AVIATION IMPACT ASSESSMENT REPORT
AIRSPACE IMPLICATIONS DUE TO THE CONSTRUCTION OF THE UNSW HEALTH TRANSLATION HUB

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Revision 1.3

AviPro
Document Verification
Page 1 of 1

Job title:	Aviation Impact Assessment Report: UNSW HTH (Randwick Hospital Campus)
Document title:	AIA – UNSW HTH
Document ref:	UNSW HTH1.3

Revision	Date	File name			
V1.0	14 Nov 20	Description	Initial issue AIA		
			Prepared by	**Checked by**	**Approved by**
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		Signature			
Revision	Date	File name			
V1.1	9 Dec 20	Description	Various revisions based upon client feedback and revised crane drawings		
			Prepared by	**Checked by**	**Approved by**
		Name	J.W. Stark	S.J Graham	S.J Graham
		Signature			
Revision	Date	File name			
V1.2	4 Feb 21	Description	Revisions post-HI review.		
			Prepared by	**Checked by**	**Approved by**
		Name	J.W. Stark	S.J Graham	S.J Graham
		Signature			
Revision	Date	File name			
V1.3	4 May 21	Description	Revisions based on changes to dimensions.		
			Prepared by	**Checked by**	**Approved by**
		Name	J.W. Stark	S.J Graham	S.J Graham
		Signature			

This Report on the airspace implications during and following construction is prepared for the UNSW Health Translation Hub (UNSW HTH) 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 Sites (HLS) at the Randwick Hospitals Campus (RHC) due to the establishment and site design of the proposed new UNSW HTH. It is intended to inform design and planning.

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1. INTRODUCTION AND DESCRIPTION OF PROPOSED DEVELOPMENT

1.1. Introduction

This report supports a State Significant Development Application (SSDA) for the proposed UNSW Health Translation Hub (UNSW HTH) at the Randwick Hospitals Campus (RHC) pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (the Act). Health Infrastructure (HI) on behalf of Health Administration Corporation (HAC) is the applicant for the UNSW HTH, which will be delivered by the University of New South Wales (UNSW).

The UNSW HTH project will bring together educational and medical researchers, clinicians, educators, industry partners and public health officials to drive excellence, and support the rapid translation of research, innovation, and education into improved patient care.

1.2. Description of Proposed Development

The SSDA seeks approval for:

- Relevant site preparation, excavation and enabling works.
- Construction and use of a new, 15-storey (RL 126.22) building and link bridge accommodating research and education uses, comprising:
  - One basement level; and
  - A total GFA of 35,600sqm, including health-related research, education and administrative floor space.
  - Pedestrian link bridges connecting the UNSW Kensington Campus to the RHC, via the Wallace Wurth building to the UNSW HTH and through to the Sydney Children's Hospital Stage 1 and the Children's Comprehensive Cancer Centre (SCH Stage1 and the CCCC)
- Landscaping and public domain works, including the creation of over 2,500m² of new publicly accessible open space within the eastern portion of the site, sitting between the UNSW HTH and the SCH Stage1 and the CCCC redevelopment.
- Services and utilities augmentation as required.
- Building signage.
- Stratum subdivision.

1.3. Operation and Function of the UNSW HTH

The UNSW HTH will accommodate new health related education, research, and administrative facilities. It will include:

- Purpose-built spaces for health educators and researchers to work alongside clinicians;
- An education hub, including education and training rooms allowing hospital staff to educate and train UNSW medical students;
- Spaces for internal hospital seminars and clinician training events;
- Clinical schools for the Women's and Children's Health, Psychiatry and Prince of Wales Hospital;
- Ambulatory care clinics;
- Supporting facilities including retail premises;
- Floor plates for health translation research focused work with physical connections to the SCH Stage1 and the CCCC and wider RHC;
- Dedicated facilities for the CCCC directly linking the UNSW HTH with the SCH Stage1 and the CCCC;
- An education hub, including education and training rooms allowing hospital staff to educate and train UNSW medical students; and
- Facilities for education, training, research, seminars and industry events.

1.4. Site Location

The site is located approximately six kilometres (km) from the Sydney Central Business District (CBD), within the Randwick Local Government Area (LGA). It is located approximately four km from Sydney Airport. Figure 1 provides a regional context map of the site showing its location in relation to the Sydney CBD and surrounding centres.

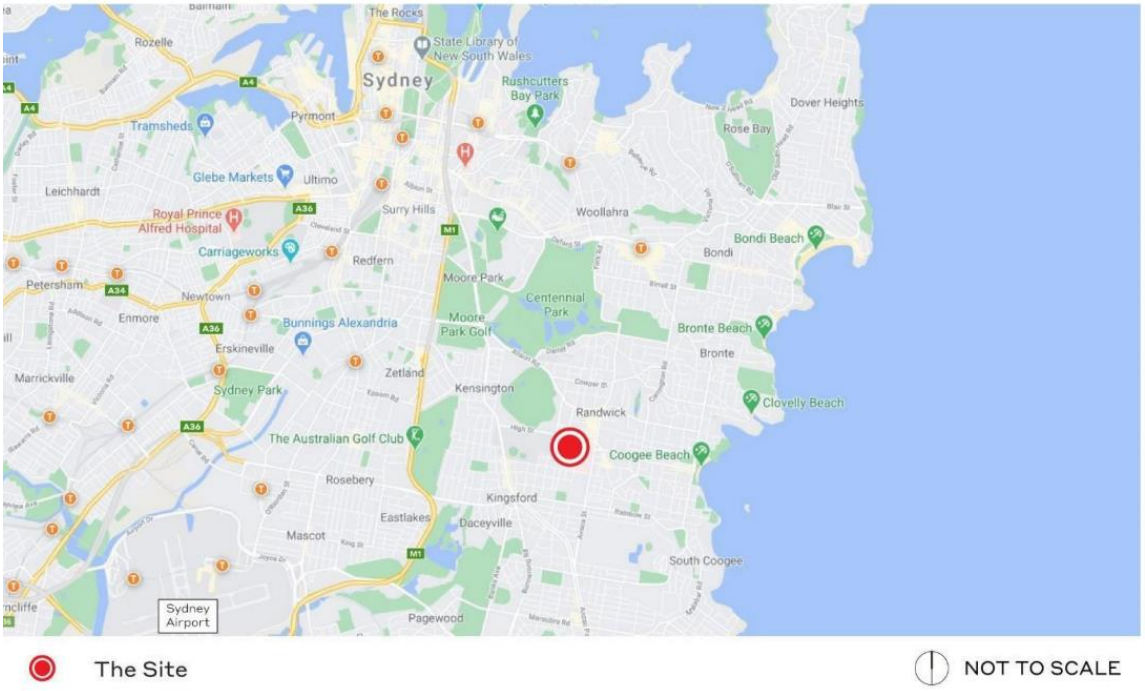

Figure 1: Site Context

1.5. Site Description

This block sits in between the existing Prince of Wales Hospital and the UNSW Kensington Campus, and directly adjacent to the CBD and South East Light Rail service which runs along High Street (Figure 2). The site of the proposed UNSW HTH has an area of 8,897square metres (sqm).

Figure 2: Site Aerial

The UNSW HTH site has been cleared and is devoid of any development or vegetation. It has been subject to some site preparation and early works associated with the broader development of the block. Adjacent to the site, along the High Street and Botany Road frontages, runs a six metre (m) wide stormwater and sewage easement.

1.6. Secretary's Environmental Assessment Requirements (SEARs) Response

No specific SEARs response was required in this Aviation Impact Assessment report.

1.7. Background Material

Drawings and reference material were provided by UNSW Estate Management.

1.8. Methodology

Criteria from all relevant references were assessed, with the Guidelines used as the primary tool. Progress briefing sessions were conducted. A large amount of feedback was provided that both expanded and enhanced the focus of the report.

1.9. Explanation of Terms

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

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 recommendations now has the VFR Approach/Departure path extending outwards from the edge of the FATO with an obstacle free gradient of 2.5º or 4.5% or 1:22 vertical to horizontal, measured from the forward edge of the FATO, to a height initially of 500 feet above the FATO at a distance of ~3,500 m. The flight path commences at the forward edge of the FATO at a width of 25 m., and increases in width uniformly to 150 m. at a distance of 3,500 m. The path may be curved left or right to avoid obstacles or to take advantage of a better approach or departure path. Changes in direction by day below 300 feet should be avoided and there should be no changes in direction below 500 feet at night.

Design Helicopter. The Agusta Westland AW139 contracted to the NSW Ambulance. The type reflects the new generation Performance Class 1 capable helicopters used in HEMS and reflects the maximum weight and maximum contact load/minimum contact area.

Elevated Helicopter Landing Site. A 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 2.5 m. 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 Length Overall of the Design Helicopter is used and equates to 25 m 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 eye height (1.5 m.) above the forward edge of the FATO in the centre of the flight path, from which the PC1 survey at 2.5º (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).

Hover Taxi. The movement of a wheeled or skid-equipped 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.

Length (Overall) (L). 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.

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 on 1m 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.

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. PC1 also requires CASA approved flight path surveys to/from the HLS.

Performance Class 2 (PC2). 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 3 (PC3). 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 VHF radio transmission on a pre-set frequency, to turn on the HLS and associated lighting.

Prior Permission Required (PPR) HLS. 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.).*

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. 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°. Both 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.

Standard HLS. A place used as an aerodrome for helicopter operations by day and night.

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 14 m. diameter.

Transitional Surfaces. Starts from the edges of the FATO parallel to the flight path centre line and extends outwards (to the sides) at a slope of 2:1 (two-units horizontal in one-unit vertical or 26.6°) from the outer edges of approach/departure surface. The outer sides are 75 m. from the centreline, i.e. the outer edges are 150 m wide. The transitional surfaces start at the forward edge of the FATO, overlaid over the approach/departure path (surfaces) and extend to the end of the approach/departure surface at 3,500 m.

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.

