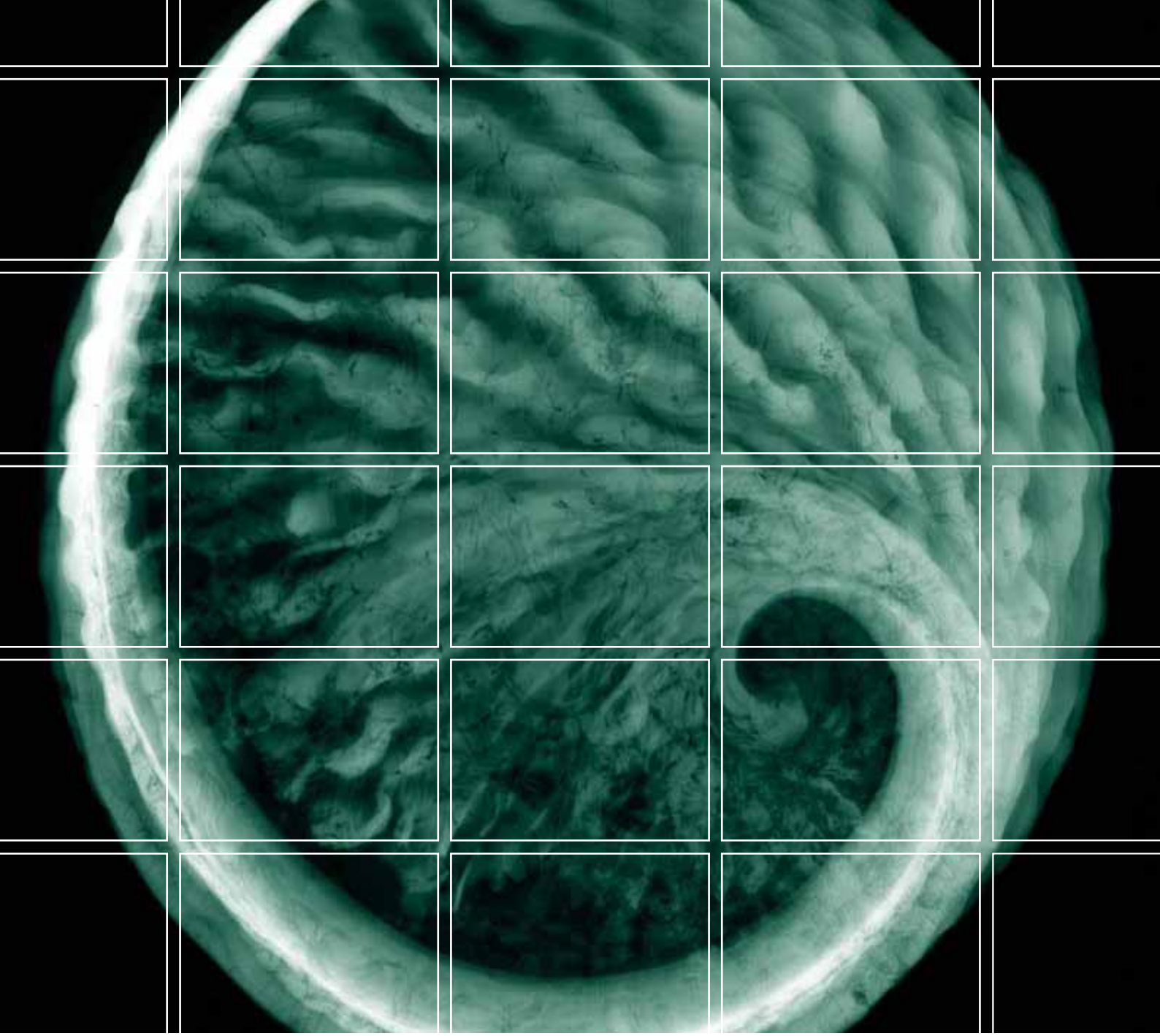

Lower Hunter Estates Development – Catherine Hill Bay

Heritage Impact Assessment
Addendum

for Catylis and Coal & Allied

August 2008

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ERM

Approved by:	*Shelley James*
Position:	Senior Heritage Consultant
Signed:	
Date:	*August, 2008*
Approved by:	*Steve Laister*
Position:	Partner
Signed:	
Date:	*August, 2008*

Environmental Resources Management Australia Pty Ltd Quality System

FINAL REPORT

Catylis and Coal & Allied

Lower Hunter Estates Development – Catherine Hill Bay

Heritage Impact Assessment Addendum

August 2008

Environmental Resources Management Australia
Building C, 33 Saunders Street
Pyrmont, NSW 2009
Telephone +61 2 8584 8888
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1 INTRODUCTION

Environmental Resources Management Australia (ERM) was commissioned by Catylis on behalf of Coal & Allied (CNA) to prepare a Heritage Impact Assessment (HIA) for lands at Catherine Hill Bay-Middle Camp (CHB), which are subject to proposed development under Part 3A of the NSW *Environmental Planning and Assessment Act* (EP&A Act) 1979.

The HIA was completed in November 2007 and forms part of the Environmental Assessment documentation for the proposed development at CHB.

This Addendum to the HIA provides an impact analysis of two recent heritage listings at CHB:

- the Catherine Hill Bay Heritage Conservation Area (CHBHCA), which was included on the Lake Macquarie Local Environmental Plan (LEP) 2004 Heritage Schedule on 20 March 2008; and

- the World War Two RAAF Radar Station 208 (former), which was included on the NSW State Heritage Register (SHR) on 22 July 2008.

The gazettal notice for the Heritage Conservation Area is provided at *Annex A* and the SHR citation is provided at *Annex B*.

1.1 BACKGROUND TO THE CATHERINE HILL BAY HERITAGE CONSERVATION AREA

Lake Macquarie City Council has advised that the March 2008 gazettal notice was simply an update reflecting the fact that the Heritage Conservation Area has been included on the LEP since 2004 (*pers. comm*. Brian Gibson, Development and Planning Officer, Lake Macquarie City Council, 19/8/2008). Lake Macquarie City Council has provided the following summary history of the listing:

- The CHBHCA was established under the Hunter Heritage REP 1989.

- The City of Lake Macquarie Heritage Study by Suters Architects Snell dated December 1993 identified CB-00 - Catherine Hill Bay Heritage Conservation Area.

- The LEP 1984 was amended (nos 87 [1999] and 89 [1995]) to incorporate recommendations of the 1993 heritage study and to replace the Hunter Heritage REP listings. The Hunter Heritage REP has since been amended to remove listings of heritage items and conservation areas. The CHBHCA included in the 1984 LEP was as per the Hunter Heritage REP CHBHCA.

- In March 2004 the LM LEP 2004 and DCP1 were gazetted/adopted respectively. The LEP was inadvertently gazetted with the wording 'Proposed' on the maps. The LEP has now been updated to remove the wording 'Proposed' from the maps regarding CHBHCA. Regardless of this amendment, the CHBHCA has been applied consistently to any relevant DA since March 2004 (Lake Macquarie City Council, email correspondence, 19/8/2008).

Lake Macquarie City Council has also advised that the values of the Catherine Hill Bay Heritage Conservation Area are identified in the 1993 Heritage Study.

1.2 METHODOLOGY

The aim of this Addendum to the HIA is to provide additional heritage impacts analysis of the development proposal in light of changes to the heritage status of the Conservation Area and the WWII RAAF Radar Station 208. ERM's approach to the preparation of the detailed heritage impact assessment was based on the following current best practice guidelines:

- NSW Heritage Office *Statements of Heritage Impact* Guideline;
- The *Australia ICOMOS Burra Charter 1999* (Burra Charter);
- *Rio Tinto Cultural Heritage Management Guidelines for Australian Businesses*; and
- *Rio Tinto Cultural Heritage Management System Guidance for Australian Businesses*.

1.3 ADDENDUM STRUCTURE

This Addendum to the HIA is structured as follows:

- *Chapter 2* outlines the heritage values of the Conservation Area and the World War Two RAAF Radar Station.
- *Chapter 3* discusses the potential heritage impacts of the proposed development on the heritage values of these heritage areas/items.
- *Chapter 4* provides the recommended impact mitigation measures for the proposed development.
- *Chapter 5* provides a brief conclusion of the findings of this Addendum to the HIA.

1.4 AUTHORSHIP

This Addendum was prepared by Dr Tim Owen, Senior Archaeologist and Shelley James, Senior Heritage Consultant. This Addendum has been reviewed by Steve Laister, ERM Partner.

2 SUMMARY OF RECENT HERITAGE LISTINGS

This Chapter summarises the values of the two heritage listings. For ease of reference, some figures and associated heritage information are reproduced in this Addendum from the HIA. Key heritage features referred to in this Chapter are shown in *Figure 2.1*. Reference should also be made to *Annex A*, *Annex B* and the CHB HIA (ERM 2007) for various details described in this Chapter.

