Aeronautical Impact Assessment

28-34 Victoria Street Burwood NSW

27 October 2017

For

VSD Investments Pty Ltd

City Plan Strategy and Development

Landrum & Brown Worldwide (Aust) Pty Ltd, 2017

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003	Final Report including revised building height	27 October 2017	BWS

Contents

1. INTRODUCTION 5
2. THE PROPOSED DEVELOPMENT SITE LOCATION 5
3. OLS ASSESSMENT 6
4. PANS-OPS ASSESSMENT 8
5. RTCC ASSESSMENT 10
6. RADAR PERFORMANCE IMPACT 11
7. PROTECTION OF NAVIGATION AIDS 13
8. ROOF TOP EXHAUST PLUMES 13
9. HELICOPTER OPERATIONS – CODED CLEARANCES 13
10. CONTINGENCY PROCEDURES 14
11. CONCLUSIONS 14

APPENDIX A: Aerial view of the site.

APPENDIX B: Profile view of the height of the buildings.

APPENDIX C: Glossary of Aeronautical Terms and Abbreviations

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1. INTRODUCTION

Landrum & Brown Worldwide Services Pty Ltd has been tasked to prepare an Aeronautical Impact Assessment (AIA) for the proposed building development at 28-34 Victoria Street Burwood NSW.

There are two buildings proposed for the site. The proposed maximum building height (top of lift overrun) is 146 m AHD, and crane height 154 m AHD.

The site MGA 94 coordinates are:

E332359.31 N6245212.33, E332437.08 N6245200.58, E332421.4 N6245093.38, E332343.28 N6245105.6

An aerial view of the site is shown at Appendix A.

A profile view of the height of the buildings is shown at Appendix B

This Report has been prepared to assess the impact of the building with reference to the Prescribed Airspace for the major Airports of Sydney and Bankstown as published by the Sydney Airport Corporation Limited (SACL) and Bankstown Airport Limited (BAL) respectively. The Airspaces of Camden Airport, RAAF Base Richmond and the proposed Western Sydney Airport and on other significant flight operations and items are also examined. The Prescribed Airspaces include:

- Obstacle Limitation Surfaces (OLS);
- Procedures for Air Navigation Services – Operations (PANS-OPS);
- Radar Terrain Clearance Charts (RTCC), and
- Clearance areas and planes for the protection of Navigation Aids and Surveillance Sensors.

Significant fight operations and items include:

- Helicopter Routes;
- Contingency Procedures for Engine Inoperative Flight Paths
- Exhaust Plume Rises.

A Glossary of Aeronautical Terms and Abbreviations is shown at Appendix C.

2. THE PROPOSED DEVELOPMENT SITE LOCATION

The site is located 10.19 km from the Aerodrome Reference Point (ARP) at Sydney Airport and 12.11 km from the ARP at Bankstown Airport. Figure 2.1 shows the location of the development site in relation to Sydney and Bankstown Airport ARPs.

