am 161)
RNAV-Z (GNSS) RWY 34R	7-Nov-2019	(Am 161)
GLS RWY 07	7-Nov-2019	(Am 161)
GLS RWY 16L	21-May-2020	(Am 163)
GLS RWY 16R	21-May-2020	(Am 163)
GLS RWY 25	7-Nov-2019	(Am 161)
GLS RWY 34L	21-May-2020	(Am 163)
GLS RWY 34R	21-May-2020	(Am 163)

Source: AIP Book (05-Nov-2020) via <http://www.airservicesaustralia.com/aip/aip.asp?pg=10>