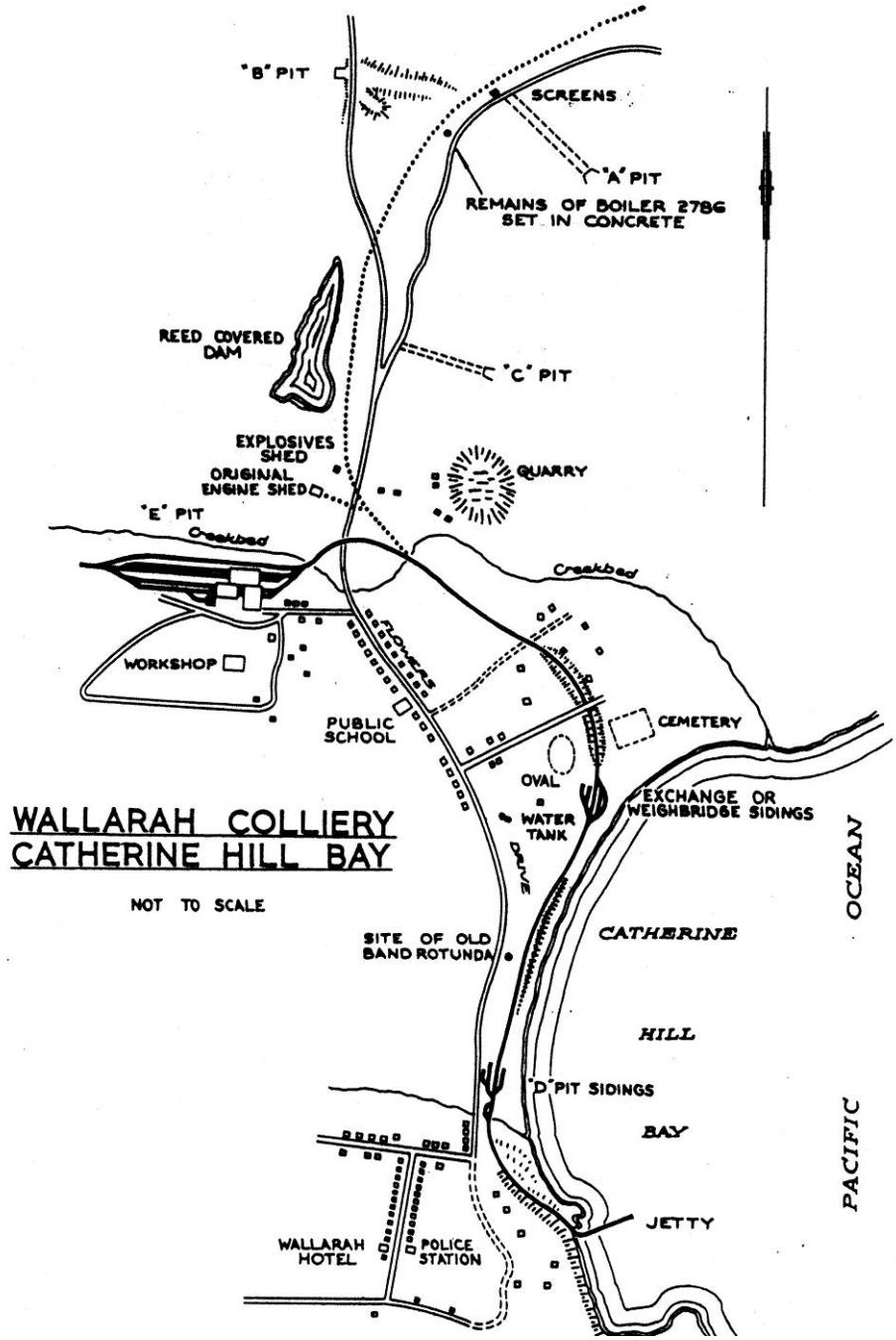

Figure 2.1 Plan of the Wallarah Colliery Railway system. Source: Wright (1973:30)

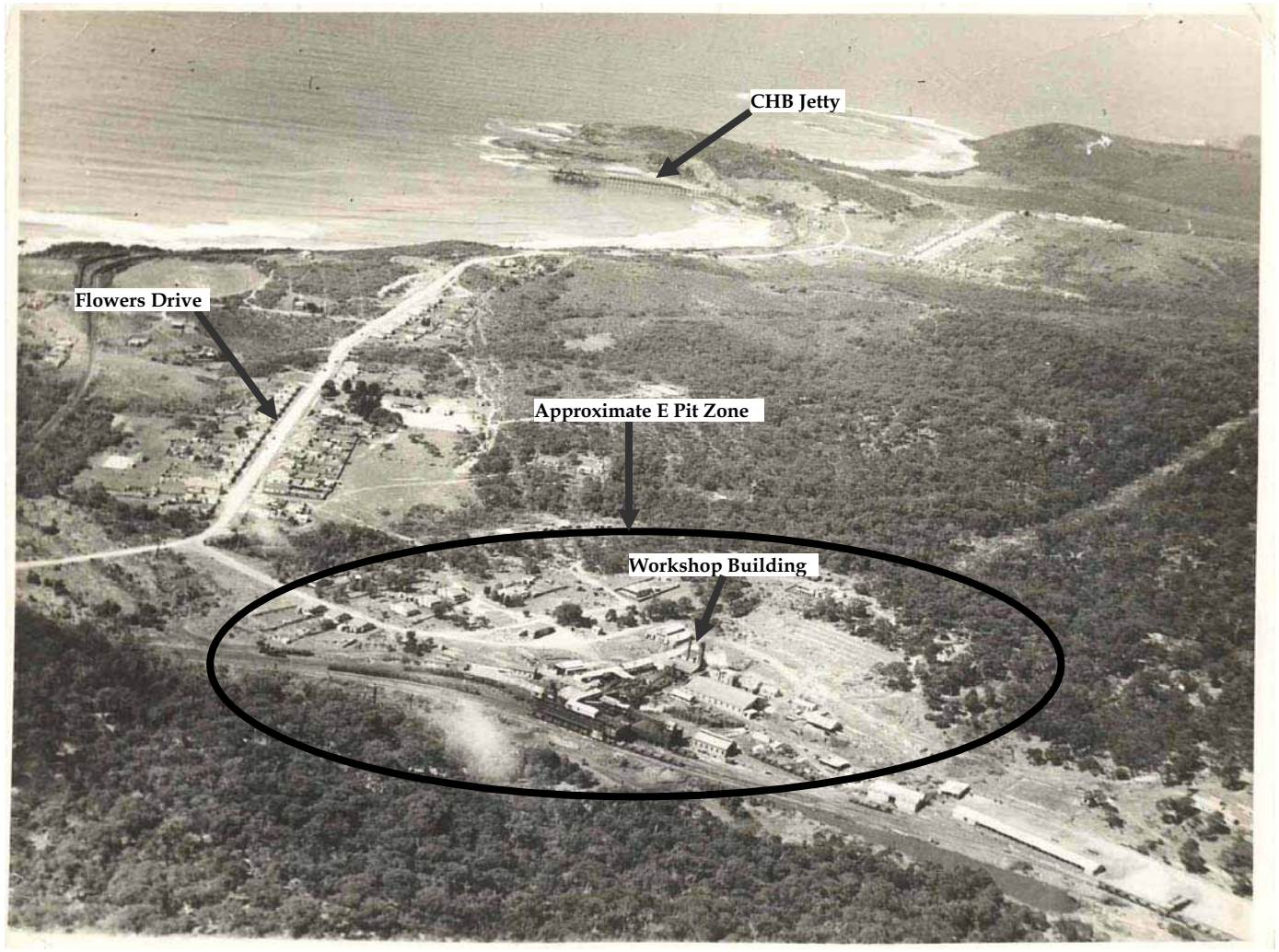

Figure 2.2 Catherine Hill Bay-Middle Camp c1912 (Source: Geoffrey Rock, CNA)

2.1 *CATHERINE HILL BAY HERITAGE CONSERVATION AREA*

Lake Macquarie City Council has advised that the Catherine Hill Heritage Conservation Area values are outlined in the 1993 City of Lake Macquarie Heritage Study that formed the basis of several heritage listings under the LEP. This information is summarised below.

Suters describes the Catherine Hill Bay Heritage Conservation Area as one of three priority conservation areas in the Lake Macquarie local government area. The 1993 report notes that the Conservation Area identified at this time did not include several areas and items considered to be of heritage significance and recommended that it be enlarged to include the whole of the former railway route.

The current boundary of the Catherine Hill Bay Heritage Conservation Area is shown in the figures included at *Annex A.*

The statement of significance for Catherine Hill Bay Heritage Conservation Area is as follows:

> *Both Catherine Hill Bay village and Middle Camp village are rare in Lake Macquarie as examples of "Company Town" developments. Company town infrastructures survive in the Upper Hunter and other parts of Australia, but Lake Macquarie mine developments were generally less organised. Uniform development of these villages has produced unique townscapes which could be threatened by new development. Catherine Hill Bay has picturesque and distinctive historic townscapes and land/seascapes unrivalled in Lake Macquarie. Catherine Hill Bay Village has the oldest group of buildings in Lake Macquarie. Catherine Hill Bay is a tremendous archaeological resource for Lake Macquarie, with great potential as an industrial heritage site.*

2.1.1 *Individual Heritage Items*

The Catherine Hill Bay Heritage Conservation Area incorporates several individual listed and potential heritage items. These items contribute to the heritage values ascribed to the Heritage Conservation Area. These items, their heritage values, and the potential heritage impacts of the proposed development have been assessed and discussed in the CHB HIA (ERM 2007). Lists of these items are provided in the following tables for ease of reference. The locations of these items are shown in *Figure 2.3*.

