

VOLUME 3 APPENDICES FEBRUARY 2009

AGL Leafs Gully Power Project Environmental Assessment

MP 08_0077

Appendix Q

Access Road Impact Assessment

URS



Switched on Business.

FINAL REPORT

Statement of Environmental Effects – Access Road Upgrade – Leafs Gully Farm, Appin NSW

Prepared for

AGL Power Generation (NSW) Pty Ltd

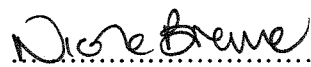
72 Christie Street
St Leonards NSW 2065

31 October 2006

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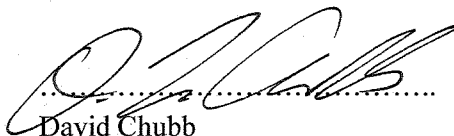
Project Manager:



Nicole Brewer
Senior Environmental Engineer

URS Australia Pty Ltd
Level 3, 116 Miller Street
North Sydney, NSW 2060 Australia
Tel: 61 2 8925 5500
Fax: 61 2 8925 5555

Project Director:



David Chubb
Principal, Environmental Planning

Date: 31 October 2006
Reference: SEE Access Road
Status: Final

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AGL Power Generation (NSW) Pty Ltd (AGL) has commissioned URS to prepare a Statement of Environmental Effects (SEE) to accompany a development application under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) seeking development consent to carry out upgrade works to the existing access road serving Lots 101-105 DP 716206 (known as Leafs Gully Farm) (Development Proposal).

The Development Proposal will comprise upgrade and realignment works to the existing access road on the following portion of land:

- That part of Lot 1 in DP 70208 burdened by the Right of Carriageway 10m wide and an Easement for Services Access 10m wide identified in Deposited Plan 633800; (Development Site)

This SEE has been prepared in accordance with the relevant provisions of the EP&A Act to review the impacts of construction and operation of the Development Proposal. This assessment is based on:

- site inspections by URS personnel;
- discussions with AGL personnel;
- flora and fauna assessment;
- cultural heritage assessment; and
- traffic assessment.

The Development Proposal requires development consent from Campbelltown City Council (Council) in order for the development to proceed.

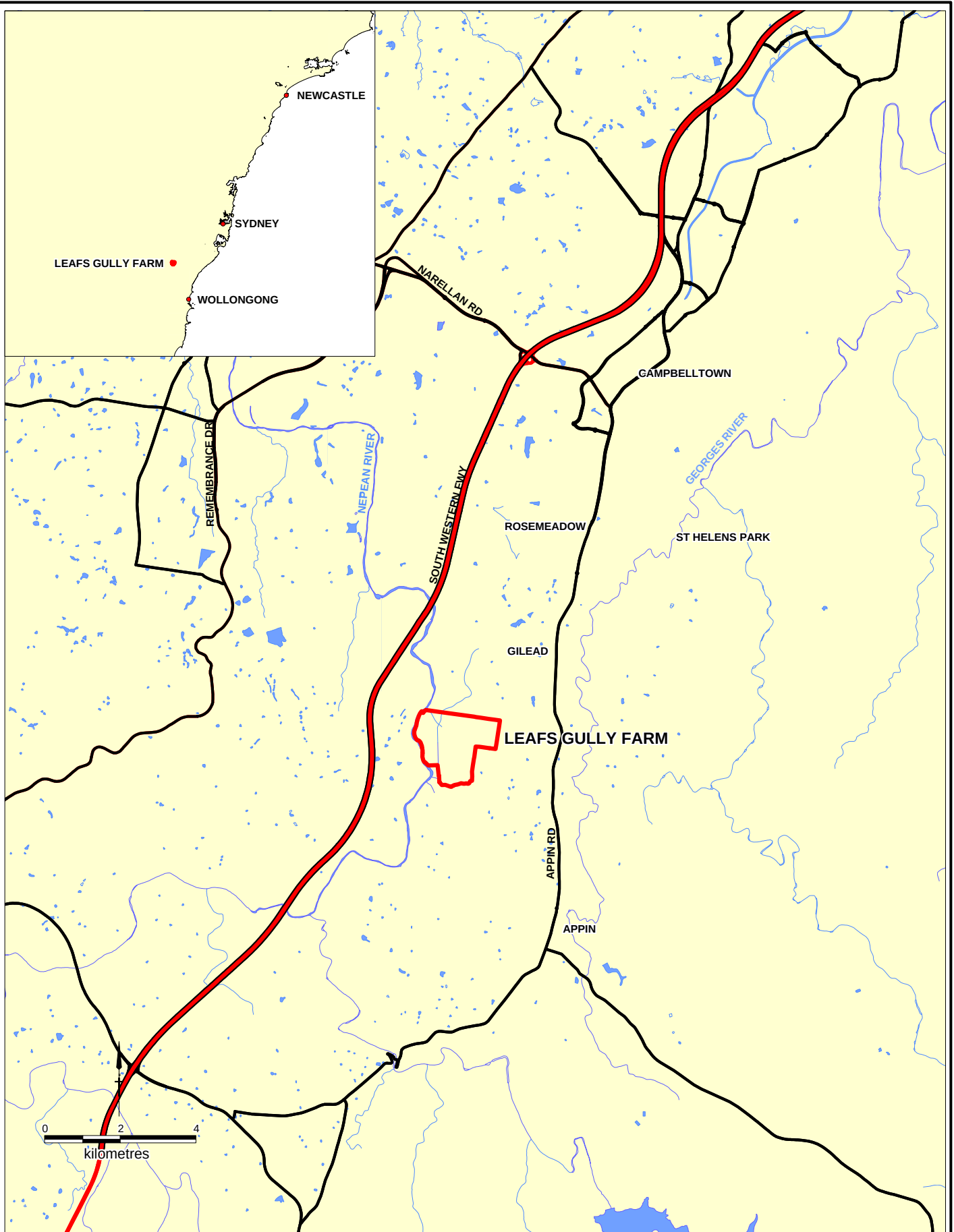
The Development Site is located in Gilead, approximately 55 km south west of the Sydney CBD, 14km south of the Campbelltown CBD and 4.5km north west of the township of Appin (refer to **Figure 2-1**). Developments immediately surrounding the Development Site are predominantly rural enterprises on medium size holdings and smaller rural home sites of between 2 and 10 hectares.

Leafs Gully Farm occupies Lots 101-105 DP 716206. A Right of Carriageway 10m wide and an Easement for Services Access 10m wide created on 11 August 1983 by the registration of an instrument under section 88B of the *Conveyancing Act 1919* and Deposited Plan 633800 benefits Leafs Gully Farm (Right of Way). The current title description of the land burdened by the Right of Way is Folio Identifier 1/70208, being Lot 1 in DP 70208.

An existing access road serves Leafs Gully Farm, but does not fully occupy the land comprised in the Right of Way (refer to **Figures 2-2a-2-2c** for survey plans of the existing access road in relation to the Right of Way).

The Right of Way forms the northern edge of Lot 1 in DP 70208, which is owned by Sheraton Homes Pty Ltd and is predominantly cleared and used for rural grazing. The land comprised in the Right of Way is highly disturbed, except for an area of remnant natural vegetation at its eastern end, towards the intersection with Appin Road.

The new access road will be located within the boundaries of the Right of Way.



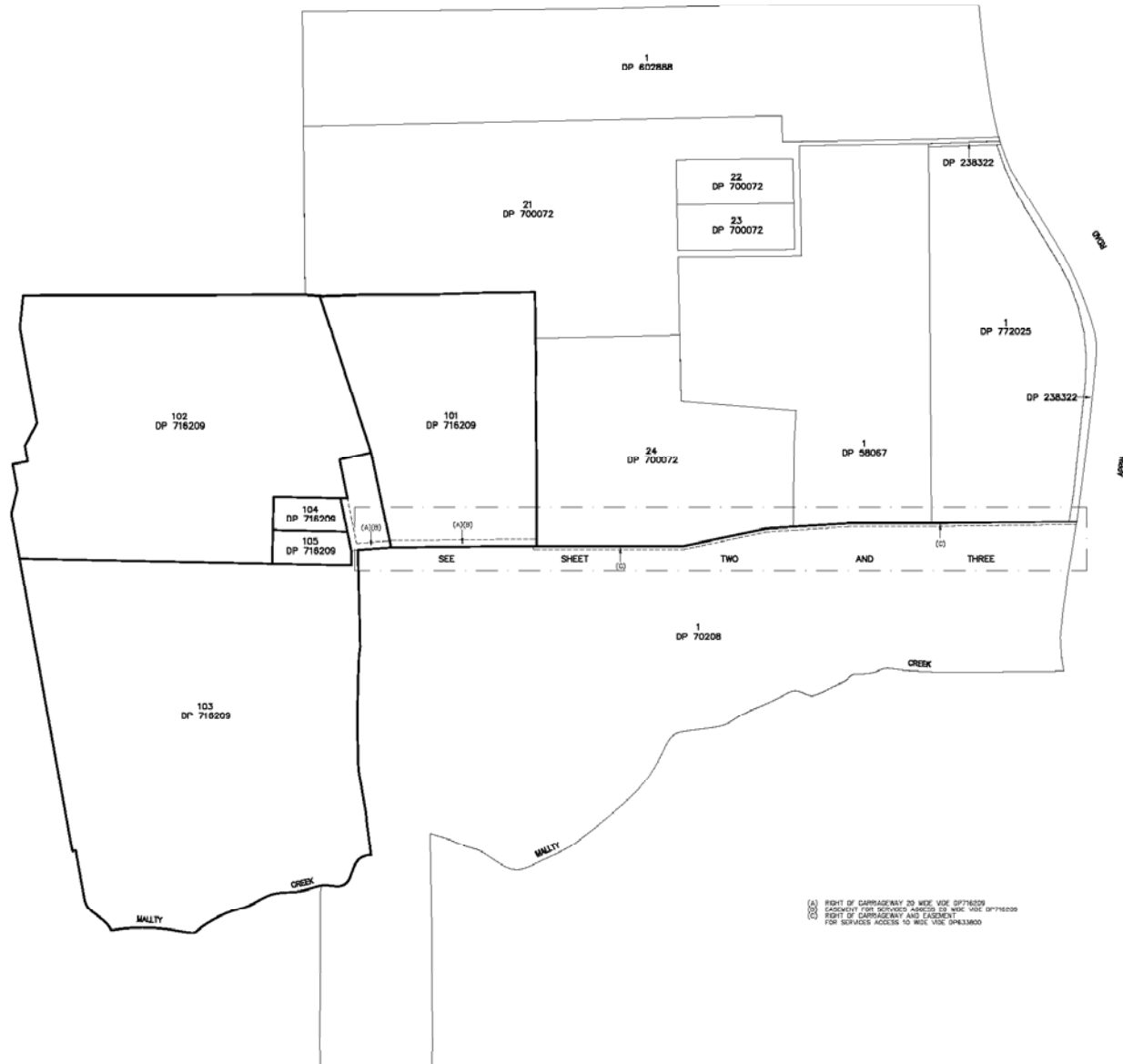
Map compiled using MapInfo StreetPro Data. © 2004 MapInfo Australia Pty Ltd, URS Australia and PSMA Australia Ltd. URS Australia, MapInfo Australia or PSMA Australia do not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that these companies shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.

Client AGL POWER GENERATION (NSW)	Project STATEMENT OF ENVIRONMENTAL EFFECTS, APPIN, NSW	Title LOCATION OF LEAF'S GULLY FARM
URS	Drawn: AJW Approved: FINAL Date: 15-05-06 Job No: 43177401 File No: 43177401-004.wor	Figure: 2-1



Source: Usher and Company Pty Limited, 21.4.06

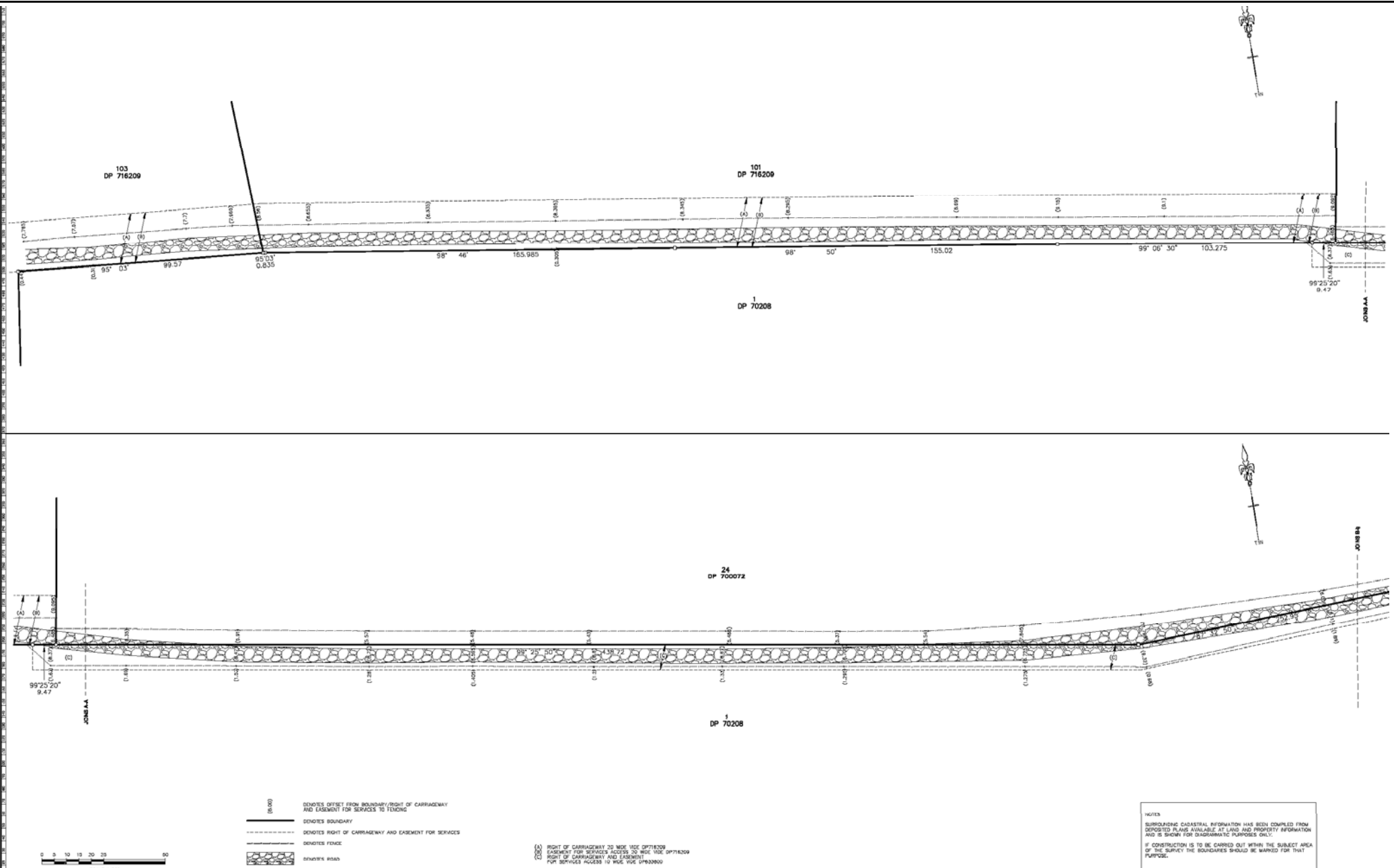
NOTES
SURROUNDING CADASTRAL INFORMATION HAS BEEN COMPILED FROM DEPOSITED PLANS AVAILABLE AT LAND AND PROPERTY INFORMATION AND IS SHOWN FOR DIAGNOSTIC PURPOSES ONLY.
IF CONSTRUCTION IS TO BE CARRIED OUT WITHIN THE SUBJECT AREA OF THE SURVEY THE BOUNDARIES SHOULD BE MARKED FOR THAT PURPOSE.



(A) RIGHT OF CARRIAGEWAY TO WIDE VIDE DP716209
(B) CARRIAGEWAY FOR PROPOSED ACCESS TO WIDE VIDE DP716209
(C) RIGHT OF CARRIAGEWAY AND EASEMENT FOR SURFACE ACCESS TO WIDE VIDE DP433800

Datum: GDA94 Projection: MGA Zone 56

Client AGL POWER GENERATION (NSW)	Project STATEMENT OF ENVIRONMENTAL EFFECTS APPIN, NSW			Title SURVEY OF EXISTING ACCESS ROAD TO LOTS 101 - 105 IN DEPOSITED PLAN 716209 APPIN SHEET 1 OF 3
	Drawn: AJW Job No: 431577401	Approved: FINAL File No: 43177401-029.wor	Date: 10.07.06	Figure: 2-2a



Datum: GDA94 Projection: MGA Zone 56

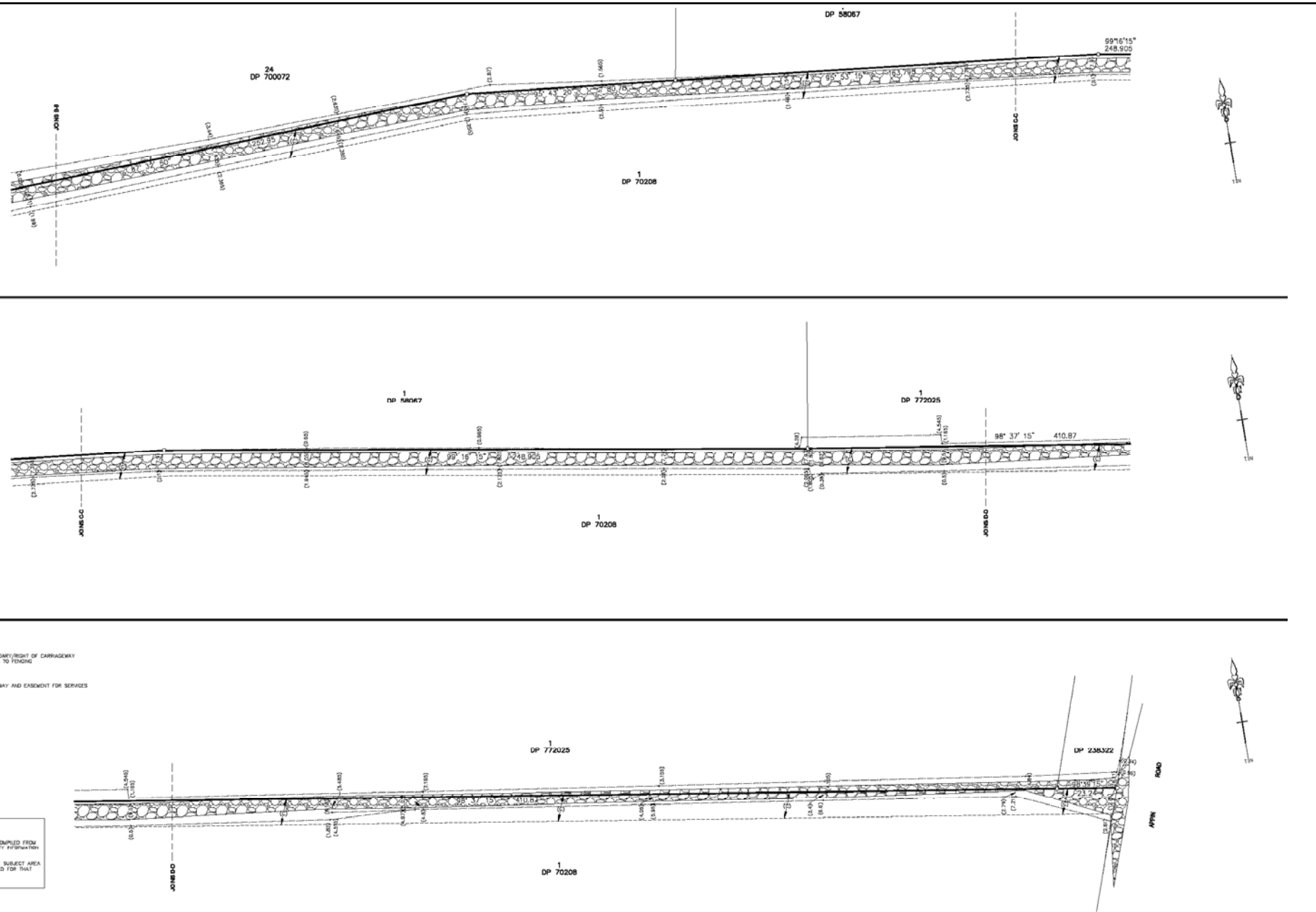
Client	Project			Title
AGL POWER GENERATION (NSW)	STATEMENT OF ENVIRONMENTAL EFFECTS APPIN, NSW			SURVEY OF EXISTING ACCESS ROAD TO LOTS 101 - 105 IN DEPOSITED PLAN 716209 APPIN SHEET 2 OF 3
URS	Drawn: AJW	Approved: FINAL	Date: 10.07.06	Figure: 2-2b
	Job No: 431577401	File No: 43177401-029.wor		

(1:500)
--- DENOTES OFFSET FROM BOUNDARY/RIGHT OF CARRIAGEWAY AND EASEMENT FOR SERVICES TO FENCING
--- DENOTES BOUNDARY
--- DENOTES RIGHT OF CARRIAGEWAY AND EASEMENT FOR SERVICES
--- DENOTES FENCING
--- DENOTES ROAD

(C) RIGHT OF CARRIAGEWAY AND EASEMENT FOR SERVICES ACCESS TO AND FROM DEPOSITED PLAN

NOTES
SURROUNDING CADASTRAL INFORMATION HAS BEEN COMPILED FROM DEPOSITED PLANS AVAILABLE AT LAND AND PROPERTY INFORMATION AND IS SHOWN FOR DIAGNOSTIC PURPOSES ONLY.
IF CONSTRUCTION IS TO BE CARRIED OUT WITHIN THE SUBJECT AREA OF THE SURVEY THE BOUNDARIES SHOULD BE MARKED FOR THAT PURPOSE.

