

Appendix H
JCIS Heritage Assessment (2007)

HERITAGE ASSESSMENT OF LLANDILO TRANSMITTER STATION, FOR AIRSERVICES AUSTRALIA

REPORT BY JCIS CONSULTANTS

Prepared for JG Service on behalf of Airservices Australia

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1 INTRODUCTION

1.1 Background to this report

The study area was purchased by the Department of Civil Aviation and opened as Sydney's High Frequency Transmission Station in March, 1959. Much of the site was not used but formed a buffer to the aerials and Transmitting Station. Because of this, areas of Cumberland Plain vegetation remained largely intact and, subsequently, the study area was identified as having high natural heritage values.

Airservices ceased Transmitter Station operations at Llandilo in December, 2005. In June, 2006 a report by Godden Mackay Logan (GML) identified that the study area had potential Commonwealth Heritage values. The GML report recommended among other things that:

- The movable elements, records and plans (archives) at the study area be identified and assessed for potential Commonwealth and National Heritage values, and State and Local heritage significance;
- That a heritage assessment be undertaken in accordance with the Commonwealth Heritage Criteria; and
- That a comprehensive site history, including a technological history of the facilities and its institutions, should be undertaken.

1.2 Study Area

The study area for this report is the Llandilo Transmitter Station, a rectangular area of land approximately 2km by 4km, located off Stony Creek Road, Shanes Park (see Figure 1).

1.3 Heritage Listings

The study area was listed on the Register of National Estate on 22nd June, 1993 because of its Natural Heritage values being a significant remnant of Cumberland Plain Woodland.

The study area was also listed on the Commonwealth Heritage List on 22nd June, 2004, primarily for its Natural Heritage values as being a significant remnant of Cumberland Plain Woodland.

In both cases the possibility of the study area having other cultural heritage values was identified in the listing but these had not been identified at the time of listing.

1.4 Methodology

The methodology used in the preparation of this report is consistent with the Commonwealth Heritage Guidelines, the guidelines of the NSW Heritage Office, and the principles outlined in the Australia ICOMOS Charter for Places of Cultural Significance (the Burra Charter).

1.5 Limitations

This report is based on historical research and field inspections. It is possible that further historical research or the emergence of new historical sources may support different interpretations of the evidence in this report.

The register searches undertaken for this report are current only to the date a particular register was searched. In the normal course of events, items are added to or removed from heritage registers and users of this report should check that sites have not been added to or removed from a particular register since the date the register was searched.

There is a limited amount of comparative material available and thus conclusions regarding the comparative rarity or the representative nature of items on the site could be subject to change if further research is undertaken.

The Heritage Values Assessment made in this report is a combination of both facts and interpretation of those facts in accordance with a standard set of assessment criteria. It is possible that another professional may interpret the historical facts and physical evidence in a different way.

A summary of the statutory requirements regarding heritage is provided In Section 5. This is made on the basis of our experience of working with the Commonwealth and NSW heritage system and does not purport to be legal advice. It should be noted that legislation, regulations and guidelines change over time and users of this report should satisfy themselves that the statutory requirements have not changed since the report was written.

1.6 Author Identification

This Heritage Assessment was prepared by Dr Iain Stuart and Jane Cummins Stuart of JCIS Consultants.

1.7 Acknowledgements

The following people provided a great deal of help in undertaking this project and their help is gratefully acknowledged.

- Roger Meyer and the volunteers at The Airways Museum & Civil Aviation Historical Society.
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2 HISTORICAL BACKGROUND

2.1.1 The Advent of Civil Aviation in Australia

By the end of the Great War in 1918, aviation had been transformed from an emerging technology to a fully developed military weapon. With the end of the war, aircraft and aviators were available to explore the potential for civil aviation. It was apparent for purposes of public safety and for the development of the industry that Government would need to regulate the industry

The Australian Government introduced a Bill ratifying the International Convention for the Regulation of Air Navigation (known as ICAN) which had been signed in Paris on October 13, 1919. As a result, the Air Navigation Act 1920 was passed on December 2, 1920. The Act and associated Regulations came into force on March 28, 1921.

The Air Navigation Act established a controller of Civil Aviation. The Air Board and the Controller of Civil Aviation together formed the Air Services Branch of the Department of Defence. The Civil Aviation Section was responsible for the acquisition and preparation of Civil Aviation landing grounds and other matters relative to Civil Aviation. The Air Services Branch ceased to exist in 1939.

With the development of commercial air services (and radio) in the 1920's and 1930's came the need for supporting ground organisation, such as airports, air traffic control and communications facilities. These were provided by the Commonwealth through the Air Services Branch. Of relevance to this study was the need for communication between airports and aircraft. This need was reinforced by the tragic losses of the first Australian National Airways' Avro X, VH-UMF *Southern Cloud*, in 1931, Airlines of Australia's Stinson VH-UHH in 1937 and the second Australian National Airways' DC3, *Kyeema*, in 1938.

2.1.2 The Aeradio Network

Until the mid 1930s, there was no formal wireless organisation or control of air traffic in Australia. Few aircraft, apart from the 'all-metal' DC2, carried two-way radio equipment. In flight communication was by prearranged ground signals or signal flares. Initially, marine radio stations (used for communicating with coastal shipping) were also used for communication with aircraft but a dedicated air traffic services organisation was soon established. This was the Aeradio network.

The earliest need was for communications with aircraft flying across open expanses of water. As several aircraft had been lost flying across Bass Strait, it was decided to install temporary Aeradio stations at Essendon (Victoria) and Western Junction (Launceston, Tasmania). The other route for which an Aeradio service was needed resulted from the agreement between the British and Australian Governments to establish an Empire Air Mail Service between the two countries. The London to Singapore section was to be operated by Imperial Airways, and the Singapore to Sydney sectors by Qantas Empire Airways (QEA).

The urgent problem for the Air Services Branch (after 1936, the Civil Aviation Board) was to establish a chain of ground stations between Brisbane and Darwin to support the air mail service. Although the schedule on this segment called for twelve stops (overnight at

Cloncurry), very few of these locations had any form of radio facilities. Through co-operation between the Civil Aviation Board, Qantas and various private and official organisations along the route, a network of Aeradio stations was established.

In 1938 Amalgamated Wireless Australasia Ltd (AWA) was contracted by the Commonwealth Government to provide equipment for and install a number of permanent, dedicated Aeradio stations in Australia and New Guinea. The contract included the maintenance and manning of these stations for a period of 12 months, after which the Commonwealth staffed the stations. The complete equipment for each station was packaged by AWA and forwarded to the various destinations by sea, road and rail circa March 1939. As AWA could not spare any engineers to assist in the construction, it was decided that the installation would be carried out by the Civil Aviation Board (after 1938, the Department of Civil Aviation (DCA) which was separate from the Department of Defence).

A 'standard' Aeradio station consisted of a Bellini-Tosi Medium Frequency (MF) Direction Finding (DF) receiver (which allowed the location of a transmitting aircraft to be determined), three HF receivers (1C2869), a control box with receiver selection, indicator lamps, volume controls and the dial for transmitter function selection. Located at a distance, so as not to interfere or be interfered with, was a High Frequency (HF) type J2876 transmitter. Electrical power for the transmitter, receivers, DF and for domestic use was provided by duplicated Fowler Sanders generators located in the Power House adjacent to the main Aeradio building.

