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AGL Leafs Gully Power Project Environmental Assessment

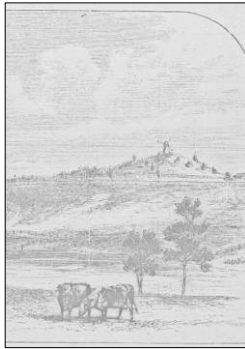
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Appendix N

Historic Heritage Assessment

URS

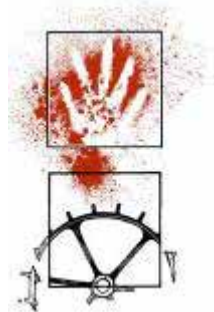




Gas Turbine Power Station Leafs Gully, NSW

Historical Heritage Assessment: Desktop Review

May 2007



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A Report to URS Australia Pty Ltd

EXECUTIVE SUMMARY

AGL is currently developing a gas turbine peaking project in Leafs Gully, southwest Sydney, NSW. The location of the development is approximately five kilometres from the southern urban fringe of the Campbelltown local government area, six kilometres northwest of Appin village, between about two and three kilometres west of Appin Road, and between 600 m and two kilometres east of the Nepean River.

This report provides a desktop review of historical heritage places in the vicinity of the proposed gas turbine power station, and the station's impact on the heritage significance of those places. Those places include, 'Meadowvale' and 'Mount Gilead' homesteads, and the Sydney Water Supply Upper Canal system.

Findings

The study found that:

'Meadow Vale':

- Is classified as an historic site by the National Trust of Australia (NSW);
- Fulfils NSW Heritage Office significance criteria a (historical), b (personal association), e (research) and g (characteristics) and has moderate heritage significance for heritage listing at a local level;
- The distant landscape context of Meadow Vale and has little heritage significance and in this regard, does not fulfil NSW Heritage Office significance criterion c (aesthetic) for local heritage listing;
- The proposed development will have no impact on the site's historical (criterion a), personal associative (criterion b), research (criterion e) or rarity (criterion g) heritage significance; and
- With respect to its landscape context, and in particular the distant views from the homestead, it is considered that the proposed development will have little or no effect on that aspect of the homestead's significance.

'Mount Gilead':

- Is listed on the Campbelltown Local Environmental Plan No. 193 of 20 June 1998 as an item of local heritage significance;
- Is classified as an historic site by the National Trust of Australia (NSW);
- Fulfils NSW Heritage Office significance criteria a (historical), b (personal association), e (research) and g (characteristics) and has moderate heritage significance for heritage listing at a local level;
- The distant landscape context of Mount Gilead has little heritage significance and in this regard, does not fulfil NSW Heritage Office significance criterion c (aesthetic) for local heritage listing;
- The proposed development will have no impact on the site's historical (criterion a), personal associative (criterion b), research (criterion e) or rarity (criterion g) heritage significance; and
- With respect to its landscape context, and in particular the distant views from the homestead, it is considered that the proposed development will have no effect on that aspect of the homestead's significance.

The Sydney Water Supply Upper Canal:

- Is listed on the NSW State Heritage Register;
- Is listed on the Campbelltown Local Environmental Plan – District 8 (Central Hills Lands) – Schedule 1 – as an item of environmental heritage;
- Is listed on the Sydney Catchment Authority's Section 170 Heritage and Conservation Register;
- Is classified as an historic site by the National Trust of Australia (NSW); and
- Fulfils NSW Heritage Office significance criteria a (historical), c (aesthetic – technical achievement), e (research) and f (rarity) for heritage listing at a State level.

The portion of the Upper Canal identified within the Leaf's Gully proposed project area consists approximately of a 50 m interval which incorporates a bend to the north encompassing approximately 130 degrees.

A small section of the Sydney Water Supply Upper Canal is the only historic site with potential to be impacted by the proposed development. The development proposal includes an option for the construction of a pump station and a pipeline connecting the Leaf's Gully Power Station to the canal. If constructed, this pipeline connection would be expected to involve only minor impact to the canal fabric and would be in accordance with the requirements of the Sydney Catchment Authority.

Recommendations

The report recommends that:

'Meadow Vale'

As it is considered that the proposed gas turbine power station at Leaf's Gully will have little or no impact on 'Meadow Vale', no mitigative measures are required.

'Mount Gilead'

As it is considered that the proposed gas turbine power station at Leaf's Gully will have no impact on 'Mount Gilead', no mitigative measures are required.

The Sydney Water Supply Upper Canal

If the option to construct a pipeline connection with the canal is further developed, then it is recommended that:

- The design of the connection should minimise direct and indirect impacts to the fabric and context of the canal;
- All works and impacts on the upper canal should be consistent with the provisions of the existing Conservation Management Plan for the Upper Canal (Higginbotham and Associates 2002); and
- Any heritage impact mitigation actions as required by Conservation Management Plan (such as the conduct archival recording) should be included in a Statement of Commitments as part of any Part 3A project approval.

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1. INTRODUCTION

1.1 Project Description

AGL is currently developing a gas turbine peaking project in Leaf's Gully, southwest Sydney, NSW. The location of the development is approximately five kilometres from the southern urban fringe of the Campbelltown local government area, six kilometres northwest of Appin village, between about two and three kilometres west of Appin Road, and between 600 m and two kilometres east of the Nepean River (Figures 1.1 to 1.3).

The size of the project is expected to be approximately 300MW for stage 1 with stage 2 comprising another 300MW. Stage 1 requires two open cycle gas turbines and stage 2 involves the addition of another two open cycle gas turbines. Stage 1 is scheduled to be operational by November 2009.

The development proposal includes, in summary:

- An access road along an already formed road corridor;
- Gas turbines and associated 35 m high stacks, an evaporative inlet air cooler, a control building, workshop and store, switchyard and transformer, transmission lines and poles linking with transmission lines to the east, and a water pumping station;
- A gas pipeline linking with a major supply pipeline to the east;
- Visual buffer plantings to the north of the station; and
- An option for a water pipeline connection with the Sydney water supply Upper Canal.

The sealed access road will be constructed from the existing entry to Leaf's Gully Farm running approximately northwest and west to the power station site.

The power station will be constructed on a level platform at around the 144 m AHD contour. The platform will be created by cut and fill operations that are expected to generate excess fill material. The excess material will be used to create an earth mound immediately north of the power station. The total study area consists of approximately 66 hectares.

The electricity generated from the turbine will pass through step up transformers to increase the voltage from the generation voltage to the transmission line voltage and then pass through a switchyard to physically connect to the transmission system. Electricity will be connected to the existing grid system by overhead transmission lines extending from the proposed switchyard to the existing power line corridor located approximately one kilometre to the east of the power station site.

The transmission lines would be supported by concrete pole structures, between 22 m and 36 m high, located to the east of the power station and switchyard. The poles would be installed at around the 163 m AHD contour.

Should a water main connection not be available it is proposed to install a water pumping station in the proximity of the Sydney Catchment Authority Upper Canal. The pumping station would be a relatively small structure.

The project has been designated Part 3A under the *Environmental Planning and Assessment Act* 1979.

1.2 Purpose of Report

The purpose of this report is to provide a desktop review of historical heritage places in the vicinity of the proposed Leaf's Gully gas turbine power station, and the station's impact on the heritage significance and visual elements of those places. Those places include, 'Meadowvale' and 'Mount Gilead' homesteads, and features associated with the Sydney Water Supply Upper Canal system.



1.3 Report Outline

This report:

- Briefly describes the proposed development;
- Outlines the methodology implemented for the desktop assessment;
- Describes the environmental setting of the study area;
- Provides a brief historical background for the study area locale;
- Describes the results of the literature and database reviews;
- Includes a discussion on the cultural heritage significance and visual assessment for each of the three components of the study, being: 'Meadowvale' and 'Mount Gilead' homesteads and features associated with the Sydney Water Supply Upper Canal system; and
- Discusses management considerations and provides recommendations based on the results of the investigation and the potential impact of the proposed development on the heritage significance and visual elements of the above three places.

1.4 Study Methodology

A range of documentation was reviewed in considering the historical heritage places in the vicinity of the proposed gas turbine power station, and the station's impact on the heritage significance and visual elements of those places.

This desktop review of documentary sources included heritage registers and schedules, regional and local histories, heritage studies, parish maps, and where available, other maps, such as portion plans.

Searches were undertaken of the following statutory and non-statutory heritage registers and schedules:

- Statutory Listings
 - World Heritage List;
 - The National Heritage List (Australian Heritage Council);
 - The Commonwealth Heritage List (Australian Heritage Council);
 - The State Heritage Register (NSW Heritage Office); and
 - Heritage Schedule from the Campbelltown Local Environmental Plan No. 193 of 20 June 1998.
- Non-Statutory Listings
 - The Register of the National Estate (Australian Heritage Council);
 - The State Heritage Inventory (NSW Heritage Office);
 - Register of the National Trust of Australia (NSW);
 - Royal Australian Institute of Architects Register; and
 - Professional Historians Association (NSW).

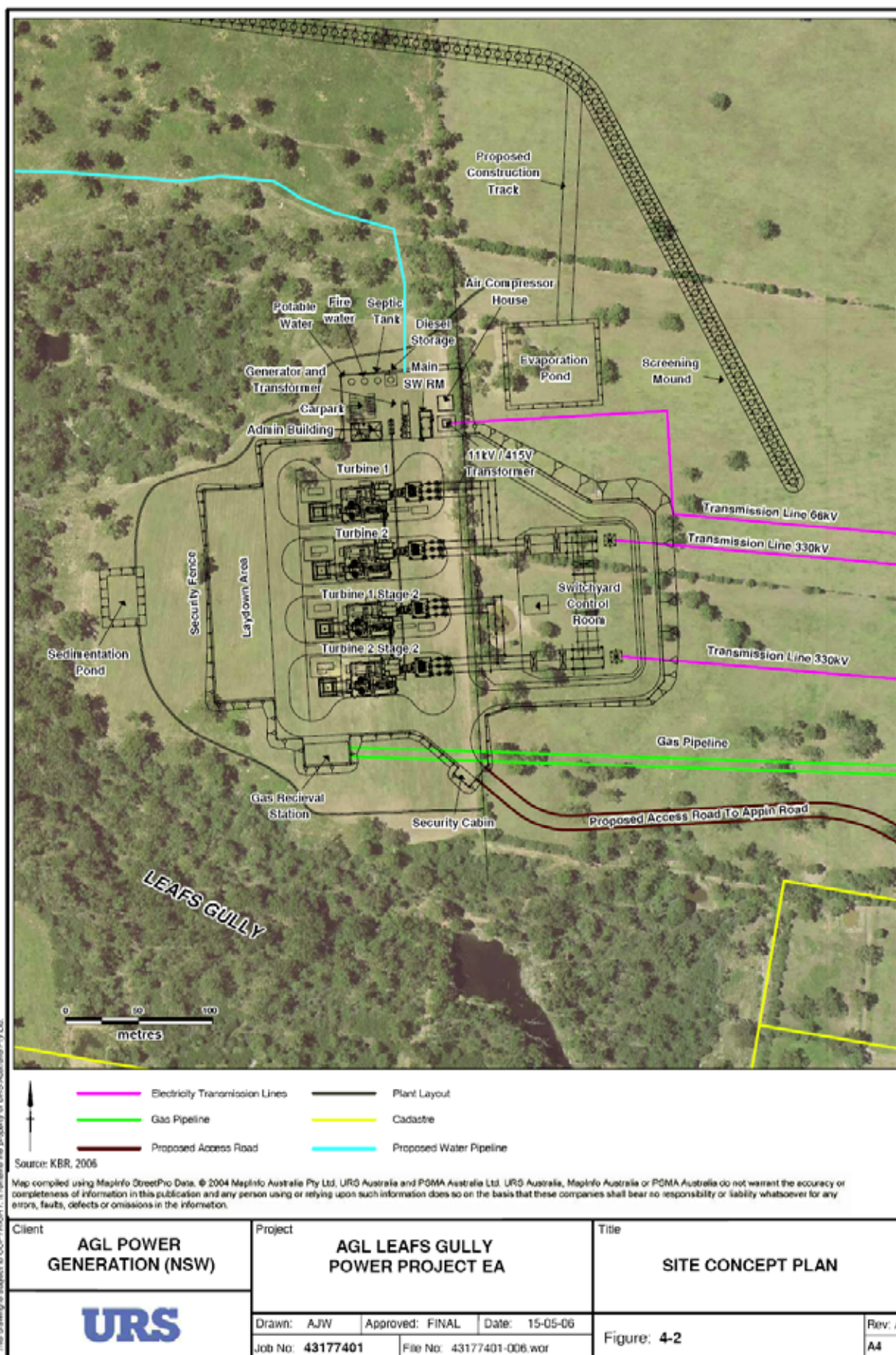


Figure 1.1 AGL Leafs Gully Power Project Site Concept Plan (URS Australia Pty Ltd)

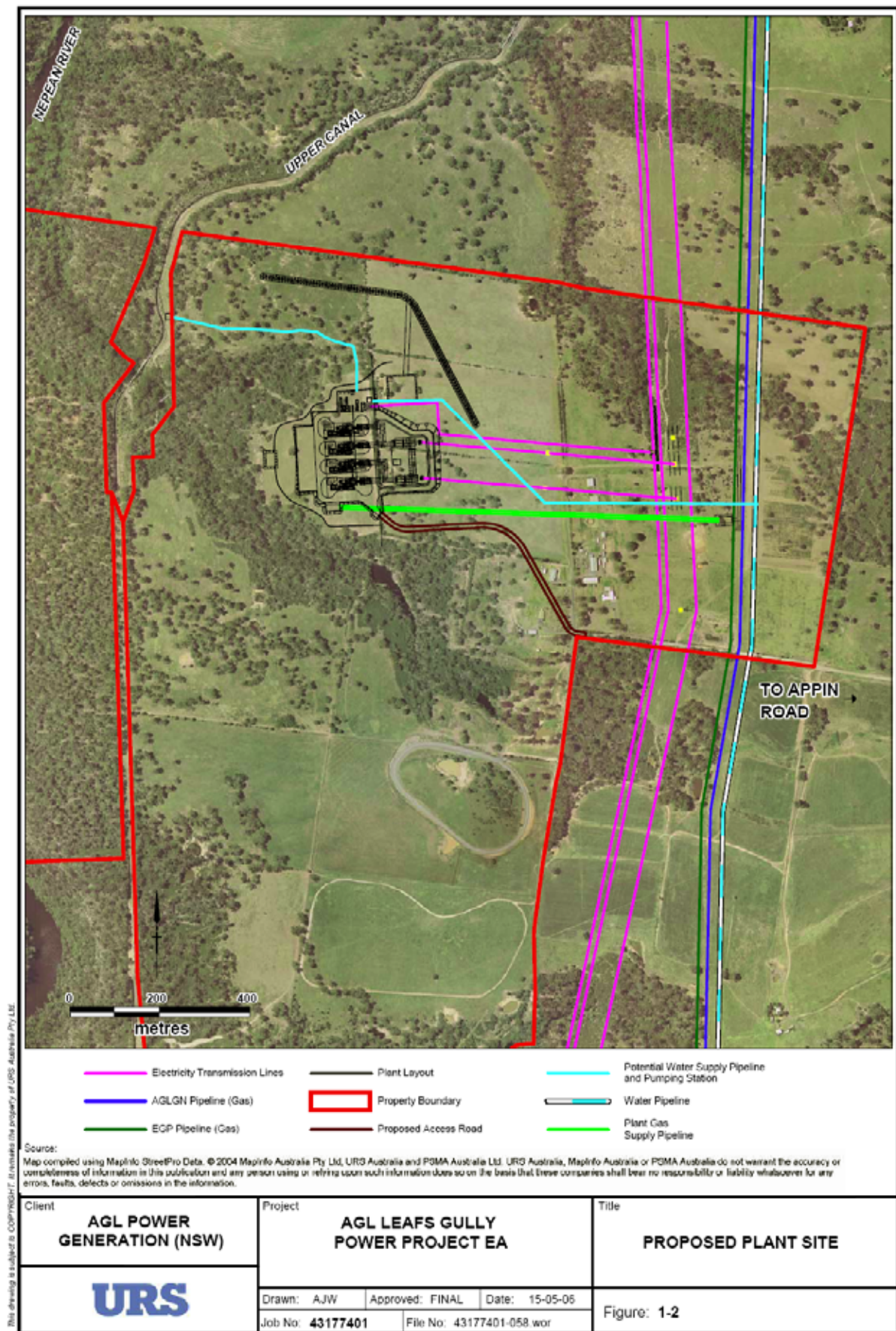


Figure 1.2 AGL Leafs Gully Power Project Proposed Plant Site (URS Australia Pty Ltd)