0 5 10 15 20 30 40 50



Datum: GDA94 Projection: MGA Zone 56

Client AGL POWER GENERATION (NSW) 	Project STATEMENT OF ENVIRONMENTAL EFFECTS APPIN, NSW			Title SURVEY OF EXISTING ACCESS ROAD TO LOTS 101 - 105 IN DEPOSITED PLAN 716209 APPIN SHEET 3 OF 3
	Drawn: AJW	Approved: FINAL	Date: 10.07.06	Figure: 2-2c
Job No: 431577401	File No: 43177401-029.wor			

The existing access road to Leaf's Gully Farm does not utilise the Right of Way. The need for the upgrade of the existing access road is related to:

- the proper alignment of the road within the legally dedicated Right of Way; and
- provision of an access road that is fit for purpose.

All other practical access road alignments would not be within the Right of Way and would therefore suffer from the issue of inappropriate alignment.

The Development Proposal involves upgrade and re-alignment works to reconstruct the existing access road to Leaf's Gully Farm within the dedicated Right of Way. This will require the following works:

- clearing of residual vegetation currently located in the Right of Way;
- earthworks to create appropriate road profile road alignment;
- realignment and upgrading the existing access road to a 'minor' rural road standard;
- constructing a roadway and associated drainage works to Council specification; and
- relocation of fences.

4.1 Design Standard

4.1.1 Requirements under DCP 49

The Development Proposal will provide vehicle access to Leaf's Gully Farm and, in compliance with Campbelltown City Council's *'Development Control Plan No. 49: Rural Environmental Sub-division Dwelling Policy'*, (DCP 49) the road is classified as a 'rural' road of 'minor' class.

DCP 49 specifies that the alignment of rural minor roads shall be in accordance with the requirements in **Table 4-1**.

Table 4-1 – Requirements for Rural Minor Roads (DCP49)

Item	Unit	Standard
Road reserve width	m	16
Design speed	Km/h	60
Formation width (depending upon availability of space)	m	8.0
Wearing surface width	m	5.5
Longitudinal grade	%	
maximum		15%
minimum		1%

4.1.2 Proposed Design Standard

As the Right of Way provides a road reserve only 10m wide, this is a constraining influence on the standard of road that can be provided. The requirements for the minimum road width (16m) specified in DCP 49 therefore cannot be met.

As a result, the design parameters specified in **Table 4-2** have been determined in accordance with general engineering practice considering this width constraint and the requirements of DCP 49 where practicable.

Table 4-2 – Adopted Design Parameter for 10m Reserve Access Road

Item	Unit	Standard
Road reserve width	m	10
Design speed	Km/h	50
Formation width (depending upon availability of space)	m	6.0 to 8.0
Wearing surface width	m	5.5
Longitudinal grade maximum minimum	%	15% 1%
Vertical curve 'k' value crest sag		5 4
Road crossfall	%	3%

4.1.3 Concept Alignment

The Right of Way will be generally of straight alignment with a right-angled return at the western end. Where bends occur a radius of 200m in size is proposed and at the right angle 'dog-leg' a centreline 'S' bend radius of 15m and 20m, respectively, is proposed. The 'S' bends would be sign posted with 15km/h advisory speeds. Lane widening is also necessary at the 'S' bend to accommodate large vehicles and equipment. **Figures 4-1** and **4-2** show the suggested concept alignment.

For the most part the upgraded access road would sit close to the existing surface. **Figure 4-3** shows typical cross sections of maximum cuts and fills.

The intersection at Appin Road is subject to a separate Project Application for the Leafs Gully Power Project to be lodged with the Department of Planning.

4.2 Description of Works to be Undertaken

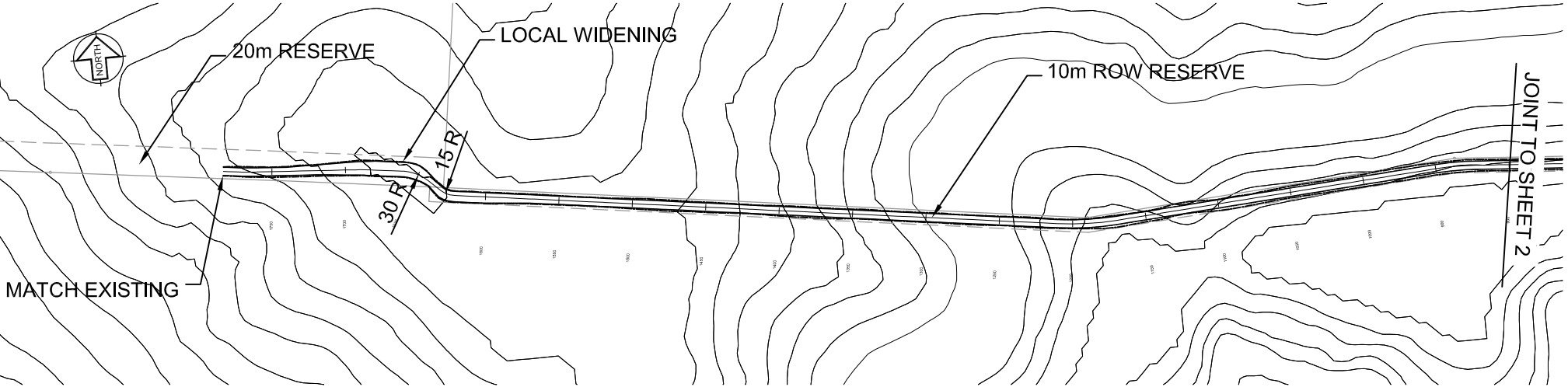
4.2.1 Equipment and Construction Timing

The works would take approximately 12 to 16 weeks and would require the following equipment:

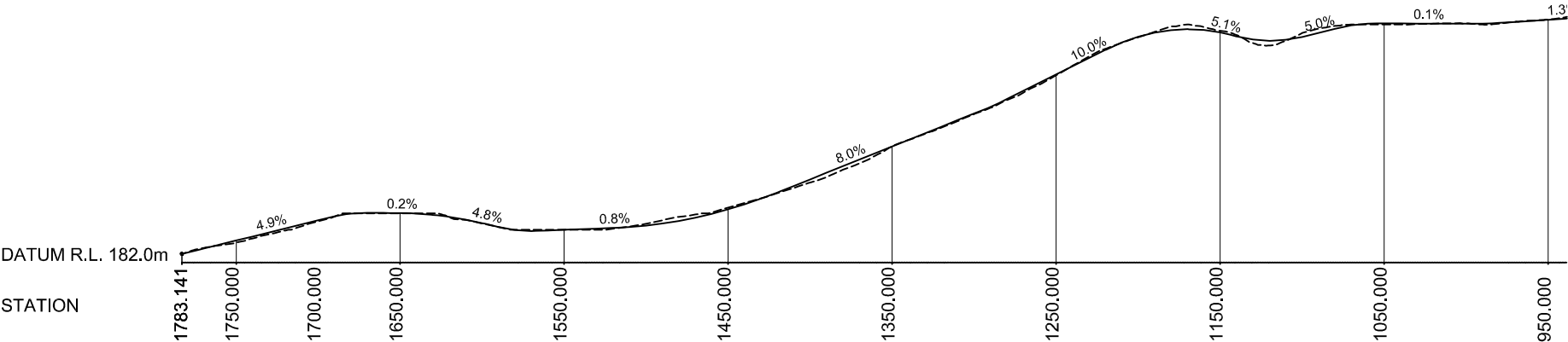
- scraper (2),
- bulldozer (1),
- grader (1),
- excavator (2),
- compactor (1),
- roller (1),
- water cart (1),
- trucks (3),
- bitumen sprayer (1), and
- road marking machine (1).

It is anticipated that construction would be undertaken during the following hours:

- 7.00am to 6.00pm during weekdays; and
- 8.00am-1.00pm on Saturdays.

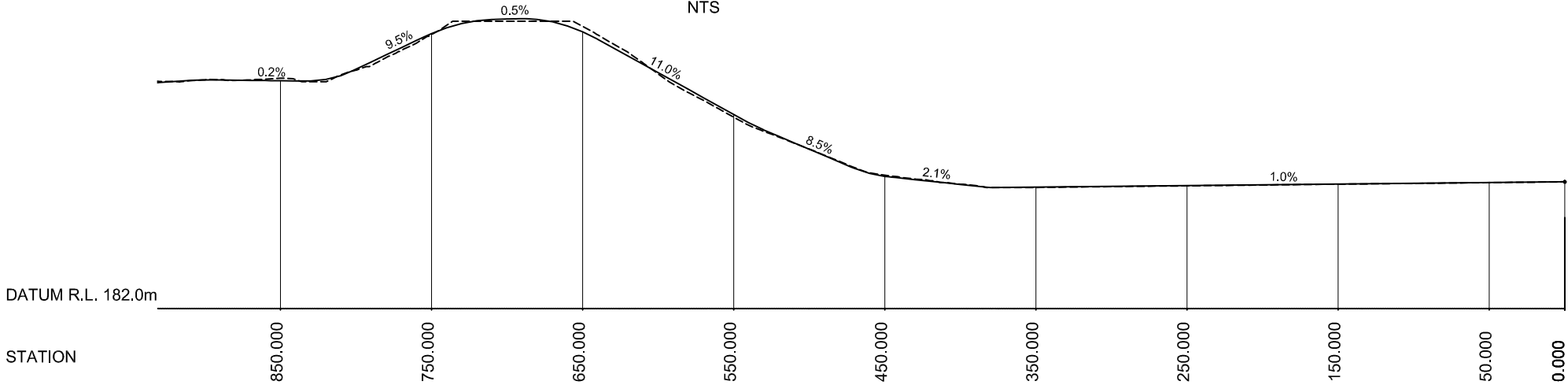


PLAN
NTS



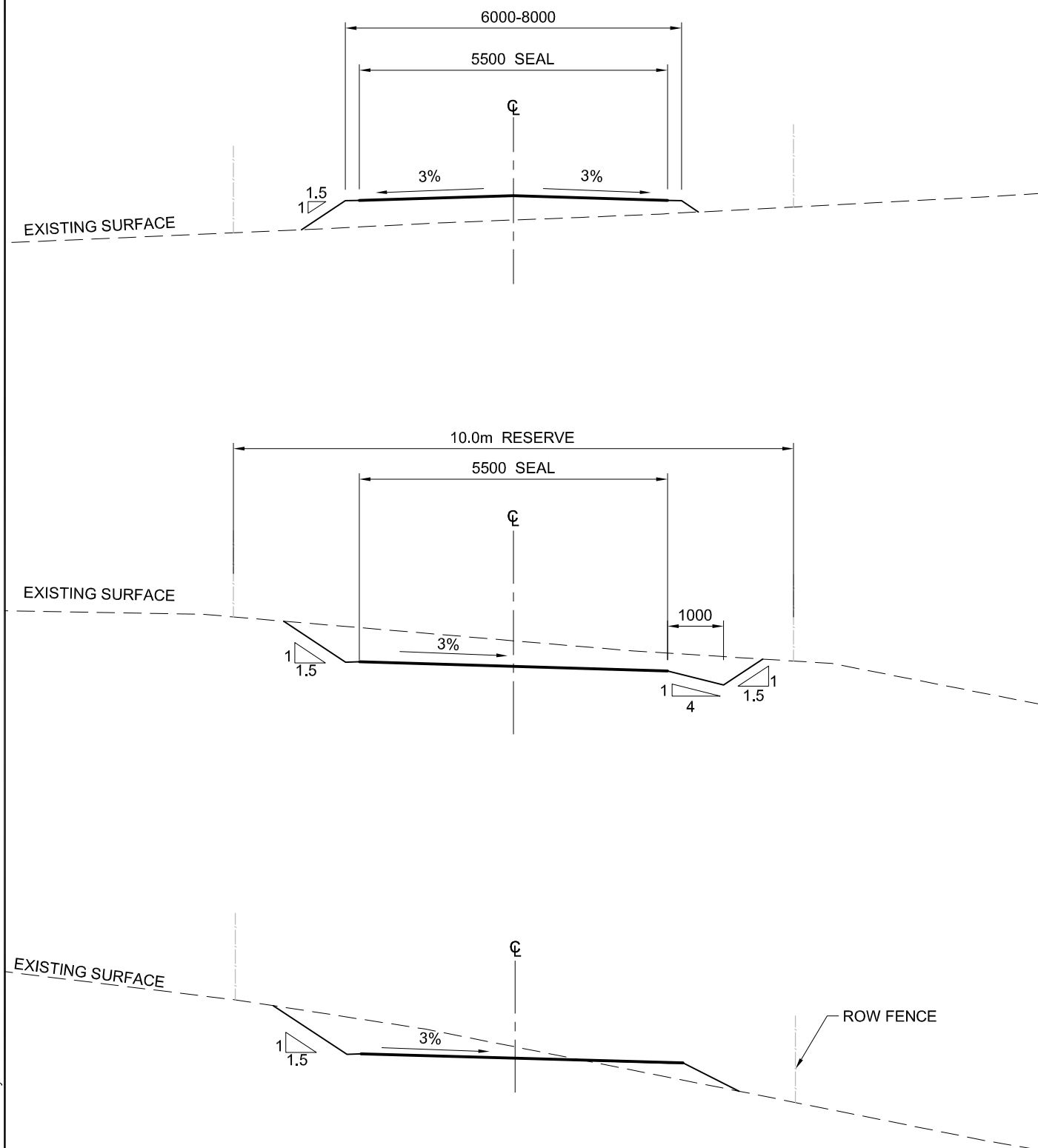
LONGSECTION
NTS

Client	AGL POWER GENERATION (NSW)	Project STATEMENT OF ENVIRONMENTAL EFFECTS, APPIN NSW			Title ACCESS ROAD LONGSECTION SHEET 1 OF 2	
			Drawn: EX	Approved: FINAL	Date: 06/07/2006	Figure: 4-1
		Job No.: 43177401	File No.: 007.dwg		A4	

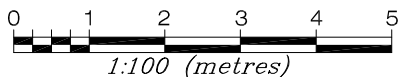


Client	AGL POWER GENERATION (NSW)		Project	STATEMENT OF ENVIRONMENTAL EFFECTS, APPIN NSW		Title	ACCESS ROAD LONGSECTION SHEET 2 OF 2	
			Drawn: EX	Approved: FINAL	Date: 06/07/2006	Figure: 4-2	Rev. A	
			Job No.: 43177401	File No.: 007.dwg			A4	

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TITLE: TYPICAL SECTIONS ALONG THE ROW



Client AGL POWER GENERATION (NSW)	Project STATEMENT OF ENVIRONMENTAL EFFECTS, APPIN NSW			Title TYPICAL SECTIONS ALONG THE ROW	
	Drawn: EX Job No.: 43177401	Approved: FINAL File No.: 009.dwg	Date: 06/07/06	Figure: 4-3	Rev. A A4

4.2.2 Clearing and Excavation

An area of vegetation approximately 300m long and up to 10m wide would need to be cleared to construct the access road within the Right of Way.

As the Right of Way traverses undulating landscape, part of the access road would require either a cutting and landscaped batter or embankment and landscaped batter. The proposed road works would occupy most of the Right of Way.

Stripped topsoil would be placed on batters as the works progress. Sediment and erosion control measures would also be in place throughout the construction phase.

4.2.3 Construction of Roadway

The road is to be of gravel construction and sealed for a 5.5m width. The thickness of pavement appropriate for this standard of road, in accordance with Council's *Engineering Design Guide for Development* (2004), would be designed to carry a traffic load of 2×10^4 equivalent standard axles (ESA's).

In cuttings, the width of reserve constrains what can be achieved and the road would be constructed with a one-way crossfall and a shallow table drain on the low side.

To avoid adverse impacts on drainage catchments local cross drain culverts would be provided at local gullies and depressions.

The Leafs Gully Farm will be vacant during construction and access to the property will not be required at this time. This is the only property that uses the access road as its primary access.

5.1 Introduction

This section addresses the proposal in the context of Commonwealth and NSW environmental and planning legislation relevant to the project.

The Environmental Planning and Assessment Act 1979 establishes the planning framework for preparing strategic plans and assessment development against these plans. The proposed road is permissible with development consent from the Campbelltown City Council.

5.2 Commonwealth Legislation

5.2.1 Environment Protection and Biodiversity Conservation Act 1999

Part 3 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides that an action which has, will have or is likely to have a significant impact on a matter of national environmental significance is a 'controlled action' and may not be undertaken without approval from the Commonwealth Minister for the Environment and Heritage, as provided for under the provisions of Part 9 of the EPBC Act. The EPBC Act provides a number of matters of national environment significance for which Ministerial approval is required.

A search of the EPBC database has revealed that the subject site is not a World Heritage property, neither contains nor is close to any wetlands of International significance, and is not a marine environment. Therefore as the proposed development does not involve nuclear activities, the detailed flora and fauna survey then determine whether the Leaf's Gully Power Project will require referral to the Commonwealth Minister for the Environment.

The flora and fauna survey and assessment found the only matter of national environment significance which is relevant to the Leaf's Gully Power Project is '*Nationally threatened species and ecological communities*'.

The EPBC Act Policy Statement 1.1 Significant Impact Guidelines (Matters of National Environmental Significance) prepared by the Department of Environment and Heritage dated May 2006 set out criteria intended to assist in determining whether an action is a 'controlled action' which requires approval. In particular, the Guidelines contain criteria for determining whether a proposed action is likely to have a significant impact on a matter of national environmental significance.

The flora and fauna assessment contained in **Chapter 6** provides that the Development Proposal is not likely to have a significant impact on nationally threatened species and ecological communities.

The Development Proposal is therefore not a 'controlled action' under the EPBC Act and does not need to be referred to the Minister for Environment and Heritage.

5.3 State Legislation

5.3.1 NSW Environmental Planning and Assessment Act 1979

The EP&A Act provides the framework for the assessment of developments in NSW.

The Development Site is zoned Zone No.1 Non-Urban Zone under *Interim Development Order No. 15 – City of Campbelltown* (IDO 15). According to IDO 15 development for the purposes of roads is permissible with development consent on the Development Site. As such, the Development Proposal will require consent from Campbelltown City Council before it can be lawfully carried out.

Part 4 of the EP&A Act provides for the assessment of development that requires development consent under the provisions of an environmental planning instrument (EPI). The EP&A Act provides for two categories of development under Part 4, these being designated and integrated development. Development can be integrated, designated or both. Designated development is development requiring the preparation of an environmental impact statement (EIS) and needs to be declared as such in an EPI or the *Environmental Planning and Assessment Regulations 2000* (EP&A Regulation). A review of EPIs and Schedule 3 of the EP&A Regulation found that the Development Proposal is not designated. An SEE, as opposed to an EIS, is therefore to be prepared to support the development application (DA) for the Development Proposal.

Integrated development is development that in order for it to be carried out, requires development consent and one or more of the approvals listed in section 91 of the EP&A Act, prior to consent being granted by the Consent Authority (in this case Campbelltown City Council). A review of section 91 of the EP&A Act found that the Development Proposal is considered to be integrated development by operation of:

- Section 15 of the *Mine Subsidence Act 1961*: As the Development Site is located within a mine subsidence district approval is required for the Development Proposal from the Mine Subsidence Compensation Board; and
- Section 138(e) of the *Roads Act 1993* - As the Development Proposal requires the connection of a road to Appin Road which is a classified road, approval is required for the Development Proposal from the NSW Roads and Traffic Authority.

This SEE presents the assessment of the potential impact of the activity on the environment. Section 7 of this SEE details the compliance of the proposed development with the provisions of Section 79C of the EP&A Act, as is required of Part 4 developments.

Section 79C Evaluation

Section 79C(1) of the Environmental Planning and Assessment Act 1979, as amended, specifies the matters which a consent authority must consider when determining a development application. These matters are summarised, assessed and were relevant referenced to other parts of the SEE for detailed discussion.

Section 79C (1)(a)(i) the provision of any Environmental Planning Instrument (EPI)

Consideration of the County of Cumberland Interim Development Order No 15, and other EPIs, is discussed under Section 5.5 of this SEE.

Section 79C (1)(a)(ii) the provision of any draft Environmental Planning Instruments

Consideration of the Draft Regional Environmental Plan Sustaining the Catchments is discussed under Section 5.4 of this SEE.