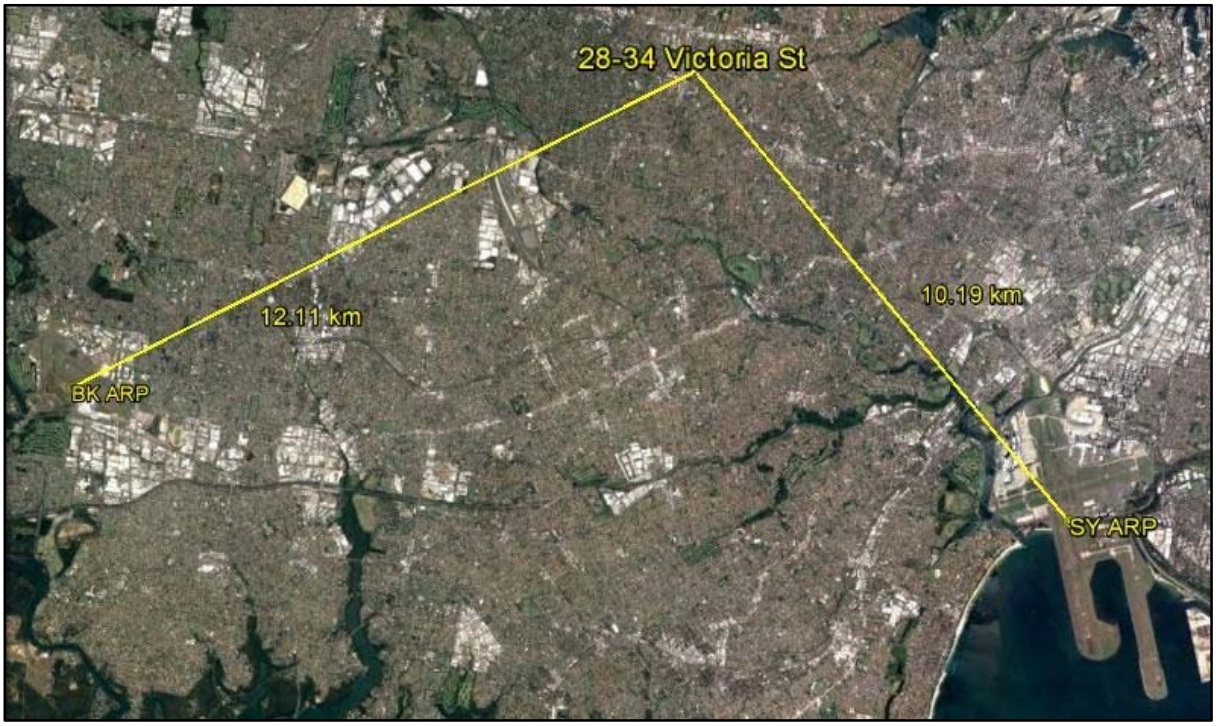

Figure 2.1 The development site and Sydney and Bankstown Airports.

3. OLS ASSESSMENT

SYDNEY OLS

The proposed building is in the OLS Outer Horizontal Surface (OHS) for Sydney Airport as shown in Figure 3.1. The height of the OHS is 156 m AHD.

At a maximum building height of 146 m AHD and crane height of 154 m AHD the development will not penetrate the Sydney OHS surface of 156 m AHD.

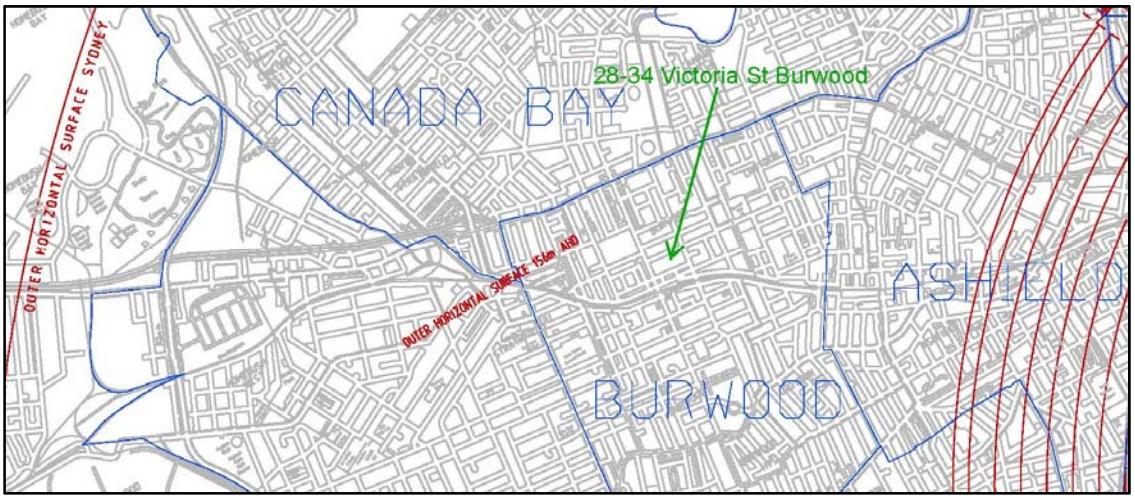

Figure 3.1 Development site in relation to the Sydney OLS surfaces (from SACL OLS chart)

BANKSTOWN OLS

The proposed building is in the OLS Outer Horizontal Surface (OHS) for Bankstown Airport as shown in Figure 3.2. The height of the OHS is 156 m AHD.

At a maximum building height of 148 m AHD and crane height of 154 m AHD the development will not penetrate the Bankstown OHS surface of 156 m AHD.

