



AERONAUTICAL IMPACT ASSESSMENT

12 Hassall St, Parramatta



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Aeronautical Impact Assessment: 12 Hassall St, Parramatta

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1

Executive Summary

Executive Summary

This Aeronautical Impact Assessment (AIA) has been prepared by Avlaw Pty Ltd, trading as Avlaw Aviation Consulting (Avlaw), for GQ Hassall St Pty Ltd (GQ Hassall) to supplement its development application (DA) as well as applications to Bankstown Airport Limited (BAL) for controlled activity approvals. The controlled activity approvals will be in relation to a proposed multi-story building development as well as two temporary luffing jib tower cranes that will be used during construction.

GQ Hassall are proposing to construct a high-rise building at 12 Hassall Street in Parramatta (the site) to a height of 210.3m AHD, with all plant and ancillary features captured within this height. Temporary crane activity will consist of two cranes reaching heights of 255.780m AHD and 256.530m AHD respectively.

There are numerous airspace protection surfaces that cover the site that form the prescribed airspace for Sydney Airport and Bankstown Airport. The table below summarises the most relevant surfaces and the heights of each over the site.

Airspace Surface	Height
Obstacle Limitation Surfaces (Bankstown Airport)	156m AHD
Radar Terrain Clearance Chart (RTCC) (Bankstown and Sydney Airports)	243.84m AHD
Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS) (Sydney Airport)	340m AHD
Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS) (Bankstown Airport) – NDB Departure	319.5m AHD

Avlaw's assessment has found that the critical (i.e. lowest) prescribed airspace protection surface covering the site is the Outer Horizontal Surface of the Bankstown Airport Obstacle Limitation Surfaces (OLS) at a height of 156m AHD. This surface will be penetrated permanently by the building and temporarily by two luffing jib cranes which will be used during construction, meaning each will require controlled activity approval.

Above the OLS, the next lowest airspace protection surface which covers the site is the RTCC for Bankstown and Sydney Airports. Although this surface is above the proposed building height (210.3m AHD), it will be penetrated by both cranes which will reach a height of 255.780m AHD and 256.530m AHD respectively.

A Construction Management Plan (CMP) will be developed as part of the CC with airspace restrictions in mind with the intention to minimise the impact on aircraft operations to the maximum extent possible. Although the RTCC will be penetrated by both cranes, this will only occur when the cranes are at their minimum radius. At all other times, the cranes will be lower than the 243.84m AHD RTCC surface. It is expected that if controlled activity approval is given, it will be conditional on the cranes being below the RTCC outside daylight hours which GQ Hassall have considered in the development of their CMP and is possible.

Helicopter operations in the vicinity of the site including those covered under Guideline H of the National Airports Safeguarding Framework (i.e. hospital helipads) have also been assessed and Avlaw has concluded that the building and crane will not adversely impact on these activities.

The conclusion of this AIA is that applications seeking approval for the building and associated cranes to penetrate the OLS should be assessed favourably by aviation stakeholders involved in the assessment process for controlled activity applications. With respect to the RTCC, penetration by the cranes for a maximum of three (3) months may be approved. Where an approval for penetration of the RTCC is given, it may be on the condition that the cranes are lowered below the RTCC outside daylight hours, thus mitigating any unacceptable risks to aircraft operations. Such conditions will be considered when developing the CMP as part of the CC.



2

Regulatory Framework

Regulatory Framework

2.1 Airspace Height Controls

Protection of airspace surrounding an airport is a critical component of maintaining requisite safety standards that facilitate the efficient use of runways, whilst also managing the associated impacts of their use on other critical infrastructure (e.g. taxiways), the environment and the general public. 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 Bankstown Airport and Sydney Airport, the following airspace protection surfaces have been "declared" by the Department of Infrastructure, Transport, Regional Development and Communications (Department) and are therefore enshrined in legislation as the airport's prescribed airspace:

- » OLS (Bankstown Airport and Sydney Airport);
- » PANS-OPS surfaces (Bankstown Airport and Sydney Airport);
- » Sydney Airport Navigation Aids Protected Surfaces;
- » Sydney Airport High Intensity Light Protected Surfaces;
- » Sydney Airport Precision Approach Path Indicator (PAPI) system protection surfaces;
- » Radar Terrain Clearance Chart (RTCC)/Radar Lowest Sector Altitude (RLSALT) surfaces (covering Bankstown Airport and Sydney Airport); and
- » Combined Radar Departure Assessment surfaces (Sydney Airport).

2.2 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" 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 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 RTCC and long-term penetrations of the OLS is the Department as specified in the Act and the Regulations.

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. Based on the crane heights provided by GQ Hassall, the RTCC will be penetrated but only when the cranes are at their minimum radius which will occur during limited periods when lifts close to the building are necessary and when the cranes are being refuelled which will not exceed a period of three months.

The approval process requires separate applications for the permanent building structure and temporary construction cranes. It is encouraged for applications for both permanent (i.e. building) and temporary (i.e. cranes) obstacles to be lodged concurrently to expedite the approval process.

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

**Proposed
Development**

Proposed Development

3.1 Location

The site is located north of Bankstown Airport and approximately 160m to the east of Parramatta Railway Station on the eastern side of the Parramatta CBD. The coordinates at the centre of the site are E315645.830 N6256624.190. The centre of the site is 11,980 metres from Bankstown Airport Aerodrome Reference Point (ARP).

