Attachment A12

Aviation impact assessment

WENTWORTH

CAPITAL

AVIATION IMPACT ASSESSMENT REPORT



AIRSPACE IMPLICATIONS DUE TO THE CONSTRUCTION OF THE LIFE SCIENCES HUB

PREPARED BY:

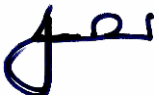
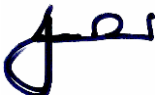
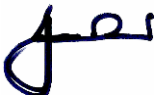
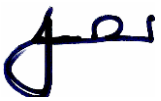
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This Report on the airspace implications, both during and following construction of the proposed Life Sciences Hub (LSH) development is prepared for Wentworth Capital acting on behalf of Spark Sub TC Pty Ltd, by Resolution Response Pty. Ltd. ABN: 94 154 052 883, trading as 'AviPro'.

The Report relates to the coordination aspects associated with prescribed/protected airspace at Sydney (Kingsford-Smith) Aerodrome and the Helicopter Landing Site (HLS) at Royal Prince Alfred Hospital (RPAH) due to the establishment and site design of the proposed LSH. It is intended to inform design and planning.

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1. EXECUTIVE SUMMARY

The aim of this report is to provide insights into aviation impacts of the proposed Life Sciences Hub (LSH) development on the aviation operations into and out of Sydney (Kingsford-Smith) Aerodrome and the Royal Prince Alfred Hospital (RPAH) HLS. Noting that a reference scheme and planning envelope are presented for review, the report analyses the likely impact of a completed building, and any likely associated construction cranes, on the aviation activities mentioned above.

The following key outcomes arose from the analysis:

- The proposed LSH development, once constructed, will not intrude into either the:
  - Sydney Radar Terrain Clearance Chart (RTCC), or
  - Sydney (Kingsford-Smith) Aerodrome Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS surfaces).
- The proposed LSH development, once constructed, **will** intrude into the Sydney (Kingsford-Smith) Aerodrome Obstacle Limitation Surfaces (OLS).
- The proposed LSH development construction crane(s) will not intrude into the:
  - Sydney RTCC, or
  - Sydney (Kingsford-Smith) Aerodrome PANS-OPS surfaces.
- The proposed LSH development construction crane(s) **will** intrude into the Sydney (Kingsford-Smith) Aerodrome OLS.
- The proposed LSH development, once constructed, will not impact the approach and departure paths of either the:
  - RPAH temporary HLS, or
  - new RPAH HLS.
- The proposed LSH development, once constructed, will not require aviation-standard obstacle lighting.
- The proposed LSH development construction crane(s) will require NSW Ministry of Health (MoH) HLS-standard obstacle lighting (due to HLS proximity).
- The proposed LSH development and its construction crane(s) will require formal assessment by the Civil Aviation Safety Authority (CASA).
- The proposed LSH development, as built, must be advised to Airservices Australia as being in excess of 45m above ground level.

The proposed LSH development, including its construction crane(s), will not adversely impact aviation safety in relation to the RPAH HLS (new or temporary). The proposed LSH development, including its construction crane(s), may adversely impact aviation safety in relation to Sydney (Kingsford-Smith) Aerodrome. Approvals will be required for the building and construction crane(s) to intrude into the the Sydney (Kingsford-Smith) Aerodrome OLS if it/they are planned to be above approximately 93 AHD, which is obviously going to be the case. The construction crane(s) will require NSW MoH HLS-specific aviation obstacle lighting which exceeds the CASA standard. (See Mitigations at Section 4.20.) A competed building will be notifiable to Airservices Australia as a building in excess of 45m above ground level.

The cumulative impacts of this proposed development on aviation operations to either Sydney Airport or the RPAH campus are negligible. This is one of several developments on or adjacent to the RPAH or USYD campuses that will be underway simultaneously. The building is further away, but higher than, the new RPAH east tower. Because the proposed LSH development is behind the lift core and overrun for the new RPAH HLS, helicopters will not approach or depart to or from the direction of the proposed LSH. From an air traffic and airspace management perspective the proposed LSH can be viewed as an independent or standalone development.

No consultation has been undertaken with any airspace authorities or any airport in relation to this proposed development. Prior to lodgment of a Development Application (DA), early consultation with CASA is highly recommended for this proposed development due to its elevation.

2. BACKGROUND

2.1. Introduction

This Aviation Impact Assessment (AIA) Report is submitted to the City of Sydney on behalf of University of Sydney / Wentworth Capital in support of a Planning Proposal for an amendment to the *Sydney Local Environmental Plan (LEP) 2012* for the introduction a new site-specific Floor Space Ratio (FSR) and Height of Buildings development standard for the purpose of a built life sciences research facility and ancillary uses at 88-94 Parramatta Road, Camperdown.

This Planning Proposal seeks approval for the amendment of FSR and Height of Buildings in the Sydney LEP 2012. Specifically, approval is sought for the following:

88-94 Parramatta Road

- A new maximum building height of part 80 metres, part 30 metres.
- A new site-specific provision for 88-94 Parramatta Road that enables 6.5:1 of additional uplift for non-residential uses.
- A site-specific clause limiting the maximum amount of residential floor space that can be provided on the site.
- Retention of the existing warehouse at 88-90 Parramatta Road.
- Amendments to the Sydney Development Control Plan 2012 (Sydney DCP 2012) to address site specific outcomes.

84 Parramatta Road

- A new mapped maximum height of 30 metres.
- A new mapped maximum floor space ratio for the Veriu site (84 Parramatta Road) of 4.8:1, retaining the mixed use zone on the site.
- Amendments to the Sydney Development Control Plan 2012 (Sydney DCP 2012) to address site specific outcomes.

Full details of the proposed amendments are outlined in the Planning Proposal Report prepared by Ethos Urban.

2.2. Site description

The site is located at 84-94 Parramatta Road, Camperdown within the City of Sydney Local Government Area (LGA). The site is situated on the traditional land of the Gadigal people.

The land is owned by the University of Sydney and is located on the opposite side of Parramatta Road from the main University of Sydney Camperdown/Darlington campus. The site fronts Parramatta Road along its southern boundary and is bounded by a mixture of residential and commercial uses to the north, east, and west of the site. The site is located just 4km south-west of the Sydney CBD, and 2.5km west of Central Station, and is currently largely used by the University of Sydney for university purposes.

The site's locational context is shown at Figure 1 and the site is shown at Image 1.

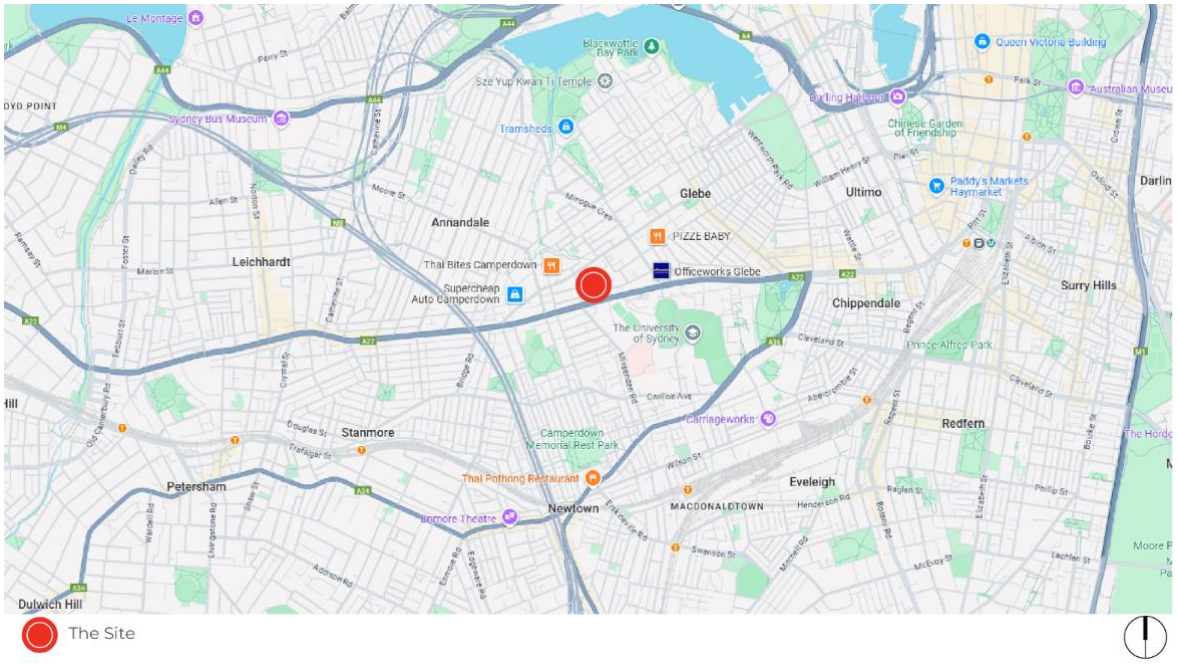


Figure 1: Locational Context



Image 1: The Site

2.3. Background Material

Reference material drawn and provided by HDR in support of the report include early planning designs and concept drawings.

