

# Technical Bulletin

## TB 0223 – Aircraft Warning Markers

### Purpose

This technical bulletin provides details on the requirement for aircraft aerial markers (including balls and discs) on the Endeavour Energy's Electrical network in accordance with AS 3891.1 and AS3891.2.

### Actions

#### 1.1 Aerial Marker Balls

Any section of a span, which has:

- a) a conductor height in excess of 90 m above any road, railway or navigable waterway; or
- b) a conductor height in excess of 90 m continuously for 50 m above any ground not containing a road, railway or navigable waterway;

shall be marked with spherical markers of colours alternating between white and yellow.

The standard marker balls to be used for all aerial markers on overhead conductors are 600 mm in diameter and either white or yellow in colour.

Stock codes for these items are:

- 1563279 – 600 mm Yellow
- 1563287 – 600 mm White

Intervals between markers shall be a maximum of 30 m and a minimum of three markers are required on any section of span that exceeds the above requirements.

The markers shall be mounted where practicable on the highest conductor in the span only (e.g on the OHEW).

Any span running generally parallel to, and within 100m of, a conductor marked in accordance with the these requirements is exempt from those requirements provided the highest cable is marked.

Marker balls should be installed as per these requirements on all new lines. Any existing span identified to be missing the appropriate markers shall be rectified in accordance with this standard.

A report is currently being generated from LIDAR data to identify spans that should have marker balls installed. This report will be made available upon completion however sites should be proactively identified and marked for any known issues of non-compliance.

Any feeder installed prior to the release of AS3891.1 – 2008: Air Navigation, that is not capable of carrying the weight and wind loading created by the marker balls, shall be identified and evidence of the inability to meet the standard submitted to the Network Mains Manager, Asset Standards and Design for identification of a solution.

The location of all aerial markers installed on Endeavour Energy lines shall be recorded in GIS for maintenance purposes.

## 1.2 Other Spans/Structures

Any section of a span, which has:

- a) a conductor height in excess of 150 m; or
  - b) a conductor height in excess of 90 m (at any point), within a span length exceeding 1500 m;
- shall be notified to the Network Mains Manager for determination of the appropriate action.

## 1.3 Aerial marking in proximity to aerodromes and landing areas

Registered/certified aerodromes are aerodromes that have been registered with or certified by the Civil Aviation Safety Authority (CASA). Certified aerodromes have runways capable of handling aircraft with more than 30 passengers or 3,400 kg of cargo. They are used by regular public transport, charter and general aviation aircraft. Registered aerodromes have lower minimum operating standards than certified aerodromes. Military aerodromes are controlled by the Australian Defence Force.

Aeroplane landing areas (ALA) and helicopter landing sites (HLS) are areas/sites that have not been authorised by CASA but are suitable for the purposes of landing and taking-off of aircraft.

### 1.3.1 Aerial conductors in proximity to Registered/Certified or Military aerodromes

Any power lines that are within 15km of a registered/certified or military aerodrome shall refer to the obstacle limitation surfaces (OLS) shown in figure 1 and figure 2. The designer of any power line that penetrates the obstacle limitation surfaces shall notify the aerodrome operator for consultation of marking requirements.

The OLS are imaginary surfaces associated with runways and are designed to protect aircraft flying visually in the vicinity of an aerodrome. Figure 1 shows the limitation surfaces associated with the approach and take-off slopes directly from the runway surface. Figure 2 shows the horizontal limitation surfaces that are in place up to a distance of 15 km from a runway. Both the approach and take-off slopes and the horizontal surfaces need to be considered for registered, certified or military aerodrome. All height measurements shall be referenced to the aerodrome runway level.

The OLS requirements specified in this technical bulletin are conservative to cover all aerodrome classifications. Consultation with the aerodrome operator is necessary to confirm the official OLS for each individual aerodrome.

A list of all known Registered/Certified and Military aerodromes in Endeavour Energy's franchise area (at the time of release of this document) is in Annexure 1.

