Sydney Catchment Authority (SCA) Upper Canal bridge maintenance works

Review of environmental factors

November 2003

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Cover page photo: Chainage 29934, near Mt Annan Tunnel.

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1 Introduction and Methodology

1.1 Name of Proposed Activity

Sydney Catchment Authority (SCA) Upper Canal bridge maintenance works (47 bridges).

1.2 Local Government Area

Fairfield, Liverpool, Campbelltown, Camden and Wollondilly.

1.3 Introduction

The SCA proposes to carry out maintenance works on SCA Upper Canal (the Canal) bridges (47 bridges). The Canal gravity feeds water from the Upper Nepean System dams to Prospect Reservoir via a series of tunnels, open canals, aqueducts and piped sections.

This Review of Environmental Factors (REF) has been prepared by Environmental Technology Branch (RTA Operations Directorate) on behalf of RTA Bridge Services.

The SCA is a statutory authority under New South Wales law, and as such is a public authority under Section 4 of the *Environmental Planning and Assessment (EP&A) Act 1979.* For the purposes of these works, the SCA is the proponent and the determining authority under Part 5 of the *Environmental Planning and Assessment* (EP&A) Act 1979.

The purpose of the REF is to describe the Proposal, to document the likely impacts of the Proposal on the environment, and to detail protective measures to be implemented.

The description of the proposed works and the associated environmental impacts have been undertaken in the context of Clause 228 of the *Environment Planning and Assessment Regulation 2000*, the *Threatened Species Conservation* (TSC) *Act 1995*, the *Fisheries Management* (FM) *Act 1994*, and the (Commonwealth) *Environment Protection and Biodiversity Conservation* (EPBC) *Act 1999.* In doing so, the REF helps fulfil the requirements of Section 111 of the EP&A Act, that the SCA examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

This REF has been prepared in accordance with the SCA's "Format For Reviews Of Environmental Factors, Small Projects" and the RTA's *Environmental Impact Assessment Policy, Guidelines and Procedures, Version 4* (RTA, April 2001).

The findings of the REF would be considered when assessing:

- whether the Proposal is likely to have a significant impact on the environment and therefore the necessity for an Environmental Impact Statement (EIS) under Section 112 of the EP&A Act;
- the significance of any impact on threatened species as defined by the TSC Act, in Section 5A of the EP&A Act and therefore the requirement for a Species Impact Statement (SIS); and
- the potential for the Proposal to significantly impact a matter of national environmental significance or Commonwealth land and the need to make a referral to the Commonwealth Environment Minister in accordance with the EPBC Act.

1.4 Background

The Upper Nepean Scheme was Sydney's fourth source of water supply. Completed in 1888, the scheme diverted water from a series of weirs on the Cataract, Cordeaux, Avon and Nepean rivers to Prospect Reservoir via 64km of tunnels, canals and aqueducts collectively

known as the Upper Canal. The Canal was constructed out of a variety of materials including sandstone blocks, excavated rock and concrete walls.

There is a service road for the Canal along the majority of its length. The surface of the majority of the service road consists of concrete "wheel tracks". Gravel/soil is used at some locations, and bridges have been constructed across creeks.

The SCA manages the supply of safe drinking water from the Upper Nepean Catchment to the Prospect Reservoir via the Canal, and has management responsibilities to ensure that the Canal is well maintained and operating as designed.

The SCA undertook an inspection and assessment of the bridges ancillary to the Canal in 1999. The 47 bridges along the Canal were identified as requiring maintenance works. The NSW RTA has been commissioned by the SCA to carry out the maintenance works on the 47 bridges.

This REF addresses the SCA objective of preventing the degradation of the environment by assessing the impact from the maintenance activities and implementing safeguards to prevent the degradation.

1.5 Methodology

The method in which this document has been prepared is as follows:

1. A discussion was held with the Project Manager to consider the Proposal.
2. RTA Environmental Technology representatives undertook site visits on 5, 8 and 12 August 2003 to provide an overview of the Proposal and discuss any issues relevant to the completion of the REF.
3. Consultation was undertaken with the following agencies:
   - Local Councils (Liverpool, Campbelltown and Wollondilly);
   - Department of Environment and Conservation (DEC).
4. A search was conducted on the following databases to identify any potential issues:
   - Australian Heritage Commission Register of the National Estate;
   - NSW Heritage Office State Heritage Register and State Heritage Inventory;
   - SCA Heritage and Conservation Register (s.170);
   - Local Council Heritage Lists (LEP);
   - NPWS Aboriginal Heritage Information Management System (AHIMS);
   - NPWS Wildlife Atlas threatened flora records;
   - NPWS Wildlife Atlas threatened fauna records; and
   - Environment Australia (EPBC Act) Databases.
5. As part of the environmental assessment undertaken for this REF, a Statement of Heritage Impact was prepared to determine the potential heritage impact of the proposed modifications to the bridges, and to develop environmental impact mitigation measures. Details and findings from the study are further discussed in this REF and a copy of the study is included in **Appendix A** to this REF.
6. A literature review and review of documentation was undertaken to determine issues relating to:
   - Landform, geology and soils and Potential Acid Sulphate Soils;
   - Local Environmental Plan (zoning and heritage);
   - Regional Environmental Plans; and
   - State Environmental Planning Policies.

1.6 Description of Site and Surroundings

1.6.1 General

The study area is located within the SCA Upper Canal corridor. The southern limit of the study area is at Pheasants Nest, and the northern limit is at the Horsley Drive, Horsley Park (see **Appendix B**). Pheasants Nest is located approximately 27km north west of Wollongong. Horsley Drive, Horsley Park, is located approximately 2km south of Prospect Reservoir. The length of the study area is approximately 57km. Refer to **Appendix B** to view the study area and photographs of each bridge site.

Adjacent land uses include the following:

- Agricultural activities (ie. cropping, poultry, cattle)
- Botanical gardens
- Regional Park
- Rural and urban housing
- BHP mining
- Public local and RTA roads
- Electricity transmission
- Gas pipeline
- Telstra utilities
- Sewage lagoons
- Sport shooting range
- Golf course
- Place of Worship
- School
- SCA offices
- Horse rising school

The following National Park areas are located within close proximity to the study area:

- Western Sydney Regional Park is located adjacent to the Canal, 10km north west of Liverpool.
- Dharawal State Conservation Area is located approximately 1km east of the Canal, and 2km east of Appin.
- Georges River National Park is located approximately 10km east of the Canal, and to the immediate north of Illawong.
- Leacock Regional Park is located approximately 2.5km east of the Canal, and 5km south of Liverpool.

1.6.2 Topography

The study area is situated within the Georges and Nepean River catchment areas. Slopes within the study area range from low to moderate, and gullies are present at creek crossing sites.

1.6.3 Soils and Geology

The soils of the study area fall within the Blacktown, Theresa Park, Hawkesbury and Luddenham Soil Landscapes. No potential acid sulphate soils are present within the study area.

The Blacktown Soil Landscape is described as shallow to moderately deep Red Podzolic Soils and Brown Podzolic Soils with its limitation being moderately reactive, highly plastic subsoils and low soil fertility. Blacktown soil materials are moderately erodibile.

The Hawkesbury Soil Landscape is described as shallow discontinuous Lithosols/Siliceous Sands, Earthy Sands, Yellow Earths and locally deep sands, localised Yellow and Red Podzolic Soils, and Siliceous Sands. Hawkesbury soil materials have an extreme soil erosion hazard.

The Luddenham Soil Landscape is described as shallow Brown Podzolic Soils and Massive Earthy Clays, moderately deep Red Podzolic Soils and Brown Podzolic Soils, and moderately deep Yellow Podzolic Soils and Prairie Soils. Luddenham soil materials are highly erodibile.

The Theresa Park Soil Landscape is described as Red Earths, Red Podzolic Soils, Prairie Soils, Alluvial Soils and Solodic Soils. Theresa Park soil materials are highly erodibile for concentrated flows.

The geology within the study area includes:

- Wianamatta Group Shales for Blacktown and Luddenham Soil Landscapes.
- Hawkesbury Sandstone for the Hawkesbury Soil Landscape.
- Quaternary and tertiary alluvium for the Theresa Park Soil Landscape.

Hazelton, P.A. and Tille, P.J. (1990) and Bannerman, S.M. and Hazelton, P.A. (1990). Refer to **Appendix C** for locations of soil types.

1.6.4 Drainage and Flooding

The Georges and Nepean Rivers are present nearby the study area. Runoff from the study area flows into both the Georges and Nepean Rivers. At some of the bridge sites, creeks are present below and nearby the Canal. The Liverpool Offtake Reservoir is located adjacent to the Canal at chainage (ch.) 55290, and Ingleburn Dam is located adjacent to the Canal at ch. 41176. Camden Council sewage lagoons are present at ch. 37394. Several other private water storages are located nearby the Canal.

The Canal has been designed to prevent the entry of surface water flow into the Canal water. This has been achieved by constructing earth mound walls, lateral drainage and cross-drainage. During high rainfall events, some surface water flow can be expected to enter the Canal.

During low rainfall periods and low flow in the Canal, water quality in the Canal is generally good. During high rainfall events, turbid water enters the Canal from the Nepean River. High flow rates in the Canal also cause scouring of material from the bottom and sides of the Canal, causing turbidity to increase. Canal water quality may also be affected by agricultural runoff (ie. sediments and animal waste) and urban runoff at some locations.

Flow within the Canal is regulated so that it does not exceed the capacity of the Canal. Flow in the creeks is ephemeral. When the creeks are in flow, the water quality can be expected to be good due to a low sediment load from the well vegetated bushland remnants. Overbank flow would not be expected at the creek sites which are sited in steep valleys.

1.6.5 Biodiversity

Construction of the Canal and adjacent land uses (ie. agricultural activities) have caused past disturbances to the study area. Limited native flora and fauna habitat is present along the Canal. The native eucalypt creek crossing sites provide habitat for birds, reptiles, amphibians and bats, particularly following periods of rainfall.

Flora

"Cumberland Plain Woodland" and "Shale/Sandstone Transition Forest" communities are present within 10km of the study area. These communities are listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC

Act) and the NSW *Threatened Species Conservation Act 1995* (TSC Act). Nineteen species listed under the Schedules of the TSC Act are known within 5km of the study area. Eighteen species listed under the Schedules of the EPBC Act have the potential to occur within 10km of the study area.

Fauna
Several species listed under the Schedules of the TSC Act and/or EPBC Act are known, or have the potential to be recorded, within 10km of the study area.

1.6.6 Noise

Sensitive noise sites are located adjacent to the study area as outlined in Table 1.1 below. The nearest sensitive noise sites are located approximately 40m from work areas.

Table 1.1 Location of sensitive noise sites

Chainage	Sensitive noise site and location
10847	rural residence 60m from bridge
25337	rural residence 100m from bridge
26256	rural residence 300m from bridge
26651	rural residences 50m, 100m and 150m from bridge respectively.
30784	rural residence 150m from bridge
31366	existing rural residence 200m from bridge. residences under construction 40m from bridge (August 2003)
32012	school 100m from bridge rural residence 200m from bridge
38636	place of worship 120m from bridge
44417	rural residence 500m from bridge
45876	rural residence 70m from bridge
47262	rural residence 40m from bridge
48883	rural residence 40m from bridge
49052	rural residence 70m from bridge
50130	rural residence 40m from bridge
51635	rural residence 40m from bridge
52376	rural residence 500m from bridge

Existing noise is generated by the following sources as outlined in Table 1.2 below.

Table 1.2 Noise sources and location

Chainage	Noise sources and location
Several locations	Farm machinery, SCA grass cutting.
10586	Local road over bridge
26256	Local road over bridge
26651	Hume Highway 150m from bridge
27614	Hume Highway 500m from bridge
31366	Residences under construction 40m from bridge (August 2003)
32012	School 100m from bridge
47262	Local road over bridge
49052	Local road over bridge
50130	Local road over bridge
51635	Local road over bridge
54615	Shooting range 1km from bridge

1.6.7 Visual Amenity

The study area is generally picturesque and is typical of grazing land on the rural fringe of Sydney's southwest. There are cleared paddocks with stands of remnant trees scattered throughout the surrounding area. Many of the creek gullies contain natural vegetation, which provides scenic views across the gullies. Steep creek valleys are present at the Appin end, and rolling hills and grassland are present towards Prospect Reservoir.

1.6.8 Climate

The climate of the study area is warm in summer and cool in winter. The average maximum temperature is approximately 17°C in winter and 28°C in summer. The average minimum temperature is approximately 3°C in winter and 17°C in summer, with subzero temperatures occurring occasionally at night in late autumn to early spring. Rainfall is relatively consistent throughout the year, with an average of 830mm received annually (Bureau of Meteorology, www.bom.gov.au).

1.7 Proposal Description

Currently 47 bridges along the Canal have been identified as requiring minor repair/maintenance works in order to ensure they are well maintained and operating as designed.

The 47 bridges consist of a variety of construction types, but generally consist of timber deck bridges, concrete bridges, brick arch bridges and sandstone bridges. The 47 bridges that require repair/maintenance works are listed in Table 1.3 below:

Table 1.3: Upper Canal bridge construction type and location

Chainage	Construction type	Adjacent landmark location	Latitude / longitude
61412	concrete/steel	The Horsley Drive	3351.07, 15052.11
55290	timber/steel	Liverpool Offtake Reservoir	3353.22, 15049.49
54615	timber/steel	Judges Hill Tunnel/Liverpool Offtake Reservoir	3353.56, 15049.51
54260	corrugated	Judges Hill Tunnel/Liverpool Offtake Reservoir	3353.74, 15049.47
53137	corrugated	Judges Hill Tunnel	3354.20, 15049.40
52376	concrete/steel	18th Ave	3354.49, 15049.69
51635	concrete/steel	18th/McIver Ave	3354.78, 15049.80
50130	concrete/steel	At 28th/27th Ave	3355.25, 15049.76
49052	concrete/steel	At 22nd Ave	3355.94, 15049.31
48883	corrugated	33rd Ave	3356.04, 15049.33
47262	concrete/steel	At Sixth Ave	3356.75, 15049.16
45876	corrugated	Camden Valley Way/Access Road	3357.37, 15049.41
44417	concrete/steel	Denham Court Road/Camden Valley Way	3358.09, 15049.40
43112	concrete/steel	Bonds Creek	3358.70, 15049.08
42309	concrete/steel	Bonds Creek	3358.96, 15048.71
41655	concrete/steel	St Andrews Road	3359.28, 15048.57
41176	concrete/steel	Ingleburn Dam	3359.51, 15048.47
38636	brick arch	Molles Main Tunnel	3400.34, 15047.49
37394	brick arch	Molles Main Tunnel	3400.58, 15047.03
32012	concrete/steel	Kenny Hill depot / Christian Life Centre	3402.90, 15046.75

Chainage	Construction type	Adjacent landmark location	Latitude / longitude
31366	timber deck/steel	Kenny Hill depot	3403.17, 15046.55
30784	concrete/steel	At Kenny Hill depot	3403.46, 15046.69
29934	steel	Mt Annan Tunnel	3403.77, 15046.39
27614	concrete	Mt Annan Bot Gardens	3404.89, 15046.08
26651	concrete/steel	Menangle Road	3405.20, 15046.30
26256	masonry arch	Menangle Road	3405.36, 15046.36
25337	concrete/steel	Sugarloaf Sed Basin	3405.71, 15046.36
23387	concrete arch/brick parapet	Menangle Creek	3406.61, 15046.87
21874	concrete/steel	AGL pipeline	3407.23, 15046.54
21260	concrete/steel	Woodhouse Creek	3407.48, 15046.38
20477	timber deck masonry piers	At Woodhouse Creek	3407.83, 15046.25
20160	concrete/steel	Nepean/Woodhouse Creek	3407.93, 15046.07
18834	timber deck concrete piers	At Nepean Creek	3408.57, 15045.98
18420	concrete/steel	Leafs Creek	3408.67, 15045.74
17582	timber deck steel trestle	At Leafs Creek	3408.99, 15045.47
15272	concrete/steel	Ousedale Creek	3410.14, 15045.60
15079	timber and railing	Macquariedale Road	3410.20, 15045.50
14769	concrete/steel	Macquariedale Road	3410.31, 15045.35
14355	concrete/steel	Macquariedale Road	3410.52, 15045.28
13786	concrete/steel	Elladale Creek	3410.78, 15045.17
13049	concrete/steel	Elladale Creek	3411.11, 15045.20
12547	timber deck steel trestle	At Elladale Creek	3411.31, 15045.29
12166	concrete/steel	Simpsons Creek	3411.38, 15045.01
11577	concrete/steel	Simpsons Creek	3411.64, 15045.12
11288	timber deck steel trestle	At Simpsons Creek	3411.78, 15045.10
10847	concrete/steel	Cataract tunnel	3411.74, 15044.84
10586	concrete/steel	Cataract tunnel	3411.87, 15044.78

Maintenance/repair work for the timber deck bridges would include the following:

- Install an additional pipe rail system to existing timber rails for the full length of the bridge and approaches on both sides. This involves fixing galvanized pipe hand rails using brackets to existing timber posts between existing timber railings.
- Replace damaged/deteriorated bridge deck timber. This involves replacing damaged timber with same size hardwood timber.
- Replace deteriorated timber posts and rails. This involves replacing damaged timber with same size hardwood timber.
- Remove rusty bolts and replace with galvanized nuts, bolts and washers. Bolts would be replaced using handheld tools.
- Evenly space deck timber and fix them to kerbs with angle brackets. This would be done manually using handheld tools.
- Repair/replace abutment sheeting. The abutment sheeting stabilises the bank and retains the fill used on the road approaches. This activity would require some excavation of material to allow replacement of the sheeting (boards).
- Clean abutments and remove rust from hold down bolts and paint them. Cleaning would be done manually (with brushes etc.) and paints would be applied by brush.

- Repair spalled concrete on abutments/wing walls using cement mortar. This activity would require the concrete to be scabbled back to dispose of the loose, cracked, drummy (delaminated) material, and as much as possible collected. Small amounts only of epoxy would be mixed at site to minimise the risk of spillage or drips.
- Install galvanized steel deck joint plates to each end of the bridge and seal under the plate at abutment wall to stop ingress of water/dirt/silt into hold down plates/bolts. This would be done using hiab crane, electric drills and handheld tools.
- Tighten all bolts - deck, kerb, posts and rail using handheld power tools.
- Install new speed limit signs. Signs would be installed on galvanised pipe posts which are embedded in to the ground.
- Install additional hold down bolts/clips at the base of steel trestles. This would be done using handheld power tools.
- Paint timber hand rails by hand. This would include paint removal (non-lead) by hand scraping.
- Install RTA standard Guard Rails on approaches. This would involve drilling holes on the ground using a suitable drilling machine and installing guard rails using handheld tools and a crane for lifting.

Maintenance/repair work for the concrete bridges would include the following:

- Remove bird nests with scraper and wire brush. Cleaning would be done manually and remove waste from site.
- Wire brush bottom flange of girders and paint. This would include paint removal (non-lead) by hand scraping and paint application by hand. This would only cover small sections of the bridge, usually where paint is debonding from the structure due to weathering.
- Clean out loose concrete from girder bearing and repair with cement mortar. This activity would require the concrete to be scabbled back to dispose of the loose, cracked, drummy (delaminated) material, and as much as possible collected. Small amounts only of epoxy would be mixed at site to minimise the risk of spillage or drips.
- Cut V joint on concrete cracks in kerbs and outer face of bridge, and repair with Megapoxy H mixed with sand. Small amounts only of epoxy would be mixed at site to minimise the risk of spillage or drips.
- Repair spalled concrete in deck and kerbs with EMACO cement mortar. This activity would require the concrete to be scabbled back to dispose of the loose, cracked, drummy (delaminated) material, and as much as possible collected. Small amounts only of epoxy would be mixed at site to minimise the risk of spillage or drips.
- Clean bridge deck of loose gravel and dirt by compressed air and/or water blast and seal the deck with bituminous paint. This would be done by hand where possible - high pressure hoses may be used to assist in the washing.
- Remove existing bridge railing and replace with new railing system made with galvanised angles and colourbond sheeting. Existing railings would be cut at concrete kerb level and new rails equivalent to existing railing system would be installed to kerb using chemical anchors.

Maintenance/repair work for the brick arch bridges would include the following:

- Weeds that are growing on the arches would be removed by hand and water blasted where necessary.
- Loose mortar would be displaced, then repointed with an approved lime mortar that conforms with the original bridge construction.
- Bridge railings would be replaced in a like for like manner.

Maintenance/repair work for the sandstone bridge would include the following:

- Weeds that are growing on the arch would be removed by hand and water blasted where necessary.
- Loose mortar would be displaced, then repointed with an approved lime mortar that conforms with the original bridge construction.
- Mould and lichen would be removed from the sandstone by hand and water blasted where necessary.
- Repairs would be undertaken to the sandstone where vehicular impacts have removed some of the high visibility white paint.
- A concrete kerb would be constructed in front of the curved sandstone ends, and a guardrail would be constructed on top of the kerb to provide protection to the sandstone fabric. To make allowance for the reduction in width of the carriageway, the bridge would be reduced to a single lane operation.