Table 2.1 Individual heritage items included on the LEP

LEP Item No.	Heritage Item	Location
CH-03	**Police Station and Lock Up**	23-27 Clarke Street
CH-04	**Wallarah Hotel**	24 Clarke Street
CH-05	**Cottages**	10 Clarke Street and 12 Clarke Street
CH-06	**Cottages**	21 Clarke St 19 Clarke Street
CH-07	**Cottage**	17 Clarke Street
CH-08	**Cottages**	9 Clarke St, 7 Clarke St, 5 Clarke St, 3 Clarke Street
CH-10	**Cottage**	3 Lindsley Street
CH-12	**Cottage**	11 Lindsley Street
CH-13	**House "Wallarah House"**	1a Keene Street
CH-14	**Coal Loader Jetty**	Southern end of the beach
CH-16	**Catherine Hill Bay Colliery Railway**	From Mine Camp, north of the township, to the coal loader (Also listed under the Railways and Trams category)
CH-17	**House and 4 Norfolk Pines**	Flowers Drive
CH-19	**Anglican Church**	71 Flowers Drive
CH-21	**Group of cottages**	27 , 29 , 31, 33 , 35, 37 , 42 , 44 , 46 , 48, 50 , 54 , 56 & , 58 Flowers Drive
CH-22	**Hall**	1 Northwood Road
CH-24	**House**	26 Flowers Drive
CH-27	**House**	Colliery Road
CH-32	**Cemetery**	8 Northwood Road
Part 2 – 2	**Wallarah East Pit – Potential archaeological site**	Flowers Drive
Part 2 – 1	**Wharf – Potential archaeological site**	Middle Camp Beach

Table 2.2 Potential Heritage Items

Heritage Study 1993 Item No.	Heritage Item	Location
CH-01	**Water Tank/Old Boiler**	Montefiore Street
CH-05	**Cottage**	8 Clarke Street
CH-09	**Cottage & Garage**	1 Clarke Street
CH-11	**Former Post Office & General Store**	Lindsley Street
CH-15	**Ships Anchors in Park**	Hale Street
CH-18	**Uniting Church**	Flowers Drive
CH-20	**Old Cornish Boiler**	Near Church, Catherine Hill Bay Beach
CH-23	**Public School**	26a Flowers Drive
CH-25	**House**	23 Flowers Drive
CH-26	**House**	2 Flowers Drive
CH-28	**Workshop Building**	Colliery Road
CH-29	**House**	Colliery Road
CH-30	**Cottage**	Colliery Road
CH-31	**Cottage**	Colliery Road
CH-33	**The mine**	Former Mine Camp area, Mine Camp Road

These items have historic importance to the local community. As discussed in the CHB HIA, several items make a contribution to the aesthetic qualities of Middle Camp, and other items and areas form a significant part of the historic archaeological resource for the community.

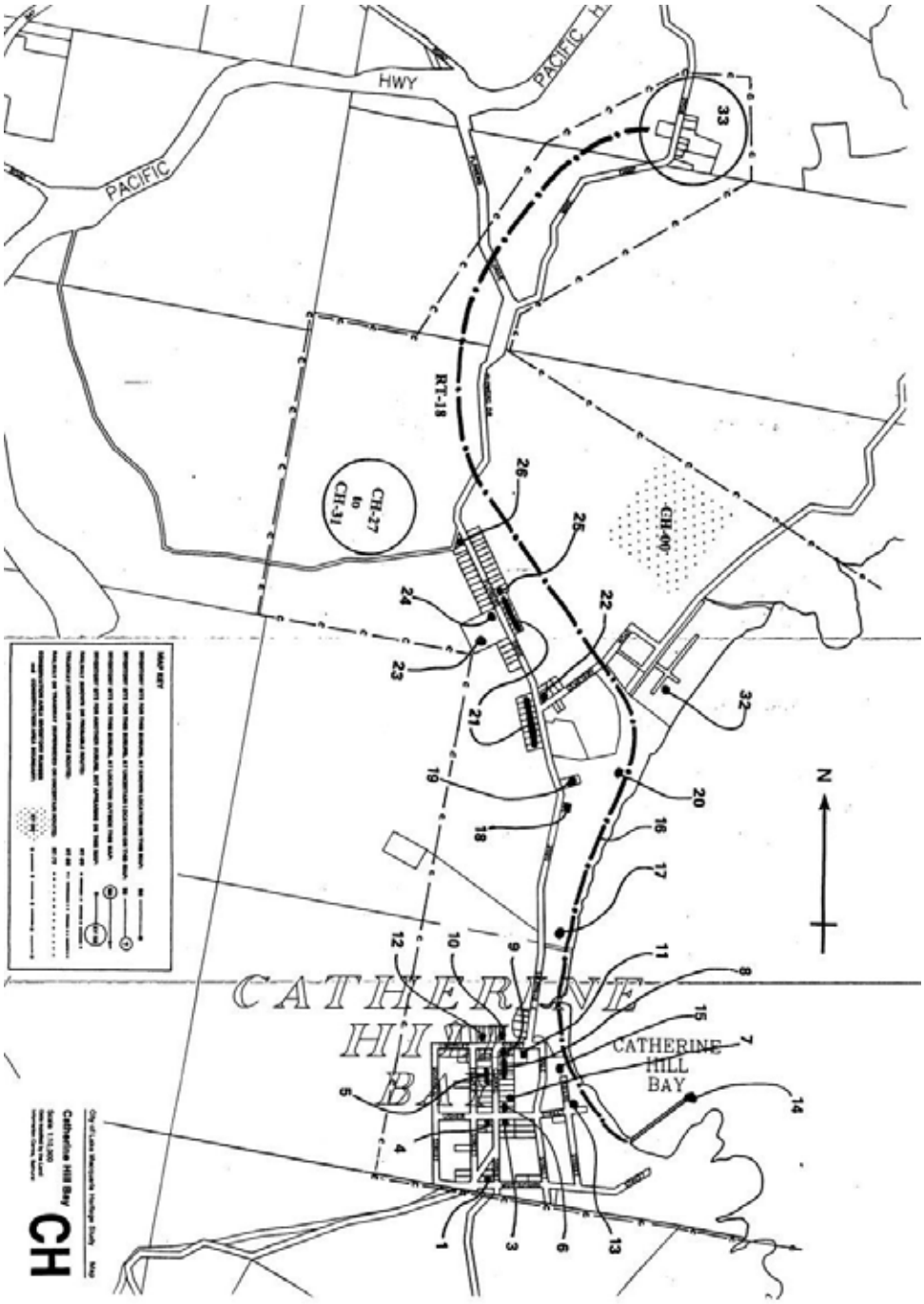

Figure 2.3 ***Items and areas identified in the Catherine Hill Bay Heritage Study conducted in 1993 (Source: Suters 1993, courtesy Lake Macquarie City Council)***

2.2 *WWII RAAF RADAR STATION 208 (FORMER)*

The WWII RAAF Radar Station 208 (former) was included on the NSW SHR on 22 July 2008. The location of the Radar Station is shown in *Figure 2.4*.

The Radar Station has been included on the SHR for its historic heritage values. The Statement of Significance included in the SHR citation for the site outlines its heritage values:

> *The former RAAF Radar Station 208 at Catherine Hill Bay, comprising remains of the RAAF radar installation is significant as a rare example of NSW's participation in the WWII network of air warning radar, established in strategic locations along Australia's coast during World War II. It is one of nine ACO radar stations established on mainland Australia using British imported ACO radar and the only remaining site of the two established in NSW.*
>
> *Its location and siting on an elevated coastal area amongst dense bushland demonstrates Australia's response to the threat of invasion and the importance placed on protecting the industrial centres along the NSW coastline during WWII.*
>
> *The site has potential to yield further information about Australian coastal defence efforts during WWII and the use and development of radar technology.*
>
> *It has historical associations with the introduction, use and development of radar technology in Australia which is regarded as one of the greatest contributions of Australian science to the war effort. The wartime development of radar in Australia became a key element in the shift towards government sponsored applied scientific research and the gradual independence of Australian science. After the war, radar became a celebrated achievement of science in Australia.*

Figure 2.4 The location of the WWII RAAF Radar Station

3 HERITAGE IMPACT ANALYSIS

3.1 DEVELOPMENT PROPOSAL OUTLINE

Coal & Allied owns approximately 4,187 hectares of land in the Lower Hunter Region located within the four local government areas of Newcastle, Cessnock, Lake Macquarie, and Wyong (located in Northern Central Coast region). The sites are not required for future mining or other operational purposes.

Coal & Allied's Lower Hunter lands including Catherine Hill Bay are included in the Lower Hunter Regional Strategy (LHRS) for urban development and conservation. Coal & Allied is one of four major landowners within the region that play a significant role in achieving the LHRS's environmental and conservation outcomes and sustainable growth.

In finalising the LHRS, the NSW Government reached agreement with Coal and Allied for the dedication of 3,322 ha (80 per cent) of Coal & Allied land for conservation corridors and development rights on 848 ha (20 per cent). The details of the negotiations are set out in a Memorandum of Understanding (MoU) between Coal & Allied and the NSW Government.

The proposed conservation lands are areas of high conservation value in the nominated green corridors that will be dedicated to the pubic. The conservation lands are similarly identified in the draft Lower Hunter Regional Conservation Plan prepared by the Department of Environment and Conservation (now Climate Change).