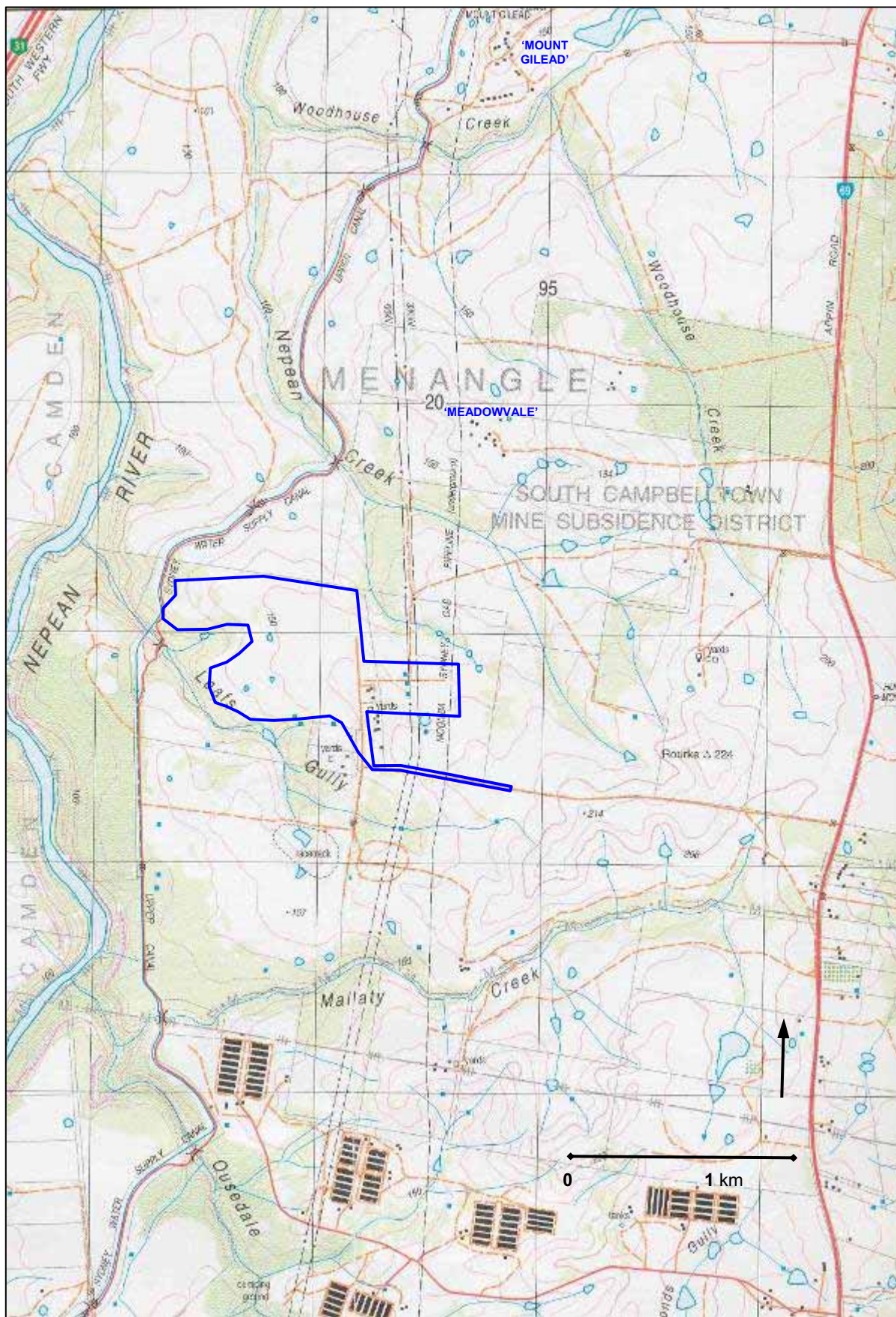


Figure 1.3 General location of Leaf's Gully Power Station study area (blue boundary) relative to the locations of "Meadowvale" and "Mount Gilead"
(Extract from Appin 9029-1S 1:25 000 topographical map 3rd Ed, LIC 2000)



2. ENVIRONMENTAL CONTEXT

2.1 The Sydney Basin

The Leaf's Gully study area is located within the Sydney Basin, a large sedimentary basin that dominates the NSW central coast and its fluvial catchments. The Basin consists of various approximately horizontally bedded sedimentary facies that accumulated during a marine transgression at the end of the Late Palaeozoic glaciation, and which was subsequently followed by a marine regression during the Late Permian and Triassic.

There are two geological and structural divisions within the Sydney Basin which are relevant to the Mount Gilead study area - the Cumberland Plain and the Woronora Ramp.

The surface of the Cumberland Plain is predominantly shales of the Wianamatta Group which have weathered to form low to moderately-graded and predominantly undulating landscapes. Surrounding the plain are extensive exposures of the underlying Hawkesbury sandstone, which is relatively resistant to erosion compared to the overlying shales. The Hawkesbury sandstones support steep slopes, minor overhangs and often extensive vertical, or near vertical, escarpments. Sandstone topographies dominate where drainage lines have down-cut through shales to lower valley levels, or where structural uplift has elevated extensive sandstone plateau which have subsequently become incised by fluvial erosion.

Where the Cumberland Plain and the Woronora Ramp come together, there is a transitional zone where the landscape includes features of both divisions. The Leaf's Gully study area falls within this zone.

2.2 The Study Area and Environs

Leaf's Gully Creek extends approximately two kilometres to the south and west of the power station site, and generally drains northwest to the Nepean River. The side slopes of the gully are densely vegetated with mature native trees around 20 to 24 m in height.

The landscape immediately surrounding the site is predominantly rural in nature. It has been generally cleared in the past for arable and livestock production, although vegetation has been retained along a number of the creek lines that flow to the Nepean River, and surrounding hill tops and ridgelines.

The landscape to the north and south of the site is divided by a number of drainage lines that flow to the Nepean River, that give rise to a gently undulating landform between Appin Road and the Nepean River. Field patterns are generally defined by the drainage lines and scattered vegetation between them.

The site has a small number of clumped and individual trees, some of which would be removed to accommodate the proposed power station and associated infrastructure.

The landscape surrounding the site contains a number of constructed elements, including:

- A small number of residential properties in the rural landscape;
- A 330kV and 66kV transmission line corridor, with towers and transmission lines;
- Sydney Catchment Authority Upper Canal;
- A transport corridor, which runs in a general north-south direction to the west of the Nepean River and contains the Hume Highway/South western freeway and main Southern Railway.
- Communication towers located on distant ridgelines and hilltops; and
- Ingham's Appin Broiler Complex.



Landform features in the area include:

- Land immediately to the north, east and south of the site is characterised by a series of ridges and gullies. The access road from Appin Road crosses a ridgeline at around 215 m AHD below the Rourke hilltop at 224 m AHD;
- Land to the west of the site gently rises to the Razorback Range ridgeline at around 170 m AHD. A lower ridgeline with a series of spurs runs north south below Razorback Range from around 150 m AHD falling to 100 m AHD. A series of gullies extend in a general north south alignment between the ridgelines;
- A series of creeks and gullies flow generally west and northwest to the east of the Nepean River, with the proposed power station located on a low spur between two of these gullies; and
- The Nepean River passes through a steep incised profile as it flows to the west of the site. The banks of the river fall for around 10m to 15m from top of bank to the river below.

The study area and adjacent properties have undergone varying degrees of landscape disturbance, primarily as a result of use for agricultural purposes for almost 200 years. The local area is substantially cleared of original vegetation and is now predominantly under pasture grass. Areas adjacent to the Nepean River have been cleared, levelled and pasture improved. Drainage lines have been dammed and this has resulted in changed hydrology and associated erosion. Service easements (gas, electricity) and unformed roads and tracks traverse the properties in the area.

The direct impacts of agriculture and the establishment of agricultural pastures are potentially substantial. Surface features and ground relief will not survive repeated tilling. The indirect impacts of ploughing and cultivation include the sedimentation of downslope and downstream areas, and downstream erosion.



3. HISTORICAL CONTEXT

3.1 The Campbelltown Region

In July 1788, two bulls and four cows brought from the Cape of Good Hope with the First Fleet strayed from the rest of the herd. The cattle had wandered southwest from Sydney and had found grazing land around present day Menangle-Camden. In 1795, the first Europeans in the vicinity of Campbelltown were an exploratory party that noted a stray herd of cattle by the Nepean River at a time when there was very little livestock in the colony. This discovery generated another expedition led by Governor Hunter later that year. The number of cattle had increased and the area became known as the 'Cowpastures'. When Hunter again visited the area in 1796 he was impressed with the quality of the soil, timber and water.

Francis Barallier investigated the district in 1802, and botanist George Caley mapped the area in 1804. Despite the objections of the Governor, John Macarthur was granted 5,000 acres on the banks of the Nepean in 1805. When Governor Macquarie visited the area in 1810, he chose the site of Liverpool and named the district around present-day Campbelltown 'Airds' after the family estate of his wife Elizabeth (an estate situated in the village of Appin in Scotland where Elizabeth was born).

By 1811, there were 107 settlers in the district. Continuing expansion and development suggested the need for centralised services and for a staging post to accommodate through-traffic. Campbelltown became the central thoroughfare for those headed on to the south-west grazing plains and south along the road that went through Appin to the Illawarra.

On 1 December 1820, Macquarie laid the foundations for the township of Campbelltown. The name Campbell-town is in honour of his wife's maiden name, Elizabeth Campbell. It is likely that government surveyor James Meehan had reserved the town site in 1815 when he surveyed the road from Liverpool to Appin. This is indicated by the layout of the land grants east of the road. Macquarie marked out the township, indicating sites for a chapel, school house and burial ground in the central part of Airds. From 1820 to 1827 land within Campbelltown was surveyed and in 1826 Robert Hoddle prepared the first town layout plans. In 1827, land grants were allocated but the grants were not occupied until 1831 because Governor Darling wanted the colonial towns to be systematic in their planning (classification of towns and determination of lot sizes/dimensions).

During the 1830s the merits of Campbelltown's location and character were debated, particularly in regard to the street alignments and town allotments, which were not properly defined or identified, and the streetscape. By 1840, it was realised that Hoddle's Plan could no longer be implemented because grants, streets, fences and gardens had been built with no regard to the town plan. Campbelltown did not have the symmetry of other colonial towns but had the only official building outside Sydney – the courthouse.

In October 1811, Macquarie proposed the construction of a road from Sydney to Liverpool. By 1814, this road had been constructed and soon extended to Appin. It was little more than a dirt track but was to become an important communication corridor to the area. The roads from Campbelltown were extended to the south coast and southern highlands as better routes were established by explorers. Campbelltown became a cross roads for movements to Sydney, Appin, Illawarra, Picton, Narellan, Camden, Penrith and Nattai. The roads and bridges were built and maintained by convict road gangs from 1826 to 1858.

The southern expansion of Sydney was confirmed with the construction of the main southern railway line from Sydney to Goulburn. The first section from Redfern to Parramatta was completed towards the end of 1855 and was extended to Campbelltown by May 1858. The railway reached Goulburn in 1869 with some substantial bridge constructions along the way but from 1858-1869 Campbelltown was the effective terminus. There were no established towns on the line. When the estates between Campbelltown and Liverpool were subdivided in the 1870s and 1880s platforms were provided for the villages that established at Glenfield, Ingleburn and Minto. The line to Campbelltown was electrified in 1968. The line continues to be an important link for the development of the area for country and urban movements.



The small land grants in the Districts surrounding Campbelltown engaged mainly in mixed farming, growing crops and grazing animals. Many struggled to survive. The large land grants (holdings) engaged in the grazing of sheep and cattle. The growing of fruit and grapes for wine were activities that also characterized the area, though many of the vineyards were destroyed in the 1890s. Agriculture from Campbelltown supplied the Sydney markets though the activity suffered from disease, market fluctuations, competition and lack of water.

From the 1840s to 1880s Campbelltown prospered from the production and milling of wheat. Until the 1860s, grain was grown on many of these leased farms and on the small grants closer to the rivers. The late 1850s and early 1860s brought a series of disasters when floods ravaged land near the rivers and then stem rust broke out in the wheat during the wet season. By the 1860s, grain growing had been largely wiped out in the County of Cumberland and Camden. That industry virtually ceased by the end of the 1880s. A network of mills had been built to serve the grain growers, grinding the wheat, which was the best grain for growing with the largest and most assured market. The end of grain growing in the area meant the closure of many of the mills, some to decay, some to be converted to other uses. Few survive with the notable exception of the Mount Gilead mill (Kass 2005).

3.2 'Meadow Vale' homestead

'Meadow Vale' is an historic house located approximately 1.25 km west of Appin Road, on Lot 1 DP602888, and approximately 1.4 km northeast of the location of the proposed gas turbine power station at Leaf's Gully (Campbelltown City Library 2007).

The 'Meadow Vale' homestead stands on the original grant of 40.5 ha (100 acres) made to Andrew Hume in 1812 and called by him 'Hume Mount Farm' (Figure 3.1) later known as 'Humewood' then 'Rockwood' before 'Meadow Vale'. It is not known when the buildings were erected although the stone cottage at the site may have been the original homestead.