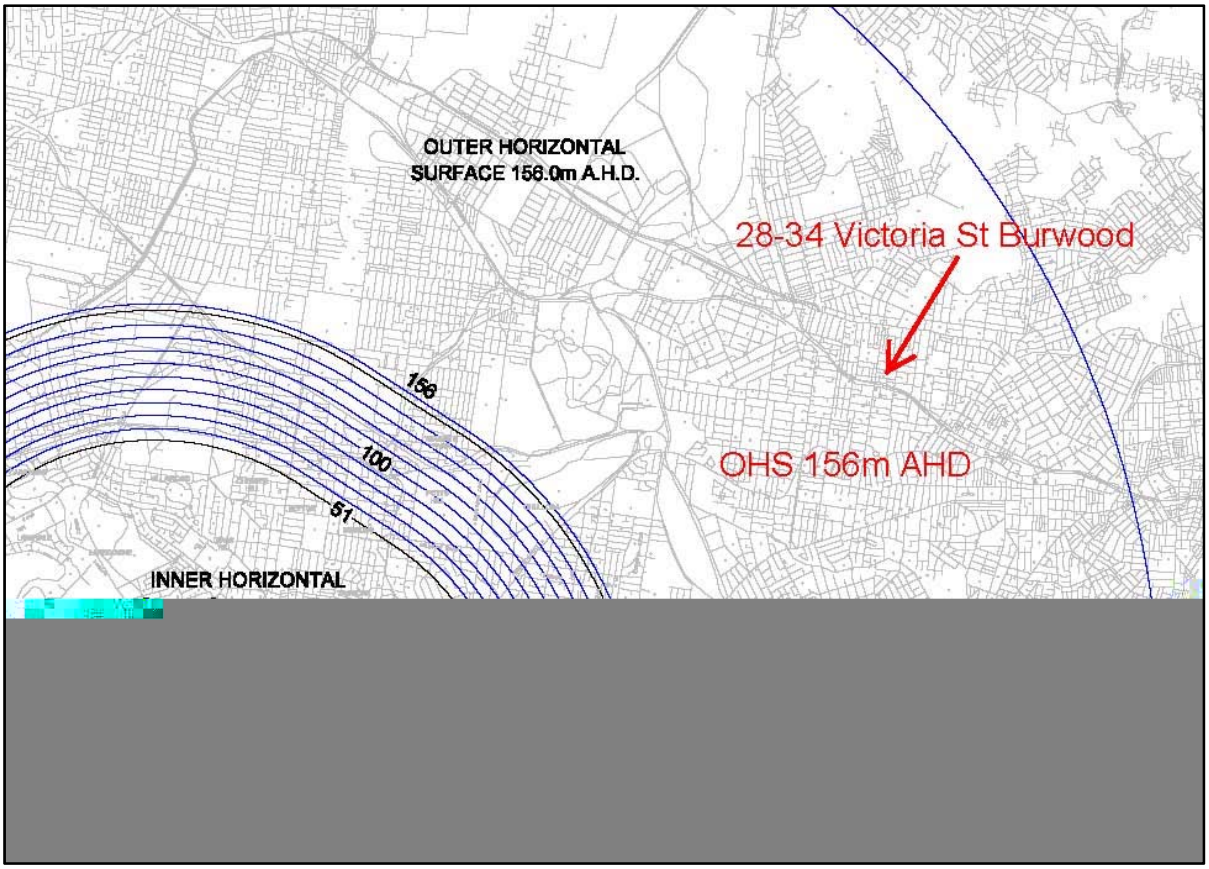

Figure 3.2 Development site in relation to the Bankstown OLS surfaces (from BAL Master Plan)

WESTERN SYDNEY AIRPORT (WSA) OLS

This Airport is still in the planning stage, however OLS for the airport are published in the Western Sydney Plan December 2016. An extract from this plan showing the OLS in relation to the development site is shown in Figure 3.3.

The development site is 35.7 km from the WSA ARP, and is beyond all OLS for the WSA.

