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Statement of environmental effects : Penrith Lakes Scheme :
development application 4 (DA4) : appendices

NSW DEPT PRIMARY INDUSTRIES



AB020029

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**STATEMENT OF ENVIRONMENTAL EFFECTS
PENRITH LAKES SCHEME**

**DEVELOPMENT APPLICATION 4
(DA4)**

APPENDICES

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November 1997

PENRITH LAKES SAND
AND GRAVEL QUARRY

DA4 - ASSESSMENT OF
AIR EMISSIONS

For:
PENRITH LAKES DEVELOPMENT CORPORATION

November 1997
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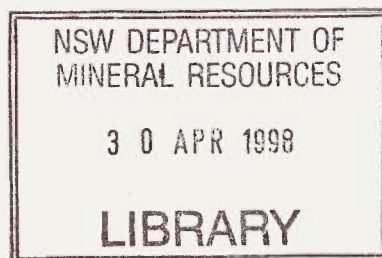


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INTRODUCTION

1.1 INTRODUCTION

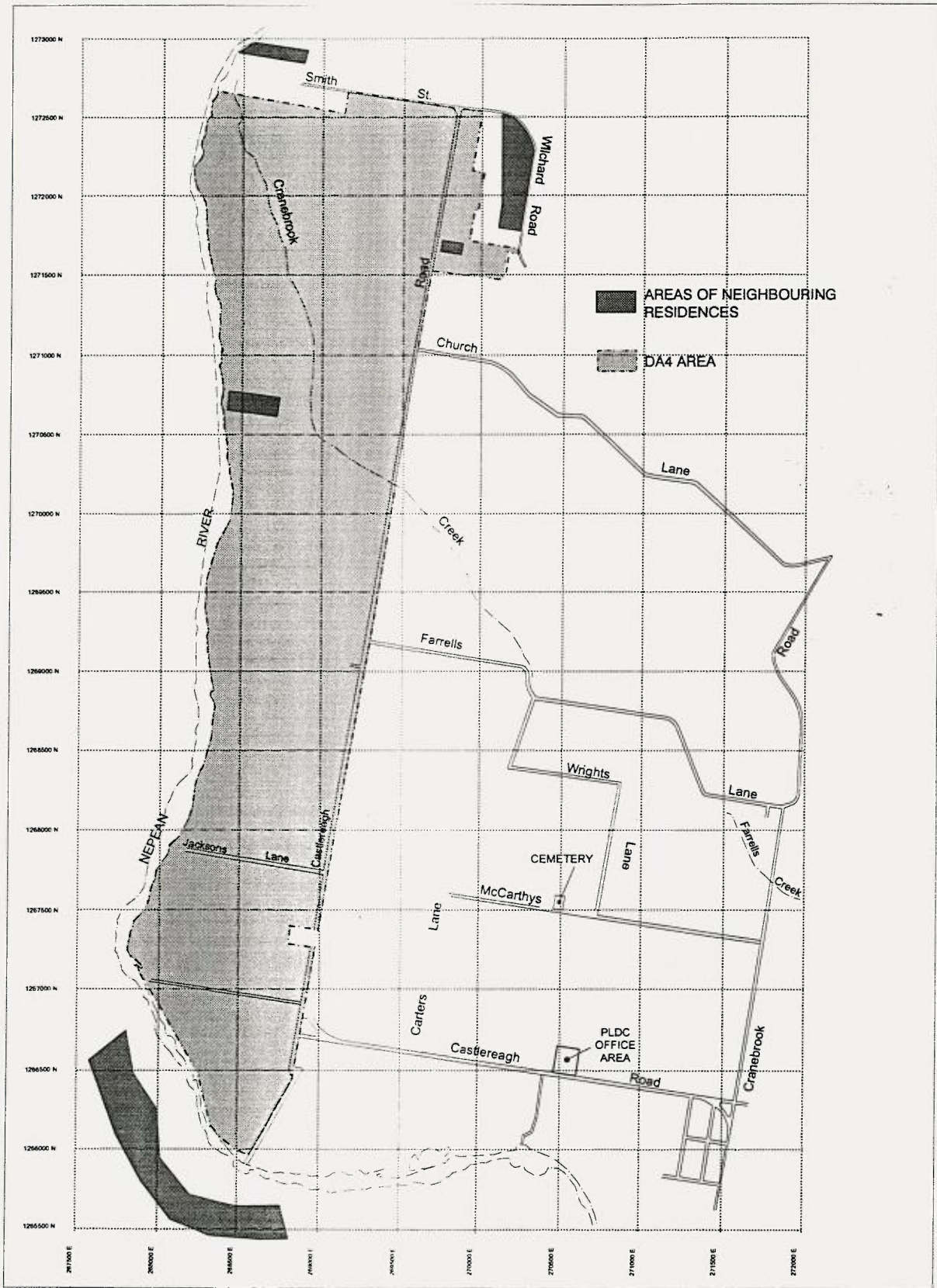
The purpose of this report is to assess the air quality impacts associated with the proposed DA4 development for the Penrith Lakes Development Corporation sand and gravel quarry.

Stage DA4 of the Penrith Lakes Development Corporation programme involves extraction of sixty nine million tonnes of sand and gravel and fifty five million cubic metres of overburden during 1998 to 2011.

The proposed development area is bounded by Castlereagh Road on the east, the Nepean River on the west and Smith Street on the north, as shown in *Figure 1.1*. The proposed development includes the closure of Castlereagh Road. *Figure 1.1* also shows residences around the site which are likely to be affected by the operation.

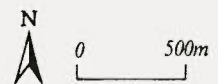
This report examines the existing ambient dust levels around the site and predicts future dust impacts due to extraction and rehabilitation involved with the quarrying operation.

The dust impacts have been assessed by comparing the predicted increase in dust concentration and fallout levels with relevant air quality criteria.



Source: Penrith Lakes Development Corporation

Figure 1.1 LOCATION PLAN



DESCRIPTION OF DA4 PROPOSAL

Penrith Lakes Development Corporation plans to progressively quarry sand and gravel and rehabilitate quarried areas as generally shown on *Figures 2.1, 2.2 and 2.3* over an estimated thirteen year period. Whilst the proposed tonnages of material to be quarried do not vary significantly over the period of the development application, total dust emissions will vary both in amount and location

The three companies involved in gravel extraction (Pioneer International Ltd., CSR Limited and Boral Limited) will be allocated specific areas that vary from year to year but follow the sequence shown on the figures.

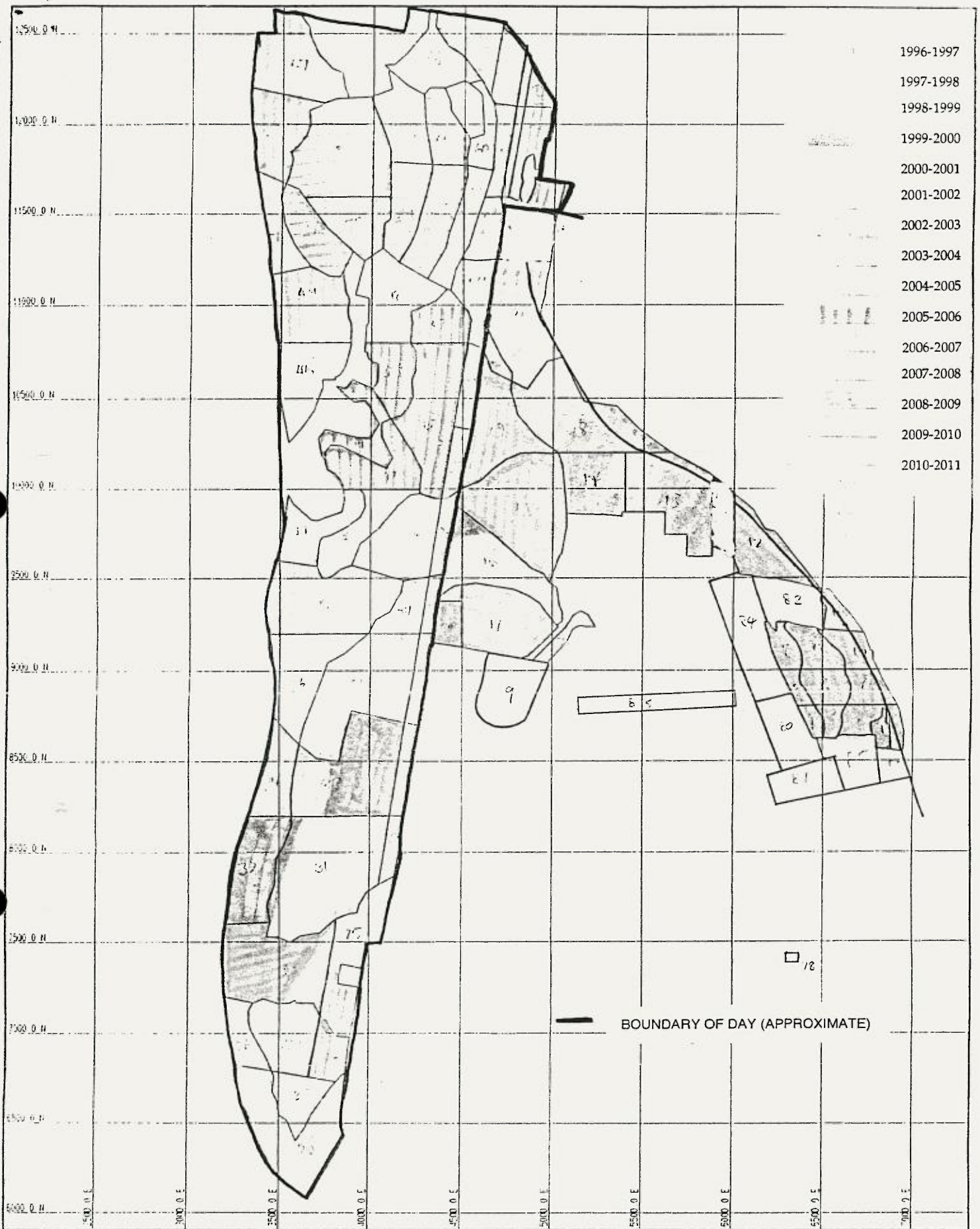
Gravel quarrying in the proposed development area involves three operations:

- removal of overburden, which varies in depth from four to ten metres;
- extraction of gravel and sand. The thickness of this layer varies from two to ten metres; and
- filling and rehabilitation of the excavated areas.

The overburden material will be used for rehabilitation of previously quarried areas and areas to be quarried during Stage DA4.

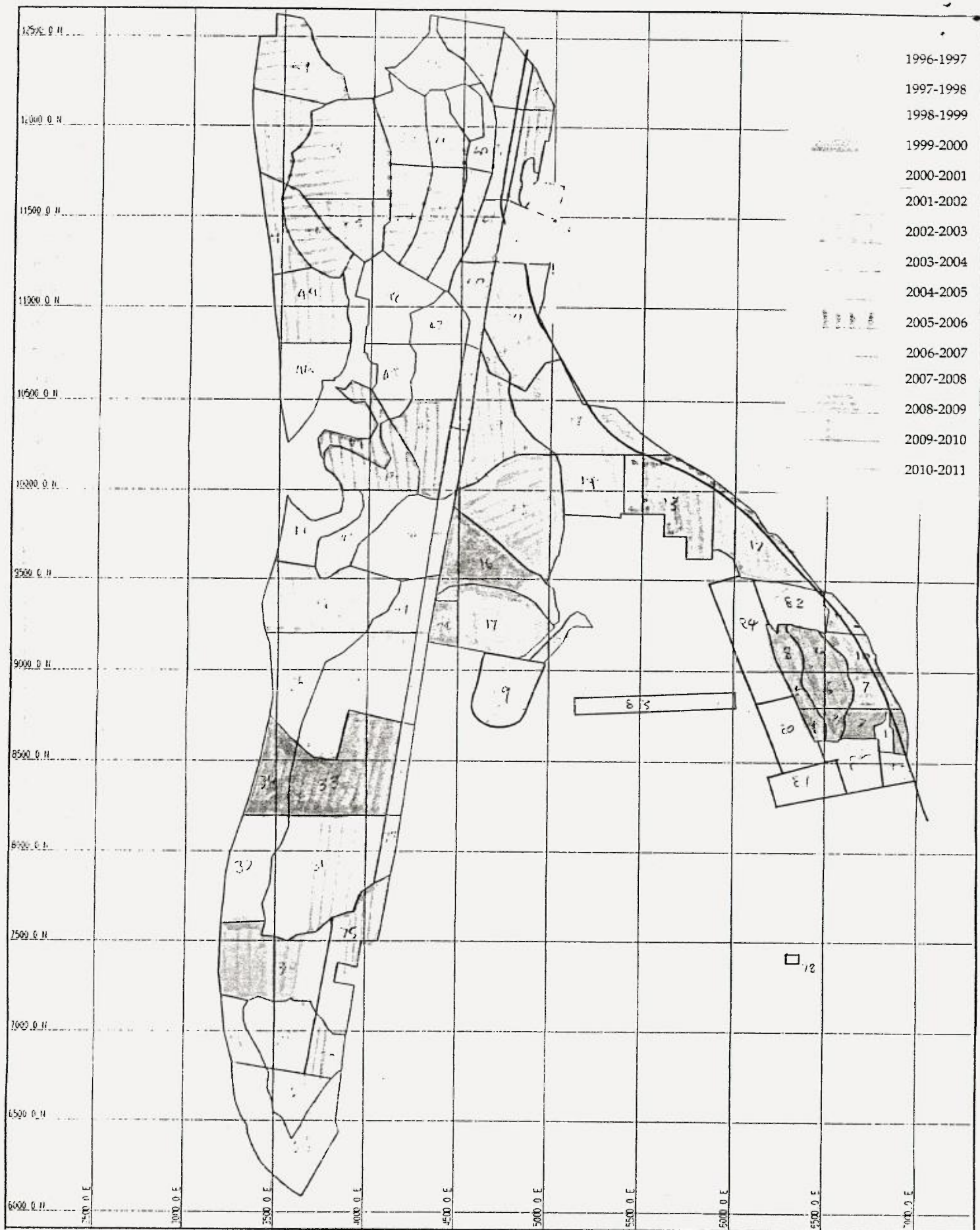
Overburden removal and rehabilitation will be carried out using scrapers and excavators. Generally, up to five months supply of sand and gravel will need to be ready for extraction at any one time. The area of pre-stripping will depend upon the depth of overburden and the demand for sand and gravel. Up to seventeen hectares could have overburden removed in advance of extraction operations. Dozers and graders are also involved in the overburden removal and rehabilitation operations.

Sand and gravel extraction is carried out by means of excavators. The material is loaded into trucks for transport to the three separate processing plants operated by the three companies. The most significant emission of dust from the gravel operations relates to the haulage of materials to the processing plants. Dust emission is related to the distance travelled and the number of trips to and from processing plants.



Source: MineConsult Pty Ltd 1996

Figure 2.1 OVERBURDEN STRIPPING PLAN



Source: MineConsult Pty Ltd 1996

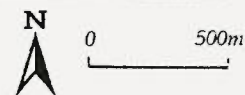
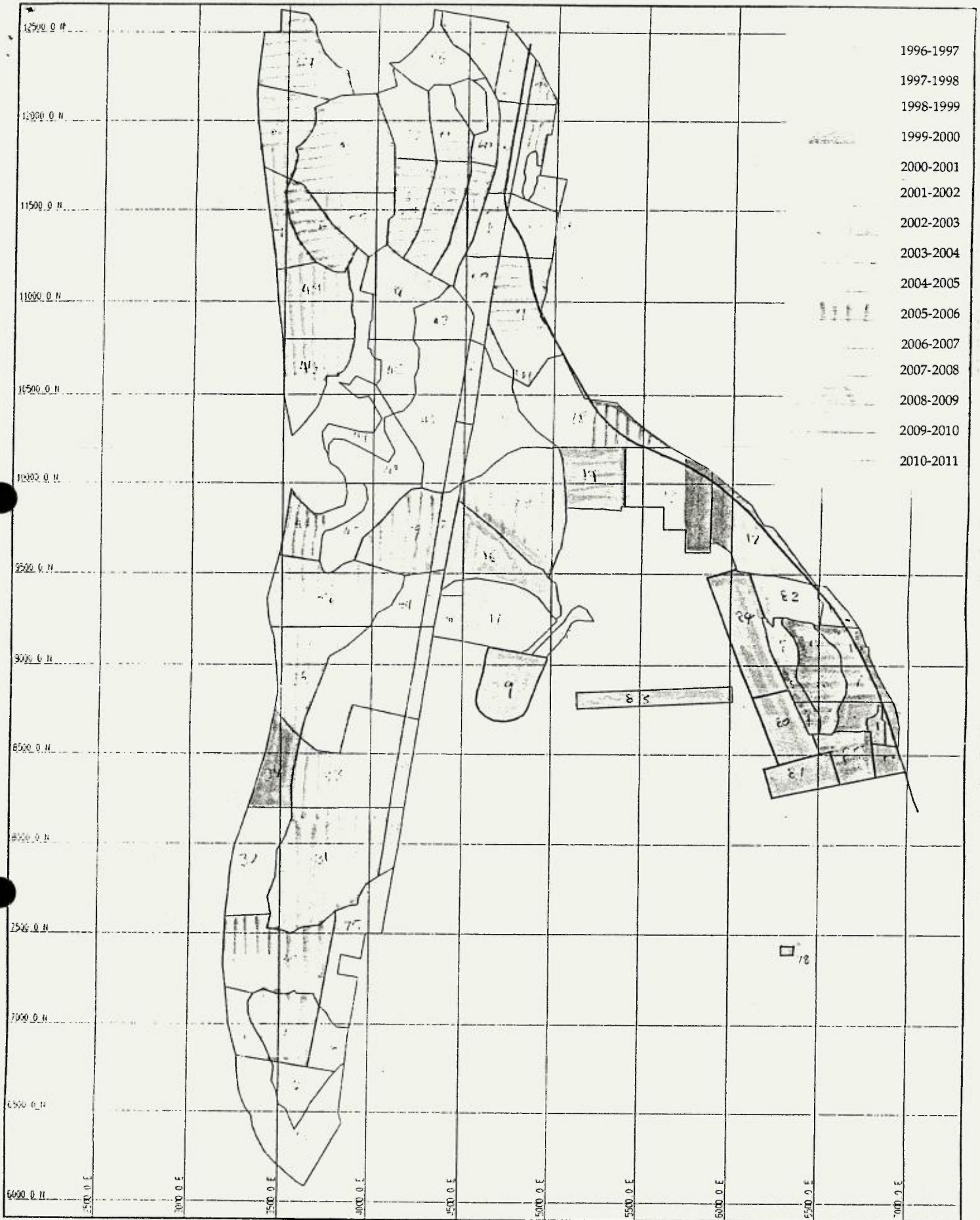


Figure 2.2 EXTRACTION PLAN



Source: MineConsult Pty Ltd 1996

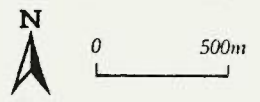


Figure 2.3 REHABILITATION PLAN

An inventory of equipment (with the potential to generate dust) proposed to be used on different quarry activities is presented in *Table 2.1*. Note that some of the equipment will be used in several activities and not all the equipment listed here will be used at all times.

Table 2.1 EQUIPMENT INVENTORY

Equipment	Number
<i>Extraction pit</i>	
Excavator - Cat 5130	2
Trucks - Komatsu D985 or Cat 777d	4
<i>Extraction haulage</i>	
Trucks - Komatsu D985 or Cat 777d	7
Grader (Cat 14 or 16)	1
Water Cart (Euclid or Wabco ACF)	2
<i>Stripping Operation</i>	
Excavator (PC 7105E, PC1000, Demag H2855)	3
Trucks (2 - 85T, 2 - 50T, 2 - 120T)	6
Scrapers (Cat 637 or 657)	2
<i>Overburden Haulage</i>	
Trucks (3- 120T, 2 - 50T)	5
Grader (Cat 14 or 16)	1
Water cart (Komatsu WS23)	1
<i>Filling</i>	
Dozers (D9L)	2
Compactors (Cat 825)	3
Trucks (1- 50T, 1-85T, 1-120T)	3
Water Cart (Komatsu HD465 WTC)	1
Grader (Cat 14 or 16)	1
<i>Rehabilitation</i>	
Scrapers (Cat 657)	4
Compactors (Cat 825)	3
Grader (Cat 16)	1
Grader (Cat 14)	1
Tractor (John Deere, Koboda, JCB Backhoe)	3
Dozer (Cat 824)	1
Dozer (Cat 834 rubber tyred)	1
Dozer (Cat D9L tract)	2
Dozer (Komatsu D65 Suamp)	1
Dozer (Cat D7 and D3)	2

REVIEW OF WEATHER DATA

3.1 DATA REQUIREMENTS

A dispersion model has been used to predict dust deposition rates and dust concentrations in the vicinity of the quarry. The model requires as input, information about the dispersion characteristics of the area. In particular, data are required on wind speed, wind direction and atmospheric stability class. The weather data used in this assessment were collected in 1992 and 1993 at a meteorological station near Penrith.

3.2 WIND DATA

The annual average wind speed was 2.0 metres per second, which is considered light to moderate, while 48.1 per cent of winds were less than 1.5 metres per second (m/sec). Wind patterns are highly directional. On an annual basis the most common winds are from the south and south-west. Winds from these directions are predominantly low speed. A similar pattern persists throughout the year, with southerly winds dominating, but north and north-easterly winds are more common in summer and spring while westerly winds increase proportionately in winter.

Wind speed also influences the dust emitted from disturbed soil areas. Wind erosion of such areas occur only when the wind speed is more than 5.4 m/sec, which occurs 4.5% of the time on an annual basis.

3.3 STABILITY CLASS

Stability class is used by dispersion models to determine the rate at which the plume grows by the process of turbulent mixing. Each stability class is associated with a dispersion curve, which is used by the model to calculate the plume dimension and dust concentration at points downwind of the source.

Frequency of occurrences of stability classes for the weather data used for the dispersion modelling are shown in *Table 3.1*.

Table 3.1 FREQUENCY OF OCCURRENCE OF STABILITY CLASSES FOR 1992 & 1993

Stability Class	Percentage of Occurrence
A	27
B	22
C	2.5
D	4
E	2.5
F	42
TOTAL	100

Stability Class A applies under sunny conditions with light winds when dispersion of the plume is at its most rapid. Stability Class D applies under windy and/or overcast conditions when dispersion is moderately rapid, and stability Class F applies at night when winds are light and the sky is clear. Dispersion under Class F conditions is poor. Classes B, C and E describe intermediate conditions between those described above.

3.4 RAINFALL

Rainfall data are collected by the Bureau of Metrology in the Penrith region. Data for mean rainfall and numbers of raindays for the years 1987 to 1992 are shown in Table 3.1. The average annual rainfall over this period was 1054.7mm and the mean number of raindays per year was 127. The Table also shows the rainfall in 1995 and number of raindays in that year.

Table 3.2 PENRITH RAINFALL DATA

Year	Rainfall (mm)	Rain days
1995	627	74
1992	1072.2	134
1991	784.6	101
1990	1317.8	130
1989	971.6	148
1988	1241.0	122
1987	941.0	-

EXISTING AIR QUALITY

4.1 DUST DEPOSITION

Dust deposition and concentration levels depend strongly on the distance from the source of dust and the prevailing meteorological conditions.

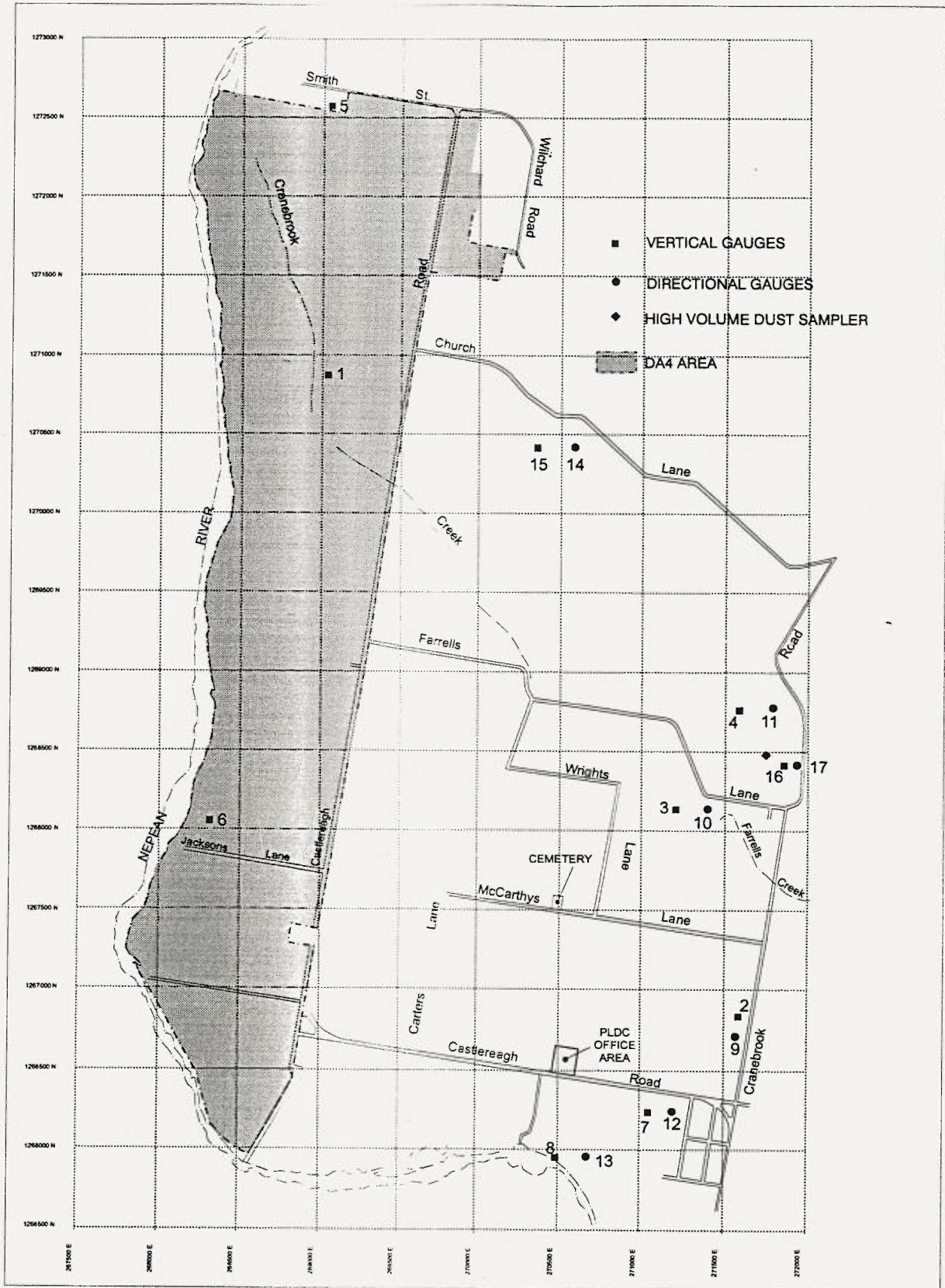
To determine background levels of dust deposition in the area around the site, a monitoring program was commenced in July 1992. This program measures dust deposition at eight positions around the site. In addition, five directional gauges were located around the site. Gauge locations are given on *Figure 4.1*.

Results for the years 1995 and 1996 are reviewed in this section to establish existing air quality. Results from the deposition gauges are shown in *Table 4.1* and *Table 4.2*. *Table 4.3* and *Table 4.4* show results from directional gauges. Directional gauges provide a method of identifying dust sources.

Existing air quality at northern (Smith Lane) and eastern (Wilchard Road) residences can be represented by the deposition recorded on the vertical gauge no. 5. This gauge shows an annual average deposition of 2.14 and 2.54 g/m²/month for 1995 and 1996 respectively. The records from the directional gauge 14 indicate that most of the deposition in 1996 was from the west and south directions. This could be from DA3 operations.

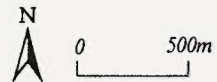
Existing air quality at central residence can be represented by the deposition recorded on the vertical gauge no. 1. This gauge shows an annual average deposition between 3.19 and 3.38 g/m²/month for the years 1995 and 1996. There was no directional gauge close to the central residences.

Vertical gauge 8 can approximately represent existing air quality at the south residences. However, the gauge is at a considerable distance from these residences, and may not provide data which are as representative as those available for the other residences. The annual average deposition recorded at this gauge for 1995 and 1996 is 2.81 and 2.71 g/m²/month respectively. The directional gauge 13, located close to vertical gauge 8, shows depositions mainly from the west for 1995 and from the west and north for 1996.



Source: Penrith Lakes Development Corporation

Figure 4.1 LOCATION OF GAUGES



A noteworthy aspect of these monitoring results was high combustible content in the depositions, which was found to range between 25% to 30% or more on some occasions. The combustible content is due to material which is generally organic in nature.

Table 4.1 MEASURED DUST DEPOSITION FOR 1995, g/m²/month

Site	Jan.	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Mean
1	2.35	3.98	3.62	3.45	2.85	3.57	2.78	2.95	4.37	2.85	3.18	4.64	3.38
2	2.59	3.57	3.32	2.13	3.89	DNE	DNE	DNE	DNE	DNE	DNE	DNE	3.10
3	3.35	3.24	2.57	2.17	2.77	1.78	2.09	H2O	3.91	4.19	7.14	5.74	3.54
4	2.1	3.29	2.78	1.15	2.187	1.25	3.49	2.99	4.04	*	3.4	3.74	2.77
5	3.13	3.39	2.26	0.87	2.19	1.02	1.13	1.54	2.2	3.71	2.34	1.94	2.14
6	5.47	4.73	3.06	1.71	2.32	1.45	2.39	4	3.54	5.48	4.23	6	3.70
7	2.39	2.98	5.03	2.46	4.17	2.05	4	3.67	3.92	2.91	4.13	3.71	3.45
8	2.45	3.05	5.59	0.91	3.71	2.05	*	1.94	3.39	2.12	2.84	2.85	2.81
15	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	3.19	3.19
16	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE

Notes: * = Equipment broken and therefore replaced. DNE=Did not exist.

Table 4.2 MEASURED DUST DEPOSITION FOR 1996, g/m²/month

	Jan	Feb	Mar	April	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
1	3.89	3.54	3.44	3.03	3	4.56	2.32	3.50	2.07	2.56	N.A.	N.A.	3.19
2	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	N.A.	N.A.	DNE
3	3.05	3.23	3.33	4.96	2.07	1.6	1.14	4.75	3.48	3.15	N.A.	N.A.	3.08
4	3.92	5.13	5.22	DNE	DNE	DNE	DNE	DNE	DNE	DNE	N.A.	N.A.	4.76
5	2.43	3.3	1.82	2.94	1.31	7.08	1.14	1.94	1.54	1.92	N.A.	N.A.	2.54
6	2.55	3.79	2.85	2.11	2.46	1.23	3.88	11.54	2.28	2.98	N.A.	N.A.	3.57
7	4.07	3.97	4.01	3.67	3.99	2.03	3.59	3.21	2.86	3.51	N.A.	N.A.	3.49
8	7.51	2.52	2.32	2.15	2.37	1.57	1.58	1.65	3.02	2.41	N.A.	N.A.	2.71
15	2.67	3.37	2.93	4.91	2.18	1.09	1.44	2.91	3.61	3.92	N.A.	N.A.	2.90
16	DNE	DNE	DNE	DNE	2.19	1.47	2.11	4.55	3.81	3.86	N.A.	N.A.	3.00

Notes: * Equipment broken and therefore replaced.
DNE - Did not exist.

Table 4.3 MEASURED DIRECTIONS AND DEPOSITIONS FOR 1995,
g/m²/month

	Jan	Feb	Mar	April	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
9	0.47 E	4.31 W	0.87 W	0.41 W	2.44 W	DNE DNE	DNE DNE	DNE DNE	DNE DNE	DNE DNE	DNE DNE	DNE DNE
10	0.66 N	4.36 W	1.13 N	0.48 W	1.47 W	1.25 W	0.78 W	2.19 W	1.28 W	15.6 S	X X	5.34 W
11	0.6 N	1.74 W	0.83 W	0.32 W	0.94 W	0.46 W	0.53 W	0.84 W	1.52 W	2.54 W	X X	6.29 W
12	1.02 W	4.27 N	0.73 W	1.84 N	1.6 N	0.44 S	1.15 N	0.87 E	2.02 W	1.4 W	X X	1.31 W
13	0.59 W	0.8 E	0.39 S	0.69 W	1.01 W	1.01 W	1.49 W	1.24 W	2.39 W	2.34 W	X X	3.2 W
14	DNE DNE	DNE DNE	DNE DNE	DNE DNE	DNE DNE	DNE DNE	DNE DNE	DNE DNE	DNE DNE	DNE DNE	DNE DNE	8.21 W
17	DNE DNE	DNE DNE	DNE DNE	DNE DNE	DNE DNE	DNE DNE	DNE DNE	DNE DNE	DNE DNE	DNE DNE	DNE DNE	DNE DNE

Notes: DNE = Did not exist W = West, E = East, N = North, S = South X = Contaminated results (insect infestation)

Table 4.4 MEASURED DIRECTIONS AND DEPOSITIONS FOR 1996,
g/m²/month

	Jan	Feb	Mar	April	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
9	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE	DNE
10	1.33	3.09	12.2	1.15	0.5	0.41	1.46	3.34	3.72	N.A.	2.46	N.A.
	W	N	N	E	S	W	W	W	W	0	N	
11	1.23	1.47	1.04	1.23	0.41	DNE	0	0	0	N.A.	0	N.A.
	N	S	N	S	S	0	0	0	0	0	0	
12	1.64	0.56	0.61	1.12	0.54	0.57	1.27	0.74	1.77	N.A.	1.32	N.A.
	N	S	S	E	S	W	N	W	W	0	S	
13	1.14	0.76	0.46	1.36	0.69	0.73	1.66	0.31	1.69	N.A.	1.01	N.A.
	W	W	E	E	S	N	N	W	N	0	W	
14	1.67	0.96	0.75	1.04	0.75	0.63	0.95	1.01	1.3	N.A.	2.81	N.A.
	N	W	E	S	S	N	W	W	W	0	N	
15	DNE	DNE	DNE	DNE	DNE	0.32	1.59	0.17	1.55	N.A.	1.7	N.A.
	DNE	DNE	DNE	DNE	DNE	S	E	S	N	0	W	

Notes: DNE - Did not exist W = West E = East N = North S = South X = Contaminated results (insect infestation)

4.2 DUST CONCENTRATION

The monitoring program also included the measurement of Total Suspended Particles (TSP) concentrations at one location near the site (see Figure 4.1). These data are obtained using a high volume sampler and the results are summarised in Table 4.5.

Table 4.5 MEASURED DUST CONCENTRATIONS FOR 1995 AND 1996, $\mu\text{g}/\text{m}^3$

	Jan	Feb	Mar	April	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
1995	41.7	77.3	79.3	47.9	45.12	40.9	70.6	125	74.7	120	236	214	97.7
1996	108	58.8	119	88.9	30.3	57.3	66	92.3	102	82.2	91.9	N.A.	81.1

N.A. = not available

Results for 1995 and 1996 show concentrations of TSP which are above or close to the EPA criterion of $90 \mu\text{g}/\text{m}^3$ (see Chapter 5). However, for these measurements the sampler was located within the DA3 area, and concentrations therefore reflect emissions from that source, rather than general concentrations throughout the area. Although data indicating existing dust concentrations over a wider area are not available, these are expected to be substantially lower than those shown above, and are assumed in the following analysis to be of the order of $30 \mu\text{g}/\text{m}^3$.

AIR QUALITY CRITERIA

The effects of dust on health and amenity can be assessed by comparing dust deposition rates and dust concentration levels with recognised air quality criteria established in New South Wales and overseas.

The National Health and Medical Research Council of Australia (NHMRC) recommends a maximum atmospheric particulate concentration level of 90 $\mu\text{g}/\text{m}^3$ (annual average) to protect public health in residential environments. This level is generally endorsed by the Environment Protection Authority (EPA).

The EPA has established air quality goals for dust deposition. These are based on an incremental approach in which the acceptable increase in dust deposition depends on the existing level. *Table 5.1* summarises the criteria.

Table 5.1 NSW EPA DUST DEPOSITION GOALS

Existing Dust Level g/m ² /month (annual average)	Maximum Acceptable Increase Over Existing Dust Level, g/m ² /month (annual average)	
	Residential	Other Areas
2	2	2
3	1	2
4	0	1
Above 4	0	0

For example, in semi-rural areas with annual average deposition levels of 2 g/m²/month, an increase of up to 2 g/m²/month (annual average) would be permitted before it is considered that a significant degradation of air quality had occurred.

Based on this criterion and the existing air quality discussed in Chapter 4, the increase in the annual average depositions at the residences around DA4 should not be more than as listed in *Table 5.2*. However it may be noted the existing levels of deposition and concentration appear to be mainly due to the DA3 operations, and therefore may vary with changes in the activities in the DA3 and will reduce as the operations in DA3 come to end. Also, not all gauges are located in the immediate

vicinity of the residences, and considering that the dust fallout generally occurs within a few hundred metres of the source, the existing levels at such residences are likely to be lower than those listed in the table.

Table 5.2 PERMISSIBLE INCREASE IN DEPOSITION RATE, g/m²/month

Residences	Existing level of deposition	Acceptable increase in the level of depositions	Acceptable level of depositions
North	2.34	1.66	4.0
East	2.34	1.66	4.0
Central	3.29	0.71	4.0
South	2.76	1.24	4.0

DUST EMISSIONS

Detailed emission inventories of atmospheric dust were prepared from dust emission factors for each operation within the quarry. The emission factors were derived from data developed by the NSW Environment Protection Authority (EPA) and by the US EPA. A list of individual activities, emission factors adopted and the source is given in *Table 6.1*.

Table 6.1 EMISSION FACTORS

Operation/Activity	Emission factor**	Reference
Wind Erosion	0.40 kg/ha/hr	SPCC (1983)
Dumping	0.01 kg/t	SPCC (1983)
Haulage*	1.0 kg/km	SPCC (1988)
Loading operations	0.01 kg/t	US EPA (1985)
Scraper	14 kg/hr	US EPA (1990)
Dozers & Compacters	7.3 kg/hr	US EPA (1990)
Grader	0.62 kg/km	US EPA (1990)

Notes: * Dust suppression system operating.

** kg = kilogram, ha = hectare, hr = hour, t = tonne, km = kilometre, m = metre

These emission factors were used to prepare a detailed dust emission inventory for the proposed quarry operation. The total annual emission of dust was calculated for four different years of operations according to their proximity to the four residential areas. These are representative of the worst case conditions at these residences throughout the proposed operational period. Dust emissions for these years are shown in *Table 6.2*. Tables in Appendix A show a break up of these emissions. *Table 6.2* also shows the amount of sand and gravel produced and overburden relocated.

Table 6.2 TOTAL DUST EMISSIONS FOR MODELLED YEARS

Year of operation	Closest residences	Sand & Gravel produced (MTPA)	Overburden Relocated (M cu. m.)	Dust emissions (kg/year)
2005-2006	North East of DA4	4.84	4.85	1,922,216
2007-2008	Centre of DA4	5.0	4.6	1,719,610
2009-2010	North of Smith Lane	5.2	5.3	1,961,095
2010-2011	South of DA4	5.3	3.6	1,426,826

MTPA - million tonnes per annum

M cu. m. million cubic metres

The difference in the total dust emissions is mainly due to different haulage distances and the annual throughput of the mine during the year.

It is assumed for calculation purposes that:

- all operations namely stripping, extraction and filling are not likely to take place simultaneously in one zone;
- all roads will be watered to suppress dust. Dust suppressant is used to increase watering efficiency; and
- loose overburden will be watered with additives to control dust and erosion.

In addition to the estimated dust emission rates from each activity with the quarry, it is necessary to provide the model with information about the proportion of dust in different particle size categories. Table 6.3 summarise the data used in the dispersion model.

Table 6.3 PARTICLE SIZE DISTRIBUTION BY MASS FROM MINING OPERATIONS (PERCENTAGE)

Operation/Activity	% Fine Particle (0 to 2.5 μ m)	% Inhalable particles (2.5 to 15 μ m)	% Coarse particles (> 15 μ m)
Wind Erosion	0.00%	67.00%	33.00%
Loading	6.00%	57.00%	37.00%
Dumping	4.00%	49.00%	47.00%
Haulage	6.00%	53.00%	41.00%
Dozer	6.00%	48.00%	46.00%
Scraper	6.00%	53.00%	41.00%
Graders	6.00%	48.00%	46.00%

PREDICTION OF AIR QUALITY IMPACTS

7.1 METHODOLOGY

Air quality impacts have been assessed using a computer-based dispersion model known as DUSTGLC. DUSTGLC has been widely used in the Hunter Valley and has been validated for two operating mines in that area.

The estimated rates of dust emissions were applied with the meteorological data to calculate dust dispersion. A computer plotting routine was used to draw isopleths of the predicted dust deposition rates and concentrations of total suspended particulates in air.

Four different years of operation were modelled depending upon the proximity of each block of residences to the operations in that year. The residences and the year of operation in which they are likely to be most affected are listed in *Table 7.1*

Table 7.1 MODELLED YEARS OF OPERATION

Residences	Year of operation
North East of DA4	2005-2006
Centre of DA4	2006-2007
North of Smith Lane	2009-2010
South of DA4	2010-2011

Contours indicating calculated levels of dust deposition and concentration for each year are presented in *Figures 7.2* to *7.9*.

In addition to these general contours, specific calculations were performed for four special receptor sites, representing residences along Wilchard Road (see *Figure 7.1*). These residences are relatively close to the site, and it was considered useful to provide more precise predicted dust levels at these locations. Predicted TSP dust fallout and concentration levels for these residences are as shown in *Table 7.2* and *Table 7.3* respectively.

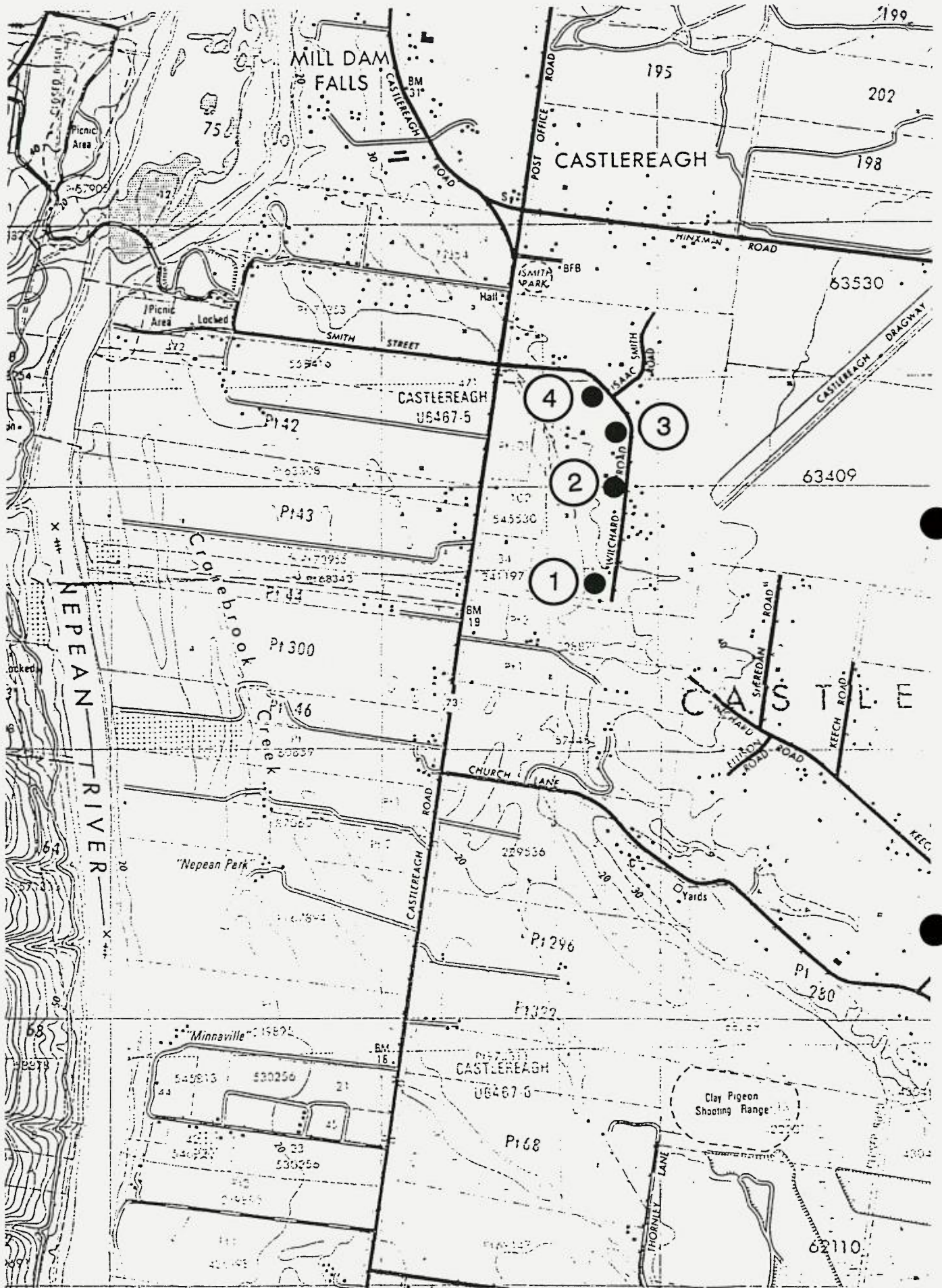


Figure 7.1 LOCATION OF RECEPTORS ALONG WILCHARD ROAD



Table 7.2 PREDICTED INCREASE IN DEPOSITION RATES AT RECEPTORS ALONG WILCHARD ROAD, g/m²/month

Receptor	Year of Operation			
	2005-2006	2006-2007	2009-2010	2010-2011
1	1.1	1.4	1.1	0.4
2	0.7	1.4	0.9	0.3
3	0.5	1.1	0.7	0.2
4	0.5	1.3	0.8	0.2

Table 7.3 PREDICTED INCREASE IN TSP CONCENTRATIONS AT RECEPTORS ALONG WILCHARD ROAD, µg/m³

Receptor	Year of Operation			
	2005-2006	2006-2007	2009-2010	2010-2011
1	60	64	54	21
2	42	57	45	17
3	35	51	40	15
4	31	59	45	14

7.2 RESULTS

7.2.1 Year 2005-2006

Operation in this year occurs closest to the residences on the north east side of DA4. It also covers the Camenzuli residence within the DA4 area. *Figure 7.2* and *Figure 7.3* show the isopleths for the annual average deposition and concentration respectively for this year. As seen from *Table 7.2* and *Figure 7.2*, depositions at the Wilchard road residences range from 0.5 to 1.1 g/m²/month. This rate of deposition is less than EPA criterion of 1.66 g/m²/month applicable for this area. *Table 7.3* and *Figure 7.3* shows that the increase in concentration of total suspended particles (TSP) near these residences range from 30 to 60 µg/m³. Based on this the total TSP concentrations are likely to remain below the NHMRC recommendation of 90 µg/m³.

Due to the proximity of the Camenzuli residence to the quarrying operations, the permissible limits of increase in TSP concentrations and depositions are likely to be exceeded. Appreciating this fact, PLDC has committed to undertake discussion with the residents prior to commencing work in this area.

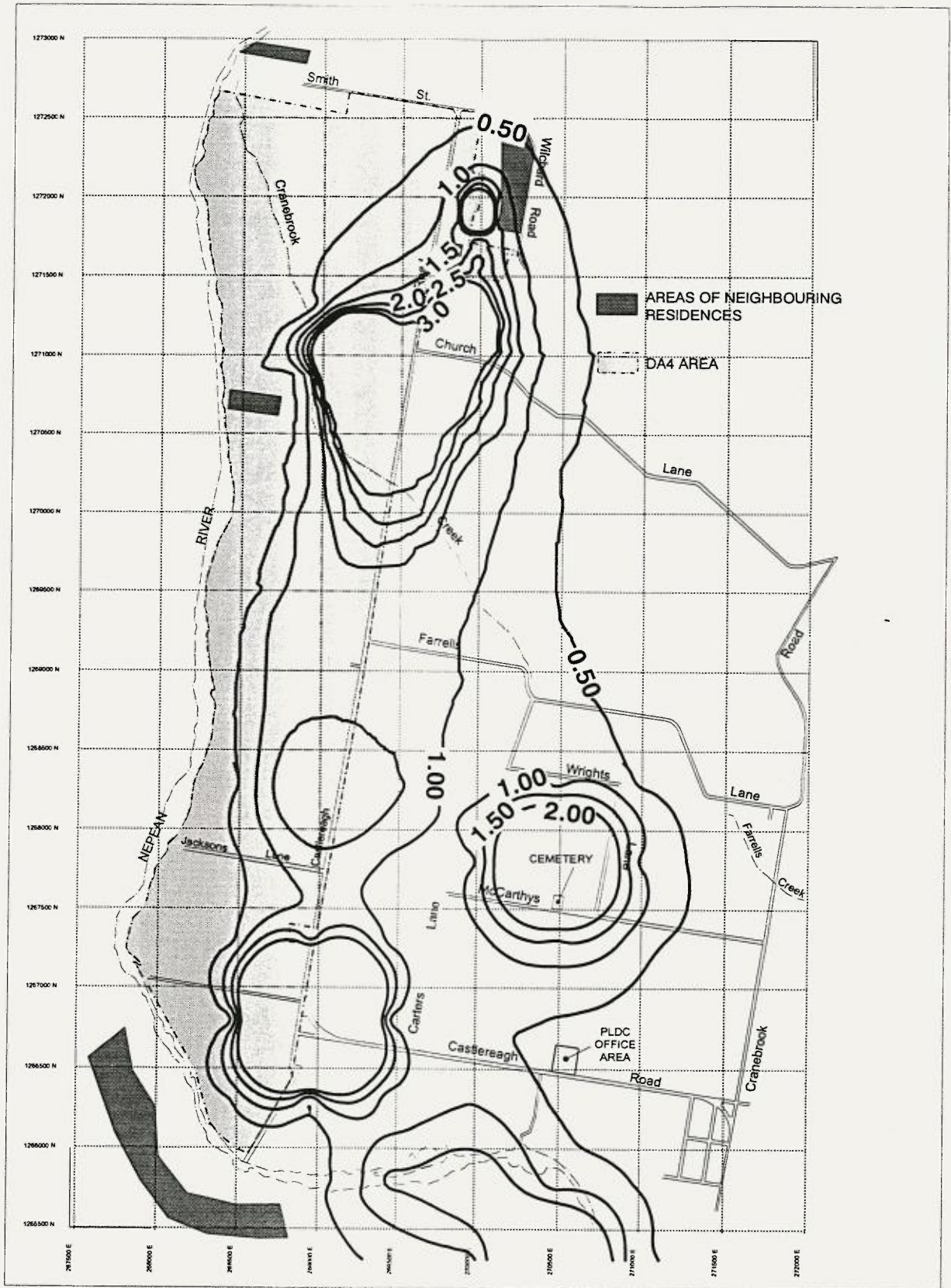
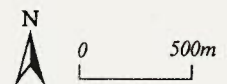


Figure 7.2 PREDICTED INCREASE IN ANNUAL AVERAGE DUST DEPOSITION FOR 2005 - 2006 ($\text{g/m}^2/\text{month}$)



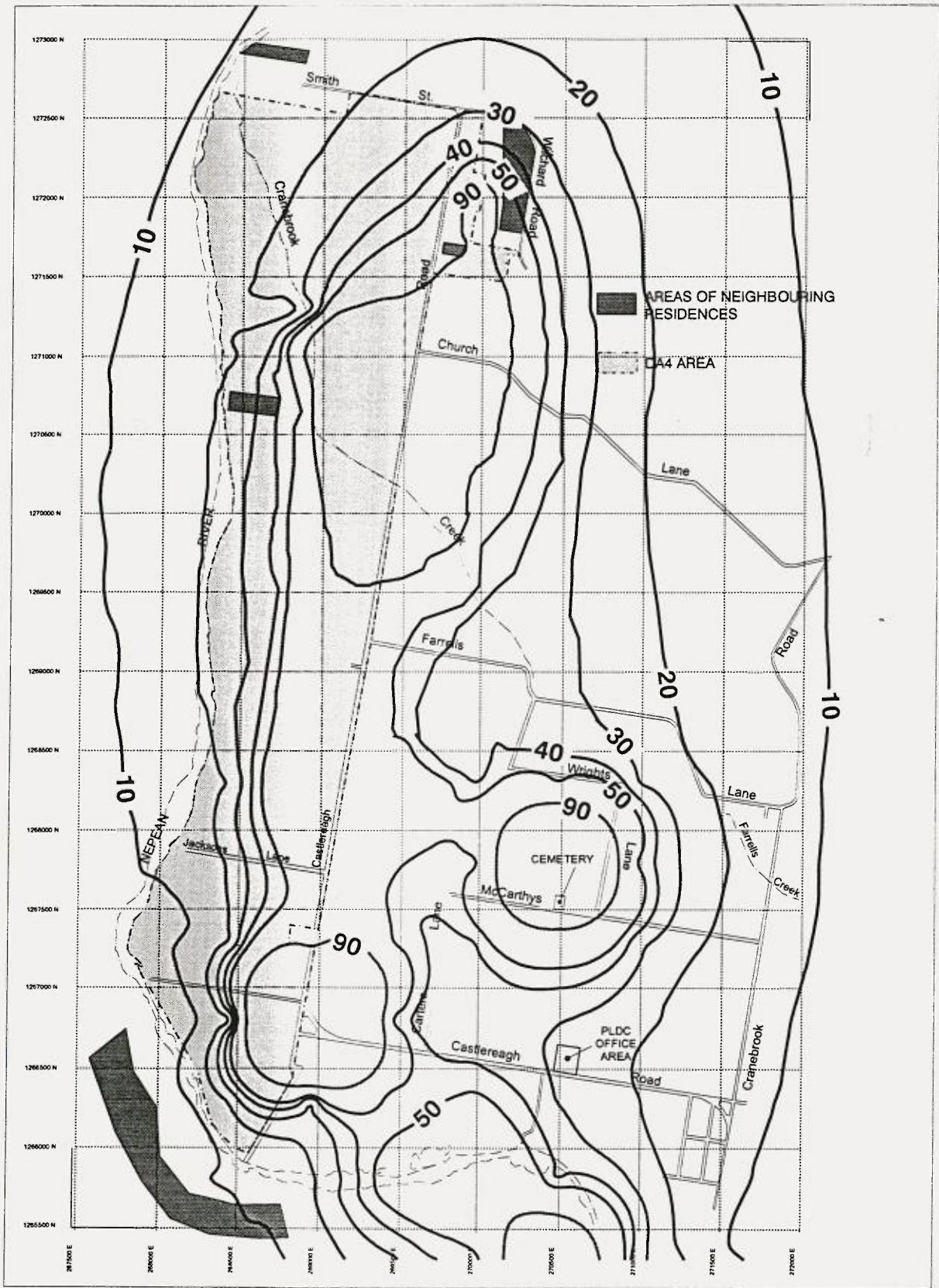
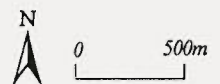


Figure 7.3 PREDICTED INCREASE IN ANNUAL AVERAGE DUST CONCENTRATIONS FOR 2005 - 2006 ($\mu\text{g}/\text{m}^3$)



Impact of the operation in this year is not seen for other residences to the north, south and in the centre of the DA4. The deposition and concentration of TSP is nominal and is predicted to be well within the relevant criteria.

7.2.2 Year 2006-2007

Operation in this year occurs closest to the residence within the DA4 near the western boundary - the Dixon residence. *Figure 7.4* and *Figure 7.5* show the isopleths for the annual average deposition and concentration respectively for this year. *Figure 7.4* shows an increase in deposition of around 2.0 g/m²/month near the residence. This rate of deposition exceeds the EPA criterion of 0.71 g/m²/month applicable for this area. *Figure 7.5* shows the increase in concentration of total suspended particles (TSP) near this residence to be approximately 90 µg/m³, which is equal to NHMRC recommendation of 90 µg/m³ for total dust concentration.

The contours shown in these diagrams represent worst-case locations for equipment, and annual average values of deposition and concentration are expected to be somewhat lower than those shown. However, it is likely that for this year, annual average values of these parameters could exceed the relevant criteria at this residence. PLDC has therefore committed to undertake discussions with the resident prior to commencing operations in the area.

Table 7.2 and *Table 7.3* show the predicted increase in depositions and TSP concentrations at the residences along Wilchard Road during this year. The maximum deposition increase is 1.4 g/m²/month which is less than the acceptable increase for this area. The maximum TSP concentration increase is 64 µg/m³. As noted above, the modelled dust concentration represents the maximum likely concentration for this period, and may not be sustained throughout the year. It is therefore likely that the total annual average concentration will not exceed the NHMRC recommendation of 90 µg/m³.

At other residences to the north, south and in the centre of the DA4, the deposition and concentration of TSP is nominal and is predicted to be well within the relevant criteria.

7.2.3 Year 2009-2010

Operations in this year occur closest to the residences north of DA4. *Figure 7.6* and *Figure 7.7* show the isopleths for the annual average deposition and concentration respectively for this year. As seen from *Figure 7.6*, an increase in the deposition of less than 1 g/m²/month is likely to occur due to the quarrying operation for some residences in this area. This rate of deposition is less than EPA criterion of 1.66

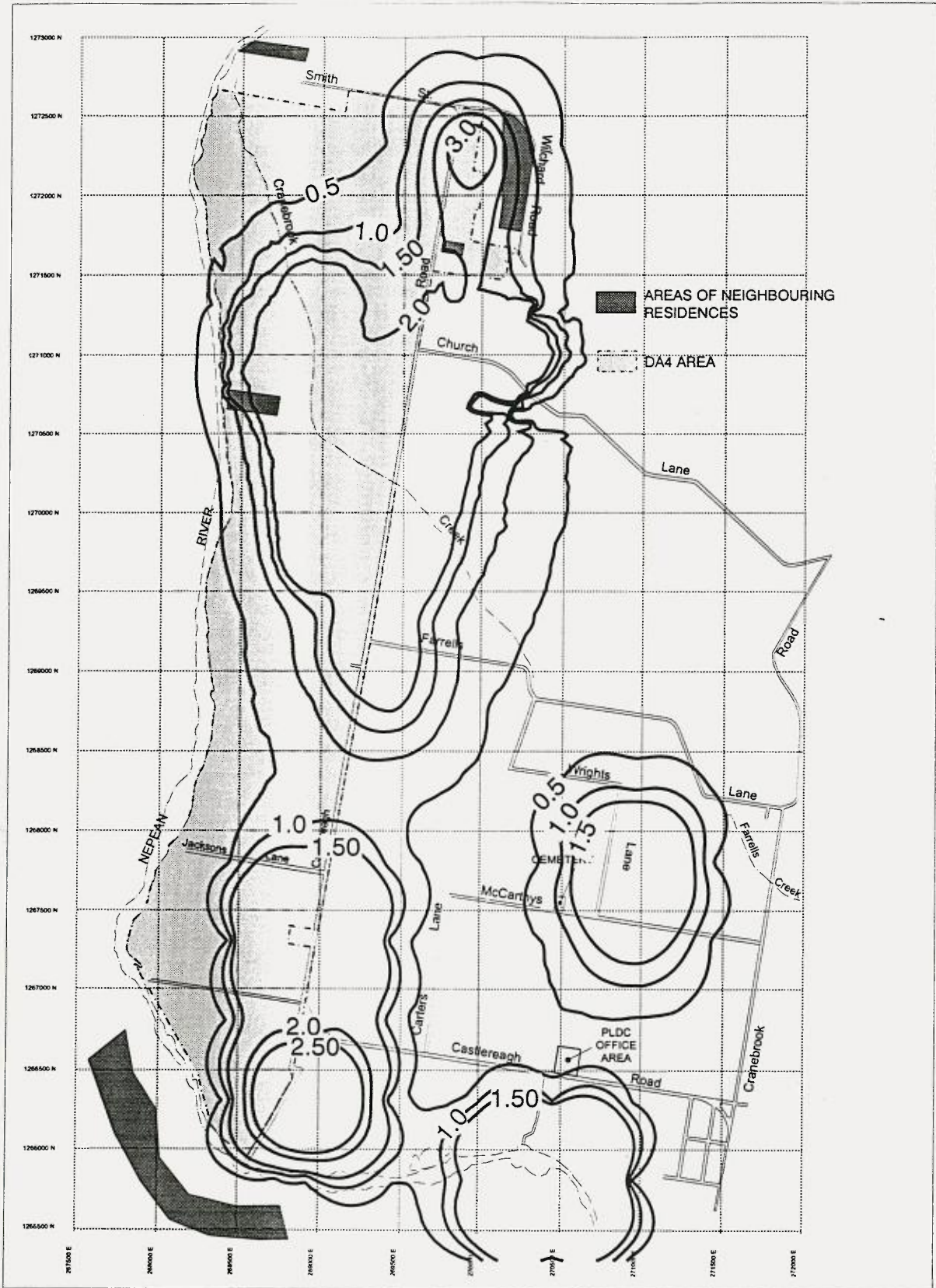
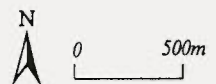


Figure 7.4 PREDICTED INCREASE IN ANNUAL AVERAGE DUST DEPOSITION FOR 2006 - 2007 ($\text{g}/\text{m}^2/\text{month}$)



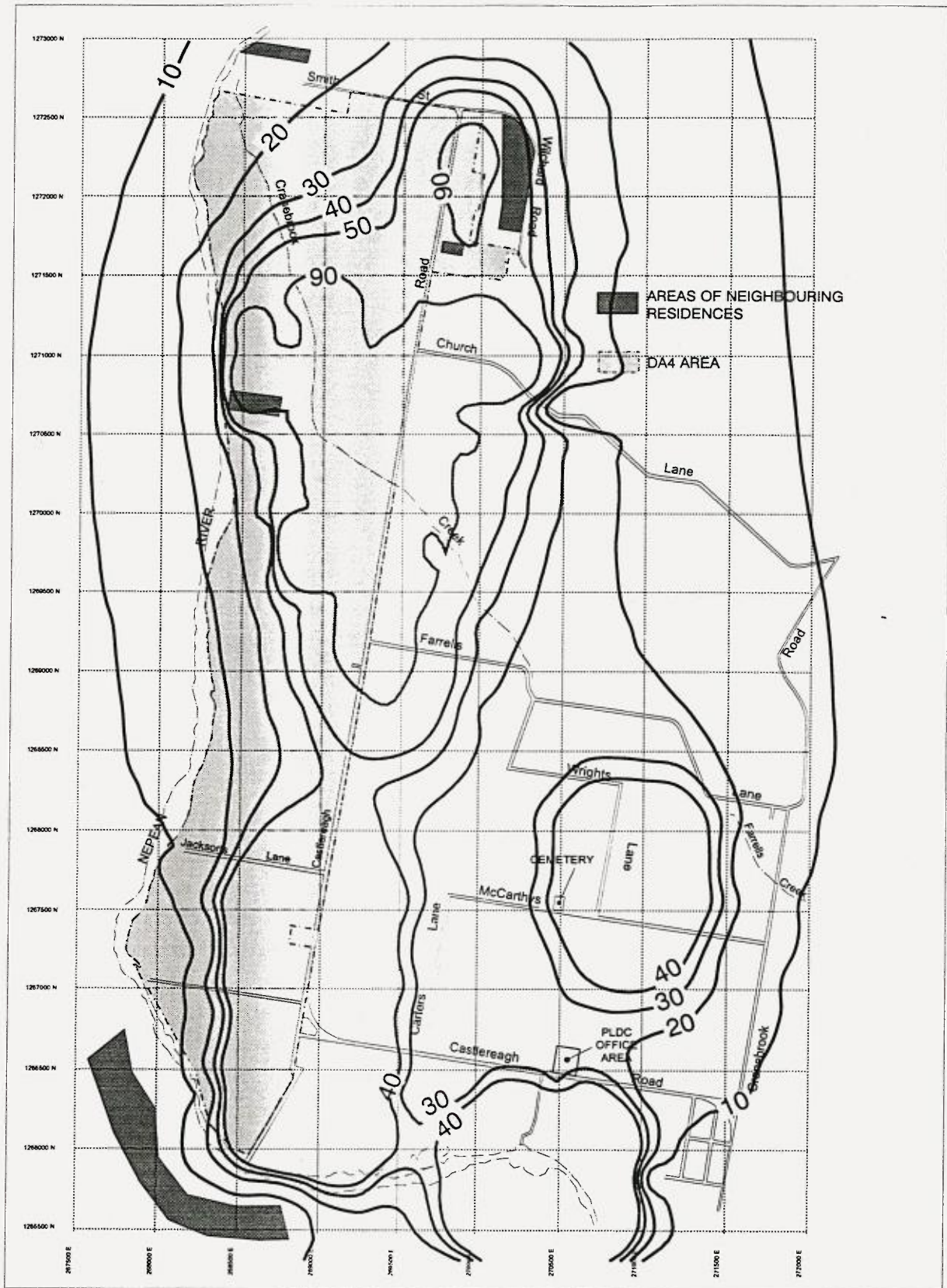
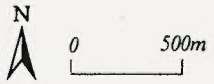


Figure 7.5 PREDICTED INCREASE IN ANNUAL AVERAGE DUST CONCENTRATIONS FOR 2006 - 2007 ($\text{g}/\text{m}^2/\text{month}$)



g/m²/month applicable for this area. *Figure 7.7* shows that the increase in concentration of TSP near the residences will be less than 40 µg/m³. The total TSP concentration therefore is likely to remain below the NHMRC recommendation of 90 µg/m³.

As seen from *Table 7.2* and *Table 7.3* the maximum predicted increase in the TSP concentrations and depositions at the residences on the North East side of the site is 54 µg/m³ and 1.1 g/m²/month respectively. Both these values are below the relevant criteria. At other residences to the south and in the centre of the DA4, the increase in deposition and concentration of TSP is nominal and is predicted to be well within the relevant criteria.

7.2.4 Year 2010-2011

Operations in this year occur closest to the residences south of DA4. *Figure 7.8* and *Figure 7.9* show the isopleths for the annual average deposition and concentration respectively for this year. As seen from *Figure 7.8*, a maximum increase in deposition of about 0.5 g/m²/month is likely to occur due to the quarrying operation in this area. This is less than the permissible increase of 1.24 g/m²/month for this area.

Figure 7.9 shows an increase in concentration of around 30 µg/m³ TSP near the residences. This concentration level combined with the existing concentration level is unlikely exceed the NHMRC recommendation of 90 µg/m³.

Other residences on the north, north-east and in the centre of the DA4 are not significantly affected by the operation in this year and therefore the deposition and concentration levels are expected to remain within the relevant criteria.

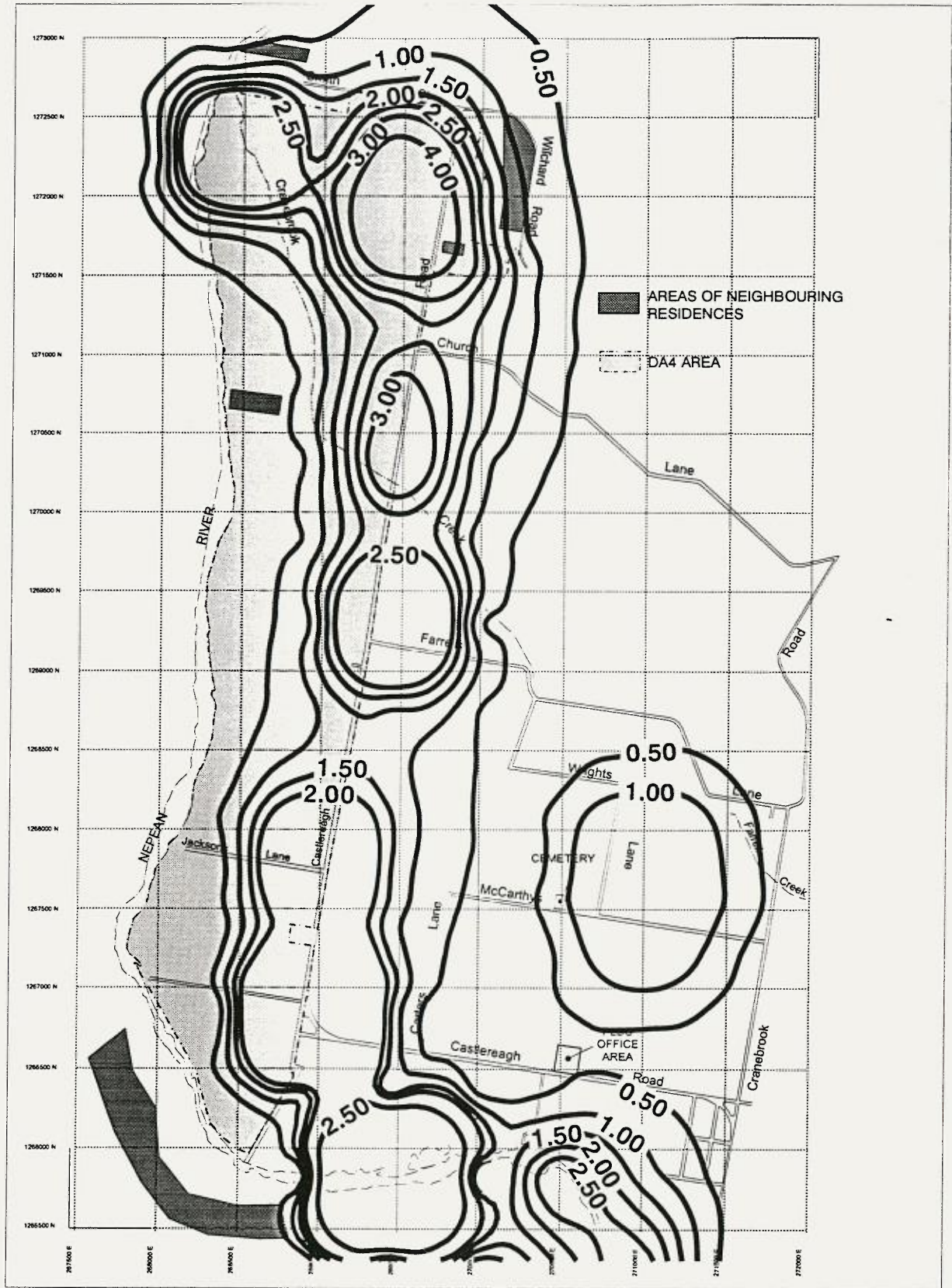
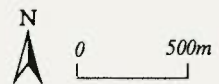


Figure 7.6 PREDICTED INCREASE IN ANNUAL AVERAGE DUST DEPOSITION FOR 2009 - 2010 ($g/m^2/month$)



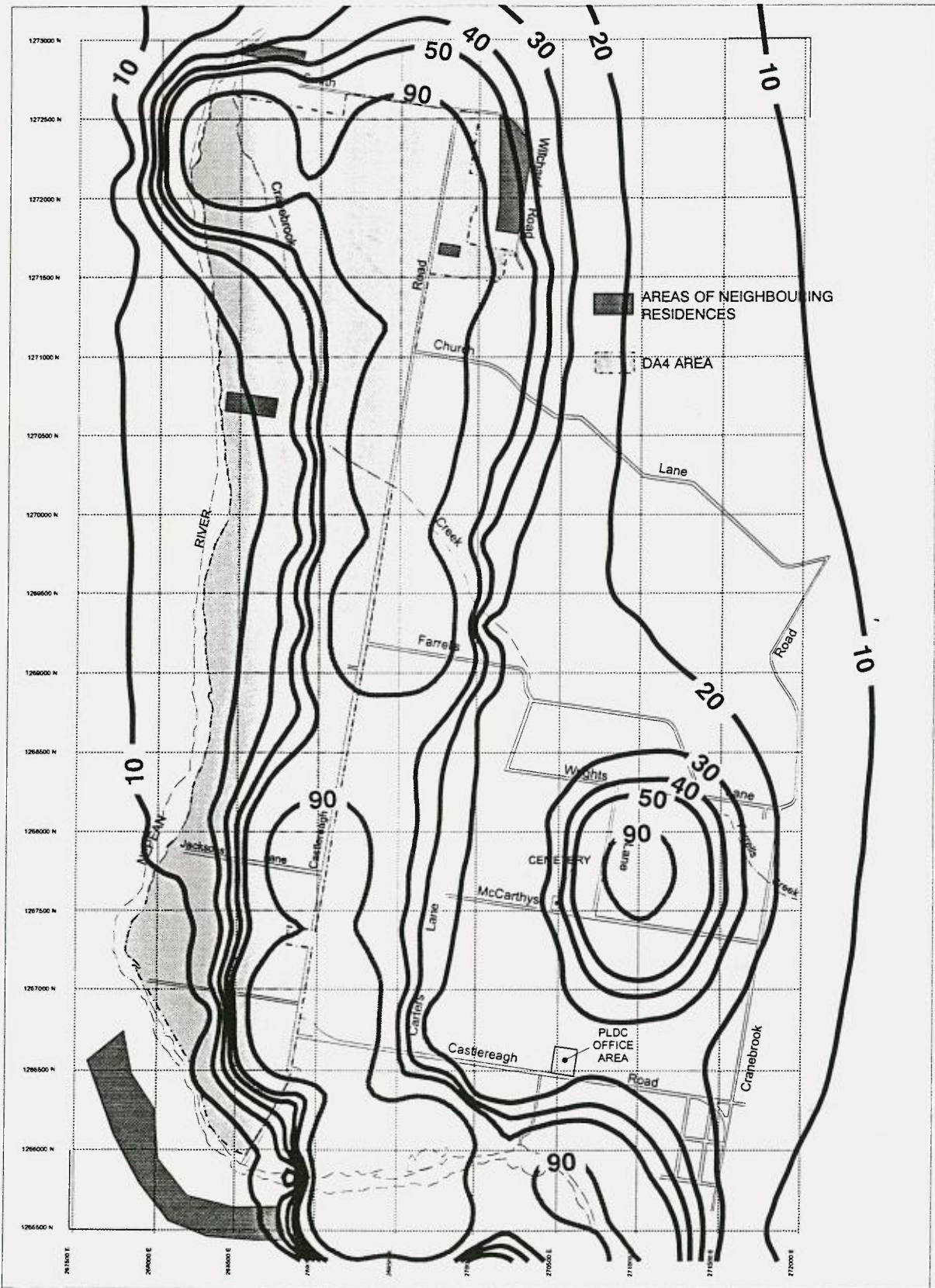
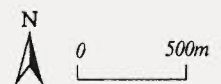


Figure 7.7 PREDICTED INCREASE IN ANNUAL AVERAGE DUST CONCENTRATIONS FOR 2009 - 2010 ($\mu\text{g}/\text{m}^3$)



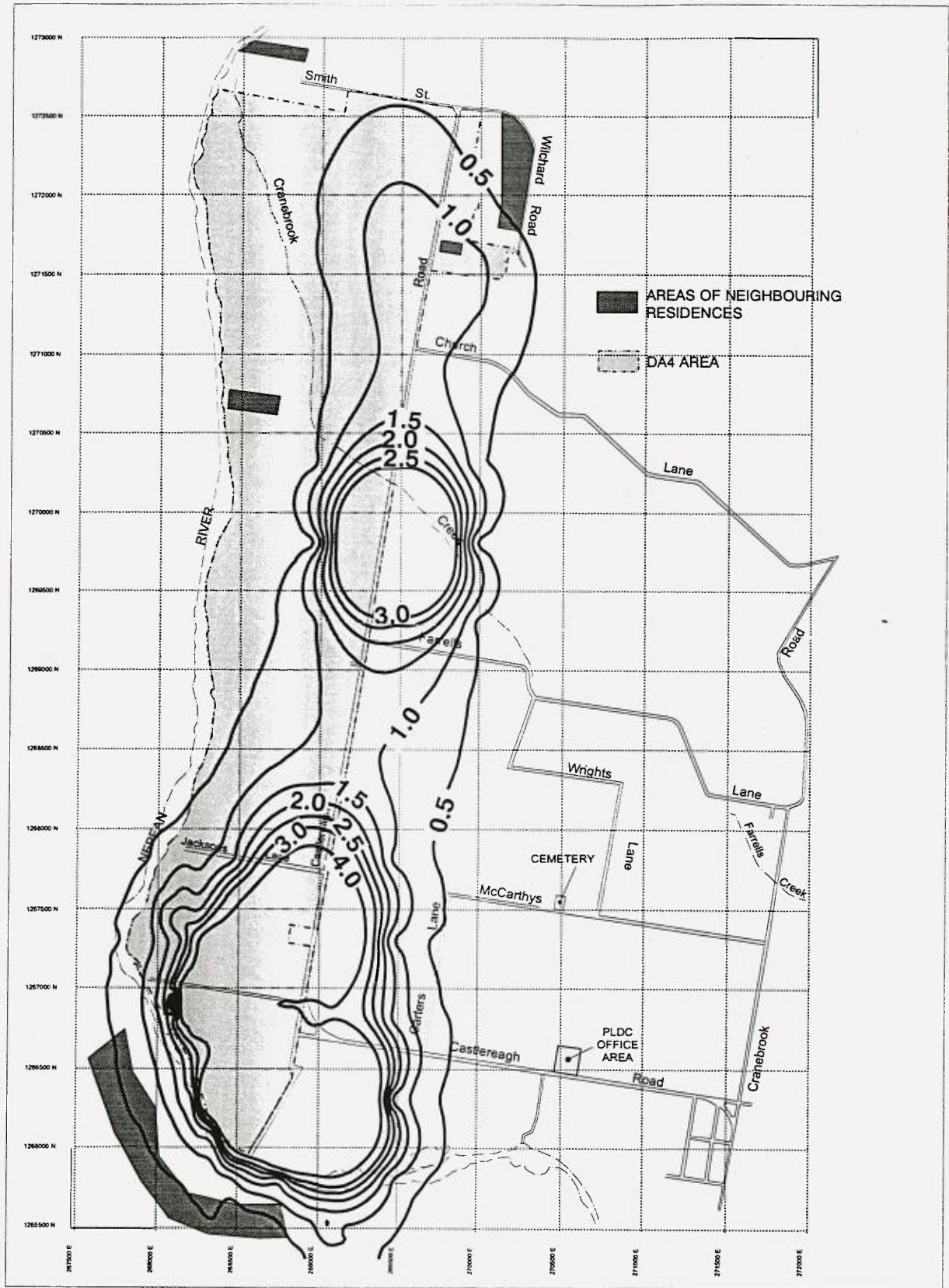
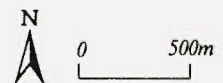


Figure 7.8 PREDICTED INCREASE IN ANNUAL AVERAGE DUST DEPOSITION FOR 2011 - 2012 ($\text{g/m}^2/\text{month}$)



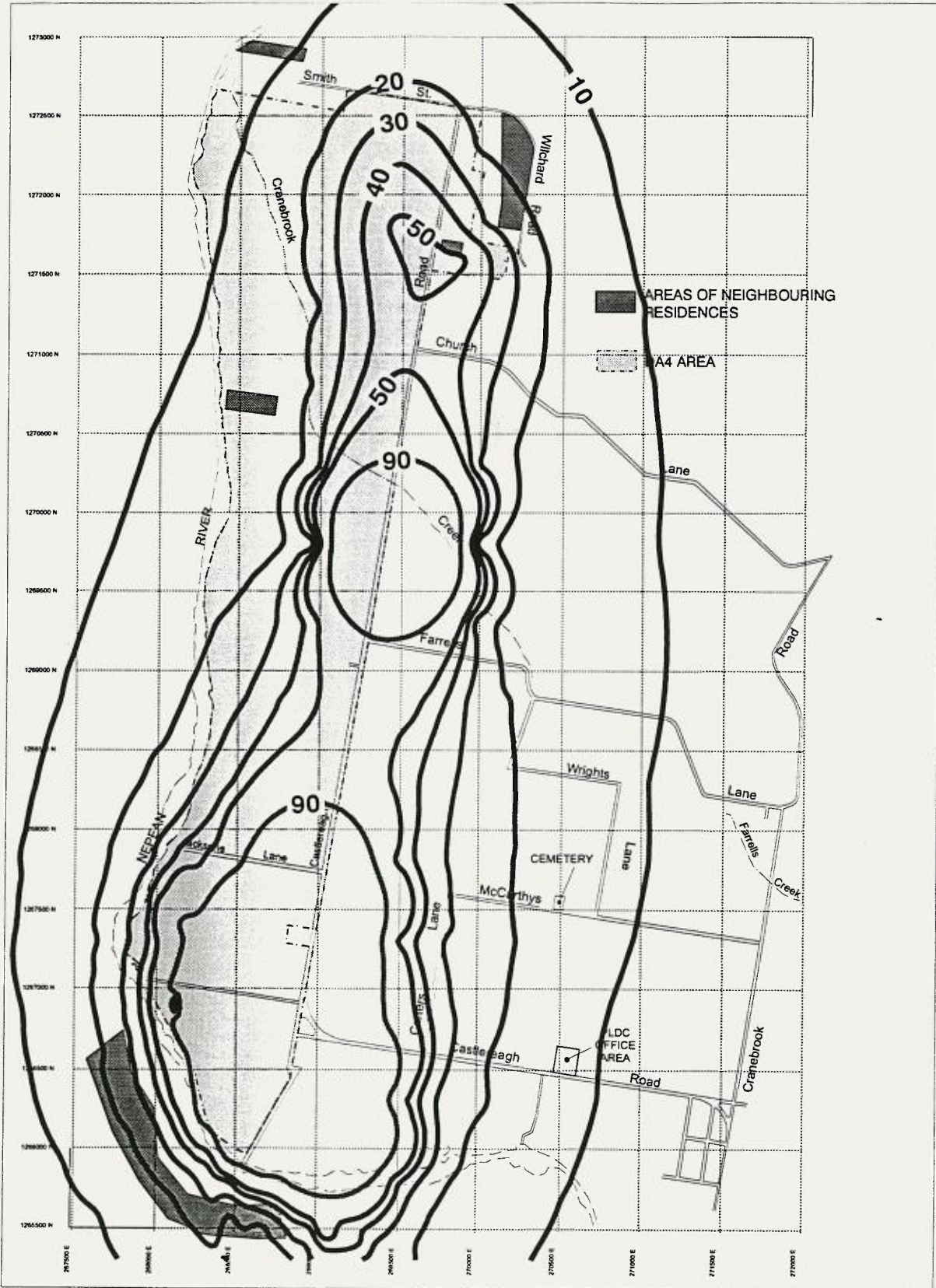


Figure 7.9 PREDICTED INCREASE IN ANNUAL AVERAGE DUST CONCENTRATIONS FOR 2011 - 2012 ($\mu\text{g}/\text{m}^3$)



EPISODIC IMPACTS

Short-term dust episodes relate to temporary increases in the amount of dust raised mainly from disturbed surfaces and other dust-containing areas by strong winds in dry weather conditions. Winds above 5 metres per second, which would at times be sufficiently strong to result in a dust episode, will most likely originate from the west.

The nature, strength and duration of a dust episode are determined by a variety of factors which are not easily quantified. A realistic prediction of dust concentrations in the air during the episodic event is more difficult to achieve with accuracy than the corresponding prediction of annual dust levels.

Sensible management will minimise the potential of dust generation from the quarry. For example, cessation of overburden dumping during periods of high winds will limit impact.

MANAGEMENT STRATEGIES

The predictions of dust deposition and concentration levels described above depend on a number of assumptions. These require the implementation of safeguards as follows:

- watering of all working and haulage areas to suppress the emission of dust from haul trucks and scrapers;
- establishment of grass cover on exposed areas as quickly as possible to reduce wind erosion;
- minimisation of cleared land awaiting quarrying or rehabilitation to reduce wind erosion;
- monitoring of monthly dust fall out levels at the critical north and north eastern boundaries of the site; and
- cessation of overburden dumping during periods of high winds which are in the direction of the critical boundaries.

The additional safeguards below will be adopted when quarrying near the Camenzuli and Dixon residence:

- reduction in the number of equipment items used where possible;
- restrictions on the use of certain dust generating equipment; and
- increased responsiveness to adverse climatic conditions.

CONCLUSION

A dispersion model was developed to predict the annual average dust deposition and concentration levels due to the quarrying operations in DA4. Four main clusters of residences were identified as experiencing the greatest potential impact from dust emissions. These are shown in *Figure 1.1* of this report. Various years of operation were then selected, representing worst-case impacts for each of the clusters of residences considered. The year of operation modelled and the residences most affected during these operations are shown in *Table 7.1*.

The results of this modelling are presented as isopleths of annual average deposition and concentrations for each year modelled (see *Figures 7.2* to *7.9*).

PLDC recognises that the dust depositions and the TSP concentrations at the Camenzuli and Dixon residences are likely to exceed the relevant criteria. It has therefore committed to undertake discussions with these residents prior to commencing operations in these areas.

For receptor sites representing Wilchard Road residences, detailed specific calculations were performed. The results for these receptors are listed in *Tables 7.2* and *7.3*. The results show that the permissible levels of deposition and concentration are not likely to be exceeded for any year of operation. Occasional high levels of dust are likely to be observed under adverse weather conditions or when equipment is operating very close to the residence. However, annual average levels are expected to remain within the criteria.

At other receptor sites, levels of dust deposition and concentration are expected to be well below the relevant criteria.

The assessment also considered a qualitative study of episodic conditions. It is concluded that sensible management will minimise the potential for episodic dust generation from the operation. In particular, cessation of overburden dumping during periods of high winds will limit these impacts.

APPENDICES

Appendix A

BREAK UP OF DUST EMISSIONS

Table A.1 DUST EMISSIONS FOR 2005-2006

	No.	Rate of Emission	Unit	Multiplier	Unit	Total Dust Emitted per year (kg pa)
Overburden Stripping						
Excavators	3	0.01	kg/t	7.77	MTPA	77,728
Scrapers	2	14	kg/hr	2,912.00	hrs. pa	81,536
Overburden Haulage						
Trucks	5	1	kg/km	2.00	km/trip	169,412
Graders	1	0.62	kg/km	8.00	km/hr	14,444
Water Carts	1	1	kg /km	2.00	km/trip	9,360
Extraction						
Excavators	2	0.01	kg/t	4.84	MTPA	24,190
Resource Haulage						
Trucks	7	1	kg/km	16.80	km/trip	1,185,882
Graders	1	0.62	kg/km	8.00	km/hr	14,444
Water Cart	2	1	kg /km	16.80	km	73,382
Filling						
Dozers	4	7.3	kg/hr	2,912.00	hrs. pa	85,030
Compactors	2	7.3	kg/hr	2,912.00	hrs. pa	42,515
Trucks (Dumping)	3	0.01	kg/t	7.77	MTPA	77,728
Graders	1	0.62	kg/km	8.00	km/hr	14,444
Scrapers	1	14	kg/hr	2,912.00	hrs. pa	40,768
Wind Erosion		0.4	kg/ha/hr	72	ha	11,353
TOTAL						1,922,216

Notes: kg - kilograms hrs - hours t - tonnes
 km - kilometer ha - hectare pa - per annum
 MTPA - million tonnes per annum

Table A.2 DUST EMISSIONS FOR 2007-2008

	No.	Rate of Emission	Unit	Multiplier	Unit	Total Dust Emitted per year (kg pa)
Overburden Stripping						
Excavators	3	0.01	kg/t	7.32	MTPA	73,232
Scrapers	2	14	kg/hr	2,912.00	Hrs. pa	81,536
Overburden Haulage						
Trucks	5	1	kg/km	1.00	km/trip	84,706
Graders	1	0.62	kg/km	8.00	km/hr	14,444
Water Carts	1	1	kg /km	1.00	km/trip	4,680
Extraction						
Excavators	2	0.01	kg/t	5.00	kg pa	25,020
Resource Haulage						
Trucks	7	1	kg/km	15.00	km/trip	1,058,824
Graders	1	0.62	kg/km	8.00	km/hr	14,444
Water Cart	2	1	kg /km	15.00	km	74,880
Filling						
Dozers	4	7.3	kg/hr	2,912.00	hrs. pa	85,030
Compactors	3	7.3	kg/hr	2,912.00	hrs. pa	63,773
Trucks (Dumping)	3	0.01	kg/t	7.32	MTPA	73,232
Graders	1	0.62	kg/km	8.00	km/hr	14,444
Scrapers	1	14	kg/hr	2,912.00	hrs. pa	40,768
Wind Erosion		0.4	kg/ha/hr	96.9	ha	15,279
TOTAL						1,724,290

Table A.3 DUST EMISSIONS FOR YEAR 2009-2010

	No.	Rate of Emission	Unit	Multiplier	Unit	Total Dust Emitted per year (kg pa)
Overburden Stripping						
Excavators	3	0.01	kg/t	8.50	MTPA	84,976
Scrapers	2	14	kg/hr	2,912.00	hrs. pa	81,536
Overburden Haulage						
Trucks	1	1	kg/km	1.50	km/trip	127,059
Graders	1	0.62	kg/km	8.00	km/hr	14,444
Water Carts	1	1	kg /km	1.50	km/Trip	7,020
Extraction						
Excavators	2	0.01	kg/t	5.13	MTPA	25,635
Resource Haulage						
Trucks	7	1	kg/km	17.00	km/trip	1,200,000
Graders	1	0.62	kg/km	8.00	km/hr	14,444
Water Cart	2	1	kg /km	17.00	km	63,648
Filling						
Dozers	6	7.3	kg/hr	2,912.00	hrs. pa	127,546
Compactors	3	7.3	kg/hr	2,912.00	hrs. pa	63,773
Trucks (Dumping)	2	0.01	kg/T	8.50	MTPA	84,976
Graders	1	0.62	kg/km	8.00	km/hr	14,444
Scrapers	1	14	kg/hr	2,912.00	hrs. pa	40,768
Wind Erosion		0.4	kg/ha/hr	68.7	ha	10,828
					TOTAL	1,961,095

Table A.4 DUST EMISSIONS FOR 2010-2011

	No.	Rate of Emission	Unit	Multiplier	Unit	Total Dust Emitted per year (kg pa)
Overburden Stripping						
Excavators	2	0.01	kg/t	5.70	MTPA	57,008
Scrapers	2	14	kg/hr	2,912.00	hrs. pa	81,536
Overburden Haulage						
Trucks	3	1	kg/km	4.00	km/trip	338,824
Graders	1	0.62	kg/km	8.00	km/hr	14,444
Water Carts	1	1	kg /km	11.00	km/trip	51,480
Extraction						
Excavators	1	0.01	kg/t	5.33	MTPA	26,635
Resource Haulage						
Trucks	1	1	kg/km	6.00	km/trip	423,529
Graders	1	0.62	kg/km	8.00	km/hr	14,444
Water Cart	1	1	kg /km	8.00	km	37,440
Filling						
Dozers	6	7.3	kg/hr	2,912.00	hrs. pa	127,546
Compactors	3	7.3	kg/hr	2,912.00	hrs. pa	63,773
Trucks (Dumping)	3	0.02	kg/t	5.70	MTPA	114,016
Graders	2	0.62	kg/km	8.00	km/hr	28,887
Scrapers	1	14	kg/hr	2,912.00	Hrs. pa	40,768
Wind Erosion		0.4	kg/ha/hr	41.21	ha	6,498
TOTAL						1,426,826

B-Noise

**PLDC OPERATIONAL NOISE
DA4 NOISE ASSESSMENT**

Report No 96263-A

July 1997

Prepared for

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SUMMARY

Penrith Lakes Development Corporation propose to develop a further section of the Penrith Lakes Scheme. The overall scheme is shown in Figure 1 and this section, named DA4, is shown in Figure 2. Noise levels associated with this development have been investigated.

It has been proposed in this report that the noise level criteria for existing operations be extended to cover the DA4 operations. This recommendation has been based on the following factors:

- * Quarrying activities are re-locating, not increasing.
- * The Lakes Scheme is of significant social and economic worth.
- * The Regional Environment Plan for the Penrith Lakes Scheme recognises that gravel extraction is the predominant land use while the scheme is being implemented.
- * Other factors affecting extraction rates such as shareholder company gravel requirements and dust emission are also relevant.
- * Quarrying operations are transient.
- * The acoustic amenity of residents in the area should be protected, in keeping with the general rural surroundings.

The existing and recommended criteria are as follows:

The total period of extraction or rehabilitation work shall not exceed:

- | | |
|----------|---|
| 1 month | where the sound pressure level exceeds 65 dB(A); |
| 3 months | where the sound pressure level exceeds 60 dB(A) and |
| 2 years | where the sound pressure level exceeds 55 dB(A). |

The sound pressure level shall be below 55 dB(A) for the remainder of extraction and rehabilitation time. The sound pressure level shall not exceed 70 dB(A) at any time.

Calculations have shown that noise levels emitted by the quarrying and land forming operations are not likely to exceed 55 dBA for extended periods of time, if the general noise controls are implemented. Recommendations have been given for both specific and general noise control measures which will limit the length of time that the 55 dBA level will be exceeded. It is unlikely that noise levels will exceed 60 dBA for more than three months at any one residence thus satisfying this noise level criterion. Some residences notably Dixon's Farm are likely to experience noise levels in excess of 70 dBA for long periods if specific noise controls (Earth bunds) are not implemented. The Dixon Farm area is likely to experience noise levels in excess of 55 dBA for periods of more than two years even with practical noise control measures.

Noise levels resulting from typical operations under worst case conditions are shown in Figures 4 to 6. These noise level contours have been calculated assuming all noise bunds recommended in Section 6.2 are constructed, and the operational conditions concerning gravel face alignment (that is, facing away from residences as per Section 6.1.2) are complied with. Other noise control options have been included for implementation at the discretion of PLDC.

The Figures show that 60 dBA will not be exceeded for more than three months and 55 dBA will be not exceeded for more than two years for most residents in each scenario considered. As previously stated, the general noise control procedures can effectively limit the noise to ensure compliance with the design criteria at most residential locations.

1. INTRODUCTION

The Penrith Lakes Scheme is a recreational development based on an interconnected lakes system on the Castlereagh Flood Plain at Penrith. It will be the end result of operations after the sand and gravel extraction phase is completed. This sand and gravel represents an important building resource for the construction industry in the Sydney region. A plan of the completed development is shown in Figure 1.

This report is an investigation into noise levels likely to occur in areas surrounding the development as a result of the extraction of 54 million tonnes of gravel, which is to be quarried during stage DA4 of the development over a 15 year period.

The proposed development area is generally bounded by Castlereagh Road to the east, the Nepean River to the west, Smith Street to the north. This area is shown in Figure 2. It includes the extraction of Castlereagh Road.

The noise level associated with the processing plants operated by the shareholder companies is not examined in this report as these facilities are the subject of separate development applications. Noise emitted by haul trucks operating on Penrith Lakes land outside of the DA4 area is considered in this report.

2. PROPOSED OPERATIONS

Gravel quarrying in the Penrith area, east of the Nepean River has been carried out for at least 40 years and has become an accepted activity in the area. In general, quarrying activities during this stage do not represent a significant increase in the rate of extraction, simply a transfer of quarrying equipment to new areas.

The three gravel quarrying companies working under the overall direction of the Penrith Lakes Development Corporation (PLDC), are Boral Ltd, CSR (Readymix) Ltd, and Pioneer International Ltd. Generally, these companies will

be working in the same localised area throughout the period of the DA4 period, but in some years extraction may take place in separate areas.

Gravel extraction in this development consists of two operations:

- * Removal of the overburden, varying in depth from 4 to 10 metres. This expected to take up to one month at each location. (3 to 4 hectares).
- * Extraction of the underlying gravel which varies in size and matrix content, down to the shale basement. The gravel and sand layer vary in thickness from 2-10 metres.

Rehabilitation of the quarry surface takes place after extraction and involves relocation of overburden to worked areas to form the final Lakes Scheme topography.

Overburden removal, extraction and rehabilitation are sequential operations. Overburden is stripped and transferred to previously extracted areas. A more detailed description of each operation, as it will be carried out in DA4, follows.

2.1 Overburden Removal

Overburden removal is carried out using three excavators and a scraper together with six haul trucks and a water cart. Generally, overburden removal should lead gravel extraction by five months in order to ensure adequate gravel supplies to PLDC shareholder companies. Based on current extraction rates, this is equivalent to approximately 17 hectares of advance overburden removal, depending on gravel and sand demand and depth of overburden.

The overburden removal operation is weather-dependent since scrapers and trucks are unable to operate on wet material. Overburden removal will typically be 100 to 300 metres away from the nearest extraction pit.

Since the overburden lies between the surface and the top of gravel and no overburden cut face is formed during stripping, minimal acoustic shielding is available during this stage. When scrapers and trucks haul overburden, it is

generally on exposed (non-shielded) haul routes, again providing little noise mitigation.

PLDC is responsible for all operations within the development area, with overburden removal and rehabilitation handled on a contract basis and the extraction of sand and gravel by individual shareholder companies. The planning of overburden removal is the responsibility of PLDC and they ensure that adequate sand and gravel reserves are available and that land forms are constructed at an affordable cost. As a result, the number of scrapers and/or haul trucks in operation in any one area will vary with time. It is estimated that PLDC's requirements can be met by the following equipment or its equivalent:

TABLE 2.1 - PLANT AND EQUIPMENT FOR STRIPPING OPERATIONS

STRIPPING OPERATIONS	PLANT AND EQUIPMENT	EXAMPLES OF MODELS OR TYPES
STRIP AREA	3 Excavators	Komatsu PC710SE, PC1000 or Demag H2855
	5 Trucks	2 x Komatsu 785 or 777 2 x HD465 1 x HD1200
	2 Scrapers	Cat 637 or 657 (part time)
HAUL ROAD	5 Trucks	3 x HD1200 2 x HD465
	1 Grader	Cat 14 or 16 Grader
	1 Water Cart	Komatsu WS23
FILL AREA	2 Dozers	D9
	2 Compactors	Cat 825
	3 Trucks	1 x Komatsu HD465 1 x Komatsu 785 or 777 1 x Komatsu 1200
	1 Water Cart	Komatsu HD465
	1 Grader	Cat 14 or 16 Grader

During peak times, or after extended rainy periods, when production needs to be increased, extra haul trucks or scrapers may be employed.

The noise has been modelled assuming the scenario that the scraper is constantly moving over each section of the site and stock piling the overburden at a position as far as possible from the residences.

2.2 Gravel Extraction

Overburden stripping leaves a bench surface four to ten metres below the existing ground level. Gravel is extracted from this level down to the shale basement and loaded onto quarrying company haul trucks for haulage to their processing plants.

Excavation of sand and gravel is carried out by means of excavators. This equipment can work at any level from the top of gravel to the shale basement, but for large depths of gravel, five metres or more, an intermediate bench level will be formed.

Boral Ltd and Pioneer International Ltd use both an excavator and front end loader to load sand and gravel onto their haul trucks, whereas CSR Ltd uses an excavator only. While all use excavators Boral and Pioneer in backhoe configuration, CSR use face shovel. These items of plant operate continuously, either preparing material for loading or loading trucks. Current equipment will be rationalised between the shareholders when extraction operations commence in DA4 as it will be necessary to have all operating out of common pits.

TABLE 2.2- PLANT AND EQUIPMENT FOR EXTRACTION OPERATIONS

EXTRACTION OPERATIONS	PLANT AND EQUIPMENT	EXAMPLES OF MODELS OR TYPES
PIT	2 Excavators	Cat 5130
	4 Trucks	Komatsu HD985 Dump Truck or Cat 777 Dump Truck
HAUL ROAD	7 Trucks	Komatsu HD985 Dump Truck or Cat 777 Dump Truck
	1 Grader	Cat 14 or 16 Grader
	2 Water Cart	Euclid Water Cart, Wabco ACF 100,000 LT

2.3 Sand and Gravel Haulage

All three quarrying companies operate off-road haulage vehicles to transfer sand and gravel to their respective processing plants. Pioneer International Ltd use two CAT 777 haul trucks depending on the distance between the quarry cut and their processing plant. Boral Ltd operate two six Komatsu HD785-3 haul trucks and CSR Ltd three CAT 777 trucks.

Additional haul trucks will be required towards the completion of DA4 due to the longer haul distances. Our calculations have been based on only two trucks being required between the quarry and crushing plant for each are modelled. In any case, the frequency of truck movement at the extraction pit will remain constant for constant production.

It is part of the responsibilities of the PLDC to build and maintain the haul roads within the lakes area. For this purpose, the PLDC operate the following equipment:

- * 1 Euclid 31TD Watercart
- * 1 Wabco CF17B Watercart
- * 1 Caterpillar 651B Watercart
- * 1 Caterpillar 14G Grader

These will only be used in place of other Water carts not in addition, hence no increased in the noise levels at any one position has been modelled due to these Water carts.

In addition PLDC also operate the following equipment for general site duties such as trench digging, pipe laying and scrub clearance, ploughing and seeding.

- * 1 Kaboda Tractor.
- * 1 John Deere Tractor.
- * 1 JCB Backhoe.

2.4 Rehabilitation of Previously Worked Pits

The rehabilitation of gravel pits worked during DA4 will be undertaken progressively, filling and forming pits worked previously during DA3 or DA4. This will be undertaken using overburden stripped from the overburden removal site being used at that time. After the final or interim lake topography has been formed, the land is drained and grass cover is established. The distance between the area to be rehabilitated and the overburden stripping site may vary from 100 m to up to 6 km. The equipment used for filling sites undergoing rehabilitation is shown below:-

- * 3 or 4 Caterpillar 657 Scrapers
- * 3 Caterpillar 637 Scrapers
- * 3 Caterpillar 825 Compactors
- * 1 Caterpillar 16 Grader
- * 1 Caterpillar 14 Grader
- * 1 John Deere Tractor (same one used above).
- * 1 Kaboda Tractor (same one used above).
- * 1 Caterpillar 824 rubber-tyre Dozer
- * 1 Caterpillar 834 rubber-tyre Dozer

- * 2 Caterpillar D9L Tract Dozer
- * 1 Komatsu D65 Swamp Dozer
- * 1 Cat. D7 Dozer
- * 1 Cat D8 Dozer

As with overburden stripping, there is little acoustic screening available to reduce the noise of land forming machinery.

In addition to filling and forming recently created gravel pits, PLDC will also undertake to carry out rehabilitation of previously mined pits.

Rehabilitation works associated with previous development approvals will require additional works to bring them to the standard proposed for the Lakes scheme.

Besides the reshaping of batters and the removal of overburden stockpiles, there will be general tidying of the previously quarried areas using graders or dozers to permit grassing and planting of trees.

Due to the close proximity of the overburden removal and gravel extraction operations, it will be necessary to form earth bunds close to the Dixon Farm. The formation of these bunds, used to mitigate noise for residents in Dixon's Farm, will result in temporarily high noise levels whilst they are being constructed. Similar noise control measures will be necessary at the northernmost end of the DA4 area.

2.5 Hours of Operation

Gravel extraction and haulage can only be carried out during the operating hours of the processing plants. Extraction equipment such as excavators and front end loaders can operate under their own lights after sunset, however overburden stripping and land forming equipment can not.

The current working hours for the operations are:

- * Sand and gravel extraction including haulage to processing plants – 0700 to 1900 Monday to Friday – 0700 to 1300 Saturday.
- * Overburden Stripping and Rehabilitation – 0700 to 1900 Monday to Friday – 0700 to 1300 Saturday.
- * None of the above works are undertaken on Sundays or Public Holidays.

2.6 Maintenance Servicing and Emergency Works

Maintenance servicing and emergency works that may need to be undertaken on Sunday or Public Holidays near noise sensitive areas as assessed on a case by case basis in consultations with the residents that may be affected.

Generally while near noise sensitive areas the overburden-stripping contractor does not work outside their compound.

2.7 Opportunity for Increased Productivity

While the current working hour for extraction and haulage begin at 0600 Monday to Saturday, the three adjacent processing plants of Boral Ltd, Pioneer International and CSR (Readymix) Ltd begin operating at 0500 Monday to Saturday. There would be a substantial increase in productivity if PLDC could start extraction at the same time as the processing plants. Besides increasing the operating times it would stop the need for a front end loader to operate at each of the processing plants during this time and therefore decrease the number of required equipment by thee units.

3.0 EXISTING NOISE ENVIRONMENT

Quarrying has been carried out in the Castlereagh flood plain area for many years. It has become an accepted activity for local residents, who will ultimately benefit from the development of The Lakes scheme in their neighbourhood.

The existing noise environment is due to three main noise sources:

- * The crushing, screening and washing plants of the shareholder companies.
- * Road traffic on arterial roads in the area, such as Castlereagh Road and Cranebrook Road.
- * Quarrying and land forming operations within the Penrith Lakes Scheme area.

In order to examine the impact of future noise sources it is necessary to establish the existing noise levels within an area. The following Sections describe our investigation into the current noise levels around the DA4 area.

3.1 Measurement Locations

Measurement locations have been selected at residences that will be most affected by the operations of the quarry during DA4. Where several houses in the same region would be affected, such as West Wilchard Road, a typical residence was selected.

The measurement locations that were used are indicated below and are shown in Figure 3.

- 236 West Wilchard Road, Castlereagh
- 42 Smith Street, Castlereagh
- 16 Strathdon Road, Emu Heights

3.2 Measurement Equipment

Measurements were made using Automatic Environmental Noise Loggers which record the noise levels continuously. A summary for each 15 minute period is provided by the equipment which contains the L_{A1} , L_{A10} , L_{A90} , and L_{Acq} values. The L_{A1} and L_{A90} levels are the levels exceeded for 1% and 90% of the time and are the typical maximum level and background noise levels respectively. The L_{Acq} is the energy average or the equivalent continuous noise level over the measurement period and is a standard measure of traffic noise. The L_{A10} is the noise level exceeded for 10% of the time and is a descriptor used for industrial noise.

The loggers were calibrated before and after measurements to ensure correct functioning. They were located within 1m of the residential boundary closest to the DA4 area, at each site.

3.3 Measured Background Noise Levels

The measurements were taken between 8 November 1996 and 12 November 1996, (although some data was lost at 42 Smith Street due to interference with the logger). In addition, previous measurements taken by Wilkinson Murray Pty on 16 January 1994 and 20 January 1994 for a period of 3 days are considered relevant..

Typical minimum background noise levels applying throughout the day at each measurement location are tabulated below:

TABLE 3.1A:
TYPICAL MINIMUM REPEATABLE DAYTIME BACKGROUND
NOISE LEVELS, 1996.

LOCATION	BACKGROUND NOISE LEVEL - L_{A90} dBA
West Wilchard Road, Castlereagh	40
Smith Street, Castlereagh	37
Strathdon Road, Emu Heights	37

TABLE 3.1B:
TYPICAL MINIMUM REPEATABLE DAYTIME BACKGROUND
NOISE LEVELS, 1994

LOCATION	BACKGROUND NOISE LEVEL - L_{A90} dBA
377 Castlereagh Road, Castlereagh	38
385 Church Lane, Castlereagh	31
Carlyle Park, Church Lane, Castlereagh	43

4. DESIGN CRITERIA

In this Section noise level design criteria are examined. In selecting these criteria, the need for an acceptable acoustic environment must be balanced with the value of the sand and gravel resources within the DA4 area and the significant social and economic worth of the Lakes Scheme to the region. Quarrying is an inherently noisy activity requiring a lot of heavy equipment, to which local residents are generally habituated. However, reasonable noise levels should be maintained for the comfort of residents, in keeping with the rural nature of the area.

In setting these criteria, it is recognised there may be short periods of time when the noise level will be significantly higher, particularly when land forming takes place close to residences, as will be case the with Smith Street and the Dixon Farm. However, the nature of the operation of The Penrith Lakes is that quarrying is progressive and as such, noise from its activities will be transient.

4.1 Existing Criteria

Under the terms of the Deed of Agreement, the following conditions are set in respect of noise emitted by the PLDC for operations nearby the residences on the Castlereagh escarpment.

Dwellings on the Castlereagh Escarpment

(a) Maximum Noise Levels

Noise levels as measured at any one dwelling on the escarpment are not to exceed the following criteria. The general location of this area is shown on Figure 1.

Maximum Noise Limits (L_{A10})

Absolute maximum	-	70 dB(A)
Greater than	-	65 dB(A) for 3 months
Greater than	-	55 dB(A) for 24 months
Less than	-	55 dB(A) for remainder of time.

- Assumptions
- Extraction and rehabilitation
 - approximately 200 m from dwellings on the escarpment.

(b) Best Practical Means

The shareholder companies of PLDC are to extract and rehabilitate the area near the escarpment within the shortest possible time period."

4.2 Design Criteria for DA4

Taking into account the Regional Environmental Plan for the scheme which specifies that quarrying is the main land use during its development, it is recommended that the existing noise criteria be extended to cover the DA4 development. This is consistent with the notion that quarrying activities are changing in location only and not in scale.

It should be borne in mind that maintaining the existing criteria will constitute a more stringent operating condition for the PLDC as the quarrying and earth-moving equipment will be operating in more localised areas and closer to some residences but away from the main bulk of residences of Cranebrook Village during DA4. It may, therefore be necessary to implement noise controls in order to meet the existing noise criteria.

5.0 IMPACT OF QUARRY NOISE

Noise levels due to the three main quarry activities, overburden removal, gravel extraction and land re-habilitation have been calculated for three stages of the DA4 development, and are compared to the proposed design noise criteria of Section 4.

5.1 Equipment Noise Levels

The octave band sound power levels for the equipment to be used during the DA4 developments are shown in Appendix A. These levels were determined by direct measurement or from equipment manufacturers' specifications. It should be emphasised that these are maximum levels and not continuous levels. Ordinarily, the noise emitted by each item of equipment will be lower, as will be the equivalent continuous noise level (L_{Aeq}) which is a measure of overall noise output. The noise levels shown may occur temporarily, perhaps up to 10% of the time and as such may affect L_{A10} levels. It is unlikely that all items of equipment would be at such a high level of noise output simultaneously, however this is the situation that has been used in our calculations to represent a worst-case scenario.

5.2 Calculations Of The Noise Levels Emitted From The Quarry During DA4

Calculations of the noise level emitted by PLDC operations have been carried out for 3 key operating scenarios. These represent times when the main quarrying operations are to take place near to the closest residential locations namely:

2005-07 Overburden removal, resource mined and rehabilitation at the north-east corner of the DA4 area. In this scenario, the majority of equipment is located near to West Wilchard Road. Overburden is stripped prior to gravel extraction, with the overburden used to back-fill previously extracted pits. Gravel is hauled directly west from the pit towards the haul road parallel to Castlereagh Road,

or south toward the Pioneer Crushing Plant. Generally PLDC equipment maintains the haul roads used throughout the Lakes area. The scenario represented is generally a steady, long term operation as extensive earthworks are required to complete operations in the area. The scenario modelled and the noise levels determined as a result represents a worst case condition for the West Wilchard Road residents for the years 2005 to 2007.

2007-2009 Main quarrying activities concentrated to the north-west of DA4 area just south of Smith Street. In this model, overburden stripping takes place within 250 m of the nearest residences. Overburden haul routes and gravel haul routes are directed away from the gravel pits to the south. Haul roads are maintained throughout the lake scheme area by the PLDC. Residences on the south side of Smith Street overlooking the DA4 area will be most affected by activities during this period. The noise levels calculated from this model are representative of levels that the few residents along Smith Street would experience when quarrying activities are concentrated nearby.

2010-2011 Overburden stripping to the far south of the DA4 area. This is adjacent to Strathdon Road which is at an elevated position on the other side of the Nepean River. Gravel extraction is to the north of this area and land forming will be to the southern-most tip of the DA4 area. All haul routes are aligned north and run close to Castlereagh Road. Gravel haul traffic and haul road maintenance vehicles are distributed throughout the Lakes area, as is the case with all model years. This situation yields noise levels which will most affect residences in Strathdon Road, Emu Heights. The scenario represented is a worst case condition for the residents here for the latter end of the project ie the years 2010 - 2011.

In addition, noise levels have been calculated assuming that plant will be in operation within 50 m of Dixon's Farm.

The number and type of each item of plant that has been included in each calculation scenario are shown in Table 2. The equipment is distributed throughout the quarry in each scenario in a manner typical for the nature and location of its activity, such as stripping overburden, hauling gravel etc.

Calculations have been made using the software "ENM" (Environmental Noise Model) distributed by RTA Technology. This model uses information about the noise output (sound power) and location of sources, the topography between source and receiver and atmospheric conditions to calculate overall noise levels at a receiver location. Acoustic effects such as distance attenuation, shielding, air and ground absorption and atmospheric effects are included in the model. These effects can be individually categorised for a given receiver location to determine, for example, the effect of noise controls. Noise levels over an area can be analysed to form contours of equal sound level which show the effect of overall operations. The ENM model has been extensively validated for Australian conditions.

In the case of PLDC DA4 gravel operations, equipment such as excavators and front end loaders are situated on low benches below ground level. This provides shielding of their noise from residences near the operations. Equipment such as dozers, scrapers and compactors, however, generally work at surface level during overburden stripping and land-forming operations.

Calculations have been made using adverse atmospheric conditions, that is a strong temperature inversion or a breeze from source to receiver. Temperature inversion conditions are likely to occur on some winter mornings. Similarly adverse wind conditions would occasionally exist and consequently raise noise levels to the predicted values.

It should be noted, however, that these conditions are infrequent and generally noise levels in the surrounding area would be less than those predicted in this report. The degree of over-estimation depends on the receiver location but an indication of noise level reduction in neutral conditions is 2-3 dBA for nearby receivers and 6-10 dBA for distant receivers.

Typical calculations for each modelled year, using a location representative of the most affected residencies for that year are shown in Tables 3 to 5. These calculations include the influence of the earth bund noise control measures recommended in Section 6. In addition, gravel faces are directed away from residences, The noise level at these locations, with and without noise bunds along with the suggested noise level criteria are shown in Table 6.

The specific receiver locations used in the calculations are as follows:

- 2005–2007 Residence at the southern end of West Wilchard Road. The rear of this residence faces the north–east part of the DA4 area.
- 2007–2009 42 Smith Street at the western part of Smith Street.
- 2010–2011 16, Strathdon Road, Emu Heights. The rear of the property is evaluated and has line–of–site, over the Nepean River, to the southern–most part of the DA4 area.

Noise level contours for the three modelled years are shown in Figures 4 to 6. These Figures include the influence of the earth bund noise controls proposed in Section 6 and are based on an operational sequence plan for the quarry as supplied by the PLDC. As mentioned previously, these represent typical high noise scenarios for residences involved.

Figure 4 shows that under worst–case conditions noise levels for residences in West Wilchard Road will not be over 60 dBA for three months and 55 dBA for any significantly longer time. Residences in Church Lane will be exposed to noise levels of approximately 60 dBA for up to 3 months. This is within the design noise level criteria of Section 4.

Noise levels less than 60 dBA are predicted and indicated in Figure 5 for the few residents at Smith Street. These worst–case levels are likely to persist for the one month during overburden removal and be less than 55 dBA for the periods in excess of 2 years. This is within the design noise level criteria of Section 4.

Noise levels under 60 dBA are indicated in Figure 6 for the residents at Emu Heights.

It is understood that all residences within the site boundaries are to be vacated with the exception of the property known as Dixon's Farm. Without noise control it is estimated that worst case noise levels will exceed 70 dBA in at this location.

6. NOISE CONTROL

The proximity and number of quarry related machinery dictates that noise control is desirable to mitigate the effects of noise at nearby residences. The design criteria, set in Section 4, represent a reasonable compromise between the need to extract sand and gravel and preserving the residents amenity. The controls discussed in this Section represent best practical means for extracting sand and gravel whilst limiting noise emission.

Noise controls are separated into two categories, general and specific, the second category, providing benefit to certain localised groups of residents.

6.1 General Noise Control measures

Noise controls in this category affect the planning and operation of the quarry whilst not requiring any additional material change to the quarry or to equipment. These are as follows:-

6.1.1 Equipment Distribution

The existing quarry plan for DA4 situates overburden stripping, gravel extraction and rehabilitation in localised areas. Whilst this may offer efficiencies in other aspects of quarry operations, it exacerbates noise problems. Judicious planning may result in lower noise levels without a resultant drop in production rates. Such a plan would involve:-

- * Stripping of overburden leading extraction by a longer time, creating larger areas exposed to 'top of gravel' ground levels. (This conflicts with dust control management and needs a practical approach to balance dust and noise issues).
- * Individual items of gravel extraction plant working on a much longer gravel face with larger distances between each item and between each shareholder company. (This needs to be balanced with the likely rationalisation of equipment in DA4 area where common pits will be used).

- * Selecting land forming and rehabilitation sites which are distant from both of the above operations, and if necessary more than one fill site. (This is usual practice).

The rationale behind the above measures is to increase the distance between items of machinery and avoid large numbers of machines being concentrated at one site, especially near residences. The effect will be to reduce emitted noise levels, but increase the length of time that these levels are emitted.

The design noise level criteria of Section 4 allow scope for the varying of production rates within the quarry so as to minimise annoyance. Thus high rates of extraction causing high noise levels for short periods of time are deemed equivalent to longer term low noise activities. Production rates are dependent upon other governing factors as well as production capacity, shareholder company requirements and dust considerations. The rate of extraction may therefore be optimised by the PLDC to satisfy all of these requirements, including the noise level limits, so as to satisfy all parties involved.

6.1.2 Gravel Faces

Whilst it is generally not possible to shield overburden stripping operations, gravel extraction machinery can be shielded to some extent by the gravel quarry face. The maximum degree of shielding occurs when the height of the gravel face significantly exceeds the height of the extraction machinery. To this end, it is desirable to operate all excavators from the lowest possible level in the gravel pit.

In addition the direction in which the gravel face progresses is an important factor in obtaining maximum shielding. The gravel face should always progress towards the nearest residences along an imaginary line joining the excavator to the residence. The gravel face should be perpendicular to this imaginary line facing away from residences. Gravel faces should be as high as possible and, where more than one bench is required due to gravel seam thickness, they should be highest above the level on which most equipment is operating.

Note that the above equipment orientation was modelled in the calculations reported in Section 5. Higher noise levels may result from quarry operations significantly different from this.

Noise level reductions of up to 3 dBA at nearby residences are possible as a result of the controls recommended in Section 6.1.1 and 6.1.2.

6.1.3 Haul Roads

Very few residences are located to the west of the DA4 area and the noise propagation is considerably reduced, in this direction, due to the natural topography and dense bush land. Benefit will be obtained from distance attenuation by, as far as possible, keeping haul roads to the west of the site. However, it is appreciated that the existing Castlereagh Road may be the more practical road to use for haulage.

Gravel haul roads should be orientated directly away from gravel pits towards the main central haul roads. Overburden haul roads should similarly be kept as much as possible away from the boundary of the lake scheme area. Judicious selection of fill site for overburden material should aid this goal. Where practical haul routes should be directed along the lowest ground levels, thus increasing the acoustic shielding provided by the sides.

Noise level reductions of up to 3 dBA at nearby residences are possible as a result of the controls recommended in this section.

6.2 Specific Noise Control Measures

This section addresses physical noise control measures for localised groups of residences affected by noise, as shown in each of the model years considered in Section 5.

6.2.1 Dixon's Farm

In order to reduce the noise levels for residents of at Dixon's Farm, an earth bund 5 m above the existing ground level should be constructed. The bund

should be seeded with a dense grass or similar vegetation to prevent erosion and provide some acoustic absorption. No gaps in the bund should be allowed with the exception of the entrance to the property. This gap should not be in a position which faces the noise. Perhaps a position facing the river will be suitable or the entrance gap may need to be changed with the changing noise direction.

Based on the bund being 50 m from the residence and a vehicle 5 m from the bund a noise reduce level of up to 14 dBA is predicted reducing the level to below 60 dBA. This noise control measure was included in the calculations of Section 5.

The need for and location of such bunding will need to be discussed and negotiated with the owners.

7. CONCLUSIONS

Calculations have shown that noise levels emitted by the quarrying and land forming operations are unlikely to exceed the 55 dBA criterion for any extended periods of time, and 60 dBA for three months, provided general noise control measures are adhered to.

Recommendations have been given for both specific and general noise control measures which will limit the noise exposure, for most residences, to below the 60 dBA and 55 dBA levels.

However, one residence, Dixon's Farm, which is located within the site, is likely to experience noise levels in excess of 55 dBA for periods of more than two years even with noise control measures.

Noise levels resulting from typical operations under worst case conditions are shown in Figures 4 to 6. These noise level contours have been calculated assuming all noise bunds recommended in Section 6.2 are constructed, and the operational conditions concerning gravel face alignment (that is, facing away from residences as per Section 6.1.2) are complied with. Other noise control options have been included for implementation by PLDC.

The Figures show that it is unlikely that 60 dBA short term, and 55 dBA long term, will be exceeded for residents, for any extended time period, in each scenario considered (except Dixon's Farm). As previously stated, the period of time that these exceedances persist can be effectively limited to ensure compliance with the design criteria at most residential locations.

Quality Assurance

Wilkinson Murray Pty Limited is committed to and has implemented AS/NZS ISO 9001 : 1994 "Quality Systems - Model for quality assurance in design, development, production, installation and servicing". This management system has been externally certified and Certificate of Approval No 543 has been issued.

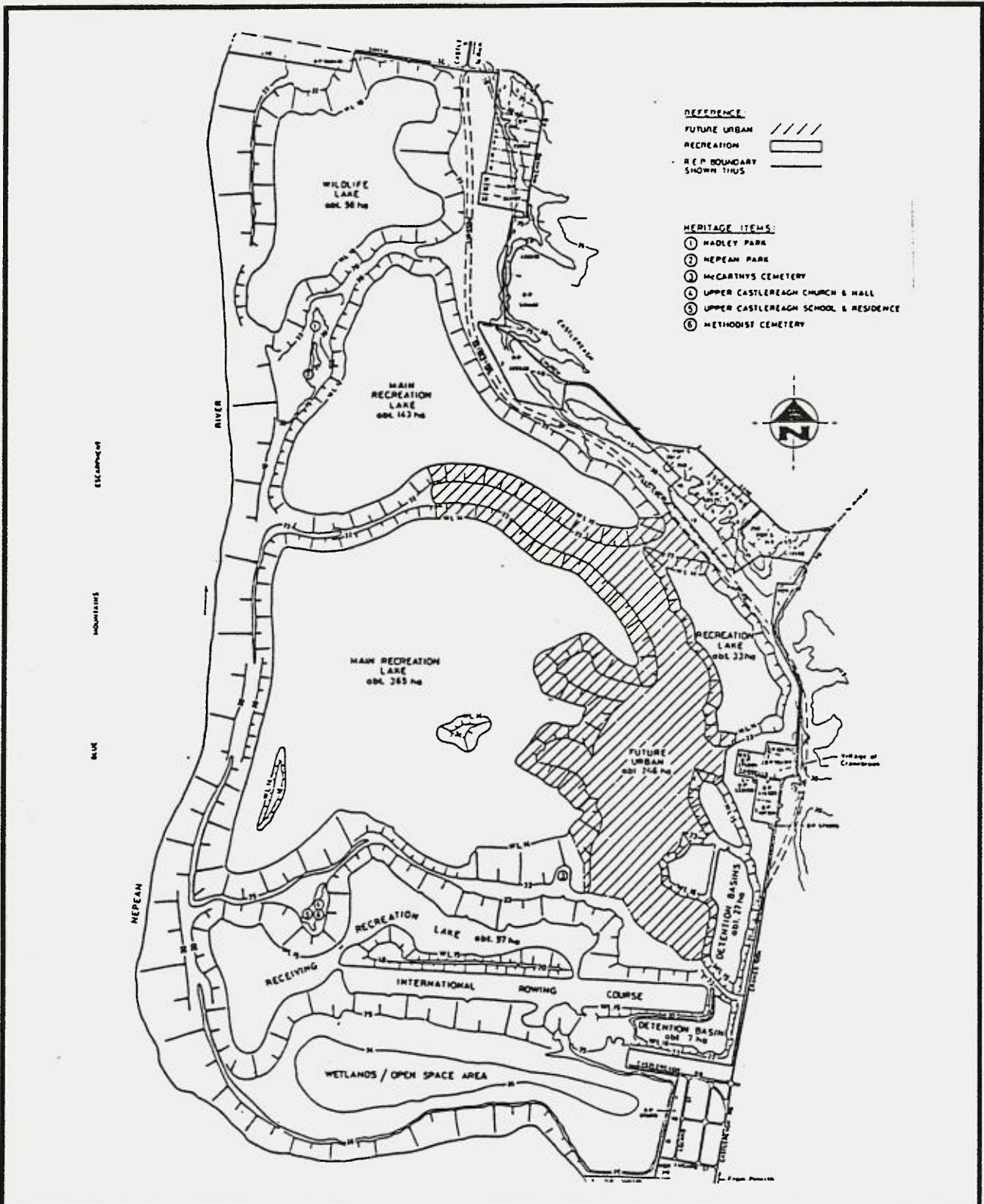
AAAC

This firm is a member firm of the Association of Australian Acoustical Consultants and the work here reported has been carried out in accordance with the terms of that membership.