1.10. Applicable Abbreviations

Acronym	Meaning
AC	US FAA Advisory Circular
ACC	Aeromedical Control Centre (HQ Eveleigh). Responsible for control and tasking of HEMS
CAAP	Civil Aviation Advisory Publication (Australia)
CASA	Civil Aviation Safety Authority (Australia)
CAOs	Civil Aviation Orders (Australia)
CARs	Civil Aviation Regulations (1988) Australia
CASRs	Civil Aviation Safety Regulations (1998) Australia
CCCC	Children's Comprehensive Cancer Centre
DA	Development Application
DDO	Design and Development Overlay
DIFFS	Deck Integrated Fire Fighting System
FAA	Federal Aviation Administration, USA
FATO	Final approach and Take-Off Area (1.5 x helicopter length)
FARA	Final Approach Reference Area
GPS	Global Positioning System
HAC	Health Administration Corporation
HEMS	Helicopter Emergency Medical Service
HI	Health Infrastructure
HLS	Helicopter Landing Site
HLSRO	HLS Reporting Officer (Airservices requirement)
HTH	Health Translation Hub (UNSW)
IASB	Integrated Acute Services Building
ICAO	International Civil Aviation Organisation
IFR	Instrument Flight Rules
IMC	Instrument Meteorological Conditions - requiring flight under IFR
L	Length (also referred to as Overall Length), in relation to a helicopter, the total distance between the main rotor and tail rotor tip plane paths when rotating
LDP	Landing Decision Point (Category A/Performance Class 1 operations)
LGA	Local Government Area
LLA	Landing and Lift Off Area. Solid surface meeting dynamic loading requirements, with undercarriage contact points + I metre in all directions
MoH	Ministry of Health NSW
MRI	Magnetic Resonance Imagers
MTOW	Maximum Take Off Weight
NOTAM	Notice to Airmen. Issued by Airservices in relation to airspace and navigation warnings

Acronym	Meaning
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
PC3	Performance Class 3
POW	Prince of Wales
RD	Main Rotor Diameter
RHC	Randwick Hospitals Campus
RTCC	Radar Terrain Clearance Chart
SACL	Sydney Airports Corporation Limited
SCH	Sydney Children's Hospital, Randwick
SARPS	Standards and Recommended Practices developed by ICAO and promulgated in the Annexes to the Convention of International Civil Aviation
SEARs	Secretary's Environmental Assessment Requirements
SSDA	State Significant Development Application
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.
UNSW	University of New South Wales
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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2. EXECUTIVE SUMMARY

The aim of this Aviation Impact Assessment report is to provide insights into the impacts of constructing the UNSW HTH on the aviation operations into and out of Sydney Aerodrome and of the IASB HLS. The report analyses likely impact of cranes during construction, as well as the impacts of the completed building on those same aviation activities.

This Aviation Impact Assessment report was not required to respond to any specific SEARs requirements.

The following key outcomes arose from the analysis:

- The UNSW HTH building will protrude permanently into the Sydney OLS and will require approval for this permanent protrusion. This is a common occurrence and approval should be anticipated.
- The UNSW HTH building will protrude permanently into the Sydney OLS and will require to be fitted with appropriate aviation-standard obstacle lighting if OLS protrusion is, as expected, approved.
- The UNSW HTH building will not protrude into the Sydney PANS-OPS surfaces once constructed.
- The UNSW HTH building will not impact the IASB HLS, its approach and departure paths, or the Parking Position.
- The UNSW HTH construction cranes will not impact the IASB HLS, its approach and departure paths, or the Parking Position.
- The UNSW HTH construction cranes will not protrude through the Sydney PANS-OPS surface in their initial (lower) stage.
- The UNSW HTH construction cranes will temporarily protrude through the Sydney PANS-OPS surface in their final (higher) stage and will require approval in order to do so.

Approval will be required from Commonwealth Department of Infrastructure, Transport, Regional Development and Communications, via SACL to build (permanently) within the Sydney OLS and if approval is forthcoming, as expected, appropriate aviation standard obstacle lighting will be required on the building. There is no permanent protrusion into the PANS-OPS surface.

Approval will be required from the Commonwealth Department of Infrastructure, Transport, Regional Development and Communications for temporary protrusion into the Sydney PANS-OPS surface for the construction cranes at their higher stage. The maximum time for which approvals are permitted is three months.

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/HLS 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 - Aerodromes

Approvals will be required if primary prescribed airspace could be impinged. The normal contact for this process is the Sydney Airport Corporation Limited (SACL).

Primary 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, must be considered.

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

Currently within Australia, there are no set rules or regulations applicable to the design, construction or placement of HLS'. The appropriate national regulatory guidance at present for the use of HLS' is Civil Aviation Regulation (CAR) 92 which places the onus on the helicopter pilot to determine the suitability of a landing site. The Civil Aviation Safety Authority (CASA) as the regulator of aviation in Australia divested itself of direct responsibility for regulating HLS' in the early 1990s and currently provides only basic operating guidelines via Civil Aviation Advisory Publication (CAAP) 92-2 (2) Guidelines for the Establishment and Operation of Onshore Helicopter Landing Sites.

Because no Federal or State (NSW) legislation is in place to protect VFR approach and departure paths and the transitional surfaces associated with hospital HLS', 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.

3.4. State Government Requirements

The various legislative/regulatory requirements relating to HLS' 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 HLS'). Generally, hospital HLS' are considered "ancillary-uses" to hospital purposes and are thus not separate "development". The same cannot necessarily be said about off-site emergency medical HLS, e.g. local sports fields.

To ensure that all requirements are met, close consultation with a NSW Ambulance approved Aviation Consultant should be maintained throughout the design and construction phases.

3.5. Local Government Requirements

Requirements emanate from the Airports Act 1996 and the Airports (Protection of Airspace) Regulations 1996. Clause 6.8 of the Randwick Local Environment Plan 2012 contains also a paragraph which states that its objective is to, in part "provide for the effective and ongoing 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".

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 Department to approve 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 Commonwealth Department of Infrastructure, Transport, Regional Development and Communications for approval. Long term intrusions of the PANS-OPS surface are prohibited.

3.6. 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 3 below:

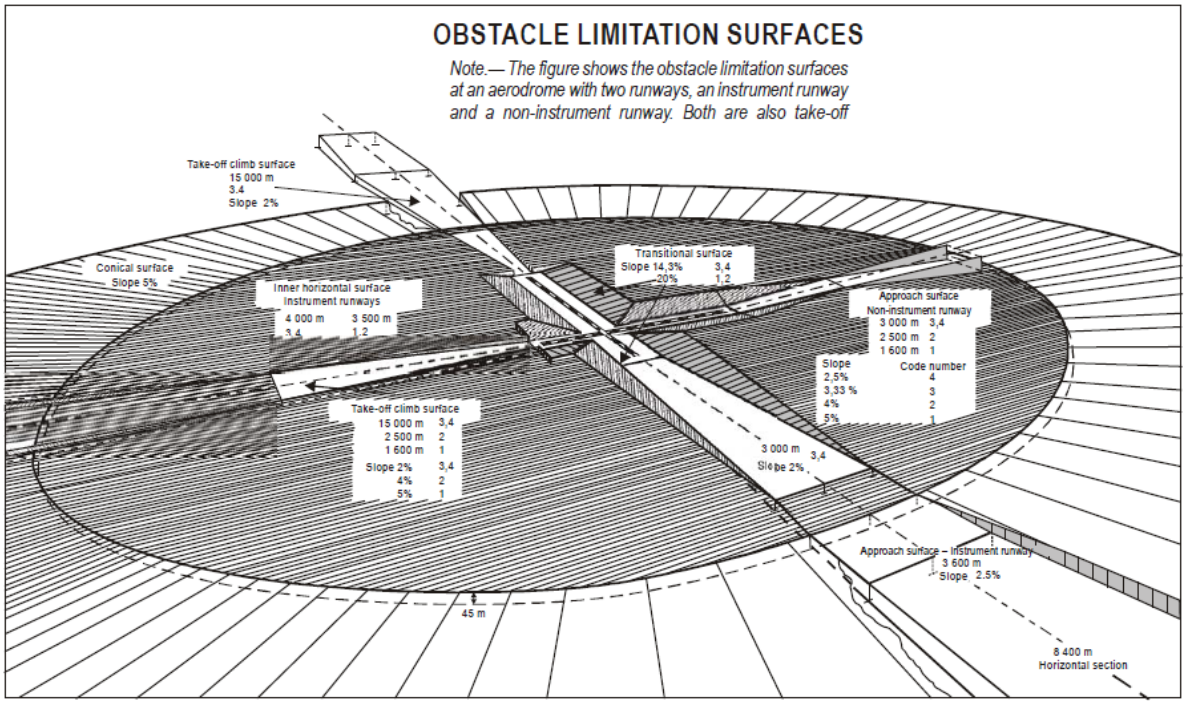

Figure 3: Example of Obstacle Limitation Surfaces

3.7. 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 4 below:

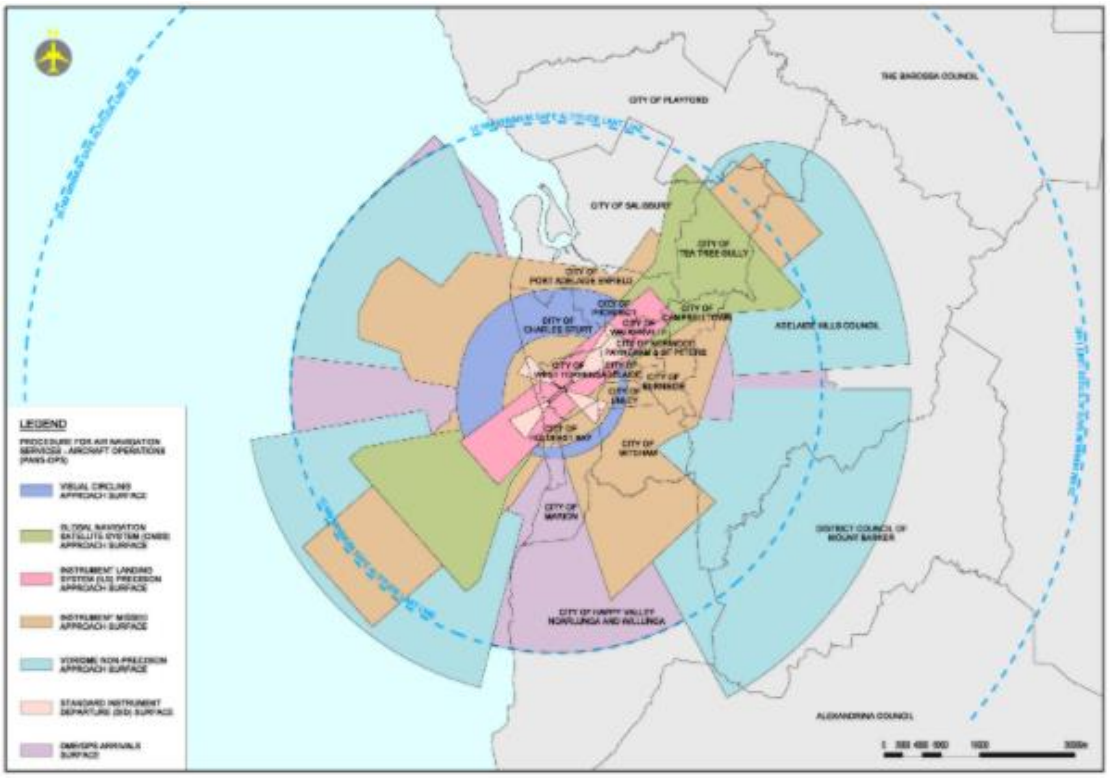

Figure 4: Example of PANS-OPS Surfaces

3.8. 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 5 below:

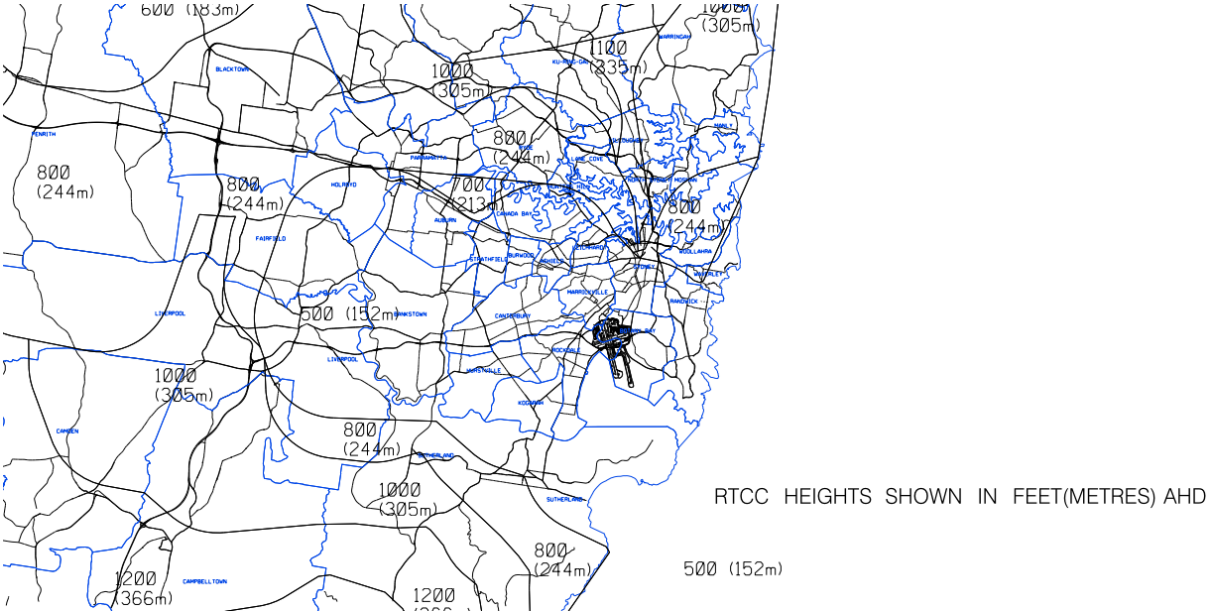

Figure 5: Example of a Radar Terrain Clearance Chart (RTCC)

3.9. VFR Approach/Departure Paths

The purpose of designating approach and departure paths is to provide sufficient airspace clear of hazards to allow safe approaches to, and departures from, an HLS.

VFR approach/departure paths should be such that there are no downwind operations and crosswind operations are kept to a minimum. To accomplish this, an HLS must have more than one approach/departure path which provides an additional safety margin and operational flexibility.

The preferred flight approach/departure path should, where possible, be aligned with the predominant wind when taking account of potential obstacles. Other approach/departure paths should also be based on an assessment of the prevailing winds and potential obstacles. The separation between such flight paths should not be less than 150°, and preferably180°.

3.10. VFR Approach/Departure and Transitional Surfaces

An approach/departure surface is centred on each approach/departure path. Under the Guidelines, the approach/departure path starts at the forward edge of the Final Approach and Takeoff Area (FATO) and slopes upward at 2.5°/4.5%/22:1 (22 units horizontal in 1 unit vertical) for a distance of ~3,500 m. The approach/departure path commences at the FATO width of 25 m. and expands uniformly to a width of 150 m. at a distance of 3,500 m., where the height is 500 feet above the elevation of FATO surface. For PC1 survey purposes, the survey commences from the forward edge of the FATO in the flight path direction, from a datum point 1.5 m. above the FATO edge. The VFR approach/departure paths are to be obstacle free. It is important to achieve 2.5° obstacle free to account for the performance requirements of one engine inoperative (OEI) flight following an emergency.

The transitional surface starts from the edges of the FATO parallel to the flight path centre line and extends outwards (to the sides) at a slope of 2:1 (2 units horizontal in 1 unit vertical or 26.6°) from the outer edges of approach/departure surface. The outer sides are 75 m. from the centreline, i.e. the outer edges are 150 m. wide. The transitional surfaces start at the forward edge of the FATO, overlaid over the approach/departure path (surfaces) and extend to the end of the approach/departure surface at 3,500 m. See Figure 6.

> ***Note:*** *The transitional surface is not applied on the FATO edge opposite the approach departure surface.*

The approach/departure surface is to be free of penetrations. Any penetration of the transitional surface is to be considered a hazard.

Figure 6 illustrates the VFR approach/departure and transitional surfaces.

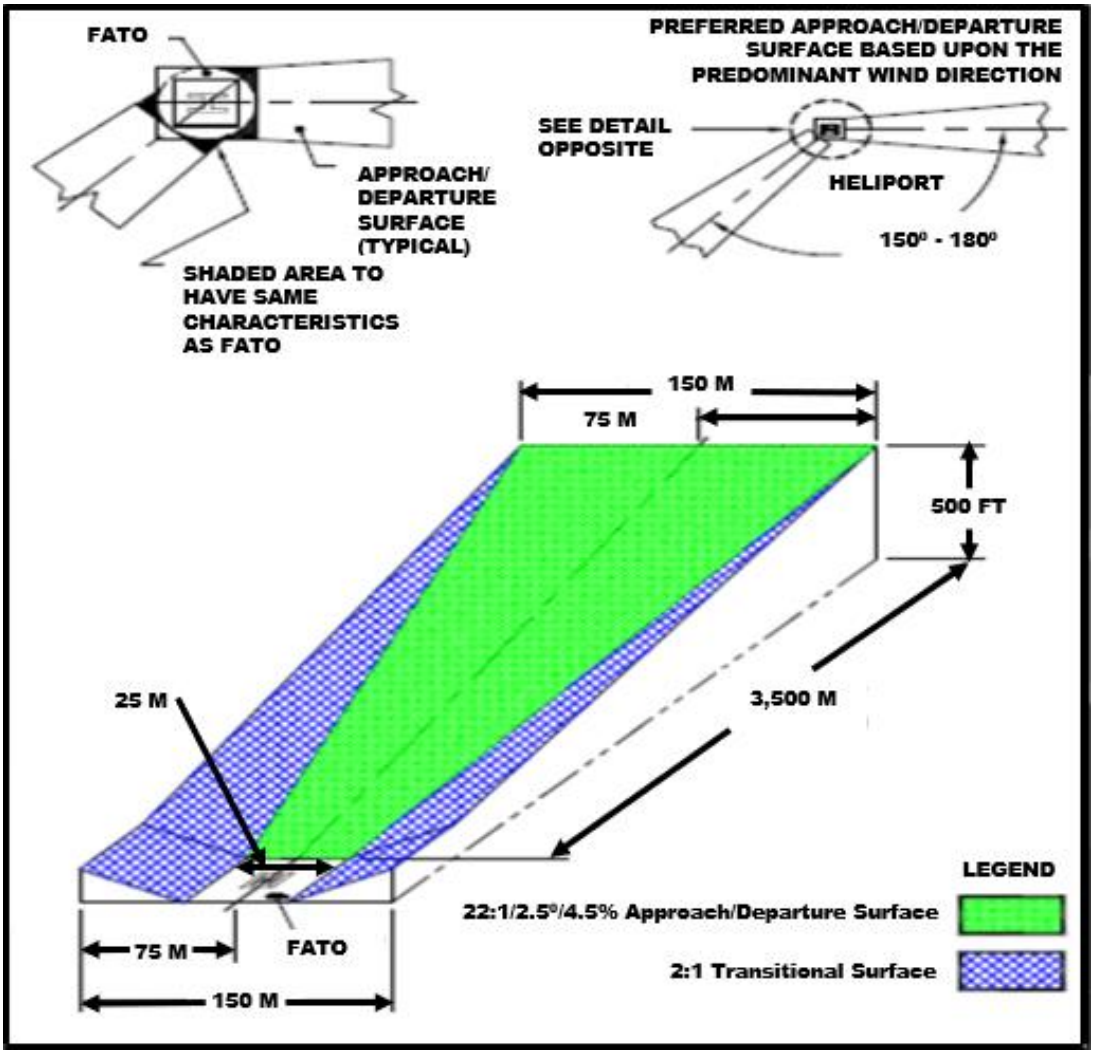

Figure 6: HLS VFR Approach/Departure and Transitional Surfaces

3.11. Object Identification Surfaces (OIS)

The OIS is used for the purpose of the Design and Development Overlay (DDO) and sits below each VFR approach and departure path to provide flight path protection. The OIS below a VFR approach and departure path is the limit for the penetration of obstructions below the flight path. That is, there should be no future development penetrating the OIS. The OIS extends out to 3.5 km. from the forward edge of the FATO. It is permissible under some circumstances to have minor penetration of the OIS, as long as the obstruction can be appropriately marked or lit.