A Concept Plan has been prepared for Catherine Hill Bay which will enable key site parameters associated with land use, infrastructure delivery and timing, and environmental conservation to be resolved up front, with subsequent detailed stages being submitted for approval progressively.

The Concept Plan has been further revised through community consultation and Independent Hearing Assessment Panel (IHAP) process. The development areas at Catherine Hill Bay have now been limited to the northern end of Flowers Drive in Middle Camp (defined as 'Area A' and 'Area B'). The current Concept Plan for the proposed development is shown in *Figure 3.1*.

Two residential development areas (instead of four) are now proposed at the northern end of Flowers Drive. These areas will be comprised of single and double storey housing, parks, new residential roads and conservation zones. Screening planting and traffic controls are to be incorporated into the design to limit visual and traffic impacts on Flowers Drive and Middle Camp.

Maximum dwelling yield - 222 dwellings

Figure A1.3.1 Catherine Hill Bay Indicative Lot Layout

3.2 *HERITAGE IMPACT ANALYSIS*

The discussion of potential heritage impacts of the proposed development on the Heritage Conservation Area and the Radar Station has been guided by the NSW Heritage Branch guideline "Statements of Heritage Impact". The guideline identifies a range of likely proposals and issues to assist with minimising and avoiding impacts to heritage values. The categories of activity that are relevant to the development proposal at Catherine Hill bay-Middle Camp are 'new development adjacent to heritage items' and 'subdivision'. The questions to be considered for these activity categories are:

New Development Adjacent To Heritage Items

- How is the impact of the new development on the heritage significance of the item to be minimised?
- Why is the new development required adjacent to a heritage item?
- How does the curtilage allowed around the heritage item contribute to the retention of its heritage significance?
- How does the new development affect views to, and from, the heritage item? What has been done to minimise negative effects?
- Is the development sited on any known, or potentially significant archaeological deposits? If so, have alternative sites been considered? Why were they rejected?
- Is the new development sympathetic to the heritage item? In what way (e.g. form, siting, proportions, design)?
- Will the additions visually dominate the heritage item? How has this been minimised?
- Will the public, and users of the item, still be able to view and appreciate its significance?

Subdivision

- How is the proposed curtilage allowed around the heritage item appropriate?
- Could future development that results from this subdivision compromise the significance of the heritage item? How has this been minimised?

- Could future development that results from this subdivision affect views to, and from, the heritage item? How are negative impacts to be minimised?

3.2.2 Impacts on the Heritage Conservation Area

The revised Concept Plan has been sensitively designed to address potential heritage impacts of the proposed development on the Heritage Conservation Area. As already discussed in the CHB HIA, the preparation of the Concept Plan has been informed by the following requirements:

- protection of views to and from heritage dwellings;
- buffer zones between any new development and listed heritage items along Flowers Drive and the Cemetery;
- sympathetic use of materials and building form, which complements the listed heritage character of Middle Camp and CHB;
- adaptive re-use of the potential heritage items located on Colliery Road and within the development zones;
- new access roads into the development zones, which will limit traffic flow along Flowers Drive and maintain the existing heritage characteristics of Middle Camp; and
- judicious use of plantings to provide additional screening between new development and existing heritage places.

The Concept Plan developed as a result of the Design Charette and IHAP process has taken these issues into consideration, and has sought to incorporate heritage items and minimise potential impacts. The design controls that will apply to the residential character of the development areas will be incorporated in the Statement of Commitments for the project.

The public open space networks include the opportunity to interpret the historic heritage values of Middle Camp.

The new development will be comprised of appropriately scaled new buildings in consistent materials, colours and finishes to ensure views and the overall setting of Middle Camp are not adversely affected.

The key issues for the Heritage Conservation Area are the potential visual impact on the historic village character of Middle Camp and impacts on the E Pit Archaeological Zone. These potential impacts are discussed in further detail below.

Visual Impact Discussion

As already discussed in the CHB HIA, any development of previously undeveloped land surrounding a Conservation Area or heritage item/s will have a visual impact. The key consideration for Middle Camp is whether the potential visual impact is acceptable and whether the visual impact directly relates to the heritage values of the Conservation Area or heritage item/s.

While the proposed development will be visible from approaches north and south to Middle Camp along Flowers Drive, and from Flowers Drive itself, it is considered that it will pose a minimal impact to the visual catchment of Middle Camp for the following reasons:

1. The historic heritage values of Middle Camp arise from the development of the camp, the land tenure and an association with the mine. These historic heritage values will not be impacted by the proposed development.

2. It is considered that Middle Camp has aesthetic significance derived from the uniformity of building form, scale, materials and set back from the street. These attributes are best viewed and appreciated from Flowers Drive and it is considered that the proposed development will not challenge these aesthetic attributes.

3. A *Buffer Zone* will be retained between Middle Camp and proposed new development. This provides a visual separation and green corridor between the 'old' and 'new'. The buffer zone also provides the new development with a separate village character which is visually and physically separated from the existing settlement.

4. The new development will be of complementary bulk, scale, height materials and colours to Middle Camp, which will ensure that the new development is visually consistent with the historic buildings along Flowers Drive.

5. Although some bushland will have to be cleared to develop the area the intention is to retain corridors of heath through the developed areas. This will lessen the visual impact of the development from this view point as it will retain the natural setting of Middle Camp and provide screening for the new development.

The potential visual impact of the proposed development on Middle Camp is acceptable as it does not impact the heritage values of the individual buildings and surrounding areas. The proposed development has also been planned to respect the visual catchment of Middle Camp. This has been achieved by the creation of visual buffers and the selection of complementary bulk, scale, materials, and colour. The retention of areas of heath land will also provide additional buffering and screening between the new and old developments.

E Pit Archaeological Zone Impact Discussion

As already discussed in the CHB HIA, the proposed development has the potential to impact the landscape elements and area with high archaeological potential in the E Pit Archaeological Zone.

The proposed development also has the potential to impact and obscure the alignment and remnants of the Catherine Hill Bay Colliery Railway located in the eastern portions of the study area and E Pit.

Impacts to the main archaeological items with assessed heritage value can be mitigated through design of appropriate public open spaces and the creation of walking tracks. If appropriately designed, these new landscape elements would conserve the heritage items and areas and create a new level of awareness and understanding of the historical elements.

A range of mitigation measures are available that will assist in minimising the historic archaeological impacts of the proposed development. These measures are provided in the CHB HIA and outlined for ease of reference in the following Chapter.

3.2.3 Impacts on the WWII RAAF Radar Station 208 (Former)

The proposed development is located approximately 1km to the south-west of the Radar Station. The proposed residential development will not have any physical or visual impacts on the Radar Station site and its heritage values.

Increased traffic flow through the increased population will be controlled to minimise effects on Flowers Drive, and the location of the Radar Station is such that additional traffic on this route will not affect its heritage values.

The incorporation of the Radar Station within the Conservation Lands to be transferred to the Department of the Environment and Climate Change under the MoU with CNA is a positive outcome for the site. This will ensure its historic setting continues to be conserved for current and future generations, and will allow public access to the site. It is likely that the site may be interpreted by National Parks as one of many cultural heritage sites under its management.

4 MITIGATION MEASURES

4.1 RADAR STATION

The proposed development will not have an impact on the WWII RAAF Radar Station 208 site. Mitigation measures are therefore considered unnecessary for this site.

4.2 CHB CONSERVATION AREA

The mitigation measures outlined in the CHB HIA are generally considered satisfactory as they will adequately minimise the visual impacts on the Heritage Conservation Area and the impacts on the archaeological resources of E Pit. A photographic recording of Middle Camp that includes panoramic photographs of the existing views along Flowers Drive from the north and south should be added to the recording recommended in the CHB HIA.

The recommended mitigation measures that address the impacts on the Conservation Area and E Pit Archaeological Zone are repeated from the CHB HIA below for ease of reference.

- incorporate the existing heritage sites and areas into the new development;
- adaptively re-use potential heritage items;
- include adequate setbacks, buffer, vegetation and screening between the proposed development and the Anglican Church, Flowers Drive, Middle Camp Conservation Area and the Cemetery.
- site new development to respect the visual catchment of Middle Camp;
- make use of sympathetic materials and roof forms for the new development. These should be are similar to, whilst not mimicking, the existing materials and roof forms;
- develop a heritage interpretation strategy to guide the provision of on-site interpretation, which could include potential heritage walks or trails, signage about the history and heritage significance of the area;
- prepare an archival record of the area prior to commencement of development; this should be made available across Council libraries in the region;
- prepare an archival record of the E Pit area to a standard of local significance in accordance with the NSW Heritage Office Department of Planning guideline. This should include landscape elements of former building locations and a detailed survey plan (not a mud map);

- create a conservation zone (buffer) around the 'Workshop' building. As the last remaining industrial building in the E Pit area, it symbolises the activities that occurred in this zone. The buffer could include the flat landscaped area to the north of the building. This can be used as a public open space. The workshop building could be adaptively reused as a community building;

- create a conservation zone around the former house site in the south west corner of E Pit. This will serve to protect the landscape values and the archaeological deposits associated with the house site. The area can be used as a public space as it affords the best views over E Pit. If this is not determined to be feasible, then archaeological test excavation of the site should be undertaken. This would need to be directed by a qualified archaeologist. Suitable interpretation of all materials excavated should be undertaken;

- undertake interpretation of the E Pit area and the former railway. This should include a history of the area and the Pit. It can be based upon the archival recording and historical research, such as that presented in this report;

- during earth works within E Pit ensure that appropriate stop work procedures are in place in the case of unforeseen archaeological discoveries. Any archaeological deposits uncovered should be recorded and monitored by a suitably qualified archaeologist; and

- should any artefacts be identified in the course of development all works should cease and an assessment of the material should be conducted by an archaeologist.

