Annexure 3

Helicopter Landing Site – Review of Facility Requirements (prepared by PSNK Aeronautical Services)

Potts Hill Reservoir
Helicopter Landing Site

Review of Facility Requirements

Report prepared for Landcom

by

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October 2008

Potts Hill Helicopter Landing Site
Facility Requirements

Contents

Figures

1. Overview

Landcom has commenced the planning and design activities for the establishment of a facility for the New South Wales Police Force (NSW Police) in the eastern precinct within the Potts Hill Reservoir site. The preliminary design work for the facility includes provision for a helicopter landing site (HLS) to be used by the New South Wales Police Air Wing and other agencies in support of NSW Police activities.

PSNK Aeronautical Services has been engaged by Landcom to identify and review the physical characteristics and operational requirements for the establishment and operation of a helipad at the site.

The analysis presented in this report has identified that the establishment of an HLS at the Potts Hill site is a feasible and practical proposition with helicopter operations able to be conducted independently to operations by helicopters and fixed wing aircraft operating at Bankstown Airport.

2. Design Criteria

The helicopter ground facilities and associated flightpaths need to be designed with reference to a design aircraft as identified by the International Civil Aviation Organisation (ICAO) in the proposed review text for Annex 14, Volume II:

> When designing a heliport, the critical design helicopter, having the largest set of dimensions and the greatest maximum take-off mass (MTOM) the heliport is intended to serve, would need to be considered. (ICAO, Proposed Amendment to Annex 14)

The range of helicopter types anticipated to use the Potts Hill HLS includes the current fleet of aircraft operated by New South Wales Police Air Wing. The facility also needs to be suitable for use by alternate helicopter types in current service with other agencies and emergency services and as well as the range of aircraft types that could be used by the Police Air Wing in the longer term future.

The critical combination of aircraft characteristics in the design group for the facility is the physical dimensions of the Bell 412 type in combination with the maximum mass of heavier aircraft such as the AW139 type.

The AW139 is currently rated as having a maximum takeoff weight of 6.4T but is generally expected to receive an increased ratting of 7 tonne in the future to match the AW149 military version of the aircraft. A maximum mass of 8 tonne has been selected for the design aircraft operating in Performance Class 1 to provide an element of future proofing for the facility beyond the operating weight of current aircraft. The 8T rating will also ensure the facility will be suitable for occasional normal mode use by special helicopters such as the Army SA70 and MRH90 helicopters.

The design aircraft for the Potts Hill HLS have the capability of operate in Performance Class 1. Accordingly, the design criteria for the facility need to meet the Performance Class 1 requirements for helipad and flightpaths of the design aircraft.

Helicopters operating in Performance Class 1 are able to continue flight or land at a helipad with one engine inoperative (OEI) and represent the highest level of operational safety. PC1 flights require a suitable combination of parameters including wind speed and direction, air temperature and pressure, and aircraft operating weight. In addition, a suitably sized helipad is essential to support PC1 flights.

In the event that any of the required criteria for PC1 flights cannot be met, the aircraft operates in Performance Class 2. PC2 aircraft have a similar OEI accountability except for the early stages after liftoff and the final stages of the approach to land during which a forced landing may be required in the OEI situation and is included in the contingency planning for such flights.

The design criteria adopted for the Potts Hill HLS reflect the standards and recommended practices published by ICAO in Annex 14 – Volume II and the ICAO Heliport Design Manual. The ICAO documentation has specific application and details of the facility requirements for Performance Class 1 helicopters. The analysis undertaken for this feasibility study also includes reference to the proposed changes to the Annex 14-II provisions which are currently in circulation for consideration by ICAO States with a retrospective application date.

As a member state of ICAO, Australia adopts the ICAO SARPS unless alternate provisions and criteria have been published. Australia published a Civil Aviation Advisory Publication (CAAP 92-2) in 1996 which presents guidelines for the establishment of helicopter landing sites (HLS). The CAAP is primarily an operational document intended to assist helicopter operators meet their responsibilities under Civil Aviation Regulation 92. Regulation 92 permits aircraft operator to use a landing site if it is fit for purpose and at the time, the flight can be conducted with safety.