1.8 Work Methodology

1.8.1 Plant and Equipment to be used

The Proposal would require the use of:

- Utility Trucks
- Hiab Trucks
- Electrical Drills
- Pneumatic Drills
- Chain Saws
- Various Hand tools used by carpenters
- Welding equipment
- Oxy Aceletene equipment
- Air Compressors
- Generators
- Drilling rigs (for installing guard rails)
- Grinders

1.8.2 Construction Process

For each bridge site, the works would be undertaken in three stages including the following:

- Site setup (work platform, drop sheets etc)
- Construction works
- Site restoration

1.8.3 Stockpile and Compound Sites

Three compound sites would be utilised within the study area at ch. 10600 (south end of works), ch. 32000 (Kenny Hill SCA Depot) and at ch. 40800 (south of Ingleburn Dam). The compound sites would consist of limited facilities, including a portaloo, lunch shed and storage shed. Machinery and materials would also be stored at the site. Workers would start and finish at RTA depots.

1.8.4 Source of Material

Tap water would be brought to site in cans or drums. Average daily use is expected to be 6 litres, and total use for the project would be 3000 litres over 2 years. The Proposal would require approximately 20 tonnes of hardwood timber to be utilised to undertake the emergency works.

No fill materials are expected to be required for the maintenance works.

1.8.5 Additional Truck Movements

On average there would be about 5 truck movements per day and 2400 in total for the entire project.

1.8.6 Workforce and Working Hours

The workforce would comprise approximately 6 personnel. Construction activities would be undertaken during standard working hours:

- Monday-Friday: 7.00am to 5.00pm
- Saturday: 7.00am to 1.00pm
- Sunday and Public Holidays: No work

Should work be required outside of the standard working hours, prior approval would be obtained from the SCA.

1.8.7 Associated Infrastructure and Activities

Three compound sites would be utilised within the study area at ch. 10600 (south end of works), ch. 32000 (Kenny Hill SCA Depot) and at ch. 40800 (south of Ingleburn Dam).

No utilities (ie. BHP, local/RTA roads, electricity transmission, gas, Telstra) would be affected by the Proposal.

1.9 Commencement of Works

It is anticipated that work would commence in November 2003.

1.10 Period of Construction

It is anticipated that works would be completed by June 2005, given ideal working conditions.

1.11 Proposal Cost and Source of Funding

The Proposal would cost approximately $1.2 million, and funding allocation would be sourced from the SCA.

2 Statutory Position

2.1 Local Environmental Plan

The Proposed works within the Campbelltown, Camden, Liverpool and Wollondilly Local Government Areas (LGAs) are controlled by the following environmental planning instruments:

- Campbelltown City Council, Interim Development Order (IDO) No. 15, 27 September 1974.
- Camden Council Local Environmental Plan (LEP) No. 48 1992.
- Liverpool City Council LEP 1997.
- Wollondilly Shire Council LEP 1991.

The applicable planning intruments and relevant zonings are outlined in Table 2.1 below.

Table 2.1: Local Environmental Planning

Relevant LEP	Zoning	EP&A Act Model Provisions 1980 adopted?	Upper Canal listed on heritage registers?	Council consent required under land zone [1]
Campbelltown City Council - Interim Development Order No. 15, 1974.	5(a) Water Supply	Yes	No	Yes
Camden LEP No. 48, 1992.	Zone 5(a) (Special Uses "A" Zone)	Yes	No	Yes
Liverpool LEP 1997	Zone 5(a) Special Uses	No [2]	Yes	Yes
Wollondilly LEP 1991	Zone No 1 (a1) (Rural "A1" Zone)	Yes	Yes	Yes

NA - Not applicable

1 - The proposed works are not prohibited under any of the above planning instruments.

2 – The Liverpool City Council LEP 1997 adopts the EP&A Act 1979 Savings Provisions Clause 11(1) (Schedule 5).

Environmental Planning and Assessment Model Provisions 1980

Campbelltown City Council IDO 15, Camden LEP and Wollondilly LEP adopt the EP&A Act Model Provisions 1980. Liverpool City Council Council does not adopt the EP&A Act Model Provisions 1980, but does adopt the EP&A Act 1979 Savings Provisions Clause 11(1) (Schedule 5). The EP&A Act Model Provisions 1980 and EP&A Act 1979 Savings Provisions classify the Sydney Catchment Authority as a public authority, and state that the following public utility undertakings are permissible without development consent:

- works at or below ground;
- the installation or erection of any structures by way of addition to or replacement or extension of existing plant or structure; and
- building alterations that do not materially affect the external appearance of a building.

The proposed maintenance works are by a public utility undertaking, and can therefore be classed as the installation or erection of any structures by way of addition to or replacement or extension of an existing plant or structure.

The proposed maintenance works within the Campbelltown, Camden, Wollondilly and LGAs are therefore exempt from development consent under the EP&A Act Model Provisions 1980, and the proposed maintenance works within the Liverpool LGA are exempt from development consent under the EP&A Act 1979 Savings Provisions.

2.2 Regional Environmental Plans

Sydney Regional Environmental Plan No. 2 - Georges River Catchment
Aims to protect the water quality of the Georges River and its tributaries and the environmental quality of the whole catchment. The objectives of the plan are to be achieved through coordinated land use planning and development control. The plan establishes the framework within which local, State and Federal agencies will consult each other so that there is a consistent approach to planning and development within the catchment.

With the implementation of safeguards as outlined in Section 6 of this REF, the objectives of the Proposal are consistent with the aims and objectives of the Georges River Catchment REP.

Sydney Regional Environmental Plan No. 20 - Hawkesbury–Nepean River (No. 2 - 1997)
Integrates planning with catchment management to protect the river system. The impact of future land use is to be considered in a regional context. The plan covers water quality and quantity, environmentally sensitive areas, riverine scenic quality, agriculture, and urban and rural residential development. It controls development that has the potential to impact on the river environment. The plan applies to all parts of the catchment in the Sydney Region (15 local government areas), except for land covered by Sydney REP No. 11 - Penrith Lakes Scheme. The REP is supported by an Action Plan, which includes actions necessary to improve existing conditions.

With the implementation of safeguards as outlined in Section 6 of this REF, the objectives of the Proposal are consistent with the aims and objectives of the Hawkesbury–Nepean River REP.

Sydney Regional Environmental Plan No. 31 - Regional Parklands
One site (ch. 61412) is located within a Regional Parkland. Regional Environmental Plan No. 31 applies to a 5400 hectare site in Western Sydney. The plan provides a consistent management approach while promoting recreation, conservation, biodiversity and landscape protection. The draft plan is accompanied by two development control plans. The objective of REP No. 31 s18 "Bulk water supply infrastructure" is to protect the quality of the water in bulk water supply infrastructure (ie. the Upper Canal).

The Proposal is not expected to have an adverse impact on the quality of the water in the Canal within the Regional Parkland. With the implementation of safeguards as outlined in Section 6 of this REF, the objectives of the Proposal are consistent with the aims and objectives of the Regional Parklands REP.

2.3 State Environmental Planning Policies

State Environmental Planning Policy 44 – Koala Habitat Protection
The provisions of SEPP 44 do not apply to Proposals assessed under Part 5 of the EP&A Act. SEPP 44 is applicable to Campbelltown, Liverpool and Wollondilly LGAs, as they are listed in

Schedule 1 of SEPP 44. As the proposed works would not remove any koala feed trees or Core Koala habitat within these Council areas, it is considered that the proposed works are not in conflict with the aims and objectives of the SEPP.

SEPP No. 58 - Protecting Sydney's Water Supply

This Policy applies to the whole or parts of the Campbelltown and Wollondilly LGAs, and applies to the land within the hydrological catchment identified on the SEPP 58 maps. SEPP 58 would not apply to the Proposal, as the Upper Canal Water Supply is not located within these hydrological catchments.

Impacts on water quality within the Canal would not be expected, provided safeguards specified in Section 6 of this REF are implemented.

2.4 Confirmation of Part 4 or Part 5 Position

All relevant statutory planning instruments have been examined for the Proposal. It is confirmed that this Proposal is subject to environmental impact assessment under Part 5 of the EP&A Act 1979.

2.5 Licences and Approvals

The Proposal is not expected to cause pollution of creeklines. A licence would not need to be obtained for the works pursuant to the PoEO Act.

Written application to the Director of the NSW Heritage Office for an exemption under Section 139(4) of the *Heritage Act* would be needed for impacts on the Upper Canal bridges prior to the commencement of works.

3 Strategic Stage

3.1 Strategic Planning

The SCA manages the supply of safe drinking water from the Upper Nepean Catchment to the Prospect Reservoir via the Upper Canal in accordance with its Environment Plan 2000–2005. The SCA's Environment Plan 2000–2005 aims to:

- Meet the SCA's regulatory obligations under the *Sydney Water Catchment Management Act 1998*, Operating Licence and environmental legislation.
- Document the SCA's environmental objectives, strategies and targets for 2000–2005.
- Implement the SCA's Environment Policy.
- Communicate the SCA's environmental direction to its regulators, stakeholders, consumers and the wider community.

The SCA also has management responsibilities to ensure the Canal is well maintained and operating as designed.

3.2 Need for the Proposal

The maintenance works on the Canal are required to protect the integrity of the Canal, its heritage significance, and to maintain the Canal's functionality. The maintenance works need to be undertaken to ensure that the bridges remain in satisfactory condition for use and travel. The maintenance activities would benefit the community by ensuring that the bridge is not out of service, is structurally sound and provides safer use and travel. Regular maintenance would also increase the life-span of the bridges and reduce the need to replace them. These activities would also reduce future maintenance and operational costs.

4 Concept Stage

4.1 Proposal Objectives

The objective of the Proposal is to maintain the integrity of the Upper Canal, its heritage significance, and it's functionality, by undertaking the maintenance works.

4.2 Options Considered

Do Nothing Option

This option was not considered suitable, as it does not address the SCA's responsibilities to maintain the Canal in accordance with the Proposal's objectives.

Replace bridges

This option meets the Proposal objectives, but does so at an unnaceptably high financial cost. This option was not considered suitable, as the preferred option meets the Proposal objectives at a much lower cost.

Preferred option – maintenance works

The preferred option (the Proposal) at a cost of $1.2 million, has been selected because it best meets the Proposal objectives. The Proposal would maintain the integrity of the Canal, its heritage significance, and it's functionality.

5 Assessment Stage

5.1 Background and Database Searches

The following results were obtained regarding the Proposal from database searches. (Refer to **Appendix C** for copies).

5.1.1 Australian Heritage Commission Register of the National Estate

A search of the Australian Heritage Commission online database was conducted on 13 October 2003 for records of listed items. The Upper Canal is not listed on the Register of the National Estate Database. There are however, several listings on the Register within the affected LGAs (6 items in Fairfield LGA, 52 items in Campbelltown LGA, 35 items in Camden LGA, 29 items in Liverpool LGA, and 51 items in Wollondilly LGA). Some of the sites are located nearby but beyond the study area. None of these sites would be affected by the Proposal.

5.1.2 NSW Heritage Office State Heritage Register

A search of the NSW Heritage Office State Heritage Register online database was conducted on 13 October 2003 for records of listed items. The Upper Canal is listed on the State Heritage Register. There are also several other listings on the Register within the affected LGAs (7 items in Fairfield LGA, 21 items in Campbelltown LGA, 6 items in Camden LGA, 8 items in Liverpool LGA, and 21 items in Wollondilly LGA). Some of the sites (other than the Upper Canal) are located nearby but beyond the study area. No listed sites other than the Upper Canal would be affected by the Proposal.

The majority of proposed works are of a minor nature only, and would fall within the parameters of "Standard Exemptions" under the *Heritage Act* (Refer to Section 5.3.8).

5.1.3 SCA Heritage and Conservation Register (s170)

A search of the SCA Heritage and Conservation Register was conducted for records of listed items. The Upper Canal is listed on the s170 Register.

The majority of proposed works are of a minor nature only, and would fall within the parameters of "Standard Exemptions" under the *Heritage Act* (Refer to Section 5.3.8).

5.1.4 LEP Heritage Listings

A search of the NSW Heritage Office State Heritage Inventory Online Database was conducted on 13 October 2003 for records of listed items. The Upper Canal is listed on the Liverpool and Wollondilly Heritage Registers. There are also several other listings on Heritage Registers within the affected LGAs (98 items in Fairfield LGA, 90 items in Campbelltown LGA, 72 items in Camden LGA, 94 items in Liverpool LGA, and 164 items in Wollondilly LGA). Some of the sites (other than the Upper Canal) are located nearby but beyond the study area. No sites other than the Upper Canal would be affected by the Proposal.

The majority of proposed works are of a minor nature only, and the existing form and fabric of the structures would be retained (Refer to Section 5.3.8).

5.1.5 NPWS Aboriginal Heritage Information Management System (AHIMS)

A search of the NPWS Aboriginal Heritage Information Management System (AHIMS) for the study area was carried out on 13 November 2003 and revealed that 138 Aboriginal objects or Aboriginal places are located within 5km of the proposed works. The nearest Aboriginal site to the proposed works (52-2-1924) is located outside the study area,

approximately 50m east of ch. 12547. No Aboriginal objects or Aboriginal places are recorded within the study area.

5.1.6 NPWS Wildlife Atlas Flora and Fauna Records

A search of the NPWS Wildlife Atlas Database was conducted on 9 September 2003 for records of threatened flora and fauna species listed on the TSC Act and known from within 5km of the study area. Twenty three threatened fauna and nineteen threatened flora species have been recorded from the locality in the past. No threatened flora species are expected to be impacted by the Proposal. Threatened fauna species (Common Bentwing Bat, Large-footed Myotis Bat) may be impacted by the Proposal (refer to **Appendix C** and Section 5.3.5).

5.1.7 Environment Australia (EPBC Act) Database

A search of the EPBC Act Online Database was conducted on 16 September 2003 for records of listed matters of National Environmental Significance (NES matters) potentially occuring within 10km of the study area. Two threatened ecological communities and several species listed under the provisions of the EPBC Act have been recorded as potentially occuring at the locality. In addition, the study area lies within the catchment of the Towra Point Nature Reserve, a Ramsar Wetland. No other NES matters are known to occur in the locality. The two threatened ecological communities, threatened flora species and Towra Point Nature Reserve are not expected to be impacted by the Proposal. One threatened fauna species (Large-eared Pied Bat) may be impacted by the Proposal (refer to **Appendix C** and Section 5.3.5).

5.2 Consultation

Consultation with Campbelltown, Liverpool and Wollondilly Councils, and Department of Environment and Conservation (DEC) was carried out. The relevant Councils were consulted as some of the 47 bridges are located within the Council areas where local roads cross over the Canal. The DEC was consulted, as one bridge is located within Mount Annan Botanic Gardens, and another is located within Western Sydney Regional Park. No reply has been received from these authorities at the time of writing this REF.

5.3 Potential Environmental Impacts

This section of the REF identifies potential environmental impacts associated with proposed works and provides appropriate safeguards to mitigate identified potential impacts. Measures to mitigate or prevent impacts would be implemented prior to construction, during construction and post-construction.

5.3.1 General

A Contractor's Environmental Management Plan (CEMP) would be prepared prior to the commencement of works. All works would be contained within the study area. Only those issues considered of relevance to the Proposal are discussed below.

The CEMP would be developed in accordance with the specifications set out in the RTA's *Environmental Protection (Management Plan) – QA Specifications G35* (Refer to **Appendix D**), and in agreement with the SCA Guidelines for EMP preparation.

The CEMP would incorporate additional site specific requirements, outlined below, which are not covered by G35. The CEMP would be reviewed and certified by the SCA, prior to the commencement of any site works.

5.3.2 Erosion, Sedimentation, Water Quality and Hydrology

Potential Impacts

The study area is subject to the following erosion potential:

- Blacktown soil materials are moderately erodible.
- Luddenham soil materials are highly erodible.
- Theresa Park soil materials are highly erodible for concentrated flows.
- Hawkesbury soil materials have an extreme soil erosion hazard.

Refer to **Appendix C** for locations of soil types.

At the timber deck bridges, the following work activities have the potential to impact on soils and water quality in the Canal:

- excavation of soil to enable repair/replacement of abutment sheeting.
- cleaning concrete abutments.
- rust removal from bolts.
- removal of loose, cracked, drummy (delaminated) concrete.
- concrete spalling repair on abutments/wing walls using a cement mortar.
- paint removal (non-lead) by hand scraping.
- painting metal and timber surfaces using brushes.

At the concrete bridges, the following work activities have the potential to impact on water quality in the Canal:

- removal of bird nests with scraper and wire brush.
- dirt and paint removal (non-lead) by hand scraping.
- removal of loose, cracked, drummy (delaminated) concrete.
- concrete spalling repair on abutments/wing walls using a cement mortar.
- concrete repair with megapoxy mixed with sand.
- removal of loose gravel and dirt on the bridge deck using compressed air and/or water blast, then seal the deck with bituminous paint.
- paint application (small sections only) by hand.

At the sandstone and brick arch bridges, the following work activities have the potential to impact on water quality in the Canal:

- removal of weeds, mould and lichen (sandstone bridges only) by hand and water blasted where necessary.
- removal of loose mortar and repointing with lime mortar.

Works on the timber deck bridges have the potential to impact on water quality in the following creeks: Woodhouse Creek (ch. 20477), Nepean Creek (ch. 18834), Leafs Creek (ch. 17582), Elladale Creek (ch. 12547) and Simpsons Creek ch. (11288). Works at other bridges along the Canal also have the potential to impact on other ephemeral watercourses which flow into the Georges and Nepean Rivers.

There is also the potential for spills and leaks from generators and/or other machinery to impact on the water quality of watercourses and/or the Canal.

It is expected that the Proposal would only have a minor impact on erosion and sedimentation. Adverse impacts on water quality of the Canal and watercourses are not expected providing the mitigation measures below are implemented.

No waterways or the Canal would be altered by the Proposal, and no impact on flooding is expected. Water to be utilised to undertake the works would be sourced from Sydney Water Corporation (approximately 6 litres per day, project total 3,000 litres).

Mitigation Measures

The following mitigation measures would be implemented to ameliorate the identified impacts of the Proposal:

- Any spills or incidents would be notified to the SCA's 24 hour Incident Management Hotline on phone 02 9751 1988.
- An Erosion and Sedimentation Control Plan (ESCP) would be developed for the site and incorporated into the CEMP. The ESCP would incorporate specifications outlined in the *NSW Erosion and Sediment Control Handbook No.2,* and would be prepared in accordance with the *Department of Housing Guidelines – Managing Urban Stormwater Soils and Construction, 3rd edition, 1998.* The ESCP would be reviewed by the SCA prior to the commencement of works.
- If any activities are likely to cause pollution of waterways, a licence would be obtained for the works under the POEO Act.
- Only small amounts of epoxy would be mixed on-site to minimise the risk of spillage or drips.
- At bridge sites on top of the Canal, geotextile fabric (or suitable alternative material) would placed under work scaffold platforms to capture all material dislodged/generated by the works (ie. bolts, loose rust/paint, concrete, mortar, epoxy). Material would be collected daily from the fabric.
- At watercourse and land sites, all material dislodged/generated by the works would be collected daily.
- Bituminous paint would be applied in a manner that would not pollute the Canal water (ie. application by hand in dry weather, and pollution control measures applied until the bitumen paint sets).
- A portaloo and any oils/fuels would be sited more than 20m away from the Canal and waterways.

5.3.3 Air Quality

Potential Impacts

The nearest houses are approximately 40m away proposed work sites (ch. 31366, ch. 47262, ch. 48883, ch. 50130, ch. 51635). A school is located approximately 100m from one work site (ch. 32012), and a Place of Worship is located approximately 120m from a work site (ch. 38636).

At the timber deck bridges, the following work activities have the potential to impact on air quality along the Canal:

- excavation of soil to enable repair/replacement of abutment sheeting.
- cleaning concrete abutments.

At the concrete bridges, the following work activities have the potential to impact on air quality along the Canal:

- removal of loose gravel and dirt on the bridge deck using compressed air and/or water blast, then sealing of the deck with bituminous paint.

At the sandstone and brick arch bridges, the following work activities have the potential to impact on air quality in the Canal:

- removal of weeds, mould and lichen (sandstone bridges only) by hand and water blasted where necessary.

The Proposal has the potential to temporarily decrease local air quality as a result of dust/air pollutants generated during the works.

Vehicle movements at work sites, and access to/from work sites also has a minor potential to impact on air quality along the Canal. These impacts would be caused by vehicle exhaust,

and minor dust generation on the minority of unsealed roads. Operation of generators and/or other machinery also has the potential to emit air pollutants along the Canal.

Mitigation Measures
No mitigation measures additional to RTA's *QA Specification G35 Environmental Protection (Management Plan)* are required.

5.3.4 Flora and Fauna

Potential Impacts
Flora
The bridge sites along the Canal are generally located on cleared land. Vegetation at the bridge sites along the Canal consists almost exclusively of native and exotic ground cover. At some bridge locations, agricultural weeds such as fireweed are also present. There are little or no trees present within close proximity to the proposed works. At two sites (ch. 12166 and ch. 15272) native trees and shrubs are present in close proximity to the bridges. Remnant native vegetation is present adjacent to the majority of the study area.