The Aeradio network was supplemented by a system of radio beacons (primarily the Lorenz UHF Blind Landing System) installed on the main domestic air routes in the late 1930's.

These commercial routes became important during the Second World War as supply routes and aircraft ferry routes from the populated core of Australia to the battlefronts in Darwin, Townsville and New Guinea. With the advent of the Pacific War, a new air route from the United States via Fiji was developed.

2.1.3 The need for High Frequency Radio

High frequency (HF) radio frequencies are between 3 and 30 MHz – also known as the decameter band or decameter wave as the wavelengths range from one to ten decametres. The radio waves are reflected off the ionosphere which allows HF radio a greater range than line of sight radio systems. Since the ionosphere often reflects HF radio waves quite well (a phenomenon known as skywave), this range is extensively used for medium and long range terrestrial radio communication. However, suitability of this portion of the spectrum for such communication varies greatly with a complex combination of factors determining how good transmission and reception of radio waves are on any particular day.

With the development of international air routes using long range aircraft, the DCA began to develop an HF radio network in order to communicate between international airports and aircraft and the airport in Sydney. The first DCA High Frequency (HF) transmitting station for Sydney was at Brighton-le-Sands, near the shore of Botany Bay; however, changes in the airport forced its relocation in 1948 to a shared facility with the RAAF at Londonderry. The DCA was asked to leave in 1950; the RAAF needed the space for more

of their transmitters and they offered the DCA a site at Bass Hill. This site had fibro buildings in which the transmitters were installed (Meyer, no date).

During the early 1950s a number of radio communication planning documents were produced by the DCA but the advent of commercial jet operations and the increase in Australian air routes resulted in these quickly becoming obsolete (DCA 1959:54-55). In 1959 the Australian Aeronautical Communications Plan was launched which updated earlier aspects of the plans.

A critical feature of these plans was the development of a network of ground communications stations, interconnected by radio or land line, with which aircraft could communicate throughout a flight. The International Transmitting Station at Llandilo was purpose-built for communication along international air routes and was optimised for short transit times for messages due to the increased speed of passenger aircraft (DCA 1959:59).

It is important to understand that the Llandilo site was only one part of a complex network. It was a transmitting station sending signals out. The International HF receiving station was at Penrith. They were linked to Kingsford Smith Airport by Ultra High Frequency links by way of a repeating station at Kings Tableland in the Blue Mountains. Thus international communications to and from an aircraft would utilise all these facilities, even though they were some distance apart.

2.1.4 Establishment at Llandilo

The International Transmitting Station at Llandilo had been moved to Llandilo from Bass Hill in 1959, although work on the project had been on-going for the previous five years (DCA:1959:58). Meyer relates a story that the original site at Llandilo purchased by the Commonwealth was in error and that it took two or three years for the current, preferred site to be purchased (Meyer n.d:1). This delay accounted for the long time that the International Transmitter remained in temporary accommodation at Bass Hill.

The main transmitting building was cross-shaped in form with a north and south transmitting hall. The entry to the transmission building and associated office was at the western end, with a series of rooms labelled as an equipment room, a workshop, a store and the air conditioning plant located at the eastern end. The foundations were concrete with numerous cable runs in the concrete slab. The building walls were constructed from bricks. The roof members were steel trusses with corrugated asbestos cement sheet roof. A ceiling was attached to the bottom truss members. The floor was originally covered by blue and grey linoleum tiles laid in a checker pattern (Parsons 1960).

The North Hall provided the International radio teletype circuits, with ten 20KW STC transmitters (type CB1) arranged on either side of the hall. Each transmitter consisted of three main units with doors between allowing access to the rear of the units (Department of Civil Aviation, n.d, Parsons 1960).

The South Hall contained a variety of equipment of lower power, used for ground air traffic, and lower-powered domestic radio teletype. The equipment comprised 10 STC CX4, 5 Phillips 1609 transmitters and Thom and Smith modulators (Department of Civil Aviation, n.d, Parsons 1960).

In between the two halls was the Control Room, which consisted of a central desk with a console on it and banks of monitors on either side of the entrance door. The control unit was used to monitor conditions of the equipment and transmitting signals so that adjustments could be made. (Department of Civil Aviation, n.d, Parsons 1960)

Behind the Control Room, to the east, were a series of rooms referred to as the equipment room. This room contained the teletype keying circuits, the voice frequency transmitter control gear, radio frequency exciters, battery supplies and other test equipment. The room could be screened from all electronic interference in order to isolate equipment being tested. Inside this room is an internal room, rather like a walk-in safe, which contained the VHF transmission equipment that needed to be screened from other radio interference (Department of Civil Aviation, n.d, Parsons 1960).

Along the main east-west axis was a separate brick building containing the auxiliary emergency generating plant, consisting of two 225 KVA English Electric diesel generating sets (Department of Civil Aviation, n.d, Parsons 1960). Next to this building was a garage.

Adjacent to the main building was the VHF tower.

The aerials used to transmit the signals were located outside these buildings.

There were ten Rhombic aerials. A rhombic aerial is a broadband directional aerial mostly commonly used in HF ranges and named after its "rhombic" diamond shape. Each side is typically at least one wavelength or longer in length and each corner is supported by a pole, typically at least one wavelength tall. It is fed at one of the sharp angles through a balun transformer, and is terminated at the opposite sharp angle with a non-inductive resistor. The aerial is directional towards the resistor end, so points towards the region of the world it is designed to serve (Wikipedia contributors, "Rhombic antenna,").

There were also dipole aerials, which were used for the aeromobile and domestic teletype circuits (Parsons 1960). A dipole aerial is an antenna with a centre-fed driven element for transmitting or receiving radio frequency energy. These antennas are the simplest practical antennas from a theoretical point of view (Wikipedia contributors, "Dipole antenna").

The aerials were located in cleared areas, kept clear by mowing, and were linked to the transmitter building by overground cables.

On early site plans and aerial photos several buildings were located about 100m due west of the main buildings. These are identified as "Line's Depot" and the archaeological remains of one building are evident on the latest aerial image of the site.

2.1.5 On going use of the International Transmission Station

The station was placed on the air on 10th March, 1959 at 6pm (Parsons 1960). Over the life of the station there were changes in equipment, buildings and aerials but these are poorly documented.

Two plans located at Llandilo identify the approximate dates of building extensions. Plan 6/15 shows that the maintenance workshops, vehicle shelters and associated areas located at the east of the site were constructed c.1966 while Plan 6/29 shows that the

extension to the south transmission hall dates from c.1965. No further information about these works has been located although, clearly, they were undertaken as the buildings exist on the site. The maintenance workshops were for Electrical and Mechanical staff who maintained equipment in the Sydney region. It is not known what function the extension to the South Hall served.

It is also clear, from variations in site plans (e.g. Department of Aviation, Department of Civil Aviation) showing the equipment in the buildings, that the equipment was changed over time. The layout of the equipment in the North Hall appears to have remained the same, although there seems to have been a change from CB1 transmitters to AM26 transmitters. The position of and transmitter type also seems to have changed in the South Hall. It is presumed that these changes reflect improvements in technology and changes in the nature of the signals transmitted.

