

Airspace Assessment to Support the Construction of a Building at 391-423 Pacific Highway, Crows Nest

Draft Report

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Glossary

AHD	Australian Height Datum
ARP	Aerodrome Reference Point
ATC	Air Traffic Control
CAAP	Civil Aviation Advisory Publication
CASA	Civil Aviation Safety Authority
DITRDCA	Department of Infrastructure, Transport, Regional Development, Communications and the Arts
FT	Feet
IFR	Instrument Flight Rules
ILS	Instrument Landing System
Km	Kilometres
m	Metres
MOS	Manual of Standards
NASF	National Airports Safeguarding Framework
nm	Nautical miles
OLS	Obstacle Limitation Surface
PANS-OPS	Procedures for Air Navigation Services-Operations
RNSH	Royal North Shore Hospital
RTCC	Radar Terrain Clearance Chart surface
SACL	Sydney Airport Corporation Ltd
SID	Standard Instrument Departure
VFR	Visual Flight Rules

Executive Summary

- Deicorp Pty Ltd is seeking to develop a building at 391-423 Pacific Highway, Crows Nest. Construction will be undertaken by two luffing cranes. The maximum height of the building is 177.9m AHD, while the tallest crane (TC2) will extend to 204.6m AHD. This report presents an analysis of the building and cranes on aircraft and helicopter operations of the Crows Nest area, including emergency helicopter operations at the Royal North Shore Hospital (RNSH).
- Building developments in the Crows Nest business area are impacted by the protected airspace restrictions defined for Sydney Airport. They are outside the prescribed airspace defined for Bankstown Airport.
- The development site is approximately 11.7km north-northeast of Sydney International Airport. At the position of 391-423 Pacific Highway, the height of the Sydney PANS-OPS surface is 340.0m AHD and radar terrain clearance (RTCC) surface is 335.2m AHD. The height of the obstacle limitation surface (OLS) is 156m AHD. Table 1 below details the maximum height of the building and cranes, as well as the impact on Sydney prescribed airspace.

Table 1: Impact of Building and Cranes on Sydney Prescribed Airspace

	Max Height	Impact on Prescribed Airspace
Building	177.9m AHD	21.9m penetration of OLS 162.1m below PANS-OPS 157.3m below RTCC
TC1	192.1m AHD	36.1m penetration of OLS 143.1m below PANS-OPS 143.1m below RTCC
TC2	204.6m AHD	48.6m penetration of OLS 135.4m below PANS-OPS 130.6m below RTCC

Table 1 illustrates that the building and two cranes will penetrate the OLS but remain below the PANS-OPS and RTCC surfaces.

- The development and crane are clear of IFR aircraft operations. Airspace procedures defined for the Sydney mean that it is rare for VFR aircraft to operate over the Crows Nest area.
- Planning NSW have adopted the National Airports Safeguarding Framework (NASF) Guideline H: Protecting Strategically Important Helicopter Landing Sites, to protect

hospital helipads and flight paths from the encroachment of building developments and crane operations.

- Royal North Shore Hospital (RNSH) helipad is located 1,103m north west of the northern edge of the 391-423 Pacific Highway site. The primary helicopter flight path to the Royal North Shore Hospital helipad is 008T/188T. This development site is 1,000m from the centre line of the southern flight path. NASF Guideline H establishes an OLS 69m either side of the flight path centreline. The building is 931m beyond the lateral dimensions of the OLS. This development site is well clear of the secondary flight path of 239T/039T that flies overhead the southeast portion of Naremburn Park.
- NASF Guideline H Clause 81 includes definition of a 240m area surrounding the helipad, applied by the State of Victoria, to provide protection for helicopters manoeuvring into wind to land. Taking account of the operating radius of TC1 (40m), crane operations will be no closer than 1,063m from the edge of the RNSH helipad. At 1,063m from the helipad, crane operations are well beyond the 240m manoeuvring radius. Applying Guideline H of the NASF, the building and crane at 391-423 Pacific Highway will not impact helicopter operations at the RNSH helipad.
- Helicopter flight paths for the Channel Nine and ABC helipads are clear of the building and crane at 391-423 Pacific Highway.
- Three buildings in the Crows Nest business area have been built or approved at a similar or greater height than 391-423 Pacific Highway. Taking account of these three existing or approved developments, the 391-423 Pacific Highway development will not present additional restrictions to helicopter or aircraft operations in the Crows Nest area.
- At a distance of 11.7km from Sydney Airport, the development at 391-423 Pacific Highway will not impact on the performance of navigation aids or radar systems.