Revision	Date	Status	Prepared by:	Checked by:
1	5 February 1997	Draft	Ken Scammell	Neil Gross
2	1 August 1997	Final	Ken Scammell	Neil Gross

APPENDIX A - TYPICAL SOUND POWER LEVELS

SOURCE	SOUND PRESSURE LEVEL (dB)								
	A	OCTAVE AND CENTRE FREQUENCY (Hz)							
		63	125	250	500	1k	2k	4k	8k
Excavator	108	103	114	107	108	100	96	91	83
Truck	100	105	108	98	96	94	93	86	80
Water Cart	119	114	119	115	114	112	111	111	109
Grader	111	111	114	111	108	106	102	98	90
Dozer	115	115	116	115	113	111	103	100	94
Compactor	115	115	116	115	113	111	103	100	94
Scraper	118	117	119	118	116	113	105	102	96

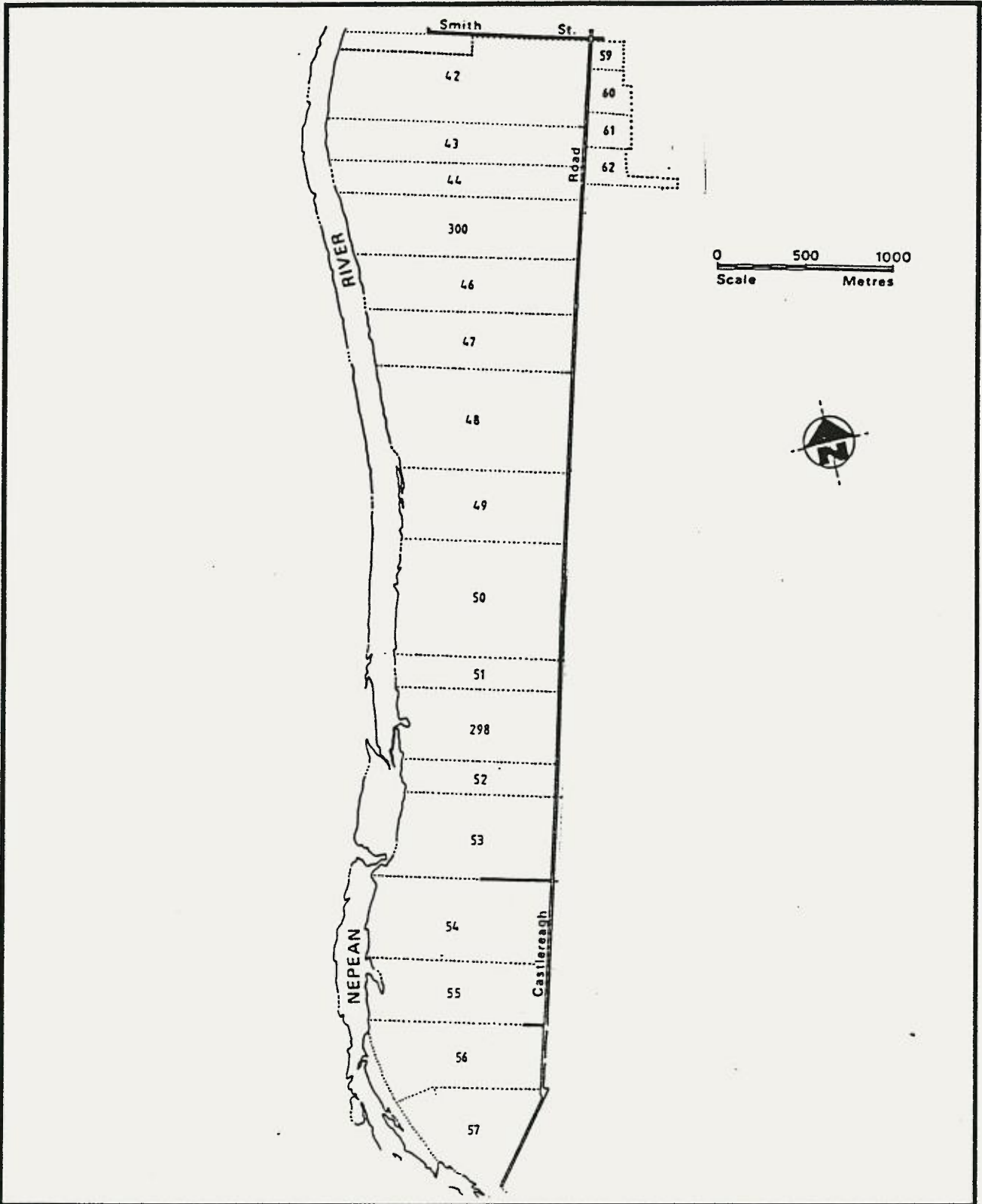


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REPORT NO: 96263 FIGURE NO: 1

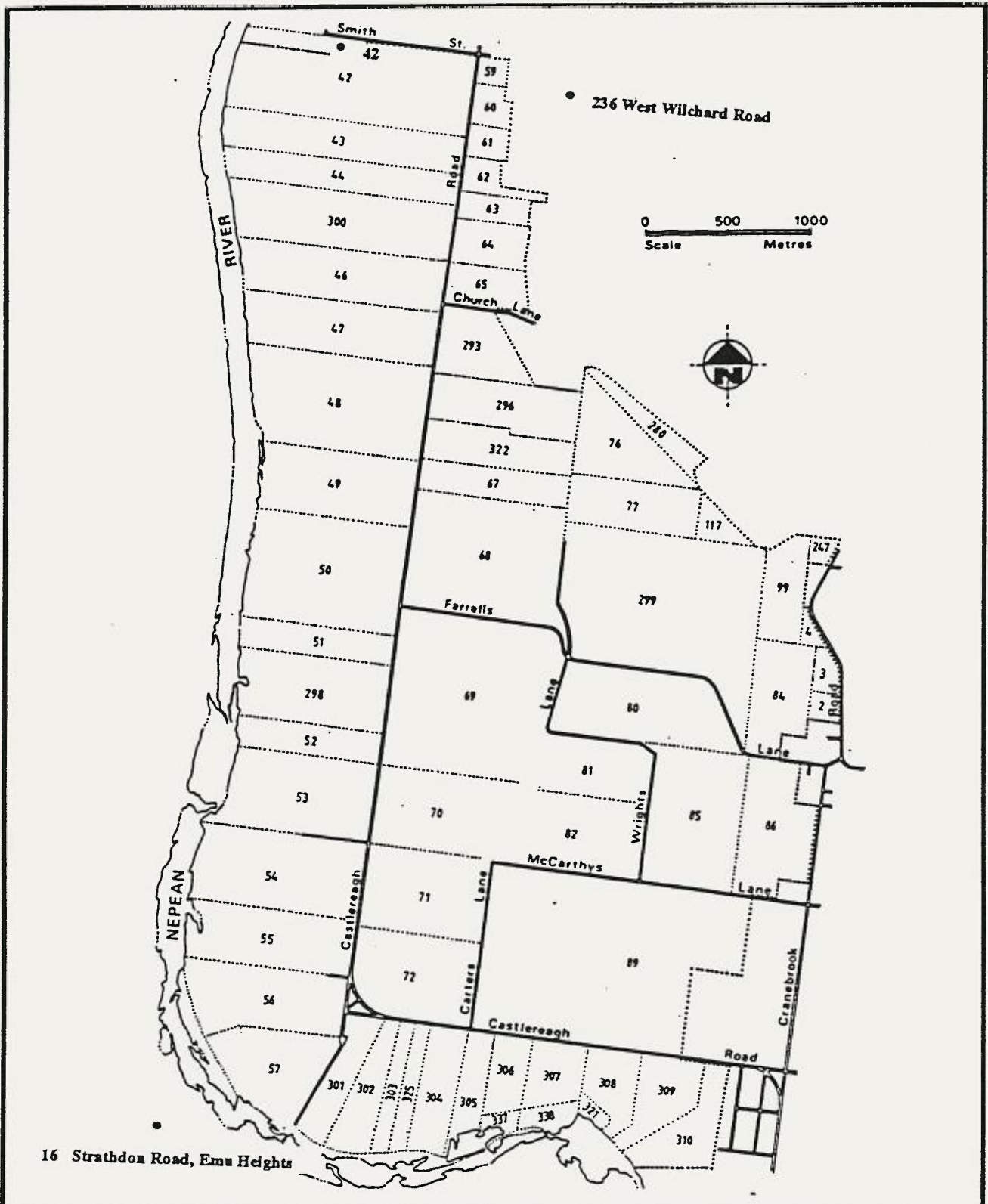


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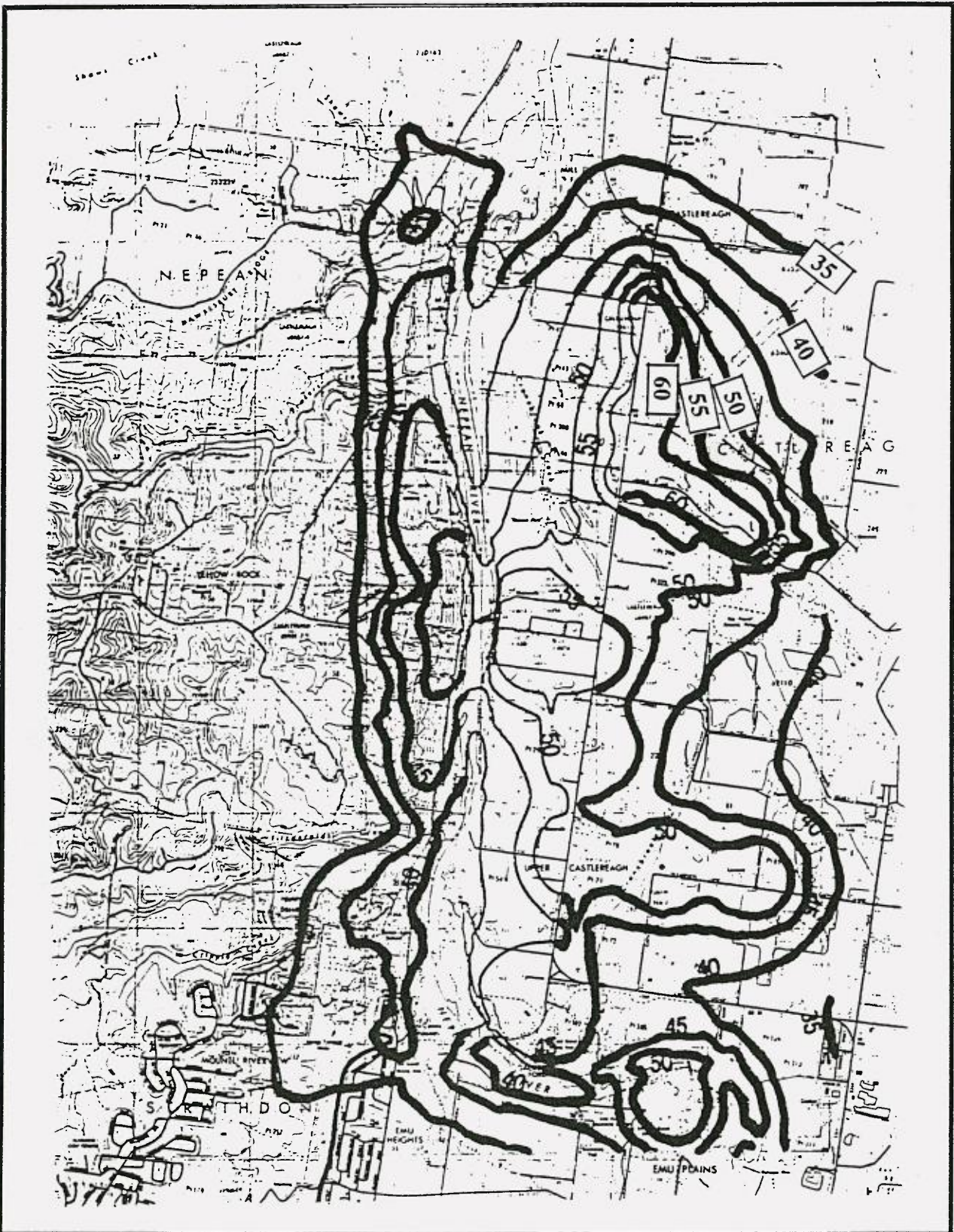
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REPORT NO:96263 FIGURE NO: 2



<p>WILKINSON MURRAY PTY LIMITED 123-125 Willoughby Road CROWS NEST NSW 2065</p>	<p>PENRITH LAKES SCHEME DA4 BACKGROUND NOISE MONITORING AND NOISE PREDICTION LOCATIONS</p>
<p>Telephone (02) 9437 4611 Facsimile (02) 9437 4393</p>	<p>REPORT NO:96263 FIGURE NO: 3</p>

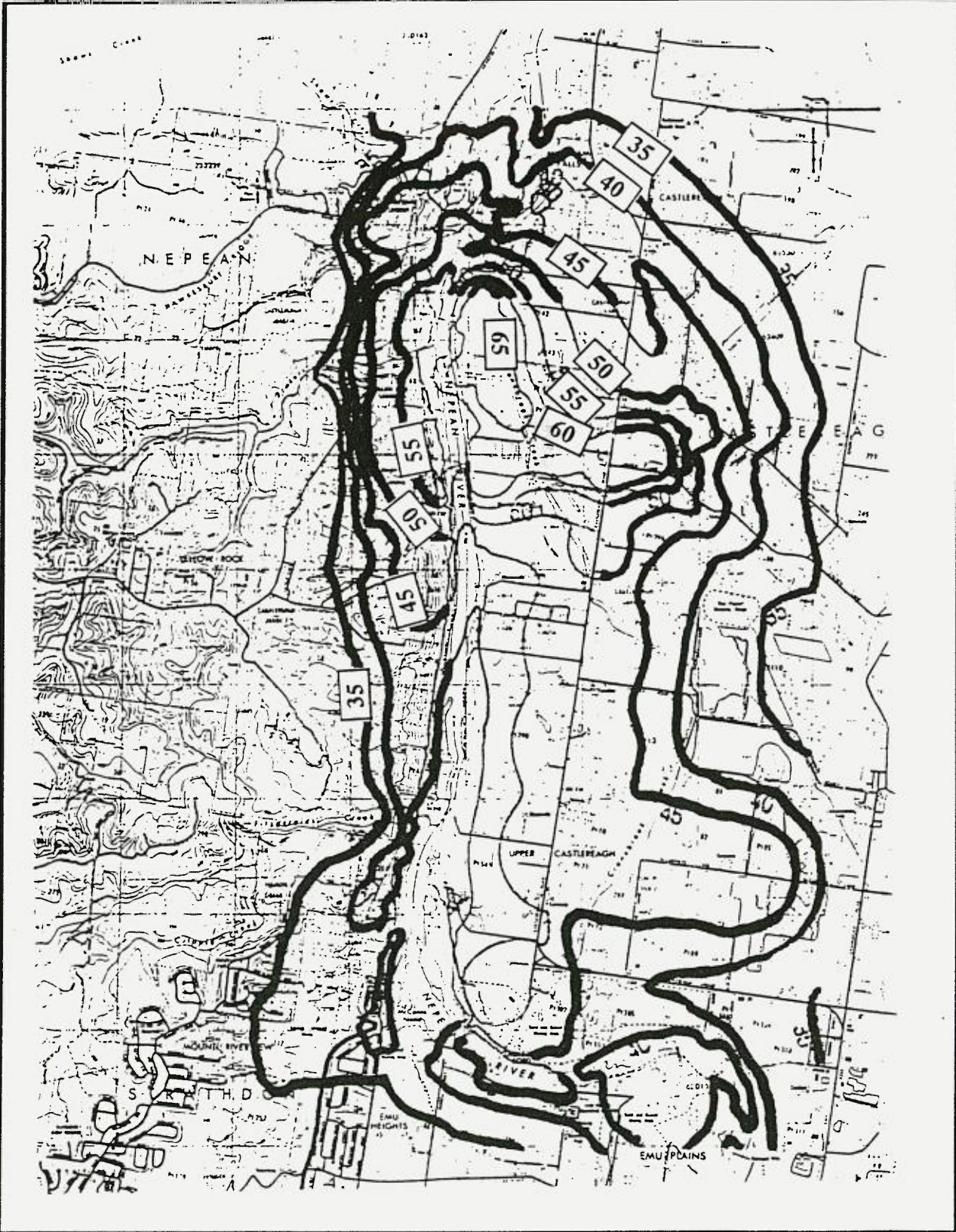


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 123-125 Willoughby Road
 Crows Nest NSW 2065

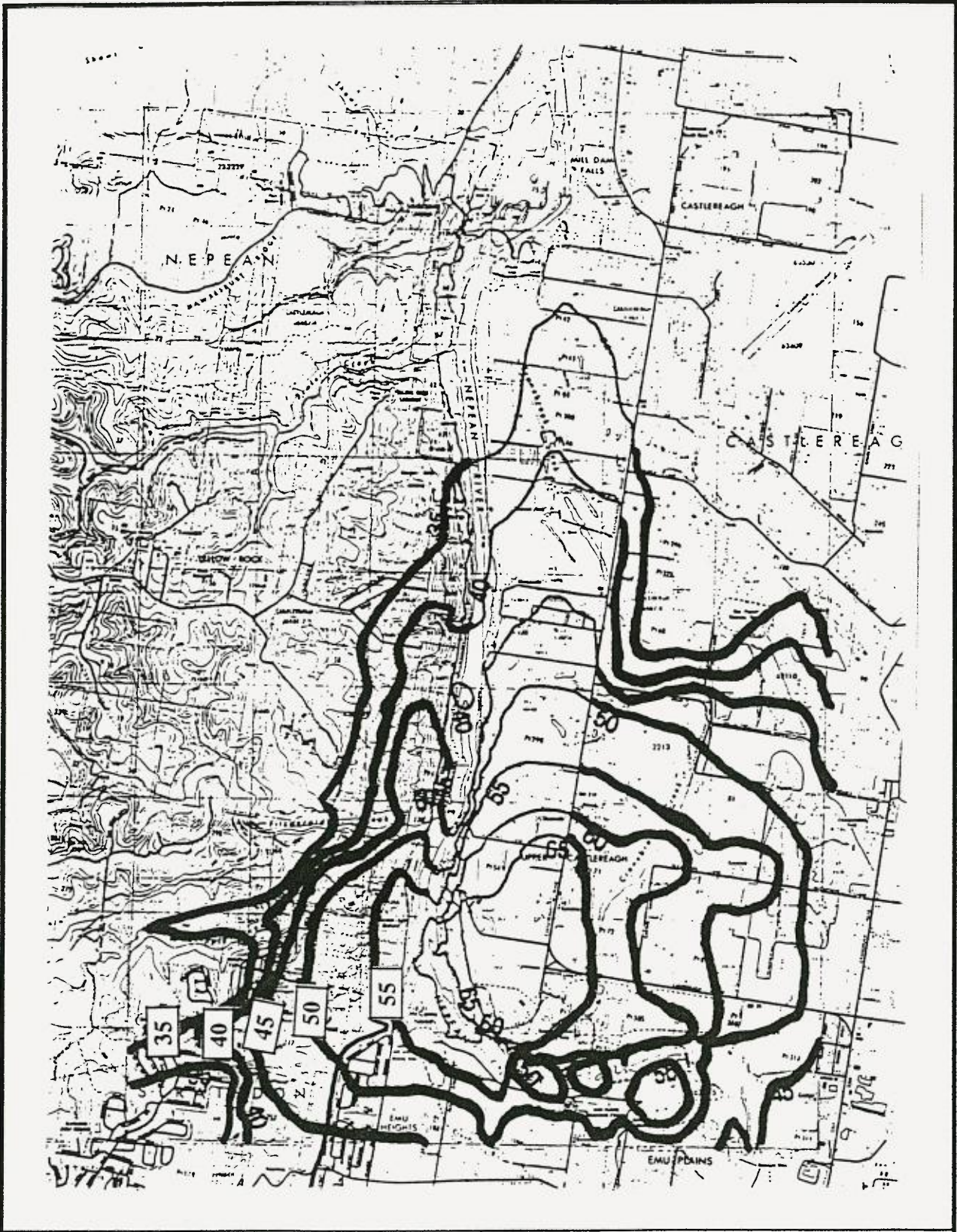
Worst-Case Conditions Noise Levels for
 Residences in West Wilchard Road and
 Church Lane.

Telephone (02) 9437 4611
 Facsimile (02) 9437 4393

REPORT NO: 96263 FIGURE NO: 4



<p>WILKINSON MURRAY PTY LIMITED 123-125 Willoughby Road Crows Nest NSW 2065</p>	<p>Worst-Case Conditions Noise Levels for Residences in Smith Street.</p>
<p>Telephone (02) 9437 4611 Facsimile (02) 9437 4393</p>	<p>REPORT NO: 96263 FIGURE NO: 5</p>



WILKINSON MURRAY PTY LIMITED
 123-125 Willoughby Road
 Crows Nest NSW 2065

Worst-Case Conditions Noise Levels for
 Residences in Emu Heights.

Telephone (02) 9437 4611
 Facsimile (02) 9437 4393

REPORT NO: 96263 FIGURE NO: 6



A C O U S T I C A L C O N S U L T A N T S

21 November, 1997

Ref. 96263P12111

Penrith Lakes Development Corporation
Locked Bag 2000
PENRITH NSW 2750

Fax No 047 301 462

Attention: Sergio Mantella-Galli

Dear Sirs,

RE:

Penrith Lakes Development Corporation proposes extending its hours of operation for extraction of resource in the area west of Castlereagh Rd known as DA4. Currently extraction commences at 7.00 am. Under the new proposal extraction would commence at 5.00 am.

Wilkinson Murray Report 96263-A of July 1997 presents a study of noise impact on residences surrounding the DA4 area. As part of that report background sound levels were measured at residences, allowing the setting of appropriate noise criteria for the earlier hours. The background levels measured, and the criteria set for noise to residences, are given in Table 1.

Three criteria are given since night-time operation is more stringent than daytime operation. The usual criterion is that the $L_{A10,15min}$ should not exceed the L_{A90} background level by more than 5 dBA. In addition, the EPA require that "background creep" be addressed, that is the noise should not raise the existing background L_{A90} above satisfactory levels. To meet that requirement the $L_{A90,15min}$ of the noise emission should not exceed those given in Table 1.

Finally the possibility of sleep disturbance should be addressed. Peak noises, measured in $L_{A1,1min}$ should not exceed the background level by more than 15 dBA.

WILKINSON MURRAY PTY. LIMITED

A.C.N. 001 341 395

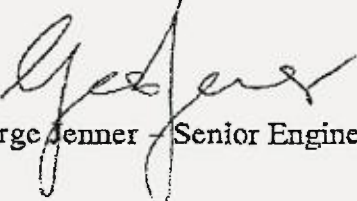
1ST FLOOR, 123 WILLOUGHBY ROAD, CROWS NEST, NSW 2065, AUSTRALIA PHONE (02) 437 4611 FAX (02) 437 4393

**TABLE 1 : NOISE CRITERIA FOR HOURS BETWEEN
5.00 PM AND 7.00 AM**

Location	Background L_{A90}	Criteria for noise of equipment at residences, dBA		
		$L_{A90,15min}$	$L_{A10,15min}$	$L_{A1,1min}$
236 West Wilchard	34	32	39	49
42 Smith Rd	30	32	35	45
Emu Heights	34	32	39	49

Preliminary calculations have shown that the criteria can be met under specific situations. Typically, extraction should be carried out no less than 1 km from any residence. Haul trucks would need to be at least 2 km from residences if they are not shielded from the residences by topography. These distances are indicative and will need to be verified, yet they give some idea of the area available for extraction at those times.

Yours faithfully,
WILKINSON MURRAY PTY LIMITED


George Jenner - Senior Engineer

**PENRITH LAKES DEVELOPMENT CORPORATION
CASTLEREAGH, NSW**

**FLORA AND FAUNA STUDY
DA4 INVESTIGATION AREA
PENRITH LAKES SCHEME, CRANEBROOK**

DECEMBER 1996

**KEVIN MILLS & ASSOCIATES PTY LIMITED
ECOLOGICAL AND ENVIRONMENTAL CONSULTANTS
222 NORTH CURRAMORE ROAD, JAMBEROO, NSW 2533**

Telephone: 042 360620 Facsimile: 042 360664 ACN 003 441 610

**FLORA AND FAUNA STUDY
DA4 INVESTIGATION AREA
PENRITH LAKES SCHEME, CRANEBROOK**

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**FLORA AND FAUNA STUDY
DA4 INVESTIGATION AREA
PENRITH LAKES SCHEME, CRANEBROOK**

1 INTRODUCTION

This study was undertaken by Kevin Mills & Associates Pty Limited, Ecological and Environmental Consultants, and was commissioned by the Penrith Lakes Development Corporation. The Corporation is in the process of preparing a development application, referred to as DA4, for the extraction of sand and gravel from an area of land at Cranebrook near Penrith.

The main purpose of this report is to meet the requirements of Section 77 of the *Environmental Planning and Assessment Act 1979* to determine whether the development would have an impact on threatened species. The following study brief was prepared for this investigation:

1. Undertake a flora and fauna survey on the site.
2. Prepare a list of native plant species and describe the vegetation in the study area.
3. Prepare a list of the native fauna species observed and describe the fauna habitats.
4. Identify any threatened species occurring in or near the study area, species listed on the schedules attached to the *Threatened Species Conservation Act 1995*.
5. Assess the potential impact of the proposed development on flora and fauna, including threatened species.
6. Apply the "eight-part test" in section 5A of the *Environmental Planning and Assessment Act 1979* to determine whether there is likely to be a significant effect on threatened species.
7. Discuss opportunities to mitigate the impact of the proposed development on flora and fauna.
8. Prepare a report outlining the findings of the investigation and containing recommendations on the matters investigated.

2 THE STUDY AREA

The Penrith Lakes Scheme is located at Cranebrook, about four kilometres northwest of Penrith in New South Wales. The Nepean River is to the west and south, Cranebrook Road is to the east and Smith Road is to the north; see Figure 1. This report focuses on the DA4 investigation area, which is bound by Castlereagh Road, the Nepean River and Smith Street.

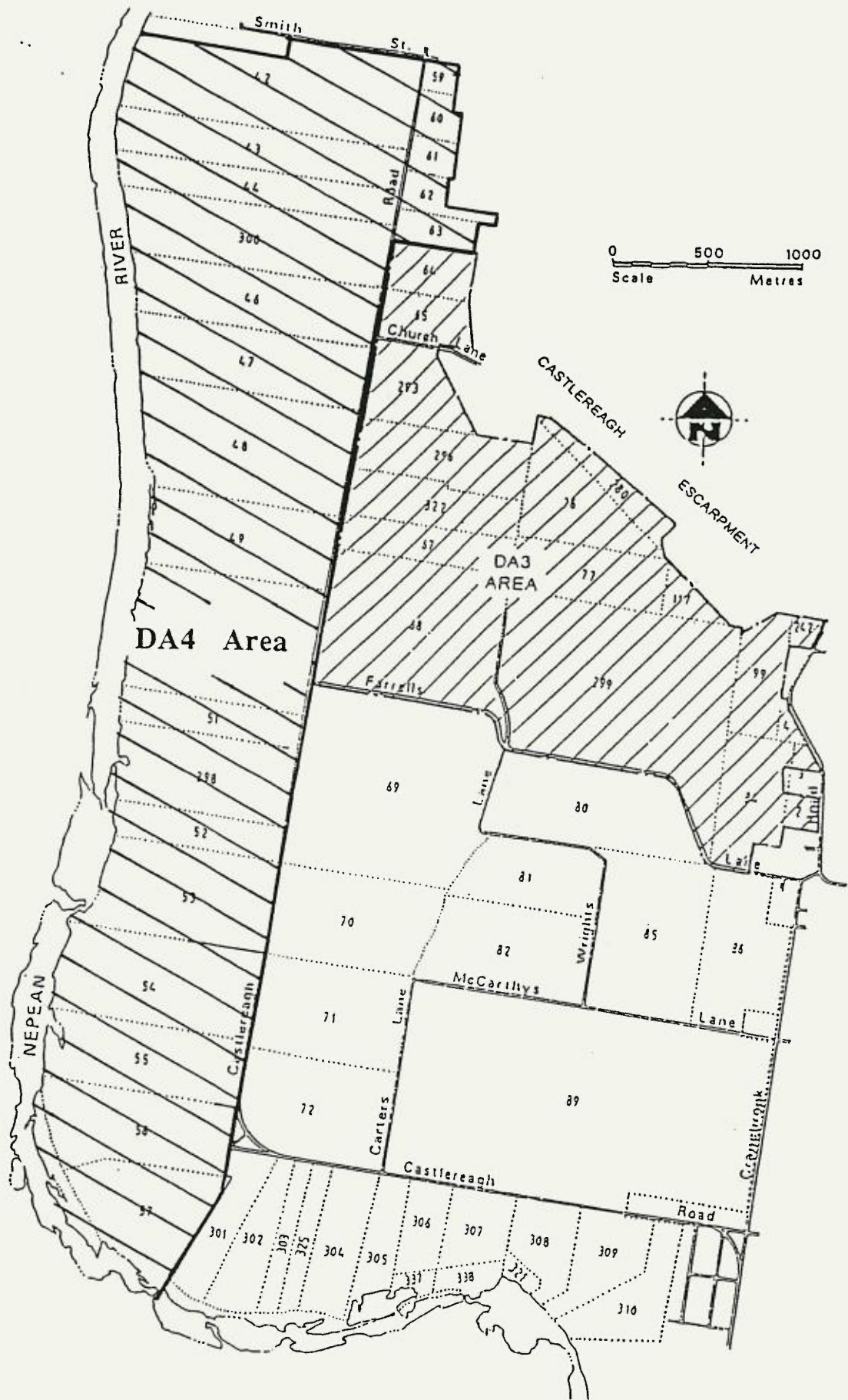


FIGURE 1 LOCATION OF THE PENRITH LAKES SCHEME AREA

The Penrith Lakes Scheme is approximately 1,950 hectares in area and is the site of a large scale quarrying operation being undertaken by the Penrith Lakes Development Corporation. The structure plan for the Scheme is shown in Figure 2.

About 75 million tonnes of sand and river gravel remain available for extraction. The quarry supplies approximately half of Sydney's sand and crushed aggregate requirements, including about 75% of the materials for ready mixed concrete. A six to eight metre strata of overburden is stripped by scrapers and compacted in previously extracted areas into landforms surrounding the future lakes. The lakes, set in a newly landscaped landform, are to be filled by water pumped from the Nepean River. By the time the Scheme is completed, there will be about 980 hectares of recreational land and 740 hectares of lake, all of which will be dedicated to the public.

A Regional Environmental Plan, the *Sydney Regional Environmental Plan No. 11*, sets the framework for design, quarrying and future uses. A Deed of Agreement between the Government and the Corporation defines the rights and responsibilities of each party. Agreed standards for landform construction, water management, erosion control, landscaping and dust and noise control are included in the Deed.

The Penrith Lakes Scheme is located on the floodplain of the Nepean River. The deep alluvial deposit is composed of coarse gravels at depth fining to the surface where fine clays occur. Originally, there were scattered small depressions in the floodplain, small drainage lines and one broad, old channel course on the eastern edge of the floodplain, termed the "black clay belt"; this was originally a natural swampland. Little natural wetland habitat now remains, only some very small areas on the DA4 area. The DA4 area also includes the edge of the Nepean River, which has rocky stream beds and large pools; the alluvial banks of the river support some native trees but are mainly covered in introduced species.

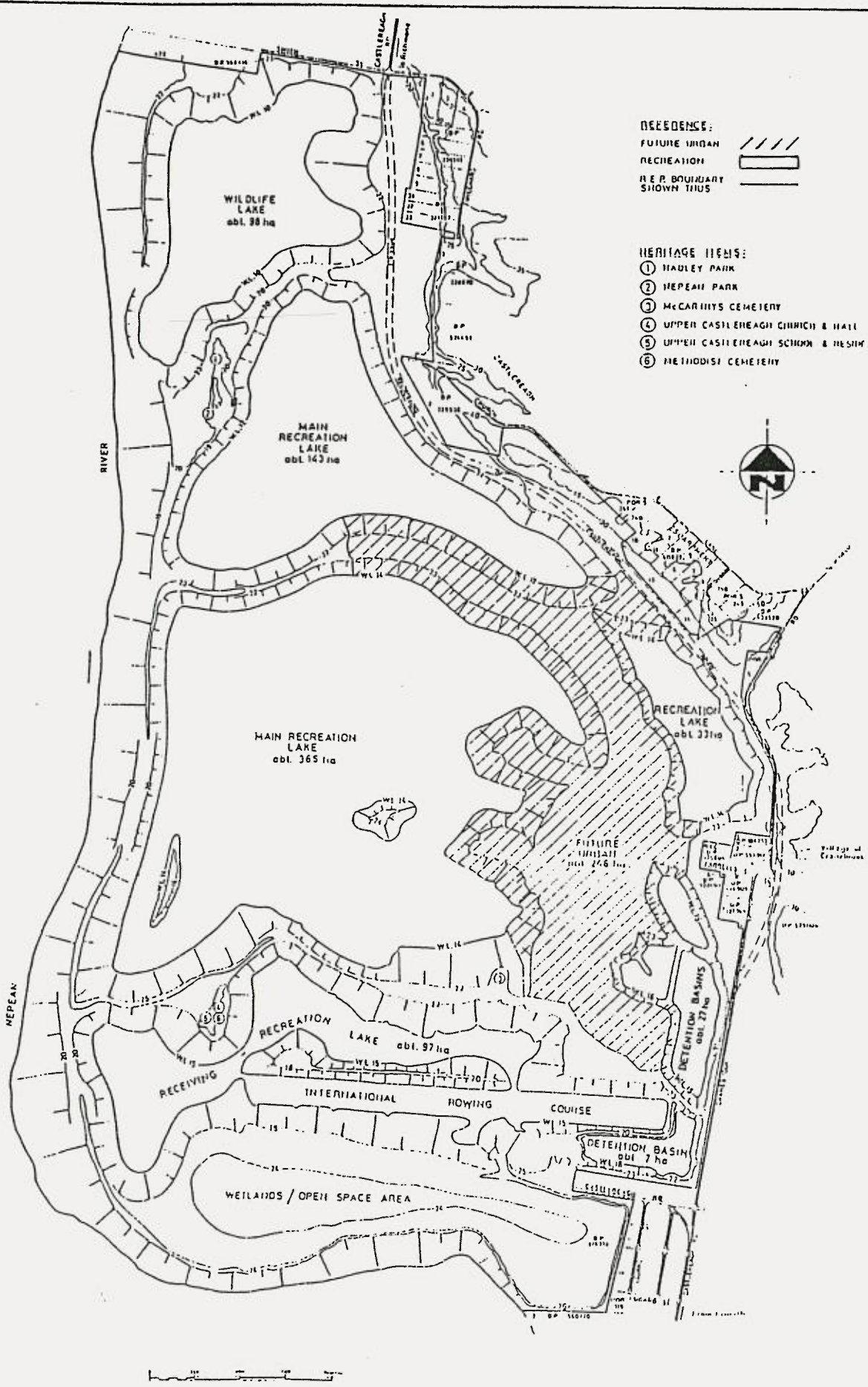
3 PREVIOUS STUDIES

There have been several studies of the flora and fauna in and near the Penrith Lakes Scheme; these studies were summarised in the report by Kevin Mills & Associates Pty Limited (1995a). The 1995 study was a survey of the wetland fauna at Penrith Lakes, but it did not include the present study area. The following conclusions were made in the previous report.

- The Penrith Lakes Scheme is a major regional wetland habitat resource.
- This system of wetlands provides a wide range of habitats that support most of the wetland birds and frogs known to occur in the region.

FIGURE 2 FEATURES OF THE PENRITH LAKES SCHEME

ESCAPMENT
MOUNTAINS
BLUE



THE PENRITH LAKES SCHEME STRUCTURE PLAN

- No endangered fauna species were located during the survey period. The only species that have been recorded there are the Freckled Duck, which was found there in the 1981-1983 drought, and the Green and Golden Bell Frog that was found in the area in 1981.
- Some species of endangered fauna, all wetland species, may occur at the Penrith Lakes Scheme from time to time; these are the Black Bittern, Australasian Bittern, Blue-billed Duck and the Freckled Duck. These are all rare species in the region and they would occur at Penrith Lakes on an irregular basis. These birds are just as likely to occur on the artificial wetlands as the natural wetlands in the area, so artificial wetlands being created as part of the Scheme will, in future, provide habitat for these species.
- The Green and Golden Bell Frog may occur in the area but it was not recorded during the field surveys. Some of the reedbeds appear to provide ideal habitat for this species. In addition to the 1981 records at Penrith Lakes, there are some records from the north and east of Penrith. However, given the presence of the Mosquitofish and the Carp, it is unlikely that the Green and Golden Bell Frog still occurs at Penrith Lakes.
- The artificial wetlands in the area support a much wider range of waterbird species than the natural wetlands, while frog species were abundant everywhere. The clay belt swamp supported the largest number of individuals, although this is a subjective assessment. *Limnodynastes dumerilii* was only recorded in this swamp.
- The evidence clearly suggests that a well developed artificial wetland can provide a good quality wetland habitat for wetland fauna. With assistance from ecologists on the design and construction of these wetlands, they can be developed to maximise their habitat value and provide a major regional wetland resource.
- The loss of all of the clay belt swamp is of some concern as this area has considerable local habitat value for frogs and some wetland birds, and complements the open water habitats of the other local wetlands. It is therefore strongly recommended that these types of habitats, viz. reeds and sedgeland, be recreated in association with the development of the lakes in the Penrith Lakes Scheme.
- Although it appears that the Green and Golden Bell Frog is no longer in the area, the introduction of this species to the Penrith Lakes Scheme area from stock bred in captivity would be worthwhile. However, the release location would have to be free of exotic fish species.

4 METHODOLOGY

Information relating to the native flora and fauna of the study area was collected from several sources. A survey of flora and fauna was undertaken during the study period in December 1996 and the data collected was supplemented by the review of the biological information collated for the Penrith Lakes Scheme by Kevin Mills & Associates Pty Limited (1995a). These sources provide a firm basis for assessing the flora and fauna of the DA4 area at Penrith Lakes.

The flora and fauna survey concentrated on all sites in the DA4 area likely to support native species. All parts of the study area and all habitat types were searched. Sites were searched for native plant species, although these are scarce because of the extensive clearing in the area. Most of the native plants were on the small wetlands and along the Nepean River.

Fauna species were recorded by several techniques, including the direct observation of animals and identification of their calls. The latter technique is especially effective for recording frog species. Attention was given to locating rare and uncommon fauna species in the field and obtaining records of these species from the literature. Survey strategies targeted threatened fauna.

Twenty-one survey sites were selected in the DA4 study area, at locations likely to support native flora and fauna; most were small wetland habitats. Except for the corridor along the Nepean River, these were islands of habitat on cleared farmland. The number of waterbird species observed on each wetland site was recorded. Frogs were surveyed at the same sites. The survey sites are summarised in Section 6. Searches for frogs were conducted at night, and the frogs were mainly identified by recognition of the calls of the males. A recording of calling males was played at various places in an attempt to elicit calls from the threatened Green and Golden Bell Frog *Litoria aurea*.

Observations and records of other species were made opportunistically and by searching for signs of their presence, such as tracks, scats and diggings. Niches likely to conceal reptiles were dissembled and then replaced. Information was also sought from local residents.

5 NATIVE FLORA AND VEGETATION COMMUNITIES

The native flora in the DA4 area is very restricted because most of the land was cleared many years ago to create farmland. Although native plants were occasionally found in the paddocks, most were found either along the Nepean River corridor or in and around the small wetlands scattered across the site. A list of the 55 native plant species recorded in the area is provided in Appendix 1.

i. Wetland Flora

There are many small areas of wetland on the low-lying parts of the floodplain. None is in a natural condition; while some of the wetlands have been greatly disturbed over the years, the others are artificial wetlands that were constructed to provide water for stock and perhaps to irrigate the paddocks.

The most common native plant species in these wetland areas are Cumbungi *Typha orientalis*, Tall Sedge *Carex appressa*, Water Primrose *Ludwigia peploides*, Water Couch *Paspalum distichum*, Common Rush *Juncus usitatus*. Spike-rush *Eleocharis ? equisetina*, Tall Spike-rush *Eleocharis sphacelata* and Knotweeds *Persicaria* spp. are less common. Introduced wetland plants also occur in the area, such as Umbrella Sedge *Cyperus eragrostis*, Water Hyacinth *Eichhornia crassipes* and Brazilian Water Milfoil *Myriophyllum aquaticum*.

ii. Riparian Flora

The vegetation along the Nepean River is a native forest that has been heavily disturbed. The dominant tree species is River Oak *Casuarina cunninghamiana*. The following additional native trees and shrubs are characteristic of this area: Coast Myall *Acacia binervia*, White Sallow Wattle *Acacia floribunda*, Forest Red Gum *Eucalyptus tereticornis*, Hickory *Acacia implexa* and Parramatta Green Wattle *Acacia parramattensis*. There are few native plants in the understorey because of the dense weed growth. The native flora includes Couch Grass *Cynodon dactylon*, Small-leaved Bramble *Rubus parvifolius*, Dusky Coral-pea *Kennedia rubicunda*, Blackthorn *Bursaria spinosa*, Glycine *Glycine clandestina* and Bluebell *Wahlenbergia gracilis*.

The river verges are heavily infested with weeds, particularly shrubs and climbers. The most common species are Willows *Salix* spp., Balloon Vine *Cardiospermum grandiflorum*, Caster Oil Plant *Ricinus communis*, Lantana *Lantana camara*, Tobacco Bush *Solanum mauritianum*, Fennel *Foeniculum vulgare*, Wandering Jew *Tradescantia albiflora* and Kikuyu Grass *Pennisetum clandestinum*. Other troublesome, but less common, weeds in the area are African Olive *Olea europaea*, Large-leaved Privet *Ligustrum lucidum*, Small-leaved Privet *Ligustrum sinense*, Moth Vine *Araujia hortorum*, Cape Ivy *Delairea odorata*, Camphor Laurel *Cinnamomum camphora*, Pampas Grass *Cortaderia selloana*, Blackberry *Rubus* sp., Honeysuckle *Lonicera japonica*, Giant Reed *Arundo donax*, Madeira Vine *Anredera cordifolia*, Blue Morning Glory *Ipomoea indica* and Tree of Heaven *Ailanthus altissima*.

The riverbanks and the moist low-lying alluvium beside the river support a mixture of native and introduced wetland plants. The native species include Common Reed *Phragmites australis*, Cumbungi *Typha orientalis*, Marsh Club-rush *Bolboschoenus fluviatilis*, Water Couch *Paspalum distichum*, River Club-rush *Schoenoplectus validus*, Azolla *Azolla filiculoides*, Swamp Millet *Isachne globosa*, Club-rush *Schoenoplectus mucronatus* and Ribbonweed *Vallisneria gigantea*. The introduced wetland species along the river include Willows *Salix* spp., Water Hyacinth

Eichhornia crassipes, Dense Waterweed *Egeria densa*, Umbrella Sedge *Cyperus eragrostis* and Blue Water Speedwell *Veronica anagallis-aquatica*.

There are only very occasional native trees on most of the floodplain and these are, almost invariably, large old specimens of Forest Red Gum *Eucalyptus tereticornis*, Broad-leaved Apple *Angophora subvelutina*, Narrow-leaved Red Ironbark *Eucalyptus crebra*, Thin-leaved Stringybark *Eucalyptus eugenioides* and Blue Box *Eucalyptus baueriana*.

6 FAUNA HABITATS

There are four main fauna habitats in the DA4 area: river wetlands, modified riparian forest, floodplain wetland and non-native grassland. The river wetlands consist of large pools, occasional riffle sections, and aquatic and fringing wetland vegetation. The modified riparian forest consists of native species and many weed species (see Section 5). The grassland is dominated by non-native species and is on cleared land retaining only occasional trees. Each small floodplain wetland was given an identification number (see below and Figure 3) and was surveyed.

1. Drainage line east of "Hadley Park"

This drainage line supports a dense stand of Cumbungi *Typha orientalis* and a few other wetland plants including River Club-rush *Schoenoplectus validus*, Water Primrose *Ludwigia peploides*, Lesser Joyweed *Alternanthera denticulata*, Water Couch *Paspalum distichum* and the introduced species Umbrella Sedge *Cyperus eragrostis* and Brazilian Water Milfoil *Myriophyllum aquaticum*. The land around the drainage line is intensively farmed.

2. Drainage lines on "Hadley Park"

These three small drainage lines support various wetland plant species. The most western area has been heavily grazed and there is only a sparse coverage of Tussock sedge *Carex appressa* and other species. Most of the central area is composed of weeds, Common Rush *Juncus usitatus* and a few other native wetland species. The eastern area is wet and mainly supports a dense stand of Cumbungi *Typha orientalis*; there are several other species near the small pond to the south, such as Water Primrose *Ludwigia peploides* and Common Rush *Juncus usitatus*.

3. Billabong (Cranebrook Creek) west of "Hadley Park"

This is a permanent billabong with various wetland plants around the edges, particularly Common Rush *Juncus usitatus*. The most prominent plant is the weed, Water Hyacinth *Eichhornia crassipes*.

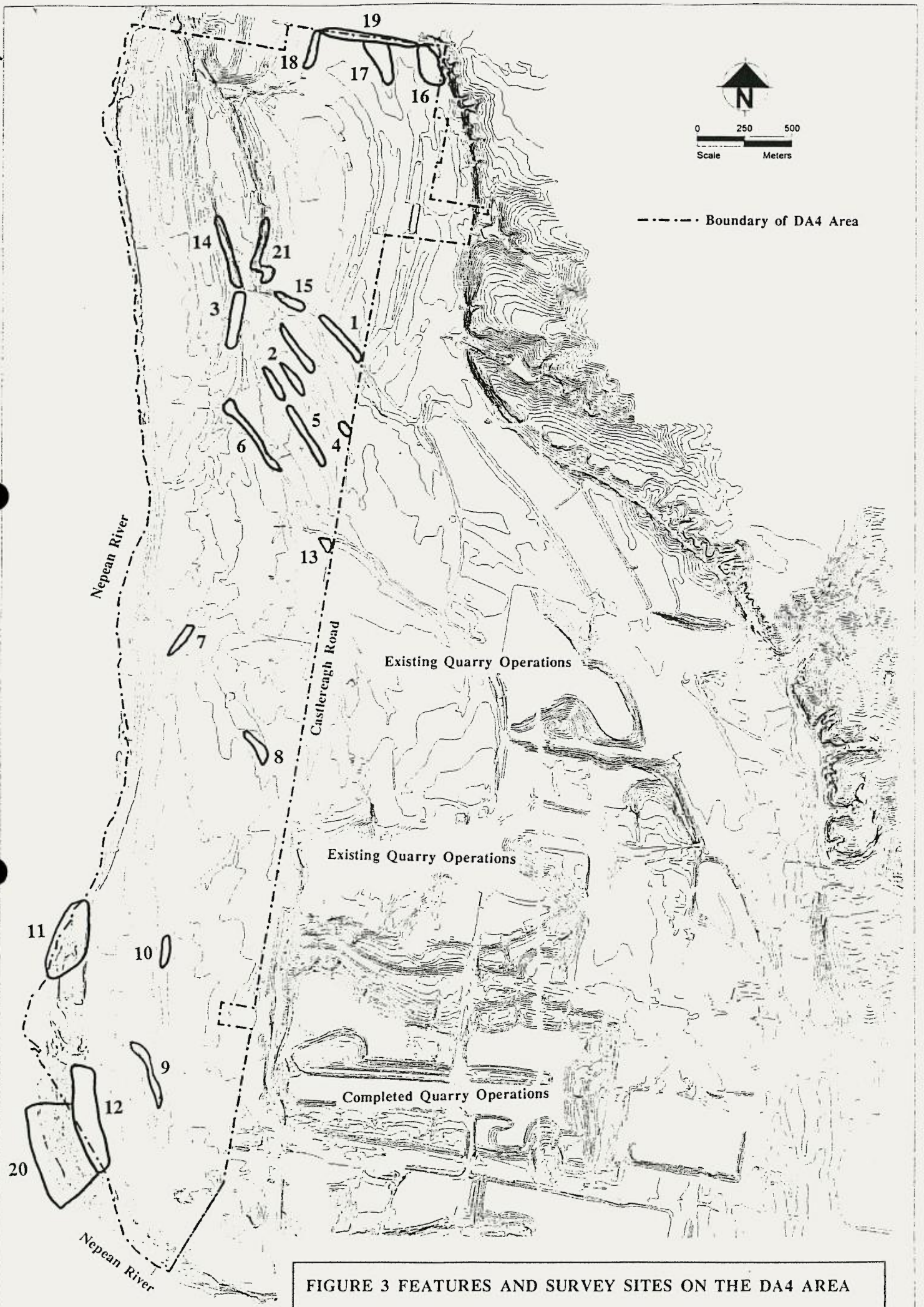


FIGURE 3 FEATURES AND SURVEY SITES ON THE DA4 AREA

4. Turnoff to "Nepean Park"

This is a small area of Common Reed *Juncus usitatus* on low-lying land; it would seldom be very wet.

5. Drainage line across "Nepean Park"

This long and narrow low-lying area mainly supports scattered Common Reed *Juncus usitatus* and a few other species, including the introduced weed Water Hyacinth *Eichhornia crassipes*.

6. Cranebrook Creek, south of "Nepean Park"

This very wet area mainly supports Water Couch *Paspalum distichum* and the introduced weed Water Hyacinth *Eichhornia crassipes*. Water Primrose *Ludwigia peploides*, Common Reed *Juncus usitatus* and a few River Oaks *Casuarina cunninghamiana* are also present. There are two large specimens of Broad-leaved Apple *Angophora subvelutina* near the creek and one specimen of Blue Box *Eucalyptus baueriana* to the far south.

7. South of the Equestrian Centre

This area is permanently wet and supports a fairly dense cover of Water Couch *Paspalum distichum* and a few other wetland species such as Common Rush *Juncus usitatus*, Water Primrose *Ludwigia peploides* and a few River Oaks *Casuarina cunninghamiana*.

8. Small wetland, southwest of the Farrells Lane turnoff

This small pond has muddy edges and a dense fringe of Common Rush *Juncus usitatus*. Water Primrose *Ludwigia peploides*, Slender Knotweed *Persicaria decipiens*, Water Couch *Paspalum distichum* and Azolla *Azolla filiculoides* are also present.

9. Creek across the unnamed lane north of CSR quarry

There is a dense stand of Cumbungi *Typha orientalis* along the drainage line to the south of the road. The northern side of the road is more entrenched and contains a permanent billabong with many wetland plants including small stands of Cumbungi *Typha orientalis*, with Water Primrose *Ludwigia peploides*, Water Couch *Paspalum distichum* and Common Rush *Juncus usitatus*.

10. South of Jacksons Lane

This site is a shallow muddy pond with scattered clumps of Common Rush *Juncus usitatus* and Tussock Sedge *Carex appressa* in a well grazed paddock.

11. Nepean River, end of Jacksons Lane

This site contains degraded riparian forest composed of River Oaks *Casuarina cunninghamiana* and many introduced shrubs and vines (see Section 5). At this location, the river is a large pond with wetland plants along the edge, including River Club-rush *Schoenoplectus validus*, Marsh Club-rush *Bolboschoenus fluviatilis* and Cumbungi *Typha orientalis*.

12. Old settling pond, CSR quarry

The old settling pond is nearly full of sediment and, although wet, there is little standing water. The area is being invaded by Willows *Salix* spp. and other weed trees. It also supports scattered River Oaks *Casuarina cunninghamiana* and dense Common Reeds *Phragmites australis*.

13. Turnoff to "Minnaville"

This is a small low-lying area supporting Cumbungi *Typha orientalis*, Water Couch *Paspalum distichum* and Water Hyacinth *Eichhornia crassipes* on the lower wet channel and Tussock Sedge *Carex appressa* on higher areas.

14. Cranebrook Creek north of "Hadley Park"

This section of creek is permanently wet and supports various wetland species such as Willows *Salix* spp., Cumbungi *Typha orientalis*, Common Rush *Juncus usitatus* and the weed, Water Hyacinth *Eichhornia crassipes*.

15. Drainage line east of "Hadley Park"

This small area supports a stand of Cumbungi *Typha orientalis* of varying density. The surrounding land is intensively farmed.

16. Corner of Smith Road and Castlereagh Road

The ungrazed paddock supports two stands of Cumbungi *Typha orientalis*, but the rest of the area is dry and supports mainly pasture species, Blackberry *Rubus* sp. thickets and stands of Sydney Green Wattle *Acacia parramattensis*.

17. Low-lying area, Smith Road east

This broad low-lying area supports a cover of Tussock Sedge *Carex appressa* in a grazing paddock.

18. Drainage line, Smith Road central

This drainage line mainly supports weeds, such as thickets of Blackberry *Rubus* sp. and Willows *Salix* spp.; there are also a few patches of Cumbungi *Typha orientalis*.

19. Drainage ditch, parallel to Smith Road

The drainage ditch along the southern side of Smith Road contains Cumbungi *Typha orientalis*, Spike-rush *Eleocharis ? equisetina*, Common Rush *Juncus usitatus*, Tussock Sedge *Carex appressa* and a few specimens of the paperbark, *Melaleuca linariifolia*.

20. Nepean River, south of CSR quarry

This part of the river is similar to site 11. The degraded forest is a mixture of River Oak *Casuarina cunninghamiana* and weed species. There are various wetland species along the edge of the river, both native and introduced. Cumbungi *Typha orientalis* is common in the shallows.

21. Creek north of "Hadley Park"

The creek is usually dry. The main feature of the area is the stand of large native trees, mainly Broad-leaved Apple *Angophora subvelutina* and Forest Red Gum *Eucalyptus tereticornis*.

7 FAUNA OF THE REGION

There have been several studies of the fauna in the Penrith district; these were reviewed in the study by Kevin Mills & Associates Pty Limited (1995a). The following discussion of the fauna in the district is based on that review but includes the most recent data, providing a sound basis for assessing the fauna recorded in the DA4 area.

Mammals

Table 1 is a list of mammals for the Penrith to Agnes Banks district and is based on the list in the earlier report (Kevin Mills & Associates 1995a). Most of these species are not expected to occur in the DA4 area because of the lack of suitable habitat.

Table 1
Mammals of the Penrith - Agnes Banks District

Common Name	Taxonomic Name	Source of Record [†]
Short-beaked Echidna	<i>Tachyglossus aculeatus</i>	1
Platypus	<i>Ornithorhynchus anatinus</i>	1
Brown Antechinus	<i>Antechinus stuartii</i>	1
Swamp Wallaby	<i>Wallabia bicolor</i>	1
Eastern Grey Kangaroo	<i>Macropus giganteus</i>	1
Common Ringtail Possum	<i>Pseudocheirus peregrinus</i>	1
Sugar Glider	<i>Petaurus breviceps</i>	1
Common Brushtail Possum	<i>Trichosurus vulpecula</i>	1
Lesser Long-eared Bat	<i>Nyctophilus geoffroyi</i>	1
Common Bent-wing Bat	<i>Miniopterus schreibersii</i>	1
Chocolate Wattled Bat	<i>Chalinolobus morio</i>	1
Greater Broad-nosed Bat	<i>Scoteanax rueppellii</i>	1
Little Forest Eptesicus	<i>Eptesicus vulturinus</i>	1
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	2
Water Rat	<i>Hydromys chrysogaster</i>	2
Bush Rat	<i>Rattus fuscipes</i>	1
Fox	<i>Vulpes vulpes*</i>	1 2
Feral Cat (includes semi-feral animals)	<i>Felis catus*</i>	1 2
Brown Hare	<i>Lepus capensis*</i>	1 2
Rabbit	<i>Oryctolagus cuniculus*</i>	1 2

Table 2
The Wetland Avifauna of the Penrith District

Family Species	Common Name	Australian Status ¹	NSW Status ²	Sydney Status ³	Penrith Lakes	Habitat
Anatidae (ducks)						
Plumed Whistling-Duck	<i>Dendrocygna eytoni</i>	A-C	MC	S	-	Grassy margins of swamps and lagoons.
Blue-billed Duck	<i>Oxyura australis</i>	U	MC	R	-	Deep freshwater wetlands.
Musk Duck	<i>Biziura lobata</i>	C	MC	S	YES	Deep freshwater wetlands.
Freckled Duck	<i>Stictonetta naevosa</i>	R	U	R	YES	Dense reed swamps and large open lakes.
Black Swan	<i>Cygnus atratus</i>	C	C	VC	YES	Shallow to moderately deep salt and fresh water.
Australian Shelduck	<i>Tadorna tadornoides</i>	U	MC	R	-	Coastal and inland mudflats, salt and fresh water.
Australian Wood Duck	<i>Chenonetta jubata</i>	A-C	A	VC	YES	Grassland near water.
Mallard*	<i>Anas platyrhynchos</i>	U	U	MC	YES	Wetlands of most types.
Pacific Black Duck	<i>Anas superciliosa</i>	A-C	A	C	YES	Ubiquitous on all wetland types, salt and fresh.
Australasian Shoveler	<i>Anas rhynchos</i>	R	MC	U	YES	Wetlands generally, particularly those with reeds.
Grey Teal	<i>Anas gracilis</i>	A-C	A	MC	YES	Ubiquitous on all wetland types, salt and fresh.
Chestnut Teal	<i>Anas castanea</i>	C	MC	U	YES	Mainly coastal fresh and brackish lagoons.
Pink-eared Duck	<i>Malacorhynchus membranaceus</i>	U	A-MC	R	YES	Mainly extensive floodwaters, coastal and inland
Hardhead	<i>Aythya australis</i>	C	C	U	YES	Wetlands generally, particularly deep freshwater.
Podicipedidae (grebes)						
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	C	A	C	YES	Almost all freshwaters, including small ponds.
Hoary-headed Grebe	<i>Poliiocephalus poliocephalus</i>	C	C	MC	YES	Usually larger lakes and other water bodies.
Great Crested Grebe	<i>Podiceps cristatus</i>	U	U	U	YES	Larger lakes and other water bodies.
Anhingidae (darter)						
Darter	<i>Anhinga melanogaster</i>	C	MC	U	YES	Shallow to deep fresh to brackish waters.
Phalacrocoracidae (cormorants)						
Little Pied Cormorant	<i>Phalacrocorax melanoleucos</i>	C	A	VC	YES	All wetlands, even very small ponds, salt and fresh.
Pied Cormorant	<i>Phalacrocorax varius</i>		MC	U	YES	Mainly large lakes, lagoons and rivers, also coastal.
Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>		A	VC	YES	Most wetlands with open water, salt and fresh.
Great Cormorant	<i>Phalacrocorax carbo</i>	C	C	C	YES	Mainly large lakes, lagoons and rivers, also coastal.
Pelecanidae (pelicans)						
Australian Pelican	<i>Pelecanus conspicillatus</i>	C	C-MC	C	YES	Large wetlands, generally, fresh and salt.
Ardeidae (herons and allies)						
White-faced Heron	<i>Egretta novaehollandiae</i>	A	A	C	YES	Shallow water, grassland and occasionally beaches.
Little Egret	<i>Egretta garzetta</i>	U	MC	MC	YES	Shallow water, fresh and salt.

Family Species	Common Name	Australian Status ¹	NSW Status ²	Sydney Status ³	Penrith Lakes	Habitat
White-necked Heron	<i>Ardea pacifica</i>	C	C	U	YES	Shallow freshwater and grasslands.
Great Egret	<i>Ardea alba</i>	C	C	MC	YES	Shallow water, fresh and salt.
Intermediate Egret	<i>Ardea intermedia</i>	C	MC	S	YES	Shallow water, fresh and salt.
Cattle Egret	<i>Ardea ibis</i>	C	MC	C	YES	Mainly grazing land, roosts near water.
Nankeen Night Heron	<i>Nycticorax caledonicus</i>	C	C-MC	U	-	Mainly sheltered ponds, rivers and other wetlands.
Little Bittern	<i>Ixobrychus minutus</i>	R	U	R	YES	Dense reed swamps.
Black Bittern	<i>Ixobrychus flavicollis</i>	U	U	R	-	Densely treed coastal wetlands.
Australasian Bittern	<i>Botaurus poiciloptilus</i>	C	MC	R	-	Dense reed swamps.
Threskiornithidae (ibises and spoonbills)						
Glossy Ibis	<i>Plegadis falcinellus</i>	U	MC	S	YES	Usually shallow water, mainly freshwater.
Australian White Ibis	<i>Threskiornis molucca</i>	A-C	A	C	YES	All wetlands, grasslands.
Straw-necked Ibis	<i>Threskiornis spinicollis</i>	C-U	A	MC	YES	Mainly grasslands, wetland edges.
Royal Spoonbill	<i>Platalea regia</i>	C-U	MC	MC	YES	Shallow water, salt and fresh.
Yellow-billed Spoonbill	<i>Platalea flavipes</i>	C-U	MC	U	YES	Shallow freshwater, particularly small dams.
Ciconiidae (storks)						
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	U	R	R	-	Rivers and lagoons, coastal and inland.
Accipitridae (hawks and eagles)						
Whistling Kite	<i>Haliastur sphenurus</i>	C	MC	MC	YES	Often associated with wetlands of various types.
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	C	U	MC	YES	Large fresh and brackish wetlands and coastal.
Swamp Harrier	<i>Circus approximans</i>	MC	MC	U	YES	Reed swamps, grasslands around wetlands.
Rallidae (rails and allies)						
Baillon's Crake	<i>Porzana pusilla</i>	C	C-MC	R	YES	Wetlands with some dense cover.
Australian Spotted Crake	<i>Porzana fluminea</i>	C	MC	S	YES	Freshwater swamps with vegetative cover.
Purple Swampphen	<i>Porphyrio porphyrio</i>	A-C	A	C	YES	Well vegetated fresh water wetlands.
Dusky Moorhen	<i>Gallinula tenebrosa</i>	A-C	A	C	YES	Well vegetated fresh water wetlands.
Eurasian Coot	<i>Fulica atra</i>	A-C	A	C	YES	Large lakes and lagoons, mainly fresh water.
Scolopacidae (sandpipers and allies)						
Latham's Snipe	<i>Gallinago hardwickii</i>	C	MC	U	YES	Moist tussock grassland, edges of fresh swamps.
Marsh Sandpiper	<i>Tringa stagnatilis</i>	U	U	R	-	Freshwater swamps, flooded paddocks.
Common Greenshank	<i>Tringa nebularia</i>	C	U	MC	YES	Freshwater swamps, moist margins of wetlands.
Wood Sandpiper	<i>Tringa glareola</i>	U	S	R	YES	Shallow margins of salt and fresh wetlands.
Common Sandpiper	<i>Actitis hypoleucos</i>		S	R	-	Margins of fresh and salt wetlands.
Sharp-tailed Sandpiper	<i>Calidris acuminata</i>	A	C	C	YES	Margins of salt and fresh wetlands.

Family Species	Common Name	Australian Status ¹	NSW Status ²	Sydney Status ³	Penrith Lakes	Habitat
Curllew Sandpiper	<i>Calidris ferruginea</i>	C	MC	MC	YES	Mainly coastal beaches and mudflats, also margins of inland wetlands.
Recurvirostridae (stilts and avocets)						
Black-winged Stilt	<i>Himantopus himantopus</i>	C	C	C	YES	Shallow fresh and salt water.
Charadriidae (plovers and dotterels)						
Black-fronted Dotterel	<i>Euseyornis melanops</i>	C	C	MC	YES	Muddy margins of fresh wetlands.
Red-kneed Dotterel	<i>Erythronyx cinctus</i>	C	MC	U	YES	Shallow fresh water, mainly inland.
Banded Lapwing	<i>Vanellus tricolor</i>	C	C	S	YES	Open grasslands.
Masked Lapwing	<i>Vanellus miles</i>		A	C	YES	Grasslands and the margins of wetlands.
Laridae (gulls and terns)						
Silver Gull	<i>Larus novaehollandiae</i>	C	A	VC	YES	Ubiquitous, large wetlands, coastal and inland.
Centropodidae						
Pheasant Coucal	<i>Centropus phasianinus</i>	C	MC	R	YES	Dense grasslands, etc. often in swamps.
Alcedinidae						
Azure Kingfisher	<i>Alcedo azurea</i>	C	MC	U	YES	Edegs of streams, lakes etc., also coastal.
Passeridae (finches and allies)						
Chestnut-breasted Mannikin	<i>Lonchura castaneothorax</i>	C	MC	U	YES	Dense thickets and reeds near wetlands.
Sylviidae						
Clamorous Reed-Warbler	<i>Acrocephalus stentoreus</i>	C	A	MC	YES	Reedbeds on all wetlands.
Little Grassbird	<i>Megalurus gramineus</i>	MC	A	U	YES	Reedbeds on all wetlands.
Golden-headed cisticola	<i>Cisticola exilis</i>	C	A	MC	YES	Grasslands, etc. often near wetlands.

Notes:

1. Estimate of abundance in Australia obtained principally from the National Photographic Index of Australian Wildlife (1985);
 2. Estimate of abundance in New South Wales obtained from Morris, McGill and Holmes (1981);
 3. Estimate of abundance in the Sydney Region obtained from the Birdwatchers Guide to Sydney (Roberts 1993).
- Introduced species are indicated by an asterisk *.

Black Rat	<i>Rattus rattus</i> *	1	2
House Mouse	<i>Mus musculus</i> *	1	

+ 1. Australian Defence Industries (ADI) site at St Marys (Gunninah Consultants 1991; Kevin Mills & Associates 1995b) and other nearby sites. 2. Penrith Lakes Scheme (all sources). * Introduced species.

Birds

A list of birds for the Penrith district was compiled by Kevin Mills & Associates (1995a); see Appendix 2. The list contains the names of 220 species and is based on the species listed by the Royal Australasian Ornithologists Union in the *Atlas of Australian Birds* for the grid block 34°45' 150°45', obtained as a computer printout from the RAOU in Melbourne. Several species have been added to the list following recent studies in and near the Penrith Lakes Scheme, including studies by the consultant. The wetland birds in the Penrith Lakes district were summarised in the report by Kevin Mills & Associates (1995a); this table is reproduced in Table 2.

Reptiles

Table 3 is a list of reptiles for the Penrith to Agnes Banks district, compiled from the sources reviewed in the earlier report (Kevin Mills & Associates 1995a). At least 11 species of snakes are known to occur in the district, 22 species of lizards and the Long-necked Tortoise *Chelodina longicollis*.

Table 3
Reptiles of the Penrith - Agnes Banks District

Common Name	Taxonomic Name	Source of Record ⁺		
Snakes				
Red-bellied Black Snake	<i>Pseudechis porphyriacus</i>	1	2	3
Eastern Brown Snake	<i>Pseudonaja textilis</i>	1	2	3
Golden Crowned Snake	<i>Cacophis squamulosus</i>		2	
Eastern Small-eyed Snake	<i>Cryptophis nigrescens</i>		2	
Yellow-faced Whip Snake	<i>Demansia psammophis</i>		2	3
Common Tree Snake	<i>Dendrelaphis punctulata</i>		2	
Black-bellied Swamp Snake	<i>Hemiaspis signata</i>		2	
Blind Snake	<i>Ramphotyphlops nigrescens</i>		2	3
Diamond Python	<i>Morelia spilota</i>			3
Common Death Adder	<i>Acanthophis antarcticus</i>			3
Red-napped Snake	<i>Furina diadema</i>			3
Lizards				
Lace Monitor	<i>Varanus varius</i>	1	2	3
Bearded Dragon	<i>Pogona barbata</i>	1	2	
Eastern Water Dragon	<i>Physignathus lesueurii</i>	1	2	
Eastern Water Skink	<i>Eulamprus quoyii</i>	1	2	3
Grass Skink	<i>Lampropholis guichenoti</i>	1	2	3
Eastern Blue-tongued Lizard	<i>Tiliqua scincoides</i>	1	2	3
Small-eyed Skink	<i>Cryptoblepharus virgatus</i>	1	2	
Robust Comb-eared Skink	<i>Ctenotus robustus</i>		2	
Copper-tailed Skink	<i>Ctenotus taeniolatus</i>		2	3
Wood Gecko	<i>Diplodactylus vittatus</i>		2	3

Cunningham's Skink	<i>Egernia cunninghami</i>		2	
White's Skink	<i>Egernia whitii</i>		2	
Delicate Skink	<i>Lampropholis delicata</i>	1	2	3
Weasel Skink	<i>Saproscincus mustelinus</i>		2	3
Red-throated Skink	<i>Pseudemoia platynota</i>		2	
Burton's Snake-lizard	<i>Lialis burtonis</i>		2	
Lesueur's Velvet Gecko	<i>Oedura lesueurii</i>		2	
Southern Leaved-tailed Gecko	<i>Phyllurus platurus</i>		2	
Common Scaly-Foot	<i>Pygopus lepidopodus</i>		2	3
Bar-sided Skink	<i>Eulamprus tenuis</i>		2	3
Thick-tailed Gecko	<i>Underwoodisaurus milii</i>		2	
Jacky Lizard	<i>Amphibolurus muricatus</i>			3
Tortoise				
Long-necked Tortoise	<i>Chelodina longicollis</i>	1	2	3

+ 1. ADI St Marys site (Gunninah Consultants 1991; Kevin Mills & Associates 1995b). 2. Penrith Lakes Scheme - Agnes Banks (Department of Environment and Planning 1984). 3. Agnes Banks (Wells and Turner 1988).

Frogs

A list of frogs for the Penrith to Agnes Banks and Richmond district was compiled by Kevin Mills & Associates (1995a) and is presented in Table 4. Eight (8) of the 20 frog species were found in the Penrith Lakes area by Kevin Mills & Associates (1995a).

Table 4
Frog Species recorded in the Penrith - Richmond District

Common Name	Taxonomic Name	Source of Record ⁺			
Tusked Frog	<i>Adelotus brevis</i>		2		
Giant Burrowing Frog	<i>Heleioporus australiacus</i>		2		
Eastern Banjo Frog	<i>Limnodynastes dumerilii</i>		2		4
Ornate Burrowing Frog	<i>Limnodynastes ornatus</i>		2	3	4
Brown-striped Frog	<i>Limnodynastes peronii</i>	1	2	3	4
Spotted Grass Frog	<i>Limnodynastes tasmaniensis</i>		2	3	
Green and Golden Bell Frog	<i>Litoria aurea</i>		2	3	
Green Tree Frog	<i>Litoria caerulea</i>		2	3	4
Bleating Tree Frog	<i>Litoria dentata</i>	1	2	3	4
Eastern Dwarf Tree Frog	<i>Litoria fallax</i>	1	2	3	4
Broad-palmed Frog	<i>Litoria latopalmata</i>	1	2	3	
Lesueur's Tree Frog	<i>Litoria lesueuri</i>		2		
Peron's Tree Frog	<i>Litoria peronii</i>	1	2	3	4
Leaf Green Tree Frog	<i>Litoria phyllochroa</i>		2		
Large-eyed Tree Frog	<i>Litoria tyleri</i>	1	2		
Verreaux's Tree Frog	<i>Litoria verreauxii</i>		2		
Red-crowned Toadlet	<i>Pseudophryne australis</i>		2		
Brown Toadlet	<i>Pseudophryne bibronii</i>	1	2	3	
Common Eastern Froglet	<i>Crinia signifera</i>	1	2	3	4
Smooth Toadlet	<i>Uperoleia laevisgata</i>		2	3	4

+ 1. ADI St Marys site (Kevin Mills & Associates 1995b).
2. Penrith Lakes Scheme - Agnes Banks (Department of Environment and Planning 1984).
3. Agnes Banks (Wells and Turner 1988).
4. Richmond - Windsor (Ferraro and Burgin 1993).

8 FAUNA SURVEY RESULTS

8.1 BIRDS

Seventy-five (75) bird species were recorded in the DA4 area during this study; see Table 5. Most species were recorded along the Nepean River corridor, although the small wetlands on the floodplain also provided important habitat for birds. The cleared farmland supports native and introduced species that favour the open character of these areas. Many of the birds listed in Appendix 2 are also expected to occur from time to time in the DA4 area at Penrith Lakes.

Table 5
Bird Species recorded in the DA4 Area, December 1996

Common Name	Taxonomic Name
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>
Australian Magpie	<i>Gymnorhina tibicen</i>
Australian Raven	<i>Corvus coronoides</i>
Australian Wood Duck	<i>Chenonetta jubata</i>
Azure Kingfisher	<i>Alcedo azurea</i>
Bar-shouldered Dove	<i>Geopelia humeralis</i>
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>
Black-fronted Dotterel	<i>Elsevornis melanops</i>
Black-shouldered Kite	<i>Elanus axillaris</i>
Black-winged Stilt	<i>Himantopus himantopus</i>
Brush Cuckoo	<i>Cacomantis variolosus</i>
Cattle Egret	<i>Ardea ibis</i>
Channel-billed Cuckoo	<i>Scythrops novaehollandiae</i>
Chestnut-breasted Mannikin	<i>Lonchura castaneothorax</i>
Cicadabird	<i>Coracina tenuirostris</i>
Clamorous Reed Warbler	<i>Acrocephalus stentoreus</i>
Common Blackbird*	<i>Turdus merula</i>
Common Greenshank	<i>Tringa nebularia</i>
Common Koel	<i>Eudynamys scolopacea</i>
Common Mynah*	<i>Acridotheres tristis</i>
Common Starling*	<i>Sturnus vulgaris</i>
Crested Pigeon	<i>Ocyphaps lophotes</i>
Crimson Rosella	<i>Platycercus elegans</i>
Dusky Moorhen	<i>Gallinula tenebrosa</i>
Eastern Rosella	<i>Platycercus eximius</i>
Eastern Whipbird	<i>Psophodes olivaceus</i>
Eastern Yellow Robin	<i>Eposaltria australis</i>
European Goldfinch*	<i>Carduelis carduelis</i>
Fairy Martin	<i>Hirundo ariel</i>
Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>
Galah	<i>Cacatua roseicapilla</i>
Golden-headed Cisticola	<i>Cisticola exilis</i>
Grey Butcherbird	<i>Cracticus torquatus</i>
Grey Fantail	<i>Rhipidura fuliginosa</i>
Grey Shrike-thrush	<i>Colluricincla harmonica</i>
Grey Teal	<i>Anas gracilis</i>

House Sparrow*	<i>Passer domesticus</i>
Jacky Winter	<i>Microeca fascinans</i>
Latham's Snipe	<i>Gallinago hardwickii</i>
Laughing Kookaburra	<i>Dacelo novaeguineae</i>
Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>
Little Corella	<i>Cacatua sanguinea</i>
Little Pied Cormorant	<i>Phalacrocorax melanoleucos</i>
Magpie-lark	<i>Gralina cyanoleuca</i>
Masked Lapwing	<i>Vanellus miles</i>
Mistletoebird	<i>Dicaeum hirundinaceum</i>
Noisy Friarbird	<i>Philemon corniculatus</i>
Noisy Miner	<i>Manorina melanocephala</i>
Nutmeg Mannikin*	<i>Lonchura punctulata</i>
Pacific Black Duck	<i>Anas superciliosa</i>
Peaceful Dove	<i>Geopelia striata</i>
Pied Currawong	<i>Strepera graculina</i>
Purple Swamphen	<i>Porphyrio porphyrio</i>
Red-browed Finch	<i>Neochmia temporalis</i>
Red-rumped Parrot	<i>Psephotus haematonotus</i>
Red-whiskered Bulbul*	<i>Pycnonotus jocosus</i>
Richard's Pipit	<i>Anthus novaeseelandiae</i>
Rock Dove*	<i>Columba livia</i>
Rufous Whistler	<i>Pachycephala rufiventris</i>
Shining Bronze-cuckoo	<i>Chrysococcyx lucidus</i>
Silvereye	<i>Zosterops lateralis</i>
Southern Boobook	<i>Ninox novaeseelandiae</i>
Spotted Turtle Dove*	<i>Streptopelia chinensis</i>
Straw-necked Ibis	<i>Threskiornis spinicollis</i>
Sulphur-crested Cockatoo	<i>Cacatus galerita</i>
Superb Fairy-wren	<i>Malurus cyaneus</i>
Welcome Swallow	<i>Hirundo neoxena</i>
White-browed Scrubwren	<i>Sericornis frontalis</i>
White-face Heron	<i>Egretta novaehollandiae</i>
White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>
Willie Wagtail	<i>Rhipidura leucophrys</i>
Yellow Thornbill	<i>Acanthiza nana</i>
Yellow-billed Spoonbill	<i>Platalea flavipes</i>
Yellow-faced Honeyeater	<i>Lichenostomus chrysops</i>
Zebra Finch	<i>Taeniopygia guttata</i>

The results of the census of wetland birds at the DA4 survey sites is presented in Table 6. The location of the survey sites is shown on Figure 3. Of the 67 wetland birds recorded in the Penrith district, 58 have been recorded at Penrith Lakes and 20 species were recorded during this survey. The wetland avifauna was much less diverse and the populations were much smaller than on the large wetlands in the DA3 area studied by Kevin Mills & Associates (1995a). Except for the river, the wetlands in the DA4 area are small, most are ephemeral and some usually contain very little or no standing water.

Table 6
Summary of Waterbird Counts at Survey Sites

Species	Sites ¹	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Other
Australasian Grebe										3												
Australian Wood Duck																						13
Azure Kingfisher																					1	
Black-fronted Dotterel									2		1											
Black-winged Stilt									5		2											
Cattle Egret											2											
Clamorous Reed-Warbler	5									1		2	3								1	
Common Greenshank											1											
Dusky Moorhen											13										1	
Golden-headed Cisticola	2									2								1				
Grey Teal									9		11	1										
Latham's Snipe										1												
Little Black Cormorant												1										
Little Pied Cormorant												1									1	
Masked Lapwing									1													5
Pacific Black Duck				2			1		1	9	35	10									4	
Purple Swamphen							2		1													
Straw-necked Ibis																						32
White-faced Heron							1			1												
Yellow-billed Spoonbill										1												
No. of Species		2	-	1	-	-	3	-	6	7	6	6	1	-	-	-	-	1	-	-	5	3

1. For location of sites, see Table 8.

Most of the native birds recorded in the DA4 area were found along the Nepean River corridor. Table 7 presents the results of the survey at site 11 on 9 December 1996 and provides an indication of the species that occur in this highly modified forest habitat.

Table 7
Results of Bird Survey in the Forest, Nepean River Corridor, 9 December 1996

Common Name	Taxonomic Name	No. of Birds
Australian Raven	<i>Corvus coronoides</i>	2
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	2
Brush Cuckoo	<i>Cacomantis variolosus</i>	1
Chestnut-breasted Mannikin	<i>Lonchura castaneothorax</i>	2
Common Blackbird*	<i>Turdus merula</i>	1
Eastern Whipbird	<i>Psophodes olivaceus</i>	1
Eastern Yellow Robin	<i>Eopsaltria australis</i>	1
European Goldfinch*	<i>Carduelis carduelis</i>	2
Grey Fantail	<i>Rhipidura fuliginosa</i>	4
Lewin's Honeyeater	<i>Meliphaga lewinii</i>	1
Magpielark	<i>Grallina cyanoleuca</i>	2
Nutmeg Mannikin*	<i>Lonchura punctulata</i>	2
Red-browed Finch	<i>Neochmia temporalis</i>	4
Red-whiskered Bulbul*	<i>Pycnonotus jocosus</i>	4
Rufous Whistler	<i>Pachycephala rufiventris</i>	2
Silvereye	<i>Zosterops lateralis</i>	3
Nutmeg Mannikin	<i>Lochura punctulata</i>	2
Spotted Turtle-Dove*	<i>Streptopelia chinensis</i>	1
Superb Fairy-wren	<i>Malurus cyaneus</i>	3
Welcome Swallow	<i>Hirundo neoxena</i>	1
Willie Wagtail	<i>Rhipidura leucophrys</i>	2
Yellow Thornbill	<i>Acanthiza nana</i>	3
Yellow-faced Honeyeater	<i>Lichenostomus chrysops</i>	1

* Introduced species

8.2 FROGS

The results of the frog surveys in the DA4 area are presented in Table 8. The table lists seven species recorded at the 21 survey sites in the study area, although no frogs were found at 10 of the sites; see Table 8 and Figure 3. The following species were recorded during the survey:

- Bleating Tree Frog *Litoria dentata*
- Broad-palmed Frog *Litoria latopalmata*
- Brown-striped Frog *Limnodynastes peronii*
- Common Eastern Froglet *Crinia signifera*
- Eastern Dwarf Tree Frog *Litoria fallax*
- Green Tree Frog *Litoria caerulea*
- Peron's Tree Frog *Litoria peronii*

Table 8
Frog Species recorded in the DA4 Area at Penrith Lakes

Site	<i>Crinia signif.</i>	<i>Limno. peronii</i>	<i>Litoria caerul.</i>	<i>Litoria fallax</i>	<i>Litoria latopal.</i>	<i>Litoria peronii</i>	<i>Litoria dentata</i>	No. of Species
1								-
2	X			X	X	X		4
3		X	X	X				3
4								-
5								-
6								-
7								-
8				X		X		2
9		X		X	X	X		4
10								-
11		X		X	X	X		4
12		X		X				2
13								-
14		X		X		X		3
15								-
16		X		X		X		3
17								-
18						X		1
19								-
20								-
21							X	1
Total	1	6	1	8	3	7	1	

Sites:

1. Drainage line east of "Hadley Park".
2. Drainage lines on "Hadley Park".
3. Billabong (Cranebrook Creek) west of "Hadley Park".
4. Turnoff to "Nepean Park".
5. Drainage line across "Nepean Park".
6. Cranebrook Creek, south of "Nepean Park".
7. South of the Equestrian Centre.
8. Small wetland, southwest of the Farrells Lane turnoff.
9. Creek across the unnamed lane north of CSR quarry.
10. South of Jacksons Lane.
11. Nepean River, end of Jacksons Lane.
12. Old settling pond, CSR quarry.
13. Turnoff to "Minnaville".
14. Cranebrook Creek north of "Hadley Park".
15. Drainage line east of "Hadley Park".
16. Corner of Smith Road and Castlereagh Road.
17. Low-lying area, Smith Road east.
18. Drainage line, Smith Road central.
19. Drainage ditch, parallel to Smith Road.
20. Nepean River, south of CSR quarry.
21. Creek north of "Hadley Park".

Most of the frog species recorded in the DA3 area at Penrith Lakes (Kevin Mills & Associates 1995a) were found in the DA4 area; all except one are common and widespread species. The Green Tree Frog *Litoria caerulea* has become uncommon to rare around Sydney, disappearing from many areas where it was once common. It was not found in 1995 at Penrith Lakes (Kevin Mills & Associates 1995a), although it had been recorded at seven of 36 survey sites in 1981 (Department of Environment and Planning 1984). However, several frogs were observed near the house at survey site 3 in the DA4 area.

Swampy sites likely to support the endangered Green and Golden Bell Frog *Litoria aurea* were carefully investigated to determine whether the species was present, particularly the settlement pond in the southwestern corner of the DA4 area (survey site 12). The species had been recorded at this site in 1981 (Department of Environment and Planning 1984). At these locations, additional time was spent searching and listening for frogs, and playing recordings of calling males at night to elicit a response from resident frogs. Despite these efforts, the Green and Golden Bell Frog was not recorded in the area.

8.3 OTHER SPECIES

The other vertebrate species recorded in the DA4 area during the study period are listed in Table 9. The Grey-headed Flying-fox *Pteropus poliocephalus* was the only native mammal recorded. Two introduced mammals were observed, the Feral Cat *Felis catus* and the Brown Hare *Lepus capensis*. Residents reported the Fox *Vulpes vulpes* and the Black Rat *Rattus rattus*. Some of the native species listed in Table 1 are expected to occur in the DA4 area, but would be uncommon there; these include the Short-beaked Echidna *Tachyglossus aculeatus*, the Common Brushtail Possum *Trichosurus vulpecula* and the Water Rat *Hydromys chrysogaster*, as well as some bat species that are most likely to occur along the Nepean River corridor.

A small number of reptiles was recorded during the survey; see Table 9. Some of the species listed in Table 3 are also expected to occur in the DA4 area.

Table 9

Species other than Birds and Frogs recorded in the DA4 Area

Common Name	Taxonomic Name	Notes
Mammals		
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	Recorded in the DA4 area.
Fox*	<i>Vulpes vulpes</i>	Reported by a resident.
Brown Hare*	<i>Lepus capensis</i>	Recorded in the DA4 area.
Feral Cat*	<i>Felis catus</i>	Recorded in the DA4 area.
Black Rat*	<i>Rattus rattus</i>	Reported by a resident.
Reptiles		
Long-necked Tortoise	<i>Chelodina longicollis</i>	Observed on the Nepean River.
Grass Skink	<i>Lampropholis guichenoti</i>	Observed near the Nepean River.
Delicate Skink	<i>Lampropholis delicata</i>	Recorded in the DA4 area.
Eastern Water Skink	<i>Eulamprus quoyii</i>	Recorded in the DA4 area.
Eastern Water Dragon	<i>Physignathus lesueurii</i>	Observed on the Nepean River.
Eastern Tiger Snake	<i>Notechis scutatus</i>	Reported by a resident.
Common Death Adder	<i>Acanthophis antarcticus</i>	Reported by a resident.
Eastern Brown Snake	<i>Pseudonaja textilis</i>	Reported by a resident.
Red-bellied Black Snake	<i>Pseudechis porphyriacus</i>	Reported by a resident.

* Introduced species.

9 THREATENED SPECIES

i. Flora

The *Threatened Species Conservation Act 1995* provides legislative protection for species considered to be threatened in New South Wales; these species are listed on the schedules attached to the Act. Species are listed as "extinct", "endangered" or "vulnerable". No threatened plant species were found in the DA4 area. The natural environment has been severely modified and it is unlikely that any threatened species are present on the farmland on the floodplain. The forest along the Nepean River contains some native plant species but has become severely degraded, mainly because much of the natural vegetation has been removed and weeds have invaded.

Australian plant species that are rare or threatened (ROTAP species) are listed on a national register maintained by the CSIRO (Briggs and Leigh 1988) and plants that are rare in the Western Sydney region have been identified by Benson and McDougall (1991), in a publication used to assess the status of plant species on the Cumberland Plain.

Benson and McDougall (1991) identified many vulnerable plant species in Western Sydney, which they defined as "those [species] not known to be conserved within two or more dedicated conservation reserves in Western Sydney or in the adjacent sandstone areas". Some of the species listed as being vulnerable are actually very common and widespread: their "vulnerability" reflects

the lack of conservation reserves in western Sydney. "Vulnerable" species occurring in the DA4 area are listed in Table 10, with a note on the location of the species. Most of the species occur along the Nepean River corridor and will not be affected by the development of the area.

Table 10
List of "Vulnerable" Species on the DA4 Area⁺

Species	Occurrence in the DA4 Area
<i>Acacia binervia</i>	This species is common along the Nepean River corridor.
<i>Acacia implexa</i>	This species is moderately common along the Nepean River corridor.
<i>Angophora subvelutina</i>	There are occasional mature specimens in farmland along Cranebrook Creek.
<i>Azolla filiculoides</i>	This species is common on the river and ponds in the DA4 area.
<i>Eleocharis ? equisetina</i>	This species occurs in a drain along Smith Road and at site 7, south of the equestrian centre.
<i>Eucalyptus baueriana</i>	There is one mature specimen at the southern end of site 6.
<i>Glochidion ferdinandi</i>	One shrub was found along the river.
<i>Lespedeza juncea</i>	About 100 plants were found on the southern side of Smith Road.
<i>Oplismenus imbecillis</i>	This species occurs in a group of trees north of "Hadley Park".
<i>Persicaria decipiens</i>	Occurs occasionally on small wetlands.
<i>Paspalum distichum</i>	Very common on several small wetlands and along the river.
<i>Persicaria lapathifolia</i>	Along the drain south of Smith Road.
<i>Persicaria praetermissa</i>	Along the drain south of Smith Road.
<i>Potamogeton ochreatus</i>	Occurs at the pond at site 9.
<i>Pyllanthus ? gunnii</i>	Occurs along the Nepean River corridor.
<i>Schoenoplectus mucronatus</i>	This species was found at one location on the river.
<i>Schoenoplectus validus</i>	Occurs occasionally along the river, and at site 1.
<i>Senecio quadridentatus</i>	Occurs occasionally along the river corridor.

⁺Species identified as "vulnerable" by Benson and McDougall (1991).

ii. Fauna

The *Threatened Species Conservation Act 1995* provides legislative protection for species considered to be threatened in New South Wales; these species are listed on the schedules attached to the Act. Species are listed as "extinct", "endangered" or "vulnerable". No threatened fauna species were recorded in the study area. However, threatened species known to occur in the vicinity of the study area, and which could reasonably be expected to occur there, are listed in Table 11 and are discussed below. Twenty threatened species were assessed because there are records of them from the Penrith district.

Table 11
Threatened Fauna in the Penrith District[†]

Common Name	Taxonomic Name
Australasian Bittern	<i>Botaurus poiciloptilus</i>
Black Bittern	<i>Ixobrychus flavicollis</i>
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>
Blue-billed Duck	<i>Oxyura australis</i>
Comb-crested Jacana	<i>Irediparra gallinacea</i>
Common Bentwing-bat	<i>Miniopterus schreibersii</i>
Freckled Duck	<i>Stictonetta naevosa</i>
Giant Burrowing Frog	<i>Heleioporus australiacus</i>
Glossy Black-Cockatoo	<i>Calyptorhynchus lathami</i>
Greater Broad-nosed Bat	<i>Scoteanax rueppellii</i>
Greater Sand Plover	<i>Charadrius leschenaultii</i>
Green and Golden Bell Frog	<i>Litoria aurea</i>
Large-footed Myotis	<i>Myotis adversus</i>
Powerful Owl	<i>Ninox strenua</i>
Red-crowned Toadlet	<i>Pseudophryne australis</i>
Regent Honeyeater	<i>Xanthomyza phrygia</i>
Squirrel Glider	<i>Petaurus norfolcensis</i>
Swift Parrot	<i>Lathamus discolor</i>
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>
Turquoise Parrot	<i>Neophema pulchella</i>

[†] Based on the report by Kevin Mills & Associates (1995a).

Australasian Bittern

Status in New South Wales: Vulnerable; the species was listed on Schedule 2 of the *Threatened Species Conservation Act 1995* because its population has declined to a critical level, the threatening processes are severe and it is an ecological specialist (NPWS 1992).

Distribution: The Australasian Bittern *Botaurus poiciloptilus* occurs in Australia and New Zealand, and is a nomadic species. In Australia it is mainly confined to the southeast and southwest. It is widespread in New South Wales and common in its stronghold in the Murray-Darling Basin. It is uncommon or rare elsewhere in the state.

Habitat, etc: The Australasian Bittern lives in freshwater and brackish wetlands and forages in still shallow water to a depth of 30cm. According to Marchant and Higgins (1990) the species favours permanent freshwater wetlands dominated by sedges, rushes, reeds or cutting grass. The species occurs in wet tussocky paddocks as well as in broad areas of dense reed beds on the edge of lagoons, swamps and slow rivers.

Threats: Habitat loss is the main threat to the Australasian Bittern, as wetlands have been drained to provide land for agriculture, and its habitats have been heavily grazed by domestic stock.

Increased salinity caused by excessive clearing of vegetation has also contributed to its decline (Garnett 1992a).

Regional Occurrence: The Australasian Bittern has been recorded in the 10' grid block covering the Penrith area (RAOU, Melbourne; see Appendix 2). The abundant reedbeds in the Penrith Lakes area could be suitable habitat for this species.

Potential to Occur in the DA4 Area: The Australasian Bittern is likely to occur in the Penrith Lakes area, which has abundant reedbeds suitable for this species. It could occur in the DA4 area, the most suitable locations being the reed beds in the old settlement pond (site 12) and along the Nepean River.

Black Bittern

Status in New South Wales: Vulnerable; the species was listed on Schedule 2 of the *Threatened Species Conservation Act 1995* because its population has been reduced to a critical level, its distribution has been reduced, the threatening processes are severe and it is an ecological specialist (NPWS 1992).

Distribution: The Black Bittern *Ixobrychus flavicollis* occurs in southeast Asia, New Guinea and Australia. In Australia, its range extends from the Kimberley Region in Western Australia through the Northern Territory to Cape York, and along the coast of Queensland and New South Wales. It also occurs in southwest Western Australia. In New South Wales, the species is rare south of Sydney.

Habitat, etc.: The Black Bittern forages on the edge of permanent wetlands, rivers and creeks fringed by dense vegetation. Along the coast, it also occurs in estuaries and within the tidal area of rivers and creeks. The vegetation "may form only a narrow fringe [and the species is] recorded in rank grassland, shrubland, woodland, dry or wet sclerophyll forest, rainforest, vine thickets and mangroves" (Marchant and Higgins 1990).

Threats: The main threat to the Black Bittern is habitat loss, as wetlands have been drained to create farmland and wetland habitats have been grazed by domestic stock. Increased salinity and siltation of wetlands, caused by excessive clearing of vegetation, have also contributed to the decline of this species.

Regional Occurrence: Roberts (1993) reported that the Black Bittern is "a rare resident in the Sydney region. They inhabit quiet freshwater streams with a good canopy of paperbark trees and [occur] well away from settled areas." One Black Bittern was observed on the ADI St Marys site on 12 January 1985 (Kevin Mills & Associates 1995b).

Potential to Occur in the DA4 Area: The Black Bittern may occur at Penrith Lakes and along the Nepean River, but it was not recorded during the survey. It is unlikely to occur in the DA4 area, because of the absence of suitable habitat.

Black-necked Stork

Status in New South Wales: Vulnerable; the species was listed on Schedule 2 of the *Threatened Species Conservation Act 1995* because its population is at a critical level although suspected to be stable, its distribution has been reduced, the potential for recovery is poor, the threatening processes are severe and it is an ecological specialist (NPWS 1992).

Distribution: The range of the Black-necked Stork *Ephippiorhynchus asiaticus*, also known as the Jabiru, includes India, Southeast Asia, New Guinea and Australia, where it is found throughout northern Australia and down the east coast into New South Wales.

Habitat, etc.: The Black-necked Stork inhabits lagoons, swamps, estuarine mudflats and mangrove swamps. It also occurs on dry floodplains and among irrigated crops, and occasionally forages in open grassy woodlands. It feeds in shallow water.

Threats: The Black-necked Stork population declined markedly late in the 19th century because of the reclamation of wetlands for farming (Klippel 1992). Its habitats continue to be reduced, especially on the coast, as urban areas and tourism expand.

Regional Occurrence: There are very few records of this species from the Sydney region. The only known record is in the 10' grid block covering the Penrith area (RAOU, Melbourne; see Appendix 2).

Potential to Occur in the DA4 Area: The Black-necked Stork is unlikely to occur at Penrith Lakes or in the DA4 area; there are very few records of the species from the Sydney region and only a small area of suitable habitat is available in the DA4 area.

Blue-billed Duck

Status in New South Wales: Vulnerable; the species is listed on Schedule 2 of the *Threatened Species Conservation Act 1995* because its population is suspected to have been reduced, it concentrates in particular areas, the threatening processes are moderate and it is an ecological specialist (NPWS 1992).

Distribution: The Blue-billed Duck *Oxyura australis* is endemic to Australia, where it occurs in wetlands in the southeast and southwest. In southeastern Australia there is a partial migration annually from the swamps of inland New South Wales, where they breed, to the Murray River and the coastal lakes in Victoria and South Australia (Serventy 1985).

Habitat, etc.: The Blue-billed Duck is almost wholly aquatic. It occurs in deep permanent swamps and lakes with abundant aquatic flora. The ducks congregate on expansive and open wetlands in winter and then disperse to well vegetated swamps to breed. They are secretive, feeding in open water within or beside tall dense vegetation. They usually remain far from the shore (Frith 1982).

Threats: The Blue-billed Duck has declined mainly because of changes to its habitat, particularly in its stronghold in the Murray-Darling Basin. Wetlands have been modified as a result of vegetation clearing, irrigation and salinisation. The species is also shot during the duck-hunting season.

Regional Occurrence: The species is rare in the Sydney region. The only known record for the Penrith area is from the 10' grid block covering the area (RAOU Melbourne; see Appendix 2).

Potential to Occur in the DA4 Area: The Blue-billed Duck is very rare around Sydney and is unlikely to occur in the DA4 area because of the absence of suitable habitat.

Comb-crested Jacana

Status in New South Wales: Vulnerable; the species was listed on Schedule 2 of the *Threatened Species Conservation Act 1995* because its population has been reduced to a critical level, its distribution has been reduced, it concentrates in particular areas, the threatening processes are severe and it is an ecological specialist (NPWS 1992).

Distribution: The range of the Comb-crested Jacana *Irediparra gallinacea* includes Southeast Asia, New Guinea and Australia. In Australia, it mainly occurs in the north, in Western Australia, the Northern Territory and Queensland, and in eastern Queensland and New South Wales as far south as the Hunter River. It sometimes occurs outside this range, mainly during drought, when it is recorded well inland (Marchant and Higgins 1993). The species is uncommon in New South Wales and is generally restricted to the north coast. The southernmost record is from Bermagui.

Habitat, etc.: The Comb-crested Jacana usually inhabits deep, permanent freshwater wetlands with abundant floating aquatic vegetation, but sometimes occurs on the edge of wetlands among grasses and sedges.

Threats: This species has been adversely affected by the loss and modification of its wetland habitats.

Regional Occurrence: The Comb-crested Jacana rarely visits the Cumberland Plain; there is one record of its presence on the swamps near Longneck Lagoon in 1979 (NPWS Wildlife Atlas).

Potential to Occur in the DA4 Area: This species could occasionally occur in the Penrith Lakes area. However, because of its rarity in the region and the scarcity of suitable habitat, the Comb-crested Jacana is unlikely to occur in the DA4 area.

Common Bentwing-bat

Status in New South Wales: Although a common species (see Parnaby 1992), the Common Bentwing-bat is vulnerable; the species was listed on Schedule 2 of the *Threatened Species Conservation Act 1995* because its population, although probably stable has been reduced, the species concentrates in particular areas, the threatening processes are severe and it is an ecological specialist (NPWS 1992).

Distribution: The Common Bentwing-bat *Miniopterus schreibersii*, an international species, is found throughout the high rainfall zones in northern and eastern Australia, where it occurs east of the Great Dividing Range.

Habitat, etc.: This species occurs in well-timbered valleys where it forages on insects above the tree canopy. It roosts in caves, old mines, stormwater channels and comparable structures including buildings (Dwyer 1995). Breeding and nurturing occur in nursery caves.

Threats: The main threat to the Common Bentwing-bat is the degradation of nursery caves. Nursery caves are vulnerable because of the mining of limestone and recreational cave exploration. Disturbance could threaten the ability of some populations to breed.

Regional Occurrence: This bat has been recorded on the ADI site at St Marys (Gunninah Consultants 1991).

Potential to Occur in the DA4 Area: The Common Bentwing-bat could fly over the DA4 area, but the few trees there are unlikely to be a significant habitat. There are no nursery caves in the area.

Freckled Duck

Status in New South Wales: Vulnerable; the species was listed on Schedule 2 of the *Threatened Species Conservation Act 1995* because its population has been severely reduced and because it concentrates in particular areas (NPWS 1992).

Distribution: The Freckled Duck *Stictonetta naevosa* is an endemic species that is widely distributed on the southern half of the mainland. Breeding mainly takes place in the Murray-Darling Basin and in the southwestern corner of Western Australia. The species rarely occurs on the coast in New South Wales.

Habitat, etc.: The Freckled Duck occurs in densely vegetated freshwater wetlands, especially in large swamps dominated by Cumbungi (Frith 1982). It is also found in lagoons and lakes, but avoids the open areas of water.

Threats: The Freckled Duck has been adversely affected by habitat loss, as wetlands have been drained to provide land for agriculture. It is also shot during the duck-hunting season.

Regional Occurrence: The Freckled Duck is rare in the region. It was recorded at Penrith Lakes in the drought in the early 1980s, with records in February 1981 (max. 11 birds) and from January to March 1983 (Lindsey 1982 and 1985). The species may occur in the region from time to time, probably in drought years.

Potential to Occur in the DA4 Area: Because of its rarity in the region and the lack of suitable habitat, the Freckled Duck is unlikely to occur in the DA4 area.

Giant Burrowing Frog

Status in New South Wales: Vulnerable; the species was listed on Schedule 2 of the *Threatened Species Conservation Act 1995* because its population and distribution are suspected to have been reduced, the threatening processes are moderate and it is an ecological specialist (NPWS 1992).

Distribution: The Giant Burrowing Frog *Heleioporus australiacus* occurs on the coast and ranges from the coast of central New South Wales to eastern Victoria (Cogger 1992). It has been recorded in several conservation reserves and state forests, such as Royal National Park, Ku-ring-gai Chase National Park, Morton National Park Marramarra National Park, Barren Grounds Nature Reserve and Watagan State Forest.

Habitat, etc.: The Giant Burrowing Frog inhabits areas underlain by sandstone, where it lives in burrows in the banks of small creeks and gullies (Cogger 1992). Although little is yet known about the ecology of this species, it breeds in permanent and ephemeral streams and may then disperse into other suitable habitat. The species has been recorded in swampy heathland and in wet and dry eucalypt woodland. Insufficient research has been undertaken to establish the size of its home range and its shelter requirements. The most suitable habitats for the Giant Burrowing Frog are sandstone escarpments, ephemeral and permanent creeks, free flowing rivers, hanging swamps, wet heathlands and eucalypt woodland.

Threats: Ecological research has not clearly established the threats to this species.

Regional Occurrence: There are several records of this frog species from the Penrith district; all occurrences were on the sandstone soils to the west of the Nepean River (NPWS Wildlife Atlas; Department of Environment and Planning 1984).

Potential to Occur in the DA4 Area: The Giant Burrowing Frog is unlikely to occur at Penrith Lakes because no sandstone habitats are present.

Glossy Black-Cockatoo

Status in New South Wales: As recently as 1981, the Glossy Black-Cockatoo was still considered to be moderately common in New South Wales (Morris, McGill and Holmes 1981). It is now vulnerable; the species was listed on Schedule 2 of the *Threatened Species Conservation Act 1995* because its population has been severely reduced, the potential for recovery is poor and it is an ecological specialist (NPWS 1992).

Distribution: The Glossy Black-Cockatoo *Calyptorhynchus lathami* occurs along the Great Dividing Range and the east coast of New South Wales, Queensland and Victoria, from Eungella in the north to Gippsland in the south. It also occurs on Kangaroo Island in South Australia. Its distribution is thin and patchy within this range. Forshaw (1981) commented that, in New South Wales, the Glossy Black-Cockatoo "is locally common in some districts, resident in small numbers in others and a rare vagrant to most parts of its range".

Habitat, etc.: The Glossy Black-Cockatoo feeds almost exclusively on the seeds of Casuarinas *Allocasuarina* and *Casuarina*, and is therefore restricted to woodlands and forests containing these species. They are sustained by mature stands of casuarinas producing sufficient quantities of cones and seed. Immature and/or scattered trees do not yield enough food.

Threats: The main threat to this species is the loss of habitat, as stands of mature Casuarinas have been cleared for agriculture and urban development. The species is also adversely affected by the clearing of large trees with hollows, used for nesting.

Regional Occurrence: The Glossy Black-Cockatoo has been recorded in the Blue Mountains, north-west of Penrith (NPWS Wildlife Atlas). It has been recorded only once in the 10' grid block covering the Penrith district (RAOU, Melbourne; see Appendix 2).

Potential to Occur in the DA4 Area: The Glossy Black-Cockatoo is unlikely to occur in the DA4 area because of the absence of suitable habitat, although it could conceivably occur along the Nepean River.

Greater Broad-nosed Bat *Scoteanax rueppellii*

Status in New South Wales: Vulnerable; this species was listed on Schedule 2 of the *Threatened Species Conservation Act 1995* because its population and distribution are suspected to have been reduced, the threatening processes are moderate and it is an ecological specialist (NPWS 1992).

Distribution: The Greater Broad-nosed Bat *Scoteanax rueppellii* occurs along the east coast and Great Dividing Range from the Atherton Tablelands in Queensland to northeastern Victoria, generally below 500 metres altitude.

Habitat, etc.: This species is found in a variety of habitats including woodland, eucalypt forest and rainforest; it prefers forests on high nutrient soils. As it forages only a few metres above the ground it is more suited to woodlands than dense forests, where it has to make use of natural and manmade openings (Hoye and Richards 1995). It also forages over creeks and small rivers, and roosts in tree hollows. Females congregate at maternity sites in suitable trees.

Threats: This species has probably suffered greatly as a result of habitat loss, for it is highly dependent on mature forests on high nutrient soils. These are precisely the forests that have been most extensively logged for timber production and agriculture. The availability of foraging habitat, roosting sites and nesting hollows has decreased.

Regional Occurrence: Gunninah Consultants (1991) reported trapping this species in forest in the northeastern corner of the ADI site at St Marys.

Potential to Occur in the DA4 Area: The few trees in the DA4 area are unlikely to be a significant area of habitat for the Greater Broad-nosed Bat, although the species could occur among the trees along the Nepean River.

Greater Sand Plover

Status in New South Wales: Vulnerable; this species was listed on Schedule 2 of the *Threatened Species Conservation Act 1995* because its population although stable is critical, its distribution is restricted, the potential for recovery is poor, the threatening processes are severe and it is an ecological specialist (NPWS 1992).

Distribution: The Greater Sand Plover *Charadrius leschenaultii* is a migratory species. The subspecies *leschenaultii* breeds in China and Mongolia and then migrates to Australia, where it is found around the entire coastline but mainly occurs in Western Australia, the Northern Territory and Queensland. In New South Wales, it concentrates at the mouth of the Clarence and Richmond Rivers, and has never been recorded south of the Shoalhaven River.

Habitat, etc.: The Greater Sand Plover mainly occurs on sheltered sandy and muddy beaches with large intertidal mudflats or sandbanks, sandy estuarine lagoons, reefs, rock platforms, near-coastal saltwater lakes and brackish swamps (Marchant and Higgins 1993). It roosts at high tide on sandy beaches and rocky shores (Smith 1991).

Threats: The species is vulnerable in New South Wales because the population in this state is only about 80 birds (Smith 1991), most of which are concentrated in only two locations: the Clarence and Richmond estuaries.

Regional Occurrence: The Greater Sand Plover is very rare in the region. There is one record of it from the swamps at Pitt Town Lagoon, dated 1972 (NPWS Wildlife Atlas).

Potential to Occur in the DA4 Area: Because of its rarity in the region and the small amount of suitable habitat, the Greater Sand Plover is unlikely to occur in the DA4 area.

Green and Golden Bell Frog

Status in New South Wales: Endangered; the species was listed on Schedule 1 of the *Threatened Species Conservation Act 1995* because its population has been severely reduced over the entire range and the threatening processes are severe (NPWS 1992).

Distribution: The Green and Golden Bell Frog *Litoria aurea* occurs in eastern and southeastern New South Wales and in eastern Victoria. Its northern limit is at Byron Bay. It usually occurs at low altitudes but, in the southern part of its range, it is also found on the southern tablelands.

Habitat, etc.: Cogger (1992) described the habitat of this species as "vegetation within or at the edge of permanent water - streams, swamps, lagoons, farm dams and ornamental ponds. [It is] often found under debris on low, oft-flooded river flats." However, White and Pyke (1996) found populations associated with wetlands of a more ephemeral nature. Although such habitat is abundant throughout eastern New South Wales, the species is still uncommon, probably because of the presence of the Mosquitofish *Gambusia holbrooki*. Green and Golden Bell Frogs are very mobile; they move over long distances and readily inhabit highly disturbed sites and unstable environments (White and Pyke 1996). However, if the site remains becomes more stable, for example by the growth of emergent reeds in previously barren waterbodies or by the growth of fringing vegetation, the Green and Golden Bell Frog's competitors also occupy the site, perhaps to its detriment.

Threats: The Green and Golden Bell Frog has declined markedly in abundance in the past decade. The presence of predatory fish influences the species' use of a site, by causing it to abandon the area or by preventing breeding. The Green and Golden Bell Frog does not defend its egg mass or protect its tadpoles, and *Gambusia* are known to eat the spawn as well as recently hatched tadpoles (White 1995). The frogs breed successfully in fish-free waters, such as temporary pools and stormwater overflows.

Regional Occurrence: The Green and Golden Bell Frog was recorded at eight of 36 survey sites at and near the Penrith Lakes Scheme (Department of Environment and Planning 1984). More recently, it was recorded near St Marys in 1994 (NPWS Wildlife Atlas).

Potential to Occur in the DA4 Area: Despite being targeted during the survey period, no Green and Golden Bell Frogs were located in the DA4 area. Although some sites appear to contain suitable habitat, the presence of Mosquitofish *Gambusia holbrooki* mitigates against the this frog breeding in the area.

Large-footed Myotis

Status in New South Wales: Vulnerable; the species was listed on Schedule 2 of the *Threatened Species Conservation Act 1995* because its population and distribution are suspected to have been reduced, the threatening processes are severe and it is an ecological specialist (NPWS 1992).

Distribution: Also known as the Large-footed Mouse-eared Bat, the Large-footed Myotis *Myotis adversus* inhabits the high rainfall regions of northern and eastern Australia, as well as an area on the Victorian/South Australian border. Its distribution includes all states on the mainland, as well as Indonesia and Melanesia.

Habitat, etc.: Colonies of this bat are found in "caves, mines or tunnels, under bridges and buildings and even in dense foliage in the tropical part of its range"(Richards 1995), and it seldom occurs far from waterbodies such as streams, lakes and dams, where it sweeps the surface for insects and small fish. Breeding usually occurs in caves.

Threats: The Large-footed Myotis has probably been affected by the large scale clearing of forests for agriculture and timber. However, the main threat is from the destruction and/or degradation of caves in which the species roosts and breeds. Disturbance could threaten the ability of some populations to breed.

Regional Occurrence: The species was recorded at Bringelly in 1993, well to the south of the study area (NPWS Wildlife Atlas).

Potential to Occur in the DA4 Area: The Large-footed Myotis could forage over some of the ponds in the DA4 area, but there are few sites for this bat to roost; it is most likely to occur along the Nepean River.

Powerful Owl

Status in New South Wales: Vulnerable; the species was listed on Schedule 2 of the *Threatened Species Conservation Act 1995* because its population is suspected to have been reduced, its

distribution has been reduced, the potential for recovery is poor, the threatening processes are moderate and it is an ecological specialist (NPWS 1992).

Distribution: The Powerful Owl *Ninox strenua* occurs along the coast and ranges of eastern Australia from near Rockhampton in Queensland, southwards throughout eastern New South Wales and Victoria. It mainly occurs on the coastal side of the Great Dividing Range but is also recorded on the western slopes. It is thinly distributed across its range.

Habitat, etc.: The Powerful Owl inhabits rainforest and wet and dry eucalypt forest, where its main prey species occur. The species often roosts in rainforest gullies by day and hunts at night, mainly in forests with an open structure and along the edge of forests. There are differing estimates of the size of its home range, although it is agreed that the home range is very large; Fleay (1968) estimated 800-1000 hectares, Davey (1993) estimated 400-1450 hectares. The Powerful Owl prefers old growth forest or, at least, forest with old growth elements. At Kioloa, Davey (1993) recorded the Powerful Owl in mid- and late-successional forest and in uneven-aged forest, but not in forest with a development age of less than 70 years. It requires large tree hollows for nesting, at least 0.5m deep (Schodde and Mason 1980). The Powerful Owl eats mainly arboreal mammals such as the Common Ringtail Possum *Pseudocheirus peregrinus* and the Grey-headed Flying Fox *Pteropus poliocephalus*, and semi-arboreal mammals and birds. It is a sedentary species that occupies a permanent territory, either singly or in pairs.

Threats: The Powerful Owl is particularly dependent upon arboreal mammals for food and large old eucalypts with hollows for nesting. Historically, the main threat to the Powerful Owl was the loss of habitat when forests were cleared for farming purposes. It is still adversely affected by the clearing of habitat and inappropriate forest management practices. Intensive logging leads to the loss of old growth elements and nesting hollows, and a reduction in the availability of prey (Braithwaite, Binns and Nowlan 1988).

Regional Occurrence: The Powerful Owl has been recorded in the Blue Mountains, west of the Nepean River.

Potential to Occur in the DA4 Area: There is no suitable habitat for this species in the Penrith Lakes study area.

Red-crowned Toadlet

Status in New South Wales: Vulnerable; the species was listed on Schedule 2 of the *Threatened Species Conservation Act 1995* because its population has been reduced, its distribution is suspected to have been reduced, the threatening processes are severe and it is an ecological specialist (NPWS 1992).

Distribution: The Red-crowned Toadlet *Pseudophryne australis* has a very restricted range. It occurs within a radius of about 160km of Sydney (Cogger 1992) and is confined to the sandstones of the Sydney Basin.

Habitat, etc.: The species has narrow habitat preferences. It inhabits only moist sandstone cliffs and rock outcrops, and is found in concealed sites and burrows "beside temporary creeks, gutters and soaks . . . and under rocks and logs (Robinson 1993).

Threats: Ecological research as not clearly established the threats to this species. Its vulnerability would be heightened by its restricted distribution.

Regional Occurrence: There are several records of the Red-crowned Toadlet from the Penrith district, from the sandstone environments west of the Nepean River (NPWS Wildlife Atlas; Department of Environment and Planning 1984).

Potential to Occur in the DA4 Area: The Red-crowned Toadlet would not occur in the DA4 area; there are no sandstone outcrops.

Regent Honeyeater

Status in New South Wales: Endangered; the species was listed on Schedule 1 of the *Threatened Species Conservation Act 1995* because its population and distribution have been reduced to a critical level, the species concentrates in particular areas, the threatening processes are severe and it is an ecological specialist (NPWS 1992).

Distribution: The range of the Regent Honeyeater *Xanthomyza phrygia* extends from southeast Queensland to western Victoria, along the coast and mountains. Its distribution is patchy, for its abundance and range have contracted considerably since 1950 (Blakers, Davies and Reilly 1984; Garnett 1992); it is absent from parts of its former range and has become vagrant in others.

Habitat: The Regent Honeyeater is highly nomadic. It mainly occurs in "temperate eucalypt woodland and open forest, including forest edges, wooded farmland and urban areas with mature trees" (Garnett 1992a). According to Webster and Menkhorst (1992), Red Ironbark *Eucalyptus sideroxylon*, White Box *Eucalyptus albens* and Yellow Box *Eucalyptus melliodora* are among its favoured trees and the species prefers areas with large trees, many flowering trees and a tall shrub layer.

Threats: The Regent Honeyeater initially declined when large areas of forest were cleared in the 1800s and early 1900s. Webster and Menkhorst (1992) suggest that, since then, the species has been affected by a steady decline in habitat quality, particularly by the loss of old trees; this has been

compounded by the effects of dieback and general tree decline in rural areas. The honeyeater must compete with larger and more aggressive birds for the remaining habitat.

Regional Occurrence: The Regent Honeyeater is rare in the Sydney region. It has been recorded in Castlereagh State Forest (Forestry Commission 1984), north of the study area.

Potential to Occur in the DA4 Area: The Regent Honeyeater is unlikely to occur in the DA4 area. The species is very rare in the region and the DA4 area contains too few trees to be a viable habitat.

Squirrel Glider

Status in New South Wales: Vulnerable; the species was listed on Schedule 2 of the *Threatened Species Conservation Act 1995* because its population and distribution have been severely reduced, the potential for recovery is poor, the threatening processes are severe and it is an ecological specialist (NPWS 1992).

Distribution: The Squirrel Glider *Petaurus norfolcensis* occurs throughout eastern Australia, in Queensland, New South Wales and central Victoria. It occurs on the coast and ranges, and across the western slopes and plains to central New South Wales.

Habitat: The Squirrel Glider “inhabits dry sclerophyll forest and woodland in southeastern Australia, where it is absent from the dense coastal ranges. However, in northern New South Wales and Queensland it occurs in coastal forest and in some wet forest areas bordering rainforest” (Suckling 1995). It requires large old trees for nesting.

Threats: The species has probably been affected by the clearing of eucalypt forests and woodlands for agricultural and forestry purposes. Breeding may have been curtailed by the loss of large trees with nesting hollows.

Regional Occurrence: The Squirrel Glider is rarely recorded on the coast, but there are some records from the eastern side of the Blue Mountains, for example, from Kurrajong (NPWS Wildlife Atlas).

Potential to Occur in the DA4 Area: There is no suitable habitat for the Squirrel Glider in the study area.

Swift Parrot

Status in New South Wales: Vulnerable; the species was listed on Schedule 2 of the *Threatened Species Conservation Act 1995* because its population and distribution have been severely reduced, the threatening processes are severe and it is an ecological specialist (NPWS 1992).

Distribution: The Swift Parrot *Lathamus discolor* occurs in southeastern Australia and breeds only in Tasmania (Blakers *et al.* 1984). Swift Parrots mainly occur on the Australian mainland in winter, outside the breeding period.

Habitats, etc.: On the mainland, the Swift Parrot occurs where there are winter-flowering eucalypts such as Red Ironbark *Eucalyptus sideroxylon*, Yellow Gum *Eucalyptus leucoxylon*, White Box *Eucalyptus albens*, Swamp Gum and *Eucalyptus ovata* (Brown 1989). It also occurs in fertile forest habitats with a Wollybutt *Eucalyptus longifolia* component (Tanton 1994).

Threats: The Swift Parrot is threatened on two fronts. In Tasmania, it has been affected by the reduced abundance of Blue Gum *Eucalyptus globulus*, as large areas of forest have been felled for agriculture, timber production and woodchips. On the mainland, many stands of the Swift Parrot's favoured food trees have been cleared, especially the Box and Ironbark woodlands west of the Great Dividing Range (Garnett 1992a).

Regional Occurrence: The Swift Parrot has been recorded in Castlereagh State Forest (Forestry Commission 1984). The occurrence of this highly nomadic species in the Penrith district is regarded as being incidental.

Potential to Occur in the DA4 Area: The Swift Parrot is unlikely to occur in the DA4 area because so few eucalypts are present.

Spotted-tailed Quoll

Status in New South Wales: Vulnerable; the species was listed on Schedule 2 of the *Threatened Species Conservation Act 1995* because its population and distribution have been severely reduced, the threatening processes are severe and it is an ecological specialist (NPWS 1992).

Distribution: Also known as the Spotted-tailed Quoll, the range of the Spotted-tailed Quoll *Dasyurus maculatus maculatus* extends along the east coast of Australia from southern Queensland to southern Victoria and Tasmania. The distribution is now disjunct over most of its range. It used to occur in South Australia but is now thought to be extinct in that state. There is another subspecies, *gracilis*, in northern Queensland.

Habitats, etc.: The Spotted-tailed Quoll lives in a wide variety of habitats including rainforest and eucalypt forest, woodlands and coastal heath. It has a large home range, 1287 to 1452 hectares for males and 614 to 1067 hectares for females (Edgar and Belcher 1995). Dens are in hollow logs, tree hollows, caves and crevices. The Spotted-tailed Quoll is usually considered to be a terrestrial species although, as an agile climber, it is also partly arboreal. Its diet mainly consists of medium sized mammals but also includes birds, small mammals and carrion.

Threats: The species is thought to have declined because of competition from cats and foxes. It has also been shot, poisoned and trapped, for it was generally regarded as a pest in rural areas. The clearing of habitat is another reason for its decline. Not only has there been a huge loss of habitat area, but the species' distribution is now disjunct over much of its range. It is still threatened by habitat loss, as the remaining habitat becomes increasingly fragmented and populations become isolated. As Edgar and Belcher (1995) commented, the species "now exists mostly in isolated areas that may be too small to support long-term viable populations while current land management practices continue".

Regional Occurrence: The Spotted-tailed Quoll is rare in the Sydney Region, having declined dramatically in the last 30 years.

Potential to Occur in the DA4 Area: There are occasional records of the Spotted-tailed Quoll from the Blue Mountains. There is no suitable habitat for the species in the DA4 area.

Turquoise Parrot

Status in New South Wales: Vulnerable; the species was listed on Schedule 2 of the *Threatened Species Conservation Act 1995* because its population and distribution have been severely reduced and it is an ecological specialist (NPWS 1992). There are conflicting assessments of its current status. Following a detailed review of distribution and population size, Morris (1980) commented that "the bird could be classed as moderately common. Certainly the species is not rare or endangered". Garnett (1992b), however, considers it to be rare.

Distribution: The Turquoise Parrot *Neophema pulchella* occurs in the eastern states, from near Maryborough in Queensland southwards to Victoria. The distribution is discontinuous within this range. In New South Wales, its stronghold is in the northeast of the state, mainly inland. The species usually occurs on the slopes and tablelands associated with the Great Dividing Range.

Habitats, etc.: The Turquoise Parrot inhabits "woodlands, open forest and timbered grasslands on mountain slopes, ridges and along watercourses", favouring "the edges of woodland adjoining open grassland, or timbered ridges and tree-lined creeks that traverse farmland" (Forshaw 1981). The parrots forage on the ground for seed, usually in pairs or small groups. After breeding, they disperse from the woodlands into more open country.

Threats: This species apparently declined dramatically between 1880 and 1920, almost to the point of extinction. Morse and Sullivan (1930) attributed the decline to disease, bird trappers and cats. Blakers, Davies and Reilly (1984) noted that the species has re-established itself over much of its former range, is regularly reported and seems secure.

Regional Occurrence: The Turquoise Parrot has been recorded in the woodlands of Castlereagh State Forest (Forestry Commission 1984), north of Penrith Lakes. The species could conceivably occur in the treed areas north of the Cranebrook escarpment, but the occurrences would be rare and incidental for the habitat has no particular importance for this species.

Potential to Occur in DA4 Area: The Turquoise Parrot is unlikely to occur in the DA4 area because it contains only very small areas of suitable habitat.

10 IMPACT ON THE BIOLOGICAL ENVIRONMENT

10.1 VEGETATION AND FAUNA HABITATS

The Penrith Lakes Scheme and the adjacent Nepean River provide a large area of wetland habitats, most of them artificial, created following the development of the quarries in the area. The wetlands support virtually all of the waterbirds and frogs recorded or expected to occur in the western Sydney region (Kevin Mills & Associates 1995a). The DA4 area contains much less wetland habitat than the DA3 area, east of Castlereagh Road; there are few significant wetlands in the DA4 area.

The Nepean River is the most important wetland in the DA4 area; the others are small and mostly ephemeral, and provide only minor habitat for wetland fauna. The cleared farm paddocks are not good habitat for native fauna and are plentiful in the region. The riverine habitats will not be affected by development of the DA4 area, although four overflow structures are to be built in the levee bank along the river, between the river and the DA4 excavations. These will result in the removal of some native trees in the vicinity of the levee banks, but not the river edges where most of the River Oaks *Casuarina cunninghamiana* are located. Because only a small amount of vegetation is to be removed, this is considered to be a minor impact.

The development will have an important positive impact on native fauna because farmland will eventually be converted to wetland habitat, the intervening areas will be landscaped and native bushland will be restored in some locations.

10.2 THREATENED SPECIES

The *Threatened Species Conservation Act 1995* (TSC Act) commenced on 1 January 1996 and applies to all plants and animals native to New South Wales, with the exception of humans, fish and marine vegetation. The TSC Act provides three categories of threatened species: endangered species, vulnerable species and species presumed extinct. The Act also allows for the listing and protection of "endangered populations" of any plant or animal, and of "endangered ecological

communities". Species identified as being threatened are listed on the schedules attached to the TSC Act.

The TSC Act makes various amendments to the *National Parks and Wildlife Act 1974* and the *Environmental Planning and Assessment Act (EPA Act)*. The TSC Act provides that the criteria in section 5A of the EPA Act must be considered in deciding whether there is likely to be a significant effect on threatened species, etc, and hence if a Species Impact Statement (SIS) is required. The following factors must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats:

(a) in the case of threatened species, whether the life cycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction

The probability of threatened species occurring in the DA4 area was assessed in Section 9. Of the twenty fauna species assessed, it was concluded that only four species have the potential to occur in the DA4 area: the Australasian Bittern, the Greater Broad-nosed Bat, the Large-footed Myotis and the Green and Golden Bell Frog. The first three species are unlikely to be affected by the development; they are highly mobile animals that would simply choose alternative habitat when the DA4 area is no longer available to them and, in the long term, the area will be enhanced for these species because more wetlands and native trees will be present.

The Green and Golden Bell Frog *Litoria aurea* was recorded near the CSR quarry in 1981 and some DA4 sites appear to contain suitable habitat. If the species is present it could be affected by the development. However, the species was not detected during the survey despite a thorough search and mosquitofish were found in most ponds, reducing the chance of the frog being in the area. Perhaps it is no longer present; the most suitable site is the old settling pond (site 12). Further field studies are required to confirm whether the frog is still present there.

If any other threatened species occur in the DA4 area, their presence is likely to be nothing other than a chance occurrence or a fleeting visit, for the area contains insufficient habitat to sustain viable local populations of these species.

(b) in the case of an endangered population, whether the life cycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised

No "endangered populations", as defined in Part 2 of Schedule 1 of the *Threatened Species Conservation Act 1995*, have been declared in the Penrith area.

(c) in relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed

The DA4 area contains no habitat known to be used by a threatened species, although the old settling pond near the CSR quarry was habitat for the Green and Golden Bell Frog in 1981. It is not expected that there would be any significant areas of threatened species habitat in the DA4 area. Notwithstanding this comment, Section 11 contains a recommendation relating to the old settling pond.

(d) whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas of habitat for a threatened species, population or ecological community

The development of the DA4 area would not result in the isolation of threatened species habitat because almost all of the area is farmland and the Nepean River habitat corridor will not be significantly affected.

(e) whether critical habitat will be affected

No "critical habitat" has been declared under Part 3 of the *Threatened Species Conservation Act 1995* in the Penrith area.

(f) whether a threatened species, population or ecological community, or their habitats, are adequately represented in conservation reserves (or similar protected areas) in the region

Because of a lack of research, it is not known whether the species discussed in Section 9 are adequately reserved in the region. The habitat of the species found in the sandstone environments are likely to be adequately reserved in the Blue Mountains National Park and associated reserves, while those found on the Cumberland Plain are likely to be inadequately reserved.

(g) whether the development or activity is of a class of development or activity that is recognised as a threatening process

No "key threatening processes" have yet been specified in Schedule 3 of the *Threatened Species Conservation Act 1995*.

(h) whether any threatened species, population or ecological community is at the limit of its known distribution

None of the species discussed in this report is at the limit of its distribution in the region.

11 CONCLUSIONS AND RECOMMENDATIONS

The Penrith Lakes Scheme and the adjacent Nepean River provide a substantial area of wetland habitat and greatly enrich the biodiversity of the district. Based on the findings of this study it is concluded that quarrying the DA4 area will not have a significant impact on flora and fauna, including threatened species, and the preparation of a Species Impact Statement is not required.

However, since the Green and Golden Bell Frog was recorded at the old settling pond in 1981, a study of this site prior to construction of the floodway should be carried out.

Generally, it is considered that the development will be advantageous to native fauna. The featureless and, for native species, sterile farm paddocks, which are so inhospitable to most native fauna, will eventually be replaced by wetland habitat and some terrestrial native habitat will be restored to the landscape. The following recommendations will assist in preserving the most important natural attributes in the area.

(i) It is *recommended* that, prior to construction of the floodway in this area, a field survey be undertaken to determine whether the Green and Golden Bell Frog is present.

(ii) The Nepean River corridor is the most important area of habitat in the DA4 area. Although the proposed development includes the construction of four floodways and the removal of some vegetation from the upper riverbank, the development will not impinge significantly on the corridor. It is *recommended* that the Penrith Lakes Development Corporation, in conjunction with the Hawkesbury-Nepean Catchment Management Trust, develop a strategy for the management of the Nepean River corridor. This matter will partly be addressed in the Flora and Fauna Management Strategy currently being developed by the Penrith Lakes Development Corporation and Kevin Mills & Associates.

(iii) The treed creek north of "Hadley Park", that contains mainly *Angophora subvelutina*, should be retained as part of the curtilage around "Hadley Park". The vegetation along the creek is a good source of seed of several local tree species and will be useful in revegetating the Penrith Lakes Scheme area.

* * *

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APPENDIX 1

NATIVE PLANT SPECIES IN THE DA4 AREA AT PENRITH LAKES

Locations are given as R - Nepean River corridor, W - floodplain wetlands and O - other locations in DA4 area.

Adiantaceae		
<i>Adiantum aethiopicum</i> L.		O
Amaranthaceae		
<i>Alternanthera denticulata</i> R. Br.		W
Apiaceae		
<i>Centella asiatica</i> (L.) Urban		W
Asteraceae		
<i>Pseudognaphalium luteo-album</i> (L.) Hilliard & B. L. Burtt	R	
<i>Senecio quadridentatus</i> Labill.	R	
Azollaceae		
<i>Azolla filiculoides</i> Lam. Var <i>rubra</i> (R. Br.) Strasburger	R	W
Campanulaceae		
<i>Wahlenbergia gracilis</i> (Forster f.) Schrader	R	
Casuarinaceae		
<i>Casuarina cunninghamiana</i> Miq.	R	
Convolvulaceae		
<i>Dichondra repens</i> Forster & Forster f.		O
Cyperaceae		
<i>Bolboschoenus fluviatilis</i> (Torrey) Sojak	R	
<i>Carex appressa</i> R. Br.		W O
<i>Eleocharis ? equisetina</i> C. Presl.		W
<i>Eleocharis sphacelata</i> R. Br.	R	W
<i>Schoenoplectus validus</i> (Vahl) A. & D. Love	R	W
Euphorbiaceae		
<i>Glochidion ferdinandi</i> (Muell. Arg.) Bailey	R	
<i>Phyllanthus ? gunnii</i> Hook. f.	R	
Fabaceae		
Faboideae (subfamily)		
<i>Glycine clandestina</i> Wendl.	R	
<i>Glycine tabacina</i> (Labill.) Benth.	R	
<i>Kennedia rubicunda</i> (Schneev.) Vent.	R	
<i>Lespedeza juncea</i> (L. f.)		O
Mimosoideae (subfamily)		
<i>Acacia binervia</i> (H. L. Wendl.) J. F. Macbr.	R	
<i>Acacia filicifolia</i> Cheel & Welch	R	
<i>Acacia floribunda</i> (Vent.) Willd.	R	

<i>Acacia implexa</i> Benth.	R		
<i>Acacia mearnsii</i> De Wild.	R		
<i>Acacia parramattensis</i> Tind.	R	W	O
<i>Acacia rubida</i> Cunn.	R		
Hydrocharitaceae			
<i>Vallisneria gigantea</i> Graeb.	R		
Juncaceae			
<i>Juncus usitatus</i> L. A. S. Johnson	R	W	O
Lomandraceae			
<i>Lomandra longifolia</i> Labill.	R		
Loranthaceae			
<i>Amyema cambagei</i> (Blakely) Danser	R		
Meliaceae			
<i>Melia azedarach</i> L.	R		
Myrtaceae			
<i>Angophora subvelutina</i> F. Muell.			O
<i>Eucalyptus baueriana</i> Schauer			O
<i>Eucalyptus crebra</i> F. Muell.			O
<i>Eucalyptus eugenioides</i> Sieber ex Sprengel			O
<i>Eucalyptus tereticornis</i> Smith	R		O
<i>Melaleuca linariifolia</i> Smith		W	
Onagraceae			
<i>Ludwigia peploides</i> (Kunth) Raven	R	W	
Pittosporaceae			
<i>Bursaria spinosa</i> Cav.	R		
Poaceae			
<i>Cynodon dactylon</i> (L.) Pers.	R		
<i>Imperata cylindrica</i> P. Beauv.	R		
<i>Isachne globosa</i> (Thunb.) Kuntze.	R		
<i>Oplismenus imbecillus</i> (R. Br.) Roem. & Schult.			O
<i>Paspalum distichum</i> L.	R	W	
<i>Phragmites australis</i> (Cav.) Trin. ex Steud.	R	W	
Polygonaceae			
<i>Persicaria decipiens</i> (R. Br.) K. L. Wilson		W	
<i>Persicaria laphathifolia</i> (L.) S. F. Gray		W	
<i>Persicaria praetermissa</i> (Hook. f.) Hara		W	
<i>Persicaria subsessilis</i> (R. Br.) K. L. Wilson		W	
Potamogetonaceae			
<i>Potamogeton ochreatus</i> Raoul		W	
Rosaceae			

Rubus parvifolius L.

R

Sapindaceae

Dodonaea triquetra Wendl.

R

Typhaceae

Typha orientalis C. Presl.

R W O

Ulmaceae

Trema aspera (Brongn.) Blume

R

APPENDIX 2

LIST OF BIRD SPECIES FOR THE PENRITH DISTRICT

Notes:

a. Estimate of abundance in New South Wales. Six orders of magnitude were used by Morris, McGill and Holmes (1981) to describe maximum population size in any given year:

Rare (R)	< 100	Moderately common (MC)	10,000 - 100,000
Scarce (S)	100 - 1,000	Common (C)	100,000 - 1,000,000
Uncommon (U)	1,000 - 10,000	Abundant (A)	> 1,000,000

b. Status in the Sydney Region as stated or implied by Roberts (1993).

c. Records:

1. Recorded in the 10' grid block 33° 45' 150° 45' (RAOU: *Atlas of Australian Birds*).
2. Recorded in Castereagh State Forest (Forestry Commission 1984).
3. Recorded in the ADI St Marys site (Kevin Mills & Associates 1995).
4. Recorded at the Penrith Lakes Scheme (all sources).
5. Observed at the Penrith Lakes Scheme during the 1995 study (Kevin Mills & Associates 1995).
6. Observed at the DA4 area on the Penrith Lakes Scheme during the present study (1996).

d. Introduced bird species are indicated by an asterisk (*).

e. Nomenclature of scientific and common names is based on Christidis and Boles (1994).