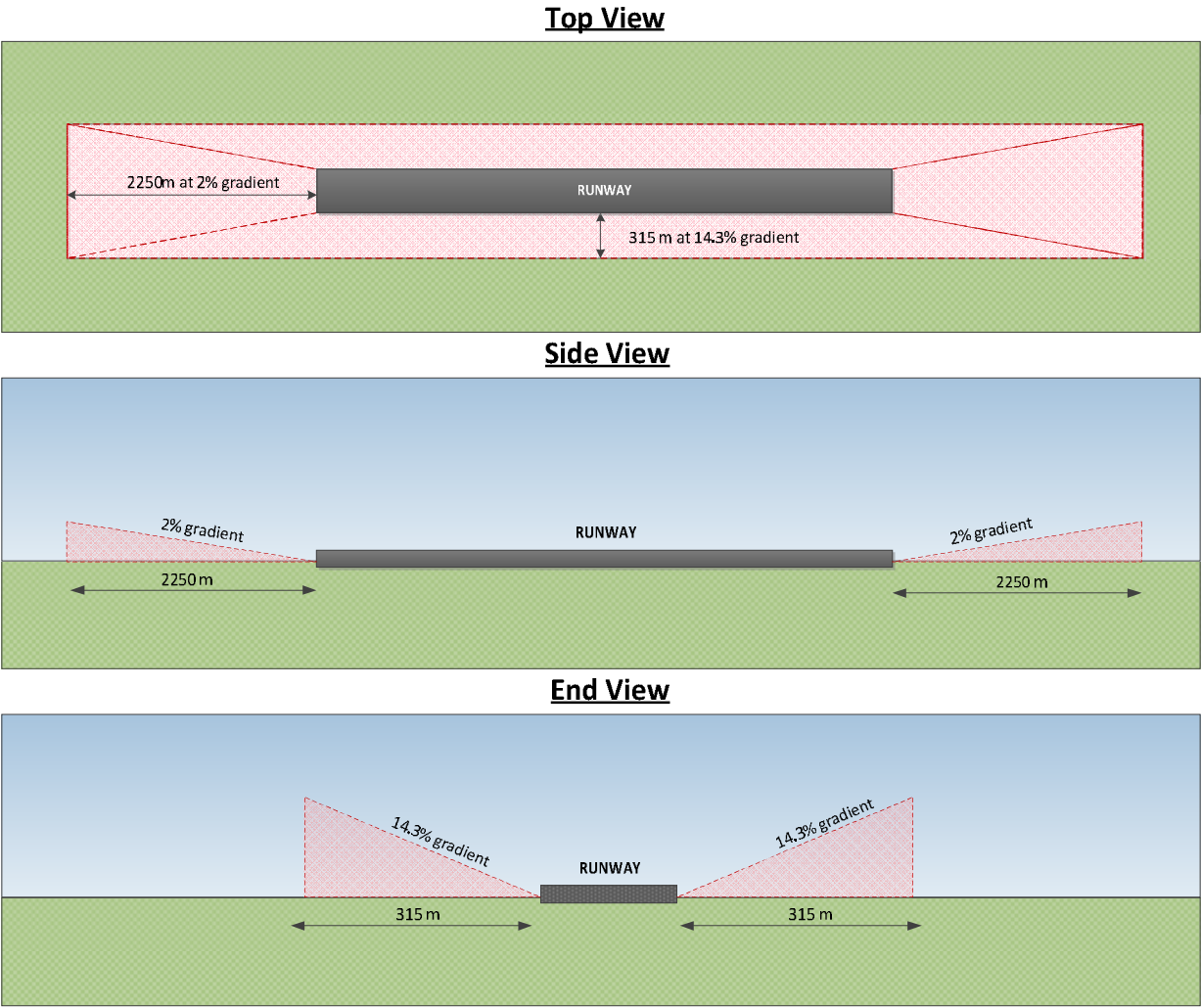


Figure 1 - Transitional, approach and take-off slopes for registered/certified aerodromes