The CAAP identifies a minimum set of general criteria for an HLS but not does not address the operational requirements of the sophisticated high performance twin-engine helicopters that will use the Potts Hill HLS. The use of the detailed operational information presented in aircraft flight manuals and the ICAO SARPS for the planning and design of facilities such as the Potts Hill HLS is acknowledged in CAAP 92-2 for helicopters with a rejected takeoff or landing capability.

3. Facility Requirements

A facility generically known as a helipad requires the provision of three key elements:

Safety Area:

The safety area provides an area within which the helicopter can operate clear of obstacles, the primary function being to protect the rotor system from striking an object. The minimum dimension of a safety area is twice the overall length of the design aircraft which for the Potts Hill HLS design helicopter is 35 meters by 35 metres. The proposed amendments to Annex 14 Volume II confirm that the safety area does not need to be load bearing but needs to also include a side slope rising at

45 degrees along the edge of the primary safety area to protect the lateral sides of the helipad area.

Final Approach and Take-Off (FATO) Area:
The FATO is located within the safety area and provides the defined area over which the final phase of the approach manoeuvre to hover or landing is completed and from which the take-off manoeuvre is commenced. Where the FATO is to be used by Performance Class 1 helicopters, the defined area includes the rejected take-off area available which for the Bell 412EP helicopter is 23 metres by 27 metres. Analysis of helicopter types indicate that the B412EP criteria are the most significant as other types have smaller HLS requirements for PC1 operations.

Touchdown and Liftoff (TLOF) area
The TLOF is a load bearing area on which a helicopter may touch down or lift off. The latest ICAO provisions include a revised minimum TLOF dimension of 0.83 times the critical design helicopter dimension. The minimum TLOF dimension for eh Potts Hill HLS design helicopter is therefore 14.5 metres for a facility that is coincident with the surrounding ground. The TLOF for an elevated helipad is assumed to be coincident with the FATO and therefore of the same dimensions as the FATO (23m x 27m).

4. Helipad Structural Loading Criteria

The heaviest aircraft in the design helicopter group currently operating is the AW139 which has recently commenced operation with the NSW Ambulance Service from the base at Bankstown Airport. The current certified maximum takeoff weight for the AW139 is 6.4 tonne but this value is expected to increase to around 7 tonne in the future in line with the AW 149 type, the military variant of the AW 139.

The design criteria adopted for helipads such as the Potts Hill HLS ensures the facility is capable of accepting the loads generated by the design helicopter making an emergency landing under PC1 conditions. The ultimate load state in such situations, as identified in the ICAO heliport manual, equates to 2.5 times the design aircraft mass.

That loading is in excess of the loads generated by larger aircraft operating in normal mode. The facility designed for use by 8 tonne helicopters in Performance Class 1 can also be used by Special Category helicopters, such as the SA70 Blackhawk and MRH90 helicopters operated by the Australian Army, operating in Performance Class 2.

The adoption of a 8 tonne design helicopter mass for the Potts Hill HLS will provide a degree of future –proofing for the facility for the potential introduction in the longer term of helicopters currently under development such as the BA609 tilt-rotor aircraft and the Eurocopter EC175 types..

5. Flightpath Area Protection Surfaces

Protection of the flight paths associated with a helipad is required through the provision of obstacle limitation surfaces.

The flight path envelopes required to support day and night flights by the Potts Hill HLS design aircraft operating in Performance Class 1 are defined by criteria presented in ICAO Annex 14 volume II.

The flight path boundary is an inclined plane with sides diverging at 15% from an inner edge of 35 metres that is coincident with the safety area of the helipad. The lateral splay of the surface continues until the final width of the envelope is 120 metres after which he sides are parallel. The gradient of the flight path surfaces for PC1 operations is 4.5%.

The topography around the Potts Hill HLS site is generally flat and free of obstacles due to the ground level elevation of the reservoir to the west of the site and the drop in ground level to the east of the site. The proposed communications antennae are located to the south of the helipad location and clear of the nominal flightpaths

A detailed assessment of the obstacle free flightpath criteria and protection will be undertaken at the detailed design phase of the project.