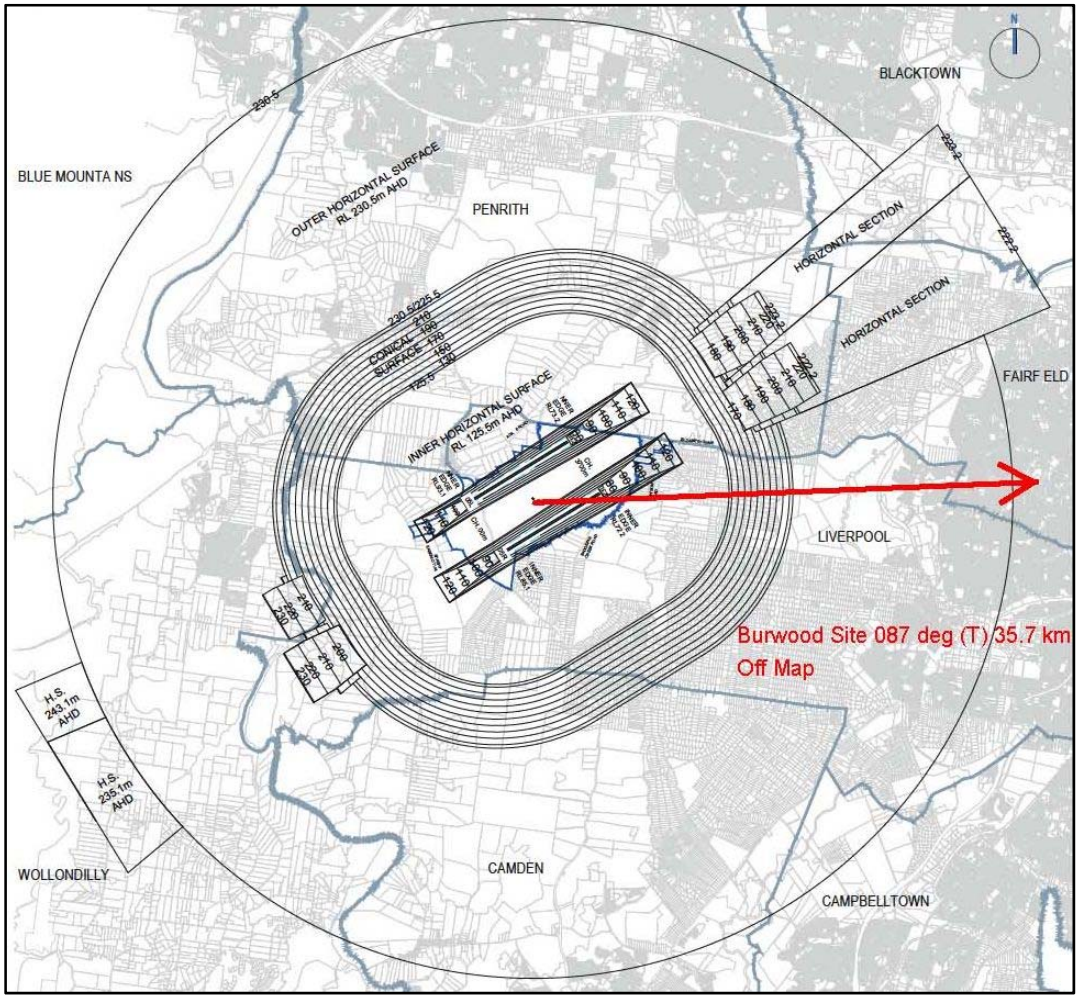

Figure 3.3 Development site in relation to the Western Sydney Airport OLS surfaces (from WSA Airport Plan December 2016)

CAMDEN AIRPORT AND RAAF BASE RICHMOND OLS

Camden Airport and the RAAF Base Richmond are 42.8 km and 43.4 km respectively from the development site.

As the OLS extends to a maximum distance of 18 km from an aerodrome ARP, the development site is well beyond the OLS for these aerodromes.

4. PANS-OPS ASSESSMENT

SYDNEY AIRPORT PANS-OPS

The development site is in an area of the Sydney PANS-OPS surfaces where the surface height over the site is 184.7 m AHD, and this is shown in an extract from the SACL PANS OPS chart in Figure 4.1 below.

At a maximum building height of 148 m AHD and crane height of 154 m AHD the development will not penetrate the Sydney PANS-OPS surface of 184.7 m AHD.