Where possible, the OIS as specified in the Guidelines are to be met. However, at most hospital HLS, existing obstructions do not allow for this standard to be met. It can normally only be accommodated at a “new” rural hospital “green field” location or on a roof top HLS which is high above the surroundings

The OIS can be described as:

- In all directions from the Safety Area, except under the approach /departure paths, the OIS starts at the Safety Area perimeter and extends out horizontally for a distance of ~30 m.
- Under the approach/departure surface, the OIS starts from the outside edge of the FATO and extends horizontally out for a distance of ~700 m. From this point, the OIS extends out for an additional distance ~2,800 m. while rising on a 2.5º or 22:1 slope (22 units horizontal in 1 unit vertical). From the point ~700 m. from the FATO perimeter, the OIS is ~30 m. beneath the approach/departure surface.

- Safety surface width increases as a function of distance from the Safety Area. From the Safety Area perimeter, the OIS extends laterally to a point ~30 m. outside the Safety Area perimeter. At the upper end of the surface, the OIS extends laterally ~60 m. on either side of the approach/departure path. See Figure 7.

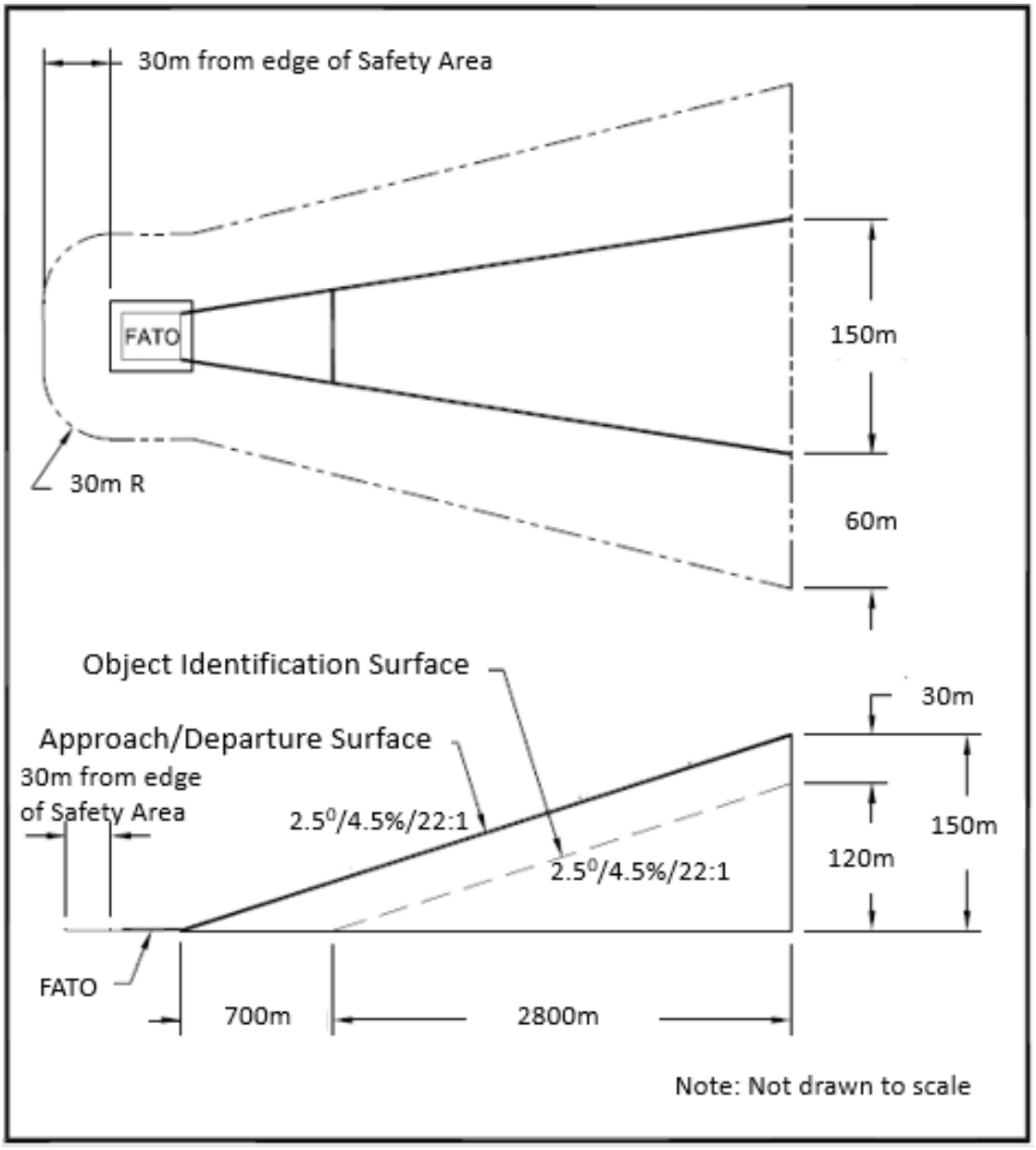

Figure 7: Object Identification Surfaces

3.12. Obstructions on or in the Vicinity of the HLS

The adverse effect of an object presumed or determined to be a hazard to air navigation may be mitigated by:

- Removing the object.
- Altering the object, e.g. reducing its height.
- Marking and/or lighting the object, provided that the object would not be a hazard to air navigation if it were marked and lit.

An example of an obstruction light required close to the HLS would be that required to be positioned on the top of the windsock. Other obstacles in close proximity to the HLS deck may include radio aerials or exhaust stacks etc. attached to the main building, other buildings in the vicinity such as a lift lobby, or stand alone. All such obstacles are required to have red obstacle lights fitted.

3.13. Obstructions in close Proximity but Outside/Below the Approach/Departure Surface

Unmarked wires, antennae, poles, cell towers, and similar objects are often difficult to see in time for a pilot to successfully take evasive action, even in the best daylight weather. Pilots can avoid such objects during enroute operations by flying well above them. Approaches and departures require operations where obstacles may be in closer proximity. Where possible, obstructions are to be moved however if this is impractical, markings and/or obstruction lighting is to be affixed.

4. SPECIFIC UNSW HTH CONSIDERATIONS

4.1. The UNSW HTH Building Location

The UNSW HTH building is planned to be constructed in the north-western corner of the RHC, adjacent to the Integrated Acute Service Building (IASB). See Figure 8 below:

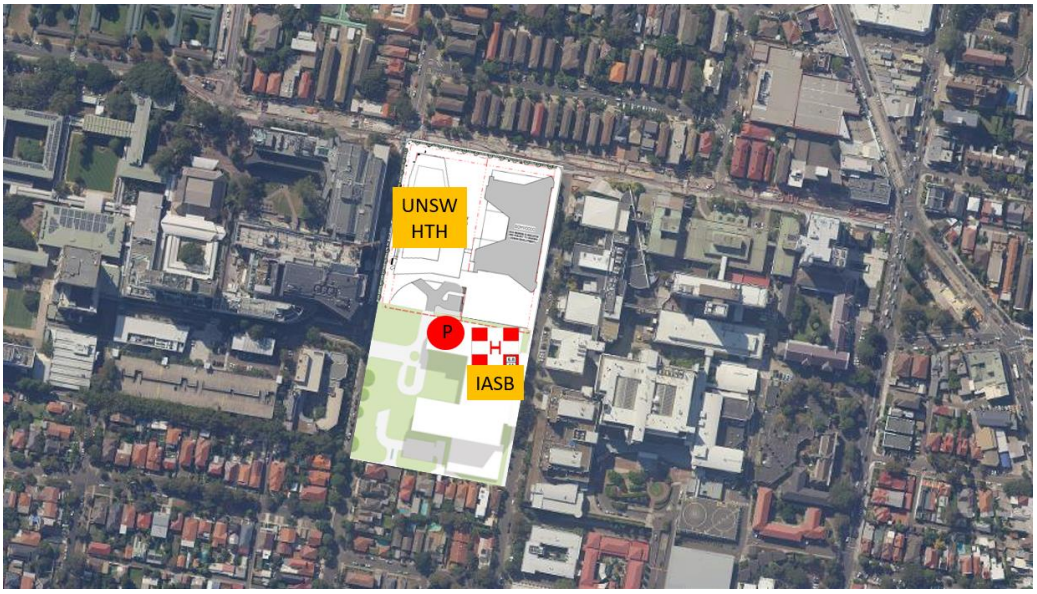

Figure 8: Location of the UNSW HTH

4.2. UNSW HTH Building Elevation

The UNSW HTH is planned to be built to 126.22 metres above sea level (RL126.22); See Figure 9 below:

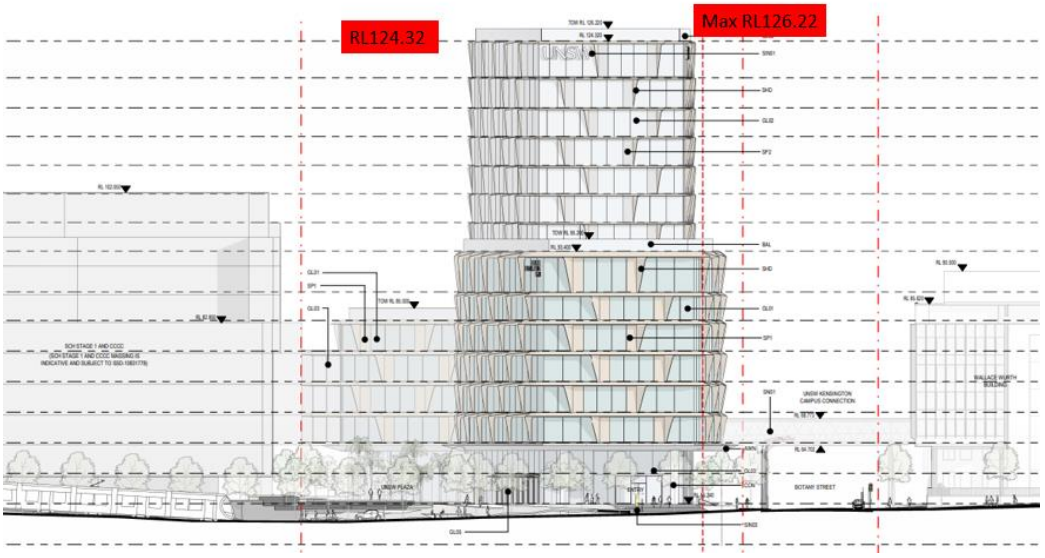

Figure 9: Elevation of the UNSW HTH

4.3. The Sydney OLS Overlay

The Sydney Aerodrome OLS is depicted in Figure 10 below. The approximate location of the RHC is also indicated.