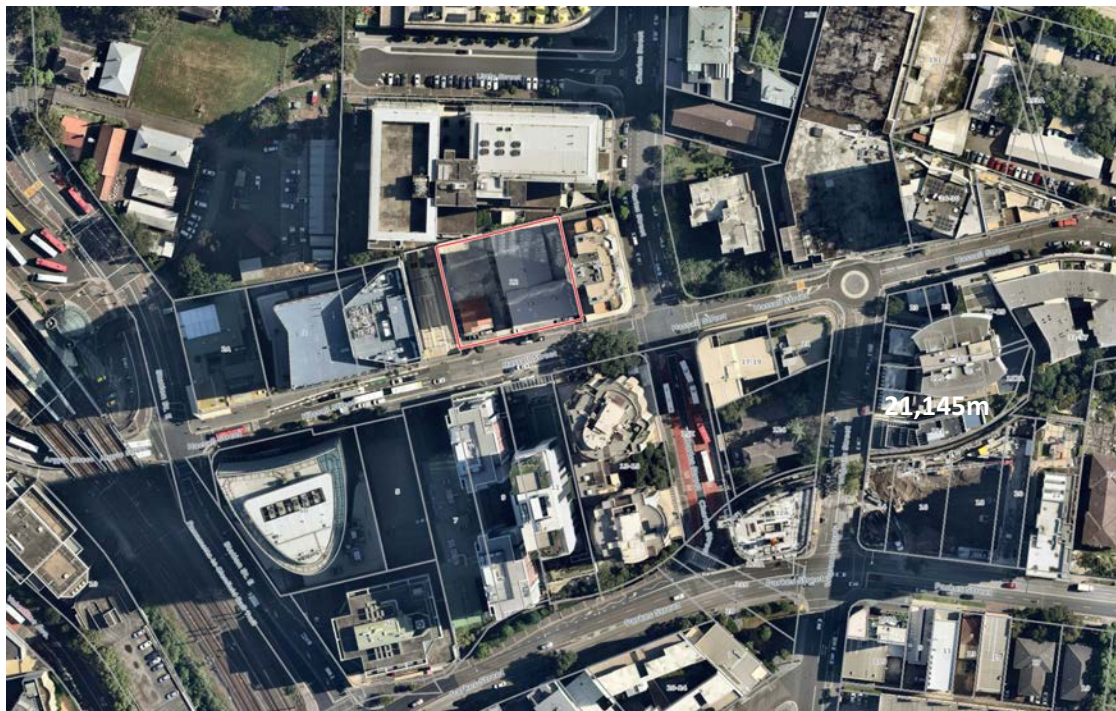


Figure 1: Site boundary indicated in red

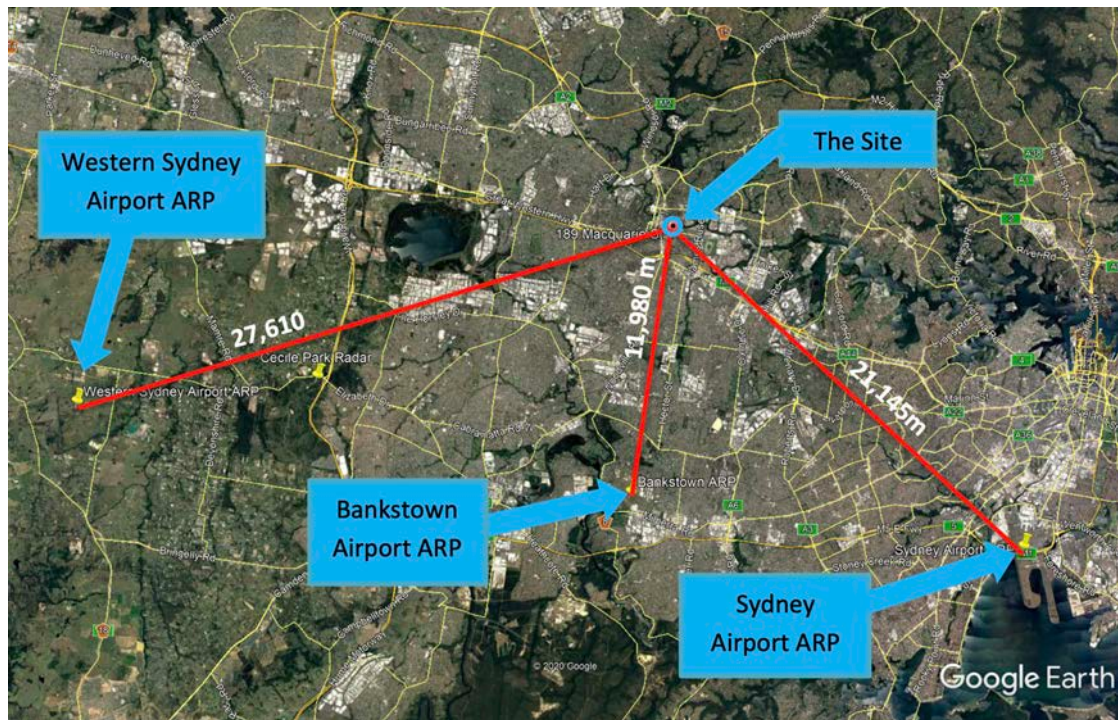


Figure 2: Site location in relation to Bankstown Airport, Sydney Airport and Western Sydney Airport

3.2 Permanent Structure

The proposed building height is 210.3m AHD, with all plant and ancillary features captured within this envelope. An elevation view image of the proposed development indicating its height is provided on the following page at Figure 3.

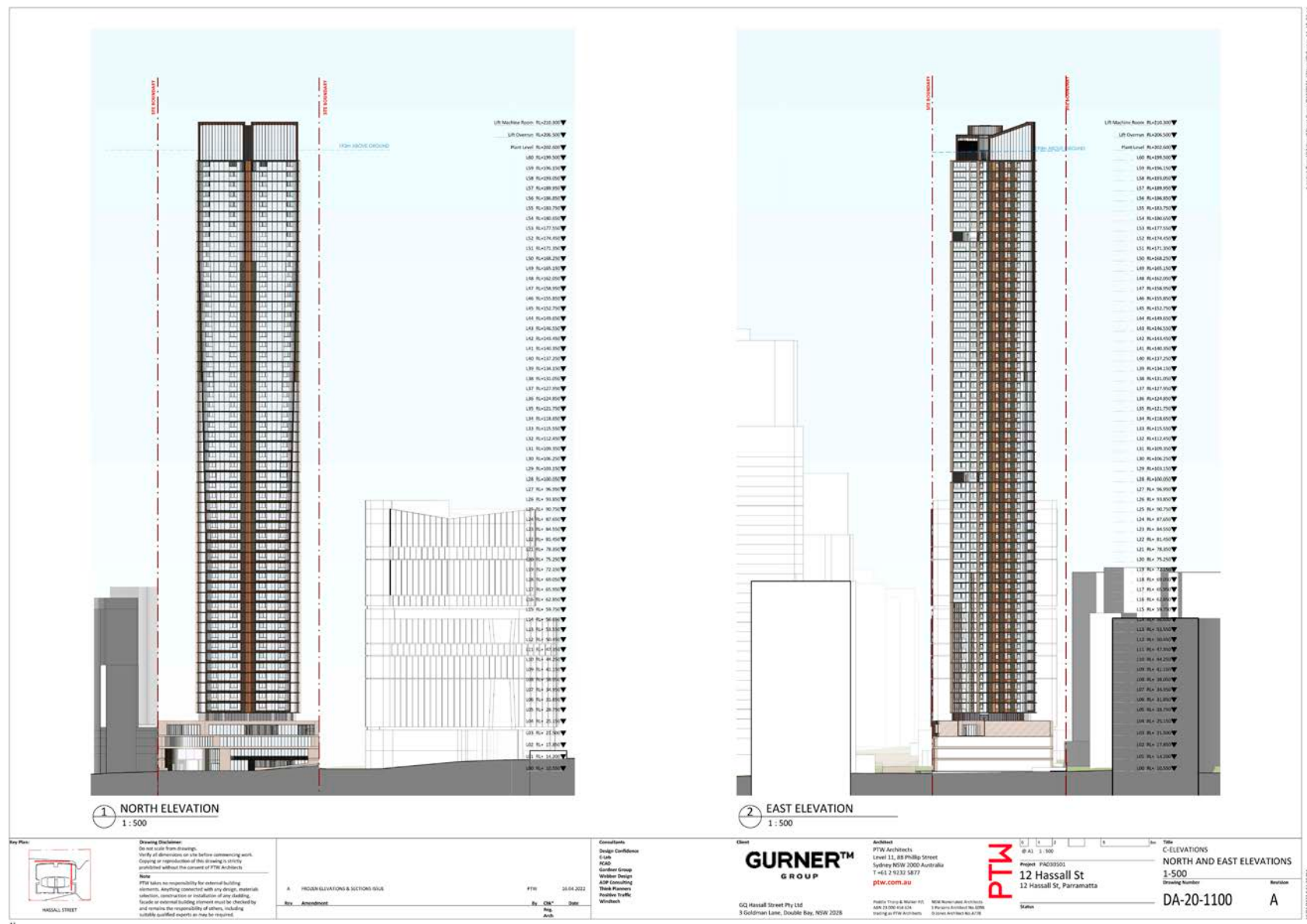
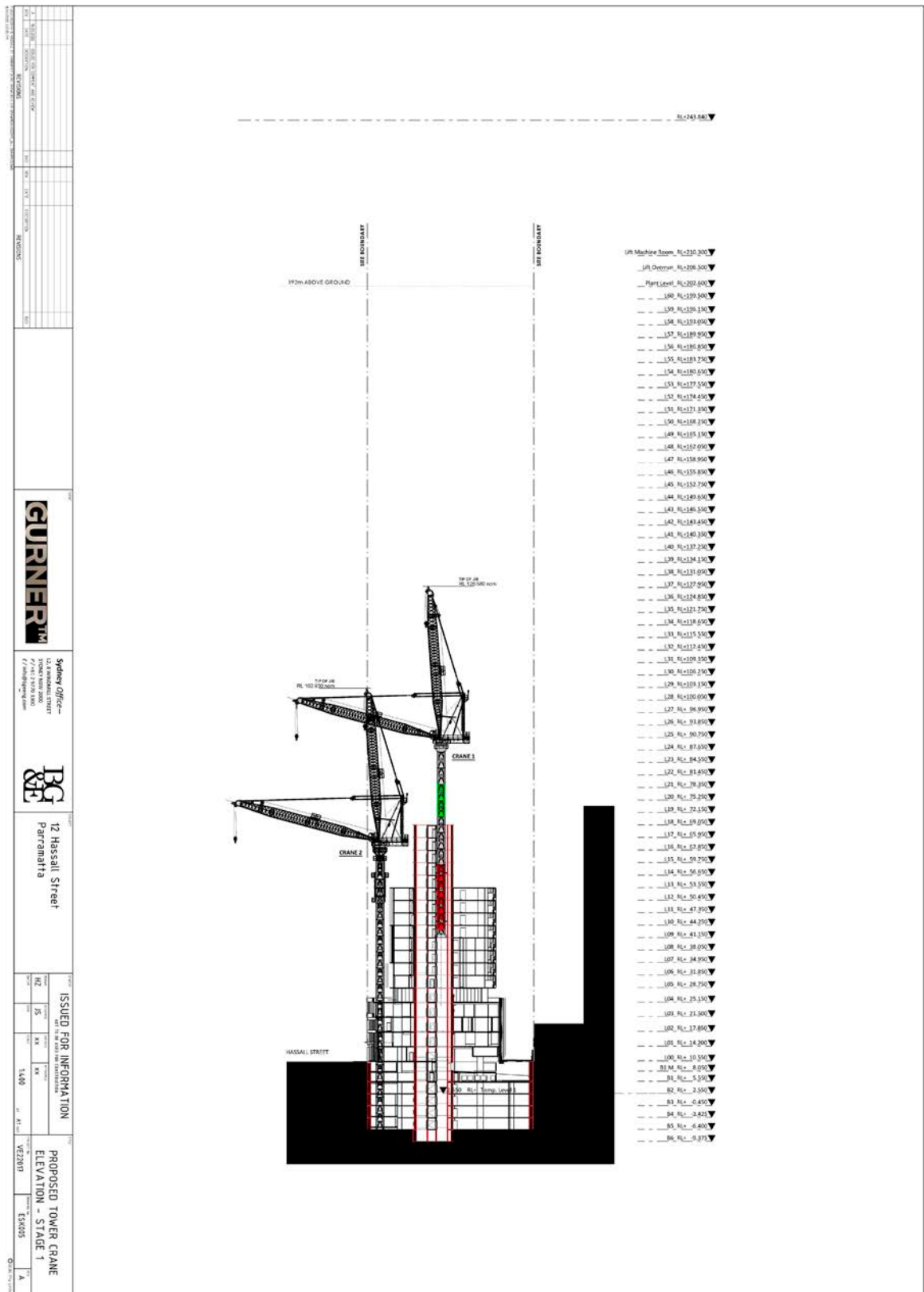
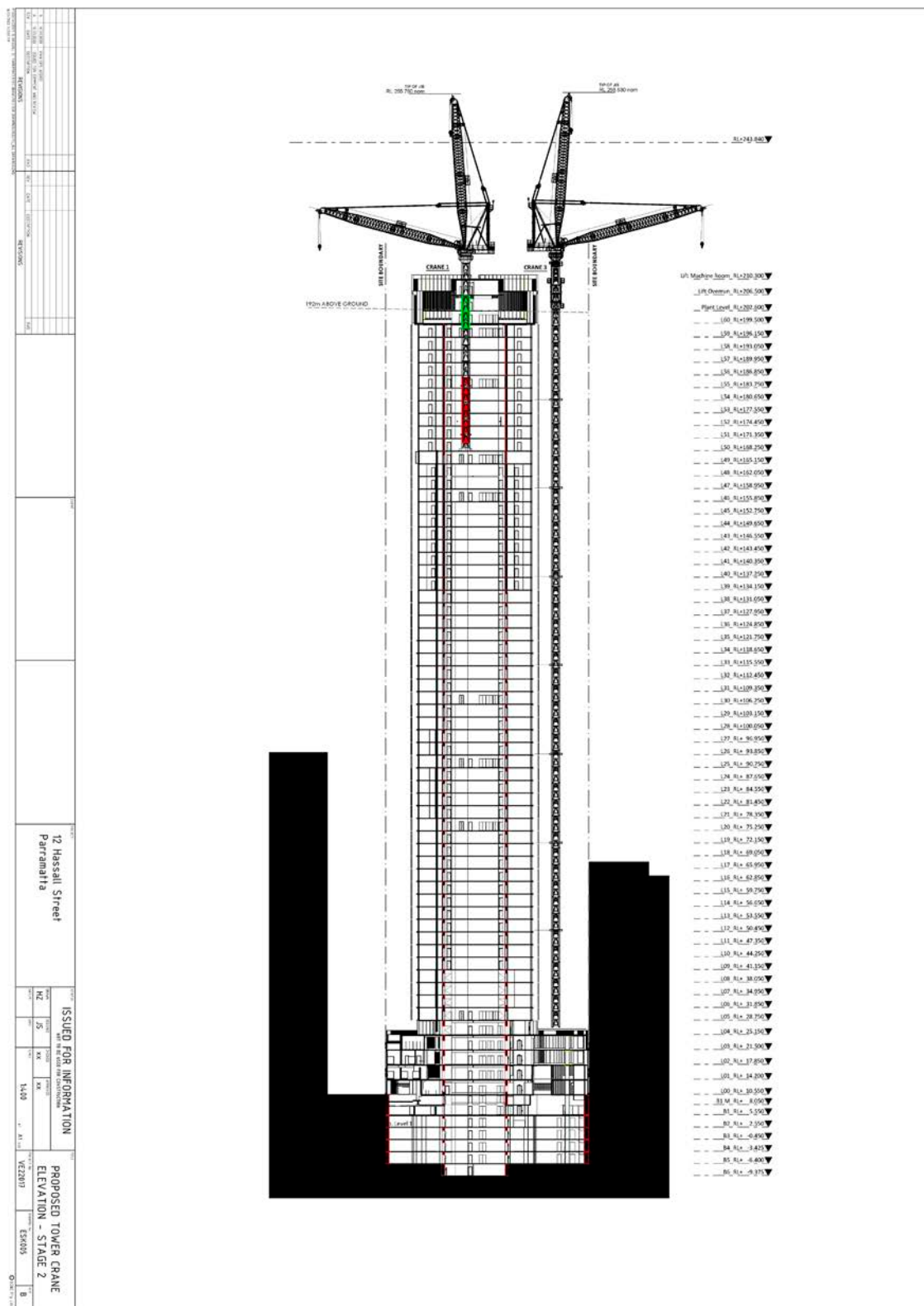


