

AVIATION IMPACT ASSESSMENT REPORT



AIRSPACE IMPLICATIONS DUE TO THE CONSTRUCTION OF THE ALEXANDRIA HEALTH CENTRE


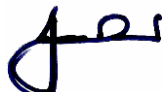
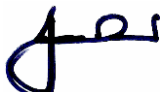
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This Report on the airspace implications, both during and following construction of the development is prepared for Alexandria Property Development Pty Ltd, directed by Johnstaff, by Resolution Response Pty. Ltd. ABN: 94 154 052 883, trading as 'AviPro'.

The Report relates to the coordination aspects associated with prescribed/protected airspace at Sydney (Kingsford-Smith) Aerodrome and the Helicopter Landing Site (HLS) at the Victoria Barracks/St Vincent's Hospital due to the establishment and site design of the Alexandria Health Centre. It is intended to inform design and planning.

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1. BACKGROUND

1.1. Project Establishment, Site Details and Context

This report accompanies an application which seeks consent for the following in accordance with the Concept State Significant Development Application (SSDA) approval:

- Site establishment including earthworks.
- Construction of the Alexandria Health Centre:
 - Total GFA of 11,436sqm;
 - Maximum FSR of 3.85:1; and
 - Maximum height of 34.95m, Max RL. 45.4
- Ancillary development including:
 - Car parking – 77 car parking spaces distributed across basement, ground, and ground mezzanine levels;
 - Utility infrastructure and services connections;
 - Building identification signage and wayfinding signage;
 - Stormwater management; and
 - Landscaping.
- Laneway for vehicle and pedestrian access along with western boundary of the site
- Operation of the Alexandria Health Centre as a mental health hospital and medical centre with ancillary uses.

AviPro has been engaged to provide advice regarding the aviation specific impacts that the Alexandria Health Centre (AHC) development will have on the prescribed airspace at Sydney (Kingsford-Smith) Aerodrome, helicopter routes for Sydney (Kingsford-Smith) Aerodrome and the Victoria Barracks HLS being the HLS for St Vincent’s Hospital, including an assessment of the impacts caused by the construction crane(s), and also the building itself once complete. There are no other HLSs in proximity to the development.

The site is located approximately 3.7km south of the Sydney Central Business District (CBD), within the western part of the Green Square Urban Renewal Area (GSURA). The site is rectangular in shape, covers an area of 2,972sqm and is bounded by Bourke Road to the north, 34-42 Bourke Road to the east, 26 Bourke Road to the west and 9-13 O’Riordan Street to the south. An existing single storey warehouse occupies the entire site.

1.2. Secretary’s Environmental Assessment Requirements (SEARs) Reporting

In preparing this report, SSDA-38600121 consent condition B43 (Future development application(s) must include an Aviation Impact Assessment, prepared by a suitably qualified professional, to assess the potential aviation impact(s) of building height and construction works, including crane height.) is met. The report also considers standard SEARs requirements for hospitals, medical centres and medical research facilities in accordance with [Table 1](#) below. Notably, neither if these SEARs requirements are applicable. Other relevant airspace are also addressed.

Item	SEARS Requirement	Relevant Section of Report
24.1	If the development proposes a helicopter landing site (HLS), assess its potential impacts on the flight paths of any nearby airport, airfield or HLS.	N/A
24.2	If the site contains or is adjacent to an HLS, assess the impacts of the development on that HLS.	N/A

Table 1: Secretary’s Environmental Assessment Requirements - Aviation

1.3. Background Material

Reference material drawn by Warren and Mahoney and MAAP, and provided by Johnstaff in support of the report include early planning designs and concept drawings.

1.4. Methodology

Criteria from all relevant references were assessed, with Advisory Circular (AC) 139.R-01 v1.0 Guidelines for heliports - design and operation used as the primary tool.

1.5. Explanation of Terms

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

Approach/Departure Path (VFR) (Day and Night). The flight track helicopters follow when landing at or departing from the FATO of an HLS. Updated standards to align with ICAO recommendations now have the VFR Approach/Departure path extending outwards from the edge of the FATO safety area with an obstacle free gradient of 2.6° or 4.5% or 1:22.2 vertical to horizontal, measured from the forward edge of the FATO safety area. The VFR Approach/Departure path commences at a width of 34m, and splays laterally at an angle of 8.7°/15%/1:12.8 to a width of 140m, then remains parallel to a distance of 3,386 m, where the height is 152 m above the elevation of FATO surface.

Design Helicopter. The Leonardo 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.

D Value (also Overall Length (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.

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 2.5 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). 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 2.6° (4.5%) is initiated.

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

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. An HLS that meets or exceeds the specifications contained within CASA Advisory Circular (AC) 139R-01 Guidelines for heliports design and operation. A heliport may have two or more co-existing 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 multi-HLS 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 an HLS or 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 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 safely 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.

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 4.5m beyond the FATO perimeter forming a 34m X 34m square or a 34m diameter circle.

Safety Net. Surrounds the outer edge of a rooftop HLS. It is to be a minimum of 1.5m wide and have a load carrying capacity of not less than 122 kg/m². 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 the Design Helicopter, and is 14m diameter.

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.

1.6. Applicable Abbreviations

Acronym	Meaning
AC	US FAA Advisory Circular
ACC	Aeromedical Control Centre (HQ Eveleigh). Responsible for control and tasking of HEMS
AHC	Alexandria Health Centre
CASA	Civil Aviation Safety Authority (Australia)
CASRs	Civil Aviation Safety Regulations (1998) Australia
CoS	City of Sydney
DCP	Development Control Plan
DDO	Design and Development Overlay
FAA	Federal Aviation Administration, USA
FATO	Final approach and Take-Off Area (1.5 x helicopter length)
FARA	Final Approach Reference Area

Acronym	Meaning
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
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)
LEP	Local Environment Plan
LLA	Landing and Lift Off Area. Solid surface meeting dynamic loading requirements, with undercarriage contact points + 1 metre in all directions
MRI	Magnetic Resonance Imagers
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
RTCC	Radar Terrain Clearance Chart
SACL	Sydney Airports Corporation Limited
SARPS	Standards and Recommended Practices developed by ICAO and promulgated in the Annexes to the Convention of International Civil Aviation
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

1.7. List of Figures

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2. EXECUTIVE SUMMARY

The aim of this report is to provide insights into the impacts of constructing the AHC on the aviation operations into and out of Sydney (Kingsford-Smith) Aerodrome and of helicopter operations in the Sydney airspace. The report analyses the likely impact of the completed building and any associated construction cranes on aviation activities.

The following key outcomes arose from the analysis:

- The AHC, once constructed, will not intrude into the Sydney (Kingsford-Smith) Aerodrome OLS.
- The AHC, once constructed, will not intrude into the Sydney (Kingsford-Smith) Aerodrome PANS-OPS surfaces.
- The AHC, once constructed, will not intrude into the Sydney RTCC.
- The AHC, and any associated construction crane will not impact the approach and departure paths of any HLS.
- The AHC, and any associated construction crane will not impact any helicopter routes.
- The AHC construction crane(s) will probably intrude into the Sydney (Kingsford-Smith) Aerodrome OLS.
- The AHC construction crane(s) will not intrude into the Sydney (Kingsford-Smith) Aerodrome PANS-OPS surfaces.
- The AHC construction crane(s) will not intrude into the Sydney RTCC.
- The AHC construction crane(s) will require aviation-standard paint marking and obstacle lighting.