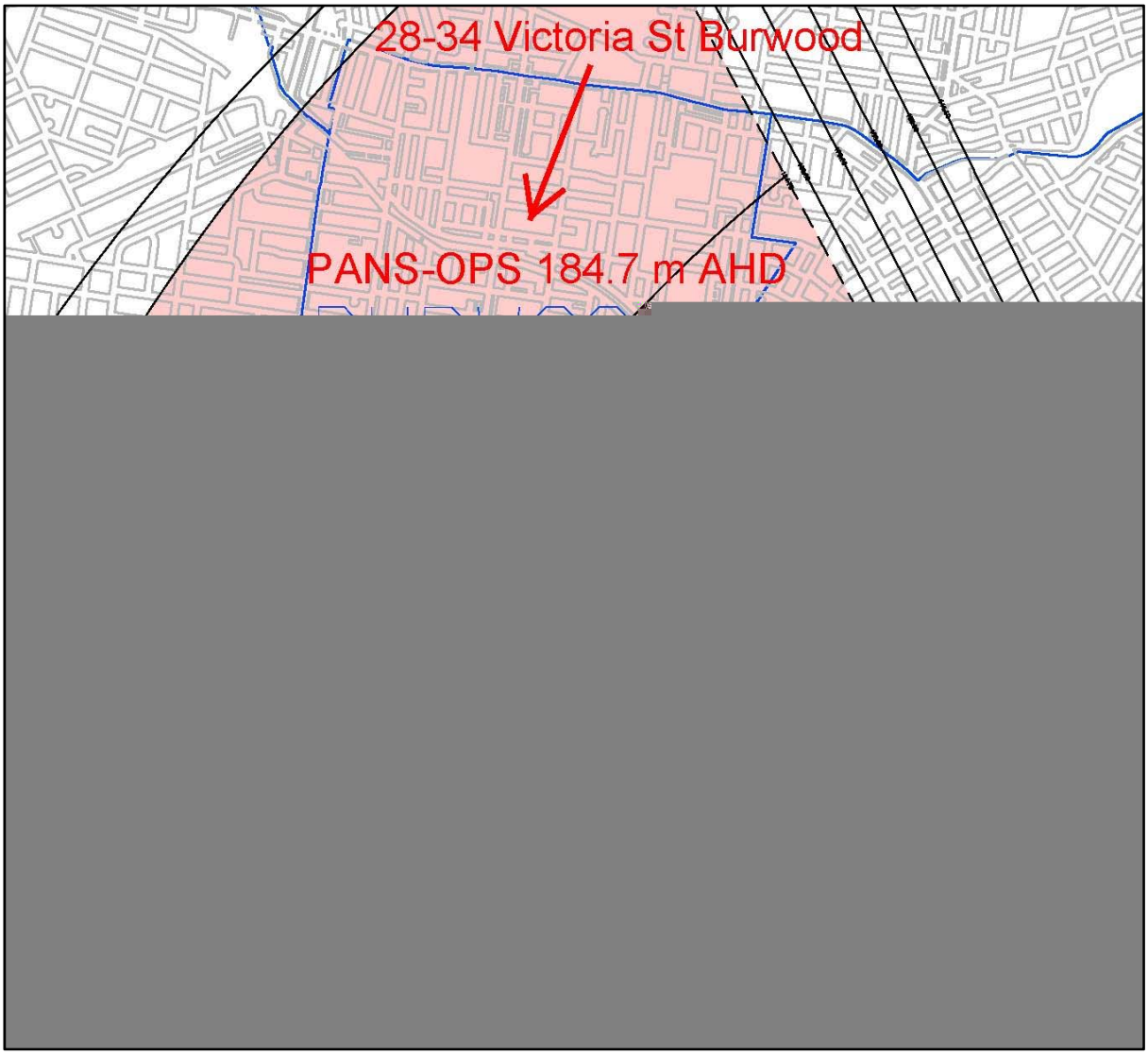

Figure 4.1 Sydney Airport PANS-OPS Surfaces

BANKSTOWN AIRPORT PANS-OPS

The development site is beyond the Bankstown Airport PANS-OPS surfaces, and this is shown in an extract from the BAL Master Plan as shown in Figure 4.2.

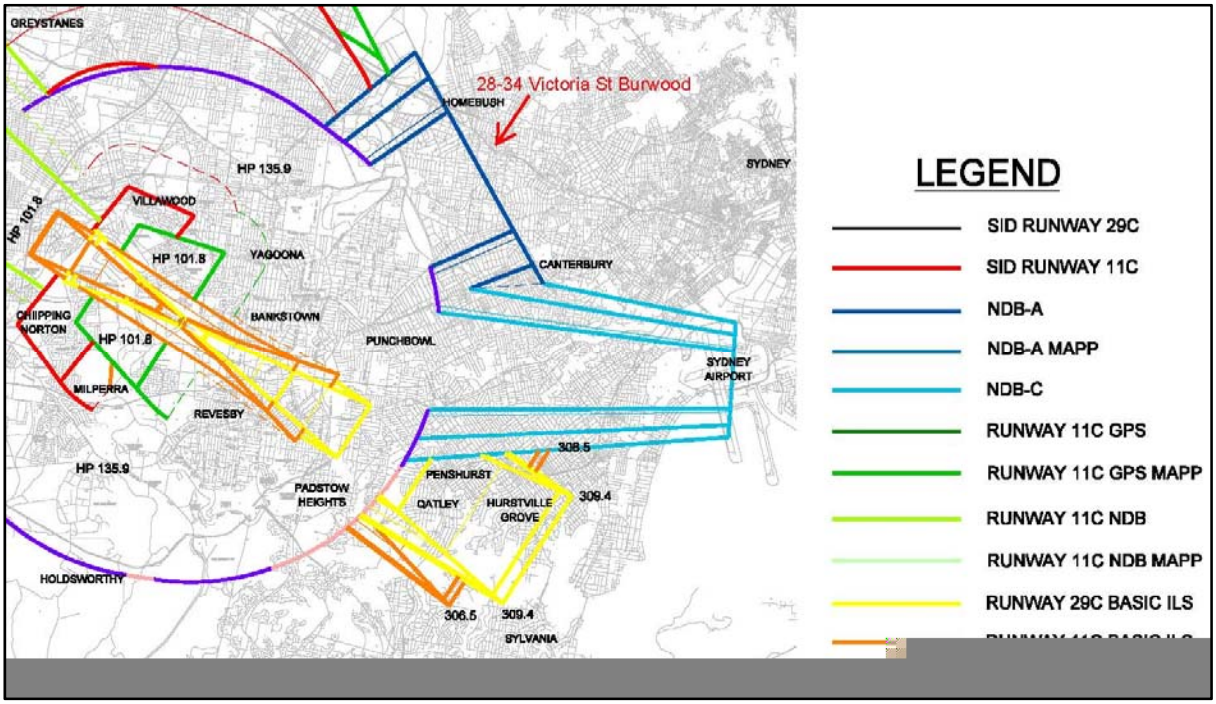

Figure 4.2 Bankstown Airport PANS-OPS surfaces.

WESTERN SYDNEY AIRPORT PANS-OPS

PANS-OPS surfaces have not yet been prepared for this proposed airport.

As the development site is 35.7 km from this airport it is most unlikely that the development will impact on the PANS-OPS surfaces for WSA.

CAMDEN AIRPORT AND RAAF BASE RICHMOND

Camden Airport and the RAAF Base Richmond are 42.8 km and 43.4 km respectively from the development site.

As the PANS-OPS surfaces for these aerodromes extend to a maximum distance of 35 km, the development site is well beyond the PANS-OPS surfaces for these aerodromes.

5. RTCC ASSESSMENT

The development site is in an RTCC area where the surface height is 152 m AHD. Figure 5.1 is an extract from the SACL RTCC chart and it also shows the development site.

The maximum building height of 146 m AHD will not penetrate the 152 m AHD RTCC surface.

The crane height of 154 m AHD will penetrate the RTCC surface height of 152 m AHD by 2m.

The consultants have made an assessment for a nearby development, and an application has been made via SACL to the DIRD, CASA and AsA for a permanent increase in the RTCC surface to 600 ft or 183 m AHD. Current indications are that the RTCC surface height will be increased to at least 183 m AHD.