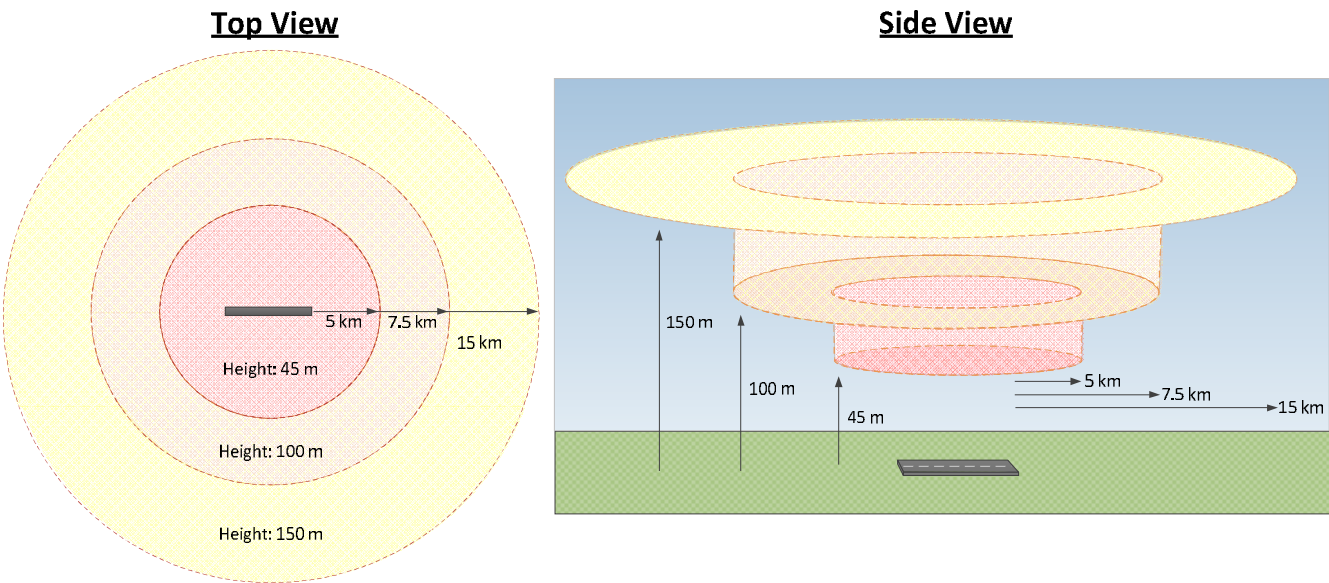


Figure 2- Horizontal Limitation Surfaces

### 1.3.2 Aerial conductors in proximity to Aeroplane Landing Areas (ALA)

Any power line that penetrates the transitional slope (20%) or the approach and take-off slope (3.3%) of an aeroplane landing area (as shown in figure 3) shall be marked in accordance with section 1.1.

A list of all known ALA in Endeavour Energy's franchise area is in Annexure 1.