Species		Abundance in NSW ^a	Sydney Region ^b	Record Study Area ^c
PHASIANIDAE				
Stubble Quail	<i>Coturnix pectoralis</i>	A	U	1,4,5
Brown Quail	<i>Coturnix ypsilophora</i>	C	U	3,4
ANATIDAE				
Plumed Whistling-Duck	<i>Dendrocygna eytoni</i>	MC	S	1
Blue-billed Duck	<i>Oxyura australis</i>	MC	R	1
Musk Duck	<i>Biziura lobata</i>	MC	S	1,3,4
Freckled Duck	<i>Stictonetta naevosa</i>	U	R	1,4
Black Swan	<i>Cygnus atratus</i>	C	VC	1,3,4,5
Australian Shelduck	<i>Tadorna tadornoides</i>	MC	R	1
Australian Wood Duck	<i>Chenonetta jubata</i>	A	VC	1,2,3,4,5,6
Mallard*	<i>Anas platyrhynchos</i>	U	MC	4,5
Pacific Black Duck	<i>Anas superciliosa</i>	A	C	1,2,3,4,5,6
Australian Shoveller	<i>Anas rhynchotis</i>	MC	U	1,4,5
Grey Teal	<i>Anas gracilis</i>	A	MC	1,3,4,5,6
Chestnut Teal	<i>Anas castanea</i>	MC	U	1,4,5
Pink-eared Duck	<i>Malacorhynchus membranaceus</i>	A-MC	R	1,4
Hardhead	<i>Aythya australis</i>	C	U	1,4,5
PODICIPEDIDAE				
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	A	C	1,4,5,6
Hoary-headed Grebe	<i>Poliiocephalus poliocephalus</i>	C	MC	1,4
Great Crested Grebe	<i>Podiceps cristatus</i>	U	U	1,3,4,5
ANHINGIDAE				
Darter	<i>Anhinga melanogaster</i>	MC	U	1,4,5
PHALACROCORACIDAE				
Little Pied Cormorant	<i>Phalacrocorax melanoleucos</i>	A	VC	1,2,3,4,5,6
Pied Cormorant	<i>Phalacrocorax varius</i>	MC	U	1,4,5
Little Black Cormorant	<i>Phalacrocorax sulcirostris</i>	A	VC	1,4,5,6
Great Cormorant	<i>Phalacrocorax carbo</i>	C	C	1,3,5

Species		Abundance in NSW ^a	Sydney Region ^b	Record Study Area ^c
PELECANIDAE				
Australian Pelican	<i>Pelecanus conspicillatus</i>	C-MC	C	1,4,5
ARDEIDAE				
White-faced Heron	<i>Egretta novaehollandiae</i>	A	C	1,2,3,4,5,6
Little Egret	<i>Egretta garzetta</i>	MC	MC	1,4,5
White-necked Heron	<i>Ardea pacifica</i>	C	U	1,2,3,4
Great Egret	<i>Ardea alba</i>	C	MC	1,3,4,5
Intermediate Egret	<i>Ardea intermedia</i>	MC	S	1,3,4
Cattle Egret	<i>Ardea ibis</i>	MC	C	1,3,4,5,6
Nankeen Night Heron	<i>Nycticorax caledonicus</i>	C-MC	U	1,2,3
Little Bittern	<i>Ixobrychus minutus</i>	U	R	4
Black Bittern	<i>Ixobrychus flavicollis</i>	U	R	3
Australasian Bittern	<i>Botaurus poiciloptilus</i>	MC	R	1
THRESKIORNITHIDAE				
Glossy Ibis	<i>Plegadis falcinellus</i>	MC	S	1,4
Australian White Ibis	<i>Threskiornis molucca</i>	A	C	1,2,4,5
Straw-necked Ibis	<i>Threskiornis spinicollis</i>	A	MC	1,3,4,5,6
Royal Spoonbill	<i>Platalea regia</i>	MC	MC	1,3,4,5
Yellow-billed Spoonbill	<i>Platalea flavipes</i>	MC	U	1,2,3,4,5,6
CICONIDAE				
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	R	R	1
ACCIPITRIDAE				
Black-shouldered Kite	<i>Elanus axillaris</i>	C-MC	MC	1,2,3,4,5,6
Whistling Kite	<i>Haliastur sphenurus</i>	MC	MC	1,2,3,4
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	U	MC	1,4
Spotted Harrier	<i>Circus assimilis</i>	MC-U	R	1
Swamp Harrier	<i>Circus approximans</i>	MC	U	1,4,5
Brown Goshawk	<i>Accipiter fasciatus</i>	MC	U	1,2,4,5
Grey Goshawk	<i>Accipiter novaehollandiae</i>	U	U	1
Collared Sparrowhawk	<i>Accipiter cirrhocephalus</i>	MC	S	2,3
Wedge-tailed Eagle	<i>Aquila audax</i>	MC	U	1,4
Little Eagle	<i>Hieraetus morphnoides</i>	MC	U	1,4
FALCONIDAE				
Brown Falcon	<i>Falco berigora</i>	MC	MC	1,2,4
Australian Hobby	<i>Falco longipennis</i>	MC	U	1,2,4,5
Peregrine Falcon	<i>Falco peregrinus</i>	U	U	3
Nankeen Kestrel	<i>Falco cenchroides</i>	C	C	1,2,3,4,5
RALLIDAE				
Australian Spotted Crake	<i>Porzana fluminea</i>	MC	S	1,4
Baillon's Crake	<i>Porzana pusilla</i>	C-MC	R	1,4
Purple Swampphen	<i>Porphyrio porphyrio</i>	A	C	1,3,4,5,6
Dusky Moorhen	<i>Gallinula tenebrosa</i>	A	C	1,3,4,5,6
Eurasian Coot	<i>Fulica atra</i>	A	C	1,3,4,5
TURNICIDAE				
Painted Button-quail	<i>Turnix varia</i>	MC	U	2
SCOLOPACIDAE				
Latham's Snipe	<i>Gallinago hardwickii</i>	MC	U	1,4,6

Species		Abundance in NSW ^a	Sydney Region ^b	Record Study Area ^c
Marsh Sandpiper	<i>Tringa stagnatilis</i>	U	R	1
Wood Sandpiper	<i>Tringa glareola</i>	S	R	1,4
Common Sandpiper	<i>Actitis hypoleucos</i>	S	R	1
Common Greenshank	<i>Tringa nebularia</i>	U	MC	1,4,6
Sharp-tailed Sandpiper	<i>Calidris acuminata</i>	C	C	1,4
Curlew Sandpiper	<i>Calidris ferruginea</i>	MC	MC	4
RECURVIROSTRIDAE				
Black-winged Stilt	<i>Himantopus himantopus</i>	C	C	1,4,5,6
CHARADRIDAE				
Black-fronted Dotterel	<i>Elseyornis melanops</i>	C	MC	1,2,3,4,5,6
Red-kneed Dotterel	<i>Erythrogonyx cinctus</i>	MC	U	1,4
Banded Lapwing	<i>Vanellus tricolor</i>	C	S	1,4
Masked Lapwing	<i>Vanellus miles</i>	A	C	1,2,3,4,5,6
LARIDAE				
Silver Gull	<i>Larus novaehollandiae</i>	A	VC	1,5
COLUMBIDAE				
Rock Dove*	<i>Columba livia</i>	A	VC	1,4,5,6
Spotted Turtle-Dove*	<i>Streptopelia chinensis</i>	A	C	1,2,3,4,5,6
Brown Cuckoo-Dove	<i>Macropygia amboinensis</i>	C	MC	1
Common Bronzewing	<i>Phaps chalcoptera</i>	A	U	1,4
Crested Pigeon	<i>Ocyphaps lophotes</i>	A	C	1,2,3,4,5,6
Peaceful Dove	<i>Geopelia striata</i>	A	U	1,2,3,4,6
Bar-shouldered Dove				6
Topknot Pigeon	<i>Lopholaimus antarcticus</i>	MC	MC	1
CACATUIDAE				
Glossy Black-Cockatoo	<i>Calyptorhynchus lathami</i>	MC	R	1
Yellow-tailed Black-Cockatoo	<i>Calyptorhynchus funereus</i>	MC	U	1,2,3
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	MC	U	1,2
Galah	<i>Cacatua roseicapilla</i>	A	VC	1,2,3,4,5,6
Little Corella	<i>Cacatua sanguinea</i>	C	MC	2,3,4,6
Sulphur-crested Cockatoo	<i>Cacatua galerita</i>	C	MC	1,2,3,4,5,6
Cockateil	<i>Nymphicus hollandicus</i>	A	R	1
PSITTACIDAE				
Rainbow Lorikeet	<i>Trichoglossus haematodus</i>	C	C	1,2,3
Scaly-breasted Lorikeet	<i>Trichoglossus chlorolepidotus</i>	MC	U	2,3
Musk Lorikeet	<i>Glossopsitta concinna</i>	MC	U	2
Little Lorikeet	<i>Glossopsitta pusilla</i>	C	MC	1,2,4
Australian King-Parrot	<i>Alisterus scapularis</i>	C	MC	1,2
Crimson Rosella	<i>Platycercus elegans</i>	A	C	1,2,3,4,6
Eastern Rosella	<i>Platycercus eximius</i>	A	C	1,2,3,4,5,6
Swift Parrot	<i>Lathamus discolor</i>	MC-S	R	2
Red-rumped Parrot	<i>Psephotus haematonotus</i>	A	MC	1,2,3,4,5,6
Turquoise Parrot	<i>Neophema pulchella</i>	U	R	2
Budgerigar	<i>Melopsittacus undulatus</i>	A	R	1
CUCULIDAE				
Pallid Cuckoo	<i>Cuculus pallidus</i>	C	MC	1,2,3,4
Brush Cuckoo	<i>Cacomantis variolosus</i>	M	U	1,2,6
Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>	C	C	1,2,3,4,5,6
Black-eared Cuckoo	<i>Chrysococcyx osculans</i>	U	R	2
Horsfield's Bronze-Cuckoo	<i>Chrysococcyx basalis</i>	C-MC	MC	1,2,4,5

Species		Abundance in NSW ^a	Sydney Region ^b	Record Study Area ^c
Shining Bronze-Cuckoo	<i>Chrysococcyx lucidus</i>	S	MC	1,2,3,4,6
Common Koel	<i>Eudynamys scolopacea</i>	MC	MC	2,6
Channel-billed Cuckoo				6
CENTROPODIDAE				
Pheasant Coucal	<i>Centropus phasianinus</i>	MC	R	4
STRIGIDAE				
Southern Boobook	<i>Ninox novaeseelandiae</i>	C	MC	1,2,3,4,6
TYTONIDAE				
Barn Owl	<i>Tyto alba</i>	C-MC	U	5
PODARGIDAE				
Tawny Frogmouth	<i>Podargus strigoides</i>	A	MC	2,3,5
CAPRIMULGIDAE				
White-throated Nightjar	<i>Eurostopodus mystacalis</i>	MC	R	2
AEGOTHELIDAE				
Australian Owlet-nightjar	<i>Aegotheles cristatus</i>	A	R	2,3
APODIDAE				
White-throated Needletail	<i>Hirundapus caudacutus</i>	A	MC	1,2,4
Fork-tailed Swift	<i>Apus pacificus</i>	S	R	2
ALCEDINIDAE				
Azure Kingfisher	<i>Alcedo azurea</i>	MC	U	1,2,3,4,6
HALCYONIDAE				
Laughing Kookaburra	<i>Dacelo novaeguineae</i>	A	C	1,2,3,4,5,6
Sacred Kingfisher	<i>Todiramphus sanctus</i>	A	C	1,2,3,4
Red-backed Kingfisher	<i>Todiramphus pyrrhopygia</i>	MC	R	1,4
MEROPIDAE				
Rainbow Bee-eater	<i>Merops ornatus</i>	A	MC	1,2,4,5
CORACIIDAE				
Dollarbird	<i>Eurystomus orientalis</i>	MC	MC	1,2,3,4
MENURIDAE				
Superb Lyrebird	<i>Menura novaehollandiae</i>	C	C	4
CLIMACTERIDAE				
White-throated Treecreeper	<i>Cormobates leucophaeus</i>	A	C	1,2,4
Brown Treecreeper	<i>Climacteris picumnus</i>	A	R	2
MALURIDAE				
Superb Fairy-wren	<i>Malurus cyaneus</i>	A	C	1,2,3,4,5,6
Variiegated Fairy-wren	<i>Malurus lamberti</i>	C	C	1,2,4
PARDALOTIDAE				
Spotted Pardalote	<i>Pardalotus punctatus</i>	A	C	1,2,3,4,5
Striated Pardalote	<i>Pardalotus striatus</i>	A	MC	1,2,3,4,5
Rockwarbler	<i>Origma solitaria</i>	MC	MC	4
White-browed Scrubwren	<i>Sericornis frontalis</i>	A	C	1,2,3,4,6

Species		Abundance in NSW ^a	Sydney Region ^b	Record Study Area ^c
Speckled Warbler	<i>Chthonicola sagittata</i>	C	S	1,2,3,4
Weebill	<i>Smicrornis brevirostris</i>	A	MC	1,3,4
Brown Gerygone	<i>Gerygone mouki</i>	A	MC	2,4
White-throated Gerygone	<i>Gerygone olivacea</i>	A	C	1,2,3,4
Brown Thornbill	<i>Acanthiza pusilla</i>	A	VC	1,2,3,4
Buff-rumped Thornbill	<i>Acanthiza reguloides</i>	A	U	1,2,4
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>	A	U	1,2,4,5
Yellow Thornbill	<i>Acanthiza nana</i>	A	C	1,2,3,4,5,6
Striated Thornbill	<i>Acanthiza lineata</i>	A	R	1,2,3,4
MELIPHAGIDAE				
Red Wattlebird	<i>Anthochaera carunculata</i>	A	C	1,2
Little Wattlebird	<i>Anthochaera chrysoptera</i>	C	VC	2,4,5
Noisy Friarbird	<i>Philemon corniculatus</i>	A	C	1,2,3,4,5,6
Little Friarbird	<i>Philemon citreogularis</i>	A	R	1
Regent Honeyeater	<i>Xanthomyza phrygia</i>	U	R	2
Bell Miner	<i>Manorina melanophrys</i>	A	MC	1
Noisy Miner	<i>Manorina melanocephala</i>	A	VC	1,2,3,4,5,6
Lewin's Honeyeater	<i>Meliphaga lewinii</i>	A	C	1,2,4,6
Yellow-faced Honeyeater	<i>Lichenostomus chrysops</i>	A	VC	1,2,3,4,6
White-eared Honeyeater	<i>Lichenostomus leucotis</i>	A	C	1,2,4
Yellow-tufted Honeyeater	<i>Lichenostomus melanops</i>	A	U	1,2,4
Fuscous Honeyeater	<i>Lichenostomus fuscus</i>	A	U	1,2,4
White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>	A	C	1,2,3,4,5,6
Brown-headed Honeyeater	<i>Melithreptus brevirostris</i>	A	U	1,2,3,4
White-naped Honeyeater	<i>Melithreptus lunatus</i>	A	C	1,2,3,4
New Holland Honeyeater	<i>Phylidonyris novaehollandiae</i>	A	VC	1,2,4
White-cheeked Honeyeater	<i>Phylidonyris nigra</i>	A	C	1,2
Eastern Spinebill	<i>Acanthorhynchus tenuirostris</i>	A	VC	1,2,3,4
Scarlet Honeyeater	<i>Myzomela sanguinolenta</i>	C	U	1,2,3
PETROICIDAE				
Jacky Winter	<i>Microeca fascians</i>	A	MC	1,2,3,6
Scarlet Robin	<i>Petroica multicolor</i>	C	MC	1,2,4
Red-capped Robin	<i>Petroica goodenovii</i>	A	R	2,4
Flame Robin	<i>Petroica phoenicea</i>	C	R	2
Rose Robin	<i>Petroica rosea</i>	C	U	1,2,3,4
Hooded Robin	<i>Melanodryas cucullata</i>	C	R	2
Eastern Yellow Robin	<i>Eopsaltria australis</i>	A	C	1,2,3,4,6
CINCLOSOMATIDAE				
Eastern Whipbird	<i>Psophodes olivaceus</i>	A	MC	1,2,4,5,6
NEOSITTIDAE				
Varied Sittella	<i>Daphoenositta chrysoptera</i>	C	U	1,2,3
PACHYCEPHALIDAE				
Crested Shrike-tit	<i>Falcunculus frontatus</i>	C	U	1,2,3
Golden Whistler	<i>Pachycephala pectoralis</i>	A	C	1,2,3,4
Rufous Whistler	<i>Pachycephala rufiventris</i>	A	C	1,2,3,4,6
Grey Shrike-thrush	<i>Colluricincla harmonica</i>	A	C	1,2,3,4,6
DICRURIDAE				
Black-faced Monarch	<i>Monarcha melanopsis</i>	C	MC	2,3
Leaden Flycatcher	<i>Myiagra rubecula</i>	C	MC	2,3
Satin Flycatcher	<i>Myiagra cyanoleuca</i>	MC	U	2

Species		Abundance in NSW ^a	Sydney Region ^b	Record Study Area ^c
Restless Flycatcher	<i>Myiagra inquieta</i>	A	U	1,2
Magpie-lark	<i>Grallina cyanoleuca</i>	A	VC	1,2,3,4,5,6
Rufous Fantail	<i>Rhipidura rufifrons</i>	C	MC	2,3
Grey Fantail	<i>Rhipidura fuliginosa</i>	A	C	1,2,3,4,5,6
Willie Wagtail	<i>Rhipidura leucophrys</i>	A	VC	1,2,3,4,5,6
Spangled Drongo	<i>Dicrurus bracteatus</i>	MC	U	1
CAMPEPHAGIDAE				
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	A	C	1,2,3,4,5,6
White-bellied Cuckoo-shrike	<i>Coracina papuensis</i>	MC	S	1
Cicadabird				6
White-winged Triller	<i>Lalage sueurii</i>	MC	U	1,2,4
ORIOLIDAE				
Olive-backed Oriole	<i>Oriolus sagittatus</i>	C	MC	1,2,3
ARTAMIDAE				
White-browed Woodswallow	<i>Artamus superciliosus</i>	A	R	1,2,3
Dusky Woodswallow	<i>Artamus cyanopterus</i>	A	MC	1,2,4
Grey Butcherbird	<i>Cracticus torquatus</i>	A	U	1,2,3,4,5,6
Australian Magpie	<i>Gymnorhina tibicen</i>	A	C	1,2,3,4,5,6
Pied Currawong	<i>Strepera graculina</i>	A	VC	1,2,3,4,5,6
CORVIDAE				
Australian Raven	<i>Corvus coronoides</i>	A	VC	1,2,3,4,5,6
CORCORACIDAE				
White-winged Chough	<i>Corcorax melanorhamphos</i>	C	U	1,2,3
PTILONORHYNCHIDAE				
Satin Bowerbird	<i>Ptilonorhynchus violaceus</i>	C	C	1,4
ALAUDIDAE				
Singing Bushlark	<i>Mirafra javanica</i>	C	R	4
Skylark*	<i>Alauda arvensis</i>	MC	S	1,4
MOTACILLIDAE				
Richard's Pipit	<i>Anthus novaeseelandiae</i>	A	C	1,3,4,5,6
PASSERIDAE				
House Sparrow*	<i>Passer domesticus</i>	A	VC	1,2,3,4,5,6
Zebra Finch	<i>Taeniopygia guttata</i>	A	U	1,2,3,4,5,6
Double-barred Finch	<i>Taeniopygia bichenovii</i>	A	MC	1,2,3,4,5
Red-browed Finch	<i>Neochmia temporalis</i>	A	C	1,2,3,4,5,6
Diamond Firetail	<i>Stagonopleura guttata</i>	C	R	1,3
Nutmeg Mannikin*	<i>Lonchura punctulata</i>	U	R	1,2,4
Spice Finch*				6
Chestnut-breasted Mannikin	<i>Lonchura castaneothorax</i>	MC	U	1,2,3,4,5,6
FRINGILLIDAE				
European Goldfinch*	<i>Carduelis carduelis</i>	A	C	1,2,3,4,5,6
DICAEIDAE				
Mistletoebird	<i>Dicaeum hirundinaceum</i>	A	C	1,2,3,4,5,6

Species		Abundance in NSW ^a	Sydney Region ^b	Record Study Area ^c
HIRUNDINIDAE				
White-backed Swallow	<i>Cheramoeca leucosternus</i>	C	U	1,2,4
Welcome Swallow	<i>Hirundo neoxena</i>	A	VC	1,2,3,4,5,6
Tree Martin	<i>Hirundo nigricans</i>	A	MC	1,2,3,4
Fairy Martin	<i>Hirundo ariel</i>	A	C	1,2,3,4,5,6
PYCNONOTIDAE				
Red-whiskered Bulbul*	<i>Pycnonotus jocosus</i>	C	C	1,2,3,4,5,6
SYLVIIDAE				
Clamorous Reed-Warbler	<i>Acrocephalus stentoreus</i>	A	MC	1,3,4,5,6
Little Grassbird	<i>Megalurus gramineus</i>	A	U	1,4,5
Rufous Songlark	<i>Cincloramphus mathewsi</i>	A	U	1,2,4
Brown Songlark	<i>Cincloramphus cruralis</i>	A	R	1,4
Golden-headed Cisticola	<i>Cisticola exilis</i>	A	MC	1,4,5,6
ZOSTEROPIDAE				
Silvereye	<i>Zosterops lateralis</i>	A	VC	1,2,3,4,5,6
MUSCICAPIDAE				
Bassian Thrush	<i>Zoothra lunulata</i>	C	U	1
Common Blackbird*	<i>Turdus merula</i>	MC	MC	1,3,6
STURNIDAE				
Common Starling*	<i>Sturnus vulgaris</i>	A	VC	1,2,3,4,5,6
Common Myna*	<i>Acridotheres tristis</i>	A	VC	1,2,3,4,5,6

Number of Species:

1. 10' Grid Block	183
2. Castlereagh State Forest	134
3. ADI St Marys site (1991-1995)	109
4. Penrith - Agnes Banks Area	156
5. Penrith Lakes Scheme Area (1995 study)	85
6. DA4 area, Penrith Lakes Scheme Area (1996 study)	75
Total	220



1. Billabong Wetland at Site 9, north of Jacksons Lane. This is a small diverse wetland; note the diversity of habitat available to wetland fauna.



2. Site 10, a small wetland in a heavily grazed paddock. Note the sparse cover of wetland plants. Most of the birds in the photo are Pacific Black Ducks.



3. Extensive beds of *Typha orientalis* at Site 1 at the corner of Smith Road and Castlereagh Road. These have developed because of increased levels of nutrients in the wetland and the removal of grazing pressure.



4. Site 17, south of Smith Road. The *Typha* reeds are in the drain along Smith Road. The brown sedges in the background are *Carex appressa*.



5. Typical vegetation along the Nepean River corridor, at Site 11. The large River Oaks *Casuarina cunninghamiana* are surrounded by weeds, including Willows *Salix* spp., Balloon Vine *Cardiosperma grandiflorum* and Kikuyu Grass *Pennisetum clandestinum*.



6. The edge of the Nepean River, near Site 11. River Oaks and Willows are common. The wetland plants along the edge of the water include Marsh Club-rush *Bolboschoenus fluviatilis*.



7. A stand of *Angophora subvelutina* and *Eucalyptus tereticornis* at Site 21, north of "Hadley Park".

**ARCHEOLOGICAL INVESTIGATIONS
IN THE DA4 AREA,
PENRITH LAKES SCHEME**

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123 Killarney Ave.,
BLACKTOWN 2148**

Report prepared for Penrith Lakes Development Corporation

August 1997

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SUMMARY

Archaeological investigations were undertaken to assist with the Statement of Environmental Effects for the DA4 development area in the Penrith Lakes Scheme. National Parks and Wildlife Site Register was searched, and the location of recorded prehistoric Aboriginal sites identified. Archaeological surveys were carried out to relocate known sites and to identify new locations. As suggested in the initial survey for the Penrith Lakes development, the three areas of major archaeological significance were confirmed to be the eastern bank of the Nepean river, Cranebrook Creek, and the northern extremity of the development in the vicinity of Smith Street (Kohen 1981; Department of Environment and Planning 1984). Archaeological visibility was poor across the area, and several sites could not be relocated, particularly along the bank of the Nepean River. However, additional artifacts were found at and adjacent to three known sites.

Consultation with Darug Tribal Aboriginal Corporation took place, and the area was subsequently inspected by the Chairman of DTAC, Colin Gale. Areas of significance to the Aboriginal community were identified, and the archaeological and cultural significance both taken into account.

Previous studies undertaken to characterise the nature and distribution of artifacts in the Penrith Lakes region, particularly large scale excavations and monitoring during the first six months of 1997, were also considered. The results of this study strongly support the view that the artifacts were originally deposited on the surface and have worked their way down into the deposit due primarily to bioturbation. There is no evidence that artifacts have accumulated *in situ* at depth. However, geomorphological studies have confirmed that there are different geomorphic depositional units present across the DA4 area (Smith 1996). Based on this information, the following recommendations were made:

1. Parts of the eastern bank of the Nepean River should be set aside as an archaeological conservation zone.
2. The region south of Smith Street contains several major archaeological sites, as well as being close to significant archaeological and historically important areas for the local Darug people. This area should also be set aside as a conservation zone.
3. A proportion of Cranebrook Creek and its tributaries should be set aside as a conservation zone. This could be done in association with other European conservation areas.
4. Aboriginal monitoring during surface stripping should continue as a routine part of the development.
5. Wherever possible, known Aboriginal sites should be protected. This is particularly important in the case of the Smith Street complex. Consent to destroy must be sought from National Parks and Wildlife Service if any sites are to be impacted by the development in the DA4 area.

INTRODUCTION

This report reviews the archaeological and geomorphological status of the DA4 area within the Penrith Lakes development (see Figure 1). The aim of the investigation was to identify known archaeological sites, assess the significance of these sites, identify areas with high archaeological and Aboriginal cultural heritage potential which could be conserved because of local or regional significance, and to make recommendations regarding future management of archaeological sites and investigations.

BACKGROUND

The Penrith Lakes Scheme was proposed as a mechanism for the orderly and systematic extraction of sand and gravel deposits located in the Penrith-Castlereagh area, and the subsequent comprehensive rehabilitation with a view to creating a water-based recreational resource in the former quarry areas. In order to facilitate this proposal, the Penrith Lakes Development Corporation Ltd was established in 1980.

As a basis for this development a regional environmental study was undertaken, incorporating a wide range of environmental considerations (Department of Environment and Planning, 1984). One of these considerations was the requirement to identify prehistoric Aboriginal sites within the proposed development, and to assess these sites in terms of local and regional significance.

Extensive archaeological surveys were carried out, and a total of 31 sites and isolated finds identified within or immediately adjacent to the development area (Kohen, 1981a; 1984). Subsequent surveys, test excavations and inspections have revealed additional sites (Kohen, 1986; 1987; 1988; 1989; 1990; 1991; 1992; 1993; 1994; 1995; 1996). Because of the poor surface visibility, and after consultation with National Parks and Wildlife Officers, the following recommendation was made (Kohen, 1986c: 16):

"Recommendation 5. ... in view of the almost total lack of archaeological visibility and the potentially significant sites which may be located beneath the surface, periodic examination of the area by an archaeologist and possibly a geomorphologist should be undertaken during the quarrying operations. This could take the form of inspections of newly excavated sand and gravel deposits, and subsequent monitoring of exposed sections to identify any significant archaeological or geomorphological features." This recommendation was restated in February 1988 (Kohen, 1988: 26) as

"Recommendation 5. Subject to the constraints of the gravel extraction programme, inspection of quarry pits by archaeologists and geomorphologists should be permitted when requested, and periodic spot inspections carried out by an archaeologist at routine intervals of approximately six months."

The National Parks and Wildlife Regional Archaeologist, Luke Godwin, endorsed these recommendations, particularly in light of the publication by Nanson *et al* (1987) of a report describing Aboriginal artifacts obtained from the gravels which were considered to be more than 40,000 years old. As a result, Penrith Lakes Development

Corporation requested that I carry out routine inspections of the exposed faces in the quarry pits.

The ninth of the six-monthly inspection reports was submitted in July 1992. In this report, a review was conducted of the results of the surveys undertaken between 1988 and 1992. It was apparent that stone artifacts were not found *in situ* within the gravels, and that cultural remains were restricted to the upper 1-2 meters of the overburden and topsoil. It was also apparent, on the basis of recently established thermoluminescence dates, that the deposits on the western side of Cranebrook Creek were significantly younger than those to the east, and had greater potential to contain more recent sites.

In view of these conclusions, it was recommended that inspections be held annually rather than every six months, and that the western side of Cranebrook Creek should act as the focus for future investigations (Kohen, 1992b). This recommendation was subsequently endorsed by National Parks and Wildlife Service. Annual inspections were carried out in 1993, 1994, 1995 and 1996. A review of the data from the inspections between 1988 and 1994 was presented at the Australian Archaeological Association conference in December 1994, and the conclusions were widely accepted (Kohen 1994c).

A detailed review of the geomorphology was undertaken by Smith and Associates in 1996 (Smith 1996).

In 1996, Daruk Local Aboriginal Land Council submitted a letter to National Parks and Wildlife Service suggesting that valuable prehistoric cultural heritage had been destroyed, and that the land council should conduct its own research into the Aboriginal cultural heritage in the Penrith Lake area (Daruk Local Aboriginal Land Council 1996). In a response to this letter, it was pointed out that all the proper procedures had been followed, and that no sites had been destroyed without the proper approval being granted by National Parks and Wildlife Service (Kohen 1996b).

Following these discussions, National Parks and Wildlife Service requested that a series of intensive excavations and a detailed analysis of sub-surface deposits should be carried out to determine the nature and taphonomy of the artifacts occurring within the overburden. These investigations were conducted between January and March 1997, and identified bioturbation as the major process by which artifacts were found at depth (Kohen 1997).

Archaeological investigations in the Nepean River area have been carried out since the 1930s (McCarthy, 1934; 1948; Kohen, 1981b, 1986a; Stockton, 1973; Stockton and Holland, 1974; Kohen et al, 1981; 1984; Nanson *et al*, 1987; Rhoads, 1984). The Nepean River and the adjoining flood plain acted as a focus for prehistoric Aboriginal communities, and the area abounds with sites. The large area involved and the disturbance of the surface and near-surface soil during the gravel extraction process lends itself to an intensive study of the distribution and nature of archaeological sites.

The original archaeological surveys conducted as part of the Penrith Lakes Regional Environmental Study identified 31 sites within the proposed development and its environs (Kohen, 1981a; 1984). Since that time, many additional artifact scatters have

been identified, particularly concentrated along Cranebrook Creek. The extensive low density spread along Cranebrook Creek resulted in the various small scatters within the DA3 area being classed as a single large site. Consent to destroy this site was granted by the Director of National Parks and Wildlife Service, and destruction has taken place. Other sites and isolated finds have been exposed during the quarrying activities.

Stockton and Holland (1974) and Nanson *et al* (1987) have identified stone artifacts which they believed were buried *in situ* below the surface, and have carried out dating on the deposits. Their original suggestions of the gravels being around 45,000 years old have now been retracted, and some revised dates suggesting that the gravels are much older have been published (Nanson *et al*, 1990).

The previous routine inspections found no evidence of artifacts being located *in situ* within the gravels, and a re-evaluation of the earlier accounts casts doubt on the proposed age in excess of 40,000 years for artifacts from the floor of the quarry (Kohen, 1992a, 1994c). Nanson *et al* (1987) suggest that the gravels and the overburden were both deposited over a short period of time, although they note that the deposits on the eastern and western sides of Cranebrook Creek are of markedly different ages, those on the western side being between 10,000 and 13,000 years old and those on the eastern side more than 50,000 years old. There is also a younger deposit in a channel infill, dated to around 36,000 years ago, within the area referred to as the "clay band" which extends northwest from the Cranebrook Village near the eastern edge of the Cranebrook Terrace boundary.

Extensive archaeological investigations in the western Cumberland Plain all demonstrate that sites occur throughout the area, and are particularly likely to occur adjacent to the rivers and creeks (Kohen 1986a). The distribution of the raw materials associated with the manufacture of stone tools suggests that chert and basalt were carried or traded east from the river gravels, and that silcrete was traded or carried from sources near South Creek and Eastern Creek west towards the Nepean flood plain.

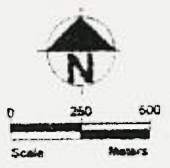
It has been concluded that all artifacts located within the Penrith Lakes Development are significantly younger than 40,000 years old, and the vast majority are less than 4,000 years old (Kohen 1992b). Most of the sites are likely to belong to the most recent lithic cultural tradition, commonly referred to as the Australian Small Tool Tradition, and locally known as the Bondaian phase. These recent stone industries are characterised by the production of small blades and points, the use of a bipolar reduction technique resulting in bipolar cores, and the use of edge-ground hatchet heads. The nature of the assemblages identified during the 1997 study at Cranebrook Creek and the Palaeochannel (Kohen 1997) strongly supports Hiscock's model of primary modification at sites close to the source of the gravels and subsequent lithic reduction at other specialised sites (Hiscock 1993).

The sub-surface testing identified bioturbation as the main reason artifacts were found at depths of up to 2m within the overburden deposits. The geomorphic and archaeological evidence suggests that all of the overburden units were deposited by alluvial activity, and that no artifacts occur *in situ* at depth. Artifacts were originally

deposited on the surface, and moved down into the overburden due to bioturbation, ploughing, and tree and stump removal (Kohen 1997).


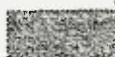
Figure 1. The DA4 area at Penrith Lakes, west of Castlereagh Road.

Smith St



Witchard Road

Church

 AREAS OF NEIGHBORING RESIDENCES
 DA4 AREA

Lane

Creek

RIVER

NEPEAN

Farrells

Road

Wrights

Lane

McCarthys

Lane

Creek

CEMETERY

Lane

Carters

Castlereagh

PLDC OFFICE AREA

Road

Cranebrook

247000 E
 248000 E
 249000 E
 250000 E
 251000 E
 252000 E
 253000 E
 254000 E
 255000 E

GEOMORPHOLOGY

During 1995 and 1996, Valerie Smith and Associates undertook a review of the geomorphology of the Penrith Lakes region. These investigations have provided information on the structure and age of the terraces comprising the scheme.

The Cranebrook Formation consists of a basal gravel unit averaging 7m in thickness resting on an eroded sheet of Ashfield Shale. The gravels originated in the Cox's River catchment, and range in size up to 300 mm in diameter. These are enclosed in a medium to coarse grained sand which also forms lenses in the gravels. Overlying the gravels is a red-brown to yellow sand and/or silt varying in thickness from 1m to 4m. Smith has argued that the gravels and the overlying sand/silt were deposited relatively contemporaneously, with the gravel deposited on a lower point bar and the sands and silts on the upper point bar or as overbank deposits during periods of flood. Atkinson (1982) identified seven soil geomorphic units or terrace sequences, and suggested that the terrace sequences became progressively younger in an east to west direction. Cranebrook Creek was recognised as a boundary between two terraces. Nanson *et al* (1987) estimated the age of the gravels using thermoluminescence dating, and the most recent estimates suggests that the gravels were deposited between 70,000 to 110,000 years ago, and the overburden to the east of Cranebrook Creek deposited somewhat later, perhaps 50,000 to 60,000 years ago. However, Smith (1996) has pointed out that all of Nanson's sites are located east of Cranebrook Creek or in a palaeochannel. The dates obtained therefore do not apply to the entire scheme.

Smith (1995) showed that there are a number of distinctly different depositional and erosional units comprising the scheme area, each unit representing a separate period of activity in an ancient Nepean River. The geomorphic units identified correlate well with those recognised by Atkinson (1982). Depositional units are separated by palaeochannels which are, for the most part, deplete of gravels. Some of these are large, such as the palaeochannel known as the "clay band", while others are smaller, such as Cranebrook Creek. Some show very little surface evidence. Some of the erosion channels are infilled with reworked gravels, sand and silt of younger age. Smith has also argued that some of the gravels are therefore likely to be much younger than the ages proposed by Nanson *et al*. A total of ten geomorphic units have now been identified, and there is no evidence of palaeosols in any of the terraces studied, which indicates a highly erosive and active river regime (Smith 1996). In terms of Aboriginal occupation, Smith argues that isolated artifacts could be expected on the surfaces of the terraces, having been redistributed by flood waters during flooding events, and suggests that artifacts which occurred in the profile are likely to have been transported, and are not likely to be in their original context. The oldest terraces are most likely to have relatively undisturbed occupation sites, and these occur to the east of Cranebrook Creek, although "potential for intact occupation sites to remain would be extremely rare" (Smith 1996: 6).

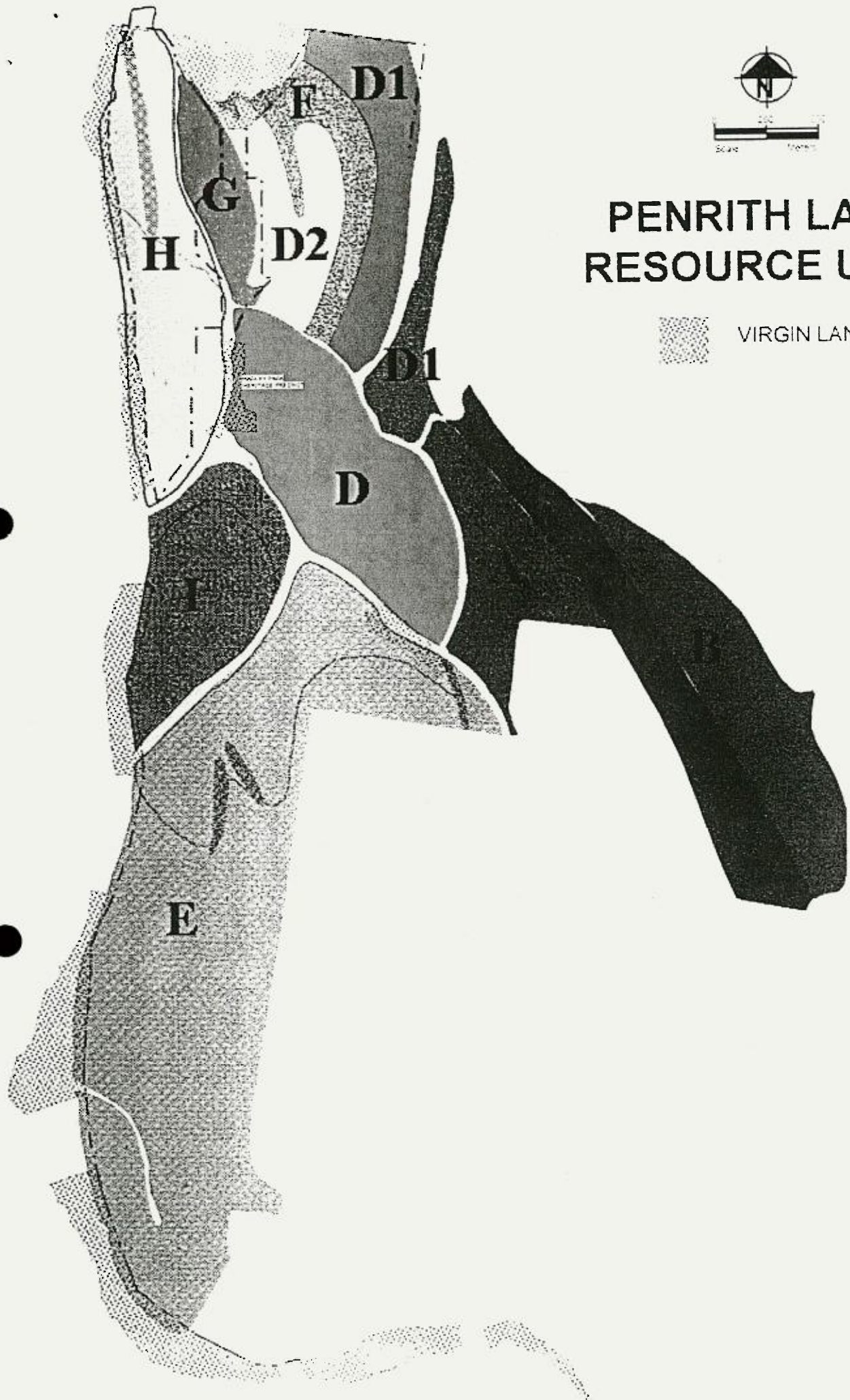
The identified geomorphic resource units representing different periods of alluviation across the Penrith Lakes region is shown in Figure 2.

Figure 2. Penrith Lakes resource units, corresponding to geomorphic units.



PENRITH LAKES RESOURCE UNITS

 VIRGIN LANDS



METHODS

The New South Wales National Parks and Wildlife Aboriginal Site Register was searched to identify all recorded Aboriginal sites within the DA4 area. The only known sites were those previously identified during the 1981 archaeological surveys (Kohen 1981; 1984). The sites are:

Upper Castlereagh (UC/1), on the eastern bank of the river north of Jackson's Lane;
Castlereagh 1 (CR/1) in a road cutting at Smith Street;
Penrith Lakes 4 (PL/4) 250 m north of Jackson's Lane;
Penrith Lakes 5 (PL/5) on Portions 50 and 51 south of the Equestrian Centre;
Penrith Lakes 6 (PL/6) on Portion 42 near a small sandstone outcrop south of Smith Street;
Penrith Lakes 7 (PL/7) on Portion 42 on a track south of Smith Street;
Penrith Lakes 8 (PL/8) on Portion 42 on a track adjacent to a house;
Penrith Lakes 12 (PL/12) on the eastern side of Cranebrook Creek within 200 m of the house at Nepean Park.

Two isolated finds were also recorded in the area, and had been given the codes Penrith Lakes 9 (PL/9) on a rise adjacent to a turf farm and Penrith Lakes PL/13 in the extreme southeast corner of the DA4 area close to the Nepean River.

Other sites occur in the vicinity of the DA4 area. Open sites occur on Emu Plains to the south at Lapstone Creek and Jamisons Creek (Kohen 1978; 1979; 1981). To the north on the eastern bank of the river is a site complex on the Property "Pelican Park" (Kohen 1988c), while a series of artifacts and axe-grinding grooves on the eastern side of the river is recorded as Penrith Lakes 25 (PL/25). On the western side of the river north-west of the DA4 area are a series of sites in the vicinity of Shaws Creek, rock shelters KI and KII (Kohen 1993c; Kohen *et al* 1981, 1984; Stockton 1973), and open sites west of Black's Falls, which was reported to be an Aboriginal fish trap (McCarthy 1948).

An archaeological survey was undertaken on 13th June 1997 by Jim Kohen and Dominique Ducros. Sergio Mantella-Galli, representing PLDC, participated in the survey during the morning and facilitated access to properties. The aim was to relocate major sites in the DA4 area, and to identify further areas with high archaeological potential. Subsequently, a second inspection was conducted on 8th July with Colin Gale, Chairman of Darug Tribal Aboriginal Corporation. Daruk Local Aboriginal Land Council were invited but did not wish to participate in any archaeological assessment in the Penrith Lakes development.

The entire DA4 area was inspected, first by car and then on foot. Permission was given to access most properties, and those which were not inspected were omitted because they had extremely low surface visibility and/or low likelihood of producing sites (e.g turf farms).

The second inspection focussed on the sites observed during the first survey, and also involved input from the Darug Tribal Aboriginal Corporation regarding the Aboriginal cultural heritage value of the sites.

RESULTS

Jackson's Lane area

The survey began in the south and extended north. The two most southerly sites, Upper Castlereagh (UC/1) and Penrith Lakes 4 (PL/4) could not be relocated because of heavy regrowth along the face of the terraces. No sites were seen in the SW corner of the DA4 area because of previous and current mining activities and regrowth of vegetation since mining terminated.

Penrith Lakes 5 (PL/5)

At Penrith Lakes 5 (PL/5), 27 artifacts found were found, 19 in situ in the face of the river terrace, 1 eroded out of the face immediately below the others, and seven on the track, extending over approximately 30 meters (N=27). However, all of the 19 artifacts in situ were within 1 m of each other, 5-6 m south of the fence line (and the pump). Access to this site is from the Equestrian Centre track. Weeds include privet, lantana, balloon vine, and wandering jew (*Tradescantia*), and a few wattles, covered almost the entire surface of the terrace. Surface visibility is very low. The artifacts recovered are shown in Table 1.

laminar slab of chert	1
chert core	1
chert flakes	14
silcrete flake	1
quartz flake	1
quartzite pebble fragment	1
chert core (on the track)	1
chert flakes on track (on the track)	7
TOTAL	27

Table 1. Artifacts identified at site Penrith Lakes 5 (PL/5).

Castlereagh 1 (CR/1) (Road cutting on Smith Street)

Collections were made of artifacts exposed in the road cutting on Smith Street in 1981. An additional 8 chert flakes, a silcrete flake, a chert core and a uniface pebble tool (illustrated in Figure 3) were found in the road cutting and on a new driveway with a sign "43 Smith Road R.J. Douch A. van Haaren". An additional nine artifacts were seen on the track extending over the first 20 metres from the gate (N=20). The artifacts are documented in Table 2.

chert flakes	14
silcrete flake	2
quartz flake	1
large chert core	1
uniface pebble tool (basalt)	1
Basalt fragment	1
TOTAL	20

Table 2. Artifacts identified at site Castlereagh 1 (CR/1) at Smith Street.

Penrith Lakes 6 (PL/6)

This site, adjacent to a small sandstone outcrop, was not relocated. The track on which it was originally identified is now totally covered with grass, and has no surface visibility.

Penrith Lakes 7 (PL/7)

Artifacts are exposed along and adjacent to a track which runs parallel and to the south of Smith Street. One chert flake was found right at the bottom of the slope on the track close to a small creek. Then 150 artifacts were found on the slope leading up to the first easterly terrace (the second away from the river). An additional 17 artifacts were found on the slope in erosion scars immediately east of the track, extending over 50 m², between the track and the fenced off orchard (N=168). These are summarised in Table 3.

chert flakes	142
chert cores	3
retouched chert blade	1
silcrete core	1
silcrete flakes	12
quartz bipolar core	1
quartz flakes	4
basalt flakes	4
TOTAL	168

Table 3. Artifacts identified at site Penrith Lakes 7 (PL/7).

Penrith Lakes 8 (PL/8)

A total of 88 artifacts were found on the track leading to the gate on the second house on the upper terrace, closest to the river. They are characterised in Table 4. The location of PL/7 and PL/8 is illustrated in the photographs in the appendix.

chert flakes	76
chert cores	2
silcrete blade core	1
silcrete flakes	3
basalt flakes	5
quartz flake	1
TOTAL	88

Table 4. Artifacts recovered at site Penrith Lakes 8 (PL/8).

Additional artifacts

On low slope east of the PL/6 sandstone outcrop and south of PL/8 near the house was a thin scatter of artifacts on a deflated and eroded surface, consisting of one chert core and 5 chert flakes. On the grassed area immediately east of the frame of an old shed and south of the track on which the artifacts at both PL/7 and PL/8 are located was found a basalt edge-ground hatchet head. These artifacts strongly suggest that the two terraces over which the track passes, and probably the entire area down to the creek, constitutes a single large site, incorporating PL/6, PL/7 and PL/8, which may well extend all the way along the terraces to the Smith Street road cutting (CR/1) and beyond. The low surface visibility across the remainder of the area because of high grass cover precludes the possibility of defining the exact boundaries of this site or site complex in more detail.

Penrith Lakes 12 (PL/12)

Artifacts had been collected from this site in 1981. The site was a thin surface scatter approximately 200m southeast of the house at Nepean Park, on the eastern bank of Cranebrook Creek. The banks of Cranebrook Creek have been identified as areas likely to contain evidence of Aboriginal occupation. The site was not relocated during this survey, but the area adjacent to the site is already proposed as part of a European cultural conservation zone.

Wilchard Road Sites east of the DA4 area

Two sites identified in the 1981 survey to the east of the DA4 area, Penrith Lakes 1 (PL/1) and Penrith Lakes 2 (PL/2), both on Wilchard Road east of Castlereagh Road, were revisited. There was no surface visibility at all at PL/1, but 20 flakes and cores were exposed in a road cutting immediately south of PL/2, which is now mostly located under a house and under a turfed yard.

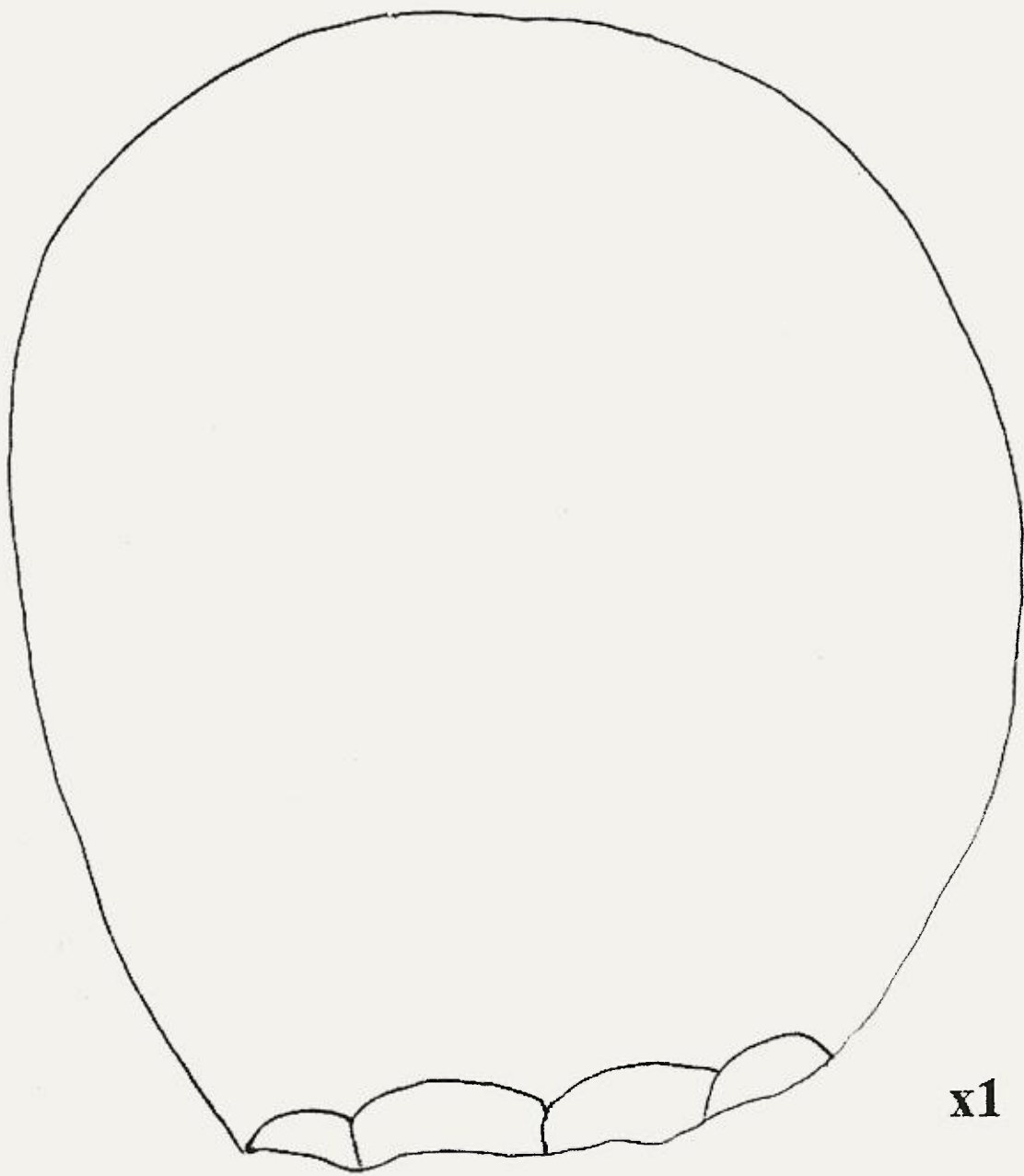


Figure 3. Uniface pebble tool identified at Castlereaigh 1 (CR/1).

DISCUSSION

The 1981 survey identified four zones with the greatest archaeological potential. Three of these four zones occur within the DA4 area - the eastern bank of the Nepean River, the area immediately south of Smith Street, and the banks of Cranebrook Creek. In addition, the geomorphic evidence proposed by Smith (1996) indicates that there are a number of geomorphic resource units represented in the DA4 area, units E, H and I along the river, and units D, F and G further to the east. Ideally, the development of the DA4 area should have minimal impact on the existing sites, and where impact does occur, extensive salvage operations should be undertaken.

The proposed Penrith Lakes Scheme Structure Plan is shown in Figure 4, and details the proposed structure of the area following completion of sand and gravel extraction. Given there is a requirement for minimal disturbance along the eastern bank of the Nepean River, and that this area has been identified as one containing archaeological sites, although these will be difficult to identify because of poor surface visibility, it would seem that the conservation of this area would satisfy many needs. If a significant proportion of the riverbank, extending eastwards, could be conserved, this would protect an archaeologically sensitive area from disturbance. This would also allow for samples of depositional units E, I and H to be conserved, along with the present active banks of the river.

Given the present planning constraints, two of the previously identified sites, Upper Castlereagh 1 and Penrith Lakes 4, both in the vicinity of Jackson's Lane, would need to be destroyed. If possible this should be avoided, but if it is not possible consent to destroy these two sites must be sought from NSW National Parks and Wildlife service.

The major complex of prehistoric Aboriginal sites in the vicinity of Smith Street represent a unique and dense cluster, which could possibly be defined as a single site extending over several thousand square meters. The low surface visibility limits the opportunities to define the boundaries of the site, and to assess its significance. However, it does appear to be quite different from the site complexes identified in the DA2 and DA3 areas. It is situated on the highest ground in the DA4 area, overlooking the entire Penrith Lakes Scheme. It contains a wide range of raw materials and artifacts types, including a significant proportion of silcrete and at least one edge-ground hatchet head, and was almost certainly used in the period immediately prior to European settlement in the area. Given the proximity of extensive grinding grooves at Penrith Lakes 25 to the north, and the evidence of at least 15,000 years occupation at Shaws Creek KII on the opposite side of the river, it is likely that this complex has been in use since before the introduction of the Small Tool Tradition. Given the fact that the site complex is on a series of sandstone ridges and river terraces which is not intended to be extracted for gravel, the entire complex could form a major conservation zone without impacting on gravel extraction.

There is already a proposal to maintain Hadley Park and Nepean Park as a conservation zone for European cultural heritage. Since the Nepean Park area also contains at least one Aboriginal site, and falls within resource unit D, which is otherwise not represented in the other two areas identified as having potential for

archaeological conservation zones, it would be appropriate to see this as an extension of the prehistoric archaeological heritage. If the opportunity exists to extend this zone to the south-east to include more of the Cranebrook Creek margins, and/or west to include more of resource units D and H, this should be considered.

The proposed archaeological conservation zones are shown in Figure 5, with the stippled area representing possible additions to the primary areas.

ABORIGINAL CONSULTATION

Consultation was carried out with Darug Tribal Aboriginal Corporation (DTAC) through their chairman, Colin Gale. The Darug are the traditional owners of the Sydney region, and their territory extended from the coast to Katoomba and from the Hawkesbury River to Appin in the south (Kohen 1993). During 1996 and 1997, DTAC have been involved in monitoring and archaeological studies undertaken at Penrith Lakes, and have participated in discussions concerning the methodology employed to conserve and protect Aboriginal sites.

Mr Gale expressed the view very strongly that the Smith Street complex should be protected at all costs, as it was in a visually important position. This area had particular significance for the contemporary Darug people because of conflicts between the Darug and Europeans in the early nineteenth century. One of the known massacres of Darug people took place at Yellow Rock west of the Smith Street complex.

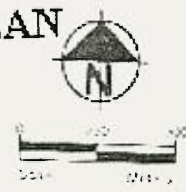
The conservation of the river banks was also seen to be important, as the Darug traditionally used many resources in and adjacent to the river. Mr Gale suggested that a flat area perhaps adjacent to the Smith Street complex could be included as part of a conservation zone because of its significance as part of a cultural landscape in the area. He also indicated that he believed the Smith Street complex would be an excellent choice for an Aboriginal cultural centre.

The practice of Aboriginal monitoring during surface stripping was seen to be an important part of the process to identify and protect significant cultural remains, and Mr Gale was strongly of the view that Aboriginal people should continue to be employed by Penrith Lakes Development Corporation to monitor the quarrying activities during the development of the DA4 area in the same way that they had been involved in the DA3 area.

Archaeological evidence forms an important component in the process of cultural identity for Darug people, and an appropriate facility for educational purposes, incorporating the archaeological remains from the Penrith Lakes area, could act as a focus for all Aboriginal people in the region (Kohen 1988d).

Figure 4. The Penrith Lakes Scheme Structure Plan.

PENRITH LAKES SCHEME STRUCTURE PLAN

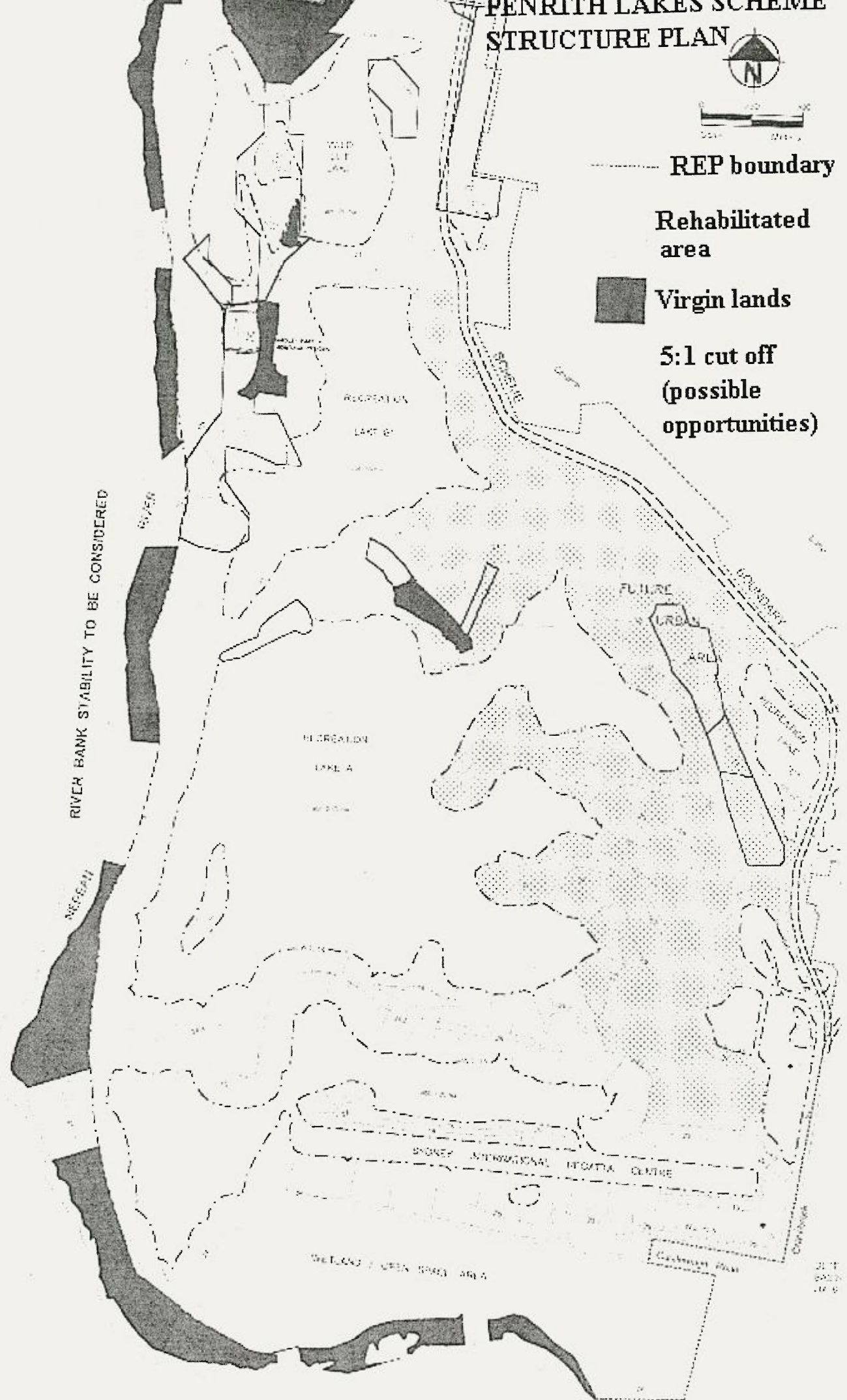


--- REP boundary

Rehabilitated area

■ Virgin lands

5:1 cut off
(possible opportunities)





RIVER BANK STABILITY TO BE CONSIDERED

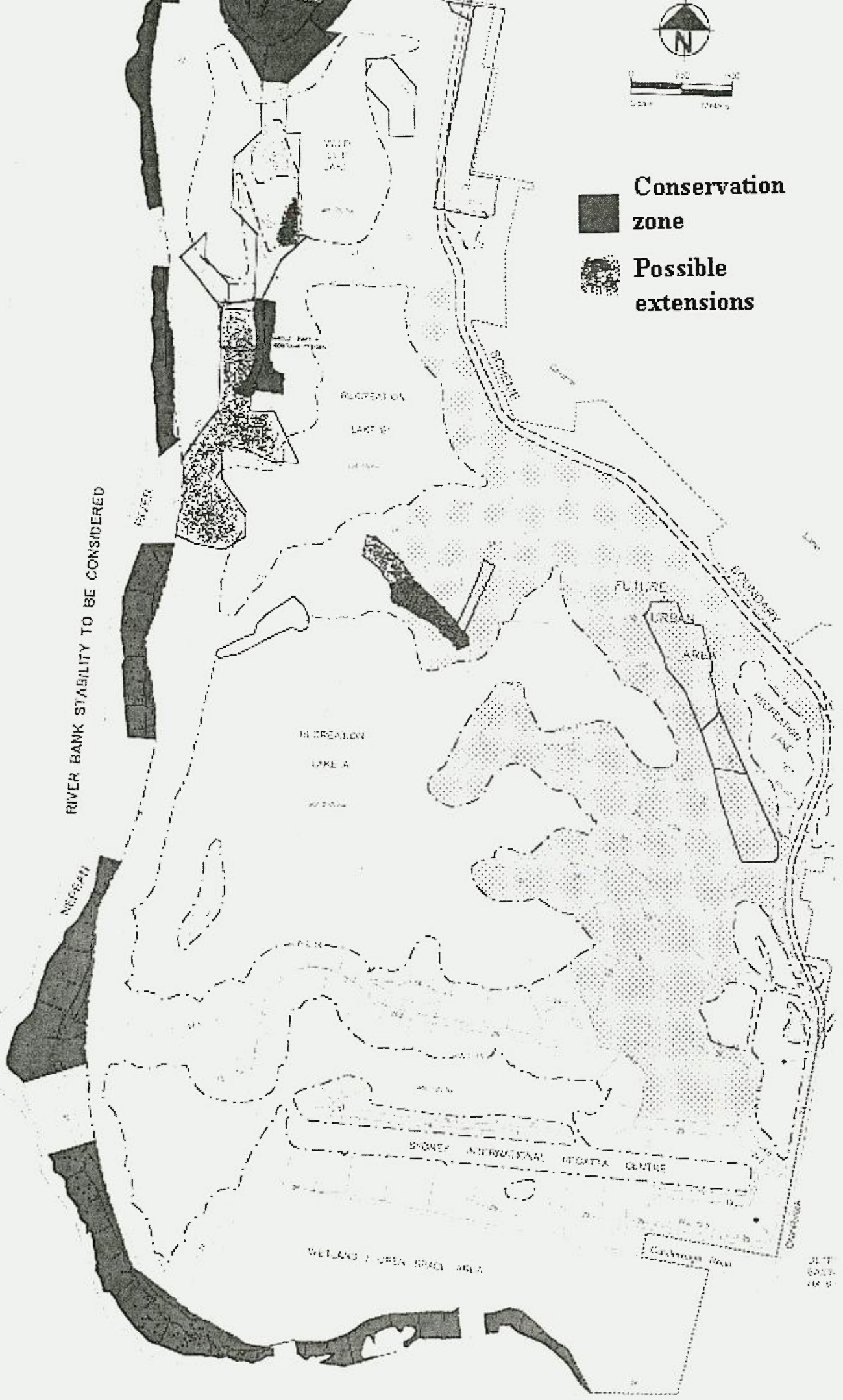
31.1
6/2/97
1/1/98

Figure 5. Proposed archaeological conservation zones in the DA4 area.



-  Conservation zone
-  Possible extensions

RIVER BANK STABILITY TO BE CONSIDERED



31 T
EAST
10 5

CONCLUSION

The review of archaeological data undertaken for this DA4 study suggests that several key areas have potential to contain sub-surface evidence for prehistoric Aboriginal occupation.

The Nepean River acted as a focus for Aboriginal economic and social activity in the Penrith Lakes area, and although much of it is disturbed by European land use practices, it has the potential to contain sites. It is also important from an aesthetic viewpoint, as well as from the viewpoint of Aboriginal heritage. Given the greater impact of flooding on the margins of the river, it is possible that artifacts may be buried at depth in their primary depositional context, probably the only area in the DA4 where this is likely to occur.

The site complex at Smith Street is clearly a major archaeological resource. The poor surface visibility restricts the opportunities for understanding the spatial and temporal variability present, but it seems likely this high ground above the flood plain has acted as a camping area for Aboriginal people perhaps extending back to the Pleistocene. Given the historical importance of this area to the Darug people, and the opportunities for developing an Aboriginal cultural precinct in the area, it is essential that this complex should be protected.

The intensive use of the DA4 area for farming since the early nineteenth century has meant that much of the flood plain is highly disturbed at least near the surface, limiting the possibility of identifying undisturbed archaeological sites. The evidence from the DA2 and DA3 archaeological studies suggest that low densities of artifacts will be found across the entire area, with greater concentrations likely to occur on high ground and close to the waterways. In this regard, the remnants of Cranebrook Creek have some potential for retaining archaeological evidence. The proposed European cultural heritage zone, which includes part of Cranebrook Creek, could perhaps be extended to include a larger proportion of the creek banks and adjoining ground.

National Parks and Wildlife have expressed the view that samples of the different geomorphic units, with potentially different archaeological histories, should be preserved. If the three major zones, Nepean River, Smith Street, and part of Cranebrook Creek near the European Cultural Heritage precinct, are conserved, then samples of units D, E, F, H, I will be conserved as well. Only unit G would not be represented, and it may be possible to include a small segment of this unit by linking the Nepean River conservation zone with the Smith Street conservation zone.

The importance of ongoing Aboriginal involvement in the Penrith Lakes project as it extends into the DA4 area cannot be understated. It is essential that the Aboriginal community be involved in monitoring during surface stripping, and in follow-up work where known sites will be impacted or where new artifact scatters have been identified.

RECOMMENDATIONS

Based on the archaeological, geomorphic and Aboriginal cultural heritage data reviewed for this report, I would make the following recommendations:

1. Part of the eastern bank of the Nepean River should be set aside as an archaeological conservation zone, extending eastwards of the river.
2. The region south of Smith Street contains several major archaeological sites, as well as being close to significant archaeological and historically important areas for the local Darug people. This area should also be set aside as a conservation zone, and has the highest priority.
3. A proportion of Cranebrook Creek and its tributaries should be set aside as a conservation zone. This could be done in association with other European conservation areas planned for Hadley Park and Nepean Park.
4. Aboriginal monitoring during surface stripping should continue as a routine part of the development.
5. Wherever possible, known Aboriginal sites should be protected. This is particularly important in the case of the Smith Street complex. Consent to destroy must be sought from National Parks and Wildlife Service if any sites are to be impacted by the development in the DA4 area.
6. The establishment of an Aboriginal Cultural Centre should be considered and supported, and an appropriate location would seem to be on or near the Smith Street site complex.

ACKNOWLEDGEMENTS

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Dominique Ducros, Val Smith, Colin Gale (DTAC), and Sergio Mantella-Galli (PLDC).

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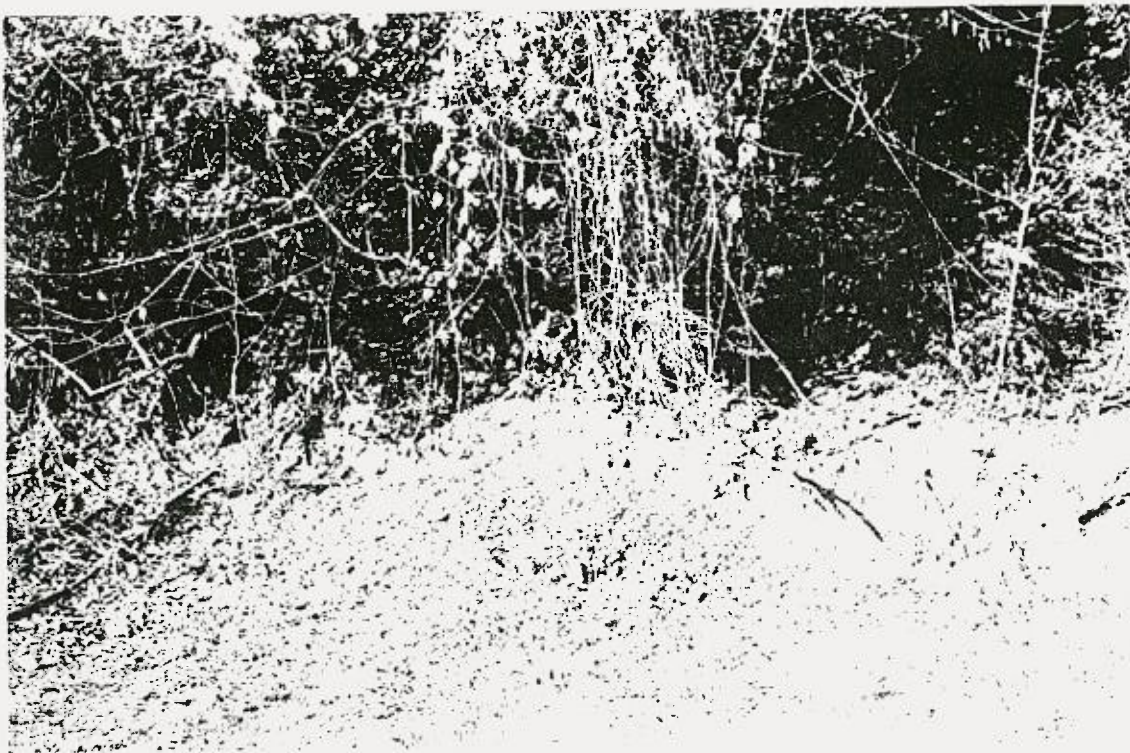
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APPENDIX 1. Photographic record of field work



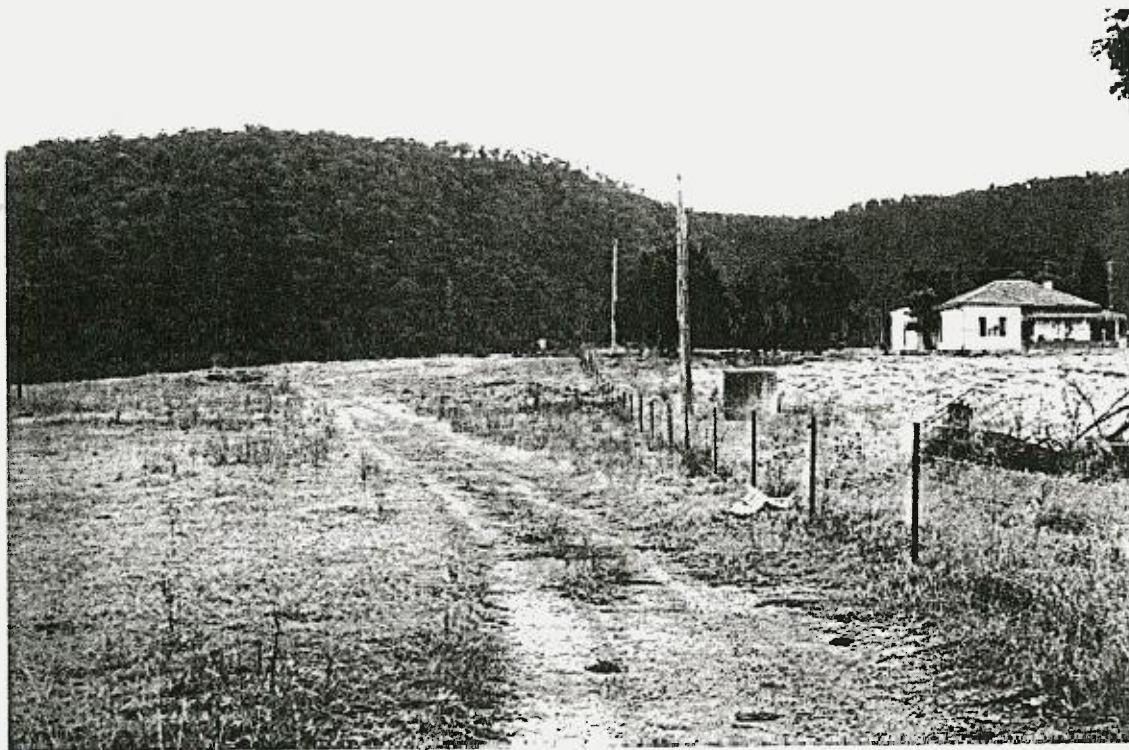
Photograph 1. Site PI/5, adjacent to a gate on a track close to the river.



Photograph 2. Artifacts exposed on the eastern edge of the track at PI/5.



Photograph 3. Track running south from Smith Street, with exposed artifacts.



Photograph 4. Sites PL/7 (foreground) and PL/8 (near house).



Photograph 5. Colin Gale (DTAC) pointing to an edge-ground hatchet head.



Photograph 6. Colin Gale (DTAC) inspecting artifacts at PL/7.

DA 4 MANAGEMENT STUDY
HERITAGE ASSESSMENT

PENRITH LAKES SCHEME AREA
CASTLEREAGH
NSW

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For

The Penrith Lakes Development Corporation

DRAFT FINAL REPORT

August 1997

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LIST OF FIGURES

Figure 1 Location Of DA 4 study area, and RES Sites

Figure 2 Structure Plan for the Penrith Lakes Scheme

Figure 3 Illustration showing Mill at Parramatta, 1820

Figure 4 Plan of Portion 55 accompanying PA 27707

Figure 5 Mass Concrete/Pise Construction (diagram and comments by Dr Lewis)

NSW HERITAGE DATABASE FORMS (Inventory Sheets)

1.0 INTRODUCTION

1.1 The client

The client for this study is the Penrith Lakes Development Corporation (PLDC) Ltd. at Castlereagh Road, Cranebrook.

1.2 Liaison

The Project Supervisor is Mr. Sergio Mantella-Galli, Engineer-Planning, at the PLDC.

1.3 The study area

The study area is within part of the Penrith Lakes Development Scheme at Castlereagh NSW. The area will be impacted by the next Development Application (DA 4) which is to be presented in early 1997. DA 4 will affect the area between the north-south section of Castlereagh Road and the Nepean River, encompassing parts of Portions 57 (Sheens Lane) to 42 (Smith Street). The DA 4 Area is shown on Figure 1. (All Figures are at the end of the report).

1.4 The brief

The relevant aspects of the brief are reproduced below.

Aim of the Study

- *The purpose of this study is to refine the existing understanding of the heritage significance of a selection of items identified in the Penrith Lakes Regional Environmental Study (RES) through investigation of each item's historical context, its history, and its fabric.*

- *This study will assume that the Penrith Lakes RES, 1983, [sic.] is correct and true unless additional information uncovered by this study proves otherwise. This study should comment on the adequacy of the heritage aspects of the RES in the light of the current state of knowledge.*

- *The Study will analyse documentary and physical evidence to determine the nature, extent and degree of significance of the remaining heritage items, and make recommendations about the management of these items in accordance with the significance.*

- *This Study will be in the form of a management strategy and will form the base document relating to heritage issues arising out of the Corporation's next development application. The study is to clearly identify the procedures PLDC is to implement for final recording of items to be removed.*

Procedure

The Penrith Lakes Regional Environmental Study's "assessment of degree of significance" and "conservation policy options" is to be reviewed in line with current standards.

The current standards are those as set out in:

- The NSW Heritage Inventory Manual - Draft of Selected Documents, February 1996 or later; and
- The State Heritage Inventory Guidelines
- Archaeological Assessment Guidelines

The Study will assume that the RES is correct and true unless new information not available at the time surfaces from this Study that would significantly change the view held in the RES.

The review is to be performed by further investigation of the item's significance, assessment of significance and advise on any possible further studies. The scope of this study will be limited to a review of previous reports and other existing documentary evidence, analysis of land title information supplied by PLDC and site visit.

A NSW Heritage Database Form is to be completed for each site.

The Corporation will supply Land Title information from the time of the grants to the present for the properties containing each site.

Study Area

The study would encompass all heritage items in areas yet to be developed and are as follows:

Structures

3	Vine cottage complex
7	Cottage & outbuildings
8	'Georgian' cottage and outbuildings
9	Landers Inn & stables
13	Jackson's house
14	Weatherboard cottage
16	Slab & weatherboard cottage
21	Penrith quarry complex
22	Federation cottage
23	Parker's homestead
25	Federation cottage
27	Bungalow
28	Bungalow
29	Farm complex

Ruins and sites of former structures

34	Lee's house
35	Kerry Lodge
37	Pise house ruin
38	Allen's Mill
42	Jackson's Mill
46	Inn Site
47	Early Slab cottage
48	Minnaville (School Site on Nepean Park)
49	Fraser's House

Roads and lanes/river fords/landscape features

50	Castlereagh Road
58	Purcell's Lane
59	Jackson's Lane
60	Long's Lane Ford
61	Sheen's Lane Ford
62	Jackson's Ford
63	Single's Ford
64	Nepean River Bank
65	Cranebrook Creek

1.5 Limitations

Those sites within the DA 4 area which are Scheduled for retention, or for which separate individual assessments have been prepared, are not included in the present re-evaluation.

Access was not gained to all of the sites listed in the brief. Access to sites RES 23 and RES 63 was denied by the property occupants. Access to RES 61 was prevented by the terrain. Site RES 49 could not be located during the site visit.

1.6 The study team

Siobhán Lavelle, historical archaeologist and heritage consultant is the Principal Consultant. She engaged Anne Bickford, historical archaeologist and heritage consultant to assist her with this project. The Nepean District Historical Archaeology Group (NDHAG) assisted in the research, site survey, and site recording. Land Title Searches were supplied for the Portions in the study area by the PLDC.

1.7 Authorship

This report has been written by Anne Bickford and Siobhán Lavelle. The Inventory Sheets also include information compiled by members of the NDHAG in particular George Gyford, Hazel Fraser and Amanda O'Toole.

1.8 Definitions

Definitions used within this report are:

House / cottage: This refers to a building built as a stone, brick, or timber residence.

Building: This refers to a standing structure such as a house, shed, dairy, barn, garage.

Site: This refers to a place. It can be a building or collection of buildings, or a homestead.

Archaeological site: This refers to the remains in the ground of a demolished building or structure (such as a fence or cow bails). Its significance can be elaborated by archaeological excavation.

Homestead: This refers to the house and garden complex including dependent structures (ie. garage, outside toilet, dog kennels, water tank).

Outbuildings: This refers to buildings of a functional nature which relate to the working of the property (ie. stable, barn, sheds, dairy).

2.0 THE EUROPEAN HERITAGE SURVEY OF 1981 AND THE 1984 RES

The Penrith Lakes Scheme Development is implemented under the provisions of *Sydney Regional Environmental Plan No. 11 - Penrith Lakes Scheme*. Prior to the making of this plan a Regional Environmental Study was completed. This study, published as *Penrith Lakes Scheme: Regional Environmental Study*, Department of Environment and Planning, 1984, included the research and inventory of European Heritage sites and items within the scheme area¹.

A specialist report on this subject was completed by F. Bently and J.M. Birmingham in 1981 and was subsequently issued as a 'working paper' for the Penrith Lakes Scheme, *Penrith Lakes Scheme Regional Environmental Study: History of European Settlement*, Department of Environment and Planning, 1983. The Bently/Birmingham report identified 75 heritage items or sites, within or immediately adjacent to the scheme area, including existing buildings, ruins, sites of former buildings, roads, river fords and landscape features. The Bently/Birmingham report gave each site a reference number. The subsequent RES document gave each site a different reference number. The RES numbers are used for the items included in this report and in the inventory.

The 1984 RES document also examined the degree of significance identified for the inventory items at that time against the technical requirements of extraction and rehabilitation for the Scheme. In addition to five major heritage items, two further items were also recommended for retention as part of a heritage precinct to be established at Upper Castlereagh.

The subsequent *Sydney Regional Environmental Plan No. 11 - Penrith Lakes Scheme.*, listed the following items for retention in Schedule 3 (Heritage Items):

- Hadley Park
- Nepean Park
- McCarthy's Cemetery
- Upper Castlereagh Methodist Church and Hall
- Upper Castlereagh School and Residence
- Methodist Cemetery

Unscheduled items have been or will be removed as the quarrying operations and Lakes Scheme rehabilitation are completed. Under an existing arrangement between the Penrith Lakes Development Corporation and the Nepean District Historical Archaeology Group (NDHAG), the NDHAG have previously completed reports on a number of sites or items removed during the development of the Lakes Scheme. In 1995 the Corporation agreed with the Heritage Branch of the DUAP (now the Heritage Office) that for a number of the sites remaining within the Scheme area a professional consultant would be involved with the NDHAG in completing heritage and archaeological site assessments.

¹ Henceforth this report is referred to as *Penrith Lakes RES*, 1984.

3.0 HISTORIC OVERVIEW OF UPPER CASTLEREAGH

From the earliest years of the European colonisation and settlement of NSW, the fertile alluvial soils alongside the Hawkesbury - Nepean River enabled farmers to grow a succession of crops from wheat, maize, and vegetables to turf. The Nepean River is now found in a channel cut about 9 metres below the level of the adjoining river terraces, and the underlying soils and geology of the area directly influenced both the earlier agricultural uses and the current extractive industry focussed on the ancient river gravel beds.

The first European to come to the banks of the Nepean was Captain Watkin Tench, who "discovered" the river in June 1789. The Nepean and the Hawkesbury were subsequently found to be the same river, although the separate names were retained above and below the junction with the Grose River. In the 1790s the deep bend of the Nepean River immediately north of Penrith and later known as "Bird's Eye Corner" lured many squatters to unofficially farm the fertile alluvial banks. From 1803 Governor King began issuing land grants which confirmed these early holdings, most farms being between 40 and 100 acres.

When the area was being surveyed by James Meehan, the north-south line of Castlereagh Road was established as the boundary between the first line of grants which fronted the Nepean and a parallel line of grants extending north from "Bird's Eye Corner". In the early nineteenth century access to Castlereagh, Upper Castlereagh and Cranebrook, came from the north via Richmond, and not from present day Penrith.

The Hawkesbury - Nepean River was frequently subject to flooding, usually in the Autumn. Floods affected the Hawkesbury in 1794, 1795, 1800 and 1801. Although the Castlereagh valley was less subject to floods than the broader and fertile floodplain of the Hawkesbury, after the issue of their formal land grants, the settlers of the Castlereagh area had their first experience of a major flood in 1806.

In 1810 and 1815 Governor Lachlan Macquarie visited the Castlereagh district. In 1810 he described the locality of Castlereagh as follows:

*...we passed through a long extensive chain of farms along the Nepean belonging to Appledore, Westmore, Collet, Stanyard, Pickering, Field, Stephen Smith, Jones, Cheshire, Harris, Guy, Wm. Cheshire, Landrine, Stockfish, Oldwright, Ryan, Griffith, Kennedy &c. &c being the front line of farms on this river. They are all good farms, good soil and well cultivated, but they are liable to be flooded in general when this river overflows its banks, and consequently the houses of the settlers are very mean and paltry.*²

During his district tours in 1810 Governor Macquarie also directed the establishment of new townships on higher ground less liable to flooding. These were the "Macquarie Towns" of the Hawkesbury, namely Windsor, Richmond,

²L Macquarie, *Journal of His Tours in New South Wales and Van Diemens Land 1810-1822*, Library of Australian History and Library Council of NSW, Sydney, 1979, p 22-23.

Pitt-Town, Wilberforce and Castlereagh, which was the first official town on the Nepean. Castlereagh was laid out on a ridge high above the flood plain. Although the town was surveyed and a church, burial ground, schoolhouse and other features were established, the lack of water meant that the town remained largely undeveloped, and was eventually abandoned. Even after more calamitous floods in 1811 and 1816 most grantees and settlers stayed on their farms, still obstinately refusing to move to the Castlereagh township.

The highest flood experienced during the nineteenth century occurred in 1867 when all of the Castlereagh/Cranebrook river terraces and floodplain were totally submerged. Several accounts confirm that only the upper sections of two storey buildings (such as "Nepean Park" and "Hadley Park") remained partially above the flood level. Floods have also continued throughout the twentieth century. Even after the completion of Warragamba Dam in 1960 which has assisted in the control of water flow in the Nepean, two of the highest twentieth century floods occurred in 1961 and 1964.

Although Old Castlereagh did not develop as a prosperous town, other embryonic villages had developed by the mid-nineteenth century adjacent to the major district transport routes. This included the small village of Upper Castlereagh which developed around the early Wesleyan Methodist Chapel and burial ground. Up to 1850 the land ownership sequences for the study indicate the subdivision of some of the early grants with sale from original grantees to new settlers or leasing to tenant farmers, and the consolidation and expansion of family holdings by those successful farming families, particularly those able to weather the drought and economic depression of the 1840s.

The extension of the metropolitan railway line from Blacktown to Penrith was completed in 1863. As Penrith was a major depot the railway provided an impetus for town growth. In 1871, Penrith was proclaimed a Municipality and a piped water supply was provided to the township in 1892. In 1895, the Municipality of Castlereagh was proclaimed. The former Castlereagh Council Chambers building is still extant north of the present study area. In 1949 the municipalities of Penrith, Castlereagh, St Marys and part of Nepean Shire, amalgamated. In 1959, the municipality was incorporated as a City.

During the late nineteenth century the railway at Penrith provided an important link to the Sydney market, especially for agricultural produce such as fruit and vegetables and, after the development of refrigeration (1880s), dairying. From the 1860s onward this brought a new phase of subdivision and development to the Upper Castlereagh area, although this was probably curtailed by the 1890s Depression and the Great War. The expansion of dairying to serve the post-WWI Sydney market saw the establishment of a centralised Penrith Dairy Co-operative in 1923.

In the rest of the twentieth century only relatively minor infill appears to have occurred in the inter-war and post WW2 period. This included the resumption of some land portions for Closer Settlement.

Gravel extraction which had commenced at Emu Plains in the 1880s gradually expanded during the early twentieth century, with leases taken out on parts of some properties. The Castlereagh Council set up their own gravel crusher to provide a source of road metal. From the 1960s onwards major land holdings have been gradually acquired by gravel companies. This aggregation of land holdings awaiting use by the extractive industry has prevented the more modern subdivision which has characterised the expansion of the urban areas around Penrith.

4.0 METHODOLOGY FOR THE SURVEY AND RE-EVALUATION

4.1 Research

The only new research for this report was Land Title information. The PLDC supplied land titles for some of the sites, and the NDHAG researched and supplied others. As stated in the brief, no new documentary research was carried out for this report.

4.2 Site Survey and Assessment

The site survey was supervised by Siobhán Lavelle. Arrangements were made with the owners, occupiers and tenants of the sites for an inspection at a mutually convenient time. Field inspections were carried out by Siobhán Lavelle, Anne Bickford and the NDHAG jointly and separately. Notes and sketch plans were made by the NDHAG and Lavelle. Bickford and Lavelle took notes and photographs for the Heritage Office Heritage Database forms.

Section 5.0 following summarises the results of the completed fieldwork. The NSW database forms completed for the sites listed in the brief are included at the end of the report. There are 34 Inventory Sheets/database forms.

Site Locations are shown on Figure 1 (All Figures occur at the end of the report).

5.0 RESULTS OF THE SITE SURVEY

5.1 Schedule of Sites Surveyed

Within the DA 4 Area (TABLE 5.1.1)

RES No.	Site Name	Date	Significance
3	Vine cottage complex	c1860s	Local
7	Cottage and outbuildings	c1925	Local
8	Cottage and outbuildings	c1880	Local
9	Landers Inn & Stables	1840s-60s	Regional/State
13	Jackson's House (Site Only)	not known	NONE
14	Weatherboard cottage	1890s	Local
16	Slab & Weatherboard Cottage (reputedly "Puddledock")	rebuild	Local
21	Penrith quarry complex	1940s	Regional
22	Federation cottage	c1890-1915	Local
25	Federation cottage	c1910	Local
27	Bungalow	1920s-30s	Local
28	Bungalow	c1930	Local
29	Farm complex/ Mass Concrete House (3)	1902	Local
42	Jackson's Mill RES Location incorrect - probably at Purcell's Lane	c1830s	Regional
46	Inn Site	not known	Local
47	Slab Cottage Site	not known	NONE
48	School Site Nepean Park (erroneous "Minnville")	c1830s	Local
50	Castlereagh Road	1800 - 1810	Regional
58	Purcell's Lane	1830s	Local
59	Jackson's Lane	1800 - 1810	Local
62	Jackson's Lane Ford	not known	Local
64	Nepean River Bank	N/A	State
65	Cranebrook Creek	N/A	Local

Additional Sites Noted and Surveyed within the DA 4 Area (TABLE 5.1.2)

RES No.	Site Name	Date	Significance
Not incl.	Mass Concrete House (2), 95 Castlereagh Road / 43 Smith Street	1902	Regional
Not incl.	Cottage, 143 Castlereagh Road	c1880s	Local

Sites Surveyed Outside the DA 4 Area (TABLE 5.1.3)

RES No.	Site Name	Date	Significance
34	Lee's House (Site Only - part disturbed)	c1870s	Local
35	Kerry Lodge (Site Only - part disturbed)	c1850	Local
37	Mass Concrete House (Ruin) (formerly described as Pise House)	c1900-1910	Local
38	Allen's Mill	1830s	Regional
49	Fraser's house (Not located during survey)	pre-1860	Regional
60	Long's Lane Ford	unknown	Local
61	Sheen's Lane Ford (Not located during survey)	unknown	Local

Sites For which Access was Refused (TABLE 5.1.4)

RES No.	Site Name	Date	Significance
23	Parker's homestead	c1910	Local
63	Single's Ford	unknown	Local

5.2 New Sites Added To The Survey

Two sites not included in the previous Bently report were surveyed as part of this project. They are number 95 Castlereagh Road /43 Smith Street, and number 143 Castlereagh Road. 95 Castlereagh Road is at the northern edge of the PLDC area. It is a mass concrete house of 1902 (See inventory sheet for details).

Number 143 Castlereagh Road must have been inadvertently excluded from the previous Bently survey as it is clearly visible on Castlereagh Road (See inventory sheet for details).

5.3 Summary Analysis of Sites Surveyed In Relation To Chronology (TABLE 5.3.1)

Period/ Dates	No. of Sites Identified	Site Types
Geological	2	Nepean River and Cranebrook Creek
Old Colonial 1788- c.1840	8	Road alignments Building Complex Archaeological
Victorian Period c.1840-c.1890	5	Building Archaeological
Federation Period c.1890 -c.1915	7	Building
Inter-war Period c.1915 -c.1940	3	Building
Post 1940s	1	Buildings/Quarry Plant
Rebuilt or Period Unknown	8	Building Archaeological

Total number of sites for analysis = 34.

5.4 Summary Analysis of Sites Surveyed In Relation To Construction Methods (TABLE 5.4.1)

Construction/ Material	No. of Buildings
Sandstone	1 (forms part of Landers' Inn Complex *)
Timber	2 (one of reused materials)
Brick	8 (includes part of Landers' Inn Complex *)
Mass Concrete	3
Concrete Blocks	2
Unknown	9 (Archaeological Sites)
Fibro / Steel	1 (Quarry Complex)
N/A	9 (Landscape Features - Roads, Fords, River)

Total = 35 *.

5.5 Archaeological Sites

5.5.1 Early Colonial And Victorian Archaeological Sites

Historical documents reveal that most of the Castlereagh land between the Nepean River and Castlereagh Road was granted to farmers by Governor King in 1803. Therefore there must have been homesteads on the land from that very early period. Hadley Park is the only securely identified pre-1820 site known in the area.

Surviving sites of Georgian and early Victorian homesteads would be very historically and archaeologically significant. As yet, however, they cannot be securely located. They are not visible because:

- 1) They were washed away in the many floods which covered the area
- 2) They have been covered over by new topsoils from the flooding of the river
- 3) They lie under the existing homesteads. It is common on country properties to build the new main house beside or on the site of the earlier one. This is likely to be the case also at Minnaville and Nepean Park, and has potentially been identified for the Kennedy Farm on Portion 42 which may be in the vicinity of the 1902 concrete pise house at 95 Castlereagh Road.

The sources reviewed for this study have identified a number of additional potential archaeological sites which may survive on properties within the DA 4 area. They include:

Portion 42 - Kennedy's Farm (noted above) - see inventory sheet

Portion 44 - Herbert Family Homestead, "Puddledock"
(refer inventory sheet for RES 16)

Portion 46 - Additional house site (refer inventory sheet RES 7)
Documents also indicate a house site on the southern part of this portion which was in existence during the 1830s³. It is also shown on the 1873 road plan.

Portion 52 - Additional house site reported by occupants of present building (refer inventory sheet for RES 25).

Portion 55 - The Land title information indicates a mill as being in existence in the 1830s and situated at the end of Purcell's Lane. Mills are discussed below. (Also refer to the inventory sheet for RES 42).

³ Appears to be the house referred to by Toby Ryan as being rented by his parents in the 1830s and "... a nice new place, five rooms, kitchen, stables, shed, and a good turn out for cattle". J T Ryan, *Reminiscences of Australia*, Facsimile edition, Nepean Family History Society, 1982, p 76.

Some additional archaeological sites have also been surveyed and inventoried for example Lee's House (RES 34) and Kerry Lodge (RES 35). These sites have been disturbed and are not of any archaeological significance.

For comment on other individual archaeological sites reference should also be made to the individual inventory sheets.

Some additional early Colonial era archaeological sites may also exist within the Scheme Land outside the present DA 4 area. These sites include:

Fraser's House - not able to be located during the field survey for this study
Fulton's Parsonage - not included in present study brief ⁴

Both of these sites are in the area of the escarpment and relate to the Macquarie town of Castlereagh. If they survive intact they would be highly significant.

The management of these potential archaeological sites is discussed further in part 7.3.7 of this report.

5.5.2 Mills

The sites of two water mills were listed in the Brief - Jackson's Mill at the end of Jackson's Lane (RES 42) and Allen's Mill at the end of Long's Lane (RES 38). These sites are close to the Nepean River, and as the high bank is not affected by the quarrying to be carried out under DA 4, the sites should be able to be retained undisturbed. No physical evidence for either of these mills was located during the field survey completed for this study.

The illustration included as Figure 3 is Samuel Marsden's water mill near Parramatta in 1820. It provides an indication of the original appearance of these structures, showing a timber mill building on stone footings, the tail race, and the miller's cottage close to the mill above the river ⁵.

As industrial archaeological sites dating from the 1830s, if they could be identified these mills would be of high significance. Extensive archaeological test excavation may reveal remains of these structures, but would not be warranted unless the sites were directly threatened by quarrying or other development.

⁴ Some discussion of this site included in a previous report by the NDHAG and Lavelle. Refer to: S. Lavelle, and the Nepean District Historical Archaeology Group, *Historical Archaeological Assessment, Site 32, Penrith Lakes Scheme Area, Cranebrook, NSW* report prepared for the Penrith Lakes Development Corporation, December, 1995.

⁵ Remains of a similar early mill were revealed at Blaxland's Crossing, Wallacia, by the fall in the levels of the Nepean River occasioned by the drought during the early 1980s. These remains were recorded by students from Sydney University. See photograph included in: J Birmingham, I Jack, D Jeans, *Industrial Archaeology in Australia: Rural Industry*, 1983. p13.

A third mill was revealed in the Land Title search for Portion 55, John Pickering's 80 acre grant. As discussed on the inventory sheet for RES 42, the previous study by Bently may have confused this mill with the mill described as RES 42. An 1836 conveyance (Book K No. 221) lists a road along the southern boundary of the Portion leading to a water, grist, or corn mill, with a dam, mill streams, and other structures. This road is now known as Purcell's Lane. A plan of the grant is contained in the Land Title documents (PA 27707). This plan shows that the mill was at the extension of Purcell Lane in a straight line to the river (ie. not at the site of Site 21, the modern Quarry Complex). The plan also shows that the river has changed its course at this location, moving to the east. The old and new location are shown on the plan, surveyed in August 1925. A copy of the plan being referred to is included as Figure 4.

5.6 Assessment of Significance

During the field survey which documented the identified items, brief statements of significance for each item were also drafted. This information appears on the individual inventory sheets. A number of categories or types of significance may be applied when attempting to determine the heritage value of an individual item. The range of heritage values assessed in the present investigation included the categories of historic, social, aesthetic, technical/research, and the comparative values of rarity and representativeness in accordance with the *NSW Heritage Manual*.

The application of such categories has become accepted practice in determining the value of individual heritage items. The preparation of statements of significance for the items in the study area included consideration of the known historical context, the existence of other heritage identifications, and consideration of the local context and present condition of the item.

The significance of each item assessed by the present study has been summarised within Table 5.1.1 included earlier in this report. The majority of the items have been assessed as being of Local significance. For example, this is the case for 24 out of the 34 items included in this report. Exceptions are:

State Significance - Nepean River (RES 64)

Regional/State Significance - Landers Inn Complex (RES 9)

Regional Significance - Castlereagh Road Alignment (RES 50)

Regional Significance - Quarry Complex (RES 21)

Regional Significance - Mills: Allens, Jacksons, Portion 55 (RES 38 & 42)
(if sites can be identified and are intact then potentially of State significance)

Regional Significance - Fraser's House (RES 49)
(if site can be identified and is intact then potentially of State significance)

Regional Significance - Mass Concrete House and potential early archaeological site
at 95 Castlereagh Road (No RES Number)

6.0 STATUTORY ISSUES

6.1 The Penrith Lakes Scheme and SREP No. 11

The Penrith Lakes Scheme Development is implemented under the provisions of *Sydney Regional Environmental Plan No. 11 - Penrith Lakes Scheme*, which sets the framework for design, quarrying and future uses.

The 1984 Regional Environmental Study examined the assessed degree of significance for each of the items identified in the European Heritage 'working paper' report of 1983 against the technical requirements of extraction and rehabilitation for the Scheme. As a result of this examination the RES stated that:

"Due to the technical requirements of extraction and rehabilitation, only a small number of heritage sites identified for their great local significance and preferred retention have been retained in the final scheme design".

Sydney Regional Environmental Plan No. 11 - Penrith Lakes Scheme., identified and listed the following Heritage Items for retention in Schedule 3:

- Hadley Park
- Nepean Park
- McCarthy's Cemetery
- Upper Castlereagh Methodist Church and Hall
- Upper Castlereagh School and Residence
- Methodist Cemetery

In fact the sites which were Scheduled for retention may all be considered of State or National significance under the assessment criteria and thresholds which have been developed since the completion of the original survey work.

For those sites which were not retained by the scheme design, the RES stated: *"Further archaeological investigation would also be required to investigate sites before they were removed or relocated"* ⁶.

The *Sydney Regional Environmental Plan No. 11 - Penrith Lakes Scheme.*, lists the following objectives in Section 2:

" 2. (1) The aims and objectives of this plan are to permit the implementation of the Penrith Lakes Scheme.

(2) Without limiting the generality of subclause (1), the particular aims of this plan are -

(a) to provide a development control process establishing environmental and technical matters which must be taken into account in implementing the Penrith Lakes Scheme in order to protect the environment;

(b) to identify and protect items of the environmental heritage;

(c) to identify land which may be rezoned for urban purposes; and

(d) to permit interim development in order to prevent the sterilisation of land to which this land applies during implementation of the Penrith Lakes Scheme."

⁶ *Penrith Lakes RES* 1984, Section 11.2, esp. p 11-10 to 11-12.

Sydney Regional Environmental Plan No. 11 - Penrith Lakes Scheme., also includes the following clause:

"4. In the event of an inconsistency between this plan and any other environmental planning instrument (whether made before, on or after the day on which this plan is made), this plan shall prevail to the extent of the inconsistency."

The Consent Authority for the Scheme is the Minister for Urban Affairs and Planning. The wide range of matters to be considered by the consent authority when determining development applications which implement the Penrith Lakes Scheme are also specifically listed in SREP No. 11, in "Part 2 - Development Control".

It is understood that existing arrangements under the Deed of Agreement between the Government and the Penrith Lakes Development Corporation allow for the possibility of alteration to the Scheme design and construction. The fundamental principle is that the party responsible for seeking design amendment is responsible for any consequential additional costs. Such additional costs would be likely to include detailed redesign studies for the Scheme and possible alterations to existing components or proposed infrastructure; as well as any specific costs which might be associated the possible retention of presently unscheduled items.

6.2 The New South Wales Heritage Act, 1977

The Heritage Act, 1977, was enacted to ensure that the environmental heritage of New South Wales would be adequately identified and conserved. The Act established the Heritage Council of New South Wales, which makes recommendations to the Minister on the implementation of the Heritage Act.

The Heritage Act includes various provisions for protecting identified heritage items. These include various conservation instruments (or "orders") and the "relics" provisions. The Heritage Act provides automatic statutory protection for historical archaeological "relics" which are defined as:

" any object, deposit or material evidence relating to the settlement of the area that comprises NSW, not being Aboriginal settlement and which is fifty or more years old" ⁷

Sections 139-145 prevent the excavation or disturbance of land for the discovering, exposing or moving of archaeological relics except in accordance with an approved excavation permit. Thus, the disturbance or excavation of land containing, or likely to contain, relics may only take place after an excavation permit has been granted by the Heritage Council or its delegate. In addition, Section 146 of the Act requires that if a relic is discovered (or located) the Heritage Council must be notified of its existence as soon as possible.

⁷ NSW Heritage Act, 1977, no. 136, s.4(1).

6.3 Penrith City Council

An Heritage Study of the City of Penrith was completed in 1986. This study formed the basis of Council's *Environmental Heritage Conservation Local Environmental Plan*, gazetted 20th December, 1991. The Penrith City Council, *Environmental Heritage Conservation Local Environmental Plan*, includes the following provisions:

" PART 2 — SPECIAL PROVISIONS

Heritage Items

8. (1) *A person must not, in respect of a building, work, tree, relic or place that is a heritage item:*

- (a) demolish or alter the building or work;*
- (b) damage or move the relic;*
- (c) excavate for the purpose of exposing the relic;*
- (d) damage or despoil the place or tree;*
- (e) erect a building on, or subdivide the land on which the building, work or relic is situated or that comprises the place; or*
- (f) damage any tree on land on which the building, work or relic is situated or on the land which comprises the place,*
except with the consent of Council.

8.(2) *An applicant for consent required by this clause must lodge with the Council a statement which includes reference to the following matters:*

- (a) the significance of the item as a heritage item;*
- (b) the extent to which the proposal would affect the heritage significance of the item and its site;*
- (c) whether any stylistic, horticultural, or archaeological features of the item or its site should be retained;*
- (d) whether the item constitutes a danger to the users or occupiers of that item or to the public;*
- (e) whether the permanent conservation of the building or work is considered necessary;*
- (f) the probability of the building or work being incapable of reasonable or economic use.*

8.(3) *The Council must, in determining an application required by this clause, take into consideration the matters listed in sub-clause (2).*

Development in the vicinity of heritage items

9. *The Council must not grant consent to an application to carry out development on land in the vicinity of a heritage item unless it has made an assessment of the effect the carrying out of the development will have on the heritage significance of the item and its setting. "*

6.3.1 Items included in Schedule 2 of the Penrith LEP

With a few exceptions, items situated within the Penrith Lakes Scheme Area were generally not included in the LEP, because they were subject to separate planning considerations. Clause 4 of the LEP describes the relationship of the LEP to other planning instruments, including SREP No. 11, and states:

"4. (2) In the event of an inconsistency between the plan and the Sydney Regional Environmental Plan No. 11 - Penrith Lakes Scheme., or Sydney Regional Environmental Plan No. 13- Mulgoa Valley., the regional environmental plan shall prevail to the extent of the inconsistency."

Nevertheless the following items included in the present study are included in Schedule 2:

C5	Victorian Farmhouse	Portion 42 (RES 29)
C6	Ruins of Stone Stables	Portion 43 (RES 9)
C7	Slab cottage	Pt Portion 44 (RES 16)
C13	Ruins of Pise House	Portion 280 (RES 37)
UC5	Crushing Plant	Pt Portion 54 (RES 21)
NR9	Sites of Water Mills	Various (RES 38; 42) ⁸
PC1	Nepean River	(RES 64)

The 1991 LEP listed some other items within the Lakes Scheme area. These listed items do not form part of the current study.

The 1986 Heritage Study also inventoried some additional items which were not subsequently Scheduled in the LEP. The most relevant to the present study are:

PC2	Castlereagh Road	Agnes Banks to Penrith
C1	Rural Landscape	Castlereagh Road

⁸ The inventory sheet for the 1986 Heritage Study has lifted all its information from the report by Fran Bently. It repeats the possible errors of the earlier work (which has been used without any review or further assessment). The 1986 inventory sheet is a confusing and unhelpful record.

7.0 RECOMMENDATIONS

7.0.1 General

The majority of the following recommendations were included in the first draft report prepared for this study in January 1997. In the intervening time between that report and this next version (completed in August 1997), several of the original recommendations made have been acted upon by the PLDC. Where this is the case it has been noted against the headings for specific recommendations.

7.1 Recommendations regarding the DA 4 Area

7.1.1 Individual Items of Local Significance

The assessment of significance has been outlined in Section 5.5. It has been indicated that the vast majority of the items included in the current study area are considered to be of Local significance.

All of the currently unscheduled items assessed in this study as being of Local value are not individually of such significance that they should impede the intended quarrying operations of DA 4 and the approved Structure Plan for the Penrith Lakes Scheme which is established under SREP No.11.

These items will therefore be progressively removed as the land is used for gravel extraction. The reports prepared by the NDHAG for items removed by previous Scheme phases are considered to provide an appropriate standard of documentation for those locally significant items within the Scheme. It is therefore recommended that the existing arrangement between the PLDC and the NDHAG should continue with short recording reports completed prior to the removal of individual items.

7.1.2 Individual Items of Regional Significance

The retention of the following items, which have been assessed as being of Regional significance is recommended.

- **Landers Inn Complex**

Landers Inn has been reported to have originally been a two-storey building. The ground floor of this site remains visible inside the California Bungalow outer skin. This residence shows two distinct building phases. Phase I is the old Lander's Inn of c. 1840-1860s. Phase II is the California bungalow redecoration and outer skin of the 1920s.

The stable to the south of the bungalow is an imposing sandstone building, which, partly because it is so visible beside Castlereagh Road, is of high community significance. It is of the same construction period as Landers Inn.

The two buildings thus form a significant early group, and it is for this reason that we recommend retention and conservation of both in-situ.

Two reports are needed for this group:

1) Dilapidation report on the stable with recommendations for stabilisation and/or maintenance, to be enacted as a matter of urgency. The lintel of the eastern carriage room is in danger of falling and causing a major collapse of the stables. The tenant has propped it up, but it is not safe from falling.

2) Maintenance report on the residence. Parts of the guttering need repair as rainwater is running down some walls causing a damp problem. In the brief examination of the residence dry rot was observed in one part of the old Inn cedar timbers, and termite activity in another part. A conservation maintenance plan is recommended for both the residence and the stables, so they can be best looked after (see following).

• **Castlereagh Road**

A part of the Castlereagh Road will be retained in association with the historic precinct to be established at the village of Upper Castlereagh. It is recommended that consideration be given to retaining an additional section of the road corridor at the northern end of the Scheme area. Such a section should ideally be associated with other historic features, the Landers Inn complex recommended for retention above being one obvious candidate. Retention of a section of the road at the northern end of the Scheme would provide an additional reference point from which the former alignment of the entire road could be interpreted.

• **Mass Concrete House, 95 Castlereagh Road**

Previous studies, including the Bently report 1983 and the Heritage Study 1986 have commented on the presence of 'rare' concrete pise buildings within the Scheme area, in particular the ruined house on Portion 280 (RES 37). The present survey has identified additional examples of this type of construction, suggesting that whilst it is unusual it appears to be more common than previously reported.

Advice obtained from Dr Miles Lewis⁹, an architect who is an expert on concrete buildings, indicates that the term *concrete pise* is incorrect. Although the construction technique is similar because it requires the use of formwork around the concrete, Dr Lewis advises that the correct term for this type of construction is mass concrete. Additional comments and a diagram showing the construction process were also supplied by Dr Lewis and are included as Figure 5.

⁹ Dr Miles Lewis, Associate Dean (Research) Faculty of Architecture, Building and Planning, The University of Melbourne, Parkville, Victoria. Miles Lewis inspected the concrete houses with Bickford and Lavelle in February 1997.

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

REF NO.

NAME OF ITEM Cottage and Outbuildings

PLDC INFORMATION 1984 RES No. 8 In DA4 Area Yes
 Surveyed By & Date A Bickford, S Lavelle, NDHAG, Dew '96 /January 97

LISTINGS
 Commonwealth Statutory

LOCATION / ADDRESS 387 Castlereagh Road
 SUBURB / TOWN CASTLEREAGH
 POSTCODE 2749

NSW Statutory

OTHER NAMES

ITEM TYPE Building

GROUP NAME

CURRENT USE Residence

Non Statutory

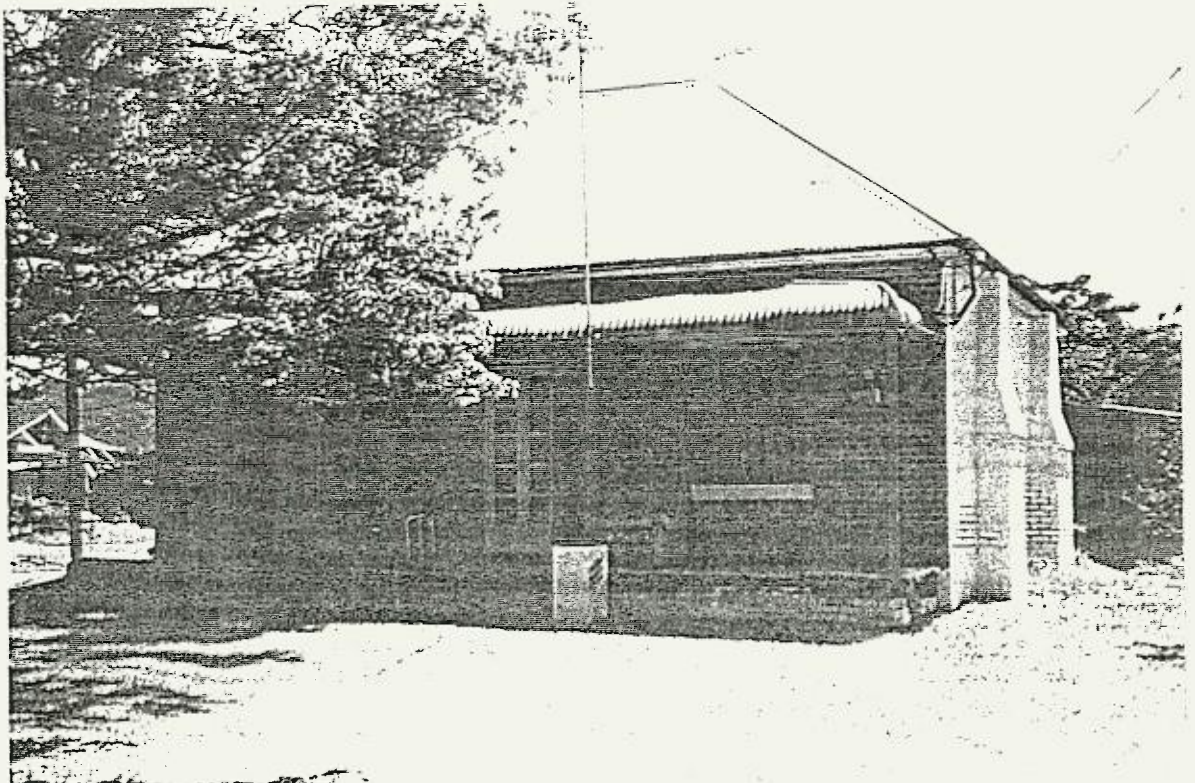
FORMER USE Residence

STATEMENT OF SIGNIFICANCE

LEVEL Local

- The extant Late Victorian cottage at this site relates to the the late nineteenth to mid twentieth century phase of local dairying, orcharding and other activities developed on land holdings in Castlereagh to serve an increasing Sydney market. The property is also associated with the twentieth century Closer Settlement phase.
- The cottage and ancillary outbuildings may be considered representative of a small mixed farm from the era of late nineteenth to early twentieth century development in this locality.

PHOTOGRAPH



FILM ROLL

NEG. NO.

DATE 12 / 1996

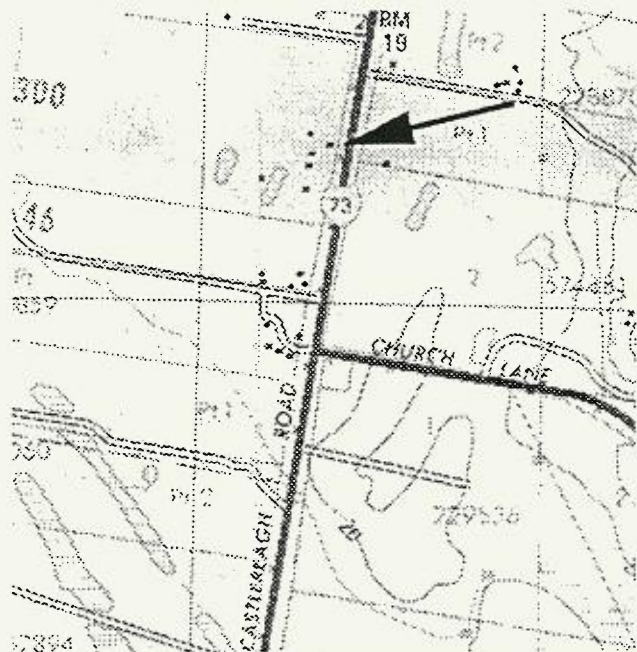
CAPTION

AUTHOR AB, SL, NDHAG

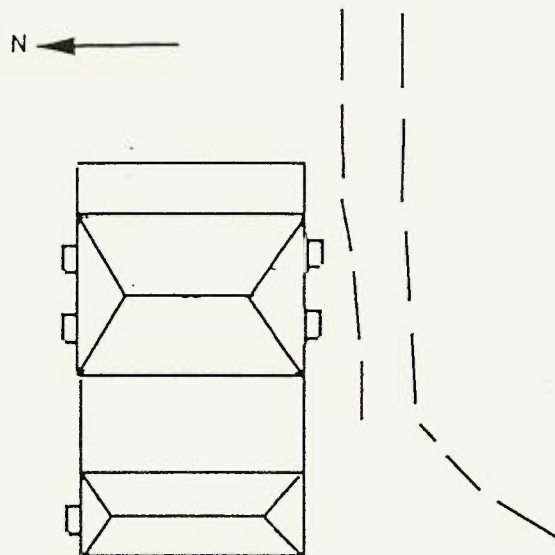
PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT	Heritage Overview / Management Study for DA 4	PLDC INFORMATION
	NAME OF ITEM Cottage and Outbuildings	1984 RES Item No. 8 In DA4 Area Yes

LOCATION PLAN



SKETCH PLAN



MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 842703
Full AMG Grid Ref: Zone 56H 284200 E 6270300 N

DESCRIPTION

Late Victorian brick cottage (Flemish bond and Colonial bond brickwork) with hipped iron roof and bullnosed verandah across the front elevation. Four external chimneys, all removed above the roof line. Rendered basecourse with chamfered edge and cast iron ventilation grates. Decorative flat arched heads (tuck pointed) above door and window openings on front and back elevation. Square fanlight over front door. Doors on front elevation replaced. Original windows are 2 x 2 pane sash, with horned stiles on top sash. Original plan central hallway with 2 rooms each side, now part modified by removal of internal wall and conversion of front window opening to door.

Separate two room outbuilding at rear, also constructed of brick with hipped iron roof. Internal evidence of former kitchen baking oven and fireplace, now sealed up with the external chimney removed. The outbuilding has been joined to the house by construction of a twentieth century fibro clad, flat roofed extension.

Other iron and timber outbuildings including milking shed and machinery sheds now in poor condition/collapsing.

Construction Date c1880 Physical Condition Modified / Extended

Modifications & Dates

HISTORICAL NOTES

Portion 45 granted to Joseph Griffiths 30/06/1803 (80 acs). Subsequently acquired by Samuel Foster (1813/1814), thence Thomas Hadley (1821). From 1843 to 1869 the property was owned by John and Mary Smith.

In 1869 the 80 acs was acquired by Edward Lord (Conv. Bk 115 No 958).

The 1873 Road Plan shows a building on the Griffiths grant, however, owner and occupier noted on the plan is Joseph Herbert - Land title records indicate that Herbert actually owned the adjoining section of Portion 44.

In 1880 the 80 acs was acquired by Robert Robertson. In PA 14466 Robertson applied to bring the 80 acs of Portion 45 and additional land from the adjoining Portion 44 under the Real Property Act. CT Vol 1836 Fol 64 for an area of 111 ac 2r 26p was issued in 1907.

In 1920 the property was surrendered to the Crown for the purposes of the Closer Settlement Acts. In 1924 the renumbered Portion 300 was purchased by Raymond Charles Lane.

Extant Late Victorian cottage most likely to relate to the Robertson ownership (1880 - 1907); additions and alterations probably after 1924.

HISTORIC THEMES	Local	dairying, orcharding	Regional	rural settlement
	State	agriculture	National	

This Mass Concrete House at 95 Castlereagh Road is situated close to the northern extremity of the Lakes Scheme area and appears to be on a land form unit in the PLDC Structure Plan. It is recommended that PLDC investigate the retention of the building and the associated potential early Colonial-era archaeological site which is described on the inventory sheet.

If the site is to be retained a short conservation management plan should be prepared. If the site is to be demolished/removed, an archaeological survey and assessment report should be prepared.

• Quarry Complex

This complex has been assessed as being of Regional significance (see inventory sheet for RES 21). It is recommended that a professional recording report (including history and comparison with other sites) should be prepared prior to the removal or demolition of this complex. The history and operation of this complex should be included in both the Castlereagh history and oral history studies referred to in Sections 7.3.2 and 7.3.3, below.

7.2 General Recommendations Concerning Management Of Sites

Part of the brief for this project requires comment to be provided on the existing heritage arrangements under the REP for the Lakes Scheme.

7.2.1 Conservation management plans for sites to be retained

It is recommended that all sites to be retained in situ in the PLDC area, including sites privately owned such as Nepean Park and the Uniting Church complex of buildings and cemetery, should have conservation management plans prepared for them. This also includes "The Poplars" which is owned by the Department of Urban Affairs and Planning. Conservation Plans would provide the PLDC and other owners, and the Penrith Lakes Trust, which is to manage these sites in the future, with clear guidance as to what is significant about each place and therefore how to maintain and manage it.

During a short visit to Nepean Park the consultants observed that a 1920s addition to the Nepean Park residence was demolished and a new brick one was being built in its place. A new 'Federation' garage, and brick surround to the pump has also been built.

To the north of the Uniting Church it is planned that a new building or complex of buildings may be constructed as a retreat. A conservation management plan will make clear what processes have to be followed before proposed new buildings can be constructed, so that the cultural significance of the old church, hall, and cemetery are not compromised. It will also state how these buildings and the whole Uniting Church site are to be managed into the future.

7.2.2 Building maintenance plans for PLDC sites currently tenanted

Several tenants have commented to us in the course of our survey that their residence is being damaged by broken guttering, rising damp, and so on. As long as these houses, ultimately to be demolished, are being retained they should be maintained in good order by the PLDC. A brief building maintenance plan by an architect for each of these buildings would describe problems and suggest immediate practical solutions.

7.2.3 Cataloguing and storage of artefacts collected

Building materials such as slabs and bricks have been collected by the NDHAG from historic sites which have been demolished in the course of the PLDC's mining. Portable artefacts such as cast iron boiling-down pots have also been collected and stored. It is recommended that a Collections Policy be prepared by the PLDC so that artefacts are not collected randomly, and so that only those artefacts which will be of use in the new Interpretation Centre for the Lakes need to be collected and stored by the PLDC. The artefacts already collected should be catalogued as to their provenance and age, and stored in a sheltered and safe place.

7.3 Additional Management Issues

7.3.1 The Need For Broader Contextual Analysis

Recommendations about individual sites have been made by this study and most single sites are identified as being of local significance. Nevertheless to fully assess the significance of the Castlereagh area as a whole impacted by the PLDC and the "group value" of all of the associated complexes and features, it is necessary that a contextual study is carried out. A comparison of the Castlereagh Valley with for instance the Agnes Banks, Richmond, Windsor and Pitt Town areas would allow for a better comparative assessment of the overall importance of the Castlereagh Valley as a cultural landscape.

It is recommended that such a study be done by a recognised heritage consultant experienced in the study of cultural landscapes.

7.3.2 The Need For A History Of Castlereagh (*Commenced*)

Because of limited funding for the Bently Report of 1981 it was only possible to do a cursory study of the history of Castlereagh. It is essential that a detailed study be commissioned from an accredited professional historian, as this will place the history of the area in its local, regional, and national context. This is especially important for the early colonial period - 1788-1840, when the Hawkesbury/Nepean settlers were involved in enterprises of national importance.

7.3.3 The Need For Oral History Recording (*Commenced*)

Much information about the settlement of Castlereagh and the history of particular buildings in this study is known by local current and former residents. There has not been time to interview such people and collect oral history from them.

It is recommended that an oral history program be commissioned.

7.3.4 The Need For An Artefact Collections Policy (*Commenced*)

Artefacts from abandoned and demolished sites have been collected and stored by the NDHAG. This random and piecemeal salvage needs to be ordered by a specific collections policy.

It is recommended that a collections policy report be commissioned by the PLDC so that current and future artefacts can be properly collected catalogued, and stored for use in a future interpretation centre.

7.3.5 The Need To Prepare For Scheme Interpretation (*Commenced*)

It has been suggested by the PLDC that sites which are to be retained may be used to interpret the settlement history of Castlereagh and of the PLDC Scheme.

It is recommended that a report on an interpretation policy for retained homesteads and archaeological sites be prepared now, so that uncoordinated activities will not pre-empt the opportunities available for such interpretation.

7.3.6 The Need For Conservation Management Plans For All Sites To Be Retained

Sites to be retained in situ such as The Poplars, Nepean Park, the cemeteries, and the Uniting Church complex need to have conservation management plans prepared so that site occupants and owners are clear about how to proceed with proposed works on their land while continuing to protect the site's heritage significance¹⁰. Had there been such a plan in place for Nepean Park the unsympathetic 'Federation' garage and addition to the north of the residence would have been more carefully considered. There is also a potential archaeological site (c1810) in the area immediately north of the homestead. It may have been agreed that work could take place on these areas, but a far better outcome, protecting and enhancing the heritage significance of the homestead, would have been produced.

¹⁰ For some individual sites relevant assessments and preliminary plans may exist. These should be collated by the PLDC an/or other relevant parties eg. other site owners and Penrith Council.

7.3.7 The Need For An Archaeological Management Plan For Sites In The Old Castlereagh Town Area (Escarpment)

The proposed building allotments and the residents from the new urban area to be constructed adjacent to the proposed lakes, will have an impact on the archaeological sites from the abandoned town of Old Castlereagh. The Structure Plan for the Penrith Lakes Scheme (see Figure 2) also indicates that the re-routed Castlereagh Road will come through this area, alongside the Scheme boundary.

To identify and protect significant sites and manage the impact of future activities in the area, an archaeological management study should be commissioned now, to put in place management strategies compatible with site planning, before road and building construction, and site visitor impact occurs.

This type of study would also need the involvement of the NSW Heritage Office and Penrith City Council. If significant surviving archaeological sites could be identified they should be Scheduled as heritage items in the Penrith LEP.

This area is partly within and partly outside the Scheme area, and sources of funding for this type of study should be investigated.

7.3.8 Other Potential Archaeological Sites

Section 5.5 of this report has discussed the issue of additional archaeological sites which may exist both within the DA 4 area and other parts of the Scheme. Most locations of such items are currently unknown. As discussed in Section 5 of this report the precise locations of sites known from historical documentation, have not been accurately identified on the ground.

The preparation of a more detailed history of Castlereagh and its additional research, may also reveal the presence of more archaeological sites. The completion of the history may also assist in assessing the relative importance of the individual sites which have been identified, helping to guide management.

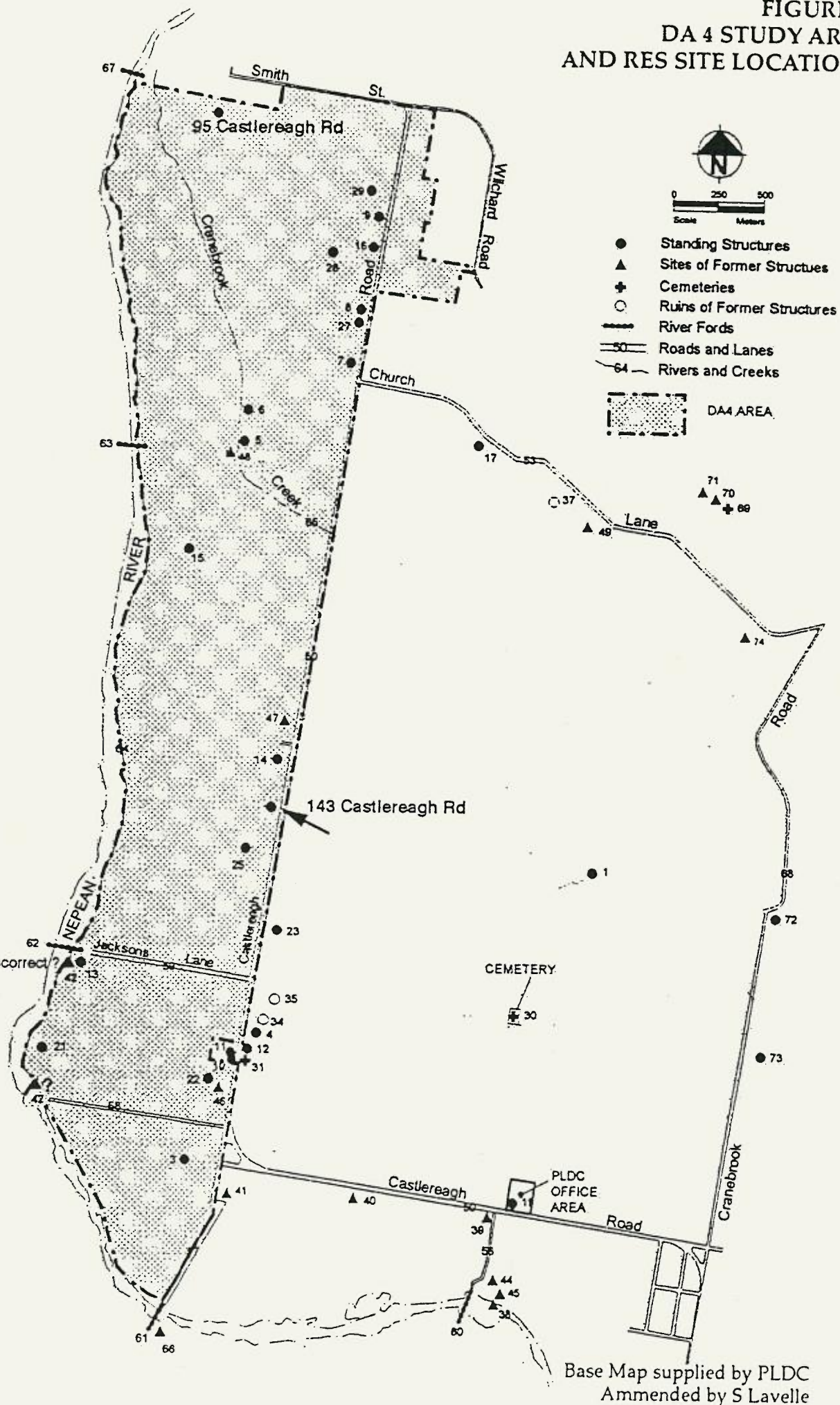
It is desirable that further work be undertaken to identify, assess and then prepare appropriate policies/management strategies for the potential archaeological sites within the Scheme area. For two potential sites, Fulton's Parsonage and Fraser's House (which on present information are likely to be inside the Scheme boundary) some initial investigation could be undertaken by the NDHAG. If these sites are within the Scheme area they would also need professional archaeological assessment (as noted in 7.3.7 above).

7.3.9 Excavation Permit Requirements

The NSW Heritage Office should be requested to provide written confirmation on whether Excavation Permits should be obtained prior to the ongoing removal of items and "relics" more than 50 years old.

0-----0

FIGURE 1
DA 4 STUDY AREA
AND RES SITE LOCATIONS



Base Map supplied by PLDC
Ammended by S Lavelle

THE PENRITH LAKES SCHEME STRUCTURE PLAN

FIGURE 2

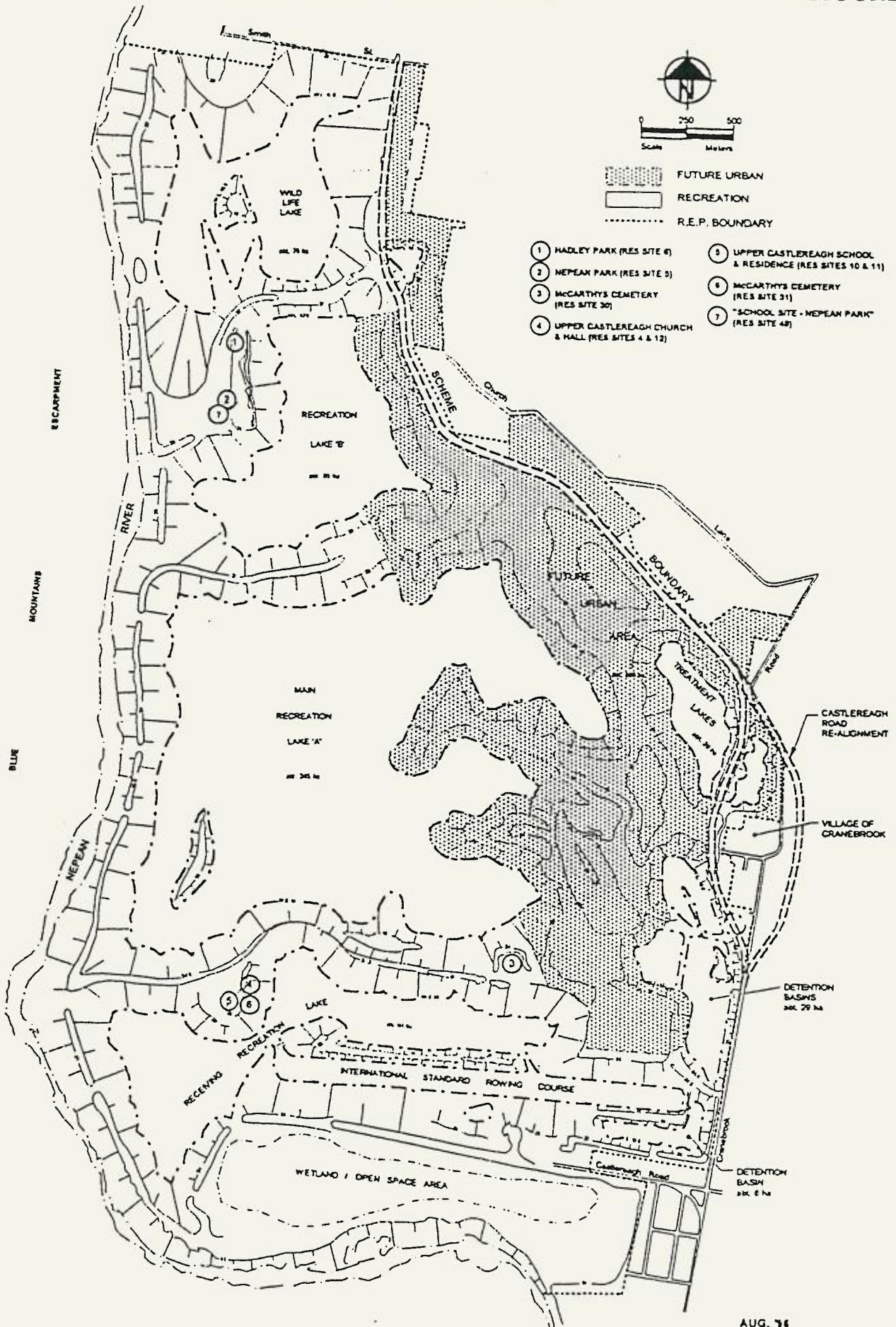
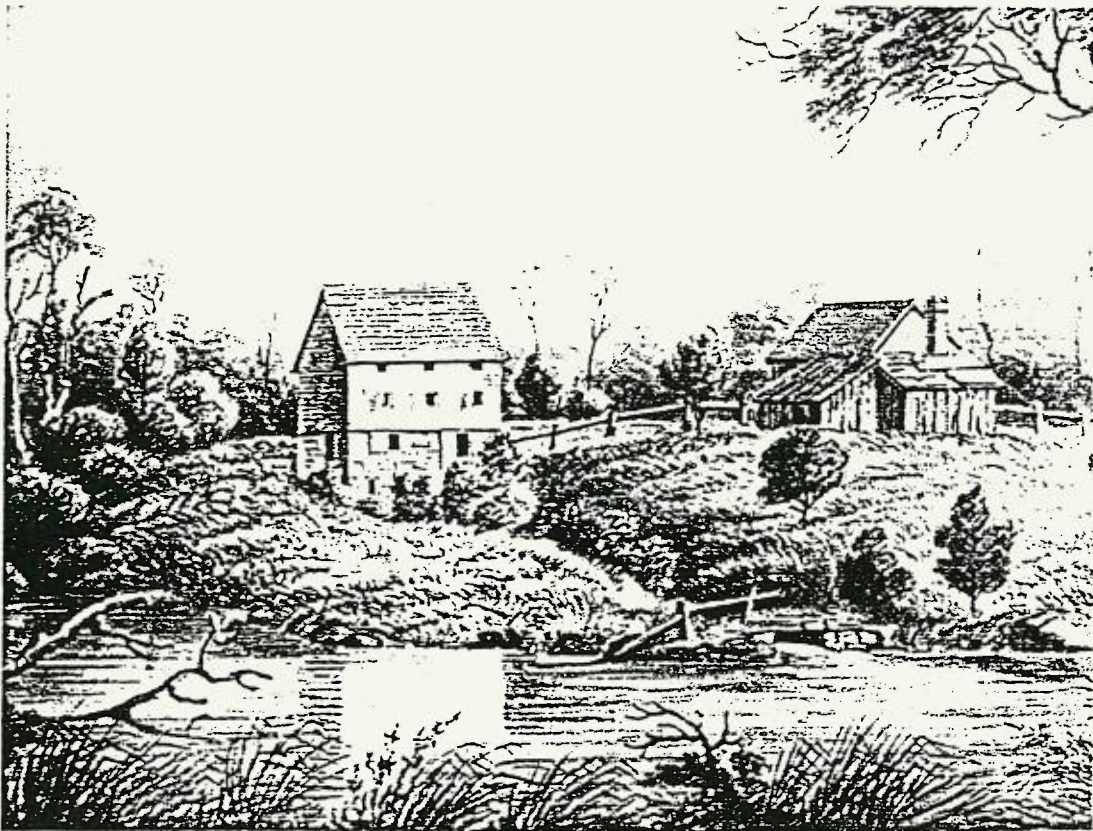


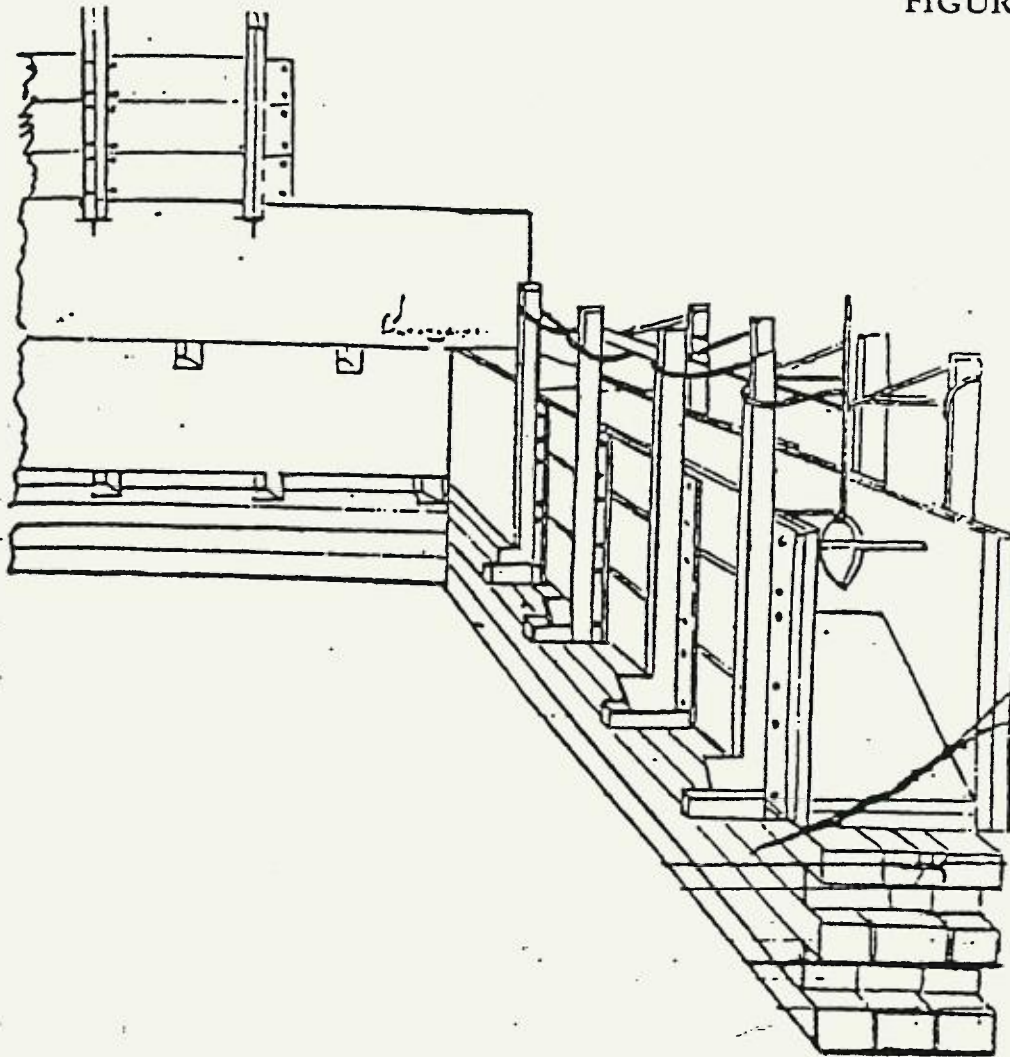
FIGURE 3



Mill near Parramatta, NSW, the property of S Marsden. 1820

Source: T McCormick, *First Views of Australia 1788-1825*,
Sydney, 1987, p 263.

FIGURE 5



The nearest thing I can find to a diagram of your concrete construction is the attached illustration from the *Town and Country Journal*, 11 November 1871, p 621.

It illustrates *pisé de terre* rather than concrete, but it exactly demonstrates the function of the cross-beams or 'putlocks'. The brick base of course does not apply in your case, nor in most concrete buildings. The other inapplicable element is the rammer or *pisoir*, the vertical tool shown towards the front end of the formwork, which of course is not required for concrete.

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

REF NO.

NAME OF ITEM Vine Cottage

PLDC INFORMATION 1984 RES No. 3 In DA4 Area Yes

Surveyed By & Date A Bickford, S Lavelle, NDHAG. Dec 1996 / Jan1997

LISTINGS

Commonwealth Statutory

LOCATION / ADDRESS Within CSR Quarrying Plant, off Sheens Lane

SUBURB / TOWN CASTLEREAGH

POSTCODE 2749

OTHER NAMES Charleville

ITEM TYPE Building

NSW Statutory

GROUP NAME

CURRENT USE Office

FORMER USE Residence

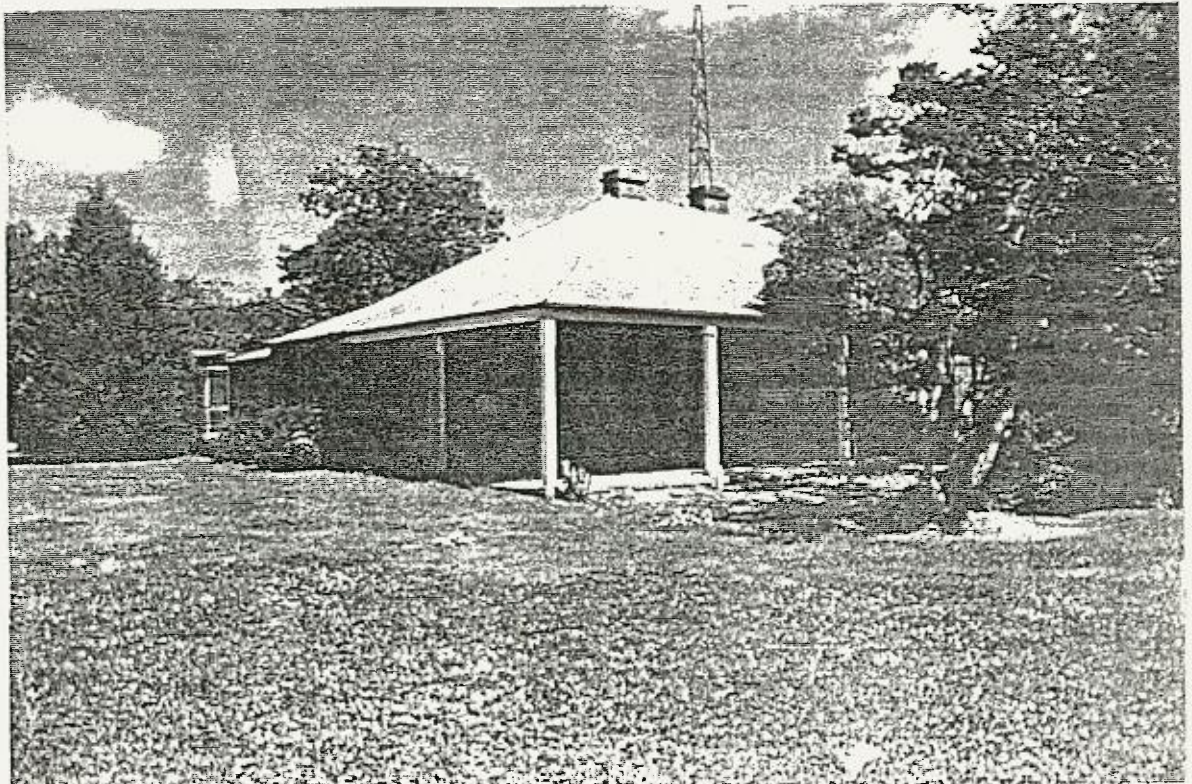
Non Statutory

STATEMENT OF SIGNIFICANCE

LEVEL Local

- The extant cottage at this site relates to the the late nineteenth to mid twentieth century phase of local dairying, orcharding and other activities which developed on land holdings in Castlereagh to serve the Sydney market.
- Like several other sites reviewed for this assessment the property is considered representative of the homestead of a small mixed farm from the era of late nineteenth to early twentieth century development in this locality. It's ability to demonstrate has however been compromised by the loss of outbuildings and by its conversion into an office.

PHOTOGRAPH



FILM ROLL

NEG. NO.

DATE 12 / 1996

CAPTION

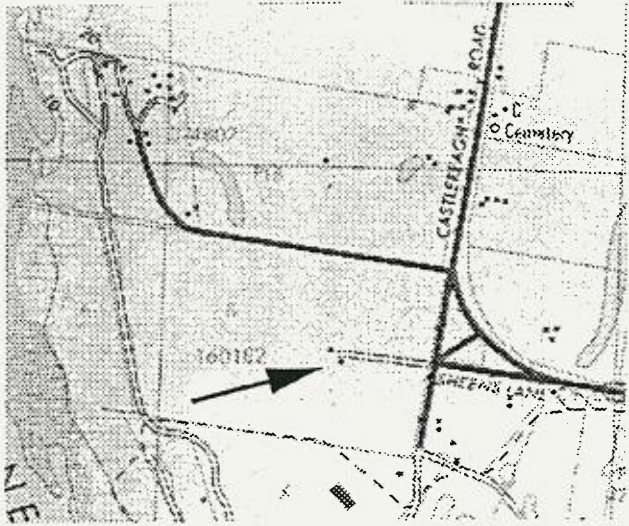
AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT	Heritage Overview / Management Study for DA 4	PLDC INFORMATION 1984 RES Item No. 3
NAME OF ITEM	Vine Cottage	In DA4 Area Yes

LOCATION PLAN

SKETCH PLAN



MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 834656
Full AMG Grid Ref: Zone 56H 283400 E 6265600 N

DESCRIPTION

Brick cottage known as "Vine Cottage". Flemish bond brickwork with decorative arched heads above windows and doors. 6 x 6 pane sash windows with sandstone sills. Two brick chimneys. The house has sandstone flagging on the verandahs, sandstone basecourse / footings, an internal cellar (not now accessible) and originally an attic under a shingle roof. Now has hipped iron roof. The detailing of one fireplace remains intact.