Section 79C (1)(a)(iii) any development control plan

Campbelltown City Council has a number of development controls plans in force. DCPs that are relevant to the site and proposed development are:

- DCP 49: Rural Environmental subdivision dwelling policy; and
- DCP 14: Trees.

The proposed development in general complies with these DCPs and they are addressed in detail in Section 5.5

Section 79C (1)(a)(iv) any matters prescribed by the regulations

Matters prescribed by regulations are described in Section 5 of this SEE.

Section 79C (1)(b) the likely impacts of the development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality

These matters have been discussed in detail in Section 6 of this SEE, and the Appendices to this SEE and submitted with this DA for consideration by Council.

Section 79C (1)(c) suitability of the site for development

The Development Site is a dedicated right of carriageway for the provision of an access to Lots 101-105 DP 716206 from Appin Road created by DP633800. Lots 101-105 DP 716206 cannot be accessed by any other means. Currently the existing access road does not fully utilise the legally dedicated Right of Way.

The Development Proposal is considered appropriate for the Development Site as the Development Site has been specifically dedicated for the provision of an access road.

Section 79C (1)(d) submissions made in accordance with the Act or the Regulations

The Consent authority will need to consider the submissions received in response to the public exhibition of the development proposal

Section 79C (1)(e) the public interest

The upgrade of this access road is in the public interest as it improves access to properties benefited by the Right of Way.

5.3.2 Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act 1995* (TSC Act) provides for the conservation of threatened species, populations and ecological communities of animals and plants. It provides a framework for the assessment of any action that may impact on threatened species.

Planning aspects of the TSC Act are implemented through the EP&A Act. Section 5A of the EP&A Act sets out a Seven Part test to determine whether a development proposal is likely to significantly affect threatened species, populations or ecological communities or their habitats. Where it is determined that a significant effect is likely, the TSC Act requires that a Species Impact Statement (SIS) be prepared to assess the impact.

A flora and fauna assessment was conducted for the project and is presented in **Section 6.5**. A Part 5A Assessment (Seven Part Test) provides more detail in support of this assessment and is provided in **Appendix B**. This assessment concluded that construction of the road through the modified area of Shale Sandstone Transitional Forest is unlikely to cause a significant impact on this endangered ecological community.

5.3.3 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (PEO Act) is the primary piece of legislation regulating pollution control and waste disposal in NSW. The PEO Act is administered by the NSW Department of Environment and Conservation (DEC). The PEO Act does not apply to the Development Proposal.

5.3.4 State Environmental Planning Policies

State Environmental Planning Policy 44 – Koala Habitat (SEPP 44)

This SEPP applies to the Development Site as Campbelltown LGA is listed in Schedule 1 of the SEPP as being an LGA which may contain potential Koala Habitat. The flora and fauna survey has confirmed that the Development Proposal is located in an area which is removed from any areas of remnant vegetation that is likely to contain koala habitat, therefore the Development Site is not considered to be potential Koala Habitat under SEPP 44. SEPP 44 does not prevent Council from granting consent to the DA.

5.4 Regional Planning Instruments

The Development Site is located in an area which is subject to *Sydney Regional Environmental Plan No. 20 – Hawkesbury Nepean River (No. 2 – 1997)*. The Development Site will also be subject to the

Drinking Water Catchments Regional Environmental Plan No.1 which was made on 9 June 2006 and is due to commence on 1 January 2007.

5.4.1 Sydney Regional Environmental Plan No. 20 – Hawkesbury Nepean River (No. 2 – 1997)

According to *Sydney Regional Environmental Plan (SREP) 20 – Hawkesbury Nepean River (No. 2 - 1997)* the site is within the Upper Nepean River Catchment Area. SREP 20 creates development control provisions for matters to consider when determining development within Hawkesbury Nepean River Catchment. Part 3 of the SREP provides details of development which is permissible and prohibited, and details development which requires concurrence and consultation. The proposed development is not specifically listed as a development under Part 3 of the SREP. The Development Proposal satisfies the aims of SREP20 to protect the environment of the Hawkesbury Nepean River system as the impacts have been considered in the regional context of future land use.

5.4.2 Drinking Water Catchments Regional Environmental Plan – No 1

The *Drinking Water Catchments Regional Environmental Plan No.1* will commence on 1 January 2007 and aims to provide direction for the future of the Sydney drinking water catchments. The focus of the plan is the health of the drinking water catchments within the Hawkesbury-Nepean, Shoalhaven, and Georges Rivers. The plan aims to recognise and understand the relationships between environmental, economic factors and the needs and values of the Sydney Catchments region's communities.

The Development Proposal satisfies the aims of *Drinking Water Catchments Regional Environmental Plan No.1*.

5.5 Local Planning Instruments

5.5.1 City of Campbelltown Interim Development Order No. 15

The Development Site is zoned Zone No.1 Non-Urban Zone under *Interim Development Order No. 15 – City of Campbelltown* (IDO 15) and development for the purposes of roads is permissible with development consent on the Development Site under IDO 15. As such, the Development Proposal will require consent from Campbelltown City Council before it can be lawfully carried out.

5.5.2 Development Control Plan No. 49 - Rural Environmental Sub-division Dwelling Policy

This policy applies to all non-urban zones and includes the proposed site. The proposed roadway width is less than the minimum design parameters provided in DCP 49. The proposed engineering design has therefore been based on the same design specifications, modified to create a road of 10 metres wide.

A description of the design of the roadway is provided in Section 4 including discussion of its modified design. The proposed road has been designed in accordance with general engineering practice considering this width constraint and the requirements of DCP 49 where practicable.

5.5.3 Development Control Plan No. 114 - Trees

The tree preservation order and Council's *Development Control Plan No. 114 – Trees* (DCP 114) applies to the proposed tree clearing. The proposal includes the removal of a number of trees within the surrounding area. The flora and fauna assessment undertaken on the proposed site concludes that the clearing is unlikely to cause a significant impact on this endangered ecological community. A number of mitigation measures are proposed to further reduce the opportunity for impacts.

Consent is required from Council for the clearing of the trees and given the assessment concludes the tree clearing. The removal of the tree will have limited impacts on the overall ecological value of the site.

6.1 Introduction

This assessment comprised a review and evaluation of the Development Proposal with respect to the following:

- water quality;
- erosion and sedimentation;
- air quality;
- noise and vibration;
- flora and fauna;
- heritage;
- traffic and access;
- visual amenity;
- waste and hazardous materials; and
- cumulative impact.

These areas are discussed in more detail below.

6.2 Water Quality

The existing access road is partly sealed and partly compacted gravel. Construction works would be performed under a Soil and Water Management Plan to minimise the potential for erosion and egress of sediment from the construction zone and impact on local water quality.

Specific impacts of erosion and sedimentation on water quality are addressed in **Section 6.3**. Other potential impacts on water quality during construction include the potential for fuel spills.

These impacts would be mitigated by implementing the following measures:

- no liquids/chemicals/oils shall be discharged into stormwater, drains, creeks;
- all fuel and chemicals stored on site shall be kept in a bunded containment facility located at least 40 meters away from watercourses;
- a spill response kit of appropriate capacity shall be onsite in the construction zone;
- no servicing / washing of machinery / equipment to be undertaken on site;
- materials to be disposed in a manner that would not pollute waters; and

-
- due to the relatively small volumes likely to spill, the relatively low probability of spills, the short construction period and the effectiveness of the mitigation measures means the significance of these impacts are negligible.

The existing access road drains naturally along the length of the road. Proposed works would include the following drainage works along the road:

- table drains on the low side of cuttings; and
- cross drainage culverts at natural gullies and depressions.

These would direct runoff into the surrounding natural drainage lines.

6.3 Erosion and Sedimentation

Construction works are likely to expose unconsolidated soils and thereby allow for erosion and the egress of valuable soil and sediment from the construction areas.

Construction works would be performed under a Soil and Water Management Plan to minimise the potential for erosion and egress of sediment from the construction zone. The Plan would reference the Department of Land and Water Conservation's publication titled "Urban Erosion and Sediment Control Field Guide". The key soil conservation principles relevant to this proposal are:

- minimise disturbance to soil and existing vegetation cover as far as possible;
- site management practices include such factors as appropriate scheduling of construction sequence and erosion control measures, restriction of access to non-essential areas, and maintaining erosion control measures e.g. sediment fences, straw bales; and
- diversion banks and drains should be used to intercept run-on stormwater away from the disturbed ground and dispose of it safely below the site. Additional diversion banks maybe required within the disturbed site to control site drainage.

Pollution control measures shall include but not be limited to:

- installing erosion and sediment retention measure prior to works;
- diverting stormwater around material, waste and earth stockpiles;
- scheduling activities to disturb the smallest area possible for the shortest possible time;
- diverting clean runoff water from flowing over the construction zone;
- installing and maintaining sediment fencing on the downslope side of any stockpiles;
- diverting run-on stormwater flowing above the works away from the stockpile;

-
- installing control structures such as sediment fences and straw bales;
 - spraying stockpiles with water to reduce dust emissions;
 - inspecting and maintaining soil erosion control structures during entire work period and desilting structures when they fill to 30% of their capacity; and
 - removing of all temporary erosion and sediment controls such as sediment fences and straw bales is required once works are completed.

During operation, as the proposed road upgrade would be entirely sealed, this would reduce erosion and sedimentation from the roadway. Drainage along the road would be designed in a manner to avoid concentration of flows and subsequent erosion.

6.4 Air Quality

There is minimal potential for air quality to be impacted by the Development Proposal. The generation of dust during the minor earthworks is not likely to create significant air quality issues due to the short period of construction. In the event that dust generation becomes significant from a nuisance perspective, then a watercart would be employed to minimise dust generation.

Air pollution from construction equipment is likely to be very minimal and localised and mitigated by utilising modern and well maintained construction equipment and maintaining all air pollution control equipment in a serviceable and a fully operational condition.

No change in air quality impacts are anticipated once the access road is operational.

6.5 Noise and Vibration

In accordance with Chapter 171 of the Environmental Noise Control Manual (ENCM) construction of the Development Proposal would be conducted within the following hours:

- Monday to Friday 7am–6pm
- 8am–1pm (if audible at residential premises)

No construction work to take place on Sundays or Public Holidays

Construction plant and equipment has the potential to generate short term noise disturbance to local residents in the order of 12 to 16 weeks. In particular, plant and equipment used for installation of the fence has the potential to generate moderate levels of noise and low levels of vibration disturbance to adjoining property owners. Noise issues relating to plant and equipment include:

- loose components such as bolts, plates and fittings on equipment which add significantly to noise emissions;

-
- excavation equipment such as excavators, bobcats, and pavement equipment produce significant noise emissions;
 - faulty or badly fitted engine silencers; and
 - truck body and tray rattles.

Based on the duration of the works, the relatively small scale machinery that would be used, and the proximity to noise receivers (the closest residential receivers to the road are located on Lot 1 DP 58067, 600m to the south and Lot 1 DP 70208, 800m to the north), noise generation is not anticipated to have a significant impact.

No change in noise impacts are anticipated once the roadway is operational.

6.6 Flora and Fauna

Field surveys of the Right of Way were conducted on 30th June 2006 and included transects (no 5) and quadrat surveys (T5 Q1, T5 Q2 and T5 Q3) of vegetation within and adjacent to the proposed alignment by a qualified ecologist, Joanne Lawry (URS, DEC Scientific Licence No# S11381).

Access was restricted to the Right of Way and therefore limits the extent to which the vegetation and habitats of the Development Proposal can be placed in context of adjoining remnants. As such this assessment is confined to the area of interest.

6.6.1 Vegetation Communities

The land comprised in the Right of Way is characterised by two vegetation types (See **Figure 6-1**):

1. Disturbed - Exotic Pasture; and
2. Modified Shale Sandstone Transitional Forest.

A species list of recorded flora within the Right of Way is contained in **Appendix A**.

Exotic Pasture

The majority of the Right of Way (1400m of 1700m) is part of a larger paddock used for grazing (Refer to **Figure 6-1**). During previous surveys, these paddocks were found to be highly disturbed and were dominated by exotic pasture species such as *Plantago lanceolata*, *Verbena litoralis*, *Onopordum spp.* but contains some native grass and forb species including *Chloris truncate* and *Stypendra glauca*. These areas have negligible ecological value due to the dominance of introduced species and lack of habitat resources for local native fauna.



Legend

- Site Boundary
- Disturbed - Exotic Pasture
- Modified Shale Sandstone Transitional Forest

Datum: GDA94 Projection: MGA Zone 56

Client AGL POWER GENERATION (NSW)	Project STATEMENT OF ENVIRONMENTAL EFFECTS		Title VEGETATION COMMUNITIES
	Drawn: AJW Job No: 431577401	Approved: FINAL File No: 43177401-027.wor	Date: 10.07.06
	Figure: 6-1		

Modified Shale Sandstone Transitional Forest

The Right of Way follows an existing power line easement from its intersection with Appin Road for approximately 300 metres west (See **Figure 6-1**). This area (0.21ha), although highly modified, contains vegetation that is representative of Shale Sandstone Transitional Forest (SSTF). Representative species of this community recorded during the June 2006 survey includes: *Kunzea ambigua*, *Eucalyptus punctata*, *Eucalyptus crebra*, *Passiflora herbertiana*, *Styphandra glauca*, *Bursaria spinosa*, *Acacia decurrens*, *Dichondra repens* and *Lomandra confertifolia*. Refer to **Plate 6-1**.



Plate 6-1 Modified Shale Sandstone Transition Forest
along Right of Way looking east

This community is listed as an Endangered Ecological Community (EEC) under the NSW *Threatened Species Conservation Act 1995* (TSC) and Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EBPC).

As the current power line easement occupies the proposed road re-alignment area, the vegetation in this area has been repeatedly removed (lopped, pruned and slashed) as part of maintenance works related to the power line. This power line is to be decommissioned and removed to allow for the upgrade of the existing access road. There are no mature tree species within the proposed road alignment. Intact SSTF EEC was present further south of the proposed alignment but was not surveyed. It was noted that mature Eucalypts were present just beyond the boundary of the Right of Way.

6.6.2 Fauna Habitat Assessment

The Right of Way, for the majority of its length is devoid of potential habitat for native fauna species as it is dominated by exotic pasture species and highly modified.

Evidence of Koala (scratching and droppings) were searched for in the modified SSTF EEC underneath powerlines, but not found and the Development Site is not considered to be potential Koala Habitat. The Development Site could, however, potentially be utilised for grazing and foraging by common and widespread species in the area such as macropods, arboreal mammals, woodland birds and bats.

The small modified area of SSTF is unlikely to provide significant habitat as:

- there is a lack of hollow bearing trees with the proposed road alignment (forest owls, bats, birds, gliders and possums);
- limited ground debris (presumably removed when lopping occurs) with the proposed road alignment (reptiles, amphibians and invertebrates);
- no drainage lines or areas of standing water (amphibians); and
- the proposed road runs parallel to a large corridor of SSTF extending to Nepean River to the west and Dharawal State Conservation Area (SCA) to the east.

6.6.3 Mitigation Measures

It is recommended that the following mitigation measures be taken as part of the Development Proposal:

- weed control should concentrate on the southern shoulder of the access road; and
- when constructing the road, mature stands of SSTF should be fenced prior to construction to ensure vehicles cannot access this area;
- when removing the modified vegetation, this should not be stockpiled into or against the southern boundary;
- investigate replanting the removed juvenile shrubs and trees; and
- implement erosion control measures during the construction of the road to ensure that the mature stand of SSTF is not impacted by erosion.

6.6.4 Impact Assessment

Impacts during construction and operation on native flora and fauna in the Right of Way, both along the 1400m area, dominated by exotic pasture species and that portion dominated by SSTF remnants, are predicted to be minimal.

Construction of the road through the modified area of SSTF is unlikely to cause a significant impact on this endangered ecological community. A small area of modified SSTF (0.21ha) will be removed. This area has been lopped, pruned and cleared to allow the placement of a power line easement. The Development Proposal follows this power line easement. The removal of this small area (0.21ha) of modified SSTF is on the northern perimeter of a much larger remnant corridor of SSTF extending to Nepean River to the west and Dharawal State Conservation Area (SCA) to the east.

It is unlikely that indirect impacts that do not exist already, namely weed invasion would be exacerbated by the Development Proposal. The spread of weeds into adjacent SSTF can be controlled along the southern edge and shoulder of the proposed road. No areas of SSTF EEC will be further isolated or fragmented as a result of the Development Proposal.

The Part 5A Assessment (7 Part Test) presented in **Appendix B** concluded that the removal of 0.21ha of modified SSTF EEC will not significantly impact on the local extent, viability or condition of the intact SSTF present adjacent to the Right of Way. However in accordance with the precautionary principle, weed control along the southern edge of the road is recommended to control weed invasion of the adjacent intact SSTF. Similarly, an assessment against the EPBC significance impact criteria provided in **Appendix C**, concluded on this basis that referral is not required under the EPBC.

6.7 Heritage

A heritage assessment has been completed for the Right of Way by Navin Officer Heritage Consultants and is presented in **Appendix D**.

6.7.1 Aboriginal Heritage

Most tribal boundary reconstructions place the proposed Leaf's Gully access road within the Dharawal (Tharawal) tribal area. Most of the Aboriginal sites which have been located in the broader Campbelltown area were recorded in the context of archaeological surveys. Site types recorded in the course of these studies include rock shelters with art and/or cultural deposit, grinding grooves, artefact scatters, isolated finds, scarred trees, and burials.

A search of the AHIMS database indicated that there were no previously recorded Aboriginal sites within the study area. Nine sites, consisting of three artefact occurrences and six art sites – are listed within a two kilometre radius of the study area.

A survey was conducted on Monday, 7 August 2006 with representatives of the Tharawal Local Aboriginal Land Council (TLALC); and Cubbitch Barta Native Title Claimants Aboriginal Corporation (CBNTCAC).

No Aboriginal artefacts were found and the area was not identified as having potential archaeological deposits.

6.7.2 European Heritage

No European historic sites or objects were identified within or in the vicinity of the existing or proposed Leaf's Gully access road.

Leaf's Gully is situated adjacent to a portion of the Upper Canal identified as the Leaf's Gully precinct. There are no previously identified Canal related sites or features within the study area.

6.7.3 Impact Assessment

The heritage assessment recommended that construction of the proposed Leaf's Gully access road may proceed without further recourse to or approval from the relevant heritage statutory authorities.

6.7.4 Mitigation Measures

If Aboriginal sites or objects, or European historic sites are encountered within proposed construction areas, then management strategies for impact mitigation to heritage values should be implemented. A management framework for the discovery of new sites is included in **Appendix D**. These measures would include:

1. All works are to be ceased in the vicinity of the object.
2. A qualified archaeologist should be called in to assess the significance of the object / relic.
3. If artefacts are discovered their location is recorded using a hand held GPS and mapped, the artefacts are to be collected, bagged and given a sequential location number.
4. If midden material is discovered its location is recorded using a hand held GPS and mapped, a sample of the material is collected, bagged and given a sequential location number. The location of any substantial intact non-Aboriginal archaeological relic should be recorded in accordance with best practices guidelines (as identified by the NSW Heritage Office).
5. The collected material is then to be examined in detail by a suitably qualified lithic specialist and the midden material examined and recorded. A report is to be written detailing the findings of this examination. For a substantial intact non-Aboriginal archaeological relic, a report is to be written by a heritage specialist detailing the outcomes of the assessment of the new discovery, including recommendations as to re-commencement of work in the affected area.
6. Following completion of the analysis any substantial intact non-Aboriginal archaeological relic assemblage, all the lithic items will be lodged with the Australian Museum, or will be subject to a Care and Control Permit issued by the Department of Environment and Conservation.

6.8 Traffic and Access

Appin Road

Appin Road at Leafs Gully Farm is a two-lane single carriageway rural road located in a narrow road corridor. The terrain is gentle and undulating with barrier linemarking controlling the movement of traffic. Traffic volumes on the road are high with field survey showing the road carrying some 9,300 vehicles in a day. **Table 6-1** presents the surveyed traffic flow on Appin Road.

Table 6-1 – Surveyed Traffic Flow on Appin Road (2006)
(Monday, 1st May to Sunday, 7th May, 2006)

Direction of Travel		Northbound	Southbound	Two -way
DAILY (vehicles per day)	WEEK DAYS	4,613	4,719	9,332
	7 DAY AVERAGE	4,617	4,627	9,244
PEAK HOUR (vehicles per hour)	AM (7:00 to 8:00)	546	300	846
	PM (15:00 to 16:00)	307	526	834
SPEED (km/h)	85 th Percentile	71.3	67.0	69.1
	Average	61.7	59.1	60.4

The Development Proposal will have negligible impact on Appin Road during construction as works are contained within the Development Site and construction traffic will not increase over the existing use.

The Development Proposal will not impact Appin Road during operation as the upgrade serves only to allow location of the road within the Right of Way, and provision of an access road that is fit for purpose. There is no intensification of use planned for the access road.

Access Road

The existing access road provides direct access to Leafs Gully Farm. Traffic generated in terms of volume is described as low (estimated to be in the order of 2 to 3 vehicle per hour).

The impact of the Development Proposal will be minimal during construction and during everyday use as the volume of traffic is low.