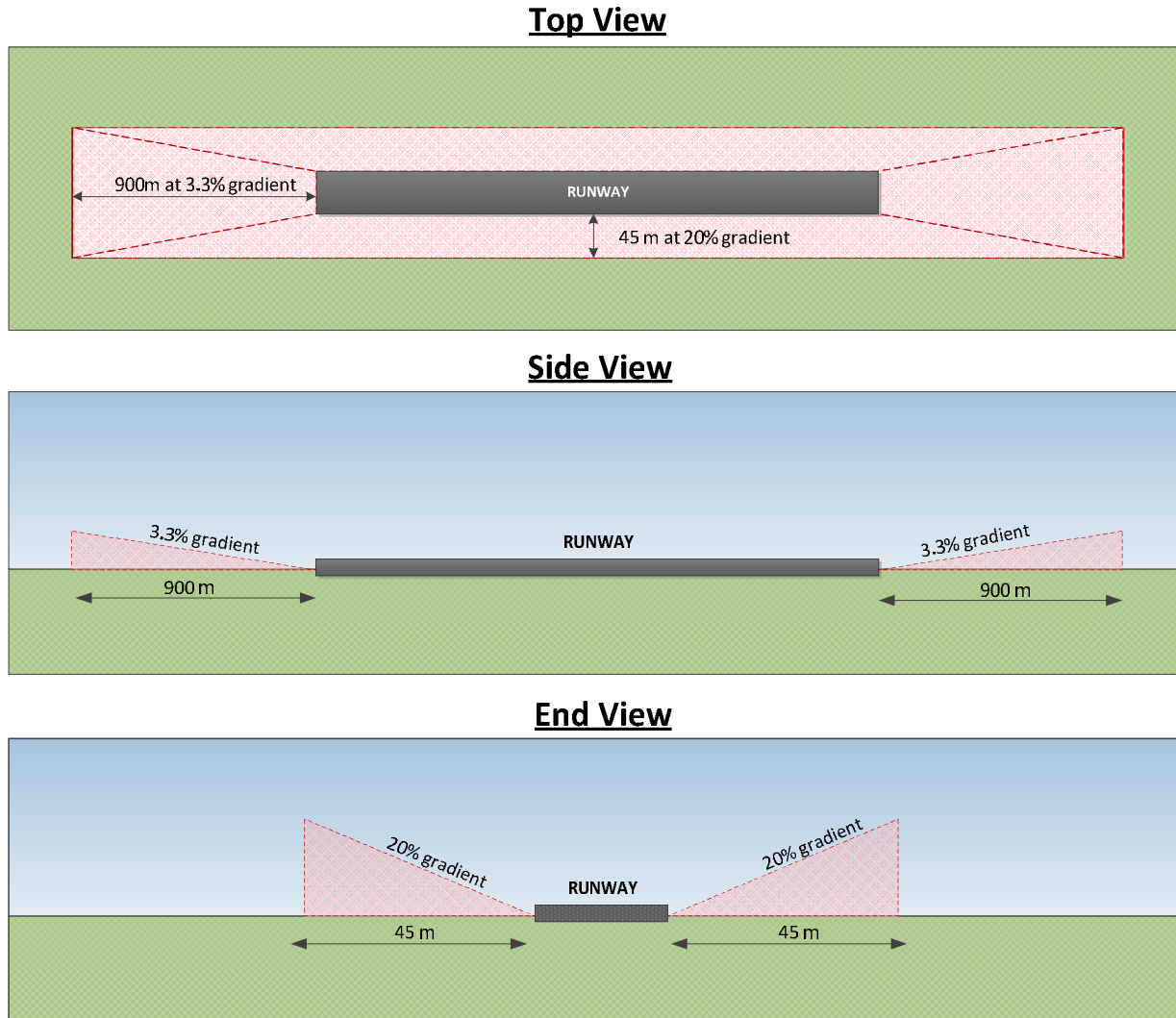


Figure 3 - Transitional, approach and take-off slopes for Aeroplane landing areas



### 1.3.3 Conductors in proximity to Helicopter Landing Sites (HLS)

Any new power line that penetrates a 4.5% slope above the helipad level and is within a 3.5 km radius of a helipad shall be notified to the helipad operator to determine if the helicopter flight path is obstructed and if line markers are required. The designated flight path for each individual helipad is different and consultation with the helipad operator is necessary for identification of the flight path direction within the 3.5 km radius. A list of all known HLS in Endeavour Energy's franchise area is in Annexure 1.