The AHC, including its construction crane(s), will not impact aviation safety in relation to either Sydney (Kingsford-Smith) Aerodrome, any hospital HLS, or any helicopter route. If the construction crane is higher than 51m AHD, specific approval will be necessary and appropriate aviation standard paint marking and obstacle lighting will be required. It is highly advisable that a crane plan is developed as soon as possible with a view to keeping the crane below 51m AHD.

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 - Aerodromes

Approvals will be required if prescribed airspace could be impinged. The normal contact for this process is through Sydney Airport, the operator of Sydney (Kingsford-Smith) Airport.

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 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 infringements to the Department for approval. Long term intrusions of the PANS-OPS surface are prohibited.

3.3. 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 v1.0 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.

3.4. State Government Requirements

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.

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.

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 1 below:

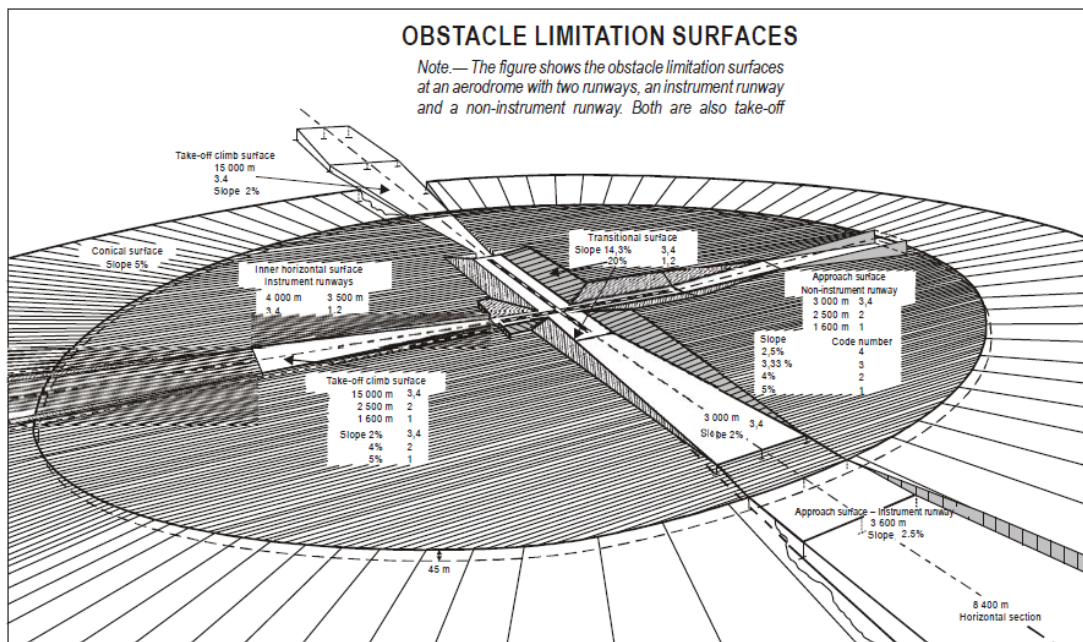


Figure 1: Example of Obstacle Limitation Surfaces

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 2](#) below:

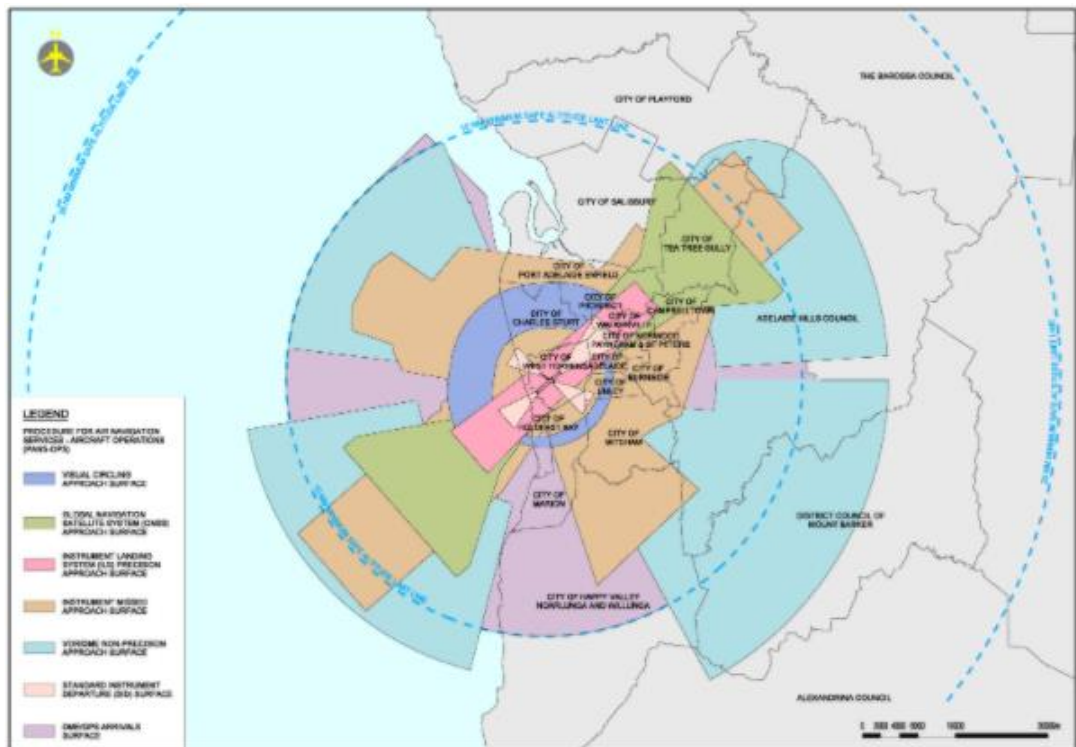


Figure 2: Example of PANS-OPS Surfaces

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 3](#) below:

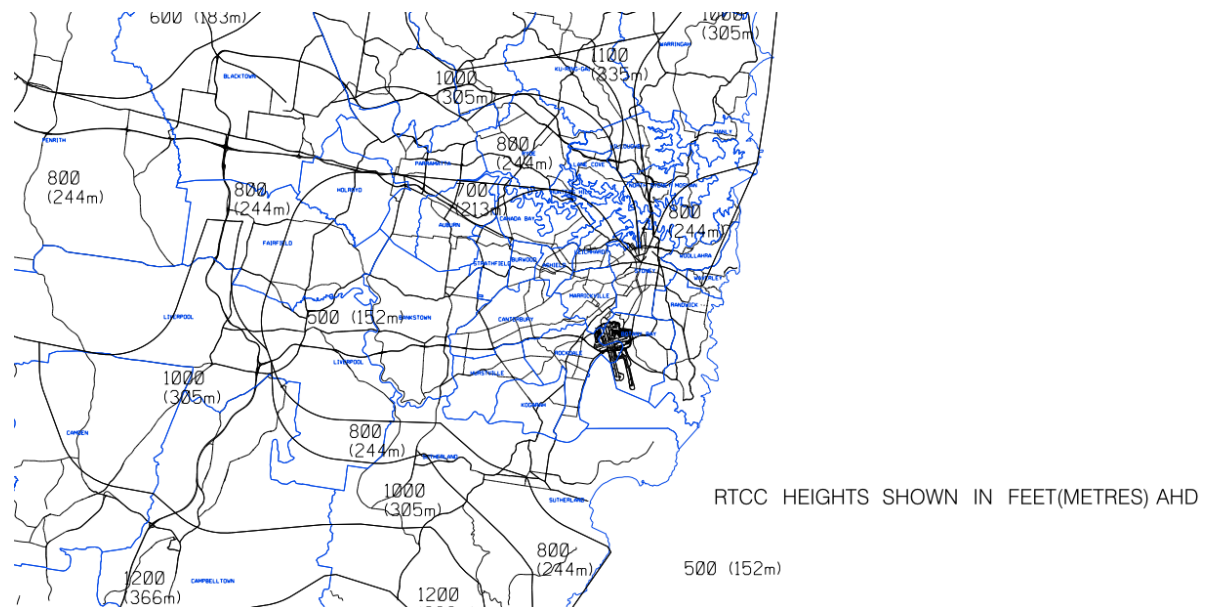


Figure 3: Example of a Radar Terrain Clearance Chart (RTCC)

3.9. HLS Approach and Departure Paths

The purpose of approach and departure path is to provide a portion of airspace sufficiently clear of hazards to allow safe approaches to, and departures from, the HLS. Approach and departure paths can be designed for both visual (VFR) use by day and by night using different criteria; and for instrument (IFR) flight (also by day and night, albeit there are no differences in design requirements).

VFR approach and 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 path which provides an additional safety margin and operational flexibility.

The preferred flight approach and departure path should where possible, be aligned with the predominant, prevailing wind when taking account of potential obstacles. Other approach and departure paths should also be based on an assessment of the average, prevailing winds and potential obstacles. The separation between approach and departure paths should not be less than 135°, and should preferably be 180°.

3.10. VFR Approach and Departure (Take-off Climb) Surface

VFR approach and departure surfaces can be designed for both day and night operations. Because all NSW hospital HLSs are required to be capable of both day and night use, the night tolerances are always used. A (day and) night approach and departure surface starts at the forward edge of the FATO safety area and slopes upward at 2.6°/4.5%/1:22.2 (22.2 units horizontal in 1 unit vertical) for a distance of ~3,386 m. The approach and departure path commences at a width of 34 m and expands uniformly, laterally at an angle of 8.7°/15%/1:12.8 to a width of 140 m, then remains parallel to a distance of 3,386 m, where the height is 152 m above the elevation of FATO surface. The VFR approach and departure paths are to be obstacle free. It is important to achieve the 2.6°/4.5%/1:22.2 obstacle free slope to account for the performance requirements of one engine inoperative (OEI) flight following an emergency. See Figures 4 and 5 below.

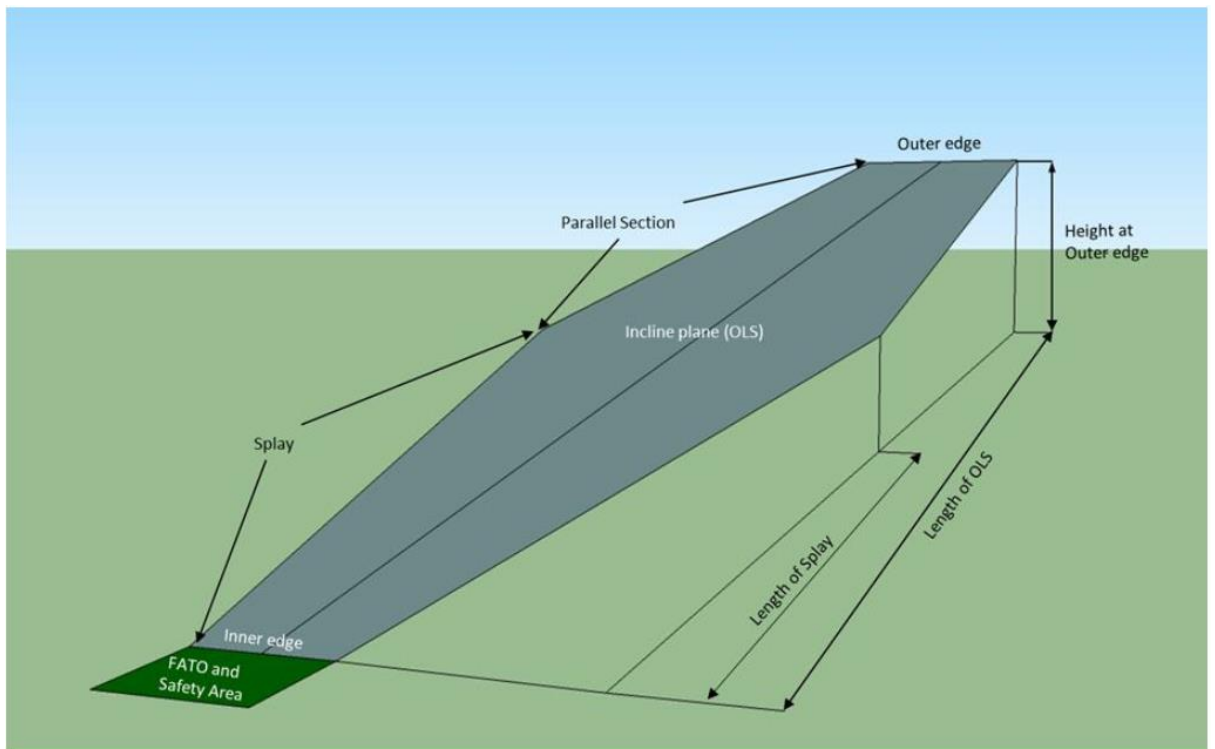


Figure 4: HLS VFR Approach and Departure Surfaces (1)