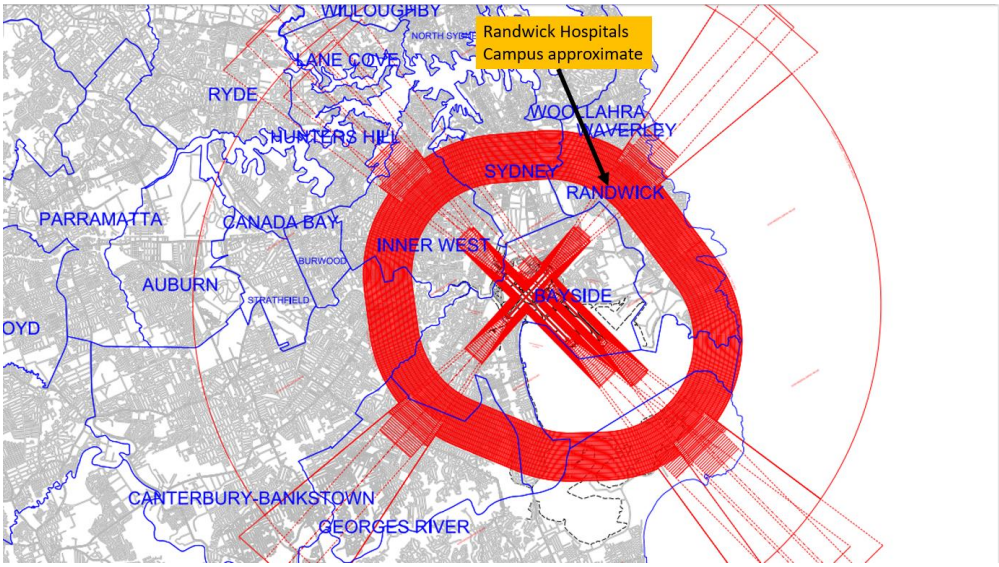

Figure 10: Sydney Aerodrome Obstacle Limitation Surfaces

4.4. The UNSW HTH within the Sydney Aerodrome OLS

At RL126.22, the completed UNSW HTH will be well within the Sydney Aerodrome OLS. With appropriate obstruction lighting, this is permitted providing the correct processes are followed. A more precise location of the UNSW HTH with permitted OLS building heights is at Figure 11 below:

Figure 11: UNSW HTH within the Sydney OLS

4.5. The Sydney PANS-OPS Overlay

The Sydney Aerodrome PANS-OPS overlay is depicted in Figure 12 below. The approximate location of the RHC is also indicated.

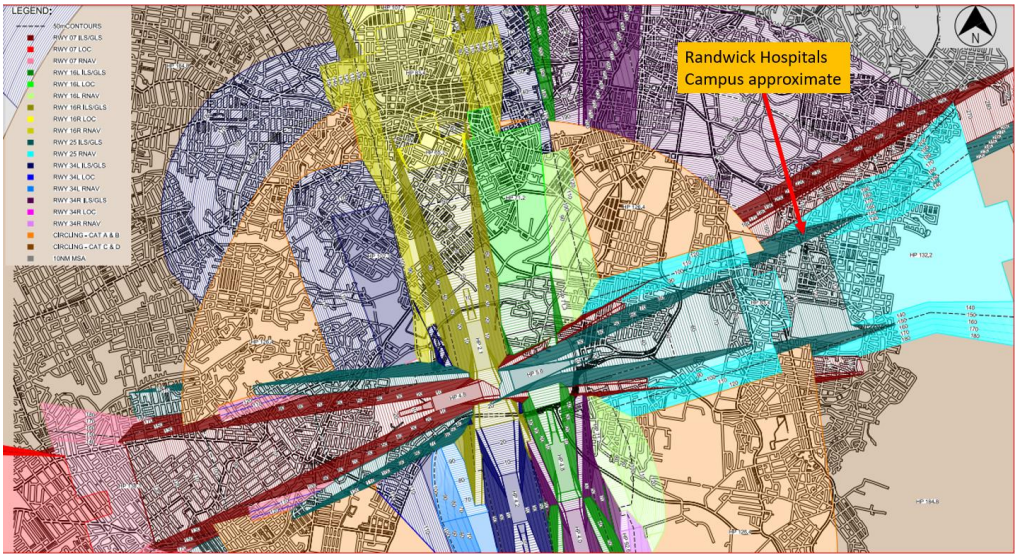

Figure 12: Sydney Airport PANS-OPS Surfaces

4.6. The UNSW HTH within the Sydney Aerodrome PANS-OPS Surfaces

At RL126.22, the completed UNSW HTH will be underneath the PANS-OPS surface, and will not protrude. Even with the addition of any tall plant or services such as antennae, satellite dishes, exhausts, vents, poles etc it is most unlikely that there would be any protrusion. Any such additional obstructions must be factored in to elevation calculations. A more precise location of the UNSW HTH with permitted PANS-OPS building heights is at Figure 13 below:

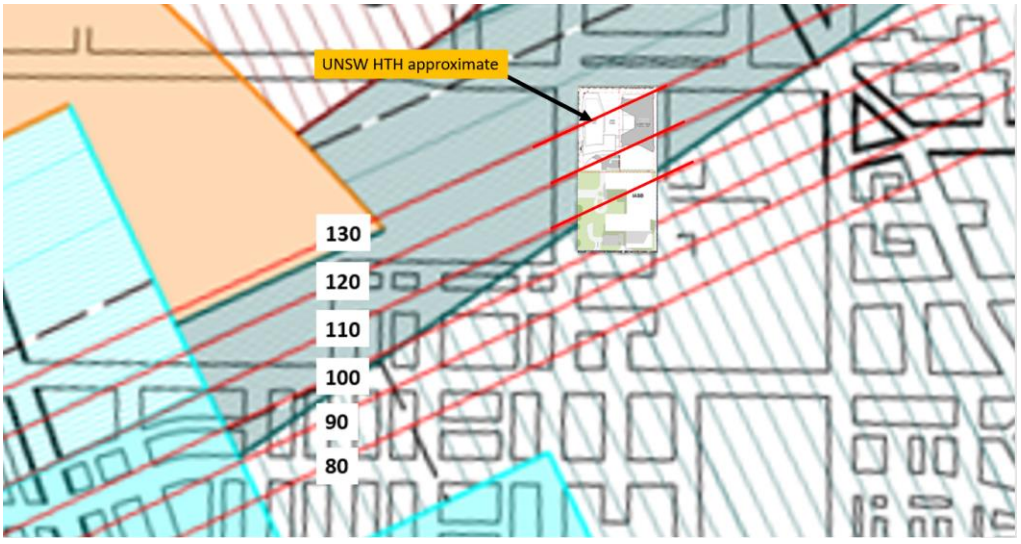

Figure 13: UNSW HTH within the Sydney PANS-OPS Surfaces

4.7. The UNSW HTH within the Sydney Aerodrome RTCC

The development, based upon the design presented, will not protrude into RTCC. See Figure 14 below.

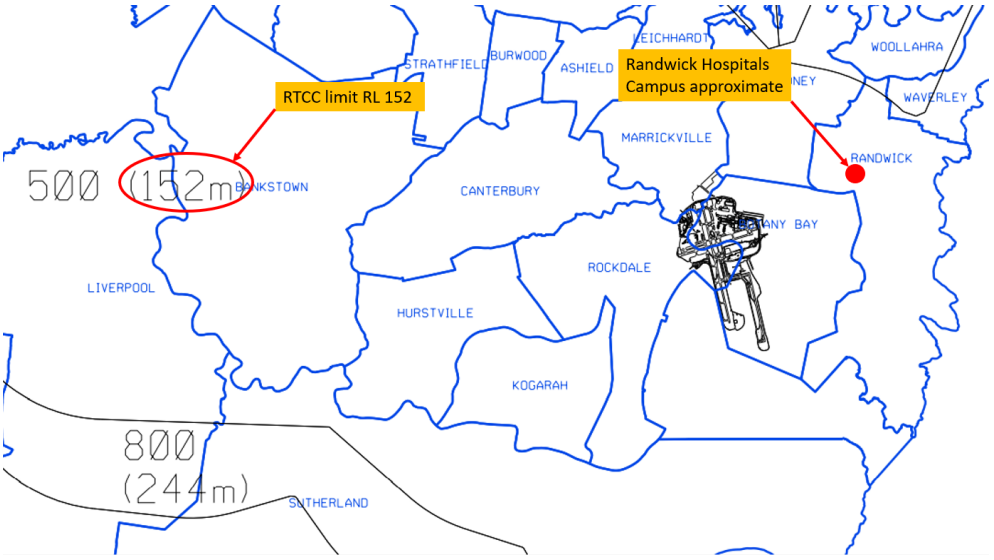

Figure 14: UNSW HTH within the Sydney RTCC

4.8. Assessment of Building Impacts on Sydney OLS and PANS-OPS

The UNSW HTH building, based upon the design presented, will not protrude into PANS-OPS surfaces. See Figures 15-18 below. The building will protrude into the OLS and with the relevant approval, it is foreseen that the building may be constructed with a provision that it is lit appropriately with obstruction lighting.