2.4. Methodology

Criteria from all relevant references were assessed, with the Sydney Airport airspace overlays and the Royal Prince Alfred Hospital HLS approach and departure path design used as the primary tools.

2.5. Explanation of Terms

Aircraft. Refers to both aeroplanes (fixed wing) and helicopters (rotorcraft).

Approach and Departure Path (IFR). The flight track helicopters follow when landing at or departing from the FATO of an HLS under the Instrument Flight Rules. The IFR approach and departure path extends upwards and outwards from the edge of the FATO safety area with an obstacle free gradient of 2.6^0/4.5%/ 1:22.2 (22.2 units horizontal in 1 unit vertical), to a height of 152m above the FATO at a distance of ~3,386 m. The approach and departure path commences at the forward edge of the FATO safety area at a width of 34m, and increases in width uniformly to 152m m above the elevation of FATO surface at a distance of ~3,386 m.

Approach/Departure Path (VFR). The flight track helicopters follow when landing at or departing from the FATO of an HLS. Updated standards to align with ICAO requirements now has the VFR (day and) night approach and departure path extending upwards from the forward edge of the FATO safety area with an obstacle free gradient of 2.6^0/4.5%/ 1:22.2 (22.2 units horizontal in 1 unit vertical), to a height of 152m above the FATO at a distance of ~3,386 m. The approach and departure path commences at the forward edge of the FATO safety area at a width of 34m, and expands uniformly, laterally at an angle of 8.7^0/15%/1:12.8 to a total width of 140 m, then remains parallel to a distance of ~3,386m, where the height is 152 m above the elevation of FATO surface.

Design Helicopter. The Agusta AW139 contracted to the NSW Ambulance. The type reflects the latest generation Performance Class 1 capable helicopters used in HEMS and reflects the maximum weight and maximum contact load/minimum contact area. The design helicopter has a maximum all up mass of 7 tonnes, however for HLS design purposes it is assumed the helicopter will never exceed 6.8 tonnes on the HLS.

D Value (Overall Length). The distance from the tip of the main rotor tip plane path to the tip of the tail rotor tip plane path or the fin if further aft, of the Design Helicopter.

Elevated Helicopter Landing Site. An HLS located on a roof top or some other elevated structure where the Ground Effect Area/Touchdown and Lift-off Area (TLOF) is at least 2.5m above ground level.

Final Approach. The reduction of height and airspeed to arrive over a predetermined point above the FATO of an HLS.

Final Approach and Takeoff Area (FATO). A defined area over which the final phase of the approach to a hover, or a landing is completed and from which the takeoff is initiated. For the purposes of these guidelines, the specification of 1.5 x D Value or Overall Length of the Design Helicopter is used and equates to 25m. diameter. Area to be load bearing.

Ground Taxi. The surface movement of a wheeled helicopter under its own power with wheels touching the ground.

Hazard to Air Navigation. Any object having a substantial adverse effect upon the safe and efficient use of the navigable airspace by aircraft, upon the operation of air navigation facilities, or upon existing or planned airport/heliport capacity.

Helicopter Landing Site (HLS). One or more may also be known as a **Heliport**. The area of land, water or a structure used or intended to be used for the landing and takeoff of helicopters, together with appurtenant buildings and facilities.

Helicopter Landing Site Elevation. At an HLS without a precision approach, the HLS elevation is the highest point of the FATO expressed as the distance above mean sea level.

Helicopter Landing Site PC1 Survey Reference Point. A position at the forward edge of the FATO safety area in the centre of the approach and departure path, from which the PC1 survey at 2.6º (4.5%) is initiated.

Helicopter Landing Site Reference Point (HRP). The geographic position of the HLS expressed as the latitude and longitude at the centre of the FATO.

Hospital Helicopter Landing Site. HLS limited to serving helicopters engaged in air ambulance, or other hospital related functions.

Note:

*A designated HLS located at a hospital or medical facility is an emergency services HLS and **not** a medical emergency site.*

Heliport. Two or more co-existing helicopter landing sites (HLS). There are no implications for operating a heliport as opposed to an HLS, other than having a "Heliport Operations Manual" rather than an "HLS Operations Manual" which would address the various interactions and interoperability (aviation, clinical etc) at the dual sites.

Hover Taxi. The movement of a helicopter above the surface, generally at a wheel/skid height of approximately one metre. For facility design purposes, a skid-equipped helicopter is assumed to hover-taxi.

Landing and Lift Off Area (LLA). A load-bearing, nominally paved area, normally located in the centre of the TLOF, on which helicopters land and lift off. Minimum dimensions are based upon a 1 x metre clearance around the undercarriage contact points of the Design Helicopter.

Lift Off. To raise the helicopter into the air.

Movement. A landing or a lift off of a helicopter.

Object Identification Surface. The OIS are a set of imaginary surfaces associated with a heliport. They define the volume of airspace that should ideally be kept free from obstacles in order to minimise the danger to a helicopter during an entirely visual approach.

Obstacle Limitation Surface. The OLS are a set of imaginary surfaces associated with an aerodrome. They define the volume of airspace that should ideally be kept free from obstacles in order to minimise the danger to aircraft during an entirely visual approach.

Obstruction to Air Navigation. Any fixed or mobile object, including a parked helicopter, which impinges the approach/departure surface or the transitional surfaces.

Parking Pad. The paved centre portion of a parking position, normally adjacent to an HLS.

Performance Class 1 (PC1). Similar to Category A requirements. For a rotorcraft, means the class of rotorcraft operations where, in the event of failure of the critical power unit, performance is available to enable the rotorcraft to land within the rejected take-off distance available, or safely continue the flight to an appropriate landing area, depending on when the failure occurs. For an elevated HLS, the reject area is that area within the FATO (25 m. diameter) and therefore this area is to be load bearing. PC1 also requires Civil Aviation Safety Authority (CASA) approved flight path surveys to/from the HLS.

Performance Class 2 (PC2). For a rotorcraft, means the class of rotorcraft operations where, in the event of failure of the critical power unit, performance is available to enable the rotorcraft to safety continue the flight, except when the failure occurs early during the take-off manoeuvres, in which case a forced landing may be required. PC2 also requires CASA approved flight path surveys to/from the HLS.

Performance Class 2 With Exposure (PC2WE). PC2WE is very similar to PC2 as mentioned above. The primary difference is that there need not be any provision for a suitable forced landing area during the take-off and landing phases of flight, within the designated exposure period for the rotorcraft. PC2WE offers operators alternative mitigation strategies based on: a defined exposure time limit, demonstrated engine reliability, engine maintenance standards, pilot procedures and training, and operator risk assessments. Specific approval to operate with exposure is required from CASA and will require a number of mitigation strategies from the operator to gain that approval.

Performance Class 3 (PC3). For a rotorcraft, means the class of rotorcraft operations where, in the event of failure of the critical power unit at any time during the flight, a forced landing:

- in the case of multi-engine rotorcraft – may be required; or
- in the case of single-engine rotorcraft – will be required.

Pilot Activated Lighting (PAL). A PAL system utilises a hospital-based VHF radio and timed switching device, activated by the pilot via a radio transmission on a pre-set frequency, to turn on the associated HLS lighting.

Prior Permission Required (PPR) HLSs. An HLS developed for exclusive use of the owner and persons authorized by the owner, i.e. a hospital-based emergency services HLS.

Note:

The HLS owner and the HEMS operator are to ensure that all pilots are thoroughly knowledgeable with the HLS (including such features as approach/departure path characteristics, preferred heading, facility limitations, lighting, obstacles in the area, size of the facility, etc.). This is addressed as part of the HLS commissioning process.

Rotor Downwash. The volume of air moved downward by the action of the rotating main rotor blades. When this air strikes the ground or some other surface, it causes a turbulent outflow of air from beneath the helicopter.

Safety Area. A defined area on an HLS surrounding the FATO intended to reduce the risk of damage to helicopters accidentally diverging from the FATO. This area should be free of objects, other than those frangible mounted objects required for air navigation purposes. The Safety Area for the Design Helicopter extends 4.5 m. beyond the FATO perimeter forming a 34 m. X 34 m. square or a 34m. diameter circle.

Safety Net. Surrounds the outer edge of a rooftop HLS. It is to be a minimum of 1.5 m. wide and have a load carrying capacity of not less than 122 kg/m^2. The outer edge is not to project above the HLS deck, and slope back and down to the deck edge at approximately 10 degrees, and not more than 20 degrees. Both the inside and outside edges of the safety net are to be secured to a solid structure.