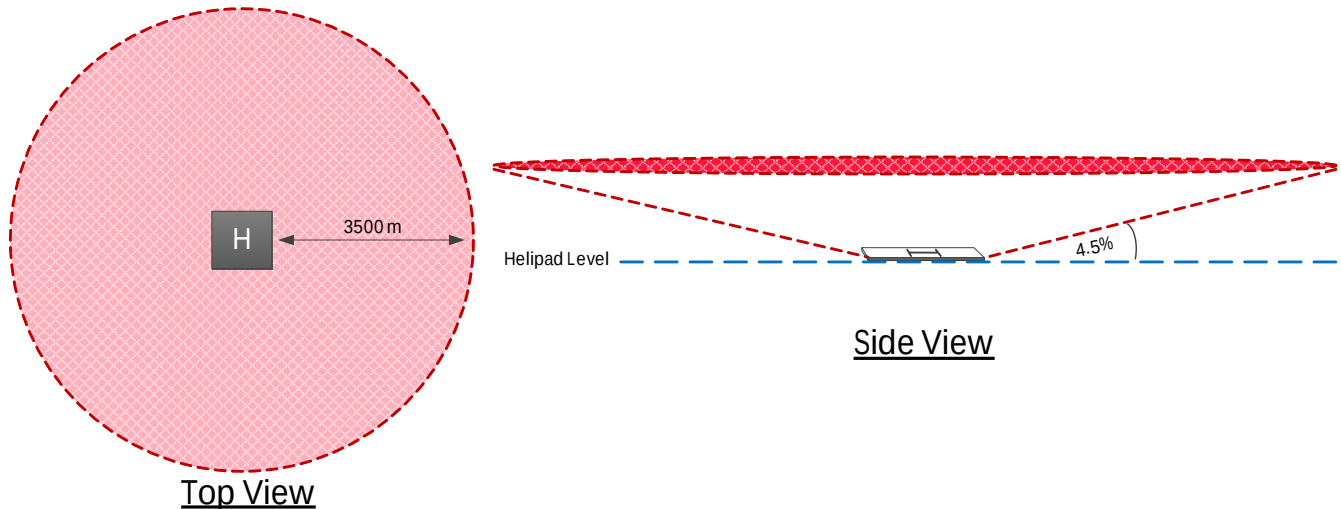


Figure 3 – Flight path slopes for helicopter landing sites

### 1.4 Waterway Crossings

As part of the risk assessment for all navigable waterway crossing spans, the Network Mains Manager will advise on the number of balls to be fitted and their location in the span.

The standard marker balls are 600 mm in diameter and yellow in colour.

### 1.5 Overhead crossing markers

Overhead crossing markers are used to indicate the proximity of a line crossing above a marked line for when low level aerial line inspections are being performed.

Marker discs shall be installed on all feeders where low level flying inspections are likely to take place such as, but not limited to, on Endeavour Energy Transmission feeders and any feeder with limited vehicle access to the entire feeder (typically in remote and bushfire prone areas).

As per Division Procedure GNV1010, Regional Managers are responsible for approving all low level flying operations. Prior to these operations taking place all impacted feeders shall be confirmed to have marker discs installed on all overhead crossings. Where low level flying has occurred in the past and is expected to be required again, discs shall be installed proactively prior to the need for low level flying. Discs should be installed as per these requirements on all new lines.

A GIS report is currently being developed to assist the identification of overhead crossings in the Endeavour Energy network that require marker discs and will be made available upon completion.

The crossing markers shall be installed on the bottom feeder passing under the other, facing away from the crossing on the second and third structures either side of the crossings location (as shown in figure 3).

Project drawings shall clearly show which structures shall have crossing markers fitted.  
The standard marker discs are 500mm in diameter and canary yellow in colour.  
Stockcode (1083144), drawing no. 279811.