Vegetation at the creek crossings (Woodhouse Creek ch. 20477, Nepean Creek ch. 18834, Leafs Creek ch. 17582, Elladale Creek ch. 12547 and Simpsons Creek ch. 11288) consists of native eucalypt forest, with some exotic species present.

Searches of the NPWS Wildlife Atlas found three threatened flora species (*Pultenaea parviflora, Pimelia spicata, Acacia pubescens)* present within the vicinity of the proposed works. Due to the minor nature of the works (ie. foot access, hand tools used), impacts on these species within the study area are not expected. No other TSC Act or EPBC Act listed species are expected to be impacted by the works.

The Proposal is not expected to require the removal of any native vegetation at any of the bridge sites or creek crossing sites. Lopping of branches may be required at two bridge sites (ch, 12166 and ch. 15272) to enable the works to be completed. Repair and/or replacement of abutment sheeting would also require removal of a small amount of ground cover vegetation.

The Proposal is not expected to impact on any ecological communities or flora species listed under the NSW TSC Act. The preparation of a Species Impact Statement for any threatened plants or endangered ecological communities would therefore not be required.

The Proposal is not expected to impact on any plants or communities listed under the Commonwealth EPBC Act. Referral to the Federal Minister for the Environment for further consideration or approval would therefore not be required.

Fauna
A small number of non-threatened native bird species (eg. magpie) were observed during the field assessment. Swallow nests are present on the underside of some of the bridges. Cattle and horses were observed grazing in paddocks bordering the SCA land. Habitat for native fauna at the Canal bridge sites is limited due to the dominance of exotic grass cover. The creek bridge sites provide habitat for birds, reptiles, amphibians and bats, particularly following periods of rainfall.

Due to the minor nature of the work at the bridge sites (ie. lopping of branches, repair and/or replacement of abutment sheeting) impacts on fauna (ie. bats, birds, reptiles and amphibians) are expected to be minimal. Swallow nests would be removed from the underside of some of the bridges. Removal of the nests has the potential to impact on swallows during their breeding season between August and February.

Threatened Species Conservation Act 1995

Searches of the NPWS Wildlife Atlas indicated that four threatened fauna species (Common Bentwing Bat, Greater Broad-nosed Bat, Cumberland Plain Land Snail, Freckled Duck) had been recorded in the vicinity of the proposed works. The searches found no threatened fauna species present at the creek sites.

Habitat for these threatened fauna species includes the following:

- Cumberland Plain Land Snails inhabit dry woodlands and forests on the Cumberland Plain (NPWS 1999a).
- Freckled Ducks inhabit plankton rich wetlands, large open lakes and their shores, creeks, farm dams, sewage ponds and floodwaters (NPWS 1999b).
- Common Bentwing Bats inhabit caves, forests, woodlands and grasslands (Australian Museum 2003a).
- Greater Broad-nosed Bats inhabit rainforest, dry and wet sclerophyll forest and eucalypt woodland (Environment Australia 1999a).
- Large-footed Myotis bats roost in vegetation near water, caves, tunnels and derelict mines (DLWC 2003).

The Cumberland Plain Land Snail and Freckled Duck are not expected to be present within the study area, as suitable habitat is not available. The Common Bentwing Bat, Greater Broad-nosed Bat and Large-footed Myotis Bat have the potential to inhabit bushland areas, and the underside of bridges within the study area.

The proposed works are not expected to impact on the Greater Broad-nosed Bat, as no habitat would be impacted. The proposed works have a minor potential to temporarily impact on the Common Bentwing Bat and Large-footed Myotis Bat at the Canal bridge sites, assuming these bats would inhabit these sites. No other TSC Act listed species are expected to be impacted by the works.

Alternative habitat for the Common Bentwing Bat and Large-footed Myotis Bat is available in the Cataract and Devines tunnels along the Canal, and in nearby bushland areas.

Environment Protection and Biodiversity Conservation Act 1999

Searches of the EPBC Act databases noted several threatened fauna species potentially occurring within 10km of the study area. The EPBC Act listed species (Giant Burrowing Frog, Large-eared Pied Bat) may be present within the study area, and potentially impacted by the works. The EPBC Act database search found no migratory swallow species potentially occurring within 10km of the study area.

Habitat for these threatened fauna species includes the following:

- Giant Burrowing Frogs have a preference for sandstone ridgetop habitat and broader upland valleys, and are associated with small headwater creek lines and along slow flowing to intermittent creeklines (NPWS 1999c).
- Large-eared Pied Bats roost in caves, mines and unused bird nests (Australian Museum 2003b).

The proposed works are not expected to impact on the Giant Burrowing Frog, as the works would not disturb their habitat. The removal of swallow nests from the underside of some of the bridges have a minor potential to impact on Large-eared Pied Bats inhabiting unused nests. No other EPBC Act listed species are expected to be impacted by the works.

The Proposal is not expected to significantly impact on any fauna species listed under the NSW TSC Act. The preparation of a Species Impact Statement for any threatened fauna would not be required.

The Proposal is not expected to significantly impact on any fauna listed under the Commonwealth EPBC Act. Referral to the Federal Minister for the Environment for further consideration or approval would therefore not be required.

Mitigation Measures
The following mitigation measures would be implemented to ameliorate the identified impacts of the Proposal:

- Lopping of branches at the two bridge sites (ch, 12166 and ch. 15272) would be limited to that necessary to enable the works to be completed.
- Lopped vegetation would be placed on the ground in adjacent bushland areas.
- Any noxious weeds present within the study area would be removed prior to the commencement of works, and on completion of the works. Weed material would be disposed of at a licensed landfill.
- Locally native species, endemic to the area would be used for any revegetation works needed.
- A qualified ecologist who can identify bat species would be available (on-call) during the works. If any bats are found during the works, work at that site would temporarily cease, and the ecologist would relocate the bats(s) to an alternative site (only applicable if outside winter period).
- Prior to removal of swallow nests from the underside of bridges, they would be checked for presence of bats. If any bats are present, work at that site would cease. Work would only recommence at that site following receipt of confirmation from an ecologist that the bats have vacated the nest.
- If any bats are found during winter (June to August) within affected work areas, work at that site would cease. Work would only recommence at that site following receipt of confirmation from an ecologist that the bats have vacated the site.
- Prior to removal of swallow nests from the underside of bridges, they would be checked for presence of birds. If any birds are present, work at that site would cease. Work would only recommence at that site following receipt of confirmation from an ecologist that the birds have vacated the nest.

5.3.5 Socio-economic Considerations Including Landuse

Potential Impacts
Access along the Canal is predominantly made for the SCA, and by rural landholders who have approved access across the Canal at defined locations.

The following land uses are adjacent to the Canal:

- Agricultural activities (ie. cattle)
- Botanic gardens (ie. pedestrians, maintenance)
- Regional Park (ie. pedestrians, maintenance)
- Public local and RTA roads
- Horse riding school
- Electricity transmission
- Gas pipeline
- Telstra utilities
- SCA access

Access for the above land uses would be maintained during the works. There is sufficient space along the Canal to park works vehicles/machinery, and to provide for other vehicles

to park or pass work sites. The works would be undertaken in daytime, Monday to Saturday for a period of 2 years. No works would be undertaken on Sundays or public holidays.

The study area is situated within existing SCA land and no property acquisition is required for the Proposal. Three compound sites would be utilised within the study area on SCA land at ch. 10600 (south end of works), ch. 32000 (Kenny Hill SCA Depot) and at ch. 40800 (south of Ingleburn Dam).

Mitigation Measures
The following mitigation measures would be implemented to ameliorate the identified impacts of the Proposal:

- All works would be undertaken in accordance with RTA's *Traffic Control Plan TCP66* in the RTA's *Traffic Control at Work Sites manual.*

5.3.6 Indigenous Heritage

Potential Impacts
Disturbance of soil would be limited to repair/replacement of abutment sheeting at the timber deck bridges. These works are not expected to impact on Indigenous Cultural Heritage, as the soil has been previously disturbed during construction of the Canal. No removal of trees, or modification of the alignment or form of waterways would be required. The proposed works are not expected to adversely affect Indigenous Cultural Heritage within the study area.

Mitigation Measures
The following mitigation measures would be implemented to ameliorate the identified impacts of the Proposal:

- In the event that any indigenous artefacts or items are located during the works, all work would cease in the vicinity of the find, and the SCA (Alan Broadbent ph. 47200 375 or Sian Waythe ph. 47252 120) would be contacted.

5.3.7 Non-Indigenous Heritage

Potential Impacts
As all the bridges are in excess of 50 years old, they are classified as "relics" under the provisions of the NSW *Heritage Act 1977.* A Statement of Heritage Impact (SOHI) was therefore required to be prepared to assess the impact of the Proposal on the Upper Canal.

The majority of proposed works are of a minor nature only, are sympathetic to the structures in that they match their existing form and fabric, and they comply with the conditions laid out in *Standard Exemption 1: Maintenance and Cleaning, Standard Exemption 2: Repairs and Standard Exemption 7: Minor Activities with no Adverse Impact on Heritage Significance* under the *Heritage Act.* The works would not require approval under s.57 (1) of the NSW *Heritage Act.* Impacts and mitigation measures are presented below, with further detail provided in **Appendix A**.

Timber deck bridges
The additions have been designed to be as unobtrusive as is practical without diminishing their operational capacity. The pipe rails would be painted in order to blend in with the rest of the bridge structure, as the appearance of unpainted galvanised steel is obtrusive and out of character with the rest of the painted timber and steel structures. The steel deck joint plates would be coated with a bituminous product to reduce their highly reflective nature. The concrete pads and associated spalling repairs would be localised in extent, and limited to the substructure of the bridge. They would not be readily viewed by users of the bridge. The spall repairs would weather over time to blend with the existing colour of the concrete

abutments. The steel straps would be located near the kerbs so that the form of the deck is not altered through it's installation.

Through the action of painting over the pipe rails and providing a bituminous covering for the steel deck joint plates, the proposed additions would harmonise with the existing bridge structures.

The proposed additions are sympathetic in that they comply with the conditions laid out for *Standard Exemption 1: Maintenance and Cleaning*. The following maintenance and cleaning would not require approval under s.57 (1) of the NSW *Heritage Act*:

> a) the maintenance of an item to retain its condition or operation without the removal of or damage to the existing fabric or the introduction of new materials;
>
> b) cleaning including the removal of surface deposits, organic growths or graffiti by the use of low pressure water (less than 100 psi at the surface being cleaned) and neutral detergents and mild brushing and scrubbing.

The proposed additions also comply with the conditions laid out for *Standard Exemption 2: Repairs*. The following repairs would not require approval under s.57 (1) of the NSW *Heritage Act*:

> a) the replacement of services such as cabling, plumbing, wiring and fire services that uses extensive service routes, cavities or voids or replaces existing surface mounted services and does not involve damage to or the removal of significant fabric;
>
> b) the repair (such as refixing and patching) or the replacement of missing, damaged or deteriorated fabric that is beyond further maintenance, which matches the existing fabric in appearance, material and method of affixing and does not involve damage to or the removal of significant fabric.

The proposed additions also comply with the conditions laid out for *Standard Exemption 7: Minor Activities with no Adverse Impact on Heritage Significance*. The following minor activities would not require approval under s.57 (1) of the NSW *Heritage Act*:

> 1. Anything which in the opinion of the Director is of a minor nature and will not adversely affect the heritage significance of the item does not require approval under s.57 (1) of the Act.
>
> 2. A person proposing to do anything of the kind described in paragraph 1 must write to the Director and describe the proposed activity. If the Director is satisfied that the proposed activity meets the criteria set out in paragraph 1, the Director shall notify the applicant.

The use of steel in the proposed alterations would conform to the existing structures as this material is present in the form of the girders and in all but one instance in the trestle piers. Furthermore, the provision of continuous pipe railing is sympathetic to the bridges in that it would raise the classification of the existing railing to a Level 3 barrier without resulting in the removal of the existing timber ordinance railing. The proposed alteration to the pedestrian bridge at ch. 15079 is sympathetic in that the form and fabric would remain unchanged.

Concrete bridges

The proposed works respect the heritage significance of the bridges in that they are to be executed in similar materials. While the spalling repairs would initially be distinct due to the grey colouring of the cement mortar, the repairs would weather over time to blend with the existing colour of the concrete abutments. The new railings proposed to be installed on the bridges would match the existing railings in appearance and would be painted the same colour.

It is considered that the proposed works are the most sympathetic solutions available to ensure the continued utility of the bridges. In most instances the works fall under the umbrella of minor maintenance items.

The proposed additions are sympathetic in that they comply with the conditions laid out for *Standard Exemption 1: Maintenance and Cleaning.* The following maintenance and cleaning would not require approval under s.57 (1) of the NSW *Heritage Act*:

> a) the maintenance of an item to retain its condition or operation without the removal of or damage to the existing fabric or the introduction of new materials.

The proposed additions also comply with the conditions laid out for *Standard Exemption 2: Repairs.* The following repairs would not require approval under s.57 (1) of the NSW *Heritage Act*:

> a) the replacement of services such as cabling, plumbing, wiring and fire services that uses extensive service routes, cavities or voids or replaces existing surface mounted services and does not involve damage to or the removal of significant fabric;
>
> b) the repair (such as refixing and patching) or the replacement of missing, damaged or deteriorated fabric that is beyond further maintenance, which matches the existing fabric in appearance, material and method of affixing and does not involve damage to or the removal of significant fabric.

Brick arch bridges

The proposed works respect the heritage significance of the bridges in that they are limited to routine maintenance only. The bridges are to be repointed with a lime mortar that conforms with that which was used in the construction of the bridges. Furthermore, the railings are to be replaced in a like for like manner.

While the mortar repairs would initially be distinct due to their pale colouring the repairs would weather over time to blend with the existing colour. The new railings to be installed on the bridges would match the existing railings in appearance and would be painted the same colour.

It is considered that the proposed works are the most sympathetic solutions available to ensure the continued utility of the bridges. In most instances the works fall under the umbrella of minor maintenance items.

The proposed additions are sympathetic in that they comply with the conditions laid out for *Standard Exemption 1: Maintenance and Cleaning.* The following maintenance and cleaning would not require approval under s.57 (1) of the NSW *Heritage Act*:

> a) the maintenance of an item to retain its condition or operation without the removal of or damage to the existing fabric or the introduction of new materials

The proposed additions also comply with the conditions laid out for *Standard Exemption 2: Repairs.* The following repairs would not require approval under s.57 (1) of the NSW *Heritage Act*:

a) the replacement of services such as cabling, plumbing, wiring and fire services that uses extensive service routes, cavities or voids or replaces existing surface mounted services and does not involve damage to or the removal of significant fabric;

b) the repair (such as refixing and patching) or the replacement of missing, damaged or deteriorated fabric that is beyond further maintenance, which matches the existing fabric in appearance, material and method of affixing and does not involve damage to or the removal of significant fabric.

Sandstone bridge

The proposed works respect the heritage significance of the bridge in that they are limited to routine maintenance only. The bridge is to be repointed with a lime mortar that conforms with that which was used in the construction of the bridge. Furthermore, a concrete kerb and steel guardrail would be constructed on the bridge deck in order to protect the sandstone balustrade form vehicular impacts.

While the mortar repairs would initially be distinct due to their pale colouring the repairs would weather over time to blend with the existing colour. The proposed new guard railings would change the appearance of the deck and as such would be carefully designed so that they do not detract from the overall aesthetics of the bridge. Consideration would be given to leaving the existing deck configuration intact and changing the operation of the bridge to single lane only.

Provided appropriate cleaning methods are utilised, the proposed methods would be sympathetic to the bridge. The construction of a guardrail may on the other hand diminish the aesthetics of the bridge and so would be considered unsympathetic unless carefully designed to conform with the structural lines of the bridge.

The proposed additions are sympathetic in that they comply with the conditions laid out for *Standard Exemption 1: Maintenance and Cleaning.* The following maintenance and cleaning would not require approval under s.57 (1) of the NSW *Heritage Act*:

a) the maintenance of an item to retain its condition or operation without the removal of or damage to the existing fabric or the introduction of new materials

The proposed additions also comply with the conditions laid out for *Standard Exemption 7: Minor Activities with no Adverse Impact on Heritage Significance.* The following minor activities would not require approval under s.57 (1) of the NSW *Heritage Act*:

1. Anything which in the opinion of the Director is of a minor nature and will not adversely affect the heritage significance of the item does not require approval under s.57 (1) of the Act.

2. A person proposing to do anything of the kind described in paragraph 1 must write to the Director and describe the proposed activity. If the Director is satisfied that the proposed activity meets the criteria set out in paragraph 1, the Director shall notify the applicant.

The construction of a guardrail may diminish the aesthetics of the bridge, and would be considered unsympathetic unless carefully designed to conform with the structural lines of the bridge.

Mitigation Measures

General

- Written application to the Director of the NSW Heritage Office for an exemption under Section 139(4) of the *Heritage Act* would be made for impacts on the Upper Canal bridges prior to the commencement of works.
- The works would be undertaken so that they conform with the schedule of conservation works for the structure. This is a requirement of the Conservation Management Plan prepared for the Canal by Higginbotham (2001).
- In the event that any non-indigenous artefacts or items are located during the works, all work would cease in the vicinity of the find, and the SCA (Alan Broadbent ph. 47200 375 or Sian Waythe ph. 47252 120) Region would be contacted.

Timber deck bridges

- Conservation would be achieved by retaining the identified significant heritage items.
- All future actions would involve the least possible physical intervention.
- Major work would be preceded by a process of documentation and recording, including photographs, plans and descriptions, incorporating analysis using professional input where required.

Concrete bridges

- A thorough physical investigation would be required to identify and diagnose problems and to quantify and specify the repair works. Mapping of defects would occur, such as cover concrete, spalling, delamination, cracking, depth of friable surface layers, and other defects.
- When selecting the repair technique and any preventative treatments the following would be considered: significance of the bridge, technical defects, required performance and the particular environmental concerns in place on the Upper Canal.
- Replacement of reinforcement would be done with the same material to avoid bimetallic corrosion. Therefore the replacement of plain steel with galvanised steel would be avoided.
- Patch repairs would be cut out and reinstated as discreetly as possible, taking care to observe joints and distinguishing marks.
- Sample patches would be viewed wet and dry, and would represent the different textures and colour ranges found around the structure.
- Ongoing maintenance would be undertaken using periodic examination and testing to determine whether further repairs are necessary. Inspections would be made in order to identify any latent damage or drumminess.
- Regular maintenance checks of concrete would include inspection of the repairs to ensure that they are fulfilling their function. A maintenance program would include upkeep of repairs to ensure their continued effectiveness, as well as that of the original fabric.

Brick arch bridges

- All conservation works would be supervised by a suitably qualified and experienced conservation practitioner.

- All maintenance and repairs would be aimed at retarding the deterioration of all significant fabric, keeping it in-situ and in its current state and form.
- The composition of the mortar used to repoint the joints would be more permeable than the adjacent stone, to encourage soluble salts to migrate into the joints rather than accumulate in the stone.
- In order to ensure that pointing and grouting is carried out effectively, quality control procedures would be implemented to ensure compliance with specification requirements for materials and workmanship.
- Masonry would only be cleaned when it becomes absolutely necessary and the gentlest method would be used.
- Cleaning would dislodge the surface dirt, but stop before abrasive or chemical damage results to the surface of the stone. Ingrained deposits (stains) would be left.
- Only experienced skilled contractors and site operatives would be engaged on stone cleaning contracts.
- Any cleaning operation would comply with the following conditions:
  - it must not lead to the formation of deteriorating by-products (salts).
  - it must cause minimal disruption to both the mineralogy and texture of the stone.
  - it must not increase surface porosity, as this is conducive to biological growth.
  - it must not damage adjacent materials, metalwork or mortar joints.
  - it must not contaminate or stain other stone fabric and open joints with dissolved salts, dirt and biological growths.
- Tests would be carried out to evaluate cleaning method(s). The selection of the most appropriate treatment would be based on objective analysis of the results obtained both from laboratory and on site tests.

Sandstone bridge

- All conservation works would be supervised by a suitably qualified and experienced conservation practitioner.
- All maintenance and repairs would be aimed at retarding the deterioration of all significant fabric, keeping it in-situ and in its current state and form.
- Stonework conservation works would be undertaken by skilled and experienced tradesmen and supervised by a suitably qualified experienced senior mason or master mason. The work would be executed under the continuous supervision and direction of an experienced heritage practitioner.
- Any proposed conservation works would aim at prolonging the life of any existing stone fabric that remains sound. To retain the cultural significance of the bridge both the form and the decorative detail need to be conserved.
- Accurate CAD drawings of the bridge and its abutments would be prepared as part of the investigation/diagnostic process. Record drawings would include the location of any fixings, their condition and replacement fixings.
- Replacement stone would be good quality stone of high durability, matching the original Hawkesbury sandstone in colour and texture. Independent, expert advice on stone selection would be sought prior to the purchase of stone from any quarry. Artificially coloured sandstone would not be used for stonework mortar repairs.
- Sacrificial mortars would be used to repoint and repair the underside of the voussoirs. Traditional soft composite mortars would not be used to repair and repoint the bridge instead of reaction resin mortars.
- The composition of the mortar used to repoint the joints would be more permeable than the adjacent stone, to encourage soluble salts to migrate into the joints rather than accumulate in the stone.