Figure 3: North (left) and east (right) elevation of the proposed development (210.3m AHD)

3.3 Crane Activity

Crane activity at the site will be across two stages. Stage 1 will consist of two luffing jib cranes which will reach heights of 126.580m AHD (crane 1) and 102.930m AHD (crane 2) respectively. Once crane 2 reaches this height, it will be relocated and from that point onwards is referred to as crane 3, although at any one time there will only ever be two luffing jib cranes in operation. Figures 4-7 on the following pages illustrate the heights of the cranes as well as their movement arcs during construction.





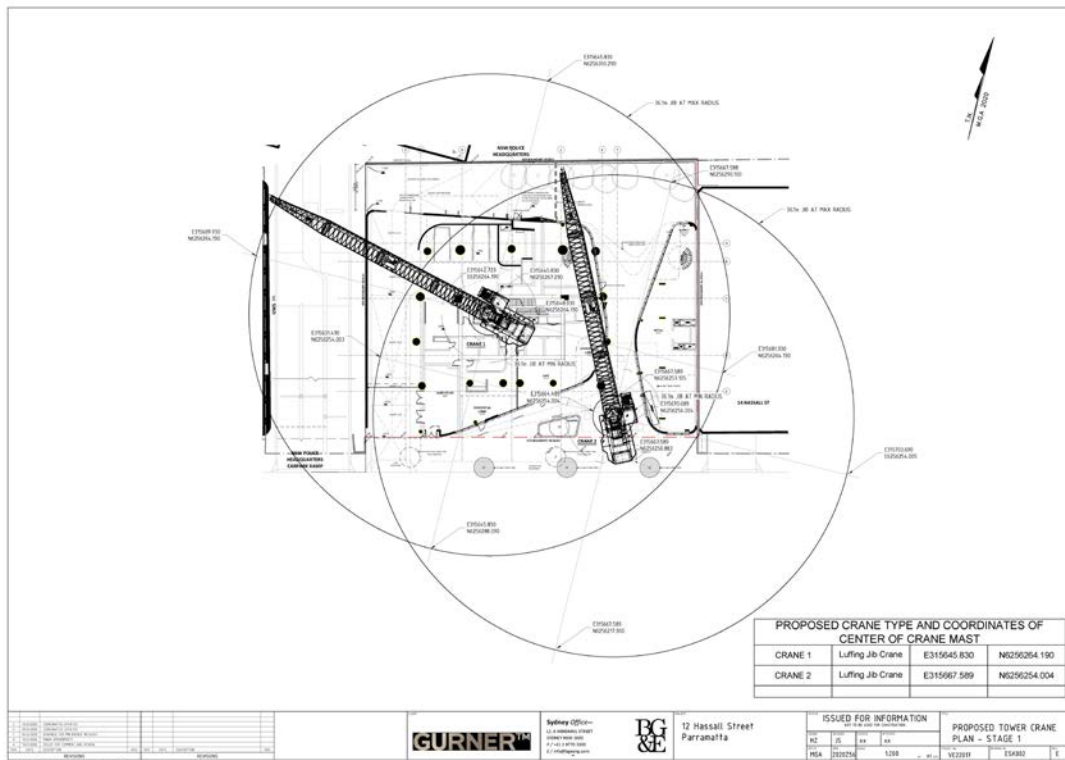


Figure 6: Movement arc of cranes 1 and 2 during Stage 1 (maximum radius)