5 *CONCLUSION*

This Addendum to the CHB HIA has determined that the proposed development at Catherine Hill Bay-Middle Camp will not have an impact on the heritage values of the WWII RAAF Radar Station 208.

This Addendum has determined that the proposed development has the potential to impact on the Catherine Hill Bay Heritage Conservation Area, including the E Pit Archaeological Zone. Provided the mitigation measures outlined in this Addendum to the CHB HIA are implemented by CNA, the potential impacts on historic heritage values will be reduced to an acceptable level.

REFERENCES

ERM November 2007 **Lower Hunter Estates Development Heritage Impact Assessment – Catherine Hill Bay-Middle Camp Estate** prepared for Catylis and Coal & Allied

ERM August 2005 **Catherine Hill Bay – Heritage Advice: Proposed State heritage Register Nomination** prepared for CNA

NSW Heritage Branch (formerly NSW Heritage Office) Guideline **Statements of Heritage Impact**

Suters 1993 **City of Lake Macquarie Heritage Study Volumes 1 and 2** prepared for Lake Macquarie Council

Wright H J 1973 "The Wallarah Colliery Railway, Catherine Hill Bay" **Australian Railway Historical Society Bulletin**, February 1973

Annex A

Catherine Hill Bay Heritage Conservation Area Listing Information

Government Gazette

OF THE STATE OF

NEW SOUTH WALES

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Pages 2395 – 2466

New South Wales

Lake Macquarie Local Environmental Plan 2004 (Amendment No 30)

under the

Environmental Planning and Assessment Act 1979

I, the Minister for Planning, make the following local environmental plan under the *Environmental Planning and Assessment Act 1979*. (N07/00117/PC)

FRANK SARTOR, M.P.,
Minister for Planning

Lake Macquarie Local Environmental Plan 2004 (Amendment No 30)

under the

Environmental Planning and Assessment Act 1979

1 Name of plan

This plan is *Lake Macquarie Local Environmental Plan 2004 (Amendment No 30)*.

2 Aims of plan

The aims of this plan are:

(a) to rezone the land referred to in clause 3 (a) from Zone 10 Investigation Zone to Zone 2 (1) Residential Zone under *Lake Macquarie Local Environmental Plan 2004* so as to allow for urban development on the land, and

(b) to remove the word "Proposed" from the Zone Index Map Legend depicted as "Proposed Heritage Conservation Area" on the map for the purposes of *Lake Macquarie Local Environmental Plan 2004*.

3 Land to which plan applies

This plan applies:

(a) with respect to the aim referred to in clause 2 (a), to Lots 21 and 22, Section N, DP 4339, The Boulevarde, Killingworth, as shown edged heavy black and lettered "2 (1)" on Sheet 1 of the map marked "Lake Macquarie Local Environmental Plan 2004 (Amendment No 30)" deposited in the office of the Council of the City of Lake Macquarie, and

(b) with respect to the aim referred to in clause 2 (b), to land shown on Sheets 2 and 3 of the map marked "Lake Macquarie Local Environmental Plan 2004 (Amendment No 30)" deposited in the office of the Council of the City of Lake Macquarie.

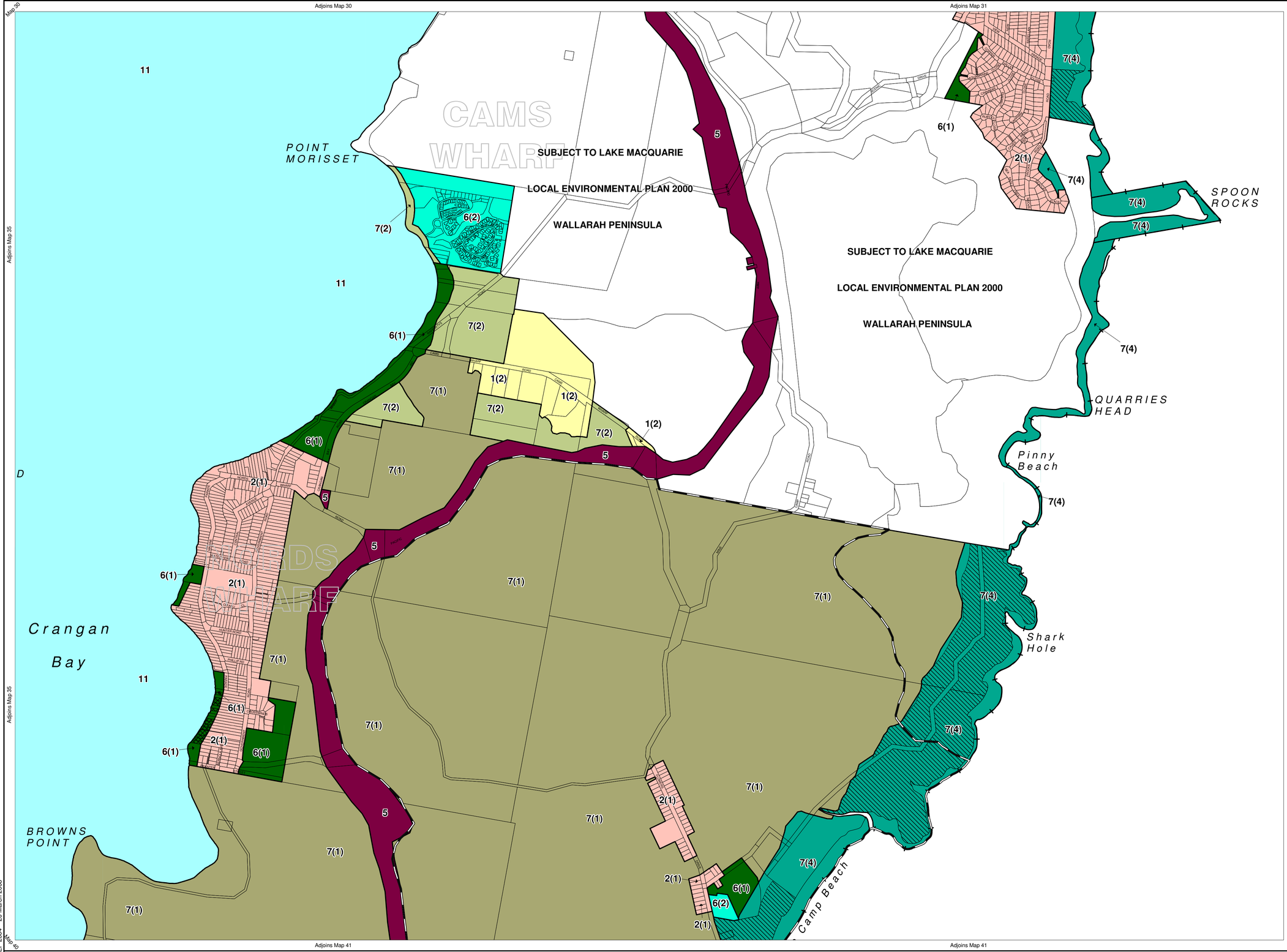
4 Amendment of Lake Macquarie Local Environmental Plan 2004

Lake Macquarie Local Environmental Plan 2004 is amended by inserting in appropriate order at the end of the definition of ***the map*** in the Dictionary the following words:

Lake Macquarie Local Environmental Plan 2004 (Amendment No 30)

Map 30 | Adjoins Map 30 | Adjoins Map 31

Adjoins Map 35



Adjoins Map 41 | Adjoins Map 41

Map 40

Adjoins Map 35

Revision 1 - LEP 2004 20 March 2008

Map 36

ZONE INDEX
LEP 2004

1. RURAL
- 1(1) 1(1) Rural (Production)
- 1(2) 1(2) Rural (Living)

2. RESIDENTIAL
- 2(1) 2(1) Residential
- 2(2) 2(2) Residential (Urban Living)

3. BUSINESS
- 3(1) 3(1) Urban Centre
- 3(2) 3(2) Urban Centre (Support)

4. INDUSTRIAL
- 4(1) 4(1) Industrial (Core)
- 4(2) 4(2) Industrial (General)
- 4(3) 4(3) Industrial (Urban Services)

5. INFRASTRUCTURE
- 5 5 Infrastructure

6. OPEN SPACE
- 6(1) 6(1) Open Space
- 6(2) 6(2) Tourism and Recreation

7. ENVIRONMENTAL PROTECTION
- 7(1) 7(1) Conservation (Primary)
- 7(2) 7(2) Conservation (Secondary)
- 7(3) 7(3) Environmental (General)
- 7(4) 7(4) Environmental (Coastline)
- 7(5) 7(5) Environmental (Living)

8. NATIONAL PARK
- 8 8 National Park

9. NATURAL RESOURCES
- 9 9 Natural Resources

10. INVESTIGATION
- 10 10 Investigation Zone

11. LAKE AND WATERWAYS
- 11 11 Lake and Waterways

12. ACQUISITION
- Acquisition (LMCC)
- Acquisition (RTA)
- Acquisition (Dept. of Planning)

13. OTHER
- Heritage Conservation Area
- Local Government Boundary

DISCLAIMER:

Maps in this series represent the zone boundaries for the Lake Macquarie Local Environmental Plan 2004. These zone boundaries are shown relative to the cadastral boundaries shown on these maps.