The Development Proposal will allow:

- location of the road within the designated Right of Way; and
- redesign and upgrade of the existing access road so that is fit for purpose.

Access Road/Appin Road Intersection

The connection point of the realigned access road at Appin Road lies central between two bends. Lines of sight to the left and right are clear of obstructions and the terrain being near level at this location ensures that motorists can see approaching traffic.

Figure 6-2 shows the proposed access road realignment with local shoulder widening at the intersection to facilitate ease of movement for left turning traffic.

6.9 Visual Amenity

No significant impact on visual amenity is likely during construction. The generation of dust during the minor earthworks is not likely to create significant air quality issues due to the short period of construction. In the event that dust generation becomes significant from a nuisance perspective, then a watercart would be employed to minimise dust generation.

No significant impact on visual amenity is likely during operation as the proposed road is similar to the existing road and as the roadway is in keeping with the landscape.

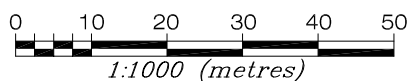
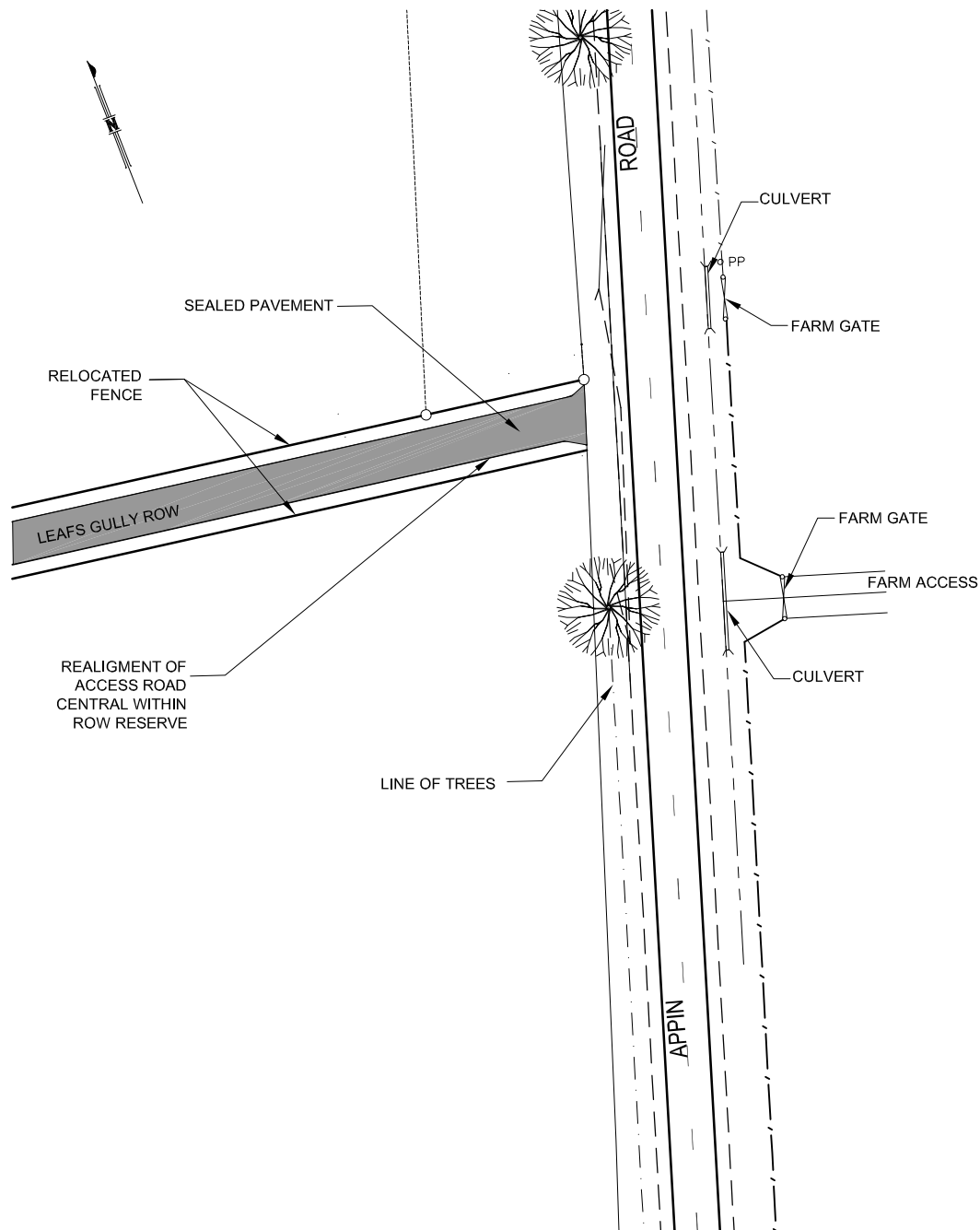
6.10 Waste and Hazardous Materials

The Development Proposal may generate the following waste materials:

- packaging;
- offcuts;
- excavated spoil;
- cleared vegetation and large rocks within the cleared area.

Any contaminated matter, plus litter and/or rubbish waste produced would be contained, collected, recovered, removed and disposed at an approved landfill. Such waste may be stockpiled for short durations on the Development Site within the construction zone awaiting removal. Stockpiles would be located away from trees or watercourses.

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Client AGL POWER GENERATION (NSW)	Project STATEMENT OF ENVIRONMENTAL EFFECTS, APPIN NSW			Title PROPOSED INTERSECTION AT APPIN ROAD	
	Drawn: EX Job No.: 43177401	Approved: FINAL File No.: 008.dwg	Date: 06/07/06	Figure: 6-2	Rev. A A4

6.11 Social and economic impact

The Development Proposal would have a positive social and economic impact as the upgraded access road would provide improved and more efficient access along the road, including the Leaf's Gully Farm. No negative social or economic impacts are anticipated as the proposed access would be located within the Right of Way.

6.12 Cumulative Impact

The cumulative impacts of the Development Proposal, with others proposed in the area will be relatively minor. In particular the proposed Leaf's Gully Power Project is likely to generate a similar level of traffic during operation to that carried by the access road. This impact is fully assessed within the project application for that development.

The Development Site comprises a Right of Carriageway 10m wide and an Easement for Services Access 10m wide identified in Deposited Plan 633800 which provides the only means of lawful access to Leafs Gully Farm.

Currently the existing access road does not fully utilise the land comprised in the Right of Way. The Development Proposal will be carried out wholly within the boundaries of the Right of Way.

The need for the Development Proposal is related to:

- location of the road within the Right of Way; and
- provision of an access road that is fit for purpose.

The Development Proposal requires consent from Campbelltown City Council in order for the development to proceed. This SEE presents the assessment of the potential impact of the Development Proposal on the environment. This assessment concludes that if mitigation measures are implemented for the works comprised in the Development Proposal then the environmental impact would be minimal.

However, Shale Sandstone Transition Forest (SSTF), an Endangered Ecological Community under the TSC Act and EPBC Act, has been identified in the vicinity of the Development Site. As construction of the road will be through a modified area of SSTF, it is unlikely to cause a significant impact on this endangered ecological community. A Part 5A Assessment (7 Part Test) provides more detail in support of this assessment. An assessment against the EPBC significance impact criteria has also been conducted and concluded that as there are previous impacts associated with the maintenance of the power line and parallel road, there are already evident edge effects on the unmodified EEC on the southern boundary of the proposed road (existing power line). The proposed works are not expected to substantially change species composition of the remaining remnant and as such the Development Proposal is not a controlled action under the EPBC Act.

The Development Proposal complies with the provisions of Section 79C of the EP&A Act as is required of Part 4 development.

Navin Officer, *Leafs Gully Gas Turbine Power Station Leafs Gully, NSW - Cultural Heritage Assessment*, June 2006

Appendix A

Flora Species List

Appendix A Flora Species List

Botanical Name	Common Name
Family Name	
Adiantaceae	
Cheilanthes austrotenuifolia	Rock fern
Asteraceae	
Conyza bonariensis*	Flaxleaf Fleabane
Taraxacum officinale*	Dandelion
Helichrysum spp.	
Ozothamnus diosmifolius	Rice Flower
Onopordum spp.*	Thistle
Chenopodiaceae	
Einadia hastata	Berry Saltbush
Convolvulaceae	
Dichondra rupens	Kidney Weed
Cuscuta australis	Australian Dodder
Ericaceae	
Leucopogon juniperinus	Prickly Beard-heath
Fabaceae	
Acacia decurrens	Black Wattle
Glycine clandestina	
Lomandraceae	
Lomandra confertifolia	Mat-rush
Malvaceae	
Sida rhombifolia *	Paddy's Lucerne
Myrtaceae	
Angophora floribunda	Rough-barked Apple
Eucalyptus punctata	Grey Gum
Eucalyptus spp (not flowering possibly Eucalyptus crebra)	Narrow-leaved Ironbark
Kunzea ambigua	Tick Bush
Passifloraceae	
Passiflora herbertiana	Native Passionfruit
Phormiaceae	

Appendix A Flora Species List

Stypandra glauca	Nodding Blue Lily
Pittosporaceae	
Pittosporum revolutum	Wild Yellow Jasmine
Bursaria spinosa	Sweet Bursaria
Plantaginaceae	
Plantago lanceolata*	Lamb's Tongues
Poaceae	
Setaria gracilis*	Slender Pigeon Grass
Sporobolus africanus	Parramatta Grass
Digitaria ramularis	
Proteaceae	
Persoonia linearis	Narrow-leaved Geebung
Rosaceae	
Rubus fruticosus**	Blackberry. NSW declared noxious weed in 70 council areas.
Thymelaeaceae	
Pimelea linifolia	Slender Rice Flower
Verbenaceae	
Lantana camara**	Declared noxious weed in 50 NSW council areas.

* Exotic

** Declared noxious weed for Campbelltown City Council

Appendix B

Seven Part Test - SSTF EEC

Appendix B

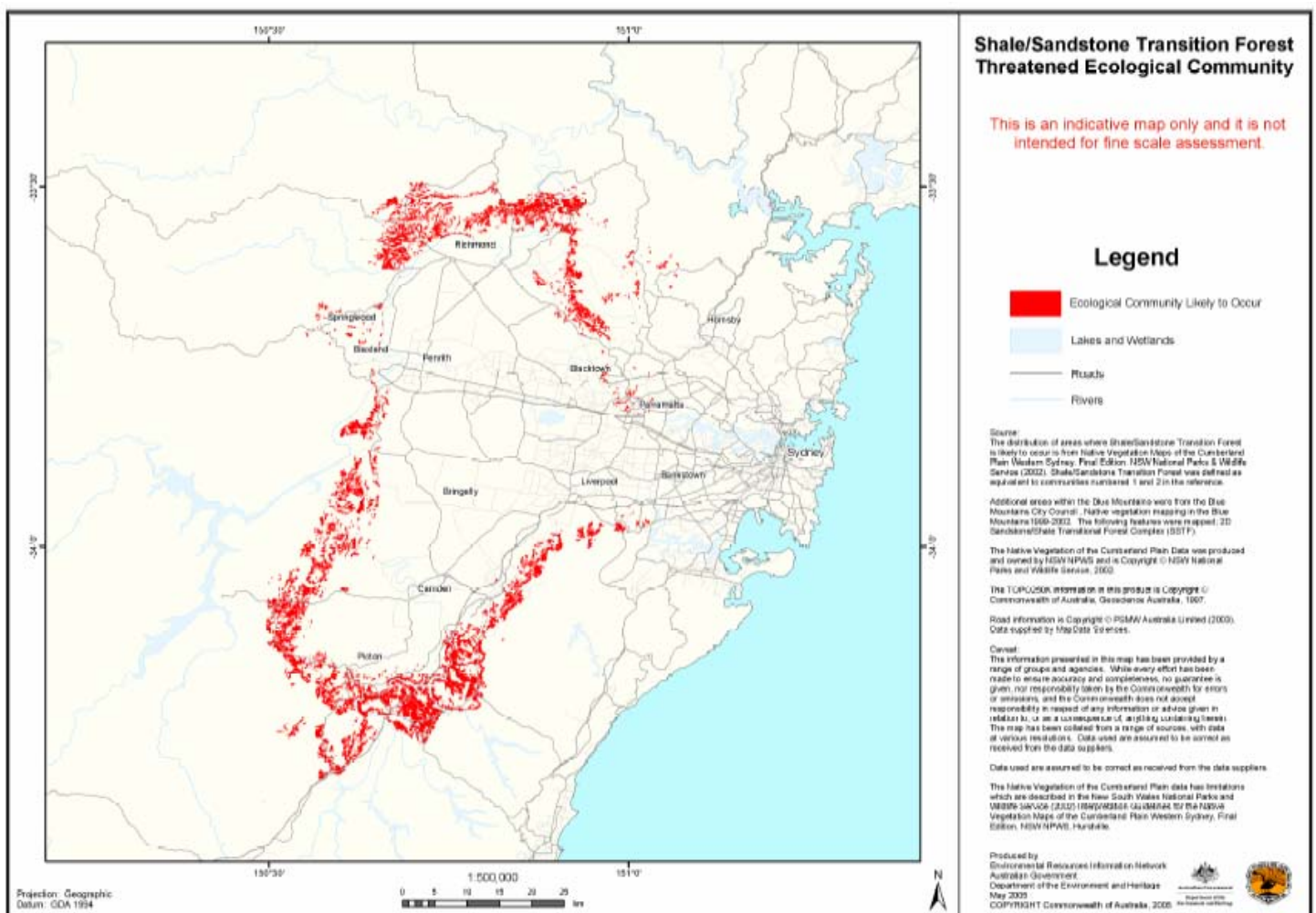
Seven Part Test - SSTF EEC

Shale Sandstone Transitional Forest EEC

Background

Shale/Sandstone Transition Forest (SSTF) is the name given to the plant community characterised by the species assemblage listed in the Scientific Committee's Final Determination dated 11 September 1998.¹ This EEC occurs on transitional areas between the clay soils derived from Wianamatta Shale and the sandy soils derived from Hawkesbury Sandstone on the margins of the Cumberland Plain.

SSTF occurs or has occurred in the Bankstown, Baulkham Hills, Blue Mountains, Campbelltown, Hawkesbury, Liverpool, Parramatta, Penrith, and Wollondilly Local Government Areas (LGAs). The distribution of SSTF is illustrated in the enclosed map from DEC.



¹ <http://www.nationalparks.nsw.gov.au/npws.nsf/content/shale+sandstone+transition+forest+endangered+ecological+community+listing>

Appendix B

Seven Part Test - SSTF EEC

The floristic composition of the community includes species otherwise characteristic of, or occurring in, either sandstone or shale habitats with the structure of the community being open and closed forest or woodland.

Characteristic tree species in SSTF are; *Eucalyptus punctata*, *Eucalyptus resinifera*, one of the stringybarks (*Eucalyptus globoidea*, *Eucalyptus eugenioides*, *Eucalyptus sparsifolia*, *Eucalyptus agglomerata*) or one or more ironbarks (*Eucalyptus fibrosa*, *Eucalyptus crebra*, *Eucalyptus paniculata*, *Eucalyptus beyeriana*). Typically the SSTF has an understorey which may be either grassy and herbaceous or of a shrubby nature. In areas that have not been burnt for an extended period of time the understorey may be dense as is the case in some areas of the proposed site.

Given that SSTF previously occurred on plateaux and hillsides and at the margins of shale cappings over sandstone, it is likely that the original extent of SSTF covered the proposed site prior to broad scale clearing for agriculture. A large proportion of the area where SSTF occurred in the past has been cleared for agriculture and urban development. Remnants are reported as small and scattered with identified threats including: clearing, physical damage from recreational activities, rubbish dumping, grazing, mowing and weed invasion.

Small areas of SSTF are presently included in only three conservation reserves, Blue Mountains National Park, Cattai National Park and Gulguer Nature Reserve.

Seven Part Test

- a) ***in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,***

Not Applicable.

- b) ***in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,***

Not Applicable.

- c) ***in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:***

- (i) ***is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or***
- (ii) ***is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,***

The extent of intact SSTF will not be impacted. A small area of modified SSTF (0.21ha) will be removed. This area has been lopped, pruned and cleared to allow the placement of a power line easement. The

Appendix B

Seven Part Test - SSTF EEC

proposed road alignment follows this power line easement. The removal of this small area (0.21ha) of modified SSTF is on the northern perimeter of a much larger remnant corridor of SSTF extending to Nepean River to the west and Dharawal State Conservation Area (SCA) to the east.

It is unlikely that indirect impacts that do not exist already, namely weed invasion would be exacerbated by the proposal. The spread of weeds into adjacent SSTF can be controlled through along the southern edge and shoulder of the proposed road.

d) *in relation to the habitat of a threatened species, population or ecological community:*

(I) *the extent to which habitat is likely to be removed or modified as a result of the action proposed, and*

(ii) *whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and*

(iii) *the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,*

If the management practices of the power line maintenance were ceased it is likely that the modified area of SSTF to be removed by this proposal would naturally regenerate. However the area proposed to be cleared for the access road is modified, relatively small (approx. 0.21ha), contains no mature hollow bearing tree species and contains noxious weeds such as blackberry and lantana.

No areas of SSTF EEC will be further isolated or fragmented as a result of the development as the proposed road corridor runs parallel to an existing road which is on the northern border of the larger remnant of SSTF.

e) *whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),*

No critical habitat listed for this community.

f) *whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,*

Threatening processes were identified in the final determination by the Scientific Committee including clearing, fire, run-off and weed invasion that can impact on species composition and abundance.

Of these weed control is applicable to the proposed development. The spread of weeds beyond the existing zone of disturbance and into the remnant SSTF can be considered a potential indirect impact of the proposal. Weed control is included in this SEE as a mitigation measure.

g) *whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.*

Key processes threatening the condition and extent of SSTF have been identified as:

Appendix B

Seven Part Test - SSTF EEC

1. *Inappropriate fire regimes, which have altered the appropriate floristic and structural diversity.*
The proposal would not increase or decrease the planned fire frequency of this remnant vegetation. The risk of accidental or intentional fire ignition would also not be likely to increase due to the proximity of the existing road (noting that fire ignition points correlate to access).
2. *Clearing for urban/rural development, and the subsequent impacts from fragmentation.*
Whilst the proposal requires clearing, the area is already modified, is small (0.21ha) and contains noxious weeds. No fragmentation of the remnant will occur as a result of the proposal.
3. *Inappropriate water run-off, which leads to increased nutrients and sedimentation.*
The parallel road and power line easement are not impacting on the drainage patterns to the SSTF remnant. The proposal will mirror alignments and gradients and as such is unlikely to alter the drainage patterns on site.
4. *Weed invasion.*
Unless controlled the existing noxious weeds in the modified areas have the potential to significantly impact on the SSTF remnant. This proposal will remove that threat in the short term, however appropriate construction and operations mitigation measures are required to ensure no reoccurrence of these species on the road verge.

Part 5A Assessment

The removal of 0.21ha of modified SSTF EEC will not significantly impact on the local extent, viability or condition of the intact SSTF present adjacent to the proposed road easement. However in accordance with the precautionary principle, weed control along the southern edge of the road is recommended to control weed invasion of the adjacent intact SSTF.

Appendix C

EPBC Significance Impact

Appendix C

EPBC Significance Impact

The *Environment Protection and Biodiversity Conservation Act 1999*, lists the Shale Sandstone Transitional Forest as an Endangered Ecological Community (EEC) (see <http://www.deh.gov.au/biodiversity/threatened/communities/shalesandstone.html>) due to the decline in, and small, geographic distribution. The pre-European extent of the Shale/Sandstone Transition Forest is estimated at 39,830 hectares. The estimated current extent of the community ranges from 7,918 hectares to 16,264 hectares. Therefore, the Shale/Sandstone Transition Forest has declined by approximately 60-80% of its previous greatest known extent.

The Federal Threatened Species Scientific Committee's determination directly references (and relies upon) the NSW Scientific Advisory Committee determination.

Under the new EPBC Policy Statement 1.1 – Significant Impact Guidelines (May 2006) for Matters of National Environmental Significance the Department of Environment and Heritage (DEH) a significant impact criteria is established. This proposal has been assessed against that criteria in order to determine if this proposal should be referred to DEH for consideration as a 'controlled action'.

Significant Impact Criteria (p13 - Critically endangered and endangered ecological communities).

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance of possibility that it will:

Reduce the extent of an ecological community.

A small portion (0.21 ha) of EEC community that is modified by power line easement maintenance (ie: removal of trees, lopping, pruning, slashing) will be cleared.

A larger (<20ha) intact stand of EEC is directly south of the proposed clearing. This area was not assessed as landholders permission was not obtained at the time of the survey. Large mature trees and a relatively weed free understorey were observed from a distance.

Fragment or increase fragmentation of an ecological community, for example for clearing vegetation for roads or transmission lines.

The proposed easement is on the northern boundary of a larger remnant of the EEC. Currently another road and an existing power line easement exist along this northern boundary. As such, the proposal will not further fragment the existing community.

Adversely affect habitat critical to the survival of an ecological community.