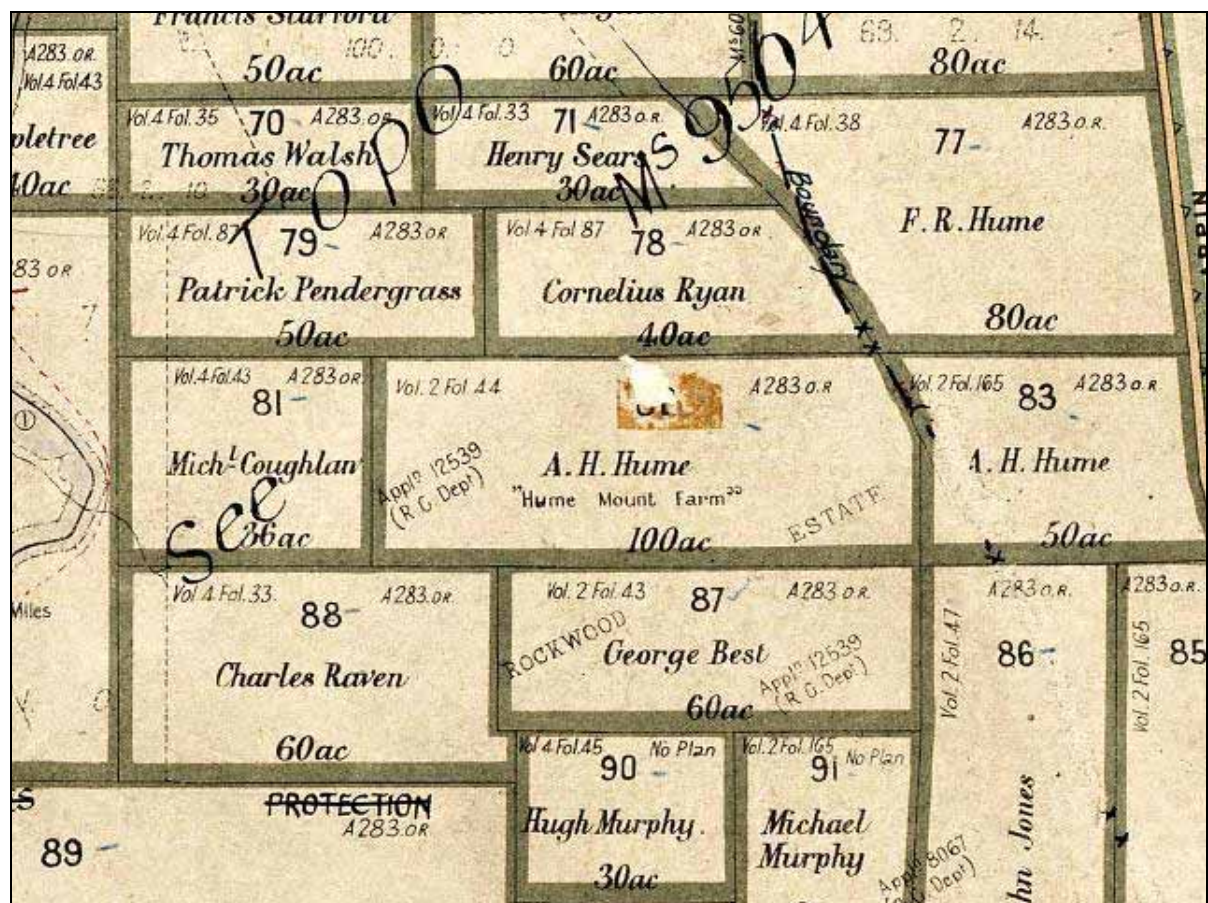


Figure 3.1 Extract from Parish Map of Menangle, County of Cumberland, 2 December 1904 showing land grant made to Andrew Hume in 1812 "Hume Mount Farm" (Dept. of Lands map ref. 14092002)



The main house was built around 1830 and then the name was changed to 'Meadow Vale' when the property was sold to A. D. Ross around 1900. The kitchen was then built and other major alterations were made to the attic storey, which changed its original appearance. Doors and windows were also replaced. Both exterior and interior walls are about 18" thick. There are large open fireplaces surrounded by cedar panelling and a mantle. The doorways are low and there are six panelled cedar doors. The main house is a single storey with an underground cellar at the rear of the house.

The main house is in use as a dwelling and the small cottage on the homestead came from another property, 'Glenlorne', to provide additional accommodation for its current use as a horse riding school (Campbelltown.nsw.gov website 2007). Figures 3.2 and 3.3 provide views of the main house and the small cottage at 'Meadow Vale'.



Figure 3.2 The main house at 'Meadow Vale' (Campbelltown.nsw.gov website 2007).



Figure 3.3 The small cottage at 'Meadow Vale' (Campbelltown.nsw.gov website 2007)



3.3 'Mount Gilead' homestead

In 1812, Reuben Uther (1791-1880), a merchant, manufacturer and landholder who arrived in Sydney on board the *Sydney Cove* in 1807, was granted 400 acres (160 hectares) of land surrounding Mount Gilead, which he named *Gilead Farm*. According to the Bible, *Gilead* was one of Israel's finest farm regions, with golden fields of wheat flourishing on the River Jordan plain. By 1815, Uther had a contract to supply meat to the government stores.

Thomas Rose purchased Gilead Farm in 1818 and renamed it *Mount Gilead*. Rose was an ex-convict, and, from 1810 until at least 1817, a baker and publican at the *Rose & Crown*, Chapell Row, Sydney. He added 50 acres to Mount Gilead which he bought from J. J. Ware, and purchased 40 acres from Joseph Inch fronting the road and Bow Bowing Creek (originally Boro Borang Creek). A cottage named *Woodbine* owned by Mrs. Rose was situated on the latter parcel of land. Thomas Rose then added 104 acres near Schuldhams to his landholdings, and in compensation for surrendering a block of land on the northeast corner of Market and Castlereagh Streets, Sydney, which was later occupied by Sydney Girls' High School and subsequently David Jones' store, he received 300 acres at Airds. He increased his holding at Mount Gilead up until 1823 but did not move to the farm until 1827. Rose cultivated his property and grazed cattle and sheep, but was limited by lack of water. In 1825, he built an artificial lake below the homestead on the property to maintain a constant water supply. He is said to have been the first to carry out such work.

Some 10 years later, in 1835, Rose built a stone windmill on the estate to grind the wheat being grown around the homestead. The four story, 60 feet high, windmill was built of sandstone quarried on the Mount Gilead property. The sails and all the fittings were made of ironbark timber cut on the property. The remains of the windmill survive on the Mount Gilead property today.

Rose died in 1837, aged 64 years (Bayley 1965:41, Campbelltown City Council 1998:11, Colonial Secretary's Papers 1788-1825, Macarthur Development Board 1977:54, McGill et al 1995).

The Mount Gilead Estate was subsequently sold to an Appin man, Edmund Hume Woodhouse (1824-1875), in either 1861 or 1867. Woodhouse had been a bank manager who turned to farming at the age of forty four. Over the following years he introduced a variety of livestock and agricultural techniques to the area. He is generally acknowledged with introducing large-scale dairying to the area after the failure of the wheat industry in the late 1860s (Campbelltown City Council 1994/5:11, Macarthur Development Board 1977:54).

It was sold again in 1888 and, in 1941; the property was sold to the Macarthur-Onslow family, which still owns and farms the property today (McGill et al 1995). The windmill is now without sails, but the tower is structurally sound and is a district landmark. Figures 3.4 and 3.5 provide views of Mount Gilead in 1883 and 2006, respectively, and Figure 3.6 provides views of the windmill over time.

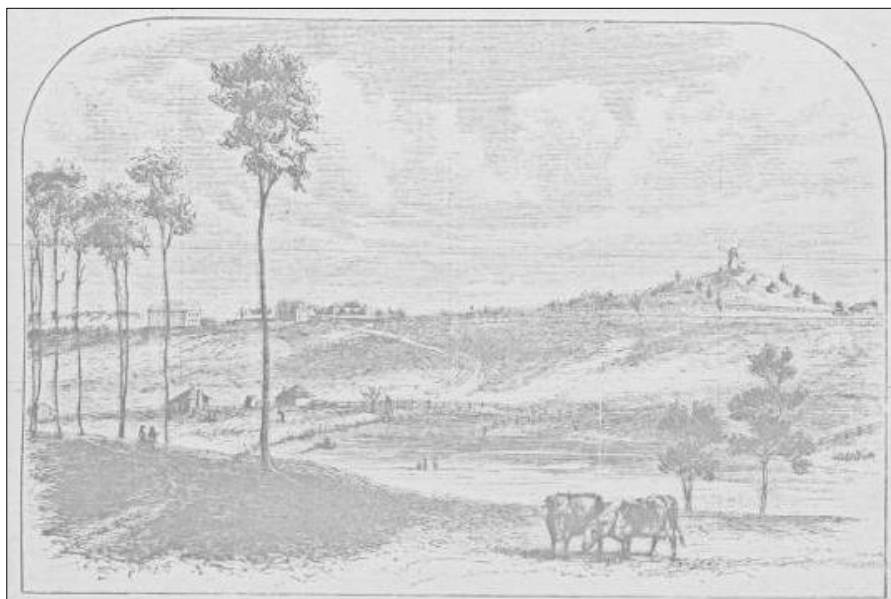


Figure 3.4 Mount Gilead Stud Farm (*The Sydney Mail*, 10 March 1883, p. 452).



Figure 3.5 Mount Gilead 2006

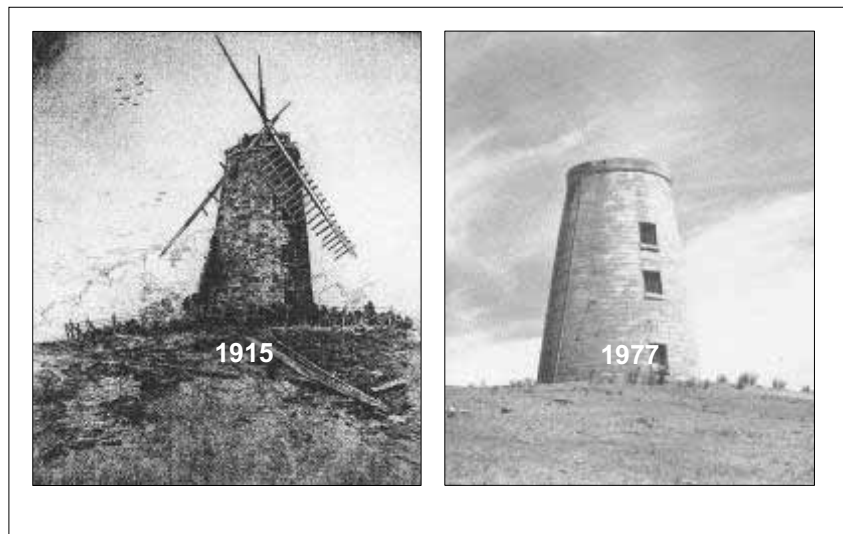


Figure 3.6 Views of the sandstone windmill at Mount Gilead
(top left: Sydney Ure Smith – Campbelltown City Bicentennial Art Gallery 1988;
top right: Macarthur Development Board 1977:54; bottom: Australand 2005:4).

Other early land grants in the 'Mount Gilead' area that are now owned by the Macarthur-Onslow family include 15 part and whole portions from original land grants in the area, as follows:

- Part Portion 28, granted to Daniel Hanchard in 1818 (total portion 40 acres);
- Portion 59, granted to George Marriott Woodhouse (100 acres). Woodhouse came free to Sydney in 1810 as a clerk to Ellis Bent, the Judge Advocate. In 1816, he received a land grant at Airds and, in 1818, at Appin;
- Portion 64, granted to John Wright (60 acres);



- Part Portion 65, granted to Reuben Uther (total portion 400 acres). Uther was a 'hatter' who arrived in Sydney as a freeman in 1807. He was a clerk or manager to Simeon Lord until March 1815 at which time he established a hat factory in Hunter Street, Sydney, which was moved to Pitt Street in 1816. In 1812 he was granted land on the Nepean River. Uther died at his residence in Crown Street, Surry Hills, Sydney in 1880, aged 90 years (*Yass Courier* 13 July 1880);
- Portion 66, granted to C. H. J. Rose (400 acres), possibly Thomas Rose's daughter, Charlotte;
- Portion 67, granted to Charles Rushton (80 acres), who was in the Royal Navy and arrived in Sydney in 1817;
- Portion 68, granted to Richard Appletree (40 acres), who arrived in Sydney as a convict in 1798. He was issued with a ticket of leave in 1810 and received an absolute pardon in 1812. In that year he was appointed as a constable in Sydney and, in 1814 received his land grant at Campbelltown;
- Portion 69, granted to Francis Stafford (50 acres);
- Portion 70, granted to Thomas Walsh (30 acres);
- Portion 72, granted to James Haydon (60 acres);
- Portion 73, granted to William Wall (80 acres);
- Portion 74, granted to Henry Early (80 acres);
- Portion 75, granted to Thomas Byrne (80 acres);
- Portion 80, granted to Thomas Rose (300 acres). Rose was born in 1773 in Newport, Shropshire, England and died on 3 March 1837 at Mount Gilead, Appin, NSW. He was buried there in 1837 but his remains were later removed to St. Peter's Church of England in Campbelltown. Rose was sentenced to death on 19 March 1793 at the Shrewsbury Assizes for housebreaking. His conviction was commuted to transportation for life. After his transportation to NSW, he was again charged in 1801 for stealing a boat with Richard Perkins and others. He was sentenced to death but pardoned by the governor. He received a conditional pardon in June 1806. In December 1809 Governor Paterson gave him an absolute pardon which was confirmed in January 1814 by Governor Macquarie.

Rose arrived in Sydney in 1798 and was a baker in Sydney from 1804, a publican from 1806, a stockholder in the Bank of New South Wales, a trustee of the Sydney Public Free Grammar School, and a clerk of the Sydney racecourse until 1827. He was granted land in Sydney at the corner of King and Castlereagh Streets known as Chapel Row. He built a bakery and the 'Rose and Crown Inn' which were both open for business in 1810. Eventually Rose owned the entire block bound by King, Castlereagh, Elizabeth and Market Streets. Rose had procured signatures in a petition against Governor Macquarie and this seems to have put him out of favour with the governor.

In 1816, his application for a grant of land in the Evan district was cancelled. His liquor license was also cancelled from 1817 until 1820, and in 1819 Macquarie decided to have St. James parochial school built on Rose's block. In exchange for the school Rose was granted 300 acres on the main southern road, east of Campbelltown. He also bought the 400 acre farm *Mt. Gilead* on the Appin road. He added to the Campbelltown estate until 1828 when it was 2,460 acres. As clerk of the Sydney racecourse, Rose is credited with promoting the first race meeting in Sydney. He owned many successful racehorses, remaining clerk until 1827 when he moved to his farm 'Mt. Gilead'. He spent much of his remaining years involved in major water conservation projects. The suburb of Rosemeadow was named in honour of Thomas Rose; and

- Portion 105, granted to William Hewitt (40 acres) (Colonial Secretary's Papers 1788-1825).

Figures 3.7 to 3.9 provide extracts from Parish maps of the area, dating from c.1870, which show the early land portions.



In 1941, the Mount Gilead property, including the above land grants, was purchased by Major General Sir Denzil Macarthur-Onslow. Sir Denzil was a descendant of John Macarthur of Camden, NSW. Sir Denzil's widow, Lady Dorothy, still lives on the property.

The MacArthur-Onslows were also a military family. Brigadier General George MacLeay MacArthur-Onslow was born at Camden, New South Wales, on 2 May 1875, the son of Arthur Alexander Walton Onslow and his wife, the former Elizabeth MacArthur, a granddaughter of John MacArthur. George's brothers James and Arthur served in the South African War. James also served with the AIF, as a colonel with the Sea transport Service. He was aide de camp to the governor general from 1902 to 1909 and 1917 to 1920 and retired from the army with the rank of major general in 1925. Arthur's son, Major General Sir Denzil Macarthur-Onslow served with the 2nd AIF and was promoted to major general in 1955.

Lady Dorothy Wolseley MacArthur-Onslow, AO, (1922 -) is a retired medical practitioner. She was Medical Superintendent at Parramatta Hospital, a trustee of the Sydney Opera House Trust, a member of the Health Advisory Council of NSW, President of the Australian Hospital Association of NSW, a member of the Royal Prince Alfred Hospital and Area Board, a member of the Board of Governors at the University of Western Sydney, and a member of the Board of the South Western Sydney Area Health Service. Lady Dorothy became an Officer of the Order of Australia in 1987, and retired in 1993.