Shielded Obstruction. A proposed or existing obstruction that does **not** need to be marked or lit due to its close proximity to another obstruction whose highest point is at the same or higher elevation.

Take off. To accelerate and commence climb at the relevant climb speed.

Take off Position. A load bearing, generally paved area, normally located on the centreline and at the edge of the TLOF, from which the helicopter takes off. Typically, there are two such positions at the edge of the TLOF, one for each of two takeoff or arrival directions.

Touchdown and Lift-off Area (TLOF). A load bearing, generally paved area, normally centred in the FATO, on which the helicopter lands or takes off, and that provides ground effect for a helicopter rotor system. Size is based on 1 x main rotor diameter of Design Helicopter, and is 14m diameter.

Transitional Surfaces. Starts from the side edges of the FATO safety area parallel to the approach and departure path centre line, and extends upwards and outwards (to the sides) at a slope of 2:1 (two-units horizontal in one-unit vertical or 26.6°) to a height of 45m above the elevation of the FATO surface. Further, from the forward edge of the side transitional surfaces, the transitional surface joins the outer edges of the approach and departure surface, and proceeds upwards and outwards until the outer edges are 152m wide at ~3386m which corresponds with the end of the approach and departure surface.

Unshielded Obstruction. A proposed or existing obstruction that may need to be marked or lit since it is **not** in close proximity to another marked and lit obstruction whose highest point is at the same or higher elevation.

2.6. Applicable Abbreviations

Acronym	Meaning
AC	Advisory Circular (from Aviation Regulator)
ACC	Aeromedical Control Centre (HQ Eveleigh). Responsible for control and tasking of HEMS
CASA	Civil Aviation Safety Authority (Australia)
CASRs	Civil Aviation Safety Regulations (1998) Australia
CBD	Central Business District
CTR	Control Zone (Air Traffic)
DCP	Development Control Plan
DDO	Design and Development Overlay
ERSA	Enroute Supplement Australia
FAA	Federal Aviation Administration, USA
FATO	Final approach and Take-Off Area (1.5 x helicopter length)
GPS	Global Positioning System
HEMS	Helicopter Emergency Medical Service
HLS	Helicopter Landing Site
HLSRO	HLS Reporting Officer (Airservices requirement)
ICAO	International Civil Aviation Organisation
IFR	Instrument Flight Rules
IMC	Instrument Meteorological Conditions - requiring flight under IFR
LEP	Local Environment Plan
MoH	Ministry of Health NSW
MTOW	Maximum Take Off Weight
NOTAM	Notice to Airmen. Issued by Airservices in relation to airspace and navigation warnings
NVG	Night Vision Goggle(s)
OIS	Object Identification Surface(s) (Heliport/HLS)
OLS	Obstacle Limitation Surface(s) (Aerodrome)
PC1	Performance Class 1
PC2	Performance Class 2
PC2(WE)	Performance Class 2 (With Exposure)
PC3	Performance Class 3
RD	Main Rotor Diameter
RPA	Royal Prince Alfred
RPAH	Royal Prince Alfred Hospital
RTCC	Radar Terrain Clearance Chart
SACL	Sydney Airport Corporation Limited
SARPS	Standards and Recommended Practices developed by ICAO and promulgated in the Annexes to the Convention of International Civil Aviation

Acronym	Meaning
TDP	Takeoff Decision Point (Category A/Performance Class 1 operations)
TLOF	Touch Down and Lift Off Area. Load bearing min. 1 x main rotor diameter.
VFR	Visual Flight Rules
VHF	Very High Frequency radio
VMC	Visual Meteorological Conditions - allowing flight under VFR
V_{TOSS}	Take off Safety Speed

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3. GENERAL AIRSPACE REQUIREMENTS AND CONSIDERATIONS

3.1. Purpose of this Section

It is important that the reader has a good understanding of the fundamentals of airspace protection for aerodromes and heliports/HLSs in order to be able to understand the analysis later in this report. Section 3 provides this general overview.

3.2. Airspace Regulation in Australia – Federally-Leased Aerodromes

At Australia's 21 Federally-leased aerodromes, approvals will be required if prescribed or protected airspace could be impinged. The normal contact for this process is through the owner or operator of the relevant aerodrome upon which the airspace is centred.

Prescribed airspace includes an airport's Obstacle Limitation Surfaces (OLS) involving a set of imaginary surfaces associated with an aerodrome that should be kept free of obstacles. Additionally, the Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS) surfaces that takes account of the airspace associated with aircraft instrument procedures, and the airspace associated with the Radar Terrain Clearance Chart (RTCC) must be considered.

The Airports (Protection of Airspace) Regulations (APARs) 1996 differentiate between "short-term" (less than 3 months) and "long-term" controlled activities. The APARs provide for the airport operator to approve short-term controlled activities that penetrate the OLS, and for the Commonwealth Department of Infrastructure, Transport, Regional Development, Communications and the Arts for approval of long-term controlled activities and those short-term controlled activities referred to it by the airport operator. However, the airport operator must refer short-term PANS-OPS infringements to the Department for approval. Long term intrusions of the PANS-OPS surface are prohibited.

3.3. Airspace Regulation in Australia – Non-Federally-Leased Aerodromes

A similar but more abbreviated system applies at all Australian aerodromes that are not Federally-leased. CASA and Airservices Australia still make assessments of the impacts on protected airspace, but the aerodrome owner/operator is the sole decision-maker (with advice from the two agencies/authorities).

3.4. Civil Aviation (Buildings Control) Regulations 1988

The Civil Aviation (Buildings Control) Regulations 1988, known as the BCRs, have been largely superseded by the APARs in the guidance they provide, however they still exist and any building that is planned to be erected in the vicinity of Sydney, Bankstown, Melbourne, Moorabbin, Essendon or Adelaide aerodromes is subject to them. The BCRs provide three different levels for which notifications must be made – 25 ft (7.5m) above ground level, 50 ft (15m) above ground level and 150ft (45m) above ground level.

3.5. Airspace Management in Australia – Heliports and Helicopter Landing Sites

Rules or regulations applicable to the design, construction or placement of HLSs within Australia are contained in Advisory Circular (AC) 139.R-01 Guidelines for heliports - design and operation and AC 91-29 Guidelines for helicopters – suitable places to takeoff and land. These ACs work in tandem with Civil Aviation Safety Regulation (CASR) 91.410 which places the onus on the helicopter pilot to determine the suitability of a landing site. CASA continues to aim towards publishing CASR Sub-part 139.R which will eventually regulate heliports and HLS' in Australia.

Because no Federal or State (NSW) legislation is in place to protect VFR approach and departure paths and the transitional surfaces associated with hospital HLSs, in May 2018, the Commonwealth Department of Infrastructure, Transport, Regional Development and Communications issued Guideline H: Protecting Strategically Important Helicopter Landing Sites under the National Airports Safeguarding Framework (NASF). Whilst this publication has no legal effect in NSW as yet, its content is gradually being aligned within the NSW MoH Guidelines for Hospital Helicopter Landing Sites in NSW.

3.6. Helicopter Routes

In addition to considering the impacts on heliports, HLSs and their associated approach and departure paths (see paragraph 3.5) it is also necessary to consider special routes designed for, and used by, helicopters to navigate the complex airspace around major aerodromes. These routes are typically associated with key destinations such as aerodromes, heliports and hospitals. Details of these routes can be found in the Sydney (Kingsford-Smith) Aerodrome entry of the Enroute Supplement Australia (ERSA).

3.7. Tall Structures

CASA Advisory Circular (AC) 139.E-01 Reporting of Tall Structures provides guidance on what needs to be reported.

Regulation 139.165 (Notifying CASA of certain proposed objects or structures) of Civil Aviation Safety Regulations Part 139 states: “This regulation applies if a person proposes to construct or erect an object or structure that…will have a height of 100 metres or more above ground level…or is of a kind prescribed by the Part 139 Manual of Standards.” This is done through Airservices Australia.

3.8. State Government Requirements

There are no specific articles of legislation for aerodromes in NSW. Matters pertaining to aerodromes are governed under the guise of State environmental legislation. The various legislative/regulatory requirements relating to HLSs in NSW are complex. Current regulation excludes emergency service landing sites from the definition of “designated development” in the Environmental Planning and Assessment Regulation (which otherwise includes most HLSs). Generally, hospital HLSs are considered “ancillary-uses” to hospital purposes and are thus not separate “development”. The same cannot necessarily be said about off-site emergency medical HLSs, e.g. local sports fields.

Whilst not an aviation requirement, cranes may need access to airspace above neighbouring properties in which case the NSW Access to Neighbouring Land Act 2000 may apply.

3.9. Local Government Requirements

For Federally-leased aerodromes, requirements emanate from the Airports Act 1996 and the Airports (Protection of Airspace) Regulations 1996.