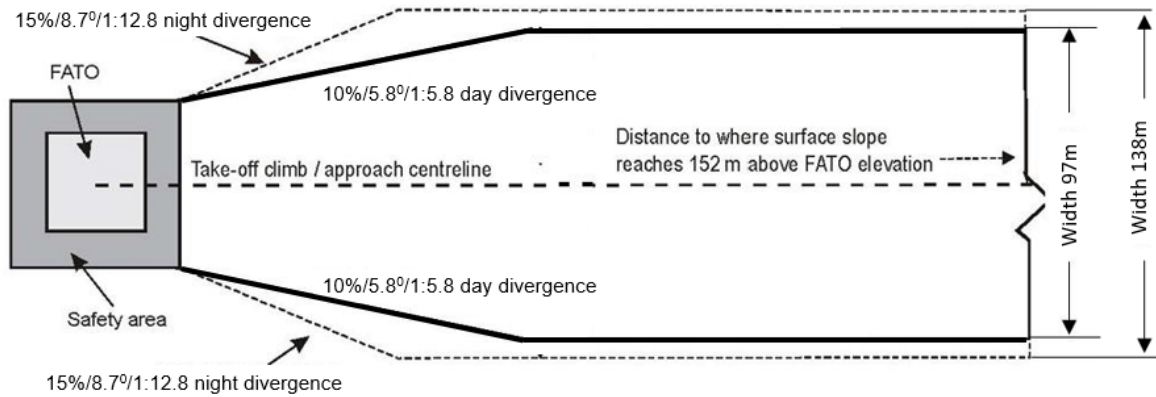


Figure 5: HLS VFR Approach and Departure Surfaces (2)

3.11. Protected Side Slope

A VFR-only HLS is to be provided with at least one, and preferably two, protected side slopes, rising at 45° from the edge of the safety area and extending to a distance of 10m. See [Figure 65](#) below. Due to the proximity of lift lobbies and other infrastructure, it is often difficult to provide the second protected side slope.

The surface of a protected side slope must not be penetrated by obstacles.

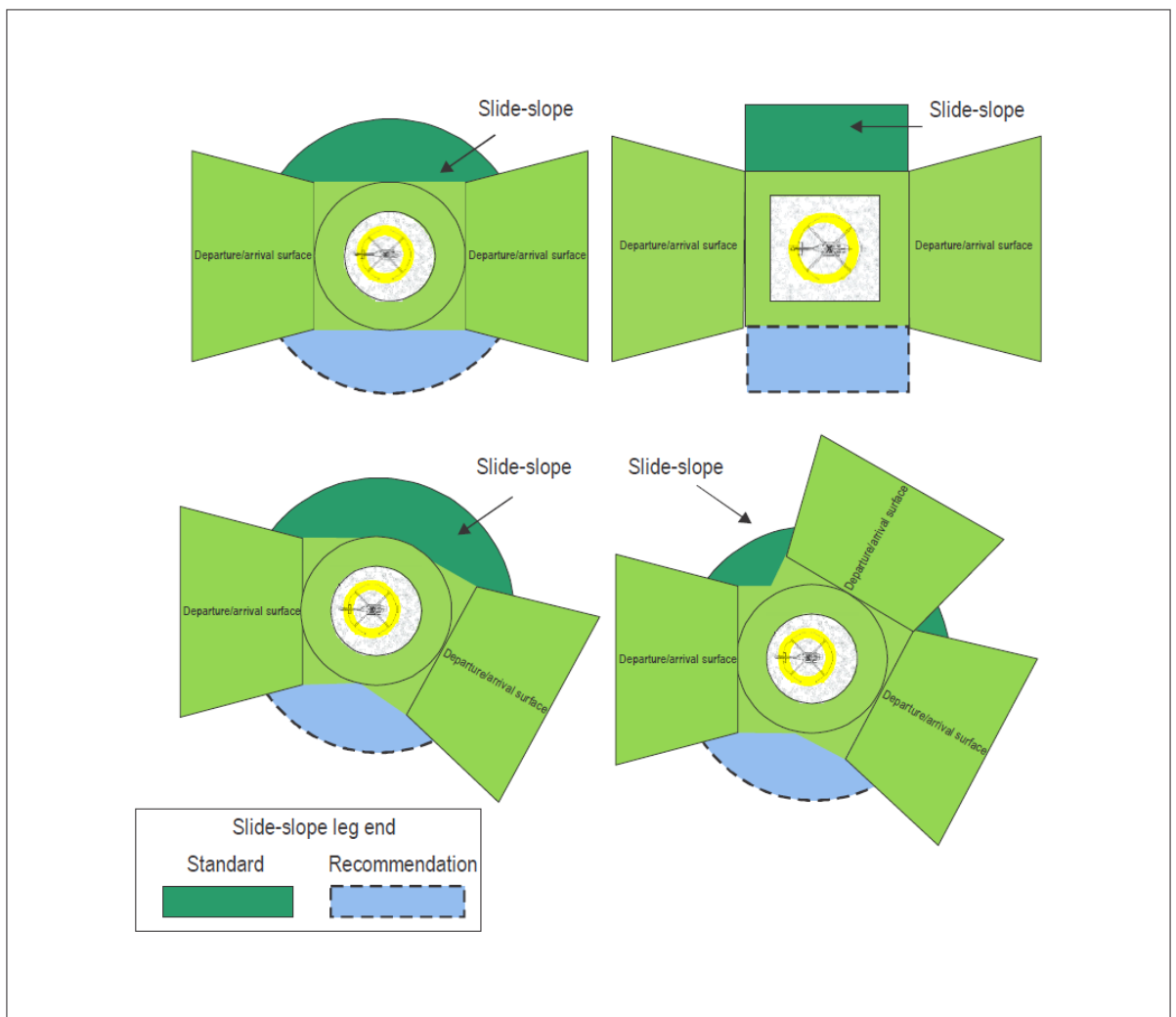


Figure 6: Protected Side Slopes

3.12. Category A Backup Procedure

A Category A back-up procedure, i.e. without a lateral component, is one of the PC1 HLS profiles provided in RFMs along with the dimensions of the backup area. Category A The backup procedure is depicted in [Figure 7](#) below.