With the changes in technology and transmitters, the aerial farm also changed with some aerials becoming disused and new aerials being erected.

A 1981 description of the International Transmitting Station describes the role of the station at that time as providing International Ground to Air (voice transmissions to aircraft flying to and from Australia); and domestic Ground to Air for aircraft flying in uncontrolled airspace. Eight frequencies were used for these two functions. Weather information was broadcast every half hour on three frequencies, twenty-four hours a day, seven days per week. Six frequencies were provided on Net 13 (the Air Traffic Control Coordination channels); a radio telephone and teletype link to Lord Howe Island; and a point to point liaison circuit were also provided. Six radio teletype circuits were provided to Darwin, Perth, Singapore, Djakarta, Alice Springs and Mount Isa. Over 40 transmitters were operating to provide these services (Anon, n.d).

It was noted that the staff of the International Transmitting Station had a high level of pride in their vocation and the role they played in air transportation. In addition to all the daily work, there was time to have an annual barbeque and fire works display in June – which contributed to a strong association with the place. According to a report in a staff magazine, over 500 people viewed the 1981 fireworks, the audience including departmental staff, ex employees and community members.

The development of undersea cables and satellite communications began to replace the use of HF radio and eventually the International Transmitting Station ceased transmitting in December, 2005.

2.1.6 Radio VNG Australia's Time Signal

Radio VNG transmitted Australia's standard time signal service which was used for such purposes as geophysics, navigation and surveying; applications that required a precise knowledge of the time. The original signal was broadcast from Lyndhurst, Victoria from 1964 to 1987. With the impending closure of this facility, the National Time Committee began to look at user needs and alternative locations for broadcasting the signal. The broadcast was moved to Llandilo from 12th January, 1993 to 31st December, 2002 (National Standards Commission 2002); however, the radio service was replaced by other methods such as the use of GPS.

The service employed STC double sideband, full carrier AM, HF broadcast transmitters. The 2.5 MHz service used a STC 4SU55A/S transmitter whilst the 5 MHz, 8.638 MHz, 12.984 MHz and 16 MHz services employed a STC 4SU48B transmitter. The signal was broadcast on five frequencies (National Standards Commission 2002).

2.2 Contextual Analysis: Historic Themes

Contextual analysis is undertaken to place the history of a particular site within relevant historical contexts in order to gauge how typical or unique the history of a particular site actually is. This is usually ascertained by gaining an understanding of the history of a site in relation to the broad historical themes characterising Australia at the time. Such themes have been established by the Australian Heritage Commission (2001) and the NSW Heritage Office and are outlined in synoptic form in New South Wales Historical Themes, issued by the NSW Heritage Office (2001A). It is a requirement of the Commonwealth that a heritage assessment take a comparative and thematic approach.

After considering the history of the study area presented in the GML report, it was apparent that the Llandilo site was primarily used as a high frequency transmitter as part of the management and control of Australia's airspace. The relevant historical themes were identified. These are presented in Table 2.1 below:

Table 2.1 Historical Themes relating to the study area.

Australian Theme	NSW Theme	Notes	Examples of evidence
3 Developing local, regional and national economies: 3.7.2 Establishing electronic means of communication.	Communication	Activities relating to the creation and conveyance of information	Post office, telephone exchange, printery, radio studio, newspaper office, telegraph equipment, network of telegraph poles, mail boat shipwreck, track, airstrip, lighthouse, stamp collection.
3 Developing local, regional and national economies: 3.8.9 Moving goods and people by air	Transport	Activities associated with the moving of people and goods from one place to another, and systems for the provision of such movements	Railway station, highway, lane, train, ferry, wharf, tickets, carriage, dray, stock route, canal, bridge, footpath, aerodrome, barge, harbour, lighthouse, shipwreck, canal, radar station, toll gate, horse yard, coach stop.

<p>3 Developing local, regional and national economies:</p>	<p>Science</p>	<p>Activities associated with systematic observations, experiments and processes for the explanation of observable phenomena</p>	<p>Laboratory, experimental equipment, text book, observatory, botanical garden, arboretum, research station, university research reserve, weather station, soil conservation area, fossil site, archaeological research site.</p>
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In 2003, the Australian Heritage Commission published *“Linking a Nation”*, a thematic history on the subject of Communications and Transportation in Australia (2003). The coverage of Civil Aviation is limited and predominantly focused on the early “heroic” period of Australian aviation and relatively little information is given on the development of airspace management and communications. This general picture has been supplemented by a series of short web pages, mostly authored by Roger Meyer, on the Airways Museum & Civil Aviation Historical Society’s website.

The International Transmitting Station at Llandilo was part of a communication network that linked air traffic control in Sydney with international airports and aircraft entering Australia’s airspace. As such, the network was important in allowing the development of post World War II commercial aviation – although in Australia this growth was heavily regulated by the Government. Once new forms of communication had demonstrated their safety and utility the transmitting station was wound down and eventually closed.

The transmission of the time signal, although a similar function, was for a different purpose – the accurate determination of time for scientific purposes. A history of time in Australia has been attempted by Graeme Davison (1993). Davison (1993:38-41) points to the on-going role of the government in providing an exact measurement of time via astronomical observations to establish the precise time and transmission of a time signal via telegraphs (and earlier via a signal gun or time ball). The use of electronic signals, transmitted by telegraph allowed the development of an Australian standard time in 1895 – an important act of federalism between the colonies (1993:74). The development of radio allowed a more precise determination of time which proved important in aerial navigation. Moreover, in the post-war period, scientists (in particular, earth scientists) used the radio-transmitted time signal for the calibration of equipment (National Standards Commission 2002).

By the mid-1980s, technology had been developed to replace the radio time signal provided by Radio VNG; however, the cost of that technology meant there was still a need for the signal and this need prompted the relocation to the Llandilo site. However, the rapid change in technology (such as GPS) resulted in its replacement in 2002.

The brief history of the time signal transmission at Llandilo fits into the Science theme; although it would be better seen as a function of Government (i.e. Government-funded scientific institutions) but these are not discussed in the thematic study.

3 PHYSICAL EVIDENCE

The Llandilo site was inspected on 24th October and on 7th December, 2007.

3.1 Main Buildings

3.1.1 North Hall

The North Hall contains a bank of ten transmitters labelled TX1 to TX10. Each transmitter consists of an STC Power supply, an STC Rectifier and a Hope AM-26 RF linear amplifier. The floor plan is shown in Figure 2. The form of the North Hall appears to be basically the same as it was when constructed in 1959.

Roger Meyer has advised that the Hope AM-26 was a rare item, as Hope was not a regular supplier to the Department of Civil Aviation and no other Hope-manufactured transmitters appear to have survived.

3.1.2 Control Room

The Control Room consists of the technician's console with equipment monitor on either side of the door to the front office. Behind the operator were switches and monitors for the power supply into the north and the south hall.

A brass plaque commemorating Warwick Flynn, whose ashes were scattered over the site, is located on the Control Room wall.