The house is in use as an office and is maintained in good condition.

Construction Date c1860s -1900 **Physical Condition** Well maintained

Modifications & Dates modern conversion to use as the csr office has resulted in modification of the interior.

HISTORICAL NOTES

Granted to Samuel Stanyard on 30 June 1803. In 1857 the land was held in trust for John Purcell, and on his death for his wife Ann Purcell, and on her death in trust for their children. Ann Purcell died in February 1919. Her will refers to "the homestead known as Charleville" [on the southern 40 acres of the portion]. The land stayed in the Purcell family until February 1955 when the western third, Lot A, was sold to Precon Pty Ltd. In 1958 the eastern third, Lot B, was sold to Quarries Limited, and in 1981 to Readymix, who now occupy the site. Members of the Purcell family are buried in the local Wesleyan cemetery and the local Roman Catholic cemetery in McCarthy's Lane.

1873 Road Plan indicates presence of additional buildings closer to Castlereagh Road. 1984 report also refers to additional sites in the vicinity.

HISTORIC THEMES	Local	dairying, orcharding	Regional	rural settlement
	State	agriculture	National	

AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

PLDC INFORMATION
1984 RES Item No.3
In DA4 Area Yes

NAME OF ITEM Vine Cottage

INFORMATION SOURCES USED FOR THIS ASSESSMENT

WRITTEN F Bently and J M Birmingham, *History of European Settlement*, unpublished report Penrith Lakes Scheme Regional Environmental Study, Dept of Environment and Planning, 1983
Land Title Search supplied by the PLDC for Portion 56
M Long, *Reminiscences of a District Veteran (1912)*, Penrith City Library, reprint 1985.

ORAL

GRAPHIC Plan R550a 1603 dated 1873 Lands Dept Plan Room (Dept Land and Water Conservation)

RELATED INFORMATION

TYPE	AUTHOR / TITLE	YEAR	REPOSITORY

PROPERTY DETAILS

LGA Penrith City Council

ZONING SREP NO. 11 (Penrith Lakes)

OWNER Readymix Farley Group (CSR)

OWNER PH/FAX (047) 30 5211

OWNER ADDRESS Sheens Lane, Castlereagh, NSW 2749

REAL PROPERTY DESCRIPTION

EVALUATION OF SIGNIFICANCE - SUMMARY MATRIX (Heritage Office Use)

VALUES: historical aesthetic social technical / research

RARE

REPRESENTATIVE

MANAGEMENT RECOMMENDATIONS

Retain if possible. If not, recording report by NDHAG prior to demolition.

CONSERVATION &/OR MANAGEMENT PLAN No

CLIENT

AUTHOR / NAME / DATE

ENDORSEMENT & DATE

FURTHER INFORMATION

AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use
 DATABASE NO.
 REF NO.

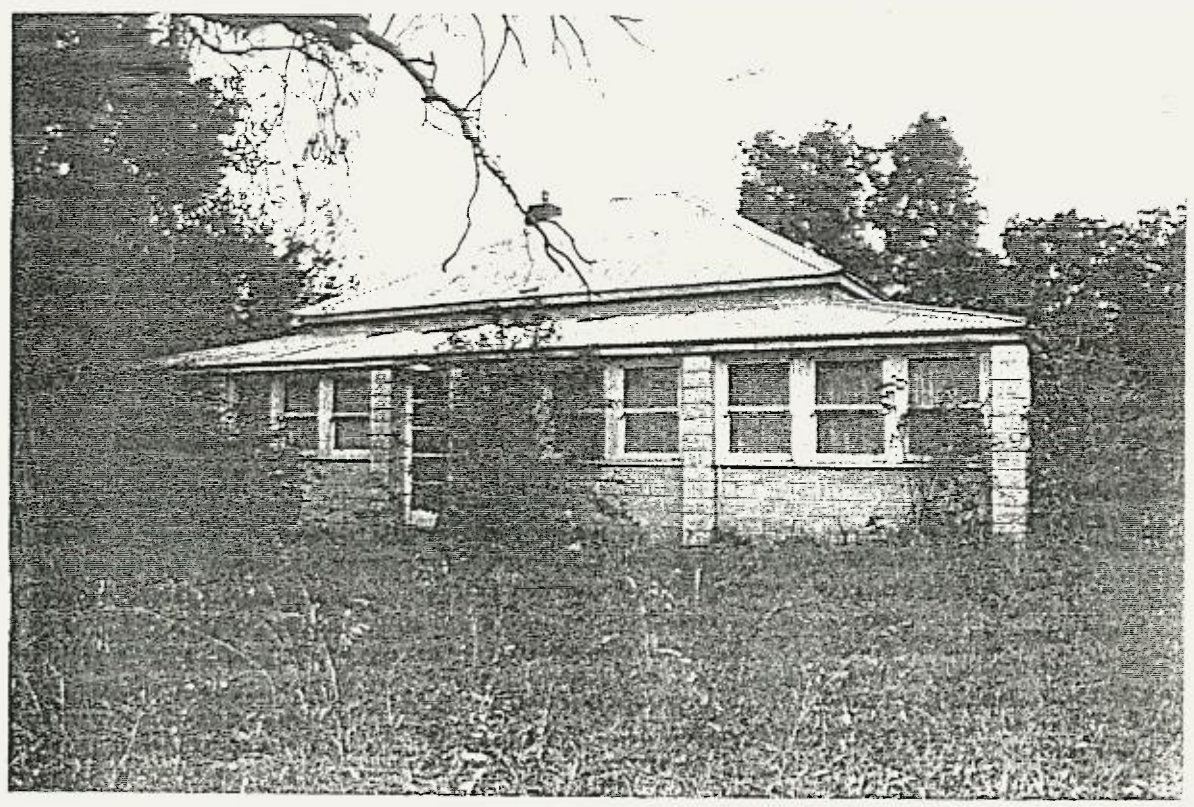
NAME OF ITEM Cottage and Outbuildings

PLDC INFORMATION 1984 RES No. 7 In DA4 Area Yes Surveyed By & Date A Bickford, S Lavelle, NDHAG. Dec 1996 /Jan1997	LISTINGS Commonwealth Statutory NSW Statutory Non Statutory
LOCATION / ADDRESS Castlereagh Road SUBURB / TOWN CASTLEREAGH POSTCODE 2749 OTHER NAMES ITEM TYPE Building GROUP NAME CURRENT USE Unoccupied FORMER USE Residence	

STATEMENT OF SIGNIFICANCE LEVEL Local

- The extant cottage at this site relates to the the late nineteenth to mid twentieth century phase of local dairying, orcharding and other activities which developed on land holdings in Castlereagh to serve the Sydney market.
- Like several other sites reviewed for this assessment the property is considered representative of a small mixed farm from the era of late nineteenth to early twentieth century development in this locality.
- Archaeological significance: The previous residence on the same site which burnt down c 1925 may be much earlier. There may be archaeological remains of this underneath the present one.

PHOTOGRAPH



FILM ROLL
 NEG. NO.

DATE 12 / 1996 CAPTION

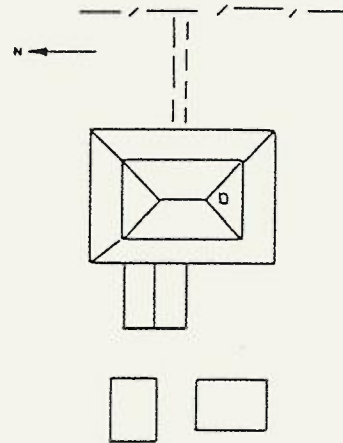
PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT	Heritage Overview / Management Study for DA 4	PLDC INFORMATION
NAME OF ITEM	Cottage and Outbuildings	1984 RES Item No.7
		In DA4 Area Yes

LOCATION PLAN



SKETCH PLAN



MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 842700
 Full AMG Grid Ref: Zone 56H 284200 E 6270000 N

DESCRIPTION

Core building comprises a rendered structure (probably brick - not visible) with a hipped iron roof. Central hallway with two rooms each side and kitchen at rear (now modified). Brick chimney. Features include pressed metal ceilings and single pane adjustable fanlights above internal doors.
 Skillion roofed verandah added on all sides constructed of concrete block posts and dwarf wall which is infilled with single pane sash windows. Concrete blocks cast with a rusticated style finish.
 Gable roofed modern brick outbuilding at the rear (laundry), also timber slab shed / garage.

Construction Date c1925

Physical Condition Modified / Extended

Modifications & Dates

HISTORICAL NOTES

Portion 46 granted to Richard Oldwright 1803 (80 acs). Land Title Search supplied to date is incomplete for the northern moiety of the grant.

Oldwright apparently sold the northern moiety to Stephen Smith.

The 1873 road plan notes John Smith as the owner of the northern moiety and also shows a 'hut' within this area. By 1929 the property was owned by Louis Judges.

Informants advise that the earlier residence on this property burnt down about 70 years ago. The existing one was subsequently built on the same site.

HISTORIC THEMES

Local dairying , orcharding
 State agriculture

Regional rural settlement
 National

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT	Heritage Overview / Management Study for DA 4	PLDC INFORMATION 1984 RES Item No.7
NAME OF ITEM	Cottage and Outbuildings	In DA4 Area Yes

INFORMATION SOURCES USED FOR THIS ASSESSMENT

WRITTEN F Bently and J M Birmingham, *History of European Settlement*, unpublished report Penrith Lakes Scheme Regional Environmental Study, Dept of Environment and Planning, 1983

ORAL Mr John Shearer. Ms Gwen Keane, Vista Place, Penrith.

GRAPHIC Plan R550a 1603 dated 1873, Lands Dept Plan Room (Dept Land and Water Conservation)

RELATED INFORMATION

TYPE	AUTHOR / TITLE	YEAR	REPOSITORY

PROPERTY DETAILS

LGA Penrith City Council ZONING SREP NO. 11 (Penrith Lakes)

OWNER Penrith Lakes Development Corporation

OWNER PH/FAX (047) 29 0044 / (047) 30 1462

OWNER ADDRESS Castlereagh Road, CRANEBROOK, NSW 2749

REAL PROPERTY DESCRIPTION

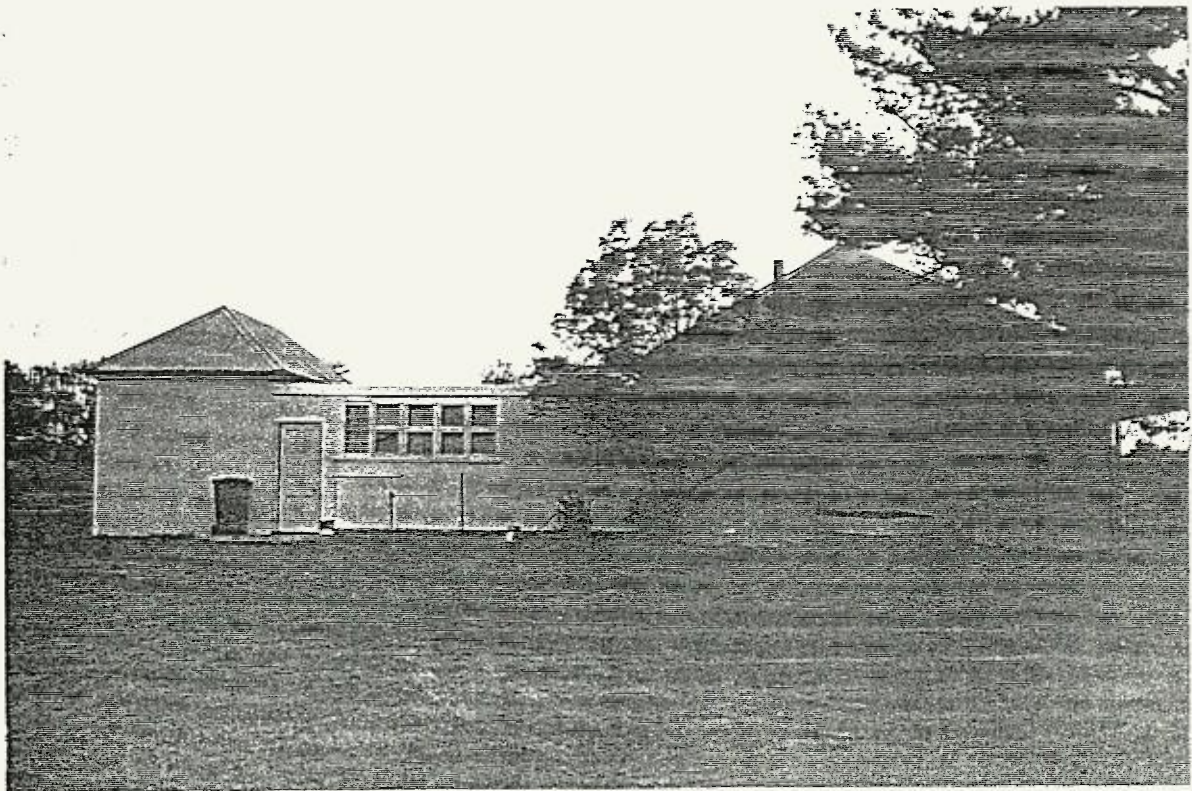
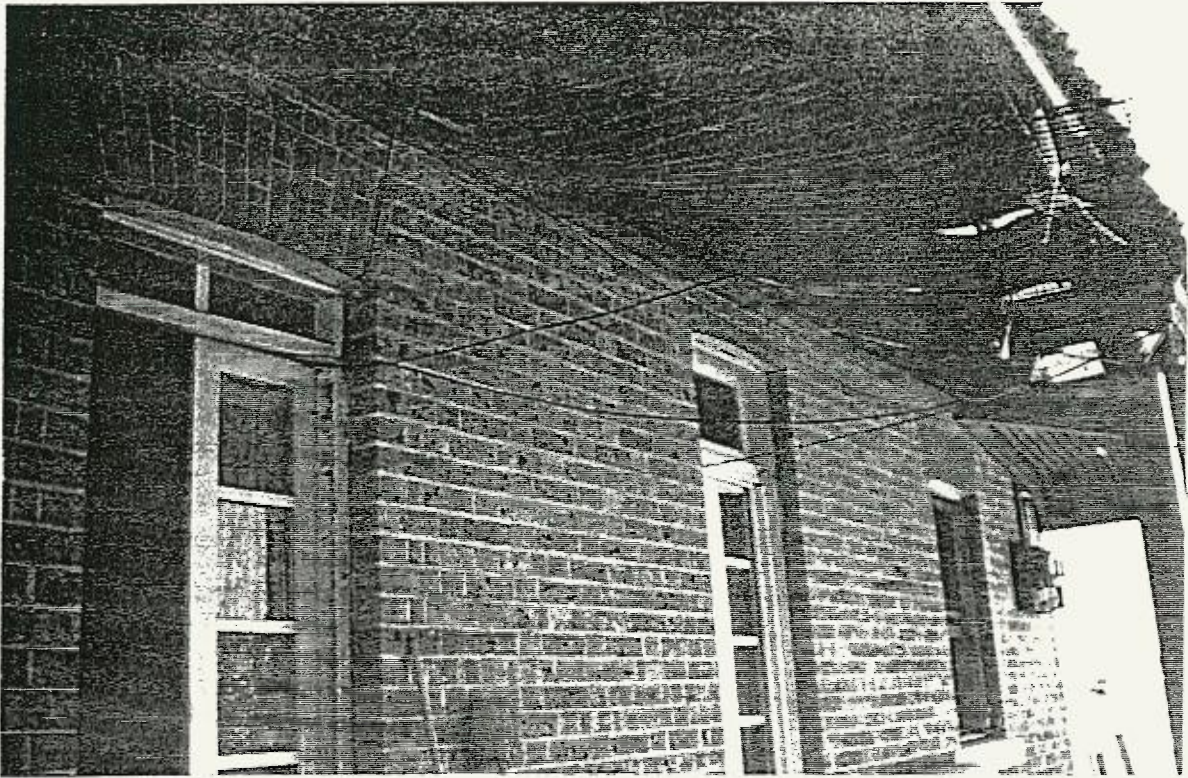
EVALUATION OF SIGNIFICANCE - SUMMARY MATRIX (Heritage Office Use)				
VALUES:	historical	aesthetic	social	technical / research
RARE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
REPRESENTATIVE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

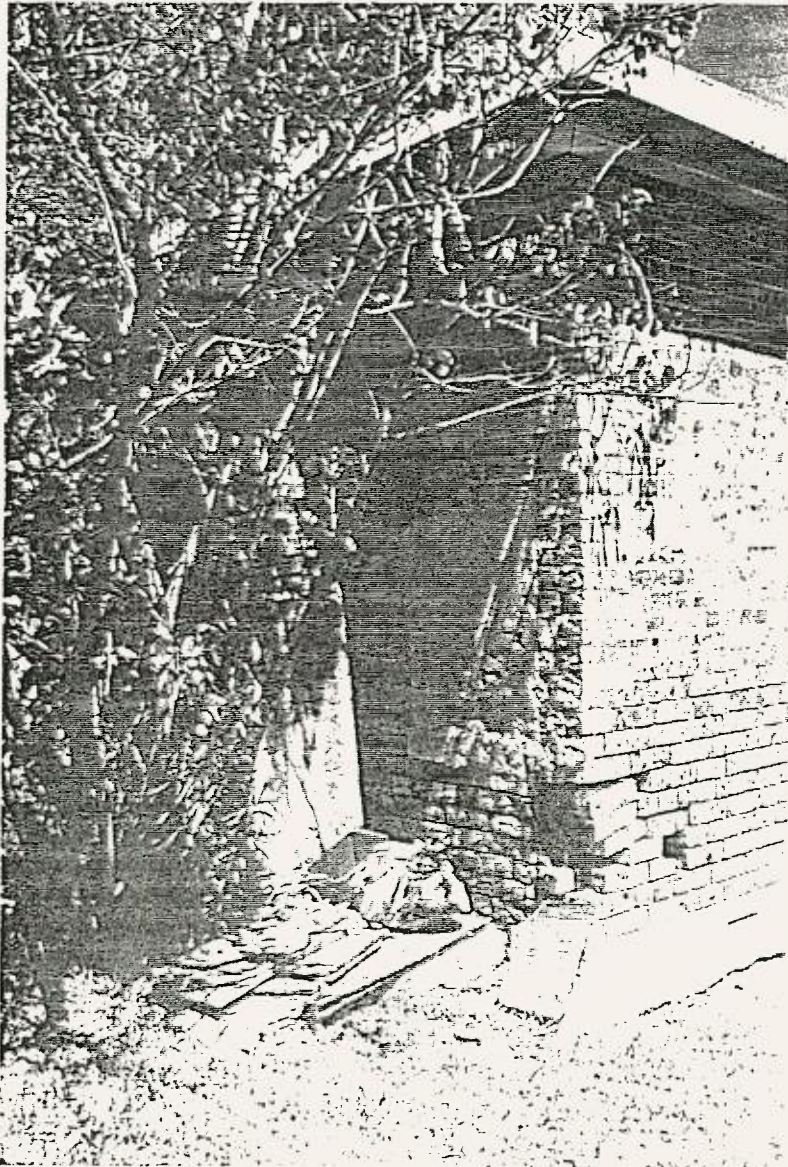
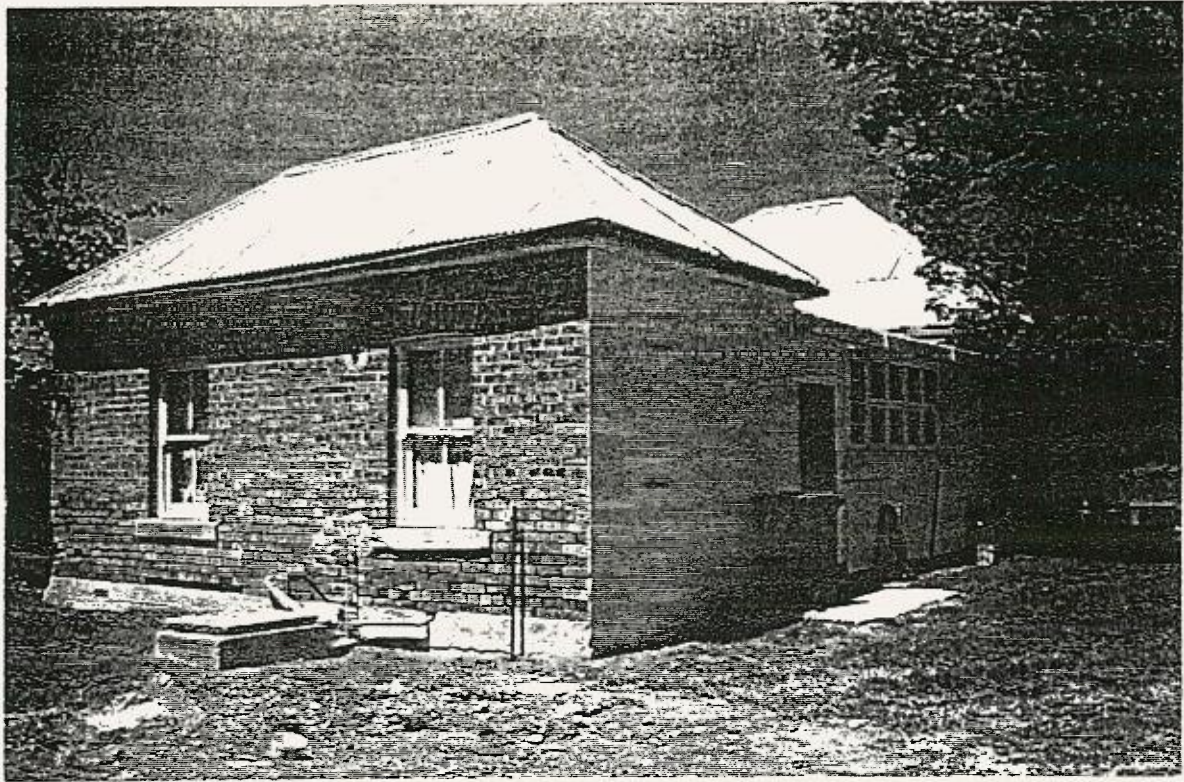
MANAGEMENT RECOMMENDATIONS

Recording report by NDHAG prior to demolition. Architectural demolition plan and preserve former residence in situ pending archaeological assessment report.

CONSERVATION &/OR MANAGEMENT PLAN	CLIENT
AUTHOR / NAME / DATE	ENDORSEMENT & DATE

FURTHER INFORMATION





PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

REF NO.

NAME OF ITEM House and Barns

PLDC INFORMATION 1984 RES No. 9 In DA4 Area Yes
 Surveyed By & Date A Bickford, S Lavelle, NDHAG. Dec 1996 / Jan 1997

LISTINGS
 Commonwealth Statutory

LOCATION / ADDRESS R 99 Castlereagh Road

SUBURB / TOWN CASTLEREAGH

POSTCODE 2749

OTHER NAMES Landers' Inn; Oddfellows Inn;

ITEM TYPE Building complex

GROUP NAME

CURRENT USE Residence

FORMER USE Inn

NSW Statutory

LEP - Heritage Schedule

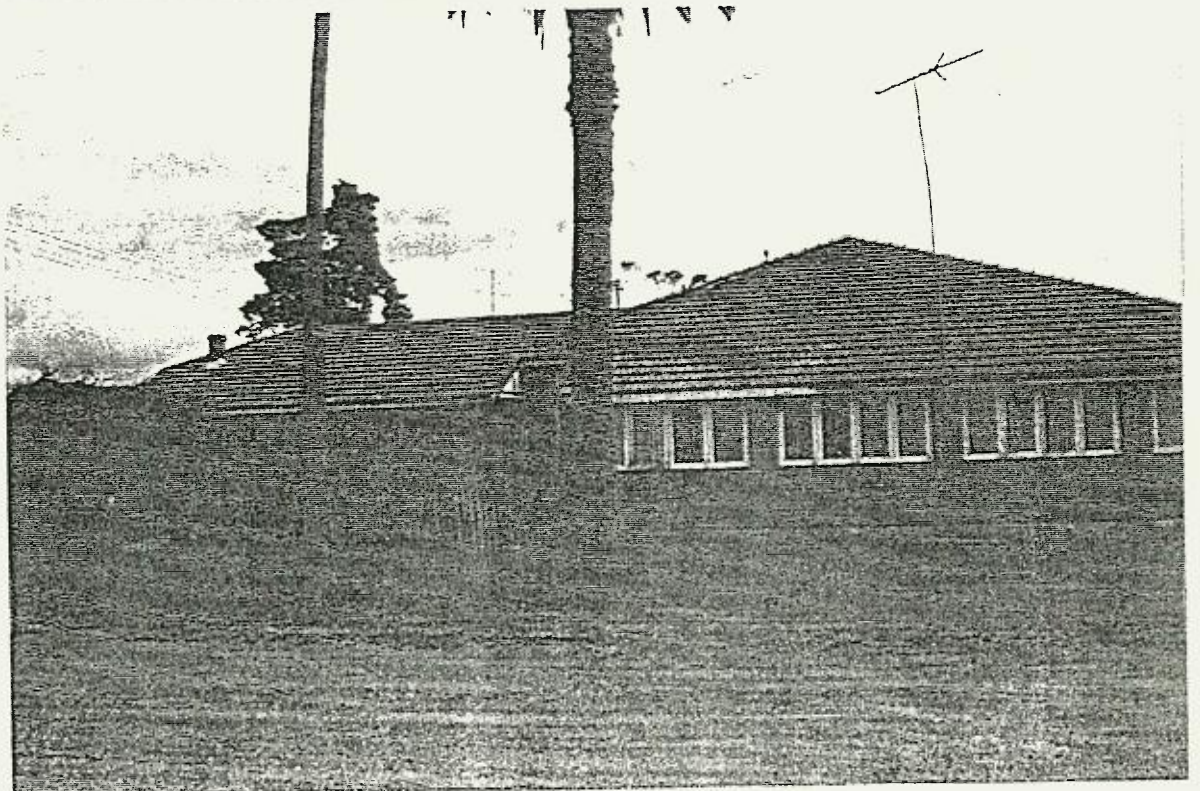
Non Statutory

STATEMENT OF SIGNIFICANCE

LEVEL Regional / State

- The Landers' Inn complex includes surviving structures from the mid-nineteenth century occupation of Castlereagh. Extant fabric includes remnants of the inn and the associated sandstone stables. Several inns are documented in the history of Castlereagh. Of the known sites reviewed for this study this complex is the only site which retains a standing building deriving from this phase of occupation / development of the locality. Inns are a significant class of item with historic and social significance as they were a characteristic feature of the Colonial period which exemplify the pattern of land settlement, transport and travel.
- The complex is associated with the Landers family, one of the major families resident in the Castlereagh area from the early nineteenth century and with a continuing association with the locality.
- The complex is a prominent local landmark when travelling the Castlereagh Road, the stone stables being an individually notable and aesthetically appealing structure.
- There is considerable technical and scientific/archaeological research potential inherent in this site given that most sections of the original and subsequently developed complex are substantially intact.

PHOTOGRAPH



FILM ROLL

NEG. NO.

DATE 12 / 1996

CAPTION

AUTHOR AB, SL, NDHAG

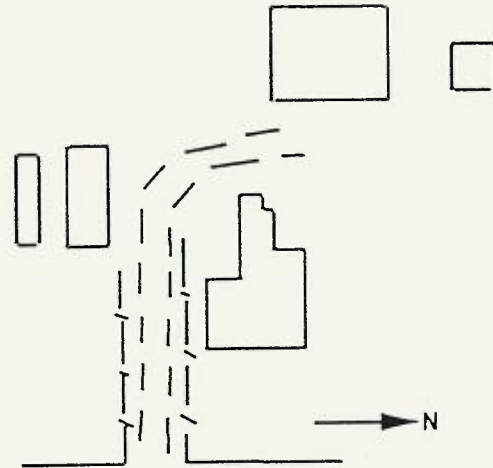
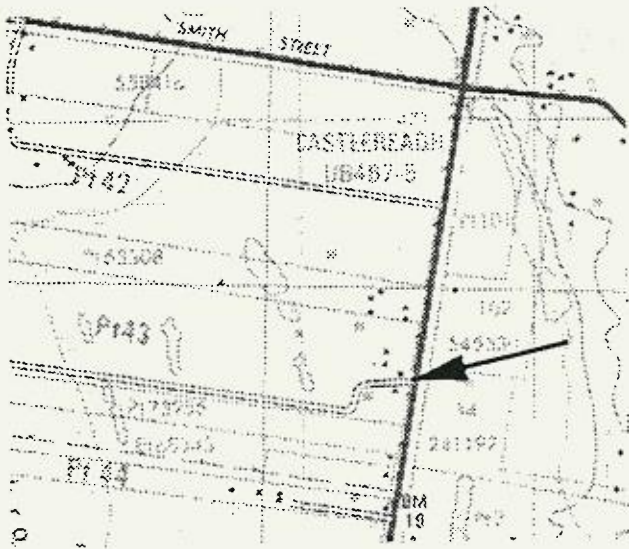
PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4
 NAME OF ITEM House and Barns

PLDC INFORMATION
 1984 RES Item No.9
 In DA4 Area Yes

LOCATION PLAN

SKETCH PLAN



MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 843708
 Full AMG Grid Ref: Zone 56H 284310 E 6270810 N

DESCRIPTION

House externally of early twentieth century California bungalow form with hipped tile roof and stretcher bond face brickwork. Verandah on east and north sides. The 20th century additions surround the remaining core of an earlier structure comprising central hallway and five rooms. Older core building constructed of brick which has been rendered and struck to imitate masonry. Joinery is cedar with Early Victorian style details and profiles, one intact original window (2 x 6 pane sash) survives in the rear side of the core building. Some c1920s/30s modification to the interiors of the core building. Brick well. Sandstone building to south of the house. The building is constructed of coursed ashlar masonry with dressed stone window sills and timber lintels above door and window openings. Windows timber framed with iron bars. An upper storey/loft constructed of brick and the roof structure (iron) was removed several years ago after storm damage. Floor sandstone flagged with a drain running E-W. Internal partitions suggest that the central part was divided into separate stalls, with a larger bay at each end accessed through larger

Construction Date 1840s - 1860s

Physical Condition Modified / Extended

Modifications & Dates c 1920s/30s, conversion of inn building into california bungalow residence.

HISTORICAL NOTES

Portion 43, Original grant of 80 acres to Robert Smith 30/06/1803. Smith's house reported to have been destroyed by fire in 1822. The 80 acres was purchased 10/03/1843 by James Landers for £1300 (Bk 3, No 468). Considerable conflict in the sources reviewed for this assessment regarding correct name/attribution of this complex - further research and clarification is required. AONSW Publicans Licenses Index notes James Landers as publican of the Oddfellows Inn, Nepean, Castlereagh from 1844 - 1846. From 1851 to 1855 the AONSW Index notes Ralph Jackson Cross as the licensee of the Farmers Arms, thence Australian Arms, thence Travellers Inn, Castlereagh. From 1856 to 1867 the AONSW Index notes William Landers as the licensee of the Travellers Inn, Castlereagh, formerly Ralph Jackson Cross. William Landers is identified as the occupier of premises shown at the location of RES site 9 on the 1873 plan of Castlereagh Road. The Landers family retained the property from 1843 to 1885. After this time there were several short-term ownerships. Informants have suggested that: the conversion of the old two storey inn to a California bungalow style residence occurred c1930 & a top storey was removed (possibly damaged by fire) Extensions were erected around the relic fabric of the older inn. Informants advise that a dump site associated with the inn may be situated in the vicinity of the Nepean River. No Welcome Inn is noted in the AONSW Index at a locality likely to correspond with RES # 9.

HISTORIC THEMES

Local inns and stores
 family relationships
 State

Regional rural settlement
 National

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT	Heritage Overview / Management Study for DA 4	PLDC INFORMATION 1984 RES Item No.9 In DA4 Area Yes
NAME OF ITEM	House and Barns	

INFORMATION SOURCES USED FOR THIS ASSESSMENT

WRITTEN	F Bently and J M Birmingham, <i>History of European Settlement</i> , unpublished report Penrith Lakes Scheme Regional Environmental Study, Dept of Environment and Planning, 1983 Land Title Search for Portion 43 (supplied by PLDC)
	AONSW Index to Publican's Licenses
ORAL	Mr Len Perkins, RMB 101 Castlereagh Road, CASTLEREAGH Mr Lester Sawyer R99 Castlereagh Road CASTLEREAGH
GRAPHIC	Plan R550a 1603 dated 1873 Lands Dept Plan Room (Dept Land and Water Conservation)

RELATED INFORMATION

TYPE	AUTHOR / TITLE	YEAR	REPOSITORY

PROPERTY DETAILS

LGA	Penrith City Council	ZONING	SREP NO. 11 (Penrith Lakes)
OWNER	Penrith Lakes Development Corporation		
OWNER PH/FAX	(047) 29 0044 / (047) 30 1462		
OWNER ADDRESS	Castlereagh Road, CRANEBROOK, NSW 2749		

REAL PROPERTY DESCRIPTION

EVALUATION OF SIGNIFICANCE - SUMMARY MATRIX (Heritage Office Use)				
VALUES:	historical	aesthetic	social	technical / research
RARE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
REPRESENTATIVE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

MANAGEMENT RECOMMENDATIONS

Lander's Inn complex recommended for retention. Dilapidation and maintenance report urgently required. Further research and analysis essential. Consider adaptive re-use as visitor orientation centre to the northern gateway of the Lakes Scheme. Prepare Conservation Management Plan.

CONSERVATION &/OR MANAGEMENT PLAN	CLIENT
AUTHOR / NAME / DATE	ENDORSEMENT & DATE

FURTHER INFORMATION

GENERAL STYLE INDICATORS

- OLD COLONIAL REGENCY OR VICTORIAN REGENCY.

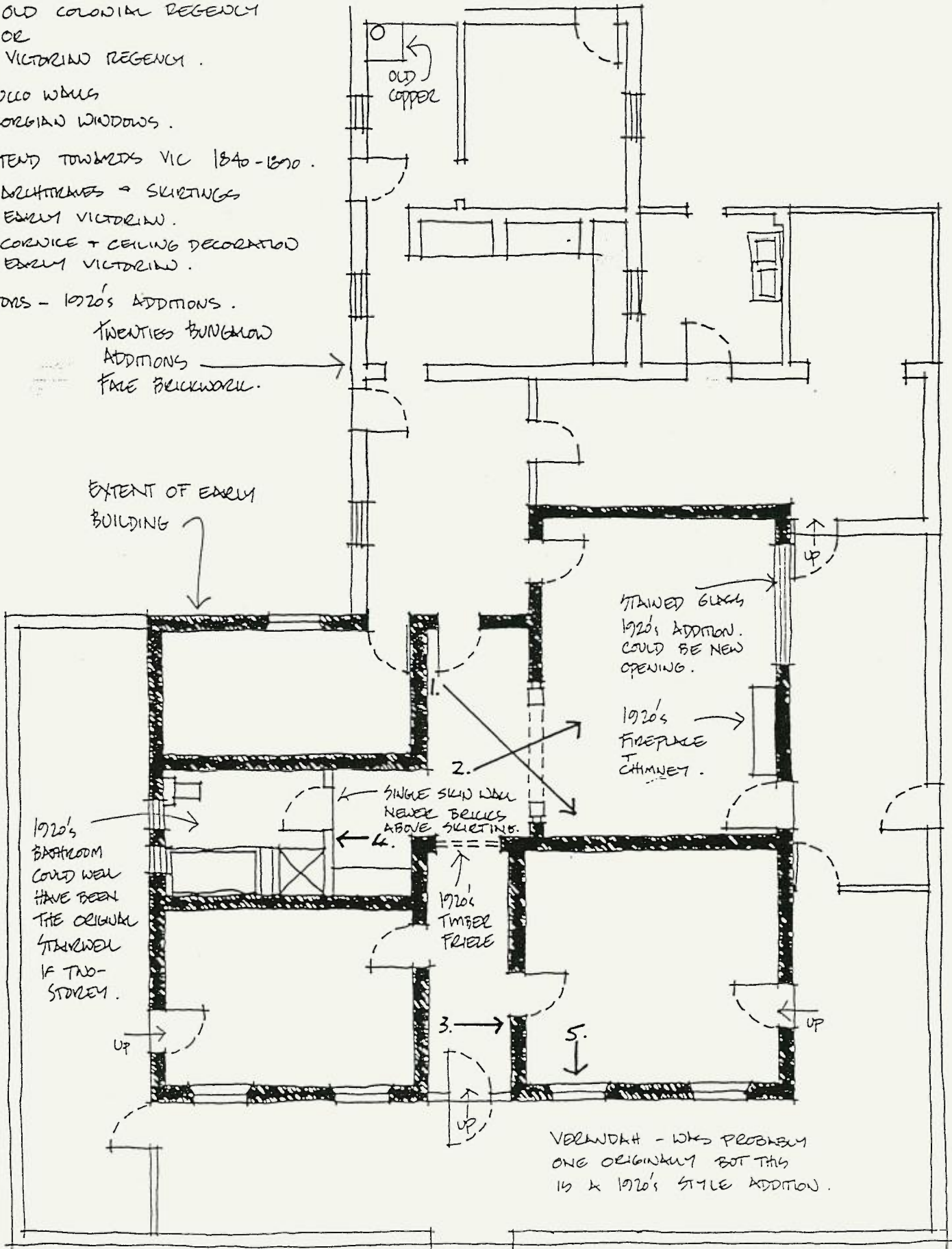
HYPOCAUSTS
GEORGIAN WINDOWS.

- TEND TOWARDS VIC 1840-1870.
- MULLIONS + SKIRTINGS
EARLY VICTORIAN.
- CORNICE + CEILING DECORATION
EARLY VICTORIAN.

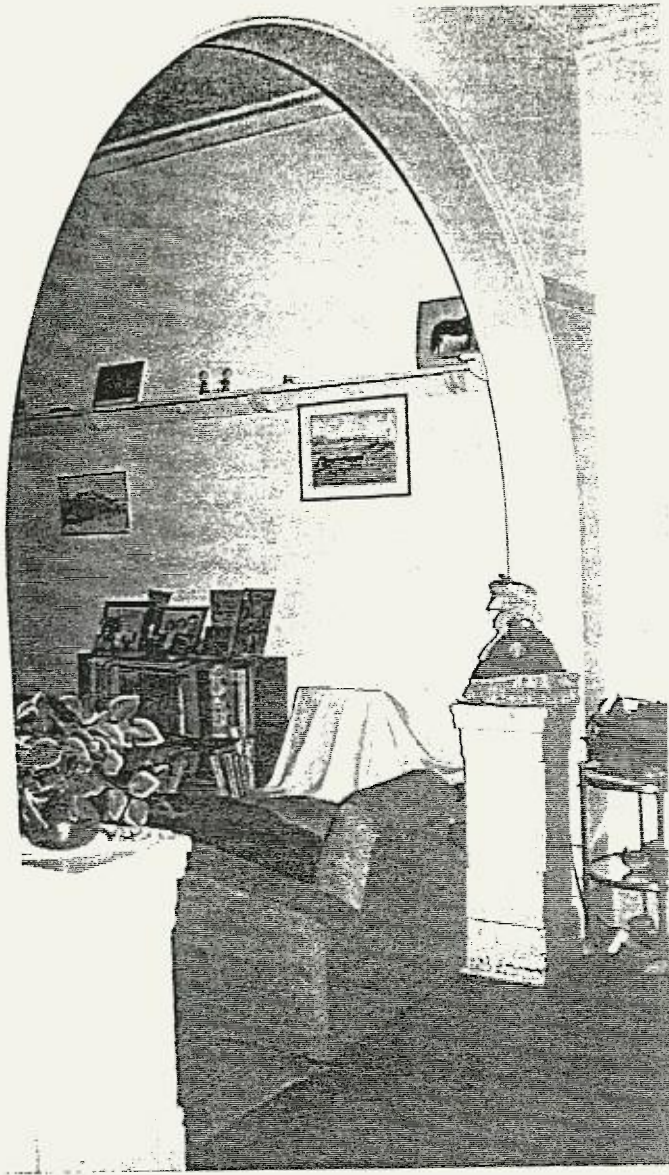
DOORS - 1920's ADDITIONS.

TWENTIES BUNGALOW
ADDITIONS
FACE BRICKWORK.

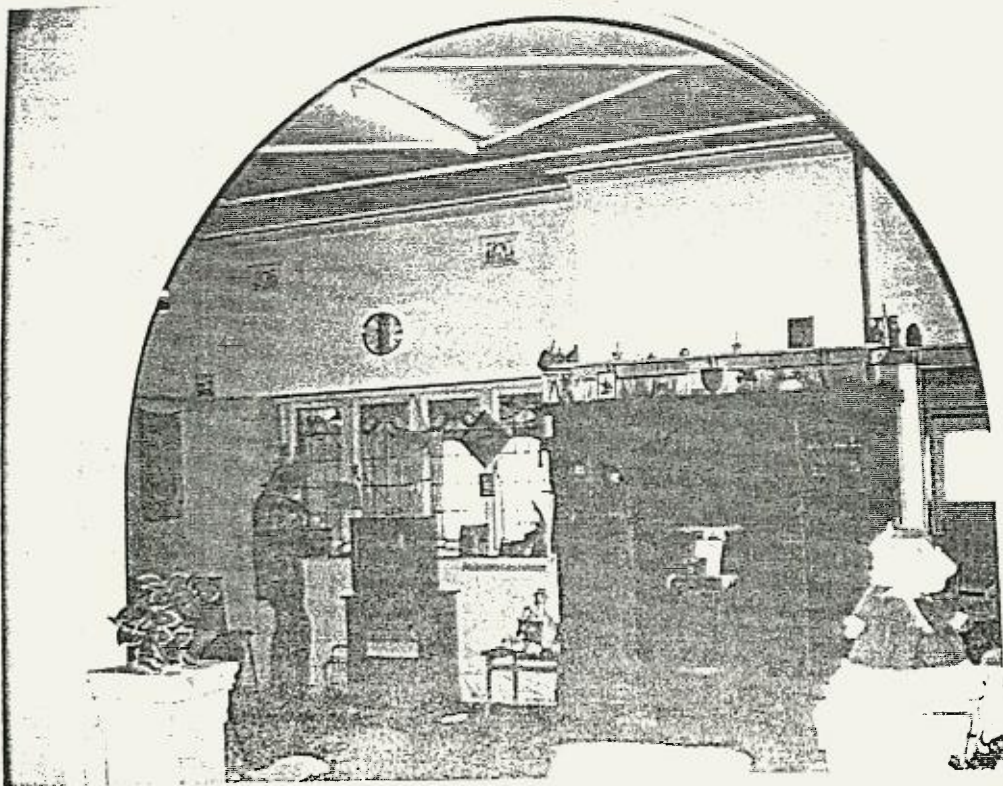
EXTENT OF EARLY
BUILDING



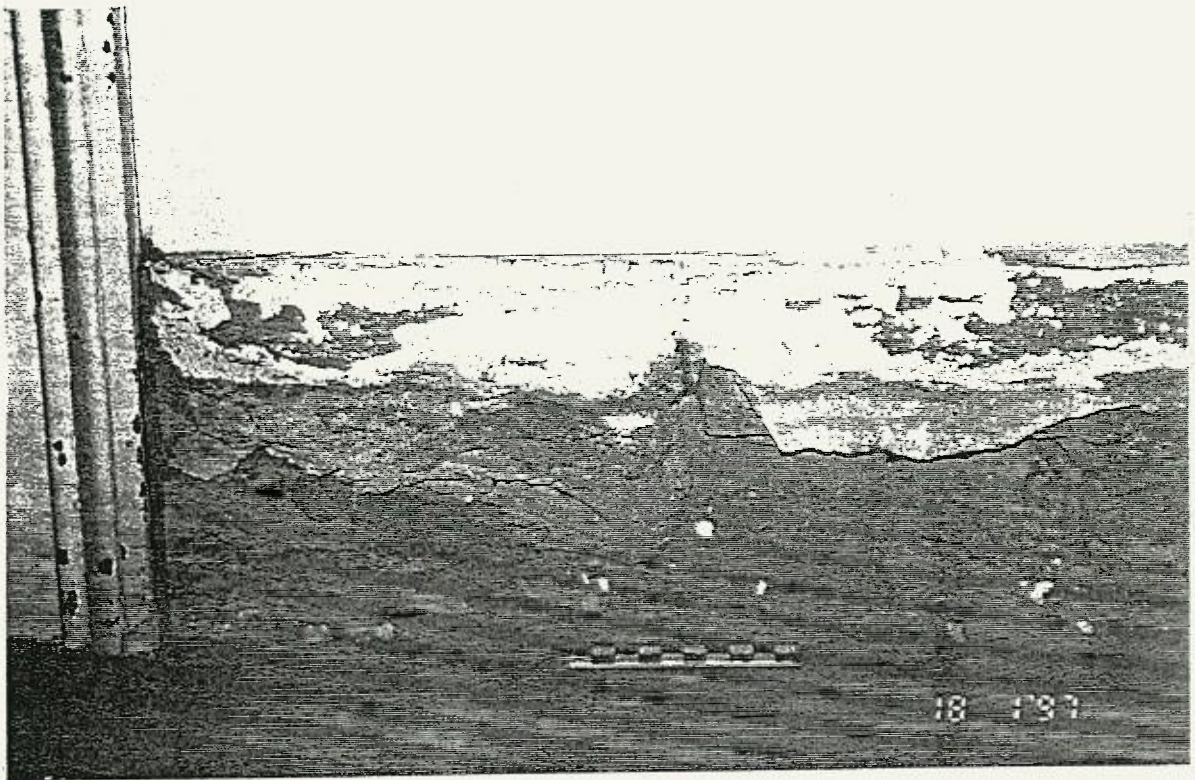
FLOOR PLAN Scale 1:100



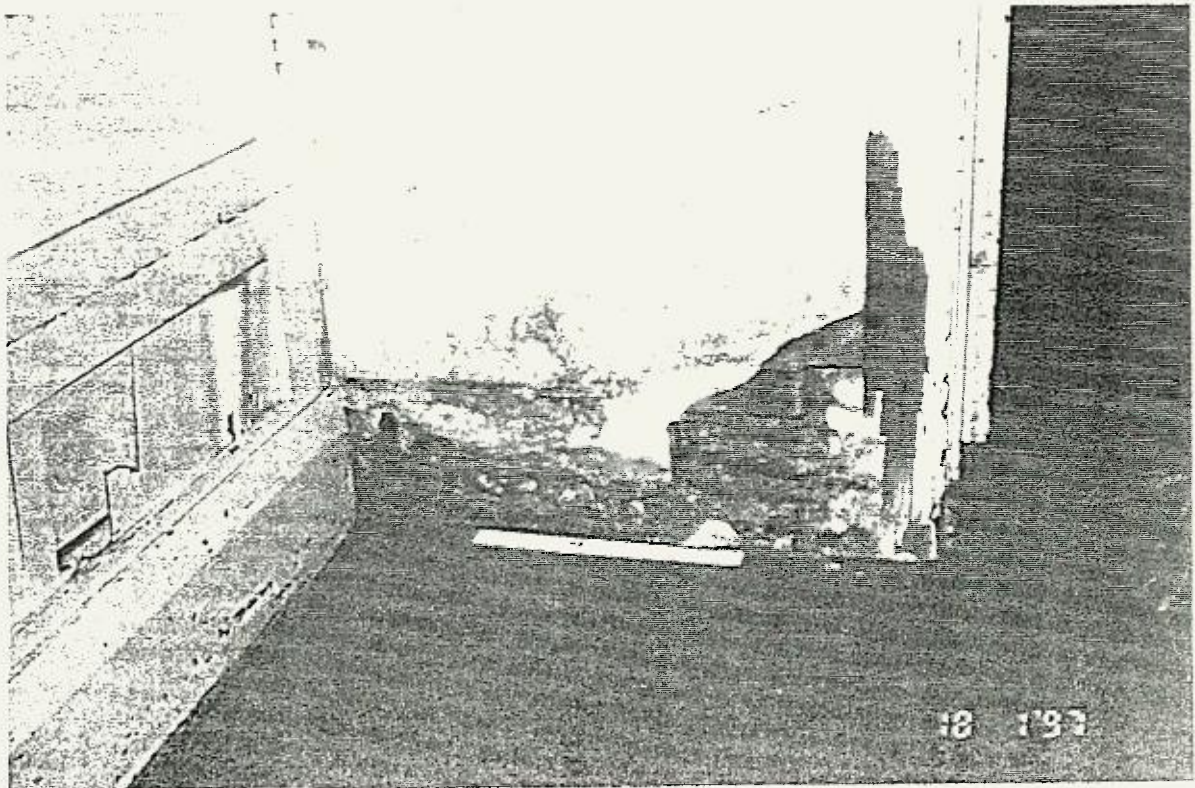
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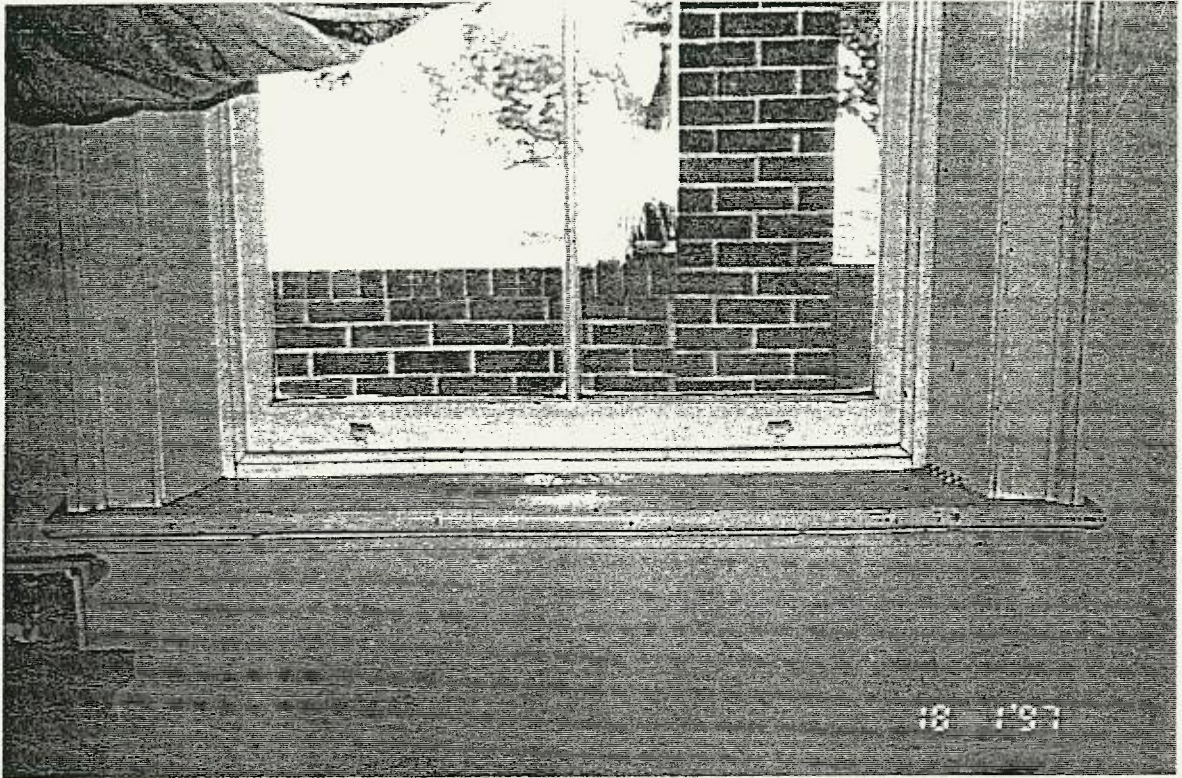
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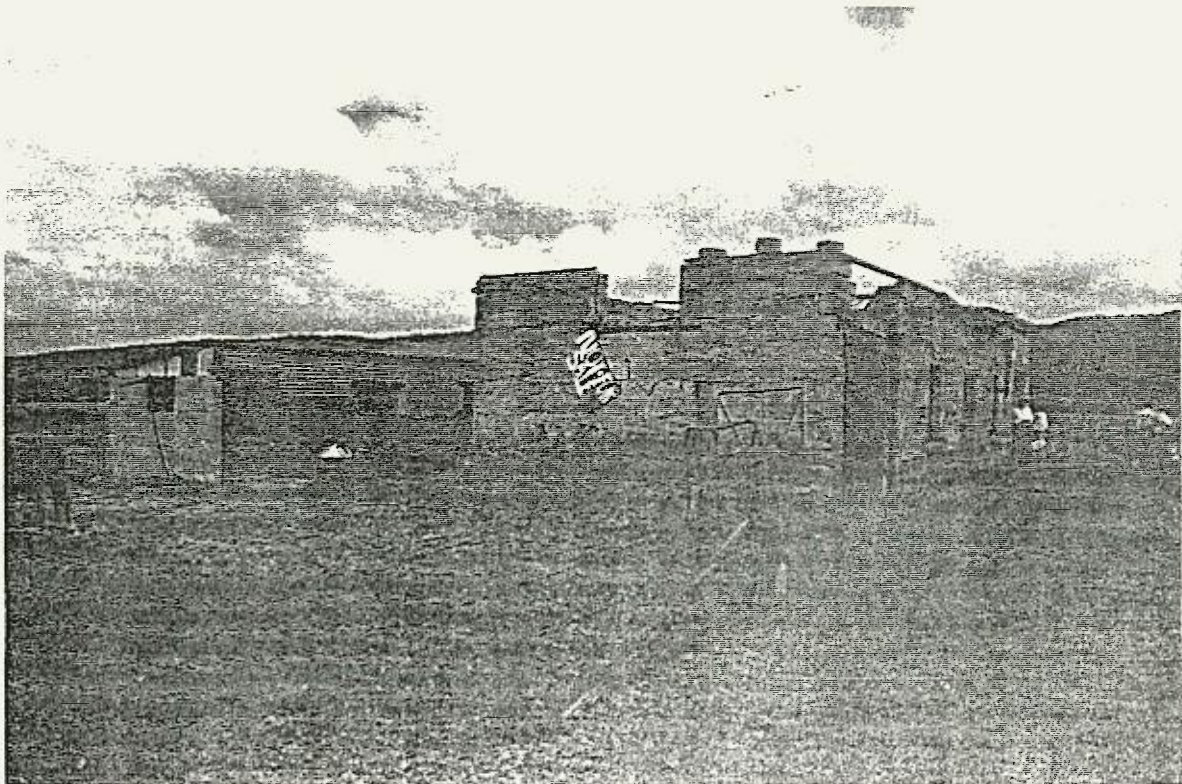
3.



4.



5.



PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

NAME OF ITEM Jackson's House

REF NO.

PLDC INFORMATION 1984 RES No. 13 In DA4 Area Yes

LISTINGS

Surveyed By & Date A Bickford, S Lavelle, NDHAG. Dec 1996 / Jan 1997

Commonwealth Statutory

LOCATION / ADDRESS Jackson's Lane

SUBURB / TOWN UPPER CASTLEREAGH

NSW Statutory

POSTCODE 2749

OTHER NAMES

ITEM TYPE Archaeological / Historic Site

GROUP NAME

Non Statutory

CURRENT USE

FORMER USE Dwelling

STATEMENT OF SIGNIFICANCE

LEVEL None

Site has been heavily disturbed. Not intact. No archaeological significance.

PHOTOGRAPH



FILM ROLL

NEG. NO.

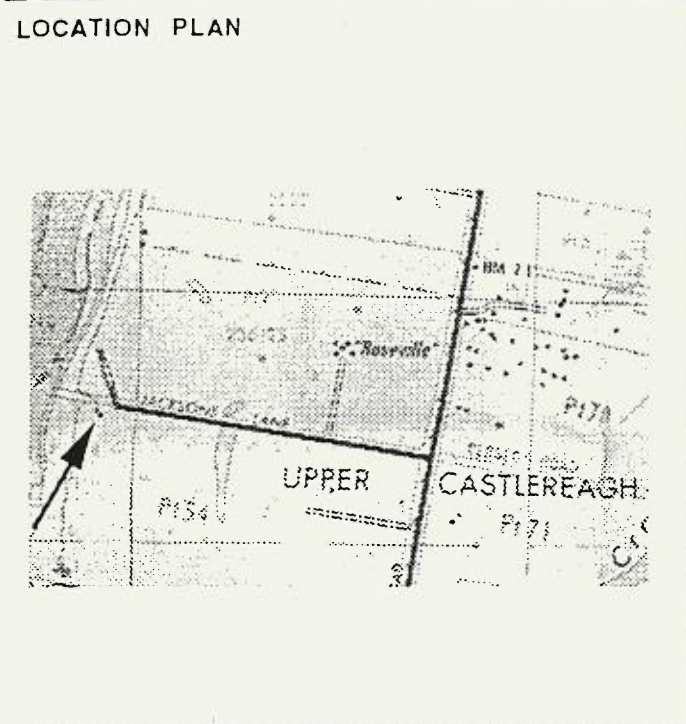
DATE 12 / 1996

CAPTION

AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT	Heritage Overview / Management Study for DA 4	PLDC INFORMATION
NAME OF ITEM	Jackson's House	1984 RES Item No. 13
		In DA4 Area Yes



MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 829667
Full AMG Grid Ref: Zone 56H 282900 E 6266700 N

DESCRIPTION

At the time of Bently's survey in 1983 the small weatherboard cottage known as Jackson's house stood on the high bank. In 1997 the house has disappeared only part of the fence still stands. The site is badly overgrown and has been used for rubbish dumping.

Construction Date	Physical Condition	Damaged / Disturbed

Modifications & Dates

HISTORICAL NOTES

The land, 100 acres, Portion 54 was originally granted to Edward Field on 30 June 1803. Subdivision of the original grant occurred prior to 1825, including 23 acres sold to John Purcell, and subsequently to John Bowman. The residue of the original grant was inherited by William Field in 1825 after the death of Edward Field. William Field sold 30 acres (NW portion of the original grant) to Joseph Collet [sic.] in 1847. Joseph Collits sold the land to John Jackson in 1867. Jackson had previously purchased the southern 50 acres of the Field grant in 1865. According to Bently's 1984 report the Jackson family were in the area prior to 1828 as millers (see RES Site 42). In 1937 the property was inherited by Nena May Jackson. In April 1939 Nena May Jackson leased 23 acres of river frontage to Industrial Metal and Gravel (Nepean) Limited. (ie intensive quarrying along river bank starting to take place). In 1948 she sold part of Portion 54, 97 acres, to Quarries Pty Ltd in 1948.

HISTORIC THEMES	Local	family relationships	Regional	rural settlement
	State		National	

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

PLDC INFORMATION
1984 RES Item No. 13
In DA4 Area Yes

NAME OF ITEM Jackson's House

INFORMATION SOURCES USED FOR THIS ASSESSMENT

WRITTEN F Bently and J M Birmingham, History of European Settlement, unpublished report Penrith Lakes Scheme Regional Environmental Study, Dept of Environment and Planning, 1983
Land Title Search for Portion 54 supplied by the PLDC.

ORAL

GRAPHIC

RELATED INFORMATION

TYPE	AUTHOR / TITLE	YEAR	REPOSITORY

PROPERTY DETAILS

LGA Penrith City Council

ZONING SREP NO. 11 (Penrith Lakes)

OWNER Penrith Lakes Development Corporation

OWNER PH/FAX (047) 29 0044 / (047) 30 1462

OWNER ADDRESS Castlereagh Road, CRANEBROOK, NSW 2749

REAL PROPERTY DESCRIPTION

EVALUATION OF SIGNIFICANCE - SUMMARY MATRIX (Heritage Office Use)

VALUES:	historical	aesthetic	social	technical / research
RARE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
REPRESENTATIVE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

MANAGEMENT RECOMMENDATIONS

No further action required.

CONSERVATION &/OR MANAGEMENT PLAN

CLIENT

AUTHOR / NAME / DATE

ENDORSEMENT & DATE

FURTHER INFORMATION

AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

REF NO.

NAME OF ITEM Weatherboard Cottage

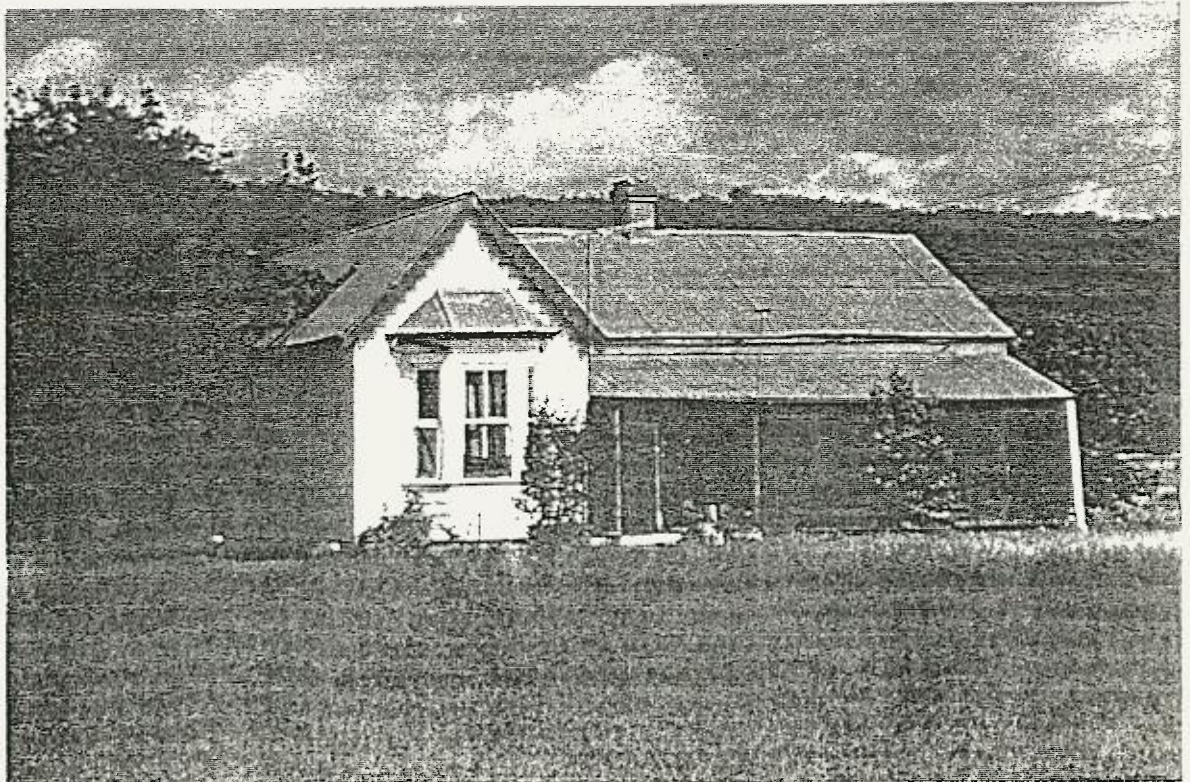
PLDC INFORMATION	1984 RES No. 14	In DA4 Area	Yes	LISTINGS
Surveyed By & Date	A Bickford, S Lavelle, NDHAG. Dec 1996 / Jan 1997			
LOCATION / ADDRESS	373 Castlereagh Road			NSW Statutory
SUBURB / TOWN	UPPER CASTLEREAGH			
POSTCODE	2749			Non Statutory
OTHER NAMES				
ITEM TYPE	Building			
GROUP NAME				
CURRENT USE				
FORMER USE				

STATEMENT OF SIGNIFICANCE

LEVEL Local

- The extant cottage at this site relates to the phase of local dairying, orcharding and other activities which commenced on land holdings in Castlereagh from the late nineteenth century onwards.
- Like several other sites reviewed for this assessment the property is considered representative of a small mixed farm from the era of late nineteenth to early twentieth century development in this locality.

PHOTOGRAPH



FILM ROLL

NEG. NO.

DATE 12 / 1996

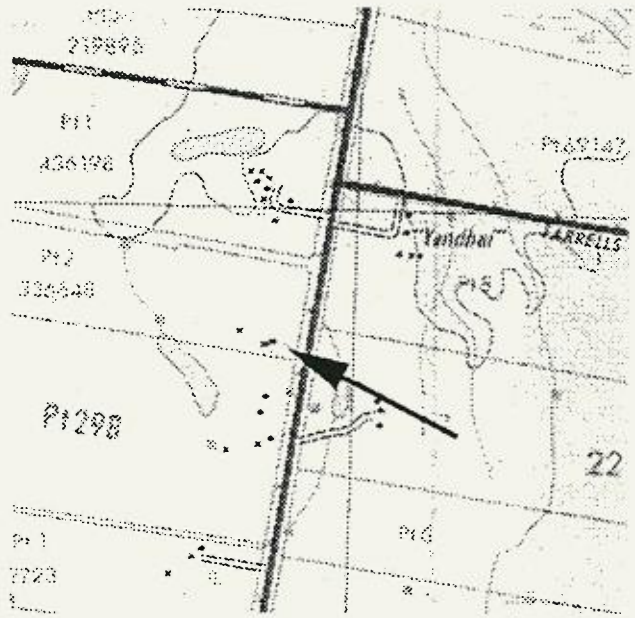
CAPTION

AUTHOR

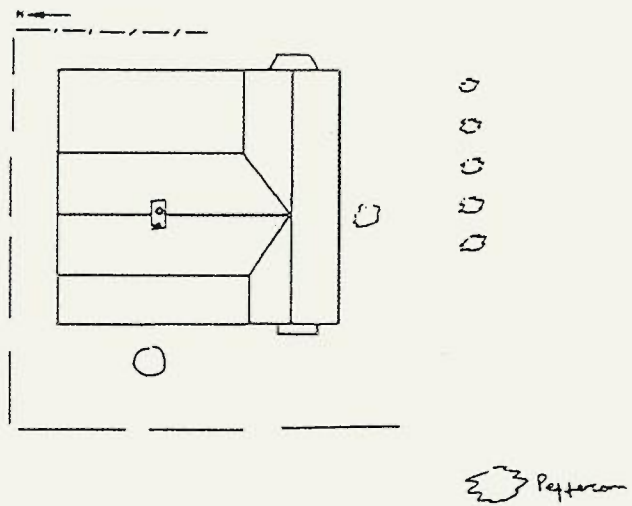
PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT	Heritage Overview / Management Study for DA 4	PLDC INFORMATION
NAME OF ITEM	Weatherboard Cottage	1984 RES Item No. 14
		In DA4 Area Yes

LOCATION PLAN



SKETCH PLAN



MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 838677
Full AMG Grid Ref: Zone 56H 283800 E 6267750 N

DESCRIPTION

Late Victorian style weatherboard cottage. Corrugated iron gable roof. T - shaped plan, gable with fretted timber barge boards and projecting bay window in front elevation, also skillion roofed verandah (now infilled with shade cloth). Some areas of the structure have been reclad - two types of weatherboard evident also fibro along southern wall. Two brick chimneys. Extant details include Late Victorian style fireplace, interior walls and ceilings lined with tongue and groove boards; surviving front door with upper panels of glass. Rear verandah now infilled with fibro. Kitchen formerly accessed via back door, includes large brick fire place for former fuel stove. Several outbuildings/structures situated to the west of the cottage including remains of concrete cow bails and dairy; two circular concrete structures (probably silos); feed or water trough; well with timber tank stand and galvanised iron header tank; brick cistern (domed top); large concrete footing/slab for hayshed-or similar structure. Also several mature plantings including pine trees, pepper tree, and loquat.

Construction Date Physical Condition Modified / Extended

Modifications & Dates

HISTORICAL NOTES

Portion 51 granted to Thomas Lambley 30/06/1803 (80 acs). 40 acs subsequently conveyed to James Morris, thence Elizabeth Buller and thence Samuel Terry in 1816. In 1888 Richard Rouse Terry lodged PA 7290 and CT Vol 902 Fol 198 was issued for land holdings at Castlereagh which included all of Portion 51. During the 1890s the property was subdivided. Lot 4 DP 2223 a parcel of 38 acs was purchased by Alexander Duff in 1896. His widow sold the property in 1903. There were a series of relatively short term ownerships of the 38 acs, until Percy McGee purchased the property in 1922 (CT Vol 3294 Fol 157). In 1937 McGee leased part of the property to Great Western (Nepean) Gravel Mining Limited. The property was acquired by Blue Metal and Gravel in 1978.

HISTORIC THEMES	Local	dairying	Regional	rural settlement
	State	agriculture	National	

AUTHOR

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4
 NAME OF ITEM Weatherboard Cottage

PLDC INFORMATION
 1984 RES Item No. 14
 In DA4 Area Yes

INFORMATION SOURCES USED FOR THIS ASSESSMENT

WRITTEN F Bently and J M Birmingham, *History of European Settlement*, unpublished report Penrith Lakes Scheme Regional Environmental Study, Dept of Environment and Planning, 1983

ORAL

GRAPHIC

RELATED INFORMATION

TYPE	AUTHOR / TITLE	YEAR	REPOSITORY

PROPERTY DETAILS

LGA Penrith City Council ZONING SREP NO. 11 (Penrith Lakes)
 OWNER Penrith Lakes Development Corporation
 OWNER PH/FAX (047) 29 0044 / (047) 30 1462
 OWNER ADDRESS Castlereagh Road, CRANE BROOK, NSW 2749

REAL PROPERTY DESCRIPTION

EVALUATION OF SIGNIFICANCE - SUMMARY MATRIX (Heritage Office Use)				
VALUES:	historical	aesthetic	social	technical / research
RARE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
REPRESENTATIVE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

MANAGEMENT RECOMMENDATIONS

Recording report by NDHAG prior to demolition.

CONSERVATION &/OR MANAGEMENT PLAN

CLIENT

AUTHOR / NAME / DATE

ENDORSEMENT & DATE

FURTHER INFORMATION

AUTHOR

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

REF NO.

NAME OF ITEM Slab and Weatherboard Cottage

PLDC INFORMATION 1984 RES No. 16 In DA4 Area Yes

Surveyed By & Date A Bickford, S Lavelle, NDHAG. Dec 1996 / Jan 1997

LOCATION / ADDRESS Castlereagh Road

SUBURB / TOWN CASTLEREAGH

POSTCODE 2749

OTHER NAMES Puddledock (probably incorrect)

ITEM TYPE Building

GROUP NAME

CURRENT USE Outbuilding / Shed

FORMER USE Residence

LISTINGS

Commonwealth Statutory

NSW Statutory

LEP - Heritage Schedule

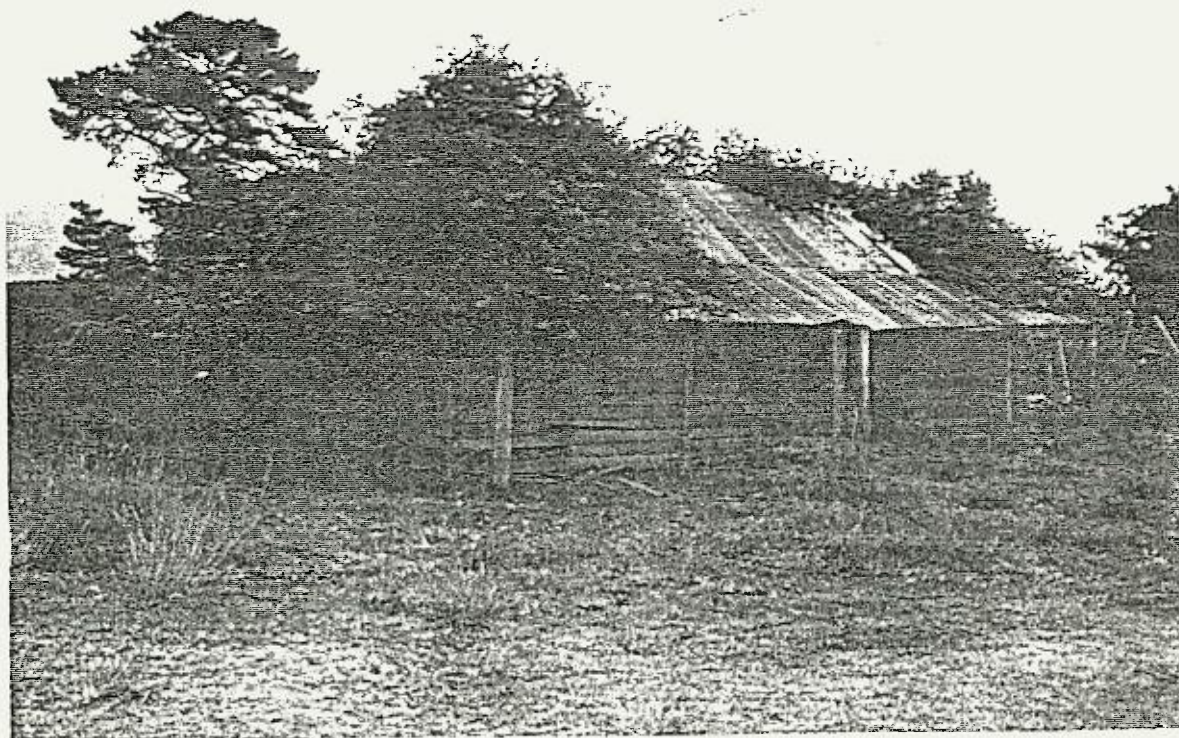
Non Statutory

STATEMENT OF SIGNIFICANCE

LEVEL Local

- Significance severely compromised by removal of this building from its original location.
- Present structure includes some remnant early fabric that was possibly associated with the occupation of the Herbert family from the mid 19th century.

PHOTOGRAPH



FILM ROLL

NEG. NO.

DATE 12 / 1996

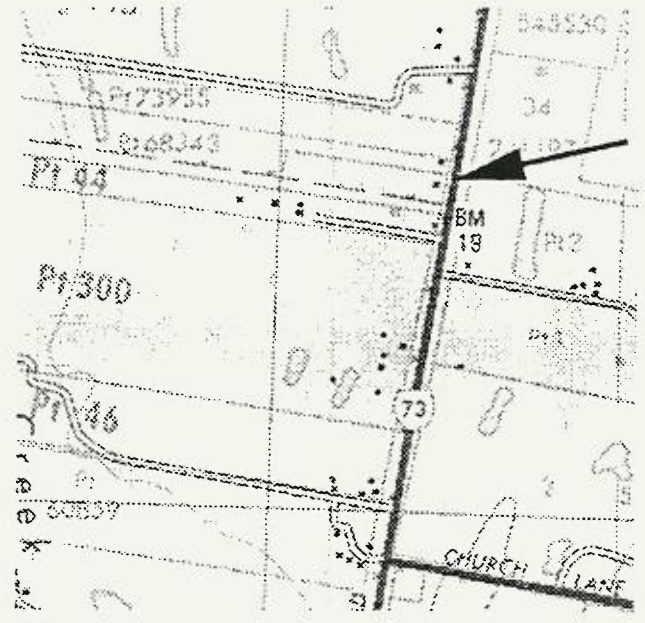
CAPTION

AUTHOR

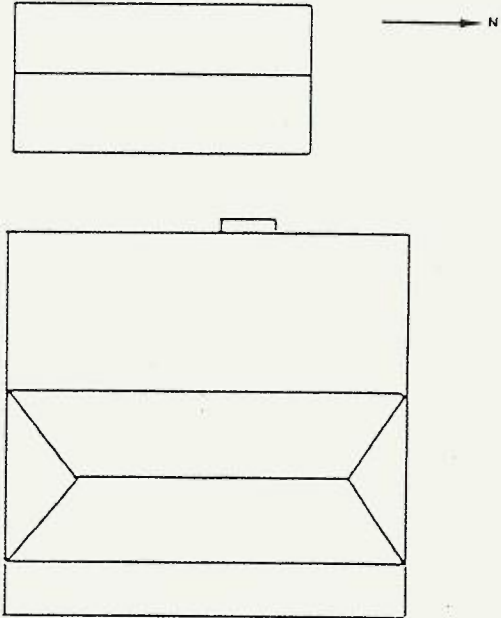
PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT	Heritage Overview / Management Study for DA 4	PLDC INFORMATION
NAME OF ITEM	Slab and Weatherboard Cottage	1984 RES Item No. 16
		In DA4 Area Yes

LOCATION PLAN



SKETCH PLAN



MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 843706
Full AMG Grid Ref: Zone 56H 284300 E 6270600 N

DESCRIPTION

Timber cottage of slab and weatherboard. Framing (walls and roof) is a mixture of undressed timber poles, roughly adzed/squared timbers and some sawn timber elements. Spacing of roof battens is for iron (not shingles). Front wall clad with pit sawn weatherboards, some a plain splayed type, others with beaded edge. Some boards evidence a previous nailing pattern. Southern side and rear (west) clad with timber slabs nailed to top plate and resting on the ground. Brick chimney in centre of rear elevation. Early form front door (4 panel beaded & flush) and windows (each 2 x 6 pane sash). Some internal partitions/walls removed to create two large bays each accessed by an opening or double doorway at the northern end of the building. Hipped corrugated iron roof above main bay, skillion verandah across the front elevation (with cobble/concrete floor), also iron skillion roof over rear bay. Interior: Pine ceiling in the main bay (6" tongue & groove), no ceiling in the rear skillion. Interior walls lined with horizontal boards of different widths - some pit sawn up to 10", others 5.5" tongue & groove. Floor of butted timber boards laid on the ground.

Construction Date _____ **Physical Condition** _____ **Modified** _____

Modifications & Dates extant building moved and/or constructed of reused materials from another site.

HISTORICAL NOTES

Portion 44 originally granted to Gilbert Goodlit 30/06/1803 (80 acs). In 1803 or 1806 the property was leased to John Herbert, becoming his property at the expiration of the lease. In 1825 the property was divided into equal shares of 16 acs each which went to John Herbert's sons: Joseph, John jnr, James, William and Charles. In 1912, two of the subdivisions were recombined into a single 32 ac portion with PA18343 lodged by Edward Herbert. Members of the Herbert family retained the property (described as 37 acs on CT Vol 2432 Fol 144) until its purchase by L D and E M Perkins in 1943. Perkins family also purchased the (adjoining) northern subdivision of Portion 44 in 1947. Herbert family descendants have suggested that the extant slab building was constructed by James Herbert (d.1877) and was the family homestead known as "Puddledock". A farm and occupied premises are noted in the 1874 Will of James Herbert (Bk 805, No117), however no building is shown in this location on the 1873 road plan. This interpretation also conflicts with oral history provided by Mr Perkins (owner since 1943). He advises that due to flooding in the late 19th century, the slab building was moved from another site closer to the Nepean River (where archaeological material has been revealed by ploughing) onto the higher ground close to Castlereagh Road. Another small building is also shown on the northern subdivision of Portion 44 on both the 1873 road plan and on CT Vol 3460 Fol 31, dated 1923. Perkins advises that this was also a timber slab cottage which was sold and removed from the site in the 1950s.

HISTORIC THEMES	Local	family relationships	Regional	rural settlement
	State	agriculture	National	

AUTHOR _____

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

NAME OF ITEM Penrith Quarry Complex

REF NO.

PLDC INFORMATION 1984 RES No. 21 In DA4 Area Yes

LISTINGS

Surveyed By & Date A Bickford, S Lavelle, NDHAG. Dec 1996 / Jan 1997

Commonwealth Statutory

LOCATION / ADDRESS Purcells Lane
 SUBURB / TOWN UPPER CASTLEREAGH
 POSTCODE 2749

NSW Statutory

OTHER NAMES

ITEM TYPE Other work

GROUP NAME

Non Statutory

CURRENT USE Abandoned and Derelict

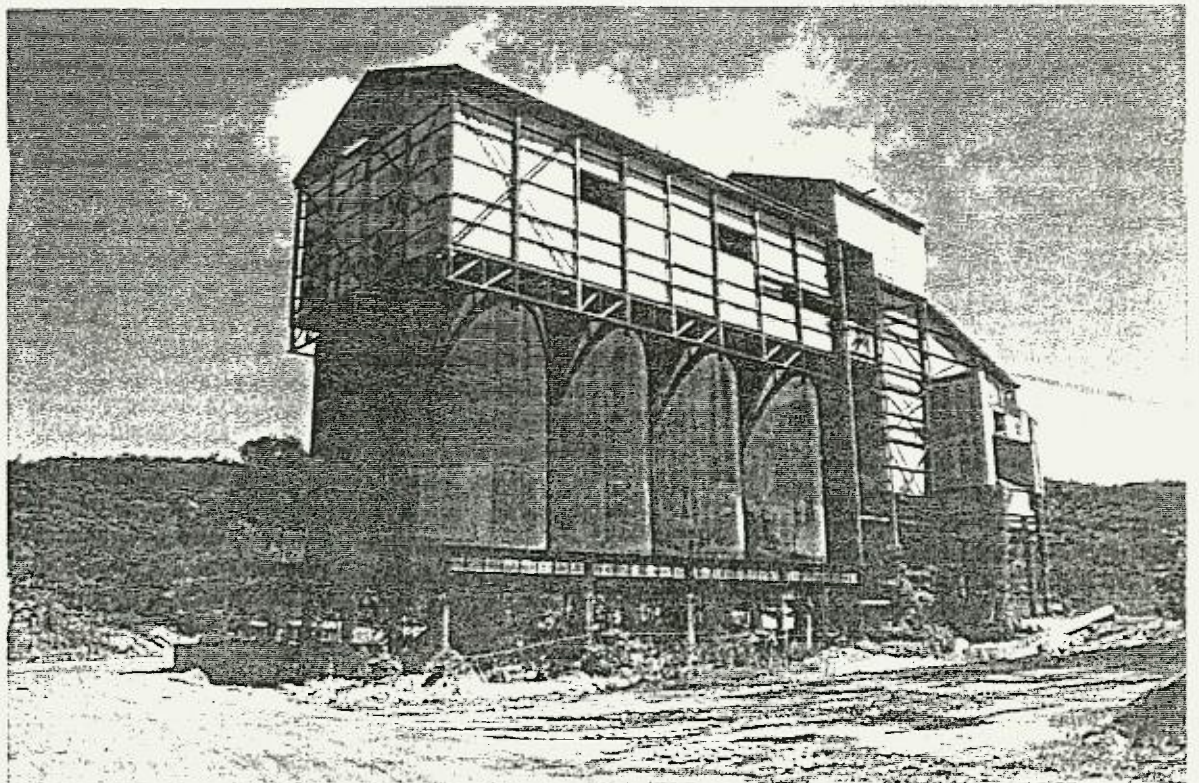
FORMER USE Quarry plant

STATEMENT OF SIGNIFICANCE

LEVEL Regional

• Quarrying is now the major activity occurring at Castlereagh, and has a long history in the locality. Formal gravel companies were established in the area in the late nineteenth century, beginning at Emu Plains.
 RES Site 21 includes substantial remnants of the plant which demonstrate the earlier technology. The plant at RES Site 21 is the oldest surviving plant within the Scheme area.

PHOTOGRAPH



FILM ROLL

NEG. NO.

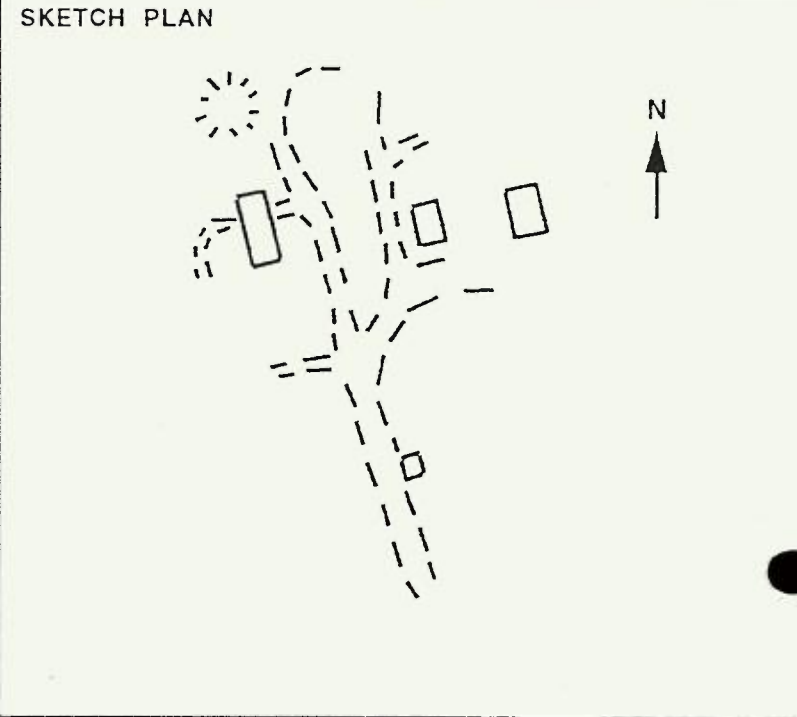
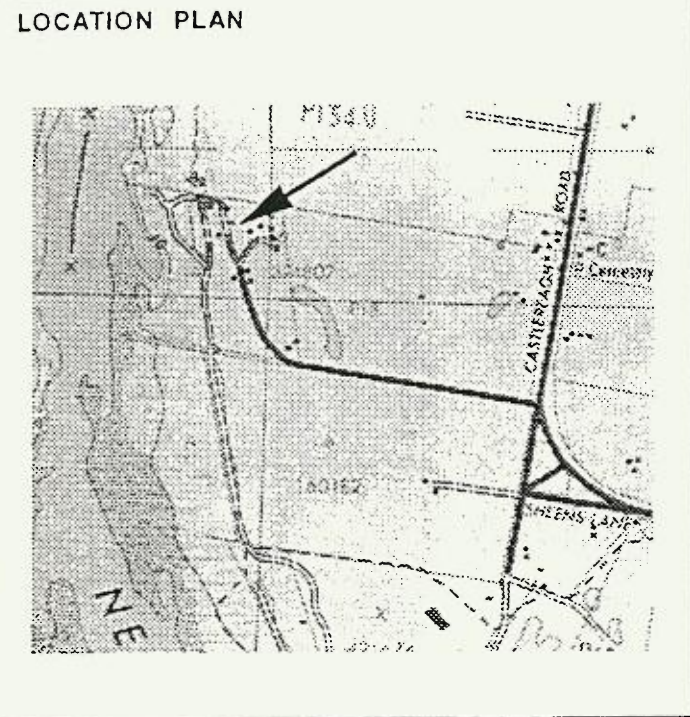
DATE 12 / 1996

CAPTION

AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT	Heritage Overview / Management Study for DA 4	PLDC INFORMATION
		1984 RES Item No. 21 In DA4 Area Yes
NAME OF ITEM	Penrith Quarry Complex	



MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 829662
Full AMG Grid Ref: Zone 56H 282950 E 6266200 N

DESCRIPTION

The size of the disused screen house with large rivetted steel cylinders (storage bins) makes it a visibly prominent feature in the area. The upper section of the screen house is clad with corrugated fibro inside an external steel frame. The complex formerly included a crushing plant and elevated conveyors, but these do not survive. Near the screen house are several large fibro sheds and offices. These have been vandalised and are in poor repair. The office building at the entrance is formally planted with poplars. The first appearance of quarrying in the LT documents appears in March 1940 when Field leased part of the land to Industrial Metal and Gravel. Therefore the crushing plant and associated buildings must have been built after 1940.

Construction Date 1940s

Physical Condition Damaged / Disturbed

Modifications & Dates

HISTORICAL NOTES

80 acres was granted to John Pickering in June 1803. In 1805 he sold the Southern 40 acres to George Colless, farmer. In 1809 he sold the Northern half to John Bowman of Richmond Hill. In about 1823 Bowman sold the Northern half to George Colless. The land stayed in Colless family hands until in the 1920s it was gradually purchased by Ernest George Field, farmer, of Castlereagh. In March 1940 Field leased part of the land to Industrial Metal and Gravel (Nepean) Ltd. And in July 1946 another part was leased to Quarries Pty Ltd. Section A, the river third of the land (Shown on the topo map), was sold to Quarries in July 1951. In 1960 Section B was sold to Blue Metal Industries Ltd. Informants advise that the plant was constructed in about 1950 and operated for about 10 years.

HISTORIC THEMES	Local	gravel quarrying	Regional	industrial development
	State	industry	National	

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

REF NO.

NAME OF ITEM Federation Cottage

PLDC INFORMATION 1984 RES No. 22 In DA4 Area Yes

LISTINGS

Surveyed By & Date A Bickford, S Lavelle, NDHAG. Dec 1996 / Jan 1997

Commonwealth Statutory

LOCATION / ADDRESS 359 Castlereagh Road

SUBURB / TOWN UPPER CASTLEREAGH

POSTCODE 2749

NSW Statutory

OTHER NAMES

ITEM TYPE Building

GROUP NAME

CURRENT USE

FORMER USE

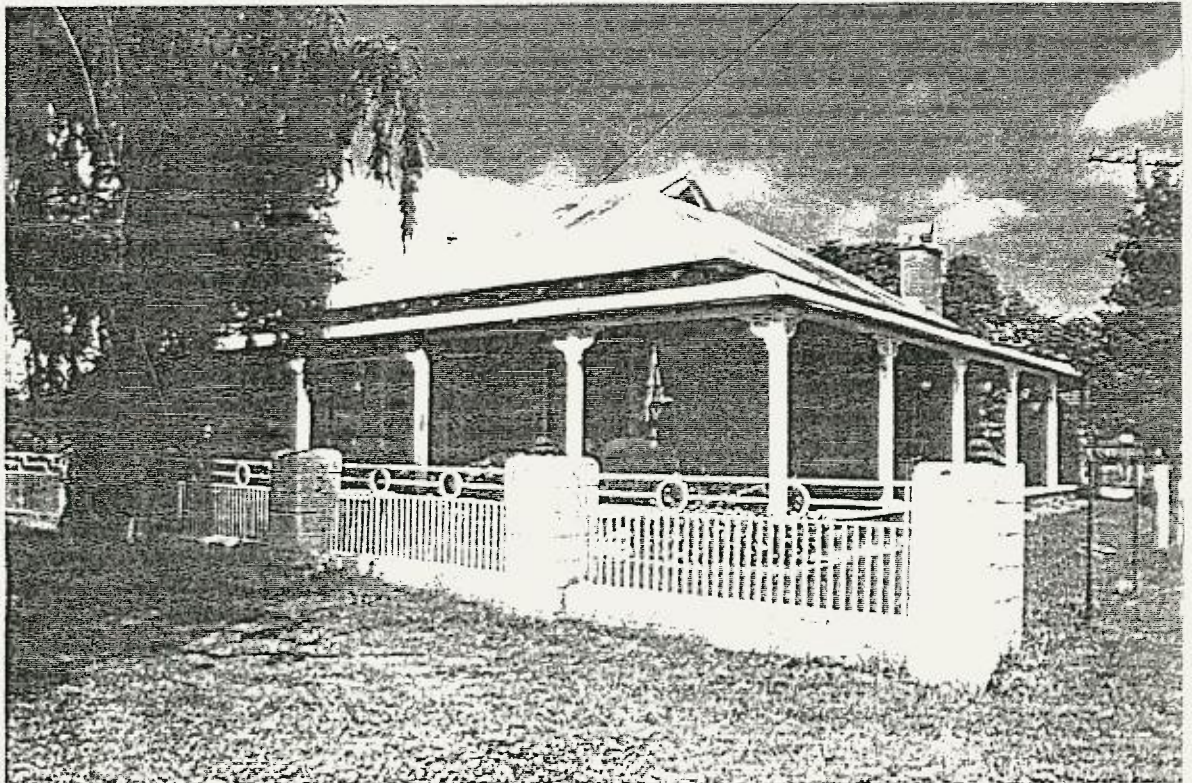
Non Statutory

STATEMENT OF SIGNIFICANCE

LEVEL Local

- The extant cottage at this site relates to the phase of local dairying, orcharding and other activities which commenced on land holdings in Castlereagh from the late nineteenth century onwards.
- Like several other sites reviewed for this assessment the property is considered representative of a small mixed farm from the era of late nineteenth to early twentieth century development in this locality.

PHOTOGRAPH



FILM ROLL

NEG. NO.

DATE 12 / 1996

CAPTION

AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT

Heritage Overview / Management Study for DA 4

PLDC INFORMATION

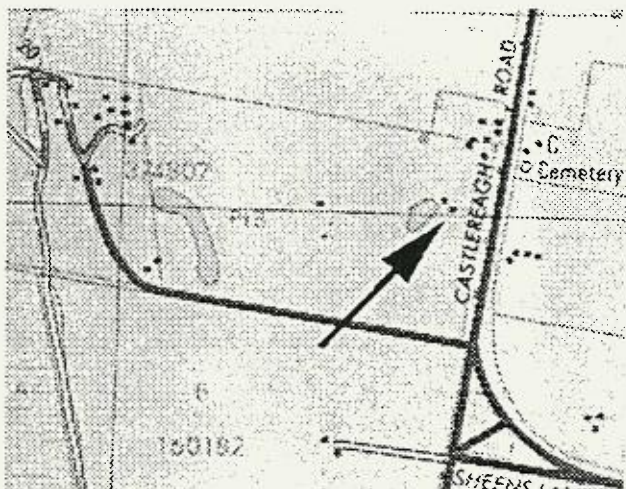
1984 RES Item No.22

NAME OF ITEM

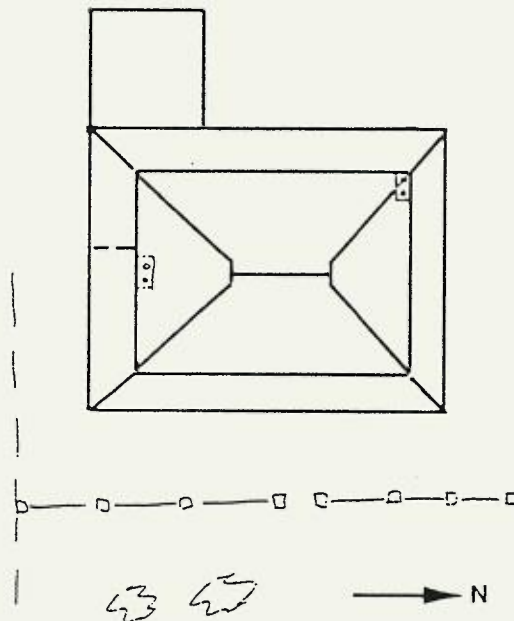
Federation Cottage

In DA4 Area Yes

LOCATION PLAN



SKETCH PLAN



MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 835660
Full AMG Grid Ref: Zone 56H 283550 E 6266000 N

DESCRIPTION

Rendered brick cottage, ruled and struck to imitate masonry coursing. Rendered brick chimney with concrete cowl. Gambrel roof of corrugated iron roof, exposed rafters below eaves. Iron bullnosed verandah supported by timber posts with sun ray motif brackets. Verandah open on three sides, partly infilled by a brick addition at the rear (west), also some fibro infill on the southern side. Square timber box window framing projects from wall and is supported by timber corbels/brackets.

Interior is very intact, with original decorative timber and ceilings.

Occupants advise that the lounge room fireplace was recently demolished because of termite infestation. It is not known how extensive the termite damage is.

Construction Date c1890-1915

Physical Condition Modified / Extended

Modifications & Dates

HISTORICAL NOTES

Portion 55, 80 acres, was granted to John Pickering in June 1803.

In 1805 he sold the Southern 40 acres to George Colless, farmer. In 1809 he sold the Northern half to John Bowman of Richmond Hill. In about 1823 Bowman sold the Northern half to George Colless.

The land title information indicates that a house had been erected by 1897.

The change in land value between 1886 and 1896 suggests that the house may have been built in this period, which is also suggested by the style of the current house. The land stayed in Colless family hands until the 1920s. It was gradually purchased by Ernest George Field, farmer, of Castlereagh.

HISTORIC THEMES

Local dairying

Regional rural settlement

State agriculture

National

AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

REF NO.

NAME OF ITEM Parker's Homestead

PLDC INFORMATION 1984 RES No. 23 In DA4 Area No

Surveyed By & Date A Bickford, S Lavelle, NDHAG. Dec1996 / Jan 1997

LISTINGS

Commonwealth Statutory

LOCATION / ADDRESS Castlereagh Road

SUBURB / TOWN UPPER CASTLEREAGH

POSTCODE 2749

OTHER NAMES Roseville

ITEM TYPE Building

NSW Statutory

GROUP NAME

CURRENT USE

FORMER USE

Non Statutory

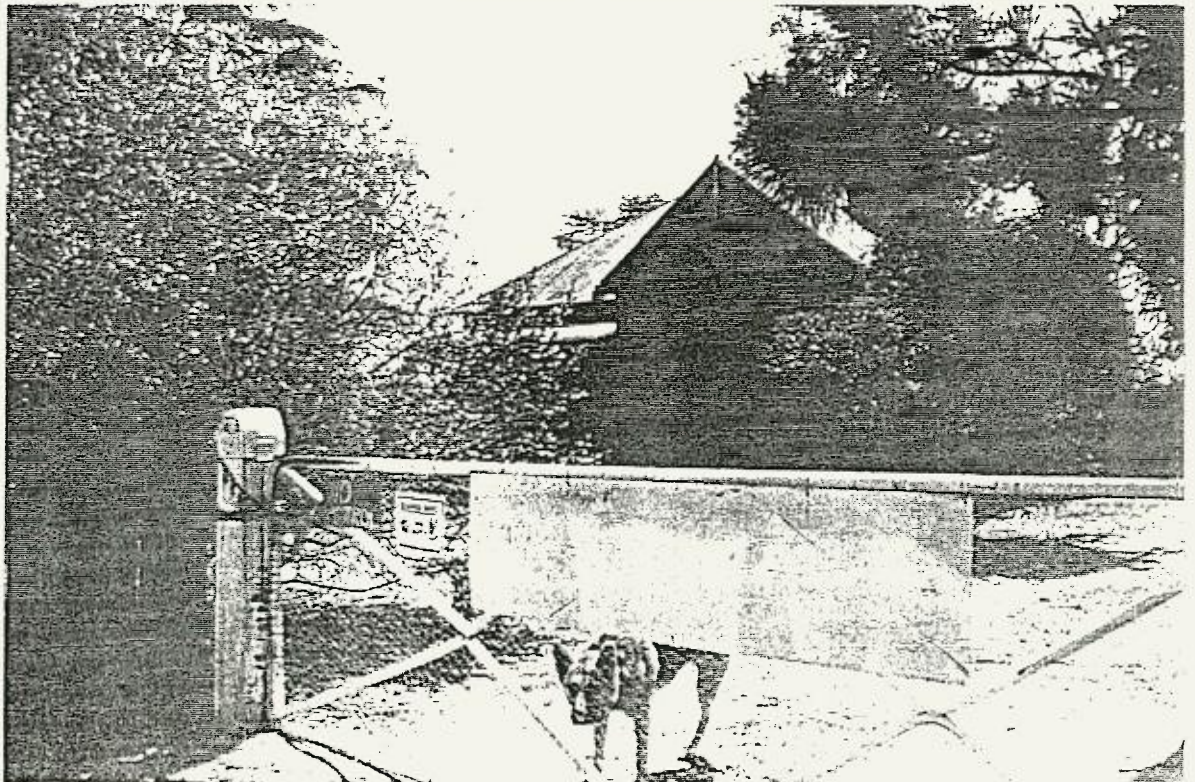
STATEMENT OF SIGNIFICANCE

LEVEL Local

Not able to be properly inspected or assessed during the field survey as access was denied by the occupants.

- Like the other early twentieth homesteads examined during this study, RES 23 reflects the renewed growth occurring in the district at that time.

PHOTOGRAPH



FILM ROLL

NEG. NO.

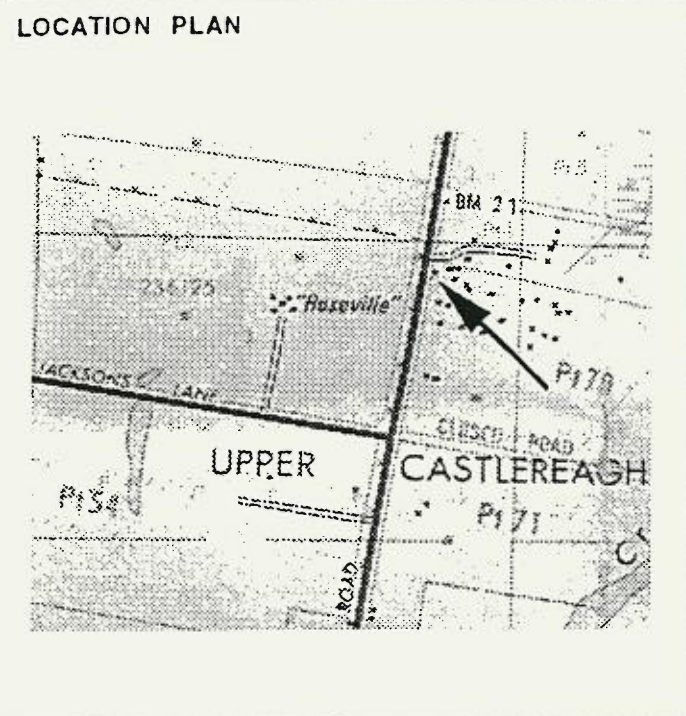
DATE 12 / 1996

CAPTION

AUTHOR

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4 NAME OF ITEM Parker's Homestead	PLDC INFORMATION 1984 RES Item No.23 In DA4 Area No
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MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 838667
 Full AMG Grid Ref: Zone 56H 283800 E 6266700 N

DESCRIPTION

Brick house. Hipped iron roof with projecting gabled bay on front elevation, upper section of gable roughcast rendered. Metal awing over window within bay. Also bullnosed verandah on front elevation. House extended to the rear (east), extensions probably 1950s. Outbuildings at rear also c1950s.

Construction Date c1910	Physical Condition Modified / Extended
-------------------------	--

Modifications & Dates

HISTORICAL NOTES

HISTORIC THEMES	Local	Regional	
	State	National	

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

PLDC INFORMATION
1984 RES Item No.23
In DA4 Area No

NAME OF ITEM Parker's Homestead

INFORMATION SOURCES USED FOR THIS ASSESSMENT

WRITTEN F Bently and J M Birmingham, *History of European Settlement*, unpublished report Penrith Lakes Scheme Regional Environmental Study, Dept of Environment and Planning, 1983

ORAL

GRAPHIC

RELATED INFORMATION

TYPE	AUTHOR / TITLE	YEAR	REPOSITORY

PROPERTY DETAILS

LGA Penrith City Council

ZONING SREP NO. 11 (Penrith Lakes)

OWNER Penrith Lakes Development Corporation

OWNER PH/FAX (047) 29 0044 / (047) 30 1462

OWNER ADDRESS Castlereagh Road, CRANEBROOK, NSW 2749

REAL PROPERTY DESCRIPTION

EVALUATION OF SIGNIFICANCE - SUMMARY MATRIX (Heritage Office Use)				
VALUES:	historical	aesthetic	social	technical / research
RARE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
REPRESENTATIVE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

MANAGEMENT RECOMMENDATIONS

CONSERVATION &/OR MANAGEMENT PLAN

CLIENT

AUTHOR /
NAME /
DATE

ENDORSEMENT
& DATE

FURTHER INFORMATION

AUTHOR

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

NAME OF ITEM Federation Cottage

REF NO.

PLDC INFORMATION 1984 RES No. 25 In DA4 Area Yes

LISTINGS

Surveyed By & Date A Bickford, S Lavelle, NDHAG, Dec 1996 / Jan 1997

Commonwealth Statutory

LOCATION / ADDRESS 370 Castlereagh Road

SUBURB / TOWN UPPER CASTLEREAGH

POSTCODE 2749

NSW Statutory

OTHER NAMES

ITEM TYPE Building

GROUP NAME

Non Statutory

CURRENT USE

FORMER USE

STATEMENT OF SIGNIFICANCE

LEVEL Local

- The extant cottage at this site relates to occupation from the late nineteenth century onwards. This phase of local occupation saw the commencement of dairying, orcharding and other activities on land holdings in Castlereagh.
- Like several other sites reviewed for this assessment the property is considered representative of a small mixed farm from the era of late nineteenth to early twentieth century development in this locality.

PHOTOGRAPH



FILM ROLL

NEG. NO.

DATE 12 / 1996

CAPTION

AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

REF NO.

NAME OF ITEM Bungalow

PLDC INFORMATION 1984 RES No. 27 In DA4 Area Yes

LISTINGS

Surveyed By & Date A Bickford, S Lavelle, NDHAG. Dec 1996 / Jan 1997

Commonwealth Statutory

LOCATION / ADDRESS 107 Castlereagh Road

SUBURB / TOWN CASTLEREAGH

POSTCODE 2749

NSW Statutory

OTHER NAMES

ITEM TYPE Building

GROUP NAME

Non Statutory

CURRENT USE

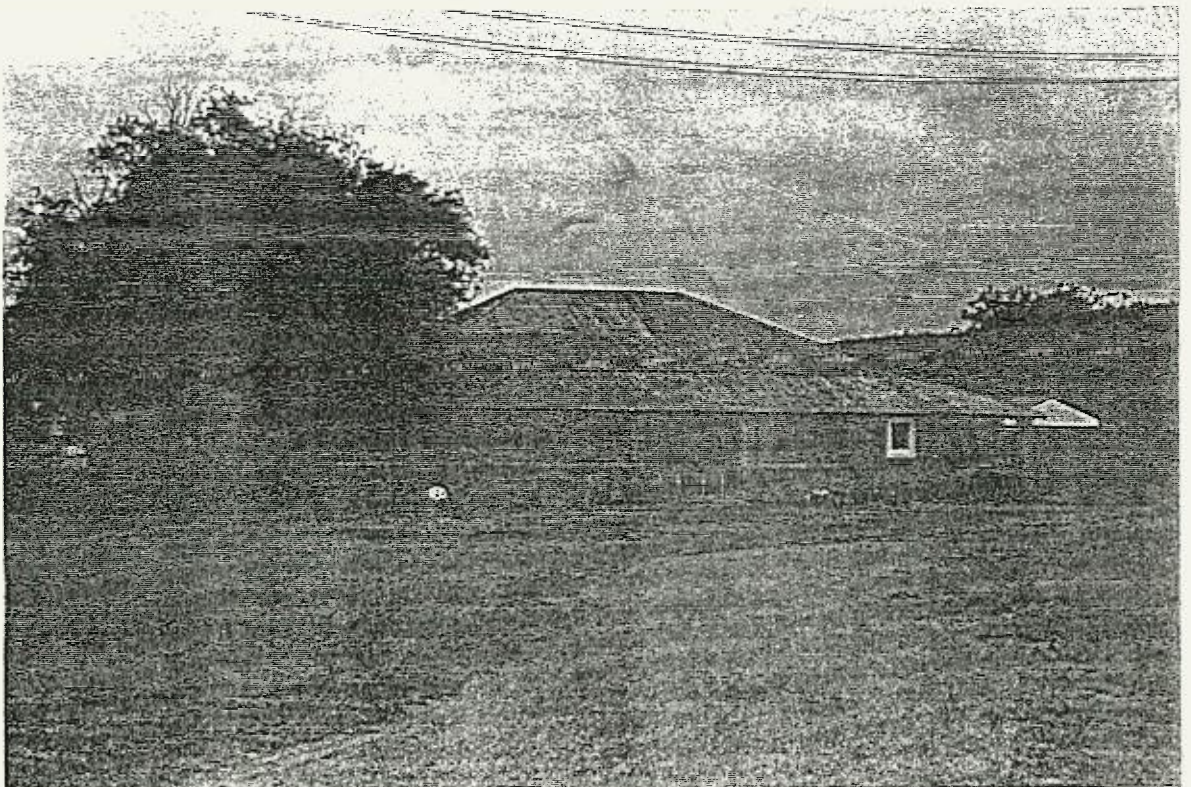
FORMER USE

STATEMENT OF SIGNIFICANCE

LEVEL Local

- The extant cottage at this site reflects the twentieth century phase of increased small holdings in Castlereagh.
- The cottage appears to relate to the Closer Settlement phase.

PHOTOGRAPH



FILM ROLL

NEG. NO.

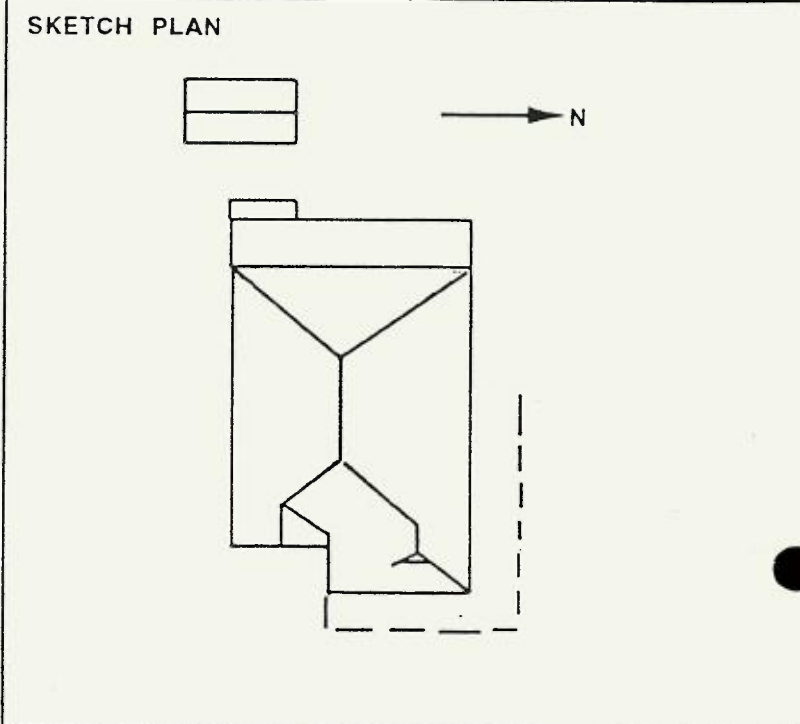
DATE 12 / 1996

CAPTION

AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT	Heritage Overview / Management Study for DA 4	PLDC INFORMATION
NAME OF ITEM	Bungalow	1984 RES Item No. 27
		In DA4 Area Yes



MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 842702
 Full AMG Grid Ref: Zone 56H 284200 E 6270250 N

DESCRIPTION

Bungalow style house constructed of stretcher bond face brickwork. Hipped corrugated iron roof, rafters exposed below eaves. Small gabled bays on front elevation with timber shingle detailing infilling the gable. Verandah on three sides, with brick piers and infill brick dwarf wall. Casement windows, some with leadlight detailing. Front door of french door form with multiple small glass panes and sidelights. Double brick arched heads to window and door openings.

House contains 4 bedrooms, lounge and dining room, plus kitchen, bathroom, etc. Retains internal detailing including picture rails and moulded plaster ceilings. Ceiling motifs include waratah, rose and cherubs.

Construction Date 1920s -1930s	Physical Condition Intact / Undisturbed
Modifications & Dates	

HISTORICAL NOTES

Originally Portion 45 granted to Joseph Griffiths in 1803. Primary Application by Robert Robertson in 1907. In 1920 the portion was surrendered for the purposes of the Closer Settlement of Returned Soldiers. Renumbered as Portion 300 and purchased by Raymond Charles Lane in 1924 (Vol 3584 Fol 78). Transferred by Lane to George Booth in 1928. Booth fails to discharge mortgage and property resold by Lane as mortgagee exercising power of sale in 1930.

HISTORIC THEMES	Local	Regional rural settlement	
	State	National	

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT	Heritage Overview / Management Study for DA 4	PLDC INFORMATION
NAME OF ITEM	Bungalow	1984 RES Item No.27 In DA4 Area Yes

INFORMATION SOURCES USED FOR THIS ASSESSMENT

WRITTEN F Bently and J M Birmingham, *History of European Settlement*, unpublished report Penrith Lakes Scheme Regional Environmental Study, Dept of Environment and Planning, 1983

ORAL

GRAPHIC

RELATED INFORMATION

TYPE	AUTHOR / TITLE	YEAR	REPOSITORY

PROPERTY DETAILS

LGA Penrith City Council ZONING SREP NO. 11 (Penrith Lakes)

OWNER Penrith Lakes Development Corporation

OWNER PH/FAX (047) 29 0044 / (047) 30 1462

OWNER ADDRESS Castlereagh Road, CRANE BROOK, NSW 2749

REAL PROPERTY DESCRIPTION

EVALUATION OF SIGNIFICANCE - SUMMARY MATRIX (Heritage Office Use)				
VALUES:	historical	aesthetic	social	technical / research
RARE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
REPRESENTATIVE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

MANAGEMENT RECOMMENDATIONS

Recording report by NDHAG. Interior details such as ceilings to be photographed.

CONSERVATION &/OR MANAGEMENT PLAN	CLIENT
AUTHOR / NAME / DATE	ENDORSEMENT & DATE

FURTHER INFORMATION

AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

REF NO.

NAME OF ITEM Bungalow

PLDC INFORMATION 1984 RES No. 28 In DA4 Area Yes

LISTINGS

Surveyed By & Date A Bickford, S Lavelle, NDHAG, Dec 1996 / Jan 1997

Commonwealth Statutory

LOCATION / ADDRESS Castlereagh Road

SUBURB / TOWN CASTLEREAGH

POSTCODE 2749

OTHER NAMES

ITEM TYPE Building

GROUP NAME

CURRENT USE Residence

FORMER USE Residence

NSW Statutory

Non Statutory

STATEMENT OF SIGNIFICANCE

LEVEL Local

- The extant cottage at this site reflects the twentieth century phase of increased small holdings in Castlereagh.
- The property also has some local social and historic significance having been built by a notable member of the locally prominent Howell family from 1930.

PHOTOGRAPH



FILM ROLL

NEG. NO.

DATE 12 / 1996

CAPTION

AUTHOR AB, SL, NDHAG

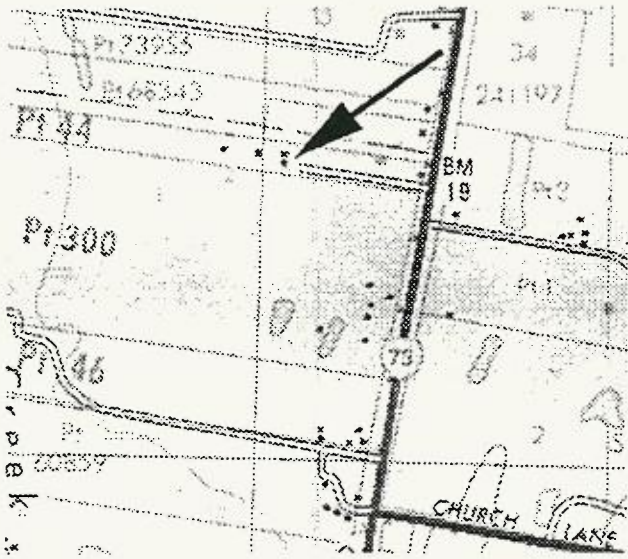
PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

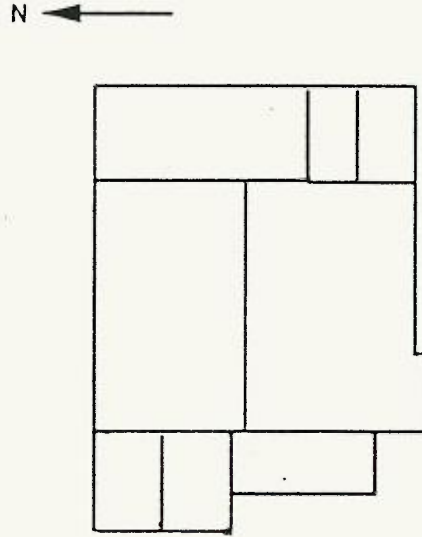
PLDC INFORMATION
1984 RES Item No. 28
In DA4 Area Yes

NAME OF ITEM Bungalow

LOCATION PLAN



SKETCH PLAN



MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 840705
Full AMG Grid Ref: Zone 56H 284000 E 6270500 N

DESCRIPTION

Bungalow style house constructed of concrete blocks with some decorative brick detailing. Main gable roof and projecting smaller half timbered gable. Timber framed casement windows. Verandah on front elevation, now partially infilled. Interior in poor condition, retains some original detailing such as high waisted four panel doors, moulded plaster ceilings with scalloped cornices and two decorative timber archways.

Additional outbuildings of slab and weatherboard noted in previous survey report.

Construction Date c1930 Physical Condition Modified / Extended

Modifications & Dates

HISTORICAL NOTES

Extant building within Portion 44 granted to Gilbert Goodlit 30/06/1803. Property leased to John Herbert either 1803 or 1806, becoming his property at the expiration of the lease. In 1825 the property was divided into 5 equal shares of 16 acs each which went to John Herbert's sons: Joseph, John jnr, James, William and Charles. After his death in 1873 the 16 ac portion of John jnr passed to his daughter Emma Jane Clarke (Mtge regd. Bk 841 No 423). Upon the death of E J Clarke the property was inherited by her daughter Maude Matilda Clarke. The property was sold by M M Clarke to William Hunter Howell in 1930 (Bk 1609 No 149).
Extant house likely to relate to Howell purchase and occupation - Present tenants (C Roach) advise that house was built by William Howell.
The property was purchased by the Rio Pioneer Gravel Co. in 1974.

HISTORIC THEMES	Local	dairying , orcharding	Regional	rural settlement
	State	agriculture	National	

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

NAME OF ITEM Farm Complex / Mass Concrete House (3)

REF NO.

PLDC INFORMATION 1984 RES No. 29 In DA4 Area Yes

Surveyed By & Date A Bickford, S Lavelle, NDHAG. Dec 1996 / Jan 1997

LISTINGS

Commonwealth Statutory

LOCATION / ADDRESS Castlereagh Road

SUBURB / TOWN CASTLEREAGH

POSTCODE 2749

OTHER NAMES Pise House

ITEM TYPE Building complex

NSW Statutory

GROUP NAME

CURRENT USE Residence

FORMER USE

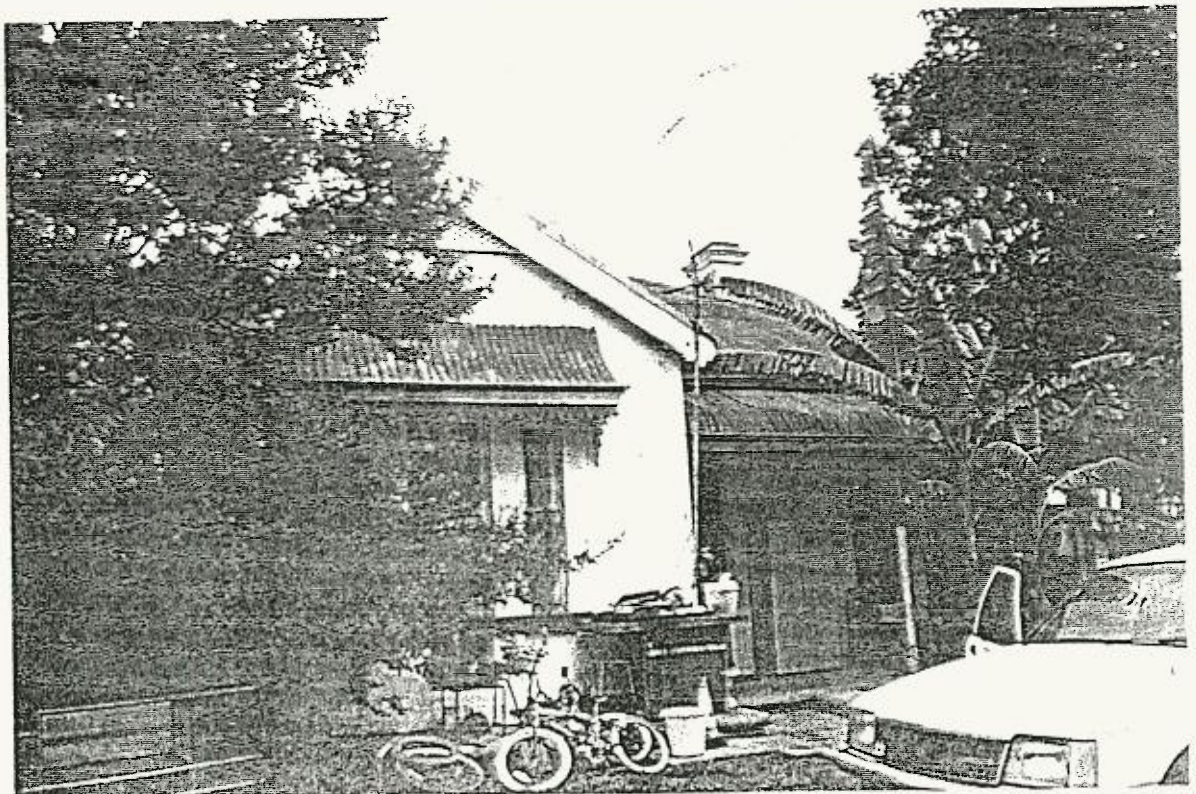
Non Statutory

STATEMENT OF SIGNIFICANCE

LEVEL Local

- The form of construction of the mass concrete house is relatively unusual, although it appears to be more common in the Castlereagh area than reported in previous studies. The construction is of some technical significance in the choice of both materials and methods, which are likely to have been locally obtained and developed.
- The construction of the extant house reflects the late nineteenth to mid twentieth century phase of increased small holdings in the Castlereagh area, with the development of local dairying and other activities to serve an increasing Sydney market.
- The property also has some local social and historic significance having been held by the descendants/branches of the original grantee's family (Kennedy/Ritchie/Howell) from 1803 to 1971.
- William Howell was a notable local identity, having been an Australian test cricket player.

PHOTOGRAPH



FILM ROLL

NEG. NO.

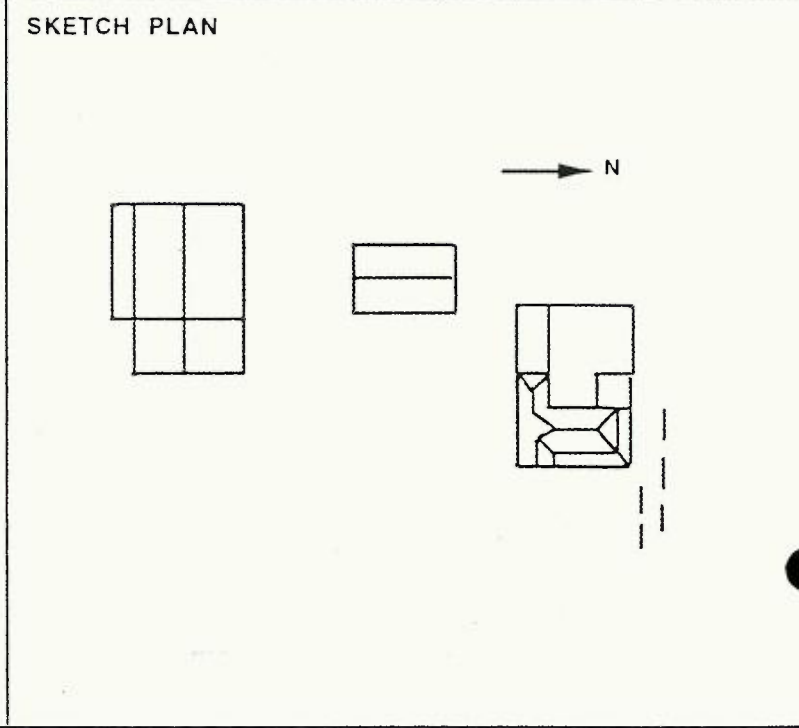
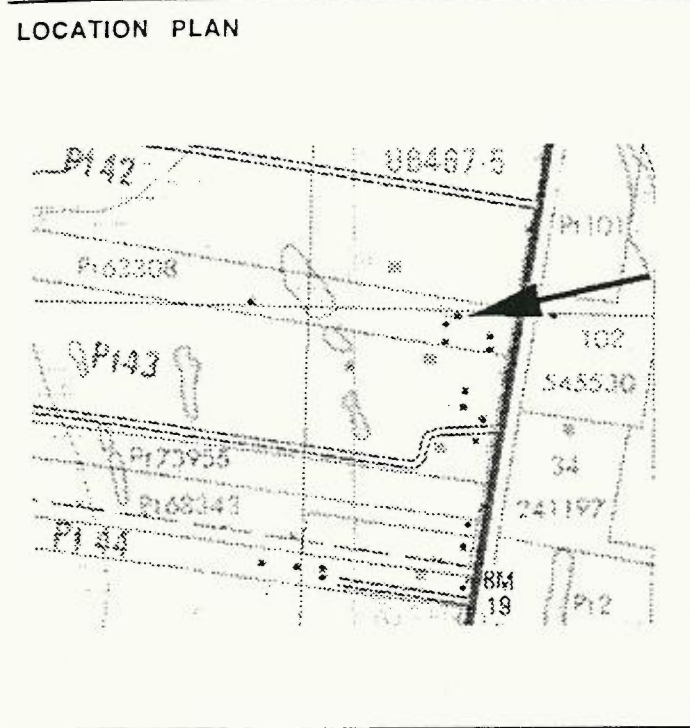
DATE 12 / 1996

CAPTION

AUTHOR

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT	Heritage Overview / Management Study for DA 4	PLDC INFORMATION
NAME OF ITEM	Farm Complex / Mass Concrete House (3)	1984 RES Item No. 29
		In DA4 Area Yes



MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 842710
Full AMG Grid Ref: Zone 56H 284250 E 6271000 N

DESCRIPTION

House of mass concrete construction using a sand / cement mix and large diameter river pebbles, hipped tile roof. Main portion of house containing six rooms. Bullnosed verandah with cast iron columns and iron lace valence on the north and east sides. Extension forming an attached wing at the rear below a skillion roof, also another larger and later-date rear extension enclosing a formerly open rear verandah area. Roof-fed concrete cistern adjoining the end of the skillion. Walls are cement rendered, with the exterior walls ruled and struck in imitation of masonry. Moulded decorative border around exterior of windows, and chamfered base course. Three rendered brick chimneys with elaborate decorative moulding. The mass concrete form of construction is relatively unusual (although three examples have been identified by the present survey) and probably relates to the close availability of the materials (cement and river aggregate pebbles) due to nearby quarrying activities based upon the Nepean River. Other features on the property include a large corrugated iron clad barn, yards, and another (dilapidated) timber framed and

Construction Date 1902 **Physical Condition** Modified / Extended

Modifications & Dates

HISTORICAL NOTES

Portion 42 originally granted to Donald Kennedy 30/06/1803 (160 acs). After death of Donald Kennedy in 1829 the 160 acs passed to his daughter Ann Ritchie. Following the death of Ann Ritchie in 1865 the 160 acs was subdivided by a family agreement in 1884. The southern subdivision of 80 acs on which the pise house is situated passed to Thomas William Hobby and Archibald Joseph Hobby. T W Hobby's portion was acquired by George Howell in 1891. Following the death of George Howell in 1902 the property passed to his son William Peter Howell. The property remained in the hands of the Howell family until 1971.

The Obituary for Mrs George Howell (died July 1902) notes that William Howell has had a new home erected (= RES Site 29). William Howell was an Australian test cricket player.

HISTORIC THEMES	Local	orcharding, dairying family relationships	Regional	rural settlement
	State	agriculture	National	

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

PLDC INFORMATION
1984 RES Item No.29
In DA4 Area Yes

NAME OF ITEM Farm Complex / Mass Concrete House (3)

INFORMATION SOURCES USED FOR THIS ASSESSMENT

WRITTEN F Bently and J M Birmingham, *History of European Settlement*, unpublished report Penrith Lakes Scheme Regional Environmental Study, Dept of Environment and Planning, 1983

ORAL

GRAPHIC

RELATED INFORMATION

TYPE	AUTHOR / TITLE	YEAR	REPOSITORY

PROPERTY DETAILS

LGA Penrith City Council

ZONING SREP NO. 11 (Penrith Lakes)

OWNER Penrith Lakes Development Corporation

OWNER PH/FAX (047) 29 0044 / (047) 30 1462

OWNER ADDRESS Castlereagh Road, CRANEBROOK, NSW 2749

REAL PROPERTY DESCRIPTION Pt Portion 42

EVALUATION OF SIGNIFICANCE - SUMMARY MATRIX (Heritage Office Use)

VALUES:	historical	aesthetic	social	technical / research
RARE	Local			
REPRESENTATIVE				

MANAGEMENT RECOMMENDATIONS

Recording report by NDHAG prior to demolition.

CONSERVATION &/OR MANAGEMENT PLAN

CLIENT

AUTHOR / NAME / DATE

ENDORSEMENT & DATE

FURTHER INFORMATION

AUTHOR

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

REF NO.

NAME OF ITEM Lee's House

PLDC INFORMATION 1984 RES No. 34 In DA4 Area No

Surveyed By & Date A Bickford, S Lavelle, NDHAG. Dec 1996 / Jan 1997

LISTINGS

Commonwealth Statutory

LOCATION / ADDRESS Castlereagh Road

SUBURB / TOWN UPPER CASTLEREAGH

POSTCODE 2749

OTHER NAMES

ITEM TYPE Archaeological / Historic Site

GROUP NAME

CURRENT USE

FORMER USE Residence

NSW Statutory

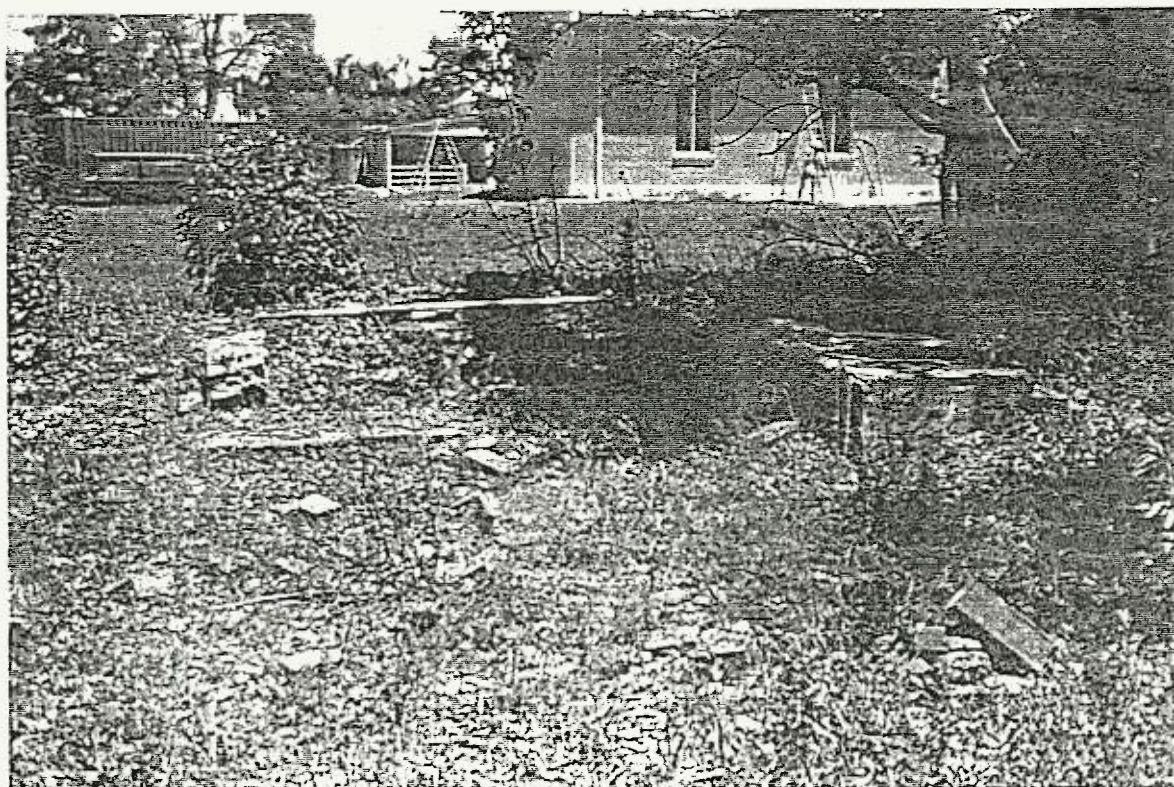
Non Statutory

STATEMENT OF SIGNIFICANCE

LEVEL Local

- Site has some social significance as it was built and occupied by members of the Lees family, closely associated with the early Methodist community of Castlereagh.
- No archaeological significance due to disturbance of the site, also original house site (east of Cranebook Creek) has been destroyed .

PHOTOGRAPH



FILM ROLL

NEG. NO.

DATE 12 / 1996

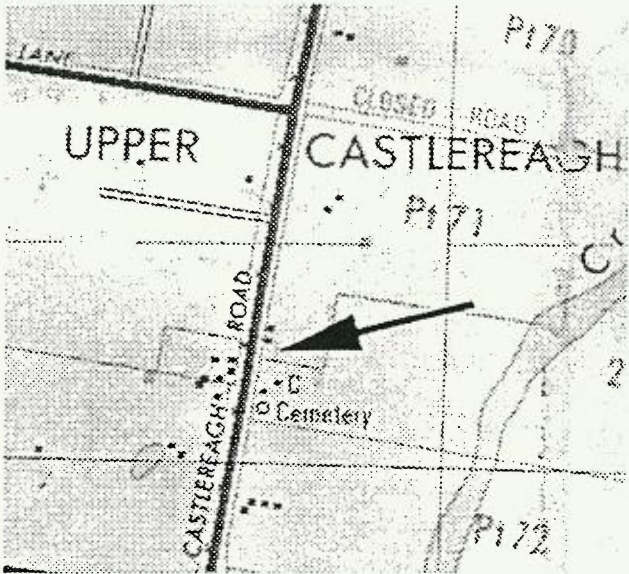
CAPTION

AUTHOR AB, SL, NDHAG

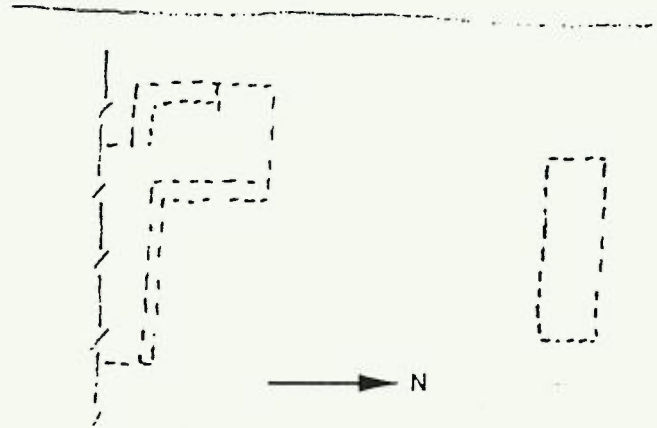
PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT	Heritage Overview / Management Study for DA 4	PLDC INFORMATION
NAME OF ITEM	Lee's House	1984 RES Item No.34
		In DA4 Area No

LOCATION PLAN



SKETCH PLAN



MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 837662
Full AMG Grid Ref: Zone 56H 283700 E 6266200 N

DESCRIPTION

Former house site very overgrown and disturbed by grazing animals and also apparently "cleaned up" using large machinery. Remains include brick footings and concrete flooring. Older parts c1870s, also 20th century additions (or rebuilds) to the rear/east. House site close to the road, kitchen wing extending to the rear (included a large fireplace or baking oven of which the footings survive). Formerly a well and privy at the rear, known to have been excavated by bottle collectors about 15 years ago. Partly standing circular brick cistern, constructed from mixed bricks of late nineteenth and also twentieth century date. Structure has been knocked over by heavy machinery. Formerly also a large slab barn to the north of the house, no remains now evident.