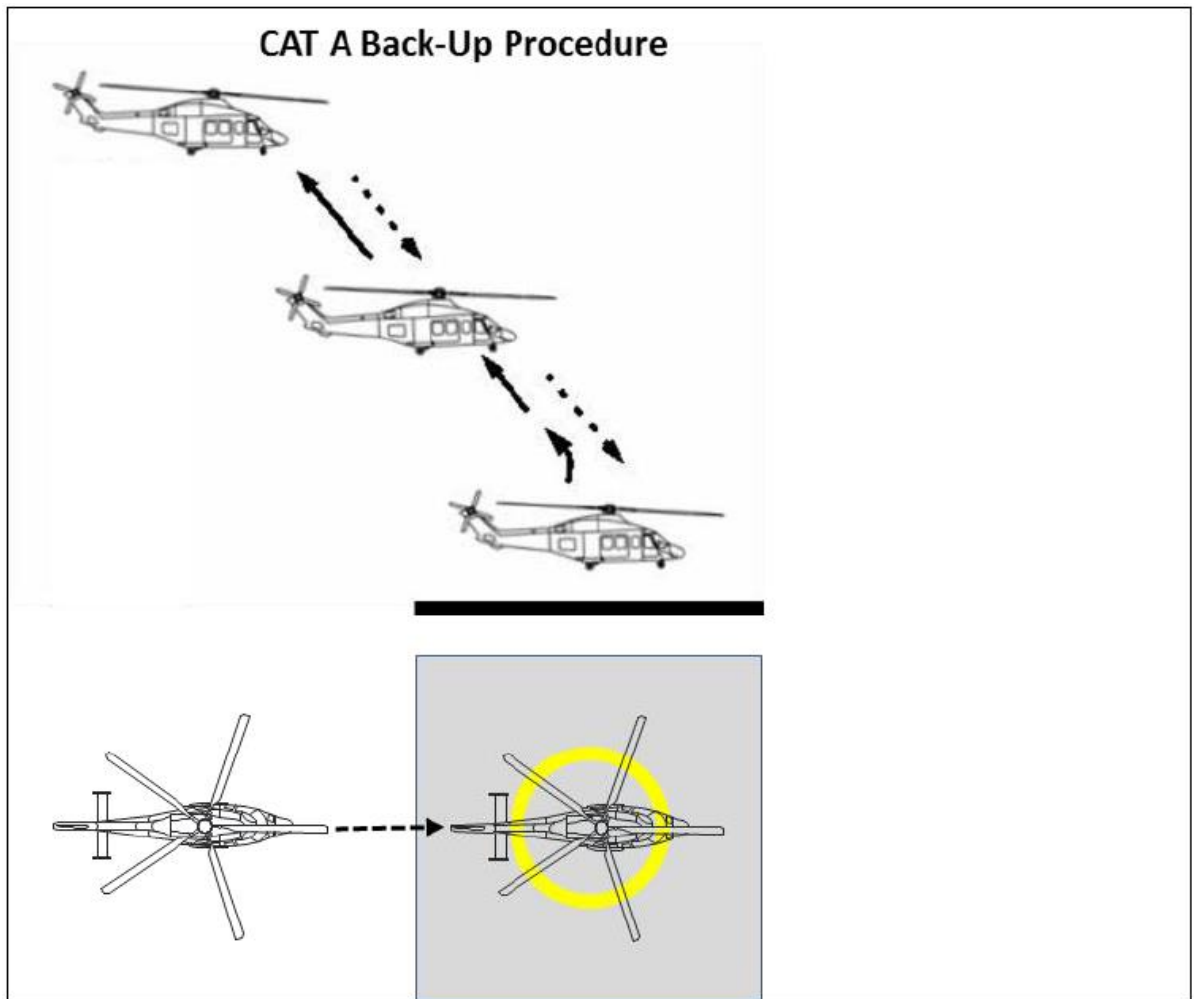


Figure 7: Category A Backup Procedure Profile

The back-up area should consist of two elements: an ascent/descent path/surface and an obstacle limitation surface. The dimensions of these are normally contained in tabular form in the Category A supplement of the RFM. For NSW hospitals which are to be both day and night capable, the splay is to be 15%. Where the backup area is coincident with a reciprocal VFR approach and departure surface, no additional airspace protection measures will be required. Where the back-up area does not overlay the VFR approach and departure surface, a specific ascent/descent path/surface and obstacle limitation surface will need to be surveyed. See [Figure 8](#) below.

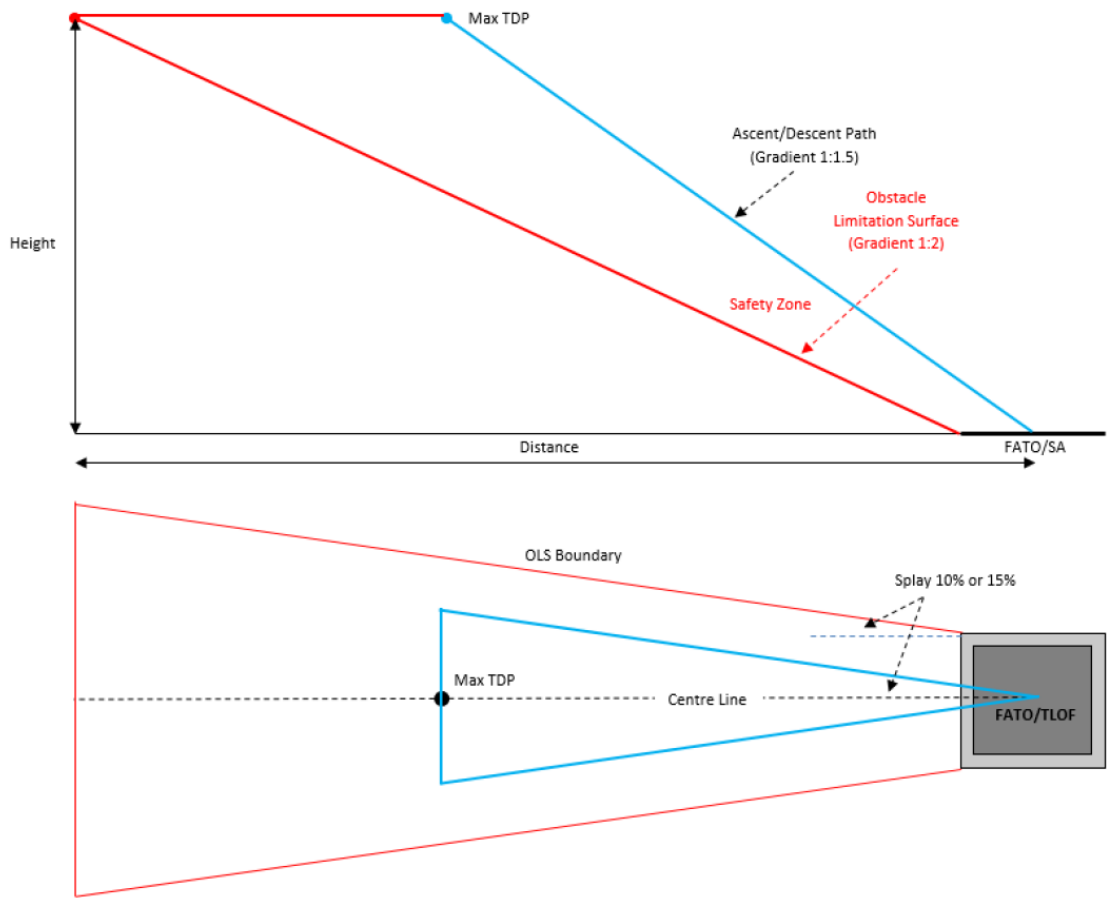


Figure 8: Category A Backup Procedure Surfaces

3.13. 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.

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

Unmarked wires, antennas, poles, mobile phone towers, and similar objects are often difficult to see even in the best daylight weather, and in time for a pilot to successfully take evasive action. While pilots can avoid such objects during enroute operations by flying well above them, approaches and departures require operations near the ground where obstacles may be in close proximity. Where possible obstructions are to be moved, however if this is impractical, markings and/or obstruction lighting is to be placed upon them.

4. SPECIFIC ALEXANDRIA HEALTH CENTRE CONSIDERATIONS

4.1. The AHC Location

The location of the lot of the proposed AHC footprint is shown in [Figures 9 and 10](#) below. It is approximately 4.5km from the Sydney (Kingsford-Smith) Aerodrome and 3.1km from the nearest hospital HLS at Victoria Barracks (the HLS for St Vincent's Hospital).