6. Application of Design Criteria to the Potts Hill HLS.

The application of the facility design criteria nominated above identifies the following facilities are required for the Potts Hill HLS:

Safety Area – 35m x 35m with a lateral side slope at 45 degrees rising to 10m above the helipad elevation;
FATO Area – 23m x 27m load bearing area suitable for use by twin engine helicopters operating in Performance Class 1;
TLOF Area – 14.5m x 14.5 m area suitable for the touch down and lift-off of the design helicopters.

These dimensions represent the minimum TLOF area for a facility that is coincident with the surrounding ground. If the helipad facility is an elevated platform, the TLOF is assumed to be coincident with the FATO and the nominated FATO dimensions apply.

7. Flightpath and HLS alignment considerations

The helipad and associated flightpaths need to be aligned relative to the prevailing wind conditions to give optimum usability for the helipad. Usability criteria for eh Potts Hill design helicopters operating in Performance Class 1 are calculated with respect to a 10 knot crosswind and nil tailwind limitation.

The wind patterns at the Potts Hill HLS site have been identified using data produced by the meteorological module in The Air Pollution Model (TAPM). TAPM is a model developed by the CSIRO to model the atmospheric dispersal of plumes and includes a module to identify meteorological data including wind speed and direction on an hourly average basis for a nominated site.

The annual distribution of the wind at the Potts hill HLS site, based on 43,824 TAPM records of hourly average wind, is shown at Figure 1 for a height of 10 metres and at Figure 2 for a height of 25 metres.

The data shows a dominant wind direction of west-south-west but with a small proportion of the hourly average wind events with a velocity greater than 10 knots (18 kilometres per hour). Analysis of the data indicates that the velocity of 98.4% of the wind records was 10 knots or less.

Figure 3 shows the nominal flightpath aligned east-west to suit the site boundary and the overall wind distribution pattern indicating a high usability for the site can be expected with reference to the prevailing wind conditions.