The vegetation proposed to be cleared is not considered critical habitat for the following reasons:

- The vegetation in the proposed easement is highly modified due to previous maintenance practices.
- The vegetation is on the northern boundary of a larger remnant.

Appendix C

EPBC Significance Impact

- The vegetation does not act as a seed source for other remnant or rejuvenating stands.

Modify or destroy abiotic (no-living) factors (such as water, nutrients, or soil) necessary for an endangered community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns.

The existing road and power line easement (less than 1m from the proposed easement) are existing impacts on surface water and groundwater (if any) to the EEC. An additional road is unlikely to critically change the water flows or nutrient cycling to the community due to the relatively flat terrain, is down slope of the EEC and will contain appropriate stormwater management.

Cause a substantial change in the species composition and occurrence of an ecological community including causing a decline in the loss of functionally important species, for example through regular burning or flora or fauna harvesting.

Because of the previous impacts associated with the maintenance of the power line and parallel road, there are already evident edge effects on the unmodified EEC on the southern boundary of the proposed road (existing power line) such as a slight increase in weed species. This is not expected to substantially change species composition of the remaining remnant.

Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including but not limited to:

- **Assisting invasive species, that are harmful to the listed ecological community, to become established; or**
- **Causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of the species in the ecological community.**

The proposed development may increase the potential for weed species to incur within the currently relatively undisturbed EEC remnant. Targeted weed control on the southern edge of the road has been recommended as an ongoing requirement for the operation of the road.

Interfere with the recovery of an ecological community.

The existing power line easement, if managed toward rehabilitation would be expected to regenerate quickly as the seed bank remains intact. As such the proposal reduces the chance that this may occur, however, under current ownership and practices, the proposal does not interfere with the recovery of this EEC in this location.

Appendix D

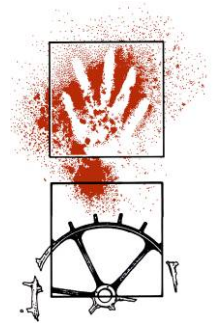
Cultural Heritage Assessment



Gas Turbine Power Station – Access Road: Appin Road to Leafs Gully, NSW

Cultural Heritage Assessment

August 2006



**Navin
Officer**

*heritage
consultants Pty Ltd*

acn: 092 901 605

*Number 4
Kingston Warehouse
71 Leichhardt St.
Kingston ACT 2604*

*ph 02 6282 9415
fx 02 6282 9416*

A Report to URS Australia Pty Ltd

EXECUTIVE SUMMARY

The proposed road, which will still remain within an already formed road corridor, runs from east to west from Appin Road to Leaf's Gully for a distance of approximately 2 km.

This report documents the results of an Aboriginal and European cultural heritage assessment of the Appin Road to Leaf's Gully proposed access road and was commissioned by URS Australia Pty Ltd.

The conclusions of the cultural heritage investigation are as follows:

1. No Aboriginal sites, objects or potential archaeological deposits were identified within or in the vicinity of the existing or proposed Leaf's Gully access road.
2. No European historic sites were identified within or in the vicinity of the existing or proposed Leaf's Gully access road.

It is therefore recommended that construction of the proposed Leaf's Gully access road may proceed without further recourse to or approval from the relevant heritage statutory authorities.

If Aboriginal or European sites or objects are encountered during construction, then the management strategies for impact mitigation to heritage values detailed in this report should be implemented.

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1. INTRODUCTION

The development proposal includes an access road along an already formed road corridor.

URS Australia Pty Ltd has been contracted to prepare the Environmental Assessment for the project.

In July 2006, Navin Officer Heritage Consultants undertook a cultural heritage assessment of the Leaf's Gully site for the Leaf's Gully Power Project, a 600 W peaking power station.

Subsequent to the report of that assessment, a variation was required to the alignment of the proposed access road. The proposed road, which will still remain within an already formed road corridor, runs from east to west from Appin Road to Leaf's Gully for a distance of approximately 2 km (Figures 1.2 to 1.4).

This report documents the results of a cultural heritage assessment of the Appin Road to Leaf's Gully proposed access road and was commissioned by URS Australia Pty Ltd.

1.1 Report Outline

This report:

- Outlines the methodology implemented for the project;
- Describes the environmental setting of the Leaf's Gully study area;
- Provides a background of local and regional archaeology for the Leaf's Gully study area;
- Provides an historical background to the Leaf's Gully study area;
- Provides predictive statements for Aboriginal and European heritage places in the study area;
- Describes the results of the desktop analyses and field surveys of the subject site;
- Outlines the statutory obligations relevant to cultural heritage of the site; and
- Provides recommendations based on the results of the investigation and the impact of the proposed development on the known and potential archaeological resource.

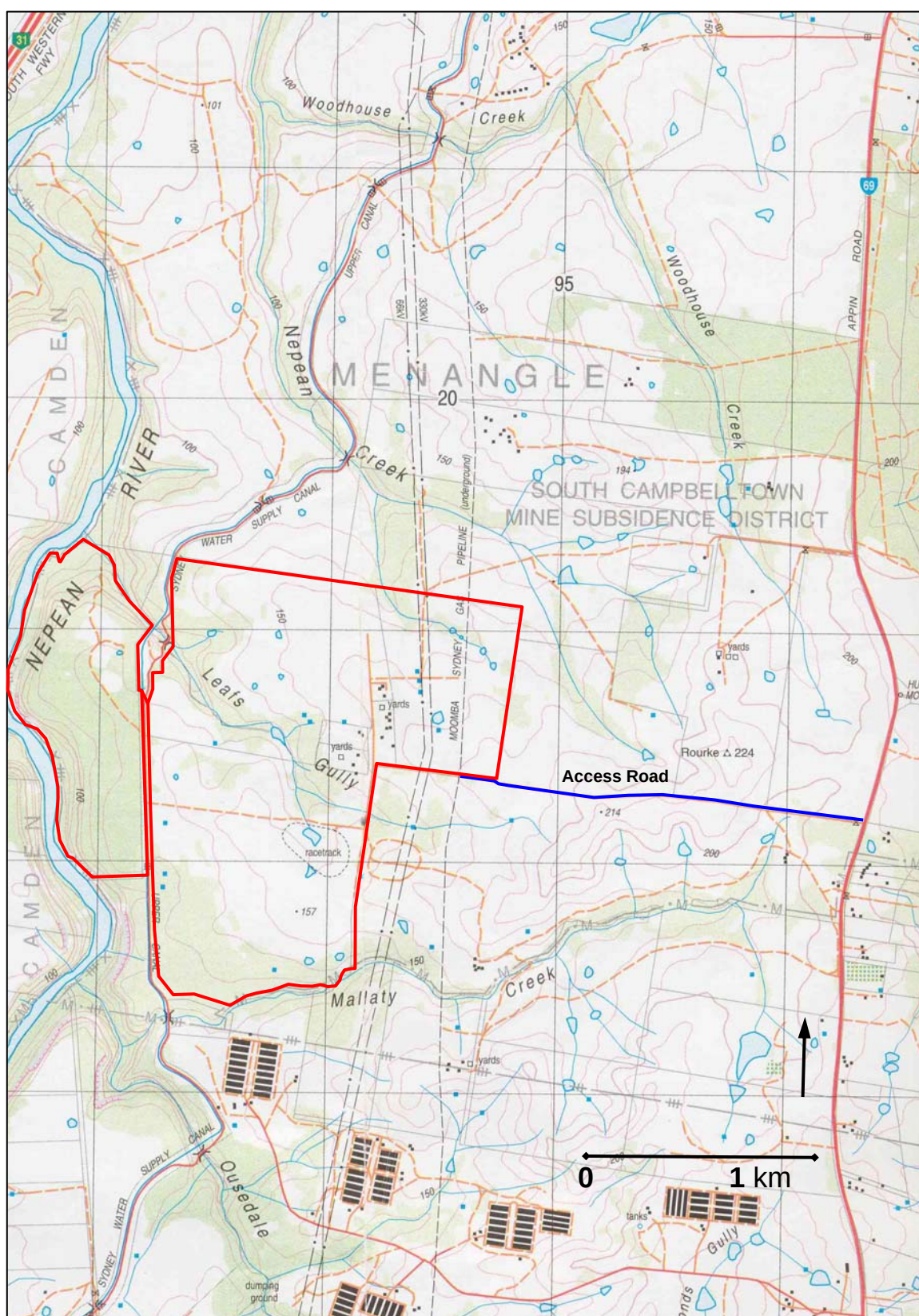


Figure 1.1 Location of Leaf's Gully Power Station site (red outline) and access road (blue line).
(Extract from Appin 9029-1S 1:25 000 topo 3rd Ed, Land Information Centre 2000).

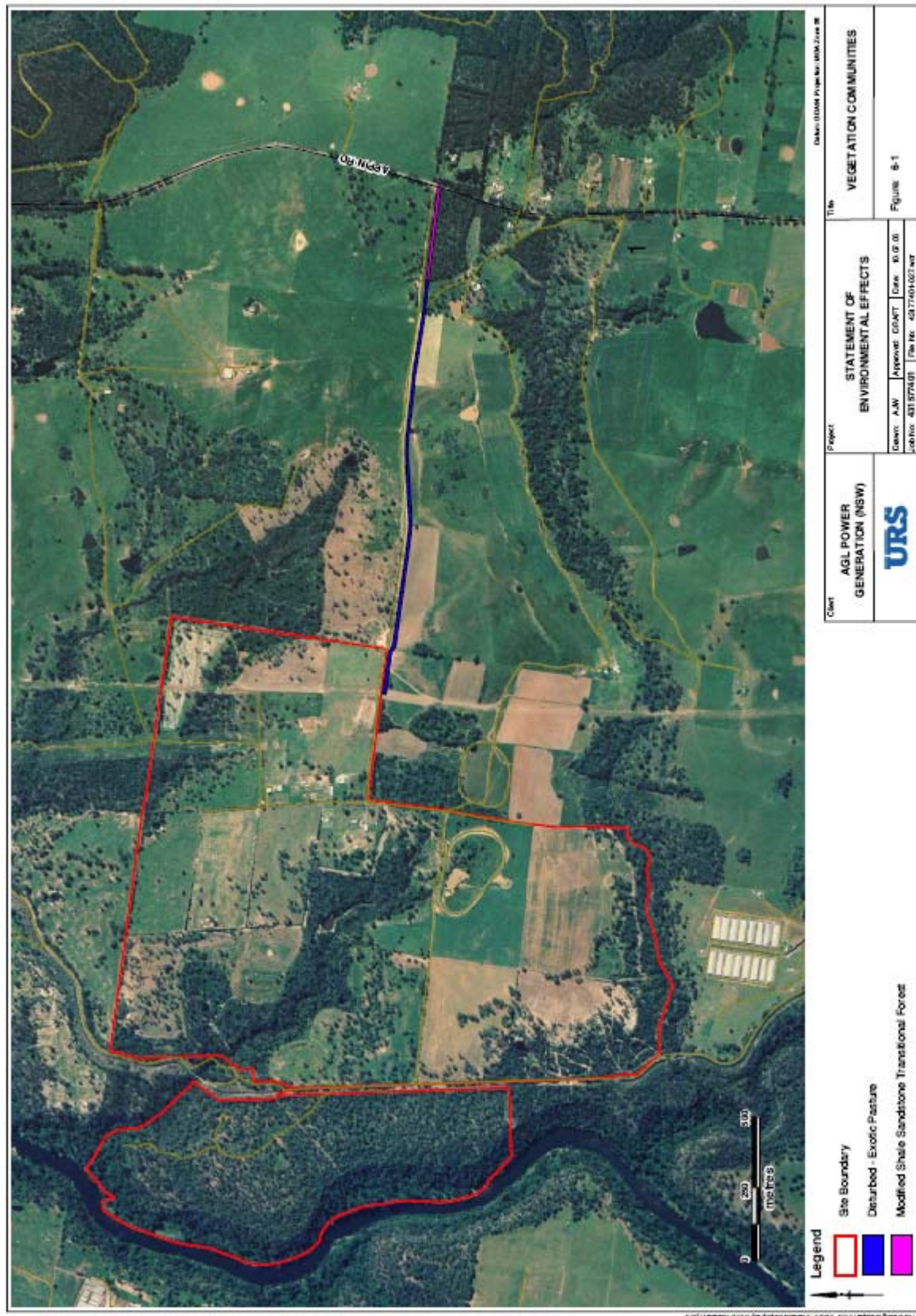


Figure 1.2 The Leaf's Gully Power Station site (red lines) and access road (blue/purple line).
(Orthophotographic map supplied by URS).

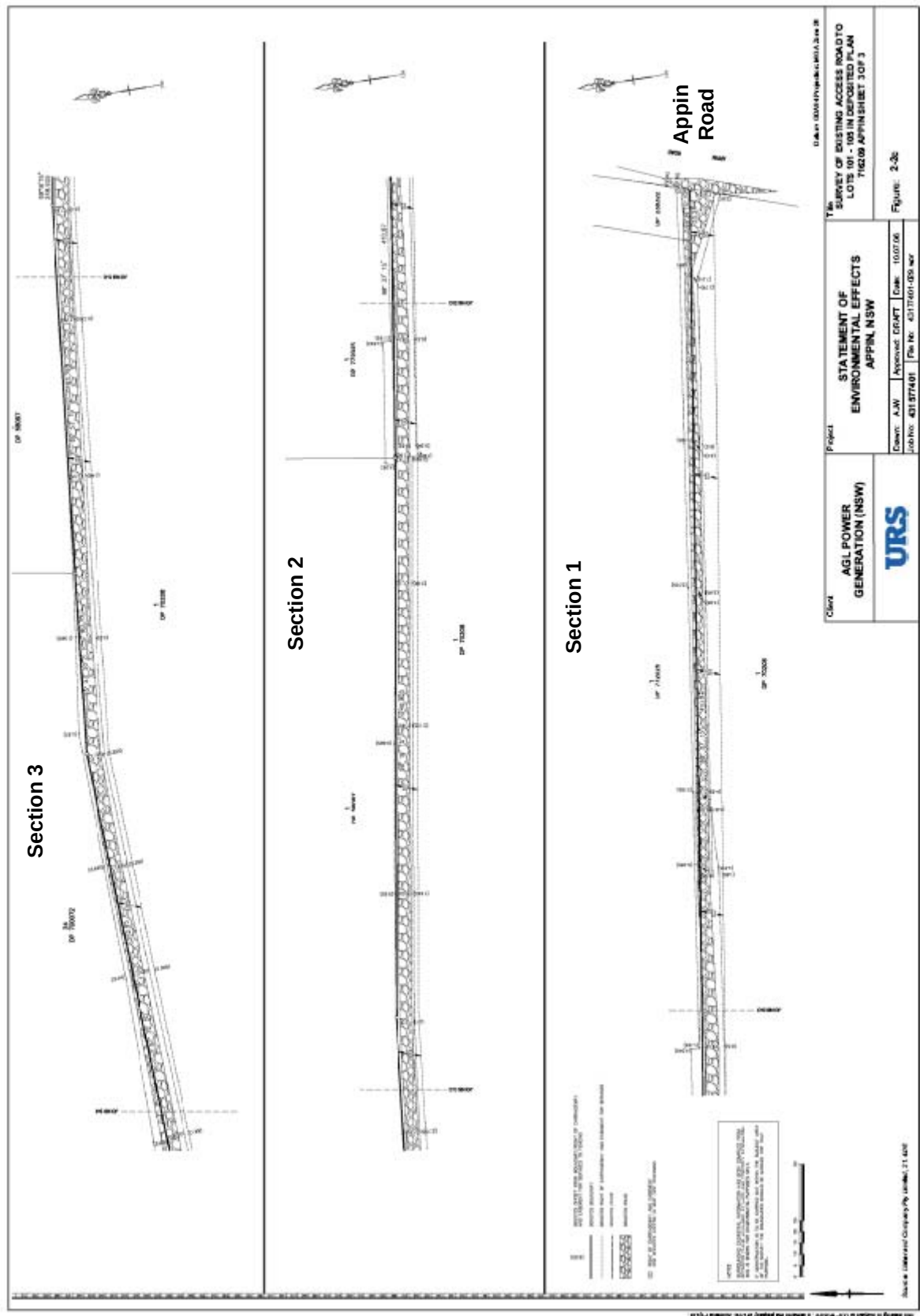


Figure 1.3 Existing and proposed access roads, Appin Road to Leafs Gully, sections 1 to 3 (of 5 sections) east to west. (Original supplied by URS).

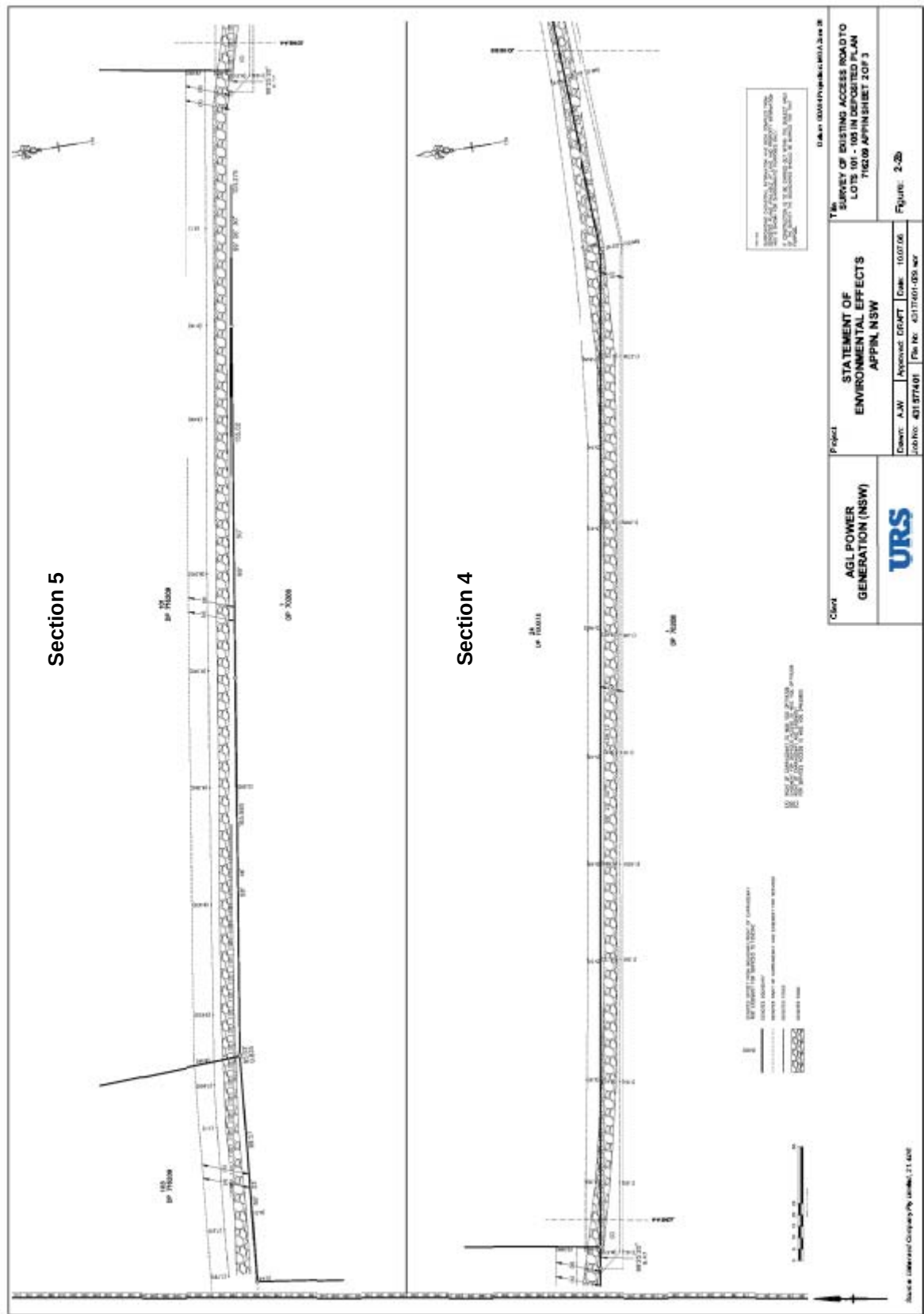


Figure 1.4 Existing and proposed access roads, Appin Road to Leafs Gully, sections 4 and 5 (of 5 sections) east to west. (Original supplied by URS).

2. ABORIGINAL PARTICIPATION

Two Aboriginal stakeholder groups have an interest in the Leaf's Gully study area. They are the:

- Tharawal Local Aboriginal Land Council (TLALC); and
- Cubbitch Barta Native Title Claimants Aboriginal Corporation (CBNTCAC).

The TLALC was contacted by telephone and subsequently facsimile, and the CBNTCAC was contacted by telephone and an invitation was extended to both groups to provide a representative(s) to participate in the archaeological field survey of the study area. Both groups responded positively to that invitation.

Kim Copeland represented the interests of the TLALC, and Glenda Chalker represented the interests of the CBNTCAC in the project. Both representatives participated in the field survey of the Leaf's Gully site access road, which was conducted over part of one day on Monday, 7 August 2006. A record of their participation is at Appendix 1.