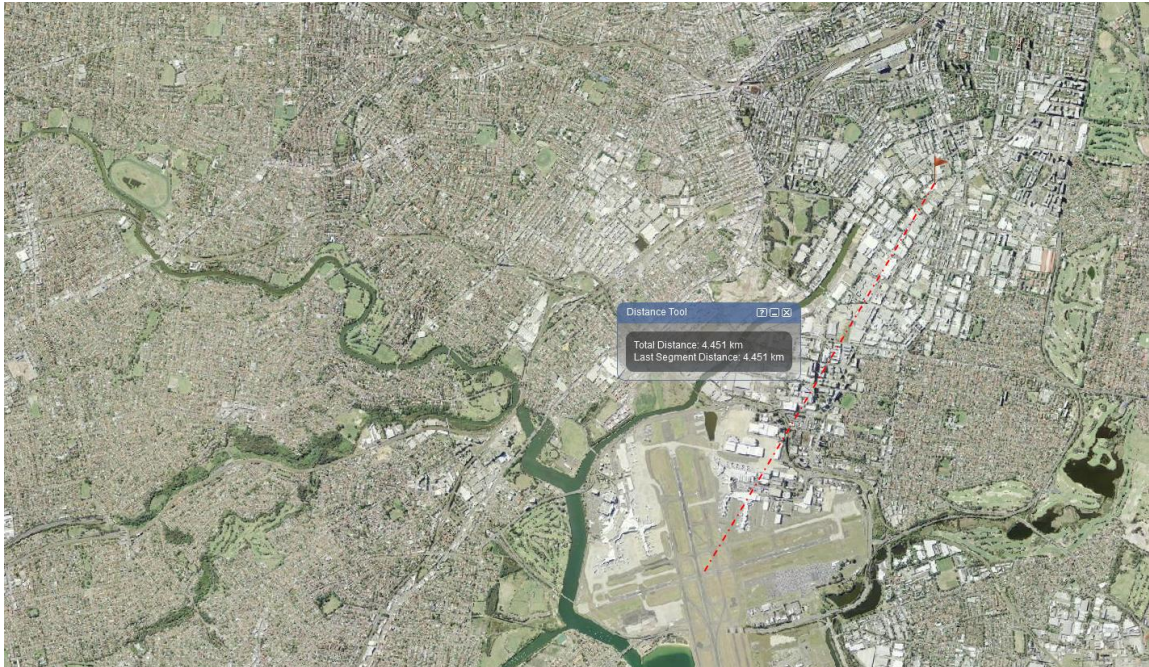


Figure 9: Location of the Proposed AHC from Sydney Airport



Figure 10: Location of the Proposed AHC from Victoria Barracks

4.2. The AHC Elevation

The ground level in the vicinity of the AHC is approximately 10m AHD (rounded). The AHC is planned to be built to approximately 34.3m above ground level (see Figure 11 below) or approximately (RL44.7). No allowance is made, however, for additional elevation for future rooftop fixtures e.g. antennae, vents, exhausts, plant and fixtures. These all count towards permitted maximum elevations with relation to intrusion into prescribed airspace. It is usual in projects such as the AHC to make some reasonable allowance for these purposes.

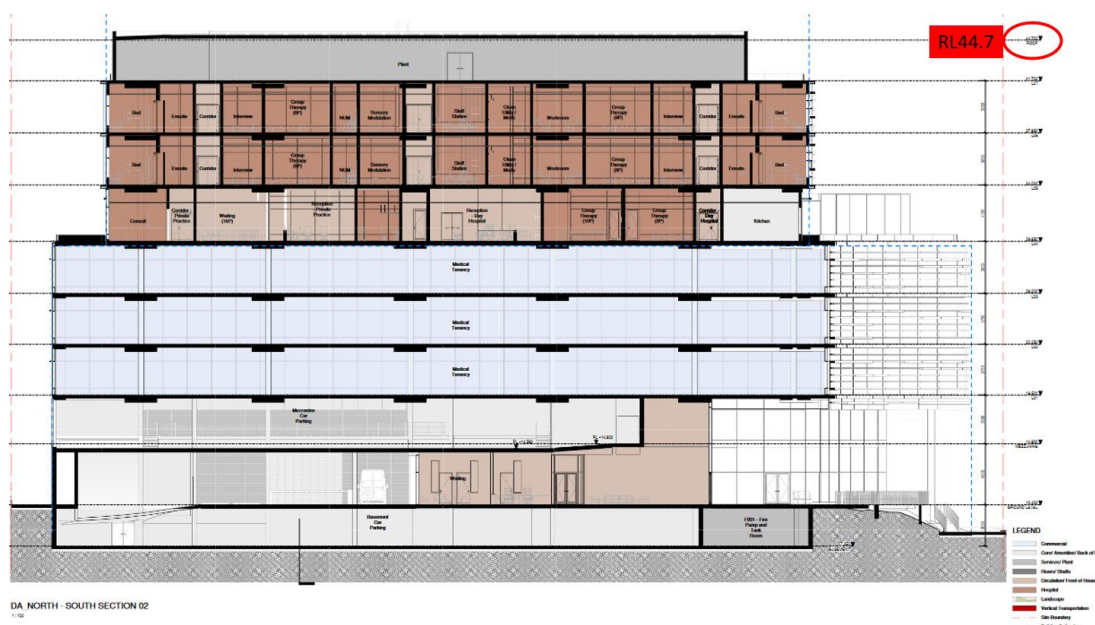


Figure 11: Elevation of the AHC

4.3. General Airspace Overhead the AHC Site

The AHC site sits within the Sydney (Kingsford-Smith) Aerodrome's Control Zone (CTR). See Figure 12 below. Tall obstructions such as construction cranes in this area are particularly relevant to pilots flying in the CTR.

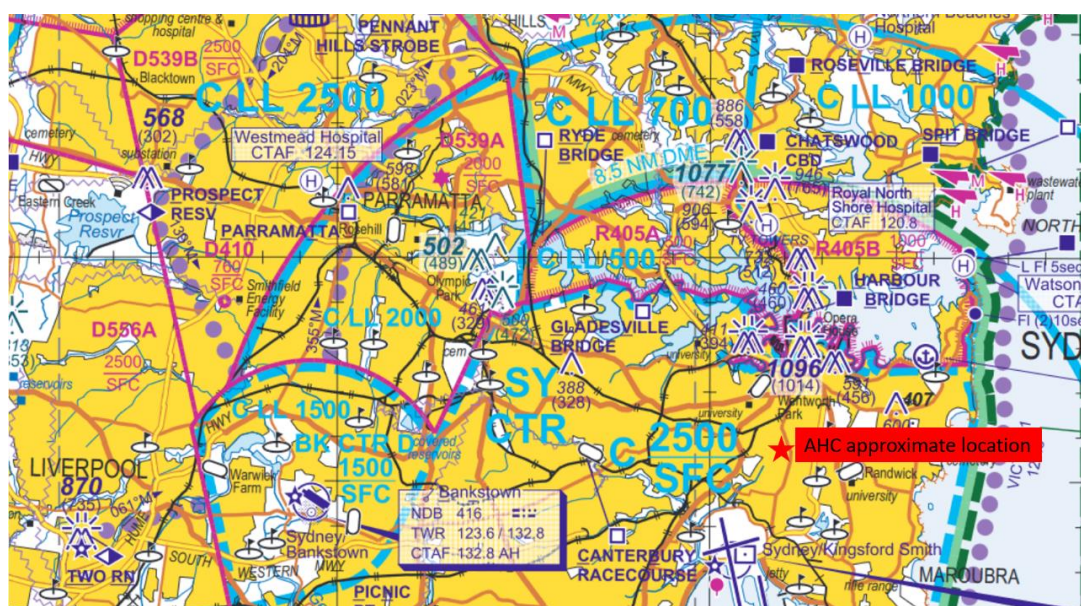


Figure 12: Sydney (Kingsford-Smith) Aerodrome General Airspace

4.4. Sydney Local Environment Plan (LEP) 2012

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.”