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6. RADAR PERFORMANCE IMPACT

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11.1.14.4

The following clearance requirements are to be maintained:

(a) No intrusion within 1 km of the radar into a height surface 5 m below the bottom of the antenna. No intrusion between the radar and the possible location of any desired targets, i.e. roughly speaking above 0.5 degrees elevation at any distance.

(b) No metallic or other electrical reflective surfaces anywhere which subtend an angle of more than 0.5 degrees when viewed from the radar, e.g. fences, power lines, tanks as well as many buildings. All overhead power lines within 1 km must be aligned radially from the radar or be located at least 10 degrees below horizontal from the antenna.

- Helicopter operations on Coded Clearances will not be impacted; and
- It is not expected that airline contingency procedures will be impacted.

This AIA will be submitted to SACL and BAL which in turn will refer the AIA to CASA and AsA for assessment.

The erection of cranes should be referred to SACL and BAL so that NOTAM actions can be taken. Cranes may be subject to marking and obstruction lighting by CASA.

APPENDICES

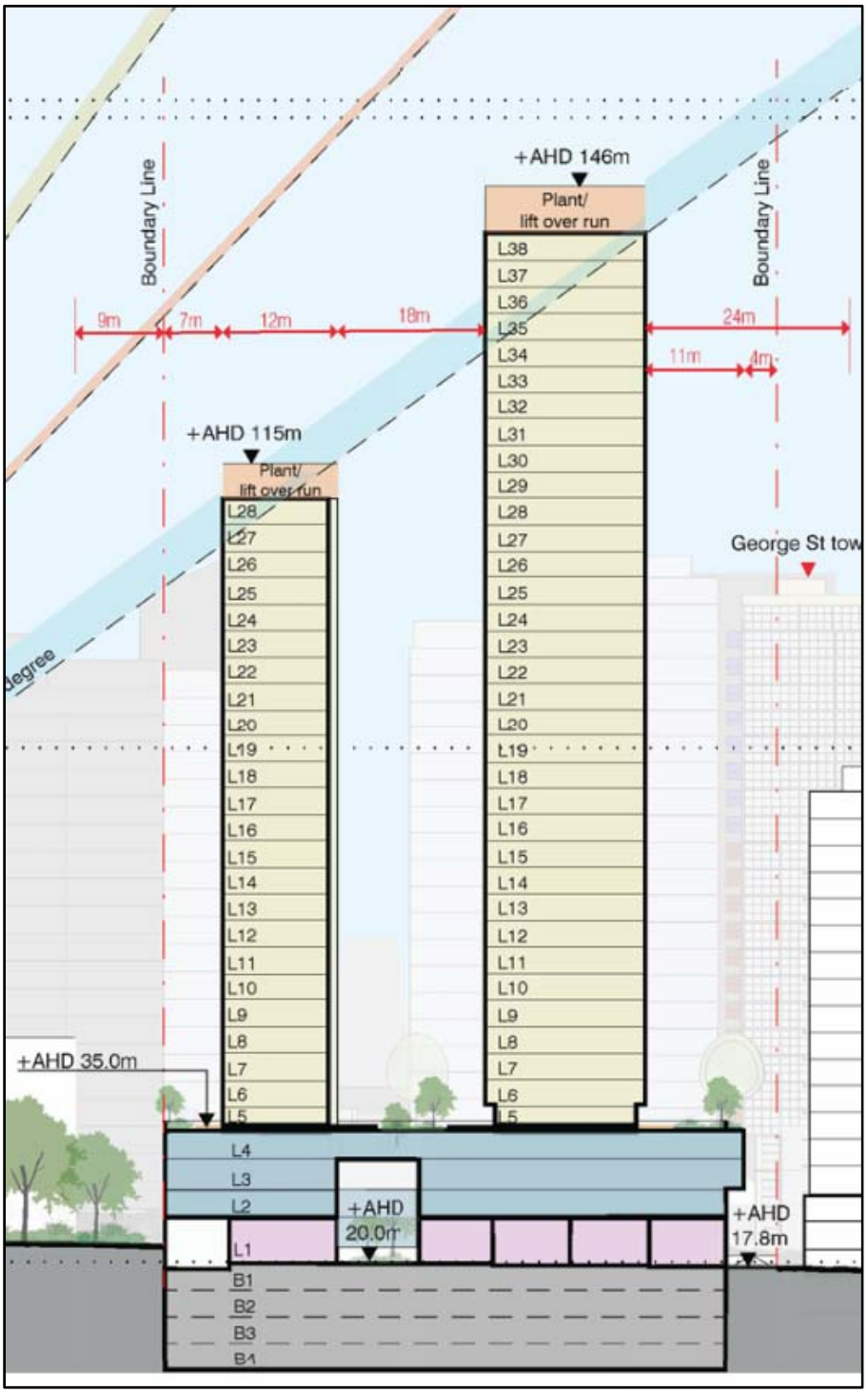
APPENDIX A

AERIAL VIEW OF THE SITE

Figure 1: Aerial view, site outlined in red and shaded in yellow (Source: Sixmaps NSW)

APPENDIX B

PROFILE VIEW OF THE HEIGHT OF THE BUILDINGS



APPENDIX C

GLOSSARY OF AERONAUTICAL TERMS AND ABBREVIATIONS

To facilitate the understanding of aviation terminology used in this report, the following is a glossary of terms and acronyms that are commonly used in aeronautical impact assessments and similar aeronautical studies.