The Airports (Protection of Airspace) Regulations 1996 differentiate between short-term (less than 3 months) and long-term controlled activities. The Regulations provide for the airport operator to approve short-term controlled activities that penetrate the OLS, and for the Commonwealth Department of Infrastructure, Transport, Regional Development and Communications for approval of long-term controlled activities and those short-term controlled activities referred to it by the airport operator. However, the airport operator must refer short-term PANS-OPS intrusions to the Department for approval. Long term intrusions of the PANS-OPS surface are prohibited.

Where an aerodrome is owned or operated by a Local Government Authority (LGA) or other entity, local government requirements for airspace protection are normally included in a Local Environment Plan (LEP), Development Control Plan (DCP) or similar document.

3.10. Obstacle Limitation Surfaces

The objective of the OLS is to define a volume of airspace in proximity to the airport which should be kept free of obstacles that may endanger aircraft in visual operations, or during the visual stages of an instrument approach.

The intention is not to restrict or prohibit all obstacles, but to ensure that either existing or potential obstacles are examined for their impact on aircraft operations and that their presence is properly taken into account. Since they are relevant to visual operations, it may sometimes be sufficient to ensure that the obstacle is conspicuous to pilots, and this may require that the obstacle be marked or lit.

In reality, there is little issue with breaching the OLS as pilots will be visual with the obstruction and can work on “see and avoid” principles. OLS at a multi-runway aerodrome look akin to Figure 2 below:

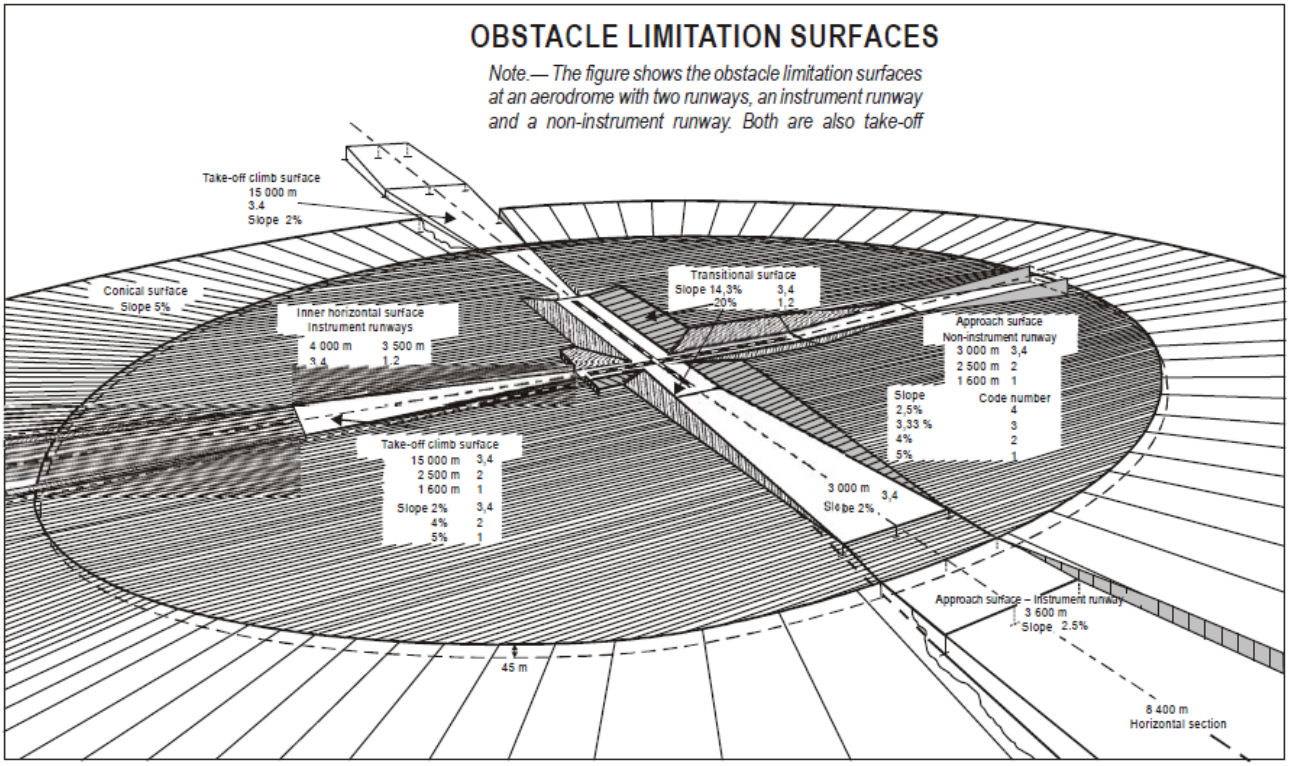


Figure 2: Example of Obstacle Limitation Surfaces

3.11. Procedures for Air Navigation – Aircraft Operations (PANS-OPS) Surfaces

PANS-OPS surfaces detail essential areas and obstacle clearance requirements for the achievement of safe, regular instrument flight operations.

The instrument flight procedures enable pilots to either descend from the high enroute environment of cruise type flight to establish visual contact with the landing runway, or climb from the runway to the enroute environment, with a prescribed safe margin above terrain and obstacles, by use of aircraft instruments and radio navigation aids or GPS in conditions where the pilot cannot maintain visual contact with the terrain and obstacles due to inclement weather conditions.

Pilots must be protected against protrusions into the PANS-OPS surfaces as they have no way of avoiding obstructions if they get off track and they cannot see such obstructions.

PANS-OPS surfaces are constructed differently to OLS however they serve a similar purpose. An example of PANS-OPS surfaces is in Figure 3 below:

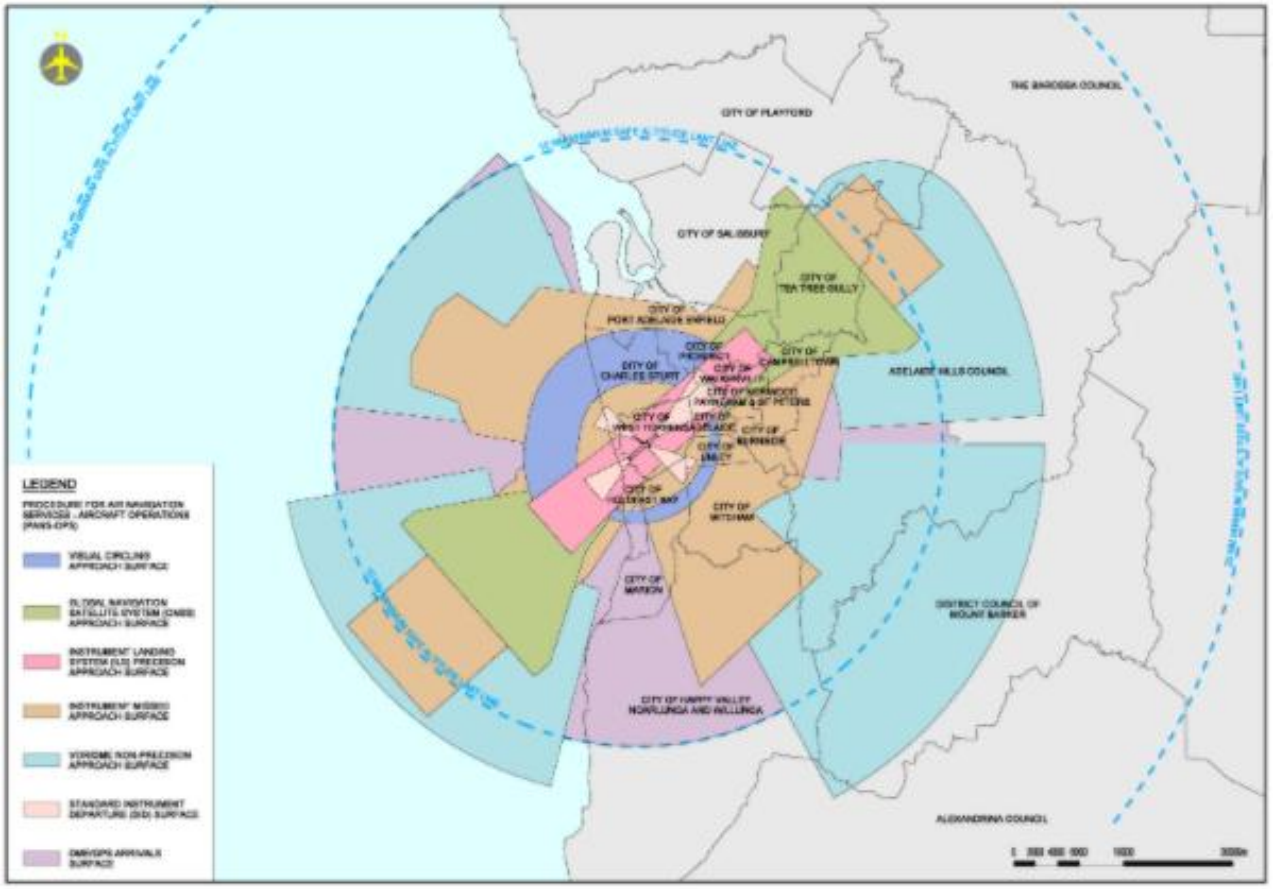


Figure 3: Example of PANS-OPS Surfaces

3.12. Radar Terrain Clearance Charts

The Radar Terrain Clearance Chart defines an area in the vicinity of an aerodrome, in which the minimum safe levels allocated by an Air Traffic Controller (ATC) vectoring Instrument Flight Rules (IFR) flights with Primary and/or Secondary Surveillance RADAR equipment have been predetermined. The figure shown on the chart is the lowest altitude which an ATC may assign to a pilot. An example of an RTCC is in Figure 4 below:

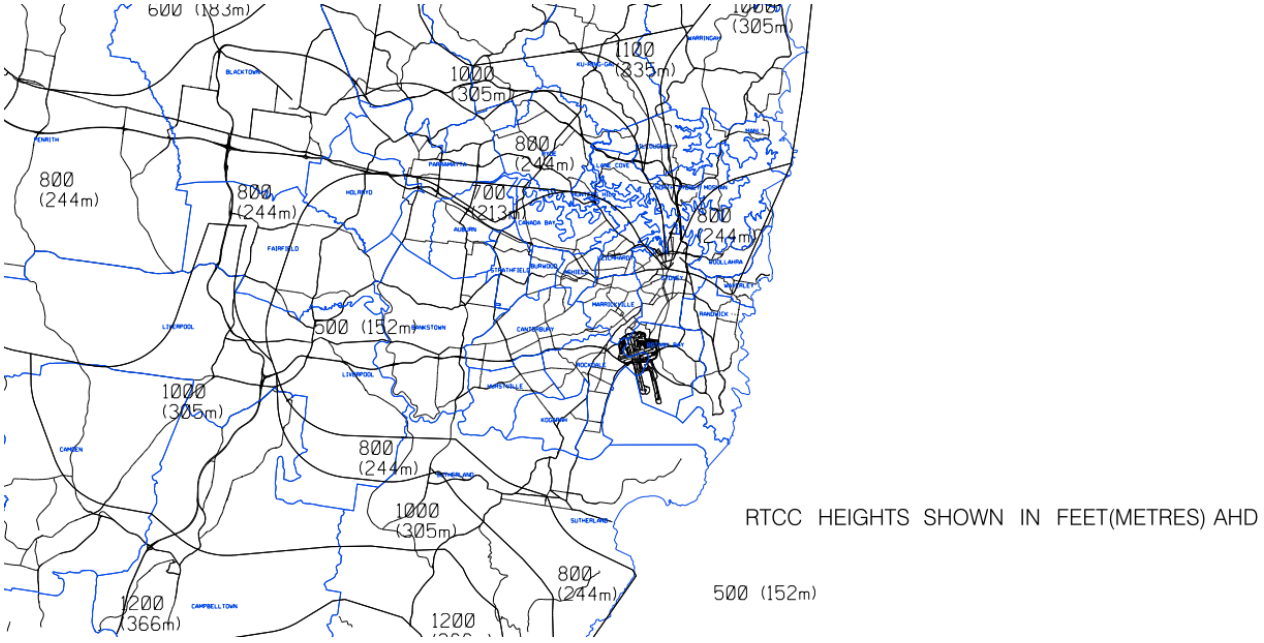


Figure 4: Example of a Radar Terrain Clearance Chart (RTCC)

4. SPECIFIC LSH DEVELOPMENT CONSIDERATIONS

4.1. The proposed LSH development location

The location of the lot of the proposed LSH development footprint is shown in Figure 5 below. It is approximately 5 km from Sydney (Kingsford-Smith) Aerodrome and close to the strategically important HLS at RPAH.

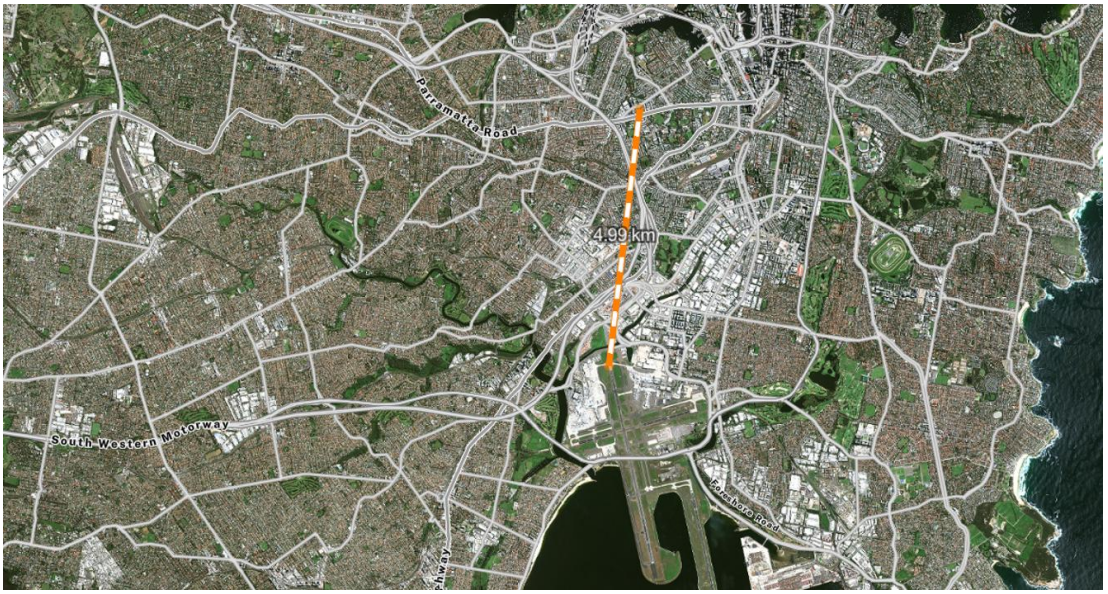


Figure 5: Location of the proposed LSH development building

4.2. The proposed LSH development Elevation

The proposed development is planned to be built to approximately RL 101.75 (see Figure 6 below).

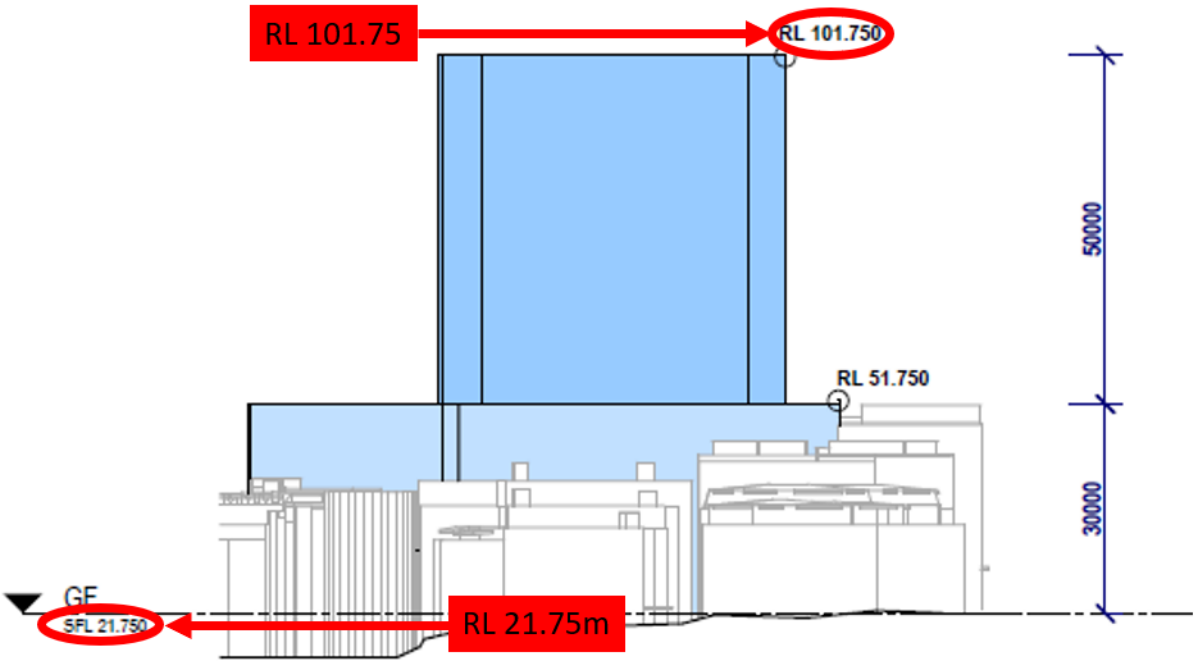


Figure 6: Elevation of the proposed LSH development

4.3. Local Government Requirements

Clause 7.16 of the Sydney Local Environment Plan 2012 states that one objective of the Clause is “to provide for the effective and on-going operation of the Sydney (Kingsford-Smith) Airport by ensuring that such operation is not compromised by proposed development that penetrates the Limitation or Operations Surface for that airport.”