3.1.3 South Hall

The South Hall contains two offices constructed at the northern entry with a bank of transmitters at the southern end of the hall. These consist of TX 17 to TX 19 on the eastern side (which are Phillips Type AM 22 10kW HF Linear Amplifiers, as is TX 29 on the western side) and, on the western side of the hall, TX 29 – already mentioned – and then a bank of three transmitters TX 30 to 32, which are labelled Transmitting LF 1KW Multi Channel.

3.1.4 South Hall Extension

The South Hall extension is divided into three rooms; the northern room is a storage area containing a small compactus and metal storage cabinets, which contain spare equipment and manuals.

The next room seems to be some form of recreation/lecture room. Beyond this is the third room, which is also used for storage.

3.1.5 Equipment Room

The Equipment Room contains two main racks of radio equipment, including that used for transmitting the time signal. Behind the equipment are computer work stations, work areas and storage for spares and equipment manuals.

There is also a picture board, with fading colour pictures of staff at various functions.

3.1.6 Workshop/Store

This section contains a workshop area and storage for equipment.

3.1.7 Air-conditioning Unit

This area was not accessible during the inspection.

3.1.8 Power House

The Power House contains two English Electric diesels, coupled to an alternator and exciter. There are ducts for drawing air into the engines and for venting the exhausts. Four air-conditioning units are located along the southern wall of the building. Switching and controlling equipment is located in a bank of cabinets along the northern wall of the power house. There is also a battery emergency power set used to start the power plant in emergencies. A Flavelle and Cole travelling 2-tonne crane is mounted in the roof.

The space for a garage, adjacent to the Power House building, has been converted into amenities.

3.1.9 Maintenance Workshops

We were not able to fully access the Maintenance Workshops; however, they appear to be standard workshops for vehicles and electrical equipment.

3.1.10 VHF Aerial

The VHF aerial is located outside the main building, adjacent to the Workshops/Store and Air-conditioning rooms. The tower is square in section and of steel lattice construction. There are at least ten aerials mounted on it.

3.2 Aerial Farm

The Aerial Farm consisted of the ten rhombic aerials, as well as dipole aerials and other aerial types, which were linked by above ground cable runs. All but one aerial have been demolished and removed. The only vestiges of these aerials are cleared areas, with concrete footings for poles and guy bolts hidden in the grass.

The only aerial remaining in situ is one to the south, identified on plans as "Domestic Aerials".

There are remains of poles supporting the cable runs along the routes of the cables but no cables are "in situ".

3.3 Sub-surface Evidence

The only sub-surface evidence from the historical period (this study does not cover Aboriginal Heritage) are the remains of the Line Depot, which were not obvious on the ground but aerial images show the remains of one building in the area.

3.4 Movable Heritage

3.4.1 What is Movable Heritage?

The *Protection of Movable Cultural Heritage Act* defines movable cultural heritage as “objects that are of importance to Australia, or to a particular part of Australia, for ethnological, archaeological, historical, literary, artistic, scientific or technological reasons”. The NSW Heritage Office defines movable heritage as: “*Movable heritage* is a term used to define any natural or manufactured object of heritage significance. It does not include archaeological relics found underwater or underground”.

What is also not clear is how this definition separates movable heritage items from other heritage items. Although it is not explicitly stated, movable items must be either portable or designed to move or be moved as an inherent quality of the finished item.

3.4.2 Movable Heritage at Llandilo

In applying this definition to the items at Llandilo, there are various issues about what might be or might not be considered movable heritage. Clearly, almost anything on the site could be moved, given the resources, but in particular the GML report identified the radio transmitters as movable heritage.

Our view is that the transmitters in the North Hall are inherently part of the fabric of the North Hall, both in an historical and physical sense, and are, therefore, not movable heritage but part of the place.

The transmitters in the South Hall have clearly been rearranged and replaced and are more consistent with being movable heritage items although, again, they are part of the historical and physical fabric of the site.

Therefore this report takes a different view to the GML report in that it sees heritage at Llandilo as being bound up in the place rather than as being a set of movable heritage items.

3.5 Archival Material

Potential archival material was located in several places throughout the site and was examined in the course of the study. This material consisted of maps and plans located in plan presses in the South Hall and in the Power House, and various manuals located on shelves in the South Hall extension and the Equipment Room. Both the manuals and the plans relate to current (1980's +) usage and equipment.

Items older than the 1980s were not located; it is suspected that older items were either discarded or archived as they were of no use on the site once they were outdated.

It should be noted that the on-line catalogue of the National Archives of Australia indicates that little material from this site is available from this source. The Airways Museum and Civil Aviation Historical Society hold only a small amount of material from Llandilo.

3.6 Comparative analysis

The aim of a comparative analysis is to determine whether the physical evidence on a particular site is rare or representative. In order for such an analysis to be meaningful, comparative material needs to be available and the comparison made between items of similar type. This is particularly important as the International Transmitting Station was unique in the Civil Aviation system in Australia, yet, obviously, was the product of shared engineering design and equipment.

There is, however, only a limited amount of material available on radio transmitting stations as radio transmitting stations have not been studied as a group. As far as it can be determined from the historical material on radio, the radio transmitters of the Aeradio Network were substantially different from the International Transmitting Station in that they were much smaller and used different equipment, although they shared some features in layout (mainly in the separation of transmitters and the control room and the provision of auxiliary power supplies). The Aeradio stations were also established pre-World War II; whereas the International Transmitting Station was completed in 1959.

The HF Transmitter Station at Campbellfield, Melbourne, appears to be similar in architectural style to the International Transmitting Station but available details are sketchy. The brief paper by Roger Meyer on the transmitter gives the operating dates of c.1950-68. A search of the location of the transmitter on Google Maps indicates that the building is no longer there. Furthermore, this site was a domestic (and not an international) transmitting station, so some of the equipment would have been different due to differing functions.

A search of the Australian Heritage Places Inventory was made on 5th February, 2008 using the search terms “radio” and “transmission”. This search covered all items registered on heritage registers in Australia but, of course, does exclude any sites not registered. Two radio transmitting sites were identified by this method – the National Broadcasting Service Radio Transmission Centre, Bald Hills, Brisbane and the RAN Transmitting Station at Lawson in the ACT.

The National Broadcasting Service Radio Transmission Centre dates from 1942 and was a commercial radio station. It contains rare examples of water-cooled STCA880A transmitters. The site consists of a transmitter building, a garage, an engine room (for emergency generators), a former residence and a store room. Although not mentioned in the citation, there are three aerials evident on the Google Map aerial image of the site.

The RAN Transmitting Station at Lawson (also called Belconnen) is part of the RAN Wireless/Transmitting Station known as HMAS Harman. The establishment of the station was recommended in the 1920s to provide long range radio communications with Australian and Allied naval forces. The main receiving station was located near Queanbeyan, with the Transmitting Station situated at what was then called Belconnen (the separation between transmitters and receivers was to avoid interference between the two). The transmitting station was commissioned in December, 1939.

The facilities at this site can be divided into two parts – transmission equipment and accommodation for sailors (accommodation being provided due to the isolated nature of the site). However, the issue of accommodation is not relevant for the site at Llandilo as this facility was not provided. The transmitting equipment consisted of aerials, aerial farm,

transmitter building (which incorporates two transmission halls, workshops, stores training rooms and amenities. The Classification Report notes that the transmission equipment and aerials were upgraded and the site contains a mixture of modern and original equipment. In contrast to the International Transmission Station, the site transmitted on the low frequency band.