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.

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

The Sydney (Kingsford-Smith) Aerodrome OLS is depicted in [Figure 13](#) below. The approximate location of the AHC is also indicated.

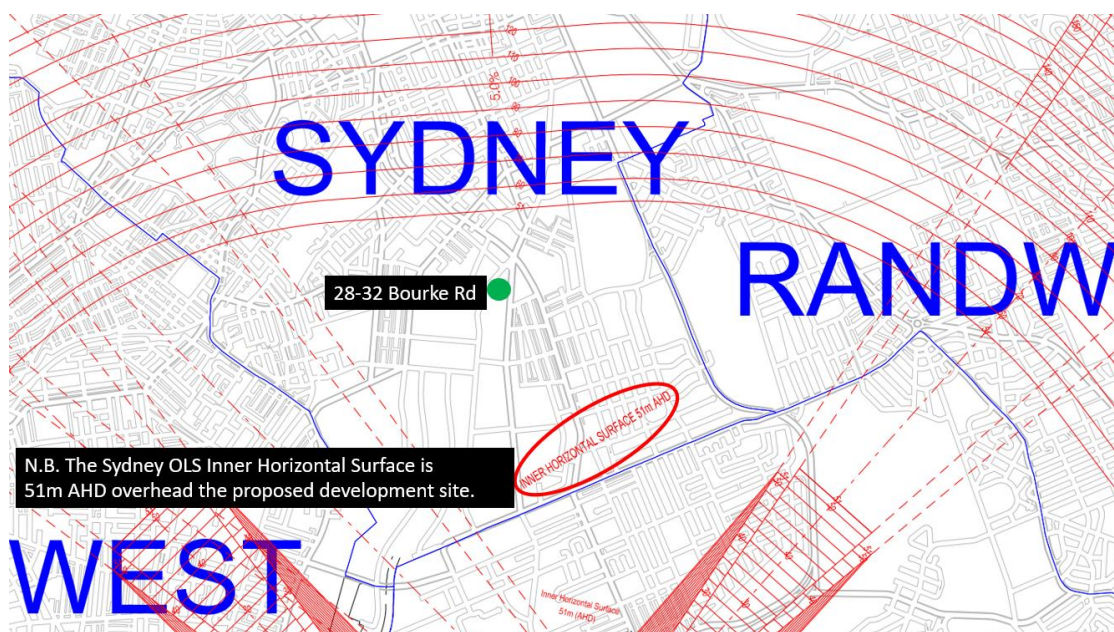


Figure 13: Sydney (Kingsford-Smith) Aerodrome Obstacle Limitation Surfaces

4.6. The AHC within the Sydney (Kingsford-Smith) Aerodrome OLS

At an elevation of RL44.7 (and allowing a reasonable additional amount for rooftop fixtures, plant etc.) the AHC will not be within the Sydney (Kingsford-Smith) Aerodrome OLS. A construction crane could possibly intrude into the OLS as it is only 6.3m from the rooftop to the OLS.

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

The Sydney (Kingsford-Smith) Aerodrome PANS-OPS is depicted in [Figure 14](#) below. The approximate location of the AHC is also indicated.



Figure 14: Sydney (Kingsford-Smith) Aerodrome PANS-OPS Surfaces

4.8. The AHC within the Sydney (Kingsford-Smith) Aerodrome PANS-OPS Surfaces

Above the AHC, the Sydney (Kingsford-Smith) Aerodrome PANS-OPS surface lower limit is 126.4m AHD. There will be no intrusion (including construction cranes).

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

The Sydney Aerodrome RTCC overlay is depicted in [Figure 15](#) below. The approximate location of the AHC is also indicated.

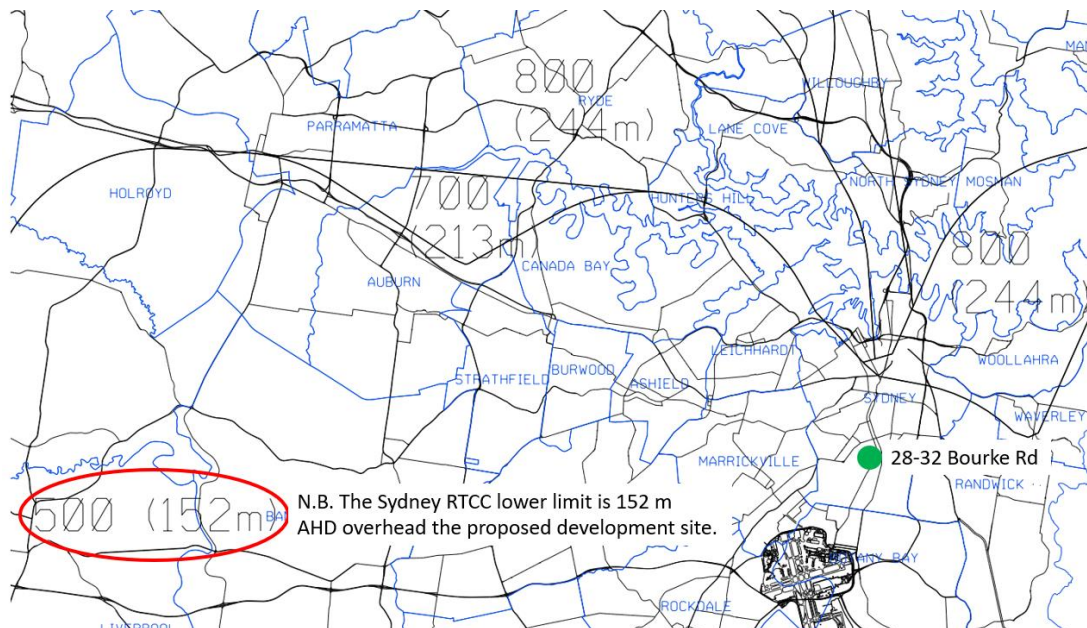


Figure 15: Sydney (Kingsford-Smith) Aerodrome RTCC

4.10. The AHC within the Sydney Aerodrome RTCC

At its current elevation, the development (including construction cranes) will be well below the RTCC lower level of 152m AHD.