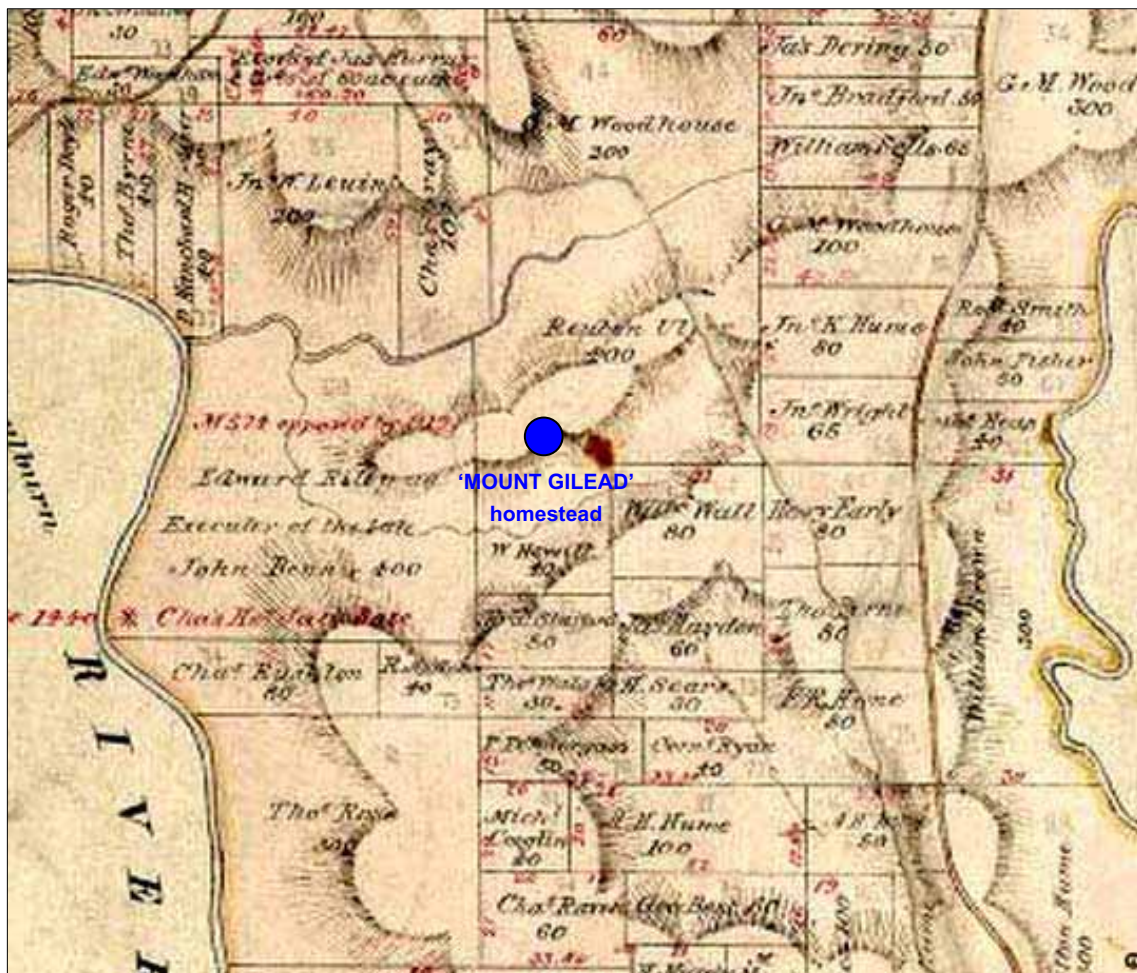


Figure 3.7 Extract from Parish Map of Menangle, County of Cumberland, c.1870, showing 'Mount Gilead' (blue circle) and surrounding holdings (Dept. of Lands map ref. 14061101)

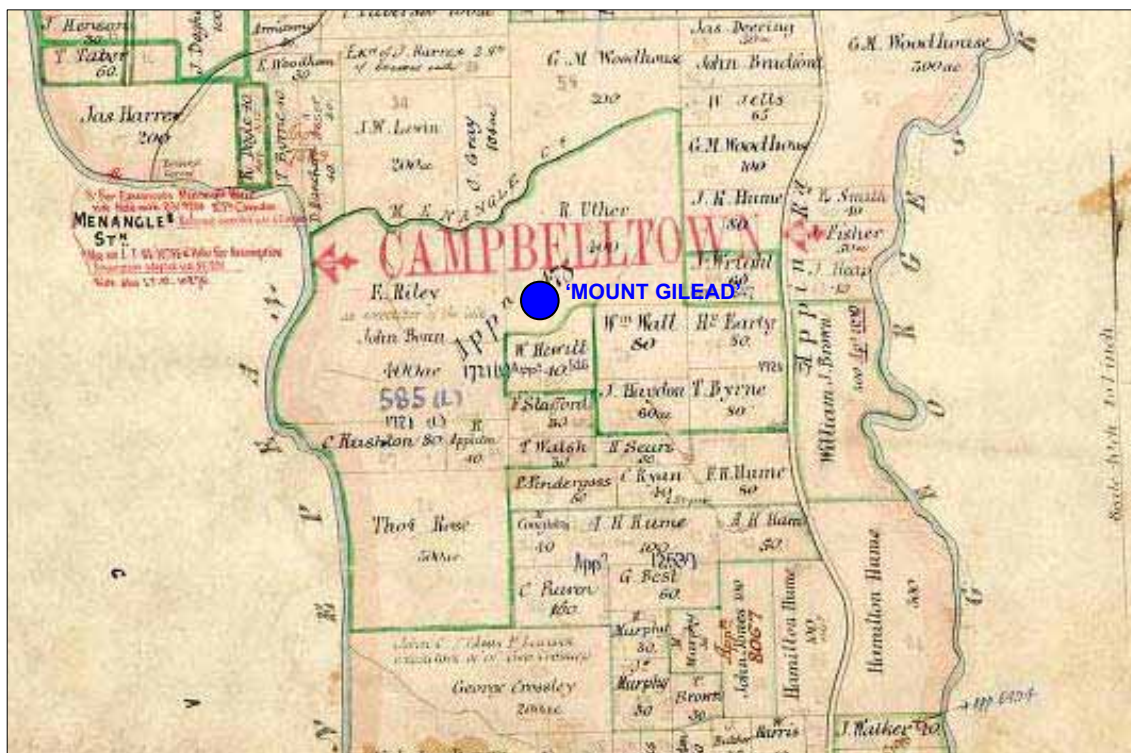


Figure 3.8 Extract from Parish Map of Menangle, County of Cumberland, c.1880, showing 'Mount Gilead' (blue circle) and surrounding holdings (Dept. of Lands map ref. 140668)

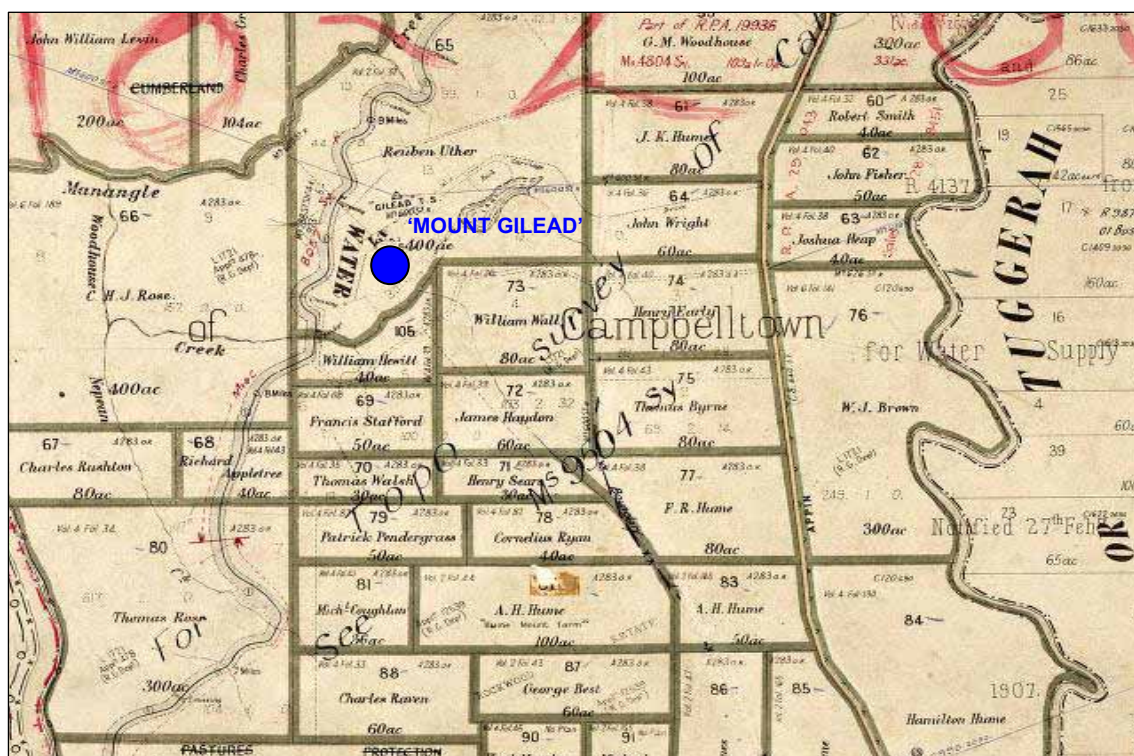


Figure 3.9 Extract from Parish Map of Menangle, County of Cumberland, 2 December 1904, showing 'Mount Gilead' (blue circle) and surrounding holdings (Dept. of Lands map ref. 14092002)



3.4 The Upper Canal

In 1877, construction began on the Nepean Water Supply Scheme for Sydney. It was a major engineering work involving the construction of weirs, dams and a canal system. Tunnels and open channels were built through Campbelltown to feed water via gravity to Prospect Reservoir (Figure 3.10). From there, water was piped to Sydney. From 1888, water was supplied to Campbelltown from the scheme (Campbelltown City Council 1998:14).

The Upper Canal of the Nepean Water Supply Scheme, a small portion of which occurs within the Leaf's Gully study area, was built of a variety of materials and section profiles depending upon the nature of the country through which it was passing. Where the ground was soft, the Canal was 'V'-shaped and the sides were pitched with shale or sandstone slabs. In other sections, a 'U'-shape was utilised and the sides were walled with sandstone masonry, or, if cut into solid rock left unlined. Where the canal crossed creeks or large depressions, such as Woodhouse and Nepean's Creeks, the water was carried across in wrought iron inverted syphons resting on stone piers. As well as bridges constructed over major roads, 'occupation bridges' were erected to allow property owners with land severed by the canal access between parts of their holdings. By 1888, the Upper Nepean Scheme was completed and in operation.

Care and maintenance of the Upper Canal in particular, was in the hands of Inspectors and maintenance men. They were housed along the Canal in cottages, owned and maintained by the Sydney Water Board. Initially, the men walked or used horses to patrol the length of the Canal assigned to them. By the late 1890s, a gradual process of adding roadways along the Canals was under way. During the cooler months when demand for water was lower and requirements could be supplied from water impounded at Prospect, repairs and maintenance were carried out on the Upper Canal. The sides were regularly cleaned, and, by the 1900s, some lengths were being relined (Higginbotham et al. 1992:10-41).

A more complete description and chronology of the works for the Upper Canal may be found in Aird 1961:15-17, 263-268, and the heritage study of the Upper Canal, Prospect Reservoir and Lower Canal (Upper Nepean Scheme) by Higginbotham et al. in 1992.



Figure 3.10 View of the Upper Canal under construction c.1886 near Sugar Loaf, note also the primitive huts and humpies erected by workmen as shelter (Higginbotham et al 1992:13).



3.5 The Leafs Gully Area

Parish maps of Menangle from c.1868 to 1904 (Figures 3.11 to 3.13) show the proposed gas turbine power station site and access road located on properties owned by several mid to late nineteenth-century land holders. A list of those landholders is provided in Table 3.1, which is followed by a very brief outline of some of them and their land acquisitions in the area.

Table 3.1 Nineteenth-century land owner details.

Name	Portion No.	Acreage	Probable date of land grant
Thomas Brown	93	30	c.1811-1816
John Butcher	100	30	1811
George Crossley	89	240	1814
Nicholas Devine	94	400	1812
William Harris	101	40	1816
Thomas Harton	99	30	c.1811-1816
Hamilton Hume	85	100	1816
John James	86	100	before 1822
Joseph Marcus	98	30	c.1811-1816
John Murphy	92	50	c.1811-1816
Robert Myles	97	50	c.1811-1816
James O'Neale	95	50	c.1811-1816
Malachi Ryan	96	50	1816

John Butcher

According to the Colonial Secretary's Index 1788-1825, on 30 July 1811, John Butcher, from Parramatta was on a list of persons to receive lands in the new Districts of Airds or Appin, and in other parts of the Colony.

George Crossley

George Crossley was an English lawyer who in February 1796 was charged with forging a will but the prosecution, relying on the evidence of an alleged accomplice, failed. However, shortly afterwards he was called upon to answer charges of professional malpractice. His answers resulted in his being charged with perjury and convicted. He was ultimately transported for seven years, arriving in Port Jackson in 1799. In 1803, despite his past and his debts, he began to practice as a lawyer in Sydney where he was one of only two or three with any legal training. He was again convicted of perjury in 1821 and he died in 1823 still under pressure from his creditors. He was on a list of persons to receive grants of land in 1814.

Crossley was married to Anna Maria, sister of Nicholas Divine, Principal Superintendent of Convicts, and listed as the owner of the property adjacent to Crossley's land at Appin. Crossley left a will leaving his personal estate, including his property at 'Airds' between John Connell, Mary Arkell and her daughter, Mary, Elizabeth Graham and Sarah Graham. Elizabeth and Sarah were in his service (Allars 1958:298).



It appears from the parish maps the land at Leafs Gully (Airds) was owned and/or purchased by the executors of Crossley's will and was still under the name of Crossley in the 1904 map (Figure 3.13).

Nicholas Devine

Devine arrived in Sydney with the second fleet in 1790 aboard the *Lady Juliana* and held the position of Principal Superintendent of Convicts until he was dismissed for misconduct and neglect in August 1808. He unsuccessfully pursued reinstatement but was placed on a pension and retired to his farm near Newtown.

In 1794 and 1799 Divine was given two adjoining land grants totaling 210 acres that covered most of today's Sydney suburb of Erskineville and almost all of Newtown east of King Street. There he grew apples and oranges and also attempted to grow tobacco and start one of Australia's first vineyards. On 8 October 1810, Devine is shown to be searching for cattle on a property owned by George Crossley and himself. In 1812, he is listed as receiving a further grant of land (Murphy 2006).

William Harris

On 21 August 1816, the Colonial Secretary's Index records Harris as being on a list of persons who were to have lands located and marked out at Appin in 1816.

Hamilton Hume

Hume was born in NSW, the son of the explorer Andrew Hamilton Hume. He was on the list of persons to have lands located and marked out in 1816 at Appin.

Hume was born at Parramatta on 18 June 1797. He was the son of Andrew Hamilton Hume, who came to Australia in 1790 as a superintendent of convicts and soon afterwards became a free settler. When only 17 years of age he began exploring the country beyond Sydney as far to the southwest as Berrima, and soon developed into a good bushman. He was on the list of persons to have lands located and marked out in 1816 at Appin.

Hume was an excellent explorer, a first-rate bushman never lacking in courage and resource, whose work was not adequately appreciated or rewarded by the government of the time. He had a good knowledge of the blacks, was always able to avoid conflicts with them, and appears to have learnt something of their speech. He has an established and well-deserved reputation as a great Australian explorer (Dictionary of Australian Biography)

John James

James is shown in the Colonial Secretary's Index as residing at Appin (Airds) in August 1822 with his wife, Mary, who was born in the Colony of NSW. On 11 December 1823, Mary is listed as having received an assigned convict.

Malachi (or Malachy) Ryan

Ryan arrived in Sydney as a convict on the *Tellicherry* in 1806. On 16 January 1816, he was listed as a person to receive a grant of land in 1816 at Appin. He received an assigned convict there in 1822. In that same year he was appointed a constable in the district of Appin and 1823 was appointed as Chief Constable.

Little is known of the remaining early land holders in the area, being: Thomas Brown; Thomas Harton; Joseph Marcus; John Murphy; Robert Myles and James O'Neale, but it is probable that they also received land grants during the early part of the nineteenth century.

Today the properties on either side of the existing and proposed access road primarily operate as horse breeding/training/agistment enterprises. The majority of the land is cleared and used for grazing and horse agistment/yards.