3. STUDY METHODOLOGY

3.1 Literature and Database Review

A range of documentation was used in assessing archaeological and historical knowledge for the Leaf's Gully study area and its surrounds. This background research was used to determine if known Aboriginal and historical sites were located within the area under investigation, to facilitate site prediction on the basis of known regional and local site patterns, and to place the area within an archaeological and heritage management context. The review of written and documentary sources included heritage registers, local histories and archaeological reports.

Aboriginal literature sources included the NSW Department of Environment and Conservation (DEC) Aboriginal Heritage Information Management System (AHIMS), associated files and catalogue of archaeological reports.

The following heritage registers and schedules were searched:

- AHIMS (NSW DEC);
- The National Heritage List (Australian Heritage Council);
- The Commonwealth Heritage List (Australian Heritage Council);
- The Register of the National Estate (Australian Heritage Council);
- Register of Significant Twentieth Century Architecture (NSW) (Royal Australian Institute of Architects, NSW Chapter);
- The State Heritage Register (NSW Heritage Office);
- The State Heritage Inventory (NSW Heritage Office);
- Heritage Schedule(s) from the Campbelltown Local Environmental Plan 2002;
- Section 170 Heritage and Conservation Registers compiled by the Sydney Catchment Authority and the RTA; and
- Register of the National Trust of Australia (NSW).

3.2 Fieldwork

Fieldwork was conducted over part of one day on Monday, 7 August 2006. Field survey was conducted on foot and involved inspection of the length of the proposed access road. All areas of ground surface visibility within the study area were inspected.

3.3 Project Personnel

Archaeologist Lindsay Smith was assisted in the field by Tom Taverner, and the Aboriginal field representatives were Kim Copeland (TLALC) and Glenda Chalker (CBNTCG).

The report was written by Lindsay Smith, Nicola Hayes and Kelvin Officer.

3.4 Recording Parameters

The archaeological survey aimed at identifying material evidence of Aboriginal and European occupation as revealed by surface artefacts and areas of archaeological potential unassociated with surface artefacts. For evidence of Aboriginal occupation, potential recordings fall into three categories: isolated finds, sites and potential archaeological deposits.

3.4.1 Isolated finds

An isolated find is a single stone artefact, not located within a rock shelter, and which occurs without any associated evidence of Aboriginal occupation within a radius of 60 m. Isolated finds may be indicative of:

- Random loss or deliberate discard of a single artefact;
- The remnant of a now dispersed and disturbed artefact scatter;
- An otherwise obscured or sub-surface artefact scatter.

Except in the case of the latter, isolated finds are considered to be constituent components of the *background scatter* present within any particular landform. Background scatter is a term used generally by archaeologists to refer to artefacts which cannot be usefully related to a place or focus of past activity (except for the net accumulation of single artefact losses).

3.4.2 Sites

A site is defined as any material evidence of past Aboriginal activity that remains within a context or place that can be reliably related to that activity.

3.4.3 Potential Archaeological Deposits

A potential archaeological deposit, or PAD, is defined as any location where the potential for subsurface archaeological material is considered to be moderate or high, relative to the surrounding study area landscape. Locations with low potential for artefacts fall below the threshold of classification. The potential for subsurface material to be present is assessed using criteria developed from the results of previous surveys and excavations relevant to the region.

4. ENVIRONMENT

4.1 The Sydney Basin

The proposed Leaf's Gully access road 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 study area - the Cumberland Plain and the Woronora Ramp.

The surface of the Cumberland Plain is predominantly shales of the Wianamatta Group that 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 proposed access road falls within this zone.

4.2 The Transitional Zone

The Cumberland Plain and the Woronora Ramp grade into each other across a relatively narrow zone in which the landscape takes on features of both these major structural units. From a geological point of view, it could be argued that all of the incised terrain to the west of the Georges River represents a transitional zone due to the presence of Wianamatta Shales on the remnant plateau and ridgeline crests. Moving west from the River, these areas become larger and coalesce, whilst the intervening incised sandstone drainage lines become shallow and give way to open and moderately graded valleys formed on shale bedrock.

However, from an archaeological perspective, the transition between these two landforms is most meaningful when the dominant variable of bedrock geology is combined with topographic variables. Critical factors that define the transitional zone are the change:

- Between sandstone and shale in creek beds;
- In valley morphology between: narrow, moderate and steeply graded valleys, situated between distinct break-of-slopes and dominated by sandstone; and shale based, wide and open valleys, with moderate low gradient slopes, with no break-of-slope; and
- In ridgeline topography between: relatively flat remnant plateau land surfaces located between distinct break-of-slopes; and broad gently graded or rounded crests with relatively distinct watersheds.

4.3 The Impact of Landuse Practices on the Archaeological Record

The area of the proposed Leaf's Gully access road has undergone landscape disturbance, primarily as a result of its use for pastoral and agricultural activities, and partially as an access road to properties undertaking those activities. Such use probably dates from the early nineteenth century.

The majority of the area on either side of the length of the existing access road is substantially cleared of original vegetation and is now predominantly under pasture grass (Figures 4.1 to 4.6).



Figure 4.1 View of southern side of existing access road (facing east towards Appin Road).



Figure 4.2 View of southern/northern sides of existing access road (facing northeast).



Figure 4.3 View of northern side of existing access road (facing north).



Figure 4.4 View of northern/southern sides of existing access road (facing east).



Figure 4.5 View of northern side of existing access road (facing northwest).



Figure 4.6 View of northern side of existing access road (facing east).

5. ABORIGINAL CONTEXT

5.1 Tribal Boundaries and Traditional Groupings

There have been numerous attempts at mapping the pre-contact and contact territories of Aboriginal people in the Sydney region (Capell 1970; Eades 1976; Kohen 1986, 1988; Mathews 1901a, 1901b; Ross 1988; Tindale 1974). The exact boundaries that existed between Aboriginal people at 1788 are impossible to reconstruct because of the lack of reliable data available from that period of time.

The primary data are limited as the early observers (members of the First Fleet and settlers) did not document how Aboriginal people perceived their own groups, or how they differentiated themselves from one another. Early anthropological work that was carried out is also not totally reliable. The population of Aboriginal people around Sydney was depleted by disease and aggression by Europeans and many of the survivors would have quickly relocated and/or probably joined other groups.

Most tribal boundary reconstructions place the proposed Leafs Gully access road within the Dharawal (Tharawal) tribal area.

Tindale's map of tribal boundaries was constructed in 1940 from fieldwork and existing literature. The boundaries as defined by Tindale (1974) show the Tharawal's northern boundary in Botany Bay extending west to where it adjoins the Gandangara (Gandangarra) and south to just east of Picton then east to the coast above Woonoona. Capell (1970) concluded that the territory of the Dharawal (Tharawal) started on the southern shore of Botany Bay and extended to Nowra and Jervis Bay. R.H. Mathews wrote that 'The Dharook dialect ... was spoken at Campbelltown, Liverpool, Camden, Penrith, and possibly as far east as Sydney' (Mathews 1901a:151).

5.2 Local Aboriginal History

Few historical accounts mention or record details specific to the Aborigines who lived in the Campbelltown area.

Investigative field expeditions by early settlers to the Cumberland Plains and Cow Pastures are documented, including meetings with Aborigines in these areas. Typical are the references provided by Captain Tench in 1790 (Collins 1798) and Governor Macquarie in 1802 and 1815 (Macquarie 1956), which relate the observation of camp remains and notched trees, and actual encounters with 'natives'.

Aboriginal observations of the initial incursion of European culture are evidenced from the Cowpasture area by three drawings of bulls which probably represent the original polled cattle which escaped to the area from the First Fleet (Lyon and Urry 1979).

References from the early explorers indicate that there was little contact between coastal and inland tribes. Tench (1793) noted that coastal Aborigines had no knowledge of the region west of what is now known as Parramatta.

Although no reliable appraisal of the number of Aborigines living in the Sydney area was made by early observers, it has been estimated that the population density for the region was between five and 10 individuals per square mile (Maddock 1972). With European settlement this population was quickly decimated, and in less than a century traditional Aboriginal lifestyle patterns in the Sydney area were virtually destroyed.

First white contact with the Aborigines of the area is attributed to two explorers – Ensign Francis Barrallier who crossed through the area in November 1802, and George Caley, a servant of Joseph Banks, who reached the area in December 1802.

In January of 1805, George Caley made an expedition to the Georges River area which he later described as 'a Journey Towards Jugroy ...' (MacLeod Morgan 1955). The river itself prevented him from crossing, making impossible 'the idea of visiting Jugroy' which apparently lay to the east of the

river. Although the meaning of the possibly Aboriginal word 'Jugroy' is never revealed, Caley does comment on the apparently extensive occupation of the area: 'By the marks or notches on the trees it is much frequented by natives'. This observation was made in forested land in the vicinity of Long Point. The natural grassy understorey of Cumberland Plains woodland was cleared for the production of wheat and other cereals during the period of agricultural expansion in the Campbelltown district in the early 1800s (Benson and Howell 1990:75).

There was considerable conflict between Aborigines and Europeans in the region. In 1809, Young Bundle with Tedbury (the son of Pemulwuy the legendary Aboriginal activist) were terrorising and stealing from travellers as well as driving sheep off properties around the Cook and Georges Rivers area (Liston 1988; Keating 1996). There were more severe conflicts between 1814 and 1816 when the area was gripped by a severe drought (Perry 1963). This combined with the fact that Aborigines' staple food gathering and hunting areas were overtaken by European grazing and cultivation, caused Aborigines to raid crops, thus angering the farmers who retaliated. These conflicts between the increasingly dispossessed Aborigines and the expanding white colony indicate the importance of these fertile plains to Aboriginal subsistence (Officer 1984; Demkiw 1985).

Governor Macquarie advised caution and stated that the loss of part of ones' crop was a small price to pay for peace (Liston 1988). However, tensions escalated and Aborigines and Europeans were killed in the ensuing struggles. In 1816, Macquarie ordered the apprehension of Aborigines in the area and if they resisted they were to be put to death (Liston 1988). There were three punitive expeditions, which were mostly unsuccessful. Two of those expeditions had Aboriginal guides (variously claimed to be Tharawal or Dharug). In 1816, a regiment headed by Wallis perpetrated a massacre of 14 Aboriginal men, women and children at Appin (Keating 1996; Liston 1988).

Aboriginal people lived and sought refuge on some properties in the Campbelltown area, especially during the 1814 to 1816 conflicts. The literature records that Charles Throsby sheltered wanted Aboriginal men from authorities in 1816 and there are other references to European farmers being accused of interfering with a punitive expedition led by Wallis (Liston 1988).

The Macarthurs were known to have Aboriginal people living on their property *Camden Park* and Macarthur's daughter is quoted as writing to a friend praising them and begging her friend to accept them (Liston 1988). In fact, in 1818, land was marked out on the Macarthur estate for Aborigines who wanted to live there under his protection (Liston 1988). Many Aborigines did choose to live on the estate. There is oral information from a Tharawal informant that her ancestors lived on Camden Park from 1820 to 1973, being employed by the Macarthurs in various capacities (Aboriginal informant, pers. comm. 1997). After 1816, the Tharawal stayed in the Cow Pastures. This was an area that was mainly used for grazing, so it was more sparsely populated than some neighbouring areas.

The traditional food economy appears to have been predominantly replaced by the 1840s, with most Aborigines being employed by whites on farms, or selling their traditional food items for European goods (Hassell 1902; Jervis 1935, 1949). In a report to a Select Committee on the Aborigines in 1845, a local Campbelltown J. P. reported that:

'For the last five to ten years they [the Aborigines] have been gradually decreasing, from the number of about fifteen to twenty, until none can be said to belong to this police district, as a tribe. Their death may be attributed to natural causes' (Select Committee on the Aborigines 1845).

Dairying became the major agricultural industry in the region after the wheat industry collapsed in the 1860s.

In spite of the enormous continuing changes which occurred in tribal culture after the arrival of Europeans some aspects of traditional life appear to have continued in Sydney. Macarthur describes a corroboree that took place on his property (Liston 1988) and Mathews documented ceremonies in the late 1800s. There is another mention of a ceremony taking place at Denbigh near Camden in the 1830s (Kohen 1985), and a corroboree involving over 400 individuals at the same place in the mid 1820s (Hassell 1902).

5.3 Regional Archaeology

The Sydney Basin has been the subject of intensive archaeological survey and assessment for many years. This research has resulted in the recording of thousands of Aboriginal sites and a wide range of site types and features. The most prevalent sites or features are isolated finds, open artefact scatters or camp sites, middens, rock shelters containing surface artefacts and/or occupation deposit and/or rock art, open grinding groove sites and open engraving sites. Uncommon site types include scarred trees, quarry and procurement sites. Rare sites include burials, stone arrangements, carved trees, and traditional story or other ceremonial places.

Archaeological studies in the Sydney Basin have generated hundreds of reports and monographs and a number of academic theses. This database has been used to propose varying models regarding regional occupation sequences, exploitation patterns, regional characteristics in site content and site location parameters.

Aborigines have lived in the Sydney region for at least 20,000 years (Stockton and Holland 1974). Late Pleistocene occupation sites have been identified around the fringes of the Sydney Basin at Shaws Creek (13,000 years BP [Before Present]) in the Blue Mountain foothills (Kohen 1986), at Mangrove Creek (11,000 BP) and at Loggers Shelter (Attenbrow 1987). Nanson et al (1987) have suggested that artefacts found in gravels of the Cranebrook Terrace indicate Aboriginal occupation over 40,000 years ago; however, there is some doubt as to the contextual integrity of these artefacts.

The majority of both open and rockshelter sites in the Sydney region date to within the last 3,000 years. A similar trend in occupation age occurs in dated deposits in NSW coastal sites. This has led many researchers to propose that population and occupation intensity increased from this period (Attenbrow 1987; Kohen 1986; McDonald and Rich 1993; McDonald 1994). The increased use of shelters postdates the time when sea levels stabilised after the last ice age around 5,000 years ago (the Holocene Stillstand). Following the stabilisation of sea levels, the development of coastal estuaries, mangrove flats and sand barriers would have increased the resource diversity, predictability, and the potential productivity of coastal environments for Aborigines. In contrast, occupation during the late Pleistocene (prior to 10,000 years BP) may have been sporadic and the Aboriginal population relatively small.

The stone technologies used by Aborigines within the Sydney Basin have not remained static and a sequence of broad scale changes through time has been consistently identified. This is known as the Eastern Regional Sequence and can be applied with various degrees of success and allowances for regional differences, to sites throughout eastern seaboard of Australia.

Recent reviews of the Eastern Regional Sequence have called into question the accuracy of the divisions, pointing out that many of the diagnostic elements, such as bipolar flaking and microlith production, cross the temporal boundaries and vary across regions (Mulvaney and Kamminga 1999). As an alternative, the broad technological changes which were associated with the introduction of a microblade based technology and a smaller tool kit are identified as the 'Late Phase' or the Australian Small Tool Phase, which began around 5,000-6,000 years ago.

This phase was characterised by the successive introduction of different technological innovations that spread or appeared in differing parts of the continent at different times. Tools with a ground edge such as stone hatchets first appear at least 4,300 years ago. The occurrence of microblades and retouched microliths dates to about 3,000-4,000 years ago in the Sydney region. From about 2,000 years ago bipolar flaking of quartz begins to increase within southeastern Australian sites, and intensifies over the last 1,000 years. A corresponding trend is the disappearance of microblade technologies over this time, however, both trends are uneven and are not consistent across and within regions. The Elouera, a thick backed blade, resembling an orange segment appeared around about 1,600 years ago. Shell fishhooks used for line fishing first appeared before 700 years ago, and possibly as early as 1,100 years (Mulvaney and Kamminga 1999).

Most of the Aboriginal sites which have been located in the broader Campbelltown area were recorded in the context of archaeological surveys. Site types recorded in the course of these studies include rock shelters with art and/or cultural deposit, grinding grooves, artefact scatters, isolated finds, scarred trees, and burials.

5.4 The Study Area

A search of the AIHMS database indicated that there were no previously recorded Aboriginal sites within the study area. Nine sites, consisting of three artefact occurrences and six art sites – are listed within a two kilometre radius of the study area (Figure 5.1).

The closest of these sites (NPWS Site No. 52-2-2265, 250 m south of the study area boundary), is an open context scatter of two surface artefacts, situated on a low gradient, mid-slope context, spurline crest, 120 m south of Leaf's Gully. This site was recorded in 2002 by Navin Officer Heritage Consultants (2002a) as part of an assessment of a proposed West Cliff Colliery PED antenna route. The site was considered to be indicative of a zone of very low density artefact incidence associated with Leaf's Gully (Navin Officer Heritage Consultants 2002a:8) (Note that the GDA map reference for this site is erroneously tagged on the AHIMS register as an AGD reference).

Of the other two artefact occurrences, one is probably a rock shelter situated on the eastern side of the Nepean River gorge (52-2-2239, identified simply as an artefact occurrence in AHIMS), and the other is situated on an elevated spurline crest, just upslope of the break-of-slope which marks the northern edge of the Mallaty Creek gully.

All six of the recorded art sites consist of pigment art within rock shelters. All are situated within sandstone escarpments or outcrops exposed with the riparian zones of the Nepean River and its west draining tributaries (Woodhouse and Mallaty Creeks). These sites have variously been recorded by the Sydney Prehistory Group (SPG 1983) and also by Carol Sefton (DEC site cards).

During a survey of the proposed Gas Turbine Power Station at Leaf's Gully in July 2006, Navin Officer Heritage Consultants identified a potential archaeological deposit (LGPAD1). No Aboriginal sites or objects were identified during that survey. The PAD occurs on the low gradient, upper slopes and crests of a spurline complex to the north of Leaf's Gully. Its downslope boundary is defined by the break-of-slope above the steep gradients around second order (or greater) drainage lines, and elsewhere by the approximate edge of the crest, extending up to 500 m away from second order drainage lines (Figure 5.1).

5.5 Site Location Parameters and Predictive Statements

In 2002, Navin Officer completed an Aboriginal heritage study of the Campbelltown local Government area. At the time of this study there were 120 Aboriginal sites recorded in the Campbelltown LGA. Based on this information site prediction models were developed for the Woronora Ramp, the Cumberland Plain and the transitional zone (Navin Officer 2002b:29-31).

At the time of the Campbelltown heritage study there had been little analysis of Aboriginal site type and location patterns relative to the landform variables particular to the transitional zone. Some more recent archaeological investigations remain un-released. The heritage study presented a predictive model for the transitional zone based on an assumption that site types and their location are likely to be consistent with the trends established for the Cumberland Plain and the Woronora Ramp – both of which are present within the transitional zone (Navin Officer 2002b). The model states that, rock shelter and grinding groove sites would be expected to occur in the valley slopes and gullies where the Hawkesbury sandstone has been exposed and weathered. On landforms derived from the overlying shales, open artefact scatters and isolated finds are likely to predominate, with potential archaeological deposits most likely within valley floor alluvium (Navin Officer 2002b:31).

In 2002, Navin Officer (2002c) undertook an archaeological assessment of the proposed 'Wilton Park' residential development. That project area is located seven kilometres southwest of Leaf's Gully and displays typical transitional zone landforms including steep sided tributary gullies in sandstone, and adjacent, elevated remnant plateau land surfaces on shale. The Wilton Park study further refined the predictive model for transitional zone landforms. The sensitivity of high gradient sandstone slopes and associated riparian corridors was confirmed with the recording of rock shelter sites including art and archaeological deposits. On the elevated and shale-based terrain, it was found that higher artefact densities were associated with drainage lines, either in their upper reaches where they have less developed channels, or up-slope of the break-of-slope marking the edge of tributary gullies and gorges.

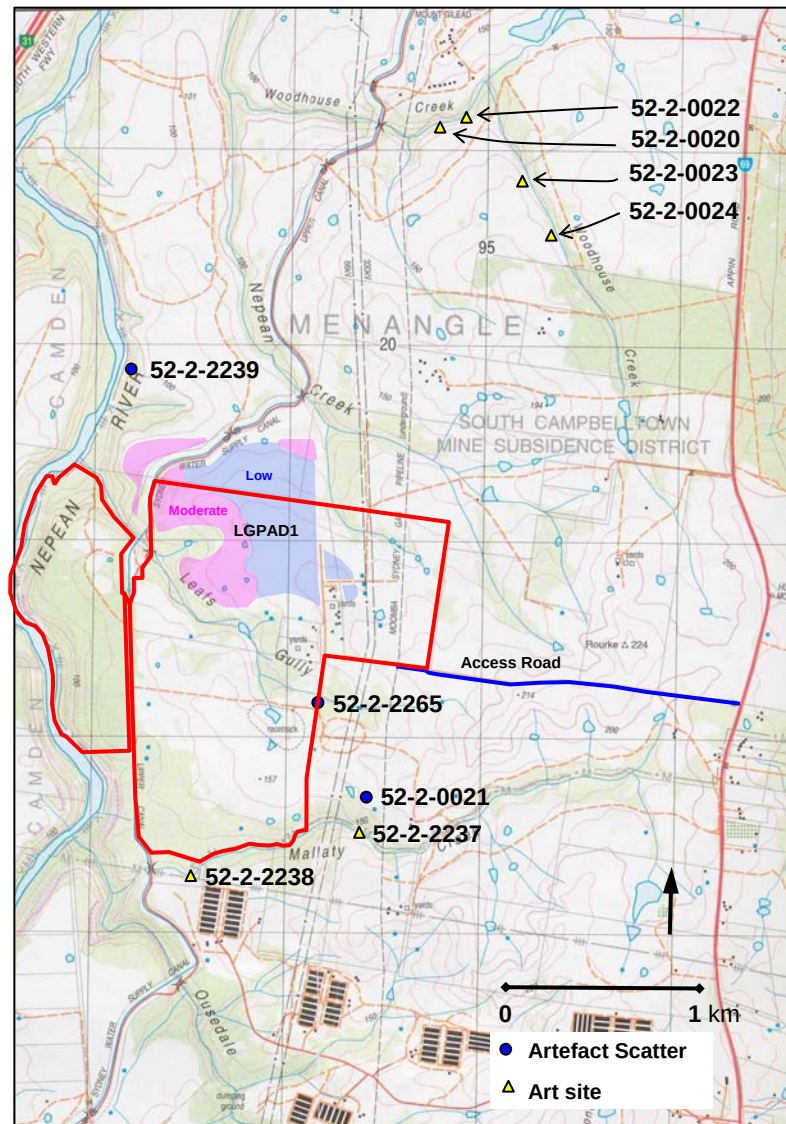


Figure 5.1 Aboriginal sites located within two kilometres of the access road (dark blue line). Extract from Appin 9029-1S 1:25 000 topographic map 3rd Ed, LIC 2000.