1.0 Introduction

Deicorp Pty Ltd is seeking approval for the construction of a building and two hammerhead cranes located on a site at 391-423 Pacific Highway, Crows Nest NSW. The maximum height of the building is 177.9m AHD, while the tallest crane will reach a maximum height of 204.6m AHD.

This development site is located approximately 11.7km north-northeast of Sydney Airport. It is approximately 1,214m southeast of the Royal North Shore Hospital (RNSH) helipad.

The proposed development will penetrate the Sydney Airport obstacle limitation surface (OLS) but remain below the PANS-OPS and radar terrain contour chart surfaces. Therefore, an assessment is needed to determine whether a proposed development at 391-423 Pacific Highway could present a risk to aircraft and helicopter operations. In particular, an assessment is needed to confirm that the development and crane operations will not impact helicopter operations at the Royal North Shore Hospital helipad.

This report details the height of the prescribed airspace above the proposed development site at 391-423 Pacific Highway plus presents an assessment on the impact on aircraft and helicopter operations. It includes: legislative context; methodology for the study; location of the building relative to prescribed airspace; and potential issues from interested parties.

2.0 Legislative Context

Airspace surrounding an airport is protected by the Airports (Protection of Airspace) Regulations 1996. It details the process required to be undertaken when an obstruction could infringe prescribed airspace and the responsibilities of various organisations.

Prescribed airspace around an airport includes the obstacle limitation surface (OLS) and the PANS-OPS surface. An OLS provides general protection for aircraft operations around an airport. The PANS-OPS surface protects the airspace used by aircraft flying instrument approach procedures. A permanent obstruction, in this case a building, can be approved to penetrate the OLS. Permanent obstructions cannot be approved when their height penetrates the PANS-OPS surface. The Airports Act provides provision for temporary obstructions e.g., construction cranes

to penetrate the PANS-OPS surface for duration not exceeding three months. This temporary penetration of the PANS-OPS surface requires the support of the airport owner. It must also not materially impact aircraft operations.

In addition to these two categories of prescribed airspace, Airservices Australia has placed a radar terrain clearance chart (RTCC) surface above Sydney. The RTCC enables air traffic controllers to descend aircraft under radar control when they are not flying on an instrument approach or departure procedure. No penetrations of this surface are permitted.

When the proposed height of an obstruction is likely to penetrate the OLS a proponent is required to make application to the airport owner-operator, in this case Sydney Airport Corporation Ltd (SACL). In cases where shielding is not available from existing buildings, the airport owner-operator may require the proponent to complete a detailed aviation study to completed to support the application. The airport owner-operator then seeks the input from the Civil Aviation Safety Authority (CASA), Airservices, major airlines and the building authority concerned. This process seeks to determine whether there is any impact on safety or operational efficiency to aircraft activities.

The Department of Infrastructure, Transport, Regional Development, Communications and the Arts (DITRDCA) ultimately grant approval for the building and crane to penetrate prescribed airspace. Should the development not be approved by DITRDCA, there is also an appeal process to the Administrative Appeals Tribunal.

Planning NSW have recently adopted the National Airports Safeguarding Framework (NASF) Guideline H: Protecting Strategically Important Helicopter Landing Sites, to protect hospital helipads and flight paths from the encroachment of building developments and crane operations. The planning authority will forward a building development or crane application, in the vicinity of a hospital helipad, to Air Ambulance NSW to confirm that helicopter operations will not be impacted.

3.0 Methodology

This section provides an overview of the approach undertaken to determine the impact on prescribed airspace plus aircraft and helicopter operations of the proposed building development at 391-423 Pacific Highway, Crows Nest.

The airspace over Crows Nest is impacted by the prescribed airspace defined for Sydney International Airport, which governs the maximum permissible heights for buildings and cranes. Calculations of the height of the OLS, RTCC and PANS-OPS surface were sourced from planning information maintained by SACL.

The purpose of this report is to assess the safety impact that the proposed development at 391-423 Pacific Highway on aircraft and helicopter operations. We have reviewed Guideline H of the National Airports Safeguarding Framework (NASF), which includes provisions detailed in Civil Aviation Advisory Publication (CAAP) 92-2(2), to determine the impact of the proposed development on design guideline standards for helipads. These NASF guidelines determine whether the building and crane impact on helicopter operations from the Royal North Shore Hospital (RNSH) helipad.