Construction Date _____ Physical Condition _____ Damaged / Disturbed _____

Modifications & Dates

HISTORICAL NOTES

Portion 71 granted to John Lees in 1804. Subdivided prior to 1825. The history of this Portion is complicated and the supplied land title information appears to be incomplete as it does not follow the full route or chain of title for all the subdivisions of the original Portion. Lee's House site (RES 34) is on the 2 ac 1 r part referred to with other land in No 741. Bk 2575 as being conveyed to River Sand and Gravel Pty Ltd in 1961.

Family history information suggests that the first church and John Lees' original house were in the area east of Cranebrook Creek. These sites would therefore not survive.

The part of the portion on which RES 34 is situated was apparently retained by Lees' descendants (Gorman and Wright families). A building conforming with the location of the present site is shown on the 1873 Road Plan as being in the ownership of Mrs Gorman (youngest daughter of John Lees). Bently suggests that the house on this site was built c1870s. The extant fabric observed at the suggests this dating is correct. The 'weatherboard' house and large slab shed are shown on DP 234745, dated 1967. The House burnt down in 1969.

Site survey, interviews and partial report already undertaken by the NDHAG.

HISTORIC THEMES	Local	family relationships	Regional	rural settlement
	State		National	

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

PLDC INFORMATION
1984 RES Item No. 34
In DA4 Area No

NAME OF ITEM Lee's House

INFORMATION SOURCES USED FOR THIS ASSESSMENT

WRITTEN F Bently and J M Birmingham, *History of European Settlement*, unpublished report Penrith Lakes Scheme Regional Environmental Study, Dept of Environment and Planning, 1983

M Kavanagh, *John Lees the Chapel Builder*, Sutherland, 1987.

ORAL

GRAPHIC

RELATED INFORMATION

TYPE	AUTHOR / TITLE	YEAR	REPOSITORY

PROPERTY DETAILS

LGA Penrith City Council

ZONING SREP NO. 11 (Penrith Lakes)

OWNER Penrith Lakes Development Corporation

OWNER PH/FAX (047) 29 0044 / (047) 30 1462

OWNER ADDRESS Castlereagh Road, CRANEBROOK, NSW 2749

REAL PROPERTY DESCRIPTION

EVALUATION OF SIGNIFICANCE - SUMMARY MATRIX (Heritage Office Use)

VALUES:	historical	aesthetic	social	technical / research
RARE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
REPRESENTATIVE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

MANAGEMENT RECOMMENDATIONS

Recording by NDHAG.

Further historical research desirable to clarify title sequence and occupation by the Lees family descendants.

CONSERVATION &/OR MANAGEMENT PLAN

CLIENT

AUTHOR / NAME / DATE

ENDORSEMENT & DATE

FURTHER INFORMATION

AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

REF NO.

NAME OF ITEM Kerry Lodge

PLDC INFORMATION 1984 RES No. 35 In DA4 Area No
 Surveyed By & Date A Bickford, S Lavelle, NDHAG, Dec 1996 / Jan 1997

LISTINGS
 Commonwealth Statutory

LOCATION / ADDRESS East side of Castlereagh Road

SUBURB / TOWN CASTLEREAGH

POSTCODE 2749

NSW Statutory

OTHER NAMES

ITEM TYPE Archaeological / Historic Site

GROUP NAME

Non Statutory

CURRENT USE

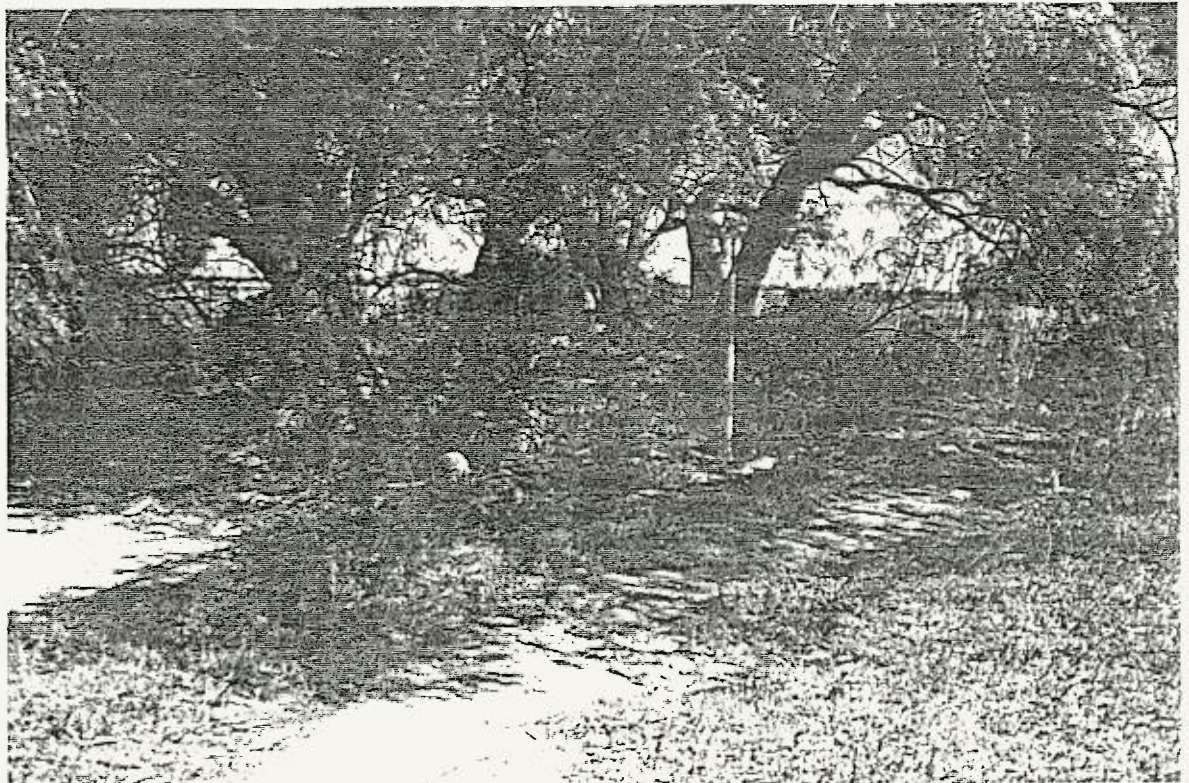
FORMER USE residence and farm complex

STATEMENT OF SIGNIFICANCE

LEVEL Local

- Site has some social significance as it has been described in the recollections of Dame Mary Gilmore.
- No archaeological significance due to disturbance of the site.

PHOTOGRAPH



FILM ROLL

NEG. NO.

DATE 12 / 1996

CAPTION

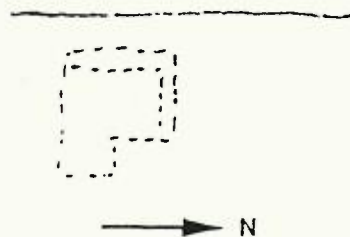
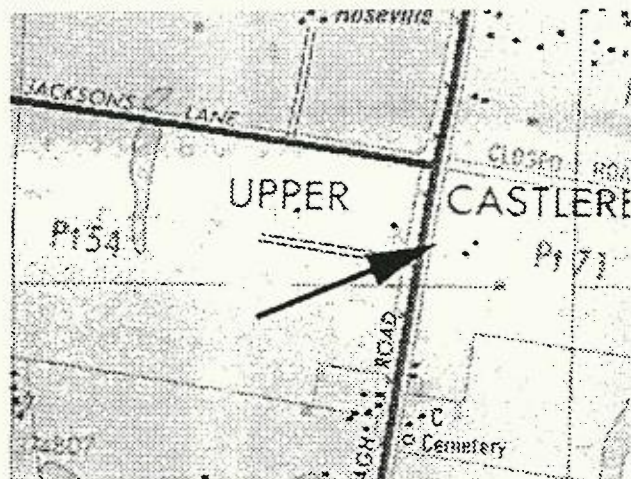
AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT	Heritage Overview / Management Study for DA 4	PLDC INFORMATION
NAME OF ITEM	Kerry Lodge	1984 RES Item No. 35 In DA4 Area No

LOCATION PLAN

SKETCH PLAN



MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 838664
Full AMG Grid Ref: Zone 56H 283800 E 6266410 N

DESCRIPTION

Remains at Kerry Lodge comprise partial footings of the former house. Include concrete paved verandah, front hallway and two front rooms. Also some remains of stone footings at the threshold and possibly also marking the base of a former chimney. Other mounds of brick rubble, bricks probably mid nineteenth century, bonded with very basic lime mortar (mud and shell grit). Also some surviving floor joists and tongue and groove flooring with wire nails (ie late nineteenth century).

Site badly disturbed by nearby quarry-related activities, particularly the placement and removal of a large earth batter. Rear part of site removed by these activities, resulting in removal of back of house site and sites of other features such as outbuildings, well, etc. Former plantings including pepper trees are also badly disturbed or are senescent.

Construction Date c1850

Physical Condition Damaged / Disturbed

Modifications & Dates

HISTORICAL NOTES

Within Portion 71, originally granted to John Lees in 1803. Portion subdivided prior to 1825. The history of this Portion is complicated and the supplied land title information appears to be incomplete as it does not follow the full route or chain of title for all the subdivisions of the original Portion. Before 1825 land known as Kerry Lodge was sold by James Badgery to John Bowman. In December 1825 on the death of J Bowman 30 acres of Lees' farm goes to George Bowman his son. In 1838 this is transferred to his son William Bowman. In December 1874, 70 acres, the buildings and land known as Kerry Lodge were bequeathed to Anne Maria Smith (daughter of W Bowman). The property stayed with Bowman descendants until 1899. In 1900 the farm known as Kerry Lodge comprising 76 acres was sold by Mathew Kearney to John Cochrane. Owners in the 20th century were Denniss, Hobson, Spinks, Connell, Roberts, Lomas. Acquired by River Sand & Gravel Pty Ltd in 1960. House shown as 'burnt down' on DP 234745, dated 1967. Kerry Lodge has been noted for its connections with the family of Dame Mary Gilmore, who wrote of this property in letters to friends and in her reminiscences, and visited the property several times during the 20th century. She stated that the house had been built by her grandfather Hugh Beattie and that her mother was born there. She specifically describes the location of the property as being on Castlereagh Rd "two doors past the Wesleyan Church" and also refers to peppercorn trees on the property having been planted by her grandfather and to other features including an old well.

HISTORIC THEMES

Local family relationships
State

Regional rural settlement
National

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

PLDC INFORMATION
1984 RES Item No. 35
In DA4 Area No

NAME OF ITEM Kerry Lodge

INFORMATION SOURCES USED FOR THIS ASSESSMENT

WRITTEN F Bently and J M Birmingham, *History of European Settlement*, unpublished report Penrith Lakes Scheme Regional Environmental Study, Dept of Environment and Planning, 1983

W H Wilde, *Courage and Grace: A Biography of Dame Mary Gilmore*, Melb Univ Press, 1988 p 20 ff.

ORAL

GRAPHIC

RELATED INFORMATION

TYPE	AUTHOR / TITLE	YEAR	REPOSITORY

PROPERTY DETAILS

LGA Penrith City Council

ZONING SREP NO. 11 (Penrith Lakes)

OWNER Penrith Lakes Development Corporation

OWNER PH/FAX (047) 29 0044 / (047) 30 1462

OWNER ADDRESS Castlereagh Road, CRANE BROOK, NSW 2749

REAL PROPERTY DESCRIPTION

EVALUATION OF SIGNIFICANCE - SUMMARY MATRIX (Heritage Office Use)

VALUES:	historical	aesthetic	social	technical / research
RARE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
REPRESENTATIVE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

MANAGEMENT RECOMMENDATIONS

Completion of report by the NDHAG.

CONSERVATION &/OR MANAGEMENT PLAN

CLIENT

AUTHOR / NAME / DATE

ENDORSEMENT & DATE

FURTHER INFORMATION

AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

REF NO.

NAME OF ITEM Mass Concrete House (Ruin)

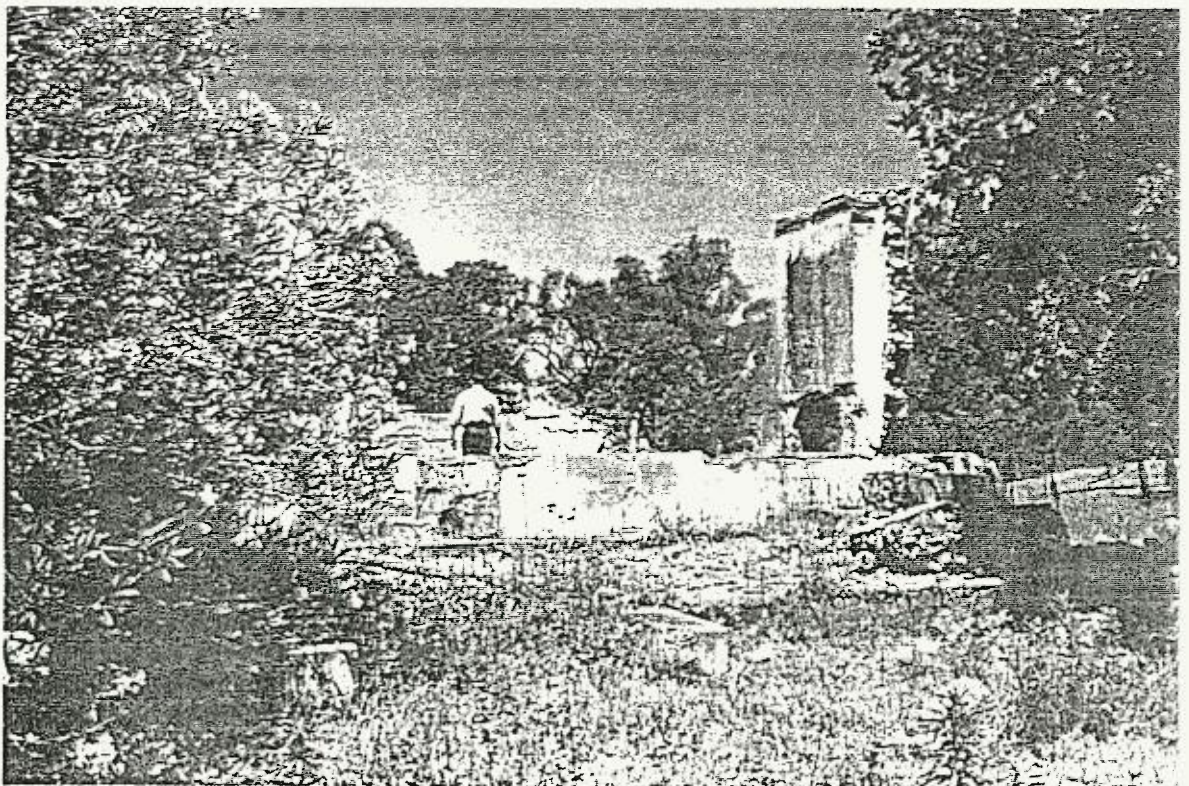
<p>PLDC INFORMATION 1984 RES No. 37 In DA4 Area No</p> <p>Surveyed By & Date A Bickford, S Lavelle, NDHAG. Dew 1996 / Jan 1997</p>	<p>LISTINGS</p> <p>Commonwealth Statutory</p>
<p>LOCATION / ADDRESS Church Lane (off)</p> <p>SUBURB / TOWN CASTLEREAGH</p> <p>POSTCODE 2749</p> <p>OTHER NAMES Pise House (Ruin)</p> <p>ITEM TYPE Building (Ruin)</p> <p>GROUP NAME</p> <p>CURRENT USE Ruin</p> <p>FORMER USE Residence</p>	<p>NSW Statutory</p> <p>Non Statutory</p>

STATEMENT OF SIGNIFICANCE

LEVEL Local

- The form of construction of the mass concrete house is relatively unusual, although it appears to be more common in the Castlereagh area than reported in previous studies. The construction is of some technical significance in the choice of both materials and methods, which are likely to have been locally obtained and developed.
- The occupation of this site and construction of the house is associated with the late nineteenth to mid twentieth century phase of increased small holdings in the Castlereagh area, with the development of local dairying and other activities to serve an increasing Sydney market. The site may be considered representative of a small mixed farm from this local historic phase.
- The property also has some local social and historic significance due to its associations with the historically prominent Single family. Joseph Daniel Single, first owner of the property, was a significant figure in local history who was involved in numerous associations, contributed to philanthropic works, and was also the Member for Nepean.

PHOTOGRAPH



FILM ROLL

NEG. NO.

DATE 12 / 1996

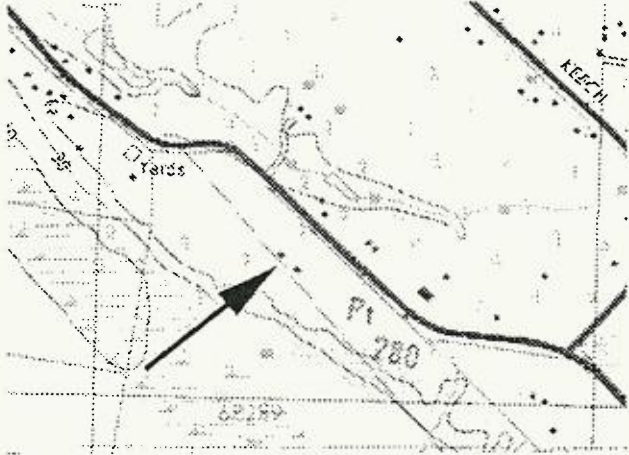
CAPTION

AUTHOR AB, SL, NDHAG

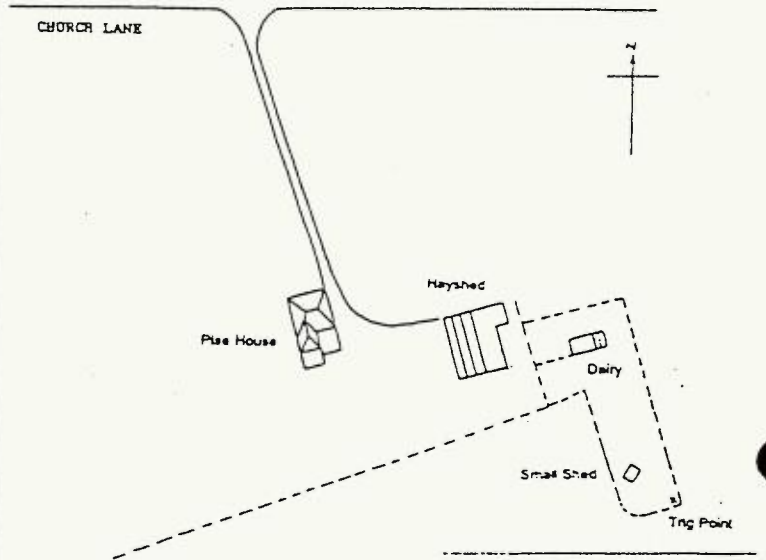
PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT	Heritage Overview / Management Study for DA 4	PLDC INFORMATION
NAME OF ITEM	Mass Concrete House (Ruin)	1984 RES Item No. 37
		In DA4 Area No

LOCATION PLAN



SKETCH PLAN



MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 853693
Full AMG Grid Ref: Zone 56H 285360 E 6269300 N

DESCRIPTION

Ruins of a mass concrete house with an L-shape plan and containing five principal rooms. House walls constructed using a sand / cement mix and large diameter river pebbles. Timber wedges inserted into the walls enabled the fixing of door and window framing. Walls cement rendered, with the exterior walls ruled and struck to imitate masonry. Simple moulded decorative border around exterior of windows. Four rendered brick chimneys with elaborate decorative moulding. Evidence of a front verandah supported on timber columns. Roof (probably hipped) of Marseille pattern tiles, manufactured by Pierre Amedee. (These tiles indicate a post-1892 date for the roof). The mass concrete form of construction is relatively unusual and probably relates to the close availability of the materials (cement and river aggregate pebbles) due to nearby quarrying activities based upon the Nepean River. (Three mass concrete house structures identified by the present study). Ancillary buildings/features on the property include remnants of a large hayshed, silage pits, dairy, cow bails, well.

Construction Date c1900 - 1910 **Physical Condition** Damaged / Disturbed

Modifications & Dates

HISTORICAL NOTES

The pise house is situated within Portion 280, Parish of Castlereagh. The original owner of this 38 acre portion was Joseph Daniel Single who purchased it in 1874. In 1886 J D Single sold 25 acres of the portion to Robert Wisdom. From 1890 this land was subsequently owned by C E and W H Maybury who sold to E E Caban an orchardist from Castlereagh, in 1897. In 1903 Caban sold the property to John McCabe. The property then passed through several short term ownerships until it was purchased by S F Sherwood and C C Grice in 1912. The Land Title information (DP 68289) indicates that a house was in existence in the same location as the extant structure by 1912. From 1915 to 1932 S F Sherwood owned the property. The property was subsequently sold/purchased by the following persons: A Holst (1932); C S Grant (1941); D W Bloomfield (1947); W H A Martin & I Martin (1952); H J & B M V Mortimer (1954). The property was acquired by River Sand & Gravel Pty Ltd in 1961. The property was apparently used for fairly small scale mixed farming, including orchards, cultivated areas, dairying, and beekeeping. Evidence from air photos suggests that the site had been abandoned by 1975.

HISTORIC THEMES	Local	villages (old castlereagh, cranebrook) orcharding, dairying, family relationships	Regional	rural settlement
	State	agriculture persons	National	

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

PLDC INFORMATION
1984 RES Item No.37
In DA4 Area No

NAME OF ITEM Mass Concrete House (Ruin)

INFORMATION SOURCES USED FOR THIS ASSESSMENT

WRITTEN F Bently and J M Birmingham, *History of European Settlement*, unpublished report Penrith Lakes Scheme Regional Environmental Study, Dept of Environment and Planning, 1983

G Gyford / NDHAG, *A Report on the Pise House - Castlereagh*, report to the PLDC, July 1996
Land Titles Office Search (provided by the PLDC)

ORAL

GRAPHIC

RELATED INFORMATION

TYPE	AUTHOR / TITLE	YEAR	REPOSITORY

PROPERTY DETAILS

LGA Penrith City Council

ZONING SREP NO. 11 (Penrith Lakes)

OWNER Penrith Lakes Development Corporation

OWNER PH/FAX (047) 29 0044 / (047) 30 1462

OWNER ADDRESS Castlereagh Road, CRANEBROOK, NSW 2749

REAL PROPERTY DESCRIPTION

EVALUATION OF SIGNIFICANCE - SUMMARY MATRIX (Heritage Office Use)

VALUES:	historical	aesthetic	social	technical / research
RARE	<input type="text" value="Local"/>	<input type="text"/>	<input type="text" value="Local"/>	<input type="text" value="Local"/>
REPRESENTATIVE	<input type="text" value="Local"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

MANAGEMENT RECOMMENDATIONS

Although in a ruinous condition, the remains of the pise house are reasonably substantial , and clearly demonstrate the unusual pise style construction of the house.
Consider retention and interpretation of this site within the future urban development area on the escarpment.

CONSERVATION &/OR MANAGEMENT PLAN No

CLIENT

AUTHOR / NAME / DATE

ENDORSEMENT & DATE

FURTHER INFORMATION

AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

REF NO.

NAME OF ITEM Allen's Mill

PLDC INFORMATION 1984 RES No. 38 In DA4 Area No

Surveyed By & Date A Bickford, S Lavelle, NDHAG. Dec 1996 / Jan 1997

LISTINGS

Commonwealth Statutory

LOCATION / ADDRESS Lugard Street (off)

SUBURB / TOWN CRANE BROOK

POSTCODE 2749

OTHER NAMES

ITEM TYPE Archaeological / Historic Site

GROUP NAME

CURRENT USE

FORMER USE

NSW Statutory

Non Statutory

Heritage Study (Penrith City)

STATEMENT OF SIGNIFICANCE

LEVEL Regional

- Mills were an important feature related to the early agricultural activity of the area.
- Allen's Mill is one of at least four mills known to have been erected in the locality

PHOTOGRAPH

FILM ROLL

NEG. NO.

DATE 12 / 1996

CAPTION

AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4 NAME OF ITEM Allen's Mill	PLDC INFORMATION 1984 RES Item No. 38 In DA4 Area No
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LOCATION PLAN	SKETCH PLAN
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MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 851649 Full AMG Grid Ref: Zone 56H 285100 E 6264900 N

DESCRIPTION <p>The site was searched for but could not be found. As with the other mill sites the changes in the form of the river, make relocation of the site difficult.</p>

Construction Date c1834	Physical Condition
Modifications & Dates	

HISTORICAL NOTES <p>Bently's inventory information in the 1984 is based upon the recollections of Michael Long.</p> <p>Mill associated with the McHenry estate, and reputedly built during the 1830s. The mill is shown on an 1850 map of the area (Book 73 No.86) The mill house was on the high bank. The mill was operated by Mr Bell, then Mr Allen until about 1865. It was demolished in 1872. After the 1867 flood, the river receded towards the opposite bank and the mill was left situated within an area of dry gravel.</p>
--

HISTORIC THEMES	Local wheat farming and flour mills	Regional nepean river
	State agriculture	National

AUTHOR AB, SL, NDHAG	Inventory Form: Page 2 of 3
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PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

PLDC INFORMATION
1984 RES Item No. 38
In DA4 Area No

NAME OF ITEM Allen's Mill

INFORMATION SOURCES USED FOR THIS ASSESSMENT

WRITTEN F Bently and J M Birmingham, History of European Settlement, unpublished report Penrith Lakes Scheme Regional Environmental Study, Dept of Environment and Planning, 1983

M Long, *Reminiscences of a District Veteran (1912)*, Penrith City Library, reprint 1985, p 34.

ORAL

GRAPHIC

RELATED INFORMATION

TYPE	AUTHOR / TITLE	YEAR	REPOSITORY

PROPERTY DETAILS

LGA Penrith City Council

ZONING SREP NO. 11 (Penrith Lakes)

OWNER Penrith Lakes Development Corporation

OWNER PH/FAX (047) 29 0044 / (047) 30 1462

OWNER ADDRESS Castlereagh Road, CRANE BROOK, NSW 2749

REAL PROPERTY DESCRIPTION

EVALUATION OF SIGNIFICANCE - SUMMARY MATRIX (Heritage Office Use)				
VALUES:	historical	aesthetic	social	technical / research
RARE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
REPRESENTATIVE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

MANAGEMENT RECOMMENDATIONS

More detailed field survey may locate this site. Could be undertaken by the NDHAG. Also complete Title Search for Portion 321. Further professional assessment would be necessary only if site could be accurately identified and if it were becomes threatened by future proposals. At the present time it is understood that the Nepean River bank will not be modified by the currently proposed works.

CONSERVATION &/OR MANAGEMENT PLAN

CLIENT

AUTHOR /
NAME /
DATE

ENDORSEMENT
& DATE

FURTHER INFORMATION

AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

NAME OF ITEM Jackson's Mill

For Heritage Office Use

DATABASE NO.

REF NO.

PLDC INFORMATION 1984 RES No. 42 In DA4 Area Yes

Surveyed By & Date A Bickford, S Lavelle, NDHAG. Dec1996 / Jan 1997

LOCATION / ADDRESS Jacksons Lane / Nepean River

SUBURB / TOWN UPPER CASTLEREAGH

POSTCODE 2749

OTHER NAMES

ITEM TYPE

GROUP NAME

CURRENT USE

FORMER USE

LISTINGS

Commonwealth Statutory

NSW Statutory

Non Statutory

Heritage Study (Penrith City)

STATEMENT OF SIGNIFICANCE

LEVEL Regional

- Mills were an important feature related to the early agricultural activity of the area.

PHOTOGRAPH

FILM ROLL

NEG. NO.

DATE 12 / 1996

CAPTION

AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT	Heritage Overview / Management Study for DA 4	PLDC INFORMATION
NAME OF ITEM	Jackson's Mill	1984 RES Item No. 42
		In DA4 Area Yes

LOCATION PLAN	SKETCH PLAN

MAP, SCALE, GRID REF.	NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 828668 Full AMG Grid Ref: Zone 56H 282800 E 6266800 N
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DESCRIPTION

The site indicated in the 1984 RES report was inspected.
No remains were identified on the river bank at the end of Jackson's Lane.

This study team considers it more likely that the mill referred to in the 1984 RES as site 42, is more likely to be the mill referred to in the Land Title information as being within Portion 55. The potential site would therefore be situated at the end of Purcell's Lane.

Construction Date	Physical Condition
Modifications & Dates	

HISTORICAL NOTES

The discussion of this site in the original Bentley report (1981, p 50; p 78) appears to be confusing and combining several different sites. No mill site is mentioned in the available information for Portion 54 (see Inventory for RES 13). The Land Title information for Portion 55 clearly indicates the presence of a mill near Purcell's Lane.

For Portion 55:
80 acres was granted to John Pickering in June 1803. In 1805 he sold the Southern 40 acres to George Colless, farmer. In 1809 he sold the Northern half to John Bowman of Richmond Hill.
In about 1823 Bowman sold the Northern half to George Colless.
In 1836 Colless sold 1 acre to Walter Howell, a baker, of Windsor. This included the right of a road one chain wide to a water, grist, or corn mill with a dam, mill stream, and other parts of the mill on the bank of the river. This road, now known as Purcell's Lane, is on the southern boundary of the grant. (See surveyed plan of 1925 attached to LT).
This mill is not in Bentley's survey, and was not searched by this team.
In 1851 Colless bequeathed the mill and 30 roods square on the SW corner of the grant to his son John.

HISTORIC THEMES	Local	wheat farming and flour mills	Regional	rural settlement
	State	agriculture	National	

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

PLDC INFORMATION
1984 RES Item No.42
In DA4 Area Yes

NAME OF ITEM Jackson's Mill

INFORMATION SOURCES USED FOR THIS ASSESSMENT

WRITTEN F Bently and J M Birmingham, History of European Settlement, unpublished report Penrith Lakes Scheme Regional Environmental Study, Dept of Environment and Planning, 1983

Land Title Search supplied by PLDC for Portions 54 and 55.

ORAL

GRAPHIC

RELATED INFORMATION

TYPE	AUTHOR / TITLE	YEAR	REPOSITORY

PROPERTY DETAILS

LGA Penrith City Council

ZONING SREP NO. 11 (Penrith Lakes)

OWNER Penrith Lakes Development Corporation

OWNER PH/FAX (047) 29 0044 / (047) 30 1462

OWNER ADDRESS Castlereagh Road, CRANEBROOK, NSW 2749

REAL PROPERTY DESCRIPTION

EVALUATION OF SIGNIFICANCE - SUMMARY MATRIX (Heritage Office Use)

VALUES:	historical	aesthetic	social	technical / research
RARE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
REPRESENTATIVE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

MANAGEMENT RECOMMENDATIONS

More detailed field survey may locate this site. Could be undertaken by the NDHAG. Further professional assessment would be necessary if site could be accurately identified and becomes threatened by future proposals. At the present time it is understood that the Nepean River bank will not be modified by the currently proposed works.

CONSERVATION &/OR MANAGEMENT PLAN

CLIENT

AUTHOR / NAME / DATE

ENDORSEMENT & DATE

FURTHER INFORMATION

AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

REF NO.

NAME OF ITEM Inn Site

PLDC INFORMATION 1984 RES No. 46 In DA4 Area Yes

Surveyed By & Date A Bickford, S Lavelle, NDHAG. Dec 1996 / Jan 1997

LISTINGS

Commonwealth Statutory

LOCATION / ADDRESS 359 Castlereagh Road

SUBURB / TOWN UPPER CASTLEREAGH

POSTCODE 2749

OTHER NAMES

ITEM TYPE Archaeological / Historic Site

GROUP NAME

CURRENT USE

FORMER USE

NSW Statutory

Non Statutory

STATEMENT OF SIGNIFICANCE

LEVEL Local

Available historic information and field inspection were unable to confirm whether the reputed inn site noted by Bently is actually present at this location.

PHOTOGRAPH

FILM ROLL

NEG. NO.

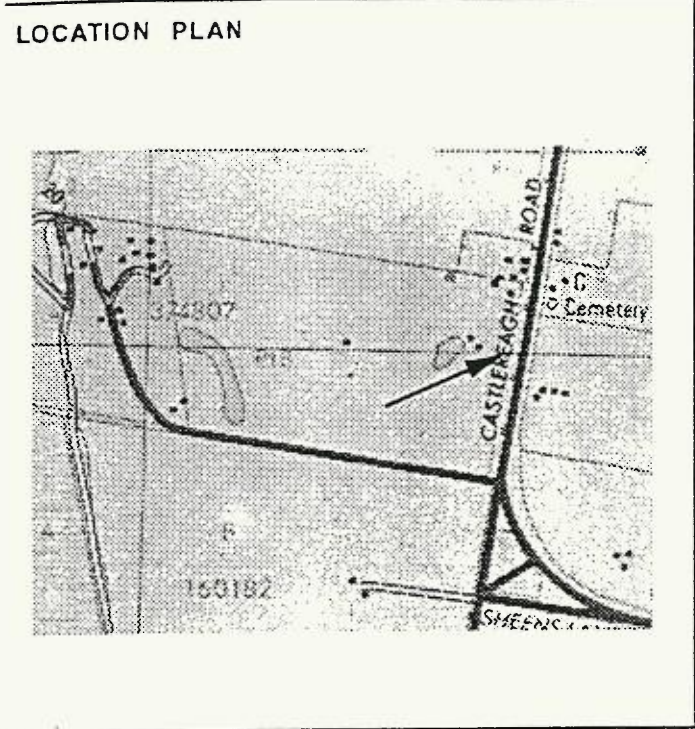
DATE 12 / 1996

CAPTION

AUTHOR

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT	Heritage Overview / Management Study for DA 4	PLDC INFORMATION
NAME OF ITEM	Inn Site	1984 RES Item No. 46
		In DA4 Area Yes



MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 836660
Full AMG Grid Ref: Zone 56H 283600 E 6266000 N

DESCRIPTION

No visible remains or precise site evident during inspection, although the large level area here would have provided an appropriate building site. The inn site was said by Bently to be between the Cottage RES 22 and Castlereagh Road. The area was surveyed. It is completely flat and thickly grassed, and no evidence of the inn or any archaeological remains could be seen.

The buildings shown on the 1873 plan may have been farm buildings, for example a large barn and other ancillary buildings.

Construction Date	Physical Condition
Modifications & Dates	

HISTORICAL NOTES

Bently report 1983 suggests that an inn in this location was operated by W Purcell as licensee, however, no Purcell noted in the AONSW Publicans Licenses Index. Edward Field held a license for an inn in 1849/1850 but this cannot be linked to the location suggested by Bently.

Several buildings are shown in this vicinity on the 1873 road plan, however their nature is not indicated.

On present evidence it is not certain that there was an inn at this location.

HISTORIC THEMES	Local	inns and stores	Regional	rural settlement
	State		National	

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

PLDC INFORMATION
1984 RES Item No. 46
In DA4 Area Yes

NAME OF ITEM Inn Site

INFORMATION SOURCES USED FOR THIS ASSESSMENT

WRITTEN F Bently and J M Birmingham, *History of European Settlement*, unpublished report Penrith Lakes Scheme Regional Environmental Study, Dept of Environment and Planning, 1983

ORAL

GRAPHIC Plan R550a 1603 dated 1873 Lands Dept Plan Room (Dept Land and Water Conservation)

RELATED INFORMATION

TYPE	AUTHOR / TITLE	YEAR	REPOSITORY

PROPERTY DETAILS

LGA Penrith City Council ZONING SREP NO. 11 (Penrith Lakes)

OWNER Penrith Lakes Development Corporation

OWNER PH/FAX (047) 29 0044 / (047) 30 1462

OWNER ADDRESS Castlereagh Road, CRANEBROOK, NSW 2749

REAL PROPERTY DESCRIPTION

EVALUATION OF SIGNIFICANCE - SUMMARY MATRIX (Heritage Office Use)				
VALUES:	historical	aesthetic	social	technical / research
RARE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
REPRESENTATIVE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

MANAGEMENT RECOMMENDATIONS

CONSERVATION &/OR MANAGEMENT PLAN

CLIENT

AUTHOR / NAME / DATE

ENDORSEMENT & DATE

FURTHER INFORMATION

AUTHOR

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

REF NO.

NAME OF ITEM Slab Cottage (Site)

PLDC INFORMATION 1984 RES No. 47 In DA4 Area Yes
 Surveyed By & Date A Bickford, S Lavelle, NDHAG. Dec 1996 / Jan 1997

LISTINGS
 Commonwealth Statutory

LOCATION / ADDRESS Castlereagh Road
 SUBURB / TOWN UPPER CASTLEREAGH
 POSTCODE 2749
 OTHER NAMES
 ITEM TYPE Archaeological / Historic Site
 GROUP NAME
 CURRENT USE
 FORMER USE

NSW Statutory

 Non Statutory

STATEMENT OF SIGNIFICANCE

LEVEL None

PHOTOGRAPH



FILM ROLL

NEG. NO.

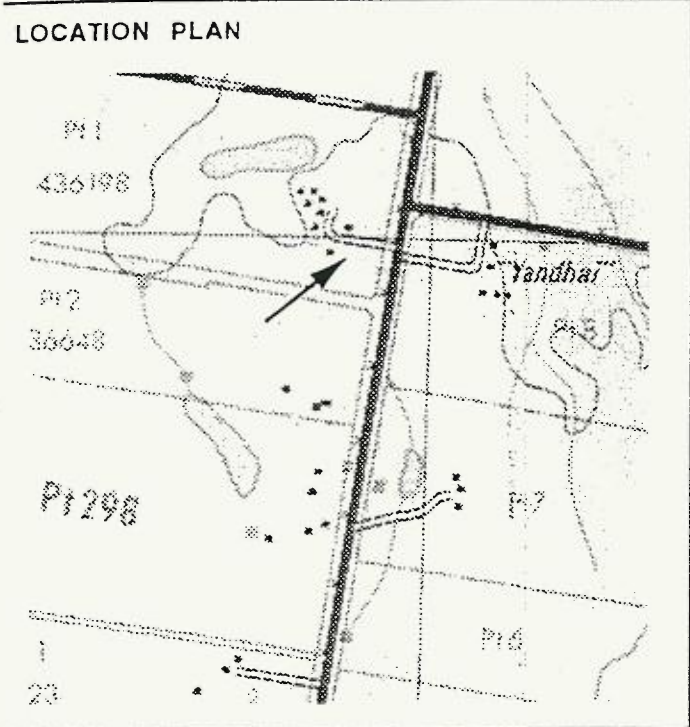
DATE 12 / 1996

CAPTION

AUTHOR

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT	Heritage Overview / Management Study for DA 4	PLDC INFORMATION
NAME OF ITEM	Slab Cottage (Site)	1984 RES Item No.47
		In DA4 Area Yes



MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 838680
 Full AMG Grid Ref: Zone 56H 283850 E 6268000 N

DESCRIPTION

Former slab cottage site reported at this location by Bently report, 1983.
 No visible remains or specific site identified during inspection.

Construction Date not known	Physical Condition
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Modifications & Dates

HISTORICAL NOTES

Site within Portion 50, 140 acs grant to Thomas Cheshire in 1803.
 Subdivided from 1806 and several subsequent short term ownerships prior to 1820.
 In 1817, 70 acs conveyed from James Badgery to Samuel Terry. Subsequently inherited by Terry's daughter, Martha Foxlove Hosking and conveyed with additional land to Edward Ebsworth in 1876 (Book 162 No.411).
 Remained with Ebsworth family until 1915.

HISTORIC THEMES	Local	Regional
	State	National

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

NAME OF ITEM School Site - Nepean Park

REF NO.

PLDC INFORMATION 1984 RES No. 48 In DA4 Area Yes
 Surveyed By & Date S Lavelle & S Mantella-Galli, May 1996

LISTINGS
 Commonwealth Statutory

LOCATION / ADDRESS Castlereagh Road, within Nepean Park property

SUBURB / TOWN CASTLEREAGH

POSTCODE 2749

OTHER NAMES Minnaville in 1983 report -

ITEM TYPE Archaeological / Historic Site

GROUP NAME

CURRENT USE

FORMER USE

NSW Statutory

Non Statutory

STATEMENT OF SIGNIFICANCE

LEVEL Local

• School site associated with the historically prominent Single family of Nepean Park. Single probably built the school in the 1830s to provide for the education of his children. Local schools were a significant feature of early settlement in Castlereagh.

Access to this site was not permitted by the Dixons during the DA 4 Study.

PHOTOGRAPH



FILM ROLL

NEG. NO.

DATE 05 / 1996

CAPTION

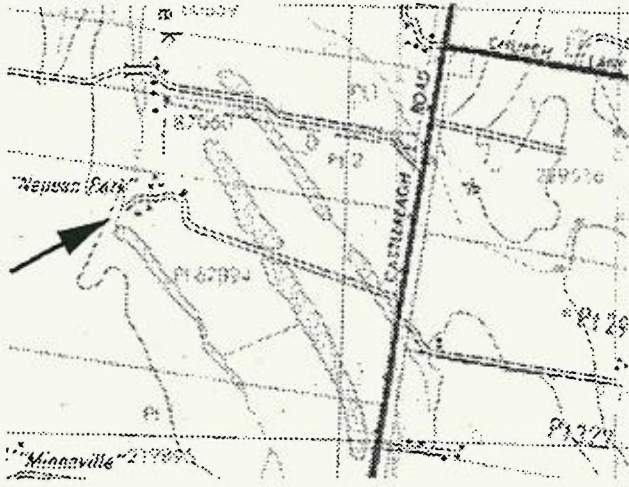
AUTHOR SL

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT	Heritage Overview / Management Study for DA 4	PLDC INFORMATION 1984 RES Item No.48
NAME OF ITEM	School Site - Nepean Park	In DA4 Area Yes

LOCATION PLAN

SKETCH PLAN



MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 834695
Full AMG Grid Ref: Zone 56H 283450 E 6269500 N

DESCRIPTION

Reputed school site on the western side of Cranebrook Creek immediately north of two mature kurrajong trees. No visible remains, however a fairly large and flat area - possibly a former building platform in this location.

Construction Date c1830s Physical Condition Intact / Undisturbed

Modifications & Dates

HISTORICAL NOTES

The 1983 European Heritage report identified a site called "Minnaville"[= RES Site 48] as being within Portion 48, Parish of Castlereagh, County of Cumberland. This portion also contains the extant 1822/23 Georgian homestead Nepean Park (formerly Nepean House) built by John Single. The 1983 inventory sheet suggests that the potential "Minnaville" on Portion 48 [= RES Site 48] is an archaeological site which represents the 1810 house of John Single. The inventory sheet also suggests that the potential "Minnaville" site on Portion 48 [= RES Site 48] is on the western side of Cranebrook Creek close to the two large kurrajong trees nicknamed 'John and Sarah' by descendants of the Single family. Most of these assertions appear to be erroneous. If an archaeological site exists in this location near the two kurrajong trees on the west side of Cranebrook Creek it appears to correspond with the site of a schoolhouse noted in the Single family history (p 24) as follows:

"A traditional family story maintains that John Single erected a building which was to serve as a school on his property between Nepean House and the river. There is evidence of a building having existed there "...

HISTORIC THEMES	Local	churches, schools, cemeteries	Regional rural settlement
	State		National

AUTHOR SL

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT	Heritage Overview / Management Study for DA 4	PLDC INFORMATION
NAME OF ITEM	School Site - Nepean Park	1984 RES Item No.48 In DA4 Area Yes

INFORMATION SOURCES USED FOR THIS ASSESSMENT

WRITTEN F Bently and J M Birmingham, *History of European Settlement*, unpublished report Penrith Lakes Scheme Regional Environmental Study, Dept of Environment and Planning, 1983
 R Pollet (Ed), *John and Sarah: A Genealogical History of the Single Family*, 1988, p 24.
 S Lavelle and Nepean District Historical Archaeology Group *Archaeological and Heritage Assessment RES Site 15, "Minnaville", Penrith Lakes Scheme Area, Castlereagh, NSW*, report to PLDC, September, 1996

ORAL

GRAPHIC

RELATED INFORMATION

TYPE	AUTHOR / TITLE	YEAR	REPOSITORY

PROPERTY DETAILS

LGA Penrith City Council **ZONING** SREP NO. 11 (Penrith Lakes)
OWNER Penrith Lakes Development Corporation
OWNER PH/FAX (047) 29 0044 / (047) 30 1462
OWNER ADDRESS Castlereagh Road, CRANEBROOK, NSW 2749

REAL PROPERTY DESCRIPTION

VALUATION OF SIGNIFICANCE - SUMMARY MATRIX (Heritage Office Use)				
VALUES:	historical	aesthetic	social	technical / research
RARE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
REPRESENTATIVE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

MANAGEMENT RECOMMENDATIONS

This study recommends a conservation management plan for Nepean Park. In such a plan this site would have an archaeological assessment and this would probably recommend that the site should be retained undisturbed.

CONSERVATION &/OR MANAGEMENT PLAN	CLIENT
AUTHOR / NAME / DATE	ENDORSEMENT & DATE

FURTHER INFORMATION

AUTHOR SL

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

NAME OF ITEM Fraser's House

For Heritage Office Use

DATABASE NO.

REF NO.

PLDC INFORMATION 1984 RES No. 49 In DA4 Area No

Surveyed By & Date A Bickford, S Lavelle, NDHAG. Dec 1996 / Jan 1997

LOCATION / ADDRESS Church Lane (off)

SUBURB / TOWN CASTLEREAGH

POSTCODE 2749

OTHER NAMES

ITEM TYPE Archaeological / Historic Site

GROUP NAME

CURRENT USE

FORMER USE

LISTINGS

Commonwealth Statutory

NSW Statutory

Non Statutory

STATEMENT OF SIGNIFICANCE

LEVEL Regional

Site not able to be definitely located during field inspection.
If the pre-1860s site survives and is archaeologically intact it would be highly significant.

PHOTOGRAPH

FILM ROLL

NEG. NO.

DATE 12 / 1996

CAPTION

AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT	Heritage Overview / Management Study for DA 4	PLDC INFORMATION 1984 RES Item No. 49 In DA4 Area No
NAME OF ITEM	Fraser's House	

LOCATION PLAN

SKETCH PLAN

MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 856691
Full AMG Grid Ref: Zone 56H 285600 E 6269100 N

DESCRIPTION

Site inspection made of general vicinity. Visibility nil due to extensive grass cover and overgrowth.
Street pattern is not evident on the ground, so reference points difficult to find.
Further specific research including AONSW and detailed survey plus more fieldwork time may locate this site.

Construction Date pre 1860s

Physical Condition

Modifications & Dates

HISTORICAL NOTES

Old Plans of Castlereagh dated 1865 and 1872 show a house and associated outbuildings at the intersection of Frazier and Londonderry Streets.
Further specific work required.

HISTORIC THEMES

Local
State

Regional
National

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

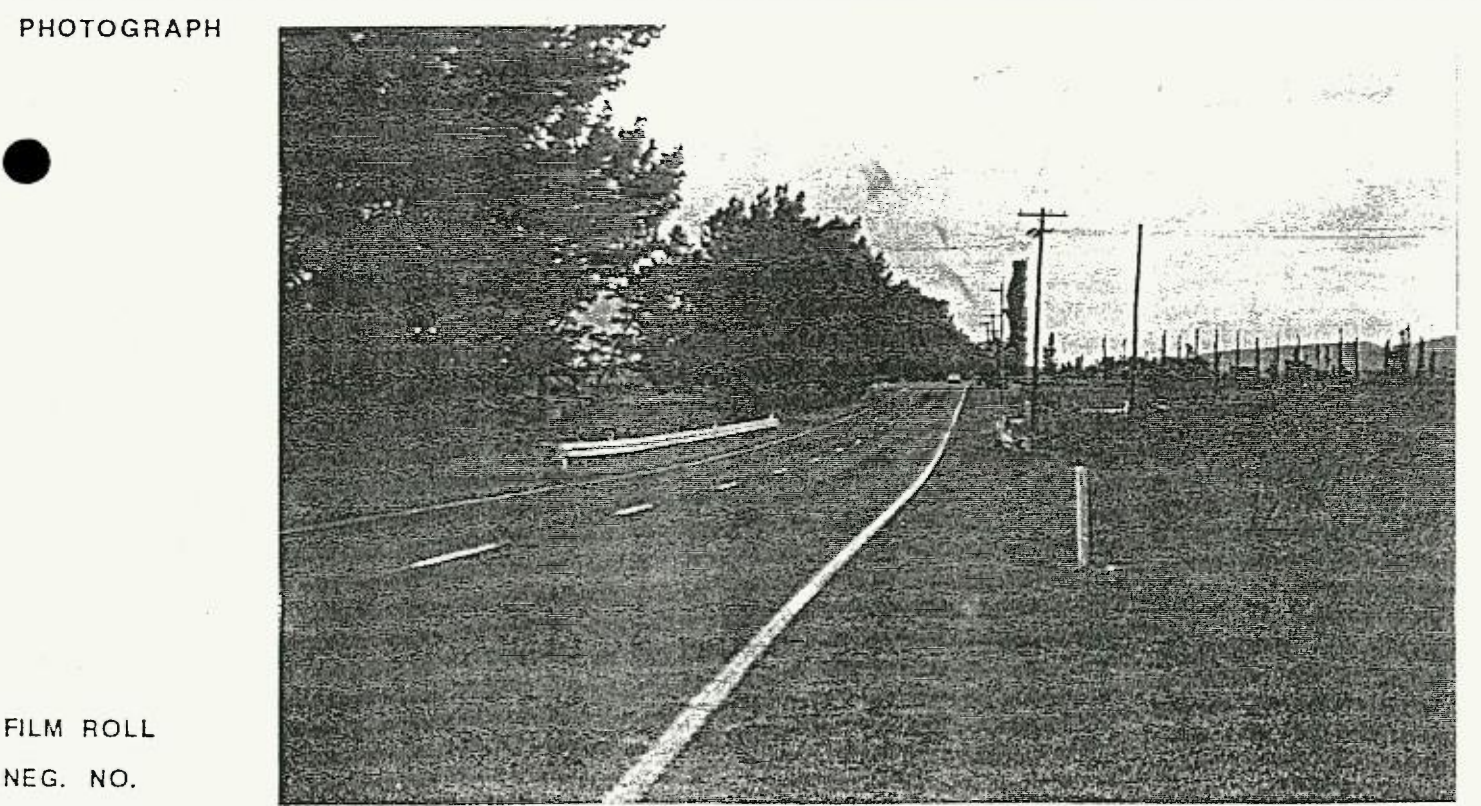
REF NO.

NAME OF ITEM Castlereagh Road

PLDC INFORMATION	1984 RES No. 50	In DA4 Area Yes	LISTINGS Commonwealth Statutory
Surveyed By & Date	A Bickford, S Lavelle, NDHAG, December 1996 / January 1997		
LOCATION / ADDRESS	Castlereagh Road, Agnes Banks to Cranebrook		NSW Statutory Non Statutory Heritage Study (Penrith City)
SUBURB / TOWN	CASTLEREAGH		
POSTCODE	2749		
OTHER NAMES			
ITEM TYPE	Road & Cultural Landscape		
GROUP NAME			
CURRENT USE			
FORMER USE			

STATEMENT OF SIGNIFICANCE **LEVEL** Regional

- The alignment of Castlereagh Road has historic and symbolic associations with the early settlement and subdivision of the Castlereagh and Upper Castlereagh areas. Of considerable historic significance for the part it played in the development of the Castlereagh area and as tangible evidence of the earliest phase of European settlement.



FILM ROLL

NEG. NO.

DATE 12 / 1996

CAPTION

AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

REF NO.

NAME OF ITEM Purcells Lane

PLDC INFORMATION 1984 RES No. 58 In DA4 Area Yes

Surveyed By & Date A Bickford, S Lavelle, NDHAG. Dec1996 / Jan 1997

LISTINGS

Commonwealth Statutory

LOCATION / ADDRESS Purcells Lane

SUBURB / TOWN UPPER CASTLEREAGH

POSTCODE 2749

OTHER NAMES

ITEM TYPE

GROUP NAME

CURRENT USE Road

FORMER USE Road

NSW Statutory

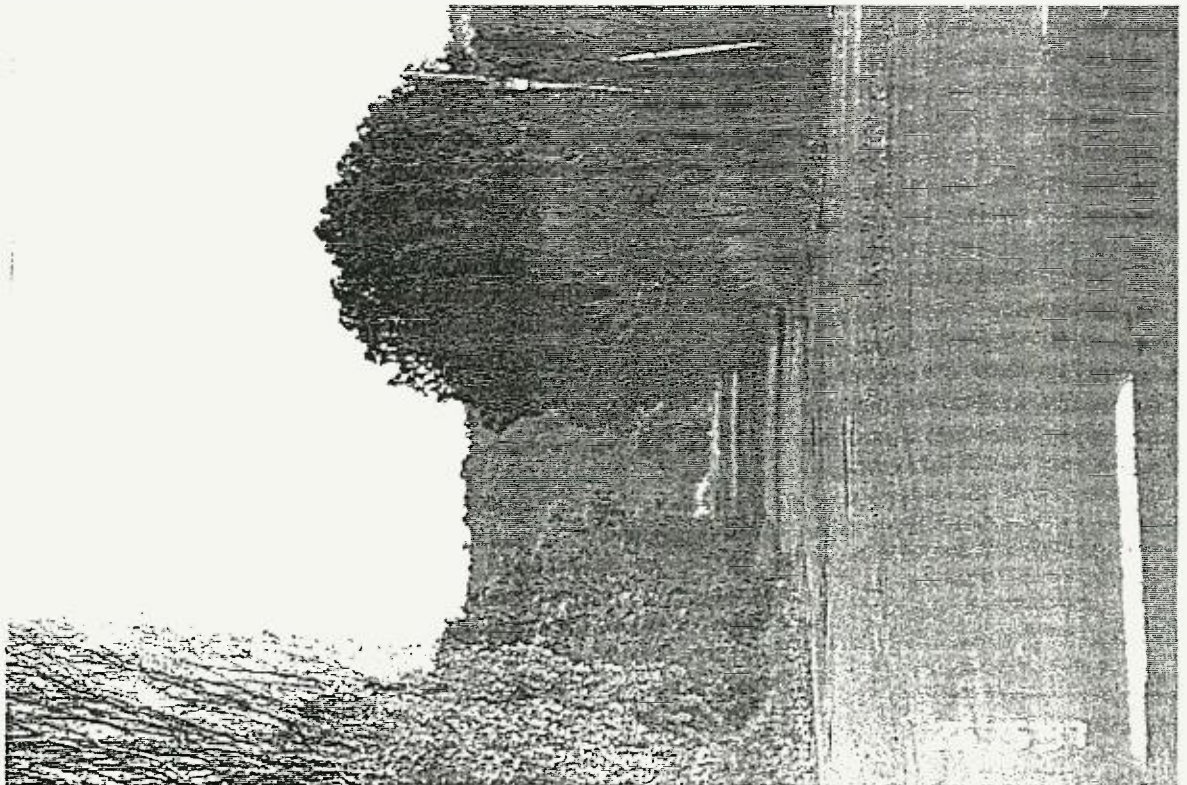
Non Statutory

STATEMENT OF SIGNIFICANCE

LEVEL Local

- One of several former lanes within the locality of Castlereagh forming part of the early subdivision pattern.

PHOTOGRAPH



FILM ROLL

NEG. NO.

DATE 12 / 1996

CAPTION

AUTHOR

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT	Heritage Overview / Management Study for DA 4	PLDC INFORMATION
NAME OF ITEM	Purcells Lane	1984 RES Item No. 58 In DA4 Area Yes

LOCATION PLAN	SKETCH PLAN

MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 836658
Full AMG Grid Ref: Zone 56H 283600 E 6265800 N

DESCRIPTION

Purcell's Lane forms the southern boundary of Pickering's 80 acre grant. It still exists and is in use. Lane is surfaced with bitumen pavement, no features of Colonial-era construction evident.

Construction Date	Physical Condition	Modified / Extended

Modifications & Dates

HISTORICAL NOTES

The earliest maps of the Castlereagh grants (eg S312 o.r. Lands Dept) indicate that most of the grants had roads or lanes laid out alongside their boundaries. Although the alignments may be considered contemporary with the early grants not all of these intended lanes were constructed. All Castlereagh lanes were named after local residents, usually the adjoining property owners. The Purcells occupied Portion 56 south of the lane from at least the 1850s. The Land Title information for Portion 55 indicates that when Colless sold 1 acre to Walter Howell in 1836 this included the right of a road one chain wide to a water, grist, or corn mill with a dam, mill stream, and other parts of the mill on the bank of the river. This road, now known as Purcell's Lane, is on the southern boundary of the grant. (It is also shown on the surveyed plan of 1925 attached to LT).
In 1851 Colless bequeathed the mill and 30 roods square on the SW corner of the grant to his son John.

HISTORIC THEMES	Local	roads / transport routes	Regional	rural settlement
	State	transport	National	

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

PLDC INFORMATION
1984 RES Item No.58
In DA4 Area Yes

NAME OF ITEM Purcells Lane

INFORMATION SOURCES USED FOR THIS ASSESSMENT

WRITTEN F Bently and J M Birmingham, *History of European Settlement*, unpublished report Penrith Lakes Scheme Regional Environmental Study, Dept of Environment and Planning, 1983

ORAL

GRAPHIC

RELATED INFORMATION

TYPE	AUTHOR / TITLE	YEAR	REPOSITORY

PROPERTY DETAILS

LGA Penrith City Council

ZONING SREP NO. 11 (Penrith Lakes)

OWNER Penrith Lakes Development Corporation

OWNER PH/FAX (047) 29 0044 / (047) 30 1462

OWNER ADDRESS Castlereagh Road, CRANE BROOK, NSW 2749

REAL PROPERTY DESCRIPTION

EVALUATION OF SIGNIFICANCE - SUMMARY MATRIX (Heritage Office Use)				
VALUES:	historical	aesthetic	social	technical / research
RARE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
REPRESENTATIVE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

MANAGEMENT RECOMMENDATIONS

CONSERVATION &/OR MANAGEMENT PLAN

CLIENT

AUTHOR / NAME / DATE

ENDORSEMENT & DATE

FURTHER INFORMATION

AUTHOR

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

NAME OF ITEM Jacksons Lane

REF NO.

PLDC INFORMATION 1984 RES No. 59 In DA4 Area Yes
 Surveyed By & Date A Bickford, S Lavelle, NDHAG, Dew 1996 / Jan 1997

LISTINGS
 Commonwealth Statutory

LOCATION / ADDRESS Jacksons Lane
 SUBURB / TOWN UPPER CASTLEREAGH
 POSTCODE 2749
 OTHER NAMES
 ITEM TYPE
 GROUP NAME
 CURRENT USE
 FORMER USE

NSW Statutory

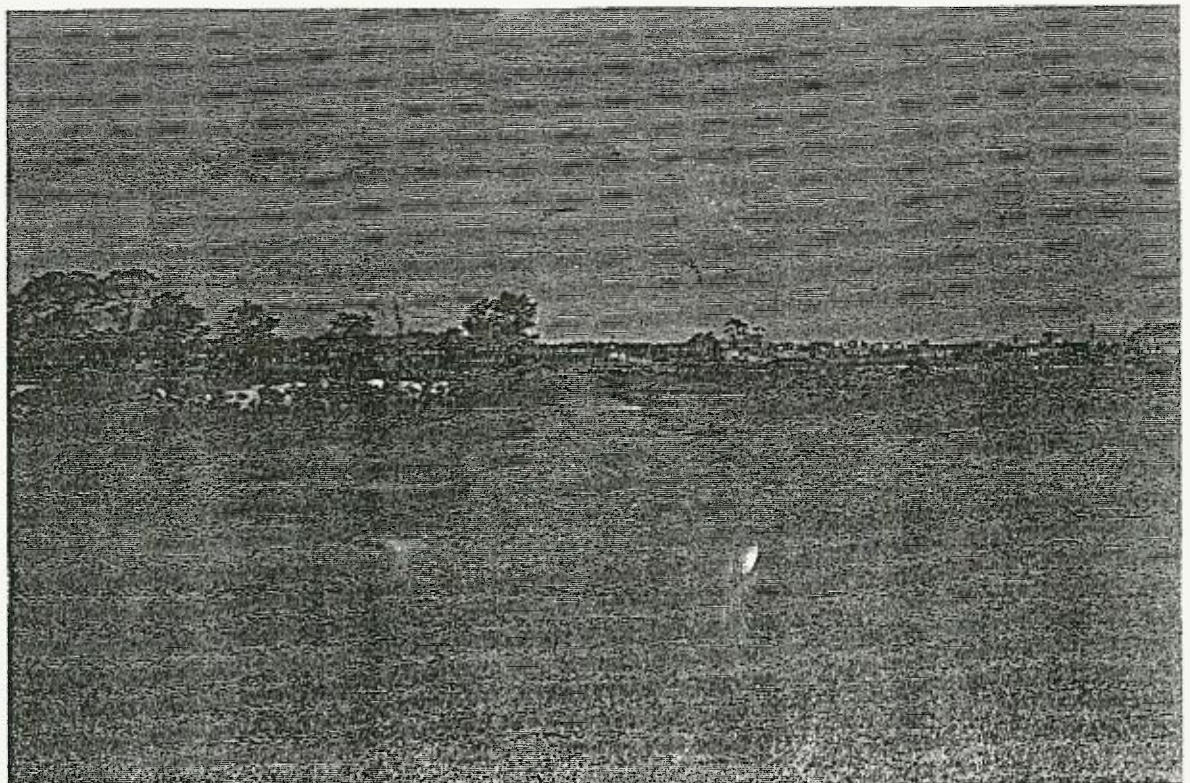
 Non Statutory

STATEMENT OF SIGNIFICANCE

LEVEL Local

- One of several former lanes within the locality of Castlereagh forming part of the original subdivision pattern.

PHOTOGRAPH



FILM ROLL

NEG. NO.

DATE 12 / 1996

CAPTION

AUTHOR

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT	Heritage Overview / Management Study for DA 4	PLDC INFORMATION
NAME OF ITEM	Jacksons Lane	1984 RES Item No. 59
		In DA4 Area Yes

LOCATION PLAN	SKETCH PLAN
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MAP, SCALE, GRID REF.	NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 837666 Full AMG Grid Ref: Zone 56H 283700 E 6266600 N
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DESCRIPTION

Gravel surfaced lane leading west from Castlereagh Road to the Nepean River. At the western end the lane descends through a steep cutting in the high bank down to the edge of the Nepean River.

Construction Date	Physical Condition Intact / Undisturbed
Modifications & Dates	

HISTORICAL NOTES

Jacksons Lane is situated between Portions 53 and 54. The earliest maps of the Castlereagh grants (eg S312 o.r. Lands Dept) indicate that most of the grants had roads or lanes laid out alongside their boundaries. Although the alignments may be considered contemporary with the early grants not all of these intended lanes were constructed. All Castlereagh lanes were named after local residents, usually the adjoining property owners. The lane may relate to the presence of Jackson's Mill reputedly situated alongside the Nepean River (but see inventory sheets for RES 13 and RES 42) . The Jackson family also purchased and occupied a subdivision of Portion 54 adjacent to the Nepean River. The intersection of Jackson's Lane and Castlereagh Road is shown on the 1873 road plan. The 1889 Ebsworth survey (PA No 12110; DP 62110) shows the entire lane as being 1 chain wide (66 feet) and also the cutting at the western end of the lane.

HISTORIC THEMES	Local	roads / transport routes	Regional	rural settlement
	State	transport	National	

AUTHOR	Inventory Form: Page 2 of 3
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PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

REF NO.

NAME OF ITEM Long's Lane Ford

PLDC INFORMATION 1984 RES No. 60 In DA4 Area No

Surveyed By & Date A Bickford, S Lavelle, NDHAG. Dec 1996 / Jan 1997

LISTINGS

Commonwealth Statutory

LOCATION / ADDRESS Longs Lane (former) / Nepean River

SUBURB / TOWN UPPER CASTLEREAGH

POSTCODE 2749

NSW Statutory

OTHER NAMES

ITEM TYPE

GROUP NAME

CURRENT USE

FORMER USE

Non Statutory

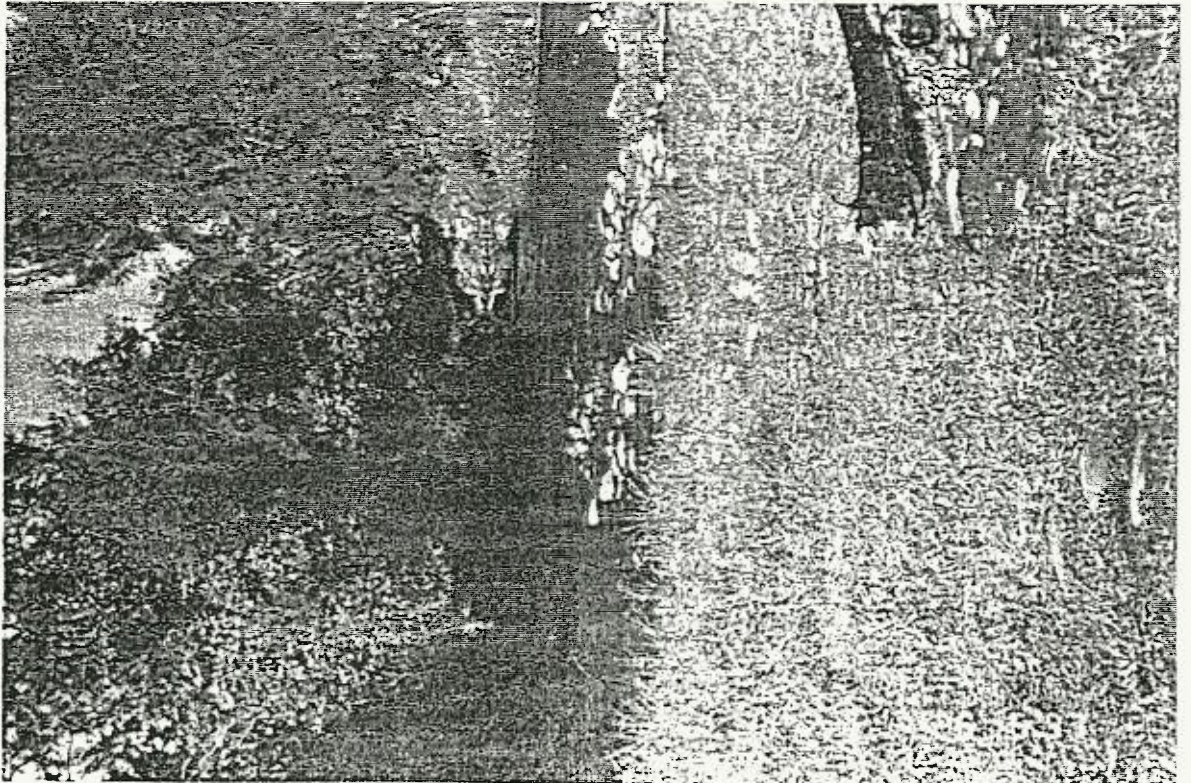
Heritage Study (Penrith City)

STATEMENT OF SIGNIFICANCE

LEVEL Local

- One of several former fords across the Nepean River which provided access in earlier periods. Used and maintained until superseded by construction of bridges across the River.

PHOTOGRAPH



FILM ROLL

NEG. NO.

DATE 12 / 1996

CAPTION

AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT	Heritage Overview / Management Study for DA 4	PLDC INFORMATION
NAME OF ITEM	Long's Lane Ford	1984 RES Item No. 60 In DA4 Area No

LOCATION PLAN	SKETCH PLAN

MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 851648
Full AMG Grid Ref: Zone 56H 285100 E 6264800 N

DESCRIPTION

Longs Lane are formed of river pebbles across flat areas of the river. Ford is distinguished by depressions in the river bank on either side of the river. No built features like fences, walls, or roadways were found.

It is not possible to apply a construction date to these fords, so it is not known how long they have been in use. Fords also likely to have been affected by changes in the River. Also no longer maintained.

Construction Date	Physical Condition	Damaged / Disturbed

Modifications & Dates

HISTORICAL NOTES

On basis of earlier maps of the district Bently suggests that a crossing in this vicinity is likely to have been the earliest ford on the Nepean River.

HISTORIC THEMES	Local	the river: floods and fords	Regional	nepean river
	State	transport	National	

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

PLDC INFORMATION
1984 RES Item No. 60
In DA4 Area No

NAME OF ITEM Long's Lane Ford

INFORMATION SOURCES USED FOR THIS ASSESSMENT

WRITTEN F Bently and J M Birmingham, *History of European Settlement*, unpublished report Penrith Lakes Scheme Regional Environmental Study, Dept of Environment and Planning, 1983

ORAL

GRAPHIC

RELATED INFORMATION

TYPE	AUTHOR / TITLE	YEAR	REPOSITORY

PROPERTY DETAILS

LGA Penrith City Council

ZONING SREP NO. 11 (Penrith Lakes)

OWNER Penrith Lakes Development Corporation

OWNER PH/FAX (047) 29 0044 / (047) 30 1462

OWNER ADDRESS Castlereagh Road, CRANEBROOK, NSW 2749

REAL PROPERTY DESCRIPTION

EVALUATION OF SIGNIFICANCE - SUMMARY MATRIX (Heritage Office Use)

VALUES:	historical	aesthetic	social	technical / research
RARE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
REPRESENTATIVE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

MANAGEMENT RECOMMENDATIONS

As the River bank is not to be affected by the construction of the Lakes Scheme the sites of the fords will not be impacted upon.

CONSERVATION &/OR MANAGEMENT PLAN

CLIENT

AUTHOR / NAME / DATE

ENDORSEMENT & DATE

FURTHER INFORMATION

AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use	
DATABASE NO.	<input type="text"/>
REF NO.	<input type="text"/>

NAME OF ITEM Sheen's Lane Ford

PLDC INFORMATION	1984 RES No. 61	In DA4 Area No	LISTINGS
Surveyed By & Date	A Bickford, S Lavelle, NDHAG. Dec 1996 / Jan 1997		Commonwealth Statutory
LOCATION / ADDRESS	Sheens Lane / Nepean River		NSW Statutory
SUBURB / TOWN	UPPER CASTLEREAGH		
POSTCODE	2749		Non Statutory
OTHER NAMES			
ITEM TYPE			
GROUP NAME			
CURRENT USE			
FORMER USE			

STATEMENT OF SIGNIFICANCE LEVEL Local

Ford not accessible.

- One of several former fords across the Nepean River which provided access in earlier periods. Used and maintained until superceded by construction of bridges across the River.

PHOTOGRAPH

FILM ROLL
 NEG. NO.
 DATE 12 / 1996
 CAPTION NO PHOTOGRAPH

AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT	Heritage Overview / Management Study for DA 4	PLDC INFORMATION
NAME OF ITEM	Sheen's Lane Ford	1984 RES Item No.61 In DA4 Area No

LOCATION PLAN	SKETCH PLAN
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MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 833647
Full AMG Grid Ref: Zone 56H 283300 E 6264700 N

DESCRIPTION

Not able to be accessed due to the terrain.
Topographic map labels this ford as "Jacksons Ford".

Construction Date	Physical Condition
Modifications & Dates	

HISTORICAL NOTES

HISTORIC THEMES	Local	Regional
	State	National

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

REF NO.

NAME OF ITEM Jacksons Ford

PLDC INFORMATION 1984 RES No. 62 In DA4 Area No

Surveyed By & Date A Bickford, S Lavelle, NDHAG. Dew 1996 / Jan 1997

LISTINGS

Commonwealth Statutory

LOCATION / ADDRESS Jacksons Lane / Nepean River

SUBURB / TOWN UPPER CASTLEREAGH

POSTCODE 2749

NSW Statutory

OTHER NAMES

ITEM TYPE

GROUP NAME

CURRENT USE

FORMER USE

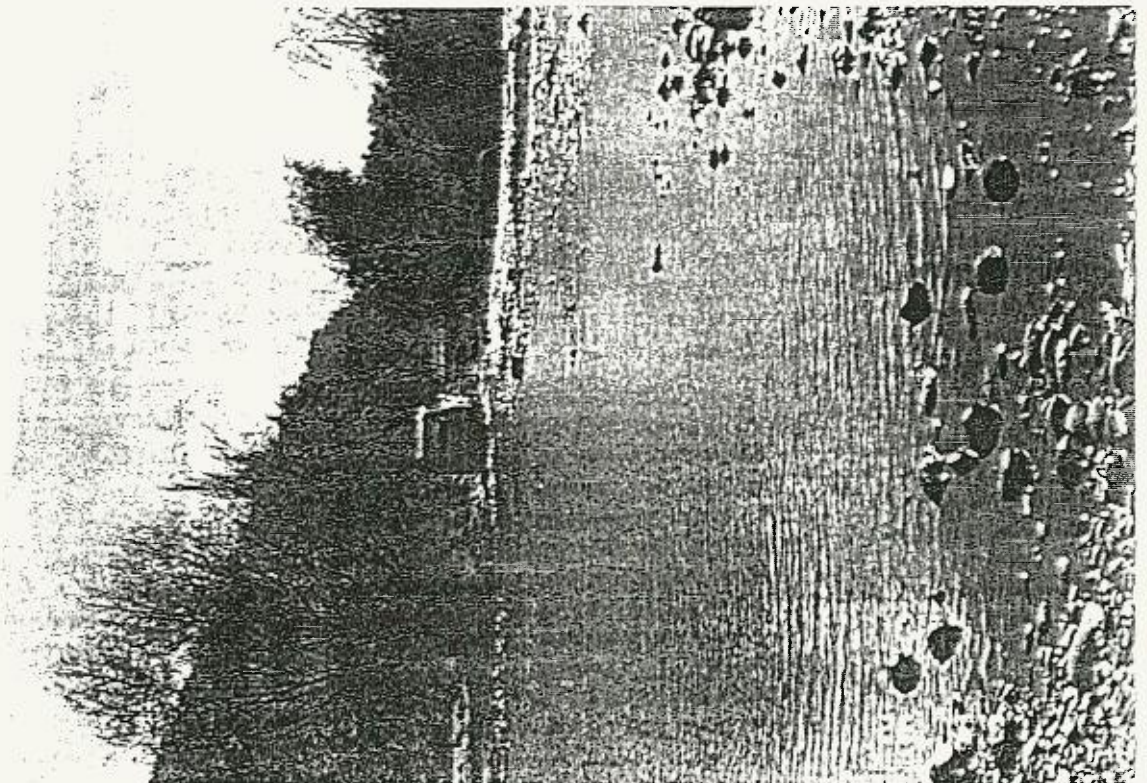
Non Statutory

STATEMENT OF SIGNIFICANCE

LEVEL Local

- One of several former fords across the Nepean River which provided access in earlier periods. Used and maintained until superseded by construction of bridges across the River. Jacksons Lane Ford is still in use.

PHOTOGRAPH



FILM ROLL

NEG. NO.

DATE 12 / 1996

CAPTION

AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4	NAME OF ITEM Jacksons Ford	PLDC INFORMATION 1984 RES Item No.62 In DA4 Area No
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LOCATION PLAN

SKETCH PLAN

MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 828668
 Full AMG Grid Ref: Zone 56H 282800 E 6266800 N

DESCRIPTION

Jackson's Lane Ford is formed of river pebbles across flat areas of the river and distinguished by depressions in the river bank on either side of the river. No built features like fences, walls, or roadways were found. Fords also likely to have been affected by changes in the River.

It is not possible to apply a construction date to these fords, so it is not known how long they have been in use. Jackson's Lane Ford was being used at the time of the survey by a 4-wheel drive vehicle. The river bank area at the end of Jackson's Lane is well used as a recreation area, and the ford is probably also often crossed.

Construction Date _____ Physical Condition _____ Damaged / Disturbed _____

Modifications & Dates _____

HISTORICAL NOTES

Bently suggests that a ford may have been at this location in order to provide access for pasturing cattle on the west side of the River and in the Blue Mountains.

HISTORIC THEMES

	Local the river: floods and fords	Regional nepean river
	State transport	National

AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

REF NO.

NAME OF ITEM Singles Ford

PLDC INFORMATION 1984 RES No. 63 In DA4 Area No
 Surveyed By & Date A Bickford, S Lavelle, NDHAG. Dec 1996 / Jan 1997

LISTINGS
 Commonwealth Statutory

LOCATION / ADDRESS Nepean River

SUBURB / TOWN

NSW Statutory

POSTCODE 2749

OTHER NAMES

ITEM TYPE

GROUP NAME

Non Statutory

CURRENT USE

FORMER USE

STATEMENT OF SIGNIFICANCE

LEVEL Local

• One of several former fords across the Nepean River which provided access in earlier periods.

Access to this site was not permitted by the Dixons during the DA 4 Study.

PHOTOGRAPH

FILM ROLL

NEG. NO.

DATE 12 / 1996

CAPTION

AUTHOR

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT

Heritage Overview / Management Study for DA 4

PLDC INFORMATION

1984 RES Item No.63

NAME OF ITEM

Singles Ford

In DA4 Area No

LOCATION PLAN

SKETCH PLAN

MAP, SCALE, GRID REF.

NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 830694
Full AMG Grid Ref: Zone 56H 283000 E 6269400 N

DESCRIPTION

Construction Date

Physical Condition

Modifications & Dates

HISTORICAL NOTES

HISTORIC THEMES

Local

Regional

State

National

AUTHOR

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

NAME OF ITEM Nepean River Bank

REF NO.

PLDC INFORMATION 1984 RES No. 64 In DA4 Area No

LISTINGS

Surveyed By & Date A Bickford, S Lavelle, NDHAG. Dec 1996 / Jan 1997

Commonwealth Statutory

LOCATION / ADDRESS Nepean River, Agnes Banks to Cranebrook

SUBURB / TOWN

NSW Statutory

POSTCODE 2749

OTHER NAMES

ITEM TYPE Landscape feature

GROUP NAME

Non Statutory

CURRENT USE

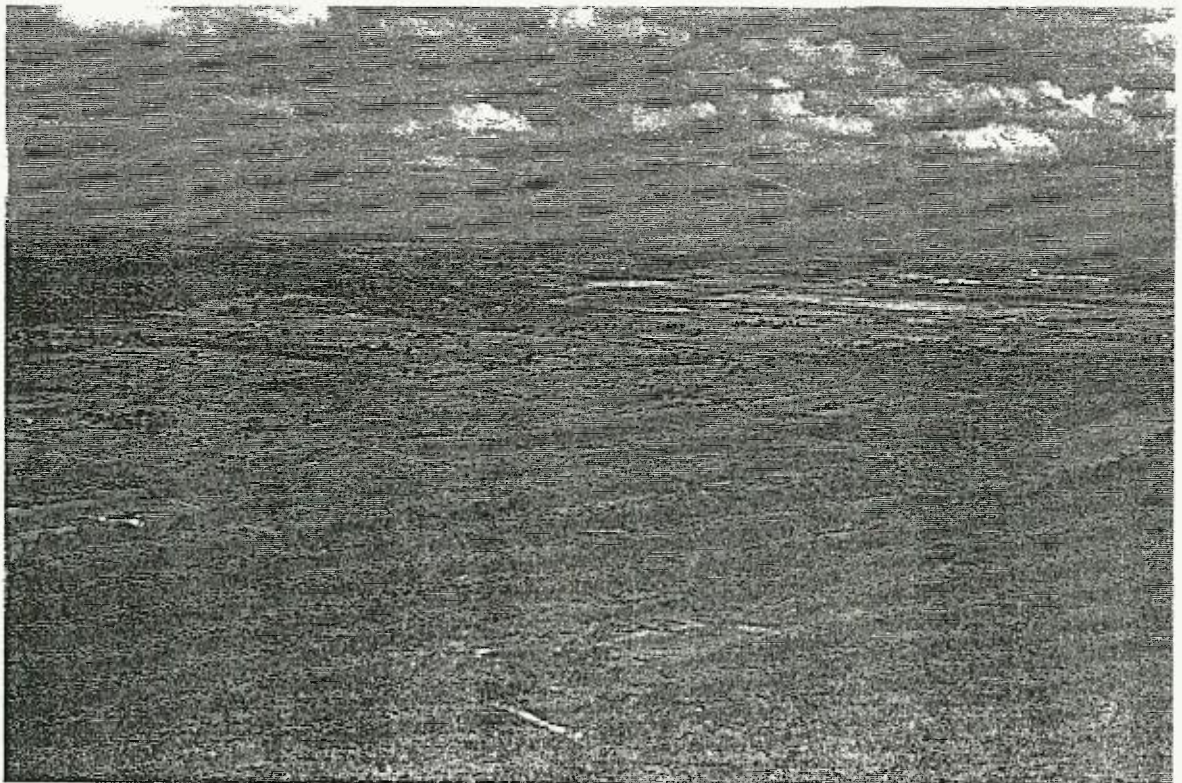
FORMER USE

STATEMENT OF SIGNIFICANCE

LEVEL State

- Of geological, environmental, historic and aesthetic significance.
- Presence of the River influenced the siting of the early Castlereagh grants.
- Aesthetically attractive, and prominent landscape feature.

PHOTOGRAPH



FILM ROLL

NEG. NO.

DATE 12 / 1996

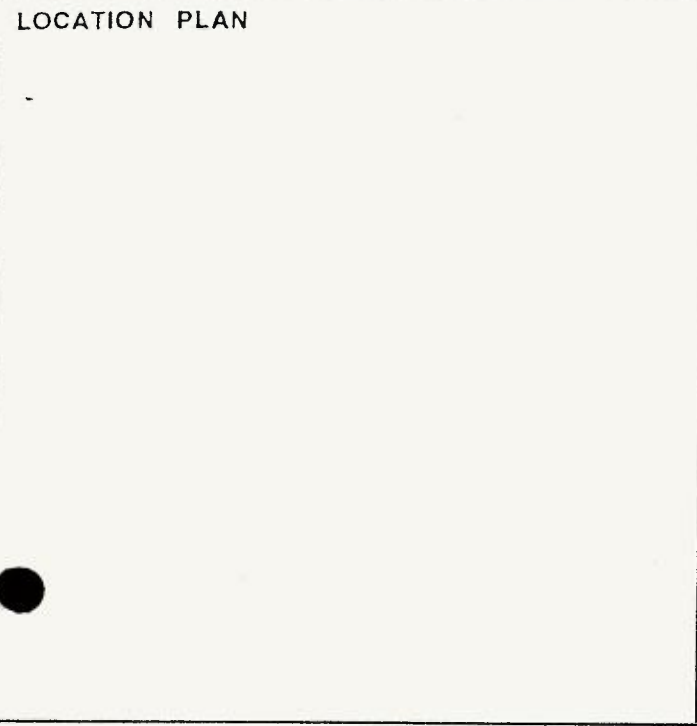
CAPTION

AUTHOR

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT	Heritage Overview / Management Study for DA 4	PLDC INFORMATION
NAME OF ITEM	Nepean River Bank	1984 RES Item No. 64 In DA4 Area No

LOCATION PLAN



SKETCH PLAN



MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 855640 to 831718
Full AMG Grid Ref: Zone 56H 285500 E 6264000 N to 283100 E 6271800 N

DESCRIPTION

The Nepean River is now found in a channel cut about 9 metres below the level of the adjoining river terraces, and the underlying soils and geology of the area directly influenced both the earlier agricultural uses and the current extractive industry focussed on the ancient river gravel beds. The River was an important resource for early settlement and dictated the layout of the early land grants. The River provided a water supply, a power supply (for water driven Mills) and an access point. In later periods the River has been used for a wider range of purposes including recreation and gravel extraction.

Construction Date	Physical Condition
Modifications & Dates	

HISTORICAL NOTES

The first European to come to the banks of the Nepean was Captain Watkin Tench, who "discovered" the river in June 1789. The Nepean and the Hawkesbury were subsequently found to be the same river, although the separate names were retained above and below the junction with the Grose River.

The presence of the River determined the location of the early settlement. In the 1790s the deep bend of the Nepean River immediately north of Penrith and later known as "Bird's Eye Corner" lured many squatters to unofficially farm the fertile alluvial banks. From 1803 Governor King began issuing land grants which confirmed these early holdings, most farms being between 40 and 100 acres.

The natural cycle of periodic flooding, and the environmental changes caused by land clearing also had significant impacts on the locality of Castlereagh. There was significant change in the course of the River as a result of the 1867 Flood.

HISTORIC THEMES	Local the river: floods and fords	Regional nepean river
	State	National

AUTHOR

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

PLDC INFORMATION
1984 RES Item No. 64
In DA4 Area No

NAME OF ITEM Nepean River Bank

INFORMATION SOURCES USED FOR THIS ASSESSMENT

WRITTEN F Bently and J M Birmingham, *History of European Settlement*, unpublished report Penrith Lakes Scheme Regional Environmental Study, Dept of Environment and Planning, 1983

ORAL

GRAPHIC

RELATED INFORMATION

TYPE	AUTHOR / TITLE	YEAR	REPOSITORY

PROPERTY DETAILS

LGA Penrith City Council

ZONING SREP NO. 11 (Penrith Lakes)

OWNER Penrith Lakes Development Corporation

OWNER PH/FAX (047) 29 0044 / (047) 30 1462

OWNER ADDRESS Castlereagh Road, CRANEBROOK, NSW 2749

REAL PROPERTY DESCRIPTION

EVALUATION OF SIGNIFICANCE - SUMMARY MATRIX (Heritage Office Use)				
VALUES:	historical	aesthetic	social	technical / research
RARE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
REPRESENTATIVE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

MANAGEMENT RECOMMENDATIONS

CONSERVATION &/OR MANAGEMENT PLAN

CLIENT

AUTHOR / NAME / DATE

ENDORSEMENT & DATE

FURTHER INFORMATION

AUTHOR

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use
 DATABASE NO.
 REF NO.

NAME OF ITEM Cranebrook Creek

PLDC INFORMATION 1984 RES No. 65 In DA4 Area Yes Surveyed By & Date A Bickford, S Lavelle, NDHAG. Dew 1996 / Jan 1997	LISTINGS Commonwealth Statutory NSW Statutory Non Statutory
LOCATION / ADDRESS SUBURB / TOWN CASTLEREAGH POSTCODE 2749 OTHER NAMES ITEM TYPE GROUP NAME CURRENT USE FORMER USE	

STATEMENT OF SIGNIFICANCE LEVEL Local

- Cranebrook Creek is a natural watercourse and water supply which influenced the siting of a number of early homesteads.
- Aesthetically attractive component of rural landscape and feature noted in the early history of Castlereagh.



FILM ROLL
 NEG. NO.
 DATE 12 / 1996

CAPTION

AUTHOR

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT	Heritage Overview / Management Study for DA 4	PLDC INFORMATION
NAME OF ITEM	Cranebrook Creek	1984 RES Item No. 65 In DA4 Area Yes

LOCATION PLAN	SKETCH PLAN
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MAP, SCALE, GRID REF.	NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 839656 to 831718 Full AMG Grid Ref: Zone 56H 283900 E 6265600 N to 283100 E 6271800 N
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DESCRIPTION

Cranebrook Creek was a natural watercourse and landscape feature extending for about 8 kilometres through the area of the Penrith Lakes Scheme. The creek commenced from a point close to lower Castlereagh Road near the Sheens Lane corner, and flowed north in the area east of Castlereagh Road crossing the alignment of Farrells Lane. The creek then turned west passing under Castlereagh Road and flowing northwest to join the Nepean River at a point just north beyond Smiths Lane. The water level and width of the creek was variable over the years, ranging from a dry creek bed or marshy ground to a chain of ponds and/or a long deep creek. In the area east of Castlereagh Road the Cranebrook Creek has been removed by the construction of the Rowing Course and the current gravel extraction pits. These activities have also interrupted the creek flow / drainage on the western side of Castlereagh Road although the creek bed alignment and partial watercourses remain visible on several properties in this area including Minnaville, Nepean Park and Hadley Park.

Construction Date	Physical Condition	Damaged / Disturbed
Modifications & Dates		

HISTORICAL NOTES

Cranebrook Creek was noted as a natural feature during the early surveys of the area for the allocation of land grants. The creek was reputedly named by James McCarthy after the large number of cranes observed in the vicinity during the early 1800s. Cranebrook Creek is traditionally associated with the adjoining early grants of James McCarthy, John Lees, Christopher Fredericks and George Fieldhouse as it was usually most apparent in the area of these grants on the eastern side of Castlereagh Road. The creek also functioned as a boundary between several properties, with parts of the alignment fenced. Several nineteenth century maps show the creek as a series of waterholes or ponds (these include the 1835 and 1895 Castlereagh Parish Maps). During the twentieth century the creek was periodically affected by both silting and scouring resulting in the creation of a series of lagoons and sandbanks within the course of the creek (evidence from aerial photographs).

HISTORIC THEMES	Local	pre-european environment	Regional
	State		National

AUTHOR	Inventory Form: Page 2 of 3
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PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

REF NO.

NAME OF ITEM Cottage

PLDC INFORMATION 1984 RES No. Not incl. In DA4 Area Yes
 Surveyed By & Date A Bickford, S Lavelle, NDHAG. Dec1996 / Jan 1997

LISTINGS

Commonwealth Statutory

NSW Statutory

Non Statutory

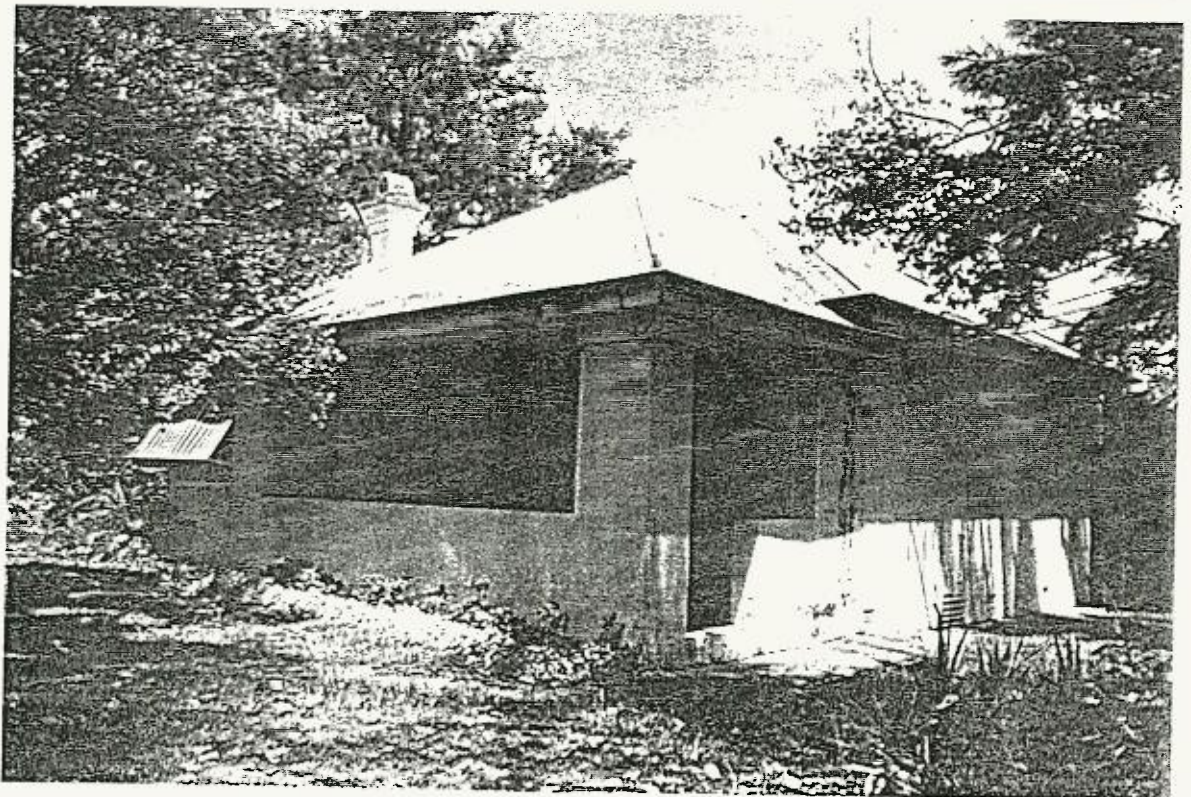
LOCATION / ADDRESS 143 Castlereagh Road
 SUBURB / TOWN UPPER CASTLEREAGH
 POSTCODE 2749
 OTHER NAMES
 ITEM TYPE Building
 GROUP NAME
 CURRENT USE
 FORMER USE

STATEMENT OF SIGNIFICANCE

LEVEL Local

- Original core building relates to the late nineteenth century phase of development, but has been extensively remodelled.

PHOTOGRAPH



FILM ROLL

NEG. NO.

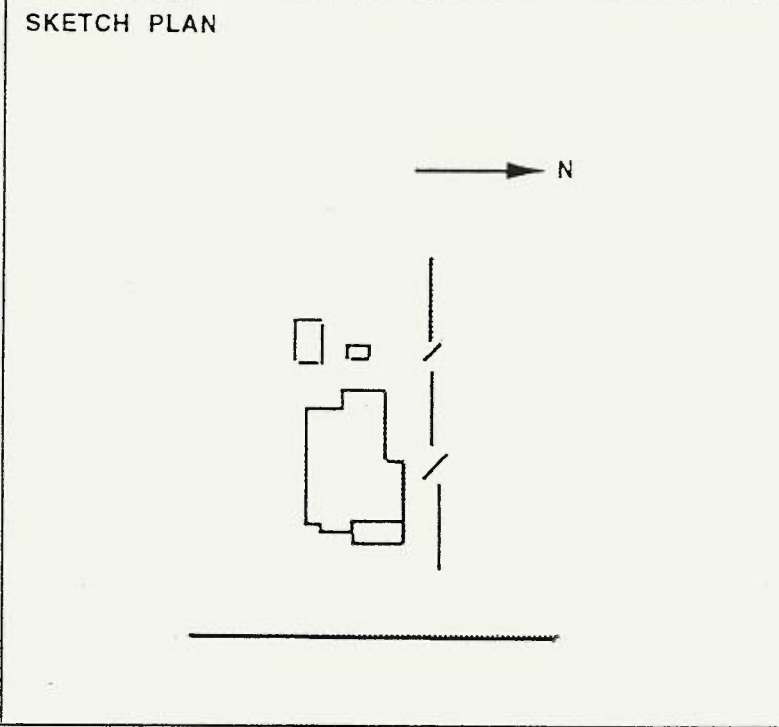
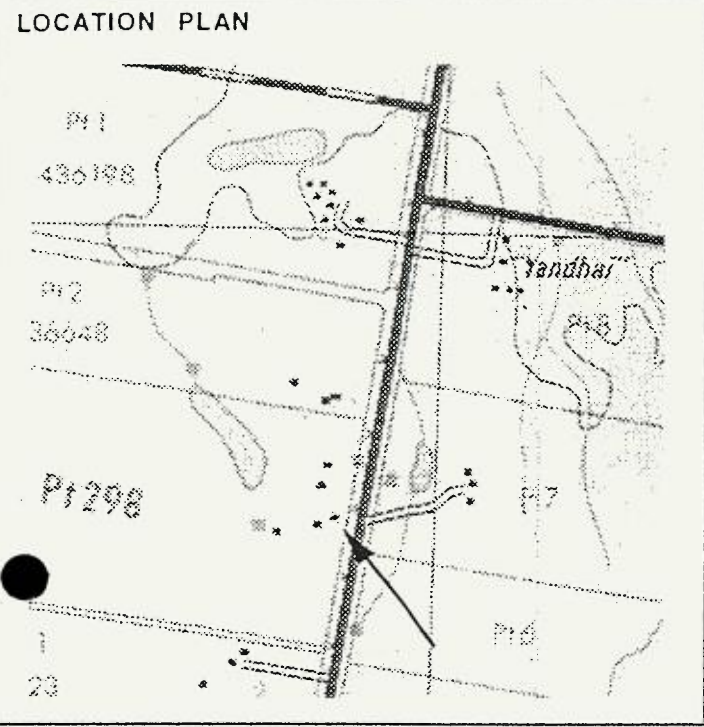
DATE 12 / 1996

CAPTION

AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT: Heritage Overview / Management Study for DA 4 NAME OF ITEM: Cottage	PLDC INFORMATION 1984 RES Item No. ? In DA4 Area Yes
--	--



MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 838675
 Full AMG Grid Ref: Zone 56H 283800 E 6267500 N

DESCRIPTION

Core building an older brick cottage, probably Late Victorian. Two brick chimneys with elaborate rendered mouldings including chimney cowl. Complex roof form with multiple hip and skillion roofs. Building extended and remodelled to contain six principal rooms plus additional open and enclosed verandah/sunroom areas. Features such as windows, doors, joinery, ceilings and cornices suggest that these modifications occurred in the 1950s. All walls also roughcast rendered. Skillion addition at the rear contains a laundry.

Ancillary buildings include a fibro garage and former brick laundry / toilet block.

Construction Date c1880 - 1900 Physical Condition Modified / Extended
 Modifications & Dates c1950s

HISTORICAL NOTES

House is within Portion 298 which includes parts of the former Portion 51 and Portion 52. Portion 51 was granted to Thomas Lambley 30/06/1803 (80 acs). In 1888 Richard Rouse Terry lodged PA 7290 and CT Vol 902 Fol 198 was issued for land holdings at Castlereagh which included all of Portion 51.

During the 1890s the property was subdivided.

Lot 3 DP 2223 a parcel of 37 acs was purchased by John Melville in 1893 (CT Vol 1108 Fol 106. This CT shows a house on the land). In 1910 this parcel was combined with Lots 2 and 4 in the ownership of John Pilcher. Lots 2 and 3 were transferred to Alexander Mc Niven in 1910. After a series of short term ownerships the property was surrendered for the purposes of the Closer Settlement Acts in 1920.

In 1942 the Crown Grant for Portion 298 was issued to the Rural Bank (CT Vol 5294 Fol 139). This 75 acs included part of Portion 51 and part of Portion 52.

6 acs of the Portion were acquired by Quarries Pty Ltd in 1944.

The remaining 69 acs were acquired by River Sand and Gravel Pty Ltd in 1961.

HISTORIC THEMES

Local	Regional rural settlement
State agriculture	National

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

PLDC INFORMATION
1984 RES Item No. ?
In DA4 Area Yes

NAME OF ITEM Cottage

INFORMATION SOURCES USED FOR THIS ASSESSMENT

WRITTEN Land Title Searches supplied by the PLDC

ORAL

GRAPHIC

RELATED INFORMATION

TYPE	AUTHOR / TITLE	YEAR	REPOSITORY

PROPERTY DETAILS

LGA Penrith City Council

ZONING SREP NO. 11 (Penrith Lakes)

OWNER Penrith Lakes Development Corporation

OWNER PH/FAX (047) 29 0044 / (047) 30 1462

OWNER ADDRESS Castlereagh Road, CRANEBROOK, NSW 2749

REAL PROPERTY DESCRIPTION

EVALUATION OF SIGNIFICANCE - SUMMARY MATRIX (Heritage Office Use)				
VALUES:	historical	aesthetic	social	technical / research
RARE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
REPRESENTATIVE	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

MANAGEMENT RECOMMENDATIONS

Recording report by NDHAG prior to demolition.

CONSERVATION &/OR MANAGEMENT PLAN

CLIENT

AUTHOR / NAME / DATE

ENDORSEMENT & DATE

FURTHER INFORMATION

AUTHOR AB, SL, NDHAG

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

NAME OF STUDY/ REASON FOR ASSESSMENT Heritage Overview / Management Study for DA 4

For Heritage Office Use

DATABASE NO.

REF NO.

NAME OF ITEM Mass Concrete House (2)

PLDC INFORMATION 1984 RES No. Not incl. In DA4 Area Yes

LISTINGS

Commonwealth Statutory

Surveyed By & Date A Bickford, S Lavelle, NDHAG. Dec 1996 / Jan 1997

LOCATION / ADDRESS 95 Castlereagh Road / 43 Smith Street

NSW Statutory

SUBURB / TOWN CASTLEREAGH

POSTCODE 2749

OTHER NAMES Clearview

ITEM TYPE Building

GROUP NAME

Non Statutory

CURRENT USE Residence

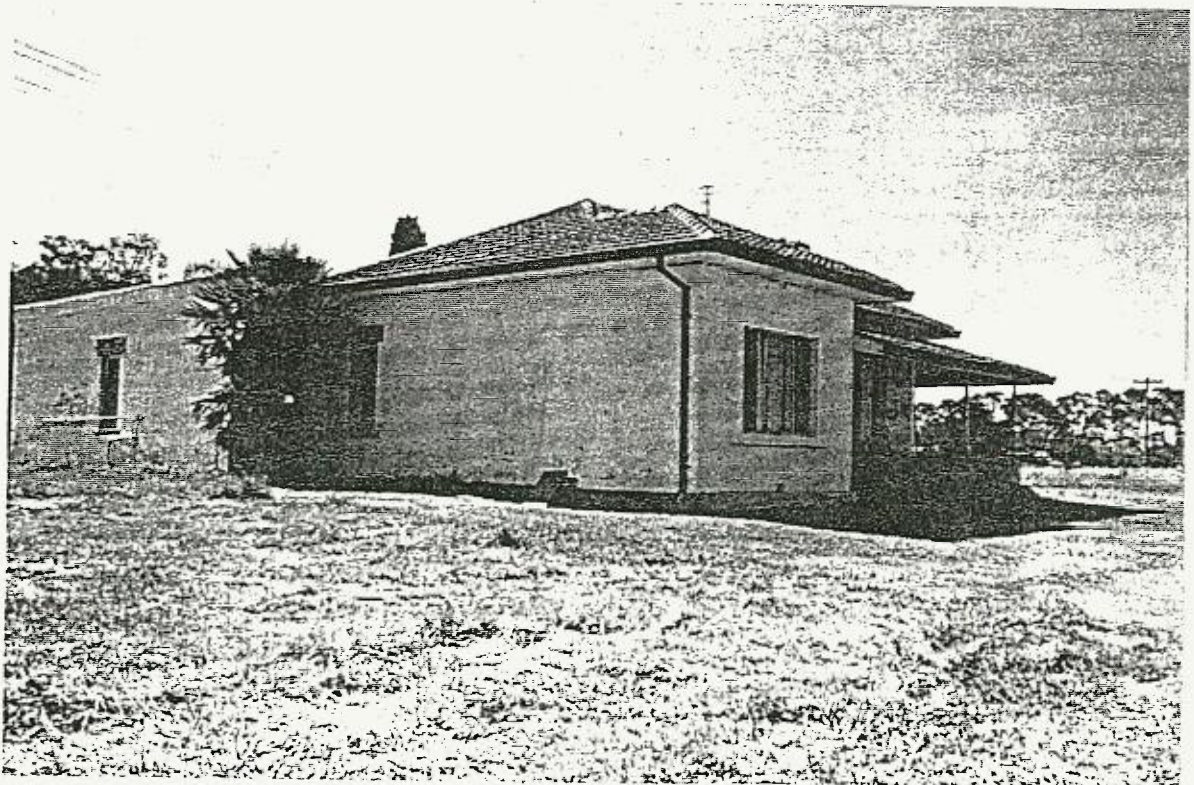
FORMER USE Residence

STATEMENT OF SIGNIFICANCE

LEVEL Regional

- The form of construction of the mass concrete house is relatively unusual, although it appears to be more common in the Castlereagh area than reported in previous studies. The construction is of some technical significance in the choice of both materials and methods, which are likely to have been locally obtained and developed.
- The construction of the extant house reflects the late nineteenth to mid twentieth century phase of increased small holdings in the Castlereagh area, with the development of local dairying and other activities to serve an increasing Sydney market.
- The property also has some local social and historic significance having been held by the descendants/branches of the original grantee's family (Kennedy/Ritchie/Howell) from 1803 to 1965.
- If there is a surviving early Colonial house site on this property it would be of considerable archaeological significance.

PHOTOGRAPH



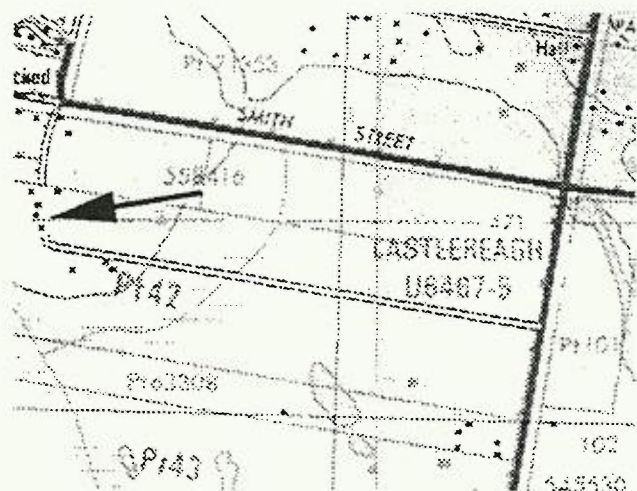
FILM ROLL

NEG. NO.

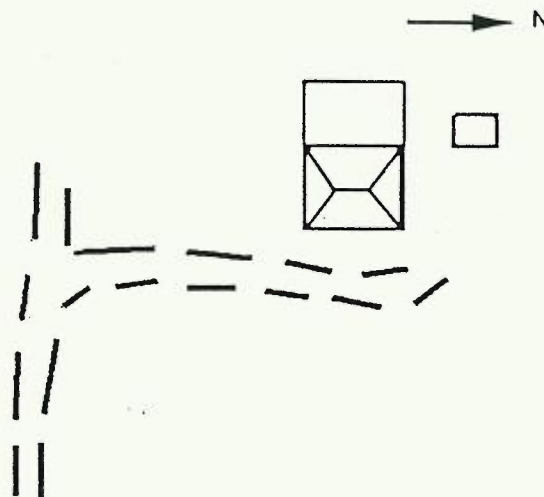
DATE 12 / 1996 CAPTION

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

LOCATION PLAN



SKETCH PLAN



MAP, SCALE, GRID REF. NSW Topo Map 1:25,000 2nd Ed "Springwood" 9030-IV-S GR: 834714
Full AMG Grid Ref: Zone 56H 283400 E 6271400 N

DESCRIPTION

House of mass concrete construction using a sand / cement mix and large diameter river pebbles. Hipped tile roof. Main portion of house containing five rooms, with verandah on north and east sides. Two attached wings at the rear containing kitchen, laundry, bathroom. Parapet of rear wing bears construction date 1902. Brick chimney. Former open courtyard at the rear now roofed over. Walls cement rendered, with the exterior walls ruled and struck in imitation of masonry. Moulded decorative border around exterior of windows, and chamfered base course. The mass concrete construction is relatively unusual (three examples identified within the present study area) and probably relates to the close availability of the materials (cement and river aggregate pebbles) due to nearby quarrying activities based upon the Nepean River. Other features on the property include an outbuilding with a stone-flagged floor, two wells, and remnants of other structures marked by concrete footings. An earlier house site may be situated in the vicinity of the extant building.

Construction Date 1902

Physical Condition Modified / Extended

Modifications & Dates

HISTORICAL NOTES

Portion 42 originally granted to Donald Kennedy 30/06/1803 (160 acs). In 1810 L Macquarie noted Kennedy's farm as "beautifully situated on a rising ground near the river". After death of Donald Kennedy in 1829 the 160 acs passed to his daughter Ann Ritchie. Following death of Ann Ritchie in 1865 the 160 acs was subdivided by a family agreement in 1884 in accordance with her Will. The subdivision of 40 acs on which the pise house is situated passed to her nephew George Howell. After death of George Howell in 1902 the property passed to his son Athol Colless Howell. In 1956 the property was inherited by Athol Robert Howell. In 1965 the property was sold by A R Howell. In 1975 the property was purchased by Quarries Pty Ltd. The Obituary for Mrs George Howell (died July 1902) notes that William Howell has had a new home erected (= RES Site 29) and that "another new home was in course of erection and approaching completion, which was for the use of Mr Athol at the death of his parents." Athol Howell was a noted local cricketer; his brother William was an Australian test cricket player.

HISTORIC THEMES	Local	Orcharding, Dairying Family relationships	Regional	Rural Settlement
	State	Agriculture	National	

PENRITH LAKES SCHEME AREA - NSW HERITAGE DATABASE FORM

INFORMATION SOURCES USED FOR THIS ASSESSMENT

WRITTEN F Bently and J M Birmingham, *History of European Settlement*, unpublished report Penrith Lakes Scheme Regional Environmental Study, Dept of Environment and Planning, 1983
 Land Titles Office Search (provided by the PLDC)
 "Nepean Times" newspaper 28th July 1902

ORAL Mr Len Perkins, RMB 101 Castlereagh Road, CASTLEREAGH

GRAPHIC

RELATED INFORMATION

TYPE	AUTHOR / TITLE	YEAR	REPOSITORY

PROPERTY DETAILS

LGA Penrith City Council

ZONING SREP NO. 11 (Penrith Lakes)

OWNER Penrith Lakes Development Corporation

OWNER PH/FAX (047) 29 0044 / (047) 30 1462

OWNER ADDRESS Castlereagh Road, CRANE BROOK, NSW 2749

REAL PROPERTY DESCRIPTION Pt Por 42; DP 558416

EVALUATION OF SIGNIFICANCE - SUMMARY MATRIX (Heritage Office Use)

VALUES:	historical	aesthetic	social	technical / research
RARE	<input style="width: 50px; height: 20px;" type="text"/>	<input style="width: 50px; height: 20px;" type="text"/>	<input style="width: 50px; height: 20px;" type="text"/>	<input style="width: 50px; height: 20px;" type="text"/>
REPRESENTATIVE	<input style="width: 50px; height: 20px;" type="text"/>	<input style="width: 50px; height: 20px;" type="text"/>	<input style="width: 50px; height: 20px;" type="text"/>	<input style="width: 50px; height: 20px;" type="text"/>

MANAGEMENT RECOMMENDATIONS

- House is situated close to the northern extremity of the Lakes Scheme area and appears to be on a land form unit in the PLDC Structure Plan.
- Recommend that PLDC investigate the retention of the building and the possible archaeological site.
- If site is to be retained a conservation management plan is to be prepared. If demolished, an archaeological survey and assessment report is to be prepared.

CONSERVATION &/OR MANAGEMENT PLAN

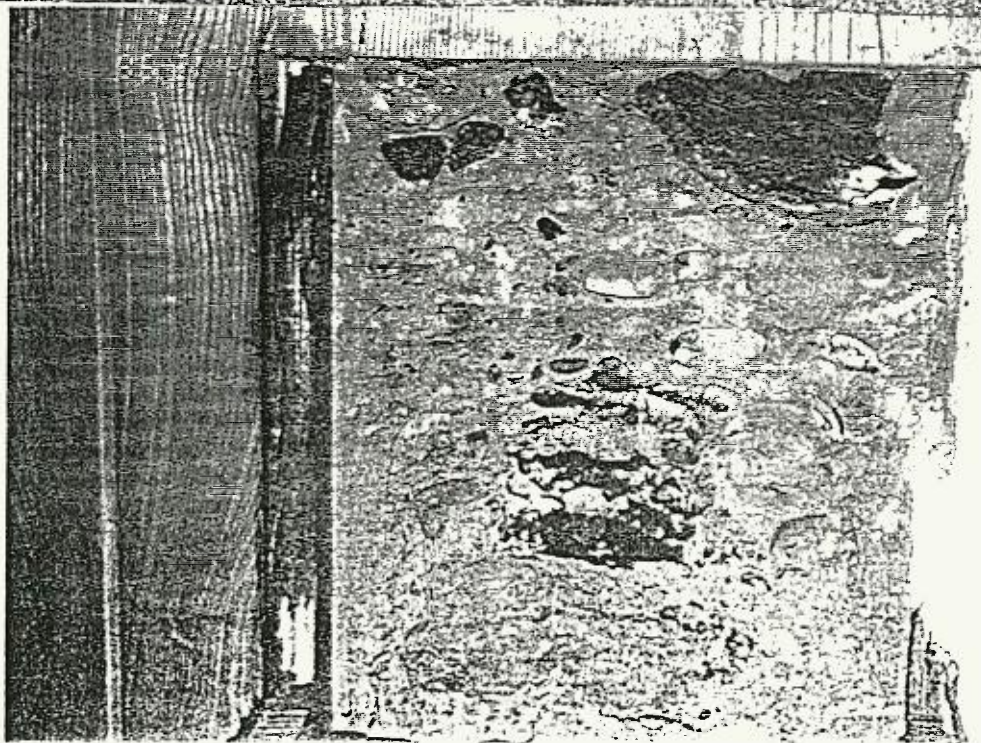
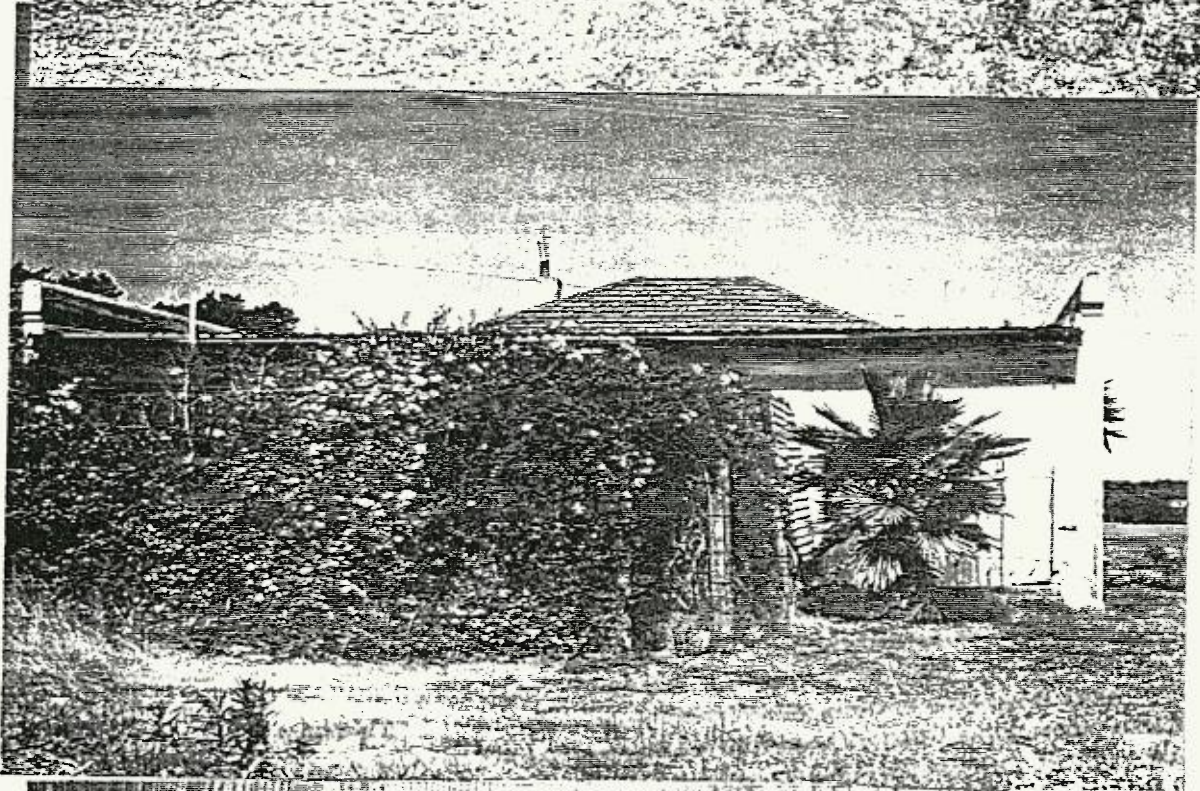
CLIENT

AUTHOR / NAME / DATE

ENDORSEMENT & DATE

FURTHER INFORMATION

AUTHOR AB, SL, NDHAG





ARCHAEOLOGICAL AND HERITAGE ASSESSMENT

RES SITE 15

"MINNAVILLE"

PENRITH LAKES SCHEME AREA

CASTLEREAGH

NSW

Prepared by

Siobhán Lavelle
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in association with

The Nepean District Historical Archaeology Group
PO Box 874, Penrith, NSW, 2751

For

The Penrith Lakes Development Corporation

September 1996
Final Report

SUMMARY

This report, commissioned by the Penrith Lakes Development Corporation, provides an historical, archaeological and heritage assessment of a site within the Penrith Lakes Scheme. The farmhouse complex is now known as "Minnaville", and equates with RES Site 15, as described in the *Penrith Lakes Scheme: Regional Environmental Study*, 1984. The complex stands within Portion 49, Parish of Castlereagh, west of Castlereagh Road. The current Penrith Lakes Scheme Development is implemented under the provisions of *Sydney Regional Environmental Plan No. 11 - Penrith Lakes Scheme*. The obligations and requirements imposed by SREP No. 11 are also described in this report.

The assessment report has been prepared on the basis of comprehensive historic research, fieldwork site inspections and detailed observation of physical evidence. From this information the history and significance of the complex have been assessed. Community consultation was also undertaken. The existing Statutory Planning Instruments and other Legislative Requirements which apply to the Lakes Scheme Area have also been considered in the drafting of the recommendations which are made at the end of the main report.

Many claims have been made in the past asserting that the extant farmhouse at "Minnaville" [RES Site 15] is associated with the original grantee of the land, John Harris, and members of his family, and that the extant homestead is a surviving early Colonial-era building. These claims are not supported by the findings of this report.

Historical research undertaken during the study and analysed in this report indicates that the extant "Minnaville" farmhouse and its associated outbuildings in fact stand within an early 30 acre subdivision of the original Portion 49 made in December 1803. This is summarised on the map included at the end of this Summary, which has been prepared to show the relationship of all of the historic and more recent subdivisions and consolidations which have affected the boundaries of the "Minnaville" property [= RES Site 15].

The physical analysis completed of the extant "Minnaville" homestead building indicates that it commenced as a small, symmetrical hipped roof cottage built during the 1860s. Additional construction which extended the building further north was completed during the 1870s. The last phase of additions and modifications to the homestead occurred during the mid-twentieth century. The sequence of building phases identified for the "Minnaville" homestead is shown on the plan at the end of this Summary.

The surviving large barn behind the "Minnaville" homestead is also attributed to the 1860s/1870s period.

The occupation and development of the "Minnaville" property as understood from the historic research and physical analysis completed for this study is summarised in the table at the end of the Summary.

On the basis of the research and analysis completed and on consideration of relevant criteria, this report has assessed the significance of "Minnaville" [= RES Site 15] and concluded that the site embodies the following attributes of significance: historic, associational, aesthetic/technical (architectural) and archaeological. It has also concluded that "Minnaville" [RES Site 15] certainly has Local heritage significance in all of these categories, and that it may lay a claim to Regional and possibly State heritage value in some of these categories, in particular its technical and archaeological aspects of significance.

The report has also concluded that some of the aspects of the significance of "Minnaville" [RES Site] as a research and information resource (ie. its identified technical and archaeological significance) may be recovered by the completion of appropriate, detailed professional recording of the existing complex prior to its future removal and excavation.

The present circumstances of the Penrith Lakes Scheme and of SREP No. 11 mean that the "Minnaville" complex [RES Site 15] being considered in this report, is not currently scheduled for retention. The Consent Authority for the Scheme is the Minister for Urban Affairs and Planning. If the "Minnaville" [RES Site 15] complex were to be determined by the Minister to be of such significance that its retention, and consequent redesign of the Scheme, would be warranted then this would be likely to impose additional costs and requirements some of which have been noted in this report.

The report makes the following specific recommendations:

- 1) Discussions should immediately be initiated with the Minister for Urban Affairs and Planning as the consent authority for the Lakes Scheme, and with the Heritage Office of NSW in regard to the findings of this report, which should be considered and reviewed by those authorities.
- 2) As soon as a determination has been made on the future of RES Site 15, appropriate investigations and planning as outlined in this report should be undertaken.

If the Lakes Scheme is to proceed in its current form, then:

- 3) Appropriate professional studies and investigations of the development area as outlined in Section 8.1 should be finalised through issue of an appropriate brief. Such investigations include recording and archaeological works.

4) If archaeological investigations are to proceed then under current legislative requirements an Excavation Permit would have to be obtained prior to any disturbance of the sub-surface deposits. The preparation of an Excavation Permit Application would also require the development of an accompanying Research Design for the future archaeological works to guide the recovery and interpretation of the archaeological evidence.

5) Under the conditions of an Excavation Permit provision also has to be made for the cataloguing, curation and storage of any artefacts, records, or other evidence recovered by the archaeological works. At present there is no official repository available in NSW and the client may have to provide for permanent storage of the artefacts and excavation records.

If the Lakes Scheme is not to proceed in its current form, then:

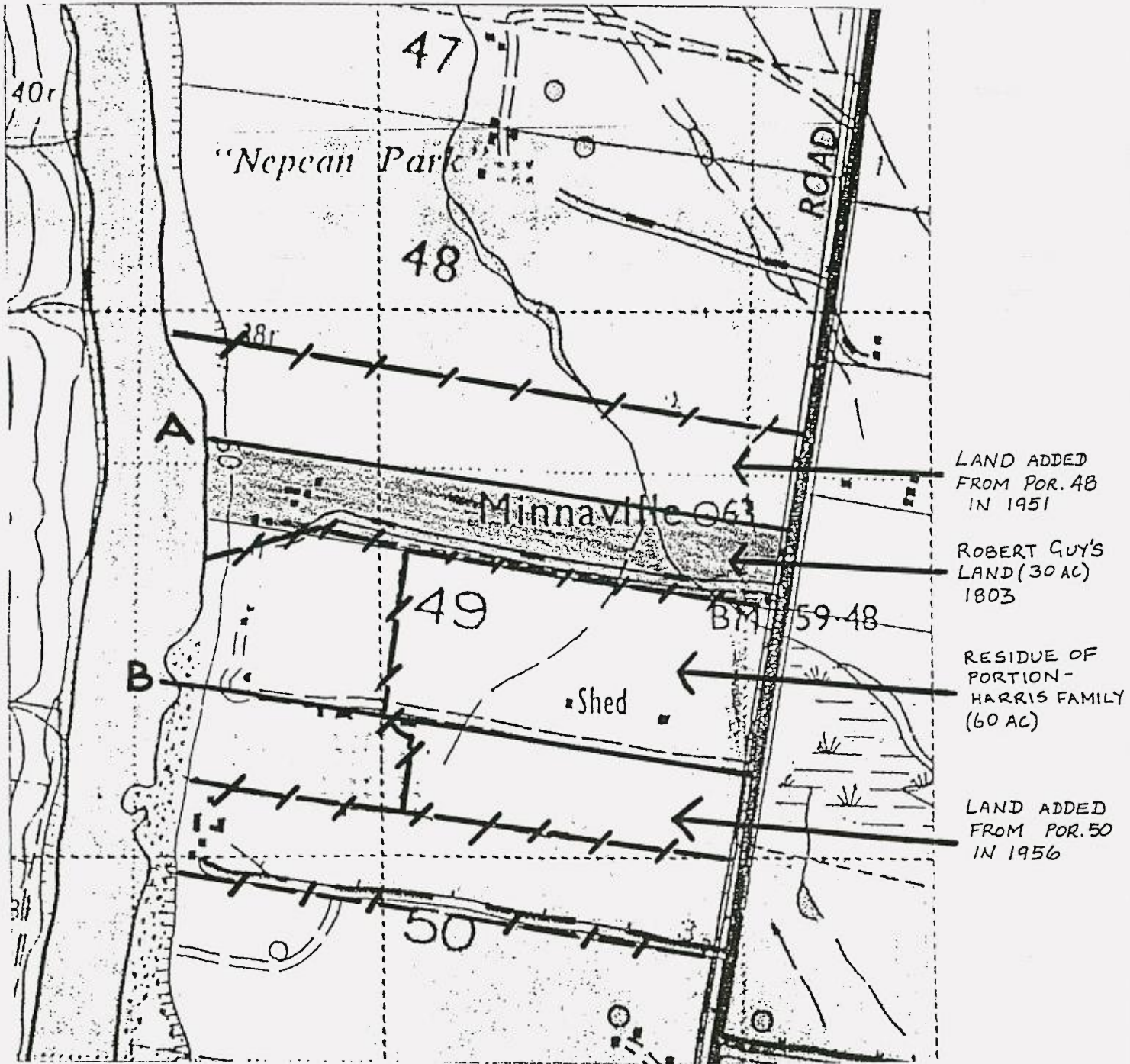
6) If the nature of the currently proposed extractive works at RES Site 15 is altered by decision of the Minister, then the impact of such a decision would need to be further addressed in line with the comments made in Sections 6.1 and 8.2 of this report.

The main points and findings made by this study may be understood by reading the following Sections of the report:

- 1.0 Introduction
- 4.0 Synthesis of Historical and Physical Evidence
- 5.0 Assessment of Significance
- 6.0 Statutory Issues and Constraints
- 8.0 Conclusions and Recommendations

0 ----- 0

PLAN PREPARED SUMMARISING AND SHOWING ALL RELEVANT LAND SUBDIVISIONS AND EXPANSIONS IN RELATION TO PRESENT FEATURES
 Plan is re-scaled from original map to approximately 1:10,000 (ie. 1 cm = 100 m)

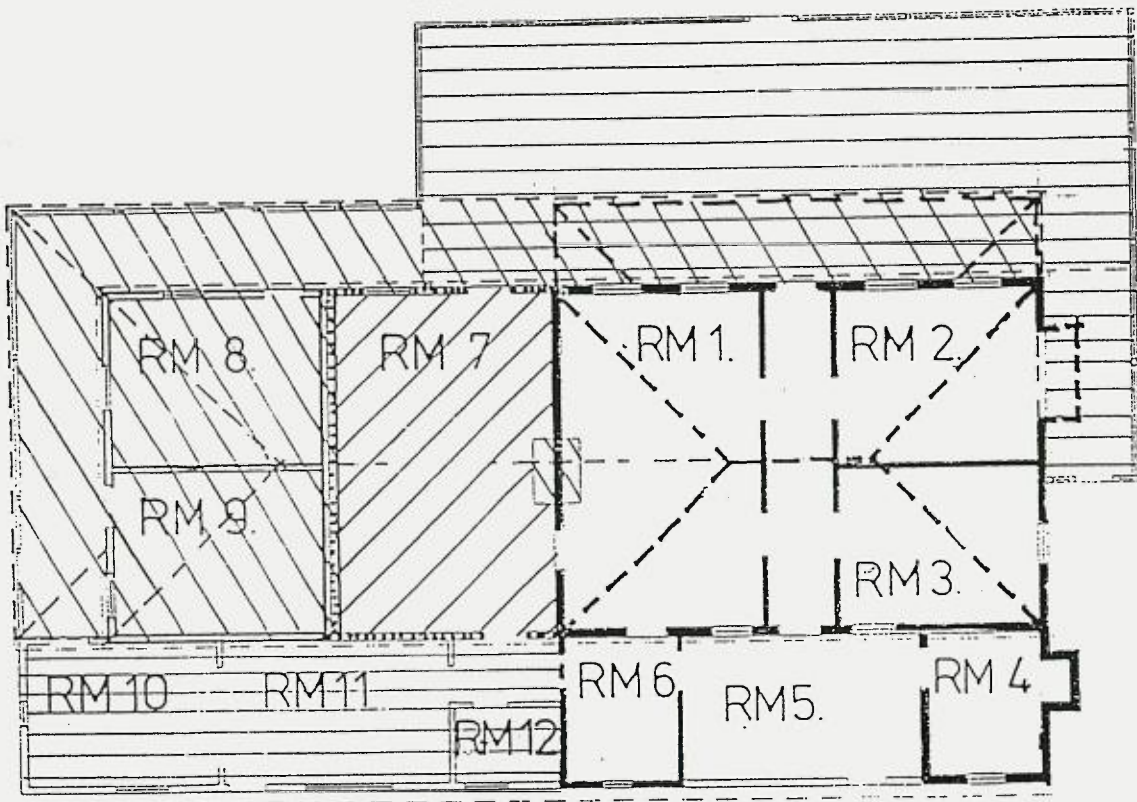


— SOLID LINE MARKED 'A' + 'B' SHOWS ORIGINAL 90 AC GRANT
 - / - BROKEN LINE SHOWS BOUNDARIES + LOTS ESTABLISHED BY DP 219895

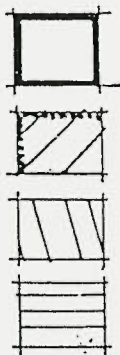
Source: Based upon NSW Topo. Map
 1:31,680 (2 in to 1 mile) 1972
 'Springwood' 9030-1V- S

PLAN SUMMARISING
CONSTRUCTION PHASES OF "MINNAVILLE"

Source: G Edds & Associates Report, Figure 2



FLOOR PLAN:
'MINNAVILLE' COTTAGE.



PHASE 1. (1860s)

PHASE 2. (c.1860s-1870)

PHASE 3. (1870s)

PHASE 4 (1950s)

**TABLE SUMMARISING
OWNERSHIP AND DEVELOPMENT AT "MINNAVILLE"**

Date	Owner	Buildings / Events
1803 - 1820	Robert Guy	Early 30 acre subdivision of original 90 acre grant. On basis of present research, clearing and farming of the land, but no precise evidence for exact buildings or sites. An early house etc., may be presumed to exist on the property.
1820 - 1844	Maria Nash	Maria Nash either occupies or leases the same (presumed) early farmhouse.
1844 - 1863	Robert Williams	Farm is let to tenants, including a Mr Fisher. Early buildings are probably still present.
1863 - 1886	Joseph Daniel Single	Older buildings possibly demolished at this time. Present homestead constructed by J D Single, and occupied by his family. Small hipped roof cottage with two phases of later additions producing the rectangular shaped, core building extant today. Large barn outbuilding and other features such as the well also added during this occupation.
1886 - 1907	Short term Owners: Wisdom, Maybury Tuckfield, Olpherts	Configuration of land and buildings probably continues without any major alterations or additions.
1907 - 1941	Samuel Apps Egging	Reconsolidation of the two early subdivisions. Configuration of main homestead shown in 1930 photograph, not greatly altered from C19th. Some of the outbuildings were probably added during this period of occupation.
1941 - 1950	A & D Fulop, G Evans	Same general configuration of land and buildings probably continues
1950 - 1960	Frank Duesbury	Expansion of the property through acquisition of additional lands. Additions and remodelling of the main homestead. Also additions and alterations to the barn. More outbuildings introduced.
1960 - 1964	Farley and Lewers, F Dowling	Documentation for Auction records buildings and layout of the property. More recent house near river swept away by floods. New subdivision of the property into 4 allotments.
1964 - 1973	A Higgins Roland P/L Minnaville P/L	Lot 1 DP 219895 contains the homestead & farm outbuildings dealt with in this report.
1973 - present	Gravel and Quarry Co.s, including BMG, thence Penrith Lakes Development Corporation	Property occupied by tenants, awaiting future use by the extractive industry. RES 1984; REP No 11, 1986. Configuration of land and buildings as established during the Duesbury period (1950s) continues.

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Appendix G - Report by Graham Edds and Associates

1.0 INTRODUCTION

1.1 Background to the Report

1.1.1 This Report

This report provides an historical, archaeological and heritage assessment of a farmhouse complex within the area of the Penrith Lakes Scheme at Cranebrook, within the City of Penrith, NSW. The Scheme Area and Site Location are shown on Figures 1 and 2, Appendix A.

The farmhouse complex is now known as "Minnaville", and equates with RES Site 15. The homestead and associated complex is situated at number 1426 Castlereagh Road, on the western side of the road, approximately 6 kilometres north west of Penrith. It is within Portion 49, Parish of Castlereagh and County of Cumberland. The complex has been previously described in other documents as "Harris' Cottage" (see below). "Harris' Cottage" is a name with no historical veracity and consequently the name "Minnaville" is used for the extant farmhouse complex on RES Site 15 throughout this report.

This assessment report was commissioned in 1996 by the Penrith Lakes Development Corporation. The report has been completed as a collaborative effort between the Nepean District Historical Archaeology Group (NDHAG) and Siobhán Lavelle, Consultant Historical Archaeologist, with a specialist component contributed by Graham Edds and Associates, Architects.

1.1.2 Previous Work and Assessments

1.1.2.1 Penrith Lakes Scheme Reports

The Penrith Lakes Scheme Development is implemented under the provisions of *Sydney Regional Environmental Plan No. 11 - Penrith Lakes Scheme*. Prior to the making of this plan an extensive Regional Environmental Study was completed. This study, published as *Penrith Lakes Scheme: Regional Environmental Study*, Department of Environment and Planning, 1984, included the research and inventory of European Heritage sites and items within the scheme area¹. A specialist report on this subject was completed by F. Bently and J.M. Birmingham in 1981 and was subsequently issued as a 'working paper' for the Penrith Lakes Scheme, *Penrith Lakes Scheme Regional Environmental Study: History of European Settlement*, Department of Environment and Planning, 1983. This research identified 75 heritage items or sites within or immediately adjacent to the scheme area, including existing buildings, ruins, sites of former buildings, roads, river fords and landscape features. The farmhouse and associated complex which is the subject of this report was identified as follows in the 1983 working paper:

Schedule 4, Class A - Visible structures, complexes and ruins:

Site 37 - Harris' cottage and farm buildings

Nature of Significance: 222 (Associative); 4 (Social); 8 (Aesthetic).

Degree of Significance: 3 (= Some significance)

The recommended conservation policy for the site was:

"2 - Retain undisturbed as long as possible."

The inventory sheet from the 1983 report also notes that Site 37 occurs within the northern subdivision of Portion 49.

The 1983 working paper also identified a further site, included in Schedule 4:

Class B - Non-visible structures and features: archaeological sites:

Site 38B or 39B - Minnaville.

Nature of Significance: 222(Associative);1 (Historic) 4 (Social); 5 (Archaeological).

Degree of Significance: 1 (= Great significance)

The recommended conservation policy for the site was:

"4 - Investigation before destruction."

This site was identified as being within Portion 48, Parish of Castlereagh, County of Cumberland. This portion also contains the 1822 Georgian homestead "Nepean Park". The identification of this site is considered further in subsequent sections of this report (Section 2.5).