These site location patterns remain consistent with preferences identified for the Cumberland Plain. Here, artefact discard is mostly associated with locally elevated, well drained and roughly level ground in relative proximity to a substantial freshwater source. In contrast to the mostly gentle gradients of the Cumberland Plain, where such micro-topographic contexts are typically close to tributary streams, the steep gullies of the transitional zone mean that the desirable camp sites are situated adjacent to the break-of-slope, and above the incised gullies.

There is inadequate data from subsurface investigations to predict the extent to which such sites may extend upslope of the break-of-slope. It is known from the lower gradient topographies of the Cumberland Plain that artefact occurrences rarely occur in high densities more than 100 m from riparian zones. A consequence of this is that the crests of spurs or ridgelines tend not to be a focus for occupation, except for specialised sites such as stone quarries (Navin Officer 2002b). By way of contrast, where terrain is characterised by higher gradients and more elevated watersheds, the low gradients afforded by crests and basal slopes are more likely to contain sites and in higher artefact densities. This pattern relates both to the proximity to water sources and the use of crests as access routes. This pattern has been established from investigations on the Woronora Ramp (Navin Officer 1997, 2002b).

Within the local area, it can be hypothesised that spurline crests and tributary gullies were utilised in combination for through and cross-country access. The lower gradients of the crests and upper slopes, together with their more open vegetation structures probably aided pedestrian travel. In

contrast, the continuous sandstone escarpments along lower tributary valleys and the adjoining Nepean River Gorge would have constrained access. In order to access the Nepean River, the gullies of side tributaries would need to have been traversed. In a few cases, spurlines also afforded negotiable and moderate grades to the river. One such spurline is situated 2 km north of the study area where a side spur provides access to the east bank of the river. This spur branches from the main watershed spurline which passes through the local area (Figure 5.2).

A review of the Leafs Gully topography in the light of these contrasting models reveals that aspects of both models are likely to be relevant – a finding which is consistent with the transitional nature of the region's geomorphology. The area consists of a broad spurline crest and upper slopes situated adjacent to the steeply graded, southwest facing slopes of Leafs Gully. The boundary between the lesser slopes of the spurline and the steeper slopes and Leafs Gully forms a relatively continuous break-of-slope. This contour defines the approximate extent of the incised gully. Upstream of the break-of-slope the tributary valley is open, and its banks are characterised by low gradient slopes. The combination of level ground adjacent to a tributary water source provides a basis for identifying the ground extending upslope of the break-of-slope as an area likely to contain sites. This topographic context is the same as for site locations recorded at Wilton Park. It is not known to what extent this potential extends upslope and away from the break-of-slope.

The spurline to the immediate north of Leafs Gully forms the watershed between the gully and Nepean Creek and as such provides a potential pedestrian route to the Nepean River. It is not known if the minor crest features, which form the interfluvies on either side of the main watershed, were a focus for Aboriginal occupation. Similarly, it is not known if artefact occurrences occur on the slopes to either side of the crests. Given the low gradients involved, these upper slopes may have also served as camp sites. The occupation of these micro-topographic features may have been associated with patterns of cross country movement or related to camping close to water sources. If the latter, any distribution of artefacts may potentially be continuous with occurrences adjacent to the break-of-slope.

Based on the predictive models for the Cumberland Plain and Woronora Ramps, and the results of other archaeological surveys within the transitional zone topographies of the Appin region, the following predictions can be drafted regarding archaeological potential within the proposed Leafs Gully access road area:

- The number and density of artefacts at any site may be, in part, related to the distance to a water source, and the degree of permanence of that source. Sites with a higher incidence of artefacts per area are likely to be situated in relative proximity to substantial water sources (such as second order or greater drainage lines). As the proposed road is more than 100 m from riparian zones it is unlikely that artefacts will occur in high densities; and
- The archaeological sensitivity of spurline crests and adjacent slopes is likely to diminish with distance from substantial water sources. It is hypothesised that sites with greater than background densities of artefacts are most likely to occur on crests that are within 500 m of second order or greater drainage lines. The crests over which the existing and proposed road passes tend not to be a focus for occupation, except for specialised sites such as stone quarries.

6. HISTORICAL CONTEXT

6.1 Historical Overview

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).

6.2 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. 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.

6.3 The Study Area

Parish maps of Menangle from c.1868 to 1904 (Figures 6.1 to 6.3) show the existing and proposed access road runs west from Appin Road through properties owned by several mid to late nineteenth century land holders. Although those maps do not show the road, it is probable that it was formed along the northern and southern boundaries of those properties to allow access to them and to properties adjacent to Nepean River in the west. Table 6.1 lists the nineteenth century property owners on whose land the access road was probably located, and a very brief outline of some of them and their land acquisitions in the area is below.

Table 6.1 Nineteenth century land owner details.

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

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).

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.

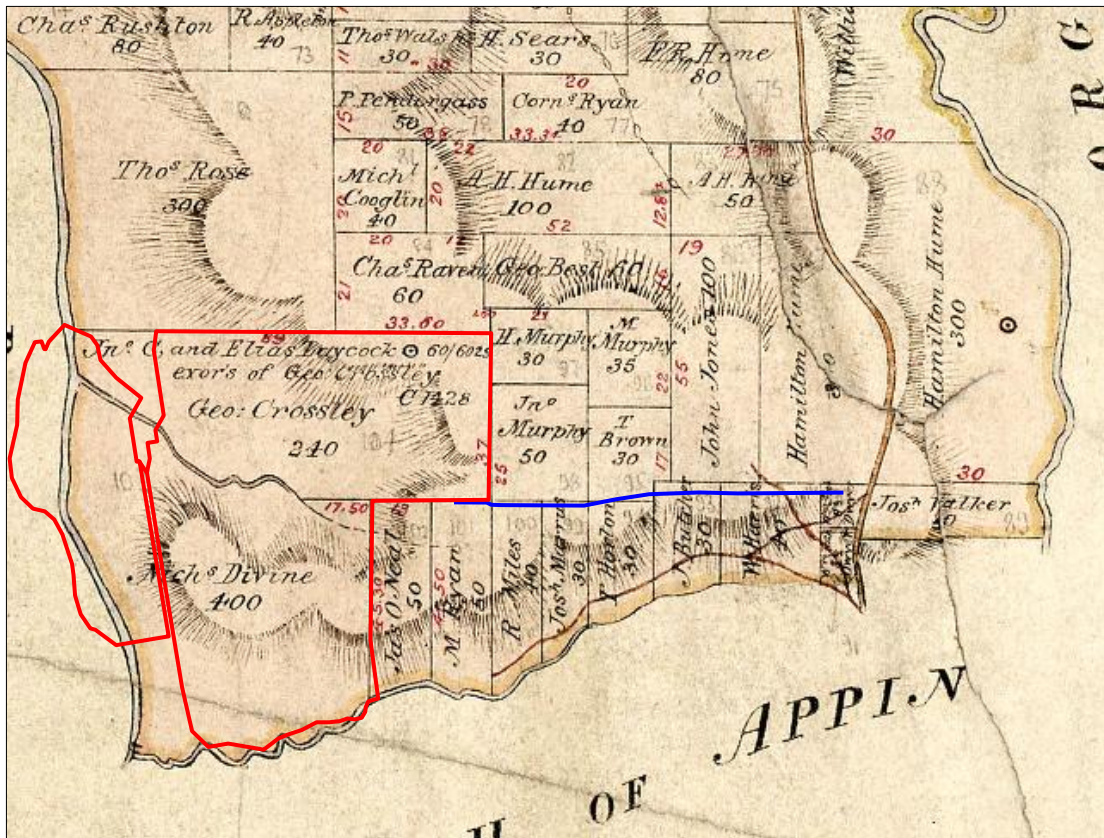


Figure 6.1 Extract from Parish Map of Menangle, County of Cumberland (c.1868) showing approximate location of access road (blue line)(AO Map No. 320, Dept. of Lands Map 14061101).

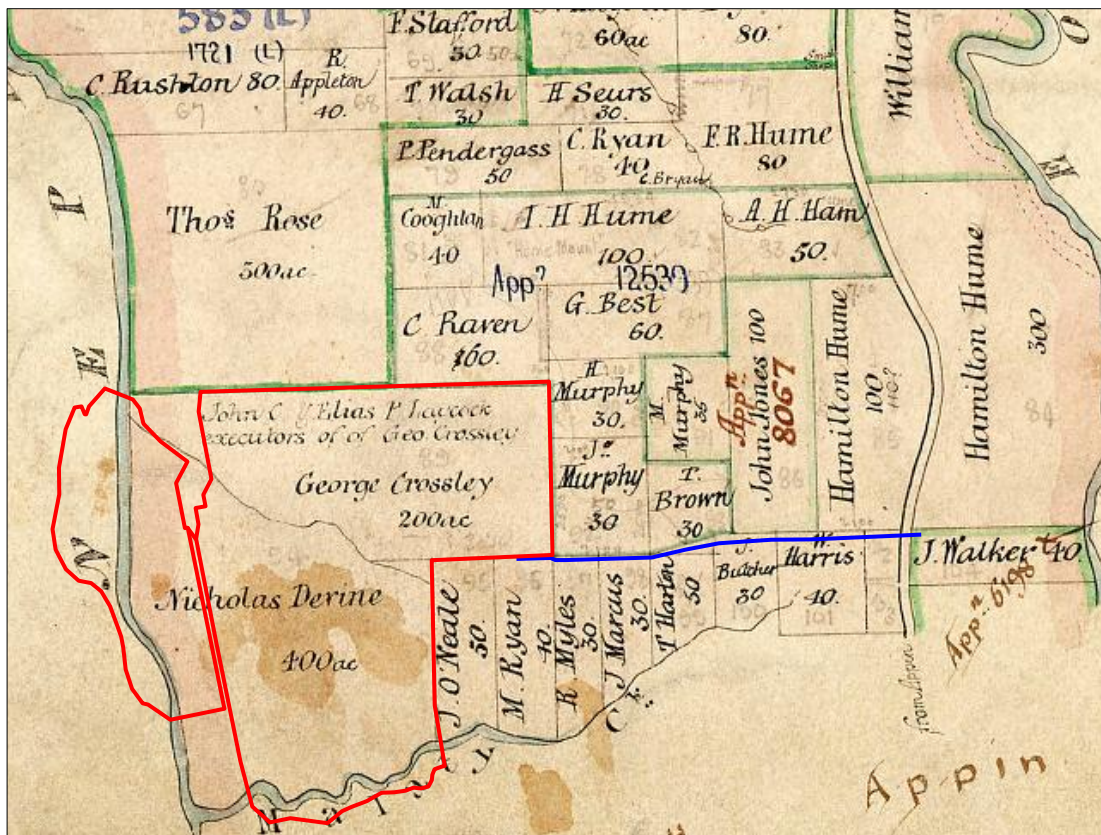


Figure 6.2 Extract from Parish Map of Menangle, County of Cumberland (c.1882) showing approximate location of access road (blue line)(AO Map No. 249, Dept. of Lands Map 14066801).



Figure 6.3 Extract from Parish Map of Menangle, County of Cumberland, 2 December 1904, showing approximate location of access road (blue line)(Department of Lands Map ref. 14092002).

6.4 Previous European 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 6.4 provides an extract from Higginbotham's 1992 report, showing the approximate location of the proposed access road 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 July 2006, Navin Officer Heritage Consultants did not locate any European heritage sites during a survey of the proposed Gas Turbine Power Station at Leafs Gully.

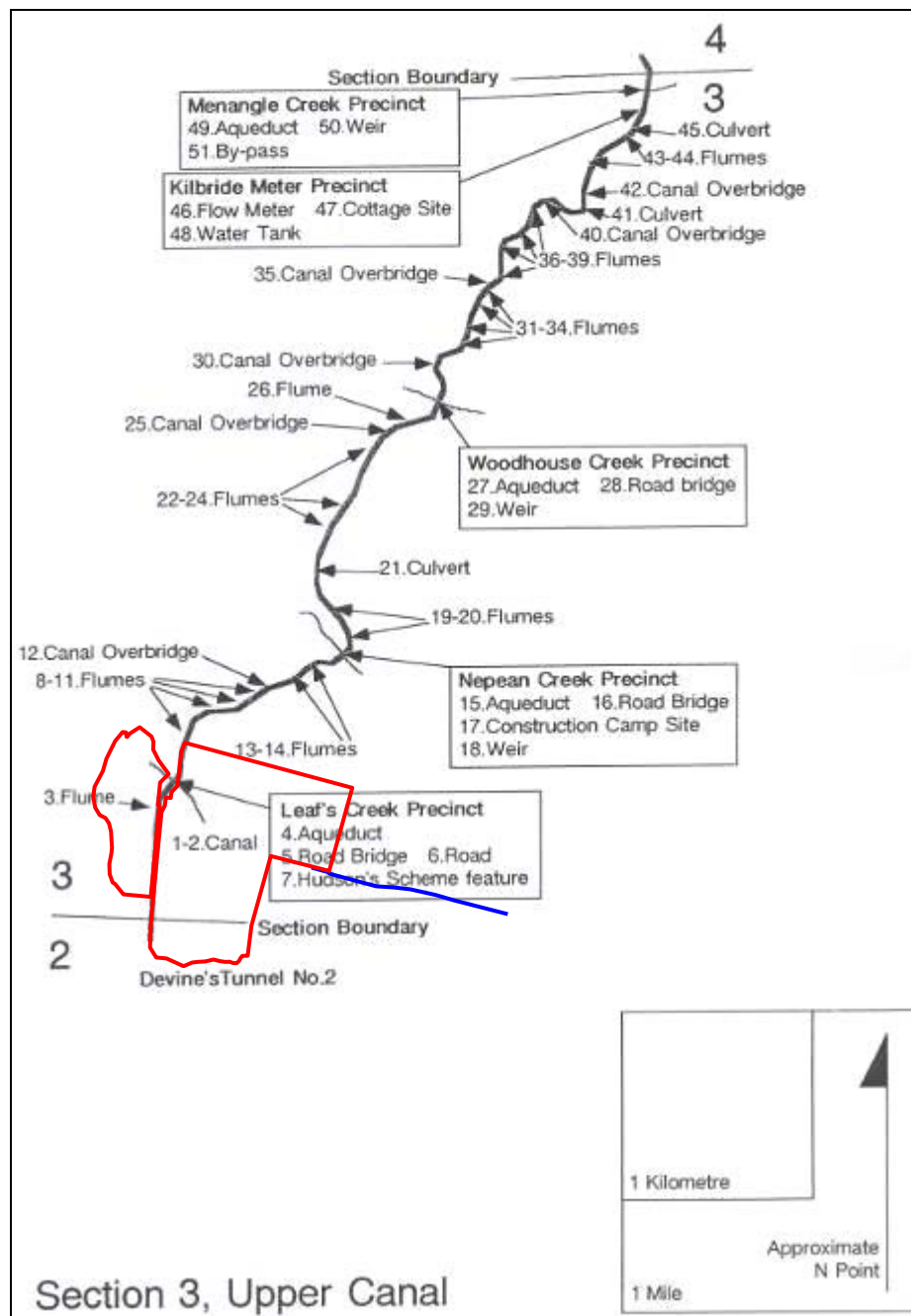


Figure 6.4 Extract from Higginbotham's report (1992:90) showing approximate location of the proposed access road (blue line), relative to historical items identified for the Upper Canal.

6.5 European Heritage Listings

There are no previously recorded European heritage places within the proposed Leafs Gully access road alignment.

6.6 Predictive Historical Archaeology Statement

The types of places or items that may form part of the historical archaeology context include:

- Below ground evidence, including building foundations, occupation deposits, features and artefacts; and above ground evidence, including buildings, works, industrial structures and relics that are intact or ruined; and
- Areas of land that display evidence of human activity or occupation.

Based on the largely agricultural historical context of the study area, unrecorded historic sites and features of heritage significance that may potentially occur within the study area include the following:

- Structures of historic interest and heritage significance may be standing, ruined, buried, abandoned or still in use;
- Nineteenth century structures such as farm dwellings, outbuildings, may survive as standing buildings, ruins or archaeological deposits and are most likely to survive on less developed rural properties, on early portion numbers, and in or near established farm building complexes;
- Archaeological sites such as the occupation remains of former dwellings including homesteads, houses and huts, will be distributed in close association with land settlement patterns, and correlated with favourable agricultural lands, trading nodes and transport corridors; and
- Old fence lines (such as post and rail fencing) may occur along the road easement boundaries and farmlands.

7. RESULTS

7.1 Aboriginal Heritage

No Aboriginal sites, objects or potential archaeological deposits were identified within or in the vicinity of the existing or proposed Leaf's Gully access road.

7.2 European Heritage

No European historic sites were identified within or in the vicinity of the existing or proposed Leaf's Gully access road.

7.3 Survey Coverage and Visibility Variables

The effectiveness of archaeological field survey is to a large degree related to the obtrusiveness of the sites being looked for and the incidence and quality of ground surface visibility. Ground surface visibility is a measure of the bare ground visible to the archaeologist during the survey. There are two main variables used to assess ground surface visibility, the frequency of exposure encountered by the surveyor and the quality of visibility within those exposures. The predominant factors affecting the quality of ground surface visibility within an exposure are the extent of vegetation and ground litter, the depth and origin of exposure, the extent of recent sedimentary deposition, and the level of visual interference from surface gravels.

The obtrusiveness of different site types is also an important factor in assessing the impact of visibility levels. For example, artefacts made from locally occurring rock such as quartz may be more difficult to detect under usual field survey conditions than rock types that are foreign to the area. The impact of natural gravels on artefact detection was taken into account in the visibility variables estimates outlined above.

The incidence and quality of ground surface exposures was reasonably consistent across the study area. There was a low incidence of exposures of around 3 per cent of the ground inspected within approximately 20 m on either side of the existing access road. The level of visibility within the surveyed exposures was good, ranging from 50 % to 60%.

The area in which survey was conducted is shown in Figure 7.1.

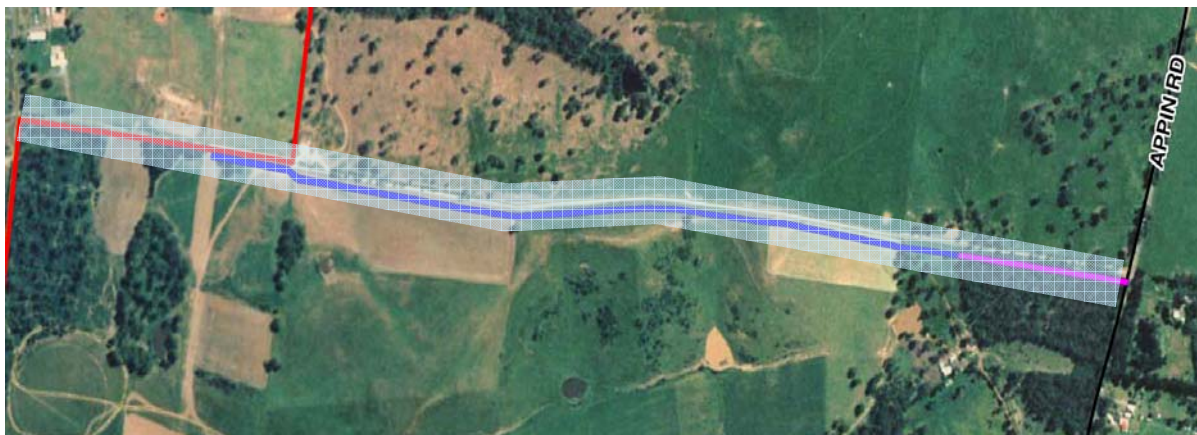


Figure 7.1 Aerial photograph of proposed and existing access road showing approximate survey area (light blue shading)(Orthophotographic map supplied by URS).