Figure 1: Potts Hill HLS site wind events, 10m height values

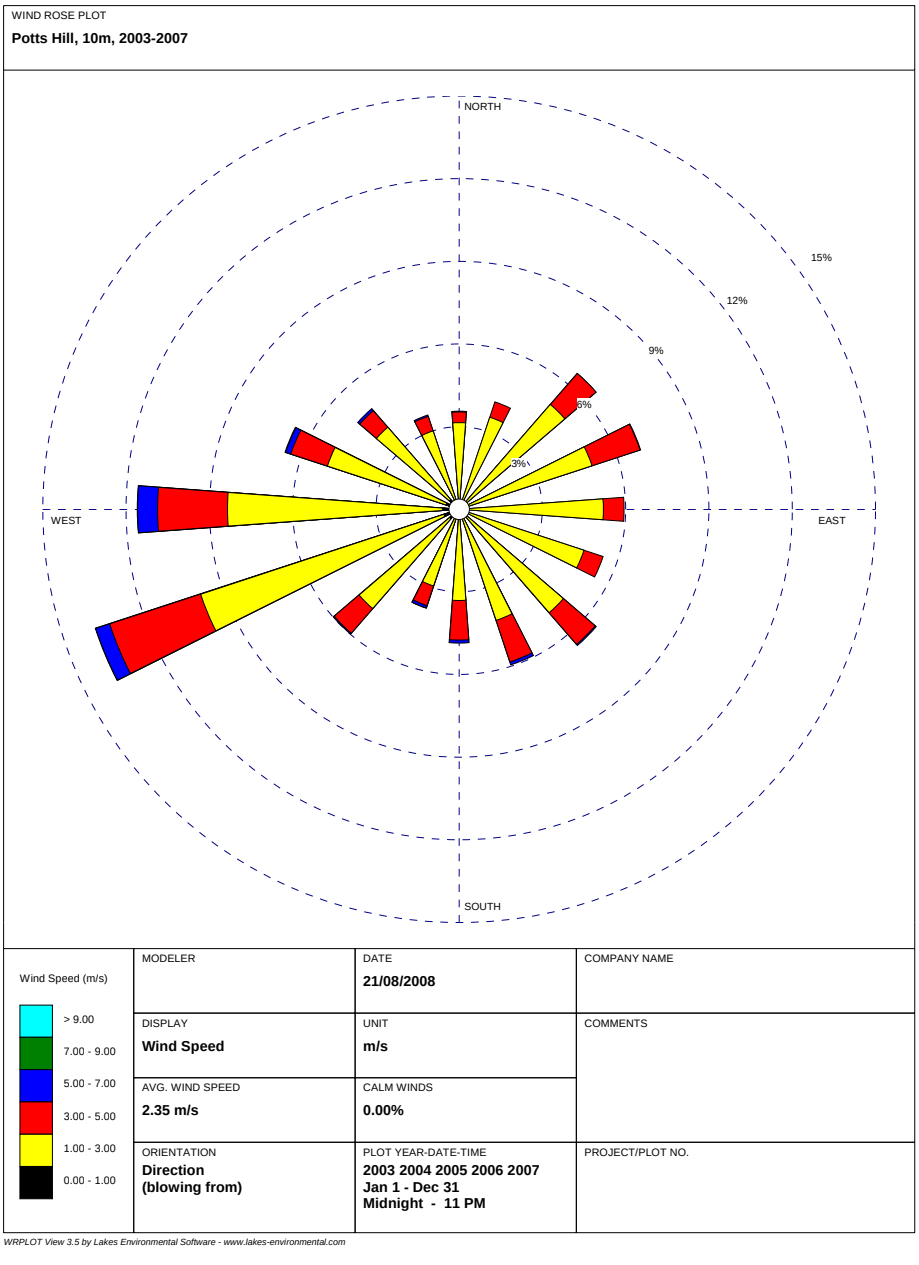