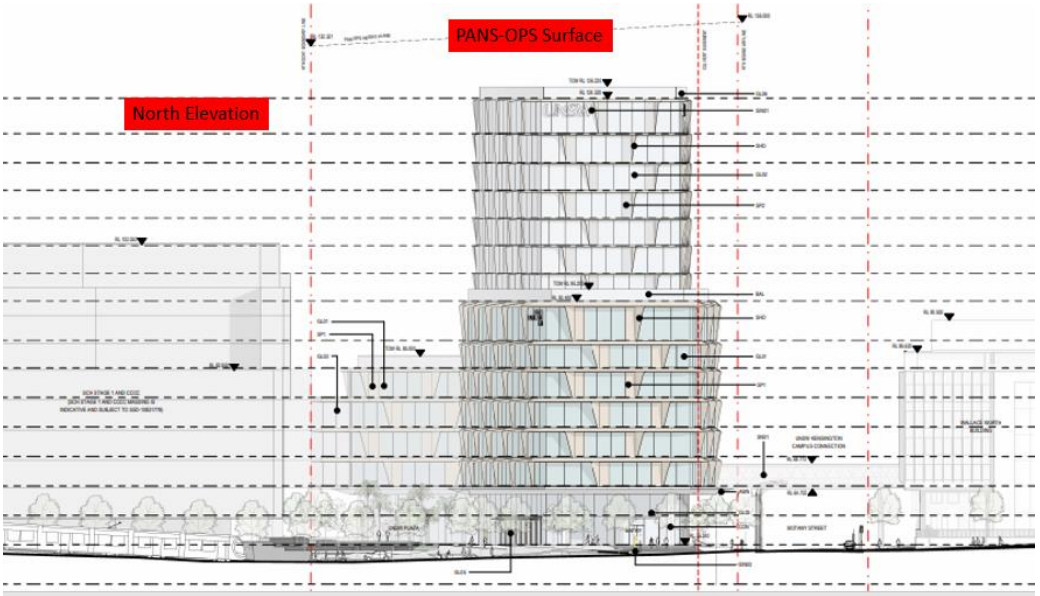

Figure 15: UNSW HTH North Elevation showing Sydney PANS-OPS Surface

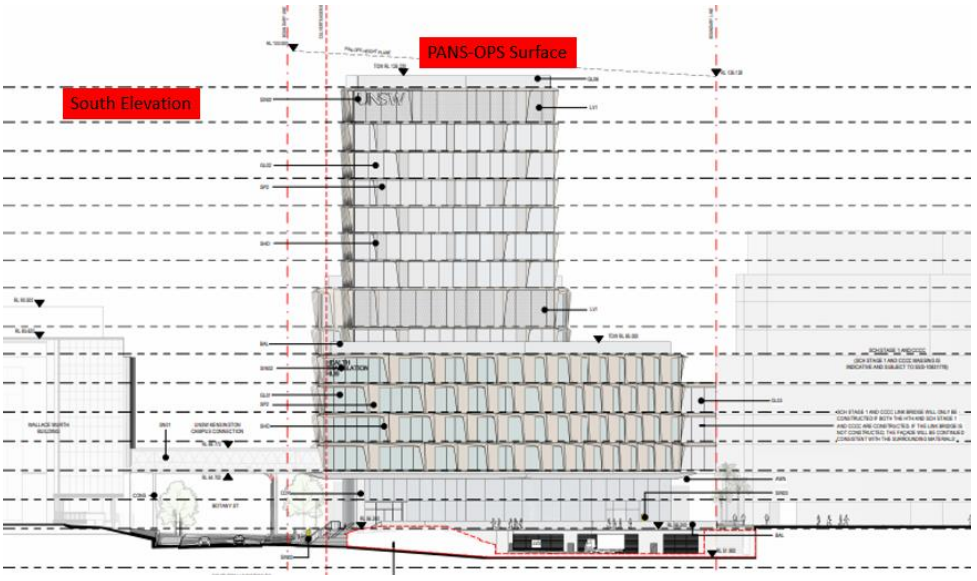

Figure 16: UNSW HTH South Elevation showing Sydney PANS-OPS Surface

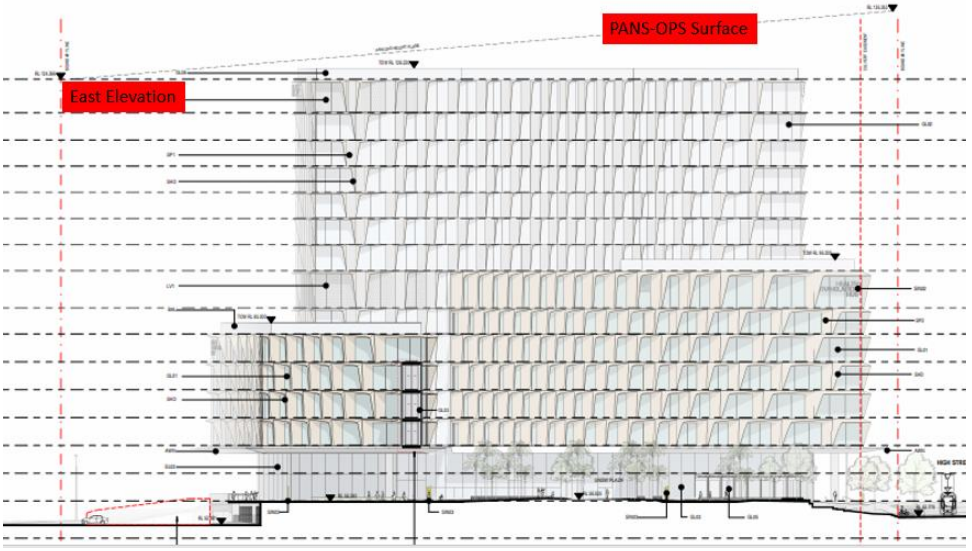

Figure 17: UNSW HTH East Elevation showing Sydney PANS-OPS Surface

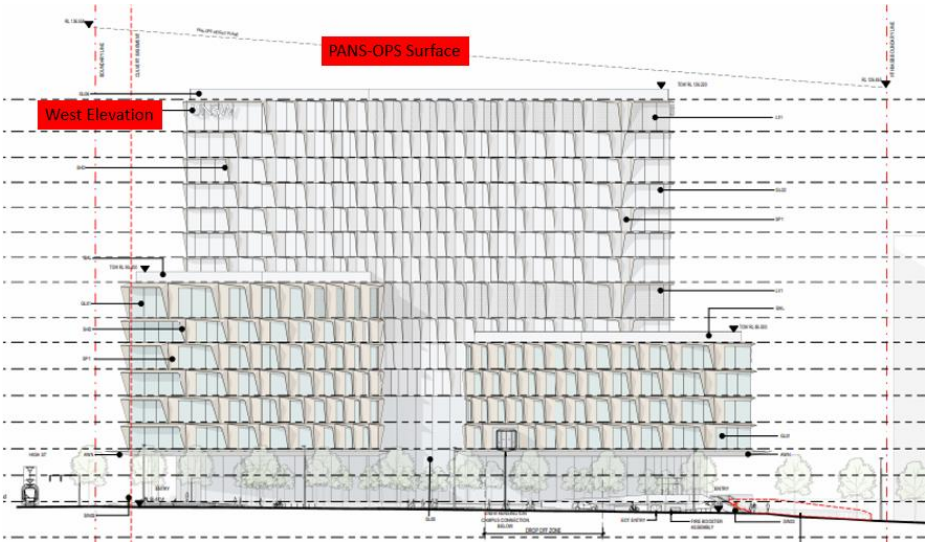

Figure 18: UNSW HTH West Elevation showing Sydney PANS-OPS Surface

4.9. Location of the UNSW HTH Building in Relation to RHC HLS

As the Integrated Acute Services Building (IASB) is closer, it is the critical HLS for this analysis. The approach and departure paths for the existing and future IASB HLS are depicted in Figure 19 below:

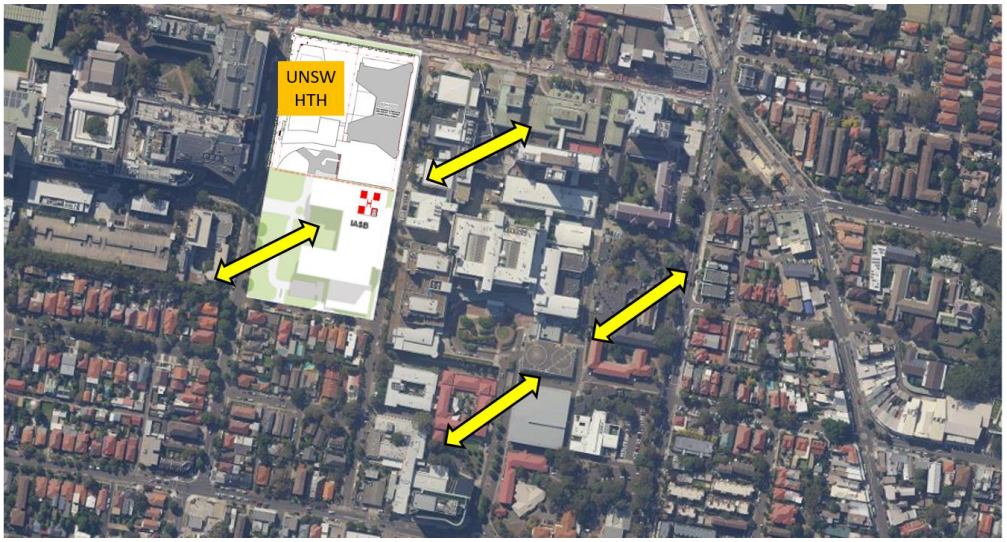

Figure 19: Current/Planned HLS Locations and Approach/Departure Paths

4.10. Impact of the UNSW HTH Building on RHC HLS

The UNSW HTH building will not adversely impact the approach and departure paths into and out of the existing HLS or the new HLS to be constructed on the IASB. Survey modelling in Figure 20 below confirms this.

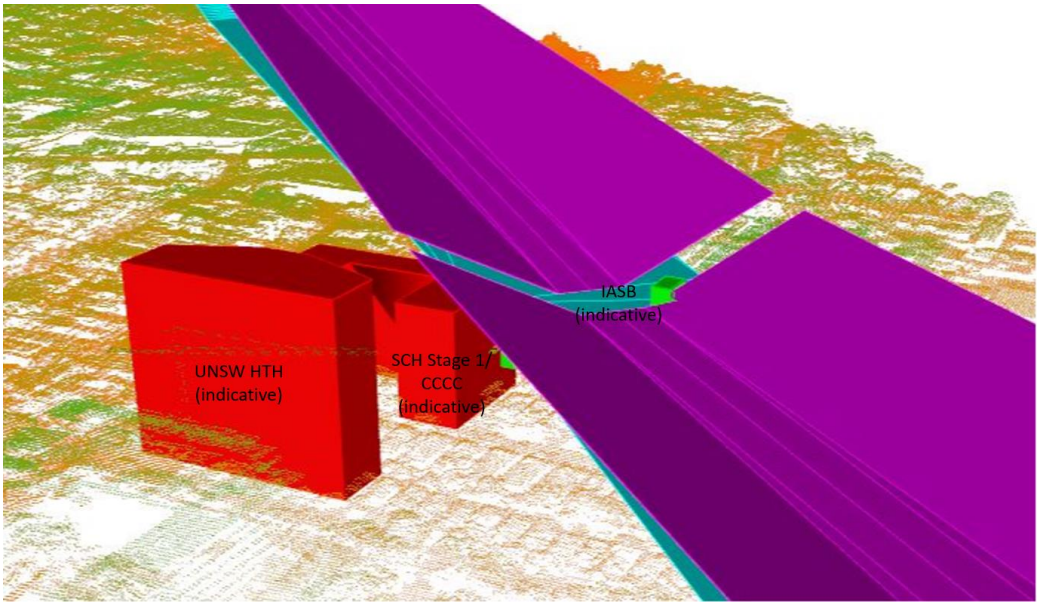

Figure 20: Survey modelling of the IASB HLS Approach/Departure Paths

4.11. All Round (360^0) HLS Airspace Protection is not Policy

Unlike HLS protection policy in Victoria, there is no NSW MoH policy to protect airspace in all directions around a hospital HLS with the exception of a 30m OIS distance to the sides and rear of an approach/departure path. See Figure 7.