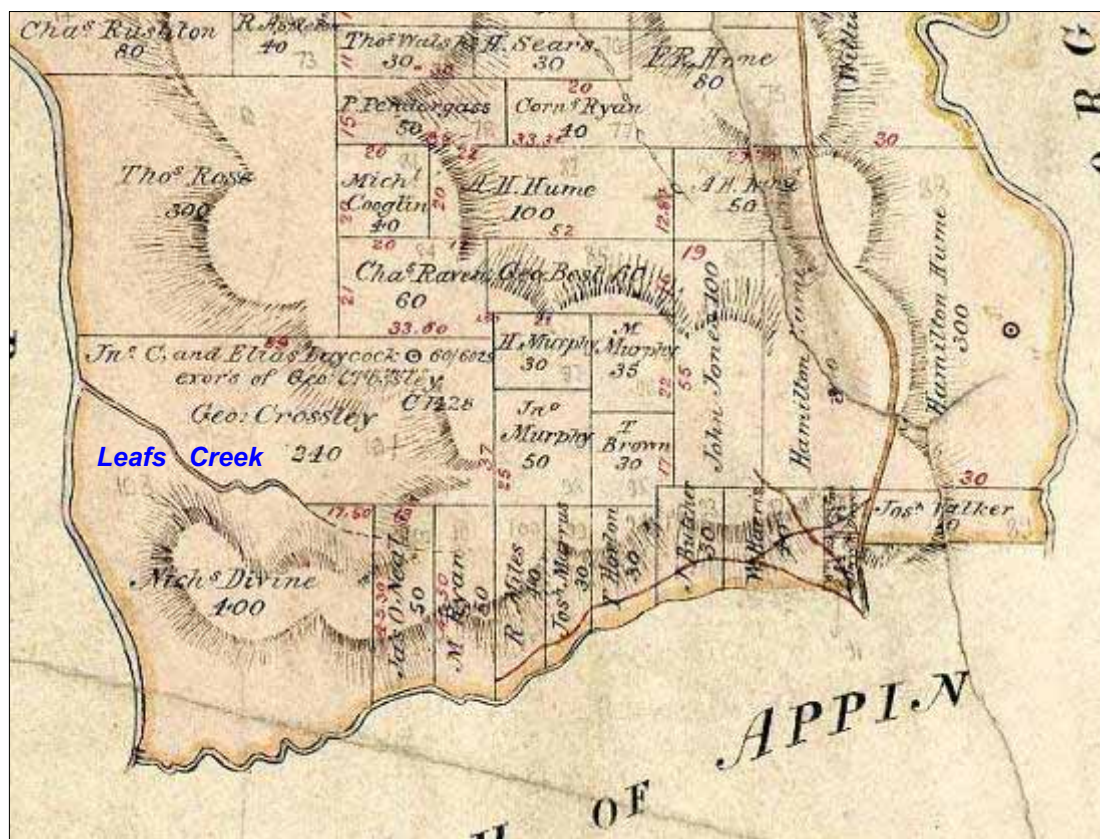


Figure 3.11 Extract from Parish Map of Menangle, County of Cumberland (c.1868) showing land holdings and location of Leaf's Creek (AO Map No. 320, Dept. of Lands Map 14061101).

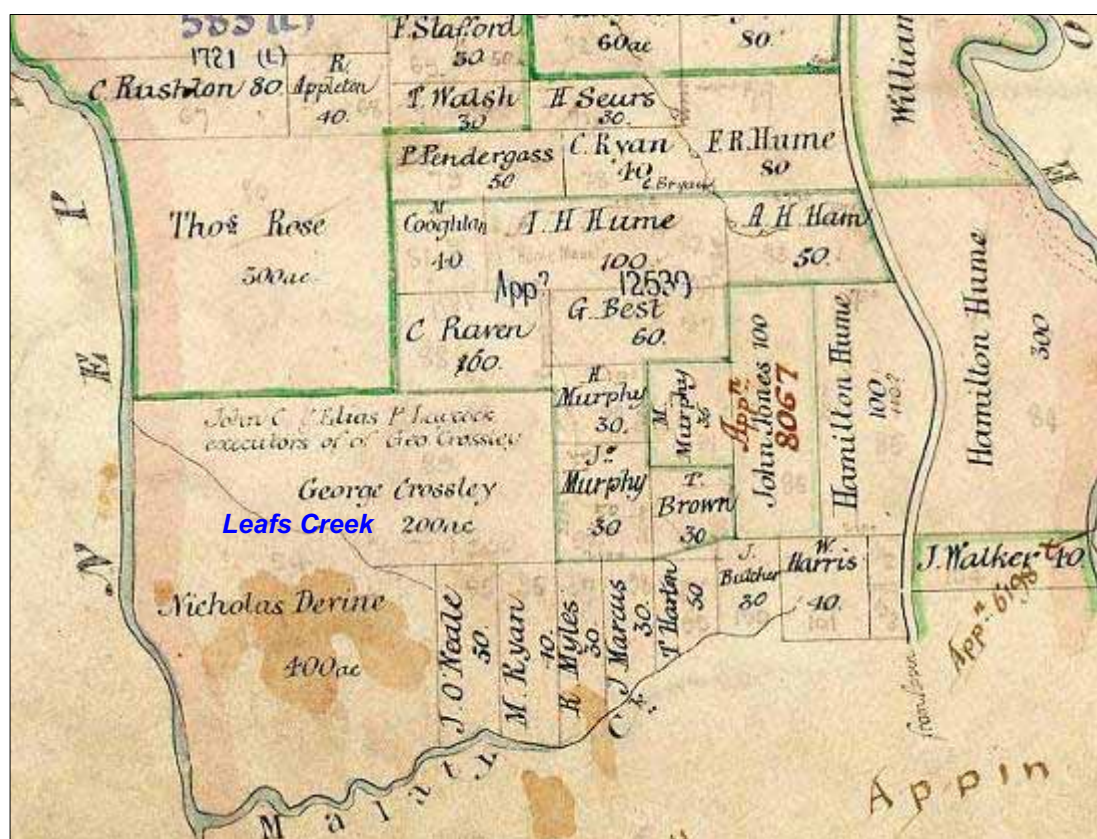


Figure 3.12 Extract from Parish Map of Menangle, County of Cumberland (c.1882) showing land holdings and location of Leaf's Creek (AO Map No. 249, Dept. of Lands Map 14066801).

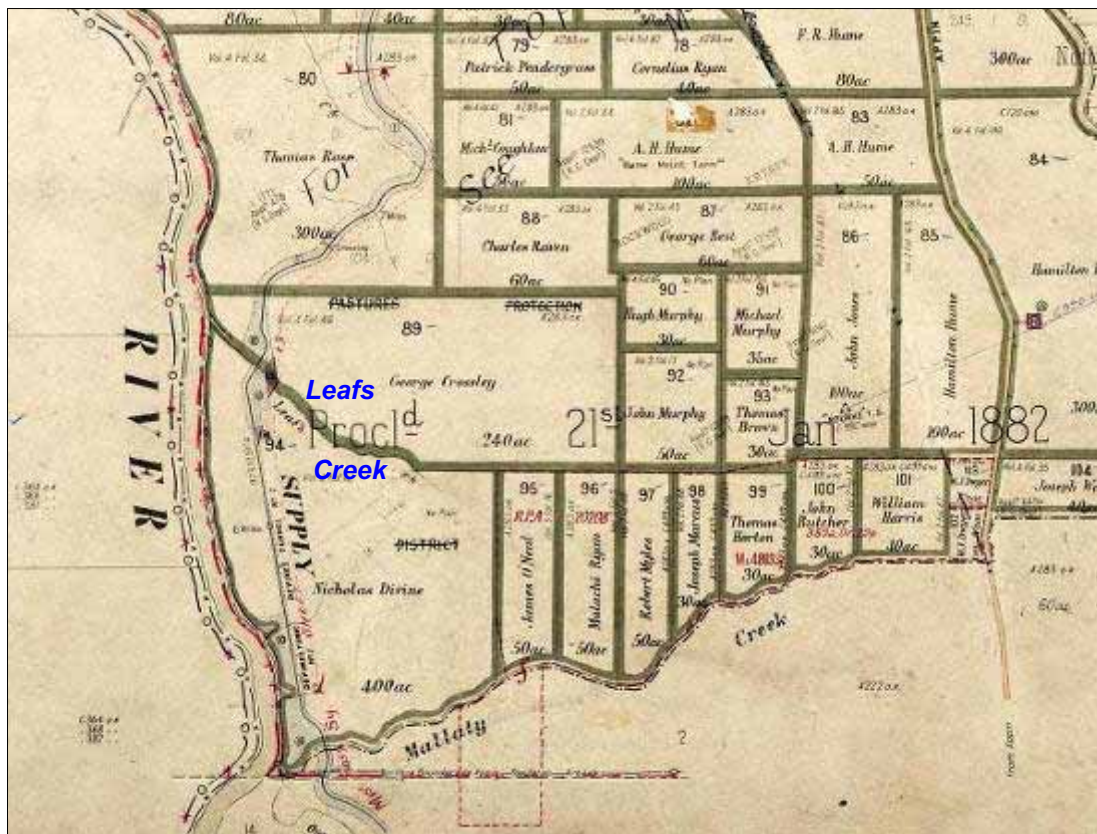


Figure 3.13 Extract from Parish Map of Menangle, County of Cumberland, 2 December 1904, showing land holdings and location of Leafs Creek (Department of Lands Map ref. 14092002).

3.6 Previous Heritage Studies

In 1992, Edward Higginbotham et al. undertook a heritage study of the Upper Canal, Prospect Reservoir & Lower Canal (Upper Nepean Scheme). The authors provided a report of their study in three parts: Volume 1 – Historical and Archaeological Assessment; Volume 2- Inventory (Prospect Reservoir, Lower Canal and Pipehead); and Volume 3 – Conservation Policy.

Leafs Gully is situated adjacent to a portion of the canal identified as the Leafs Gully precinct within Section 3. Figure 3.14 provides an extract from Higginbotham's 1992 report, showing the approximate location of the Leafs Gully study area relative to historical places and features he identified within Section 3 of the Upper Canal. There are no previously identified canal-related sites or features within the study area.

In 2002, Edward Higginbotham et al. developed a Conservation Management for the Upper Canal, Pheasant's Nest to Prospect Reservoir, NSW. The Plan was endorsed by the Heritage Council of NSW on 27 June 2003.

In two separate reports in July and August 2006, Navin Officer Heritage Consultants did not locate any European heritage sites during surveys of the proposed Gas Turbine Power Station at Leafs Gully or the proposed Access Road, respectively.

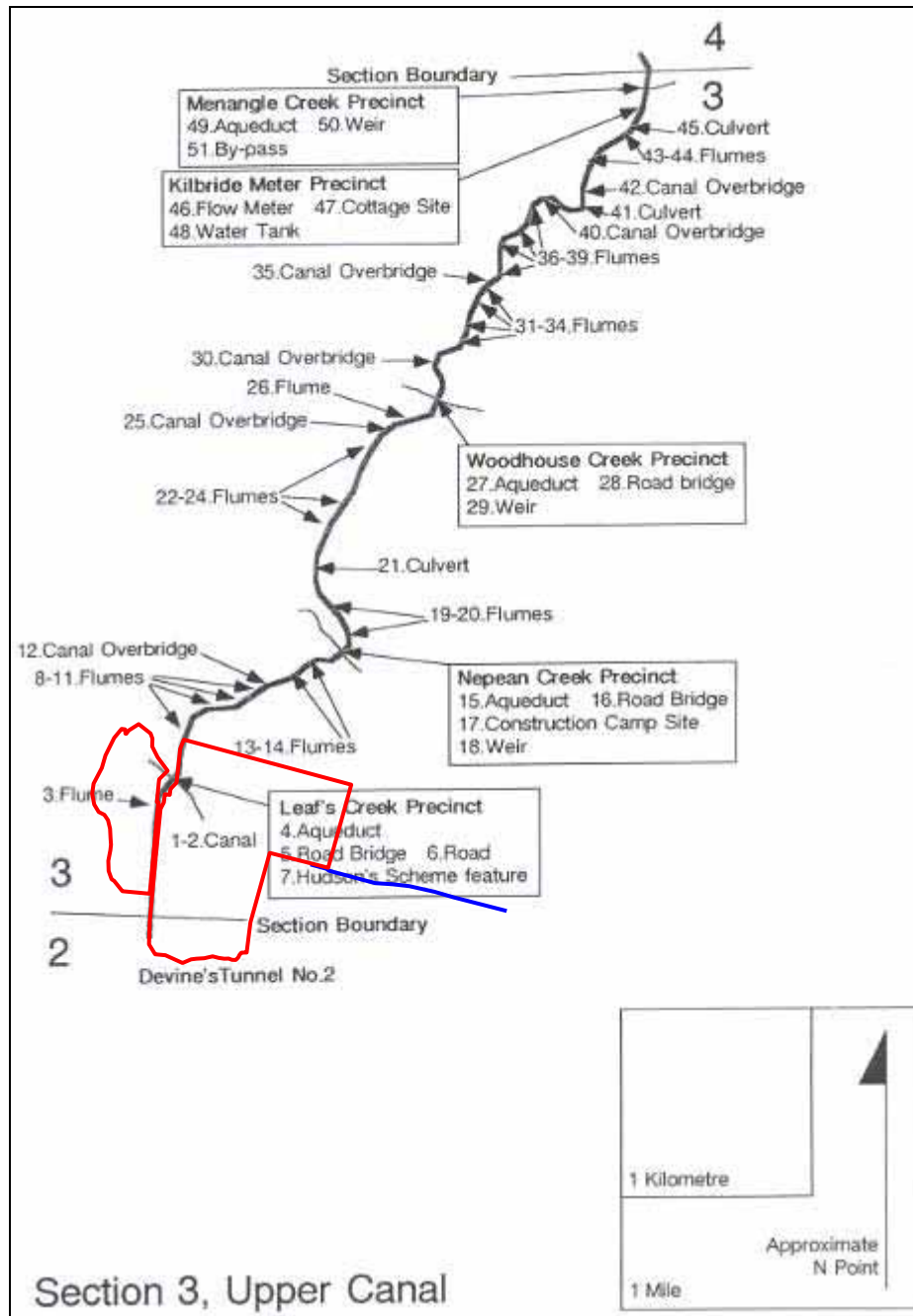


Figure 3.14 Extract from Higginbotham's report (1992:90) showing approximate location of the Leaf's Gully area, relative to historical items identified for the Upper Canal.



4. HERITAGE SIGNIFICANCE, IMPACT ASSESSMENT AND MITIGATIVE MEASURES

4.1 Heritage Significance Methodology and Criteria

The NSW Heritage Office has defined a methodology and set of criteria for the assessment of cultural heritage significance for items and places, where these do not include Aboriginal heritage from the pre-contact period (NSW Heritage Office & DUAP 1996, NSW Heritage Office 2000). The assessments provided in this report follow the Heritage Office methodology.

The following heritage assessment criteria are those set out for Listing on the State Heritage Register. In many cases items will be significant under only one or two criteria. The State Heritage Register was established under Part 3A of the Heritage Act (as amended in 1999) for listing of items of environmental heritage that are of state heritage significance. Environmental heritage means those places, buildings, works, relics, moveable objects, and precincts, of state or local heritage significance (section 4, Heritage Act 1977).

An item will be considered to be of State (or local) heritage significance if, in the opinion of the Heritage Council of NSW, it meets one or more of the following criteria:

- Criterion (a)** an item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area);
- Criterion (b)** an item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history (or the cultural or natural history of the local area);
- Criterion (c)** an item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area);
- Criterion (d)** an item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons;
- Criterion (e)** an item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area);
- Criterion (f)** an item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area);
- Criterion (g)** an item is important in demonstrating the principal characteristics of a class of NSW's
 - cultural or natural places; or
 - cultural or natural environments.
(or a class of the local area's
 - cultural or natural places; or
 - cultural or natural environments.)

An item is not to be excluded from the Register on the ground that items with similar characteristics have already been listed on the Register. Only particularly complex items or places will be significant under all criteria.

In using these criteria it is important to assess the values first, then the local or State context in which they may be significant.

Different components of a place may make a different relative contribution to its heritage value. For example, loss of integrity or condition may diminish significance. In some cases it is constructive to note the relative contribution of an item or its components. Table 4.1 provides a guide to ascribing relative value.