Figure 2: Potts Hill HLS wind events, 25m height values

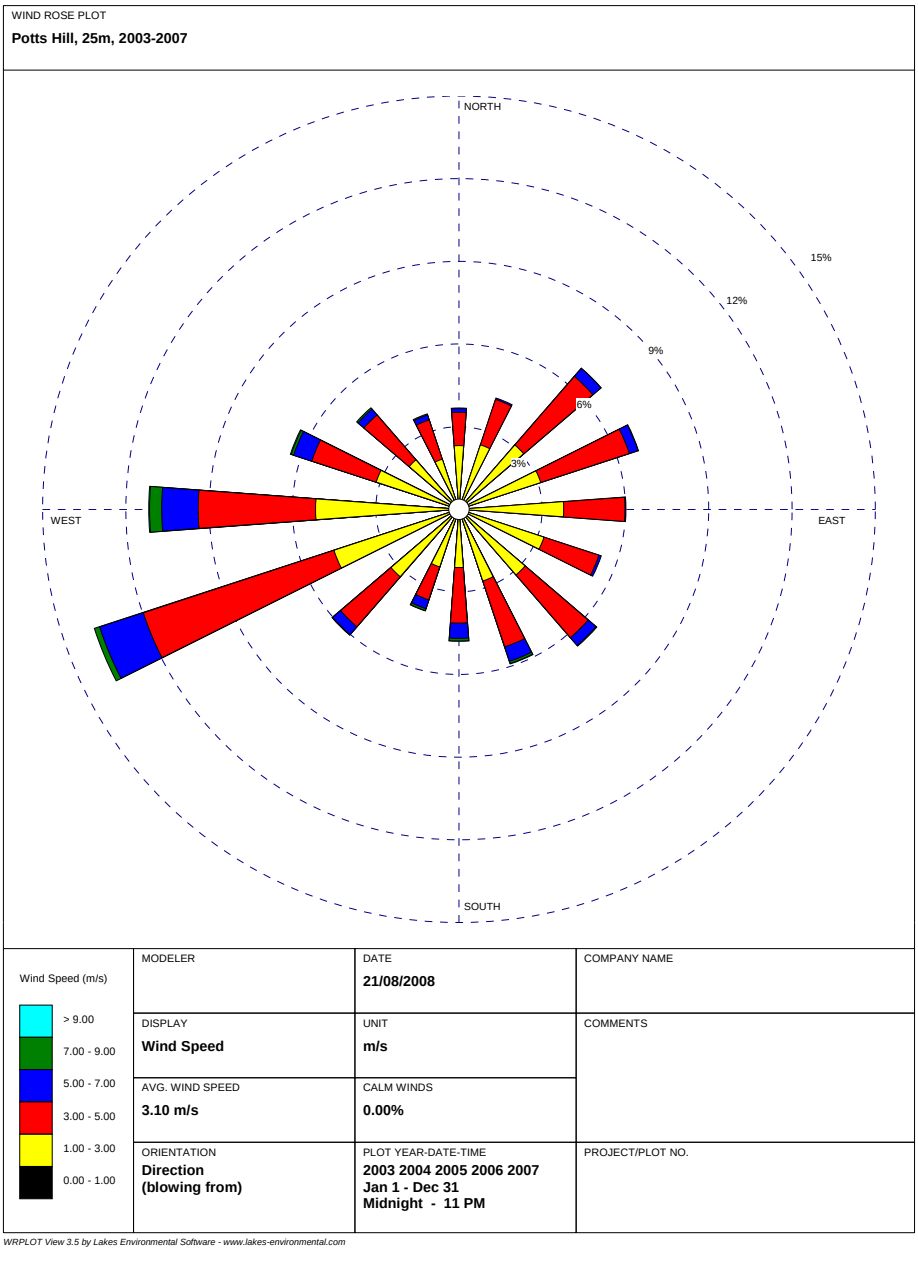
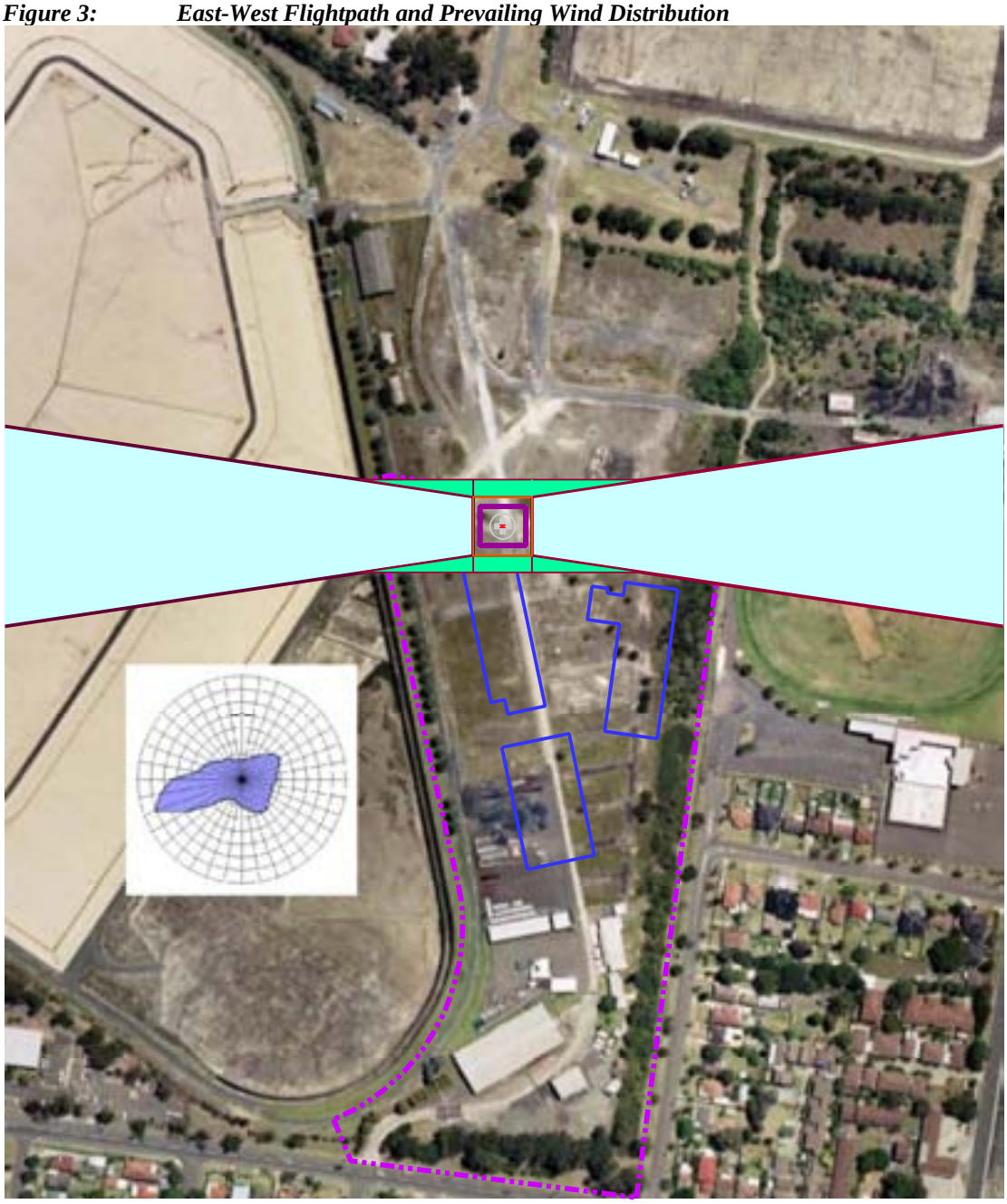