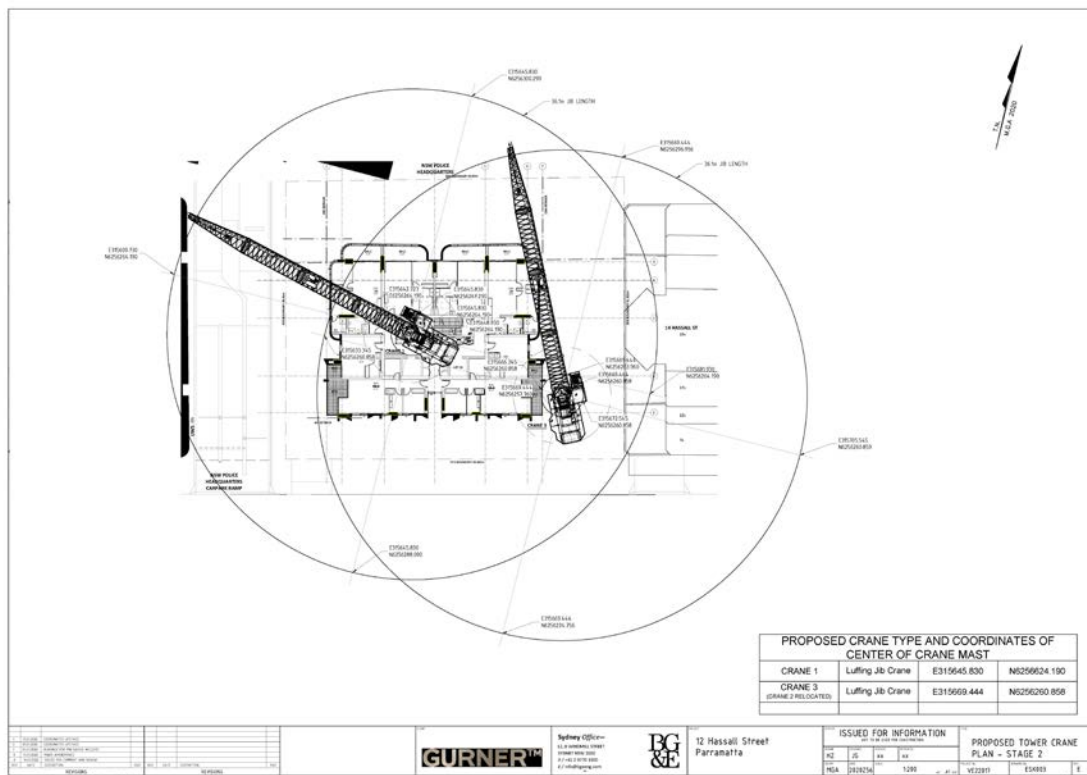


Figure 7: Movement arc of cranes 1 and 3 during Stage 2 (maximum radius)

The two cranes that will be erected on site will each have a 36.1m jib and progressively increase in height as construction proceeds.

Cranes 2 and 3 will both penetrate the RTCC as they will reach heights of 255.780m AHD and 256.530m AHD respectively. Although the cranes will be erected for a total of 14 months, the time cranes 1 and 3 will penetrate the RTCC is limited to:

- » when the crane is being operated at its minimum turn radius, which will occur when key lifts are necessary close to the building; and
- » when refuelling is taking place.

RTCC penetrations if approved are limited to a maximum of three months and this will be factored into the CMP whereby the crane will be lower than the RTCC outside daylight hours, assuming that is a condition of the controlled activity being approved.

The forecast site start date for construction is March 2023 with a construction timeline of 56 months. Penetration of the RTCC is expected to be months 53-56.



4

**Prescribed Airspace
Assessment**

Prescribed Airspace Assessment

It is a regulatory requirement for federally leased airports including Bankstown Airport, Sydney Airport and Western Sydney Airport to produce and make available charts which illustrate each of their prescribed airspace. Although charts are available for all the aforementioned airports, based on recent experience on other projects, it has become apparent that the PANS-OPS chart published by Bankstown Airport in their Master Plan does not accurately reflect their current instrument procedures. To mitigate against the risk of drawing incorrect conclusions of the actual airspace restrictions which cover the site, Avlaw has based its assessment of Bankstown Airports instrument procedures on first principles and produced a model which based on recent experience has been demonstrated to be accurate after subsequent detailed assessments by aviation stakeholders.

With respect to Sydney Airport and Western Sydney Airport, the charts they have published are considered to be accurate over the site and have therefore been referenced in our assessment.

The following charts and associated airspace are not relevant because the site is approximately 21km from Sydney Airport and well clear of the horizontal limits of these surfaces:

- » Sydney Airport Navigation Aids Protected Surfaces;
- » Sydney Airport High Intensity Light Protected Surfaces); and
- » Sydney Airport Precision Approach Path Indicator (PAPI) system protection surfaces

The Sydney Airport Combined Radar Departure Assessment Surfaces have also been deemed irrelevant and excluded from Avlaw's assessment as SACL have advised that these surfaces have been incorporated into the PANS-OPS chart.

Western Sydney Airport was assessed as not having any limitation on development at the site because the site is outside the horizontal limits of OLS and the closer Bankstown Airport and Sydney Airport are the most limiting for development heights.

Avlaw has identified the OLS, PANS-OPS and RTCC for Bankstown Airport and Sydney Airport as the most critical volumes of airspace for which further analysis would be required to achieve requisite approvals. These are explained in more detail in section 4.1-4.4 below. Figure 8 on the following page provides a summary of the findings.

Prescribed airspace - Bankstown and Sydney Airports					
Airspace surface	Height	Building (210.3m AHD)		Cranes (up to 256.530m AHD)	
		Above surface?	Clearance/penetration	Above surface?	Clearance/penetration
OLS (Bankstown Airport)	156m AHD	YES	54.3m	YES	100.53m
PANS-OPS (Bankstown Airport)	319.5m AHD	NO	109.2m	NO	62.97m
PANS-OPS (Sydney Airport)	340m AHD	NO	129.7m	NO	83.47m
RTCC (Bankstown Airport and Sydney Airport)	243.84	NO	33.54m	YES	12.69m

Figure 8: Summary of Aeronautical Impact Assessment Findings

4.1 Obstacle Limitation Surfaces

The site lies under the Outer Horizontal Surface of the OLS for Bankstown Airport and outside the horizontal limits of the OLS for Sydney Airport and Western Sydney Airport. It is indicated by the marker on Figure 9. The proposed building height at 210.3m AHD will penetrate the OLS by 54.3m. Temporary construction cranes up to 256.530m AHD will penetrate the OLS by 100.53m. Since the building and temporary crane activity will penetrate the prescribed airspace for Bankstown Airport, they will be considered controlled activities and require approval from aviation authorities prior to proceeding.