Table 4.1 Guide to ascribing relative heritage value

Grading	Justification	Status
Exceptional	Rare or outstanding item of local or State significance. High degree of intactness Item can be interpreted relatively easily.	Fulfil criteria for local or State listing.
High	High degree of original fabric. Demonstrates a key element of the item's significance. Alterations do not detract from significance.	Fulfil criteria for local or State listing.
Moderate	Altered or modified elements. Elements with little heritage value, but which contribute to the overall significance of the item.	Fulfil criteria for local or State listing.
Little	Alterations detract from significance. Difficult to interpret.	Does not fulfil criteria for local or State listing.
Intrusive	Damaging to the item's heritage significance.	Does not fulfil criteria for local or State listing.

4.2 'Meadow Vale'

4.2.1 Heritage Significance Assessment

'Meadow Vale' is classified as an historic site by the National Trust of Australia (NSW) (National Trust of Australia (NSW) 1998). While the National Trust Register does not provide any statutory obligations for protection of a site as such, the acknowledgment of a place being listed on the Register as a significant site lends weight to its heritage value.

In addition, based on historical and photographic evidence of 'Meadow Vale' homestead, under the above NSW Heritage Office heritage significance criteria and heritage value guidelines, it appears that the main building, at least, fulfils some of those criteria for heritage listing at a local level. The main building:

- Was probably built around 1830 and may have been the original homestead on the original grant of 100 acres made to Andrew Hume in 1812, called 'Hume Mount Farm'. This identifies the building as being important in the course, or pattern, of the cultural of the local area (Criterion **a**). Although the building appears to have altered or modified elements and elements with little heritage value they nevertheless contribute to the overall significance of the item. The building, therefore, could be considered to have moderate heritage significance value and thus fulfils this criterion for local heritage listing;
- Has a strong and special association with the life or works of an important person and group of persons in the cultural history of the local area (Criterion **b**). That is, Andrew Hume, and by extension, the Hume family, which was prominent in the early development of the Colony. As with Criterion **a**, although the building appears to have altered or modified elements and elements with little heritage value they nevertheless contribute to the overall significance of the item. The building, therefore, could be considered to have moderate heritage significance value and thus fulfils this criterion for local heritage listing;



- Has potential to yield information that will contribute to an understanding of cultural history of the local area (Criterion **e**). The probable age of the original building, and its original contextual landscape setting, have the potential to provide information on, among other things, construction techniques, construction materials, and at a broader level the social and economic values of its original occupants. As with the above criteria, although the building appears to have altered or modified elements and elements with little heritage value they nevertheless contribute to the overall significance of the item. The building, therefore, could be considered to have moderate heritage significance value and thus fulfils this criterion for local heritage listing; and
- Is important in demonstrating the principal characteristics of a class of cultural places of the local area (Criterion **g**). The probable age of the original building, c.1830, identifies it as an early colonial construction with the characteristics of a building, and farm setting, of that era. The building, and setting, is contemporary with other similar cultural places in the local area, such as 'Mount Gilead' homestead. The building, therefore, could be considered to have moderate heritage significance value and thus fulfils this criterion for local heritage listing.

The heritage values of the landscape setting of 'Meadow Vale' also fall within the scope of NSW Heritage Criterion (**c**), that is, an item is important in demonstrating aesthetic characteristics in NSW (or the local area). In this regard:

- The main and associated out buildings of 'Meadow Vale' are located on the top of a spur at around 165 m AHD, approximately 200 m northwest of a tributary of Nepean Creek, which itself is a tributary of the Nepean River. As was common for the early nineteenth-century, the original site was probably chosen because of its proximity to a watercourse (Nepean Creek) and its sufficient elevation to avoid flooding, which was usually an unknown factor at that time. Secondly, it may have been chosen to take advantage of the distant views to the south and west, which are now largely screened by a line of tree planting that provides shelter from the prevailing south-westerly wind. These and other distant views from the homestead are compromised by more modern intrusions in the landscape, for example, electricity towers and transmission lines, the Hume Highway/South Western Freeway, the Main Southern Railway, and communication towers.

As such, although the landscape setting of 'Meadow Vale' has potential to yield information that will contribute to an understanding of cultural history of the local area (see Criterion **e** above), the alterations to the more distant landscape created by screening trees and modern cultural constructions detract from its aesthetic heritage significance. The main and associated out buildings of 'Meadow Vale' could therefore be considered to have little significance with regard to their distant landscape context and in this regard do not fulfil this criterion for local heritage listing.

4.2.2 Heritage Impact Assessment

As the 'Meadow Vale' historic site is located approximately 1.4 km northeast of the location of the proposed gas turbine power station at Leaf's Gully, the proposed development will have no impact on the site's historical (Criterion a above), associative (Criterion b), research (Criterion e) or rarity (Criterion g) heritage significance.

In addition, with respect to its landscape context, and in particular the distant views from the homestead, it is considered that the site has little aesthetic heritage significance (Criterion c), due to those views being compromised by a screening line of tree plantings on its south and west and more modern constructions in the landscape, such as electricity towers and transmission lines, the Hume Highway/South Western Freeway, the Main Southern Railway and communication towers. It is also considered that the proposed development will have little or no effect on that aspect of the homestead's significance.

4.2.3 Mitigative Measures

As it is considered that the proposed gas turbine power station at Leaf's Gully will have little or no impact on 'Meadow Vale', no mitigative measures are required.



4.3 'Mount Gilead' homestead

4.3.1 Heritage Significance Assessment

'Mount Gilead' is:

- Listed on the Campbelltown Local Environmental Plan No. 193 of 20 June 1998 as an item of local heritage significance (that listing reads 'Mount Gilead', group, house, outbuildings, dam and mill situated on part Lot 1, DP 807555, Appin Road, Gilead); and
- Classified as an historic site by the National Trust of Australia (NSW) (National Trust of Australia (NSW) 1998). While the National Trust Register does not provide any statutory obligations for protection of a site as such, the acknowledgment of a place being listed on the Register as a significant site lends weight to its heritage value.

Based on historical and photographic evidence of 'Mount Gilead' homestead, under the above NSW Heritage Office heritage significance criteria and heritage value guidelines, it appears that the site fulfils some of those criteria for heritage listing at a local level. The site:

- Dates from the early nineteenth century and was the original location of buildings erected by Reuben Uther and, subsequently, Thomas Rose, on 400 acres granted to the former in 1812. This identifies the site as being important in the course, or pattern, of the cultural of the local area (Criterion **a**). Although the buildings and features at the site appear to have altered or modified elements and elements with little heritage value they nevertheless contribute to the overall significance of the place. The site, therefore, could be considered to have moderate heritage significance value and thus fulfils this criterion for local heritage listing;
- Has a strong and special association with the life or works of an important person, that is Thomas Rose, in the cultural history of the local area (Criterion **b**). As with Criterion **a**, although the site appears to have altered or modified elements and elements with little heritage value they nevertheless contribute to the overall significance of the place. The site, therefore, could be considered to have moderate heritage significance value and thus fulfils this criterion for local heritage listing;
- Has potential to yield information that will contribute to an understanding of cultural history of the local area (Criterion **e**). The age of some of the original structures and its original contextual landscape setting, have the potential to provide information on, among other things, construction techniques, construction materials, and at a broader level the social and economic values of its original occupants. As with the above criteria, although the site appears to have altered or modified elements and elements with little heritage value they nevertheless contribute to the overall significance of the item. The site, therefore, could be considered to have moderate heritage significance value and thus fulfils this criterion for local heritage listing; and
- Is important in demonstrating the principal characteristics of a class of cultural places of the local area (Criterion **g**). The age of the original structures at the site identifies it as an early colonial construction with the characteristics of a building, and farm setting, of that era. The buildings, and setting, are contemporary with other similar cultural places in the local area, such as 'Meadow Vale' homestead. The site, therefore, could be considered to have moderate heritage significance value and thus fulfils this criterion for local heritage listing.

In addition to being encompassed by the NSW Heritage Office Criterion **e** (potential to yield information that will contribute to an understanding of cultural history of the local area), and as with 'Meadow Vale' above, the heritage values of the landscape setting of 'Mount Gilead' also fall within the scope of NSW Heritage Criterion (**c**), that is, an item is important in demonstrating aesthetic characteristics in NSW (or the local area). In this regard:

- The main and associated out buildings and features of 'Mount Gilead' are located on the top of a spur at between 150 and 160 m AHD, approximately 250 m northwest of Woodhouse Creek, a tributary of Nepean Creek, which is a tributary of the Nepean River. As was common for the early nineteenth-century, the original site was probably chosen because of its proximity to a



watercourse (Woodhouse Creek) and its sufficient elevation to avoid flooding, which was usually an unknown factor at that time. Secondly, it may have been chosen to take advantage of the distant views. These views are now compromised by boundary tree plantings and more modern intrusions in the landscape, such as electricity towers and transmission lines, the Hume Highway/South Western Freeway, the Main Southern Railway, and communication towers.

As such, although the landscape setting of 'Mount Gilead' may fulfil Criterion e, the alterations to the more distant landscape created by boundary trees and modern cultural constructions detract from its aesthetic heritage significance. The main and associated out buildings of 'Mount Gilead' could therefore be considered to have little significance with regard to their distant landscape context and in this regard do not fulfil this criterion (Criterion c) for local heritage listing.

4.3.2 Heritage Impact Assessment

As the 'Mount Gilead' historic site is located approximately 2.9 km northeast of the location of the proposed gas turbine power station at Leaf's Gully, the proposed development will have no impact on the site's historical (Criterion a above), associative (Criterion b), research (Criterion e) or rarity (Criterion g) heritage significance.

In addition, with respect to its landscape context, and in particular the distant views from the homestead, it is considered that the site has little aesthetic heritage significance (Criterion c), due to those views being blocked by landform and boundary tree plantings, and compromised by more modern constructions in the landscape, such as electricity towers and transmission lines, the Hume Highway/South Western Freeway, the Main Southern Railway and communication towers. It is also considered that the proposed development will have no effect on that aspect of the homestead's significance.

4.3.3 Mitigative Measures

As it is considered that the proposed gas turbine power station at Leaf's Gully will have no impact on 'Mount Gilead', no mitigative measures are required.

4.4 Sydney Water Supply Upper Canal System

4.4.1 Heritage Significance Assessment

The Sydney Water Supply Upper Canal is:

- Listed on the NSW State Heritage Register;
- Listed on the Campbelltown Local Environmental Plan – District 8 (Central Hills Lands) – Schedule 1 – as an item of environmental heritage, and described as 'generally following western boundary of local government area of the City of Campbelltown and south, in so far as it traverses land under this plan';
- Listed on the Sydney Catchment Authority's Section 170 Heritage and Conservation Register; and
- Classified as an historic site by the National Trust of Australia (NSW) (National Trust of Australia (NSW) 1998). While the National Trust Register does not provide any statutory obligations for protection of a site as such, the acknowledgment of a place being listed on the Register as a significant site lends weight to its heritage value.

A copy of the NSW State Heritage Register listing for the Upper Canal is at Appendix 1. Although the Sydney Water Supply Upper Canal System does not appear on the NSW Heritage Inventory for the Campbelltown Local Government Area (LGA), it does appear on that Inventory for the Liverpool LGA. A copy of that listing is also at Appendix 1.



The listings encompass the canal itself together with various ancillary structures along its route, such as wrought iron flume (pipe) sections supported on stone piers in order to cross steep gullies, concrete bridges giving access across the canal, other drainage structures to prevent pollution of the canal such as brick and stone culverts, aqueducts, control and gauging installations, an original gateway and gate at the canal's intersection with 18th Ave and stone markers along the entire length of the structure. The listings also incorporate items identified by Higginbotham et al. in 1992 and 2002.

Under the above heritage listings the Upper Canal has been assessed as meeting NSW Heritage Office Criteria a, c, e, and f, as follows:

- *Criterion a (Historical Significance):* The Upper Canal as an essential part of Sydney's fourth water supply, the Upper Nepean, demonstrates the history of the first major civic engineering project of the late 19th century in the wider Sydney area. It also demonstrates the rapid growth of settlement in the environs of Sydney and the need to supply a growing urban population with a water system;
- *Criterion c (Aesthetic Significance):* The site indicates a level of technical achievement being an example of a late 19th century hydraulic design and construction engineering project. The canal maintains the highest possible elevation (with grades as flat as 1 in 3000) in order that most of the supply to the city was controlled by gravity. It is still in use as a water supply system for the south-western suburbs of Sydney;
- *Criterion e (Research Potential):* There is the potential to gain more information on the site from further architectural, archaeological and documentary research; and
- *Criterion f (Rarity):* The site is rare within the Liverpool LGA and the State.

4.4.2 Heritage Impact Assessment

The portion of the Upper Canal identified within the Leaf's Gully proposed project area consists approximately of a 50 m interval which incorporates a bend to the north encompassing approximately 130 degrees. The form of this section of the canal has been classified by Higginbotham et al. (1992) as belonging to a type two.

- Type two sections consist of an open, square sided canal, with a U-shaped cross section formed partly by rock cut and partly by sandstone block masonry on each side. In some areas type two canal sections have been lined with concrete. Higginbotham notes that some simple dry-stone retaining walls exist above the canal immediately north of the Leaf's Gully aqueduct which is located 100 m upstream of the proposed project area.

A small section of the Sydney Water Supply Upper Canal is the only historic site with potential to be impacted by the proposed development. The development proposal includes an option for the construction of a pump station and a pipeline connecting the Leaf's Gully Power Station to the canal. If constructed, this pipeline connection would be expected to involve only minor impact to the canal fabric and would be in accordance with the requirements of the Sydney Catchment Authority.

4.4.3 Mitigative Measures

The Upper Canal is listed as an item of heritage significance on the NSW Heritage Register. Part 4 of the *Heritage Act 1977* specifies that no disturbance can occur to items listed on the State Heritage Register without approval from the Heritage Council of NSW. Such approval may be obtained by an application made to the Heritage Office under Section 60 of the *Heritage Act 1977*. However, since the introduction of Part 3A of the Environmental Protection and Assessment Act 1979, section 75U of the amended Act excludes approved projects from the requirements of Part 4 of the Heritage Act.

In the absence of the Part 4 statutory provisions, the Heritage Office would be unlikely to advise approval of the application to the Department of Planning except where it could be demonstrated that impact to the canal would be minor and/or there was an appropriate commitment by the proponent to effectively mitigate any potential impacts to heritage values.



If the option to construct a pipeline connection with the canal is developed further, it is recommended that:

- The design of the connection should minimise direct and indirect impacts to the fabric and context of the canal;
- All works and impacts on the upper canal should be consistent with the provisions of the existing Conservation Management Plan for the Upper Canal (Higginbotham and Associates 2002); and
- Any heritage impact mitigation actions as required by Conservation Management Plan (such as the conduct archival recording) should be included in a Statement of Commitments as part of any Part 3A project approval.

4.5 Summary

Table 4.2 provides a summary of the heritage significance, impact assessment and mitigative measures associated with the above three historical heritage sites, being 'Meadow Vale', 'Mount Gilead' and the Sydney Water Supply Upper Canal System.

Table 4.2 Summary of heritage significance, impact assessment and mitigative measures.

NSW Heritage Office Criteria	(a) Historical	(b) Personal Association	(c) Aesthetic	(d) Community Association	(e) Research	(f) Rarity	(g) Characteristics
'Meadow Vale'							
Significance	Local	Local	None	na	Local	na	Local
Impact	None	None	None	na	None	na	None
Mitigation	None	None	Little/None	na	None	na	None
'Mount Gilead'							
Significance	Local	Local	None	na	Local	na	Local
Impact	None	None	None	na	None	na	None
Mitigation	None	None	None	na	None	na	None
Sydney Water Supply Upper Canal System							
Significance	State	na	State	na	State	State	na
Impact	Potential	na	Potential	na	Potential	Potential	na
Mitigation	Refer 4.4.3 above	na	Refer 4.4.3 above	na	Refer 4.4.3 above	Refer 4.4.3 above	na

na Not applicable



5. STATUTORY INFORMATION¹

5.1 Environmental Planning & Assessment Act (1979)

The Environmental Planning & Assessment Act 1979 (EP&A Act) and its regulations, schedules and associated guidelines require that environmental impacts are considered in land use planning and decision making. Environmental impacts include cultural heritage assessment. The Act was recently reformed by the passage of the Environmental Planning and Assessment Amendment (Infrastructure and other Planning Reform) Act in June 2005.