In order to explore the safety impact on aircraft and helicopter operations of the proposed development at 391-423 Pacific Highway, discussions and/or information was obtained from:

- Sydney Airport Corporation Ltd;
- Airservices;
- Channel Nine-(Chief Helicopter Pilot);
- ABC-(Sydney base manager-helicopter operations);
- Design Consultant for the Royal North Shore Hospital helipad;
- CASA;
- Air Ambulance NSW.

4.0 Location of Proposed Building and Cranes Relative to Sydney Prescribed Airspace

This section details the position the building and cranes relative to the Sydney Airport OLS, PANS-OPS and RTCC surfaces.

4.1 Height of Sydney Prescribed Airspace

The heights of the Sydney OLS, PANS-OPS surface and RTCC surface above 391-423 Pacific Highway are:

- | | |
|---|-------------|
| • Obstacle Limitation Surface (OLS): | 156.0m AHD; |
| • PANS-OPS Surface: | 340.0m AHD; |
| • Radar Terrain Contour Chart (RTCC) Surface: | 335.2m AHD. |

4.2 Maximum Height of the Building and Cranes

The maximum height and of the building and hammerhead cranes is:

- Building: 177.9m AHD;
- TC1: 192.1m AHD;
- TC2: 204.6m AHD.

Attachment 1 presents the maximum height of the building and each hammerhead crane.

4.3 Impact of Building and Cranes on Sydney Prescribed Airspace

Table 1 below summarises the impact of the building and cranes on Sydney prescribed airspace.

Table 1: Impact of Building and Cranes on Sydney Prescribed Airspace

	Max Height	Impact on Prescribed Airspace
Building	177.9m AHD	21.9m penetration of OLS 162.1m below PANS-OPS 157.3m below RTCC
TC1	192.1m AHD	36.1m penetration of OLS 143.1m below PANS-OPS 143.1m below RTCC
TC2	204.6m AHD	48.6m penetration of OLS 135.4m below PANS-OPS 130.6m below RTCC

Table 1 shows that the building and each crane will penetrate the OLS but all remain below the PANS-OPS and RTCC surfaces.

This means that a proposed development and/or construction cranes will require approval by the Department of Infrastructure, Transport, Regional Development, Communications and the Arts (DITRDCA) under the Airports Act. This approval is subject to there being no impact on the safety or the efficiency of aircraft and helicopter operations. This evaluation is presented below in sections 5.0 and 6.0.

5.0 Aircraft Operations in Vicinity of Development Site

This section provides an overview of IFR and VFR aircraft operations in the vicinity of 391-423 Pacific Highway. It also explores whether these aircraft operations will be impacted by the proposed development.

5.1 IFR Aircraft Operations

The proposed 391-423 Pacific Highway development is located approximately 1.3nm east of the approach path to runway 16L at Sydney. On occasions when arriving aircraft join on left base for runway 16L, these aircraft track along the harbour for noise abatement reasons. The path along the harbour is well south of the proposed development.

Two departure tracks are available to aircraft taking off from Sydney runway 34R. Aircraft either climb runway heading to 12nm before turning right. Alternatively, aircraft turn right at 500ft on a standard instrument departure (SID) tracking east of Sydney. The runway-heading climb keeps aircraft to the west of the proposed development. A right turn at 500ft on a SID tracking to the east of Sydney involves the aircraft turning well south of the harbour. This track keeps aircraft well to the south of the proposed development.

5.2 VFR Aircraft Operations

To keep VFR aircraft clear of the Sydney 16 approach path, air traffic control require VFR aircraft to operate east of a line between Roseville Bridge and the Sydney Harbour Bridge. The proposed development at 391-423 Pacific Highway lies west of this line. Operations may be cleared to operate west of the line only when Sydney runway 07/25 is in use. Airservices' Sydney Airport movement statistics indicates that runway 07/25 is in operation approximately 20% of the time. Even on occasions when runway 07/25 is in use air traffic control is reluctant to allow aircraft to operate west of the line between Roseville Bridge and Sydney Harbour Bridge. This means that it is rare for VFR aircraft to operate over the Crows Nest area.

Two areas of restricted airspace have been defined to enable VFR aircraft and helicopters to operate over the harbour west of the line between Roseville Bridge and Sydney Harbour Bridge. R405A is defined for operations over the harbour west of the harbour bridge and along the Parramatta River. Operations above 500ft AHD in R405A are not permitted.

R405B is provided for seaplanes and helicopters to operate over the harbour to the east of the Sydney Harbour Bridge. Seaplanes normally track along the coast and enter the harbour at Manly to land at Rose Bay. Aircraft are not permitted to operate above 1,000ft AHD.