AC (Advisory Circulars) are issued by CASA and are intended to provide recommendations and guidance to illustrate a means, but not necessarily the only means, of complying with the *Regulations*.

Aeronautical study is a tool used to review aerodrome and airspace processes and procedures to ensure that safety criteria are appropriate.

AIPs (Aeronautical Information Publications) are publications promulgated to provide operators with aeronautical information of a lasting character essential to air navigation. They contain details of regulations, procedures and other information pertinent to flying and operation of aircraft. In Australia, AIPs may be issued by CASA or Airservices Australia.

Air routes exist between navigation aid equipped aerodromes or waypoints to facilitate the regular and safe flow of aircraft operating under IFR.

Airservices Australia is the Australian government-owned corporation providing safe and environmentally sound air traffic management and related airside services to the aviation industry.

Altitude is the vertical distance of a level, a point or an object, considered as a point, measured from mean sea level.

ATC (Air Traffic Control) service is a service provided for the purpose of:

a. preventing collisions:
    1. between aircraft; and
    2. on the manoeuvring area between aircraft and obstructions; and
b. expediting and maintaining an orderly flow of air traffic.

CASA (Civil Aviation Safety Authority) is the Australian government authority responsible under the *Civil Aviation Act 1988* for developing and promulgating appropriate, clear and concise aviation safety standards. As Australia is a signatory to the ICAO *Chicago Convention,* CASA adopts the standards and recommended practices established by ICAO, except where a difference has been notified.

CASR (Civil Aviation Safety Regulations) are promulgated by CASA and establish the regulatory framework *(Regulations)* within which all service providers must operate.

Civil Aviation Act 1988 (the Act) establishes the CASA with functions relating to civil aviation, in particular the safety of civil aviation and for related purposes.

ICAO (International Civil Aviation Organization) is an agency of the United Nations which codifies the principles and techniques of international air navigation and fosters the planning and development of international air transport to ensure safe and orderly growth. The ICAO Council

adopts standards and recommended practices concerning air navigation, its infrastructure, flight inspection, prevention of unlawful interference, and facilitation of border-crossing procedures for international civil aviation. In addition, the ICAO defines the protocols for air accident investigation followed by transport safety authorities in countries signatory to the Convention on International Civil Aviation, commonly known as the *Chicago Convention*. Australia is a signatory to the *Chicago Convention.*

IFR (Instrument Flight Rules) are rules applicable to the conduct of flight under IMC. IFR are established to govern flight under conditions in which flight by outside visual reference is not safe. IFR flight depends upon flying by reference to instruments in the flight deck, and navigation is accomplished by reference to electronic signals. It is also referred to as, “a term used by pilots and controllers to indicate the type of flight plan an aircraft is flying,” such as an IFR or VFR flight plan.

IMC (Instrument Meteorological Conditions) are meteorological conditions expressed in terms of visibility, distance from cloud and ceiling, less than the minimum specified for visual meteorological conditions.

LSALT (Lowest Safe Altitudes) are published for each low level air route segment. Their purpose is to allow pilots of aircraft that suffer a system failure to descend to the LSALT to ensure terrain or obstacle clearance in IMC where the pilot cannot see the terrain or obstacles due to cloud or poor visibility conditions. It is an altitude that is at least 1,000 feet above any obstacle or terrain within a defined safety buffer region around a particular route that a pilot might fly.

MOS (Manual of Standards) comprises specifications (Standards) prescribed by CASA, of uniform application, determined to be necessary for the safety of air navigation.

NOTAMs (Notices to Airmen) are notices issued by the NOTAM office containing information or instruction concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to persons concerned with flight operations.

Obstacles. All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that are located on an area intended for the surface movement of aircraft or that extend above a defined surface intended to protect aircraft in flight.

OLS (Obstacle Limitation Surfaces) are a series of planes associated with each runway at an aerodrome that defines the desirable limits to which objects may project into the airspace around the aerodrome so that aircraft operations may be conducted safely.

PANS-OPS (Procedures for Air Navigation Services - Aircraft Operations) is an Air Traffic Control term denominating rules for designing instrument approach and departure procedures. Such procedures are used to allow aircraft to land and take off under Instrument Meteorological Conditions (IMC) or Instrument Flight Rules (IFR). ICAO document 8168-OPS/611 (volumes 1 and 2) outlines the principles for airspace protection and procedure design which all ICAO signatory states must adhere to. The regulatory material surrounding PANS-OPS may vary from country to country.