Although every care has been taken in the preparation of these maps, Lake Macquarie City Council accepts no responsibility for any misprints, errors, omissions, inaccuracies in these maps or damages resulting from the use of this information.

Integrated Survey Grid (ISG 56/1)

SCALE 1:10 000

0 200 500 Metres

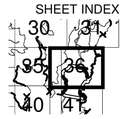
ENVIRONMENTAL PLANNING & ASSESSMENT ACT , 1979

LAKE MACQUARIE LOCAL ENVIRONMENTAL PLAN 2004

PUBLISHED IN GOVT GAZETTE NO.55 DATED 19 March 2004

LOCALITY **CAMS WHARF/CATHERINE HILL BAY**

SHEET INDEX



Last Amendment No. : 30

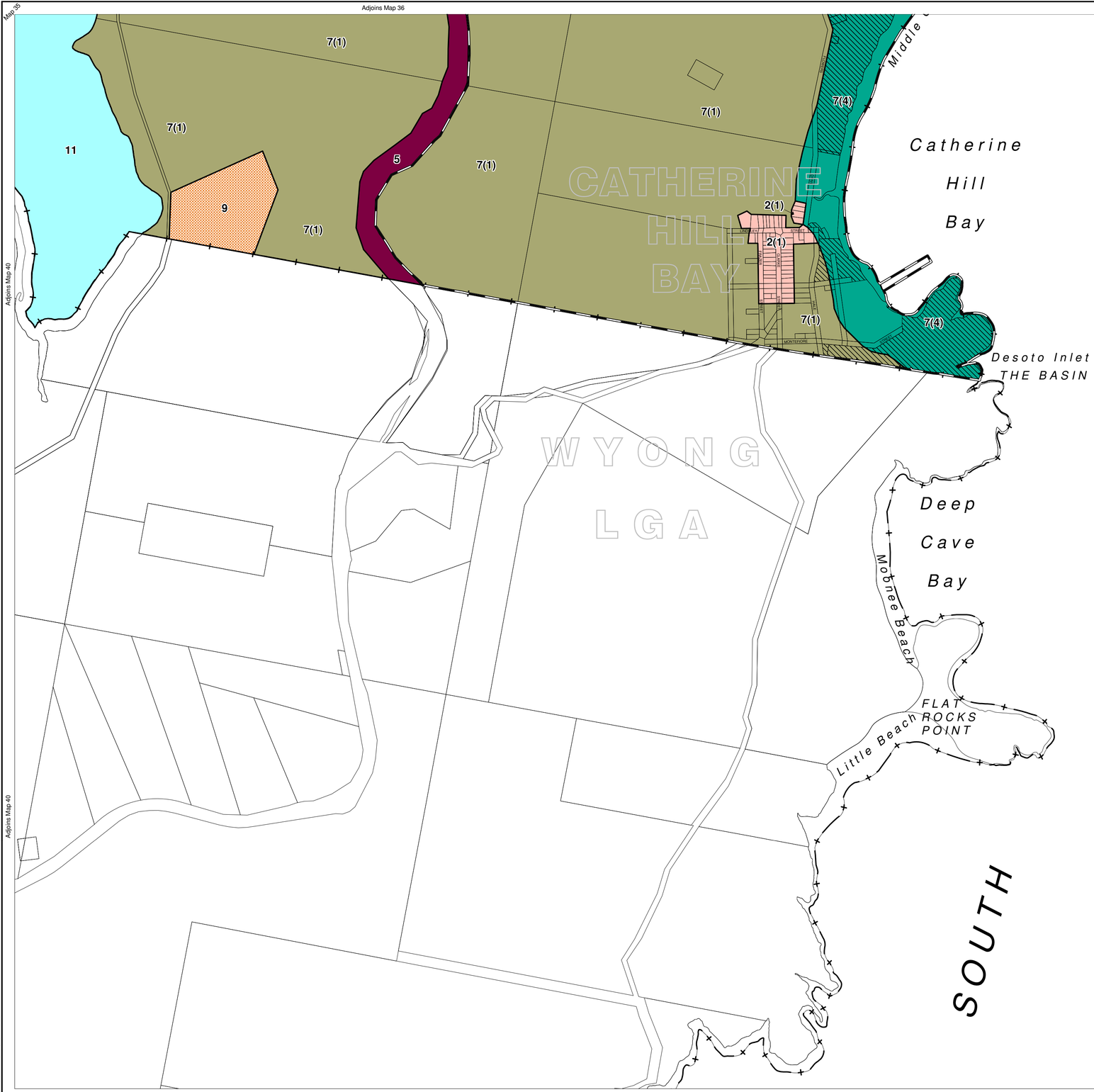
Last Update : 20 March 2008

Map 35

Adjoins Map 36

Adjoins Map 36

Adjoins Map 40



Adjoins Map 40

Adjoins Map 40

Map 41

Revision 1 - LEP 2004 20 March 2008

ZONE INDEX

LEP 2004

1. RURAL
- 1(1) 1(1) Rural (Production)
- 1(2) 1(2) Rural (Living)

2. RESIDENTIAL
- 2(1) 2(1) Residential
- 2(2) 2(2) Residential (Urban Living)

3. BUSINESS
- 3(1) 3(1) Urban Centre
- 3(2) 3(2) Urban Centre (Support)

4. INDUSTRIAL
- 4(1) 4(1) Industrial (Core)
- 4(2) 4(2) Industrial (General)
- 4(3) 4(3) Industrial (Urban Services)

5. INFRASTRUCTURE
- 5 5 Infrastructure

6. OPEN SPACE
- 6(1) 6(1) Open Space
- 6(2) 6(2) Tourism and Recreation

7. ENVIRONMENTAL PROTECTION
- 7(1) 7(1) Conservation (Primary)
- 7(2) 7(2) Conservation (Secondary)
- 7(3) 7(3) Environmental (General)
- 7(4) 7(4) Environmental (Coastline)
- 7(5) 7(5) Environmental (Living)

8. NATIONAL PARK
- 8 8 National Park

9. NATURAL RESOURCES
- 9 9 Natural Resources

10. INVESTIGATION
- 10 10 Investigation Zone

11. LAKE AND WATERWAYS
- 11 11 Lake and Waterways

12. ACQUISITION
- Acquisition (LMCC)
- Acquisition (RTA)
- Acquisition (Dept. of Planning)

13. OTHER
- Heritage Conservation Area
- Local Government Boundary

DISCLAIMER:

Maps in this series represent the zone boundaries for the Lake Macquarie Local Environmental Plan 2004. These zone boundaries are shown relative to the cadastral boundaries shown on these maps.

Although every care has been taken in the preparation of these maps, Lake Macquarie City Council accepts no responsibility for any misprints, errors, omissions, inaccuracies in these maps or damages resulting from the use of this information.

Integrated Survey Grid (ISG 56/1)

SCALE 1:10 000

0 200 500 Metres

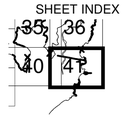
ENVIRONMENTAL PLANNING & ASSESSMENT ACT , 1979

LAKE MACQUARIE LOCAL ENVIRONMENTAL PLAN 2004

PUBLISHED IN GOVT GAZETTE NO.55 DATED 19 March 2004

LOCALITY **CATHERINE HILL BAY**

SHEET INDEX



Last Amendment No. : 30

Last Update : 20 March 2008

Annex B

WWII Radar Station 208 SHR Citation

WWII RAAF Radar Station 208 (former)

Item

Name of Item: WWII RAAF Radar Station 208 (former)
Other Name/s: Mine Camp, Signal Hill, Radar Hill
Type of Item: Built
Group/Collection: Defence
Category: Defence Radar Station
Location: Lat:33.0848 Long:151.3847
Primary Address: Catherine Hill Bay, NSW 2281
Local Govt. Area: Lake Macquarie

Property Description:

Lot/Volume Code	Lot/Volume Number	Section Number	Plan/Folio Code	Plan/Folio Number
PART LOT	3	-	DP	1016670
PART LOT	16	-	DP	755266

All Addresses

Street Address	Suburb/Town	LGA	Parish	County	Type
	Catherine Hill Bay	Lake Macquarie			Primary

Statement of Significance

The former RAAF Radar Station 208 at Catherine Hill Bay, comprising remains of the RAAF radar installation is significant as a rare example of NSW's participation in the WWII network of air warning radar, established in strategic locations along Australia's coast during World War II. It is one of nine ACO radar stations established on mainland Australia using British imported ACO radar and the only remaining site of the two established in NSW.

Its location and siting on an elevated coastal area amongst dense bushland demonstrates Australia's response to the threat of invasion and the importance placed on protecting the industrial centres along NSW coastline during WWII.

The site has potential to yield further information about Australian coastal defence efforts during WWII and the use and development of radar technology.

It has historical associations with the introduction, use and development of radar technology in Australia which is regarded as one of the greatest contributions of Australian science to the war effort (Mellor 1958). The wartime development of radar in Australia became a key element in the shift towards government sponsored applied scientific research (MacLeod 1999) and the gradual independence of Australian science (Mellor 1958). After the war, radar became a celebrated achievement of science in Australia (MacLeod 1999).