A comparison between these sites shows similarities in design – aerials, aerial farm, transmission halls, workshops and auxiliary generators. However, the equipment is different on each site, reflecting the variations in site function, different commencement dates and upgrading of equipment. Nevertheless, the site plans show a similarity in layout and size between the RAN Transmitting Station and the National Broadcasting Service Radio. The International Transmitting Station at Llandilo shows a different form – cross-like – with its long transmission halls and ancillary rooms and buildings at right angles to them (see Figure 3).

To conclude, the International Transmitting Station at Llandilo seems to share similar characteristics with existing transmission stations and, probably, the Melbourne HF station. These shared characteristics probably relate to the practicalities of the radio transmission function at the time the sites operated.

It should be stressed that this analysis is limited by lack of available information on similar sites. This is an important caveat on the conclusions to be drawn from the analysis – in particular, conclusions based on the rarity or representative nature of the site and its contents.

4 ASSESSMENT OF HERITAGE VALUES

4.1 Principles

The concept of 'cultural significance' or 'heritage value' embraces the value of a place or item which cannot be expressed solely in financial terms. The assessment of heritage values endeavours to establish why a place or item is considered important and why it is valued by the community. Heritage values are embodied in the fabric of the place (including its setting and relationship to other items), the records associated with the place and the response that the place evokes in the community. The Commonwealth and National Heritage Criteria established under the Environment Protection and Biodiversity (EPBC) Act are the organisational and threshold tools used to identify, assess and evaluate those values and connections for items in Commonwealth ownership or control.

4.2 The Commonwealth Heritage Criteria

Under Section 341D of the EPBC Act, a place has Commonwealth heritage value only if the place meets one or more of the Commonwealth Heritage Criteria specified in EPBC Regulation 10.03A. The EPBC Act Regulation 10.03 defines nine Commonwealth Heritage Criteria for evaluating, identifying and assessing the Commonwealth heritage values of a place. A place that embodies one or more criteria is considered to have Commonwealth Heritage Values.

The Commonwealth Heritage Criteria are:

Criterion A—Historic: The place's importance in the course, or pattern, of Australia's natural or cultural history.

Criterion B—Rarity: The place's possession of uncommon, rare or endangered aspects of Australia's natural or cultural history.

Criterion C—Scientific: The place's potential to yield information that will contribute to an understanding of Australia's natural or cultural history.

Criterion D—Representative: The place's importance in demonstrating the principal characteristics of:

- a class of Australia's natural or cultural places; or
- a class of Australia's natural or cultural environments.

Criterion E—Aesthetic: The place's importance in exhibiting particular aesthetic characteristics valued by a community or cultural group.

Criterion F—Creative/Technical: The place's importance in demonstrating a high degree of creative or technical achievement at a particular period.

Criterion G—Social: The place's strong or special associations with a particular community or cultural group for social, cultural or spiritual reasons.

Criterion H—Associative: The place's special association with the life or works of a person, or group of persons, of importance in Australia's natural or cultural history.

Criterion I—Indigenous: The place's importance as part of Indigenous tradition.

The threshold for inclusion on the Commonwealth Heritage List is that a place has one or more of the heritage values listed above.

The criteria for National heritage value are the same as for Commonwealth heritage value. Places must have outstanding heritage values for Australia in order to be included in the National Heritage List.

There are currently no guidelines for applying the criteria for the Commonwealth Heritage List. In the interim, Airservices required that the guidelines of the former Australian Heritage Commission, published for the Register of the National Estate, be used as a good point of reference but these guidelines (published in 1990) are now not readily available and a reference copy was only located comparatively late in the study. The guidelines "*Assessing Heritage Significance*", published by the NSW Heritage Office (2001B), were also used to help clarify thresholds for meeting the criterion. It should be noted that both the NSW and the Commonwealth Governments use similar heritage significance criterion.

A preliminary assessment of Commonwealth heritage values was undertaken in the GML report (GML 2006:19-21).

4.3 Heritage Values of the Llandilo Transmitter Station

4.3.1 Criterion A – Historic

The development of air transportation was important in the history of Australia as it introduced a new form of transport which was more rapid and, to a large extent, overcame some of the challenges of the Australian environment that had made other transport modes difficult, risky or time consuming. With the introduction of airliners came the need for suitable infrastructure to develop an airline industry – and part of this technology was the communication between planes and airports to form a system of air traffic control.

The role of the International Transmitting Station was important in the operation of the international air routes to Australia as part of the air traffic control system for international flights to and from this country from 1959 to 2005. The International Transmitting Station was purpose built and transmitted communications in various formats to incoming aircraft and related airports. This was the principal transmission station for this function of air traffic control in Australia and thus is important in the course and pattern of the history of the air transportation in Australia.

The whole site meets this criterion at a level suitable to meet the criterion for Commonwealth heritage values but not at the level to meet National Heritage values as the historical values of the site are not outstanding.

The International Transmitting Station was important for the transmission of Australia's standard time signal from 12th January, 1993 to 31st December, 2002. This was important for scientific research via the provision of an accurate time signal. While the site is important for this purpose, the site exercised this function only for a short time and there is only a limited amount of physical evidence relating to the transmission of this signal at the International Transmitting Station.

Accordingly, the whole site meets this criterion in respect of the historical importance of the standard time signal at a level less than the threshold for Commonwealth Heritage values (and National Heritage values). However, this additional task of the International Transmitting Station adds to the historic heritage values established above.

4.3.2 Criterion B – Rarity

The design and layout of the buildings and aerials at Llandilo are similar to several other transmission stations constructed at this time and, therefore, cannot be considered as being rare. Conversely, the radio transmission equipment manufactured by Hope is rare primarily because of its manufacture.

The site itself does not meet this criterion; although the radio transmitting equipment manufactured by Hope does meet this criterion as being the only equipment supplied by Hope to the Commonwealth.

4.3.3 Criterion C – Scientific

The site as a whole does not meet this criterion as it lacks the potential to yield information that will contribute to an understanding of Australia's cultural history at a significant (non-trivial) level.

Some of the individual transmitters and associated documentation (archives) would meet this criterion because they would reveal information about how the transmitters were constructed and maintained over time. This information would add to the understanding of the technology used at the International Transmitting Station.

4.3.4 Criterion D – Representative

The International Transmitting Station is representative of large HF radio transmitters constructed in Australia as it demonstrates the principal characteristics of these stations. In particular, it is possible to identify all the features of the site, the aerial farm, cables to and from the aerials, the transmission halls, the control room, equipment room, auxiliary power plant and VHF aerial (despite the aerials being largely removed their location can be readily interpreted). The scale and nature of these features demonstrate how the International Transmitting Station was constructed and worked over its years of operation.

The whole site meets this criterion at a level suitable to meet the criterion for Commonwealth heritage values but not at the level to meet National Heritage values as the historical values of the site are not outstanding.

4.3.5 Criterion E – Aesthetic

There is no evidence that the site meets this criterion.

4.3.6 Criterion F – Creative/Technical

There is no evidence that the International Transmitting Station was particularly innovative or used new technology. This is not surprising as the station had to be reliable and avoid breakdowns and, thus, would use proven technology.