There are four main areas of protection under the Act:

- Planning instruments allow particular uses for land and specify constraints. Part 3 governs the preparation of planning instruments. Both Aboriginal and Historical (Non-Indigenous) cultural heritage values should be assessed when determining land use;
- A separate streamlined and integrated development assessment and approvals regime for major infrastructure and other projects of significance to the State is defined by Part 3A;
- Section 90 lists impacts which must be considered before development approval is granted. Part 4 relates to the development assessment process for local government authorities. Impact to both Aboriginal and Historical (Non-Indigenous) cultural heritage values are included; and
- State Government agencies which act as the determining authority on the environmental impacts of proposed activities must consider a variety of community and cultural factors in their decisions, including Aboriginal and Historical (Non-Indigenous) cultural heritage values. Part 5 relates to activities which do not require consent but still require an environmental evaluation, such as proposals by government authorities.

Under the *Environmental Planning & Assessment Act (1979)* the Minister for Planning may make various planning instruments such as regional environmental plans (section 51) and local environment plans (section 70). The Minister may direct a public authority such as a Local Council, to exercise certain actions within a specified time, including the preparation of draft Local Environmental Plans and appropriate provisions to achieve the principles and aims of the Act (section 117).

These planning instruments may identify places and features of cultural heritage significance and define various statutory requirements regarding the potential development, modification and conservation of these items. In general, places of identified significance, or places requiring further assessment, are listed in various heritage schedules that may form part of a Local Environmental Plan (LEP) or a Regional Environmental Plan (REP). Listed heritage items are then protected from certain defined activities, normally including demolition, renovation, excavation, subdivision, and other forms or damage, unless consent has been gained from an identified consent authority. The consent authority under a LEP is normally the local Shire or City Council.

In addition to the development of these environmental planning instruments, the Director of the Department of Planning (DoP) or a local Council may prepare a Development Control Plan (DCP), where it is considered that more detailed provisions or guidelines are required over any part of land covered by an REP, LEP or their Drafts (sections 51A and 72).

Recent amendments to the Act require a single LEP to be prepared according to a standard template, for each local government area within the next five years

¹ The following information is provided as a guide only and is accurate to the best knowledge of Navin Officer Heritage Consultants. Readers are advised that this information is subject to confirmation from qualified legal opinion.



In determining a development application (DA), a consent authority, such as a local Council, must take into consideration any of the following which are relevant to the subject application (section 79C(1) Potential Matters for Consideration):

- The provisions of any environmental planning instrument, or draft environmental planning instrument (which has been placed on public exhibition); any development control plan; and the regulations;
- The likely impacts of that development on the natural and built environments, and the social and economic impacts on the locality;
- The suitability of the site for the development;
- Any submissions made in accordance with the Act or the regulations; and
- The public interest.

Best Practice Guidelines have been issued by DoP on the use of section 79C(1) and include an assessment of how the proposed development will affect the heritage significance of the property, or adjacent properties, in terms of the historical, scientific, cultural, spiritual and archaeological of Aboriginal, non-Aboriginal and natural heritage.

If a development consent is required from council under the provisions of a LEP and a permit or license is also required from a State Government Agency an integrated development must be submitted to the consent authority. A development is an 'integrated development' if it requires an approval under section 90 of the *NSW National Parks & Wildlife Act, 1974* or if the Director General of DEC is of the opinion that consultation with an Aboriginal group or organisation should be consulted prior to a determination being made. Any development approval issued for an integrated development of this kind must be consistent with the general terms of approval or requirements provided by the relevant State Government Agency.

The *Environmental Planning & Assessment Act, 1979*, as amended, provides for the listing of heritage items and conservation areas and for the protection of these items or areas through environmental planning instruments (like LEPs and REPs) at the local government and State planning levels. These statutory planning instruments usually contain provisions for the conservation of these items and areas as well as an assessment process to reduce the impacts of new development on the heritage significance of a place, building or conservation area.

Part 3A of the Act is a recent amendment and establishes a separate streamlined and integrated development assessment and approvals regime for major State government infrastructure projects, development that was previously classified as State Significant development, and other projects, plans or programs declared by the Minister for Planning.

Part 3A removes the stop-the-clock provisions and the need for single-issue approvals under eight other Acts, including the National Parks and Wildlife Act 1974 and the Heritage Act 1977. Environmental planning instruments such as the heritage provisions within LEP and REPs, (other than State environmental planning policies) do not apply to projects approved under Part 3A.

Where warranted the Minister may declare any project subject to Part 3A to be a critical infrastructure project. These projects only require a concept approval in contrast to other Part 3A projects which require project approval. In most circumstances, a concept approval will be obtained to establish the environmental performance requirements and consultation requirements for the implementation of the subsequent stages of the project.

Under the provisions of Part 3A, proponents of major and infrastructure projects must make a project application seeking approval of the Minister. The application is to include a preliminary assessment of the project. Application may be for concept plan approval or full approval. Following input from relevant agencies and council(s), DoP will issue the proponent with requirements for the preparation of an Environmental Assessment and a Statement of Commitments. The Statement of Commitments will include how the project will be managed in an environmentally sustainable manner, and consultation requirements.



Following submission of an Environmental Assessment and draft Statement of Commitments to DoP, these documents are variously evaluated, reviewed, circulated and exhibited. The proponent may modify the proposal to minimise impacts in response to submissions received during this process. The proponent then provides a Statement of Commitments and, following any project changes, a Preferred Project Report. An assessment report is then drafted by the Director-General and following consultation with relevant agencies, a final report with recommendations for approval conditions or application refusal is submitted to the Minister. The Minister may refuse the project, or approve it with any conditions considered appropriate.

5.2 The National Trust (NSW)

Whilst the National Trust Register does not provide any statutory obligations for protection of a site as such, the acknowledgment of a place being listed on the Register as a significant site lends weight to its heritage value. Also, the fact that the actual data for sites may be minimal, does not diminish the significance of a place. In fact, many sites were listed with only basic data added, especially in the early developmental stages of the Register.

The Trust, over the last few years have been upgrading the information for places listed, with criteria for assessment for listing based on the Australian Heritage Commission Criteria of assessment for entry to the Register of the National Estate.

5.1 The NSW Heritage Act (1977)

Overview

The purpose of the NSW Heritage Act 1977 is to ensure that the heritage of New South Wales is adequately identified and conserved. In practice the NSW Heritage Act has focused on items and places of non-indigenous heritage to avoid overlap with the NP&W Act, 1974 which has primary responsibilities for nature conservation and the protection of Aboriginal relics and places in NSW.

The *Heritage Amendment Act 1998* came into effect in April 1999. This Act instigated changes to the NSW heritage system, which were the result of a substantial review begun in 1992. A central feature of the amendments was the clarification and strengthening of shared responsibility for heritage management between local government authorities, responsible for items of local significance, and the NSW Heritage Council. The Council retained its consent powers for alterations to heritage items of state significance.

The Heritage Act is concerned with all aspects of conservation ranging from the most basic protection against damage and demolition, to restoration and enhancement. It recognises two levels of heritage significance, State significance and Local significance across a broad range of values. Some key provisions of the Act are:

- The establishment and functions of the Heritage Council (Part 2),
- Interim heritage orders (Part 3), the State Heritage Register (Part 3A),
- Heritage Agreements (Part 3B),
- Environmental planning instruments (Part 5),
- The protection of archaeological deposits and relics (Part 6), and
- The establishment of Heritage and Conservation Registers for state government owned and managed items (Part 7).

Generally this Act provides protection to items that have been identified, assessed and listed on various registers including State government section 170 registers, local government LEPs and the State Heritage Register. The Interim Heritage Order provisions allow the minister or his delegates (local government may have delegated authority) to provide emergency protection to threatened places which have not been previously identified.

In addition, the Act includes provisions which relate to the definition and protection of relics.



Protection of Relics and Archaeological Deposits

Section 139 of the Act specifically provides protection for any item classed as a relic. A relic is defined as "...any deposit object or material evidence -

- (a) Which relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement; and
- (b) Which is 50 or more years old."

(Heritage Act 1977, Part 1, Section 4)

Section 139 of the Act disallows disturbance of a relic unless in accordance with an 'excavation permit' from the Heritage Council. This section also allows the Heritage Council to create exceptions to the requirement for an excavation permit with respect to certain types of relic, contexts, or types of disturbance (refer below).

Section 146 of the Act requires that the discovery of a previously unknown relic be reported to the Heritage Council within a reasonable time of its discovery.

Current policy and interpretation by the NSW Heritage Office (Department of Planning) limits the scope of the 'relic' definition to exclude above ground structures and a range of ground features or 'works' which may include roads, embankments and other forms of constructed ground relief.

Permits and Approval Requirements

The Act includes two key approval requirements;

- A permit must be obtained for works which have the potential to interfere with a heritage item or place which is either listed on the State Heritage Register or the subject of an interim heritage order (Section 57); and
- A permit must be obtained to disturb or excavate land where it is known (or there is reasonable cause to suspect) that such action will or is likely to uncover or affect a relic (Section 139). This permit is known as an excavation permit and can be applied for under section 140 of the Act. Current interpretation of the Act by the Heritage Office indicates that excavation permits are only applicable to relics which are situated below the ground surface.

It should be noted that section 75U of the EP&A Act 1979 (as amended) establishes an exception to the requirement for an excavation permit. It states that an approval under Part 4, or an excavation permit under section 139 of the Heritage Act 1977 is not required for an approved project subject to the provisions of Part 3A of the EP&A Act.

Exemptions for works requiring Heritage Council Approval

Certain activities which may be conducted on heritage item listed on the State Heritage Register are exempted from the Section 57 approval requirements. Such exemptions are granted by the Minister and fall into two groups, standard exemptions and site specific exemptions.

A schedule of section 57 standard exemptions has been formulated which includes activities such as certain types of maintenance and repair, minor excavations, changes of use, some temporary structures and 'anything which in the opinion of the Director is of a minor nature and will not adversely affect the heritage significance of the item'. In many cases notification of such proposed activities must be made by the applicant to the Director, and written notification from the Director received regarding his satisfaction that the exemption criteria have been met.

Exceptions from Excavation Permit Requirements

Certain activities are excluded from the 139 permit approval requirements.

A series of exceptions have also been established for Section 139 Permit approval requirements. This includes demolition and maintenance of bridges not listed on the State Heritage Register, some



forms of excavation and maintenance of underground services, conservation and repair of monuments and grave markers, and the exposing of survey marks in the course of survey operations.

On the 5th March of 2003, the following section 139 exceptions were notified:

Excavation or disturbance of the following land does not require an excavation permit under Section 139, provided that the Director is satisfied that the criteria in (a), (b) or (c) have been met and the person to undertake the excavation or disturbance has received a notice advising that the Director is satisfied:

- (a) Where an archaeological assessment has been prepared in accordance with Guidelines published by the Heritage Council of NSW which indicates that there is little likelihood of there being any relics in the land or that any relics in the land are unlikely to have State or local heritage significance;
- (b) Where the excavation or disturbance of land will have a minor impact on the archaeological resource; and
- (c) Where the excavation or disturbance of land involves only the removal of fill which has been deposited on the land.

A person proposing to excavate or disturb land according to the above criteria must write to the Director and describe the proposed excavation or disturbance and set out why it satisfies the criteria. The Director shall notify the applicant if he or she is satisfied that one or more of the criteria have been met.

The Heritage Council of NSW

The role of the Heritage Council is to provide the Minister with advice on a broad range of matters relating to the conservation of the heritage of NSW. It also has a role in promoting heritage conservation through research, seminars and publications. The membership of the Heritage Council is designed to reflect a broad range of interests and areas of expertise.

Interim Heritage Orders

Under the provisions of Part 3 of the Act, the Minister can make an interim heritage order (IHO). A recommendation with respect to an order can come from the Heritage Council, either based on a request for the Minister, or the Council's own considerations. The Minister can also authorise Local Councils to make IHOs within their area. An interim conservation order may remain in force for up to 12 months, until such time as it is revoked or the item is listed on the State Heritage Register. A heritage order may control activities such as demolition of structures, damage to relics, places or land, development and alteration of buildings, works or relics.

The State Heritage Register

Changes to the Heritage Act in the 1998 amendments established the State Heritage Register which includes all places previously protected by permanent conservation orders (PCOs) and items identified as being of state significance in heritage and conservation registers prepared by State Government instrumentalities. Sites or places which are found to have a state level of heritage significance should be formally identified to the Heritage Council and considered for inclusion on the State Heritage Register.

Heritage Agreements

Under Section 39 of the Act, the Minister can enter into an Agreement with the owner of a heritage item listed on the State Heritage Register to ensure its conservation. Such an Agreement can cover a range of responsibilities including financial or specialist assistance and can be attached to the title of the land.



Environmental Planning Instruments

Part 5 of the Act gives the Heritage Council the authority to request that an environmental planning instrument be prepared covering certain lands. It also directs that the Heritage Council shall be consulted by others when preparing a draft planning instrument affecting land to which an interim heritage order applies or which includes an item listed on the State Heritage Register. In addition it gives the Heritage Council the authority to produce guidelines for the preparation of such planning instruments.

Heritage and Conservation Registers

Section 170 of the Act requires all state government instrumentalities to establish and maintain a Heritage and Conservation Register that lists items of environmental heritage. The register is to include items which are, or could potentially be, the subject of a conservation instrument, and which are owned, occupied or otherwise under the control of that instrumentality.



6. CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

6.1.1 'Meadow Vale' homestead

'Meadow Vale':

- Is classified as an historic site by the National Trust of Australia (NSW);
- Fulfills NSW Heritage Office significance criteria a (historical), b (personal association), e (research) and g (characteristics) and has moderate heritage significance for heritage listing at a local level; and
- The distant landscape context of Meadow Vale and has little heritage significance and in this regard, does not fulfil NSW Heritage Office significance criterion c (aesthetic) for local heritage listing.

As the 'Meadow Vale' historic site is located approximately 1.4 km northeast of the location of the proposed gas turbine power station at Leaf's Gully, the proposed development will have no impact on the site's historical (criterion a), personal associative (criterion b), research (criterion e) or rarity (criterion g) heritage significance.

With respect to its landscape context, and in particular the distant views from the homestead, it is considered that the site has little aesthetic heritage significance (criterion c), due to those views being compromised by a screening line of tree plantings on its south and west and more modern constructions in the landscape, such as electricity towers and transmission lines, the Hume Highway/South Western Freeway, the Main Southern Railway and communication towers, it is also considered that the proposed development will have little or no effect on that aspect of the homestead's significance.

6.1.2 'Mount Gilead' homestead

'Mount Gilead':

- Is listed on the Campbelltown Local Environmental Plan No. 193 of 20 June 1998 as an item of local heritage significance;
- Is classified as an historic site by the National Trust of Australia (NSW);
- Fulfills NSW Heritage Office significance criteria a (historical), b (personal association), e (research) and g (characteristics) and has moderate heritage significance for heritage listing at a local level; and
- The distant landscape context of Mount Gilead has little heritage significance and in this regard, does not fulfil NSW Heritage Office significance criterion c (aesthetic) for local heritage listing

As the 'Mount Gilead' historic site is located approximately 2.9 km northeast of the location of the proposed gas turbine power station at Leaf's Gully, the proposed development will have no impact on the site's historical (criterion a), personal associative (criterion b), research (criterion e) or rarity (criterion g) heritage significance.