Figure 3: East-West Flightpath and Prevailing Wind Distribution



8. Bankstown Airport Traffic Flows

Bankstown Airport is located 5 km to the South West of the Potts Hill site. The airport is used by fixed wing and rotary wing aircraft with prescribed flight path tracks for arrival and departure traffic flows.

The runways at Bankstown airport are aligned in the south-east/north-west direction. Runway 11 is used for arrivals and departures when the winds have an easterly component and runway 29 is used when winds have westerly component. The fixed wing traffic circuit at Bankstown is located to the North of the runway complex within 2 km of the runways.

Bankstown Airport is located to the West of the controlled airspace serving Sydney airport. Traffic at Bankstown operates outside controlled airspace by following prescribed tracks to the North, West and South. Traffic to and from the North track via Parramatta (departures) and Prospect Reservoir (arrivals) with the Runway 11 departure track to Parramatta being the closest to the Potts hill site. Location of the track relative to Potts Hill is shown in figure 4, indicating the nominal flight path is 2.5 km from the Potts Hill site. In addition to the lateral clearance from the outbound fixed wing traffic, the departing aircraft climb to an elevation of 1500 feet when departing to the North from runway 11 which provides vertical separation from any activity at the Potts Hill HLS site.

Traffic arriving from the North wind runway 29 is in use track via Prospect Reservoir and join the traffic circuit on a downward leg as shown in figure 5.

Helicopter flight is in the Bankstown airport control zone are conducted at 700 feet altitude to follow prescribed paths and ensure separation from the fixed wing traffic.