Copies of the inventory sheets for these items as included in the 1983 working paper are included as an Appendix to this report (Appendix D).

The preliminary conclusions made about Sites 37 and 39B in the 1983 working paper are not supported by this report which provides a different interpretation of the sites and their history.

The numbering of these items was altered between the 1983 working paper and the published *Penrith Lakes RES* 1984. Thus in the RES document, Appendix E.1, List of Heritage Items, sites 37 and 39B respectively become:

Free - standing structures 1867 - 1899

Site 15 - Harris's cottage complex

Sites of former structures

Site 48 - Minnaville

The RES document also examined the degree of significance identified for the inventoried items against the technical requirements of extraction and rehabilitation for the Scheme. In addition to five major heritage items, two further items were also recommended for retention as part of a heritage precinct to be established at Upper Castlereagh.

The subsequent *Sydney Regional Environmental Plan No. 11 - Penrith Lakes Scheme.*, listed the following items for retention in Schedule 3 (Heritage Items):

- Hadley Park
- Nepean Park
- McCarthys Cemetery
- Upper Castlereagh Methodist Church and Hall
- Upper Castlereagh School and Residence
- Methodist Cemetery

Under an existing arrangement between the Penrith Lakes Development Corporation and the Nepean District Historical Archaeology Group, the NDHAG have previously completed reports on a number of sites or items removed during the development of the Lakes Scheme. In 1995 the Corporation agreed with the Heritage Branch of the then Department of Urban Affairs and Planning (now the Heritage Office) that for a number of the sites remaining within the Scheme area a professional consultant would be involved with the NDHAG in completing archaeological site assessments. The "Minnaville" complex on Portion 49, Parish of Castlereagh, [RES Site 15] which is examined in this report, is one such instance.

1.1.2.2 Published Local and Family Histories

In 1988 Mrs Jean Gray, a descendant of Ann Harris (formerly Ann Cook), published a history of the property being investigated in this report. Her book *Magnificent Minnaville* was based upon Land Titles research of John Harris' Portion 49 grant and the other adjoining early grants, as well as upon her knowledge of Harris family history. *Magnificent Minnaville* also includes some more recent information about the property, including twentieth century photographs and other material such as 1960s Auction Brochures. From her interpretation of the Land Title information Mrs Gray has suggested in her book that the present farmhouse building at "Minnaville" is the original homestead built and occupied by John and Ann Harris during the early nineteenth century².

The interpretations and assertions made by Jean Gray about the history and dating of the present "Minnaville" homestead [= RES Site 15] are not able to be confirmed by either the historic or physical evidence reviewed during this study and are not supported by the findings of this report.

In 1988, descendants of John and Sarah Single, who built the Georgian homestead "Nepean Park" on nearby Portion 48, also prepared and published a family history, *John and Sarah: A Genealogical History of the Single Family*.³ Some information in this publication, and other documents held by descendants link members of the Single family with the construction and occupation of a house on a property called "Minna Ville", in particular Joseph Daniel Single who purchased the land on which the extant farmhouse complex stands in 1863.

This interpretation is confirmed by the subsequent analyses and findings of this report.

1.1.2.3 National Trust Listing

In 1994, the complex known as "Harris' Cottage / Minnaville" was given a Classified listing by the Historic Buildings Committee of the National Trust. The listing was largely based upon the information in Jean Gray's publication and upon descriptions completed during a site inspection of the property. No additional or primary historic research was undertaken by the National Trust for the purpose of the listing. A copy of the National Trust listing information is included in the Appendices to this report. The Trust's present interpretation of the development of the property is not supported by this report.

1.2 Methodology

This report has been prepared having regard to the methodology and approaches outlined in the following documents and publications:

- *Archaeological Assessment Guidelines*, unpublished draft report, NSW Department of Urban Affairs and Planning, June 1995.
- *The NSW Heritage Manual: Draft of Selected Contents*, unpublished draft report, NSW Department of Urban Affairs and Planning, February, 1996.

Although it is an assessment, not a recording report, it has also had regard to:

- "How to Prepare Archival Records of Heritage Items [2nd Edition]" brochure issued by Department of Planning/Heritage Council of NSW, February 1995.
- "Guidelines for Photographic Recording of Heritage Sites, Buildings and Structures" brochure issued by Department of Planning/Heritage Council of NSW, June, 1994.

In addition to standard study procedures such as independent historical research and verification of previous research by other parties, site fieldwork, and documentation (plans / photographs), analysis, and assessment of significance, this study has also included consultation with a range of interested parties. These have included individuals with specific knowledge or opinions about the history of the "Minnaville" property, and a range of other organisations including Local History Groups, Penrith City Council, the Heritage Office of NSW and the National Trust (NSW).

1.3 Objectives of the Study

The objectives of this historical archaeological and heritage assessment of "RES Site 15: Harris' Cottage Complex" [= the extant "Minnaville" homestead complex], as described in the Study Brief issued by the Penrith Lakes Development Corporation in April 1996, are:

"1.3 Objectives

- evaluate the probable extent, nature and integrity of the archaeological and heritage resource at RES Site 15;*
- determine the significance of that resource; and*
- define the appropriate management for that resource having regard to significance and statutory requirements. "*

1.4 Structure of the Report

This report:

- describes the background and methodology of the current study;
- outlines the history of the farmhouse complex identified as RES Site 15 and of Portion 49 and other Portions as relevant;
- documents the extent and nature of the farmhouse complex [RES Site 15] and other structures or archaeological remains known to be present on the site;
- interprets the historical and physical evidence and assesses the archaeological potential of the site, and adjoining Portions or subdivisions of land as relevant to the present study;
- assesses the heritage significance of the site;
- outlines statutory matters relevant to the site and the Penrith Lakes Scheme;
- summarises the views elaborated by other parties in the course of the consultation phase;
- makes recommendations for treatment of the site, having regard to current circumstances and statutory controls, and also to proposals which have been suggested for the site's future and raised by some parties both prior to, and during, completion of this study. Such proposals are understood to be subject to future consideration by other authorities.

Additional material is collated into Appendices to the report:

Appendix A - Figures

Appendix B - Historic Material

Appendix C - Current Site Photographs

Appendix D - Previous Inventory Sheet for site (from 1983 working paper)

Appendix E - National Trust Listing and recent correspondence

Appendix F - Local Press Cuttings (Sample Selection only)

Appendix G - Report by Graham Edds and Associates

1.5 Authorship and Acknowledgments

This report has been prepared by Siobhán Lavelle, Consultant Historical Archaeologist, in collaboration with the Nepean District Historical Archaeology Group. Members of the NDHAG who participated in this study were:

George Gyford (President) - Historical Research and Site Fieldwork.

George Gyford is the author of the biographies of site occupants included in Section 2.4 of this report. George also provided considerable input into the analysis of site history and into many of the interpretations developed during the course of the study.

Hazel Fraser - Historical Research and Site Fieldwork.

Scott Davis - Site Plans

Other NDHAG Participants in Site Fieldwork were:

Ros Wright, Pam Williams, Amanda O'Toole, Peter Nicholls, Maureen Turner, Allayne Foley, Chris Hewett, Natasha Jackson.

A separate professional survey of the position of the "Minnaville" complex, its surrounding land subdivision and relationship to previous historic boundaries, (in particular the boundary between Portion 48 and Portion 49, Parish of Castlereagh) was also completed. The survey was undertaken by Craven, Elliston and Hayes Pty Ltd. A copy of the recent survey plan is included in the Appendices to the report (Figure 11 - Appendix A).

Due to the nature of the farmhouse complex and its National Trust Listing, Graham Edds and Associates, Architects, have contributed a specialist sub-component assessing the construction, age and significance of the main farmhouse at "Minnaville". This report is included in the Appendices.

The study team wishes to particularly acknowledge the co-operation and patience of Mr Alan McNally and Mrs Ruth McNally, the current occupants of "Minnaville", who gave full and complete access to the house and property on numerous occasions during the fieldwork phase of the project.

Assistance at all stages of the study was provided by Mr Sergio Mantella-Galli of the Penrith Lakes Development Corporation.

The study team also acknowledges many individuals who gave their time during the consultation phase, to contribute information, their recollections of the site and its occupants, or their opinions about the property. They included: Mrs Jean Gray, Mrs Rosalie Pollet, Mrs Fran Bently, Mr J Bently, Mrs B Childs, Ms Jacqueline Flower, Mr T Dowling, Mr C Dowling, Mr H Cooper.

Individuals representing organisations consulted during the study included: Ms Cath Snelgrove, Archaeologist, NSW Heritage Office (Heritage Council)
Mr Ian Hayes, Historic Buildings Officer, National Trust of Australia (NSW)
Ms Julie Gleaves, Archivist, National Trust of Australia (NSW)
Mr Terry Agar, Senior Environmental Planner, Penrith City Council.
Mrs Lorna Parr, and Mrs Barbara Higginson, Nepean District Historical Society⁴

2.0 DOCUMENTARY EVIDENCE and HISTORICAL OUTLINE

2.1 Sources of Information

The main sources of documentary evidence used to prepare the following historical outline and biographies were the records of the Land Titles Office, the Lands Department Plan Room, the Archives Office of New South Wales, the State Library, the Mitchell Library, and various published and unpublished reports, histories and family histories. Specific references are provided in notes to the text and reference should also be made to the report bibliography.

2.2 Historic Context

From the earliest years of the European colonisation and settlement of NSW, the fertile alluvial soils alongside the Hawkesbury - Nepean River enabled farmers to grow a succession of crops from wheat, maize, and vegetables to turf. The Nepean River is now found in a channel cut about 9 metres below the level of the adjoining river terraces, and the underlying soils and geology of the area directly influenced both the earlier agricultural uses and the current extractive industry focussed on the ancient river gravel beds.

The first European to come to the banks of the Nepean was Captain Watkin Tench, who "discovered" the river in June 1789. The Nepean and the Hawkesbury were subsequently found to be the same river, although the separate names were retained above and below the junction with the Grose River. In the 1790s the deep bend of the Nepean River immediately north of Penrith and later known as "Bird's Eye Corner" lured many squatters to unofficially farm the fertile alluvial banks. From 1803 Governor King began issuing land grants which confirmed these early holdings, most farms being between 40 and 100 acres.

When the area was being surveyed by James Meehan, the north-south line of Castlereagh Road was established as the boundary between the first line of grants which fronted the Nepean and a parallel line of grants extending north from "Bird's Eye Corner". After passing south through Upper Castlereagh, the Castlereagh Road turned east and ended at the boundary of Thomas Appledore's grant (Portion 74) where a lane led along the eastern boundary of Appledore's grant to the river (see Figure 3, Appendix A). Thus, in this early period access into Castlereagh, Upper Castlereagh and Cranebrook, came from the north via Richmond, and not from present day Penrith.

The Hawkesbury - Nepean River was frequently subject to flooding, usually in the Autumn. Floods affected the Hawkesbury in 1794, 1795, 1800 and 1801. Although the Castlereagh valley was less subject to floods than the broader and fertile floodplain of the Hawkesbury, after the issue of their formal land grants, the settlers of the Castlereagh area had their first experience of a major flood in

1806. Further down the Hawkesbury River floodplain the height of the floods "was on an average eight feet above the ground"⁵ and many settlers lost crops and stock, as well as suffering considerable damage and in some cases, the destruction of their homes.

In 1810 Governor Lachlan Macquarie toured the Hawkesbury and Nepean districts. He described the locality of Castlereagh as follows:

*...we passed through a long extensive chain of farms along the Nepean belonging to Appledore, Westmore, Collet, Stanyard, Pickering, Field, Stephen Smith, Jones, Cheshire, Harris, Guy, Wm. Cheshire, [sic. - should be Tonks] Landrine, Stockfish, Oldwright, Ryan, Griffith, Kennedy &c. &c being the front line of farms on this river. They are all good farms, good soil and well cultivated, but they are liable to be flooded in general when this river overflows its banks, and consequently the houses of the settlers are very mean and paltry.*⁶

In 1810 Governor Macquarie also directed the establishment of new townships on higher ground less liable to flooding. These were the "Macquarie Towns" of the Hawkesbury, namely Windsor, Richmond, Pitt-Town, Wilberforce and Castlereagh, which was the first official town on the Nepean. Castlereagh was laid out on a ridge high above the flood plain. Although the town was surveyed and a church, burial ground, schoolhouse and other features were established, the lack of water meant that the town remained largely undeveloped, and was eventually abandoned. Even after more calamitous floods in 1811 and 1816 most grantees and settlers stayed on their farms, still obstinately refusing to move to the Castlereagh township.

The highest flood experienced during the nineteenth century occurred in 1867 when all of the Castlereagh/Cranebrook river terraces and floodplain were totally submerged. Several accounts confirm that only the upper sections of two storey buildings (such as "Nepean Park" and "Hadley Park") remained partially above the flood level, and many settlers were forced to seek shelter in the old church schoolhouse in the town of Castlereagh. Floods have also continued throughout the twentieth century. Even after the completion of Warragamba Dam in 1960 which has assisted in the control of water flow in the Nepean, two of the highest twentieth century floods occurred in 1961 and 1964.

The present farm complex known as "Minnaville" on Castlereagh Road [= RES Site 15], stands within part of Portion 49, Parish of Castlereagh and County of Cumberland. This rectangular portion of 90 acres was initially granted to John Harris by Governor King on 30th June 1803. Adjoining grants were: on the southern side, that of Thomas Cheshire, being Portion 50, 140 acres; and on the northern side that of William Tonks, being Portion 48, also of 140 acres. Figures 4a and 4b shows the location of John Harris's grant (Portion 49) and the adjacent grants of Cheshire and Tonks.

2.3 Land Title Information

The Land Title search completed for Portion 49, and its subdivisions and (re)consolidations has established the following transactions. It appears that some of the early dealings may never have been formally registered, a common situation for properties situated in the Macquarie Towns and the other outlying areas of early Colonial NSW.

- 30 June, 1803. Crown Grant to John Harris, 90 acres. Portion 49, Parish of Castlereagh, County of Cumberland. The description of the Grant was "Ninety Acres in the District of Evan, bounded on the North side by Tonks farm and on the South side by Cheshire's Farm on the River Nepean"⁷.

- Six months after the date of grant, John Harris subdivided the Portion. 30 acres, was assigned to Robert Guy. Land Titles Office [LTO] pre-1825 Old Registers, Book 1, page 73 Entry number 365, dated 20th December 1803, records:

Assigt. of 30 Acres of Land from Jno. Harris to Robt. Guy for 5 years at the expiration of which (term ?) the said 30 Acres is to be made over from Harris to Guy('s) possession.

The original Deed of Gift from Harris to Guy was subsequently lodged with the Deposited Deeds packet for Primary Application No. 89. A copy of the Deed is included in the Appendices to this report. It reads as follows:

To all people to whom these presents shall come. I John Harris do send Greeting. Know ye that I the said John Harris settler at Nepean river in the Territory of New South Wales For and in consideration of the Love Goodwill and affection which I have and do bear towards Robert Guy of this Territory have given and granted by these presents do freely Give and Grant unto the said Robert Guy his Heirs Executors Administrators and Assigns Thirty Acres on my farm. Known by the name of Harris's Farm lying and situate at Nepean River as aforesaid. To have and to hold the same thirty acres of land for ever. His Heirs Executors Administrators and Assigns from Henceforth as his or their property. On condition that the said Robert Guy reside thereon and proceed to the Improvement and Cultivation of the said Land for five years from the date Hereof and paying the quit rents or any incumberances specified in the Deed. In witness whereof I have Hereunto put my hand and seal this Twenty third day of December one Thousand Eight Hundred and Three.

*Signed, sealed and delivered
where no stamps are in use
in presence of
Richd. Atkins*

*his
John X Harris
mark*

*Regd. Rd. Atkins
JA*

The rear side of the Deed reads:

It is understood that at the (Expiration ?) of the 5 years at the time the said Harris assigns over the sd. 30 Acres to Robt. Guy the said Robt. Guy is to pay the sd. Harris the sum of £30 purchase money for the sd. 30 Acres.

Witness

R Atkins J A ⁸

his
Robt. X Guy
mark

- Land Titles Office [LTO] pre-1825 Old Registers, Book 2, page 24 Entry number 63, dated 1809, records the sale of 30 Acres of land at the Nepean from John Harris to Robert Guy for £30.

2.3.1 The 30 acre Subdivision (Northern Part of Portion 49)

It is clear from the subsequent transactions involving the 30 acres, and in particular from the Certificate of Title issued for the 30 acres in 1863, (refer to Figure 5) that the land conveyed to Robert Guy was a rectangular shaped strip encompassing the northern third of Harris' 90 acre portion.

- Primary Application No. 89 was lodged for the land in 1863. The Application was made by Robert Williams of Cooma, to bring the land portion under the Torrens Title system. The Application states the Applicant is seized of an Estate of inheritance and that the land measures 36 acres and 34 perches, (ie. is greater than just 30 acres). The Primary Packet for the Application also indicates that by his Will dated 19th January 1819, Robert Guy devised his lands to Mrs Maria Nash for life, with the remainder to the Applicant and his heirs. Robert Guy died in 1820 and Maria Nash in 1844. Further information on these individuals and their relationship is provided in the biographies in the following section of the report.

In establishing undisturbed possession and legitimate title to the land it was the usual practice that Statutory Declarations be lodged with the Application by various parties able to affirm a knowledge of the circumstances of the land parcel being considered. For Application 89 declarations by Robert Williams himself, and by Alexander Fraser were lodged. These read as follows (copies in Report Appendices):

I Robert Williams of Cooma in the Colony of New South Wales, Farmer do hereby solemnly and sincerely declare that I have been in possession of All that parcel of land containing thirty six acres and thirty four perches situate at Castlereagh in the County of Cumberland in the Colony aforesaid commencing at a point on the Nepean River which is the South West corner of the late Mr John Single's One Hundred and Sixty Acres (they are bounded on the North by an East line of fifty two Chains to the Castlereagh Road on the East by the said road bearing South Seven Chains and Eight links to the north east corner of Mr John Harris's Sixty Acres on the South adjoining the said sixty acres by a line bearing Westerly fifty Chains and thirty links to the Nepean River and then on the West by the said River to the point of commencement) in and since the month of November one thousand eight hundred and forty four. I verily believe that Ann Guy Widow of Robert Guy formerly of Castlereagh aforesaid is dead and that the said Robert Guy was in possession of the land above described from the year one thousand eight hundred and three up to the time of his death.

Robert Williams [signed]

....Subscribed and declared at my office King Street Sydney this ninth day of May 1863., before me William Hellyer J.P. Notary Public.

I Alexander Fraser of Castlereagh in the District of Penrith and Colony of New South Wales, do hereby solemnly and sincerely declare that Robert Guy late of Castlereagh in the said Colony Farmer, deceased, Departed this life at Nepean in the said Colony in the year One thousand eight hundred and nine teen⁹. That Ann Guy Wife of the said Robert Guy departed this life in the said Colony soon after the decease of the said Robert Guy, she has been dead many years. That thirty six acres of land parcel of the premises described in the Application of Robert Williams in Case Number Eighty Nine under Land Titles Act was held by the said Robert Guy in his Lifetime and until his decease and was subsequently held in possession by Mrs Maria Nash from the date of decease of the said Robert Guy up to the decease of the said Mrs Maria Nash and from the said Mrs Maria Nash to the Applicant Robert Williams up to the time of this Application being made.

A Fraser [signed]

....Subscribed and declared at Penrith this thirteenth day of June 1863., before me Geo. Thos. Clarke J.P.

Application Number 89 also states that the tenant on the land in 1863 is a Mr Fisher and that the adjoining properties are owned by Mr Charles Single and Mr John Harris (2) ¹⁰, with Harris' land being occupied by Robert Robertson as a tenant. The Application requests that the Certificate of Title be issued in the name of Joseph Daniel Single, Squatter, of Castlereagh near Penrith, who is the nominee of the Applicant.

The Registrar General also sought clarification about whether there was an existing road between Portions 48 and 49 (Tonks' and Harris' Grants) as a road was shown on the old sketch of the grants held in the Surveyor's Office. Many of the early Castlereagh grants were originally laid out with roads or lanes dividing and delineating the separate properties. One of the oldest maps of the Castlereagh grants is numbered S 312 o.r., which is still held in the Lands Department Plan Room, Bridge Street, Sydney. An extract from this map is included as Figure 4a. Clarification about whether the road existed was sought from the Single family, owners of the adjoining Portion 48 (Tonks' grant).

A letter dated 18th June, 1863 in answer to the Registrar General's enquiry was sent by Mrs Sarah Single of "Nepean House", Castlereagh, and survives in the Primary Application packet for PA No. 89. This letter states:

Sir,

In answer to your enquiry relative to the application from your Office of Robert Williams' Case No. 89. I beg to inform you there never has been any road in existence between Harris and Tunks' [sic.] Grant now in my possession, nor does any road exist now.

The late Mr John Single and myself having resided on Tunks' Grant for the last forty five years.

I have the honor to be

Sir

Yours Obedly

Sarah Single

Executrix.

The Examiner's Report on Application 89 concluded that:

The Documentary evidence taken together with possession of the parties deriving title under Conveyance of 30 acres made to Guy in 1803, shews an existing Satisfactory Title in the applicant to the lands applied for, but as the discrepancy in admeasurement is not explained we advise that it be estimated at the original quantity with the words "more or less" added.

We recommend this Title to be passed under Section 16 -----

Dated this 25th day of June 1863

(signed) Examiners of Titles

- Certificate of Title Volume 1 Folio 127 was issued in the name of Joseph Daniel Single, Squatter, of Castlereagh near Penrith, on 16th September, 1863. This Certificate provides the earliest dated plan of the 30 acre subdivision. The 30 acres "more or less" is described as "Commencing on the Nepean River at the southwest corner of William Tonk's Grant and bounded on the North by the South boundary of that land bearing East to the Castlereagh Road. On the East by that Road bearing South seven chains and eight links to the North East corner of Harris' land. On the South by the North boundary of that land bearing West to the Nepean River and on the West by that River downwards to the point of commencement as shown on the plan at the foot hereof ... which said piece of land is portion of Ninety acres of Land ... originally granted to John Harris by Deed of Grant dated the thirtieth day of June one thousand eight hundred and three under the hand of Philip Gidley King ..." . A copy of the plan from this Certificate of Title is included as Figure 5 in Appendix A.
- In 1873 a plan of Castlereagh Road was prepared which shows owners and occupiers along this section of the road ¹¹. An extract from the plan is reproduced as Figure 6. The plan shows Mr Joseph Single as the owner and occupier of the 140 acre grant to William Tonks (ie. Portion 48, now known as the "Nepean Park" property) and Mr J Single as also the owner of the adjoining 30 acres (northern subdivision of Portion 49). The remainder of Portion 49 (60 acre residue) is shown as John Harris' Grant with the occupier named as Robert Robinson¹².
- In 1884 Joseph Daniel Single mortgaged the 30 acres. The mortgage was discharged in 1886.
- In 1886 the "30 acres more or less" was transferred by Joseph Daniel Single to Robert Wisdom, Barrister at Law, Sydney. A new Certificate of Title, Volume 800 Folio 127 was issued in the name of Robert Wisdom on 3rd August 1886. ¹³.
- On 11th November 1890 the land was transferred to Cecil Edmund Bridgewater Maybury under Sheriff William Wiley and to William Henry Maybury. Following the death of W H Maybury in 1893, the land was transferred to Cecil Edmund Bridgewater Maybury and William Wiley as Joint Tenants on 29th September, 1893. [transactions noted on Vol 800 Fol 127].
- In 1894 the 30 acres was transferred to William Tuckfield, Tram Conductor of Sydney, with a new Certificate of Title, Volume 1125 Folio 35 issued on 14th April 1894. Tuckfield mortgaged the land to Cecil Edmund Bridgewater Maybury and William Wiley. On 13th July 1898 the land was transferred to Robert Pearce Olpherts, Gentleman, of Waverley, with Tuckfield then able to discharge the mortgage. On 4th May 1907 the land was transferred to Samuel Apps Eggins, School Teacher from Mortlake. In 1929 and 1931 Eggins mortgaged the 30 acres to Francis Brell and Lillias Maude Hardwicke respectively.
[LTO, CT, Volume 1125 Folio 35]
- In 1907, Samuel Apps Eggins also purchased the adjoining 65 acres, which was the residue of Portion 49 that had been retained by the descendants of John

Harris during the nineteenth century. [LTO, CT Volume 1012 Folio 241]. This meant that the two subdivisions of the original 90 acre grant were returned to a single ownership.

- In 1941, Samuel Apps Eggins applied to Consolidate the two separate titles. The history of the (re) consolidated land is considered in Section 2.3.4, below.

2.3.2 60 acres Remainder of Grant (Southern Part of Portion 49)

The primary purpose of this report is to address the history of the extant farmhouse complex identified as RES Site 15 [= "Minnaville"]. The history of the land on which the complex stands has been given above. Due to competing claims about the location and attribution of the homestead by other parties (who have suggested that the present house was built and occupied by John Harris) it is also necessary to briefly examine the history of the residue of Portion 49. A summary of the relevant Land Title information follows.

30/6/1803	90 acre Grant to John Harris. Portion 49, Parish of Castlereagh
23/12/1803	Assignment of 30 acres to Robert Guy (resulting transactions described in Section 2.3.1 above). [LTO Pre-1825 Old Registers, Book 1, page 76, Entry 365].
9/8/1817	90 acres of land granted to Harris did "grant bargain and sell unto said Samuel Terry" [[LTO Pre-1825 Old Registers, Book 7, page 124, Entry 383]. This transaction is possibly a mortgage. No further dealings (such as a discharge) relative to this transaction are noted and the land was retained by John Harris and subsequently mortgaged to other parties.
6/2/1847	Mortgage John Harris ¹⁴ to Michael McQuade, £ 56. 90 acres, known as "Harris' Farm", bounded by Tonks' Grant to the north and Cheshire's grant to the south. [LTO Old System Book 12, Number 223] ¹⁵ .
7/2/1867	Mortgage John Harris and Rachel Harris to John Michael McQuade, £ 300. ¹⁶ . [LTO, Old System, Book 102, No. 223].
23/9/1873	Occupier of residue of John Harris' grant shown as Robert Robinson. [Lands Dept Plan R 550a 1603].
16/3/1875	Discharge of Mortgage and Reconveyance John Michael McQuade to John Harris. [LTO, Old Sys., Book 149, No. 20].
3/11/1879	Mortgage Rachel Harris to Bank of NSW. £ 100. 90 acres in the District of Evan, Crown Grant to John Harris 30th June 1803. [LTO, Old System, Book 196, No. 948].

- 5/4/1886 Lease Rachel Harris to T R Smith for 5 years at £40 per year. [LTO, Primary Application (RPA) 8179].
- 19/12/1890 Discharge of Mortgage and Reconveyance, Bank of NSW to Rachel Harris. [LTO, Old System, Book 455, No. 151].
- 10/9/1890 Application by Rachel Harris to bring her land under the Real Property Act. The Application [LTO, PA Number 8179] is clearly for the residue of the original grant, the land being described as:

"All that parcel of land situate in the Parish of Castlereagh, County of Cumberland, Colony of New South Wales, being part of Harris' 90 Acre Grant and containing 65 acres 3 rood and 30 perches be the same more or less commencing at a point on the west side of a reserved road being the South East corner of said Harris' Grant and bounded thence on the East by said road bearing Northerly 1358 links thence on the North by other part of said grant ¹⁷ being fenced lines bearing westerly in all 4784 links to the Nepean River thence on the west by the Nepean River bearing southerly to the southwest corner of said Grant and thence on the south by fenced lines bearing Easterly in all 4615 1/2 links to the point of commencement..."

The Primary Application / Deposited Deeds Packet also contains a number of Statutory Declarations by Rachel Harris and others concerning the occupation of the land during its ownership by the Harris family throughout the nineteenth century. These confirm that the Harris family left the property in about 1847 and the property was subsequently leased to numerous tenants in the second half of the 19th century.

- 18/5/1891 Certificate of Title issued in the name of Rachel Harris for 65 acres, 3 roods and 30 perches. Value £ 700. The plan from the Certificate is reproduced as Figure 7. [LTO, CT., Volume 1012 Folio 241].
- 31/10/1902 Land transferred to William Stephenson of Randwick, commercial traveller, Stephen Belcher Burge of Randwick, Draper and Thomas Samuel Threlkeld of Waterfall, Railway Station Master. [LTO, CT., Volume 1012 Folio 241].

These men were son-in-laws of Rachel Harris who had died in August 1902 ¹⁸. At the same time as the transfer of the Title, a Caveat [LTO, Caveat No. 351830] was issued over the Title by the Registrar General "forbidding the Registration of any dealing in favour of William Stephenson & Others, not consistent with their duties as Executors of the Will of Rachel Harris (deceased) and to protect the interest of the Lessee under the Lease produced." The Caveat was withdrawn in 1905.

- 28/11/1905 Transfer of the land from the abovementioned parties to Amos Parker of Penrith, Dealer. 65 ac, 3 r and 30 p. [LTO, CT., Volume 1012 Folio 241].

- 17/6/1907 Transfer of the land from Amos Parker to Samuel Apps Eggins, School Teacher of Mortlake. 65 ac, 3 r and 30 p. [LTO, CT., Volume 1012 Folio 241]. Eggins had previously purchased the adjoining 30 acres, and the total grant was now returned to a single ownership, although remaining in two legally separate titles.
- 1929 & 1931 Eggins mortgages the 65 acres to Francis Brell and Lillias Maude Hardwicke respectively.
- 1941 Samuel Apps Eggins applies to Consolidate the two separate titles. See below.

2.3.3 The (re) Consolidated Portion 49

Dealing number C961879 for consolidation of the two adjoining land titles was lodged by Samuel Apps Eggins in 1941. The two existing Certificates of Title [LTO, CT, Volume 1125 Folio 35 and Volume 1012 Folio 241] were surrendered for consolidation. The Application for Consolidation states that although the areas of land in the respective Certificates are stated at 30 acres and at 65 acres, 3 roods and 30 perches, making a total of 95 acres, 3 roods and 30 perches or thereabouts, that a recent survey dated 28th January 1941 has found the land comprised in the Certificates to measure 112 acres, 0 roods and 21 3/4 perches. A copy of the plan lodged with the Application for consolidation is included as Figure 8a in Appendix A of this report.

- On 9th July 1941, a new Certificate of Title, Volume 5245 Folio 226, was issued in the name of Samuel Apps Eggins for 112 acres, and 21 3/4 perches of land or thereabouts, "being originally granted as 90 acres (Portion 49 of Parish) to John Harris by Crown Grant dated 30th June 1803 ". The plan from the certificate of title is included as Figure 8b in Appendix A. Later that month the land was leased to Alexander Fulop of Kingswood, Distiller. [LTO, CT, Vol 5245 Fol 226].
- On 19th December 1941, the land (112 ac) was transferred from S A Eggins to Alexander Fulop and Dulcie Greenhalgh of Darlinghurst, as joint tenants.
- On 17th October 1950, the land was transferred from Alexander Fulop and Dulcie Fulop (formerly Greenhalgh) to George Lacey Evans of Kogarah, Grazier.
- On 24th October 1950, the land was transferred from George Lacey Evans to Frank Wentworth Duesbury of Sydney, Chartered Accountant. [Vol 5245 Fol 226] Duesbury subsequently added additional land which expanded the size of the "Minnaville" property beyond the boundaries of the original Portion 49. He acquired an additional 40 acres from Portion 48 (Tonk's Grant) adjoining the northern side of Portion 49 in 1951 [LTO, CT, Vol 4558 Fol 106]. Duesbury then acquired a further 78 acres from Portion 50 (Cheshire's Grant) adjoining the southern side of Portion 49 in 1956 [LTO, CT, Vol 6539 Fol 109]. This eventually resulted in a total area of 230 acres.

- In 1960, the 112 acres (Portion 49) was purchased by Farley and Lewers Ltd [LTO, CT Volume 8132 Folio 132]. In 1960, Farley and Lewers also acquired the other parcels of land mentioned above. The combined 230 acre property was auctioned in April 1960. A sketch plan of the land prepared for the Auction is included as Figure 9.

- In 1961, the 112 acres (Portion 49) was transferred by Francis Edward Dowling, Grazier, of Penrith with a new Certificate of Title, Volume 8132 Folio 132, being issued on 30th March 1961. Dowling had also purchased the other land portions which comprised the 230 acre total.

- In 1963, Deposited Plan number 219895 was prepared for a new subdivision of the combined 230 acres held by Francis Dowling. This created Lots 1 to 4 in DP 219895 which were issued with Certificates of Title Volume 9849 Folios 93 to 96. A copy of DP 219895 is included as Figure 10 in the Appendices to the report.

Lot 1 contained an area of 80 acres, 0 roods, 7 1/4 perches. This thus includes the 40 acres acquired from Portion 48 (the Tonk's Grant) and the 30 acres "more or less" formerly subdivided from the northern part Portion 49 (Harris' Grant), plus some additional land. The extant "Minnaville" homestead complex is situated within Lot 1.

- On 26th September, 1964, Lot 1 DP 219895 was transferred to Alexander Higgins, of Point Piper, Grazier.

- On 15th June, 1965, Lot 1 DP 219895 was transferred to Roland Pty Ltd. The name of the proprietor was changed to Minnaville Pty Ltd in 1970.

- In 1973 Lot 1 was transferred to Quarries Pty Ltd.

- In 1978 Lot 1 was transferred to Blue Metal & Gravel Limited.

Figure 12 in Appendix A has been prepared to show the relationship of all of the historic and more recent Land Title plans which are included as Figures 3 to 8 and relate to the series of subdivisions and consolidations which have affected the "Minnaville" property [= RES Site 15].

2.4 Occupants of Portion 49

The following biographies for the occupants of Portion 49 were prepared by George Gyford of the Nepean District Historical Archaeology Group. Some biographies have been partly expanded to include other information known to S Lavelle. Such information is usually evident from the relevant footnote.

2.4.1 The 30 acre Subdivision (Northern Part of Portion 49)

2.4.1.1 Robert Guy (1771? - 1820)

Robert Guy, Robert Fenwell and James Dawson were convicted at the Old Bailey in September 1788 of the theft of a gelding valued at £ 10. Initially sentenced to death, Robert Guy's sentence was changed in September 1789 to transportation for life.

Robert Guy embarked on the "Scarborough" (2) ¹⁹ in December 1789 and sailed from England on the 19th January 1790. The "Scarborough" (2) a 416 ton ship under her master John Marshall was making her second voyage as a convict transport ship having previously formed part of the First Fleet. 259 male convicts, including a John Harris, who was to play an important part in Guy's life, embarked on the "Scarborough" (2) in England but 6 were later re-landed and another 8 landed at the Cape.

After a voyage of 160 days the "Scarborough" (2) in company with the "Neptune", arrived at Port Jackson on the 28th June 1790 two days after the arrival of the "Surprize", the third ship in the Second Fleet. According to Charles Bateson, *The Convict Ships 1787 - 1868*, the passage to Australia was described as disastrous, and the ships had a mortality rate which was reported to be the highest in the history of transportation to Australia. The prisoners on all ships in the Second Fleet were reported to have been treated brutally and in the case of the "Scarborough" (2) were closely confined for most of the voyage because of a report that a mutiny may take place. By the time the ship reached Port Jackson 73 convicts had died, at least 96 sick convicts were landed and even the remainder appeared to be in a sickly condition. John Harris' deed of gift to Robert Guy in 1803 may have had its roots in some incident or favour which occurred between the two men during the turbulent voyage in which so many died.

We next hear of Robert Guy on the 27th of June 1792 when he married an Ann Yarnell at St Johns, Parramatta. Nothing is known about Ann's arrival or previous history so it is possible that she arrived under another name. It is not known how long Ann and Robert lived together and her whereabouts subsequent to the marriage are a bit of a mystery. However the contents of two Statutory Declarations in 1863, by Robert Williams and Alexander Fraser, indicate that some members of the family must have known of her whereabouts and her relationship to Robert Guy. Robert Williams states that he believes that

"Ann Guy, widow of Robert Guy formerly of Castlereagh aforesaid is dead." Alexander Fraser goes even further and states that "Ann Guy wife of the said Robert Guy departed her life in the said Colony soon after the decease of the said Robert Guy, she has been dead many years."

It is believed that Robert Guy received a Conditional Pardon in 1800. In the Muster of that year he is also listed as living on a farm at Concord, off stores, with one pig, 2 1/2 acres of wheat sown and one acre of maize to be planted.

The 1801 Muster records that he had a family of two, off stores, was renting 30 a, with 16 a cleared, 9 a of wheat and maize, with 3 hogs. The location of the farm must still have been Concord, as the 1802 Muster records a similar acreage located at Concord.

In 1802 he had a woman and two children living with him off stores. The woman was most likely Maria Nash and two of her children, George and Sarah. Maria Nash (nee Haynes) arrived on the "Prince of Wales" as the wife of William Nash, a private in the Marines. After bearing him six children, Maria left William to live with Robert Guy in 1802. In 1803 William Nash attempted unsuccessfully through the courts to force her to return to him but the court dismissed his complaint in favour of Robert Guy, so Maria and her two children continued to live with Robert. Even though they were never married Robert treated Maria as his wife and left her his farm in the Will made in 1819 a year before his death in 1820.

In December 1803 Robert Guy moved onto 30 acres at Castlereagh, land assigned to him as a Deed of Gift by John Harris, "in consideration of the Love Goodwill and affection which I have and do bear towards Robert Guy." At the end of five years Robert was to purchase the land for £30. The land that he received from Harris was the northern section of his 90 acre grant obtained by Harris in June 1803. By 1809 the purchase was made and Robert Guy was now the officially registered owner of his 30 acre farm which he retained until his death²⁰.

Within two years Robert had 9 a of wheat, 3 a of maize, and 18 a of pasture land on his farm. Over the next 15 years there are various references to his activities in the district. In 1806 he signed an address from Hawkesbury settlers to Governor Bligh. In 1807 he signed another address from the Hawkesbury settlers to Samuel Marsden. In 1809 produce from his farm was received at the Hawkesbury stores. Macquarie mentions his farm during his visit to the area in 1810. In 1810 he was on the list of settlers at the Hawkesbury and only a few months before his death he was petitioning the Governor for a grant of land which he never received.

Robert died on the 30th December 1820, aged 48, and was buried at the Castlereagh Cemetery. The 30 acre farm was passed on to Maria Nash through his Will.

2.4.1.2 Maria Nash

The 30 a farm at Castlereagh appears to be the only property that Robert Guy ever owned and this passed to Maria Nash through his Will. References to Maria Nash appear on several documents between 1820 and 1844 including memorials, musters and census records indicating that she probably occupied her farm until her death in 1844.

The 1822 Muster recorded that she was a land holder and resident at Windsor with 30 a cleared of which 16 a were with wheat, 5 a with maize, 1 a with barley and 1/2 a with potatoes. The two horses, 35 hogs and 8 bushels of wheat and 50 of maize held in stores point to successful farming. Because Castlereagh residents often had more to do with the administrative centre at Windsor rather than the embryonic town of Penrith, it was not unusual for them to be listed as Windsor residents rather than Penrith or Castlereagh. This may account for the listing of the land at Windsor in the Muster.

Maria's name appears on two 1825 memorials from magistrates, land proprietors and settlers in the District of Evan. In the 1828 Census she still held 30 a cleared and cultivated at Evan (Castlereagh). Two of her children, George and Sarah are also listed, Both are married with children. George Nash lived nearby at Castlereagh and Sarah lived at Camden with her husband John and their six children. One of Sarah's children, Robert Williams, was staying with his uncle, George Nash. Robert is probably the same person who inherited the farm at Castlereagh after the death of Maria Nash.

In November 1844 Maria Nash died and was buried at the Castlereagh cemetery. Why the 30 a farm passed to Robert Williams and not one of Maria's children or other relatives is not known. But Robert makes it clear in his Statutory Declaration of 1863 that he "had been in possession of all that parcel of land ... since the month of November one thousand eight hundred and forty four," (1844) which was the date of Maria's death. There is no record of the Guy Williams mentioned on page 33 of Jean Gray's book *Magnificent Minnaville* in any of the primary source documentation held in the Land Titles Office and examined during this study, and his origins are unknown.

2.4.1.3 Robert Williams

The Robert Williams who inherited Maria's farm was probably her grandson, the first son of Sarah and John Williams. Robert was a farmer living at Cooma with his wife Susannah whom he married in 1835. It is unlikely that he ever occupied the Castlereagh farm but instead probably leased it to local farmers. In RPA No. 89 (1863), converting the old system title to Torrens Title he mentions a Mr Fisher as a tenant occupying the farm. This may have been John Fisher, a Castlereagh farmer listed in the 1869 to 1871 Electoral rolls. Joseph Daniel Single might also have been a tenant prior to his purchase of the property in 1863 as the Single family history records (see below) that after Joseph Daniel Single returned with his wife Ann Lydia Single from Richmond in about 1856 he subsequently "lived at Minna Ville Castlereagh which was next door to his father".

2.4.1.4 Joseph Daniel Single (1826 - 1900)

Joseph Daniel Single was the third son of John and Sarah Single of "Nepean House" Castlereagh (later named "Nepean Park", Portion 48). Born on the 22nd of February 1826 at Castlereagh, he was educated at the King's School, Parramatta. On finishing his education he was articled to a firm of Solicitors but illness prevented him from completing the final year of his apprenticeship. His father then assigned him to manage one of the family properties in the Mudgee district called "Tellaraga". Together with his brothers he also managed some other family properties at different times.

On the 6th July 1854, he married Ann Lydia Fraser, daughter of two prominent local Castlereagh residents Alexander and Lydia Fraser. Joseph and Ann lived at Richmond for approximately two years before returning to Castlereagh. It is known that they subsequently settled at "Minna Ville" a property identified as being next door to the family property "Nepean House/Nepean Park". When John Single, father of Joseph, died in 1858 he bequeathed the 1600 a property "Tellaraga" to Joseph Daniel Single. "Nepean House" the Single family home (Portion 48) went to Charles Single, the youngest son who subsequently sold it in 1873 to Joseph Daniel Single. J D Single in turn presented it to his daughter Isabella in 1891, following her marriage to Frederick Cork in 1886 [LTO, Old System, Book 462, No. 90]. "Tellaraga" was sold by Joseph Daniel Single in 1862.

J D Single purchased several other properties including the adjoining 30 acre subdivision of Portion 49 (now known as "Minnaville" [= RES Site 15]) which adjoined the "Nepean House" property in 1863. Other purchases included 25 acres part of Chapman's 1300 acre grant near Penrith in 1861; "Woodville", his fathers 60 acre grant (Portion 76) in 1863; "Wandoona", a 4500 a property in the Mudgee district in 1873, Portion 280, the 38 a farm near the old town of Castlereagh in 1874, and another 24 acres part of the Chapman grant in 1884.

Because the 30 acre subdivision of Portion 49 (Robert Guy's farm) adjoined the southern border of "Nepean House" (Portion 48) Joseph Daniel Single possibly purchased it to increase the acreage of the family property. The earliest commencement date of his occupancy and the exact length of his residence on the property is not certain. The Single family history states that Joseph Daniel and Ann Lydia Single occupied the property sometime after 1856, when they moved from Richmond back to Castlereagh. It is possible however that in returning to Castlereagh, they may have initially resided at "Nepean House" prior to their building and subsequent occupancy of "Minna Ville". The Land Title information previously outlined in Section 2.3.1 above, indicates that the 30 acre property was actually purchased by Joseph Daniel Single in 1863, and states a Mr Fisher as being the tenant at that time.

The first use of the name "Minna Ville" for the property being considered in this report [= RES Site 15, referred to as "Minnaville" in this report] appears to be directly associated with the Single family occupation. Joseph Daniel and Ann

Lydia Single had 15 children between 1855 and 1874, 9 of these children being born after 1860. The children included two sets of twins, the first pair died as infants in 1857. Three other children also died as infants in 1865, 1869 and 1872. It is perhaps interesting to note that their eldest surviving daughter, born in 1858, was named Minna Augusta, possibly named for the property or vice versa.

Descendants of the family have indicated in the published family history that they believe several children were born at "Minna Ville" Castlereagh, including some of those born before 1863 (ie., when J D Single buys the land). Copies of birth certificates for three children (Minna Augusta 1858; Isabel Edith 1865; and Kate Ethel, 1874) were obtained during preparation of this study. These certificates do not include a specific address or property name, only the locality of "Castlereagh" or "Nepean" is indicated as a birthplace, so they do not assist with precise dating of the building.²¹ A sewing album/scrapbook dated 1874 which is in the possession of descendants, does however have both Minna Single and Maude Single signing their address as "Minna Ville" in 1874 ²². This is the earliest documented use of the name found during this study.

An Obituary published at the time of the death of Ann Lydia Single in 1899 was prepared using information from her daughter Kate Ethel, who lived at "Cassola" on Castlereagh Road, and obtained the same house as a Deed of Gift from her father, Joseph Daniel Single in 1899. [LTO, Old System, Book 644 No. 742]. The general information about Joseph Daniel and Ann Lydia Single mentioned above appears to derive directly from this Obituary. An extract from the Obituary follows, and a full copy is included in the Appendices to the report.

"... In 1854 she [Ann Lydia] was married to Mr J D Single by the late Rev. Elijah Smith of Castlereagh. Their home was at Richmond for two years. After that Mr Single built Minna Ville, Castlereagh, and resided there until 1884. When Cassola, near Penrith was completed, Mr and Mrs Single and family came to reside there, and it was there she also breathed her last."

The mention of "Cassola" as the property occupied by J D Single after his residence at "Minna Ville" is confirmed by some of the land dealings. It has already been mentioned in Section 2.3.1 that Single mortgaged the 30 acres (part of Portion 49) in 1884, the mortgage being discharged in 1886 ²³. This mortgage is almost certainly linked to J D Single's building of the new residence for his family, "Cassola", which was situated on Castlereagh Road closer to Penrith. "Cassola" still exists but is now known as the house "Craithes" which is set back, but was previously accessible from Castlereagh Road. The house is now accessed from Lemko Place. "Cassola" stands on land previously owned by Daniel and thence Bartholomew Dolan (or Doolan). Daniel Dolan had purchased the land from Sarah MacHenry in 1861 [LTO, Old System, Book 80, No. 243]. This 24 acre parcel was purchased by Joseph Daniel Single in 1884 [LTO, Old System, Book 285 No. 356]. J D Single added this 24 acres to another parcel of adjoining land (25 acres) he had previously purchased from the MacHenry's "Lambridge Estate" subdivision in 1861 [LTO, Old System, Book 75 No. 219] .

As indicated in Section 2.3.1 of this report, after the completion of the new house "Cassola" closer to Penrith in 1884 and the relocation of the Single family, the "Minna Ville" property was sold to Robert Wisdom in 1886.

From 1871 Joseph Daniel Single represented the Nepean Electorate on the Legislative Council. As well as being a successful farmer and horse judge, he was also a senior Penrith magistrate, President of the Hawkesbury Race Club and the Agricultural Society and on the board of a number of local organisations. In 1878 J D Single gave land for the relocation of Christchurch Castlereagh from Church Street in the old town to the present site on Church Lane. He also contributed to subscriptions for the building of the church and with other family members dedicated several of the stained glass windows. J D Single was also a generous family man, giving "Wandoona" in 1880 to Henry Ernest his eldest son, "Nepean House" to his daughter Isabella in 1891, "Tichular" a 9000 a property to Joseph Daniel Jnr. in 1898 and "Cassola" to his daughter Kate Ethel in 1899. He died in 1900, one year after his wife Ann Lydia, and they are both buried in Emu Plains General Cemetery.

2.4.1.5 Owners and Occupiers after Single

Between 1890 and 1907 the "Minnaville" property passed through a succession of short term ownerships. As indicated from the Land Title information previously described, Robert Wisdom sold the farm in 1890 to Cecil and William Maybury. The next owner was William Tuckfield who bought it in 1894 and sold it in 1898 to Robert Olpherts. In 1907 the property was purchased by Samuel Apps Eggins. Samuel Eggins is known to have lived at "Minnaville" but the occupancy by the previous owners is uncertain. Two months after purchasing "Minnaville" Samuel Eggins also purchased the southern 60 a portion of Harris' original grant. That the name "Minnaville" continued in use for the property is shown by the 1926 Electoral Roll which lists Albron Carlisle Eggins, a farmer, residing at "Minnaville", Castlereagh. This person is presumably a relative, possibly a son or brother of Samuel Apps Eggins, owner of the property from 1907 to 1941.

An unusual aspect of the property's history in this period which is reported by Mrs Jean Gray, Mr T Dowling, and by Mr and Mrs McNally, was the use of the old farmhouse during the filming of "On Our Selection". Two photographs from this period are included in *Magnificent Minnaville*. One photograph is of interest as it shows the front elevation of the farmhouse c1930, and a copy has been included in Appendix B of this report.

In 1941 Samuel Eggins consolidated the property into a single title, as described in Section 2.3.1 of this report (also refer to Figure 8). It was then sold to Alexander Fulop and Dulcie Greenhalgh (Fulop).

Although Samuel Eggins had the farm for 34 years very little information has been found about him other than that he was married with four children and ran a dairy and mixed farming on the property. It is believed that Samuel and

his wife moved closer to Sydney after selling the property in 1941, which probably explains why there are no obituary notices in the "Nepean Times" newspaper recording their deaths.

In 1950 George Evans purchased the property from Fulop and almost immediately sold it to Frank Duesbury, a Chartered Accountant from Sydney. Using "Minnaville" as a base, over the six years Duesbury increased his holdings at Castlereagh to 230 acres. In 1951 he acquired 40 acres of William Tonks' grant adjoining the northern boundary of "Minnaville" and in 1956 he purchased 78 acres of Thomas Cheshire's grant adjoining the southern boundary of the Harris grant.

Robert Guy's 30 acre portion with the "Minnaville" homestead, became the centre of his large race horse spelling establishment with the rest of the property turned over to dairy farming and citrus orchards. The old farmhouse was extended and remodelled during the Duesbury occupation, including internal modifications, removal and alterations of doorways and additions on both the front and rear sides of the building. The main farmhouse was divided into two separate flats. Repairs and improvements in this period were completed by Percy Roots, Alec Higgins, and Ken Dixon²⁴. The large barn behind the homestead was also partially remodelled, a former blacksmith's shop in the southern end being replaced by a self-contained flat²⁵. Some new outbuildings also appear to have been added during this period, including the U-shaped stables complex situated in the vicinity of the river bank.

In 1960 the combined property was acquired by Farley and Lewers Limited but a short time later its ownership passed to Francis Dowling who started with dairy farming then is believed to have expanded to citrus orchards. Initially Dowling lived at "Minnaville" but later built himself another house, probably about 1964 when he subdivided the property into four farms. The name "Minnaville" was also applied to this new homestead, probably contributing to some of the more recent confusion over the correct location and attribution of the original "Minna Ville".

Descriptions of the property and a sketch map prepared for the Auction sale held "under instructions from Mr F E Dowling" in 1962 provide the first detailed documentation about the individual components present on the property. Many of these descriptions and a series of photographs from the Auction brochures were kept by the Dowling family who provided some information to Jean Gray for inclusion in her book *Magnificent Minnaville*. The most useful information comprises a written description of the property, including the main homestead, other residential buildings and farm buildings and the accompanying plan. Copies of the description and of the plan are included in the Appendices to the report.

Although it is not to scale the sketch plan clearly shows the general layout of the complex and the identification of the various separate buildings such as stables, hay shed, dairy, fruit packing shed, etc. and their location on the separate blocks. Several separate cottages are shown on the sketch plan. The one shown south of

the large hayshed still exists and is clearly a twentieth century building . Another cottage is shown in the northwestern corner of the property. Several informants recalled this building and stated that it was a weatherboard clad, twentieth century building. Informants also confirmed that it was this cottage which was damaged by the 1961 flood and finally swept away by the 1964 flood ²⁶. This house site is thus not likely to survive in any intact fashion, and even if it does it would not relate to an initial period of occupation of the grant such as the early period before the construction of the extant "Minnaville" farmhouse.

Lot 1, of the 1964 subdivision, which included Robert Guy's 30 acre portion containing the old "Minnaville" homestead and several outbuildings, plus 40 acres being part of Tonk's Grant (Portion 48), eventually went to Blue Metal and Gravel Limited in 1978 although there were numerous leases to horse breeders in that time.

2.4.2 The 60 acre Residue of the Grant (Southern Part of Portion 49)

2.4.2.1 John Harris Snr. (1771 - 1838)

The grant of 90 acres at Evan (Castlereagh) on the 30th of June 1803 by Governor King to a John Harris is well documented in the official records of NSW. Trying to identify which John Harris received the grant is not as straightforward because there were at least three men named John Harris in the Colony by the 1790s. Another John Harris had arrived by 1806. Other writers, including Michael Flynn, the Historian of the Second Fleet, have also highlighted this problem. As a result many of the more recent secondary sources dealing with early colonists are often contradictory and contain information attributed to the wrong Harris. Some instances of contradictory information may be found in the following examples.

In *First Fleet Families of Australia* by C J Smee, a John Harris is listed as arriving on the ship "Scarborough (1)", marrying a Mary Green and dying at Castlereagh in 1838. In the *Bicentenary Pioneer Register Volume IV*, also by C J Smee, a John Harris is listed as arriving on the "Alexander" in 1806²⁷, marrying Ann L'Andre and having two children, John and Thomas, born at 'Minavile' [sic.] Castlereagh. This is clearly a very confused account of any Harris family details and it also incorrectly states that John Harris Jnr. marries Rachel Skinn instead of Rachel Ikin in 1834.

In *Magnificent Minnaville*, Jean Gray also discusses the same problem and states on page 1 that:

"There has always been a certain amount of mystery re the earliest John Harrises in the colony. Our John said he had arrived on the Second Fleet voyage of the Scarborough, yet in many ways details of his life fit with those of a John Harris who arrived on the First Fleet. There were at least three John Harrises living in New South Wales in those early days and, to add to the confusion, our John Harris and Surgeon John Harris both died in 1838, though in different months."

The Second Fleet, by Michael Flynn states that John Harris arrived on the "Scarborough (2)" in 1790 and joined the NSW Corps for three years in 1800.

In attempting to provide an accurate biographical summary for the John Harris of Portion 49, Parish of Castlereagh, primary sources such as Musters and Census records, particularly where there is corroboration between two different sources, have been used as the most accurate source of information especially given that the details for these records would have been provided by John Harris himself.

The Harris entries in the 1800-1802 Musters do not appear to be related to the Castlereagh Harris but the entries in the other Musters and Census records do provide useful information. The 1805/1806 Musters and the 1828 Census supply the bulk of the corroborative information on the early period of the Harris family. Both agree on the arrival ship as being the "Scarborough (2)" and the size and location of his grant as being 90 acres at the Nepean or Evan. His age listed

as 56 in the 1828 Census is recorded as 67 in the Castlereagh Burial Register when he died in 1838 which is as accurate as can be expected for that period. From the Muster and Census records between 1805 and 1828 the following picture of John Harris emerges.

John Harris was sentenced to transportation for life at the Old Bailey in 1789 and embarked on the "Scarborough (2)" which sailed from England on January 19, 1790. The voyage of the "Scarborough (2)" is recorded in Robert Guy's history in Section 2.4.1.1 of this report. In 1803 John Harris received from Governor King a grant of 90 acres at Castlereagh or Evan as the district was originally known. Six months later he assigned 30 acres of his grant to Robert Guy as a Deed of Gift. The 30 acres consisted of the northern portion of his grant, adjoining Tonks' grant. It is clear from both of the Primary Applications relevant to the 90 acre grant [PA No. 89 and PA No. 8179] that from December 1803 onwards the Harris farm comprised only the 60 acres residue of the early grant, even though several mortgages between 1817 and 1879 still recite the original definition of the grant as 90 acres.

In the 1806 Muster John Harris is recorded as a settler freed by servitude (FBS) having arrived on the "Scarborough (2)". He had received a 90 acre grant on the Nepean, employed 2 freemen and had a wife and one child off stores. The wife mentioned in the entry was probably Ann Carney, listed elsewhere in the Muster as arriving on the "Marquis Cornwallis" (1796 ?), freed by servitude and wife of John Harris. However no record of a marriage between them has so far been located and nothing is known of Ann's later whereabouts or of her child.

The 1811 Muster only records that John Harris was a convict, sentenced to life at the Old Bailey in 1789, who arrived in the Colony on the "Scarborough".

On the 3rd of June 1813 John married Ann Landrin/Landers who had arrived as Ann Cook in 1800 on the "Royal Admiral". Her husband, Benjamin Cook had died on the voyage, and her son William Cook was born a few days before the ship arrived in Sydney. Soon after landing in the Colony Ann married a French prisoner, Antoine L'Andre/Landrin who had travelled on the same ship. They initially settled on a farm at Prospect Hill, then Parramatta and finally at Castlereagh where Antoine died in 1811. This left Ann with five children to raise, one from her previous marriage and four of their own. Two years later she married John Harris and settled down on John's farm at Castlereagh.

In 1817 John mortgaged the farm (erroneously described as 90 acres) to Samuel Terry for an undisclosed sum of money. There is no record of a discharge of the mortgage but many early land dealings are not always recorded in the official pre-1825 Old Registers. In the 1822 Muster John is again recorded as arriving on the "Scarborough" but the sentence is noted as 7 years. Ann is recorded elsewhere in the Muster as Ann Cook and three of her children, James, Samuel and Mary, all by Landrin, are also listed.

In the 1828 Census John is listed with Ann and his two children, John and Thomas. He is also recorded as having 90 acres of land with 5 horses and 64

cattle. As previously discussed elsewhere in this report, this acreage is not strictly correct as John had sold 30 acres of his northern moiety to Robert Guy in 1809. The 60 acre portion and the 30 acre portion remained in separate ownerships until Samuel Eggins purchased both portions and recombined the grant.

John must have worked hard on his 60 acres to make it productive and unlike many of the neighbouring grantees he never sold out or left his farm up until his death in 1838, three years after Ann's death. In her Statutory Declaration lodged with the Primary Application packet 8179, Rachel Harris, his daughter-in-law, confirms that "the said John Harris lived upon the said land with his family and continued to reside upon the said land up until the time of his death..." .

2.4.2.1 John Harris Jnr. (1814 - 1877)

John Harris, born 27th January 1814, was the eldest son of John and Ann Harris. In March 1834 he married Rachel Ikin who bore him eight children. According to Rachel's Statutory Declaration mentioned earlier, following their father's death in 1838 the land passed to John and his brother Thomas who sold his share to John in 1843²⁸. John and Rachel continued to live on their 60 acre farm until 1847 when they moved to Windsor where they remained until John's death in 1877.

During that period the farm was, according to Rachel's Declaration, let to a number of tenants including Willmot, Gunnell, Evans and Robinson. The name of Robinson also appears as the occupier of Harris' farm in the 1873 plan of Castlereagh Road R 550a 1603, perhaps confirming Robinson's name on the Statutory Declaration²⁹.

After moving away from Castlereagh John Harris became the licensee of a number of hotels in Windsor, the last one being the MacQuade Park Hotel which Rachel took over for three years after John's death. Although the 60 acre farm passed to Rachel Harris she never returned to it but continued to lease it to tenants who occupied and cultivated the land until after her death. The farm passed from the ownership of the Harris family when it was sold to Amos Parker in 1905. Two years later Amos sold the farm to Samuel Eggins, a schoolteacher from Mortlake.

2.5 Other Early Occupations on adjacent land and Portions

2.5.1 Portion 48, and RES Site 48

In reviewing the previous assessments and other historic material for land adjacent to the extant "Minnaville" homestead complex [RES Site 15] it is clear that a number other early occupations occurred in the surrounding area. Such early occupations are of potential interest because they may be expected to have left physical traces in the form of archaeological sites with deposits or other evidence, and also because the presence of several early occupations on the adjoining early land grants has undoubtedly contributed to the more recent diversity of opinion about the correct attribution of the extant "Minnaville" complex [RES Site 15].

One of the earliest of the recent misinterpretations of the history and possible attribution of a property associated with members of the Single family and called "Minnaville", occurs in the short pamphlet *Lambridge and Castlereagh* compiled by Freda Palmer and produced by the Nepean District Historical Society many years ago³⁰. No clear or detailed referencing is provided in the article on "Nepean House" in the pamphlet, and much of the information used appears to have been anecdotal (albeit from Single family members) with no attempt at separate verification. This article states that:

John Single ...acquired land at Castlereagh (some of it originally belonging to William Tonks) and here he built a five roomed cottage on the property known as "Minnaville". Basically this cottage still stands but the additions have hidden all evidence of the original structure. Later, about 1822-23, a little north of Minnaville, Nepean House was built.

These comments, which strongly appear to have influenced some subsequent opinions, and have been repeated in other general publications about the Castlereagh area, are not supported by any of the historic documentation or physical evidence reviewed during this study.

Also relevant are the two previous inventory sheets already described in Section 1.1.2.1 and included in Appendix D of this report. The European Heritage Working Paper of 1983 and the subsequent RES 1984, identified a site called "Minnaville"[= RES Site 48] as being within Portion 48, Parish of Castlereagh, County of Cumberland. This portion also contains the extant 1822/23 Georgian homestead "Nepean Park" (formerly "Nepean House").

The inventory sheet from the working paper suggests that the potential "Minnaville" on Portion 48 [= RES Site 48] is an archaeological site which represents the 1810 house of John Single. The inventory sheet also suggests that the potential "Minnaville" site on Portion 48 [= RES Site 48] is on the western side of Cranebrook Creek close to the two large kurrajong trees nicknamed 'John and Sarah' by descendants of the Single family.

It must be noted that by comparison with the present site-specific study, the 1983 working paper completed relatively limited documentary research and no detailed physical analysis of any extant structures. The objective at that time was

to provide an overview of the historic phases of the area that would be sufficient to allow the categorisation of any identified inventory items into their relative phase and (probable) historic context. Comprehensive or complete research of Land Titles and detailed occupational history for individual Portions and sites was generally not undertaken within the scope of the 1983 working paper. The 1983 working paper did undertake some primary research, but it also relied upon information contained in local history articles and pamphlets such as the *Lambridge and Castlereagh* pamphlet discussed above.

In addition to the more comprehensive documentary research and physical analysis undertaken during the present study of RES Site 15 [= the extant "Minnaville" homestead complex], some additional material has also been published since the completion of the 1983 working paper. In particular, this includes the history of the Single family published in 1988³¹.

The documentary evidence for Portion 48, Parish of Castlereagh, County of Cook, indicates that the original land grant was made by Governor King to William Tonks (Tunks) in June 1803. The land was subsequently purchased by Samuel Foster. Foster died in England in 1819, and the portion was subsequently acquired by John Single. With the death of John Single in 1858, the property then passed to John's wife, Sarah, and after her death to their son Charles Walker Single. C W Single sold the property to his brother, Joseph Daniel Single (at that time the owner of "Minnaville" [= RES Site 15]) in 1873. J D Single gave the property to his daughter Isabel Edith Cork in 1891. After her death in 1911, the property passed to her husband Frederick Arthur Henry Cork. The property was subsequently sold to Edward Joseph Keith in 1912. The property passed through several successive ownerships from 1916 into the 1930s. In 1933, the property was subdivided. A rectangular 40 acre block adjacent to the southern boundary of Portion 48 and extending from Castlereagh Road to the Nepean River, was purchased by Athol Colless Howell in 1932. This 40 acres was later added to the adjoining "Minnaville" property [= RES Site 15] when it was purchased by Frank Duesbury in 1951 during his expansion of the property. The remainder of Portion 48 was purchased by members of the Dixon family in 1933. Members of this family still occupy "Nepean Park"³².

The Single family history indicates that the first member of the family to come to Australia was Ann Single who was transported to the Colony of NSW and arrived on the ship "Sydney Cove" in 1807. Ann formed a liaison with Samuel Foster who had become the owner of the Tonk's grant (Portion 48), bearing him a daughter Mary Foster, in 1809. When transported Ann had left her children behind in England. Family tradition relates that John Single (son of Ann) visited NSW in 1810, apparently to present a Petition for the Pardon of Ann Single, and then returned to England. Ann Single received an Absolute Pardon in 1812, and she and Samuel Foster returned to England in about 1818.

John Single returned to the Colony of NSW in 1817 as a free settler, arriving on the "Harriet". He married Sarah Baker of Windsor in 1818. In 1819, he either inherited or purchased the 140 acre Tonks' Grant (Portion 48). The building of

the extant two storey Georgian homestead known as "Nepean House" and subsequently as "Nepean Park" occurred in 1822-23.

The potential "Minnaville" site [= RES Site 48] near the two kurrajong trees on the west side of Cranebrook Creek identified in the 1983 working paper appears to correspond with the site of a schoolhouse noted in the Single family history as follows:

A traditional family story maintains that John Single erected a building which was to serve as a school on his property between Nepean House and the river. There is evidence of a building having existed there and an old ink well has been found in the area. Two kurrajong trees, known as John and Sarah, were planted on either side of the entrance, and are still thriving today. ³³

An inspection undertaken on 13th May 1996, with the permission of the site owners the Dixon family, confirmed a likely building platform in this area, although no archaeological deposits or actual building remains were observed.

During discussions at that time Mr Dixon also advised of another old building which formerly existed in the yard area at the rear (north) side of the present two-storey Georgian homestead. Mr Dixon recalls this building as "very old" when demolished by him sometime during the 1940s. The Single family history includes a c1900 photograph reproduced in Appendix B of this report, which shows a building in the same location.

The building shown is a small hipped roof structure with a continuous verandah across the front elevation. It appears to be timber-framed, with at least some round timbers used as verandah posts. The only visible wall of the building appears to be clad with corrugated iron sheets fixed horizontally. Given the date of the photograph, the iron could be a replacement for earlier timber slabs or other cladding. The roof of the small building is clad with Morewood and Rogers type patent iron roofing tiles, c1840s. These tiles are likely to cover or replace an earlier roofing material, such as timber shingles. As a roofing material, timber shingles generally have a 'life' of 30 to 40 years before they require complete replacement. Many buildings of the early colonial-era in NSW typically have these patent metal roofing tiles either replacing or added over older shingle roofs. Interestingly, the photograph shows the same patent tiles covering the rear verandah of the main homestead, although by this time the main roof on the house has been re-roofed with corrugated iron. Thus, the iron roofing tiles on the smaller outbuilding could have been added to it during a single phase c1840s when all roofs (house and outbuildings) were renewed, or the tiles might have been recycled and reused from the roof of the main house when this was re-clad with corrugated iron at a later date. In either case the form of the small building as evident from the photograph, is consistent with that of an early vernacular small farmhouse cottage, kitchen, or similar building.

From the above historic summary for Portion 48, the following conclusions can be drawn. It is clear that the earliest occupants of the Tonks' grant, including Samuel Foster and Ann Single, must have resided in some sort of dwelling on the property, even if it were small and primitive. During his brief visit in 1810 it

is extremely unlikely that John Single was the builder of any residence on Portion 48 or elsewhere. It is therefore suggested that the "very old" building, which survived at the rear of the main house until the 1940s is the most likely structure to be the earliest house on the property. The site of the building may survive within the rear lawn and garden area behind the main house.

The potential "Minnaville" site on Portion 48 [= RES Site 48] identified near the two kurrajong trees appears more likely to be the schoolhouse described in the Single family history. As already discussed in Section 2.4.1.4 above, the "Minna Ville" name is strongly linked to the Single family, but appears to relate to their occupation of RES Site 15 from c1863. This connection between later generations of the Single family and the house or property name "Minna Ville" as well as the fact that the extant farmhouse complex on RES Site 15 is of a simpler form and style than the more substantial "Nepean House", appears to have contributed to the type of erroneous conclusions drawn by Freda Palmer and others that the "Minnaville" complex on RES Site 15 must be an earlier building than "Nepean House".

It should be noted that any archaeological deposits or other relics which may survive at either the schoolhouse site or at the other early house site at the rear of the "Nepean Park" homestead remain in the ownership of the Dixon family and are not within the area of the Penrith Lakes Scheme. The statutory provisions of the Heritage Act, 1977, described elsewhere in this report would apply to any archaeological *relics* which may be present at "Nepean Park".

2.5.2 Residue of Portion 49 (the Harris Family)

The history given in the preceding sections of this report (especially Sections 2.3.2 and 2.4.2) indicates that John Harris Snr was living on his grant probably as early as 1803 and certainly by the time of the 1806 Muster. As discussed for the initial occupants of Portion 48, it may be expected that an early house must have been built on the part of Portion 49 occupied and retained by the Harris family. This southern subdivision of the land grant does not include, and it never did include, the area of the present "Minnaville" homestead complex.

Section 2.2 has outlined some of the historic context, in particular the comments of Lachlan Macquarie in 1810 that most of the early houses were 'mean and paltry' owing to the constant susceptibility of the area to flooding. No detailed plans or other graphic information survives for the early occupation period, so it has not been possible to identify any precise sites for former buildings or early houses on the southern part of the original 90 acre grant.

The Statutory Declaration of Rachel Harris made in 1890 concerning the southern 60/65 acres of Portion 49 states that the Harris family lived on the land until 1847 and that "the land was at that time fenced in and built upon as it now is". The plan of the land included in the subsequent Certificate of Title (Figure 7) shows only the boundaries of the 65 acres, it does not show the positions of any buildings within the property. The more intensive development and uses of the

property in the twentieth century including the planting of commercial orchards and the development of large areas of horse yards is likely to have obscured or even removed evidence of the early occupations, except where features (eg. privies or cess-pits, etc) were cut into the lower layers of the soil profile. From the available historic documentation no building sites can be precisely identified.

3.0 DESCRIPTION OF THE PROPERTY and PHYSICAL EVIDENCE

The present farm complex identified as RES Site 15 or "Minnaville" contains a diverse range of buildings and other features. The complex was inspected on several occasions from May to July 1996 with photography, site plans and written descriptions of major components being completed. Figures included in Appendix A document the layout of the site and the form of major site components/buildings. Current site photographs are included in Appendix C.

The two most important buildings within the complex are the main farmhouse or homestead building and the large barn. These buildings are also described and assessed in the report prepared by Graham Edds and Associates which is included in the Appendices to this report.

The descriptions and interpretations of the buildings given in the following sections of this report are based on observation of visible evidence only, no building fabric was disturbed to facilitate interpretation. The underfloor areas of the homestead/main house are not accessible as there is no 'crawl space', however, considerable evidence of the phasing and construction of the homestead remains within the roof space, which was inspected and photographed several times during the course of this study. Photographs of relevant evidence within the roof space are included in Appendix C. Samples of the typical nails from various areas within the roof were also obtained and are specifically discussed in Section 3.1.1 below.

3.1 Homestead / Main House

The homestead on RES Site 15 [= "Minnaville"] is a sprawling single storey building with a main hipped roof and skillion roofs on the front and rear. Due to several phases of construction and extensions the homestead now contains thirteen main rooms plus additional enclosed verandah areas.

The core of the building is of timber framed construction, the exterior being clad with weatherboards and the interior presumed to have been originally lined with lath and plaster although this has been generally replaced by more recent cement rendering. The timber framework comprises a top and bottom wall plate which has been checked out (cut) at regular distances to take the ends of the vertical studs (timber uprights). In the older sections of the building the wall cavity appears to have been filled by 'brick-nog' construction. This is not visible in the oldest section of the structure, and could not be inspected but it is evident in other parts where the exterior weatherboard cladding has become displaced.

The phases of construction of the homestead are described in sequence in the following text. Reference should also be made to the building phase diagram occurring in the G Edds report (Appendix G) and also included in the Summary at the front of the report. Site and building plans are also provided in Appendix A (Figures 13 to 17).

Phase 1

The earliest section of the building is at the southern end under the main hipped roof. This comprised a small symmetrical Victorian/Georgian style timber cottage. As stated above the exterior walls were clad with timber weatherboards. These are splayed boards with a simple beaded edge (width approx 145 mm). Surviving windows in the earliest section of the building are 6 pane double hung sash windows, which are of a relatively large proportion. The windows originally featured external timber shutters.

This first cottage would have originally had four rooms, two on either side of a central hallway. Subsequent removal of an internal wall has created a single large room on the northern side of the hallway. Other internal modifications have included the replacement and/or relocation of original doors, replacement of architraves and skirtings in most rooms, the cement rendered walls, and replacement of original ceilings with fibrous plaster, decorative cornices and mid-twentieth century light fittings. It is likely that the cottage also originally had an open verandah across the front (east) elevation although this does not now survive due to subsequent extensions on that side. Evidence of the verandah may be expected to survive below the floor of the sunroom extension.

The cottage also had two additional small rooms under a skillion roof at the rear, both of these rooms feature sandstone footings or flagging and have matching cast iron underfloor ventilation grates. There was an open verandah between these two small rooms which has now been enclosed by a half wall of timber weatherboards with a fibro lining and louvre glass windows above. The southern room, now converted to a bathroom, features a short but broad external chimney. The internal hearth size of this chimney may well have been sufficient to enable the preparation of meals, although the overall dimensions of the room are fairly small. It is probably too small for a typical kitchen, but might have served as a scullery or similar from which meals could be served to the other rooms of the cottage. The northern room under the rear skillion, presently used as an office, is the only room which retains many original internal finishes including joinery/skirtings and some lath and plaster walling (refer to report by G Edds and Associates, p 5 - Appendix G).

The interpretation of this southern section of the building as being the oldest part of the existing structure is confirmed by physical evidence within the roof space. The hipped roof framework comprises evenly pitched rafters, collar ties, ridge piece and hip timbers. All timbers appear to have been milled by pit sawing and are generally notable for their consistent sizes and regular finish. An early roof cladding of split shingles (ironbark ?) nailed to timber battens, survives under corrugated iron roof sheeting. Samples of nails from the southern part of the roof space are of an early wrought iron type, which is discussed further below. The roof space also retains the northern hip timbers for the Phase 1 cottage, which are shown in photographs in Appendix C. The roof space also provides evidence of an additional chimney within the roof line on the southern side of the building. The evidence comprises a 'cut-out' in the

battens to allow the chimney to pierce the roof line. The subsequent infill of the 'cut-out' with roof sheeting after the removal of the chimney is also evident when viewed from the exterior of the building. The position of the chimney corresponds with the tall chimney shown in the circa 1930 photograph of the building included in *Magnificent Minnaville* and reproduced in Appendix B ³⁴. The position of the chimney also corresponds with the large opening in the southern wall of the present dining room which was subsequently altered to accommodate c.1950s french doors.

Phase 2

Shortly after the completion of the small symmetrical cottage, the building was extended further to the north, by addition of a single large room. This extension is very similar in construction to Phase 1, using similar roof timbers, wall construction and cladding, and maintaining a pitched roof structure as an extension of the initial hip roof. Original shingles are present beneath the corrugated iron. The Phase 2 extension is also evident on the original external walls of the core building, where there is a discontinuity and slight change in the angle of the weatherboard cladding. Internally there is also a pronounced change in the floor level at the junction of the two sections (between the present lounge room and the master bedroom). The detailing of the external walls of Phase 2 was also slightly different from Phase 1 as the front wall (east elevation) contained two sets of French doors with external timber shutters. One of these doors survives, the other opening has been converted to a large pane sash window with a fibro panel infilling the wall beneath the window.

Phase 3

Phase 3 of the building also appears to have occurred fairly soon after the completion of Phase 2. The building was again extended further north, this time with two internally divided rooms being added. Within the roof space this extension is evident from a consistent change in the size of the roof/shingle battens, and from the fact that the nails used in the timbers in this northern part of the house are clearly machine-made, wire cut nails, unlike the older wrought type found elsewhere in the building.

It is also likely that this construction phase resulted in the extension of the verandah further along the front (east) elevation and wrapping around the northern side of the building, as the two rooms can only be accessed from the verandah. It was the Phase 3 extension which gave the main homestead the linear form shown in the 1930 photograph referred to above, creating a long, rectangular building.

Phase 3 construction is also similar to that of the preceding phases, using generally similar materials and techniques, including timber shingles as original roof cladding. The northern end of the roof was finished with a hip. The different nails found fixing the Phase 3 roof timbers are discussed further below. Displaced weatherboards on the external wall of the northernmost room of the house, enable confirmation that the wall is infilled with brick nogging. The two

rooms of the Phase 3 extension also have surviving French doors which match those of phase 2. In each of these two rooms a previous doorway onto the verandah has been replaced by a sash window with a panel infilling the wall space below the sill.

The Phase 3 construction also included the formation of a double skin brick wall at the junction of phases 2 and 3, and modifications to part of the Phase 1 structure. These modifications appear to have included the removal of the internal wall in the present lounge room, and probably the insertion of the central chimney at the junction of phases 1 and 2. The evidence provided by the bricks in this central chimney is outlined and discussed in the G Edds report (Appendix G) and also briefly considered below (3.1.1 Building fabric).

Phase 4

The Phase 4 construction occurred a considerable time after the earlier phases. Phase 4 involved extensions made on the front and rear sides of the core building including the large sunroom added on the front (east) elevation. An interesting feature of this room was the presence of an observation sundeck on the roof which was accessed by a stairway. This has subsequently been removed. Additions were also made which extended the rear skillion roof further north providing an extra three rooms in the northwest part of the house. These rooms included an additional bathroom and kitchen, thereby enabling the northern part of the house to be used as separate self-contained accommodation.

Phase 4 also involved considerable modifications and alterations to existing older areas of the house such as removal and replacement of much old joinery (architraves, skirtings); removal of a chimney (southeast corner) and replacement of internal fireplaces; alteration and modification of original finishes and fittings; and the installation, conversion or upgrading of facilities such as the kitchen and bathroom now existing in the oldest section of the homestead. The older verandahs remaining on the east and north sides of the homestead were infilled with weatherboard clad

Phase 4 is well documented as having occurred during the period of ownership of the house by Mr Duesbury (1950s). The expansion of the property with additional outbuildings and other facilities is also recorded by the Auction material discussed in the previous chapter of this report and included in the report Appendices.

3.1.1 Discussion of the Building Fabric in the Homestead

The building fabric present within the extant "Minnaville" building [= RES Site 15] in itself provides independent and primary physical evidence which may be used to interpret the dating of the various construction phases. The general characteristics of the timber construction are described above, and are also dealt with in the G Edds report (p 8 & following). Despite some variation in specific details, the overall similarity and uniformity of the construction in the three oldest building phases would imply that the phases followed in fairly quick succession, ie., that they were not widely separated in time. This is discussed further in Section 4 of this report.

The weatherboards present on the house are of three main types, which were noted by the NDHAG during the fieldwork phase. The earliest is the splayed and beaded type described above, which, like the timber roofing shingles, is present as cladding on all of the first three stages of the core building. The second type of weatherboard features a pronounced groove or scallop below the top edge, and has a width of approximately 125 mm³⁵. This boarding is present as exterior cladding to the half walls of the sunroom and as the infill in the area of the former open verandah, as well as 'new' cladding along the southern wall of the house in the area between the sunroom and the surviving old chimney. The third type is a splayed board with a chamfered edge/corner at the base and a width of approx 145 mm. This type is present along most of the exterior western wall of the house, including as infill of the previous open verandah under the rear skillion. The only exception is the exterior wall of the present office room which retains its external boards from Phase 1. Types 2 and 3 of the weatherboards would appear to be related to the modifications made during Phase 4. They also match the cladding found on other structures elsewhere on the property which also appear to have been built or upgraded during Phase 4.

Of more importance for the dating of the separate phases is the specific evidence provided by the nails and bricks, which are described below.

Nails ³⁶

Drawings of the nails referred to in the following discussion are included in Appendix A (Figure 19).

Two typical examples of nails were obtained from within the southern area (ie. the early phase construction) of the homestead.

- Nail 1 was from a timber shingle fixed to a roof batten. It is a wrought nail measuring 36 mm in length with a wedge point (broad) and a tapering shaft with a rectangular cross section (4 mm). The head of the nail features four equal facets which rise to a central point (pyramid head).
- Nail 2 was from a roof batten fixed to a rafter. It is also a wrought nail, and is slightly larger than nail 1. The example is now incomplete, the lower section and point having snapped off during the removal of the nail. Nail 2 is very

similar to nail 1 as it also has a tapering shaft with a rectangular cross section, and a slight flaring of the shaft where it joins the head of the nail. The side of the shaft also features a slightly turned up edge or flange. The head of Nail 2 also has four equal facets which rise to a central point (pyramid head).

In appearance these nails are somewhat similar to a completely hand made nail, however, they are far more regular and consistent in their shape and appearance than a true early hand made nail.

These types of wrought nails were developed during the first half of the nineteenth century with innovations and patents exchanged between England and the USA. In this period methods were developed which cut wrought nails from rod iron and then headed and pointed the nails. A specific development of this wrought form became known as the "Eubank's (or Ewbank) patent nail"³⁷. This nail was available in Australia in the late 1850s in sizes ranging from one to six inches (25 mm to 152 mm).

The two nails described are of this typical wrought form and feature distinct physical evidence such as the moulded edge or flange already noted, which relates to the use of presses or hammers to shape the shaft, whilst the form of the head is consistent with the use of dies to form the heads by compression. Wedge points are also a standard feature of these wrought nails. Chisel or wedge pointed nails were also often used in timbers which might split easily (such as roofing shingles). Given that timber shingles may shrink and bend, these wrought nails were also of importance because of their strength, especially when used to fix Australian hardwoods.

These early wrought or "Ewbank" type nails are most commonly found in buildings of the late 1840s and continue to be used in buildings until about 1870 when they are replaced by the machine made wire nail.

The third nail sample obtained from the roof space of "Minnaville" was recovered from a rafter in the northern (Phase 3) end of the building. It is a wire nail measuring 52 mm in length with a round shaft tapering to a four sided point. The head of the nail is large and square, with four equal facets which rise to a central square crown. Diameter of the shaft is approximately 3 mm and the underside of the head features two major and two minor brackets. There are also several 'ribs' visible on the neck of the shaft of the nail which relate to the gripping of the nail during the heading and pointing processes (see Figure 19).

This type of wire nail was developed from 1851 with drawn wire being used as the raw material instead of an iron nail rod. Machines were used which could cut, head and point the nail either as a single operation or as a separate series of mechanical processes. These types of nails were first imported into Australia in the 1850s but did not become accepted by builders until the mid-1860s. By about 1870, improved methods of wire manufacture made wire nails both cheaper and more readily available. They quickly replaced the early type wrought iron nails described above, with several later types (rhomboidal and roseheads) being developed in the last quarter of the nineteenth century.

Bricks

The bricks are also discussed in detail in the report by G Edds (Appendix G, p 9-10). The bricks used in the construction of "Minnaville" [= RES Site 15] are visible in several parts of the structure, including the surviving chimney on the southern side, the central chimney, the partition wall between the phase 2 and phase 3 construction, and in the external wall at the northern end of the core building.

The sandstock bricks observed in the structure are relatively large and regular, with dimensions generally about 220 x 110 x 70 mm. Most bricks are a light salmon pink colour, with some occasional cinder present. The bricks are bonded with a relatively crude mud mortar (This is not especially unusual in the countryside where there was no easy access to shell or rock lime for mortar). A brick sample recovered from the cavity around the central chimney bears a shallow diamond shaped frog. This brick has evidence of having previously been laid in mortar, and is likely to derive from one of the internal walls of the building.

Diamond shaped frogs became increasingly common on bricks from the 1860s. The density, regularity and size (especially width) of these bricks also indicates that, like the nails described above, they are more characteristic of the 1860s/1870s period rather than any earlier decades. The G Edds report (Appendix G) also suggests that the Phase 3 bricks might be attributed to William Fleming who operated a Penrith based brickworks from about 1866.

3.2 Barn

Additional description of the large barn behind (west of) the main "Minnaville" homestead is provided in the report prepared by Graham Edds and Associates.

The barn is a gable roofed structure with a ground floor and a loft above. The barn is a timber post and beam structure constructed using roughly squared posts set into the ground. The posts extend above the floor level of the loft to a wall plate. A line of posts along the mid-point of the barn divide the ground floor into an eastern and western bay. These posts have chamfered edges and also feature 'check-outs' for rails or other internal divisions, likely to have been animal (probably horse) stalls, but now removed. Several large iron spikes present in the wall plate indicate that the original exterior cladding on the ground floor walls was probably timber slabs spiked at the top and set into the ground at the base. Exterior cladding and roofing is now of corrugated iron. The spacing of the roof battens/rafters suggests that original roofing used on the structure was of corrugated iron. At the loft level horizontal splayed boarding was used to infill the gable ends and as cladding for the walls. At the northern end of the loft there is a projecting floor and a doorway providing access into the interior of the loft. Above the doorway there are remnants of a large, but now

badly weathered, projecting beam to which a block and tackle or similar lifting device is likely to have been attached.

There is a skillion addition containing a bathroom at the southern end. The southern part of the barn was internally remodelled (lined) and partitioned during its conversion into a flat during the 1950s. The barn also appears to now include several components removed from the main homestead including joinery (architraves and skirting) rebuilt into shelving and several old doors which have been re-hung in the 'new' rooms created by the partitions.

The discussion in the G Edds report (Appendix G) has examined the overall characteristics of the barn's construction, in particular the span of members and jointing, and concluded (p 11) that these "indicate a building construction date after the 1850s and more likely to be 1860 to 1870".

3.3 Brood Mare / Stallion / Foal Boxes

Immediately south of the large barn is a smaller timber building. The building has a corrugated iron gable roof with a skillion roof on the west side. The building is constructed of squared timber posts set into a concrete floor and bolted at the top to a wall plate. Walls are constructed of circular and double circular sawn timber boards laid horizontally and kept in place by timber fillets nailed to the upright posts/studs. (This type of construction is not uncommon in stables, the theory being that if a horse kicks out and damages the wall that only one or two single boards have to be replaced, not a major wall element). The gable ends of the building appear to have been previously infilled with horizontal boards. Where these are now missing the building has been clad with corrugated iron sheets.

Internally the building is divided by partitions also constructed of horizontal boarding between timber posts. These partitions provide four stalls or 'loose boxes' within the building, two of 18 feet by 12 feet (5.5 x 3.6 m), and two of 9 feet by 12 feet (2.7 x 3.6 m). Each box is accessed by an outward opening door divided into separate top and bottom halves which are hung on T-hinges. Informants have advised that the larger boxes were generally used for brood mares and/or stallions, and that the smaller ones were often used for foals, especially overnight, although adult horses could also be kept in them for short periods.

3.4 Machinery Shed

To the southwest of the main building complex there exists a large shed, identified on the site plans in Appendix A as the machinery shed. This large corrugated iron clad shed is actually several adjoining sheds, and at least four phases of construction can be identified.

The earliest part is the north-south running gable roofed shed at the western end. This is a timber framed and corrugated iron clad building with an

extremely substantial concrete slab footing which extends about 0.75 metres above the ground. Wire mesh has been used to infill the gable and ceiling level. This considerable effort to prevent entry by either birds or rodents suggests that this building is the "grain shed" described in the 1962 Auction material. The interior of this shed was subsequently converted to a tack room, but is not now in use. The next phase of construction is the large gable roofed and timber framed shed added perpendicular to the east side of the grain shed and running from west to east. This shed had two entries on the southern side and was also open at the eastern end. It has a dirt floor. Much of the central part of this shed is now missing. This shed appears to be the large "hayshed" described in the auction material. The next addition comprises a skillion roofed shed added on the northern side of the large gable roofed shed (possibly added in two stages). Part of the interior of this shed has a concrete floor. There is a concrete lined silage pit in the centre of this shed and a concrete water tank at the eastern end. The last phase is the small gable roofed, part timber and part steel framed and corrugated iron clad shed which has been added to the northern side of the central skillion. This shed has a concrete floor and is identified as the "machinery shed" described in the auction material.

3.5 Stables and Horse Yards

An additional stables complex and associated yards are situated to the west of the large machinery shed/hayshed/grain shed in the area towards the river bank. The stables building is U-shaped in plan, and is constructed of cement rendered brick with a skillion roof. The complex contains 4 separate stables along each arm of the U, with 5 stables along the base of the U. Individual stables are 10 by 10 feet. Rooms or former stables at each end of the base of the U have been converted to a feed room and a shower/change room.

A series of separately fenced horse yards extend from the U-shaped stables complex on either side of a grassed lane which leads to the modern northern property boundary. The cottage which was washed away by floods was formerly in this general yard area. There are about 30 yards in total, which occupy the area along the river bank and part of the northern boundary, and the area immediately north of the "Minnaville" homestead. These yards contain a mixture of relatively recent horse sheds and shelters (refer to Figure 18).

3.6 Garage

A double garage is situated close to the main "Minnaville" homestead on the southern side. This is timber framed and weatherboard clad with a corrugated iron gable roof and a concrete floor.

3.7 Other Structures

Other structures in the vicinity of the main homestead include two timber tankstands. The one closest to the house had been enclosed at the base to provide a laundry area.

The remains of a timber lattice gazebo are evident beneath the large silky oak and bougainvillea vine alongside the driveway to the house.

An above ground fishpond/fountain constructed of coursed random rubble sandstone blocks with a cement rendered interior is present in the area at the rear of the main homestead. There is also a timber pergola in the vicinity, and other miscellaneous items such as septic tanks, incinerator and garden sheds.

3.8 Archaeological Features

A filled well or cistern (presumably brick-lined) is known to be present in the area between the double garage and the house, immediately east of the concrete path. The well/cistern is presumed to have been constructed at the same time as the main house (c.1860s). The date or nature of the fill deposits is presently unknown. The yard area around the house may also contain other potential archaeological features, possibly including evidence from occupations that precede the extant building (discussed further in the following section of this report). An obvious item which can be predicted to occur, but for which no exact location is identified, is a privy or earth closet in use prior to the introduction of septic tanks onto the property.

3.9 Garden

A well established garden exists around the main "Minnaville" homestead. The garden includes a number of mature trees, many planted from the early to mid twentieth century and a few which may date from the Victorian era. Major trees around the homestead include the following: Poplars, Holly Tree, Jacaranda, Olive, Firewheel tree, Pepper, Palm, Cypress and Silky Oak.

There are a number of mature Pepper trees scattered through the horse yard areas which might be the remnants of old planting to mark the boundaries of the "home paddock" area. This type of planting is commonly found on rural properties. Several mature Poplar trees have also been planted to mark the alignment of the main driveway from Castlereagh Road and these are a distinct landscape feature when approaching the property.

3.10 Additional Elements away from the Homestead

During the fieldwork for this study a traverse was made along the area presumed to be the original boundary between Portions 48 and 49. Several features of interest were noted.

A ditch and embankment was observed to be present close to the presumed alignment of the original boundary. This is possibly the remnant of an early landscape feature such as a boundary ditch, or more likely, may be a more recent drainage feature intended to direct stormwater runoff towards Cranebrook Creek.

The most interesting item noted was a surviving crib-work timber bridge across Cranebrook Creek in the centre of the present paddock which fronts Castlereagh Road. This bridge is constructed of large diameter logs laid in the creek bed with additional logs laid at right angles above. The logs are also used as timber bearers or beams to which the timber slab decking of the bridge has been attached with fencing wire. This fairly simple type of bridge was often used for early and simple road building in the Colonial period, with similar structures known to have been built from the early 1800s onwards. Crib-work bridges do not often survive as by the very nature of their construction they tend to trap debris during floods which banks up against the logs in the creek bed causing the foundations of the bridge to wash away. These types of bridges are also prone to upgrading or replacement and to physical decay. For this reason, the example on the "Minnaville" property is not likely to be particularly old, it is merely an interesting example of a surviving form of simple vernacular bridge construction.

Another part timber and concrete pipe bridge carries the present driveway over Cranebrook Creek. This structure appears to have been upgraded or rebuilt several times and is not of any interest.

4.0 SYNTHESIS OF DOCUMENTARY & PHYSICAL EVIDENCE

This section of the report considers the combined historic and physical evidence for development phases during the occupation of the "Minnaville" property, and assesses the likelihood of archaeological remains to be present within the property.

4.1 The Documentary evidence for the Historic development and the Archaeological Potential of the "Minnaville" Property [RES Site 15]

The historical outline presented in Section 2 of this report indicates that Portion 49, on which RES Site 15 is located, was granted by Governor King in June 1803. It is the argument of this report from interpretation of the Land Title information and plans, that the old farmhouse complex now known as "Minnaville" is situated within the early subdivision of the northern 30 acres of the Portion made by Deed of Gift from John Harris to Robert Guy. This interpretation was confirmed by a separate professional survey of the land portion completed in July 1996.

Clearing and occupation of the land would have been commenced by 1803. The existing documentary evidence in the form of early maps and written descriptions, does not allow the precise identification of any these (presumed) early sites from the initial phases of ownership and occupation during the first half of the nineteenth century. Macquarie's comments about the earliest housing in the area being 'mean and paltry' were previously discussed, as was the repeated flooding of the area from time to time. Wherever and whatever the earliest buildings were on RES Site 15 [= 'Minnaville'], they are unlikely to have been modified or extensively rebuilt either following the death of Robert Guy, when the property passes to Maria Nash, or during the ownership of Robert Williams of Cooma when the property appears to have been occupied by tenants.

The periodic inundation of the area is an interesting factor, as this may result in two separate and opposite potential impacts on any archaeological house sites which may be present on the "Minnaville" property [= RES Site 15]. The first possibility is that the floods may have largely removed the traces of the earlier occupations. The opposite possibility is that the floods, especially the highest ones, might have buried the earliest sites under a layer of river silt or other flood deposits. In this case the sites would not be presently visible, but might be revealed by future ground disturbance. This is likely to be the case for other ancillary features, such as older wells, cisterns and privies which may be expected to have been associated with the earliest occupations. These types of features would have been cut into the original ground surface and may survive in the lower part of the site profile even if not currently evident on the ground surface. More fragile evidence from simpler buildings or structures (for example "negative" evidence such as post-holes) might also survive. Less

formal occupation deposits, including rubbish dumps etc., which may contain artefacts or other cultural debris for example bottles, other containers, food refuse (bones, etc.) may also exist in association with early building sites. These types of features might be revealed through ground disturbances and other excavation.

Given the general topography of RES Site 15, and the arrangement of buildings found at other nearby early properties such as "Hadley Park" and "Nepean Park", it is probable that the early building sites may have been in the same vicinity as the present "Minnaville" farmhouse. The early buildings may have been demolished when the present homestead was built and evidence of these buildings and early occupations could thus be present underneath the existing building. This was the case at McCarthy's Farm, Cranebrook, where additional evidence of earlier buildings and construction phases was revealed by archaeological excavations within and around the site of the former farmhouse confirming occupation at that site from the early 1800s.

There is no historic record which provides an exact date for the construction of the present "Minnaville" homestead on RES Site 15, which is obviously the oldest surviving building of the extant farm complex.

From the Land Title documents and some other corroborative evidence which was outlined in Section 2, the most likely builder of "Minna Ville" (sic.) is Joseph Daniel Single who purchases the land in 1863 and sells it in 1884. The most likely construction date for the earliest part of the present farmhouse is therefore the 1860s. The family of J D Single are certainly occupying the property in the 1870s³⁸. It is also clear that they are in residence on a property adjoining, but separate from, "Nepean Park" and RES Site 15 conforms with this location.

The "Minnaville" farmhouse [= RES Site 15] has thus been continuously occupied since its construction in the 1860s and may be expected to contain its own sub-surface archaeological deposits, and other physical evidence generated during its various ownerships and occupations. In addition to the types of features and occupation deposits already outlined, the area around the extant "Minnaville" farmhouse and its associated early outbuildings such as the barn, might also possibly contain additional elements such as former garden areas, or other "hard landscaping" (such as paths/drives, paving, cobblestones, etc). Another element which might occur would be an additional kitchen block of some kind, given the small dimensions of the possible former kitchen or scullery in the early rear skillion.

The survival of any archaeological features or deposits will be subject to the nature and intensity of the subsequent activities which may have partly disturbed or removed the evidence on-site.

It is known from the documentary evidence that some remodelling of the farmhouse and expansion of the facilities on the "Minnaville" property occurred during the mid-twentieth century ownership of Mr Duesbury. Whilst this has affected parts of the interior, there does not appear to have been any

large-scale sub-surface disturbance under or around the homestead. For example an old filled well or cistern is known to still survive close to the house. The same cannot be said of the areas developed elsewhere on the property during the extensive horse spelling and stabling use, or in the formerly planted and cultivated commercial orchard areas. This use was, and in some areas still is, very intensive with constant attrition of existing ground surfaces. If the early occupation sites on the property were in these areas they would be likely to have been disturbed or even removed by this intensive use of the land. The only exception would be the potential buried sites and other features discussed above.

For the reasons discussed above, the documentary evidence indicates that area of greatest archaeological sensitivity at the "Minnaville" property [= RES Site 15] comprises the relatively undisturbed home paddock, yard and garden areas around the old farmhouse complex and its associated older outbuildings.

4.2 The Physical Evidence

Although there is no documentary record which establishes the precise date of construction of the extant homestead, the analysis of the existing fabric of the homestead and the barn already described in this report enables the following inferences to be drawn from the physical evidence.

The extant "Minnaville" homestead commenced as a small, symmetrical hipped roof cottage with 4 main rooms and a central hallway. There were two additional rooms under a skillion roof at the rear, and probably also a verandah across the front (east) elevation. The physical evidence for the first phase of construction indicates a date during the 1860s. This strongly corresponds with the documentary evidence for J D Single's purchase of the property in 1863.

Phases 2 and 3 of the homestead which extended the building further north, were constructed within a short time. The physical evidence of Phase 3 indicates a probable 1870s construction date. It is interesting to note that the rooms added to the house were essentially bedrooms, which would appear to relate to the historically documented increase in J D Single's family. The family had fifteen children between 1855 and 1874, of whom ten survived to adulthood. Nine of these children were born between 1864 and 1874.

The Phases may be tentatively divided as follows:

- Phase 1 - c.1860s (early)
(Single's purchase of the land 1863 & presumed construction of the house)
- Phase 2 - c.1860s (late)
(first extension by Single, probably to accommodate increased size of family)
- Phase 3 - c. 1870s
(second extension by Single, again due to increase in family)

The large barn behind the homestead is also attributed to the 1860s/1870s period.

As already outlined in Section 3 of this report, the Phase 4 construction of the homestead includes external additions and internal alterations to the "Minnaville" farmhouse. Phase 4 construction is consistent with having occurred during the period of ownership of the house by Mr Duesbury (1950s). The Duesbury period is well documented as having resulted in various modifications to, and expansion of, the "Minnaville" property. Several of the extant outbuildings at "Minnaville" would also appear to relate to the Duesbury period of property improvement (1950s). The likelihood of the Duesbury period to have removed or disturbed archaeological sites and deposits has been examined in Section 4.1 above.

4.3 Summary of Occupation Phases and Development at "Minnaville"

The following table summarises the currently known ownership or occupation, and the major known or presumed development and building phases of "Minnaville" [= RES Site 15].

Date	Owner	Buildings / Events
1803 - 1820	Robert Guy	Early 30 acre subdivision of original 90 acre grant. On basis of present research, clearing and farming of the land, but no precise evidence for exact buildings or sites. An early house etc., may be presumed to exist on the property.
1820 - 1844	Maria Nash	Maria Nash either occupies or leases the same (presumed) early farmhouse.
1844 - 1863	Robert Williams	Farm is let to tenants, including a Mr Fisher. Early buildings are probably still present.
1863 - 1886	Joseph Daniel Single	Older buildings possibly demolished at this time. Present homestead constructed by J D Single, and occupied by his family. Small hipped roof cottage with two phases of later additions producing the rectangular shaped, core building extant today. Large barn outbuilding and other features such as the well also added during this occupation.
1886 - 1907	Short term Owners: Wisdom, Maybury Tuckfield, Olpherts	Configuration of land and buildings probably continues without any major alterations or additions.
1907 - 1941	Samuel Apps Eggins	Reconsolidation of the two early subdivisions. Configuration of main homestead shown in 1930 photograph, not greatly altered from C19th. Some of the outbuildings were probably added during this period of occupation.
1941 - 1950	A & D Fulop, G Evans	Same general configuration of land and buildings probably continues
1950 - 1960	Frank Duesbury	Expansion of the property through acquisition of additional lands. Additions and remodelling of the main homestead. Also additions and alterations to the barn. More outbuildings introduced.
1960 - 1964	Farley and Lewers, F Dowling	Documentation for Auction records buildings and layout of the property. More recent house near river swept away by floods. New subdivision of the property into 4 allotments.
1964 - 1973	A Higgins Roland P/L Minnaville P/L	Lot 1 DP 219895 contains the homestead & farm outbuildings dealt with in this report.
1973 - present	Gravel and Quarry Co.s, including BMG, thence the Penrith Lakes Development Corporation	Property occupied by tenants, awaiting future use by the extractive industry. RES 1984; REP No 11, 1986. Configuration of land and buildings as established during the Duesbury period (1950s) continues.

5.0 ASSESSMENT OF SIGNIFICANCE

5.1 The Concept of Cultural Significance

The concept of cultural significance or heritage value attempts to define the aspects of a place or item which make it of value to the community. The term, "cultural significance" is essentially interchangeable with the term "environmental heritage", as defined by the NSW *Heritage Act*, 1977: where it "means those buildings, works, relics or places of historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance".³⁹ Of these listed adjectives, "cultural" significance has become the generic term, with the other adjectives attempting to provide more detailed categories.

The methodology and guidelines used to assess cultural significance have been gradually standardised in recent years and there now exists a range of material on this subject published and disseminated by a various agencies or groups ⁴⁰.

5.2 Criteria for Assessment ⁴¹

Specific evaluation criteria for the assessment of the heritage values of individual items have been developed over the past five years, primarily through the efforts of the former Heritage Branch of the NSW Department of Planning. These values may be divided into two major categories which are the nature of significance (a range of values) and the degree of significance, which is based on the comparative values of representativeness and rarity.

The nature of significance includes four main values (1 -4) as follows:

- Value 1: Historic significance (Evolution and Association)
An item which meets this value is significant because of the importance of its association with cultural history.
- Value 2: Aesthetic significance (scenic qualities, creative accomplishment)
An item meeting this value is significant because it demonstrates positive visual or sensory appeal, landmark qualities and/or creative or technical excellence.
- Value 3: Social significance (Community Esteem)
Items meeting this value are significant through their social, spiritual or cultural association with a recognisable state, regional or local community.
- Value 4: Research and Educational Potential
(Scientific, technical, interpretative, and archaeological values)
Items meeting this value are significant because of their potential to contribute to an understanding of history or historic environment.

The comparative values are defined as follows:

- **Rarity (Value A)**

An item meeting this value is significant because it reflects a rare, endangered, or unusual aspect of the history or cultural environment at a local, regional, or state level.

- **Representativeness (Value B)**

Items meeting this value are significant because they represent an important class of historic items or environments at a local, regional or state level.

To be a heritage item of local, regional, or state significance an item must meet at least one of the nature of significance values (Values 1 - 4) and at least one of the comparative significance values (A or B) under any of the values 1 to 4.

The item must also retain the integrity of its key attributes of significance. This means that "it must not be altered or compromised to such an extent that the assessment values cannot be applied and its links to the thematic context are not clear" ⁴².

The draft *Archaeological Assessment Guidelines* also make specific comment regarding "Research Potential" (Value 4) as this is usually the most relevant value in the assessment of archaeological sites. Once it has been determined (through historic research, fieldwork and analysis) that a site may have archaeological deposits, relics or other physical features present, relevant historic and research themes or questions to which such deposits may contribute information need to be established. This is usually done by means of a formal research design submitted at the same time as an Excavation Permit Application.

The draft *Archaeological Assessment Guidelines* note however that it is possible during the archaeological assessment process to use the following questions, developed in an influential paper by Bickford and Sullivan in 1984, to assess the archaeological research potential of a site ⁴³.

- can the site contribute knowledge that no other resource can ?
- can the site contribute knowledge that no other site can ?
- is this knowledge relevant:
 - to general questions about human history;
 - to other substantive questions relating to Australian history;
 - to other major research questions ?

In answering the first and second questions the preservation or "intactness" of the archaeological site, the availability of comparative sites, and the extent of historical documentation should be considered. In answering the third question the relevance and importance of this contribution may be assessed on a spatial basis. For example, the contribution may be relevant to the site, between sites, or on a regional or wider basis.⁴⁴

5.3 Evaluation of "Minnaville" [RES Site 15]

5.3.1 General

The preceding sections of this report, in particular the outline of the documentary evidence, physical evidence and the synthesis of the two, have informed the following evaluation of the "Minnaville" farmhouse complex. The following comments consider the site against the evaluation criteria outlined in Section 5.2. The general context and overall significance of the Castlereagh valley was also considered and described in the 1983 European Heritage 'working paper' prepared as a background document for the *Regional Environmental Study*. In commenting on the value of the Castlereagh area as an item of European cultural heritage, the Summary section of the 1983 'working paper' report stated:

- *that the region of the Penrith Lakes Scheme has a history of European settlement back to 1793, ie longer than most parts of the County of Cumberland, let alone NSW;*
- *that because of the slow growth and/or development rate of the region it has retained a number of discrete historic and archaeological sites of considerable interest;*
- *that because of the slow growth and development (until recently) it has retained considerable scenic or aesthetic quality as a rural landscape embodying relics of a succession of land uses from the present day back to 1793;*
- *that because it is now on the rural and urban fringe in a particularly marginal situation between western suburbs development and the Blue Mountains it takes an additional heritage significance."*

The "Minnaville" complex stands within an original grant made in 1803 when the Castlereagh area was first formally surveyed and alienated from the Crown, and more particularly within an equally early 1803 subdivision of the original grant. Other adjoining properties such as "Hadley Park" and "Nepean Park" also presently stand within their original grant boundaries.

At the present time much of the Castlereagh valley still retains clear evidence of its early alienation and subdivision pattern in the form of major roads, some surviving lanes, and property boundaries. Early Colonial-era settlement areas which retain this sort of broad-scale historic landscape are becoming increasingly rare on the Cumberland Plain due to constant development pressure from the expanding Sydney metropolis. Some other surviving areas which also display clear evidence of early settlement pattern in the present landscape occur in the Hawkesbury-Nepean region, the Pitt Town bottoms near Windsor (occupied 1793, granted from 1794) and the Mulgoa Valley (granted 1809-1812) being two other notable examples.

In addition to its evidence of early settlement pattern the locality of Castlereagh also has considerable aesthetic appeal as previously noted in the working paper. The "Minnaville" property [= RES Site 15] is readily distinguished in the landscape due to its retention of a series of mature trees, in particular the large Poplars which mark the driveway into the homestead. These trees clearly have landmark quality.

The "Minnaville" farmhouse complex is believed to have been constructed by Joseph Daniel Single c.1863, and subsequently occupied by his family. As indicated in Section 2 of this report, the Singles are a prominent and significant local family, associated with several properties in the Castlereagh-Penrith area, including "Nepean House", "Minna Ville" (sic.) and "Cassola". The family also held considerable land holdings elsewhere in NSW including properties in the Hunter, New England and Mudgee districts.

Particular aspects of the construction of the "Minnaville" farmhouse have been considered in the specialist report by Graham Edds and Associates which is included in Appendix G of this report. The Edds report comments:

"Minnaville is certainly historically significant, has aesthetic significance and it is believed to be scientifically significant in that the wall structure described within this report is most unusual and is certainly very rare within the Hawkesbury/Nepean settlements, yet very similar to that found at "Cooma Cottage", Yass.

Timber structures with brick nogging prior to the 1840s within the Hawkesbury River settlements, almost entirely consisted of timber post and beam wall structures where the posts were embedded into the ground for stability and then infilled with brick nogging constructed between the posts and resting on the ground. The internal walls of these structures were similarly constructed (very different to what is extant at "Minnaville")."

5.3.2 Archaeological Aspects and Research Questions

The archaeological aspects and potential of RES Site 15 to contain archaeological deposits have been considered in Section 4.1. It has been noted that the earliest occupation and house sites on the "Minnaville" property cannot be precisely located because of the absence of detailed early historic documents (ie maps). It is nevertheless predicted that at least some archaeological evidence for these early sites may survive, especially in those areas of RES Site 15 which have not been unduly disturbed, and that the earlier house site might be within, or close to, the area of the present farmhouse.

In view of this assessed archaeological potential of RES Site 15 ["Minnaville"] site it is also relevant to consider its modern archaeological context. To date relatively little archaeological investigation has been completed in the Penrith LGA, and very little work has been specifically completed in the Castlereagh area. One exception is the c1980s archaeological excavation of McCarthy's Farm, Cranebrook. Other investigations have included work at the old Penrith Courthouse and further out of town, "Blaxland's Crossing" near Wallacia and at "The Cottage", Mulgoa. By far the best known and longest running project in the Penrith region has been the archaeological excavation of the former mansion at "Regentville" near Mulgoa by the University of Sydney. A problem with most of the investigations to date is that their results only exist in an incomplete form which is not readily accessible, have not been widely disseminated, or only exist as a series of somewhat disconnected interim reports and/or articles. More research on directly comparable sites and projects, such as "McCarthy's Farm"

and access to relevant artefact assemblages and analyses would need to be undertaken if and when major archaeological work was to occur at RES Site 15.

A more specific issue for RES Site 15 "Minnaville" is that much of its immediately adjacent 'archaeological neighbourhood' has been removed by the intensity and scale of subsequent quarrying activities, particularly on the east of the present Castlereagh Road. Those other archaeological deposits which are likely to survive at immediately adjacent properties such as "Nepean Park" and "Hadley Park" are also tied to above ground buildings, which are themselves identified as heritage items which will be retained into the future. In this case the most appropriate actions for the archaeological resources present at these properties is preservation and conservation as part of the significant fabric of the property. This means that archaeological work should generally not occur at these properties unless it is unavoidable due to other conservation requirements.

It may be concluded that few sites directly comparable with "Minnaville" [RES Site 15] have been previously excavated. No other comparable site (eg those with presumed early deposits such as "Hadley Park" and "Nepean Park") is likely to be available for total excavation in the near future.

5.3.2.1 Early Occupation Sites

If an early occupation site from the first half of the nineteenth century does exist at RES Site 15 it would be of considerable archaeological significance. This type of site would relate to important historic themes in the early development of the area, such as the early rural settlement of emancipist grantees and farmers, the focus of early settlement and social structure around early churches, etc., several such themes being noted in or able to be inferred from the 1983 'working paper' report.

For a time these early Nepean River land grants were on the edge of European civilisation, at the junction with the unknown wilderness. If the early occupation and house sites on RES Site 15 are able to be located, identified and subsequently excavated archaeologically, they would provide a window onto this Colonial-era "frontier". One appropriate theoretical model which could be applied in these circumstances is that of the classic Core/Periphery model. In this type of model an economic and social central core (ie. the town/city) will contain sites and localities which are typically wealthier and more developed than those that are further from the centre (ie. on the frontier). It is also likely that the city/core will also have greater access through trade networks to imported manufactured goods, etc. This type of differentiation should be apparent in different material culture evidence such as artefact assemblages.

Any surviving early occupation sites with associated archaeological deposits may be expected to also yield information (in the form of artefacts, spatial/physical relationships, etc) which might also illuminate aspects regarding the social status and aspirations of early emancipist farmers.

5.3.2.2 The Extant Farmhouse

It is believed that the extant farmhouse dates from the 1860s and has been continuously occupied since that time. The farmhouse and its adjacent areas (including the filled well) are likely to contain archaeological deposits relevant to all of its own occupation phases. These deposits may be expected to yield information about matters such as living conditions, changes in use, introduction of services, modifications, etc. Some specific issues about initial construction and use of the "Minnaville" building are not able to be resolved by the existing documentary evidence, for example the early use of rooms within the house, and whether the first kitchen was within the house or in a separate location.

5.3.2.3 Research Questions

The types of specific research design questions which could apply to RES Site 15 if it were to be archaeologically investigated at a future date are considered here. The suggested archaeological research questions for "Minnaville" have been developed to provide a relevant framework through which the archaeological information recovered during a future investigation might be interpreted.

"Minnaville" [= RES Site 15] may be viewed at two interpretive levels: being part of a larger corpus of rural properties and archaeological sites, and also possessing the potential to yield site-specific and idiosyncratic information. During completion of any future archaeological work it may also be necessary to modify aspects of the research design. Archaeological deposits are neither uniform or constant, and despite predictions and assessment often present considerable variety in survival owing to site specific taphonomic (site formation) processes. Site specific research questions for "Minnaville" [RES Site 15] might include:

- Does any physical or structural evidence of earlier buildings or occupation phases survive sub-surface within the main homestead building? Does the sub-surface evidence confirm or deny the presence of an earlier building in this location? If evidence survives, is the earlier form, orientation and ground-plan of the earlier structures able to be determined?
- Does any additional structural or physical evidence relevant to early occupations survive in or around the main building? Is it possible to determine the positions and phasing of any ancillary structures and outbuildings?
- What additional structural or physical evidence relevant to the occupation and construction of the extant building complex survives? What evidence is provided by ancillary structures such as the filled well, other structures and outbuildings?
- What evidence is there of the earlier room functions and utilisation of space in the extant "Minnaville" farmhouse? Is it possible to determine any alteration of these through time? Can the evidence be linked to specific occupations?

- Is it possible to gauge the wealth or status of the occupants of the extant homestead building ? If so, how ? What is the evidence of the material culture ?
- Does any additional evidence relevant to earlier kitchen gardens or other formal landscaping survive ? If so, what is it ?
- Do the grounds of the "Minnaville" property contain any evidence of early occupation sites or other activities prior to the construction and occupation of the extant farmhouse complex ? ⁴⁵

5.4 Statement of Cultural Significance for "Minnaville" [RES Site 15]

- The extant farmhouse complex at "Minnaville" [RES Site 15] stands within an historically significant original grant made in 1803 (Portion 49), and more particularly within an equally early 1803 subdivision of the original grant, which retains its historic boundaries. Other historic occupation sites from the first half of the nineteenth century may survive on the "Minnaville" property.
- The extant farmhouse complex at "Minnaville" [RES Site 15] has historic, visual and physical relationships with its surrounding setting and historic landscape. This landscape includes major historic features such as the Nepean River and the Castlereagh Road which strongly influenced the development of the locality of Castlereagh, and several other surviving historic properties such as the adjoining "Nepean Park" and "Hadley Park".
- The extant farmhouse complex at "Minnaville" [RES Site 15] is directly associated with Joseph Daniel Single, who purchased the 30 acre property in 1863. The property is therefore associated with the Single family, who also occupied the adjoining "Nepean Park" property. The Singles were a prominent family in the history of the Castlereagh - Penrith area, and are linked to other early local families through inter-marriage ⁴⁶. J D Single was a significant figure in local history. He was involved in numerous associations, contributed to philanthropic works, and was also the Member for Nepean.
- The extant farmhouse building at "Minnaville" [RES Site 15] is a rare and unusual example of brick-nog construction which is unlike the other earlier types which may be found elsewhere in the Hawkesbury - Nepean settlements. The total wall structure at "Minnaville" is of interest due to its use of timber wall studs morticed and tenoned into a top plate and base plate, the base plate resting on sandstone footings. This is unusual for a "brick-nog" building.
- The archaeological evidence which is known and predicted to survive at "Minnaville" [RES Site 15] has scientific and research value. Systematic archaeological investigation of specific areas of the site particularly in the vicinity of the homestead complex, has the potential to reveal information about the lifestyle, living conditions, socio-economic status and material culture of the occupants. Surviving sub-surface physical evidence may also contribute additional information concerning the location, construction, form and function of structures previously and currently present at RES Site 15.

6.0 STATUTORY ISSUES AND EXISTING CONSTRAINTS

6.1 The Penrith Lakes Scheme and SREP No. 11

It has been indicated in Section 1 of this report that the Penrith Lakes Scheme Development is implemented under the provisions of *Sydney Regional Environmental Plan No. 11 - Penrith Lakes Scheme*, which sets the framework for design, quarrying and future uses. It was also indicated in Section 1 that prior to the making of the plan, a Regional Environmental Study was undertaken (published as *Penrith Lakes Scheme: Regional Environmental Study*, Department of Environment and Planning, 1984). This study examined a wide range of matters such as: the need for the resources of the Scheme area; Scheme alternatives; Preferred Scheme; Quarrying; Scheme Management; Urban Environment and Recreation Needs; Water Environment; Air and Acoustical Environment; Biological Environment; Cultural Environment (Aboriginal and European Heritage); and Infrastructure issues.

The 1984 RES document also examined the assessed degree of significance for each of the items identified in the European Heritage 'working paper' report of 1983 against the technical requirements of extraction and rehabilitation for the Scheme. As a result of this examination the RES stated that:

"Due to the technical requirements of extraction and rehabilitation, only a small number of heritage sites identified for their great local significance and preferred retention have been retained in the final scheme design". For those sites which were not retained by the scheme design, the RES stated: *"Further archaeological investigation would also be required to investigate sites before they were removed or relocated"* ⁴⁷.

The subsequent *Sydney Regional Environmental Plan No. 11 - Penrith Lakes Scheme.*, lists the following objectives in Section 2:

" 2. (1) The aims and objectives of this plan are to permit the implementation of the Penrith Lakes Scheme.

(2) Without limiting the generality of subclause (1), the particular aims of this plan are --

(a) to provide a development control process establishing environmental and technical matters which must be taken into account in implementing the Penrith Lakes Scheme in order to protect the environment;

(b) to identify and protect items of the environmental heritage;

(c) to identify land which may be rezoned for urban purposes; and

(d) to permit interim development in order to prevent the sterilisation of land to which this land applies during implementation of the Penrith Lakes Scheme."

Sydney Regional Environmental Plan No. 11 - Penrith Lakes Scheme., identified and listed the following Heritage Items for retention in Schedule 3:

- Hadley Park
- Nepean Park
- McCarthys Cemetery
- Upper Castlereagh Methodist Church and Hall
- Upper Castlereagh School and Residence
- Methodist Cemetery

The "Minnaville" complex [RES Site 15] being considered in this report, is not currently scheduled for retention. Thus, under the current Scheme Design and the approved *Structure Plan* for the Scheme which forms part of SREP No. 11, it is intended that the "Minnaville" complex will be demolished, the area will be used by the extractive industry, and will subsequently form part of the water area of the Lakes Scheme. A copy of the Structure Plan for the Lakes Scheme is included in Appendix A (Figure 20).

The Consent Authority for the Scheme is the Minister for Urban Affairs and Planning. The wide range of matters to be considered by the consent authority when determining development applications which implement the Penrith Lakes Scheme are also specifically listed in SREP No. 11, in "Part 2 - Development Control".

It is known that representations have been made by various parties to the Minister, seeking an amendment to the Scheme in order that "Minnaville" [RES Site 15] might be retained⁴⁸. It is also understood that existing arrangements under the Deed of Agreement between the Government and the Penrith Lakes Development Corporation allow for the possibility of alteration to the Scheme design and construction. The fundamental principle is that the party responsible for seeking design amendment is responsible for any consequential additional costs. Such additional costs would be likely to include detailed redesign studies for the Scheme and possible alterations to existing components or proposed infrastructure; as well as any specific costs which might be associated with the possible retention of RES Site 15 itself. These specific costs would include the further investigations which would be necessary to determine issues such as an appropriate curtilage for the property; future access to the property; future use, management and ownership; as well as the costs of maintenance, repair and conservation of the existing buildings.

Sydney Regional Environmental Plan No. 11 - Penrith Lakes Scheme., also includes the following clause:

"4. In the event of an inconsistency between this plan and any other environmental planning instrument (whether made before, on or after the day on which this plan is made), this plan shall prevail to the extent of the inconsistency."

Sydney Regional Environmental Plan No. 11 - Penrith Lakes Scheme., should be referred to directly for complete information.

6.2 The New South Wales Heritage Act, 1977

The Heritage Act, 1977, was enacted to ensure that the environmental heritage of New South Wales would be adequately identified and conserved. The Act established the Heritage Council of New South Wales, an independent advisory body of twelve members, which makes recommendations to the Minister for Urban Affairs and Planning on matters affecting the environmental heritage and on the implementation of the Heritage Act.

The Heritage Act includes various provisions for protecting identified heritage items. These include various conservation instruments (or "orders") and the "relics" provisions. The Heritage Act provides automatic statutory protection for historical archaeological "relics" which are defined as:

" any object, deposit or material evidence relating to the settlement of the area that comprises NSW, not being Aboriginal settlement and which is fifty or more years old" 49

Sections 139-145 prevent the excavation or disturbance of land for the discovering, exposing or moving of archaeological relics except in accordance with an approved excavation permit. Thus, the disturbance or excavation of land containing, or likely to contain, relics may only take place after an excavation permit has been granted by the Heritage Council or its delegate. In addition, Section 146 of the Act requires that if a relic is discovered (or located) the Heritage Council must be notified of its existence as soon as possible.

Compliance with these requirements of the Heritage Act has been assumed in the drafting of the subsequent recommendations given in this report.

Recent changes announced by the Minister for Urban Affairs and Planning have created a new agency to service the NSW Heritage Council. The new Heritage Office was established in July 1996. The Heritage Office and Heritage Council are now independent of the Department of Urban Affairs and Planning, reporting through a separate Director to the Minister for Urban Affairs and Planning.

6.3 Penrith City Council

An Heritage Study of the City of Penrith was completed in 1986. This study formed the basis of Council's *Environmental Heritage Conservation Local Environmental Plan*, gazetted 20th December, 1991.

With a few exceptions, items situated within the Penrith Lakes Scheme Area were generally not included in the LEP, because they were subject to separate planning considerations. Clause 4 of the LEP describes the relationship of the LEP to other planning instruments, including SREP No. 11, and states:

"4. (2) In the event of an inconsistency between the plan and the Sydney Regional Environmental Plan No. 11 - Penrith Lakes Scheme., or Sydney Regional Environmental Plan No. 13- Mulgoa Valley., the regional environmental plan shall prevail to the extent of the inconsistency."

6.4 The National Trust of Australia (NSW)

The National Trust is a non-government organisation which compiles its own Register of heritage items. Listing in the Trust register has no legal force and imposes no statutory requirements but is generally regarded as an authoritative statement of the heritage significance of a place or item.

It has already been mentioned in Section 1 that RES Site 15 has been Classified by the National Trust, and that the listing was largely based upon the information in Jean Gray's publication, *Magnificent Minnaville*. Although no separate primary research was undertaken by the National Trust, the Trust appears to have been aware of possible conflicting views about the history of the property. The listing information states:

"It is uncertain that the building currently located on the property presently referred to as Minnaville, was the house of John Single [sic.] or indeed the house of John Harris Snr. It is likely, however, that the building presently known as Minnaville is not the original building erected on this site since the first occupation of that land by the Harris family in 1803."

Despite this uncertainty the National Trust listing proceeds to the following statement of significance:

"The house and outbuildings at "Minnaville", Castlereagh Road, Castlereagh, have architectural and historic significance as a rare example of early colonial farm buildings. Despite later changes the buildings retain significant surviving evidence of early Colonial design and construction.

The site is historically significant as it is part of a series of colonial land grants along the Nepean River, whose settlement contributed to Castlereagh becoming an integral member of the Macquarie Five Towns.

The site has potential for considerable archaeological, scientific and agricultural research."

A full copy of the National Trust listing is included in Appendix E.

The National Trust's present interpretation of the development of the property and its historic attribution (largely based on Jean Gray's assertions) is not supported by the findings of this report.

6.5 The Australian Heritage Commission (Commonwealth)

The *Australian Heritage Commission Act, 1975, (Federal)* established the Australian Heritage Commission (AHC) which is responsible for maintaining the Register of the National Estate, defined as "components of the natural or the cultural environment of Australia that have aesthetic, historic, scientific or social significance or other special value for future generations as well as for the present community". The Act prevents any Commonwealth Department or instrumentality, or any organisation using Commonwealth funds, from taking any action which might adversely affect a site on the Register except where there is no "prudent or feasible" alternative.

The AHC have advised that a nomination has previously been received for "Minnaville", Castlereagh, but that at the present time the nomination is categorised as "not assessable". The site is therefore not included in the Register of the National Estate at the present time⁵⁰.

7.0 CONSULTATIONS

During the preparation of this study consultation was undertaken with a range of interested parties. Letters advising of the study and seeking information or comments were prepared and sent to Mrs Gray, the Nepean District Historical Society and the Nepean Family History Group. No written replies were received however, several telephone conversations and/or face to face discussions ensued as a result of these initial letters. The parties consulted during the study have included individuals with specific knowledge or opinions about the history of the "Minnaville" property, and a range of other organisations including Local History Groups, Penrith City Council, the Heritage Office of NSW and the National Trust (NSW). The results are summarised below.

7.1 Mrs Jean Gray

Mrs Gray's interpretations of the homestead at RES Site 15 are contained in her book, *Magnificent Minnaville*, 1988. She has argued that the present "Minnaville" homestead [RES Site 15] is the original homestead built and occupied by John and Ann Harris during the early nineteenth century.

During discussion with Mrs Gray on 12th July 1996, clarification was sought by the consultant about the interpretations developed by Mrs Gray from the Land Title evidence for Portion 49, in particular her view of the position, shape, and physical boundaries of the early 30 acre subdivision given to Robert Guy. Mrs Gray's view on this matter is that the marking of the Minnaville Trig Station, and therefore the position of the name "Minnaville" on some of the topographic and parish maps issued by the Lands Department has:

*"possibly confused some people and they have assumed Minnaville was incorporated into Nepean Park with Joseph Daniel Single becoming the owner of 30 acres of the land in 1863. It has often been assumed that that section of Minnaville was incorporated as Nepean Park, but this is incorrect. It is the Trig Station on Robert Guy's land and not the homestead".*⁵¹

An outline of the preliminary findings of this study and of the analysis of the physical evidence provided by the extant "Minnaville" building, was indicated during the discussions held in July, however, Mrs Gray's view on this matter remains largely unaltered. She remains committed to the interpretation that "Minnaville" is the homestead built and/or occupied by the Harris Family.

It is the view of this report, from the historical research, fieldwork analysis, and the synthesis of the historical and physical evidence (see Section 4) that in fact, the boundaries of the early 30 acre subdivision of Portion 49 encompass *both* the modern Trig Station *and* the "Minnaville" house. This has been confirmed by an independent professional survey of the land portion (Appendix A, Figure 11).

It is the view of this report, that the Harris family's part of Portion 49 lies further south, in the area to the south of the present access driveway to the "Minnaville" homestead. These views are summarised on Figure 12 in Appendix A (copy also in report Summary).

7.2 Mrs Rosalie Pollet

During discussions on 15th July 1996, with Mrs Rosalie Pollet, a descendant of the Single family and the compiler of the published family history, she was asked for her view of the importance of the property if it could be shown that the present "Minnaville" farmhouse was built by Joseph Daniel Single.

Whilst the views of one descendant do not necessarily equate with the opinion that may be held by other descendants, Mrs Pollet made the observation that a number of other houses built and occupied by members of the family still exist within the Penrith district and elsewhere in the State. The descendants are more concerned with "Nepean Park" as this homestead and property represents the genesis of the family in Australia. "Nepean Park" is now owned by the Dixon family and does not form part of the Penrith Lakes Scheme. It will be retained.

7.3 Nepean District Historical Society

Mrs Lorna Parr replied by telephone to the letter sent to the Historical Society in May, 1996. For a number of years the Nepean District Historical Society has consistently lobbied for a greater number of items to be retained within the Penrith Lakes Scheme Area, one of these being the "Minnaville" property [RES Site 15]. The Society has also expressed wider concerns about the Lakes Scheme and its future impact on other items including Castlereagh Road.

The views of some members of the Society about "Minnaville" and the Lakes Scheme are indicated by some of the correspondence on the public record. Examples of such correspondence are included in Appendix F.

To date, the lobbying by the Society has been based on the views and assertions contained in the publication by Jean Gray. The preliminary findings of this report about the "Minnaville" property have been outlined in discussions during July with both Mrs Lorna Parr and Mrs Barbara Higginson⁵². Representatives of the Society have expressed interest in obtaining a copy of the study report.

7.4 Nepean Family History Society

Mrs Lorna Parr also replied to the letter sent to the Family History Society in May, 1996. Mrs Parr has been kept informed of the progress of the study through her role as contact for the Nepean District Historical Society.

7.5 Penrith City Council

Penrith City Council has been lobbied by Mrs Gray and by the Historical Society about "Minnaville" [= RES Site 15] for a number of years. During discussions on 31st July, 1996, the preliminary findings of this study were outlined. Council's representative expressed the view that if the property was found to be of significance by the present study that Council would be likely to consider the future inclusion of "Minnaville" as a scheduled heritage item in the LEP.

Council have also expressed interest in obtaining a copy of the report.

7.6 National Trust

The National Trust file on "Minnaville" indicates that the National Trust has been lobbied about "Minnaville" [= RES Site 15] by Mrs Gray since the mid-1980s. The property was listed by the Trust in 1994. The Historical Society has also written to the National Trust

The preliminary findings of this study, which do not accord with the existing National Trust listing, were outlined at a meeting with the Trust's Historic Buildings Officer on 22nd July, 1996. Correspondence received from the National Trust following this meeting is included in Appendix E.

The National Trust has requested a copy of the report.

7.7 Heritage Office

The preliminary findings of this study, were outlined at a meeting with the Heritage Office Archaeologist on 22nd July, 1996.

The Heritage Office Archaeologist has requested a copy of the report in order that its findings and recommendations may be reviewed.

8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1 Impact of the Implementation of the Current Penrith Lakes Scheme

The following discussion is based upon the assessment of significance given in Section 5, and upon the existing constraints and statutory obligations which have been observed in Section 6 which clearly have implications for the future management and use of "Minnaville" [= RES Site 15].

The assessment of significance presented in Section 5 of this report has indicated that "Minnaville" [= RES Site 15] embodies the following attributes of significance: historic, associational, aesthetic, technical (architectural) and archaeological. From Section 5.4 it may also be concluded that "Minnaville" [RES Site 15] certainly has Local heritage significance in all of these categories, and that it may lay a claim to Regional and possibly State heritage value in some of these categories, in particular its aesthetic/technical and archaeological aspects of significance.

The presently intended future use and development of "Minnaville" [= RES Site 15] will require the demolition of all extant above-ground buildings and ancillary structures, and will also require the bulk excavation of the site for gravel extraction, prior to its future use as a water area in the Lakes Scheme.

This work will thus inevitably compromise some of the attributes of significance which have been identified in this report. It may also be argued, however, that some of the other aspects of the significance of "Minnaville" [RES Site 15] as a research and information resource (ie. its identified technical and archaeological significance) may be recovered by the completion of appropriate, detailed professional recording of the existing complex prior to its future removal and excavation. In this respect, whilst it cannot be assumed that significance can merely be equated with the scientific and historical information which it may be possible to extract from the site, it is clearly the case that much of this information source could be argued to be able to be changed from physical evidence at the site and within the ground, to future records and other artefacts recovered and stored away from the site. In fact, this type of argument is frequently used on development sites in urban centres where archaeological 'salvage' excavations are undertaken to secure evidence which would otherwise be lost during the redevelopment of the site for new uses.

If it is assumed that the existing planning instrument (SREP No. 11) will prevail and the Scheme will be constructed as currently planned, then the work required will have major impact on the areas of the site which have been assessed as having technical/architectural significance and archaeological research potential. All features and deposits will be removed by bulk excavation for gravel extraction. This work is also likely to result in the possible exposure of the surviving remains and sites of any previous structures such as early dwellings. This 'full exposure' greatly increases the potential for recovery of meaningful information in a controlled manner from archaeological contexts.

Owing to the technical significance of the homestead building assessed in this report, if it is to be removed at a future date, full and comprehensive recording including measured drawings and archival photographs supplementary to those included in this report should be completed and lodged with appropriate agencies and archives.

Because archaeological "relics" as defined in the NSW Heritage Act, and assessed in this report as being of significance, are predicted to be present within areas of "Minnaville" [RES Site 15] site it is recommended that archaeological investigations should be undertaken in the course of the site redevelopment, and prior to the bulk excavation of archaeologically sensitive areas.

Appropriate investigations would include monitoring of ground disturbance such as topsoil stripping, testing of any areas of archaeological deposits already identified or found by ground disturbance, and full archaeological salvage excavations to recover significant evidence and information which would otherwise be destroyed in the process of site redevelopment.

On the basis of the current knowledge, the area considered to be "archaeologically sensitive" essentially comprises the area in the vicinity of the existing homestead and outbuildings, but it may include other areas of the property if these are found to contain archaeological sites.

To prevent the archaeological work becoming a 'critical path' activity it is desirable that requirements for any future archaeological investigation should be included in any discussions with staff of the Heritage Council of NSW.

8.1.1 Archaeological Strategy

The archaeological investigations recommended by this report could occur either prior to the future demolition of the extant structures on the site or after demolition but prior to the bulk excavation. Although some comments are included below, a separate archaeological proposal and Excavation Permit application would need to be prepared at such time as the implementation of the current scheme .

Option 1

The completion of archaeological work whilst the current building is still in place would have the advantage of enabling the easy correlation of above and below ground physical evidence, and the continuing presence of the building shell would ensure that delays to fieldwork caused by unfavourable weather (ie rain) would be minimised. The disadvantage of this option is that the presence of the building may itself impede clearance of the deposits within the structure.

Option 2

This option also requires the completion of appropriate archaeological investigations, but would schedule this to occur after the demolition of the extant structures, prior to the bulk excavations for gravel extraction. A major advantage of this option would be that some of the topsoil stripping, of areas assessed as having little archaeological potential, would be able to proceed concurrently where such areas do not impinge on the archaeological works. The loss of the buildings, however, would mean that an alternative on-site structure and services may need to be provided.

The archaeological strategy recommended as part of this option would involve initial archaeological supervision of the final stages of demolition of the main building and the supervised clearing/preparation of ancillary areas for archaeological investigation in order that these works do not inadvertently disturb sub-surface, archaeological "relics" or sensitive areas.

8.2 Variation to the Current Penrith Lakes Scheme

The present circumstances of the Penrith Lakes Scheme and obligations of SREP No. 11 have been outlined in Section 6.1 of this report. The "Minnaville" complex [RES Site 15] being considered in this report, is not currently scheduled for retention. The Consent Authority for the Scheme is the Minister for Urban Affairs and Planning. It has also been indicated that there exists the possibility of alteration to the Scheme design and construction. If the "Minnaville" [RES Site 15] complex is determined by the Minister to be of such significance that its retention, and consequent redesign of the Scheme, is warranted it has also been noted that this would be likely to impose additional costs and requirements.

Further consideration of the specific costs of retention of RES Site 15 would need to be undertaken. Given the existing parameters established by SREP No. 11, it appears that this investigation would need to include what may be termed the 'opportunity costs', namely the cost of the opportunities foregone by abandoning the existing Scheme proposals for this area; and of the other detailed redesign studies for the rest of the Scheme that would need to be completed. Sources of funding for these studies would also need to be identified. Some further planning and site-specific costs would also be associated with the future retention of RES Site 15 itself, and would need to be further investigated. Further investigations would be necessary to determine issues such as an appropriate curtilage for the property versus the technical requirements of the Scheme; future access to the property; future use, management and ownership; as well as the costs of maintenance, repair and conservation of the existing buildings. The archaeological conservation policy and consequently the type of strategy recommended, would also need to be altered if the "Minnaville" [= RES Site 15] building complex is to be retained.