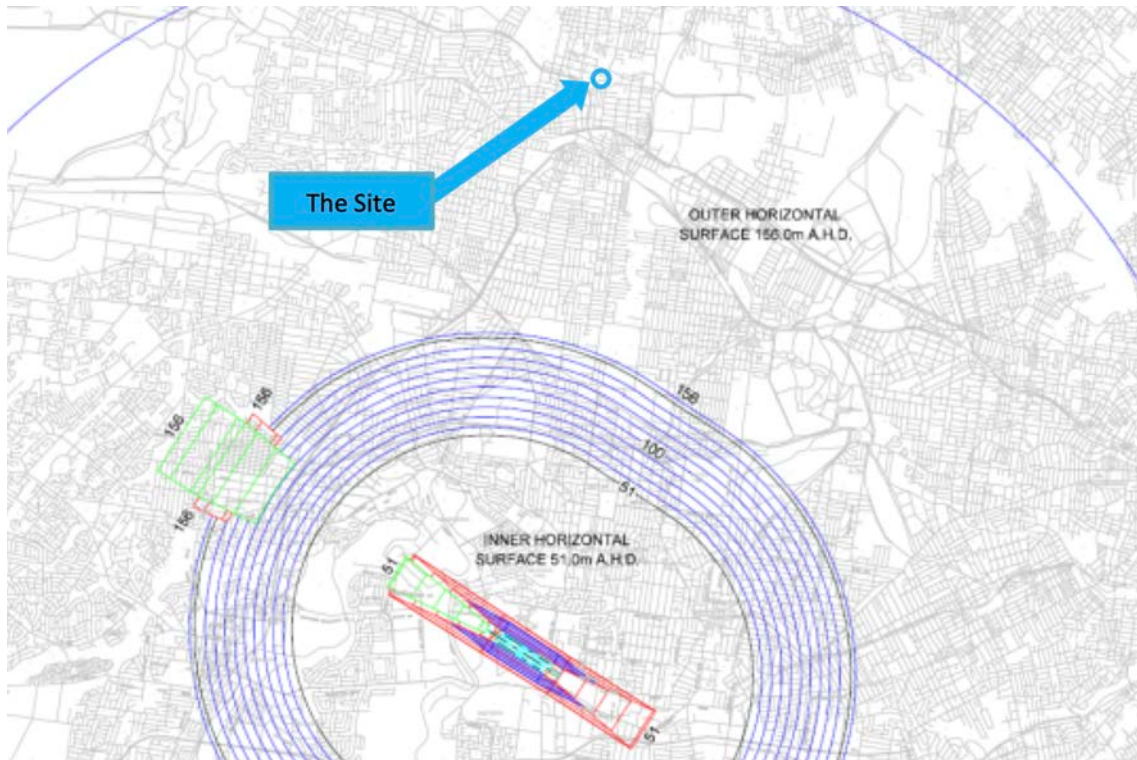


Figure 9: Location with respect to the Bankstown Airport OLS

4.2 Procedures for Air Navigation Services – Aircraft Operations Surfaces

The site is covered by a horizontal segment of Sydney Airport's PANS-OPS surfaces at 340m AHD and will therefore not be penetrated by the building or temporary crane activity at the site.

With respect to Bankstown Airport's PANS-OPS, plotting the site on the PANS-OPS chart published in their Master Plan identified a nominal PANS-OPS surface height of 360m AHD. However, recent experience on other projects has demonstrated that the PANS-OPS chart published by Bankstown Airport in their Master Plan does not accurately reflect their current instrument procedures. Therefore, Avlaw has produced a model of the PANS-OPS based on first principles and has found that the PANS-OPS for the NDB Departure is 319.5m AHD over the site. The proposed building and temporary crane activity do not penetrate the Bankstown Airport PANS-OPS surfaces as identified in either the Master Plan or our own model. Figure 10 and Figure 11 show the PANS-OPS surfaces applicable in the vicinity of the proposed development from the Sydney Airport PANS-OPS chart and Bankstown Master Plan respectively. Figure 12 shows Avlaw modelling of the building and cranes.

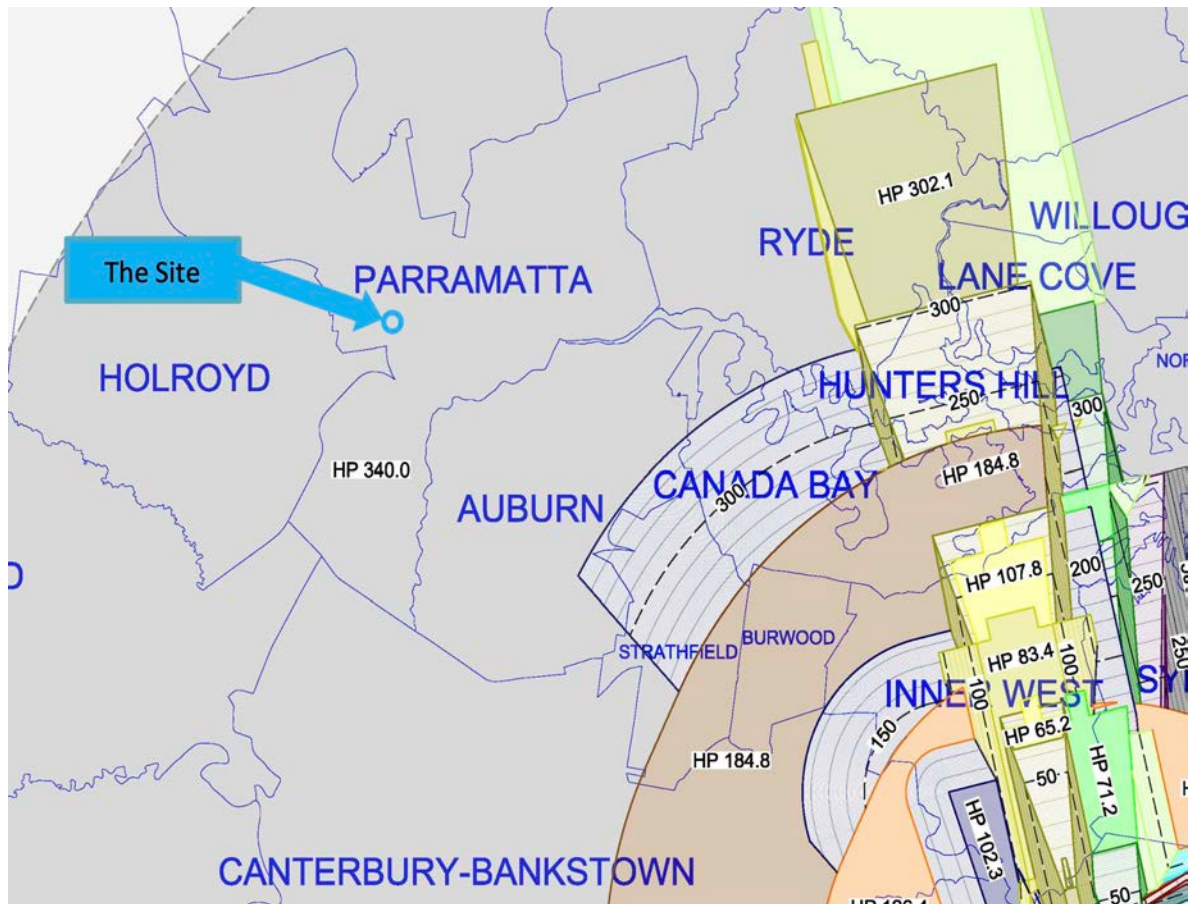


Figure 10: The site plotted on the Sydney Airport PANS-OPS Chart
 Note: HP = Horizontal Plane

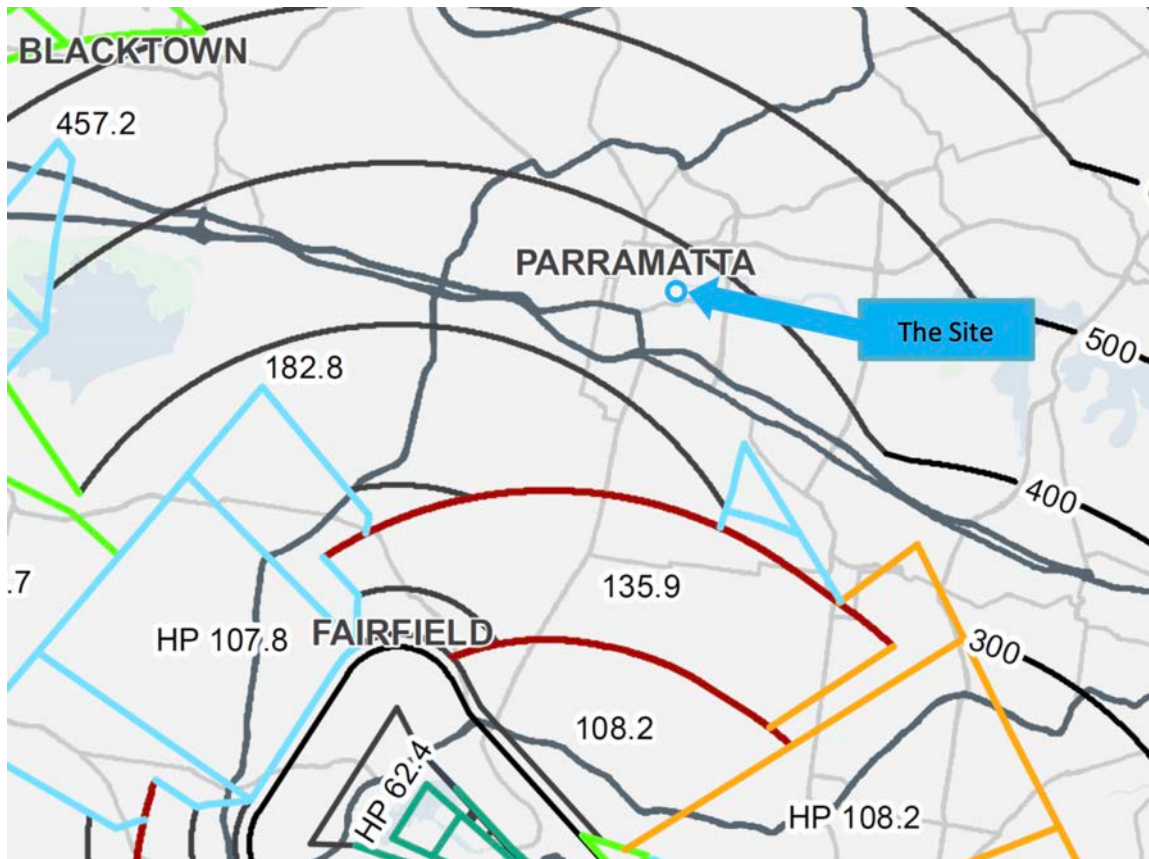


Figure 11: The site plotted on the Bankstown Airport PANS-OPS Chart (2019 Master Plan)
 Note: HP = Horizontal Plane