In this case, the term “Limitation or Operations Surface” means “the Obstacle Limitation Surface or the Procedures for Air Navigation Services Operations Surface as shown on the Obstacle Limitation Surface Map or the Procedures for Air Navigation Services Operations Surface Map for the Sydney (Kingsford-Smith) Airport.”

Further, Clause 7.16. states that “If a development application is received and the consent authority is satisfied that the proposed development will penetrate the Limitation or Operations Surface, the consent authority must not grant development consent unless it has consulted with the relevant Commonwealth body about the application.”

4.4. General Airspace Overhead the proposed LSH development

The proposed LSH development sits to the south-western edge of the Sydney City Central Business District and within the Sydney Aerodrome’s Control Zone (CTR). See Figure 7 below. Implication of the airspace issues are discussed later in this report.

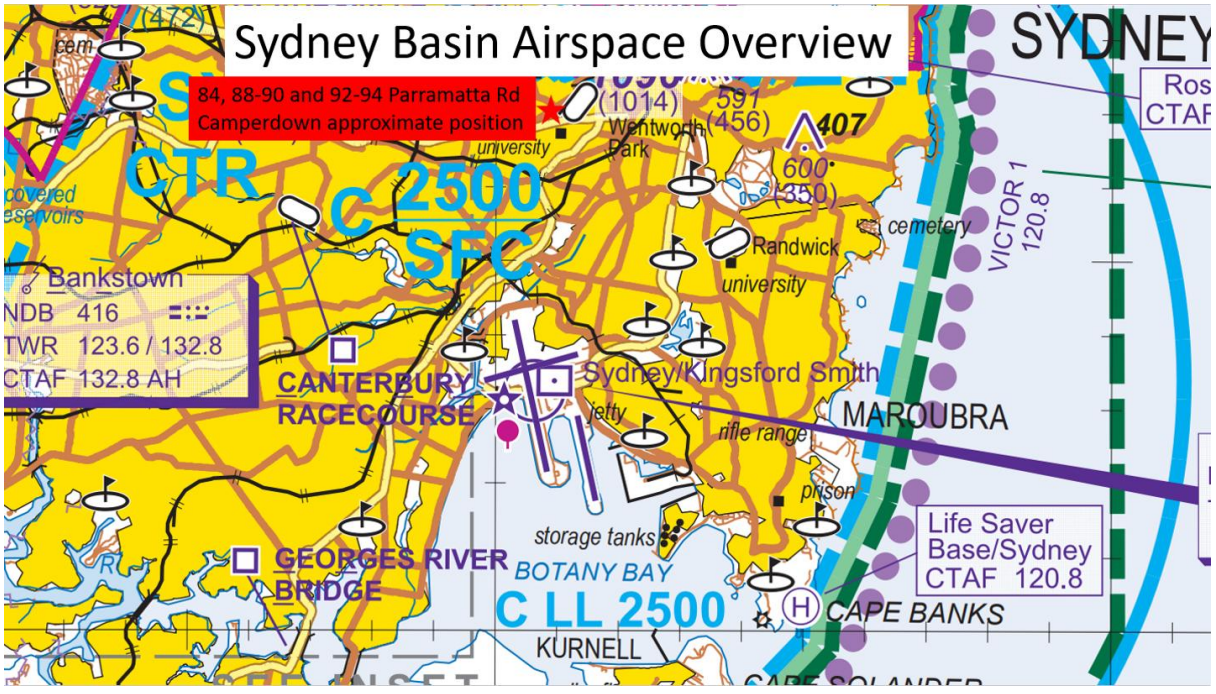


Figure 7: Sydney (Kingsford-Smith) Aerodrome General Airspace

4.5. Application of the Civil Aviation (Buildings Control) Regulations 1988

The position of the proposed LSH development falls within the 50 ft (15m) above ground level zone of the BCRs. Regardless of any other airspace requirements, the proposed development must be advised to Sydney Airport Corporation Limited (SACL). SACL will incorporate the advice into other related activities pertaining to potential penetration of prescribed airspace. This is discussed further below.

4.6. The Sydney (Kingsford-Smith) Aerodrome OLS Overlay

The Sydney (Kingsford-Smith) Aerodrome OLS is depicted in Figures 8 and 9 below. The approximate location of the proposed LSH development is also indicated.

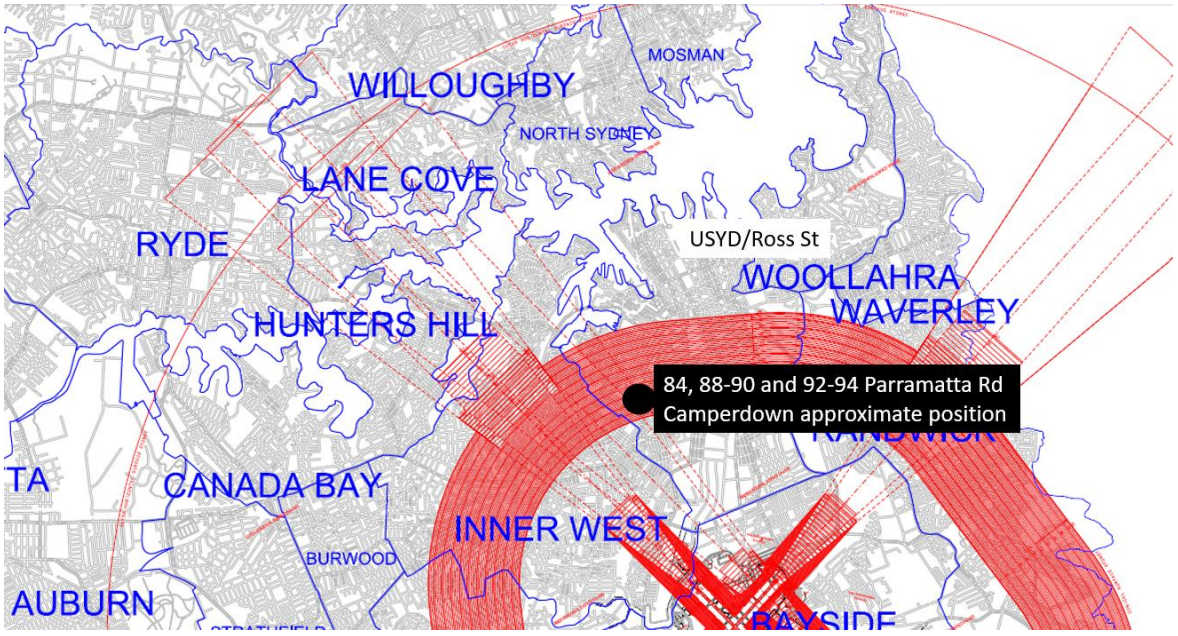


Figure 8: Sydney (Kingsford-Smith) Aerodrome Obstacle Limitation Surfaces (1)

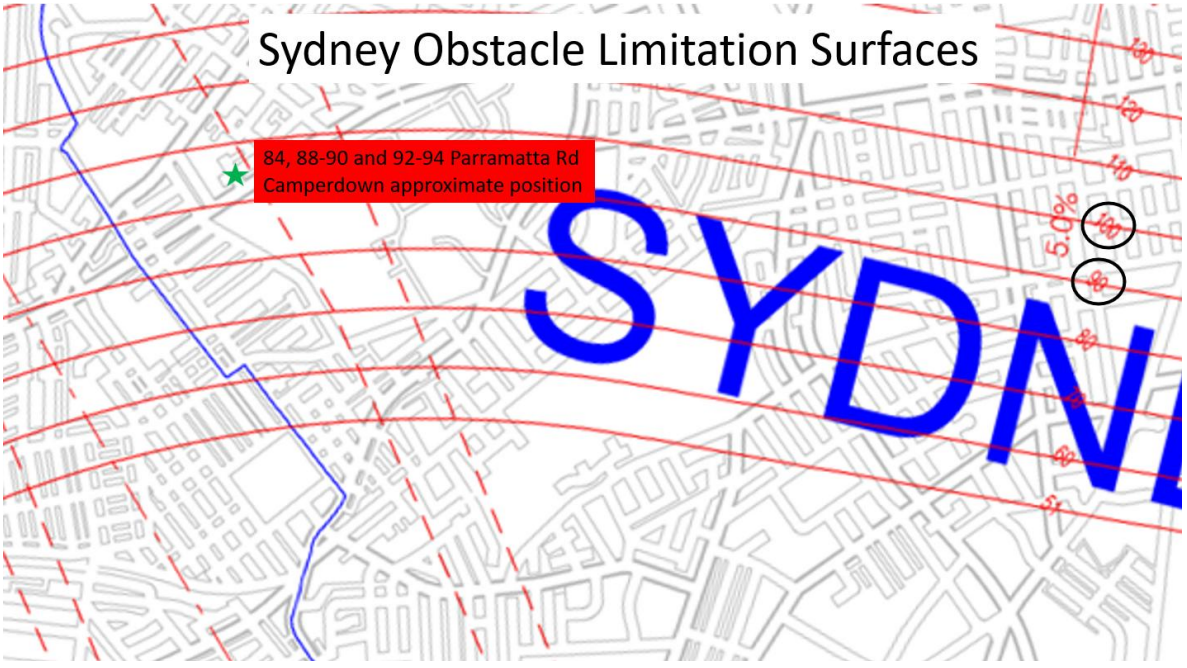


Figure 9: Sydney (Kingsford-Smith) Aerodrome Obstacle Limitation Surfaces (2)