- In order to ensure that pointing and grouting is carried out effectively, quality control procedures would be implemented to ensure compliance with specification requirements for materials and workmanship.
- Masonry would only be cleaned when it becomes absolutely necessary and the gentlest method would be used.
- Cleaning would dislodge the surface dirt, but stop before abrasive or chemical damage results to the surface of the stone. Ingrained deposits (stains) would be left.
- Only experienced skilled contractors and site operatives would be engaged on stone cleaning contracts.
- Any cleaning operation would comply with the following conditions:
  - it must not lead to the formation of deteriorating by-products (salts).
  - it must cause minimal disruption to both the mineralogy and texture of the stone.
  - it must not increase surface porosity, as this is conducive to biological growth.
  - it must not damage adjacent materials, metalwork or mortar joints.
  - it must not contaminate or stain other stone fabric and open joints with dissolved salts, dirt and biological growths.
- Tests would be carried out to evaluate cleaning method(s). The selection of the most appropriate treatment would be based on objective analysis of the results obtained both from laboratory and on site tests.

5.3.8 Visual Amenity and Landscape

Potential Impacts

The majority of the study area has been cleared in the past to construct the Canal and access roads/bridges. The surrouning areas are generally picturesque and typical of grazing land on the rural fringe of Sydney's southwest. Native bushland is present at the bridge sites within the creek gullies, and in areas adjacent to the study area. The creek gullies and adjoining bushland areas are sites of high visual amenity.

The works would not adversely impact on the heritage value of the bridges, as they are sympathetic to the structures in that they echo their existing form and fabric. Lopping of branches may be required at two bridge sites (ch. 12166 and ch. 15272) to enable the works to be completed. Repair and/or replacement of abutment sheeting would also require removal of a small amount of ground cover vegetation. The repair works would not adversely impact the existing appearance of the Canal corridor, the bridges contained within it, or the visual amenity of the surrounding area. There would however be minor short-term disturbances within the study area during the works, with the presence of machinery and materials stored on site.

Mitigation Measures

To mitigate against any potentially negative impacts on visual amenity, the following are proposed:

- All timber, concrete, metal, bitumen and any minor waste material (eg. workers refuse) would be stored at the compound sites prior to off-site disposal at a licensed waste facility.

5.3.9 Noise and Vibration

Potential Impacts

The closest rural/residential noise receptors are located within approximately 40m of the study area. A school is located approximately 100m from a work site, and a Place of Worship is located approximately 120m from another work site.

The guidelines for assessment of construction noise are those established by the EPA in Chapter 171 of the EPA's *Environmental Noise Control Manual*. The RTA adopts the construction noise control criteria of the NSW EPA. Construction activities are programmed for a total of 2 years. For construction periods longer than 26 weeks, long term noise goals apply. The EPA guidelines establish target noise levels at background +5dBA for periods greater than 26 weeks.

Works would be undertaken for short time periods (ie. 2 weeks or less) at each of the 47 bridge sites. Operation of noisy plant and equipment (eg. drills, chainsaws, generators) would generate moderate noise levels at the study site. The daytime construction activities may exceed the current EPA Criteria at the closest receptors. Considering the minor short term nature of the Proposal, it is not anticipated that construction noise would cause adverse impacts. Any potential noise impacts would be minimised as much as practicable.

There are no set guidelines to limit peak particle velocity (PPV) which is a measure of vibration, however it is generally accepted that for continuous vibration, a level of 5mm/sec is considered safe for residential construction (German Standard DIN 4150 1986). It is predicted that normal construction techniques (excluding blasting) would not result in levels greater than 1.5 mm/sec at a distance of 30m. No blasting would be undertaken during the proposed works. No vibration sensitive sites are present within 30m of the study area.

Mitigation Measures

While it is not considered that any mitigation measures would be necessary to control noise and vibration, all work would be undertaken in accordance with the RTA's *Noise Management Manual, 2001* and with specifications set out in Clause 6.7 and 6.8 of RTA's *Environmental Protection (Management Plan) - QA Specification G35*. In addition:

- Best management practices would be adopted that are consistent with the RTA's *Environmental Noise Management Manual, 2001*.
- Nearby residents would be notified prior to the works commencing and a contact number for complaints would be provided.
- Where works are required outside the standard construction hours, the SCA would be informed prior to works commencing.

5.3.10 Waste Minimisation and Management

Potential Impacts

Minimal waste would be generated as a result of the Proposal. Materials removed/generated by the works (timber, steel, concrete, mortar, epoxy) would be stockpiled on-site, then disposed of appropriately. Disposal of fill material is not anticipated, and no fill material is expected to be brought in for the works.

The RTA is committed to ensuring the responsible environmental management of waste that cannot be avoided and to providing opportunities for promoting the re-use of these wastes through appropriate measures. In undertaking this commitment the RTA would follow the Resource Management Hierarchy principles embodied in the *Waste and Resource Recovery Act 2001* (WARR Act).

Mitigation Measures

The principles of waste management are to minimise the amount of waste generated, recycle waste wherever possible and dispose of the remainder in a responsible manner in accordance with appropriate RTA policy. The RTA adopts the Resource Management Hierarchy principles embodied in the *Waste Avoidance & Resource Recovery Act 2001* (WARR Act).

Accordingly, the following waste minimisation and impact mitigation methods are proposed:

- Works would be undertaken in accordance with the principles of the WARR Act.
  - Unnecessary resource consumption would be avoided as a priority.
  - Avoidance would be followed by resource recovery (including re-use of bridge materials, reprocessing, recycling and energy recovery).
  - Disposal would be undertaken as a last resort.
- Waste materials would be disposed of at licenced waste disposal facilities.

5.3.11 Contaminated Lands

Potential Impacts

No contaminated land is known to exist within the study area. Small amounts of contaminants (hydrocarbons, fuel/oil leaks and spills from SCA maintenance activities and local Councils and RTA roads) may be present within the study area. Herbicides are also applied to adjoining lands by farmers, the Botanic Gardens, Regional Park, local Councils and RTA (roads), and the golf course. Herbicide residue can be expected to be minimal or non-existent within the study area due to degradation by soil microorganisms.

Mitigation Measures

- Should any spillage occur during construction works, the SCA's 24 hour Incident Management Hotline (ph. 02 9751 1988) would be contacted immediately. Contaminants would be immediately contained, removed, treated (if necessary) and disposed of at a licensed waste disposal facility.
- Any contaminated waste found would be identified and classified by a suitably qualified consultant.
- Any contaminated waste identified or generated during the works would be disposed of in accordance with Department of Environment and Conservation guidelines.

5.3.12 Demand on Resources

The RTA adopts the Resource Management Hierarchy principles embodied in the *Waste Avoidance & Resource Recovery Act 2001 (WARR Act)*. The Proposal would require the use of approximately 20 tonnes of hardwood timber, which is a resource that is in short supply.

5.4 Summary of Beneficial Effects

The works would be beneficial as they would improve the safety of the Upper Canal bridges. The proposed works would also ensure that the heritage significance of the Upper Canal bridges is maintained.

5.5 Summary of Adverse Effects

The works would result in some adverse effects, which would include:

- Potential for minor erosion and sedimentation, and impacts on water quality in the Upper Canal and in watercourses during construction.
- Minor increase in noise during construction.

However, these effects would be mitigated by safeguards listed in Sections 6.

6 Implementation Stage

6.1 Safeguards Process

A Contractor's Environmental Management Plan (CEMP) would be developed in accordance with the specifications set out in the RTA's *Environmental Protection (Management Plan) – QA Specifications G35* (Refer to **Appendix D**), and in agreement with the SCA Guidelines for EMP preparation. The CEMP would incorporate additional site specific requirements, which are not covered by G35, as outlined below.

The CEMP would act as a construction operations manual for the Contractor(s). The CEMP would be reviewed and certified by the SCA Statutory Planning Division prior to the commencement of any site works.

Erosion, Sedimentation, Water Quality and Hydrology

- Any spills or incidents would be notified to the SCA's 24 hour Incident Management Hotline on phone 02 9751 1988.
- An Erosion and Sedimentation Control Plan (ESCP) would be developed for the site and incorporated into the CEMP. The ESCP would incorporate specifications outlined in the NSW Erosion and Sediment Control Handbook No.2, and would be prepared in accordance with the Department of Housing Guidelines – Managing Urban Stormwater Soils and Construction, 3rd edition, 1998. The ESCP would be reviewed by the SCA prior to the commencement of works.
- If any activities are likely to cause pollution of waterways, a licence would be obtained for the works under the POEO Act.
- Only small amounts of epoxy would be mixed on-site to minimise the risk of spillage or drips.
- At bridge sites on top of the Canal, geotextile fabric (or suitable alternative material) would placed under work scaffold platforms to capture all material dislodged/generated by the works (ie. bolts, loose rust/paint, concrete, mortar, epoxy). Material would be collected daily from the fabric.
- At watercourse and land sites, all material dislodged/generated by the works would be collected daily.
- Bituminous paint would be applied in a manner that would not pollute the Canal water (ie. application by hand in dry weather, and pollution control measures applied until the bitumen paint sets).
- A portaloo and any oils/fuels would be sited more than 20m away from the Canal and waterways.

Flora and Fauna

- Lopping of branches at the two bridge sites (ch, 12166 and ch. 15272) would be limited to that necessary to enable the works to be completed.
- Lopped vegetation would be placed on the ground in adjacent bushland areas.
- Any noxious weeds present within the study area

would be removed prior to the commencement of works, and on completion of the works. Weed material would be disposed of at a licensed landfill.

- Locally native species, endemic to the area would be used for any revegetation works needed.
- A qualified ecologist who can identify bat species would be available (on-call) during the works. If any bats are found during the works, work at that site would temporarily cease, and the ecologist would relocate the bats(s) to an alternative site (only applicable if outside winter period).
- Prior to removal of swallow nests from the underside of bridges, they would be checked for presence of bats. If any bats are present, work at that site would cease. Work would only recommence at that site following receipt of confirmation from an ecologist that the bats have vacated the nest.
- If any bats are found during winter (June to August) within affected work areas, work at that site would cease. Work would only recommence at that site following receipt of confirmation from an ecologist that the bats have vacated the site.
- Prior to removal of swallow nests from the underside of bridges, they would be checked for presence of birds. If any birds are present, work at that site would cease. Work would only recommence at that site following receipt of confirmation from an ecologist that the birds have vacated the nest.

Socio-economic Considerations including Landuse

- All works would be undertaken in accordance with RTA's Traffic Control Plan TCP66 in the RTA's Traffic Control at Work Sites manual.

Indigenous Heritage

- In the event that any indigenous artefacts or items are located during the works, all work would cease in the vicinity of the find, and the SCA (Alan Broadbent ph. 47200 375 or Sian Waythe ph. 47252 120) would be contacted.

Non-Indigenous Heritage

<u>General</u>

- Written application to the Director of the NSW Heritage Office for an exemption under Section 139(4) of the Heritage Act would be made for impacts on the Upper Canal bridges prior to the commencement of works.
- The works would be undertaken so that they conform with the schedule of conservation works for the structure. This is a requirement of the Conservation Management Plan prepared for the Canal by Higginbotham (2001).
- In the event that any non-indigenous artefacts or items are located during the works, all work would cease in the vicinity of the find, and the SCA (Alan

Broadbent ph. 47200 375 or Sian Waythe ph. 47252 120) Region would be contacted.

Timber deck bridges

- Conservation would be effected such that all identified heritage significant attributes are retained.
- All future actions would involve the least possible physical intervention.
- Major work would be preceded by a process of documentation and recording, including photographs, plans and descriptions, incorporating analysis using professional input where required.

Concrete bridges

- A thorough physical investigation would be required to identify and diagnose problems and to quantify and specify the repair works. Mapping of defects would occur, such as cover concrete, spalling, delamination, cracking, depth of friable surface layers, and other defects.
- When selecting the repair technique and any preventative treatments the following would be considered: significance of the bridge, technical defects, required performance and the particular environmental concerns in place on the Upper Canal.
- Replacement of reinforcement would be done with the same material to avoid bimetallic corrosion. Therefore the replacement of plain steel with galvanised steel would be avoided.
- Patch repairs would be cut out and reinstated as discreetly as possible, taking care to observe joints and distinguishing marks.
- Sample patches would be viewed wet and dry, and would represent the different textures and colour ranges found around the structure.
- Ongoing maintenance would be undertaken using periodic examination and testing to determine whether further repairs are necessary. Inspections would be made in order to identify any latent damage or drumminess.
- Regular maintenance checks of concrete would include inspection of the repairs to ensure that they are fulfilling their function. A maintenance program would include upkeep of repairs to ensure their continued effectiveness, as well as that of the original fabric.

Brick arch bridges

- All conservation works would be supervised by a suitably qualified and experienced conservation practitioner.
- All maintenance and repairs would be aimed at retarding the deterioration of all significant fabric,

keeping it in-situ and in its current state and form.

- The composition of the mortar used to repoint the joints would be more permeable than the adjacent stone, to encourage soluble salts to migrate into the joints rather than accumulate in the stone.
- In order to ensure that pointing and grouting is carried out effectively, quality control procedures would be implemented to ensure compliance with specification requirements for materials and workmanship.
- Masonry would only be cleaned when it becomes absolutely necessary and the gentlest method would be used.
- Cleaning would dislodge the surface dirt, but stop before abrasive or chemical damage results to the surface of the stone. Ingrained deposits (stains) would be left.
- Only experienced skilled contractors and site operatives would be engaged on stone cleaning contracts.
- Any cleaning operation would comply with the following conditions:
  - it must not lead to the formation of deteriorating by-products (salts).
  - it must cause minimal disruption to both the mineralogy and texture of the stone.
  - it must not increase surface porosity, as this is conducive to biological growth.
  - it must not damage adjacent materials, metalwork or mortar joints.
  - it must not contaminate or stain other stone fabric and open joints with dissolved salts, dirt and biological growths.
- Tests would be carried out to evaluate cleaning method(s). The selection of the most appropriate treatment would be based on objective analysis of the results obtained both from laboratory and on site tests.

Sandstone bridge

- All conservation works would be supervised by a suitably qualified and experienced conservation practitioner.
- All maintenance and repairs would be aimed at retarding the deterioration of all significant fabric, keeping it in-situ and in its current state and form.
- Stonework conservation works would be undertaken by skilled and experienced tradesmen and supervised by a suitably qualified experienced senior mason or master mason. The work would be executed under the continuous supervision and direction of an experienced heritage practitioner.
- Any proposed conservation works would aim at

prolonging the life of any existing stone fabric that remains sound. To retain the cultural significance of the bridge both the form and the decorative detail need to be conserved.

- Accurate CAD drawings of the bridge and its abutments would be prepared as part of the investigation/diagnostic process. Record drawings would include the location of any fixings, their condition and replacement fixings.
- Replacement stone would be good quality stone of high durability, matching the original Hawkesbury sandstone in colour and texture. Independent, expert advice on stone selection would be sought prior to the purchase of stone from any quarry. Artificially coloured sandstone would not be used for stonework mortar repairs.
- Sacrificial mortars would be used to repoint and repair the underside of the voussoirs. Traditional soft composite mortars would not be used to repair and repoint the bridge instead of reaction resin mortars.
- The composition of the mortar used to repoint the joints would be more permeable than the adjacent stone, to encourage soluble salts to migrate into the joints rather than accumulate in the stone.
- In order to ensure that pointing and grouting is carried out effectively, quality control procedures would be implemented to ensure compliance with specification requirements for materials and workmanship.
- Masonry would only be cleaned when it becomes absolutely necessary and the gentlest method would be used.
- Cleaning would dislodge the surface dirt, but stop before abrasive or chemical damage results to the surface of the stone. Ingrained deposits (stains) would be left.
- Only experienced skilled contractors and site operatives would be engaged on stone cleaning contracts.
- Any cleaning operation would comply with the following conditions:
  - it must not lead to the formation of deteriorating by-products (salts).
  - it must cause minimal disruption to both the mineralogy and texture of the stone.
  - it must not increase surface porosity, as this is conducive to biological growth.
  - it must not damage adjacent materials, metalwork or mortar joints.
  - it must not contaminate or stain other stone fabric and open joints with dissolved salts, dirt and biological growths.
- Tests would be carried out to evaluate cleaning

method(s). The selection of the most appropriate treatment would be based on objective analysis of the results obtained both from laboratory and on site tests.

Visual Amenity and Landscape

- All timber, concrete, metal, bitumen and any minor waste material (eg. workers refuse) would be stored at the compound sites prior to off-site disposal at a licensed waste facility.

Noise and Vibration

- Best management practices would be adopted that are consistent with the RTA's Environmental Noise Management Manual, 2001.
- Nearby residents would be notified prior to the works commencing and a contact number for complaints would be provided.
- Where works are required outside the standard construction hours, the SCA would be informed prior to works commencing.

Waste Minimisation and Management

- The principles of waste management are to minimise the amount of waste generated, recycle waste wherever possible and dispose of the remainder in a responsible manner in accordance with appropriate RTA policy. The RTA adopts the Resource Management Hierarchy principles embodied in the Waste Avoidance & Resource Recovery Act 2001 (WARR Act).
- Accordingly, the following waste minimisation and impact mitigation methods are proposed:
- Works would be undertaken in accordance with the principles of the WARR Act.
  - Unnecessary resource consumption would be avoided as a priority.
  - Avoidance would be followed by resource recovery (including re-use of bridge materials, reprocessing, recycling and energy recovery).
  - Disposal would be undertaken as a last resort.
- Waste materials would be disposed of at licenced waste disposal facilities.

Contaminated Lands

- Should any spillage occur during construction works, the SCA's 24 hour Incident Management Hotline (ph. 02 9751 1988) would be contacted immediately. Contaminants would be immediately contained, removed, treated (if necessary) and disposed of at a licensed waste disposal facility.
- Any contaminated waste found would be identified and classified by a suitably qualified consultant.
- Any contaminated waste identified or generated during the works would be disposed of in accordance with Department of Environment and Conservation guidelines.

7 Consideration of Environmental Factors

7.1 Clause 228 Checklist (NSW Legislation)

Factor	Impact
a) Any environmental impact on a community?	Short term - ve
Comments: Short term negative impacts on the community potentially include minor construction noise and dust. Overall, the risks are low and the impacts would be eliminated or minimised through the implementation of controls and measures described in Section 6 of this report.	
b) Any transformation of a locality?	Nil
Comments: The existing locality would not be transformed by the proposed works.	
c) Any environmental impact on the ecosystems of the locality?	Short term - ve
Comments: The Proposal would only remove minimal ground cover vegetation, and a small amount of tree branches would be lopped within the study area. Adverse impacts within the creek environments are not expected providing the mitigation measures described in Section 6 are implemented. Restoration works undertaken as part of the Proposal would restore the ground cover.	
d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?	Nil
Comments: There would be no reduction of the aesthetic, recreational, scientific or other environmental quality or value of the locality.	
e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?	Nil
Comments: The proposed works are expected to have a minimal impact on the heritage significance of the Upper Canal. The proposed works would ensure that the heritage significance of the Upper Canal is maintained.	
f) Any impact on the habitat of any protected or endangered fauna (within the meaning of the National Parks and Wildlife Act 1974?	Nil
Comments: Providing the mitigation measures listed in Section 6 of this report are implemented, adverse impact on the habitat of any protected or	

Factor	Impact
endangered fauna (within the meaning of the National Parks and Wildlife Act 1974) is not expected to occur.	
g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?	Nil
Comments: It is not anticipated that the Proposal would result in the endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air.	
h) Any long-term effects on the environment?	Nil
Comments: The Proposal is not expected to cause long term negative impacts on the environment.	
i) Any degradation of the quality of the environment?	Short term - ve
Comments: The Proposal would not degrade the quality of the natural environment. There may be some minor short term impacts during construction, however these would be managed via mitigation measures listed in Section 6.	
j) Any risk to the safety of the environment?	Long term + ve
Comments: The Proposal would not cause any risk to the safety of the environment in the long term. The works would be beneficial as they would improve the safety of the Upper Canal bridges. There is a potential for sedimentation of the Georges and Nepean Rivers. This potential impact would be minimised providing mitigation measures in Section 6 are implemented.	Short term - ve
k) Any reduction in the range of beneficial uses of the environment?	Nil
Comments: The Proposal would not result in any reduction in the range of beneficial uses of the environment.	
l) Any pollution of the environment?	Nil
Comments: It is expected that the Proposal would not pollute the environment providing the mitigation measures in Section 6 are implemented.	

m) Any environmental problems associated with the disposal of waste? Nil

Comments:
Minimal waste (timber, steel, concrete, mortar, epoxy) would be generated as a result of the Proposal. Waste material (particularly timber) would be recycled/reused where possible. Waste material would be disposed of at a licensed waste disposal site and managed in accordance with the Resource Management Hierarchy of the WARR Act.

n) Any increased demands on resources, natural or otherwise which are, or are likely to become in short supply? Long term - ve

Comments:
The Proposal would require 20 tonnes of hardwood timber to be utilised to undertake the emergency works. Hardwood timber is a resource which is in short supply.

o) Any cumulative environmental effect with other existing or likely future activities? Long term + ve / - ve

Comments:
The proposed works would have a positive cumulative effect on the safety of the Upper Canal bridges.