8.3 Recommendations

As a result of all of the preceding Sections and matters considered in this report, the following recommendations are made to the Penrith Lakes Development Corporation:

1) Discussions should immediately be initiated with the Minister for Urban Affairs and Planning as the consent authority for the Lakes Scheme, and with the Heritage Office of NSW in regard to the findings of this report, which should be considered and reviewed by those authorities.

2) As soon as a determination has been made on the future of RES Site 15, appropriate investigations and planning as outlined in this report should be undertaken.

If the Lakes Scheme is to proceed in its current form, then:

3) Appropriate professional studies and investigations of the development area as outlined in Section 8.1 should be finalised through issue of an appropriate brief. Such investigations include recording and archaeological works.

4) If archaeological investigations are to proceed then under current legislative requirements an Excavation Permit would have to be obtained prior to any disturbance of the sub-surface deposits. The preparation of an Excavation Permit Application would also require the development of an accompanying Research Design for the future archaeological works to guide the recovery and interpretation of the archaeological evidence.

5) Under the conditions of an Excavation Permit provision also has to be made for the cataloguing, curation and storage of any artefacts, records, or other evidence recovered by the archaeological works. At present there is no official repository available in NSW and the client may have to provide for permanent storage of the artefacts and excavation records.

If the Lakes Scheme is not to proceed in its current form, then:

6) If the nature of the currently proposed extractive works at RES Site 15 is altered by decision of the Minister, then the impact of such a decision would need to be further addressed in line with the comments made in Sections 6.1 and 8.2 of this report.

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NOTES TO THE TEXT

- ¹ Henceforth this report is referred to as *Penrith Lakes RES*, 1984.
- ² Jean A Gray, *Magnificent Minnaville*, 1988, esp. p 3 -5.
- ³ Rosalie Pollet (Ed), *John and Sarah: A Genealogical History of the Single Family*, 1988.
- ⁴ Mrs Higginson provided most of the press clippings included in Appendix F.
- ⁵ "Chart shewing the inundation at the Hawkesbury, March 22nd , 23rd and 24th 1806" *Historical Records of NSW*, Volume 6.
- ⁶ L Macquarie, *Journal of His Tours in New South Wales and Van Diemens Land 1810-1822*, Library of Australian History and Library Council of NSW, Sydney, 1979, p 22-23.
- ⁷ Description of original grant given in PA Packet No.89, LTO; also see R J Ryan, *Land Grants 1788 -1809*, (2nd Edition) Library of Australian History, Sydney, 1981, page 158.
- ⁸ Richard Atkins was the Judge Advocate of the Colony at this time.
- ⁹ According to the Castlereagh Cemetery records Robert Guy actually died in 1820.
- ¹⁰ This John Harris was the son of the original grantee, see following Biographical information.
- ¹¹ Lands Department Plan Room, Roll Plan number R 550a 1603
- ¹² This might actually have been Robert Robertson, who is named as the adjoining tenant in 1863 in Application 89. Robert Robertson was a son-in-law of John Harris (2) and Rachel Harris [pers. comm., Mrs Jean Gray].
- ¹³ At the same time Single also transferred a separate parcel of land containing 25 acres and 6 perches to Wisdom. This land was Portion 280, Parish of Castlereagh, adjoining Church Lane.
- ¹⁴ This is John Harris (2), the son of the original grantee.
- ¹⁵ It is interesting to note that these early indentures simply recite the description of the land from the original grant, apparently ignoring the reduction in the size of the parcel from 1803, due to the subdivision through the Deed of Gift to Robert Guy from John Harris (1).
- ¹⁶ This is John Harris (2), the son of the original grantee, who was married to Rachel Ikin in 1834. John Michael McQuade later became the son-in-law of Rachel Harris after his marriage to Eliza Ellen Harris in 1881.
- ¹⁷ ie., the 30 acre northern subdivision of the original Grant
- ¹⁸ J Gray, *op. cit.*, 1988 p 60.
- ¹⁹ The "Scarborough" made two voyages to NSW, being included in both the First Fleet and the Second Fleet. Scarborough (2) was used in Musters and Census information as a shorthand, meaning the second voyage of the ship to NSW.
- ²⁰ It is perhaps interesting to speculate now as to the favour that was owed to Robert Guy by John Harris. Did Guy take care of Harris on the "Scarborough (2)" through a bout of serious illness? Were they related back in England? Were they childhood friends? Whatever it was John Harris was prepared to let Robert Guy have a third of his grant with both road and river frontage.
- ²¹ Birth Certificates from the NSW Registry Office, registration nos: 10967; 13789; 17659.
- ²² Album viewed at meeting between S Lavelle and R Pollet, 15th July 1996. Other family members and friends also sign the album and give different addresses, including "Thorn Hill" also thought to be somewhere in the Penrith area but as yet unidentified.
- ²³ Mortgage noted on LTO Cert. Title, Vol. 1 Fol. 127.
- ²⁴ Personal communications, Mr A McNally to G Gyford, and Mr T Dowling to S Lavelle.
- ²⁵ Personal communication, Mr Tony Dowling, 24th July 1996.
- ²⁶ Mr T Dowling, Mr C Dowling and Ms J Flower. Mrs McNally first indicated the former existence of another house on the property which had been washed away by floods.
- ²⁷ Note that this arrival is 3 years after the date of his Land grant at Castlereagh.
- ²⁸ This transaction was another that was never formally registered with the Land Titles Office.
- ²⁹ Compare with comments made in Note 13, above.
- ³⁰ F Palmer, Nepean District Historical Society Centenary Edition *Lambridge and Castlereagh* not dated, p 7 ff, "Nepean House".
- ³¹ Rosalie Pollet (Ed), *John and Sarah: A Genealogical History of the Single Family*, 1988.
- ³² Abstract of Land Title from PA 17894; bound Search Notes for PA 17894 and Old System Titles Indexes and Registers. Also Torrens Title Registers Vol 2349 Fol 141; Vol 4558 Fol 106; Vol 4558 Fol 110. Other details re death dates, etc, obtained from R Pollet, *op. cit.*, 1988, passim.
- ³³ R Pollet, *op. cit.*, 1988, p 24.

³⁴ Note that the chimney shown in this photograph cannot be the extant chimney at the southwest corner (present bathroom) of the house. This surviving chimney is short and only reaches to the height of the rear skillion roof. The chimney shown in the 1930 photo is much taller, reaching to the same height as the ridge of the main hipped roof.

³⁵ This is the 'shiplap' type boarding described by the National Trust listing.

³⁶ The following discussion is based upon R V J Varman, "The nail as a criterion for the dating of buildings and building sites (Late C18th to 1900)" *ASHA Newsletter*, Vol 10 No 1, 1980, p 30-37, and also M Lewis, *Physical Investigation of a Building: An Approach to the Archaeology of Standing Structures*, Technical Bulletin 9.1, National Trust of Australia (Victoria), 1989.

³⁷ Eubank is also spelt Ewbank in some sources. Varman uses 'Eubank'. Lewis & others use 'Ewbank'.

³⁸ Refer to discussion in Section 2. The corroborative evidence includes material held by descendants of the Single family and the 1873 plan of Castlereagh Road.

³⁹ *Heritage Act*, 1977, no.136, s.4(1).

⁴⁰ Reference information includes:

Australia ICOMOS, *The Australia ICOMOS Charter for the Conservation of Cultural Significance (The Burra Charter)*, 1981;

Australia ICOMOS, *Guidelines to the Burra Charter: Cultural Significance*, 1984;

Department of Planning / Heritage Council of NSW, *Heritage Assessment Guidelines*, 1990;

J Domicelj, *State Heritage Inventory Status and Scope Evaluation Criteria and Application Guidelines*, report prepared for the Department of Planning, 1990;

J Kerr, *The Conservation Plan*, The National Trust of Australia (NSW), 3rd edition, 1990.

⁴¹ The following discussion is based on:

Draft Manual for the Use of Historical Themes and Evaluation Criteria, unpublished draft report, Department of Planning / Heritage Council of NSW, October, 1994.

Archaeological Assessment Guidelines, unpublished draft report, NSW Department of Urban Affairs and Planning, June 1995, "Section 5 - Assessing Significance" p 31 ff.

⁴² *Archaeological Assessment Guidelines*, 1995, p 32.

⁴³ A Bickford and S Sullivan, "Assessing the research significance of historic sites", in Sullivan, S, Bowdler, S. *Site survey and significance assessment in Australian archaeology*, (Proceedings of the 1981 Springwood Conference on Australian Prehistory), Department of Prehistory, Research School of Pacific Studies, The Australian National University, Canberra, 1984, pp 19-26.

⁴⁴ M Pearson, "Assessing the significance of historical archaeological resources", in Sullivan, S, Bowdler, S. *Site survey and significance assessment in Australian archaeology*, (Proceedings of the 1981 Springwood Conference on Australian Prehistory, Department of Prehistory, Research School of Pacific Studies, The Australian National University, Canberra, 1984, pp 27-33.

⁴⁵ For these last two questions this type of evidence might be revealed during topsoil stripping of the property prior to bulk excavation.

⁴⁶ Two examples are the Fraser and Willmot families.

⁴⁷ *Penrith Lakes RES* 1984, Section 11.2, esp. p 11-10 to 11-12.

⁴⁸ The consultant is aware that members of the Nepean District Historical Society met with the Minister on 26th July 1996.

⁴⁹ *NSW Heritage Act*, 1977, no.136, s.4(1).

⁵⁰ Information obtained from Mr Tony Tkachenko, 7/8/1996. Mr Tkachenko advised that the 'Not Assessable' category usually means that a place or nomination has incomplete information and cannot therefore be processed for potential listing in the Register of the National Estate.

⁵¹ Jean A Gray, *Magnificent Minnaville*, 1988, p 31.

It should be noted that the marking or naming of the Trig Station has not influenced any of the interpretations suggested by this report, nor its findings which are based on detailed historical research and professional physical analysis of the homestead's construction.

⁵² Most recently with Lorna Parr on 25/7/96 and Barbara Higginson on 28/7/96.

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1822 General Muster and Land and Stock Muster of NSW
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Second Fleet Families of Australia

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Varman, R V J

"The nail as a criterion for the dating of buildings and building sites (Late C18th to 1900)" *ASHA Newsletter*, Vol 10 No 1, 1980, p 30-37.

Maps and Plans

Parish Map of Castlereagh 1835
Parish Map of Castlereagh 1895
Parish Map of Castlereagh 1969
Survey Map No. 416 Zone 8 Windsor 1925
Topographic Map 9030-IV-S Springwood 1972
Topographic Map 9030-IV-S Springwood 1982

Road Plan R550a - 1603 Castlereagh, dated 1873
Road Plan R550b - 1603 Castlereagh, dated 1892
Road Plan R5294 - 1603 Castlereagh, dated 1895

Primary Source Repositories

Archives Office of NSW (Kingswood)

Department of Land and Water Conservation / Lands Dept Plan Room
- Plans and Air Photos

Land Titles Office
- Parish Maps; Old System and Torrens Title Registers of Land Dealings

NSW Registry of Births, Deaths and Marriages

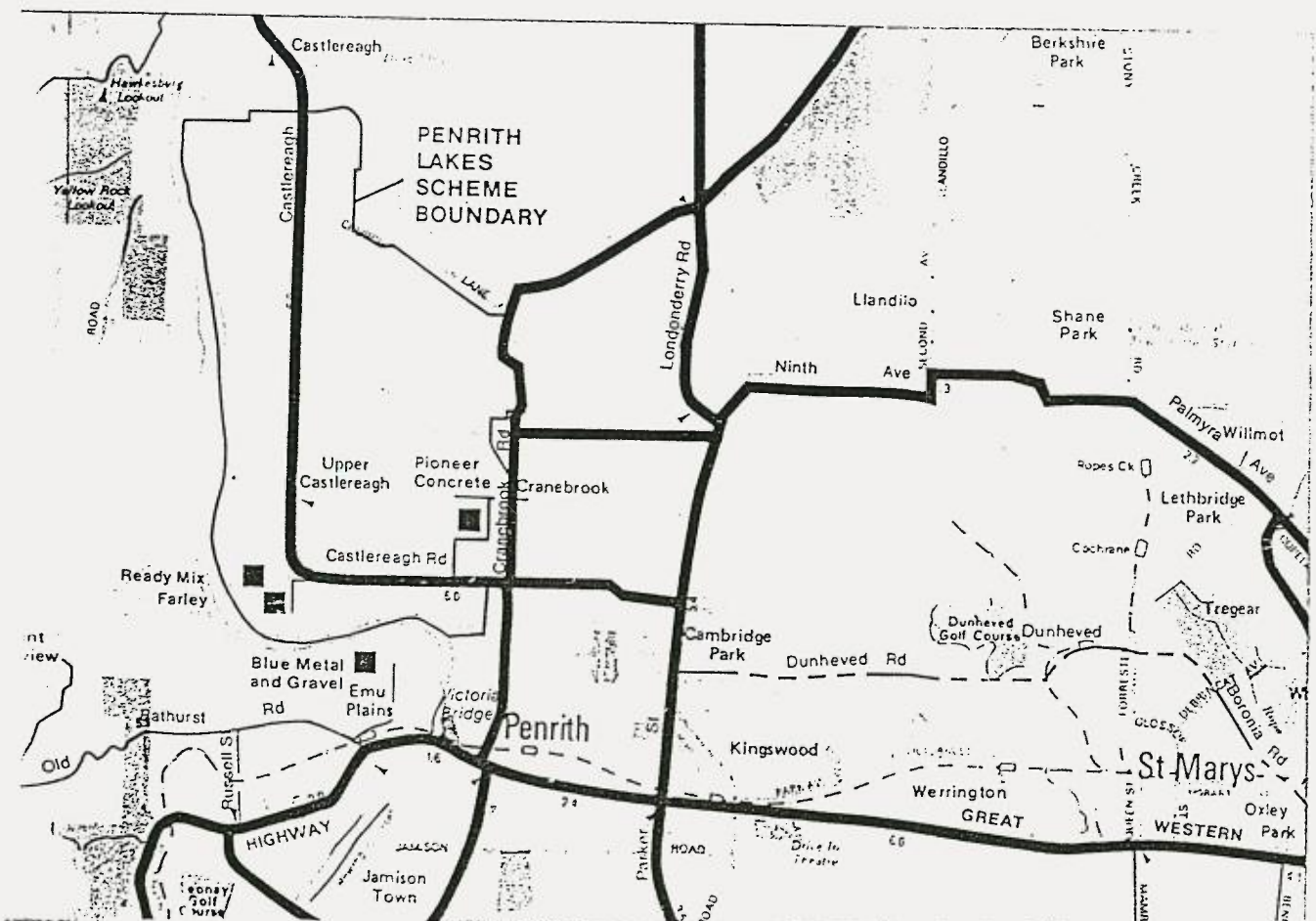
State Library
- State Electoral Rolls 1869-1900; Pioneer Register (Microfiche)

APPENDIX A

FIGURES

FIGURE 1

LOCATION OF THE PENRITH LAKES SCHEME

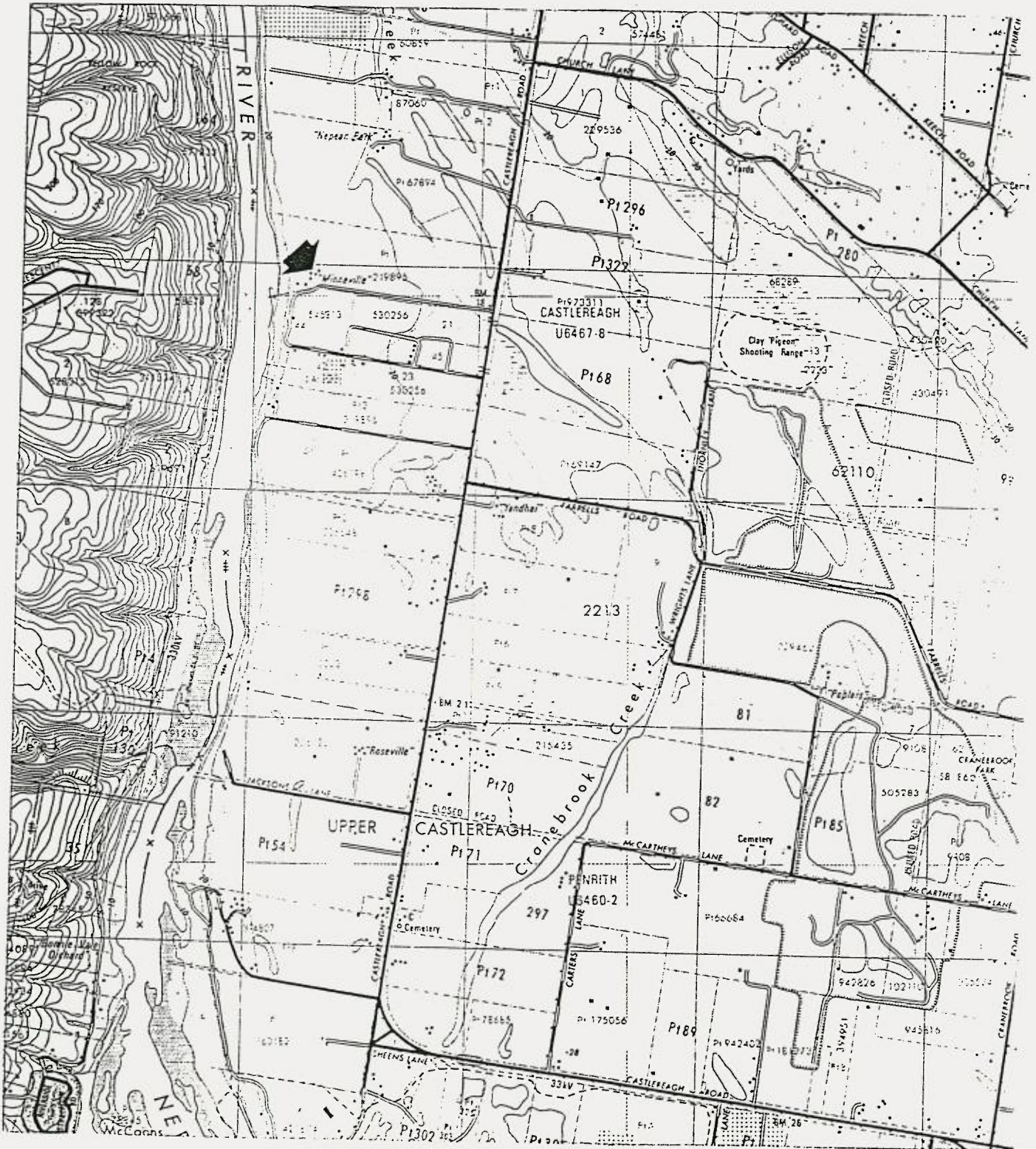


Source: RES, 1984

FIGURE 2

LOCATION PLAN, RES Site 15
Site 15, [= "Minnville"] is arrowed

"Nepean Park" is also shown
(Location of RES Sites 48 & 5)



Source: NSW Topo. Map
1:25,000 2nd Edition 1982
'Springwood' 9030-1V-S

FIGURE 4 (a)

ORIGINAL GRANTS of HARRIS, TONKS, CHESHIRE
note road between Harris' and Tonks' Grants / Portions

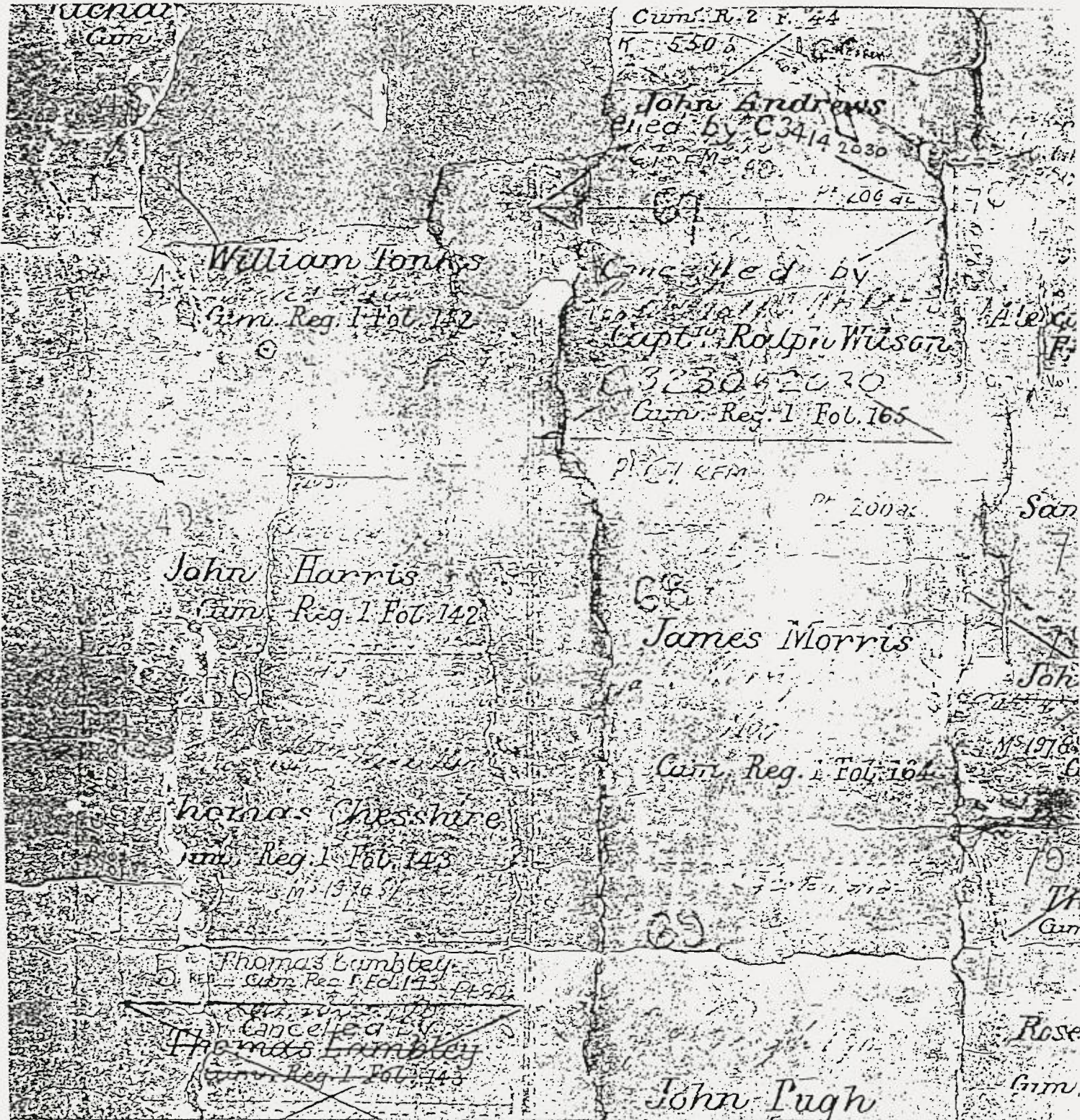
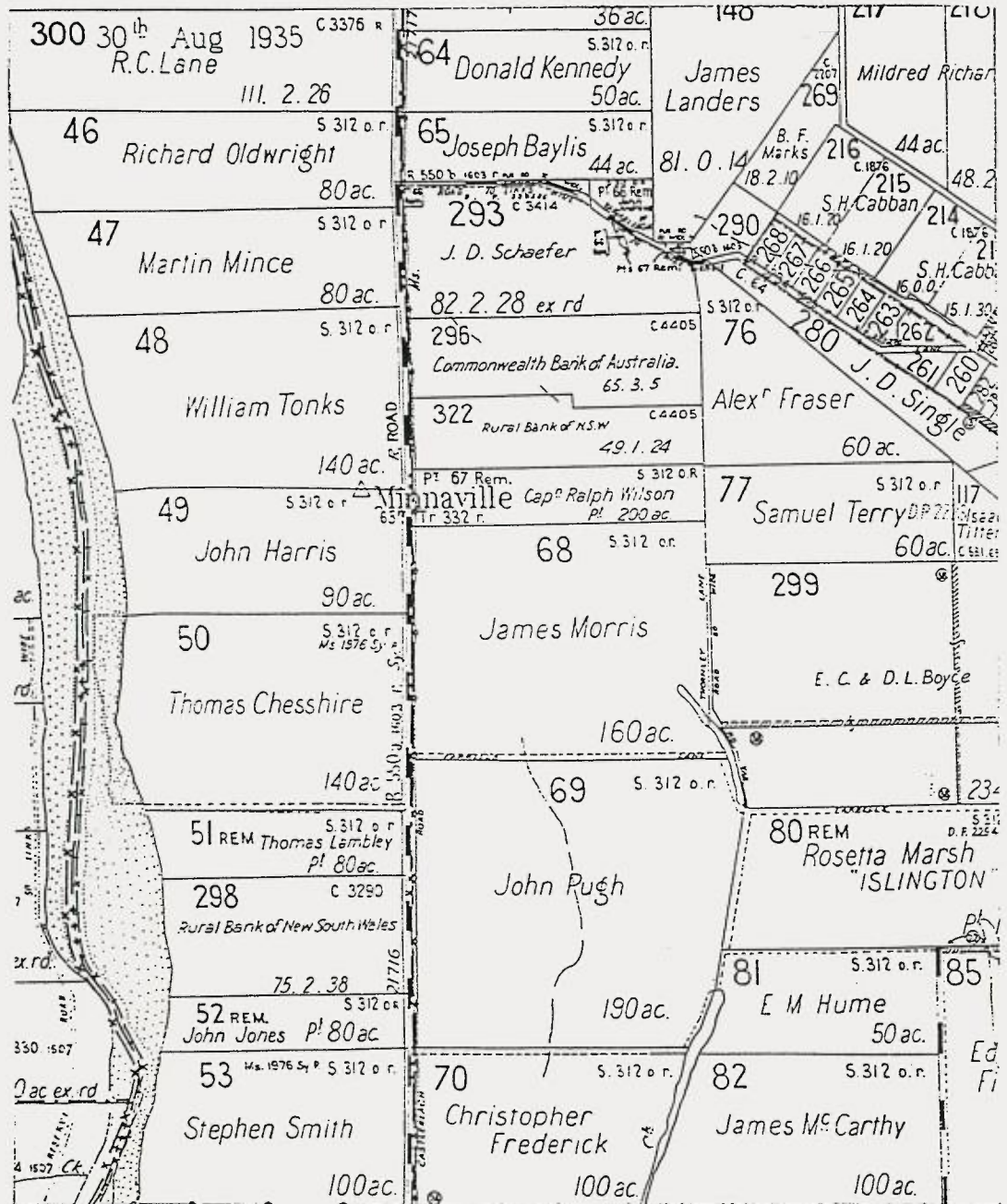


FIGURE 4 (b)

GRANTS of HARRIS, TONKS, CHESHIRE
showing modern features and roads



Source: Parish Map
Parish of Castlereagh,
County of Cumberland

FIGURE 5

COPY OF PLAN DATED 1863, SHOWING THE 30 ACRE SUBDIVISION
This copy has been re-scaled to approximately 1:10,000 (ie. 1 cm = 100 m)

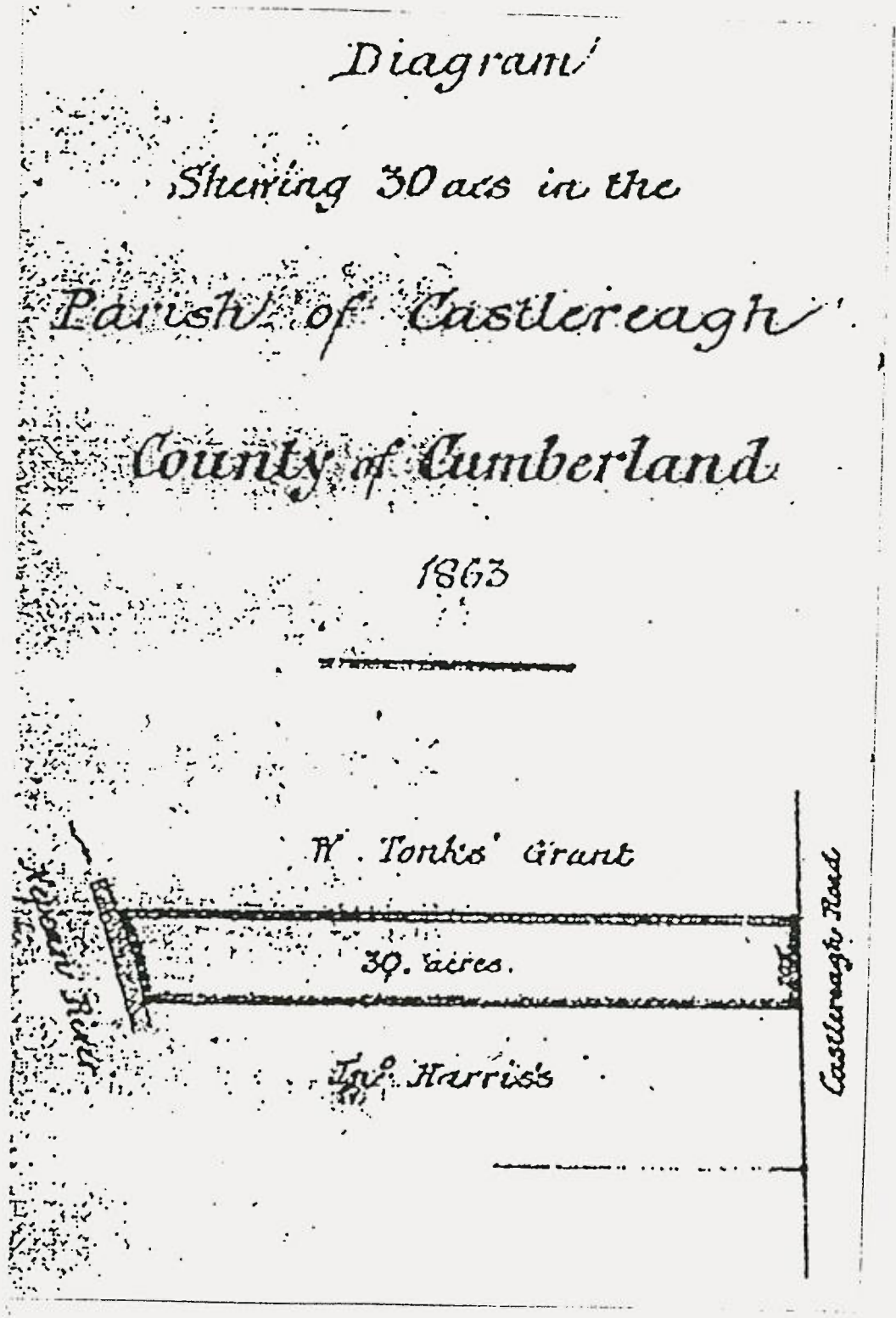
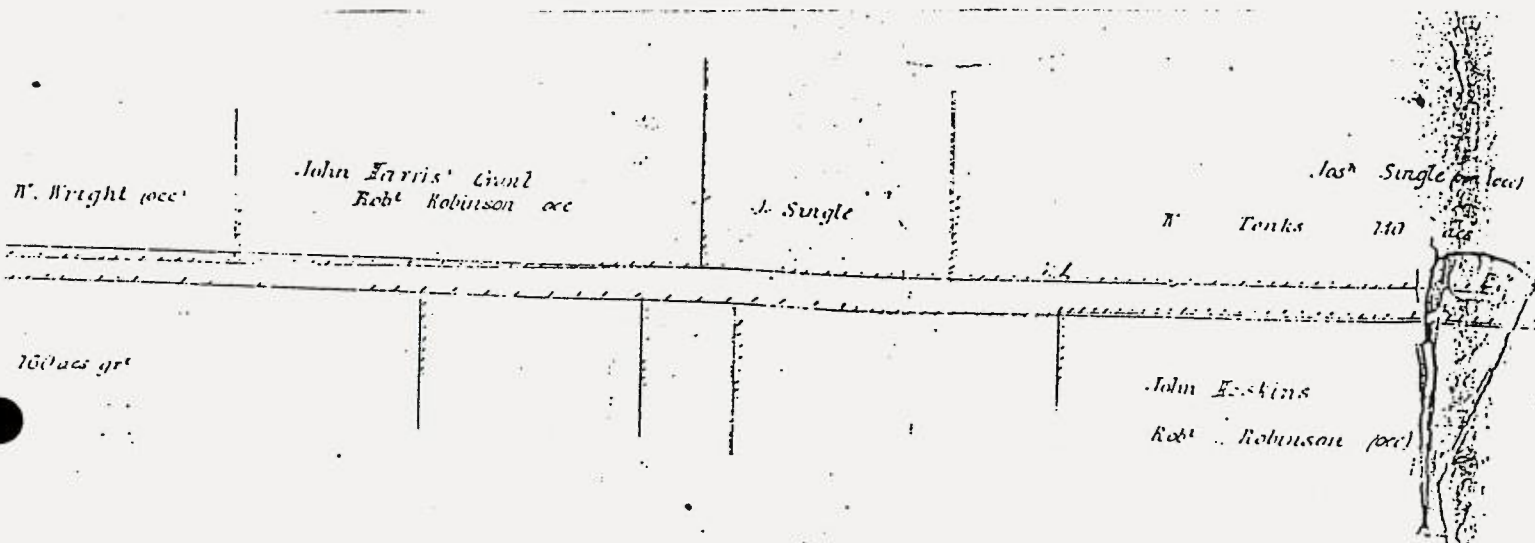


FIGURE 6

COPY OF PLAN DATED 1873 SHOWING PROPERTIES AND OWNERS
ALONG CASTLEREAGH ROAD. THE 30 ACRE SUBDIVISION IS SHOWN



D I A G R A M

*of portion of the Road leading from Penrith
to Richmond*

*(Showing the position of fences on a scale of five
chains to the inch from Penrith to end of Section D 29)*

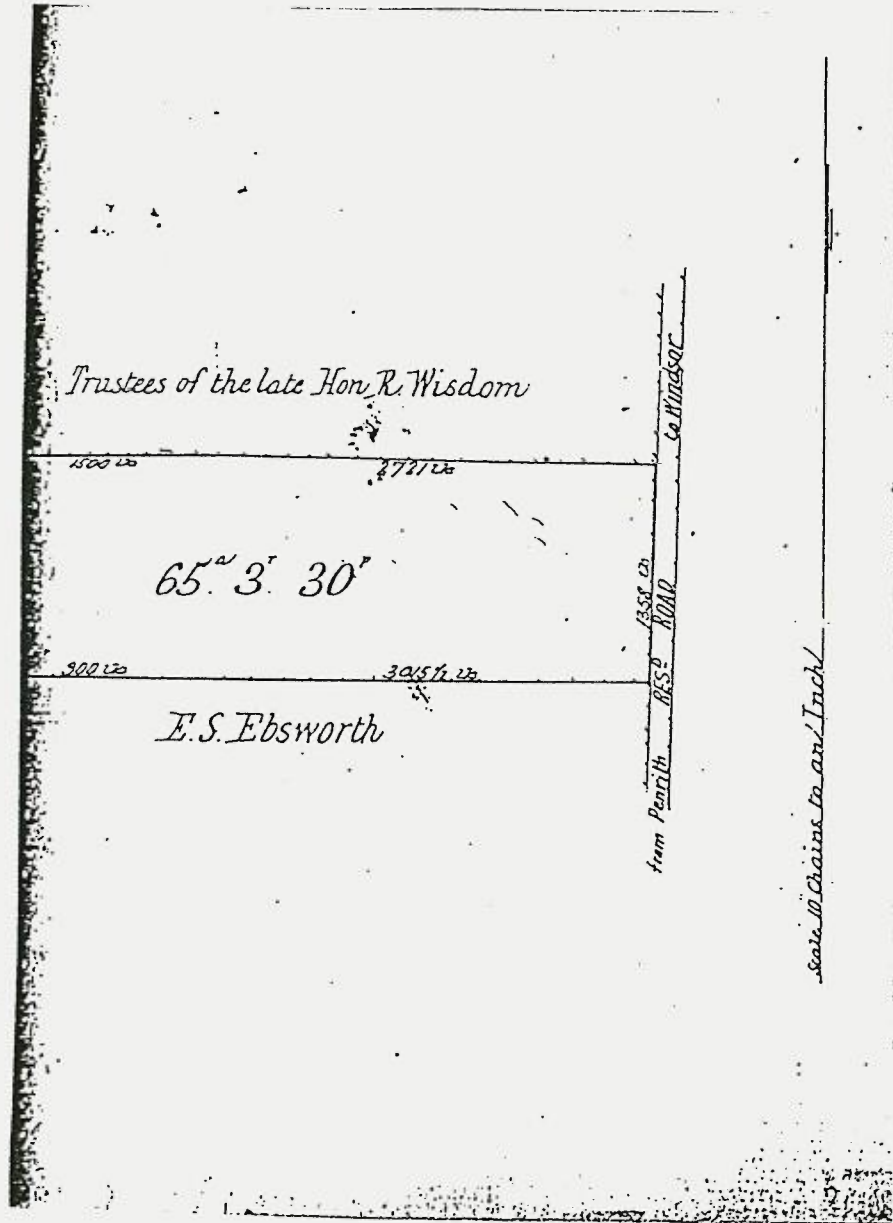
lot 446
lot 2480

*Amended the Executive Council
on 19th May 1873
W. G. ...*

*Transmitted to the Survey
General
with my letter of 1st July 1873*

FIGURE 7

COPY OF PLAN DATED 1891, SHOWING THE 60/65 ACRE RESIDUE OF THE ORIGINAL GRANT WHICH WAS RETAINED BY THE HARRIS FAMILY
This copy has been re-scaled to approximately 1:10,000 (ie. 1 cm = 100 m)



COPY OF PLAN LODGED WITH APPLICATION FOR CONSOLIDATION

FIGURE 8 (a)

Municipality of Castlereagh.
Subst. Plan.
C 961879.

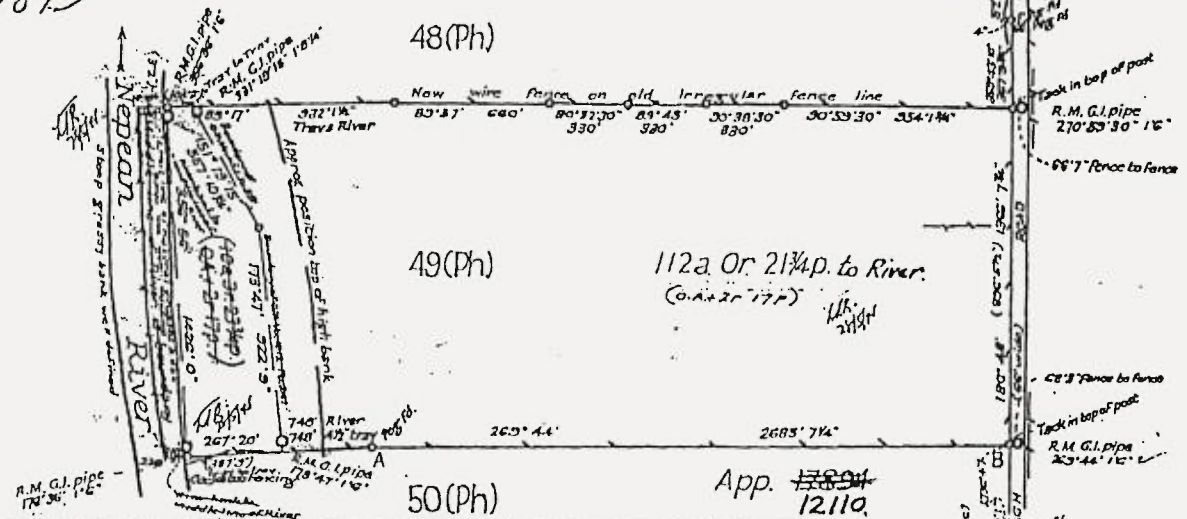
PLAN
of Portion 49(P^h)
Parish of Castlereagh County of Cumberland
Scale: 500 feet to an inch.

F.P. 191213.

C 961879

M.M.

1912/22. G.E.
12.2.4



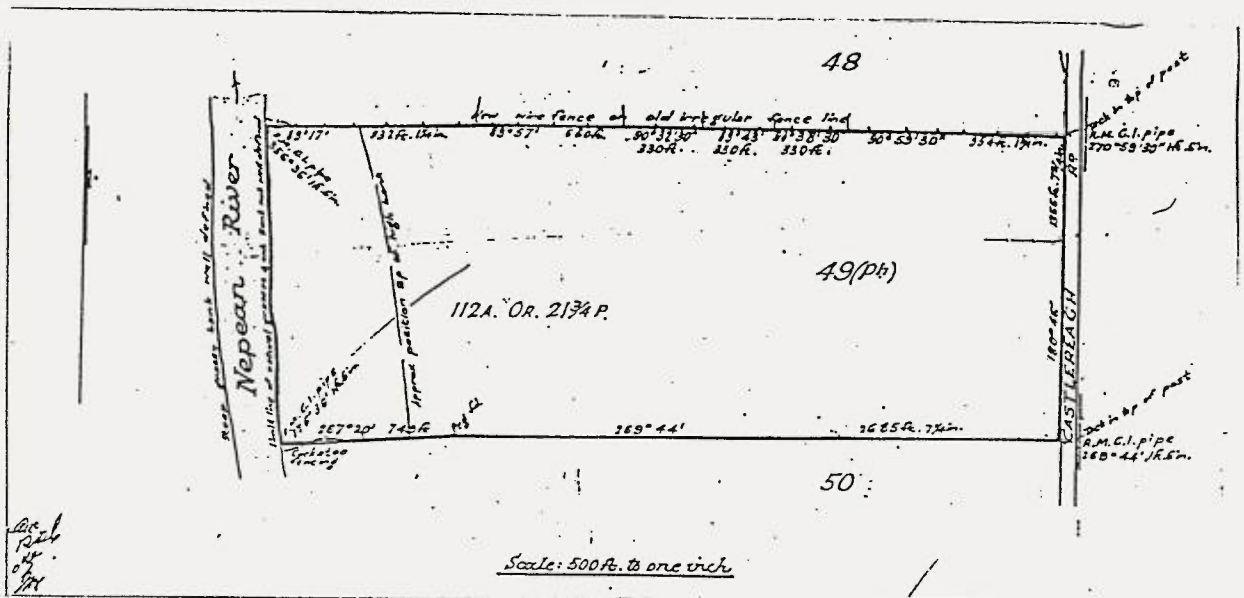
I Leslie Thomas Roberts of Penrith a Surveyor registered under the Surveyors Act 1929, do hereby solemnly and sincerely declare (a) that all boundaries and measurements shown on this plan are correct (b) that all survey marks found and relevant physical objects on or adjacent to the boundaries are correctly represented (c) that all physical objects indicated actually exist in the positions shown (d) that the whole of the material facts in relation to the land are correctly represented (e) that the survey represented in this plan has been made in accordance with the Survey Practice Regulations, 1933 by me and was completed on 28th January 1941 and Reference Marks have been placed as shown hereon. And I make this solemn declaration conscientiously believing the same to be true and by virtue of the provisions of the Oaths Act 1900.

Subscribed and declared before me at Sydney
this 30th day of January 1941
Datum line of Azimuth AB.
Leslie Thomas Roberts
Surveyor registered under the Surveyors Act 1929.

Source: FP 191213
Land Titles Office

FIGURE 8 (b)

COPY OF PLAN DATED 1941 SHOWING THE CONSOLIDATED PORTION
This copy has been re-scaled to approximately 1:10,000 (ie. 1 cm = 100 m)



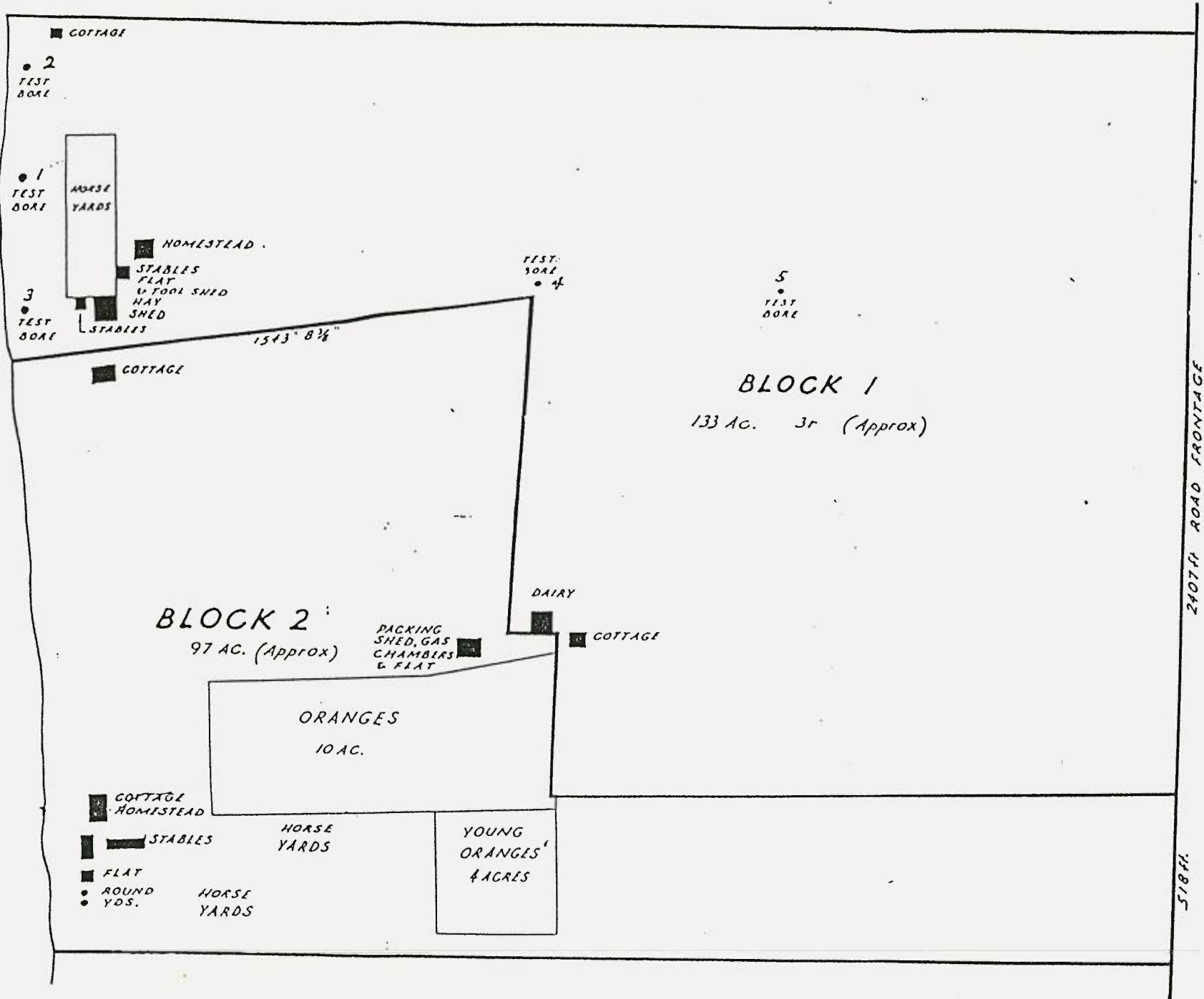
COPY OF SKETCH PLAN PREPARED FOR THE AUCTION OF THE PROPERTY

HERRING ROAD

2407M ROAD FRONTAGE

518M

FIGURE 9

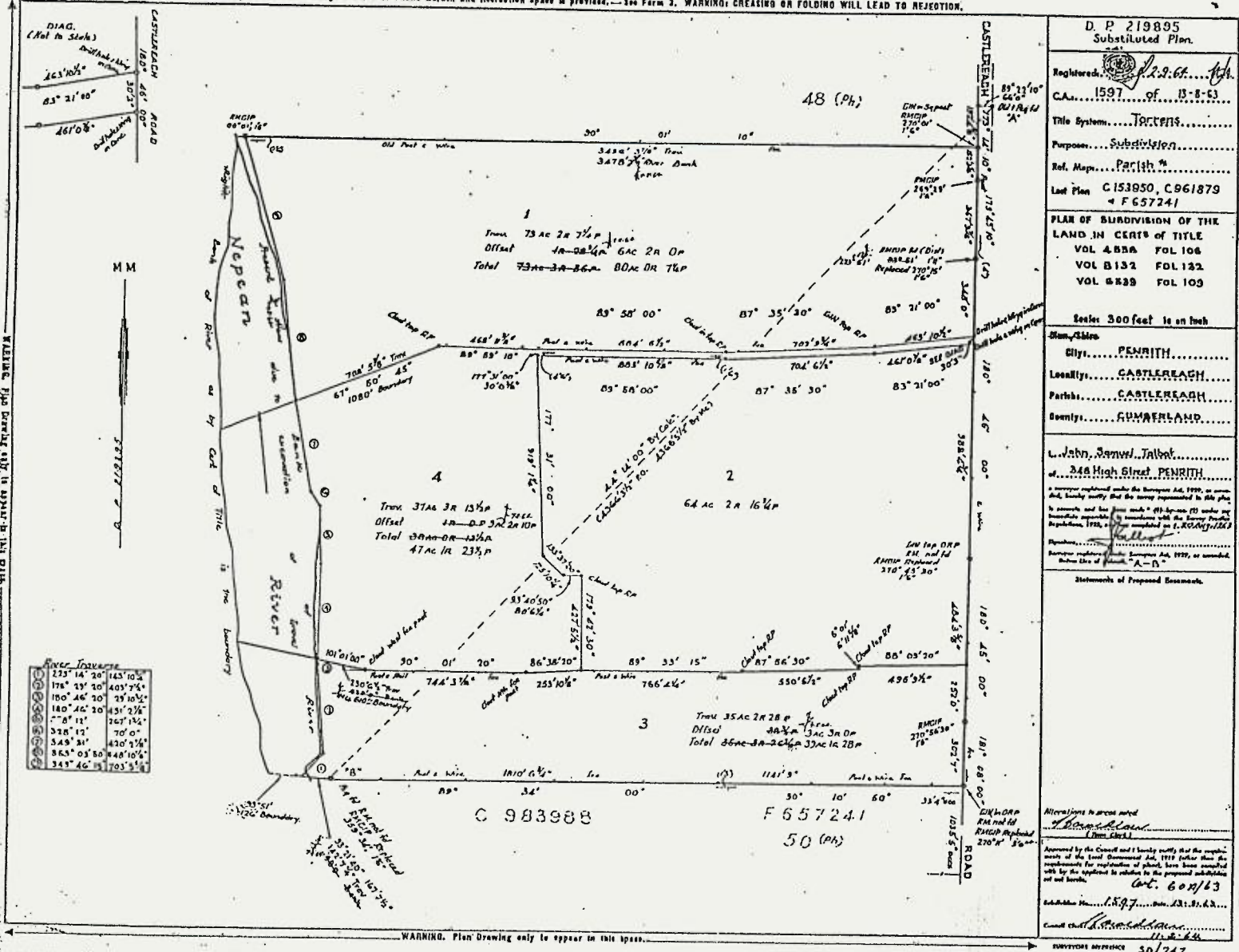


River

Nepean

Source: National Trust (NSW)

Form 2.—This form must NOT be used where any Dedication, Drainage Reserve or Public Garden and Recreation Space is provided.—See Form 3. WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION.



D. P. 219895
Substituted Plan.

Registered *12.2.63*
C.A. 1597 of 13-8-63

Title System... Torrens
Purpose... Subdivision
Ref. Maps... Parish
Last Plan C 153850, C 961879
+ F 657241

PLAN OF SUBDIVISION OF THE LAND IN CERTS OF TITLE
VOL 458A FOL 106
VOL B132 FOL 122
VOL 6229 FOL 109

Scale: 300 feet to an inch

Shire/City... PENRITH
Locality... CASTLEREAGH
Parish... CASTLEREAGH
County... SUMMERLAND

L. John Samuel Talbot
of 348 High Street PENRITH
a surveyor registered under the Surveyors Act, 1912, as amended, hereby certifies that the survey represented by this plan is accurate and has been made in accordance with the Surveyors Act, 1912, as amended, and the Surveyors Regulations, 1912, as amended, and in accordance with the provisions of the Land Transfer Act, 1925, as amended, and the Land Transfer Regulations, 1925, as amended, and in accordance with the provisions of the Land Transfer Act, 1925, as amended, and the Land Transfer Regulations, 1925, as amended.

Statements of Proposed Encumbrances

Approved by the Council and I hereby certify that the requirements for registration of this plan, have been complied with by the applicant in relation to the proposed subdivision set out herein.
Date: 6/11/63

Substituted Plan No. 1597 of 13-8-63

Surveyors Reference 50/747

OFFICE USE ONLY. D.P. 219895

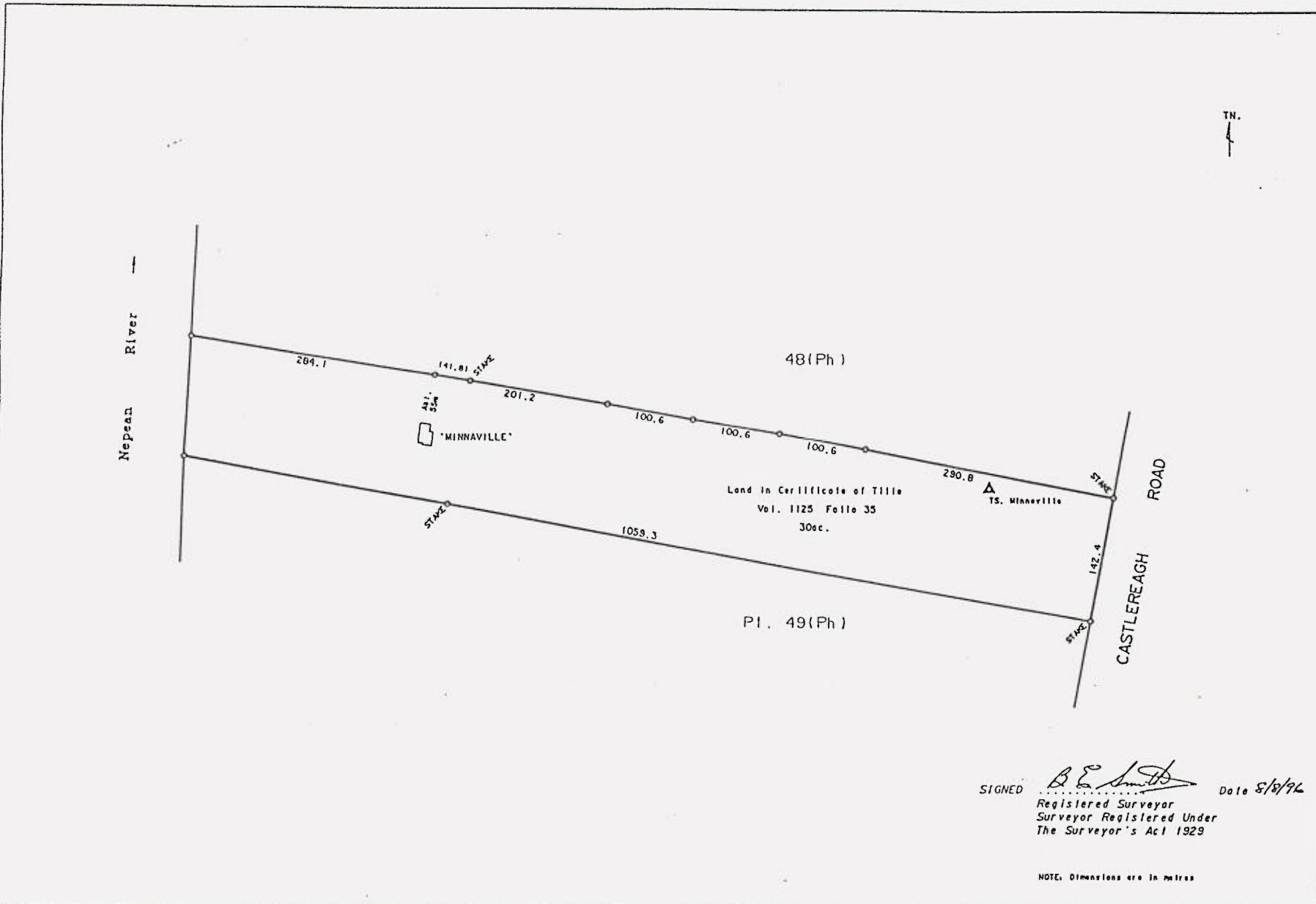
COPY OF DEPOSITED PLAN DATED 1963

FIGURE 10

Source: DP 219895
Land Titles Office

COPY OF RECENT SURVEY PLAN SHOWING THE ORIGINAL
30 ACRE SUBDIVISION AND THE POSITION OF THE PRESENT HOMESTEAD

FIGURE 11



SIGNED *B.E. Smith* Date 8/8/96
Registered Surveyor
Surveyor Registered Under
The Surveyor's Act 1929

NOTE: Dimensions are in metres

CRAVEN, ELLISTON & HAYES (DAPTO) PTY. LTD.
A.C.N. 058 544 804
CONSULTING, LAND ENGINEERING AND MINING SURVEYORS
"The Link" 35 BAAN BAAN STREET DAPTO NSW 2530
PHONE (042) 614366 FAX (042) 615243

SURVEY OF HARRIS' COTTAGE COMPLEX being
Land in Certificate of Title Vol. 1125 Folio 35
Perish of Castlereagh County of Cumberland
Local of Castlereagh RES 17CM No. 15

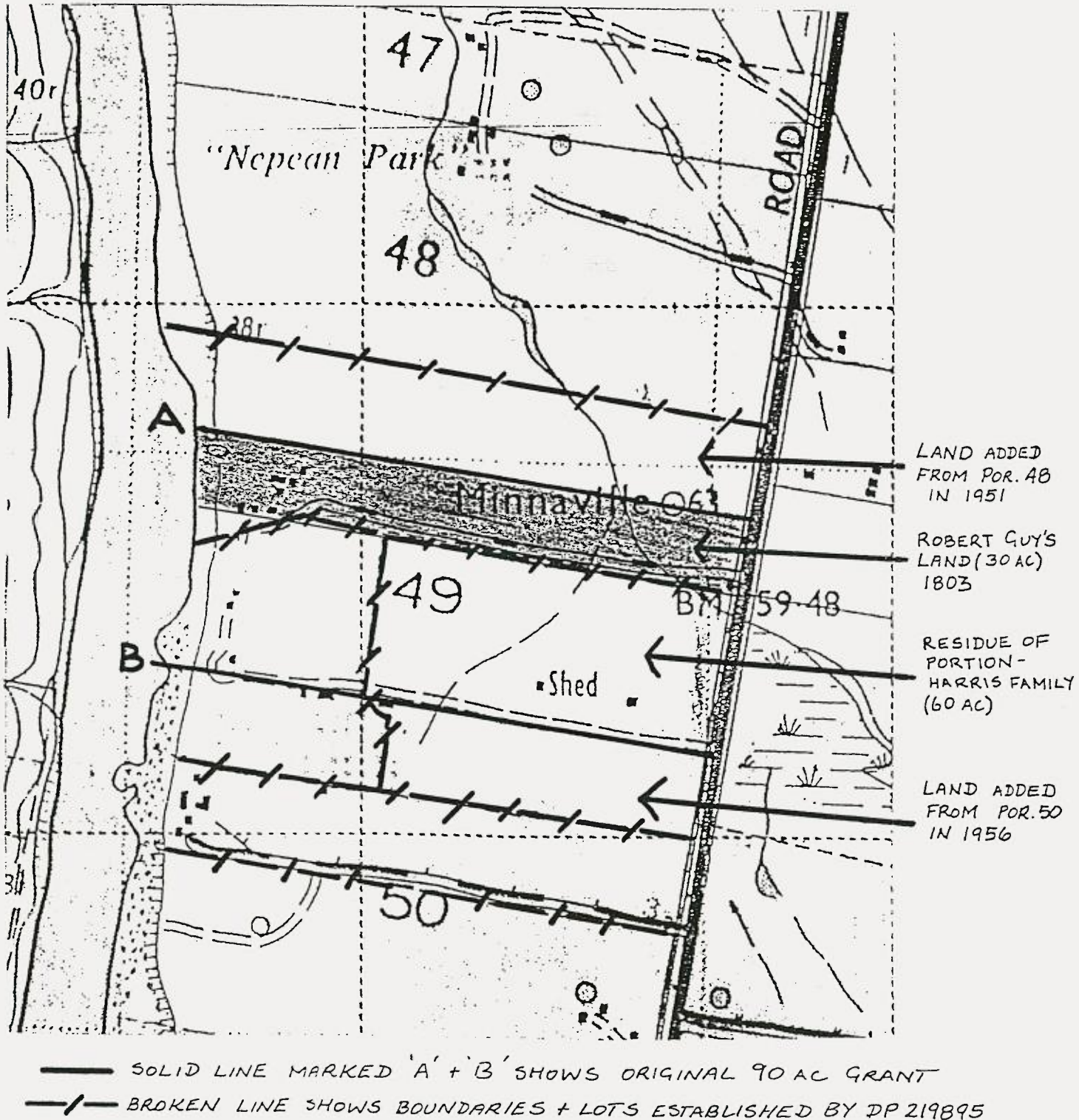
DATE	26.7.96
SURVEYOR	M.S./A.H.
DRAWN	B.E.S.
CHECKED	

DRAWING No.
A3-PLDC598
SCALE 1:4000

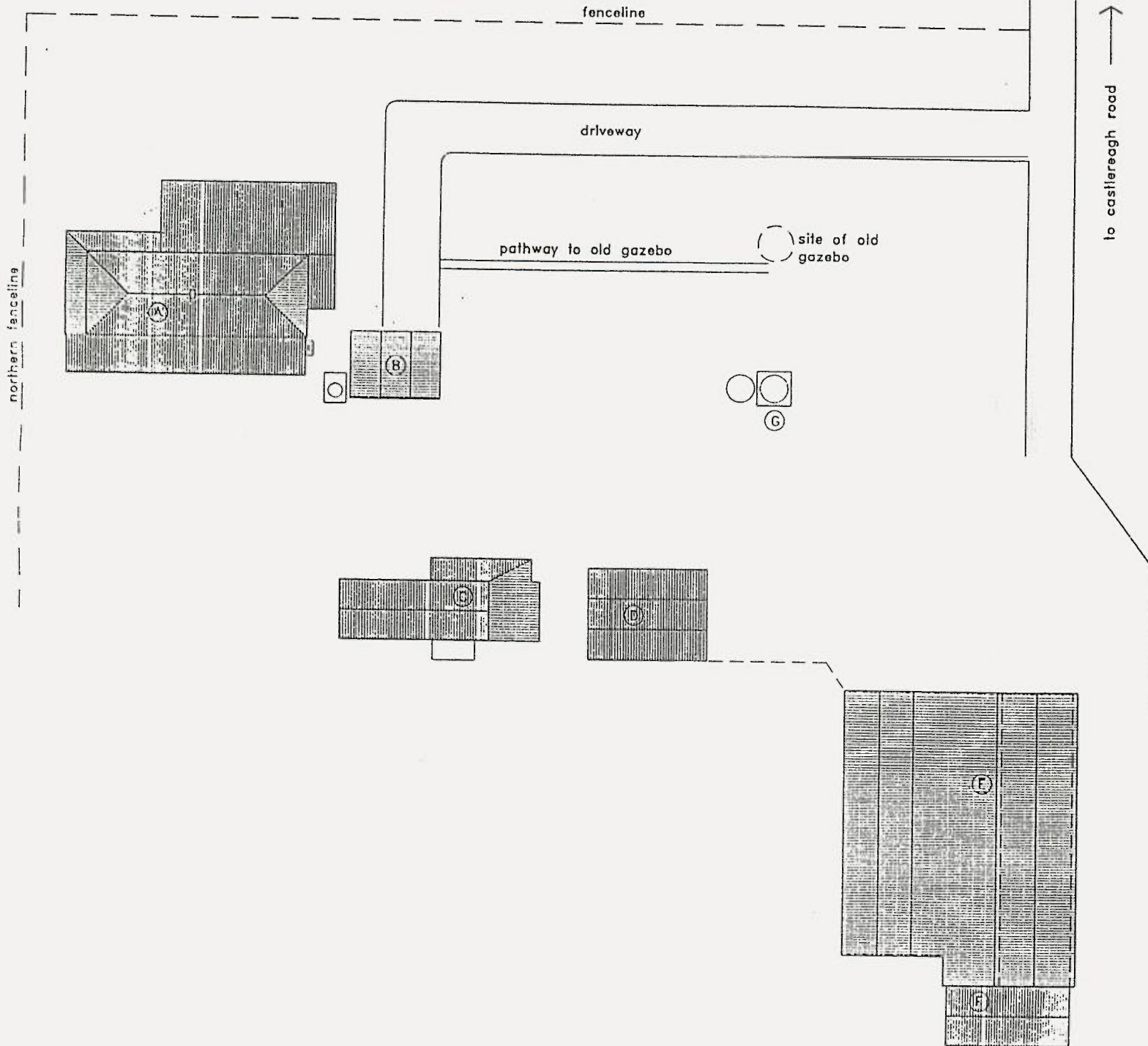
REDUCED COPY N.T.S.

FIGURE 12

PLAN PREPARED SUMMARISING AND SHOWING ALL RELEVANT LAND SUBDIVISIONS AND EXPANSIONS IN RELATION TO PRESENT FEATURES
Plan is re-scaled from original map to approximately 1:10,000 (ie. 1 cm = 100 m)



Source: Based upon NSW Topo. Map
1:31,680 (2 in to 1 mile) 1972
'Springwood' 9030-1V- S


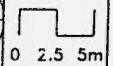


LEGEND

- (A) FARMHOUSE
- (B) GARAGE
- (C) BARN
- (D) BROOD MARE & FOALS BOXES
- (E) MACHINERY SHED
- (F) LARGE SHED
- (G) TANKSTAND

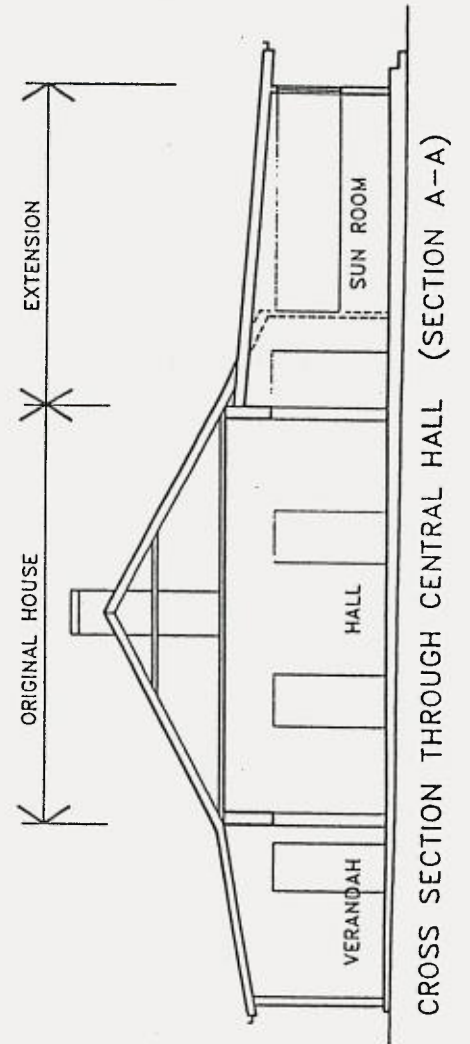
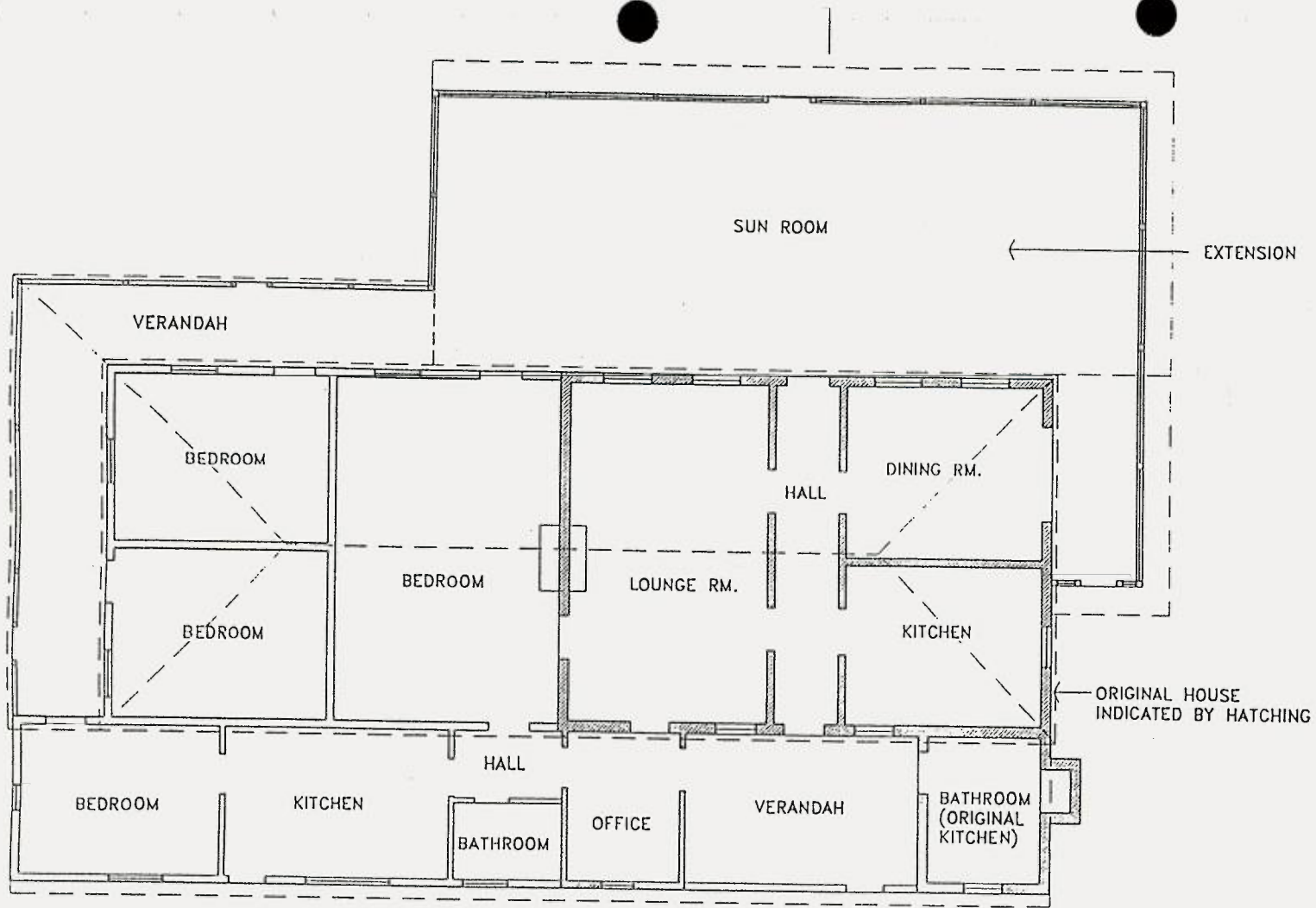
THIS DRAWING IS THE PROPERTY OF THE NEPEAN DISTRICT HISTORICAL ARCHAEOLOGY GROUP

SITE PLAN
 "MINNAVILLE"
 castlereagh road,
 CASTLEREAGH

date	drawn	approved
june'96	sd	
	scale	drawing no.
	 0 2.5 5m	MIN / 1

SITE PLAN OF "MINNAVILLE"

FIGURE 13

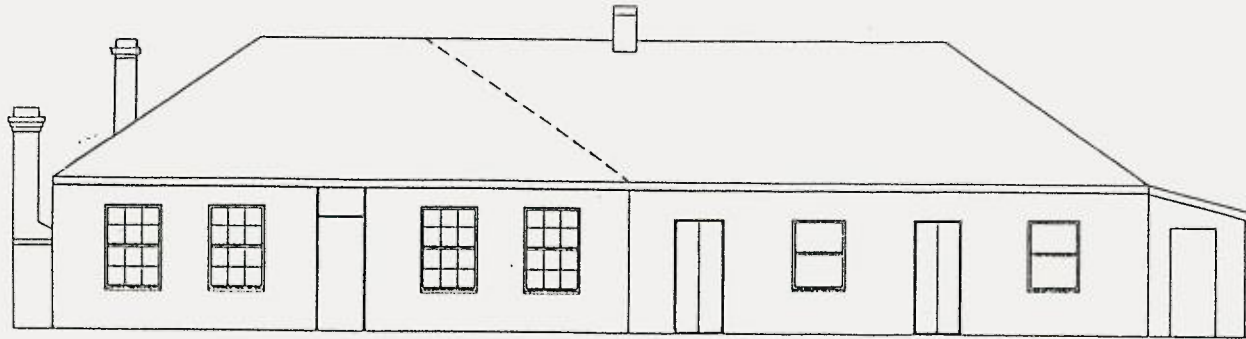


THIS DRAWING IS THE PROPERTY OF THE NEPEAN DISTRICT HISTORICAL ARCHAEOLOGY GROUP

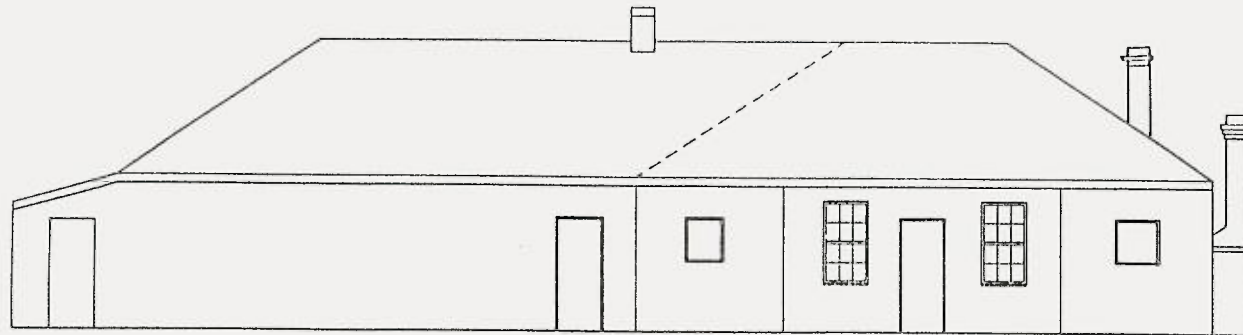
FARMHOUSE FLOOR PLAN & SECTION "MINNAVILLE" castlereagh road, CASTLEREAGH		
date	drawn	approved
june'96	sd	
	scale	drawing no.
	0 0.5 1m	MIN / 2

PLAN OF FARMHOUSE

FIGURE 14



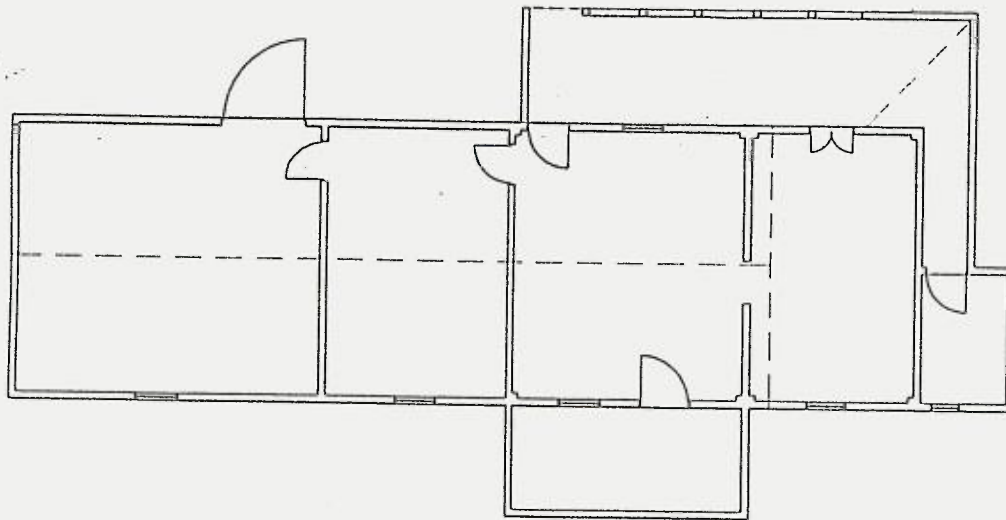
EAST ELEVATION AT ORIGINAL WALL
 NOTE : EXCLUDES SUN ROOM AND N-E BACK VERANDAH



WEST ELEVATION AT ORIGINAL WALL
 NOTE : EXCLUDES BACK VERANDAH BUT INCLUDES OLD KITCHEN AND SMALL OUTSIDE ROOM


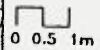
THIS DRAWING IS THE PROPERTY
 OF THE NEPEAN DISTRICT
 HISTORICAL ARCHAEOLOGY GROUP

FARMHOUSE ELEVATIONS "MINNAVILLE" castlereagh road, CASTLEREAGH		
date	drawn	approved
june '96	sd	
	scale	drawing no.
	0 0.5 1m	MIN / 3



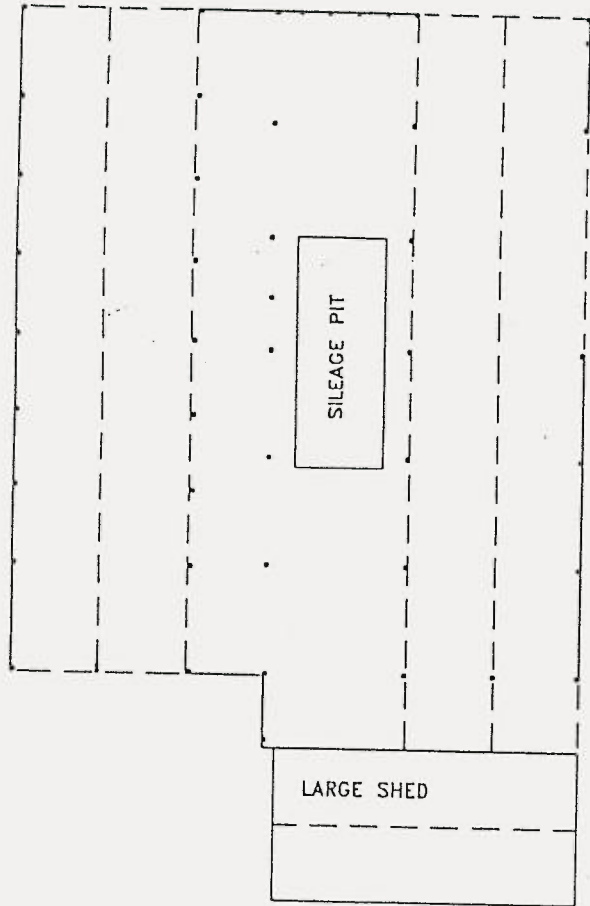
FLOOR PLAN

THIS DRAWING IS THE PROPERTY
OF THE NEPEAN DISTRICT
HISTORICAL ARCHAEOLOGY GROUP

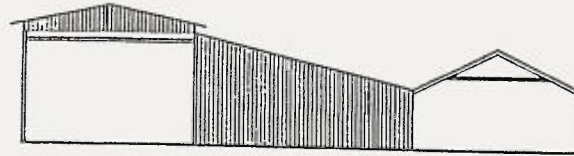
LARGE BARN FLOOR PLAN "MINNAVILLE" castlereagh road, CASTLEREAGH		
date	drawn	approved
june'96	sd	
	scale	drawing no.
		MIN / 5

PLAN OF BARN

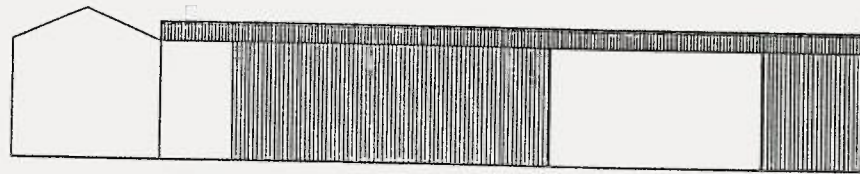
FIGURE 16



FLOOR PLAN


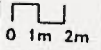


EAST ELEVATION



SOUTH ELEVATION

THIS DRAWING IS THE PROPERTY
OF THE NEPEAN DISTRICT
HISTORICAL ARCHAEOLOGY GROUP

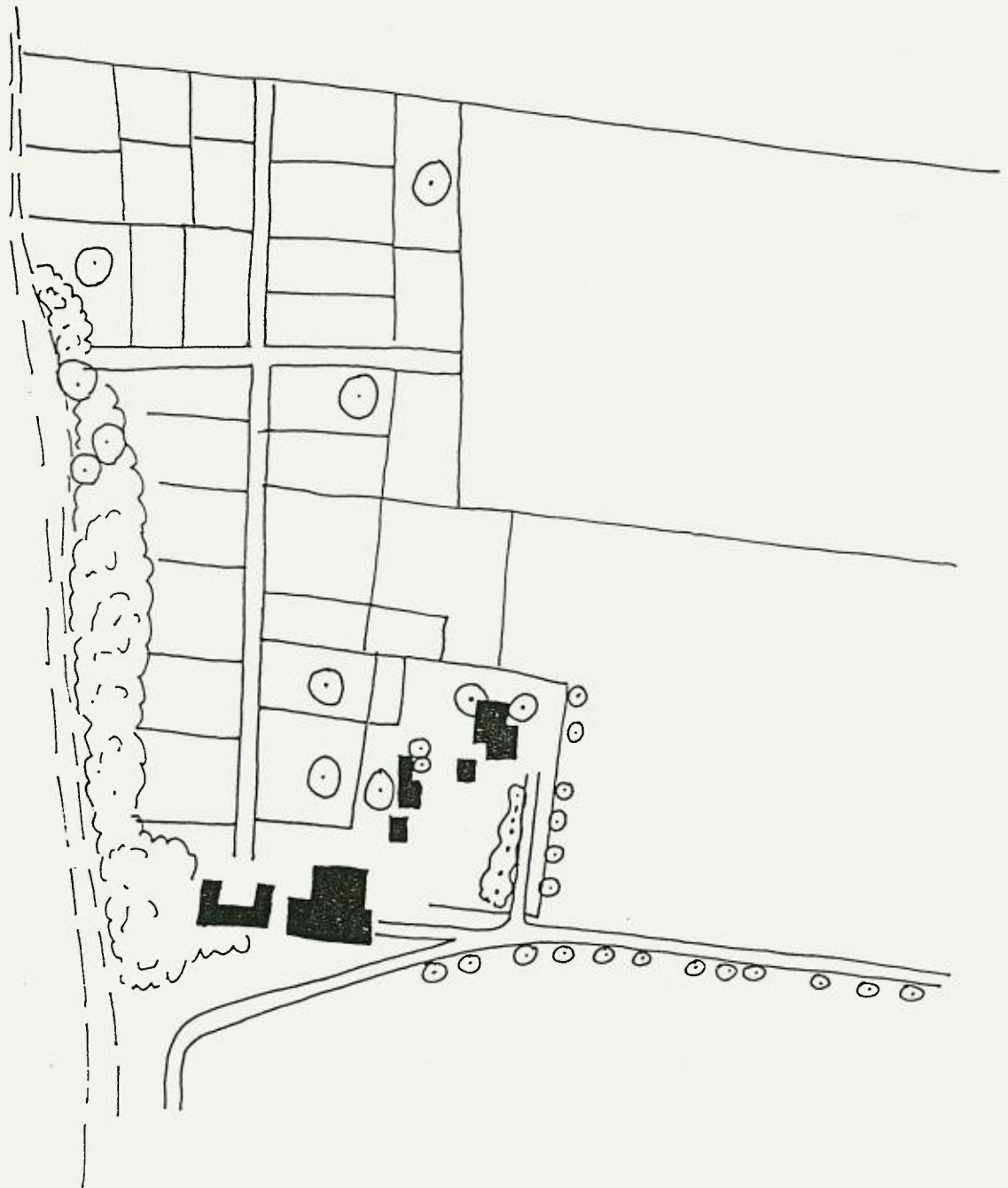
MACHINERY SHED FLOOR PLAN & ELEVATIONS "MINNAVILLE" castlereagh road, CASTLEREAGH		
date	drawn	approved
june '96	sd	
	scale	drawing no.
		MIN / 4

PLAN OF MCHINERY SHED

FIGURE 17

FIGURE 18

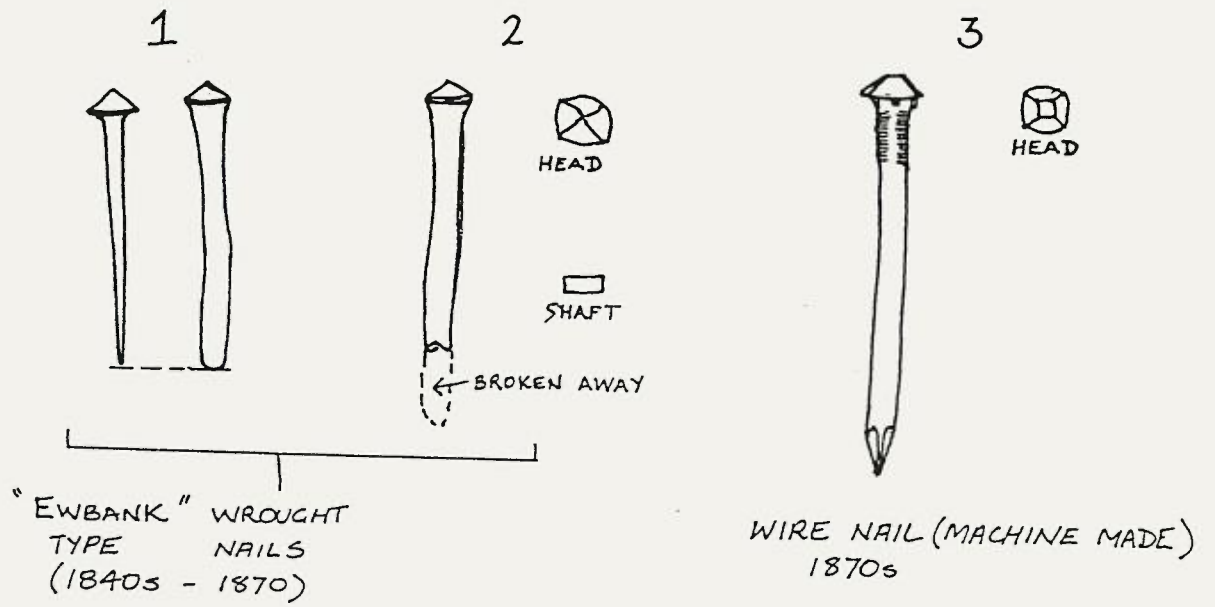
SKETCH PLAN SHOWING POSITION & EXTENT OF HORSE YARD AREAS



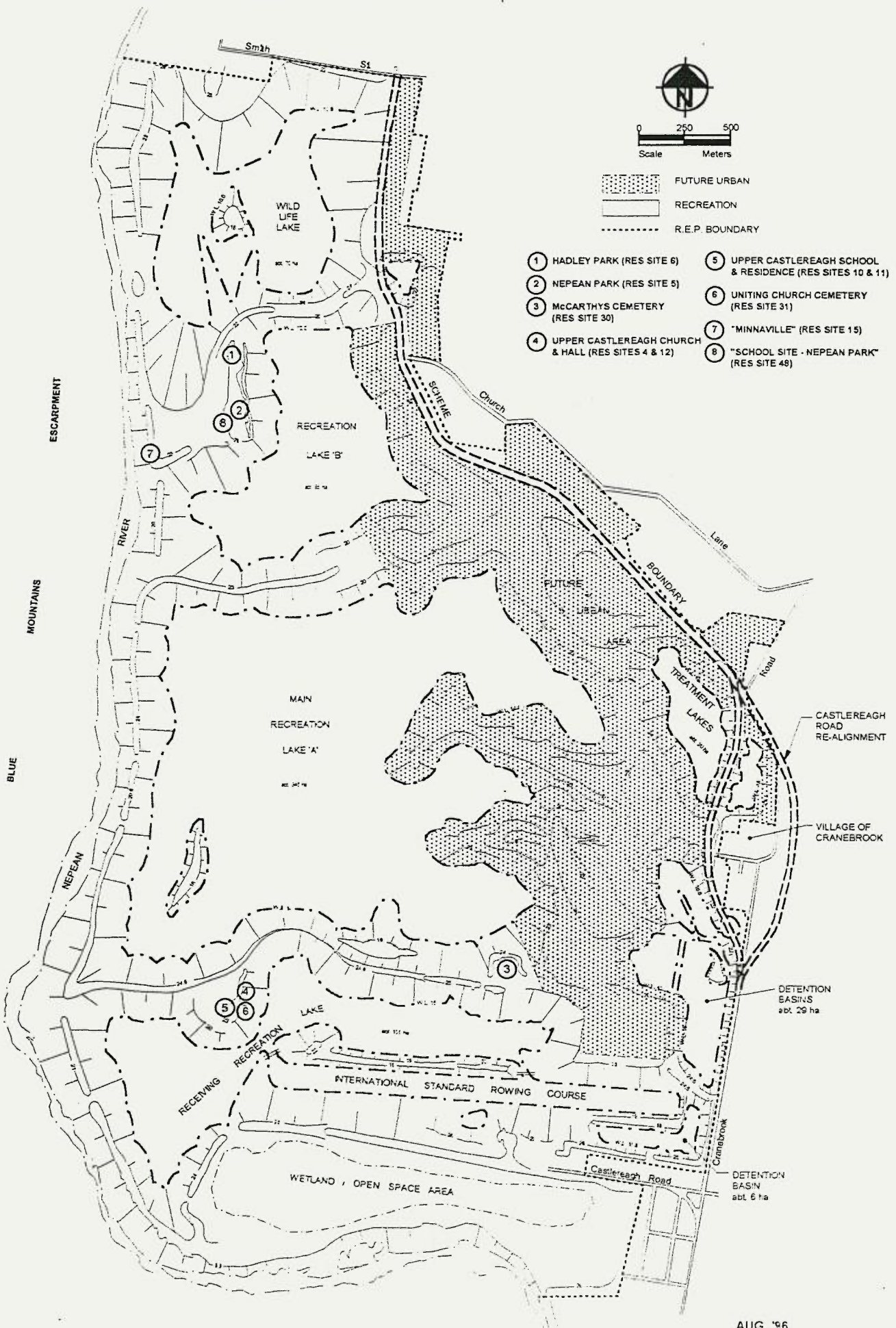
Not to Scale.
Based on Air Photo, NSW 2708/125, Run 6, 21/3/1978

FIGURE 19

NAIL SAMPLES RECOVERED FROM
THE "MINNAVILLE" HOMESTEAD



STRUCTURE PLAN FOR THE PENRITH LAKES SCHEME



APPENDIX B

HISTORIC MATERIAL

(DOCUMENTS AND PHOTOGRAPHS)

DEED OF GIFT FROM JOHN HARRIS TO ROBERT GUY, 1803

89

It will be to the whole of the
 do and cutting. Know ye
 it appeared in the
 considerations of the said
 and do bear towards Robert
 and Robert Guy, the
 the said Robert Guy, the
 Acreage. Thirty Acres of my
 Farm, being a situate at
 to hold the said Thirty acres of
 and Acreage,
 Condition, that
 the said Robert Guy
 from the date hereof, and paying the quit rents
 other encumbrances specified in the deed. In Witness
 whereof I have hereunto put my hand and seal this Twenty
 third day of December one thousand eight hundred and Three

Successors shall come. I John Harris
 of the said John Harris seller
 of New South Wales, Toward in
 full, and Affection which I have
 Guy of this Territory, have given
 rents do hereby Give & Grant unto
 rs. Executors, Administrators, and
 Heirs. Known by the name of Harris
 near River as aforesaid, To have and
 Land for ever. This Heirs Executors
 from henceforth, as his or their
 the said Robert Guy reside, Heirs
 and Cultivation of the said Land,
 and paying the quit rents
 In Witness
 whereof I have hereunto put my hand and seal this Twenty
 third day of December one thousand eight hundred and Three

John + Harris
 Mark
 J. A.

13 Dec. 1803. Deed of Gift - John Harris to Robt Guy,
 of 30 acres, known as Harris Farm, situate
 near River, New South Wales

Note: See back of Deed.

STATUTORY DECLARATION OF ROBERT WILLIAMS, 1863

89
 I Robert Williams of Torra in the Colony of New South
 Wales do hereby solemnly and sincerely declare that I have been in possession of

All that parcel of land containing thirty six acres and thirty four perches situate at Castlecragh in the County of Cumberland in the Colony of New South Wales commencing at a point on the Riparian River which is the South West corner of the late Mr John Smith's One hundred and sixty acres (they are bounded on the North by an East line of fifty two chains to the Castlecragh road, on the East by the said river bearing South seven chains and eight links to the East corner of Mr John Smith's sixty acres in the South adjoining the said sixty acres by a line bearing West by fifty chains and thirty links to the Riparian River and then on the West by the said River to the point of commencement) in the

1844 hundred and forty four. I verily believe that one
 3 years ago
 said land
 was
 in possession of the land above described from the year one thousand eight hundred and three up to the time of his death

And I make this solemn declaration conscientiously believing the same to be true, and by virtue of the provisions of an Act made and passed in the ninth year of the Reign of Her present Majesty, intituled "An Act for the more effectual abolition of Oaths and Affirmations taken and made in various Departments of the Government of New South Wales, and to substitute Declarations in lieu thereof, and for the suppression of voluntary and extra-judicial Oaths and Affidavits."

Subscribed and declared at my office
 Newcastle on this Ninth Robert Williams
 day of March 1863,
 before me,
 William Murray
 Notary Public
 Sydney New South Wales

J.P.



STATUTORY DECLARATION OF ALEXANDER FRASER, 1863

Alexander Fraser of Port Phillip in the District of Swan and Colony of New South Wales do hereby solemnly and sincerely declare that Robert Guy late of Port Phillip in the said Colony Farmer deceased departed this life at Meppan in the said Colony in the year One thousand eight hundred and nine teen. That Ann Guy Wife of the said Robert Guy departed her life in the said Colony soon after the decease of the said Robert Guy she has been dead many years.

That thirty six acres of land Parcel of the premises described in the application of Robert Williams in Case Number Eighty Nine Under Land Titles Act was held by the said Robert Guy in his life time and until his decease and was subsequently held in possession by Mrs. Maria Nash from the date of decease of the said Robert Guy up to the decease of the said Mrs. Maria Nash and from the said Mrs. Maria Nash to the Applicant Robert Williams up to the time of this Application being made.

And I make this solemn declaration conscientiously believing the same to be true, and by virtue of the provisions of an Act made and passed in the ninth year of the Reign of Her present Majesty, intituled "An Act for the more effectual abolition of Oaths and Affirmations taken and made in various Departments of the Government of New South Wales, and to substitute Declarations in lieu thereof, and for the suppression of voluntary and extra-judicial Oaths and Affidavits."

Subscribed and declared at

day of

June

this thirteenth

1863

before me,

A. Fraser
Wm. H. Clarke J.P.

Death of an old Resident.

MRS. J. D. SINGLE.

On Sunday evening last Mrs Ann Lydia Single, wife of Mr J D Single, J.P., of Cassola, Penrith, passed away somewhat suddenly. Some five months ago Mrs Single was taken seriously ill with bronchitis and enlargement of the liver. Dr Barber was called in and at once pronounced the case a serious one. Under the best medical skill and careful nursing however, Mrs Single got very much better, and about three or four months ago went on a trip to Hobart. The outward trip, which was calm, appeared to suit her admirably, but the return journey, which was very rough, rather upset her for a while. The deceased lady, although far from being well, kept up and her condition gave no anxiety to Mr Single and her family. Five days before her death deceased took to her bed, and even then no serious consequences were anticipated. Mr Single attended the Hawkesbury Show. On Thursday he told the writer Mrs Single was not very well, and he was anxious to get home early. On the following day, however, he was unusually cheerful and said Mrs Single was much better. She was not so well on Saturday, but on Sunday, up to a very short time before her death, she felt much better. The end, however, came suddenly, and the deceased lady passed away at 7 p.m. Mrs Single leaves behind her a large family all of whom are grown up, married and settled down. Throughout the whole colony the name of Single is generally respected, and the deceased lady will long be remembered in this district for her many acts of charity, which she distributed in a lavish manner. During deceased illness she was attended almost solely by Dr Barber, although Dr Scott-Skiving attended once in company with Dr Barber. The cause of death was enlargement of the liver and weakness of the heart. The deceased lady was born at Castlereagh somewhere near the site of Christ Church, in 1830. She was the daughter of the late Mr Alexander Frazer, and grand-daughter of the late Rev Henry Felton. Mr Frazer was formerly Clerk of Petty Sessions at Penrith, and afterwards, in partnership with Mr George Wentworth, took up pastoral pursuits on the Ladhlan River. In 1854 she was married to Mr J D Single by the late Rev Elijah Smith, of Castlereagh. Their home was at Richmond for two years. After that Mr Single built Minna Ville, Castlereagh, and resided there until 1884. When Cassola, near Penrith, was completed, Mr and Mrs Single and family came to reside there, and it was there she breathed her last.

The funeral, which took place on Tuesday, the remains being interred in the Church of England portion of Emu General Cemetery, was a very large and representative one, some 40 or 50 vehicles, as well as a large number of horsemen, making up the procession. Beside all the representative men of the Nepean District, the Hawkesbury Agricultural Society's Committee were well represented, among those present being Colonel Holborrow, Major Guest, Dr Callaghan, Messrs Ridge, Campbell, Icely and others. The remains were encased in a polished cedar casket, with silver mounts. Rev H Fryer, Rector of St. Paul's and Christ Church, conducted the burial service according to the rites of the Church of England in a most impressive manner. During the service the rev. gentleman took occasion to say a few words with reference to the deceased lady. He said he was not going to depart from his usual custom of saying a few words over the open grave. He wished to refer to the late Mrs Single and her family, and the esteem in which she was held in the district. He desired to say that during his 13 years' residence among them the deceased had always been most highly esteemed and beloved, and bore an irreproachable character. Mr and Mrs Single's connection with Christ Church, Castlereagh, would long be remembered; they had done noble work there. Mr Single had erected stained glass windows in that church to the honor of his parents, and every stone and every item in that church had Mrs and Mr Single's name indelibly fixed on them. The late Mrs Single had always been doing good work, and her many acts of kindness would ever be remembered. Later, in Mr and Mrs Single's life, when they removed from Castlereagh they connected themselves with St. Paul's Church, in the same parish. They continued to nurse (Mr Fryer) took up his ministrations at Emu when they attended St. Stephen's Church, Penrith. The people of Penrith also spoke well of Mrs Single. She was ever ready to assist in any worthy and noble object, and no one was turned away from her doors. The news of Mrs Single's death when heard at Hunter's Hill the day before was a shock and surprise to him, and he at once telegraphed to Mr Single his deepest sympathy. The rev. gentleman then referred at some length to the excellent qualities of Mrs Single as a wife, mother, philanthropist and friend, and concluded by expressing his sympathy with the bereaved ones.

STATUTORY DECLARATION OF RACHEL HARRIS, 1890

Source: Land Titles Office, Primary Application Packet, No.8179

Statutory Declaration

10. 2/11/91

I Rachel Harris of Ammandale near Sydney in the Colony of New South Wales do hereby solemnly and sincerely declare as follows:

1. I am now seventy four years of age.

90
3/11
5/6

2. I was married to John Harris my late husband at Cackereagh near Penrith in the said Colony in the month of March in the year one thousand eight hundred and thirty four my said husband was the son of one John Harris who was the grantee of certain land at Cackereagh and which I am now applying to bring under the Real Property act which said land is fully described in the application lodged herewith.

10. 2/11/91

3. I have known the said land for fifty six years.

4. My two daughters Elizabeth Dorothy Rebecka (formerly Elizabeth Dorothy ~~Harris~~ ^{Harris}) wife of Edward Rebecka of Campersdown near Sydney aforesaid and Mary Ann Stephenson (formerly Mary Ann Harris) wife of Mr. Stephenson of Randwick and my son John William Harris of Sydney aforesaid were all born upon the said land.

8176

5. At the time of my marriage with the said John Harris his father the said John Harris lived upon the said land with his family and continued to remain upon the said land up to the time of his death which was about the year one thousand eight hundred and thirty seven.

6. The said land was at that time fenced in and built upon as it now is.
7. After the death of the said John Harris my said husband and his brother Thomas Harris took possession of the said land and about the year one thousand eight hundred and forty three my said husband took possession of the whole of the said land having purchased all the interest which the said Thomas Harris might have had in and to the said land.
8. My husband continued to reside upon the said land for about four years he then removed from the said land and from time to time let the same to various tenants who always occupied and cultivated it as a farm and paid rent to me to the time of his death which was the year one thousand eight hundred and seventy seven. Some of the names of the tenants were. Webster - Russell - Robinson and Evans.
9. After the death of my said husband I took possession of the said farm and have always collected the rents from the different tenants and am still collecting them. The present tenant being Thomas R. Smith.
10. The fences have always remained upon the said land though since I have had possession of the said farm they have been from time to time renewed by me or at my expense.
11. Since the year 1843, the time that my said husband took possession of the whole of the said farm he has never been disturbed

possession of the said land nor
his title was disputed. Since I am
in possession my title has never been
disputed by anyone.

And I make this solemn declaration
conscientiously believing the same to be true
and in virtue of the provisions of an Act made
and passed on the ninth year of the reign
of Her Present Majesty, intituled in relation
to the more effectual abolition of oaths and affirmations
taken and made in various departments of
the Government of New South Wales and to
substitute Declarations in lieu thereof, and for
the suppression of voluntary and extra-
judicial oaths and Affidavits.

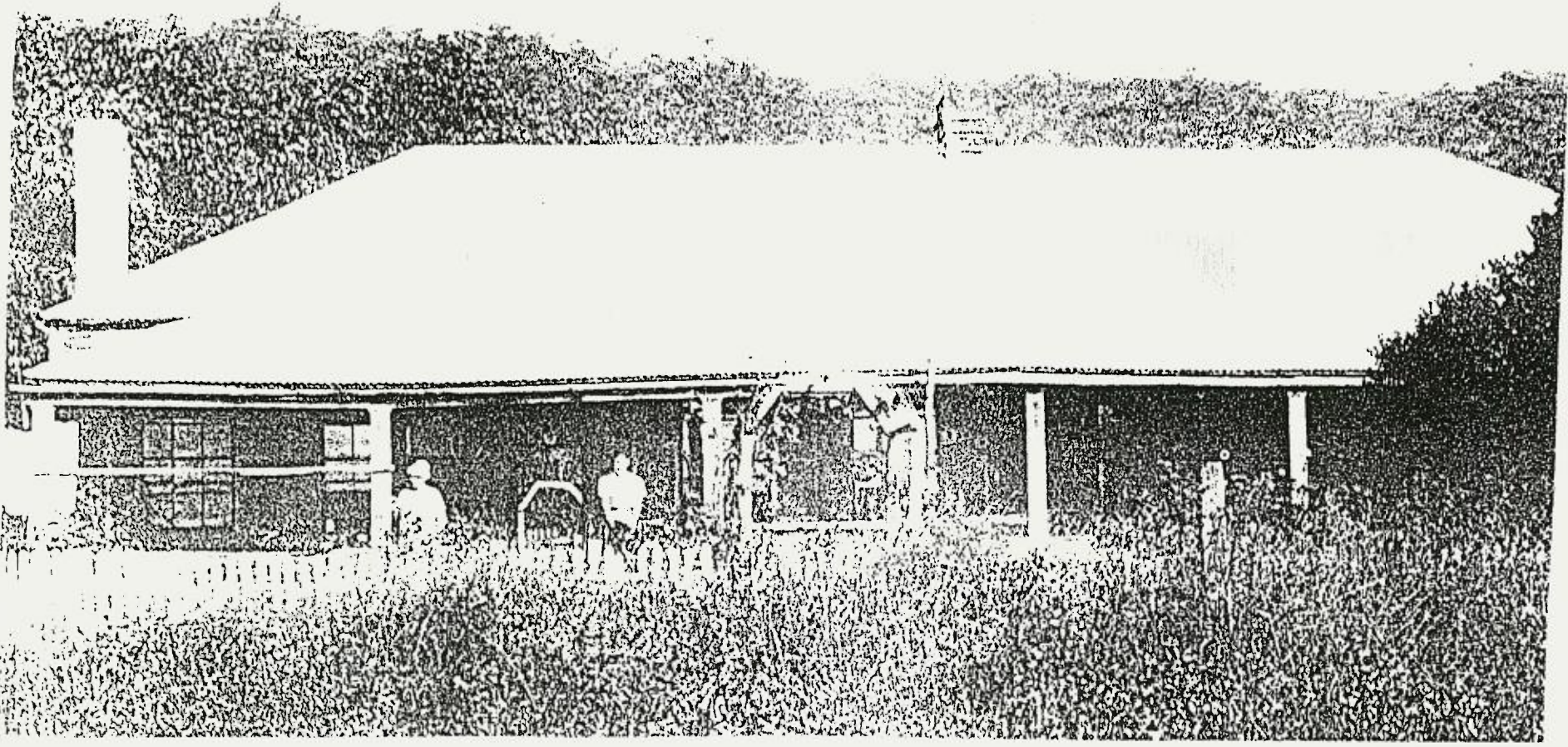
Subscribed and sworn at
Sydney this 17th
day of September 1841
thousand eight hundred and
fourth - before me, the Justice
James Macpherson, J.P.
and he appeared to perfectly
understand the nature and
effect thereof

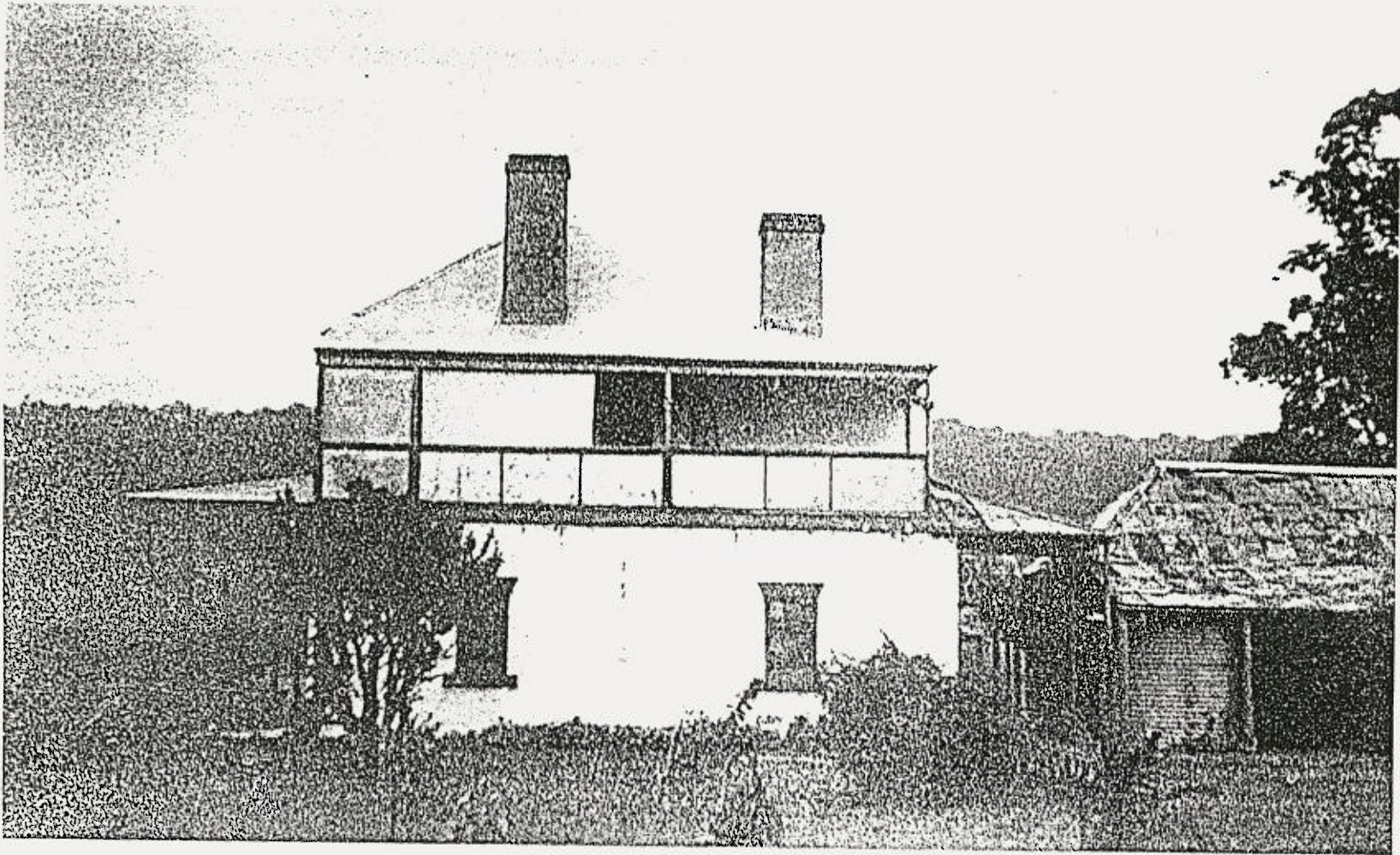
Richard X Thomas
Mark

W. Abbott
Commissioner for Affidavits

PHOTOGRAPH OF "MINNAPVILLE" 1930

Source: J A Gray, *Magnificent Minnerville*, 1988, p 10





Nepean House side view, early 1900. Out-buildings have since been demolished (photograph Pam Thompson)

PHOTOGRAPH OF "NEPEAN HOUSE" c1900, SHOWING OUT BUILDING

Source: R Pollet, *John and Sarah*, 1988, p 20

DESCRIPTION OF "MINNAVILLE"

- SITUATION:** 5 miles from the fast growing Railway Town of PENRITH on the Castlereagh Road, 39 miles from Sydney (all bitumen). Electricity and continuous telephone connected.
- AREA:** 230 acres 3 roods 27 $\frac{1}{2}$ perches, Freehold, Torrens Title.
- COUNTRY:** All rich Nepean alluvial river flats. 10 acres of Washington Navel Oranges now showing a heavy crop estimated at 4,000 cases, which will provide an immediate return; 16 acres of established cutting lucerne; balance all pasture improved and all under spray irrigation
- WATER:** By 58 chains frontage to the Nepean River, from which water for irrigation is pumped by two 45 h.p. electric motors and 4" centrifugal pumps in sealed concrete housing. There are about 3 miles of underground fibrolite mains, practically all 6" and all inter-connected with both pumps. 105 lengths of Ames aluminium spray lines, also 5 Giant irrigation sprays.
- RESIDENTIAL BUILDINGS:** Attractive homestead of brick, faced with weatherboard, containing master bedroom 26' x 16', 4 other bedrooms, lounge, dining room, modern kitchen with electric stove and ample cupboards. Large tiled bathroom with inside toilet. Also second bathroom and toilet. Electric hot water service. Large septic tank. Spacious sun verandah 50' x 20' with observation sundeck overhead. All fly-proofed. Stone fish pond and fernhouse with aviary. Laundry with "Naco" washing machine. Double garage. The house is approached by a kerbed and guttered drive, flanked on each side by roses and ornamental trees.

STAFF ACCOMMODATION

Good manager's cottage; 3 other cottages, one of which is furnished; 3 self-contained flats, two furnished. All have electricity and water connected, bathrooms and septic tanks.

FARM BUILDINGS: Splendidly equipped brick dairy with tiled walls, concrete floors and steel yards, hot water service and cooler, 36 tubular steel feed stalls, feed room. Large hayshed to hold 200 tons, machinery shed, grain shed, fruit packing shed, tool shed, etc.

FENCING: Mostly 5-wire and barb, all in perfect condition. Divided into 29 paddocks each with access to a lane and each with automatic water trough.

APPENDIX C

CURRENT SITE PHOTOGRAPHS

Photo 1, General view of "Minnaville" Homestead Complex. Photo taken on east side of the house, looking west.



Photo 2, Eastern side of the "Minnaville" Homestead, showing older hipped roof line and more recent sunroom addition. (Photograph taken looking to the northwest).



Photo 3. Southwestern corner of "Minnaville" Homestead, showing old chimney (exterior of modern bathroom, possibly a former kitchen/scullery area).

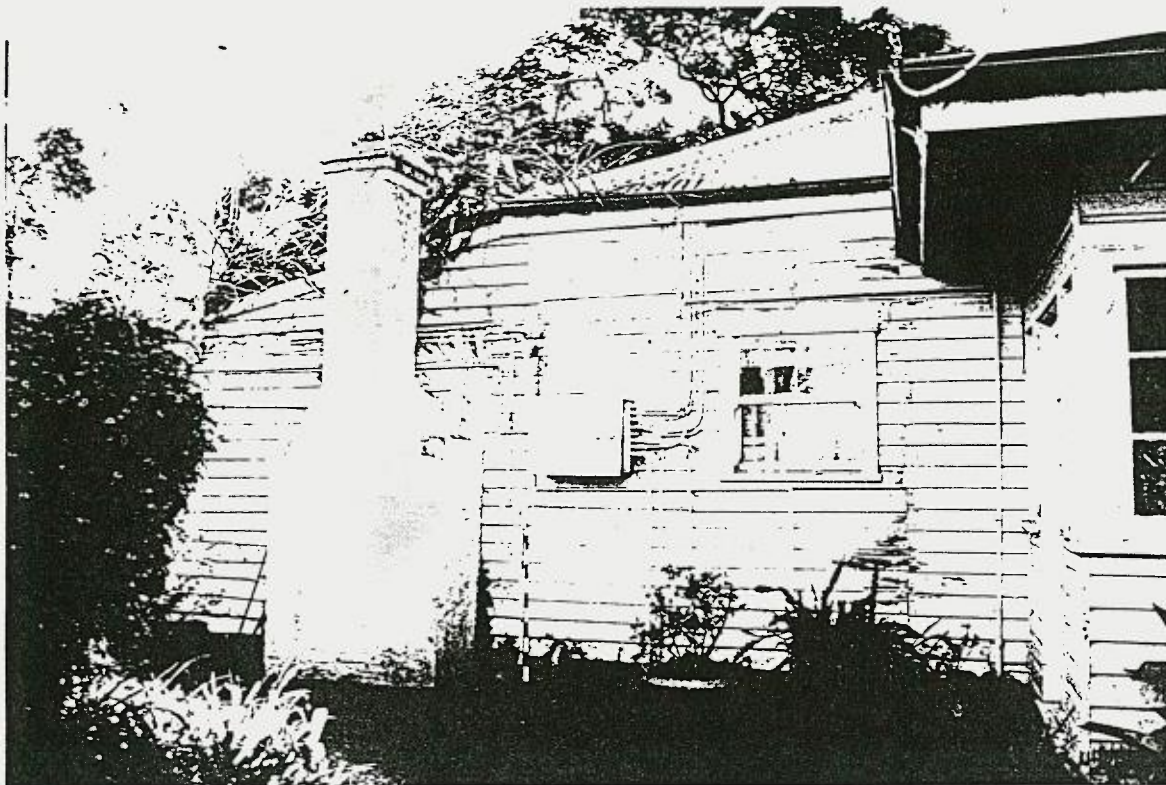


Photo 4. Detail of southern hip of main roof, "Minnaville" homestead. Location of former chimney within main roof line is shown by roofing sheets (arrowed).



Photo 5, Interior of "Minnaville" homestead, showing front (east side) of Phase 1 cottage.

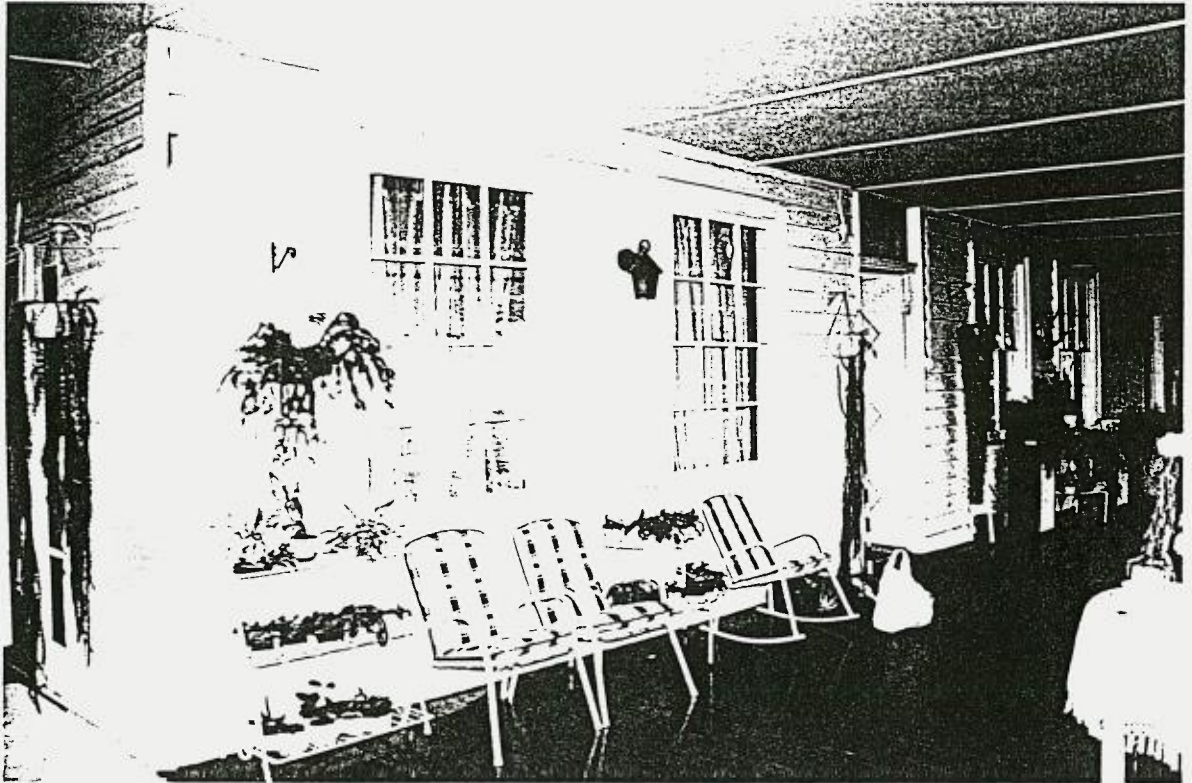


Photo 6, Interior of "Minnaville" homestead, showing front (east side) of Phase 1 cottage.

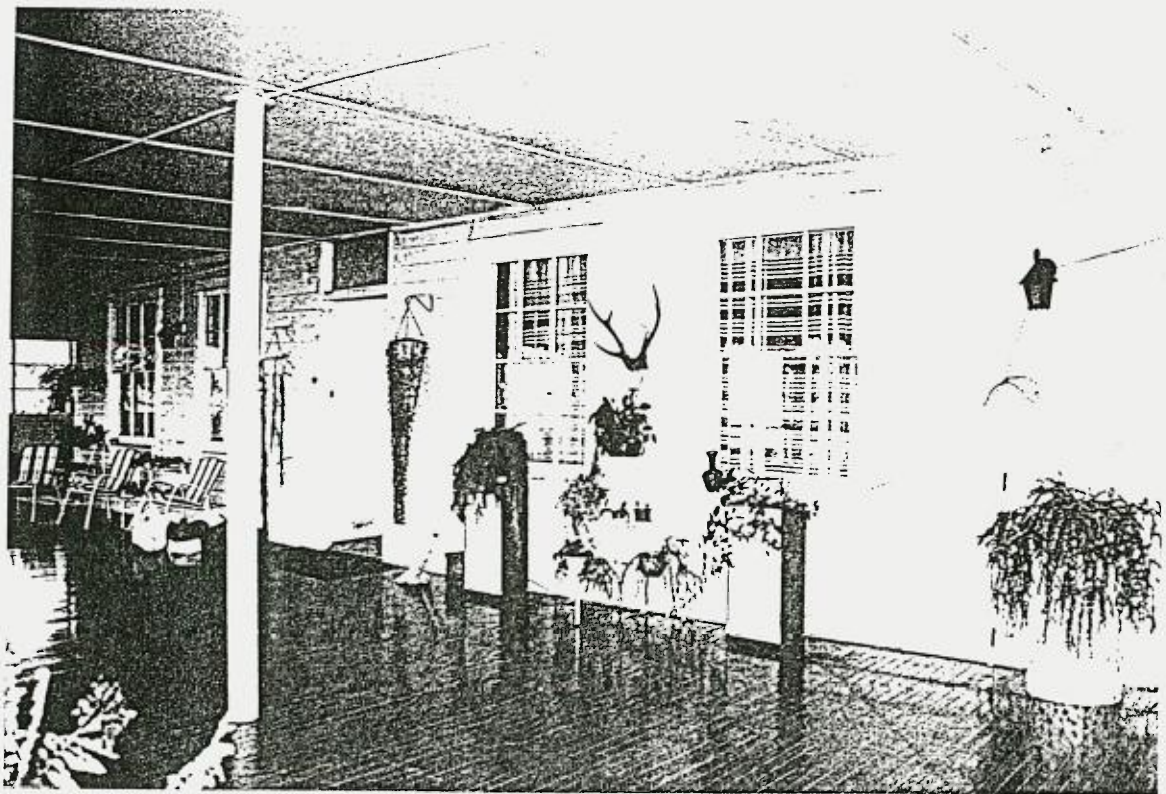


Photo 7. Detail of front elevation. One metre scale is placed at the junction between Phase 1 and Phase 2 construction (scale in same position as in Photo 6).

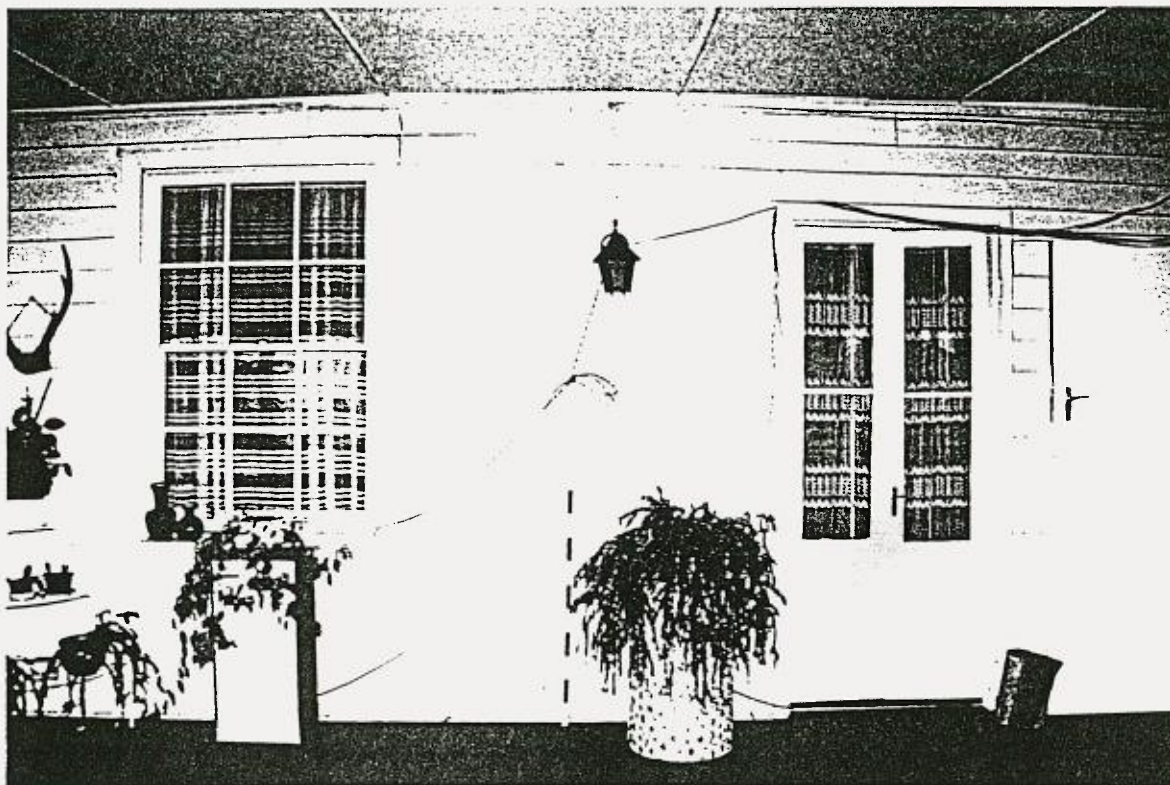


Photo 8. Interior of "Minnaville" homestead. Rear (west) elevation of Phase 1 cottage.

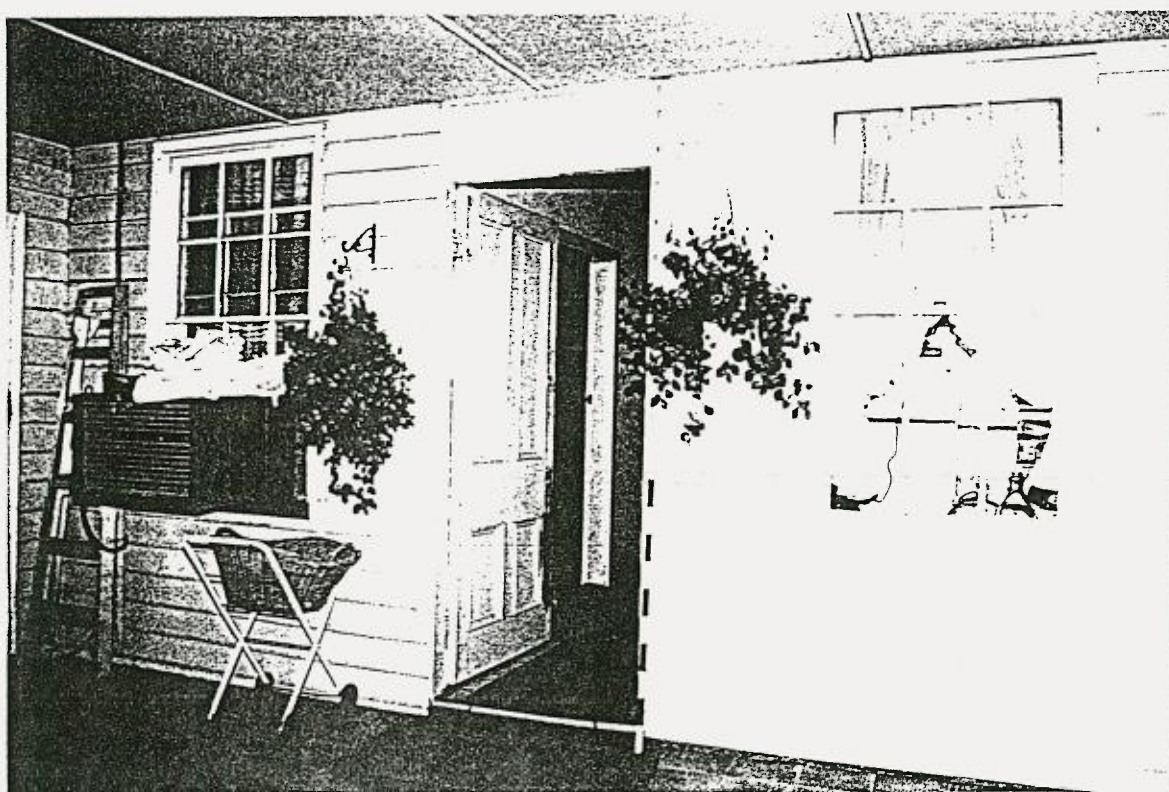


Photo 9, Roof space. "Minnaville" homestead. Southeast corner of Phase 1 cottage, showing 'cut out' for former chimney, now removed.

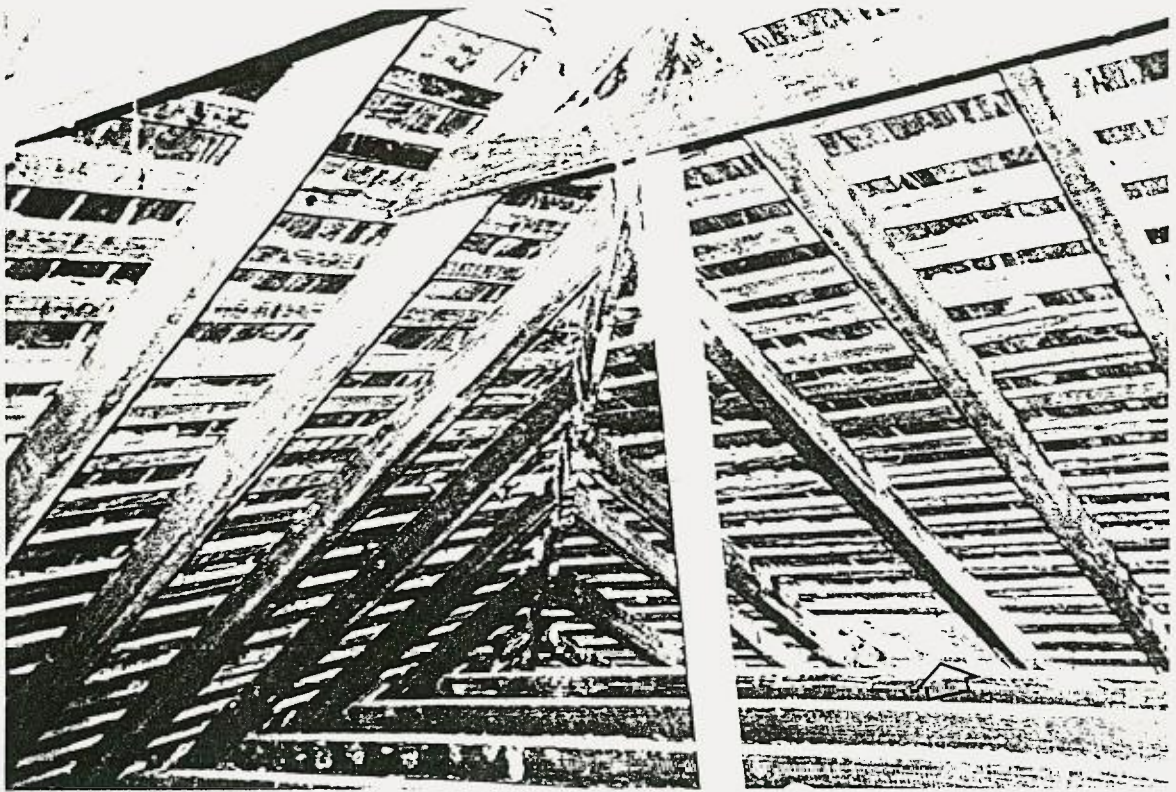


Photo 10, Roof space. "Minnaville" homestead. Phase 1 cottage, showing ridge piece and hipped rafters still present within roof, south of central chimney.

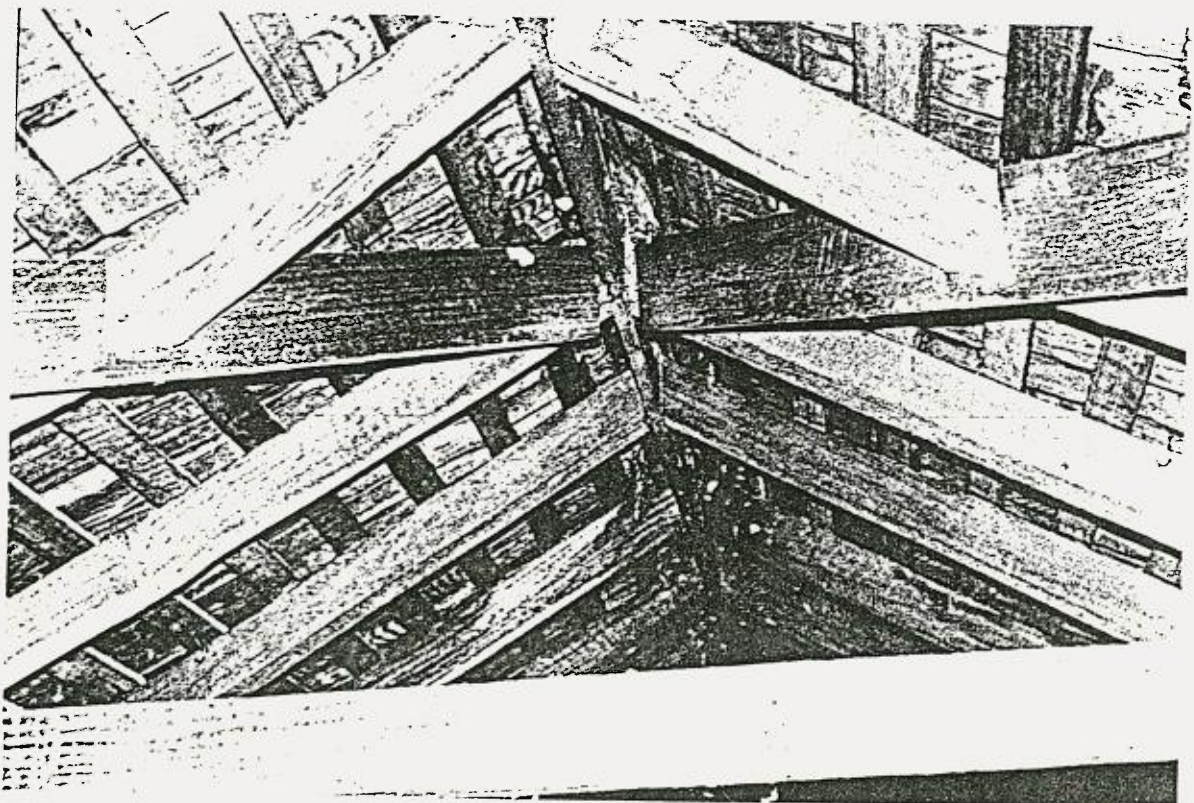


Photo 11, Roof space, "Minnaville" Phase 1 cottage, showing hipped rafter (on diagonal).



Photo 12, Roof space, "Minnaville" homestead. Detail of hipped rafter shown above, at junction with wall between Phase 1 cottage and subsequent northern extension (Phase 2).