8. STATUTORY OBLIGATIONS¹

8.1 The National Parks and Wildlife Act 1974

The following summary is based on:

- The provisions of the current National Parks and Wildlife Act 1974 (NP&W Act) as amended. It should be noted that amendments to this Act were passed by both houses of the NSW State Government in 2001 (no.130, assented 19/12/2001). Some of these amendments are yet to be proclaimed.
- Department of Environment and Conservation policy as presented in the 1997 Standards and Guidelines Kit for Aboriginal Cultural Heritage provided by the (then) NSW NPWS, and as communicated orally to the consultants on a periodic basis. The 1997 Standards and Guidelines Kit is currently under review and subject to change in the near future.

The guideline documents presented in the 1997 Standards and Guidelines Kit were stated to be working drafts and subject to an 18 months performance review. The Standards Manual was defined not to be a draft and subject to periodic supplements.

With the exception of projects subject to the provisions of Part 3A of the Environmental Planning and Assessment Act 1979 (EP&A Act), the National Parks and Wildlife Act 1974 (as amended) provides the primary basis for the legal protection and management of Aboriginal sites within NSW. The implementation of the Aboriginal heritage provisions of the Act is the responsibility of the Department of Environment and Conservation (DEC).

The rationale behind the Act is the prevention of unnecessary or unwarranted destruction of relics, and the active protection and conservation of relics that are of high cultural significance.

With the exception of some artefacts in collections, or those specifically made for sale, the Act generally defines all Aboriginal artefacts to be 'Aboriginal objects' and to be the property of the Crown. An Aboriginal object has a broad definition and is inclusive of most archaeological evidence. The Act then provides various controls for the protection, management and disturbance of Aboriginal objects.

An Aboriginal object is defined as:

'any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains.' [Section 5(1)].

In practice, archaeologists use a methodology that groups 'Aboriginal objects' into various site classifications according to the nature, occurrence and exposure of archaeological material evidence. The archaeological definition of a site may vary according to survey objectives, however a site is not recognised or defined as a legal entity in the Act. It should be noted that even single and isolated artefacts are protected as Aboriginal objects under the Act.

The investigation, use or destruction of Aboriginal objects is managed through a system of Permits and Consents under the provisions of Sections 87 and 90 of the Act. Section 87 relates to actions which do not involve direct damage to Aboriginal objects, and Section 90 relates to damage or defacement of Aboriginal objects.

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.

Under Section 87 of the Act, it is an offence to do any of the following without a Permit from the Director-General of the Department of Environment and Conservation: disturb or excavate any land for the purpose of discovering an Aboriginal object; disturbing or moving an Aboriginal object; take possession of or removing an Aboriginal object from certain lands; and erecting a building or structure to store Aboriginal objects on certain land (Section 86). The maximum penalty is \$11,000 for individuals and \$22,000 for corporations.

Under section 90 of the Act, a person who, without first obtaining the consent of the Director-General knowingly destroys, defaces or damages, or knowingly causes or permits the destruction or defacement of or damage to, an Aboriginal object or Aboriginal Place is guilty of an offence against the Act.

Where salvage actions (such as collection or re-positioning) are proposed in conjunction with an application to destroy Aboriginal objects, then an application for a section 87 permit must accompany the section 90 application. This is because a consent issued solely under section 90 of the Act is not considered to permit actions other than those which destroy, deface or damage Aboriginal objects.

In January of 2005, the DEC introduced Interim guidelines for Aboriginal Community Consultation with regard to the preparation of applications for a consent or permit under Part 6 (section 87 and 90) of the NP&W Act. The DEC anticipate that the guidelines will be replaced with a more detailed policy later in 2005 following consultation with the Aboriginal community and other stakeholders. The Interim guidelines include a required process of notification of intended applications in the local media, an invitation for stakeholder groups to register interest, and various time periods providing an opportunity for registered stakeholders to comment and review proposed methodologies and assessments. A transition phase has been specified for the application of the Interim guidelines. Any project where a Planning Focus Meeting was held before the 1st of January 2005, or where the proponent can demonstrate that cultural heritage assessment work commenced prior to this date, may continue to prepare Part 6 applications according to the former processes. Alternatively a proponent may choose to comply with the new guidelines.

It should be noted that section 75U of the EP&A Act 1979 (as amended) establishes an exception to the application of sections 87 and 90 of the NP&W Act. It states that a Permit under section 87 or a Consent under section 90 of the NP&W Act 1974 is not required for an approved project subject to the provisions of Part 3A of the EP&A Act.

Section 175B of the NP&W Act outlines circumstances where corporation directors may be taken to have contravened these provisions, based on the acts or omissions of that Corporation.

The processing and assessment of Permit and Consent applications is dependent upon adequate archaeological review and assessment, together with an appropriate level of Aboriginal community liaison and involvement (refer Standards for Archaeological Practice in Aboriginal Heritage Management in 1997 NPWS Standards and Guidelines Kit).

The Minister may declare any place which, in his or her opinion, is or was of special Aboriginal significance with respect to Aboriginal culture, to be an Aboriginal place (Section 84). The Director-General has responsibility for the preservation and protection of the Aboriginal place (Section 85). An area declared to be an Aboriginal place may remain in private ownership, or be acquired by the Crown by agreement or by a compulsory process (Section 145).

The Director General may make an interim protection order and order that an action cease where that action is, or is likely to, significantly affect an Aboriginal object or Aboriginal place. Such an order is current for 40 days (Section 91AA, Schedule 3[10]). Such an order does not apply to certain actions, such as where they are in accordance with development consents or emergency procedures.

8.1.1 General Management Constraints and Requirements

Except where a project is subject to the provisions of Part 3A of the EP&A Act, the NP&W Act, together with the policies of the Department of Environment and Conservation provide the following constraints and requirements on land owners and managers:

- It is an offence to knowingly disturb an Aboriginal object (or site) without an appropriate permit or consent (Sections 87 and 90);
- Prior to instigating any action which may conceivably disturb an Aboriginal object (this generally means land surface disturbance or felling of mature trees), archaeological survey and assessment is required (refer Standards for Archaeological Practice in Aboriginal Heritage Management in 1997 NPWS Standards and Guidelines Kit).
- When the archaeological resource of an area is known or can be reliably predicted, appropriate landuse practices should be adopted which will minimise the necessity for the destruction of sites/Aboriginal objects, and prevent destruction to sites/Aboriginal objects which warrant conservation (refer Standards for Archaeological Practice in Aboriginal Heritage Management in 1997 NPWS Standards and Guidelines Kit).
- Documented and appropriate consultation with relevant Aboriginal Community representatives is required by the Department of Environment and Conservation as part of the prerequisite information necessary for endorsement of consultant recommendations or the provision of Consents and Permits by the DEC (refer Standards for Archaeological Practice in Aboriginal Heritage Management in 1997 NPWS Standards and Guidelines Kit).

8.1.2 Statutory Constraints Arising from Artefacts which Constitute Background Scatter

Background scatter is a term used generally by archaeologists to refer to artefacts that cannot be usefully related to a place or focus of past activity. There is no single concept for background 'scatter' or discard, and therefore no agreed definition. The recognition of background material within a particular study area is dependent on an appreciation of local contextual and taphonomic factors. Artefacts within a 'background' scatter can be found in most landscape types and may vary considerably in density.

Standard archaeological methodologies cannot effectively predict the location of individual artefacts within background scatters. Surface survey may detect background material either as individual artefacts ('isolated finds'), or even as small, low-density 'sites'. Subsurface testing may sample, and through analysis, characterise background material. However, beyond the scope of archaeological sampling, the potential to encounter background artefacts within the context of development related ground disturbance will always remain.

Most previous cultural resource management archaeological methodologies have acknowledged that there is little scientific justification for the conduct of archaeological salvage or ground disturbance monitoring to effect the recovery of background artefacts. The intrinsic scientific value of any recovered artefacts does not, in general, outweigh the expense of conducting the monitoring. However, low density distributions of artefacts are a current subject of interest by some heritage practitioners and DEC policy regarding this issue may change in the future. The monitoring of construction related ground works by Aboriginal groups is now increasingly practiced. The recovery of background scatter artefacts is often a probable outcome of such monitoring exercises.

Given the nature of statutory and DEC policy requirements in NSW, the detection of background artefacts during monitoring can be problematic. Except where a project is subject to the provisions of Part 3A of the EP&A Act, or where an Aboriginal object is covered by a current Consent or Permit (or Heritage Impact Permit (HIP)), from DEC, all further impact to an Aboriginal object detected during development works, and to the ground in its immediate vicinity, must cease until an appropriate Permit or Consent is gained. It may take up to eight weeks for this to occur. In the past, however, DEC has not as a general rule granted Consents to cover artefacts within background scatters which remain undescribed and undetected. This is because DEC sought to provide Consents where the significance and location of the Aboriginal objects to be impacted could be reliably defined. By their very nature, this may not be possible for artefacts that constitute a background scatter.

The present application of policy by the DEC does not provide for a consistent or proactive means of dealing with the statutory constraints posed by the detection of background scatter artefacts during development works. In those cases where the provisions of Part 3A of the EP&A Act do not apply, an option is the provision by the DEC of a section 87 Permit or section 90 Consent which includes all

Aboriginal objects situated within the defined development site rather than specific sites or finds within it. This approach has been adopted by some DEC branch jurisdictions where an assessment has been provided which suitably investigates the known and predicted incidence of Aboriginal objects potentially subject to disturbance. Other DEC jurisdictions do not accept this approach and only provide Permits and Consents for known and defined Aboriginal object occurrences.

It should therefore be noted, that in the event that an Aboriginal artefact ('Aboriginal object') is detected during ground disturbance within a development study area, and that area or Aboriginal object is not covered by a Permit or Consent to Destroy (or Heritage Impact Permit), there may be considerable delays to development works while an application for a Consent to Destroy is processed.

8.2 The National Parks and Wildlife Amendment Bill 2001

Although this Act was passed by both houses of the NSW parliament in 2001, a number of its provisions with regard to Aboriginal cultural heritage have yet to be gazetted and are not yet law. These include the following provisions:

- The requirement for a section 90 'Consent to Destroy' from the Director General will be replaced by a 'heritage impact permit' (Schedule 3[1], 3[3-8]).
- The offence under section 90 of the Principal Act of 'knowingly' destroying, defacing or damaging Aboriginal objects and Aboriginal Places without Consent will be changed so that the element of knowledge will be removed (Schedule 3 [2]). The amended section 90, subsection 1 will read:

'A person must not destroy, deface, damage or desecrate, or cause or permit the destruction, defacement, damage or desecration of, an Aboriginal object or Aboriginal place.'
- Section 90 subsection 1 will not apply when an Aboriginal object or Aboriginal place is dealt with in accordance with a heritage impact permit issued by the Director-General (Schedule 3[3], Section 90(1B) in amended Act).
- It will be a defence to a prosecution for an offence against subsection 1 if the defendant shows that:
 - (a) 'he or she took reasonable precautions and exercised due diligence to determine whether the action constituting the alleged offence would, or would be likely to, impact on the Aboriginal object of Aboriginal place concerned, and
 - (b) the person reasonably believed that the action would not destroy, deface, damage or desecrate the Aboriginal object or Aboriginal place.' (Schedule 3[3], Section 90(1C) in amended Act)
- A court will be able to direct a person to mitigate damage to or restore an Aboriginal object or an Aboriginal place in appropriate circumstances when finding the person guilty of an offence referred to in section 90 of the Principal Act (Schedule 3[9]).
- Schedule 4[8] of the Bill provides for the Director-General to withhold in the public interest specified documents in the possession of the DEC which relate to the location of Aboriginal objects, or the cultural values of an Aboriginal place or Aboriginal object.

8.3 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 focussed 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. The only 'blanket' protection provisions in the Act relate to the protection of archaeological deposits and relics greater than 50 years old.

Protection of Archaeological Relics and 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.

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 from Permit Requirements

Certain activities are exempted from the Section 57 and 139 permit approval requirements. Exemptions from Section 57 requirements may be granted by the Minister, and the NSW Heritage Council may provide exemptions from Section 139 requirements.

A schedule of section 57 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.

A series of exemptions 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 exemptions 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;
- (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.

8.4 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 Historic (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 Historic (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 Historic (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 of 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.

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 historic, 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.

9. CONCLUSIONS AND RECOMMENDATIONS

9.1 Aboriginal Heritage

No Aboriginal sites, objects or potential archaeological deposits were identified within or in the vicinity of the existing or proposed Leaf's Gully access road.

It is therefore recommended that construction of the proposed Leaf's Gully access road may proceed without further recourse to or approval from the relevant heritage statutory authorities.

If Aboriginal sites or objects are encountered within proposed construction areas, then management strategies for impact mitigation to heritage values should be implemented. A management framework for the discovery of new sites is included at Appendix 2.

9.2 European Heritage

No European historic sites or objects were identified within or in the vicinity of the existing or proposed Leaf's Gully access road.

It is therefore recommended that construction of the proposed Leaf's Gully access road may proceed without further recourse to or approval from the relevant heritage statutory authorities.

If European historic sites or objects are encountered within proposed construction areas, then management strategies for impact mitigation to heritage values should be implemented. A management framework for the discovery of new sites is included at Appendix 2.

9.3 General

1. *Three copies of this report should be forwarded to the NSW NPWS at the following address:*

Cultural Heritage Officer
Conservation Planning Unit
Metro EPRD
NSW Department of Environment and Conservation
PO Box 1967
HURSTVILLE NSW 2220

2. *One copy of this report should be forwarded to the NSW Heritage Office at the following address:*

Heritage Officer
NSW Heritage Office
Department of Planning
Locked Bag 5020
PARRAMATTA NSW 2124

3. *One copy of this report should be forwarded to each of the following Aboriginal groups:*

Leanne Hestelow
Tharawal Local Aboriginal Land Council
PO Box 20
Buxton NSW 2571

Glenda Chalker
Cubbitch Barta Native Title Claimants Aboriginal Corporation
55 Nightingale Road
Pheasants Nest NSW 2574

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APPENDIX 1

RECORD OF ABORIGINAL PARTICIPATION

Record of Aboriginal Representative Participation*

Name(s) of Aboriginal Representative: GLENDA CHALKER

Name of Aboriginal Organisation: **Cubbitch Barta Native Title Claimants
Aboriginal Corporation**

Archaeologist: Name & Address Lindsay Smith
Navin Officer Heritage Consultants Pty Ltd
4/71 Leichhardt Street, Kingston, ACT 2604

Project Name: **Appin Gas Turbine Power Station Access Road:
Appin Road to Leafs Gully, NSW.**

Client: Name & Address: **URS Australia Pty Ltd**
(please send your **Level 3, 116 Miller Street,**
invoice to this address **NORTH SYDNEY NSW 2060**

- Type of participation: ☐ Guided inspection of study area and sites
 ☒ Accompanied/participated in archaeological survey/salvage
 ☐ Separate inspection or survey
 ☐ Accompanied/participated in excavation program

Period of participation:

Date	Start	Finish
Monday, 7 August 2006	11.00 am	1.00 pm

Issues raised:
..... nil
.....
.....
.....

Signed (archaeologist): [Signature]

Signed (Aboriginal representative(s)): [Signature]

*** Please note this form is not an invoice. For payment, please send an invoice from your organisation to the client name and address provided above.**

Record of Aboriginal Representative Participation*

Name(s) of Aboriginal Representative: KIM COPELAND

Name of Aboriginal Organisation: **Tharawal Local Aboriginal Land Council**

Archaeologist: Name & Address
Lindsay Smith
Navin Officer Heritage Consultants Pty Ltd
4/71 Leichhardt Street, Kingston, ACT 2604

Project Name: **Appin Gas Turbine Power Station Access Road:
Appin Road to Leafs Gully, NSW.**

Client: Name & Address:
(please send your
invoice to this address)
**URS Australia Pty Ltd
Level 3, 116 Miller Street,
NORTH SYDNEY NSW 2060**

Type of participation: ☐ Guided inspection of study area and sites
☒ Accompanied/participated in archaeological survey/salvage
☐ Separate inspection or survey
☐ Accompanied/participated in excavation program

Period of participation:

Date	Start	Finish
Monday, 7 August 2006	11.00 am	1.00 pm

Issues raised: nil.

Signed (archaeologist): [Signature]

Signed (Aboriginal representative(s)): [Signature]

*** Please note this form is not an invoice. For payment, please send an invoice from your organisation to the client name and address provided above.**

APPENDIX 2

MANAGEMENT FRAMEWORK FOR THE DISCOVERY OF NEW SITES

The following should be implemented should discovery of new sites occur.

Aboriginal Objects

In the event that an Aboriginal object is uncovered during the construction of the project the following is to be undertaken:

1. All works are to be ceased in the vicinity of the object.
2. A qualified archaeologist should be called in to assess the significance of the object.
3. If artefacts are discovered their location is recorded using a hand held GPS and mapped, the artefacts are to be collected, bagged and given a sequential location number.

If midden material is discovered its location is recorded using a hand held GPS and mapped, a sample of the material is collected, bagged and given a sequential location number.

4. The collected material is then to be examined in detail by a suitably qualified lithic specialist and the midden material examined and recorded. A report is to be written detailing the findings of this examination.
5. Following completion of the analysis of the assemblage, all the lithic items will be lodged with the Australian Museum, or will be subject to a Care and Control Permit issued by the Department of Environment and Conservation.

The potential for human skeletal remains to be uncovered when excavating in sand deposits in relative proximity to water sources and known areas of Aboriginal occupation cannot be discounted. These actions should be followed if human skeletal material is detected during development activities:

1. If the remains are detected during construction, then no further excavation that involves the removal of *in situ* bones is to occur until the local Aboriginal community and DEC representatives have been contacted and consensus is reached regarding the continuation of the excavation.
2. If there is substantial doubt regarding a human origin for the bones, then evaluate if it is possible to gain a qualified opinion from an archaeologist within a short period of time. If feasible within a short period of time, seek an informed opinion (this can circumvent proceeding further along the protocol for non-human remains). If a quick opinion cannot be gained, or the identification is positive, then proceed to the next step.
3. Notify immediately the following people of the discovery:
 - The local Police (required by law);
 - A DEC archaeologist or Aboriginal Heritage Officer;
 - A representative from the *Tharawal Local Aboriginal Land Council* and *Cubbitch Barta Native Title Claimants*; and
 - The project archaeologist (if not already present).
4. Facilitate, in co-operation with the appropriate authorities and Aboriginal representatives, the definitive identification of the skeletal material by a qualified person (if not already completed). This must be done with as little further disturbance to any remaining *in situ* material as possible.

If the skeletal material is identified as human, but not Aboriginal, then all further decisions and responsibilities regarding the remains rest with the NSW Police.

If the skeletal material is identified as Aboriginal then:

- 4.1 Ascertain the requirements of the local Aboriginal organisations, the DEC and the project archaeologist.
- 4.2 Based on the above, determine and conduct an appropriate course of action. Possible strategies could include:
 - Avoiding further disturbance to the find and conserving the burial *in situ*, (this option may require relocating the mining activity and this may not be possible in some contexts);
 - Conduct (or continue) archaeological salvage of the finds;
 - Scientific description of the remains prior to reburial;
 - Recovery of samples for dating and other analyses; and
 - Subsequent reburial at another place and in an appropriate manner determined by local Aboriginal organisations.
5. Following the removal of the skeletal and associated burial material to the satisfaction of the project archaeologist and local Aboriginal organisation representatives, recommence previous activities.

Non-Aboriginal Relics

In the event that a substantial intact non-Aboriginal archaeological relic is unexpectedly discovered then the following is to be undertaken:

1. All work must cease in the affected area.
2. A qualified archaeologist should be called in to assess the significance of the relic.
3. The location of any relic should be recorded in accordance with best practices guidelines (as identified by the NSW Heritage Office).
4. Based on (2) and (3) above, a report is to be written by a heritage specialist detailing the outcomes of the assessment of the new discovery, including recommendations as to re-commencement of work in the affected area.

In the event that if human skeletal material is unexpectedly detected then the following is to be undertaken:

1. All work must cease in the affected area.
2. No further excavation that involves the removal of *in situ* bones is to occur.
3. If there is substantial doubt regarding a human origin for the bones, then evaluate if it is possible to gain a qualified opinion from an archaeologist within a short period of time. If feasible within a short period of time, seek an informed opinion (this can circumvent proceeding further along the protocol for non-human remains). If a quick opinion cannot be gained, or the identification is positive, then proceed to the next step.
4. Immediately notify the following people of the discovery:
 - The local Police (required by law);
 - The NSW Heritage Office; and
 - The project archaeologist (if not already present).

5. Facilitate, in co-operation with the appropriate authorities, the definitive identification of the skeletal material by a qualified person (if not already completed). This must be done with as little further disturbance to any remaining *in situ* material as possible.

If the skeletal material is identified as human then all further decisions and responsibilities regarding the remains rest with the NSW Police.

6. Following the removal of the skeletal and associated burial material to the satisfaction of the local Police, the NSW Heritage Office and the project archaeologist, recommence previous work activities.

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