The significance of the site under this criterion might lie in the technical achievement in establishing and maintaining the station with a high level of serviceability and reliability consummate with its role in the air traffic control system. However, it is not considered that that this is a technical achievement of sufficient importance to meet this criterion.

4.3.7 Criterion G – Social

The site does have special associations for former DCA staff who worked and socialised there. The Commonwealth Heritage Criteria does not specify whether this association has to be within a broader community or at a particular level of importance. The Guidelines for the Register of National Estate note: “the value of a place to a very small section of the community ...may not be sufficient to demonstrate national estate significance, unless a much wider part of the community accepts that such associations have wider cultural significance” (1990:23). Given the small number of workers and their families and the lack of a demonstrated interest in the site by other community groups, it is suggested that the study area does not meet this criterion at a sufficiently high level – although the special association of the site with former DCA staff needs to be acknowledged as contributing to the overall significance of the site.

4.3.8 Criterion H – Associative

The site does not meet this criterion as there does not appear to be the special association with a person or group of persons of importance in Australia’s cultural history.

4.3.9 Criterion I – Indigenous

This criterion was not assessed in this study.

4.4 Summary Statement of Heritage Values

The International Transmitting Station at Llandilo has heritage values relating to its historical importance for its role in the operation of the international air routes to Australia from 1959 to 2005 as part of the air traffic control system. The design and layout of the buildings and aerials at Llandilo are similar to several other transmission stations constructed at this time and, therefore, cannot be considered as being rare – rather they are typical of similar designs. However, the equipment is rare, primarily because of its function and manufacture. The site has special associations for former DCA staff who worked and socialised there and demonstrated a distinctive pride in their work.

The International Transmitting Station has also heritage values relating to the transmission of Australia’s standard time signal from 12th January, 1993 to 31st December, 2002.

Therefore, it is concluded that, in addition to the natural heritage values identified for the site, the International Transmitting Station at Llandilo has Commonwealth cultural heritage values. The heritage values of the site have not been identified as being of outstanding significance to Australia and, therefore, none of the criterion for National Heritage listing has been met.

4.5 Grading of Significance

Different components of a place may make a different relative contribution to its heritage value. Loss of integrity or condition may diminish significance. In some cases, it may be useful to specify the relative contribution of an item or its components. The ranking below introduces a grading that assists in quantifying the degree to which buildings, structures,

items of machinery and equipment, etc., contribute to the heritage value of the site overall. The five rankings are defined in Table 4.1 below:

Table 4.1 Significance Ranking

Ranking	Significance
5	Very high
4	High
3	Medium
2	Low
1	Neutral
0	Intrusive

The assessment of elements within the International Transmitting Station at Llandilo is as set out below.

Element	Grading	Elements embodying heritage values
Main Buildings - North Hall	Very High	<ul style="list-style-type: none"> The North Hall embodies the specific Commonwealth heritage values under Criterion D in its form, construction, layout and equipment. The equipment in particular the Hope transmitters meets Criterion B – rarity. The North Hall also contributes to the overall Commonwealth heritage values of the site.
Main Buildings - Control Room	High	<ul style="list-style-type: none"> The Control Room embodies the specific Commonwealth heritage values under Criterion D in its form, construction, layout and equipment (in particular the control desk). The Control Room also contributes to the overall Commonwealth heritage values of the site.
Main Buildings - South Hall	High	<ul style="list-style-type: none"> The South Hall embodies the specific Commonwealth heritage values under Criterion D in its form, construction, layout and equipment (although the equipment is representative

		<p>rather than rare).</p> <ul style="list-style-type: none"> • The South Hall also contributes to the overall Commonwealth heritage values of the site.
Main Buildings - South Hall Extension	Low	<ul style="list-style-type: none"> • This area is considered unlikely to embody any specific Commonwealth heritage values and is contributory only to the overall Commonwealth heritage values of the site.
Main Buildings - Equipment Room	High	<ul style="list-style-type: none"> • The Equipment Room embodies the specific Commonwealth heritage values under Criterion D in its form, construction, layout and equipment (although the equipment is representative rather than rare). • The facilities for transmitting Australia's standard time signal are located in this room. • The Equipment Room also contributes to the overall Commonwealth heritage values of the site.
Main Buildings - Workshop/Store	Low	<ul style="list-style-type: none"> • This area is considered unlikely to embody any specific Commonwealth heritage values and is contributory only to the overall Commonwealth heritage values of the site.
Main Buildings - Air condition Unit	Low	<ul style="list-style-type: none"> • This area is considered unlikely to embody any specific Commonwealth heritage values and is contributory only to the overall Commonwealth heritage values of the site.

Main Buildings - Power House	Medium	<ul style="list-style-type: none"> • The Power House embodies Commonwealth heritage values relating to Criterion D • The Power house also contributes to the overall Commonwealth heritage values of the site.
Main Buildings - Maintenance workshops	Low	<ul style="list-style-type: none"> • This area is considered unlikely to embody any specific Commonwealth heritage values and is contributory only to the overall Commonwealth heritage values of the site.
Main Buildings - VHF Aerial	High	<ul style="list-style-type: none"> • The VHF Aerial embodies Commonwealth heritage values relating to Criterion D as the aerials location and role demonstrate how the study area was part of a larger network as well as contributing to the overall Commonwealth heritage values of the site.
Aerial farm	High	<ul style="list-style-type: none"> • The Aerial Farm embodies Commonwealth heritage values relating to Criterion D as the aerials location and form are representative of large HF radio transmitters as well as contributing to the overall Commonwealth heritage values of the site.
Non-Indigenous sub-surface evidence	Low	<ul style="list-style-type: none"> • Non-Indigenous sub-surface evidence is considered unlikely to embody Commonwealth heritage values.

Archival Material	High	<ul style="list-style-type: none">• The small amount of archival material on site would have embody the overall Commonwealth heritage values as well as specifically having values relating to Commonwealth Heritage Criterion C as the archive material would have the potential to reveal how the transmitters were constructed and maintained over time.• The board of staff photos is an important documentation of recreational activities on the site and of past staff and would have significance as well to past DCA staff.
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5 MANAGEMENT

This section discusses the management of heritage within the study area.

5.1 Statutory Controls Relating to Heritage

The nature and level of relevant statutory controls to protect cultural heritage within the study area are set out below.

5.1.1 Commonwealth Legislation

5.1.1.1 Archives Act

The *Archives Act* prohibits the destruction of Commonwealth records and requires Commonwealth records to be made available for public access once they are 30 years old and after they have been cleared for public release by the National Archives. This Act would apply to the archival records on site at Llandilo.

5.1.1.2 Environment Protection and Biodiversity Conservation Act 1999 (as amended 2007)

In 2004, a new heritage management system was introduced to protect Australia's heritage places. Key elements are amendments to the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), which include explicit requirements for cultural heritage protection, the creation of a National Heritage List and a Commonwealth Heritage List and the establishment of the Australian Heritage Council under the *Australian Heritage Council Act 2003*. The Register of the National Estate has been retained.

The study area was listed on the Commonwealth Heritage List on 22nd June, 2004 primarily for its Natural Heritage values, being a significant remnant of Cumberland Plain Woodland, and, therefore, is a Commonwealth Heritage Place.