Figure 12: Building (red) and cranes 1, 2 and 3 (white, green and yellow domes respectively) modelled below PANS-OPS surfaces (319.5m AHD)

4.3 Radar Terrain Clearance Chart

The RTCC depictions are contained in the Radar Lowest Safe Altitude (RLSALT) chart. The intersection of two RTCC sectors cover the site, the lowest being at a height of 243.84m AHD as shown on the figures on the following page.

The proposed maximum building height is 210.3m AHD, with all plant and ancillary features captured within this envelope will not penetrate. However, temporary crane activity will reach a height of 256.530m AHD and will therefore penetrate this surface.

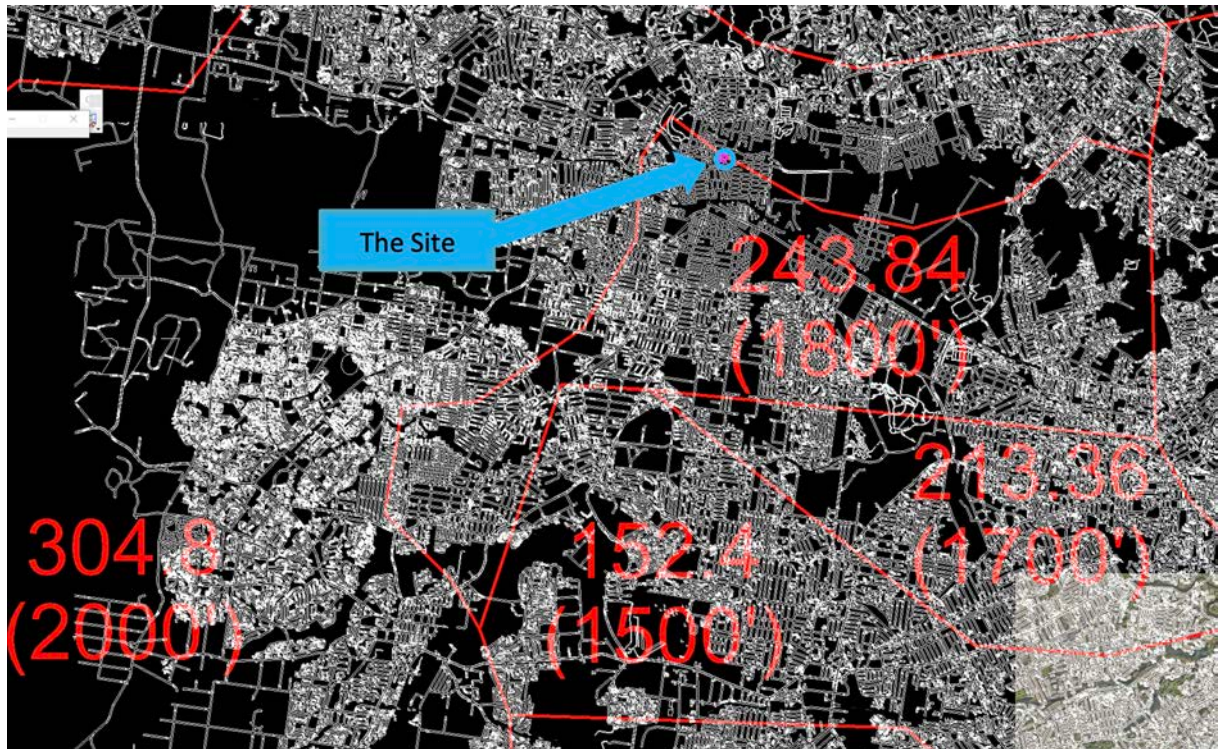


Figure 13: The site plotted on the Sydney Airport RTCC Chart (2019)