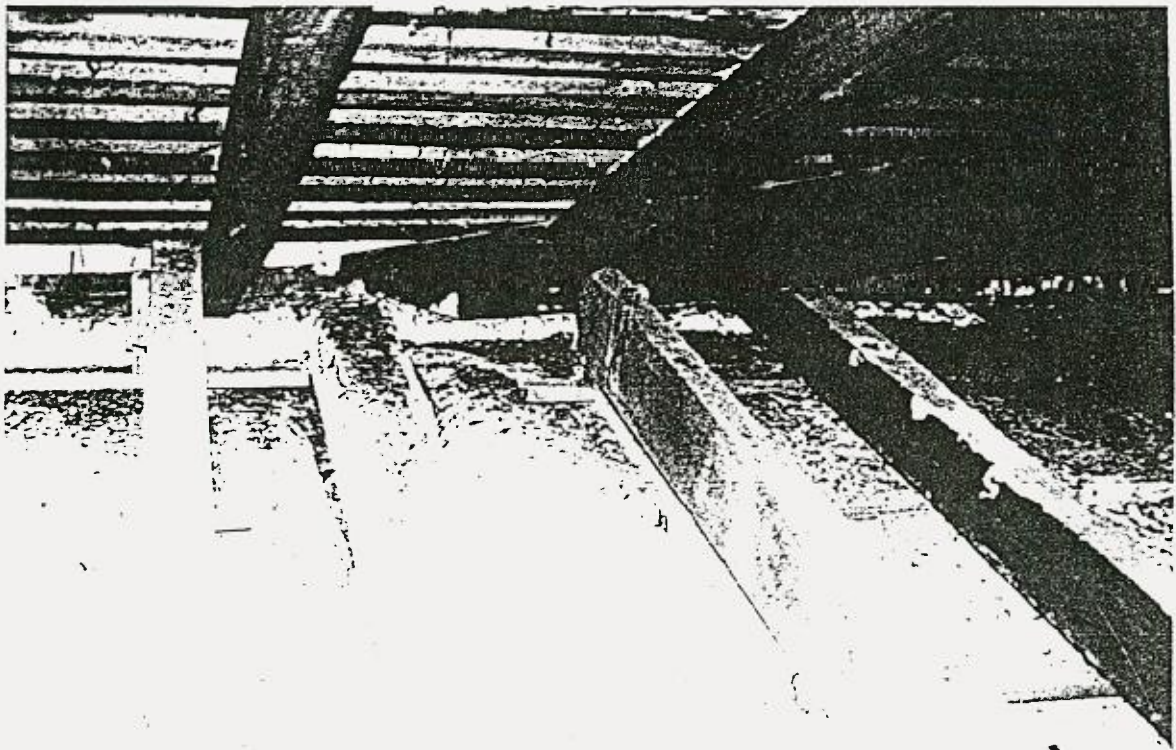


Photo 13, Roof space, "Minnaville"
Central Chimney.

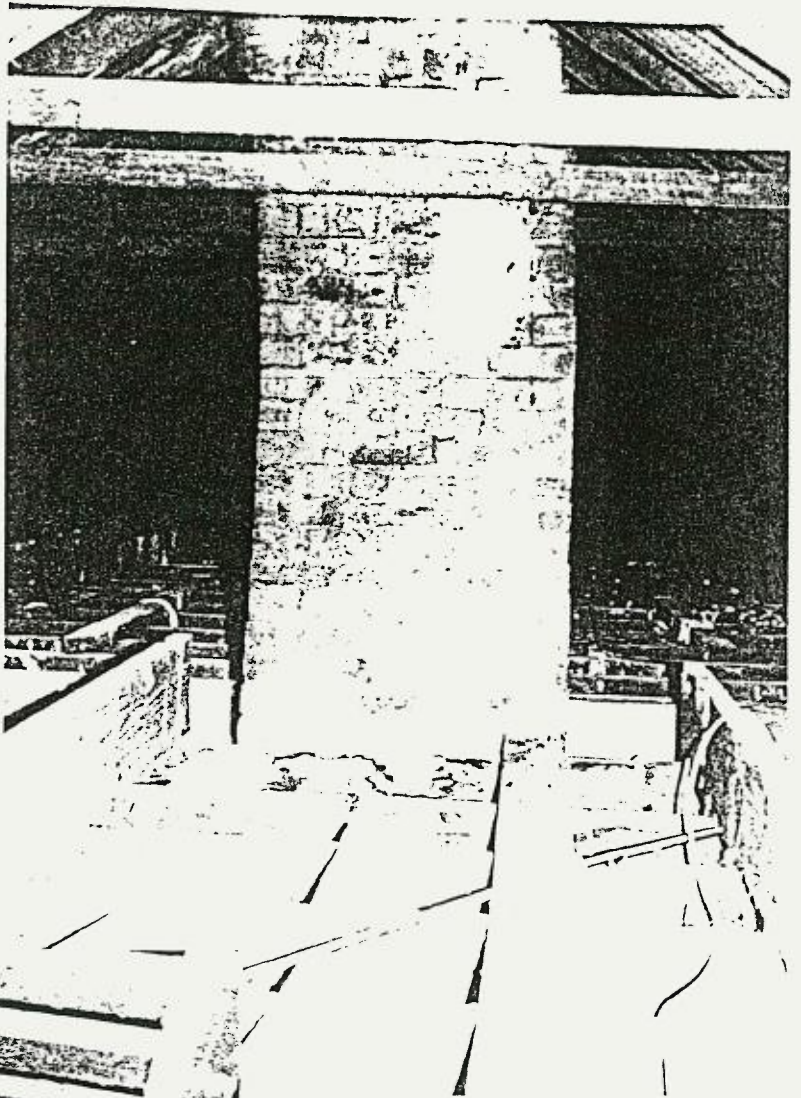


Photo 14, Roof space,
"Minnaville" homestead.
Double brick wall between
Phase 2 & Phase 3 construction

Photo 15, Roof space. "Minnaville" homestead. Phase 1 area, showing later beam inserted after removal of wall in room north of hallway (present loungeroom).

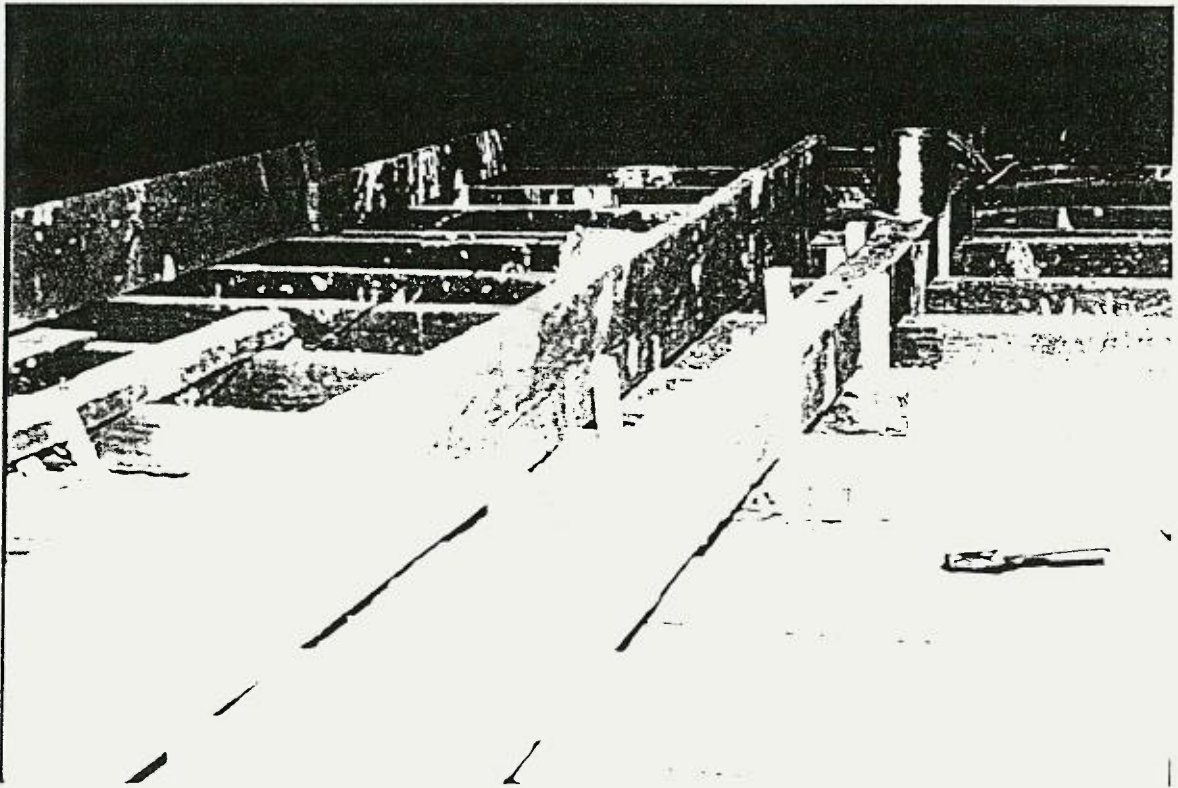


Photo 16, "Minnaville" homestead. Rear (west) elevation.

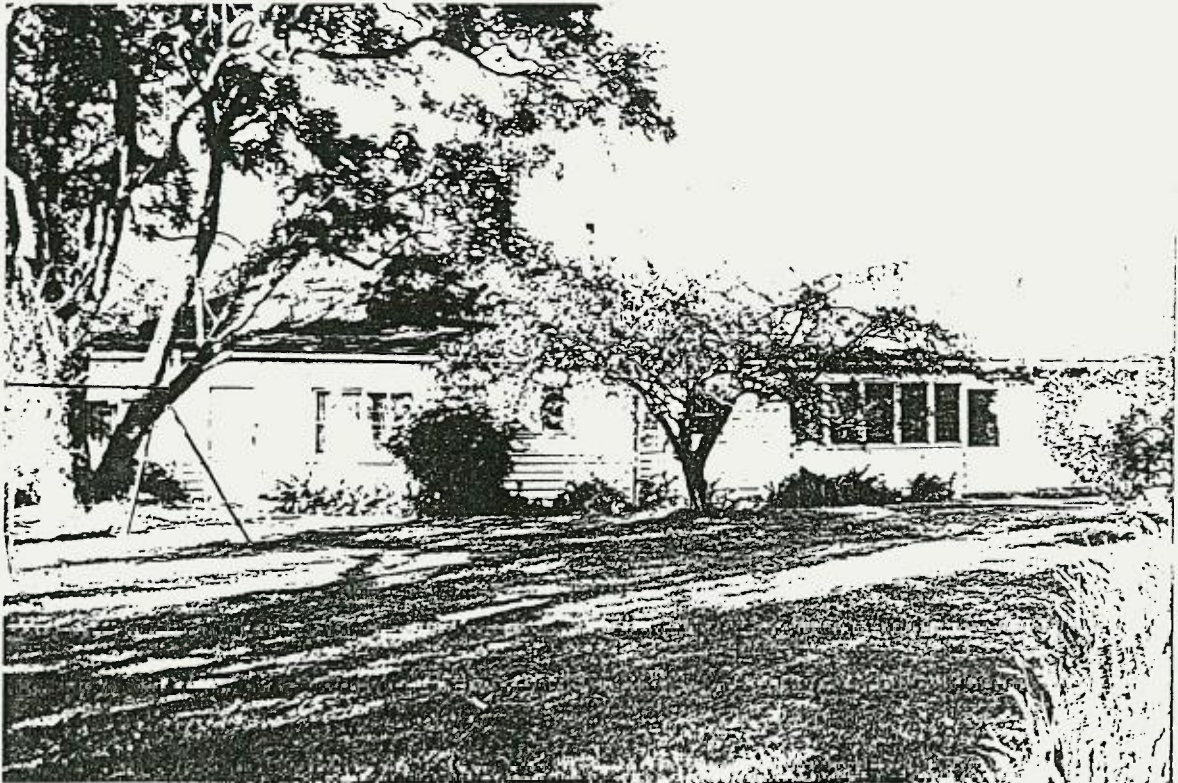


Photo 17, "Minnaville" complex, outbuildings. Large barn. View showing north and west sides, note left in northern gable. (Photo looking southeast).

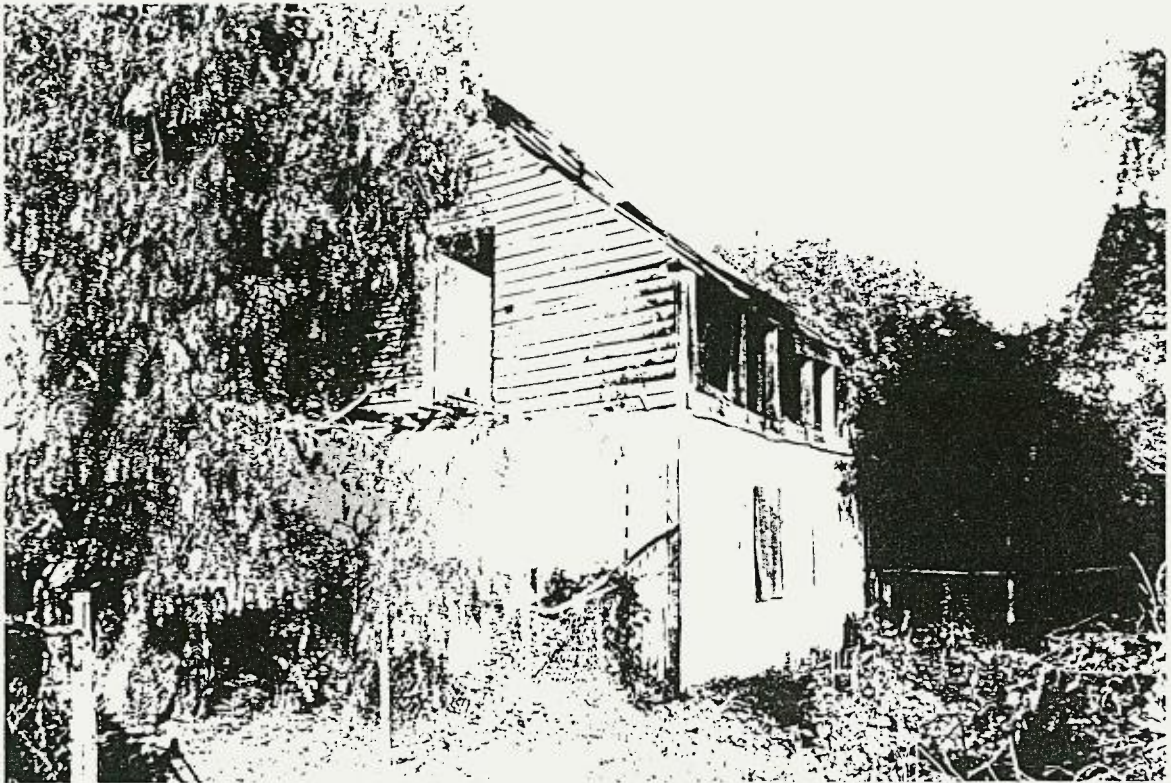


Photo 18, "Minnaville" complex, outbuildings. Large barn, east side. Note skillion extension for conversion of southern end to a self-contained flat during the 1950s.

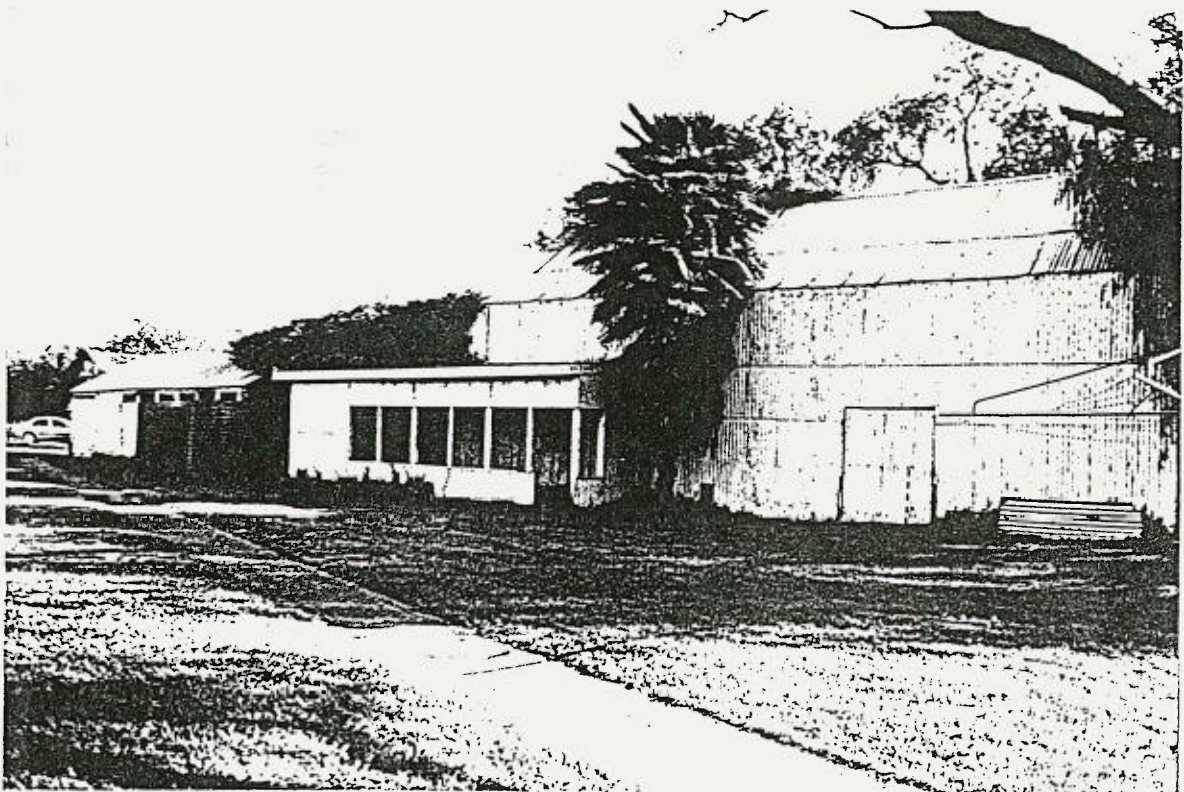


Photo 19, "Minnaville" complex, outbuildings. Brood mare and foal boxes, east side.

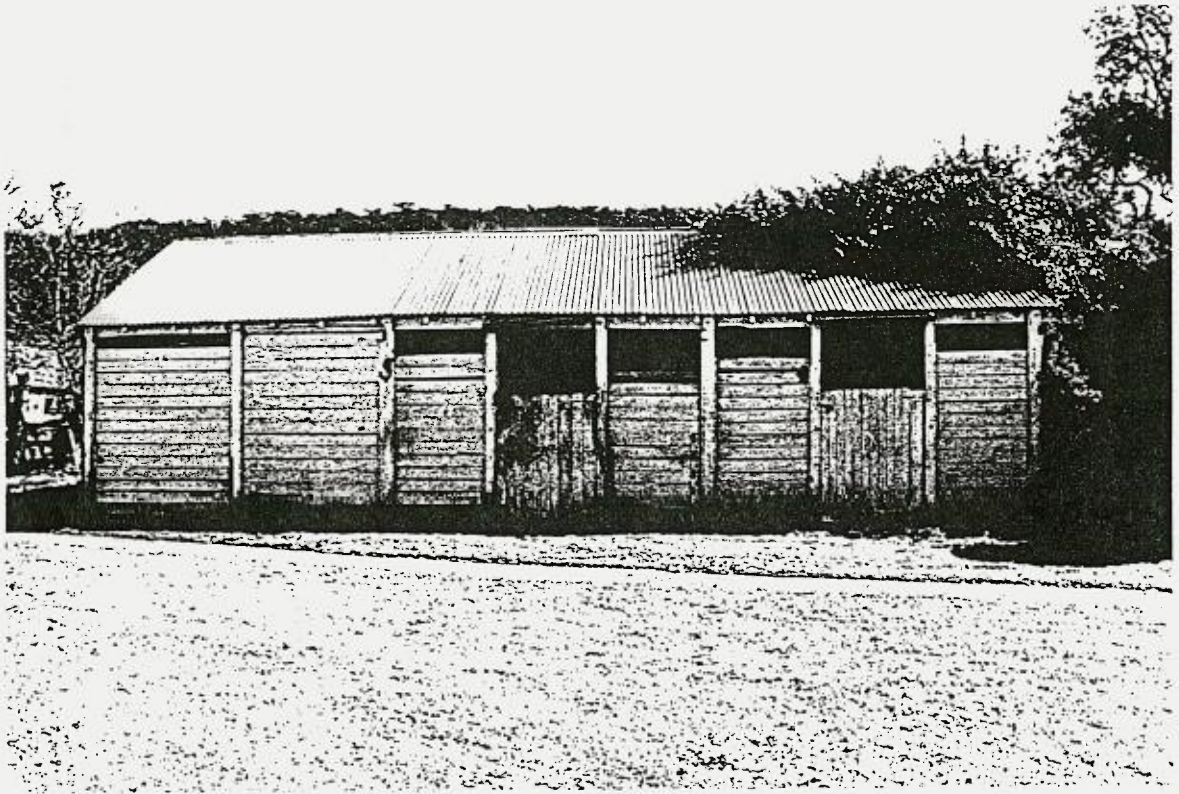


Photo 20, "Minnaville" complex, outbuildings. Mare / Foal boxes, southern elevation.

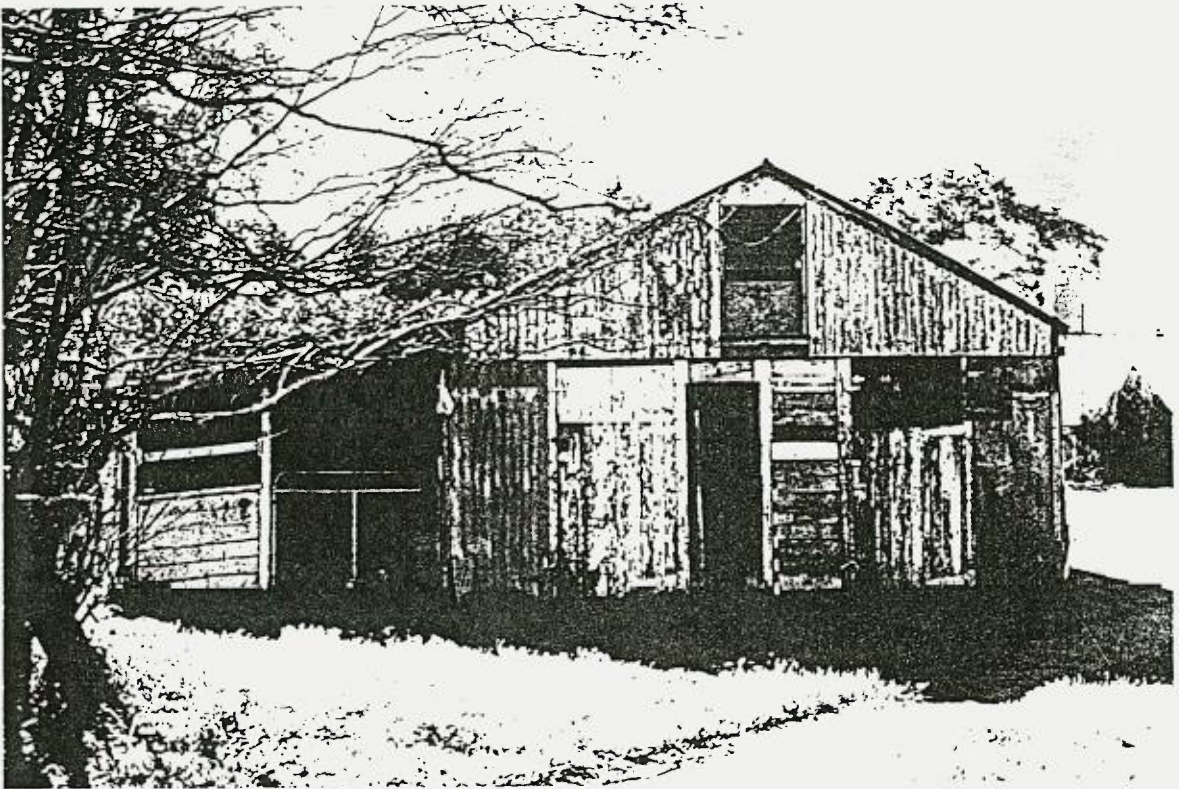


Photo 21, "Minnaville" complex, outbuildings. Machinery Shed, east elevation.

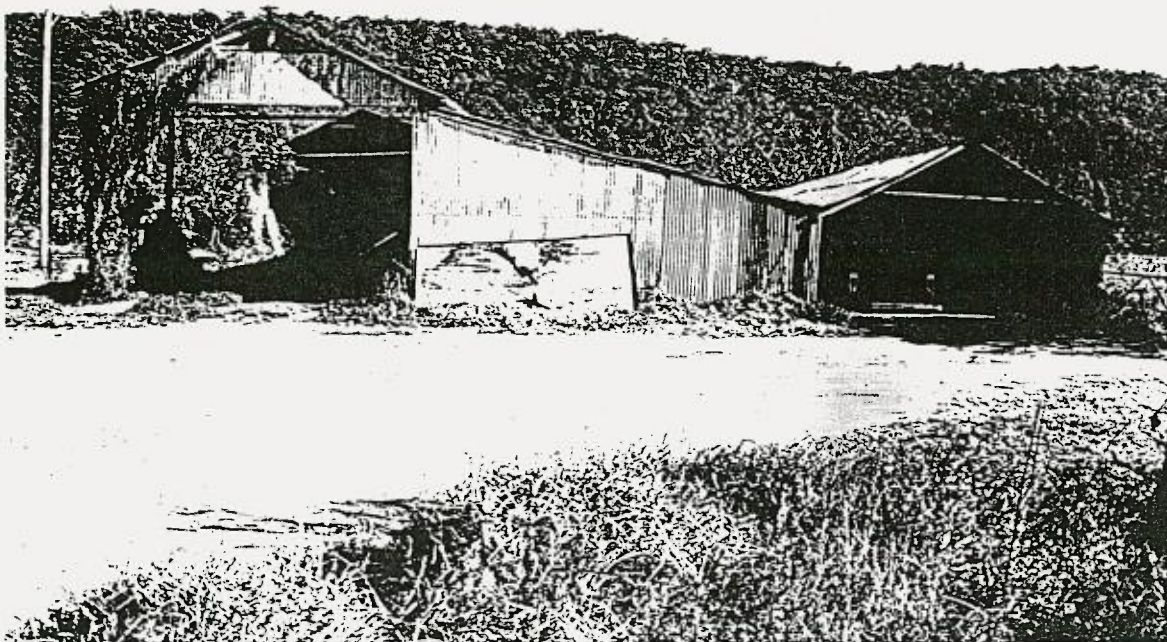


Photo 22, "Minnaville" complex, outbuildings. Machinery Shed, south elevation.

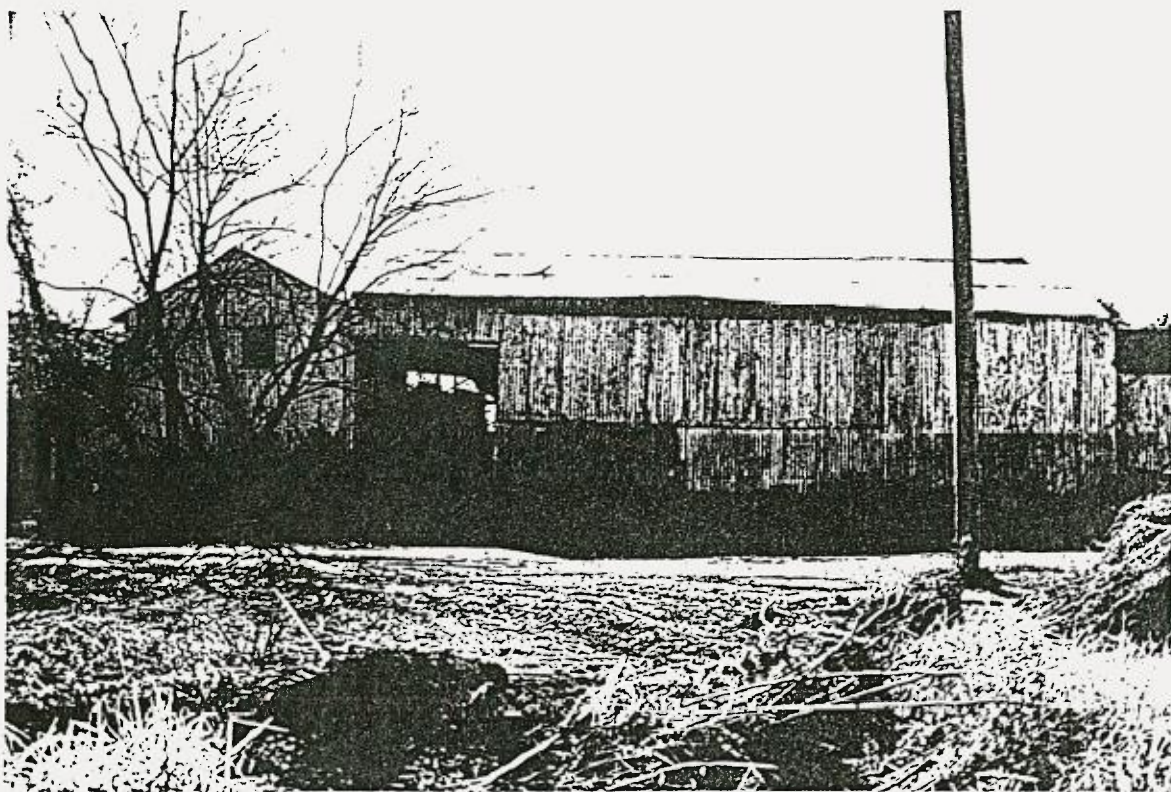


Photo 23, "Minnaville" complex, outbuildings. U-shaped stables complex near river.

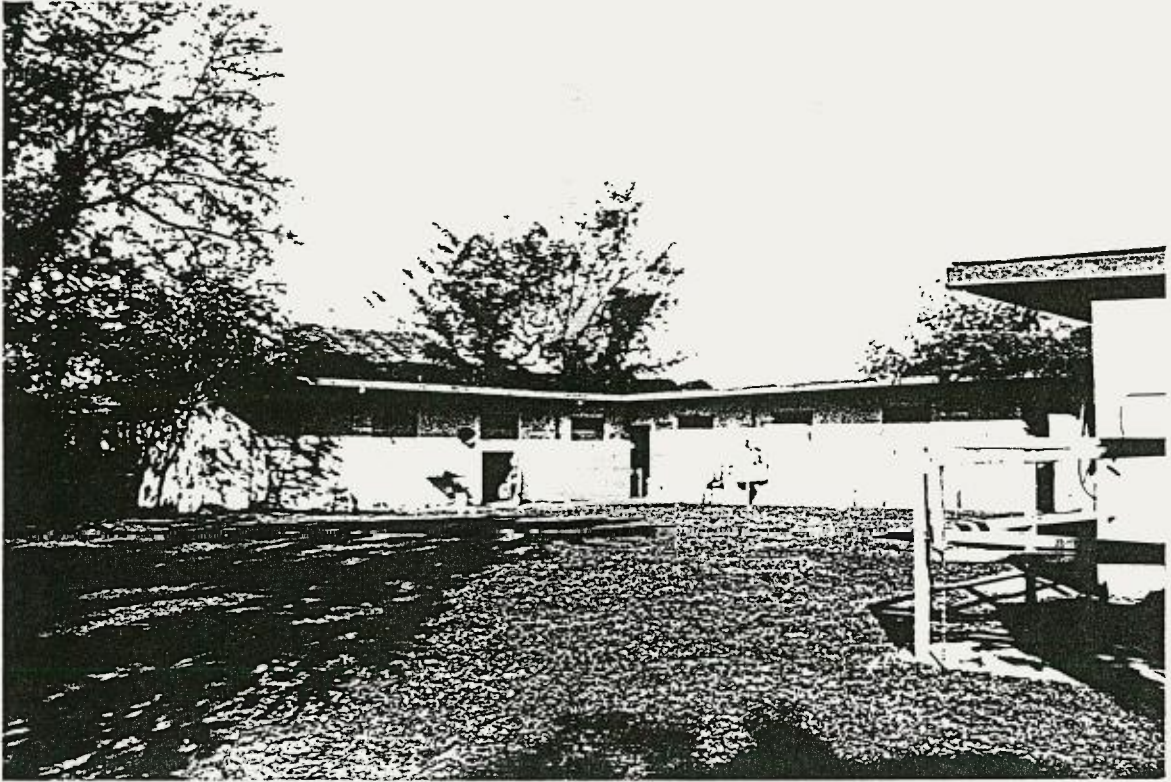


Photo 24, "Minnaville" complex, crib-work bridge across Cranebrook Creek.



APPENDIX D

INVENTORY SHEETS

from 1983 European Heritage Report

Site 37

Harris' cottage and farm buildings

Description:

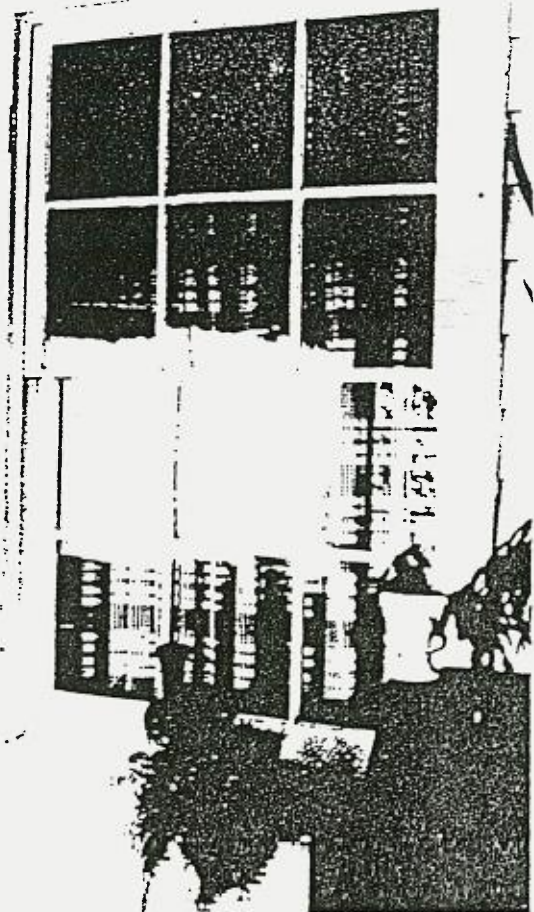
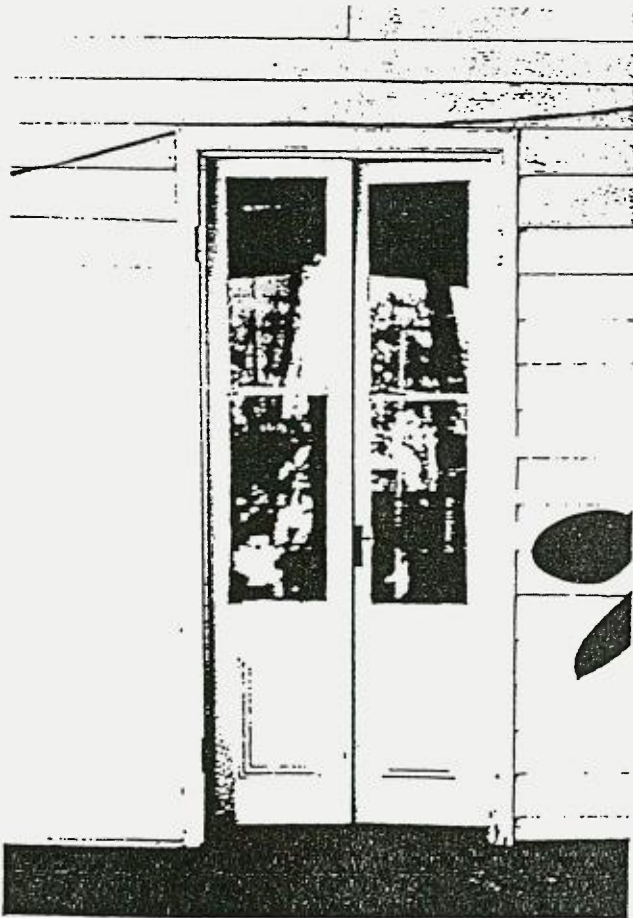
White weatherboard cottage and its associated farm storage buildings. The house has had several additions and alterations made to it, the original building being obscured by these. There is evidence of sandstone footings (or flagging), six-pane windows and French doors. A pleasant mature garden surrounds the house.

Historical Data:

The original grant was 90 acres made to John Harris in 1803 by Governor King. The Harris family were resident in 1828. Some of the family are buried in the Anglican cemetery off Church Lane, Castlereagh. Although the Harris family are not listed in the 1841 census, the southern subdivision of this Portion 49 was owned by a Mrs Harris of Newtown in 1889. It was tenanted by G Bisbie. The northern subdivision where Site 37 occurs was owned by the Wisdom family and occupied by the Lowes.

Significance:

The house and garden are in a condition suitable for their retention per se. The historic features of the site are not particularly high except in association with the total history of Castlereagh.



Site 39B

Minnaville

Archaeological site only, precise location unknown.

Historical
Data:

The full details of Portion 48 and Site 39 indicate that an earlier structure existed somewhere on this land which housed the Single family prior to the construction of Nepean Park in 1822.

Physical examination of the terrain narrows down the possible locations to a short list, the most likely near the two
* named kurrajong trees mentioned by local historians.

Significance:

Historically a site of considerable interest since it will represent the 1810-11 house of John Single, with a limited occupation to 1822 when the family moved to Nepean Park.

No photograph.

Site 50

Alexander Frasers house (site only)

Description:

No visible sign although site apparently undisturbed.

Historical
Data:

The precise location of this house and out-buildings on Portion 284 is shown on the 1869 plan of Old Castlereagh, on the corner of Frazer Street and Londonderry Road. Alexander Frazer was postmaster for Penrith from 1828 to 1834 in the courthouse and also listed as Clerk to the Bench in the 1828 census. Two of the magistrates at the bench at this time were the Reverend Henry Fulton and John McHenry who owned the Chapman estate and the blacksmith shop next to the court house. Eventually the three families were linked by marriages of the sons and daughters.

Significance:

Significant as a survival of the early settlement at Old Castlereagh (Phase 2A).

No photograph.

APPENDIX E

**National Trust Listing
and recent correspondence**



Observatory Hill
Sydney NSW 2000

GPO Box 518
Sydney NSW 2001

Telephone (02) 258 0123
Fax (02) 251 1110

22 July 1996

Ms Siobhan Lavelle
Historical Archaeologist
PO Box 42
Woodford NSW 2778

Dear Ms Lavelle .

RE: "MINNAVILLE", CASTLEREAGH ROAD, CASTLEREAGH

I refer to our discussions today concerning your current study of the above mentioned property. The National Trust was most interested in your preliminary findings.

As the building is Classified by the Trust, we would appreciate a copy of your final report for our information.

Please contact this office if we can be of further assistance in this matter.

Yours faithfully

Ian Hayes
Historic Buildings Consultant

NATIONAL TRUST LISTING

CASTLEREAGH

"Minnaville"

Castlereagh Road

Also known as
Harris' Cottage

APPROVED: 22/2/1994

Penrith City Council 2750

Owner: Penrith Lakes Development Corporation
Third Floor
SBU Insurance Building
565 High Street
Penrith NSW 2750

Author: M Craswell I Hayes S Lavelle

Date: 1/1994

Bibliography: Gray J A, Magnificent Minnaville,
Sydney 1988.
Penrith Lakes Scheme Regional Environmental
Study, NSW Department of Environment and
Planning 1983.

.....

HISTORY:

The land on which Minnaville stands forms part of an original 1803 Crown Land grant of 90 acres from Governor Philip Gidley King to John Harris Snr. Harris' grant was known as Portion 49.

In December, 1803 John Harris Snr gifted 30 acres from his 90 acre land grant to Robert Guy. In 1808, Guy paid Harris 30 pounds for the 30 acres.

The Harris family were resident on this land in 1828. It is presumed to have been the first stone fruit orchard in New South Wales.

John Harris Snr worked the farm until his death in 1837. The land was then inherited by Harris' two sons, John and Thomas. In 1843, the eldest son, John Harris Jnr and his wife, Rachel took sole possession of the said land, buying out the interests of brother Thomas. The Harris family remained on the property until 1847. Circa 1850, Harris placed a few tenants in control of the operation of the farm; some of the names of these tenants being Wilmott, Gunnell, Robinson, and Evans.

Following the death of John Harris Jnr in 1877, Rachel Harris inherited the property, and she continued to let, and collect rent of the farm. In 1890, the tenant was Thomas R. Smith, Penrith auctioneer. Although the Harris family are not listed in the 1841 Census, the southern subdivision of this Portion 49 was owned by a Mrs Harris of Newtown in 1889, and tenanted by G Bisbie. The northern subdivision was owned by the Wisdom family and occupied by the Lowes.

In 1896, Rachel Harris applied to have the land transferred to Torrens Title. After her death in 1902, the property was sold to William Stephenson of Randwick, and others including Stephen Burge and Amos Parker, Penrith dealer. In 1907, the property was purchased by Samuel Apps Eggins of Mortlake, a school teacher and farmer. Eggins sold the property to Frank Duesbury, chartered accountant, in 1950. Subsequent to the death of Duesbury, the property was sold to Farley and Lewers Limited. In 1960, the property was purchased by Francis Edward Dowling of Penrith. Dowling subdivided the property and the lots were sold separately, two of these lots purchased by the Penrith Lakes Development Corporation in 1985.

A building known as Minnaville housed John Single and family from c.1810-11 until c.1822 when "Nepean Park" was built.

It is uncertain that the building currently located on the property presently referred to as Minnaville, was the house of John Single or indeed the house of John Harris Snr. It is likely, however, that the building presently known as Minnaville is not the original building erected on this site since the first occupation of that land by the Harris family in 1803.

There is no record of the date of construction of the present building.

DESCRIPTION:

A single storey, rectangular house with shiplap timber board cladding to external walls. The hip roof, with central brick and render chimney piercing the ridge line, is covered in corrugated iron. Part of the roof construction includes round sawn logs with timber shingles over.

There is a continuous verandah to three sides of the house (east, north and south), with a separate verandah at rear (west). All verandahs are enclosed by timber frame and glazed construction. Timber lining to eaves soffit of hip roof. All verandah floors concreted. The front (east) elevation of the residence has a projecting sunroom of recent construction. The sunroom enclosure has a squat gable roof clad in corrugated iron. The ceiling is fibrous plaster.

The external walls of the main body of the house comprise double-hung, six-pane sash windows with original glass, and french doors.

On the south elevation of the house is a brick chimney that served the original kitchen.

There is a distinct and continuous change in floor level throughout the residence at midpoint, this being evidenced by both a physical floor height difference and a change in the angle of timber cladding to external walls at the aforesaid midpoint, from horizontal to slight inclination. It is feasible that one could best assume that the house was constructed in two stages; the house originally being of square plan form.

Internally, some of the dividing walls are constructed of convict brick nog with plaster finish.

The bedrooms are not accessible from within the house; all doors leading to bedrooms are located off the verandahs.

The current bathroom was originally the scullery.

Much of the original timber joinery has been removed; there is plasterboard to walls, and general finishes such as detailing and cornices are not part of the original interiors or intended character.

The house, surrounded by established and maintained gardens, is approached by a formal drive.

A series of outbuildings, comprising tank stand, garage, stables, and two-storey barn (c.1870s), are set at the rear of the house.

There are two wells on the property; one located in the stables, the other outside the present dining room.

Archaeological study required.

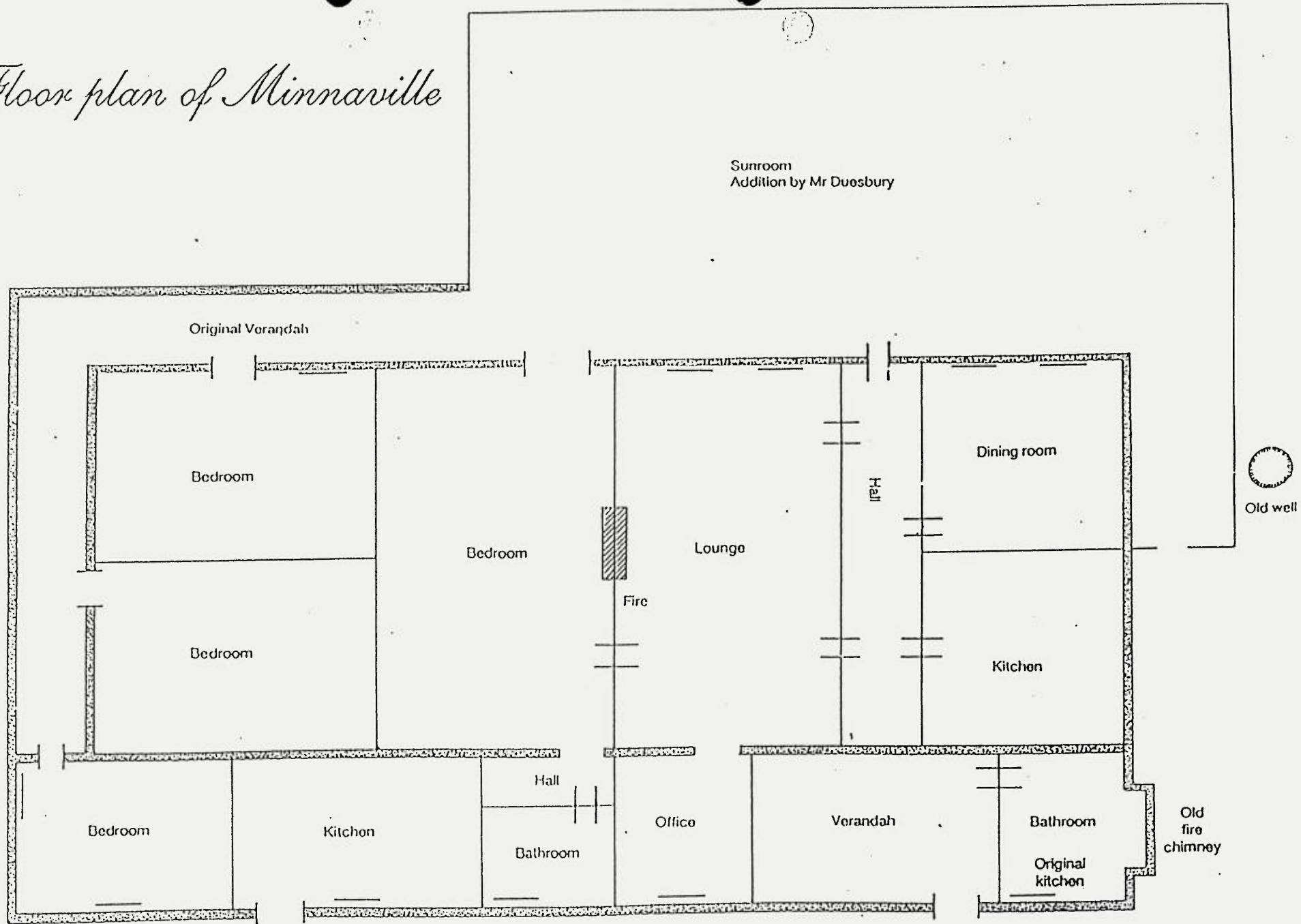
STATEMENT OF SIGNIFICANCE:

The house and outbuildings at "Minnaville", Castlereagh Road, Castlereagh, have architectural and historic significance as a rare example of early colonial farm buildings. Despite later changes the buildings retain significant surviving evidence of early Colonial design and construction.

The site is historically significant as it is part of a series of colonial land grants along the Nepean River, whose settlement contributed to Castlereagh becoming an integral member of the Macquarie Five Towns.

The site has potential for considerable archaeological, scientific and agricultural research.

Floor plan of Minnaville



KEY

— Original House

— Door

The house was divided into flats by Mr Duesbury

APPENDIX F

PRESS CUTTINGS
(Sample Only)

Historic home under threat

DISCUSSIONS are under way between The Penrith Lakes Scheme and the National Trust over the fate of Minnaville at Castlereagh.

Minnaville, once the home of early settler John Harris, has recently been listed by the National Trust but is in the middle of a site for a proposed flood weir.

"Minnaville was not a listed property when the lakes scheme was designed," said lakes general manager Ian Stainton.

He said other heritage sites had already been incorporated into the scheme.

"If it is a significant heritage site, our general approach is to restore and incorporate," he said. "We are not interested in trampling over the traces."

Protected sites now include Hadley Park,

Upper Castlereagh church and school and two cemeteries.

Stephen Davies of the National Trust said there should be a thorough investigation to determine whether Minnaville was, in fact, a significant site.

"The house was not picked up in earlier studies because from the outside it does not look significant."

However, Mr Davies said there was a possibility the house may have been built before 1850. A heritage listing does not mean the house cannot be demolished.

Minnaville was classified by the Trust after submissions by the Nepean District Historical Society, led by Jean Grey, the author of *Magnificent Minnaville*.

- GAIL KAVANAGH

P. PRESS TUES. FEB. 14, 1995. P. 7.

LETTERS TO THE EDITOR

Area's history sunk by the lakes scheme

THE people of Penrith should have been given a choice. We could have the Penrith Lakes Scheme or heritage of the area. It seems we can't have both.

However, we were not given the choice. We were told we are to get these wonderful lakes and lose all our history whether we like it or not.

Castlereagh Rd and the farms along it were some of the earliest in the history of our country. No other council or community would stand for the destruction of such early history. Why are we so apathetic?

Over the years the lakes scheme has systematically destroyed so many historic buildings and sites in the Castlereagh area. Sure they are keeping six sites — McArthy's Cemetery and the church/school complex at upper Castlereagh.

Let me just tell you a few of the items we have lost for all time. McArthy's house was the oldest in Australia continuously occupied by the one family, Parkers' Slaughterhouse — a unique old industry, the trees Dame Mary Gilmore's parents planted and of which she wrote, very old farmhouses and ruins, sites of old inns and more.

Now they are talking about knocking down Minnaville which has recently been classified by the National Trust. This was the home of John Harris who came to that area in 1806 and whose family lived there last century.

Apparently the lakes scheme does not have to ask Penrith Council if they can knock down our history.

In the fight between making money and retaining history money always wins.

Lorna Parr
Cranebrook



☐ CLR Kevin Crameri stands outside an historic sandstone barn that dates back to the early 1800s. Photo by Glenn Shipley.

Lakes threat

A Penrith councillor fears the yet-to-be-completed Penrith Lakes Scheme could destroy some of the area's heritage.

Cr Kevin Crameri said a number of historic properties had been lost to make way for the Penrith Lake Scheme and he has now called for a list outlining the heritage sites remaining in a bid that they might be saved.

He says Castlereagh Road boasts some of the best farming land in the history of the country and he could not stand by and watch it be destroyed.

"Some of these houses date back more than 100 years. I have asked for an outline of the properties that have an historic order on them and I hope that will be delivered to me soon," Mr Crameri said.

The debate has been going on since 1972 when plans were first

By ILLIANA RUSCIO

made for a multi-million dollar lakes scheme. Two years later, Mr Crameri joined Penrith Council and is still fighting to have the area saved - even turned into a tourist attraction.

Mr Crameri said three properties have since been destroyed, one will soon be demolished and six other sites will remain, including McArthy's House - the oldest home in Australia.

The Castlereagh Uniting Church, built in 1847, is among the six properties that will remain and Mr Crameri said it was probable the houses dated back further as the church would only have been built after the village was established, making some houses more than 150 years old.

Penrith Press - Tues. 29-11-1988

Jean takes her ancestor's life

and writes all about it

by RICHARD BRYCE

THE great-great-great-grand-daughter of one of Penrith's original residents has published a book to "set the record straight" on the development of the historic Castlereagh district.

Magnificent Minnavale traces changes in the area from the first 90-acre land grant given to ex-convict John Harris in 1803, to today's Penrith Lakes Scheme, set to transform the property into a 21st-century recreation park.

Mrs Jean Gray, of Toongabbie, is one of thousands of descendants linked to Harris — whether they know it or not — who came to Australia in 1790 on the Scarborough.

Her direct lineage comes from Ann Cook, whose first husband died shortly after her ship left England

and whose son William — Mrs Gray's side of the family — was born at sea just outside Sydney Harbor.

Cook married Harris and lived at Minnavale House, though some historians say the home was built years later by John Single in 1822.

Mrs Gray, 68, said last week that her research showed Ann Cook also owned Hadley House for a short time, before it was sold to Charles Hadley.

Her work is based on land ownership documents — "it's absolutely fascinating how it's changed" — which she regards as providing a more accurate historical picture than other written records.

Mrs Gray said much of the confusion among historians resulted from the fact that three John Harris' were among the first residents of the time,

and two Charles Hadleys.

"And these people were all inter-married as well, so it was easier to look at the land," she said.

A first-time author, Mrs Gray said she published her research in an effort to preserve Castlereagh's history after European settlement "before it's all gone".

Ann Cook died in 1835 and was buried off Church Lane, Castlereagh. Mrs Gray suspects John Harris also is buried there

Preserving history 'before it's all gone'

— although there is no headstone — because the site appears to be designed for two graves.

Magnificent Minnavale, which was published by Mrs Gray last week after four years of work, includes historic maps, photos and family trees.

To order a copy, write to Mrs Gray at 21 Willmut Ave, Toongabbie, 2146.



MRS Gray at the Church Lane gravesite of Ann Cook ... book "sets the record straight".

CONTRIBUTOR: Magnificent Minnavale

APPENDIX G

REPORT BY GRAHAM EDDS & ASSOCIATES

ARCHITECTURAL ASSESSMENT OF

“MINNAVILLE”

Castlereagh Road, Castlereagh NSW

& INPUT INTO ARCHAEOLOGICAL ASSESSMENT
OF THE PROPERTY

Prepared By:

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Sub-consultant to:-

SIOBHAN LAVELLE

Historical Archaeologist

In Conjunction with:-

Nepean District Historical Archaeology Group

July 1996

1.0 INTRODUCTION

This architectural assessment has been sanctioned as a subconsultancy to an archaeological study of the 'Minnaville' building complex being undertaken by Siobhan Lavelle in conjunction with the Nepean District Historical Archaeology Group and forms an appendix to the archaeological study.

'Minnaville' has been architecturally assessed by Graham Edds, Graham Edds & Associates, on 17 July 1996. The findings of this assessment were discussed verbally with Siobhan Lavelle on site and general agreement reached as to its probable origins. This report is based on physical evidence only and the writer's knowledge of early structures of the Nepean/Hawkesbury area, in particular the early land grants and the structures which go with them. Parts of the structures have been photographically recorded within Appendix 1 of this report.

2.0 DESCRIPTION OF THE PROPERTY

Although the property contains the building thought to be 'Minnaville', numerous outbuildings, horse yards and other shed structures within a perceived curtilage, including trees and shrubs, this report is confined to the cottage (or residence) and the barn structure. Refer to Fig No 1.

2.01 "MINNAVILLE" THE COTTAGE (or residence)

'Minnaville' is a large rectangular residence containing thirteen (13) rooms from varying stages of construction covered by a hipped roof with skillions both front and rear. This complex of thirteen rooms has grown from a symmetrical Victorian/Georgian style structure of six rooms with central hallway and rear verandah with its frontal elevation toward Castlereagh Road and its rear, the river.

In an endeavour to understand the growth of this structure it is worth discussing the sequence of construction. This has been outlined in the following sub-section and diagrammatically recorded within Fig No 2.

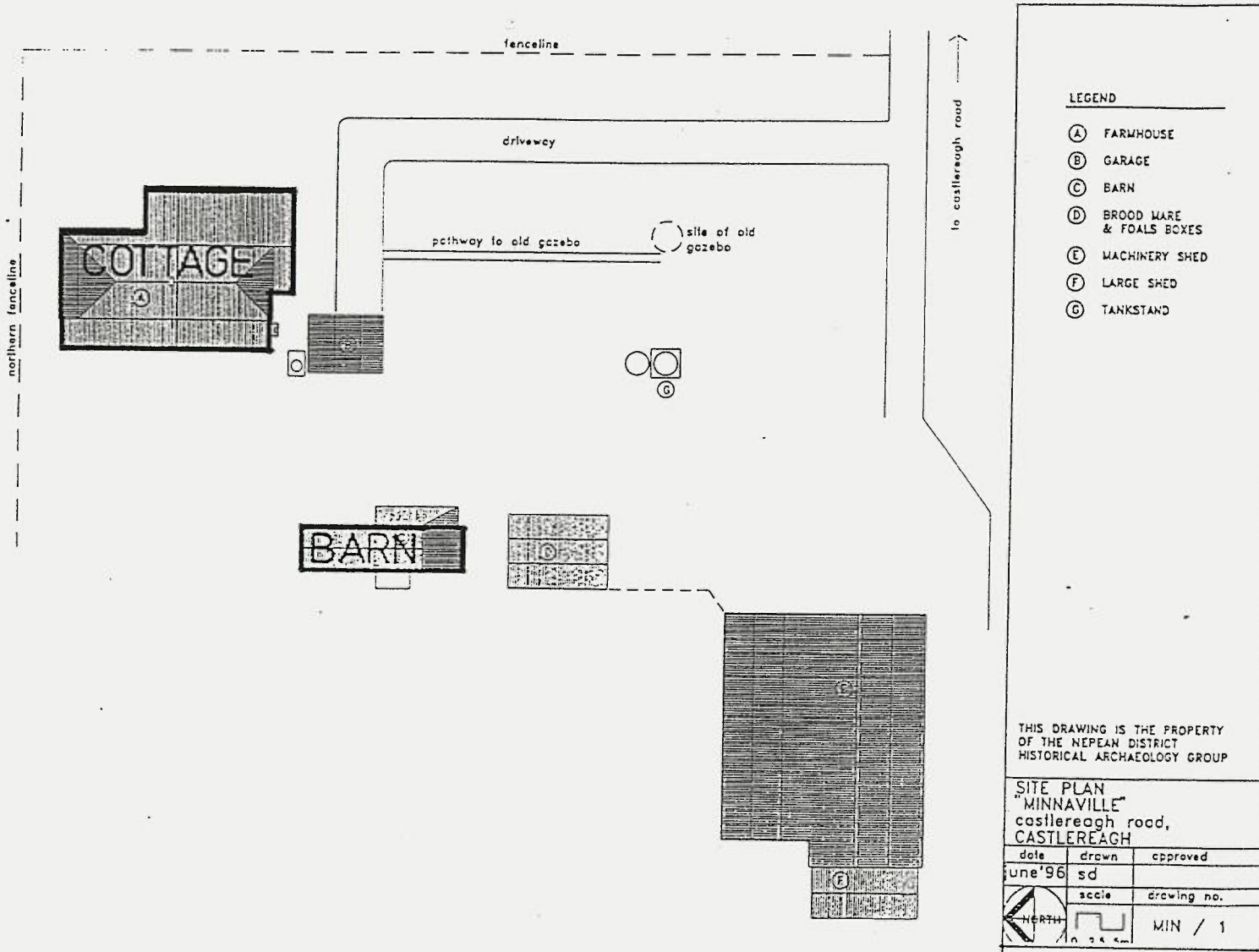
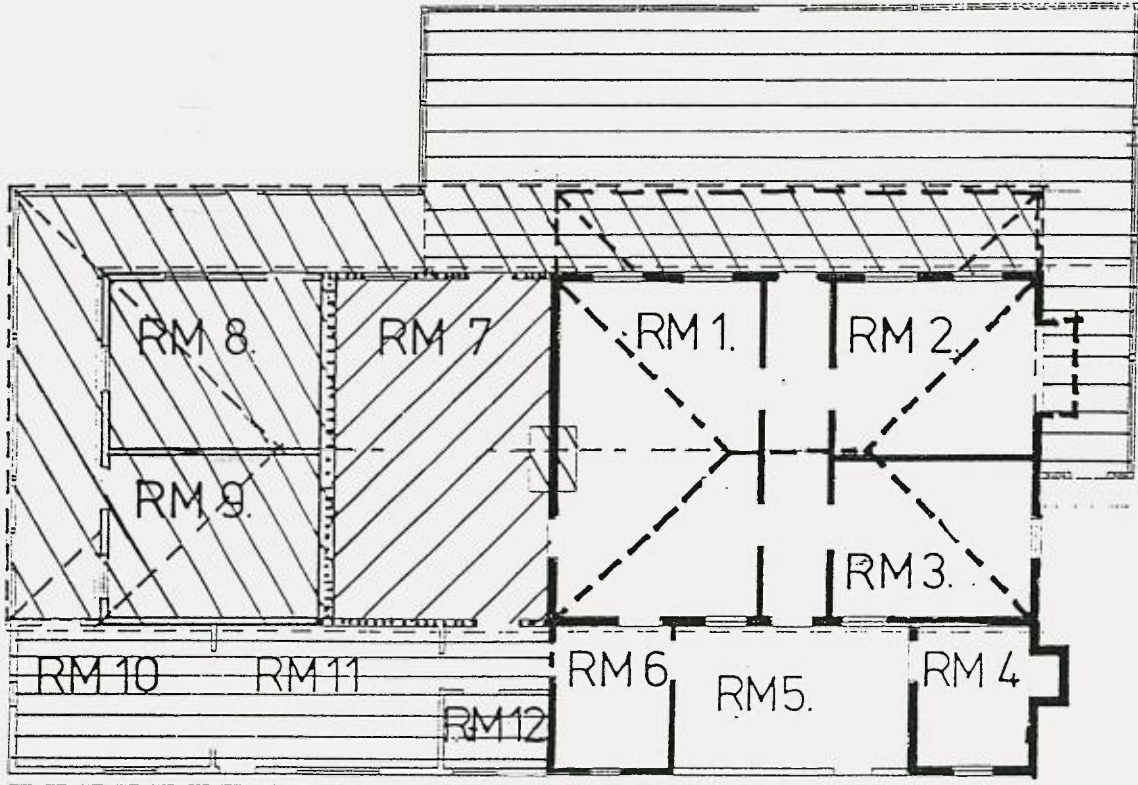


Fig No 1
 Part property plan
 Reduced image from drawings
 prepared by N.D.H.A.G.
 June 1996



FLOOR PLAN:
'MINNAVILLE' COTTAGE.

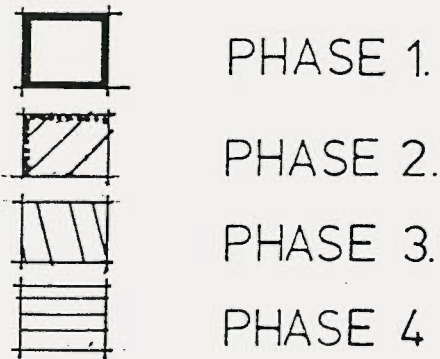


Fig No 2
Sequence of construction
"Minnaville" cottage
Plan image amended from
drawings prepared by N.D.H.A.G.
June 1996

"Minnaville" sequence of construction & description of the parts.

Although the complex displays many construction phases within its development three major phases are important to be recognised for this analysis.

Construction Phase 1:-

A symmetrical four room Victorian/Georgian cottage with a central hallway and hipped roof facing Castlereagh Road, two additional rooms and an open verandah beneath a skillion roof at rear and probably a verandah at front. (The verandah is no longer extant). Refer to photographs 1-9 inclusive.

The structure is timber framed, weatherboard clad externally and originally lath and plaster lined internally. The timber frame consists of a top plate and bottom plate with vertical studs between. Although not sighted at the inspection, it is probable that the framework has been nogged with masonry, either brick or some other material, between the timber frame. These frames being clad as previously described.

The main hipped roof framework consists of regular sized rafters, collar ties, ridge and hip timbers, milled by pit sawing and fixed by early nails. The former roof cladding of timber shingles are still extant beneath corrugated iron sheeting.

The windows in the main frontal elevation consist of twelve pane, timber frame windows comprising two sashes each of six panes. The windows are of a large proportion consistent with room size and a three metre (3.0m) ceiling height.

The original door, now replaced, is believed to be a half solid timber panel door and half glazed panel door located at the entrance to Room 4. All other internal doors are four panel solid timber doors with inlay mouldings. Most have the architraves replaced.

Similarly most of the decorative finishes within the building ie Rooms 1, 2 and 3, have had these features removed and replaced with modern equivalents including the cement

rendering of the walls internally and replacement of the original lath and plaster ceiling with fibrous plaster and decorative cornices.

Room 6 is an important room in that it retains the majority of its original internal finishes ie portions of lath and plaster surfaces, door frame, architrave and skirting mouldings, four panel doors, window frame within the external wall but with the sashes removed.

The original cladding of splayed boarding with a decorative bead along the bottom is generally extant in most wall surfaces.

The original fireplace and chimney from within Room 2 has been removed and the opening altered to accommodate French doors.

Room 4, now used as a bathroom and fitted out for that purpose, may have originally been the kitchen as it has an external fireplace and flue large enough to accommodate the preparation of meals within the fire hearth area. The room size however, being only 3.0 metres x 2.4 metres is thought to be very small for a kitchen to serve a building from this period of construction. The fire hearth could not be examined as it was lined with recent claddings and tiled in a continuous face along the wall covering the fireplace.

This phase of the building is identified within Fig No 2 "Sequence of Construction" drawing as Rooms 1-6 inclusive.

Construction Phase 2:-

The addition of two further rooms to the north of Room 1 and identified on Fig No 2 as Room 7. It appears from fabric evidence that this addition followed closely after phase 1, however with a differing external appearance, but maintaining a pitched roof structure as an extension of the earlier hipped roof. Refer to photographs 11 and 12.

The walls of this addition were constructed in a very similar manner to those of the former building containing timber framework and nogged in a similar formation. The external

wall facing Castlereagh Road (eastern wall) originally contained two sets of French doors with timber shutters swinging externally. Only one of those French doors remains extant, the other being infilled with a smaller window and panelling beneath the sill down to the floor level.

The roof structure is again constructed identically to the former phase with matching sized rafters, collar tie and ridge. The timbers were also pit sawn and of regular size. The construction of this roof has left insitu the hipped rafters from the earlier building.

Construction Phase 3:-

The addition of two further rooms (Rooms 8 & 9) to the north adjacent to the former addition (Room 7) including an extension of the verandah at front and around the northern face of the building resulted in the total resembling a long rectangular shaped building concurring with the photographic image within the publication *Magnificent Minnaville* and described as "*Minnaville during the 1930s (photograph courtesy Mrs June Lee)*"¹. Refer to Fig No 3 and photographs 13-19.

Again the wall and roof structure are very similar to the preceding stages of construction and it is within Room 9 that it can be confirmed that the infill is certainly of brick nogging. Openings within the walls of Rooms 8 and 9 contain identical French doors to the previous addition and including timber shutters on the outside. It can be noted that two of the French door openings have been enclosed with a window and similarly panelled between the sill and the floor level. Shutters to these French doors have also been removed, although evidence of the hinging still remains.

At this time a verandah would have been extended along the eastern and northern face of the building around these additions. As the northern verandah culminates in a hip immediately adjacent to Room 9 it is likely that this verandah was constructed and finished at this point and that the formation of Rooms 10, 11 and 12 did not occur until much later. This phase did however, include the formation of a double skin brick wall

¹ Gray, Jean A, *Magnificent Minnaville*, 1988

Minnaville during the 1930s
(Photograph courtesy Mrs June Lee)

Architectural Assessment of "Minnaville", Castlereaigh &
input into archaeological assessment of the property
Prepared by Graham Edds & Associates, July 1996

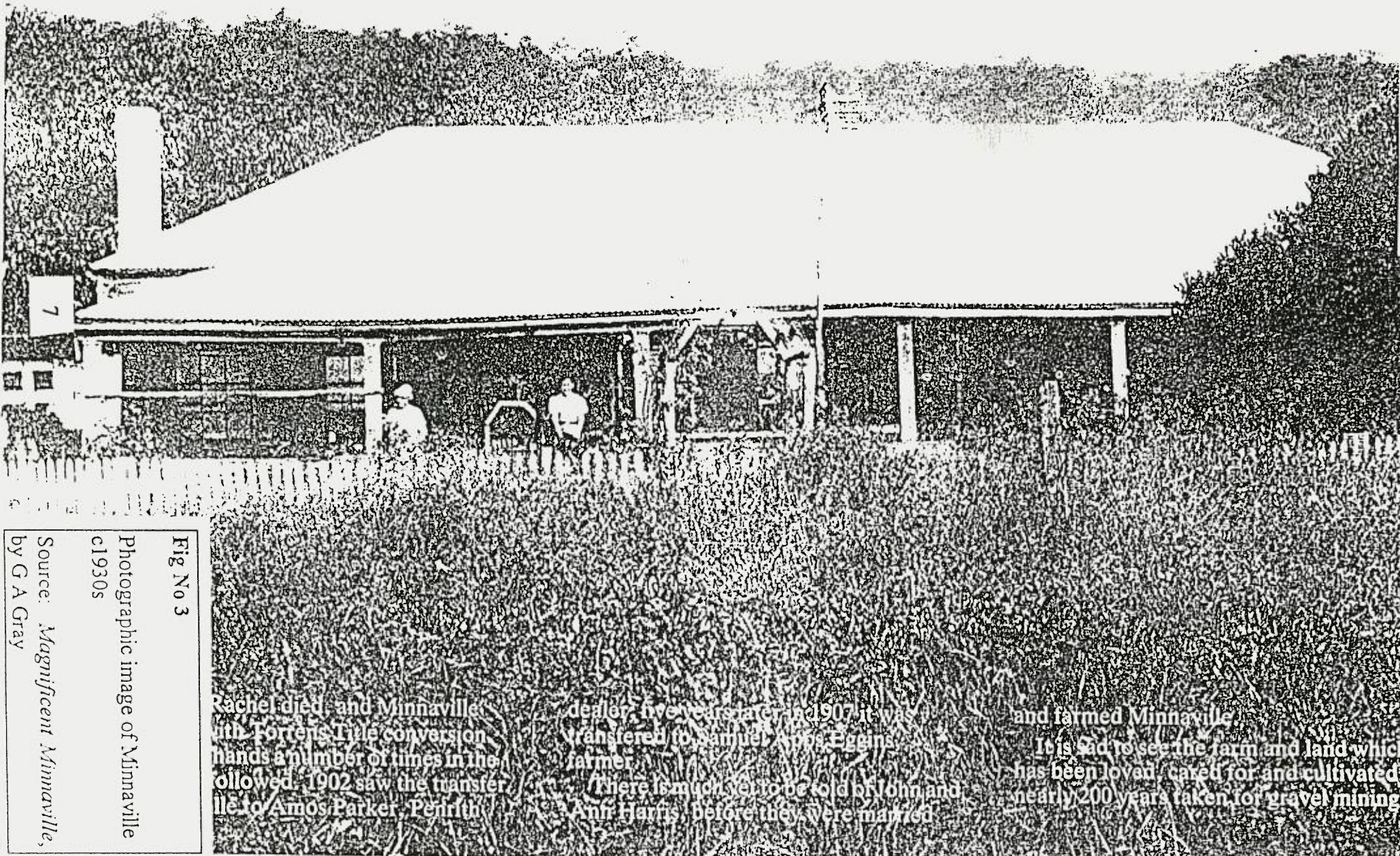


Fig No 3
Photographic image of Minnaville
c1930s
Source: Magnificent Minnaville,
by G A Gray

Rachel died and Minnaville
with Fortens Tile conversion
hands a number of times in the
followed. 1902 saw the transfer
to Amos Parker, Penrith

dealer, five years later in 1907 it was
transferred to Samuel A. Egans,
farmer.

There is much yet to be told of John and
Ann Harris, before they were married

and farmed Minnaville.

It is sad to see the farm and land which
has been loved, cared for and cultivated
nearly 200 years taken for gravel mining

between Rooms 8 and 7, and 9 and 7, the insertion of the central fireplace within Room 1 and Room 7, the removal of the dividing wall within Room 1 and the removal of the dividing wall within Room 7. (Evidence of this is obtained from within the roof void with bricks identical to those used within the wall nogging).

It is also evident that with the extension of the hipped roof above Rooms 8 and 9 this has been framed up using fixings of machine made nails whereas the previous structures were fixed using hand made nails.

As previously noted Rooms 10, 11 and 12 were constructed during a later phase at a time when the cottage was divided into flats and possibly during the ownership of Mr Duesbury, c1950s. Similarly the addition of the large sunroom at the front of the building (Room 13) probably occurred at this time along with internal alteration and refurbishment of all of the rooms. Amongst other things these alterations included the cement rendering of most of the wall surfaces, the removal and replacement of significant architrave and skirting fabric, fireplace formations, the removal of a fireplace and chimney within Room 2, the alteration of French doors to windows with a panel below the sill level, the construction of fibrous plaster ceilings throughout with decorative cornices including recessed light fittings and fitments of the day.

Discussion

The structure of the three main construction phases appears to embody very similar structural techniques both for the wall and roof framework (the floor frame work could not be accessed and is therefore not described).

The majority of wall framework appears to be constructed of timber studding morticed and tenoned into a top plate and bottom plate. The bottom plate bearing on sandstone foundation. It is thought that the space between the timber studs is infilled either with brickwork or some other material, however this has not been conclusively tested within the majority of wall areas except for Room 9 where it is readily apparent at the north west corner immediately adjacent to the verandah end (refer to photograph 16). It also appears that the majority of internal walling is similarly constructed, however it is believed that this does not contain the brick or masonry infill

but instead was clad on the face of the wall frames in lath and plaster. Evidence of this was sighted and photographed within the roof space immediately above the common wall to Rooms 2 and 3 (refer to photograph 9).

The roof framework is consistent throughout, using timbers of pit sawn origin, originally with shingled roof covering (extant) immediately beneath the existing corrugated metal cladding. The roof framing formation is a coupled roof with the ceiling joists and rafters running in the same direction and providing triangulation. The hipped formation over the phase 1 structure is still evident as the hip rafters are still in place and in phases 2 and 3 the roof framework simply has been added to this arrangement. Except for isolated structural members that have evidence of termite activity the roof structure maintains a reasonably sound configuration. Hand made nails have been used to fix the timber members together within phase 1 and phase 2 roof structure, however the phase 3 roof structure has been fixed by machine made nails (these have been described within the main body of the archaeological report).

The wall structure between construction phase 2 and construction phase 3 differs from everywhere else where it has been constructed using solid brickwork two skins thick, and presently without any door formations linking these rooms to the former building. Within the sequence of construction and analysis of the brick type, it is believed that the addition of Rooms 8 & 9 (phase 3) the separating wall previously described and the chimney between phase 1 and 2 were all constructed at the same time. It is also probable that the division wall within Room 1 and Room 7 was also removed at that time.

The sample of sandstock brick shown in photograph 19, Appendix 1, indicates a sandstock brick of size approximately 220mm x 110mm x 70mm high containing a shallow diamond shaped frog is recorded within Warwick Gemmell publication of *The Brickmakers of New South Wales*, titled *And So We Graft From Six To Six*, p.73 as manufactured from a Penrith based brick making firm known as the Nepean Brick and Tile Company and belonging to William Fleming. This company was set up in 1866 and was situated in the Hornseywood Estate off Castlereagh Street.

Fleming advertised bricks that were "hard square and make the driest walls". Fleming closed his yard down shortly before his death in 1897 when he found that he could not compete with the modern machinery being used by his competitors.²

Although bricks from this yard had frogs with the initials "W F", Fleming's sandstocks were impressed with rectangular and diamond shaped frogs as well as with the initials "W F".

It is likely, then, that phase 3 utilised bricks from William Fleming's brickmaking yard at Penrith and could not have been constructed prior to 1866.

2.02 "MINNAVILLE" BARN STRUCTURE

The barn can be described as a single storey outbuilding with loft and skillion at one end. Although the barn has been infilled and developed for other purposes during its life the main structure remains intact but without its original external claddings. Refer to photographs 20-22.

The barn comprises a structure similar to those found within the Hawkesbury district and generally determined to be a timber post and beam structure where the posts continue past the loft floor structure to a wall plate, forming the pitching plate for the gabled roof above. The posts are generally at 1500mm centres, roughly squared in shape and are set into the ground for structural rigidity. A central row of posts at larger centres form two bays within the barn width, halving the span of the floor joists and assisting in supporting the loft above. These posts together with rails housed within provided divisions for former stables or similar. (The division rails no longer exist).

The floor joists to support the loft floor are generally spaced at 500mm centres so that every third joist is actually dove-tail jointed into the post on each side of the barn. (This is a refinement not necessarily found in other barns). The intermediate floor joists are supported on a perimeter wall beam.

² Gemmell, Warwick, *And So We Graft From Six to Six, The Brickmakers of New South Wales, Penrith and St Marys*, p73; Angus & Robertson, 1986

The roof is gabled with a slope of approximately 40 degrees with rafters and battens spaced to supported the corrugated metal roof cladding.

The wall beam used to support the loft floor joists was also used to support the timber framing for the external loft cladding and also to support the top of the timber slabs which formed the cladding for the lower walls of the barn.

The loft is framed between the posts with vertical studding for the fixing of horizontal splayed boarding. This boarding is replicated within the gable end wall areas. At the northern gable the loft floor projects out and a door is inserted centrally within the gable to provide access to the loft and a means by which produce could be handled and moved into the loft for storage.

The main barn wall claddings have been replaced with corrugated metal sheeting but were originally vertical timber slabs spiked to the beam at the top and embedded into the ground at the bottom.

Although the structure maintains its original form the spaces have been used for varying purposes during the barn's life and presently they are enclosed into a number of rooms. The walls and ceilings have been lined internally and a timber framed floor installed.

The extant structure has been framed using roughly squared posts and other timbers of pit sawn origin. The span of members and jointing indicate a building construction date after the 1850s and more likely to 1860-1870.

3.0 CONCLUSION

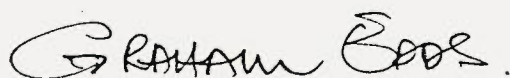
3.01 THE "MINNAVILLE" COTTAGE

The physical evidence described within this report suggests that the earlier part of the "Minnaville" residence was constructed c1860-70 (Construction Phase 1) and that Phases 2 and 3 were constructed shortly afterwards and probably between 1870 and 1880. This corresponds to the occupation by Joseph Daniel Single and possibly the construction of "Minnaville" soon after Joseph's ownership of the property in 1863. Should this be the case, and considering the historic evidence, it can be established that this extant complex replaces an earlier cottage on the property.

It is also apparent that the conclusions reached within the National Trust listing for "Minnaville", approval dated 22/2/1994, cannot be concurred with by the writer of this report. This does not mean that "Minnaville" does not contain architectural and historic significance and that it does not contribute to the understanding of the development of the Castlereagh/Nepean River farming allotments.

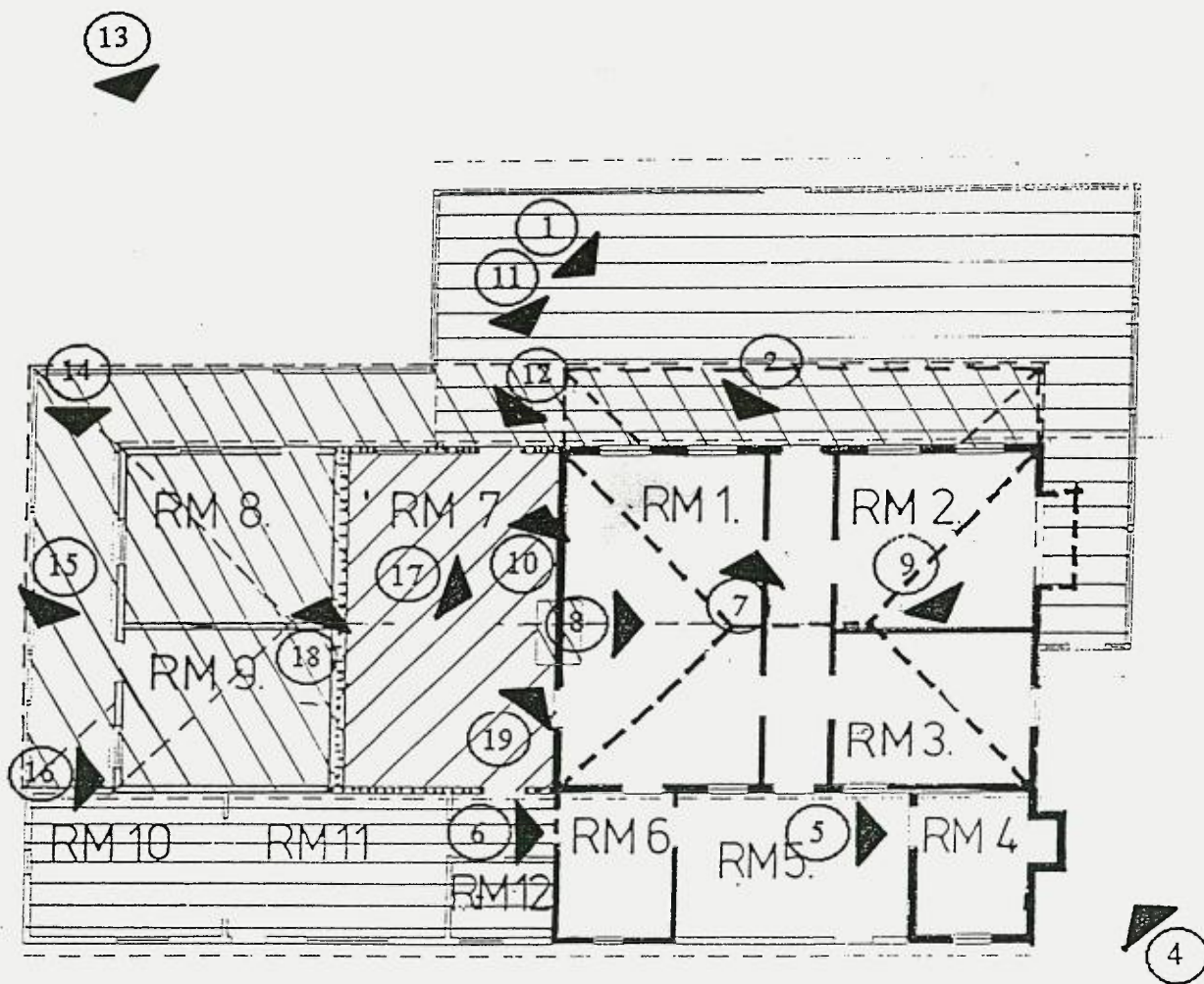
"Minnaville" is certainly historically significant, has aesthetical significance and it is believed to be scientifically significant in that the wall structure described within this report is most unusual and is certainly very rare within the Hawkesbury/Nepean settlements, yet very similar to that found at Cooma Cottage, Yass.

Timber structures with brick nogging prior to the 1840s within the Hawkesbury River settlements, almost entirely consisted of timber post and beam wall structures where the posts were embedded into the ground for stability and then infilled with brick nogging constructed between the posts and resting on the ground. The internal walls of these structures were similarly constructed (very different to what is extant at "Minnaville").



GRAHAM EDDES

APPENDIX 1

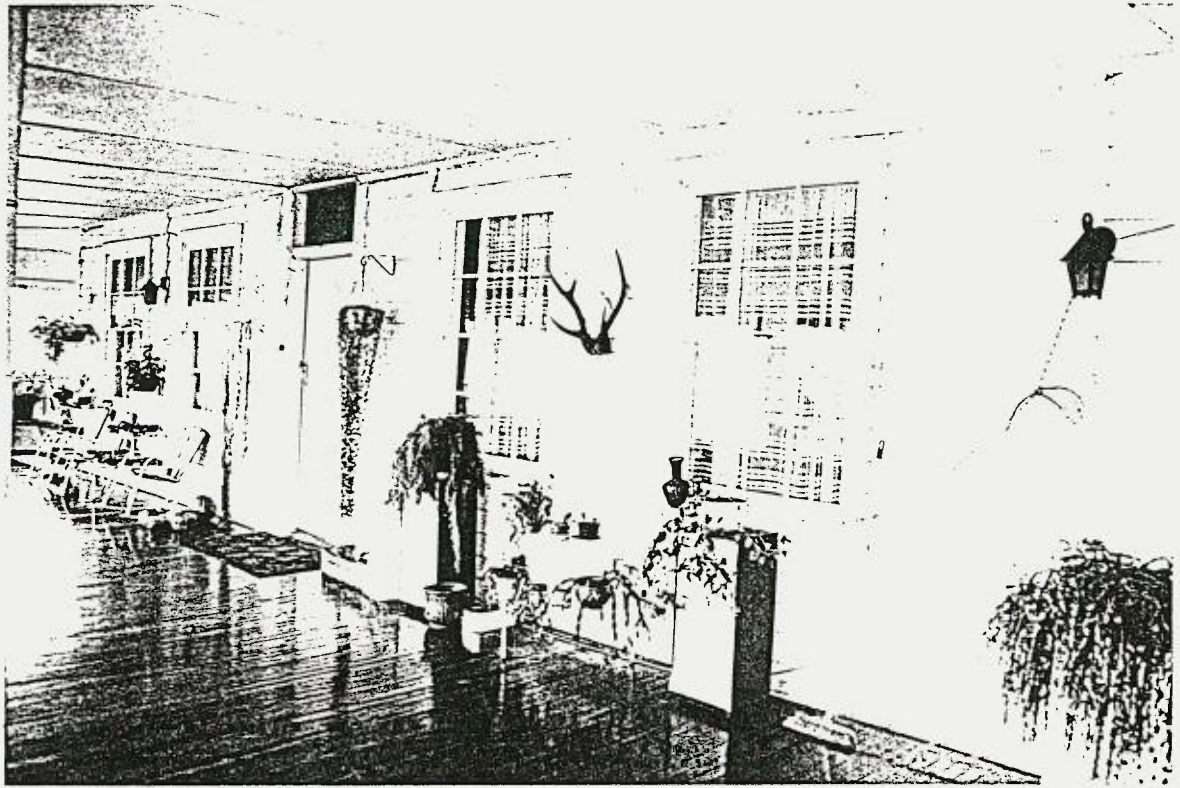


FLOOR PLAN:
'MINNAVILLE' COTTAGE.

APPENDIX 1

Fig No 4
"Minnaville" cottage
Position and direction of
photographic views

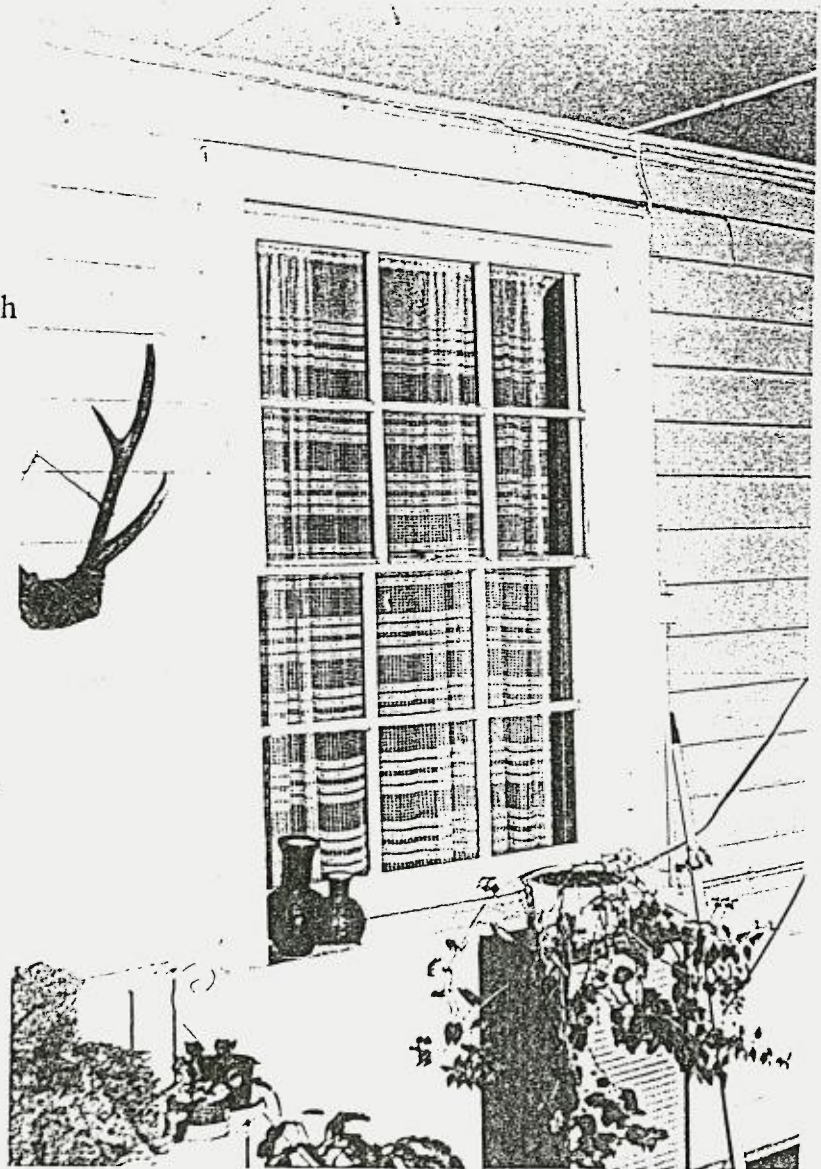
Photographs taken by
Graham Edds, July 1996

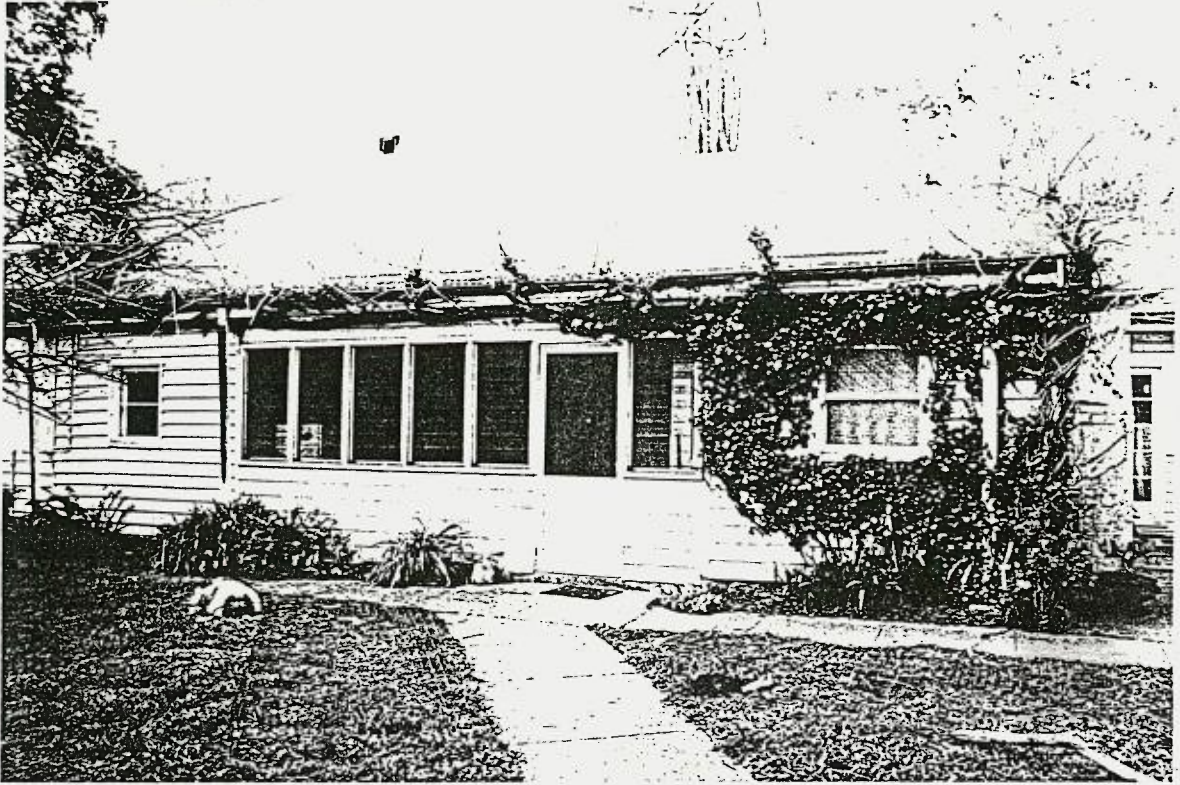


Photograph 1 Eastern external wall of phase 1 cottage (now internal wall).
Symmetrically placed door and windows
Phase 2 addition starts at butt joints of boarding near wall light fitting
(RHS of photograph)

Photograph 2

Detail of 12 pane window with
profiled architraves

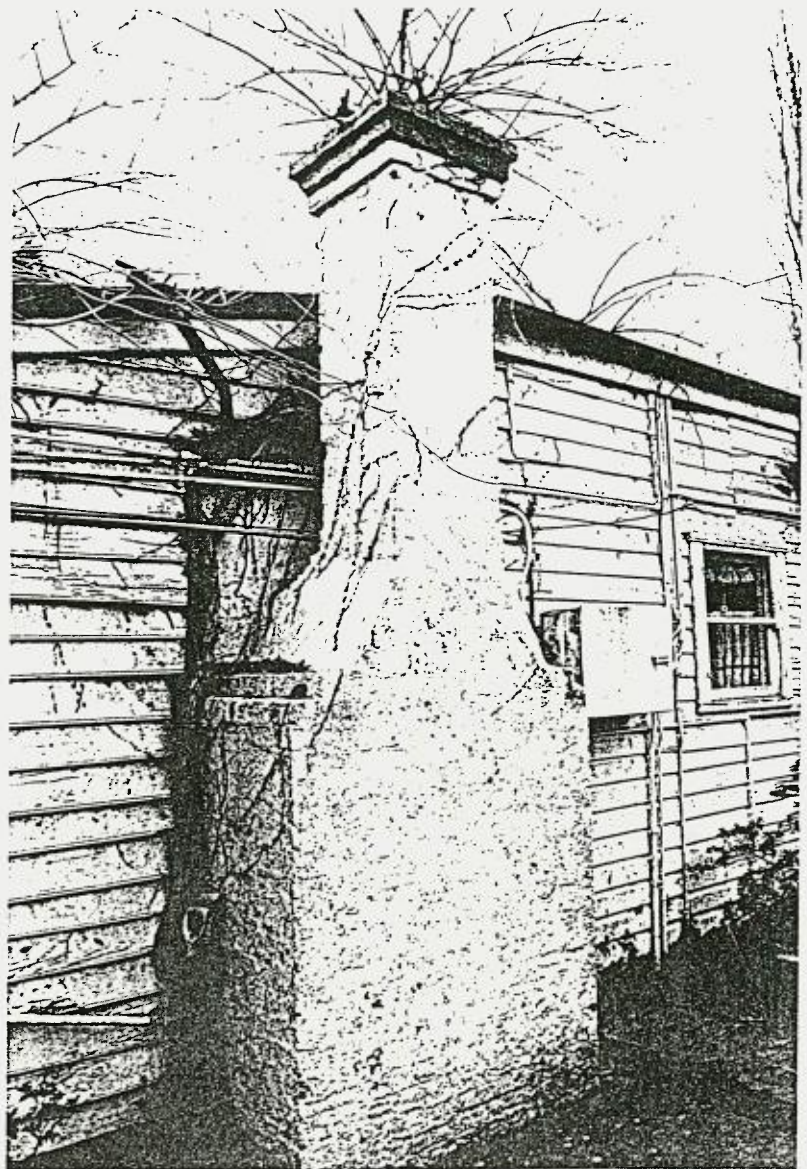




Photograph 3 Western external elevation of phase 1 cottage.
Enclosed verandah previously open.

Photograph 4

Detail of fireplace Room 4.
Possibly early kitchen cooking
fireplace





Photograph 5

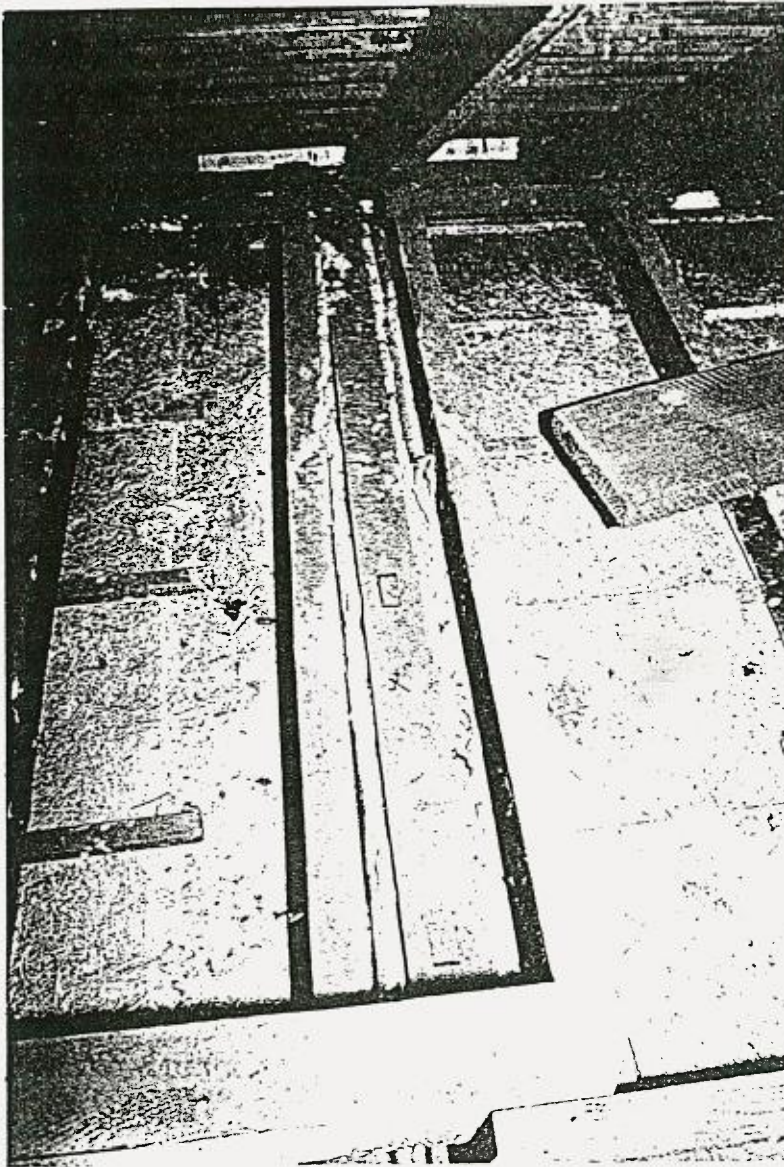
Front door repositioned to
Room 4

Four panel door with
projecting mouldings

Photograph 6

Bottom wall plate of Room 6
with mortice of stud cut off
at tenon for later doorway
opening through wall





Photograph 7

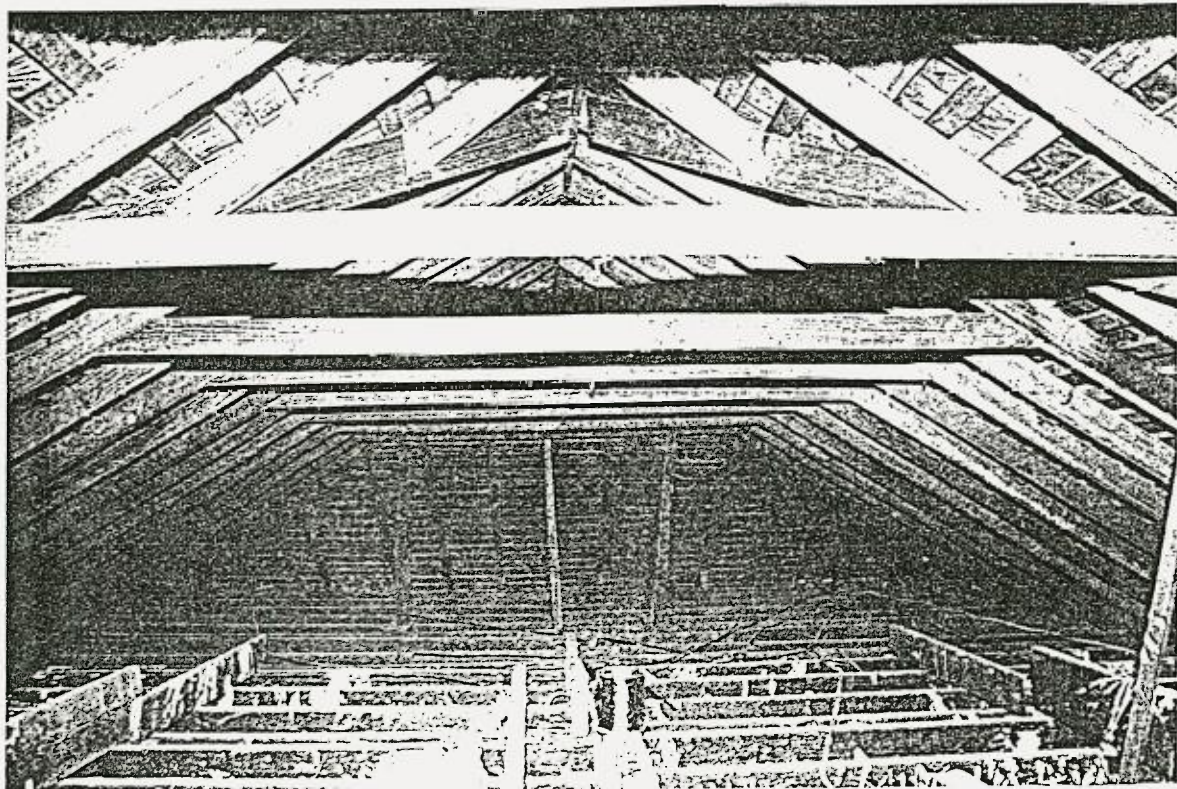
View of wall top plate showing tenon of stud projecting through mortice in top plate.

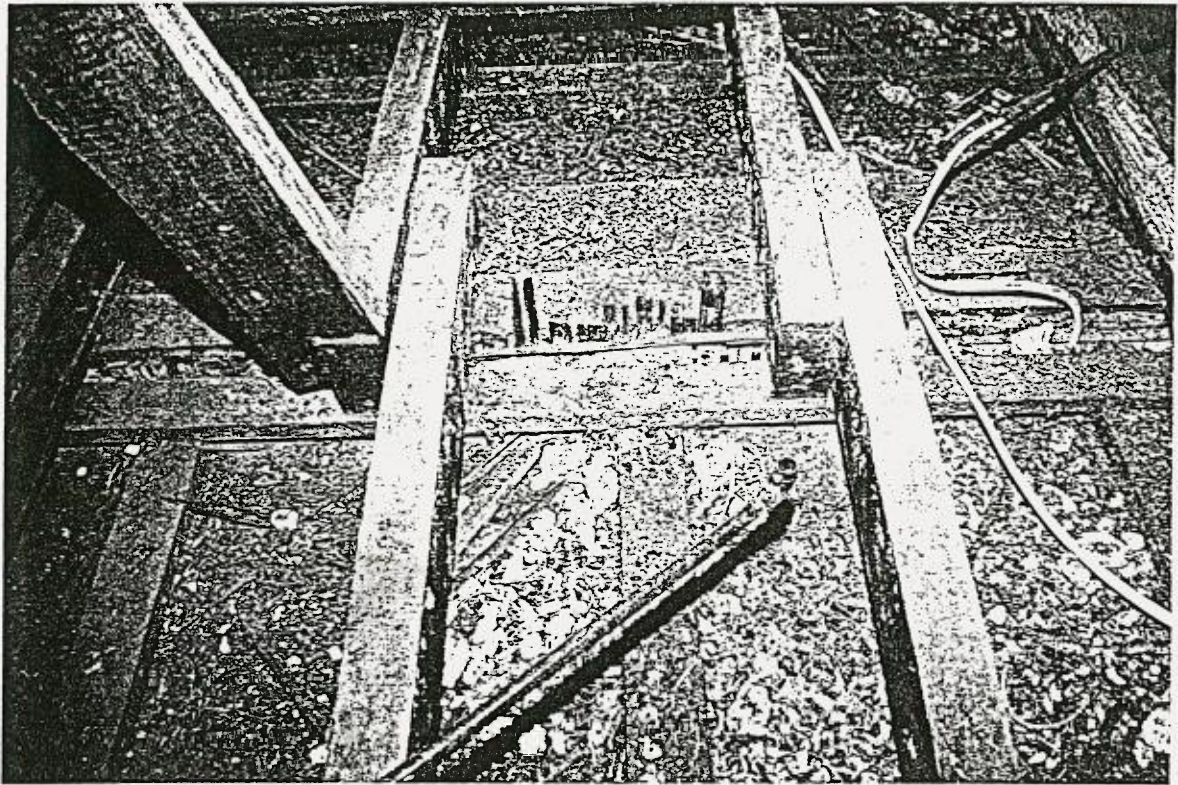
Internal wall - hallway to room

Photograph 8

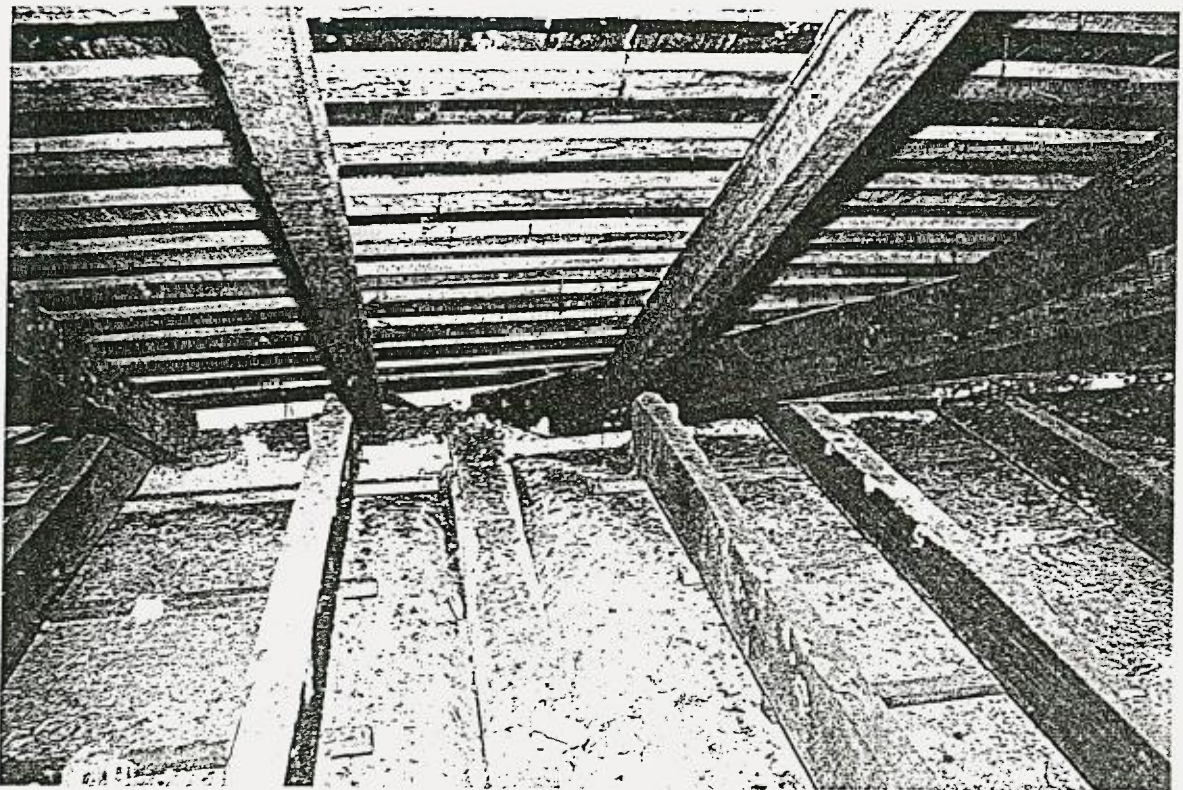
Structures of phase 1 with hip rafters still in place.

All timbers pit sawn fixed with hand made nails.





Photograph 9 Wall division between Rooms 2 and 3 showing vertically placed laths and plaster for the original wall finish



Photograph 10 Roof frame at wall junction of phases 1 and 2 with hip rafter in place. Phase 2 structure LHS of hip timber



Photograph 11

Phase 2

Eastern wall at junction of phase 1 (LHS) and phase 2 (RHS of light fitting).

Note:- Butt jointing of splayed horizontal boarding.

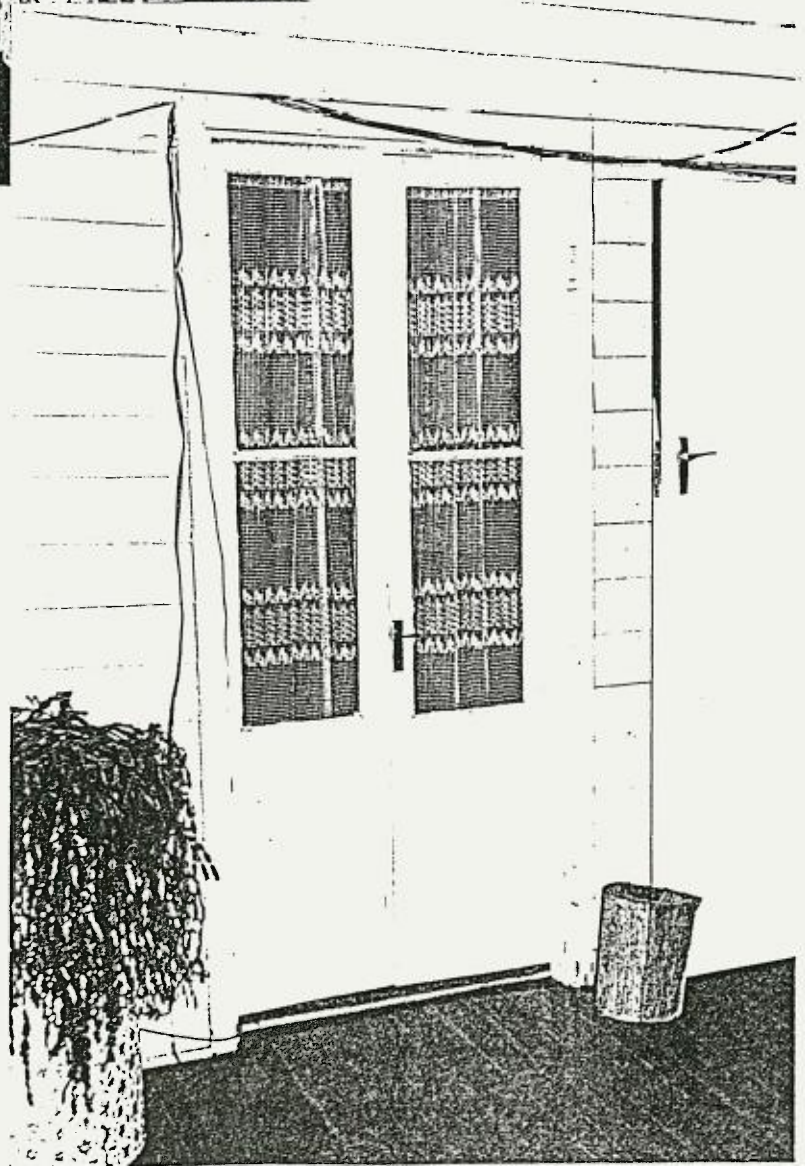
Victorian/Georgian style window LHS. Victorian style French doors originally with shutters on RHS

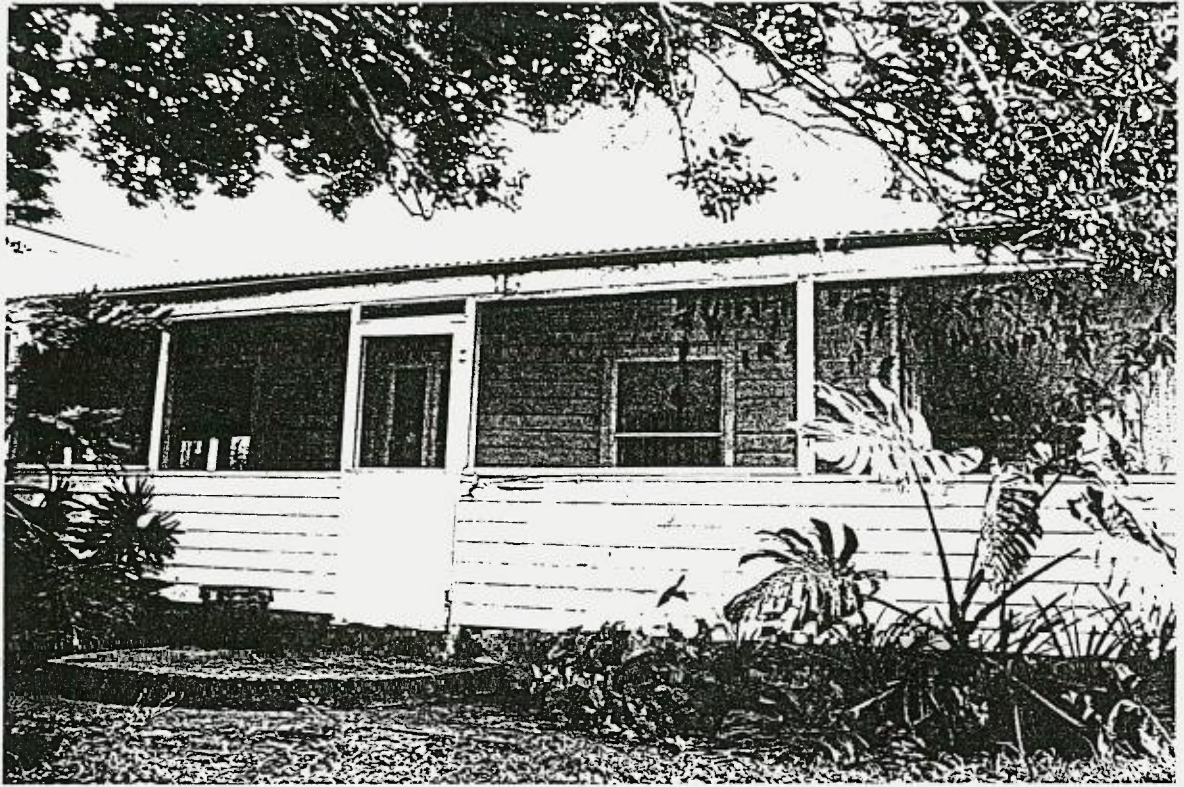
Photograph 12

Phase 2

Detail of Victorian style French doors $\frac{2}{3}$ glass with bottom timber panelled (inlay moulds).

Note:- Simple double beaded architraves around doors.





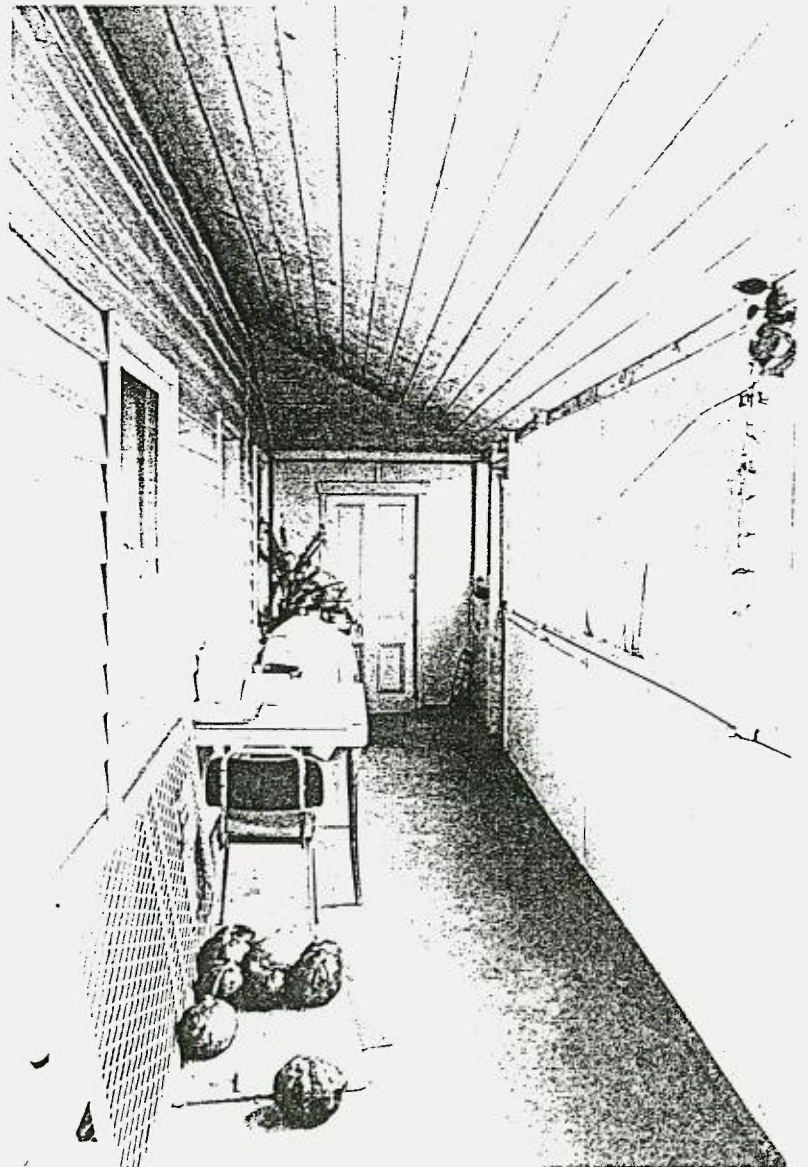
Photograph 13 Phases 2 and 3 addition with continuous roof line over verandah but at reduced slope

Photograph 14

Phase 3

Northern verandah (now enclosed)
with original fabric

- hip return to verandah at end
- double beaded verandah beam
- beaded soffit lining boards
- splayed weatherboards
- Victorian style French doors
- four panelled door moved from elsewhere
- verandah posts removed





Photograph 15

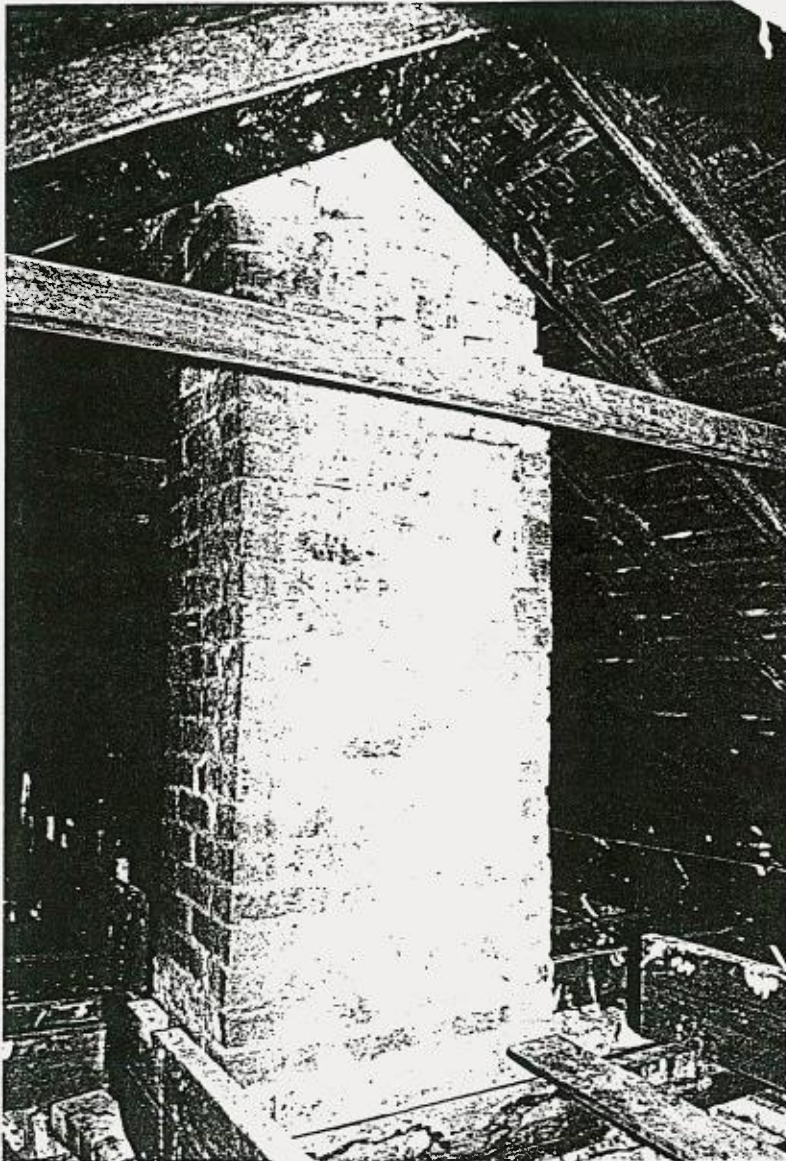
Phase 3
Verandah beam at northern
return
Double beaded finish to
beam timber (posts not
original)
Beaded soffit lining boards

Photograph 16

Phase 3

Corner of Room 9 with brick
nogging exposed behind
weatherboards



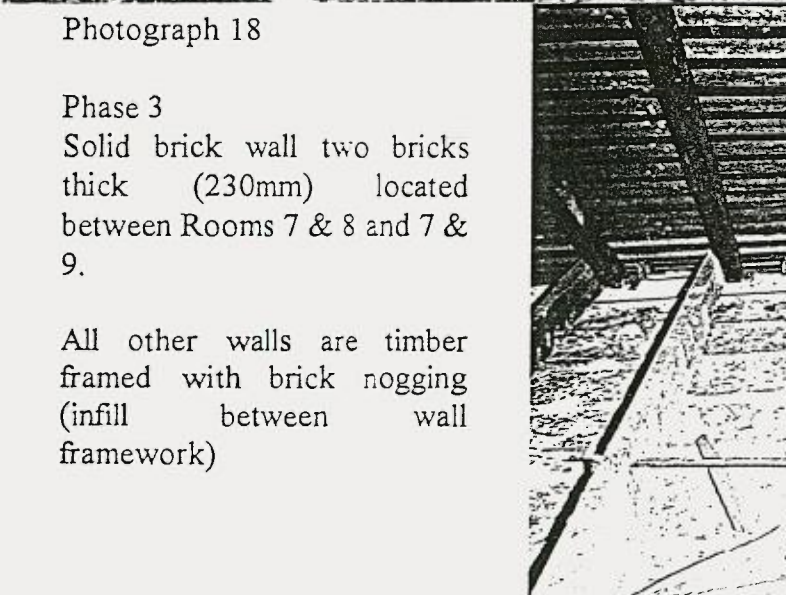


Photograph 17

Phase 3

Chimney constructed between Rooms 1 and 7 dividing wall requiring the removal of division walling within those rooms.

Note:- Brick type/age and mortar consistency of this chimney, brick nogging and wall in photograph 18 appear to be identical.



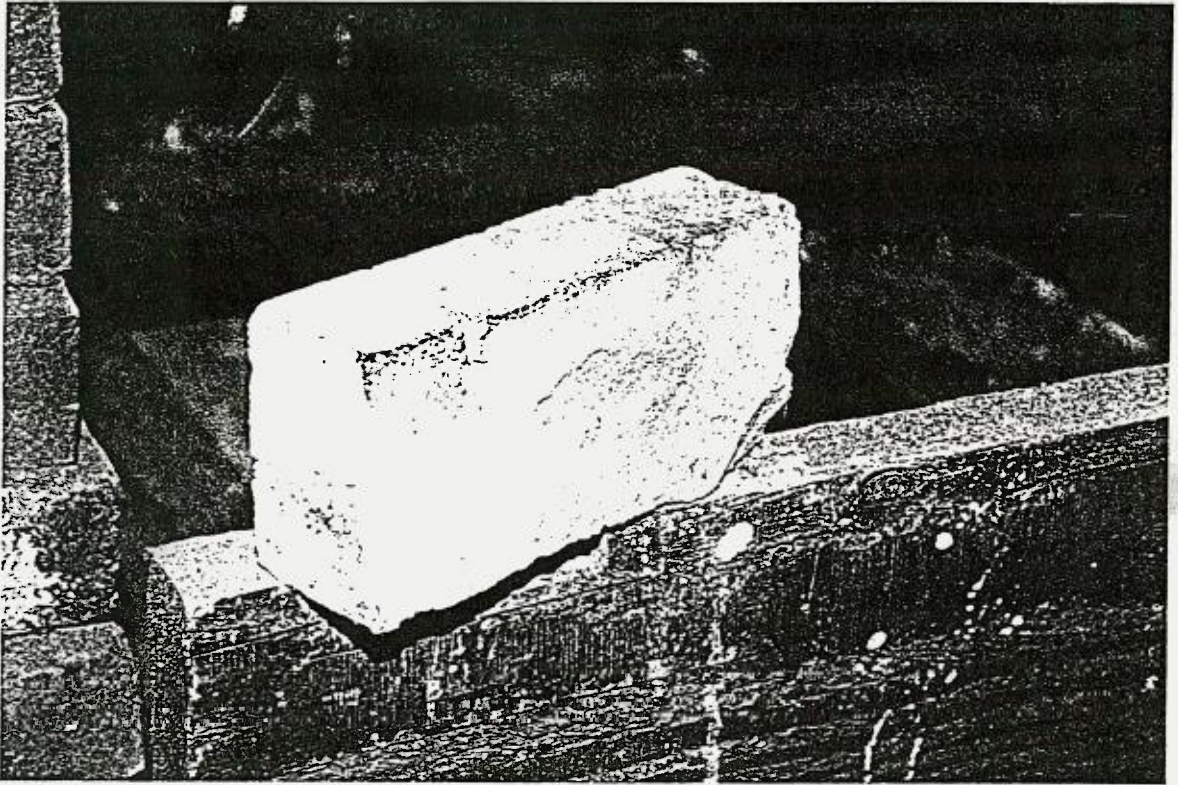
Photograph 18

Phase 3

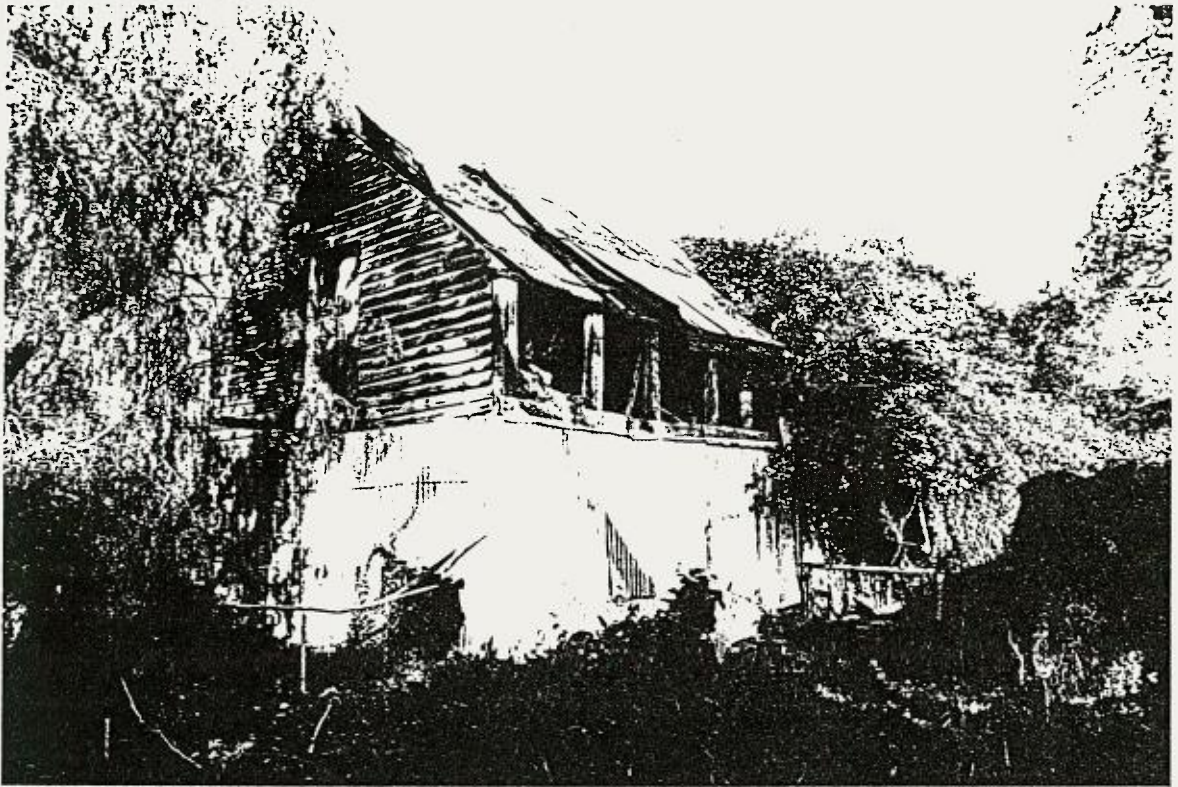
Solid brick wall two bricks thick (230mm) located between Rooms 7 & 8 and 7 & 9.

All other walls are timber framed with brick nogging (infill between wall framework)





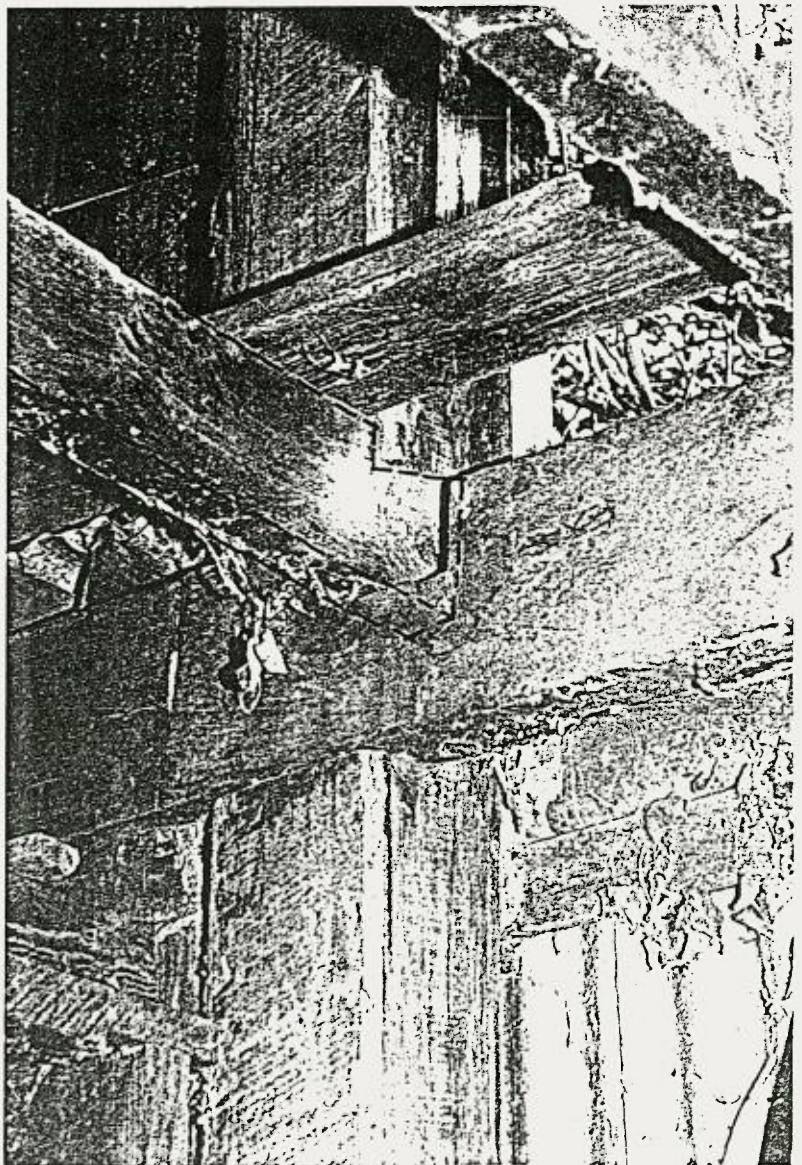
Photograph 19 Brick with shallow diamond shaped frog located at chimney (previously laid in mortar). Possibly from removed internal walls. Brick size 220mm x 110mm x 70mm and probably from William Fleming's brick yard. Similarly a section of morticed wall top plate is used for bracing within the roof space (not photographed).

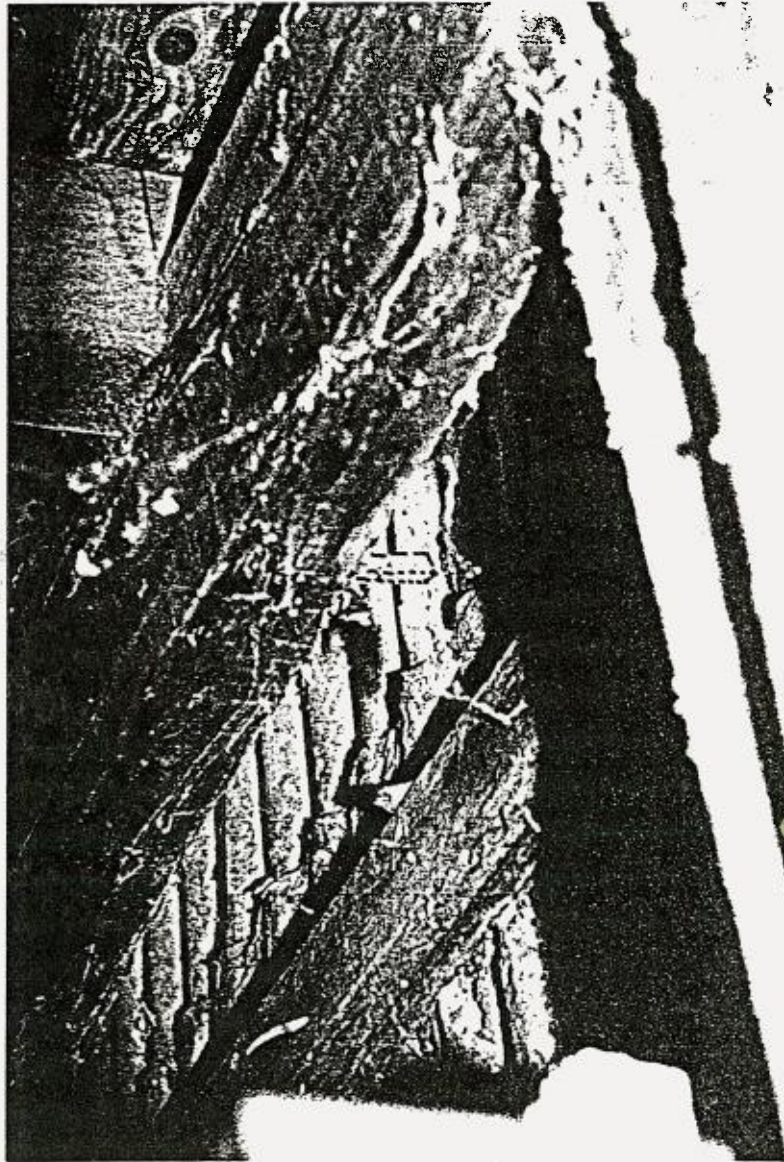


Photograph 20 Timber framed barn originally clad with boarding to loft space and vertical timber slabs below

Photograph 21

Post and beam structure pit
sawn timbers, dove tail timber
joist to post (dotted for clarity)





Photograph 22
Barn external cladding formerly of vertical timber slabs.
Photograph shows handmade spike remaining in beam for
fixing of slabs to beam