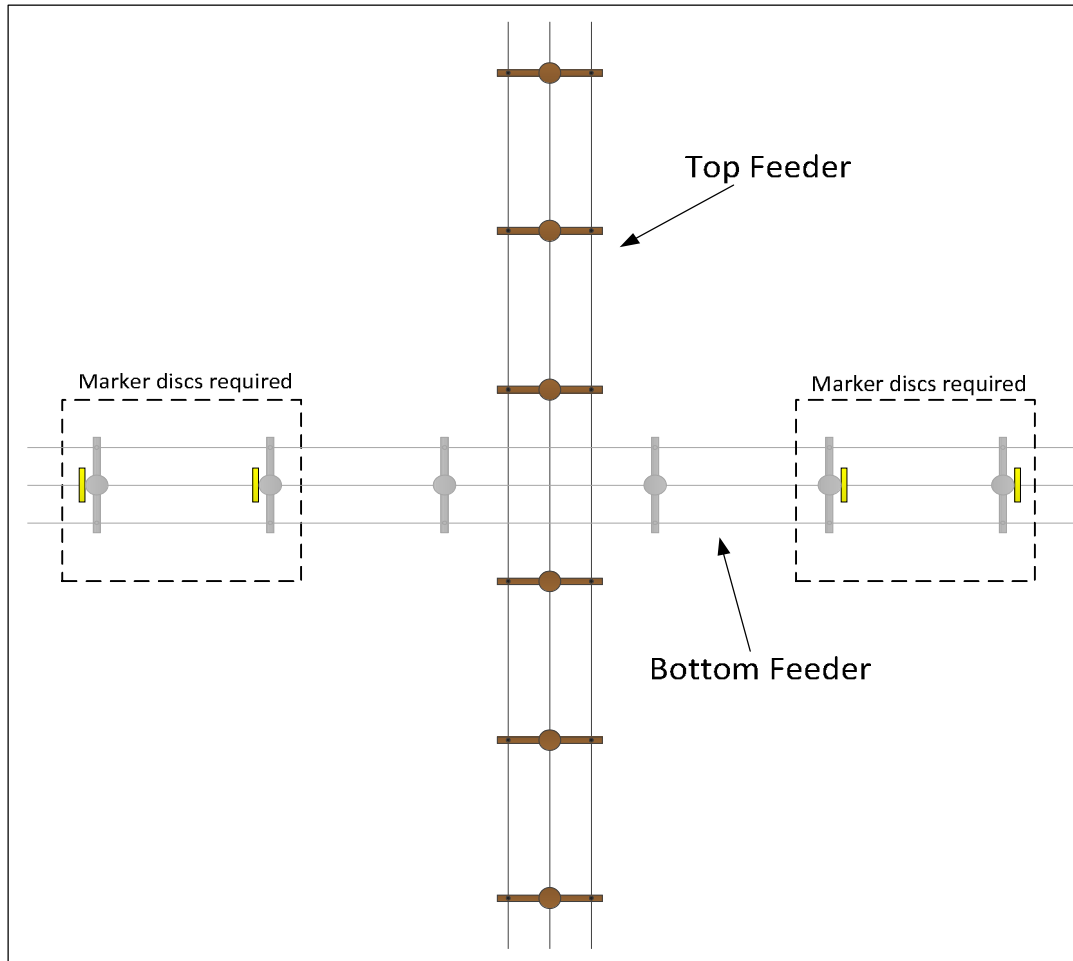


Figure 3 – Location of Overhead Crossing Markers

### 1.6 Remote Areas

The following areas are exempted from the requirements of the installation of marker balls:

- Any area not within 40 km of any aerodrome, ALA or HLS.
- Any area not within 20 km of any railway line currently in use, any major road classified as a national highway, or navigable waterway.
- Any area designated as Remote by the Civil Aviation Safety Authority. As of 2015 no part of the Endeavour Energy network was classified as remote. See Civil Aviation Order 20.11 (CAO 20.11) and the Aeronautical Information Package document ERSA: GEN-FIS-7 for more information.