Date Significance Updated: 17 May 05

Note: There are incomplete details for a number of items listed in NSW. The Heritage Branch intends to develop or upgrade statements of significance and other information for these items as resources become available.

Description

Designer: Directorate of Works for the Air Ministiry, Britain
Builder/Maker: Allied Works Council
Construction Years: 1942 - 1943
Physical The former Radar Station 208 site has a north and south arrangement with principal structures

Description: replicated in each sector. There are two arrangements of four concrete footings that originally supported 44 metre timber aerial towers. The footings are arranged in a square pattern with remnant cast iron supports protruding from each block. Two concrete above ground igloo shaped bunkers remain, each with an access tower on the seaward side. The footings and bunkers are symmetrically placed across an east-west axis. The bunkers have remnants of electrical fittings and recessed areas on the internal walls and concrete slab floors and an egress on the eastern walls. The southern area has a remnant rectangular shaped concrete support for the transmitter feeder rising several centimetres above the ground surface. The northern area has a remnant concrete stair structure of approximately half a metre high with three steps and the outer rim concrete remains of a depressed circular structure.

A six metre safety fence, erected in the 1990's, is located on the northern and eastern boundary and isolates the footings and other above surface remains in the northern section. The eastern side of both bunkers is one and a half metres from the cliff edge.

Physical Condition and/or Archaeological Potential: The southern sector arrangement of footings is well preserved and obscured by dense regrowth vegetation. The northern sector footings shows a greater level of deterioration with exposure to coastal conditions. The concrete bunkers have been subject to graffiti and fire but remain in good condition. There is some evidence of concrete cancer to the buildings in the form of exposed reinforcing where minor concrete spalling has occurred. **Date Condition Updated:** 07 Feb 06

Current Use: Disused. Future planning strategies for integrated recreational space.

Former Use: Open cut mining

History

Historical Notes: The British Committee of Imperial Defence first shared their technical radar knowledge with Australian, New Zealand, South African and Canadian scientist in a top secret meeting in London in February 1939 (McLeod 1999). It was anticipated that these commonwealth nations would launch their own research and use the new technology for defence developments (Bowen 1987). In August 1939, just weeks before the outbreak of war, the Australian Council for Scientific and Industrial Research approved the creation of the Radiophysics Advisory Board concealed in the University of Sydney (Minnett in McLeod 1999).

In May 1941 Wing Commander Albert George Pither was put in charge of RAAF's radar operations. Pither was in Britain, studying radar when the technology was put to use during the Battle of Britain in 1940. He developed a plan to surround Australia with a 'home chain' of radar stations based on his experience in Britain. On the 7th November 1941, one month before the attack on Pearl Harbour, the RAAF were given full responsibility for Australia's early warning radar operations (Fielder-Gill in MacLeod 1999) and adopted Pither's radar defence plans.

The delays that Australia experienced in acquiring radar equipment spurred an innovative period of radar development by Australia's scientists. In 1941 Britain was the only supplier of radar equipment. The tyranny of distance, competing demands and lack of material resources (Simmonds & Smith 1995) meant that Australia would not receive its first shipment of radar equipment until the middle of 1942. As a result, key modifications and electrical engineering solutions developed by Australia's scientists led to the creation of the Australian 'Air Warning' (AW) radar. The AW employed an innovative switching circuit developed by Dr Joseph Pawsey of the Radiophysics Laboratory and aerials engineered by J.G Worledge at the Eveleigh Annexe of the NSW Railways. By the time the ACO radar was installed at Catherine Hill Bay, features of its design had already been superseded by the Australian AW radar, especially its conspicuous twin towers. The AW design included replacement of the cumbersome towers with a single aerial that rapidly switched between transmitting and receiving.

By December 1941 a prototype of the Australia designed AW radar system was ready for production. The radar equipment was manufactured by The Gramophone Company at Homebush which produced 100 units by the end of WWII (Simmonds & Smith 2002). The AW radar was a robust and light weight system that proved useful for the conditions of the war in the Pacific.

In 1941 the Joint Planning Committee of the armed forces agreed that the limited supply of radar equipment in Australia was to be utilised for the protection of the vital industrial region of Newcastle - Sydney - Port Kembla (Minnett et al. in MacLeod 1999). At that time, the Newcastle region was an important focal area for coal mining, steelworks and associated heavy industry. The region was also vitally important as Australia's principal centre for the manufacture of armaments needed for the war effort and the Port of Newcastle was considered vulnerable to air and seaborne enemy attack.

In November 1941 Air Force Officers including Wing Commander Pither, made a reconnaissance flight of the Newcastle - Sydney - Port Kembla coastal strip. In January 1942 the air warning

defence began in the Newcastle region with the establishment of a radar station at Shepherd's Hill followed by the installation of the Australian designed AW radar at Tomoree in April of that year. The ACO radar installation at Mine Camp was to be the third permanent radar station within the Newcastle region (Bale 1995).

The British made Advance Chain Overseas (ACO) radar installations were distinguished by robust towers capable of withstanding hurricanes in the Far East. These radar installations were regarded as sophisticated, complex and at the time, very expensive at an estimated cost of 21,000 Pounds. It took several months to construct and calibrate an ACO radar system and the sheer size of the transmitter and receiver towers made them difficult to camouflage (Simmonds & Smith 1995).

The ACO radar used a floodlighting type wave system capable of simultaneously scanning a wide area to detect enemy approaches (Mellor 1958). The sophisticated electronics were the second generation of British CH type of radar, operating in the HF band. The electronics contained panels and features not otherwise seen in other types or deemed to be necessary in the Pacific during the war (Simmonds & Smith 1995).

Radar Station 208:

Radar Station 208 at Catherine Hill Bay was one of nine ACO radar installations on mainland Australia. The War Cabinet had originally intended to have 32 units to implement the plan for Australia's radar station chain, but this became difficult to achieve and later unnecessary after significant events that changed the course of the war (Simmonds & Smith 1995). The ACO radar equipment sent to Australia was originally intended for other territories such as Malaya and Singapore but diverted after Japanese invasion of these countries (Simmonds & Smith 1995).

Radar Station 208 was sited on a ridge 93m above sea level amongst dense woodland overlooking the ocean. The transmitter and receiver towers were over 44 metres in height and spaced 100metres apart to ensure that radio pulses were received as echoes and not confused with transmissions. The floodlight system of the ACO radars required a high volume of electrical power sourced from power mains with backup generator located in a smaller dedicated bunker. Bombproof underground bunkers were designed for the radar electronics and two tonne consoles for the transmitter and receiver.

According to RAAF records, "No. 208 RDF Station formed to establishment No. HD 318 of Mine Camp, NSW on 10th February 1943 under the control of H.Q. Eastern Area. The purpose of the unit is, by means of Radio Direction Finding to locate and promulgate advice of enemy and other aircraft approaching to locality of the station".

At its establishment it had a total of 41 personnel consisting of 1 RAAF Officer, 1 WAAAF Officer, 14 RAAF and 25 WAAAF, the personnel levels peaked in May 1943 with a total of 54. The WAAAF female personnel served as radar Operators and the RAAF male personnel served as radar Mechanics. The unit also included guards, cooks and personnel that communicated plotted data to the Fighter Unit in Newcastle by land line or radio telephone.

The radar Operator monitored aircraft activity from an eleven inch cathode ray tube screen. Using the goniometre consisting of switches and controls of the direction and height finding components, the operator would alter the screen and make comparisons to decipher the direction, elevation and distance of the aircraft. The radar mechanics were required to regularly climb the radar towers to service relay switches and aerials.

As a fixed radar station, the ACO had some advantages over others with its quick height finding capabilities and ability to monitor aircraft movements up to 200 miles (Simmonds & Smith 1995). Radar Station 208 also served Rathmines RAAF Seaplane Base monitoring movements of Catalina's. Plotted data was communicated to the command centre, Fighter Station No 2 located 26km north of the installation.

In August 1944 Radar Station 208 ceased to be a 24 hour operation and personnel numbers were steadily reduced until January 1947 when it was disbanded.

Electronic Equipment:

The transmitter was a British MB3 model which put out 250Kw of power at 42.5 MHz. The frequency was in the VHF band which would later become a common use in television transmission. However, in 1942 this short wavelength was unfamiliar technology. The transmitter aerial system was in two parts set at different heights to enable height finding using the floodlit system. Each part had four elements to cover four sectors of 120 degrees.

The receiver was a British RF7 (receiver fixed location) model built in four vertical racks held in a frame of 2 x 2 x 0.6metres. The receiver detected radio echoes from all directions

simultaneously. The receiver compared the strength of the echo from within a radius to identify the direction from which a signal was originating. The receiver had two parts on the tower plus crossed dipoles used for the height finding of an aircraft by comparing the echoes from the higher and lower sections on the tower.

As the towers did not rotate like those commonly used in other radar models, the ACO radar installation consisted of fourteen switches on the receiver tower and more on the transmitter . These had to be constantly relayed from on to off, lower to higher and to between different directions. The switches were controlled by the radar operator from the radar console located within the bunker.