With respect to its landscape context, and in particular the distant views from the homestead, it is considered that the site has little aesthetic heritage significance (criterion c), due to those views being blocked by landform and boundary tree plantings and compromised by more modern constructions in the landscape, such as electricity towers and transmission lines, the Hume Highway/South Western Freeway, the Main Southern Railway and communication towers, it is also



considered that the proposed development will have no effect on that aspect of the homestead's significance.

6.1.3 Sydney Water Supply Upper Canal System

The Sydney Water Supply Upper Canal is:

- Listed on the NSW State Heritage Register;
- Listed on the Campbelltown Local Environmental Plan – District 8 (Central Hills Lands) – Schedule 1 – as an item of environmental heritage;
- Listed on the Sydney Catchment Authority's Section 170 Heritage and Conservation Register;
- Classified as an historic site by the National Trust of Australia (NSW); and
- Fulfils NSW Heritage Office significance criteria a (historical), c (aesthetic – technical achievement), e (research) and f (rarity) for heritage listing at a State level.

The portion of the Upper Canal identified within the Leaf's Gully proposed project area consists approximately of a 50 m interval which incorporates a bend to the north encompassing approximately 130 degrees.

A small section of the Sydney Water Supply Upper Canal is the only historic site with potential to be impacted by the proposed development. The development proposal includes an option for the construction of a pump station and a pipeline connecting the Leaf's Gully Power Station to the canal. If constructed, this pipeline connection would be expected to involve only minor impact to the canal fabric and would be in accordance with the requirements of the Sydney Catchment Authority.

6.2 Recommendations

6.2.1 'Meadow Vale' homestead

As it is considered that the proposed gas turbine power station at Leaf's Gully will have little or no impact on 'Meadow Vale', no mitigative measures are required.

6.2.2 'Mount Gilead' homestead

As it is considered that the proposed gas turbine power station at Leaf's Gully will have no impact on 'Mount Gilead', no mitigative measures are required.

6.2.3 Sydney Water Supply Upper Canal System

If the option to construct a pipeline connection with the canal is further developed, then it is recommended that:

- The design of the connection should minimise direct and indirect impacts to the fabric and context of the canal;
- All works and impacts on the upper canal should be consistent with the provisions of the existing Conservation Management Plan for the Upper Canal (Higginbotham and Associates 2002); and
- Any heritage impact mitigation actions as required by Conservation Management Plan (such as the conduct archival recording) should be included in a Statement of Commitments as part of any Part 3A project approval.



7. REFERENCES

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APPENDIX 1

HERITAGE LISTINGS FOR THE UPPER CANAL



NSW Heritage Register Listing

Upper Canal System (Prospect Reservoir)

Name of Item: Upper Canal System (Prospect Reservoir)

Other Name/s: includes the Southern Railway Aqueduct

Type of Item: Area/Complex/Group

Group/Collection: Utilities - Water

Category: Water Supply Canal

Primary Address: Prospect, NSW 2148

Local Govt. Area: Blacktown

Property Description:

Lot/Volume Code	Lot/Volume Number	Section Number	Plan/Folio Code	Plan/Folio Number
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Boundary: The Upper Canal forms a major component of the Upper Nepean Scheme, which also includes the Prospect Reservoir and the Lower Canal. The Upper Nepean Scheme supplies water from the Cataract River at Broughtons Pass to the Crown Street reservoir, a distance of 63.25 miles. The Upper Canal commences by tunnel from Pheasant's Nest Weir on the Nepean River and extends through the Local Government areas of Wollondilly, Liverpool, Holroyd, Fairfield, Campbelltown and Camden.

All Addresses

Street Address	Suburb/Town	LGA	Parish	County	Type
	Prospect	Blacktown			Primary
	Leppington	Camden			Alternate
	Horsley Park	Fairfield			Alternate
	Catherine Field	Camden			Alternate
	Mount Annan	Camden			Alternate
	Currans Hill	Camden			Alternate
	Cecil Park	Liverpool			Alternate
	West Hoxton	Liverpool			Alternate
	Appin	Wollondilly			Alternate
	Denham Court	Campbelltown			Alternate
	Gilead	Campbelltown			Alternate



Owner/s

Organisation Name	Owner Category	Date Ownership Updated
Sydney Catchment Authority	State Government	

Statement of Significance

The Upper Nepean Scheme is significant because:

- * In its scope and execution, it is a unique and excellent example of the ingenuity of late 19th century hydraulic engineering in Australia, in particular for its design as a gravity-fed water supply system.
- * It has functioned as a unique part of the main water supply system for Sydney for over 100 years, and has changed little in its basic principles since the day it was completed.
- * It represented the major engineering advance from depending on local water sources to harvesting water in upland catchment areas, storing it in major dams and transporting it the city by means of major canals and pipelines.
- * It provides detailed and varied evidence of the engineering construction techniques prior to the revolution inspired by reinforced concrete construction, of the evolution of these techniques (such as the replacement of timber flumes with wrought iron and then concrete flumes), and of the early utilisation of concrete for many engineering purposes in the system.
- * The scheme possesses many elements of infrastructure which are of world and national renown in technological and engineering terms.
- * Many of the structural elements are unique to the Upper Nepean Scheme.

Reference: Edward Higginbotham & Associates, SCA Heritage and Conservation Register

Date: 18 December 2000

Date Significance Updated: 17 Sep 03

Note: There are incomplete details for a number of items listed on the State Heritage Register. The Heritage Office intends to develop or upgrade statements of significance for these items as resources become available.

Description

Assessment Criteria

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

Procedures /Exemptions

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



57(2)	Exemption to allow work	Trash rack safety upgrade for 19 access bridges	Exemption granted under Heritage Council exemption No. 7	Mar 20 2003
21(1)(b)	Conservation Plan submitted for endorsement	Upper Canal CMP, Pheasant's Nest to Prospect Reservoir, Vols 1-3 (Aug 2002)		Jun 27 2003
57(2)	Exemption to allow work	geotechnical investigation drilling program to assess feasibility of emergency and long term stabilisation options		Oct 20 2003
57(2)	Exemption to allow work	Installation of steel pipe guard rail and steel deck joint plates on timber bridges on upper canal system		Feb 18 2004
57(2)	Exemption to allow work	Minor excavation of floor of Southern Railway Aqueduct, Upper Canal System, downstream of aqueduct, to allow for minor change to approved construction programme (2003/S60/147)		Feb 20 2004
57(2)	Exemption to allow work	Application for prevention works on the Cataract Tunnel, Upper Canal (Brooks Point) to mitigate the effects of subsidence from Longwall Coal Mining		Jun 18 2004
57(2)	Exemption to allow work	Drilling of two boreholes adjacent to the Upper Canal		Dec 23 2004
57(2)	Exemption to allow work	Underbore the Sydney Water Supply Canal (Upper Canal System) to install a 110mm pipe for a length of 200m		Jul 21 2005
57(2)	Exemption to allow work	Cecil Hills Water Tunnel and reservoir		Nov 17 2005
57(2)	Exemption to allow work	Westons Tunnel - Installation of a borehole for vibration monitoring during road construction. Installation of fill and construction of widened road over Westons Tunnel.		Feb 20 2006



Listings

Heritage Listing	Listing Title	Listing Number	Gazette Date	Gazette Number	Gazette Page
<i>Heritage Act - State Heritage Register</i>		01373	18 Nov 99		
<i>Heritage Act - s.170 NSW State agency heritage register</i>					
<i>Local Environmental Plan</i>	Wollondilly				
<i>National Trust of Australia register</i>					

Study Details

Title	Year	Number	Author	Inspected by	Guidelines Used
Sydney Water Section 170 Register	1996		Graham Brooks and Associates		No

References, Internet links & Images

Type	Author	Year	Title	Internet Links
Written	Caitlin Allen, Conservation Archaeologist, NSW Government Architect's Office	2003	Southern Railway Aqueduct on the Upper Canal at Mount Annan Refurbishment and Repair Heritage Impact Assessment	
Written	Edward Higginbotham et. al.	2002	Conservation management plan for the Upper Canal, Pheasant's Nest to Prospect Reservoir, NSW [Endorsed by the Heritage Council of NSW on 27/6/2003]	
Written	Edward Higginbotham, Terry Kass, Vince Murphy, John Collocott, Toby Fiander, Siobhan Lavelle	1992	Heritage Study of the Upper Canal, Prospect Reservoir & Lower Canal (Upper Nepean Scheme): Volume 1 - Historical & Archaeological Assessment	
Written	Edward Higginbotham, Terry Kass, Vince Murphy, John Collocott, Toby Fiander, Siobhan Lavelle	1992	Heritage Study of the Upper Canal, Prospect Reservoir & Lower Canal (Upper Nepean Scheme): Volume 2 - Inventory. Part 4. Prospect Reservoir, Lower Canal & Pipehead	



Written	Edward Higginbotham, Terry Kass, Vince Murphy, John Collocott, Toby Fiander, Siobhan Lavelle	1992	Heritage Study of the Upper Canal, Prospect Reservoir & Lower Canal (Upper Nepean Scheme): Volume 3 - Conservation Policy	
Written	Kim Ketelby	2005	Westons Tunnel: Assessment of Cultural Significance & Heritage Impact	
Written	RTA Operations	2003	Statement of Heritage Impact	

Source of information for this entry

Name: NSW Heritage Office

Email: watters@heritage.nsw.gov.au

Web Page: www.heritage.nsw.gov.au

Administration

Database Number: 5051481

File Number: H00/00238



NSW Heritage Inventory Listing (as it applies to the Liverpool LGA)

Sydney Water Supply Upper Canal

Item

Name of Item: Sydney Water Supply Upper Canal

Type of Item: Built

Group/Collection: Utilities - Water

Category: Water Supply Canal

Primary Address: Off Elizabeth Drive (opposite the intersection with Wallgrove Road), Cecil Hills, NSW 2171

Local Govt. Area: Liverpool

Property Description:

Lot/Volume Code	Lot/Volume Number	Section Number	Plan/Folio Code	Plan/Folio Number
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All Addresses

Street Address	Suburb/Town	LGA	Parish	County	Type
Off Elizabeth Drive (opposite the intersection with Wallgrove Road)	Cecil Hills	Liverpool			Primary

Statement of Significance

Sydney Water Supply Upper Canal as an essential part of Sydney's fourth water supply, the Upper Nepean, demonstrates the history of the first major civic engineering project of the late 19th century in the wider Sydney area. It also demonstrates the rapid growth of settlement in the environs of Sydney and the need to supply a growing urban population with a water system. The site indicates a level of technical achievement being an example of a late 19th century hydraulic design and construction engineering project. It is now a rare site type in the LGA and State. There is the potential to gain more information on the site from further architectural, archaeological and documentary research.

Date Significance Updated: 09 Nov 04

Note: There are incomplete details for a number of items listed on the State Heritage Register. The Heritage Office intends to develop or upgrade statements of significance for these items as resources become available.

Description

Construction Years: 1880 - 1888

Physical Description: The Sydney Water Supply Canal runs c. N-S through the Liverpool LGA area. It enters Liverpool LGA south of the Elizabeth Drive and Wallgrove Road



intersection at Cecil Hills and exits the LGA at the intersection between Bringelly Road and Cowpasture Road, West Hoxton.

The Upper Canal is the conduit which carries water stored in the Upper Nepean Catchment dams (Cataract, Cordeaux, Avon and Nepean) to Prospect Reservoir, the major service reservoir for much of the Sydney Metropolis. The "Upper Canal" comprises approximately 58kms of tunnels, aqueducts and open channels of various cross-section which diverts the flow of the Nepean River below its junctions with the Avon and Cordeaux Rivers at Pheasant's Pass where the flow of the four rivers is diverted to Prospect Reservoir.

The construction of the canal is variable and depends on the type of country through which it passes. The canal includes unlined tunnels through stable sandstone, brick lined tunnels through shale formation, open lengths of the canal in stable sandstone are unlined, in earth areas the canal has battered walls of locally quarried rubble masonry and in poor ground walls has concrete or rubble set in cement mortar. Section 8, 9 & 10 of the Canal cross the Liverpool City CGA.

Section 8 commences near Denham Court Road (27 miles from Pheasant's Nest Weir) and comprises a concrete flume (canal) usually with a trapezoidal section up to nearly 6ms wide at the top and a water depth of just 2ms.

Section 9 also comprises an open canal (commencing approx. 30 miles from Pheasants Nest and continuing to the 33 mile point).

Section 10 comprises of an open canal which has an inlet to the Liverpool Off-take Reservoir locate at Cecil Hills and thence continues as the Cecil Hills Tunnel to the 27 mile point.

Along the route of the canal are situated various ancillary structures such as wrought iron flume (pipe) sections supported on stone piers in order to cross steep gullies, concrete bridges giving access across the canal, other drainage structures to prevent pollution of the canal such as brick and stone culverts, aqueducts, control and gauging installations, an original gateway and gate at the canals intersection with 18th Ave and stone markers along the entire length of the structure.

**Physical Condition
and/or
Archaeological
Potential:**

Excellent **Date Condition Updated:** 09 Nov 04

Current Use: Water Supply Canal

Former Use: Water Supply Canal

History

Historical Notes: The Upper Canal was constructed between 1880 and 1888 as an essential part of the Upper Nepean Scheme which was Sydney's fourth water supply source. Following completion in 1888 the Upper Nepean Scheme was further developed by the construction of major storage dams on the four source rivers Cataract (1907), Cordeaux (1926), Avon (1927) and Nepean (1935) dams. Since the construction of Sydney's fifth water supply source, Warragamba Dam, the Upper Canal is now limited to supplying the Campbelltown and Camden areas from Cataract and Nepean Dams whilst



Cordeaux and Avon Dams supply Wollongong area through the Shoalhaven Scheme.

Historic Themes

Australian Theme (abbrev)	New South Wales Theme	Local Theme
3. Economy - Developing local, regional and national economies	Technology - Activities and processes associated with the knowledge or use of mechanical arts and applied sciences	Water Supply System -
4. Settlement - Building settlements, towns and cities	Utilities - Activities associated with the provision of services, especially on a communal basis	Providing a water supply -

Assessment of Significance

SHR Criteria a)
[Historical Significance] The Upper Canal as an essential part of Sydney's fourth water supply, the Upper Nepean, demonstrates the history of the first major civic engineering project of the late 19th century in the wider Sydney area. It also demonstrates the rapid growth of settlement in the environs of Sydney and the need to supply a growing urban population with a water system.

SHR Criteria c)
[Aesthetic Significance] The site indicates a level of technical achievement being an example of a late 19th century hydraulic design and construction engineering project. The canal maintains the highest possible elevation (with grades as flat as 1 in 3000) in order that most of the supply to the city was controlled by gravity. It is still in use as a water supply system for the south-western suburbs of Sydney.

SHR Criteria e)
[Research Potential] There is the potential to gain more information on the site from further architectural, archaeological and documentary research.

SHR Criteria f)
[Rarity] The site is rare within the Liverpool LGA and the State.

Integrity/Intactness: Intact

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

Recommendations

Management Category	Description	Date Updated
Recommended Management	No Action, follow existing management controls	05 Mar 05

Listings

Heritage Listing	Listing Title	Listing Number	Gazette Date	Gazette Number	Gazette Page
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(Liverpool) Local Environmental Plan		0252	03 Feb 95	011	678
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Study Details

Title	Year	Number	Author	Inspected by	Guidelines Used
Liverpool Heritage Study	1992	LP008	Neustein & Associates		No
Liverpool Heritage Study Review	2004	1970096	FORM architects aust pty ltd	Helen Davies & Fred Ramos	Yes

References, Internet links & Images

Type	Author	Year	Title	Internet Links
Written	J M Collocott	1985	National Trust Classification Report- Sydney Water Supply Upper Canal	
Written	W V Aird	1961	"The Water Supply Sewerage and Drainage of Sydney"	

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



Source of information for this entry

Name: Local Government

Email: Contact Local Council

Administration