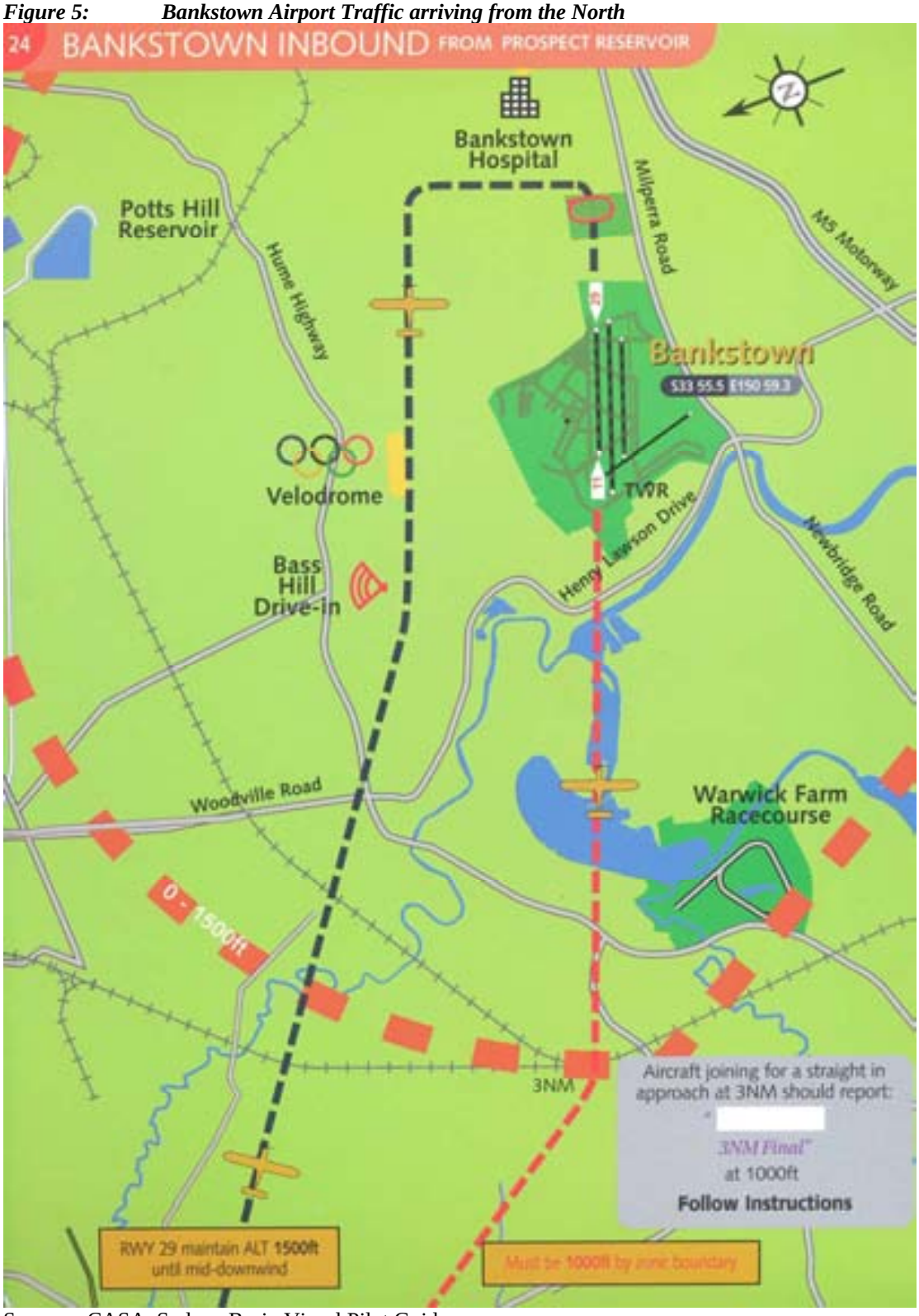
There are four gateways for helicopters tracking to and from Bankstown airport, two of which are in the vicinity of the Potts Hill site. Choppers North is located at the intersection of the pipeline and railway line on the Western side of Regents Park railway station, approximately 1.6 km from the Potts Hill site. Choppers West is located a further 2.2 km to the west above the Michel's Patisserie factory site. Choppers North is over flown by helicopters departing to the North when runway 11 is in use and arriving from the North when runway 29 is use. Traffic operate over Choppers North and Choppers West at an altitude of 700 feet (213 metres). The ground level at the Potts Hill site is 57 metres (190 feet).

The Potts Hill site is laterally and vertically separated from helicopter traffic tracking to and from the North through the Choppers North and Choppers West gateways.

Figure 4: Bankstown Airport traffic departing to the North

Source: CASA, Sydney Basin Visual Pilot Guide

Figure 5: Bankstown Airport Traffic arriving from the North



Source: CASA, Sydney Basin Visual Pilot Guide