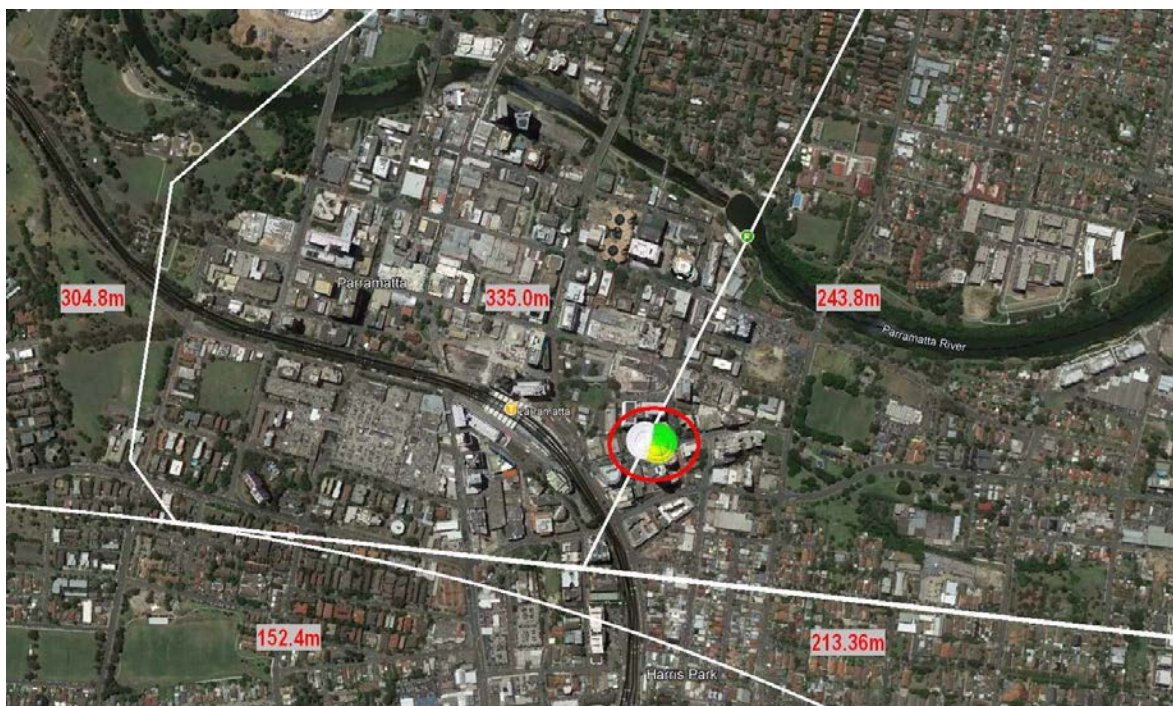


Figure 14: Building site (red circle) indicated on aerial view of modelled RTCC

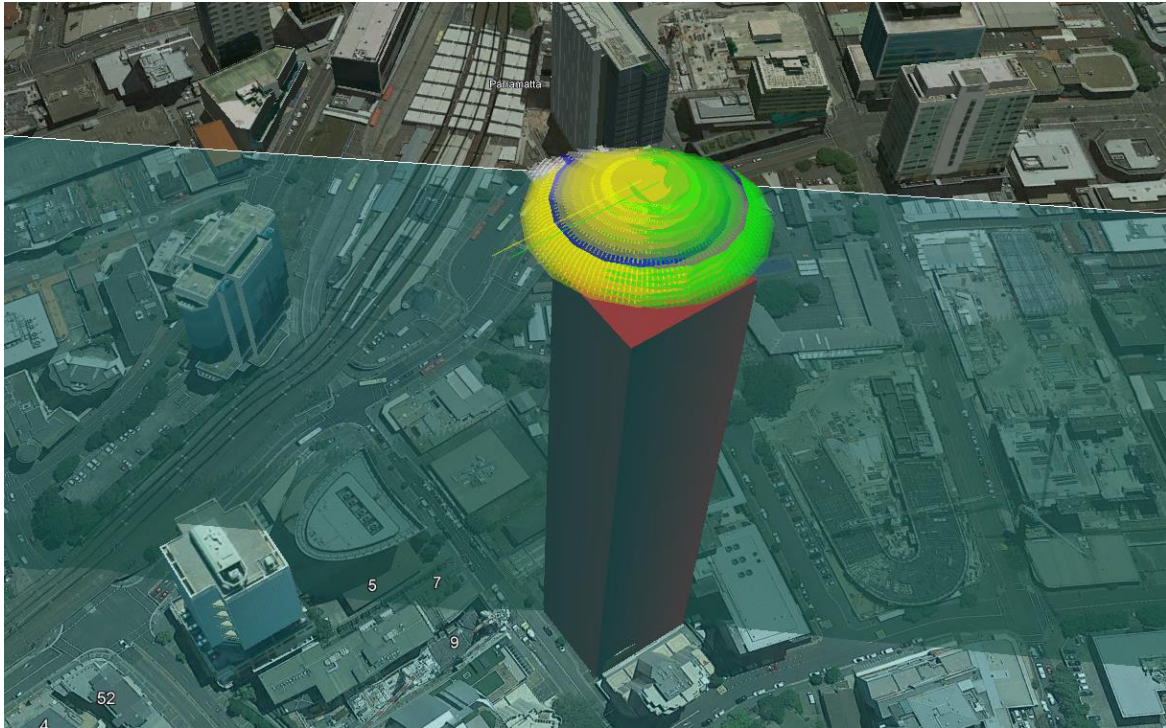


Figure 15: Building (red) and cranes (three domes) modelled showing RTCC penetration



5

**Assessment of
Flight Procedures**

Assessment of Instrument Flight Procedures

A review of all published approach and departure procedures as described in Aeronautical Information Publication/Departure and Approach Procedures (AIP/DAP) for Sydney Airport and Bankstown Airport has been undertaken and confirms that the proposed building height of 210.3m AHD and temporary crane activity up to a maximum height of 256.530m AHD will not impact on any instrument flight procedures. The PANS-OPS chart extracts for Bankstown Airport at Figure 11 show the obstacle clearance heights for all instrument flight procedures over the site which will have no adverse effect on instrument flight operations. Modelling conducted by Avlaw at Figure 12 was undertaken against the lowest PANS-OPS over the site being the NDB Departure at 319.5m AHD. The building and temporary construction crane are below the instrument flight protected surfaces.



6

**Radar, Navigation
and Communications
Performance Impact**

Radar, Navigation and Communications Performance Impact

An assessment by Avlaw has identified no potential performance issues from the proposed building development. The proposed development is 21,715 metres from the Sydney Airport Terminal Radar (TAR) and 17,135 metres from the Cecil Park TAR. There are no facilities in close proximity to the proposed development for their performance to be compromised.

Sydney Airport Terminal Radar (TAR) and Cecil Park TAR have specified clearances and provide overlap for performance issues that may exist on each TAR due to individual isolated structures. Once the applications for controlled activity approvals are lodged by GQ Hassall, Airservices will conduct their own assessment to confirm that there are no performance issues from penetration of standard TAR clearance surfaces.



7

Airport Master Plans

Airport Master Plans

Bankstown Airport Master Plan 2019 includes updated PANS-OPS requirements to provide for future expansion. This has been taken into account in preparing this AIA and Figure 11 is an extract from the Master Plan. Avlaw has also conducted PANS-OPS assessment from first principles because the master plan heights have not been updated to include less restrictive obstacle clearance requirements.

The Sydney Airport Master Plan 2039 identifies future planning including assessment of aircraft traffic, passenger movements and instrument flight procedures in use. Avlaw has noted that passenger and aircraft movements at Sydney are predicted to increase and that there are no identified changes to instrument flight procedures. In assessing the master plan predictions of increased movements, Avlaw is cognisant of the fact that aircraft movements that are predicted to increase should be insignificant. Sydney Airport has regulated caps on the number of movements per hour that are permitted and movements are already operating at near capacity during peak periods.

The Western Sydney Airport Plan 2016 provides advice on airspace control and contains the detailed OLS that identifies the site is clear of the OLS horizontal limits. The PANS-OPS is currently under design with Western Sydney Airport 27,610 metres from the site and SE of the extended centre line of the new 05/23 parallel runways. Sydney Airport is 21,145 metres from the site and Bankstown is 11,980 metres from the site. The most limiting airspace is expected to remain the closer airports at Bankstown and Sydney where aircraft will be at a lower height conducting instrument flight procedures to/from those airports.

There are no identified issues in the various Master Plans which have not been taken into account in the preparation of this AIA.



8

Conclusions

Visual Flight

The site is further than 15km from Sydney Airport and Western Sydney Airport and more than 5.5km from Bankstown Airport, and therefore beyond the limits of all protection surfaces set aside for visual flight at the three aerodromes.



9

Helicopter Operations

Helicopter Operations

Legislation requires the pilot of a helicopter to determine the safe take-off and landing approach taking into account all 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.

9.1 Bankstown Airport

The nearest corner of site is located approximately 11,050 metres north of the Bankstown Airport 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 Sydney Control Zone. These are included in the Coded Clearances and Operating Requirements for Bankstown Airport, with the coded clearances containing the specific routes and prescribed altitudes to be flown. Avlaw's assessment has found that the proposed development site is clear of specific helicopter transit routes namely CHOPPERS NORTH and CHOPPERS WEST.

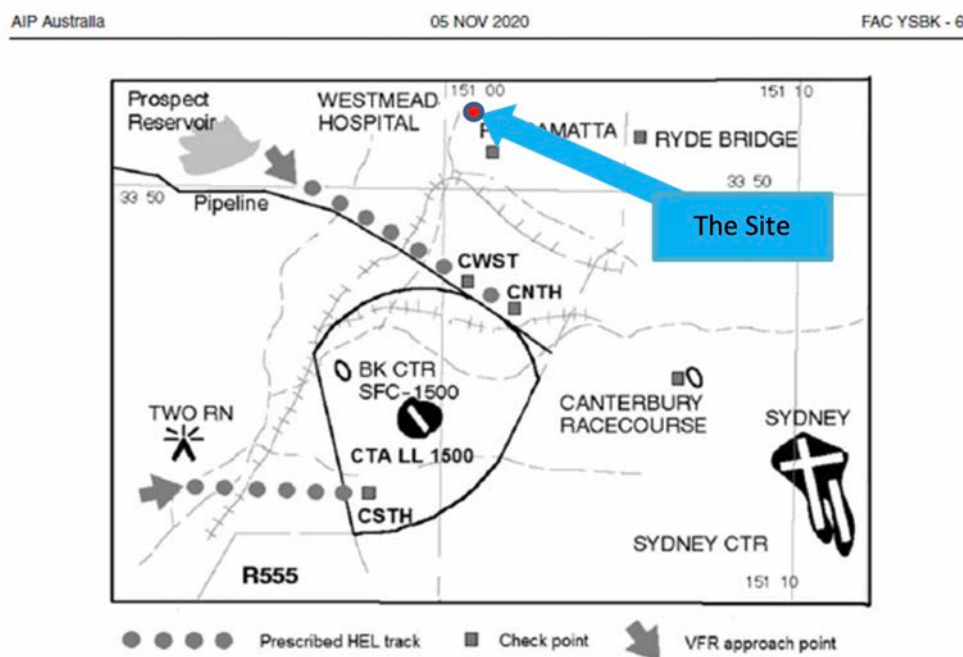


Figure 16: AIP ERSA extract showing CHOPPERS NORTH and CHOPPERS WEST transit routes

9.2 Hospital Helipads

The [NASE](#) Guideline H has been issued regarding protection of what are being termed strategically important Helicopter Landing Sites (SHLSs). Under the guideline, hospital helipads would be considered as SHLSs 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. The steps, rising in 15m increments, are shown in Figure 17 below that has been sourced from Guideline H and illustrates the protection of SHLS and the heights above which further assessment is triggered.