7.2 EPBC Act 1999 (Commonwealth Legislation)

The EPBC Act requires that the following matters of National Environmental Significance (NES) be considered:

Factor	Impact
a) Any environmental impact on a World Heritage property?	Nil

Comments:
The Proposal would not impact any World Heritage property as no World Heritage properties exist within 10km of the Proposal.

b) Any environmental impact on wetlands of international importance? Nil

Comments:
The Proposal is located within the catchment of the Towra Point Nature Reserve (Ramsar Wetland), which is located approximately 30km east of the study area. The Proposal would not impact on any wetland of international importance due to the minor nature of the works and the distance of the works from the wetlands.

c) Any environmental impact on Commonwealth listed threatened species or ecological communities? Nil

Comments:
There are 2 threatened ecological communities (Cumberland Plain Woodlands and Shale/Sandstone Transition Forest), several threatened species and 8 marine protected species recorded as potentially occurring within a 10km search area around the locality. It is not anticipated that the Proposal would impact on any of these species or the threatened ecological communities.

d) Any environmental impact on Commonwealth listed migratory species? Nil

Comments:
Although there have been 8 migratory species recorded within a 10km search area around the locality, no habitat for any of those species would be affected as a result of the proposed works. The Proposal would not have any impact on Commonwealth listed migratory species.

e) Does any part of the proposal involve a nuclear action? Nil

Comments:
The Proposal would not involve a nuclear action.

f) Any environmental impact on a Commonwealth marine area? Nil

Comments:
The Proposal would not impact on a Commonwealth marine area.

In addition; Any impact on Commonwealth Land? Nil
Commonwealth land would not be affected, directly or indirectly, as part of this Proposal.

8 Certification

This Review of Environmental Factors provides a true and fair review of the Proposal in relation to its potential effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the Proposal.

Peter Ryan
Environmental Officer
Signature:
Date: 28 November 2003

I have examined this Review of Environmental Factors and the certification by Peter Ryan and accept the Review of Environmental Factors on behalf of the RTA.

Mahinda Karunaratne
RTA Project Manager
Signature:
Date:

MANAGER STATUTORY PLANNING, ENVIRONMENTAL & PLANNING DIVISION, SCA

Representative:
Signature:
Date:

SCA CLIENT APPROVAL

Client:
Signature:
Date:

9 References

Australian Museum 2003a. *Common Bentwing Bat Fact File, Miniopterus schreibersii.* Web site http://faunanet.gov.au/

Australian Museum 2003b. *Bats in Australia, Large-eared Pied Bat, Chalinolobus dwyeri.* Web site http://www.amonline.net.au/bats/records/bat53.htm

Bannerman, S.M. and Hazelton, P.A. 1990. *Soil Landscapes of the Penrith 1:100,000 Sheet.* Soil Conservation Service of NSW, Sydney.

Beasley M 1988. *The sweat of their brows – 100 years of the Sydney Water Board 1888-1988.* (Water Board Sydney, Illawarra, Blue Mountains).

DLWC 2003. *ADVISORY NOTE 5, SIGNIFICANT BAT ROOSTS.* DLWC Web site http://www.dlwc.nsw.gov.au/care/veg/vegact/manning_pdfs/advisorynote5.pdf

Environment Australia 1999. *The Action Plan for Australian Bats. RECOVERY OUTLINES AND TAXON SUMMARIES - Greater Broad-nosed Bat.* Edited by Anne Duncan, G. Barry Baker and Narelle Montgomery with assistance from the Editorial Panel Biodiversity Group Environment Australia.

Hazelton, P.A. and Tille, P.J. 1990. *Soil Landscapes of the Wollongong-Port Hacking 1:100,000 Sheet.* Soil Conservation Service of NSW, Sydney.

Higginbotham, E. 2001. *Conservation Management Plan for the Upper Canal, Pheasant's Nest to Prospect Reservoir, volume 1.* Prepared for Sydney Catchment Authority.

NPWS 1999a. *THREATENED SPECIES INFORMATION - Cumberland Plain Land Snail, Meridolum corneovirens.* Threatened Species Unit, Policy and Science Directorate, Hurstville, Web site www.npws.nsw.gov.au

NPWS 1999b. *THREATENED SPECIES INFORMATION - Freckled Duck, Stictonetta naevosa.* Threatened Species Unit, Policy and Science Directorate, Hurstville, Web site www.npws.nsw.gov.au

NPWS 1999c. *THREATENED SPECIES INFORMATION - Giant Burrowing Frog, Heleioporus australiacus.* Threatened Species Unit, Policy and Science Directorate, Hurstville, Web site www.npws.nsw.gov.au

Sherwin & Holmes 1986. *Geology of the Wollongong and Port Hacking 1:100,000 Sheets 9029, 9129.* Geological Survey of NSW Dept of Mineral Resources.

Sydney Catchment Authority (SCA) 2000. *Environment Plan 2000–2005.*

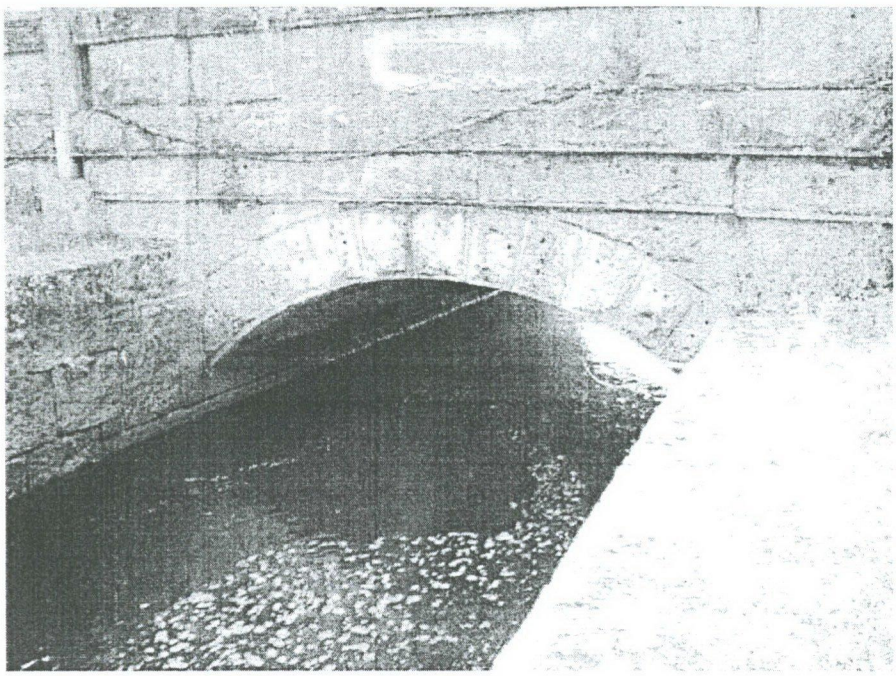
Appendix A Statement of Heritage Impact

Statement of Heritage Impact

Proposed maintenance of 48 bridges on the Upper Canal

Upper Nepean Scheme

Pheasants Nest to Prospect Reservoir, NSW



Prepared for RTA Sydney Bridge Services

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November 2003

Document Controls

Business Unit	Environmental Technology Branch, RTA Operations		
Project No.	H/40486/C		
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	Name	**Signed**	**Date**
Approving Manager	Lisa Brown		November 2003

Person managing this document	**Person(s) writing this document**
Ian Berger	Ian Berger
Location	**File**
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Client Reference	**Status**	**Date**
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Prepared by Environmental Technology Branch, RTA Operations

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Appendix A: Location maps of the bridges on the Upper Canal

Appendix B: Inventory sheets from Upper Canal Conservation Management Plan

1 Introduction and Background to the works

The NSW Roads & Traffic Authority (RTA) on behalf of the Sydney Catchment Authority (SCA) is investigating options for the maintenance of 48 bridges located on the Upper Canal within the Upper Nepean Scheme. These were earmarked as requiring substantial remedial works following an inspection undertaken by AWT Engineering in 1998. The bridges are significant to the road network servicing the Upper Canal as they carry primarily maintenance, construction and some farmyard traffic.

The location of the bridges is shown in **Appendix A**. As the bridges are in excess of 50 years old, they are classified as "relics" under the provisions of the NSW *Heritage Act* 1977. A Statement of Heritage Impact (SOHI) is therefore required in order to determine the potential heritage impact of the proposed modifications to the bridges and whether the level of impact is acceptable. The heritage significance of the bridges was assessed within a Conservation Management Plan for the Upper Canal (Higginbotham, 2001) and endorsed by the NSW Heritage Office in November 2003. The relevant inventory sheets for the bridges are included in **Appendix B**.

2 History and significance of the bridges

2.1 History of the Upper Canal

In 1867, the growth of Sydney coupled with recurring dry seasons, brought into sharp focus the pressing need for a water supply which was larger and more reliable than the existing Botany Swamps source. This led the Governor, Sir John Young, to appoint a special Commission to investigate how an adequate long term supply might be achieved. The Commission was chaired by Professor John Smith of Sydney University and included in its membership was Edwin Orpen Moriarty, a talented civil engineer of the NSW Public Works Department. During its two years of investigations, a detailed examination of the catchments available to serve Sydney was carried out under the direction of Moriarty. The Commission explored the option of enlarging the Botany Swamps scheme through an increase in the storage and pumping capacity, but concluded that its viability and prospect as a major source of water was limited (Higginbotham,2001:6).

Numerous schemes were investigated by the Commission involving supplies from the Georges River, the Picton Lakes, the Lower Nepean and the Upper Nepean with its major tributaries; the Cataract, Cordeaux and Avon Rivers. It was this latter scheme, devised by Moriarty, of diverting the flow of the four rivers, high up in the sandstone plateau inland from the Illawarra escarpment, to Sydney via a system of tunnels, aqueducts, canals and pipelines, that received approval. In principle it was modelled on similar schemes elsewhere in the Western world but the sheer size and the audacious engineering effort required to construct it, in an outpost colony not yet 100 years old, made it an outstanding proposal. The scheme captured the imagination of the populace. It promised an almost unlimited supply, for the then foreseeable future, of water pure beyond the imagination of the Busby's Bore and Botany supplies which were becoming contaminated due to the progressive encroachment of urban and industrial developments on the catchment (Thorpe, 1989:21).

Financing the scheme, however, was another matter and it took the findings and recommendations of another Commission, the 1875 Special Board of Health, to jolt Parliament into passing the necessary legislation to implement both the construction of the Upper Nepean water supply system and the genesis of the present system of major sewers for the improvement of sanitation in metropolitan Sydney. In 1879 and 1880 the necessary Acts were passed authorising the construction of the Sydney Water Supply and the Northern (Bondi) and Southern (Botany) Ocean Outfall Sewers. A complementary Act also legislated for an independent Board of Water Supply and Sewerage to control and maintain these works after their design and construction by the Public Works Department. The Upper Nepean Scheme, as constructed, brought water from the Cataract River at Broughtons Pass to the Crown Street reservoir, a distance of 63.25 miles. All work was carried out by contract under the supervision of section engineers responsible to the Resident Engineer who was responsible to E O Moriarty.

However, before the scheme was completed a severe drought affected the Sydney area and early in 1885 fears were expressed that the Botany supply would fail. The major unfinished works in the Upper Nepean Scheme were the wrought iron aqueducts of the Upper Canal, Prospect Dam, the 72 inch pipeline from Pipe Head, Guildford, to Potts Hill and the main from Potts Hill to Crown Street reservoir. During the public agitation for an urgent solution, the general engineering firm of Hudson Brothers (later Clyde Engineering) came forward with a daring rescue plan. This involved the provision of a temporary supply by bridging the gaps in Upper Canal where creeks remained to be crossed, in addition to carrying the water from Pipe Head by elevated temporary storm water drains to the Botany Swamps. Work commenced on this emergency scheme in July 1885 and water flowed into the Botany Engine Pond in January 1886 (Higginbotham,2001:6).

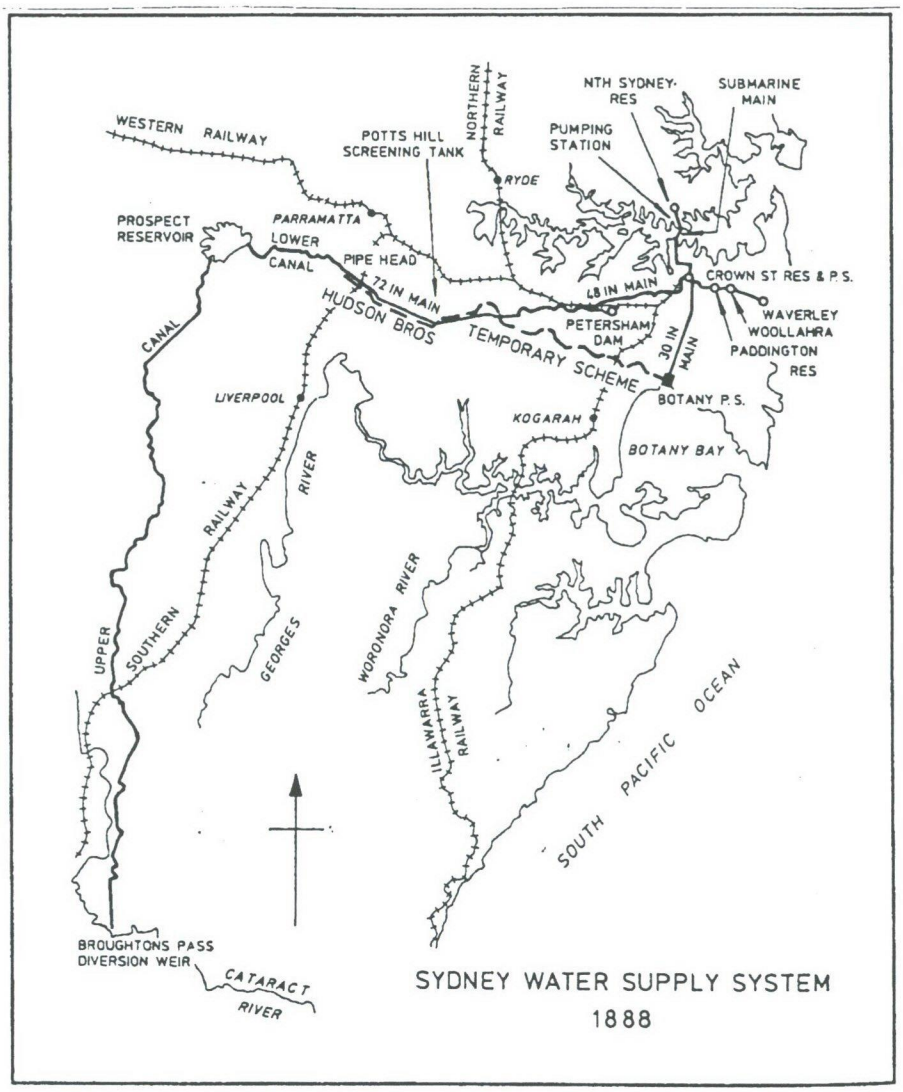


Figure 1: Plan of the Water Supply System in 1888 detailing the sites described in the text.

With the completion of the first stage of the Upper Nepean Scheme early in 1888 (**Figure 1**), the Board of Water Supply and Sewerage came into being in April of that year. Its function was to maintain the major works completed by the Public Works Department, and to extend and amplify the reticulation system. This dual control, from planning to operation, continued until 1924 when the Metropolitan Water, Sewerage and drainage Act provided for the Board to be the sole designer, constructor and operator of all water and sewerage works within the Board's area of responsibility. Despite this ruling, a number of major works were completed by both Public Works and Board engineers and employees over the next 35 years.

The Upper Nepean Scheme was not immune from the effects of droughts, as exemplified by the severe 1899-1903 drought during which the water level in Prospect Reservoir became critically low. Again an emergency plan was instigated. A pumping station, consisting of nine pumps driven by steam engines, was built alongside the outlet basin for lifting water from the reservoir into a flume (storm water drain) on the roof of the station. The flume discharged into the Lower Canal adjacent to the outlet basin. Another contingency work was the building of a steam-driven electricity generating station at Menangle Railway Station, which powered an isolated pumping station in the nearby Nepean Gorge, thereby lifting water from the Nepean River into the Upper Canal. These works were completed in 1903, the year the drought broke.

In order to alleviate the effects of future droughts, a long term plan was decided upon whereby four large storage dams were to be built on the tributaries of the Upper Nepean. The plan was later expanded to include the Woronora and Warragamba Dams.

In 1903 the Public Works Department began construction of Cataract Dam (completed 1907), the first of the storage dams. In common with all major constructions up till then the work was undertaken by contract labour, Messers Lane & Peters being the contractors. The subsequent five major dams of the Sydney supply system, Cordeaux (1926), Avon (1927), Nepean (1935), Woronora (1937) and Warragamba (1960), were all built by day labour; Cordeaux and Avon completely by the PWD; Nepean commenced by the PWD and completed by the Board; Woronora and Warragamba entirely by the Board.

The great merit of the Upper Nepean Scheme is that it was, and still is, a gravity supply. Water harvested in the Southern Highlands, when diverted by the Pheasants Nest and Broughtons Pass weirs, flowed all the way down the Upper Canal into Prospect Reservoir, then along the Lower Canal to Pipe Head, then by pipe to Potts Hill Reservoir and again by pipe to Crown Street Reservoir from where it was reticulated to the major portion of the city and suburbs of the time, all by gravity (Higginbotham,2001:8).

2.2 Description of the Upper Canal

The Upper Canal was built of a variety of materials with 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 here the sides were walled with sandstone masonry, or, if cut into solid rock left unlined. Where the canal had to go under a hill, tunnels were excavated. These were left unlined if cut through in solid rock, or lined with brick or stone, if cut through softer material. Where the canal crossed creeks or large depressions, such as Elladale, Simpsons, Ousedale, Mullaly, Woodhouse, Nepean and Leaf Creeks, the water was carried across in wrought iron inverted syphons resting upon stone piers (Higginbotham,1991:8).

To supply water for towns along the route, such as Camden, Campbelltown, Ingleburn and Liverpool, offtakes were built at suitable points along the Canal, where stop logs were used to divert water. At the Liverpool Offtake, a small storage dam, for use when the canal was emptied for cleaning or repairs was built in the 1890s. The Dam at Ingleburn was constructed in the 1920s.

There are 11 maintenance sections on the Upper Canal, numbered 1 to 11 from Broughtons Pass in a northerly direction. The north end of the Upper Canal and the western end or commencement of the Lower Canal fall within the maintenance section for Prospect Reservoir. The Lower Canal forms one maintenance section and finishes at Pipehead, itself forming another maintenance section. The Upper Canal commences by tunnel from Pheasants Nest Weir. In all historical documentation, chainage measurements along the Upper Nepean Scheme commences at Pheasants Nest.

3 Timber Bridges

3.1 Description of timber bridges

The timber bridges that are the focus of the present study can be divided into two types based on their locations: aqueduct bridges and canal overbridges. Multiple span timber bridges are used to span the creeks at which locations the canal water is carried by aqueducts and these are supported by steel trestles with steel cross-ties and beams or in one instance sandstone piers. In contrast, canal overbridges are single span only and are uncommon within the bridge population of the Upper Canal. Both types are supported by concrete abutments and feature timber ordinance fencing or pipe railing. A single example of a pedestrian bridge is included in this study at chainage 15079.

CREEK BRIDGES

Figure 2: View of Simpsons Creek Aqueduct bridge at chainage 11288 (Section 2 Inventory 21).

Figure 3: View of Elladale Creek Aqueduct bridge at chainage 12547 (Section 2 Inventory 39).

Figure 4: View of Leafs Creek Aqueduct road bridge at chainage 17582 (Section 3 Inventory 7).

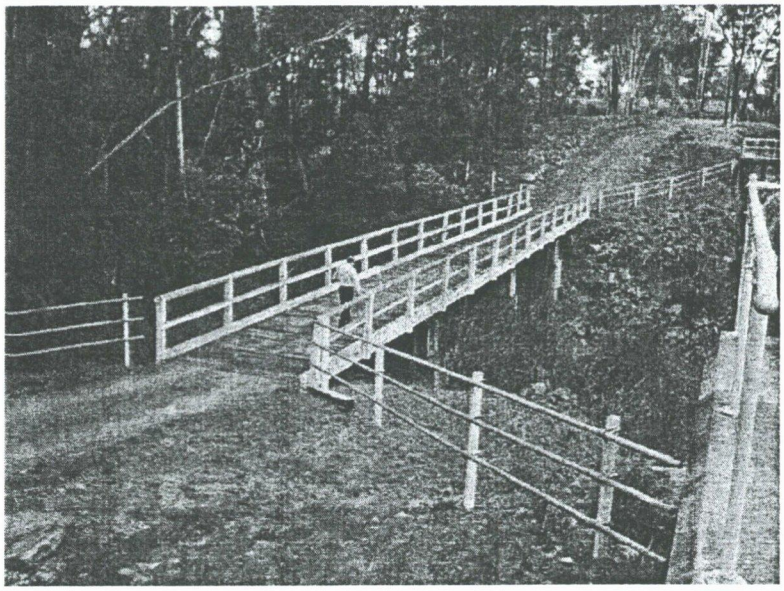


Figure 5: View of Nepean Creek Aqueduct bridge at chainage 18834 (Section 3 Inventory 20).