The Towers:

The towers were built to the design of the Directorate of Works for the Air Ministry in Britain by the Allied Works Council. The complex timber towers were prefabricated by Civil Construction Corps in Sydney from Australian oak supplied by the Sydney timber firm of A.E.Willis & Sons. The timber towers were fixed to steel members set in four concrete footings and placed in a north and south alignment. The complex arrangement of the structure was designed to withstand hurricanes and took a dozen men ten weeks to construct (Simmonds pers. Comm.).

Bunkers (Above Ground):

An igloo shaped above ground bunker was located close to each of the aerial towers. The bunkers were made of concrete and built to British design for withstanding bomb blasts. The bunker located in the northern part of the site housed equipment for the receiver radar equipment and the southern bunker housed the transmitter equipment. Each bunker contains a small passage leading to a turret at the coastal side of the structure. The passage and turret indicates that these bunkers were intended for underground installation, however were constructed above ground at Radar Station 208.

Associated Defence Units:

The development of the Radar Station required the involvement of several defence units prior to reaching operational stage. The complex timber towers were prefabricated by Civil Construction Corps in Sydney and built to the design of the Directorate of Works for the Air Ministry in Britain by the Allied Works Council. The site construction was carried out by the Allied Works Council. Specialist RAAF and British RAF personnel installed and calibrated electrical and radar equipment (Simmonds & Smith 1995).

Trained personnel for radar operations were a scarce resource and Britain sent an RAF installation party to assist the RAAF in the erection of the imported British ACO radar equipment. Many Australian industries were affected by a shortage of physicists during the war with the introduction of radar enticing many physicists to abandon their degree courses to obtain training in radar for the RAAF (Mellor 1958).

WAAAF:

The roles carried out by officers at radar stations in Australian were delineated by gender with airmen serving as mechanics and airwomen serving as operators. Recruitment of Women's Australian Auxiliary Air Force (WAAAF) radar operators began in May 1942 after the success of WAAF radar operators in Britain (Simmonds & Smith 1995).

The Australian government were initially unwilling to permit women in the armed services during WWII. However, RAAF's new Chief of Air Staff, Sir Charles Burnett was familiar with the Women's Auxiliary Air Force in Britain and persuaded the government to adopt the same approach in Australia.

The WAAAF came into existence in February 1941 amidst some controversy and resentment. Women in uniform was a new concept for the Australian armed forces and they were not readily accepted. Airmen believed that the presence of airwomen signalled the transfer of men to remote and dangerous places. The Minister for Air, Arthur Drakeford accepted the WAAAF but was reluctant to allow female officers into traditional male occupations. Controversy was also aired in the Australian media over equitable pay and allowances for WAAAF personnel (Thomson 1991). Initially, WAAAF personnel were recruited for menial tasks such as wireless operators, teleprinter operators and cipher clerks.

The role of 'Operator R.D.F' became dedicated to the WAAAF in October 1941 on the recommendation of Sir Charles Burnett . In making this decision Minister Drakeford insisted that living quarters of radar stations must be strictly segregated, accommodation must not be substandard and the location should not pose a risk from enemy attack (Dellit 2000). He was also concerned about possible immorality and refused several of the proposed sites because of

their isolation (Thomson 1991). In August 1942 Minister Drakeford agreed to eight of twenty five locations becoming WAAAF radar stations meaning the operators would be women.

The first radar training for WAAAF personnel commenced in July 1942. Women were selected on the basis of vision, speech, education, intelligence and ability to calculate and use maps and plans. Training was conducted in segregated classes over four weeks at the Richmond RAAF Base.

Radar Installation and Maintenance Unit:

The RAAF Radar Installation and Maintenance Unit (RIMU) was established in June 1942 to provide specialist installation, calibration and maintenance support. The unit occupied the Presbyterian Ladies College at Croydon and a depot at Figtree Bridge and often made service visits to Radar Station 208.

Fighter Sector Units:

The RAAF established Fighter Sector Units to evaluate data generated by radar stations and issue commands directly to RAAF bases to respond as necessary. The fall of Singapore generated an urgency for the establishment of these control centres and in 1942 Fighter Sector No. 2 was established in the Newcastle suburb of New Lambton. Fighter Sector No. 2 occupied the New Lambton Public School. The fighter sector commenced 24 hour operations on the 29th March 1942 and directed the fighter planes at Williamtown Air Base. It received plotted data from Radar Station 208 and other regional radars stationed at Tomaree and Ash Island.

Associated sites - Mine Camp:

RAAF and WAAAF personnel of Radar Station 208 were stationed at a small township near Catherine Hill Bay below the radar station, which once served as a camp during the early mining period. The first shipment of coal from the area was made in 1873 by the New Wallsend Coal Company. Initially a shanty town served the miners but by the 1870's a miners settlement was established boasting 20 houses (Newcastle Herald 1987). The arrival of forty five WAAAF and RAAF personnel doubled the townships population which had one shop and a post office. Additional living quarters were erected for personnel that imitated the existing housing within the township for camouflage purposes.

Some civilians remained at Mine Camp village after the war, yet numbers declined and the post office closed in 1952. In 1969 twelve dwellings remained and soon after the Housing Commission of New South Wales acquired the property. In the 1980's the village was destroyed by bush fire.

Historic Themes

Australian Theme (abbrev)	New South Wales Theme	Local Theme
7. Governing - Governing	Defence - Activities associated with defending places from hostile takeover and occupation	Observing and looking out for enemy movements -
7. Governing - Governing	Defence - Activities associated with defending places from hostile takeover and occupation	Involvement with the Second World War -

Assessment of Significance

SHR Criteria a) [Historical Significance]

The remains of the former Radar Station 208 illustrates Australia's response to the imminent threat of invasion during WWII and the role of NSW in the defence of Australia. Its setting demonstrates the importance of NSW's industrial region and military efforts for its protection during the war.

It represents a distinct stage of the introduction of radar technology that led to innovative adaptation and advancement of radar technology by Australian scientists and engineers in NSW during WWII.

SHR Criteria b) [Associative Significance]

The former Radar Station 208 is of State significance for its association with the RAAF which were given responsibility for the nation's air warning defence operations during WWII and exservice RAAF and WAAAF personnel that served during WWII. It has strong associations with the role of women WAAAF who served as radar operators during WWII.

SHR Criteria c) [Aesthetic Significance]

The technical integrity and aesthetic characteristics have been lost with the removal of associated electrical and timber fabric of the aerial towers. The siting of the above ground bunkers demonstrate an Australian adaptation.

SHR Criteria d) [Social Significance]	The former Radar Station 208 is of State significance for its association with veteran groups and RAAF and WAAAF personnel that served during WWII.
SHR Criteria e) [Research Potential]	It has potential to yield further information about NSW during WWII and its role in the network of the nation's air warning defence during this period. It is a reminder of NSW's role in the introduction and development of radar technology during the war.
SHR Criteria f) [Rarity]	The former Radar Station 208 is the only intact example of a WWII ACO radar station in NSW. It was one of nine installations established in Australia during the war, and the only one remaining of the two located in NSW. The use and development of radar is an uncommon aspect of NSW's WWII history.
SHR Criteria g) [Representitivenes]	The former Radar Station 208 retains fabric of the original layout that demonstrates the characteristics of a WWII RAAF radar installation.

Assessment Criteria Items are assessed against the **State Heritage Register (SHR) Criteria** to determine the level of significance. Refer to the Listings below for the level of statutory protection.

Procedures /Exemptions

Section of Act	Description	Title	Comments	Action Date
57(2)	Exemption to allow work	Standard Exemptions	I, the Minister for Planning, pursuant to section 57(2) of the Heritage Act 1977 on recommendation of the Heritage Council of New South Wales grant standard exemptions from section 57(1) of the Heritage Act, 1977 described in the schedule gazetted on 7 March 2003, Gaz No. 59 pages 4066-4070. (As amended on 18 June 2004 and July 2005 and incorporating guidelines as adopted in April 2004). To view the schedule click on the link below.	Jul 22 2008

Standard Exemptions for Works Requiring Heritage Council Approval

Listings

Heritage Listing	Listing Title	Listing Number	Gazette Date	Gazette Number	Gazette Page
Heritage Act - State Heritage Register		01752	22 Jul 08	90	7273

References, Internet links & Images

Type	Author	Year	Title	Internet Links
Written	Environmental Resources Management Australia	2005	Heritage Review of the WWII Radar Station located at Catherine Hill Bay	
Written	Graham Brooks & Associates	2005	Amendment to proposed SHR Listing Curtilage - RAAF Radar Station 208 , CHB	
Written	Eric Manning	2004	Nomination submission	
Oral History	Ed Simmonds	2004	(Oral History collected by Eric Manning)	
Oral History	Rober Coggins	2004	(Oral history collected by Eric Manning)	
Written	Courtney Thompson	2004	(Oral history collected by Eric Manning)	
Oral History	Charles Hammer	2003	(Oral history collected by Eric Manning)	
Written	Minnett, H., Alexander, B., Cooper, B. & Porter H	1999	'Radar and the bombing of Darwin' (in Mcleod 1999)	
Written	Bale, J	1995	Looking back to the beginning of RAAF Radar in Australia	
Written	Thomson, J A	1991	The WAAAF in Wartime Australia	
Written	Newcastle Herald	1987	Coal at Catherine Hill Bay since 1870's	

Note: Internet links may be to web pages, documents or images.

(Click on Thumbnail for Full Size Image and Image Details)

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