The study area was listed on the Register of National Estate on 22nd June, 1993 because of its Natural Heritage values, being a significant remnant of Cumberland Plain Woodland. The significance of this listing is limited as the Commonwealth listing has greater statutory importance.

Approval for impacts on the environment

Section 26 of the EPBC Act requires that an approval must be granted by the Minister for any action that will have, or is likely to have, a significant impact on Commonwealth land. Section 28 requires that Commonwealth agencies apply to the Minister for approval before undertaking an action that will have, or is likely to have, a significant impact on the Australian environment.

The term 'environment' in the EPBC Act encompasses Commonwealth land having identified cultural and natural heritage value (but not necessarily listed on the Commonwealth Heritage List). Any action that has, which will have, or is likely to have, a significant impact on the heritage values of a Commonwealth place may be deemed a

'controlled action' (Section 67) and requires written approval for this action under the provisions of Part 9. A person who is proposing to take an action must refer the proposal to the Minister if they think it is a controlled action and may refer the proposal to the Minister if they do not think it is a controlled action (Section 68).

Under Sections 72 of the Act, a referral to the Minister must contain a full description of the proposed action, the likely impact on the environment and a description of the affected area (Schedule 2, EPBC Regulations 2000). The referring party has the opportunity to provide the Minister with information that the referring party believes demonstrates whether or not the action requires approval. In making a decision, the Minister must consider public comment and must also consider any adverse impacts the action may have (Sections 74–75).

The Minister must provide the reasons for his or her decision as to whether approval is needed or not (Section 77). If the Minister declares that an action does not require approval, then the person or agency proposing the action may proceed with the action (subject to any other Commonwealth, or State or local government requirements). If the Minister declares that the proposed action is a controlled action and therefore requires approval, the action cannot proceed unless it passes through the appropriate approvals process. This process may involve the preparation of a public environment report or environmental impact statement or a public enquiry (Chapter 4, Part 8).

Under these provisions of the EPBC Act, if Airservices proposes an action that is a controlled action having a significant impact on the cultural heritage values in the study area, then a referral to the Minister must be made.

Commonwealth Heritage List

Under Part 15, Division 3A the Commonwealth Heritage List is created. This is a list of places with Commonwealth Heritage Values (see 4.2 above) and a place entered onto the list is termed a Commonwealth Heritage Place. Under Part 15, Division 3A Subsection C and D there are various provisions relating to the management of Commonwealth Heritage Places.

The study area is a Commonwealth Heritage Place as a result of meeting several of the Commonwealth Heritage Values for natural places. The requirements under Subsection C, which primarily are to do with the managing of Commonwealth Heritage Values on Commonwealth Heritage Places, would not apply in relation to the cultural heritage values identified in the study area as, under Section 341S of the EPBC Act, that section explicitly refers to managing Commonwealth Heritage Values and these are the Commonwealth Heritage values of the place listed on the Commonwealth Heritage List. Therefore, there would be no requirement to manage additional heritage values unless they are added to the values recognised in the Commonwealth Heritage List (which is able to be undertaken under Section 341N).

In addition, Section 341ZC of the Act requires that a Commonwealth agency must not take an action that has, will have or is likely to have, an adverse impact on the National Heritage values of a National Heritage place or the Commonwealth Heritage values of a Commonwealth Heritage place, unless:

- (a) there is no feasible and prudent alternative to taking the action; and

- (b) all measures that can reasonably be taken to mitigate the impact of the action on those values are taken.

Again, this would only apply to the established Commonwealth Heritage Values of the study area, not any additional values.

Section 341ZE also has detailed provisions regarding the protection of Commonwealth Heritage Values of Commonwealth Heritage Places proposed to be sold or leased. These would only apply to the established Commonwealth Heritage Values of the study area, not to any additional values identified in this report.

To summarise, currently the Llandilo study area is a Commonwealth Heritage Place as a result of it meeting several of the Commonwealth Heritage Values for natural places but not for its potential Commonwealth Heritage Values relating to cultural heritage. Accordingly, Airservices has only statutory obligations towards places with heritage values in so far as they are part of the environment. This is due to the term 'environment' as defined under the EPBC Act, including 'the heritage values of a place'. Therefore, any action could potentially come under Section 26 and 28 of the EPBC Act.

5.1.2 New South Wales Legislation

5.1.2.1 Heritage Act (NSW) 1977

The Heritage Act 1977 (NSW) provides a number of mechanisms by which items and places of heritage significance may be protected. The Heritage Act is designed to protect both known heritage items (such as standing structures) and items that may not be immediately obvious (such as potential archaeological remains or 'relics'). Different parts of the Heritage Act deal with these different situations.

State Heritage Register

The site is not listed on the State Heritage Register (SHR) and is not subject to an Interim Heritage Order (IHO) under the Heritage Act 1977 (NSW). Consequently, consultation with the Heritage Council of NSW is not required under Section 83 of the Heritage Act during the preparation of any draft planning instrument that may affect the site.

Archaeological Relics

Section 139 of the Heritage Act protects archaeological 'relics' from being 'exposed, moved, damaged or destroyed' by the disturbance or excavation of land. This protection extends to the situation where a person has 'reasonable cause to suspect' that archaeological remains may be affected by the disturbance or excavation of the land. It applies to all land in New South Wales that is not included on the SHR.

A 'relic' is defined by the Heritage Act as:

- “Any deposit, object or material evidence:
 - (a) which relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, and
 - (b) which is 50 or more years old.”

Section 139 of the Heritage Act requires any person who knows or has reasonable cause to suspect that their proposed works will expose or disturb a 'relic' to first obtain an Excavation Permit from the Heritage Council of NSW (pursuant to Section 140 of the Act), unless there is an applicable exception (pursuant to Section 139(4)).

Exceptions to the standard Section 140 process exist. Most exceptions to the requirement to obtain an excavation permit under Section 140 of the Act, however, must be approved by the Director of the NSW Heritage Office.

Currently, the International Transmitting Station at Llandilo is not listed under NSW Heritage Legislation. Due to the Australian Constitution, the NSW government may have no power to enforce the Commonwealth to comply with any provisions of the NSW Heritage Act. However, if the study area moved from Commonwealth ownership, the heritage values of the site are such that it could be nominated for the State Heritage Register.

5.1.3 Environmental Planning and Assessment Act 1979

Planning and development in NSW is carried out under the *Environmental Planning and Assessment Act 1979* and *Environmental Planning and Assessment Regulation 2000*. This legislation allows the making of Regional and Local Environmental plans with provisions that protect heritage items, heritage conservation areas and archaeological sites. It is understood that items of Commonwealth ownership might be listed on Local Environmental Plans; however, due to the Australian Constitution local government may have no power to enforce the Commonwealth to comply with any provisions of a Local Environmental Plan.

The study area is within the Blacktown City Council Local Government Area. Heritage items can be protected by listing under the *Blacktown Local Environmental Plan 1988*. The study area is not listed as a heritage item within *Blacktown Local Environmental Plan 1988*.

Should the International Transmitting Station at Llandilo move from Commonwealth ownership, the heritage values of the site are such that it could be nominated for the inclusion on as a heritage item on *Blacktown Local Environmental Plan*.