Figure 6: View of Woodhouse Creek Aqueduct bridge chainage 20477 (Section 3 Inventory 37).

CANAL OVERBRIDGES

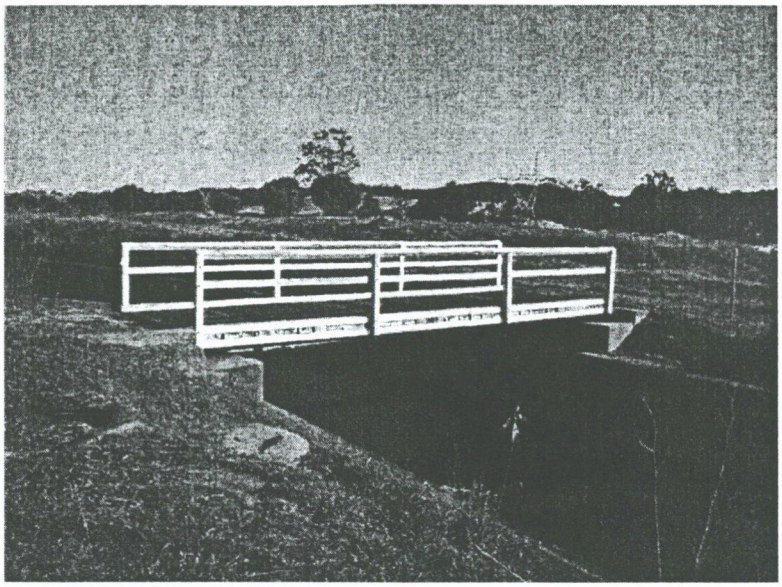


Figure 7: View of bridge at chainage 31366 (Section 5 Inventory 46).

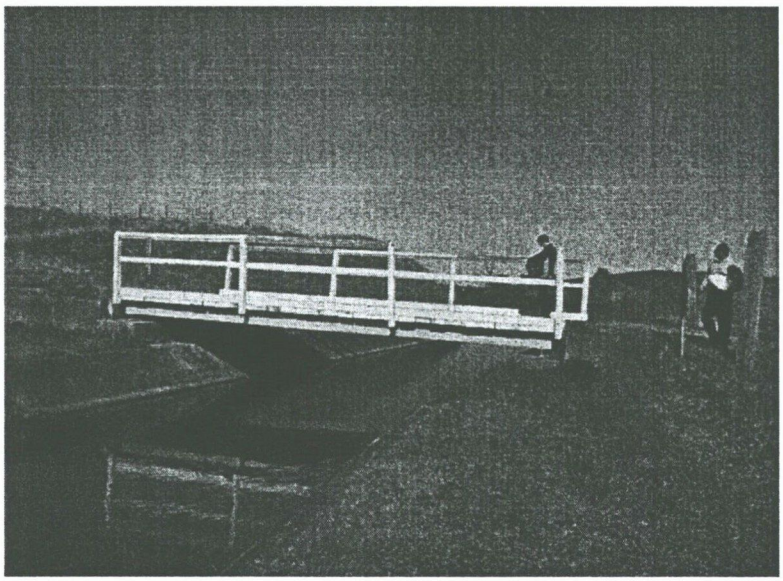


Figure 8: View of bridge at chainage 54615 (Section 10 Inventory 9).

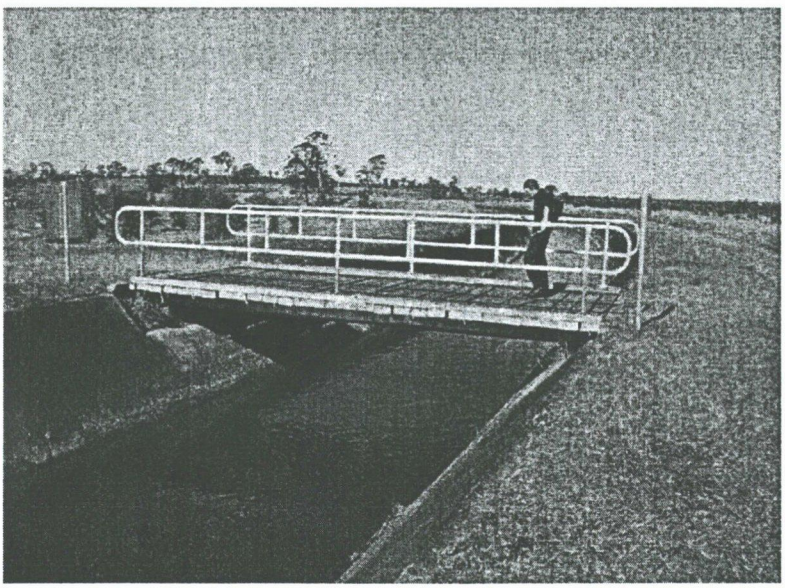


Figure 9: View of bridge at chainage 55290 (Section 10 Inventory 20).

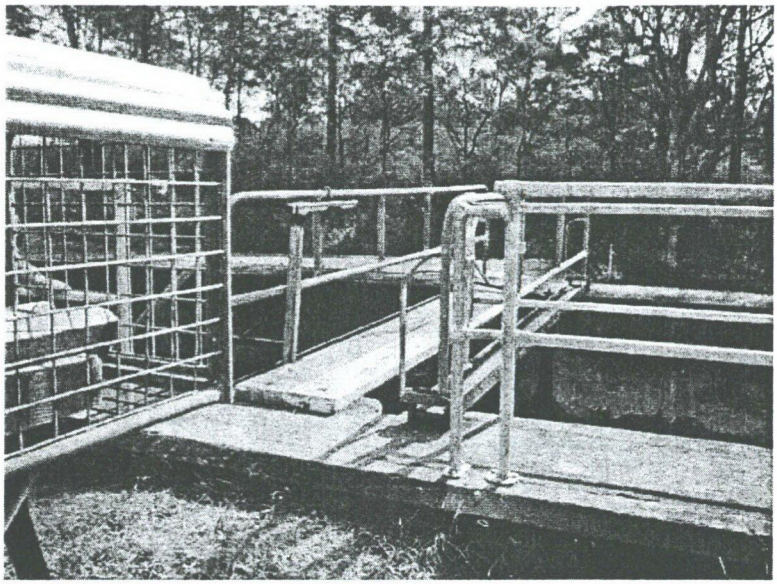


Figure 10: View of pedestrian bridge at chainage 15079.

3.2 Proposed works

Installation of single pipe rail crash barrier (PR)

The present works seek to ensure that the bridges are in compliance with the current 1996 AUSTROADS Bridge Design Code. The code requires that level 3 safety barriers be installed on the bridges. In order to comply with this code, it is proposed that a continuous pipe rail be installed for the entire length of the first five bridges that terminates in barrier posts (**Figure 11**). This is considered sympathetic to the Bridge as it would enable the existing timber ordinance railing to be preserved *in situ* rather than its wholesale replacement with a purpose built steel barrier.

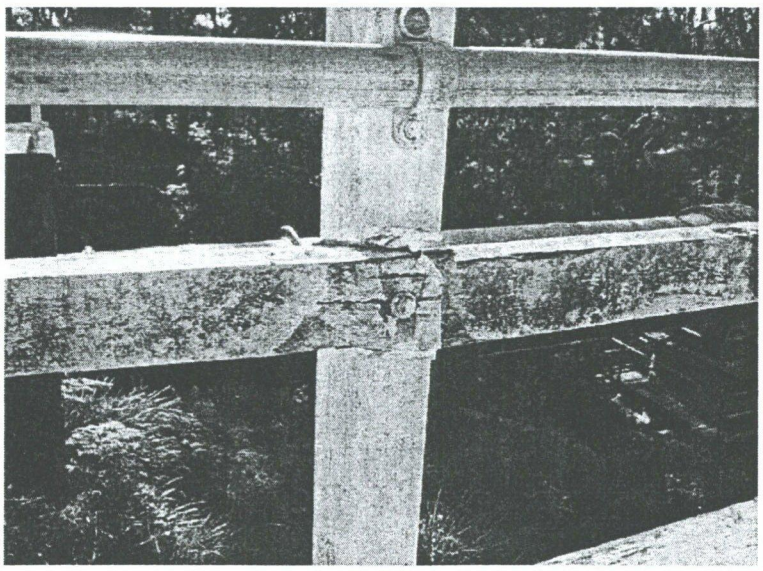


Figure 11: View of pipe rail illustrating its method of attachment to existing timber railing.

Restoration of spacing to timber planks (S)

This would be achieved through the introduction of two steel straps that are located along each side of the deck and are continuous along its full length. Restoration of spacing would ensure smooth vehicular travel over the bridge and would prevent water pooling on the deck.

Installation of steel deck joint plates (DJ)

The purpose of these is to preserve the timber girders from corrosion through water entering the substructure at these places. These would be secured with coach screws as shown in **Figure 12**.

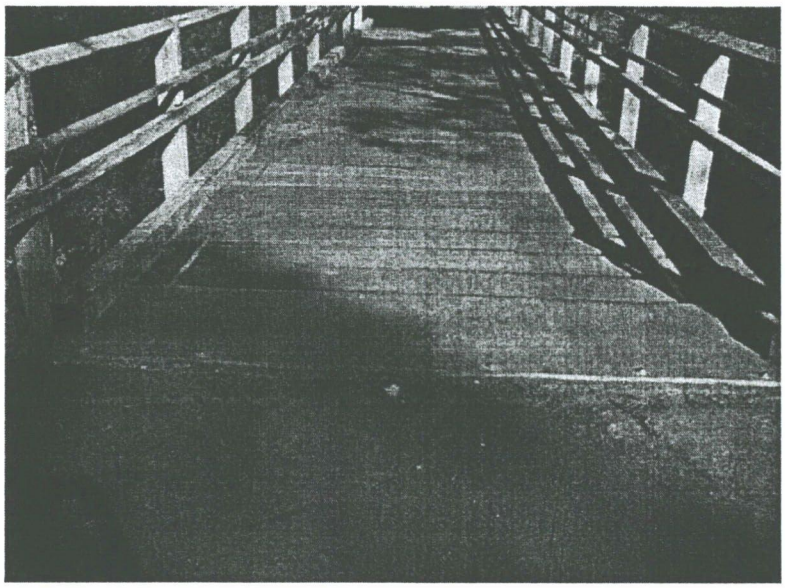


Figure 12: View of steel deck joint pad on the approach of a timber creek bridge.

Installation of concrete pads on each approach (C)

Several timber aqueduct bridges have concrete abutments and wingwalls which have spalled where they come into contact with the steel girders and timber deck. These would require patch repairs as can be seen in **Figure 13**.

The proposed works for the pedestrian overbridge at chainage 15079 are limited to the replacement of the two existing timber boards with boards that are thicker and wider. This bridge functions as a stop board placement point. The alteration would bring the bridge into line with the modern OH & S guidelines for SCA workers involved in the stop board placements and add to the carrying capacity of the bridge.

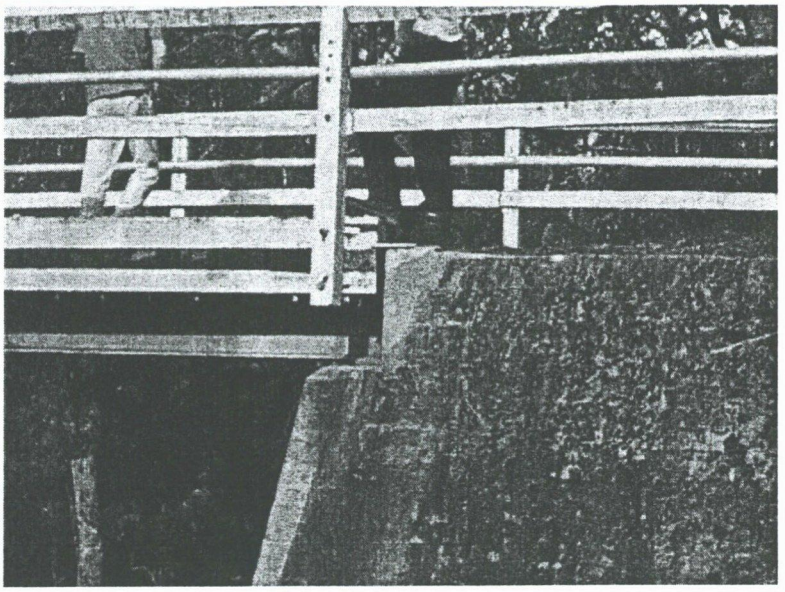


Figure 13: View of patch repaired concrete abutment.

Bridge Number	PR	S	DJ	C
11288	x	x	x	x
12547	x	x	x	x
17582	x	x	x	
18834	x	x	x	x
20477	x	x	x	
31366		x		
54615		x		
55290	x	x		

Table 1: Schedule of works for timber bridges.

3.3 Statement of Heritage Impact

The following questions are presented in the *NSW Heritage Manual* document "Statements of Heritage Impact" as the minimum response required to properly address the present proposals on the timber bridges which would result in minor additions to the items (HO/DUAP 1996).

3.3.1 How is the impact of the additions on the heritage significance of the item to be minimised?

The additions are designed to be as unobtrusive as is practical without diminishing their operational capacity. The pipe rails would be painted in order to blend in with the rest of the Bridge structure, as the appearance of unpainted galvanised steel is obtrusive and out of character with the rest of the painted timber and steel structures. The steel deck joint plates would be coated over with a bituminous product to reduce their highly reflective nature. The concrete pads and associated spalling repairs would be localised in extent and as they are limited to the substructure of the bridge, would not be readily viewed by users of the bridge. The spall repairs would weather over time to blend with the existing colour of the concrete abutments. The steel straps are to be located near the kerbs so that the form of the deck is not altered through its installation.

3.3.2 Will the additions visually dominate the heritage item?

Through the action of painting over the pipe rails and providing a bituminous covering for the steel deck joint plates it is felt that the proposed additions would harmonise with the existing bridge structures.

3.3.3 Are the additions sympathetic to the heritage item? In what way (e.g. form, proportions and design)?

Each of the proposed additions has been designed so as to harmonise with the existing materials of the bridge. They are sympathetic in that they comply with the conditions laid out for :

Standard Exemption 1: Maintenance and Cleaning

The following maintenance and cleaning does not require approval under s.57 (1) of the *NSW Heritage Act*:

a) the maintenance of an item to retain its condition or operation without the removal of or damage to the existing fabric or the introduction of new materials

Standard Exemption 2: Repairs

Repair to an item which is of the type described in (a) or (b) below does not require approval under s.57 (1) of the *NSW Heritage Act*.

a) the replacement of services such as cabling, plumbing, wiring and fire services that uses extensive service routes, cavities or voids or replaces existing surface mounted services and does not involve damage to or the removal of significant fabric;

b) the repair (such as refixing and patching) or the replacement of missing, damaged or deteriorated fabric that is beyond further maintenance, which matches the existing fabric in appearance, material and method of affixing and does not involve damage to or the removal of significant fabric.

The use of steel in the proposed alterations would conform to the existing structures as this material is present in the form of the girders and in all but one instance in the trestle piers.

Furthermore, the provision of continuous pipe railing is sympathetic to the bridges in that it would raise the classification of the existing railing to that of Level 3 barrier without resulting in the removal the existing timber ordinance railing.

Standard Exemption 7: Minor activities with no adverse impact on heritage significance

1. Anything which in the opinion of the Director is of a minor nature and will not adversely affect the heritage significance of the item does not require approval under s.57 (1) of the Act.
2. A person proposing to do anything of the kind described in paragraph 1 must write to the Director and describe the proposed activity. If the Director is satisfied that the proposed activity meets the criteria set out in paragraph 1, the Director shall notify the applicant.

The proposed alteration to the pedestrian bridge at chainage 15079 is sympathetic in that the form and fabric would remain unchanged.

3.4 Schedule of conservation works for timber bridges

This section sets out basic conservation principles for each of the timber bridges over the Upper Canal. The basis of these principles is derived from the Australian ICOMOS *Burra Charter*.

The *Burra Charter* (Article 2) states; "The aim of conservation is to retain or recover the cultural significance of a place and must include provision for its security, its maintenance, and its future."

General

Conservation should be effected such that all identified heritage significant attributes are retained.

All future actions should involve the least possible physical intervention.

Major work should be preceded by a process of documentation and recording, including photographs, plans and descriptions, incorporating analysis using professional input where required.

Fabric

To ensure that the work is in compliance with the Standard Exemptions published by the NSW Heritage Office the following conditions should be adhered to:

Standard Exemption 1: Maintenance and Cleaning

The following maintenance and cleaning does not require approval under s.57 (1) of the *NSW Heritage Act*:

a) the maintenance of an item to retain its condition or operation without the removal of or damage to the existing fabric or the introduction of new materials;

b) cleaning including the removal of surface deposits, organic growths or graffiti by the use of low pressure water (less than 100 psi at the surface being cleaned) and neutral detergents and mild brushing and scrubbing.

Standard Exemption 2: Repairs

Repair to an item which is of the type described in (a) or (b) below does not require approval under s.57 (1) of the *NSW Heritage Act*.

a) the replacement of services such as cabling, plumbing, wiring and fire services that uses extensive service routes, cavities or voids or replaces existing surface mounted services and does not involve damage to or the removal of significant fabric;

b) the repair (such as refixing and patching) or the replacement of missing, damaged or deteriorated fabric that is beyond further maintenance, which matches the existing fabric in appearance, material and method of affixing and does not involve damage to or the removal of significant fabric.

Repairs must be based on the principle of doing as little as possible and only as much as is necessary to retain and protect the element. Therefore replacement must only occur as a last resort where the major part of an element has decayed beyond future maintenance.

Any new materials used for repair must not exacerbate the decay of existing fabric due to chemical incompatibility, obscure existing fabric or limit access to existing fabric for future maintenance.

As such, wherever possible original fabric should be retained, preserved and maintained.

Wherever possible displaced original fabric should be restored.

Replacement fabric should be of the same design, form and finish as existing fabric.

Any introduced materials should be documented (by means of photographs, reports and sketches) and should be clearly identifiable to an expert as new.

Termite treatment

Typical treatments in use by the RTA are pressure treatment with Copper Chromated Arsenate (CCA). The cut ends and surfaces (contact areas) of new timbers are also treated with copper napthanate gel in the field during construction. These treatments are not available on the Upper Canal bridges due to the policy of the Sydney Catchment Authority to prevent potential sources of hazardous pollution from entering the water supply. Therefore, as none of the bridge timbers have been treated there are extensive signs of white ant damage within the structure.

It is recommended that investigations be conducted into any potentially non-hazardous termite treatments available for future use on the Canal as a priority. Tony Kondek of the SCA is a good source of advice on termite treatments and should be consulted for his specialist knowledge in this field.

Management

The management of the Bridge is the responsibility of the owners of the Bridges. The Bridges should be kept as public property under the control of the SCA, to ensure the appropriate future management of the Bridge.

Maintenance and inspections

Semi-annual inspections and regular maintenance of the bridges are required to keep it in a safe operating condition. The SCA also has obligations under Sections 118 and 170 of the *NSW Heritage Act* 1977 to maintain the Bridge to a minimum standard as a heritage item to ensure its heritage significance is not reduced through neglect.

4 Reinforced concrete bridges

4.1 Description of concrete bridges

The form of the reinforced concrete bridges built along the length of the Upper Canal can be separated into four distinct types. The first of these (**Type A**) is by far the most numerous and these have a reinforced concrete deck supported on rolled steel joists encased in concrete. The parapet consists of galvanised corrugated iron sheeting (**figures 14 – 38**). **Type B** is distinct in that the corrugated iron extends down into a rivetted iron trough base with reinforced concrete deck (**figures 39 – 43**). These bridges were identified as being of exceptional significance in the CMP prepared for the Canal (Higginbotham, 2001). **Type C** bridges feature raised concrete sides and angled steel railings (**figures 44 – 46**). Bridges classified as **Type D** do not fall into the previous categories (**figures 47 - 49**).

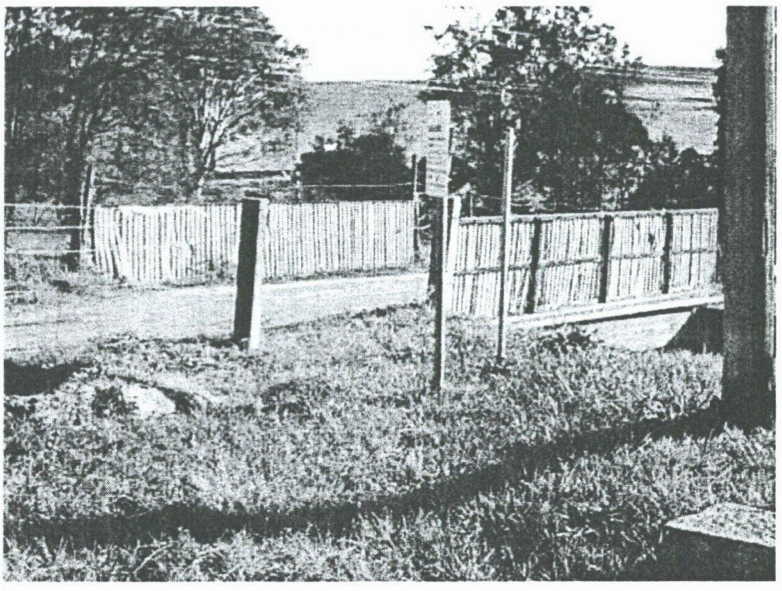


Figure 14: View of bridge at chainage 10586 (Section 2 Inventory 6).