Aircraft and helicopter operations in R405A and R405B take place over the Sydney Harbour. Therefore, these operations take place well to the south of the proposed development at 391-423 Pacific Highway.

5.3 Summary

IFR aircraft operations at Sydney Airport are not impacted by the proposed development at 391-423 Pacific Highway. Due to existing airspace procedures, it is rare for VFR aircraft operations to take place over Crows Nest. The building and cranes do not impact IFR and VFR operations.

6.0 Helicopter Operations in the Vicinity of Crows Nest

This section reviews the operational safety impact on three helipads in the Crows Nest area presented by the proposed development at 391-423 Pacific Highway, namely the Royal North Shore Hospital helipad, Channel Nine and the ABC.

6.1 Royal North Shore Hospital (RNSH) Helipad

This subsection analyses the impact of the building development and crane operations on helicopter operations at the Royal North Shore Hospital (RNSH) helipad.

6.1.1 Position of RNSH Helipad and Flight Paths

RNSH helipad is located approximately 1,214m northwest of the proposed 391-423 Pacific Highway development. The height of the RNSH helipad is 422ft AHD. Consultation has been undertaken with the designer of the flight paths for the RNSH helipad.

There are two flight paths to the RNSH helipad. The primary approach and departure path is to/from the south. Helicopters approach the

helipad on a track of 008T and depart on a 188T track. This path sees the helicopters pass over the southeast corner of Gore Hill Park. The centreline of the flight path is approximately 1,000m west of the proposed 391-423 Pacific Highway development.

The secondary helicopter flight path to the RNSH helipad is to/from the northeast. Helicopters approach and depart the helipad on a track of in a direction of 239T/039T. This path takes the helicopters over the southeast corner of Naremburn Park.

Attachment 4 presents a pictorial representation of these primary and secondary helicopter flight paths relative to the development site.

6.1.2 Application of National Airport Safeguarding Framework (NASF) Guideline H

Planning NSW have adopted the National Airports Safeguarding Framework (NASF) Guideline H: Protecting Strategically Important Helicopter Landing Sites, to protect hospital helipads and flight paths from the encroachment of building developments and crane operations.

Guideline H incorporates the parameters detailed in CASA document CAAP 92-2(2), Guidelines for the Establishment of Onshore Helicopter Landing Sites, (February 2014). CAAP 92-2(2) details recommended standards for the design of a helicopter landing site (HLS). This guideline includes the definition of an OLS around the flight paths to a HLS. Vertical dimensions of an OLS rise outward at a gradient of 4.5% from the edge of the helipad. Horizontal, the OLS extends for 10 times the rotor diameter.

AW139 helicopters provide emergency services to RNSH, which have a rotor diameter of 13.8m. Therefore, the overall width of the OLS is 138m, extending 69m either side of the centreline. As noted earlier, the proposed development is located approximately 1,000m east of the 008T/188T primary flight path. Therefore, the building is approximately 931m outside the lateral dimensions of the OLS.

Both the building and cranes are well clear of the secondary flight paths that track toward the southeast corner of Naremburn Park.

Clause 81 of Guideline H describes the application of an inner Design Development Overlay (DDO) within 240m of a hospital helipad by the State of Victoria. This inner DDO provides protection from encroachment from buildings and cranes to enable the helicopter to manoeuvre into wind to land.

Taking the most conservative case, with the operating radius of TC1 extending 40m beyond the northwest corner of the site, the cranes at 391-423 Pacific Highway are located 1,063m southeast from the edge of the RNSH helipad. Therefore, well beyond the inner design DDO and the helicopter landing manoeuvring area.

6.1.3 Summary

Applying the standards contained in NASF Guideline H, the building and crane operations will not impact helicopter operations at the RNSH helipad. In particular, the building and crane operations are outside the OLS protecting helicopter flight paths and the landing manoeuvring area.

6.2 Channel Nine and ABC Helipads

This section details helicopter operations to the Channel Nine and ABC helipads.

6.2.1 Channel Nine Helipad

Helicopters for the Channel Nine and ABC helipads approach via the North Shore Helicopter Access Lane. While flying within this access lane helicopters maintain a height of 1,000ft AHD.