Figure 17: Referral trigger for SHLS

There is a total of four Helicopter Landing Sites (HLSs) in the area. Three to support operations to and from Westmead Hospital and Westmead Children's Hospital and one for the Careflight Base. The nearest hospital helipads to the site are the Westmead Hospital Accident and Emergency (A&E) rooftop helipad which is approximately 2,310 metres to the NW of the site (i.e. the site is 2,310 metres to the SE of the hospital helipad), and the Westmead Children's Hospital rooftop helipad which is approximately 2,155 metres to the NW of the site (i.e. the site is 2,155 metres to the SE of the hospital helipad). This would place the sites within a zone that triggers additional assessment of permanent or temporary structures that are 80m above the elevation of the helipad if the flight path is over the site. The nominal elevation of the helipad available at ozrunways.com/helipads is 38.78m AHD which means that any structure that is 118.78m AHD or higher at the site would meet the trigger referral requirements if the flight path is over the site. A Design and Development Overlay (DDO) which illustrates preferred flight tracks to and from the A&E helipad has been sourced via Westmead Hospital's aviation advisors AviPro and is copied below.

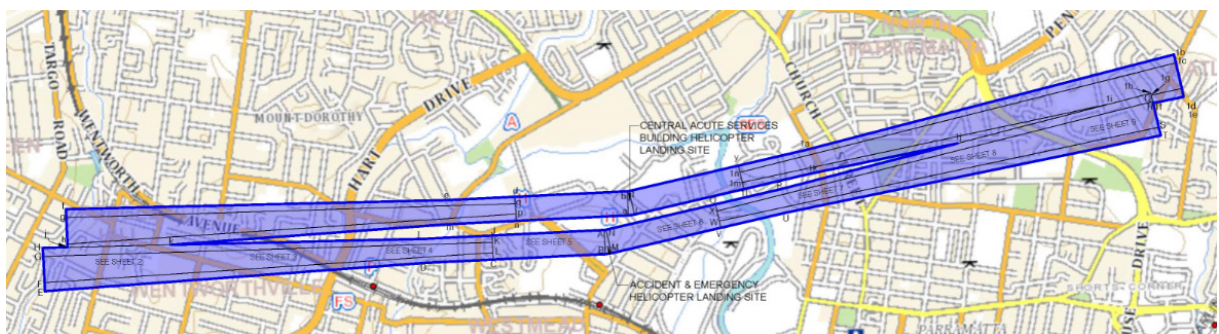


Figure 17: Design and Development Overlay showing flight tracks for the A&E and CASB HLSs

The graphic above shows two sets of protected airspace for HLSs at Westmead Hospital i.e. the southern one applies to the A&E HLS whereas the northern one relates to the new Central Acute Services Building (CASB) HLS. The A&E HLS is both closer to the site and lower than the CASB HLS which is at a height of 80.5m AHD.

The graphic presented as Figure 17 does not extend far enough south for the site to be visible and as the protected airspace is not in the direction of the site it can therefore be concluded that the flight tracks illustrated above do not cover the site.

Multiple other flight tracks for all the HLSs in the Westmead area that differ to those illustrated above are also published through other sources, all of which are summarised below:

- » A&E HLS
 - 255 degrees magnetic (based on HLS markings and lighting)
 - 052 degrees magnetic and 127 degrees magnetic (AIP DAP)
 - Approaches from the NE or SW (Oz Runways)
 - Departures to the NE and SW (OzRunways)
- » Westmead Children's Hospital (555m NE of the A&E HLS)
 - Approaches from the N and SSE (Oz Runways)
 - Departures are to the N and SW (Oz Runways)
- » CareFlight base (540m N of the A&E HLS)
 - Approaches from the N and SSE
 - Departures to the N and SSE

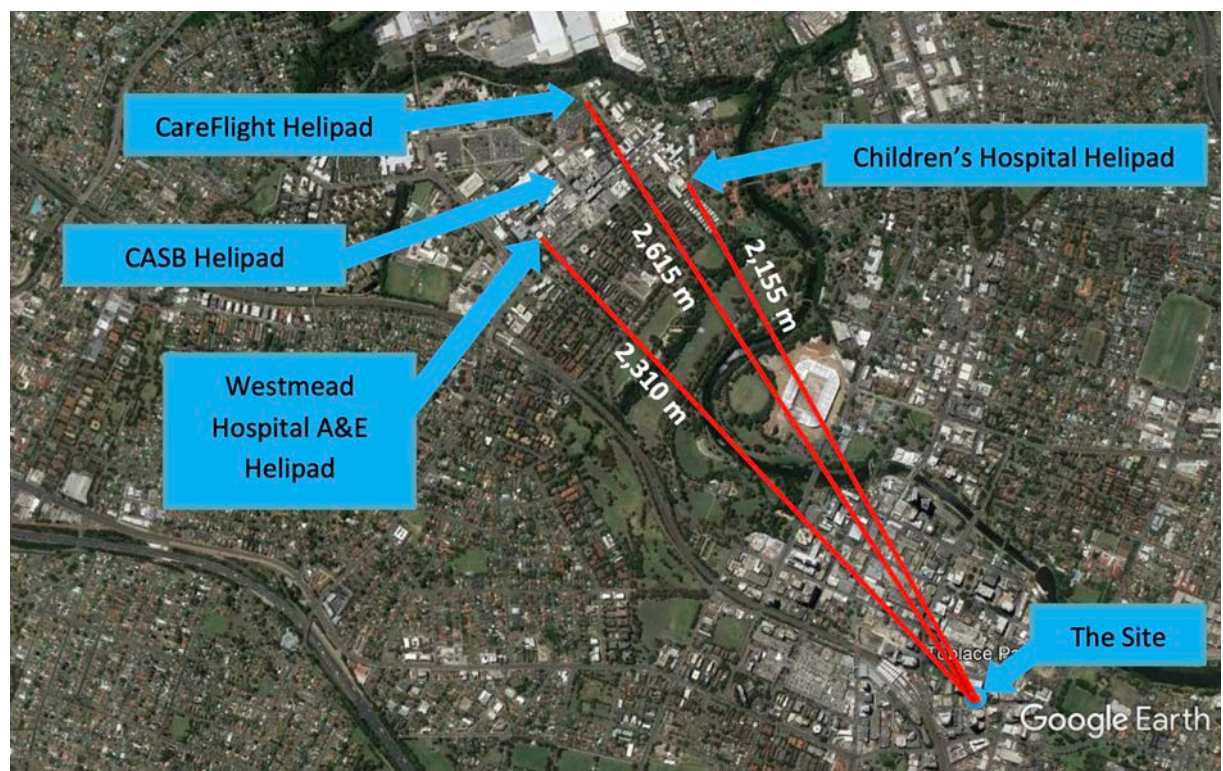


Figure 18: Location of helipads with respect to the site

Approaches and departures for all four helipads are not in the direction of the site so NASF Guideline H is not triggered.

Therefore, Avlaw's assessment of current and future helicopter operations in the vicinity of the site concludes the proposed development (i.e. buildings and cranes) will pose no increased safety risk to those that already exist due to other obstacles in the area.

A large circular graphic with a thick black border. A segment of the border, located at the bottom right, is highlighted in light blue. Two thin black curved lines arc around the top and bottom of the circle.

10

Conclusions

Conclusions

Permanent building development at the site is proposed to reach a maximum height of 210.3m AHD, with all plant and ancillary features captured within this envelope whilst temporary crane activity will reach a maximum height of 256.530m AHD. The airspace protection surfaces that will be penetrated by the building and cranes are the Outer Horizontal Surface of the Bankstown Airport OLS and the RTCC. With respect to the OLS, Avlaw does not believe the penetration is problematic because the site is outside the approach and take-off area for any of the runways at Bankstown Airport and as such, no defined flight operational clearance surfaces are adversely affected.

Temporary construction crane activity to a maximum height of 256.530m AHD will however penetrate the declared RTCC of 243.84m AHD by 12.69m and therefore will be the subject of scrutiny by Airservices. A CMP will be developed as part of the CC to minimise the time the crane will penetrate the RTCC, which will only occur when the crane is operating at its minimum radius when key lifts are occurring close to the building or during refuelling.

Helicopter operations have also been assessed and Avlaw has concluded that none are impacted adversely by the proposed building or crane activity at the site including those conducted at multiple hospital helipads in Westmead.

As the site is further than 15km from Sydney and Western Sydney Airports and more than 5.5km from Bankstown Airport, it is beyond the limits of all protection surfaces set aside for visual flight at the three aerodromes.

This AIA concludes that the proposed building at 210.3m AHD is clear of all aircraft operational surfaces and will not adversely affect safety, efficiency or regularity of operations of aircraft (aeroplanes and helicopters). Temporary construction crane activity will require specific assessment by Airservices to identify any issues associated with short-term penetration of the RTCC by two luffing jib cranes but should be approved subject to conditions relating the lighting, marking and lowering the cranes outside daylight hours below 243.84m AHD.



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