### Impacted Standards

The contents of this technical bulletin will be included in the next update of the following standard(s):

- MDI 0031– Overhead distribution: Design Standards Manual
- MDI 0047– Overhead transmission mains design

**ANNEXURE 1 – List of Aerodromes, ALA and HLS in Endeavour Energy's franchise area**

| Classification       | Region  | Location                                 | ERSA Code |
|----------------------|---------|------------------------------------------|-----------|
| Certified            | South   | Wollongong                               | YWOL/AD   |
| Certified            | Central | Bankstown                                | YSBK/AD   |
| Registered           | Central | Camden                                   | YSCN/AD   |
| Military (Army)      | Central | Holsworthy                               | YSHW/AD   |
| Military (Air Force) | North   | Richmond                                 | YSRI/AD   |
| Military (Navy)      | South   | Jervis Bay                               | YJBY/AD   |
| Military (Navy)      | South   | Nowra                                    | YSNW/AD   |
| ALA                  | South   | Cambewarra (Jaspers Brush)               | YCAW/ALA  |
| ALA                  | Central | Mittagong                                | YMIG/ALA  |
| ALA                  | Central | Robertson                                | YRBN/ALA  |
| ALA                  | Central | The Oaks (Oakdale)                       | YOAS/ALA  |
| ALA                  | Central | Wedderburn                               | YWBN/ALA  |
| ALA                  | Central | Wilton (Sydney Skydivers)                | YWIO/ALA  |
| ALA                  | North   | Katoomba                                 | YKAT/ALA  |
| ALA                  | North   | Cherrydale                               | YCHY/ALA  |
| ALA                  | North   | Rylstone                                 | -         |
| HLS                  | South   | Helensburgh medical                      | YXHN/HLS  |
| HLS                  | South   | Kiama                                    | YKAM/HLS  |
| HLS                  | South   | Milton                                   | YILT/HLS  |
| HLS                  | South   | Shellharbour hospital                    | YXSH/HLS  |
| HLS                  | South   | The Shoalhaven hospital Nowra            | YXNW/HLS  |
| HLS                  | South   | Ulladulla medical                        | YXUA/HLS  |
| HLS                  | South   | Wollongong heliport                      | YWHP/HLS  |
| HLS                  | South   | Wollongong hospital                      | YXWL/HLS  |
| HLS                  | Central | Bowral medical                           | YXOW/HLS  |
| HLS                  | Central | Camden medical                           | YXCN/HLS  |
| HLS                  | Central | Campbelltown hospital                    | YXCP/HLS  |
| HLS                  | Central | Fairfield hospital                       | YFHO/HLS  |
| HLS                  | Central | Hilltop medical                          | YXHI/HLS  |
| HLS                  | Central | Ingleburn                                | YIGB/HLS  |
| HLS                  | Central | Liverpool medical                        | YXLL/HLS  |
| HLS                  | Central | Mittagong medical                        | YXMI/HLS  |
| HLS                  | Central | Wedderburn medical                       | YXWD/HLS  |
| HLS                  | Central | Wilton medical                           | YXWN/HLS  |
| HLS                  | North   | Glenbrook                                | YGNB/HLS  |
| HLS                  | North   | Glenbrook NPWS                           | YGNB/HLS  |
| HLS                  | North   | Hawkesbury hospital                      | YXHA/HLS  |
| HLS                  | North   | Jamison private hospital Penrith         | YXJA/HLS  |
| HLS                  | North   | Kandos medical                           | YXKD/HLS  |
| HLS                  | North   | Katoomba medical                         | YXKM/HLS  |
| HLS                  | North   | Mount Druitt hospital                    | YXMD/HLS  |
| HLS                  | North   | Nepean hospital                          | YXNE/HLS  |
| HLS                  | North   | Royal Alexandra hospital                 | YRAH/HLS  |
| HLS                  | North   | Lithgow medical                          | YXLG/HLS  |
| HLS                  | North   | Westmead hospital                        | YWST/HLS  |
| HLS                  | North   | Westmead Nets base (children's hospital) | YWNT/HLS  |
| HLS                  | North   | Windsor medical                          | YXWS/HLS  |
| HLS                  | North   | Eastern Creek Raceway                    | -         |

Information obtained from the Aeronautical Information Package (AIP) - En Route Supplement Australia (ERSA) – Aerodrome and ALA codes, available on [www.airservicesaustralia.com](http://www.airservicesaustralia.com)