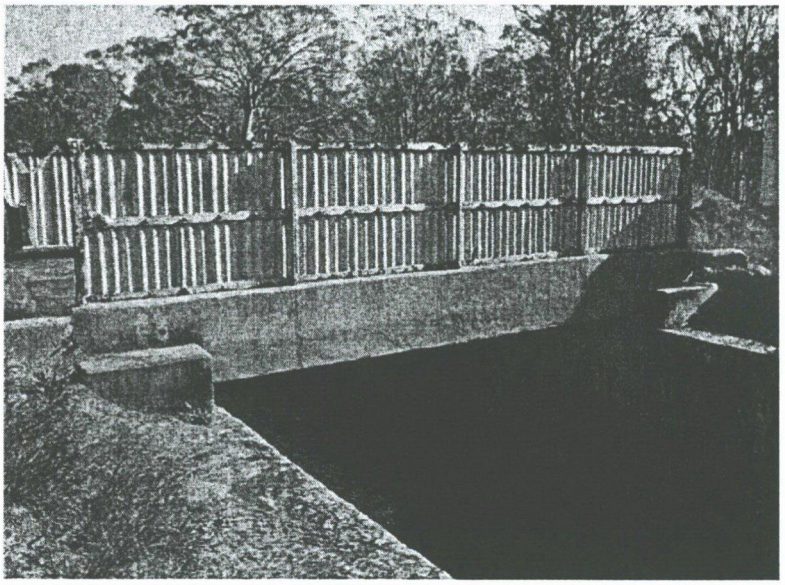


Figure 15: View of bridge at chainage 10847 (Section 2 Inventory 9).

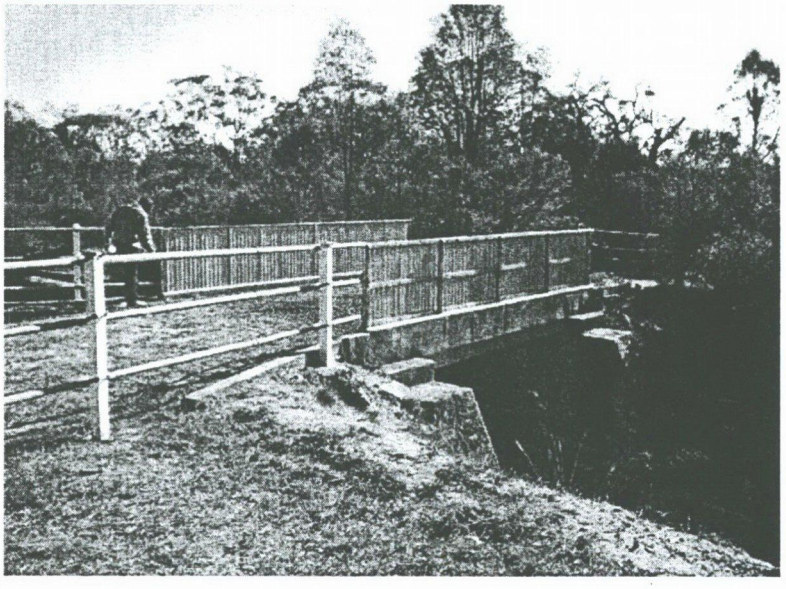


Figure 16: View of bridge at chainage 12166 (Section 2 Inventory 32).

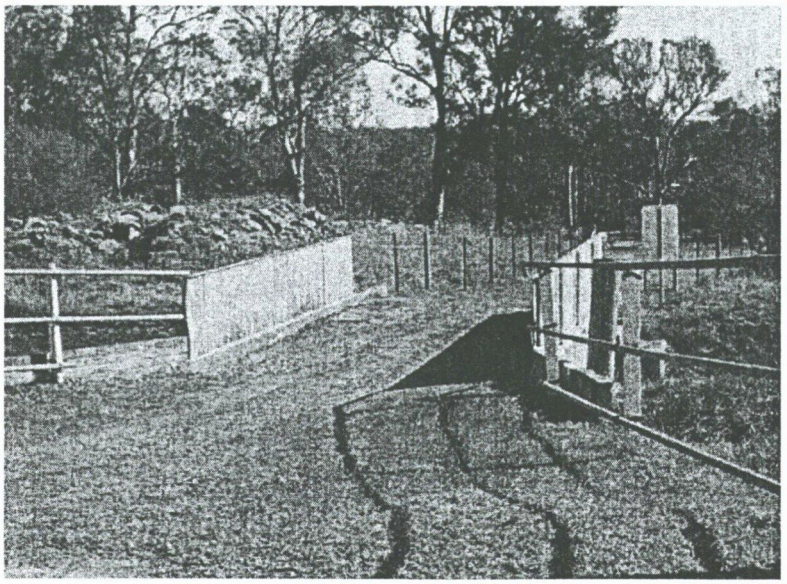


Figure 17: View of bridge at chainage 13049 (Section 2 Inventory 41).

Figure 18: View of bridge at chainage 13786 (Section 2 Inventory 47).

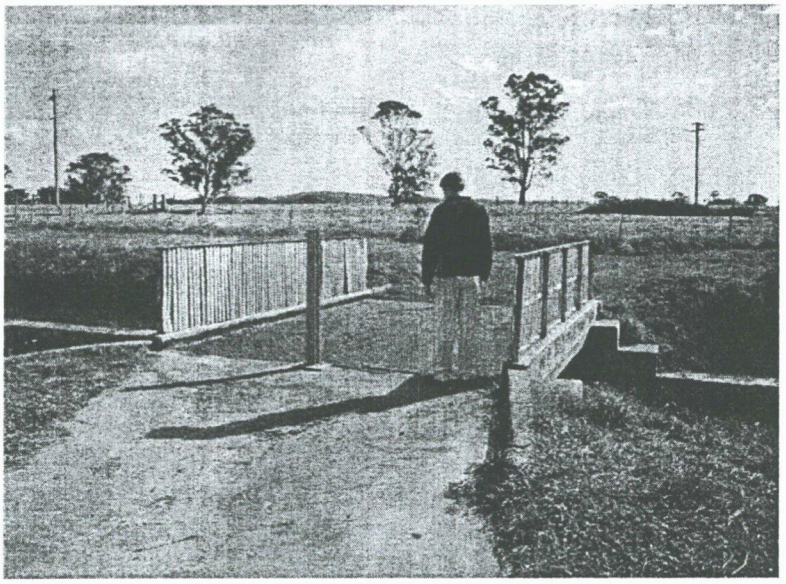


Figure 19: View of bridge at chainage 14355 (Section 2 Inventory 51).

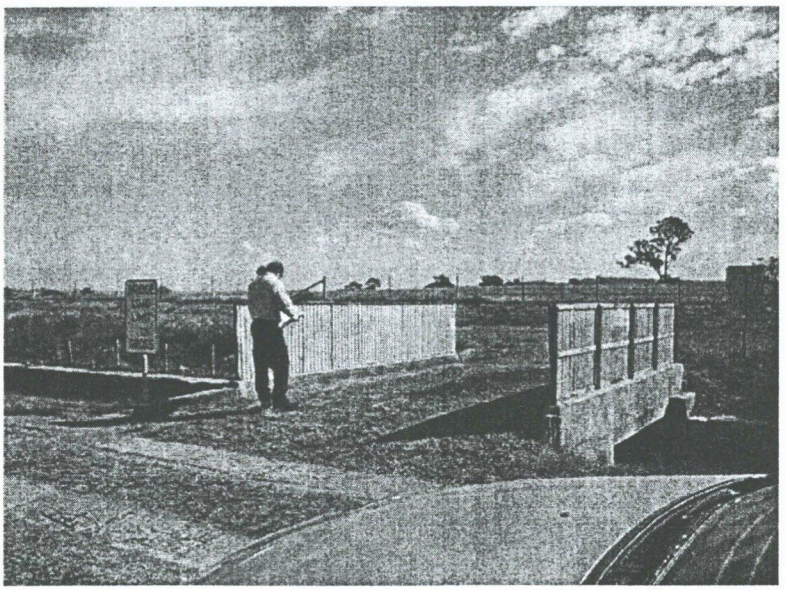


Figure 20: View of bridge at chainage 14769 (Section 2 Inventory 58).

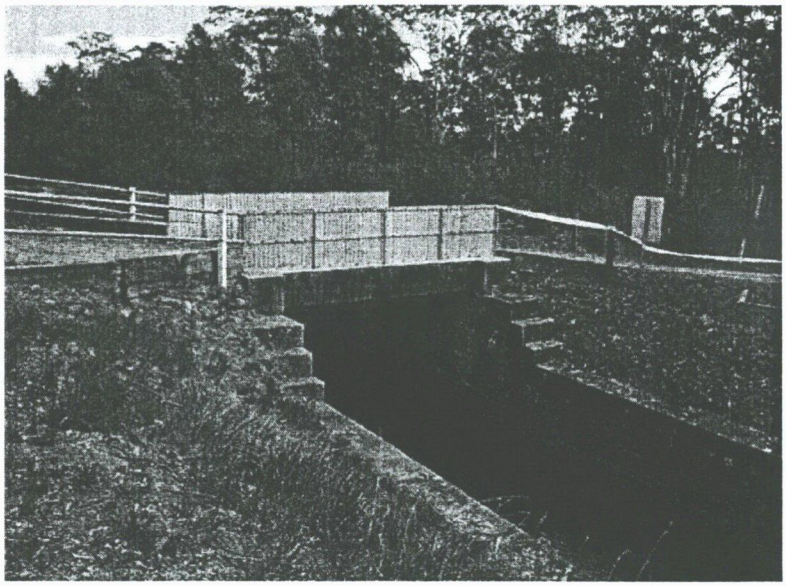


Figure 21: View of bridge at chainage 18420 (Section 3 Inventory 14).

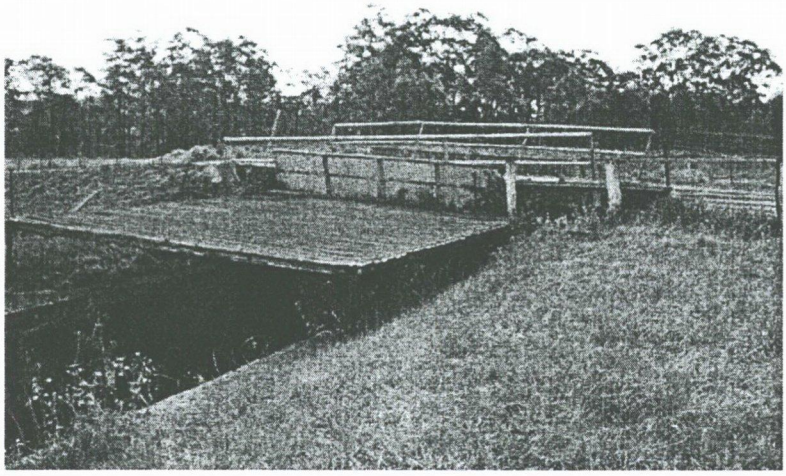


Figure 22: View of bridge at chainage 20160 (Section 3 Inventory 28).

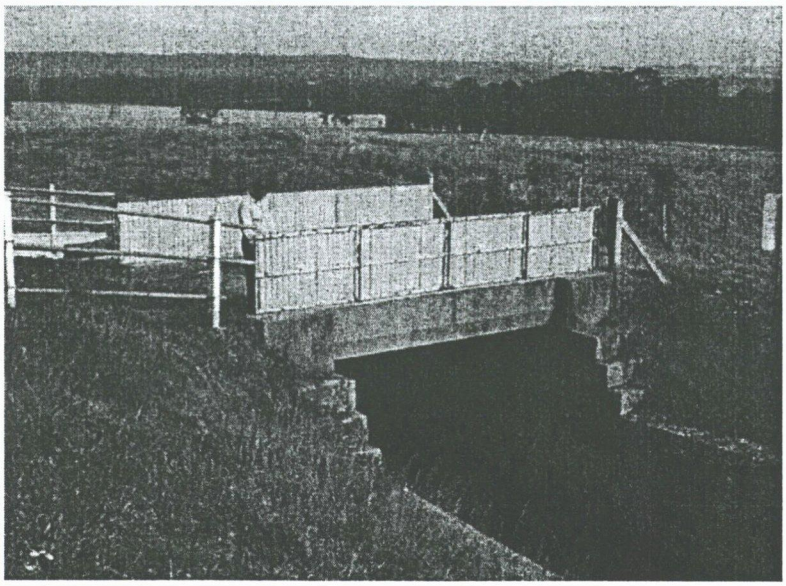


Figure 23: View of bridge at chainage 21260.

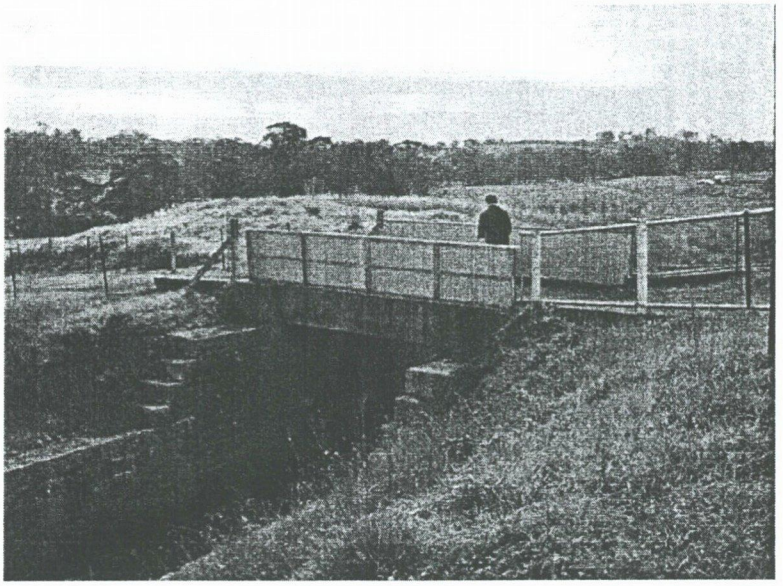


Figure 24: View of bridge at chainage 21874 (Section 3 Inventory 52).

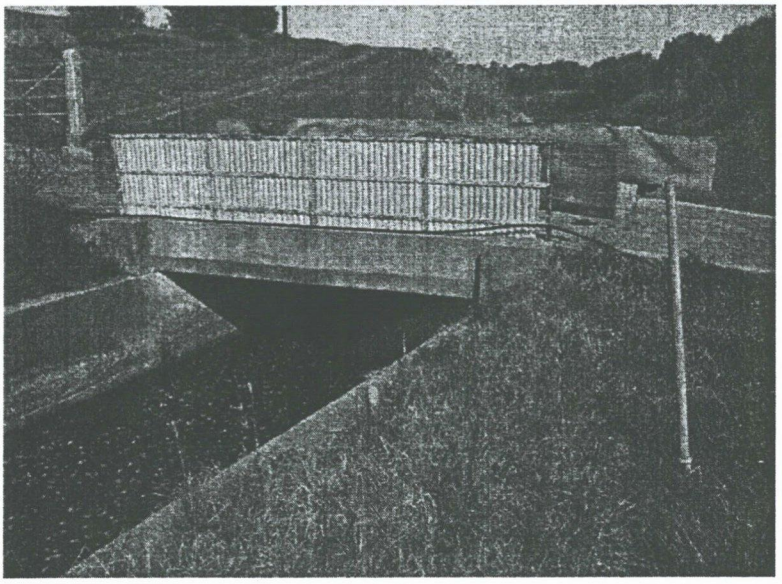


Figure 25: View of bridge at chainage 25337 (Section 4 Inventory 24).

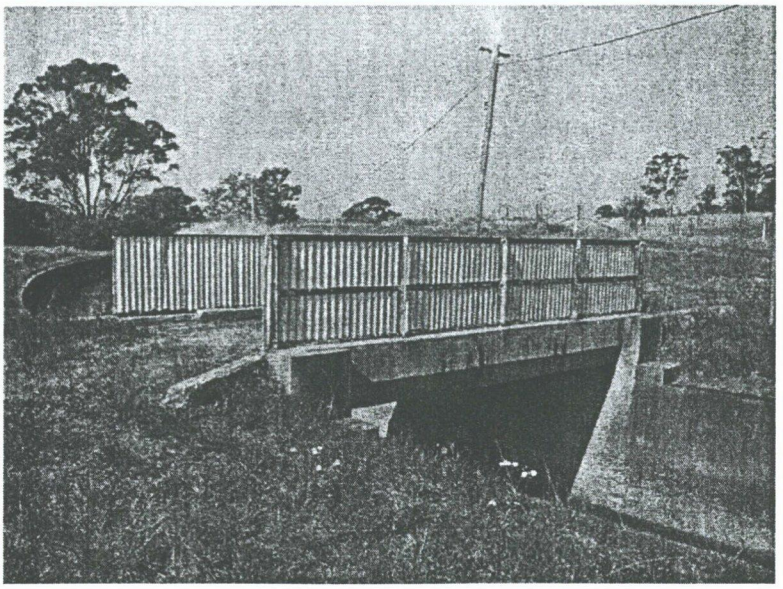


Figure 26: View of bridge at chainage 26651 (Section 4 Inventory 50).

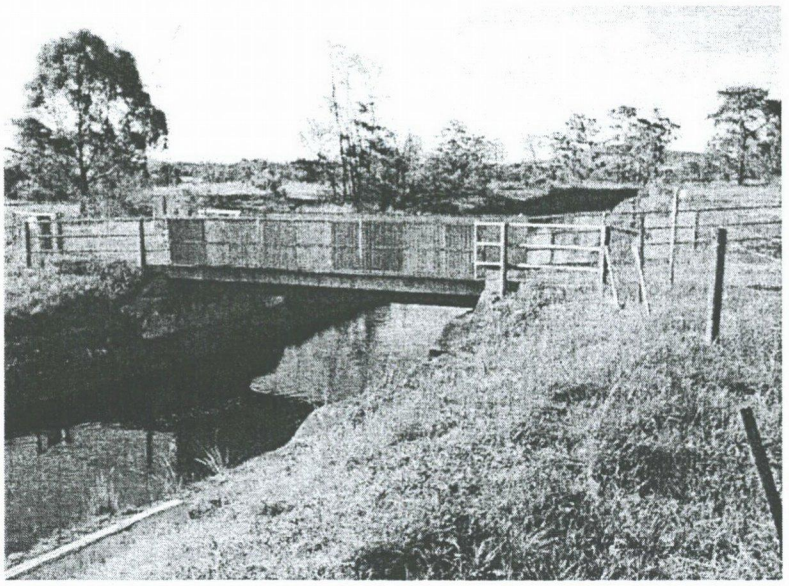


Figure 27: View of bridge at chainage 29934 (Section 5 Inventory 15).

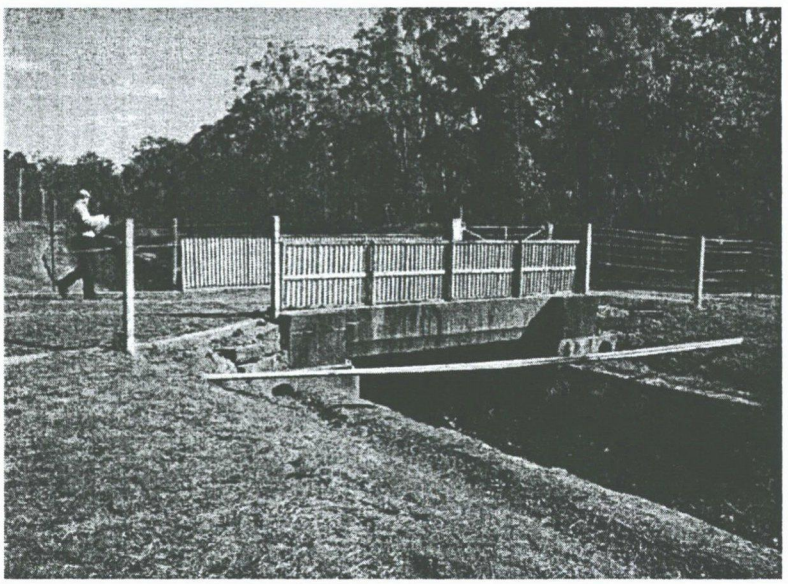


Figure 28: View of bridge at chainage 41176 (Section 7 Inventory 25).