PANS OPS Surfaces. Similar to an Obstacle Limitation Surface, the PANS-OPS protection surfaces are imaginary surfaces in space which guarantee the aircraft a certain minimum obstacle clearance. These surfaces may be used as a tool for local governments in assessing building development. Where buildings may (under certain circumstances) be permitted to penetrate the

OLS, they cannot be permitted to penetrate any PANS-OPS surface, because the purpose of these surfaces is to guarantee pilots operating under IMC an obstacle free descent path for a given approach.

Prescribed airspace is an airspace specified in, or ascertained in accordance with, the Regulations, where it is in the interests of the safety, efficiency or regularity of existing or future air transport operations into or out of an airport for the airspace to be protected. The prescribed airspace for an airport is the airspace above any part of either an OLS or a PANS OPS surface for the airport and airspace declared in a declaration relating to the airport.

Regulations (Civil Aviation Safety Regulations)

VFR (Visual Flight Rules) are rules applicable to the conduct of flight under VMC. VFR allow a pilot to operate an aircraft in weather conditions generally clear enough to allow the pilot to maintain visual contact with the terrain and to see where the aircraft is going. Specifically, the weather must be better than basic VFR weather minima. If the weather is worse than VFR minima, pilots are required to use instrument flight rules.

VMC (Visual Meteorological Conditions) are meteorological conditions expressed in terms of visibility, distance from cloud and ceiling, equal or better than specified minima.

ABBREVIATIONS

Abbreviations used in this report, and the meanings assigned to them for the purposes of this report are detailed in the following table.

Abbreviation	Meaning
AC	Advisory Circular (document support CAR 1998)
ACFT	Aircraft
AD	Aerodrome
AHD	Australian Height Datum
AHT	Aircraft height
AIP	Aeronautical Information Publication
Airports Act	Airports Act 1996, as amended
AIS	Aeronautical Information Service
Alt	Altitude
AMSL	Above Mean Sea Level
APARs	Airports (Protection of Airspace) Regulations, 1996 as amended
ARP	Aerodrome Reference Point
AsA	Airservices Australia
ATC	Air Traffic Control(ler)
ATM	Air Traffic Management
BRA	Building Restricted Area (for GP)
CAO	Civil Aviation Order
CAR	Civil Aviation Regulation
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulation
Cat	Category

Abbreviation	Meaning
DAP	Departure and Approach Procedures (charts published by AsA)
DER	Departure End of (the) Runway
DEVELMT	Development
DME	Distance Measuring Equipment
Doc nn	ICAO Document Number nn
DIT	Department of Infrastructure and Transport. (Formerly Dept. of Infrastructure, Transport, Regional Development and Local Government and Department of Transport and Regional Services (DoTARS))
DOTARS	See DIT above
ELEV	Elevation (above mean sea level)
ENE	East North East
ERSA	Enroute Supplement Australia
FAF	Final Approach Fix
FAP	Final Approach Point
ft	feet
GBAS	Ground Based Augmentation System (satellite precision landing system)
GNSS	Global Navigation Satellite System
GP	Glide Path
IAS	Indicated Airspeed
ICAO	International Civil Aviation Organisation
IHS	Inner Horizontal Surface, an Obstacle Limitation Surface
ILS	Instrument Landing System
ISA	International Standard Atmosphere
km	kilometres
kt	Knot (one nautical mile per hour)
LAT	Latitude
LLZ	Localizer
LONG	Longitude
m	metres
MAPt	Missed Approach Point
MDA	Minimum Descent Altitude
MGA94	Map Grid Australia 1994
MOC	Minimum Obstacle Clearance
MOS	Manual of Standards, published by CASA
MSA	Minimum Sector Altitude
MVA	Minimum Vector Altitude
NASAG	National Airports Safeguarding Advisory Group
NDB	Non Directional Beacon
NE	North East
NM	Nautical Mile (= 1.852 km)
nnDME	Distance from the DME (in nautical miles)
NNE	North North East
NOTAM	NOtice to AirMen
OAS	Obstacle Assessment Surface
OCA	Obstacle Clearance Altitude
OCH	Obstacle Clearance Height

Abbreviation	Meaning
OHS	Outer Horizontal Surface
OIS	Obstacle Identification Surface
OLS	Obstacle Limitation Surface
PANS-OPS	Procedures for Air Navigation Services – Operations, ICAO Doc 8168
PBN	Performance Based Navigation
PRM	Precision Runway Monitor
QNH	An altimeter setting relative to height above mean sea level
REF	Reference
RL	Relative Level
RNAV	aRea NAVigation
RNP	Required Navigation Performance
RPA	Rules and Practices for Aerodromes — replaced by the MOS Part 139 — Aerodromes
RPT	Regular Public Transport
RTCC	Radar Terrain Clearance Chart
RWY	Runway
SFC	Surface
SID	Standard Instrument Departure
SOC	Start Of Climb
STAR	Standard ARrival
SGHAT	Solar Glare Hazard Analysis Tool
TAR	Terminal Approach Radar
TAS	True Air Speed
THR	Threshold (Runway)
TNA	Turn Altitude
TODA	Take-Off Distance Available
V_n	aircraft critical Velocity reference
VOR	Very high frequency Omni directional Range
WAC	World Aeronautical Chart