The only requirements are those described in Sections 3.9 to 3.13 of this report. The protection requirements for approach/departure paths are actually very narrow corridors. The protection requirements discussed in this report are based upon the Guidelines for Hospital Helicopter Landing Sites in NSW, the basis for which was discussed in Sections 1 and 3.

4.12. Potential Locations of UNSW HTH Construction Cranes

It is currently proposed to use two hammerhead tower cranes to construct the UNSW HTH. The potential, approximate locations of the two proposed construction cranes for the UNSW HTH are depicted in Figure 21 below:

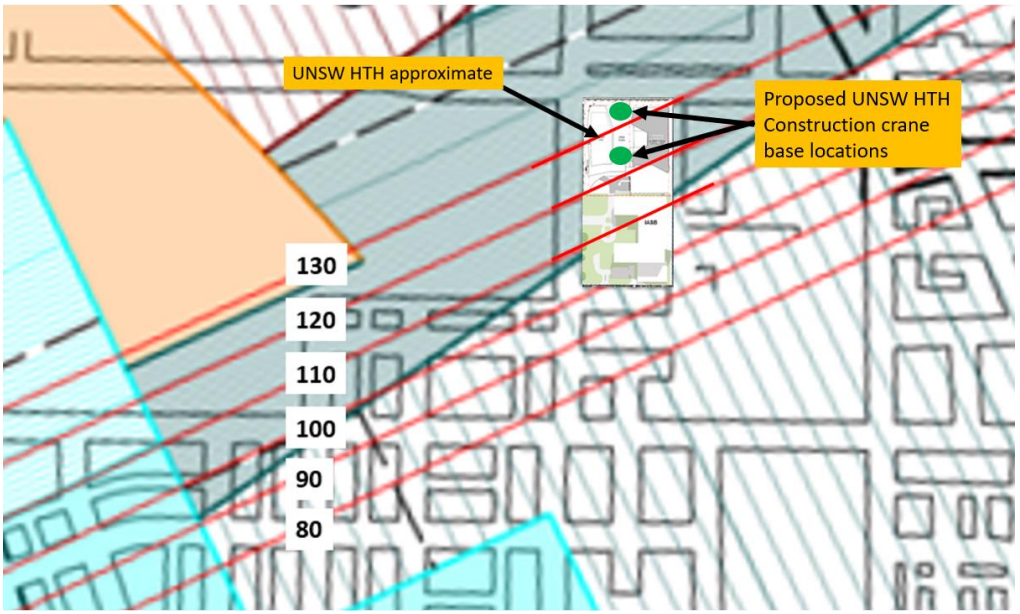

Figure 21: Proposed UNSW HTH Construction Crane Locations

4.13. UNSW HTH Construction Crane Erection Concept

It is proposed to erect the two self-climbing cranes in stages. The initial stage keeps the cranes out of the PANS-OPS surface. At an appropriate time the cranes will be climbed for the final stage to within the PANS-OPS surface to complete the top-out of the building. The first crane (TC1) is currently estimated to be at RL 114.578 at its initial (lower) stage, and RL 140.827 at its final (higher) stage. The second crane (TC2) is currently estimated to be at RL 127.9 at its initial stage and RL 150.259 at its final stage. The initial stage is depicted in Figure 22 below. This view is facing west. The red crane (TC2) is at the northern end of the development and the blue crane (TC1) is towards the southern end of the development. All of these elevations are subject to change as modifications are made to the Construction Management Plan.

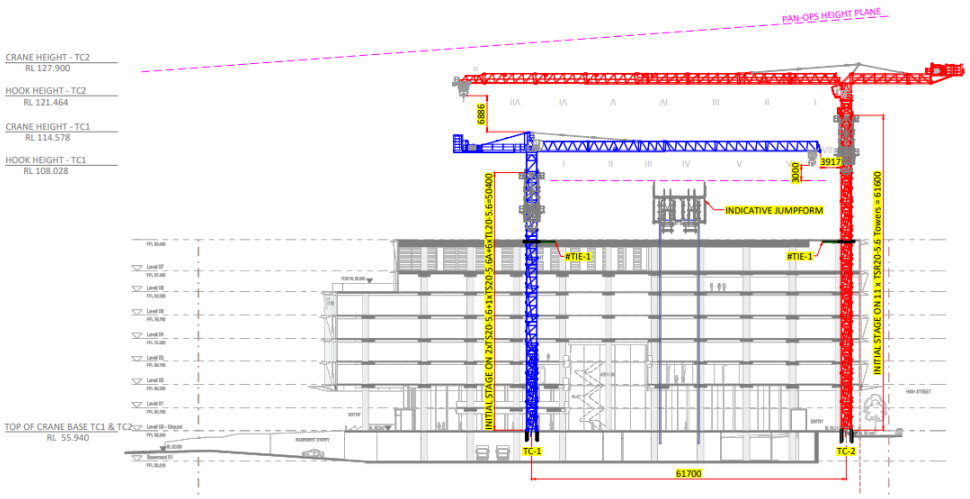

Figure 22: Cranes at Initial (Lower) Stage

The final stage is depicted in Figure 23 below. This view is facing west. The red crane (TC2) is at the northern end of the development and the blue crane (TC1) is towards the southern end of the development.

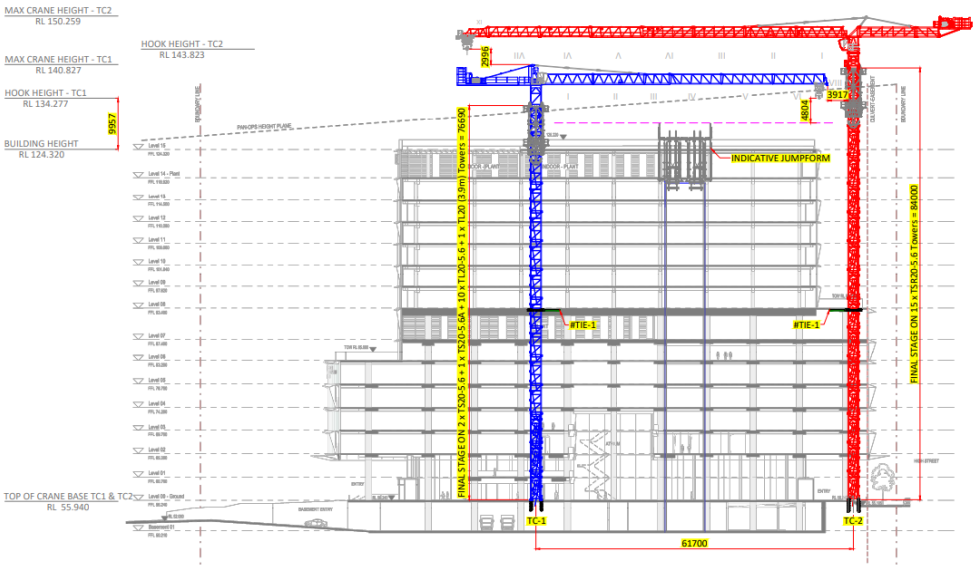

Figure 23: Cranes at Final (Higher) Stage

4.14. Alternate Crane Plan

An alternate crane plan is being developed to reduce crane heights and minimise the period of the penetration of the PANS-OPS surface in the event that the currently-planned final stage of the crane plan becomes problematic for airspace approvals.

4.15. Impact of Proposed UNSW HTH Construction Cranes on OLS

As the UNSW HTH building will clearly protrude into the Sydney OLS, so too will the construction cranes at both their initial (lower) and final (higher) operating heights. This is permissible, with the relevant approvals, as long as appropriate aviation-standard lighting is attached to the cranes.

4.16. Impact of Proposed UNSW HTH Construction Cranes on PANS-OPS

At the initial (lower) stage, neither crane will protrude into PANS-OPS. When TC1 slews freely to the south it will still remain clear of the PANS-OPS surface. Both cranes will penetrate the PANS-OPS surface at the final (higher) stage. Temporary protrusions into PANS-OPS may be approved, but only for a maximum period of three months.

4.17. Impact of Proposed UNSW HTH Construction Cranes on RTCC

Neither crane will protrude into the RTCC, either at the initial (lower) stage or the final (higher) stage.

4.18. Impact of Proposed UNSW HTH Construction Cranes on IASB HLS and Parking Position

An aerial view of how the construction cranes will appear in relation to the IASB is shown in Figure 24 below. TC1 has a jib length of 55m and TC2 has a jib length of 75m.