4.11. AHC Impacts on Sydney (Kingsford-Smith) Aerodrome OLS, PANS-OPS and RTCC

The building, including rooftop protrusions of a reasonable elevation, will not intrude into the relevant OLS, PANS-OPS or RTCC surfaces. An associated construction crane is likely to intrude into the OLS, however. This is a common occurrence and approval can be anticipated, especially give the amount of intrusion is likely to be minimal.

4.12. Location of the AHC in Relation to the Hospital HLSs

The location of the AHC in relation to the St Vincent’s Hospital HLS at Victoria Barracks is shown in [Figure 10](#) above.

4.13. Location of the AHC in Relation to Helicopter Routes

The site of the AHC sits between, and well clear of, the Erskineville 5 and the Barracks 5 helicopter routes. See [Figure 16](#) below. The transit altitude for helicopters is 1000ft or 305m.

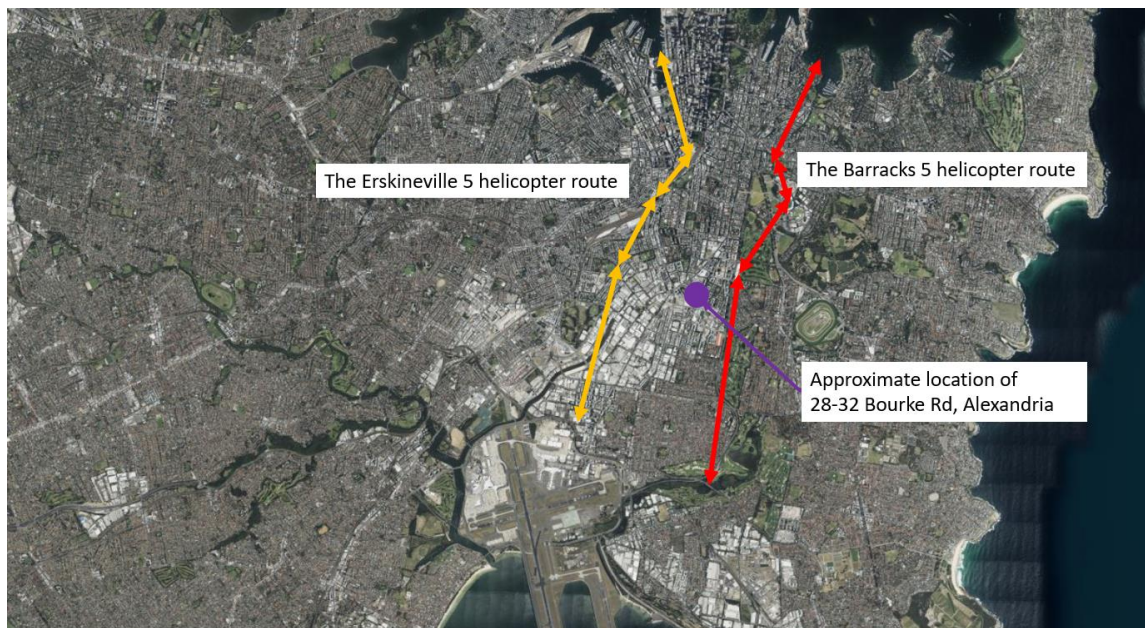


Figure 16: AHC in Relation to Helicopter Routes

4.14. Construction Crane Considerations

A construction crane(s) will probably intrude into prescribed airspace (unless it is kept under 51m AHD). The proposed development will therefore require assessment by CASA and others. CASA will advise on paint marking and lighting requirements for any crane that enters the OLS.

4.15. Deductions: Airspace, Cranes, Obstructions and HLSs

The following key deductions can be made:

- The AHC, once constructed, will not intrude into the Sydney (Kingsford-Smith) Aerodrome OLS.
- The AHC, once constructed, will not intrude into the Sydney (Kingsford-Smith) Aerodrome PANS-OPS surfaces.
- The AHC, once constructed, will not intrude into the Sydney RTCC.
- The AHC, and any associated construction crane will not impact the approach and departure paths of any HLS.
- The AHC, and any associated construction crane will not impact any helicopter routes.
- The AHC construction crane(s) will probably intrude into the Sydney (Kingsford-Smith) Aerodrome OLS.
- The AHC construction crane(s) will not intrude into the Sydney (Kingsford-Smith) Aerodrome PANS-OPS surfaces.
- The AHC construction crane(s) will not intrude into the Sydney RTCC.
- The AHC construction crane(s) will require aviation-standard paint marking and obstacle lighting.

4.16. Process to Follow in Order to Obtain Airspace 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. Although the AHC building will not enter

prescribed airspace, the crane most probably will so it is important to disclose this fact to Sydney Airport, the Civil Aviation Safety Authority (CASA) and AirServices Australia to institute a formal assessment. The cost is free but the timeframe is very long. The process is currently taking about four months.

Links to relevant forms are below. On receipt of the Application Forms SACL seeks comment and assessment from:

- Sydney Aerodrome based airlines
- AirServices Australia
- CASA

Once 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, Communications and the Arts by SACL's airspace protection team (point of contact details are below).

4.17. 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/v228i5y5k0x4/2ID4yo6oIW4Y8oUiQ4elu8/80cabbc2d221eda3a35723c4385f1e14/Crane_Enquiry_Form.pdf

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

4.18. 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.

4.19. 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

4.20. Decisions on Temporary Protrusions into Protected Airspace

Approvals for temporary penetration of the PANS-OPS and RTCC surfaces (less than three months) and long-term penetrations of the OLS (over 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 and SACL.

There is significant lag in gaining approvals for cranes planned to penetrate PANS-OPS and RTCC surfaces for up to three months and for OLS penetrations of more than three months. To minimise the time taken for a decision, it is 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 intrude into the relevant airspace.

4.21. Principle of Shielding not Applicable for Temporary Structures

“Shielding” is a principle whereby one tall structure acts as a barrier for another tall structure such that the level of hazard or risk to aviation safety is not actually increased. It is used in some cases by the relevant Regulators and Delegates involved in granting approvals for OLS, PANS-OPS and RTCC penetrations, however, the CASR Part 139 (Aerodromes) Manual of Standards 2019 (MOS 139) states in a note to Chapter 7, Division 4 Part 7.25 General that: “A new obstacle, located in the vicinity of an existing obstacle, and assessed as not being a hazard to aircraft, would be considered to be shielded. Only existing permanent obstacles may be considered in assessing the applicability of shielding of new obstacles.” It is therefore a flawed proposition that a crane temporarily erected to build one structure can be considered as a precedent and thus used to progress the shielding argument.

4.22. Conclusion

The AHC, including its construction crane(s), will not impact aviation safety in relation to either Sydney (Kingsford-Smith) Aerodrome, any hospital HLS, or any helicopter route. If the construction crane is higher than 51m AHD, specific approval will be necessary and appropriate aviation standard paint marking and obstacle lighting will be required. It is highly advisable that a crane plan is developed as soon as possible with a view to keeping the crane below 51m AHD.