5.2 Statutory Management Actions

Under the *Environment Protection and Biodiversity Conservation Act 1999* (as amended 2003), Airservices Australia is required to prepare a Heritage Strategy for its assets with heritage values. The Airservices Australia Strategy was released in December, 2005.

The objectives of the Airservices Heritage Strategy primarily relate to:

- integrating heritage management into Airservices Australia's Corporate planning framework;
- ensuring Airservices Australia staff responsible for heritage matters are aware of their obligations through education and training on best practice heritage management;

- identifying and assessing Commonwealth heritage values of places owned or controlled by Airservices Australia;
- preparing Management Plans for Commonwealth Heritage listed places owned or controlled by Airservices Australia;
- ensuring effective inter-governmental and community consultation and conflict resolution processes exist in relation to heritage matters; and
- developing and maintaining a register of heritage places under Airservices Australia's ownership and control.

Management of the International Transmitting Station at Llandilo would need to conform to the objectives of the Airservices Australia Heritage Strategy.

5.2.1 Entering and amending register entries

Under section 4.1 of the Airservices Australia Heritage Strategy and in accordance with Section 314ZB(1)(b) of Environment Protection and Biodiversity Conservation Act 1999, places with Commonwealth Heritage values will be entered into the Airservices Australia Heritage Register.

It is assumed that the International Transmitting Station at Llandilo will already be entered on this list because of its established Natural heritage values. The results of this study – that the site also has cultural heritage values – should be incorporated into the listing for this site.

In a similar way, the Australian Heritage Council (which administers the Commonwealth heritage list) should be advised of the results of this study with a request that the listing of the site on the Commonwealth Heritage List be amended, as provided in Section 341N of the EPBC Act, to include the site's Commonwealth cultural heritage values.

5.2.2 Conservation Management Plan

Under Section 341S of the Environment Protection and Biodiversity Conservation Act 1999, a Commonwealth agency must make a written plan to protect and manage the Commonwealth heritage values of a Commonwealth Heritage Place it owns or controls. Therefore, Airservices Australia should act to prepare a Conservation Management Plan for the International Transmitting Station at Llandilo if and when the place is listed on the Commonwealth Heritage list. As well as being consistent with the Airservices Australia Heritage Strategy, the Conservation Management Plan must conform to the following regulation.

Schedule 7A Management plans for Commonwealth Heritage places (regulation 10.03B)

A management plan must:

- (a) establish objectives for the identification, protection, conservation, presentation and transmission of the Commonwealth Heritage values of the place; and*
- (b) provide a management framework that includes reference to any statutory requirements and agency mechanisms for the protection of the Commonwealth Heritage values of the place; and*
- (c) provide a comprehensive description of the place, including information about its location, physical features, condition, historical context and current uses; and*

- (d) provide a description of the Commonwealth Heritage values and any other heritage values of the place; and*
- (e) describe the condition of the Commonwealth Heritage values of the place; and*
- (f) describe the method used to assess the Commonwealth Heritage values of the place; and*
- (g) describe the current management requirements and goals, including proposals for change and any potential pressures on the Commonwealth Heritage values of the place; and*
- (h) have policies to manage the Commonwealth Heritage values of a place, and include in those policies, guidance in relation to the following:*
 - (i) the management and conservation processes to be used;*
 - (ii) the access and security arrangements, including access to the area for indigenous people to maintain cultural traditions;*
 - (iii) the stakeholder and community consultation and liaison arrangements;*
 - (iv) the policies and protocols to ensure that indigenous people participate in the management process;*
 - (v) the protocols for the management of sensitive information;*
 - (vi) the planning and management of works, development, adaptive reuse and property divestment proposals;*
 - (vii) how unforeseen discoveries or disturbance of heritage are to be managed;*
 - (viii) how, and under what circumstances, heritage advice is to be obtained;*
 - (ix) how the condition of Commonwealth Heritage values is to be monitored and reported;*
 - (x) how records of intervention and maintenance of a heritage places register are kept;*
 - (xi) the research, training and resources needed to improve management;*
 - (xii) how heritage values are to be interpreted and promoted; and*
- (i) include an implementation plan; and*
- (j) show how the implementation of policies will be monitored; and*
- (k) show how the management plan will be reviewed.*

It is understood that such a plan has not been prepared for the Llandilo site and it is recommended that this be the next step in the management process. The Management Plan must take into account Commonwealth Heritage values.

Although it is not required, the precautionary principle would suggest that such a management plan also incorporate identified indigenous and non-indigenous cultural heritage values in order that potential Commonwealth Heritage Values be considered so that they are managed while the assessment process is undertaken (which may take several years).

A Conservation Management Plan need not be a complex document as many of the procedures will be in place as part of normal asset management. The most successful management plans are those where the team preparing the plan works closely with the managers of the site.

5.3 Relocation of movable Cultural Heritage Items

Airservices Australia has specifically asked that this section include information on the matter of relocating heritage related items in the study area to the Civil Aviation Museum

in Melbourne for inclusion in the Museum's display and archives. In particular, they requested comment on their obligations under the EPBC Act. As no specific proposals have been put forward for review, this matter can only be discussed in general terms and legal advice may be needed to definitely establish Airservices' obligations.

As noted above, the situation at the date of submitting this report is that the site is listed on the Commonwealth Heritage List only for its natural values; therefore, the question is whether relocation of heritage-related items is a "significant impact" under Section 26 or Section 28.

The then Department of Environment and Heritage issued EPBC Policy Statement 1.2 Significant Impact Guidelines (2006), which deal with actions under these sections and aim to assist in determining whether a matter should be referred under the EPBC Act. The question of relocating heritage-related items in the study area has been discussed with reference to the statement of heritage values in Section 4 as well as the above guidelines.

There is no doubt that relocation of heritage items would be considered an action under the EPBC Act (see Department of Environment and Heritage 2006:3).

A significant impact is defined in the Guidelines (but not in the EPBC Act) as: "A 'significant impact' is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts" (2006:5).

The Guidelines provide a useful self assessment process in the form of a flow chart which has been reproduced as Figure 9 in this report. The Guidelines then elaborate on the stages in the process.

Based on the Guidelines and on heritage values of the study area, it is considered to be highly likely that relocation of heritage items from the study area would be considered to have significant impact and, therefore, likely to require a referral under the EPBC Act. However, this is a general opinion without a detailed and specific proposal to examine.

It is recommended that, if the relocation of heritage items from the study area is considered, a detailed proposal and project brief for the relocation be prepared by an appropriate person (or team) with experience in movable cultural heritage and industrial heritage and that this proposal be assessed using the Department of Environment and Heritage Guidelines with the aim of preparing a project which minimises the impact of the action.

5.4 Recommendations for Management

It is clear that best heritage practice would be for a Conservation Management Plan for the study area to be prepared for the on-going management of Natural and Cultural heritage values of the study area. It is recommended that a Conservation Management Plan be commissioned by Airservices Australia.

In the interim, site managers would need to be cautious in making decisions that are likely to impact on the Natural and Cultural heritage values of the study area. It is recommended

that the precautionary principal be applied which, in the context of the study area, means that in evaluating management actions the one that causes the least or no impact on natural or cultural heritage be adopted.

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6.1 Plans

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