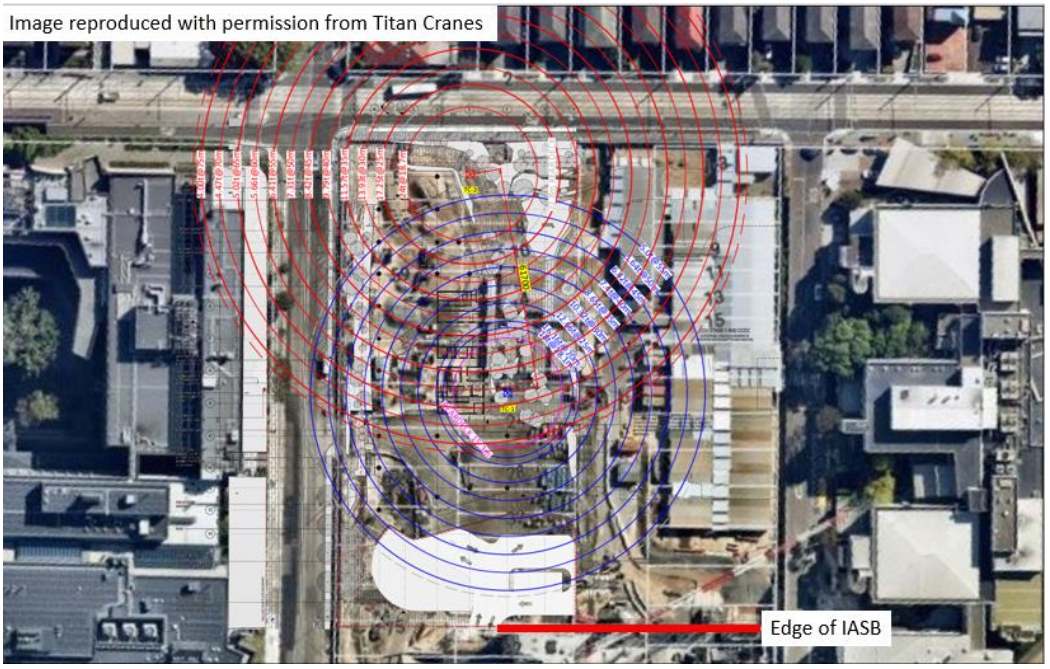

Figure 24: Position of Cranes in Relation to the IASB

The relationships between the cranes and the IASB HLS and Parking Position are depicted in Figure 25 below:

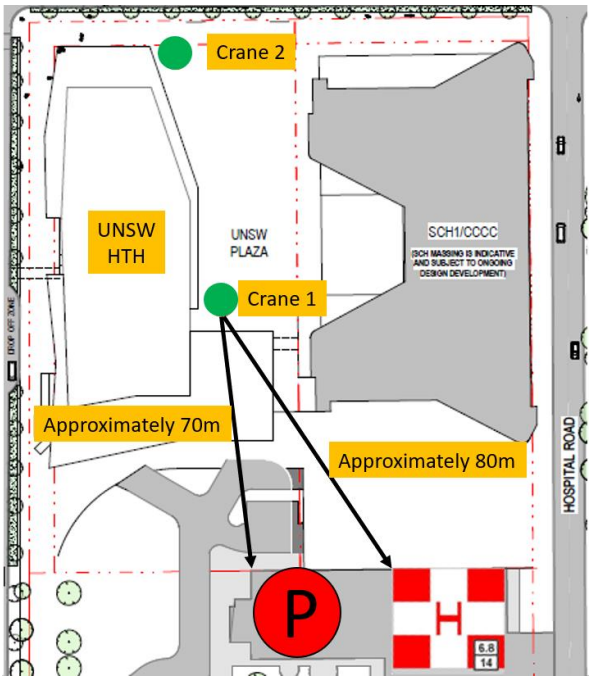

Figure 25: Relationship of UNSW HTH Construction Cranes and IASB HLS and Parking Position

From the base of the southern-most crane (TC1) to the nearest point of the IASB is approximately 70m. From the base of this crane to the edge of the IASB HLS safety area is approximately 80m. TC1, with a jib length of 55m, will therefore be sufficiently clear of both the HLS and Parking Position such that no remedial action will be required.

4.19. Impact of Proposed UNSW HTH Construction Cranes on IASB HLS Approach and Departure Paths

The jib of the southern-most crane (TC1) will not intersect with the approach and departure paths for the IASB HLS. An impact example, based upon a 55m jib is included in Figure 26 below. It will be sufficiently clear of the approach and departure paths such that no remedial action will be required.

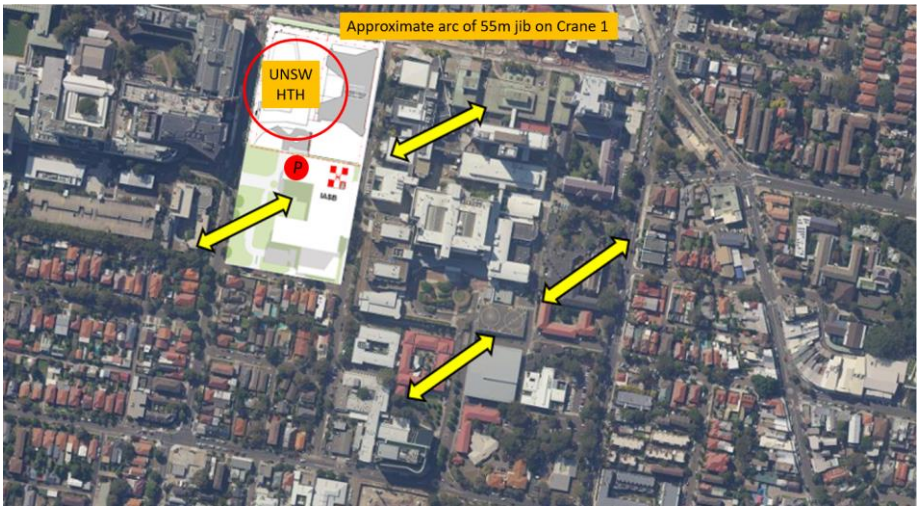

Figure 26: Relationship of UNSW HTH Construction Cranes and IASB HLS Approach and Departure Paths

4.20. Deductions: Airspace, Cranes, Survey, Obstructions and HLS and Parking Position Usage

The following key deductions can be made:

- The UNSW HTH building will protrude permanently into the Sydney OLS and will require approval for this permanent protrusion. This is a common occurrence and approval should be anticipated.
- The UNSW HTH building will protrude permanently into the Sydney OLS and will require to be fitted with appropriate aviation-standard obstacle lighting if OLS protrusion is, as expected, approved.
- The UNSW HTH building will not protrude into the Sydney PANS-OPS surfaces once constructed.
- The UNSW HTH building will not impact the IASB HLS, its approach and departure paths, or the Parking Position.
- The UNSW HTH construction cranes will not impact the IASB HLS, its approach and departure paths, or the Parking Position.
- The UNSW HTH construction cranes will not protrude through the Sydney PANS-OPS surface in their initial (lower) stage.
- The UNSW HTH construction cranes will temporarily protrude through the Sydney PANS-OPS surface in their final (higher) stage and will require approval in order to do so.

4.21. Process to Follow in Order to Obtain Relevant Approvals

Sydney Airport Corporation Limited (SACL) is the organisation that acts as the agent for all prescribed airspace applications associated with Sydney Aerodrome and its airspace. Links to relevant forms are below. On receipt of the Application Forms SACL seeks comment and assessment from:

- Sydney Aerodrome based airlines
- Airservices Australia
- Civil Aviation Safety Authority

Once these stakeholders have reviewed the impact of the requested penetration of the prescribed airspace, the responses are submitted to the Department of Infrastructure, Transport, Regional Development and Communications by SACL's airspace protection team (point of contact details are below).

4.22. Links to Relevant Forms

Application for Development Approval (link)
https://assets.ctfassets.net/v228i5y5k0x4/5ANcgf7qFiakke6SUYASSU/a5d8915cfbdb8f18e95eedde9a8d685f/Airspace_Protection_Form.pdf

Application for Approval of Crane Operation (link)
https://assets.ctfassets.net/v228i5y5k0x4/2ID4yo6olW4Y8oUiQ4eIu8/80cabbc2d221eda3a35723c4385f1e14/Crane_Enquiry_Form.pdf

Once completed, the forms can be submitted online. Ensure all attachments are sent through to the SACL point of contact.

4.23. SACL Point of Contact

The SACL Point of contact is detailed below. It is well worth a call prior to submission of the application to ensure the correct information is provided.

Peter Bleasdale
Airfield Design Manager
Sydney Airport
Tel: +61 2 9667 9246
Mob: +61 408 479 192
Email: peter.bleasdale@syd.com.au

Email: airspaceprotection@syd.com.au

Regular follow-up is advised. SACL receives hundreds of applications every year and difficult cases can often be held up.

4.24. Supporting Information for Penetration of Prescribed Airspace

Supporting details will be required to remove ambiguity and delays in the assessment of the submission. It is recommended drawings showing the following are created:

- Building information:
  - Site coordinates (MGA94)
  - Date the building will progress into prescribed airspace (if applicable)
  - Building coordinates (the corners of the 'as built' building in prescribed airspace)
  - Elevations of the buildings
  - Drawing of the building with the above information is recommended
- Crane information:
  - Centre of the base coordinates (MGA 94)
  - Date the crane/s will progress into prescribed airspace (if applicable)
  - Crane types (tower/luffing)
  - Crane elevations
  - Ensure the stages into prescribed airspace are drawn with accompanying dates
- Mobile crane information:
  - Dates (timings essential for notification of airspace users)
  - Location
  - Height of lift

4.25. Decisions on Temporary Protrusions into PANS-OPS surfaces

Approvals for temporary penetration of the PANS-OPS surface (less than three months) and long-term penetrations of the OLS (more than three months) can only be given by the Commonwealth Department of Infrastructure, Transport, Regional Development and Communications. They act under the Airports Act 1996 and the Airports (Protection of Airspace) Regulations 1996 and will take into account advice from CASA, Airservices Australia, SACL and the Sydney-based airlines.

There is a significant lag in gaining approvals for cranes planned to penetrate PANS-OPS surfaces for up to three months and for OLS penetrations of more than three months. To help minimise the time taken for a decision, it is very important that the exact type, location, heights and jib lengths of cranes intended to be used in the development are determined very early in the planning process; as well as the period during which they will protrude into the relevant airspace.

4.26. Conclusion

Approval will be required from Commonwealth Department of Infrastructure, Transport, Regional Development and Communications, via SACL to build (permanently) within the Sydney OLS and if approval is forthcoming, appropriate aviation standard obstacle lighting will be required on the building. It is very common for buildings in inner city areas to protrude into the OLS. As long as appropriate aviation-standard obstacle lighting is fitted, approval for the protrusion is normally routine.

Approval will be required from the Commonwealth Department of Infrastructure, Transport, Regional Development and Communications for temporary protrusion into the Sydney PANS-OPS surfaces.