4.7. Impact on the Sydney (Kingsford-Smith) Aerodrome OLS

The proposed LSH development would enter the Sydney (Kingsford-Smith) Aerodrome OLS from approximately 93 AHD. Because the proposed LSH development is currently investigating a maximum elevation of RL 101.75, it would be strongly advisable to seek a CASA assessment of the proposed development in the near future to confirm there is not going to be any unacceptable OLS penetration by the building.

4.8. The Sydney (Kingsford-Smith) Aerodrome PANS-OPS Overlay

The Sydney (Kingsford-Smith) Aerodrome PANS-OPS is depicted in Figures 10 and 11 below. The approximate location of the proposed LSH development is also indicated.

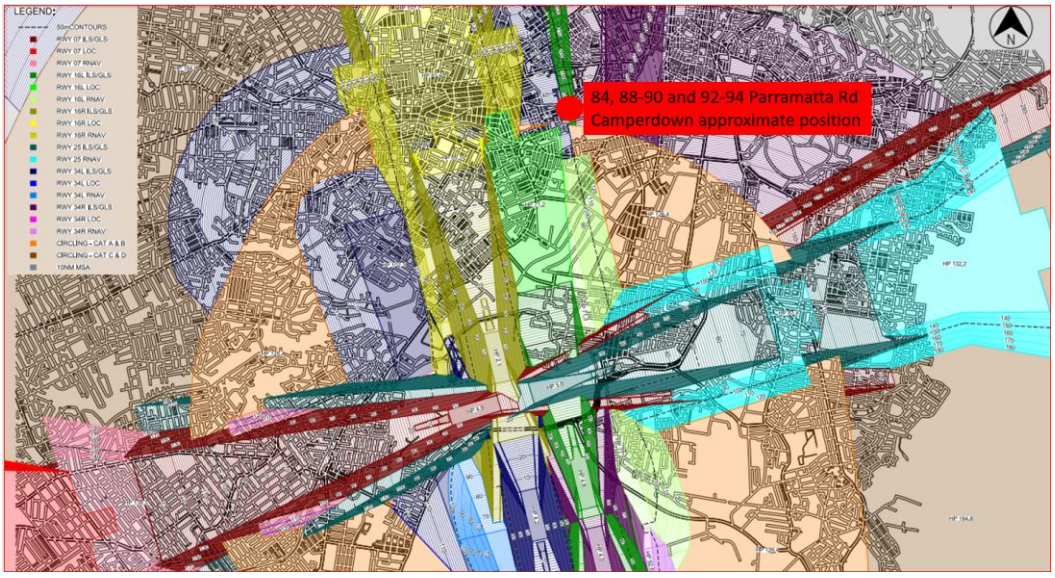


Figure 10: Sydney (Kingsford-Smith) Aerodrome PANS-OPS Surfaces (1)

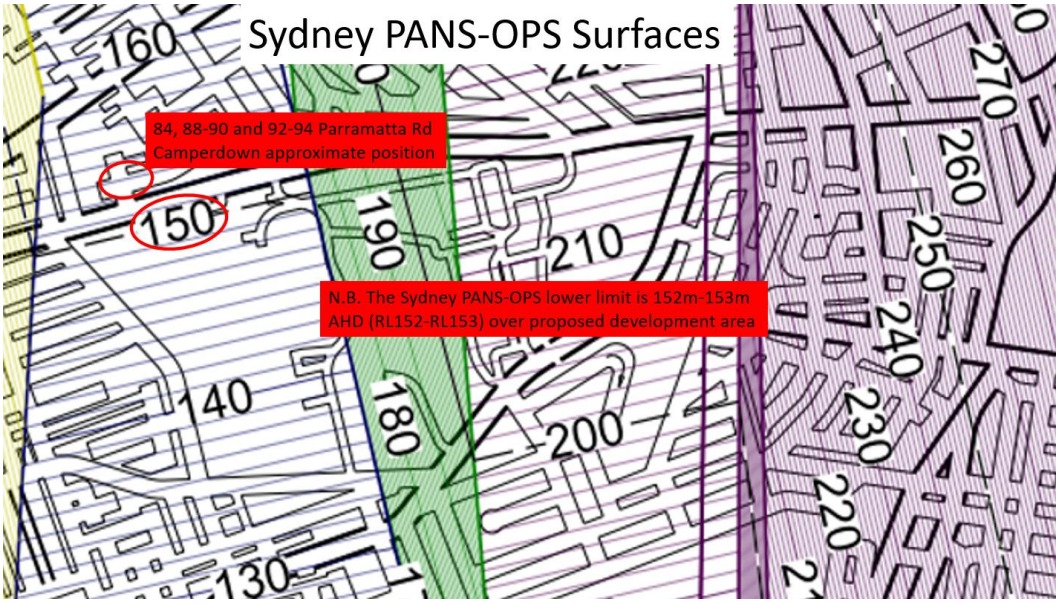


Figure 11: Sydney (Kingsford-Smith) Aerodrome PANS-OPS Surfaces (2)

4.9. Impact on the Sydney (Kingsford-Smith) Aerodrome PANS-OPS Surfaces

The Sydney (Kingsford-Smith) Aerodrome PANS-OPS surfaces extend over the proposed LSH development at approximately 152-153 AHD. There will be no intrusion (including construction cranes) for an RL 101.75 building.

4.10. The Sydney Aerodrome Radar Terrain Clearance Chart (RTCC) Overlay

The Sydney Aerodrome RTCC overlay is depicted in Figure 12 and 13 below. The approximate location of the proposed LSH is also indicated.

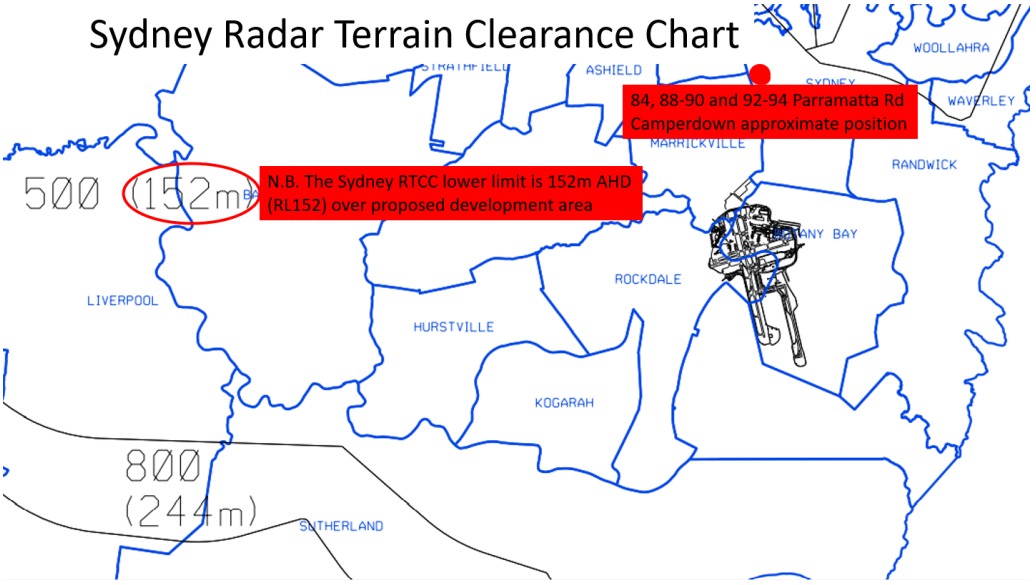


Figure 12: The proposed LSH development within the Sydney RTCC

4.11. Impact on the Sydney Aerodrome RTCC

At its current height, the proposed LSH development will be well below the RTCC lower level for the area of 152m AHD. Construction cranes will need to remain below RL 152.