The Channel Nine helipad is located approximately 1.2km north of the proposed 391-423 Pacific Highway development. From the harbour helicopters track north along the freeway to Donnelly Road. From Donnelly Road they turn left to Naremburn Park from which they turn right to join final approach for the helipad. This flight path is well to the east and north of the proposed development at 391-423 Pacific

Highway. The Channel Nine chief pilot advised that the proposed development would have no operational impact on the helipad.

6.2.2 ABC Helipad

The ABC helipad is located approximately 1.3km northwest of the proposed development at 391-423 Pacific Highway. From the harbour helicopters track along the freeway, generally keeping to the east. At Crows Nest Park the helicopters keep to the north the freeway until turning left to track to the north of Naremburn Park. From Naremburn Park the helicopters approach the helipad to land. The ABC helicopter base manager advised that helicopter operations take place well to the north of the proposed 391-423 Pacific Highway development and would have no impact on helipad operations.

6.2.3 Summary

The flight paths to the Channel Nine and ABC helipads are clear of the development site at 391-423 Pacific Highway.

7.0 Probable Building and Crane Lighting Requirements

CASA will require that the building and crane be lit due to both penetrating the Sydney OLS. These lighting requirements will be detailed in the building and crane approvals issued by DITRDCA. These lighting requirements should be expected to include:

- The building to be obstacle lit by medium intensity steady red lights at the highest point of the building, in accordance with Manual of Standards (MOS) Part 139 subsections 9.4.7 and 9.4.3;
- Cranes to be lit with medium intensity red lighting at night, placed at the highest point of the crane and able to be observed in a 360 degree radius as per section 9.4 of MOS;
- Cranes must be marked (red and white) in accordance with MOS Part 139 subsection 9.10.2. OR lit with medium intensity flashing white lights as per subsection 9.4.

In addition to CASA lighting requirements, Air Ambulance NSW are likely to stipulate additional measures. These may include:

- Flashing red medium intensity obstacle lights be placed at the tip of the boom and rear of the crane, with these lights being operational during night time hours;
- Flashing white medium intensity obstacle lights be placed at the tip of the of the boom and rear of the crane, with these lights being operational during day time hours; and
- Floodlighting of the crane shaft.

8.0 Other Nearby Developments

Four other developments near to the proposed development at 391-423 Pacific Highway will exceed its requested maximum height, another is close to the proposed height. These developments are:

- 58-62 Atchison Street have been approved to a height of 257.4m AHD;
- 500-504 Pacific Highway has been approved to a height of 262.8m AHD; and
- The Forum, East Building, is immediately to the west of the proposed 391-423 Pacific Highway development. This development is 189m AHD; and
- Redevelopment of the RNSH is in the planning approval stage. This development located within the hospital precinct and is intended to reach a maximum height of 275m AHD.

Taking account of these three existing or approved developments, the 391-423 Pacific Highway development will not present additional restrictions to helicopter or aircraft operations in the Crows Nest area.

9.0 Impact on Navigation Aids and Radar Performance

Secondary surveillance radar is the technology used by air traffic controllers to provide radar separation between aircraft. Overlapping secondary surveillance radar coverage of the area overhead Crows Nest. This means the proposed development at 391-423 Pacific Highway will not impact secondary radar performance.

Primary radar is used to detect aircraft that do not have an operational transponder. The proposed development at 391-423 Pacific Highway is located approximately

13km from the primary radar antenna. At this distance, primary radar coverage will not be impacted by this development.

At a distance of approximately 11.7km from the runway 16 threshold at Sydney Airport, the proposed 391-423 Pacific Highway development will not impact on the performance of navigation aids located on the airport.

10.0 Conclusion

This report is an assessment of the issues that may impact operational safety from the proposed development at 391-423 Pacific Highway, Crows Nest.

The building at a maximum height of 177.9m AHD, will penetrate the Sydney Airport OLS by 21.9m. TC1 (192.1m AHD) and TC2 (204.6m AHD) will penetrate the Sydney OLS by 36.1m and 48.6m respectively.

As assessment of responses from SACL, Airservices and helicopter operators concludes that the proposed development at 391-423 Pacific Highway will not impact aircraft and helicopter operations both for Sydney Airport and helipads located in the vicinity of Crows Nest. The report has demonstrated that the building and cranes at 391-423 Pacific Highway are clear of the flight paths to RNSH helipad, as well as the area protecting helicopters manoeuvring into wind to land.

There are other developments in the Crows Nest area that are or have been approved to a height that exceeds 391-423 Pacific Highway. The existence of these developments means the 391-423 Pacific Highway building and crane will not present additional restrictions to helicopter or aircraft operations in the Crows Nest area.