4.12. Overall impacts on Sydney (Kingsford-Smith) Aerodrome OLS, PANS-OPS and RTCC

The development is most unlikely to intrude into the Sydney (Kingsford-Smith) Aerodrome OLS, PANS-OPS surfaces or RTCC. Construction cranes will definitely need to intrude into the OLS. Construction cranes must avoid intruding into the PANS-OPS and RTCC surfaces.

4.13. Impact on the RPA Hospital HLS

There is one strategically important HLS within close proximity to the proposed LSH at RPAH. See Figure 13 below.

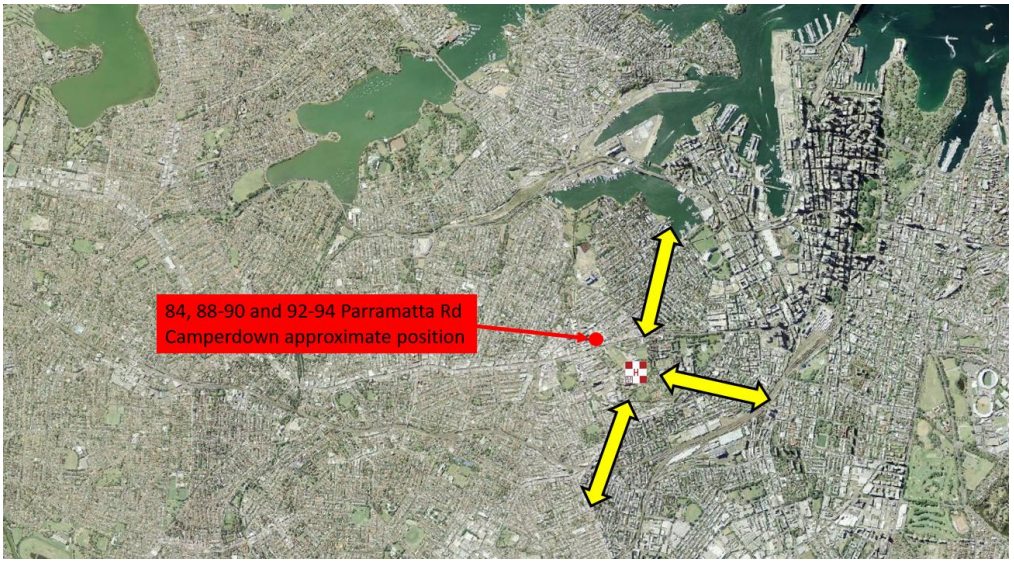


Figure 13: New RPA Hospital HLS Approach and Departure Paths

None of the approach and departure paths that will be surveyed for the new RPAH HLS will transit towards the proposed LSH development. The new HLS deck will be at RL 86.38 or 86.38 AHD which is approximately 15m lower than the proposed LSH. A tower crane used to construct the proposed LSH building will be somewhat proximate to, and significantly higher than, the RPAH HLS and will therefore need to be lit appropriately to avoid collision at night and in low visibility. The new RPAH HLS is expected to be operational some time in late 2026 at the earliest. Until then, a temporary HLS will be in use at RPAH and the cranes(s) for the building for the proposed LSH will not impact that temporary HLS given its shielded location behind (to the south) the Queen Mary Building.

4.14. Impact on Helicopter Routes

The proposed LSH development will not impact any helicopter routes. There is only one helicopter route in the Enroute Supplement - Australia (ERSA) that enters and leaves the Sydney Aerodrome CTR near the site of the proposed LSH development. The Erskineville route requires helicopters to track via Darling Harbour, to Central Railway Station and Redfern Railway Station; or to follow that route in reverse. This route avoids the inner west of Sydney where the proposed LSH development is located. See Figure 14 below.



Figure 14: The Erskineville 5 Helicopter Route

4.15. Tall Structure Considerations

CASA AC 139.E-01 v1.0 Reporting of tall structures dated December 2021 states that “Any object that extends to a height of 100 m or more above local ground level, must be notified to CASA by the proponent or owner.” At less than 100 m above ground level, this building need not be notified to CASA for “tall structure” assessment. AC 139.E-01 v1.0 also states that “the RAAF and Airservices Australia require information on structures that are 30 m or more above ground level - within 30 km of an aerodrome or 45 m or more above ground level elsewhere for the RAAF, or 30 m or more above ground level elsewhere for Airservices Australia.” This building therefore will need to be notified to Airservices Australia as a tall structure.

4.16. Construction Crane Considerations

The Guidelines require cranes to be lit when "in the vicinity" of a Hospital HLS. The illumination requirements for cranes in the vicinity of a Hospital HLS are detailed below. It should be noted that there are no specified lighting requirements for mobile cranes however a similar level of safety should be applied for these as would be applied for tower cranes.

As a minimum for all tower [hammerhead] cranes:

- top of crane A frame or cabin: medium intensity flashing red obstruction light;
- both ends of Jib: medium intensity flashing red obstruction light
- along Jib: line of white LED fluoro on a PE cell along the full length of the jib, and
- tower section: stairway lights or spot lights attached to the top of the tower pointing down and onto the tower (not up into pilot eyes).

As a minimum for all luffing cranes:

- top of crane A-frame or cabin: medium intensity red obstruction light;
- end of Jib: medium intensity red obstruction light;
- along Jib: line of white LED fluoro on a PE cell along the full length of the jib; and
- tower section: stairway lights or spot lights attached to the top of the tower pointing down and onto the tower (not up into pilot eyes).

The LED jib fluoro lights are to be LED weather proof emergency fluoros controlled via a PE cell with a minimum 90 minute battery back-up.

4.17. Deductions: Airspace, Cranes, Obstructions and HLSs

The following key deductions can be made:

- The proposed LSH development, once constructed, will not intrude into either the:
  - Sydney RTCC, or
  - Sydney (Kingsford-Smith) Aerodrome PANS-OPS surfaces.
- The proposed LSH development, once constructed, **will** intrude into the Sydney (Kingsford-Smith) Aerodrome OLS.
- The proposed LSH development construction crane(s) will not intrude into the:
  - Sydney RTCC, or
  - Sydney (Kingsford-Smith) Aerodrome PANS-OPS surfaces.
- The proposed LSH development construction crane(s) **will** intrude into the Sydney (Kingsford-Smith) Aerodrome OLS.
- The proposed LSH development, once constructed, will not impact the approach and departure paths of either the:
  - RPAH temporary HLS, or
  - new RPAH HLS.
- The proposed LSH development, once constructed, will not require aviation-standard obstacle lighting.
- The proposed LSH development construction crane(s) will require NSW MoH HLS-standard obstacle lighting (due to HLS proximity).
- The proposed LSH development and its construction crane(s) will require formal assessment by CASA.
- The proposed LSH development, as built, must be advised to Airservices Australia as being in excess of 45m above ground level.

4.18. Authority Consultation

No consultation has been undertaken with any airspace authorities or any airport in relation to this proposed development. Prior to lodgment of a Development Application (DA), early consultation with CASA is highly recommended for this proposed development due to its elevation.

4.19. Cumulative Impacts

The cumulative impacts of this proposed development on aviation operations to either Sydney Airport or the RPAH campus are negligible. This is one of several developments on or adjacent to the RPAH or USYD campuses that will be underway simultaneously. The building is further away than, but higher than, the new RPAH east tower. Because the proposed LSH development is behind the lift core and overrun for the new RPAH HLS, helicopters will not approach or depart to or from the direction of the proposed LSH. From an air traffic and airspace management perspective the proposed LSH can be viewed as an independent or standalone development.

4.20. Mitigations

There is nothing significant to mitigate in relation to aviation impact and airspace protection matters for the proposed LSH development. Aviation-standard obstacle lighting for construction crane(s) are routine issues that are considered on all projects in the vicinity of aerodromes, helicopter landing sites or helicopter routes. See Table 1 below.

Project Stage	Mitigation Measures	Relevant Section
C	Crane lighting to NSW MoH standards.	4.16-4.17

Table 1: Mitigation Measures

4.21. Conclusion

The proposed LSH development, including its construction crane(s), will not adversely impact aviation safety in relation to the RPAH HLS (new or temporary). The proposed LSH development, including its construction crane(s), may adversely impact aviation safety in relation to Sydney (Kingsford-Smith) Aerodrome. Approvals will be required for the tower and construction crane(s) to intrude into the the Sydney (Kingsford-Smith) Aerodrome OLS if it/they are planned to be above approximately 93 AHD, which is obviously going to be the case. The construction crane(s) will require NSW MoH HLS-specific aviation obstacle lighting which exceeds the CASA standard. A competed building will be notifiable to Airservices Australia as a building in excess of 45m above ground level.

4.22. Recommendations

Ensure that the proposed LSH development construction tower crane(s) is/are fitted with NSW MoH HLS-specific aviation obstacle lighting. If operating at night or in low visibility, ensure that the proposed LSH development construction mobile crane(s) is/are fitted with NSW MoH HLS-specific aviation obstacle lighting.