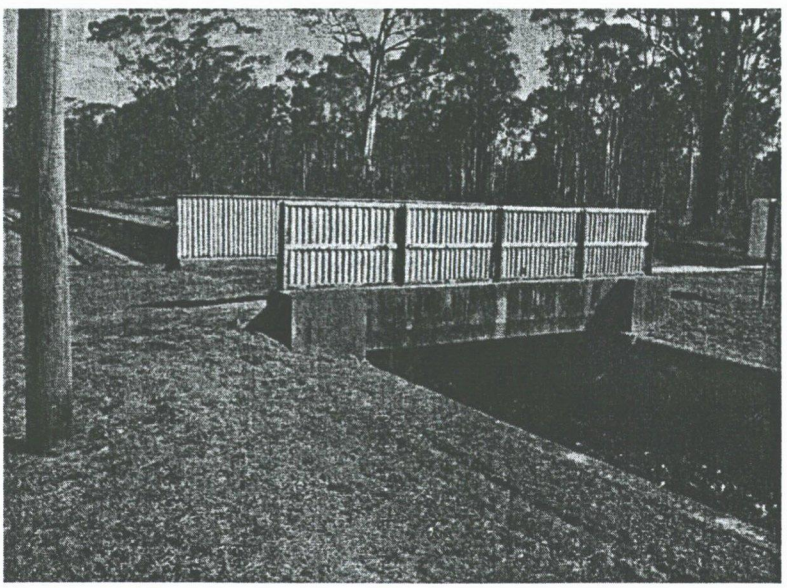


Figure 29: View of bridge at chainage 41655 (Section 7 Inventory 30).

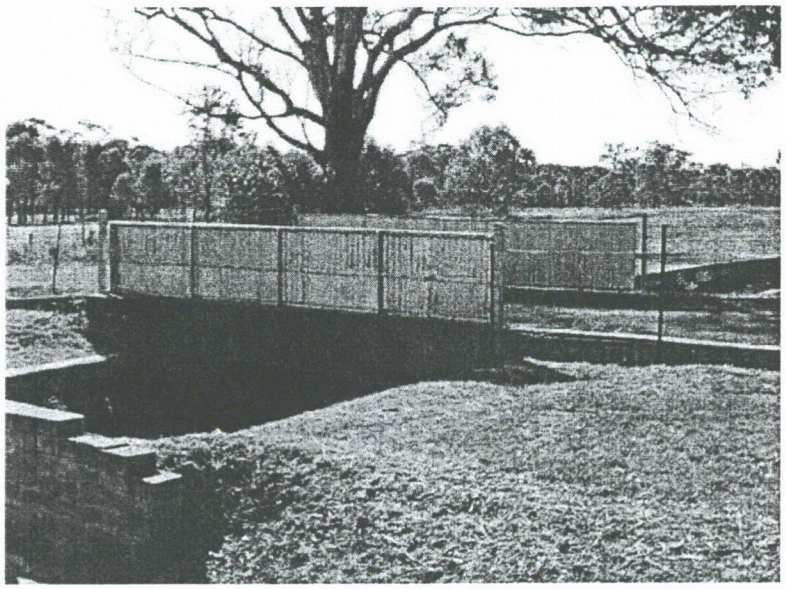


Figure 30: View of bridge at chainage 42309 (Section 7 Inventory 37).

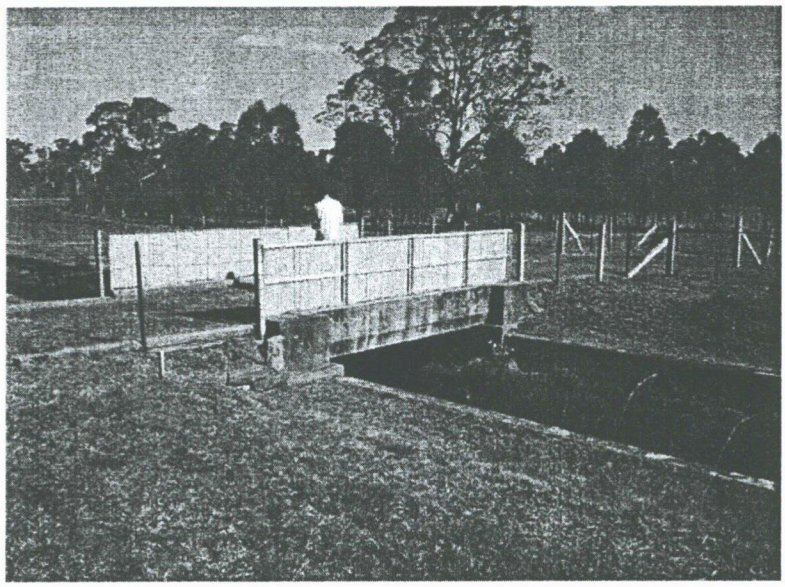


Figure 31: View of bridge at chainage 43112 (Section 7 Inventory 42).

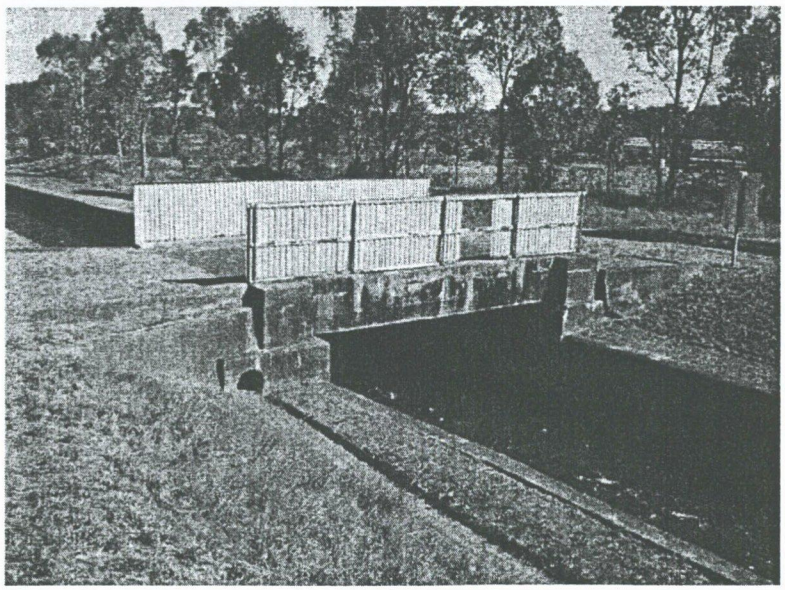


Figure 32: View of bridge at chainage 44417 (Section 8 Inventory 12).

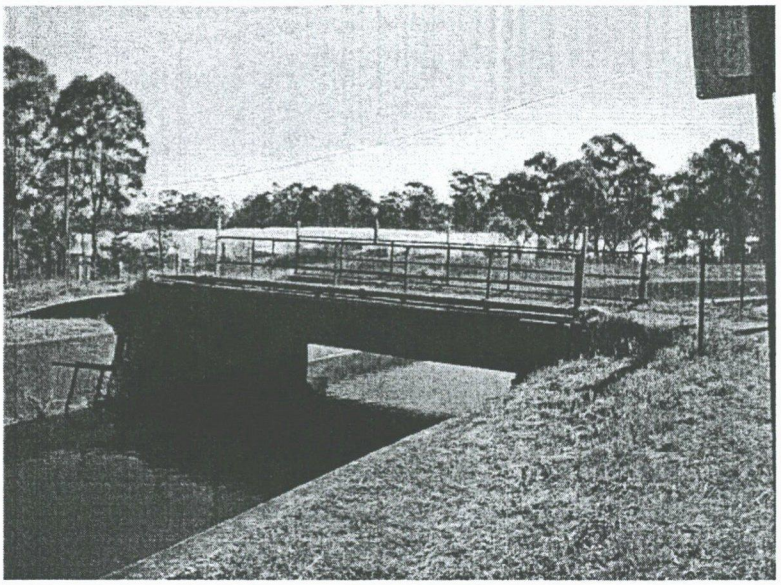


Figure 33: View of bridge at chainage 47262 (Section 8 Inventory 41).

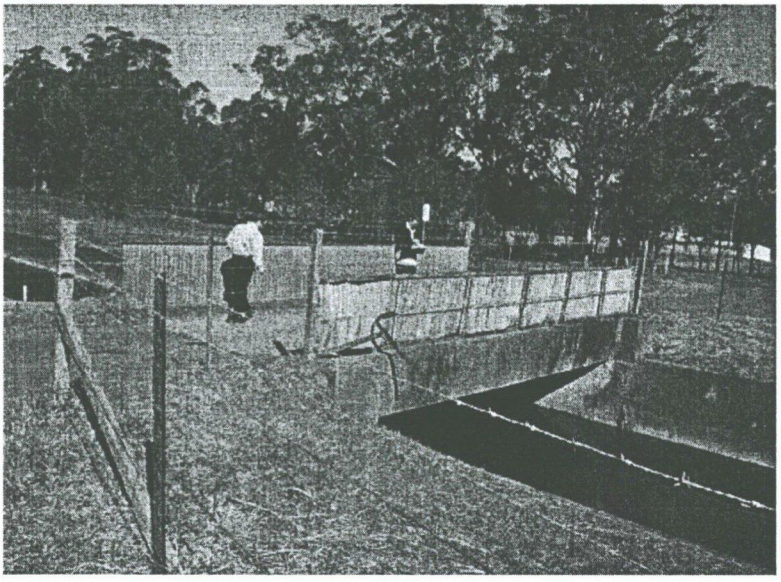


Figure 34: View of bridge at chainage 49052 (Section 9 Inventory 3).

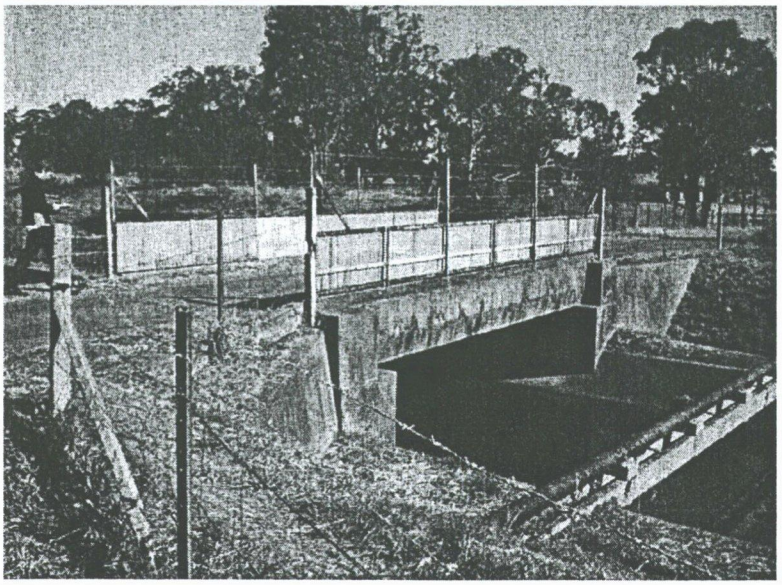


Figure 35: View of bridge at chainage 50130 (Section 9 Inventory 8).

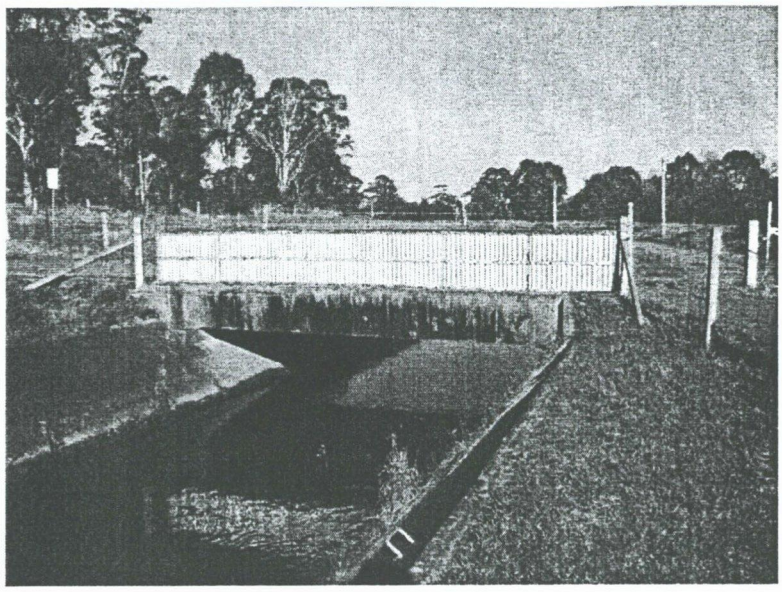


Figure 36: View of bridge at chainage 51635 (Section 9 Inventory 22).

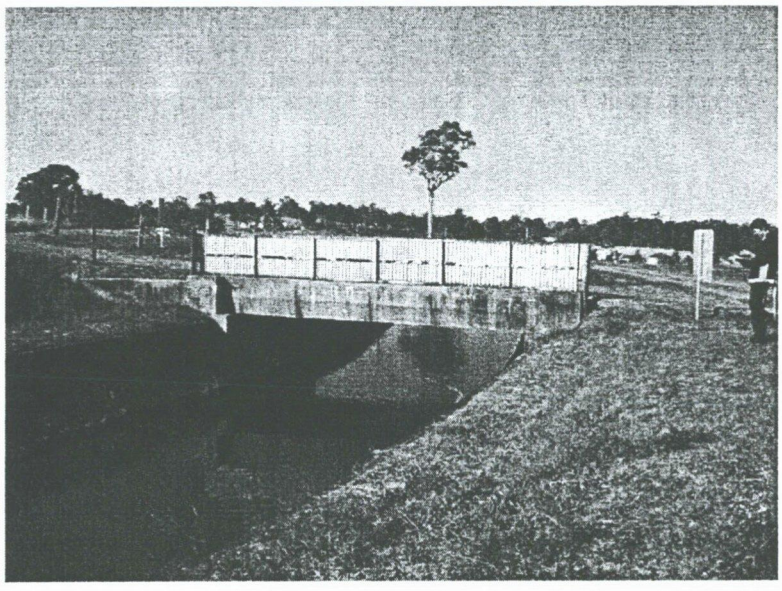


Figure 37: View of bridge at chainage 52376 (Section 9 Inventory 28).

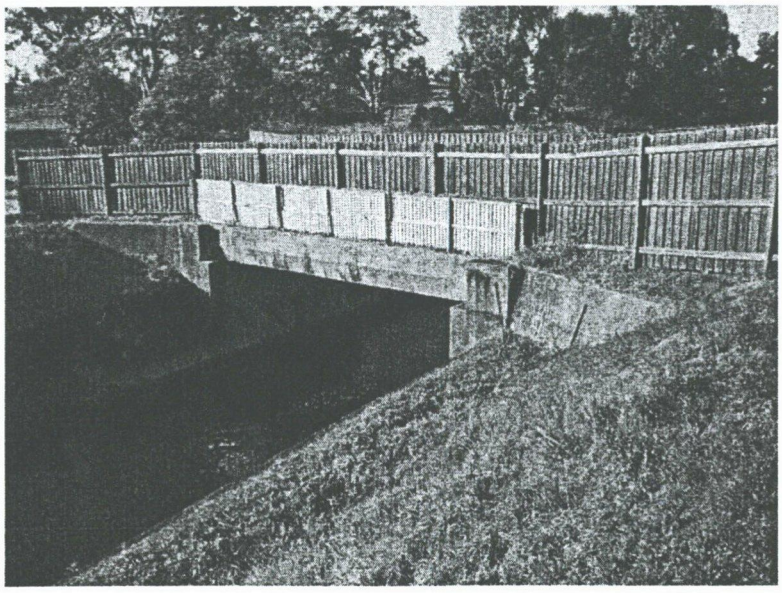


Figure 38: View of bridge at chainage 61412 (Section 11 Inventory 29).

TYPE B

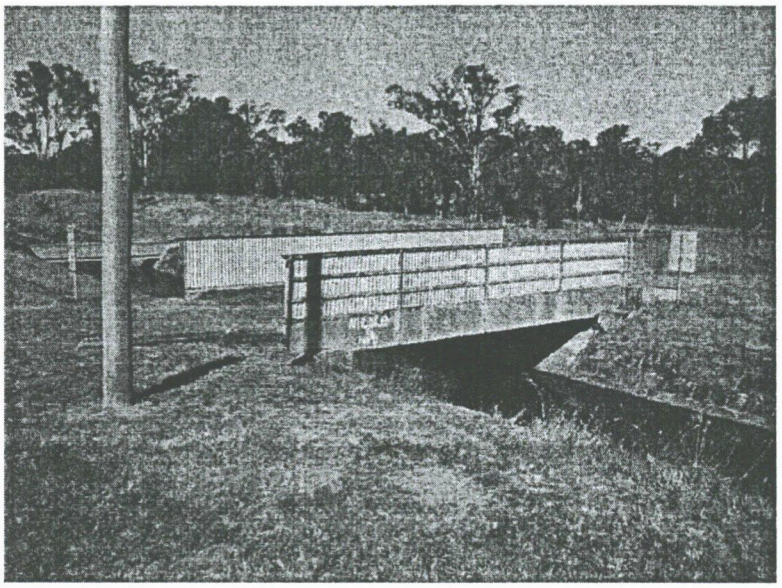


Figure 39: View of bridge at chainage 45876 (Section 8 Inventory 24).

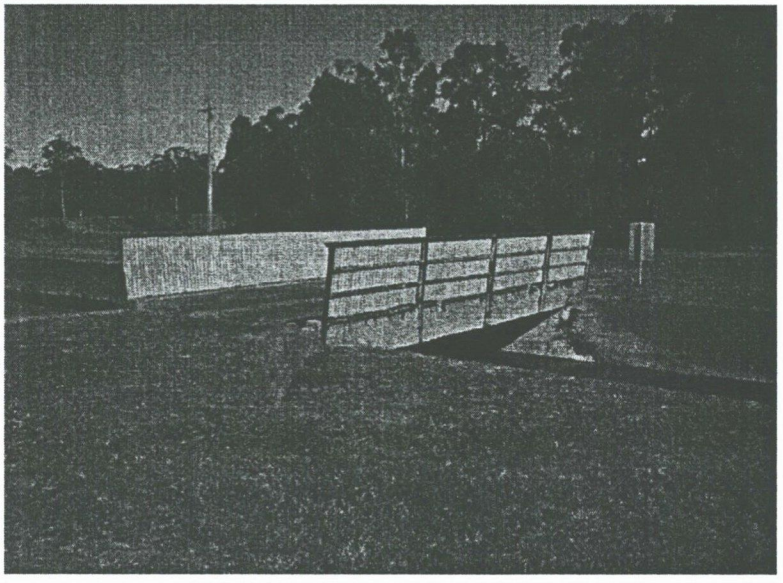


Figure 40: View of bridge at chainage 48883 (Section 8 Inventory 52).

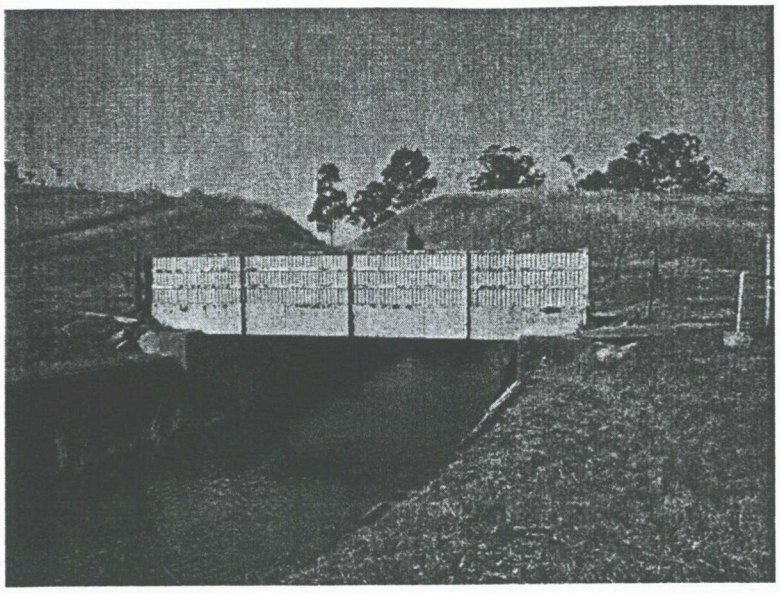


Figure 41: View of bridge at chainage 53137 (Section 9 Inventory 37).

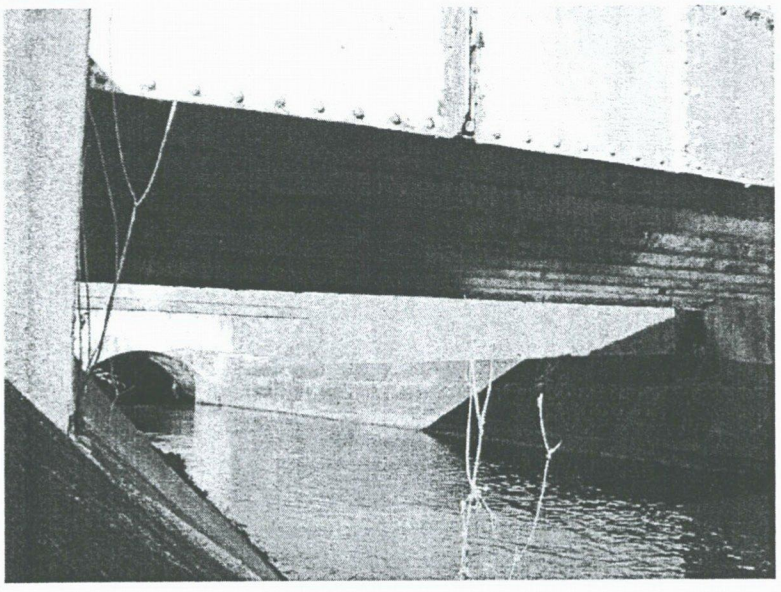


Figure 42: View of the underside of the deck of bridge at chainage 53137.

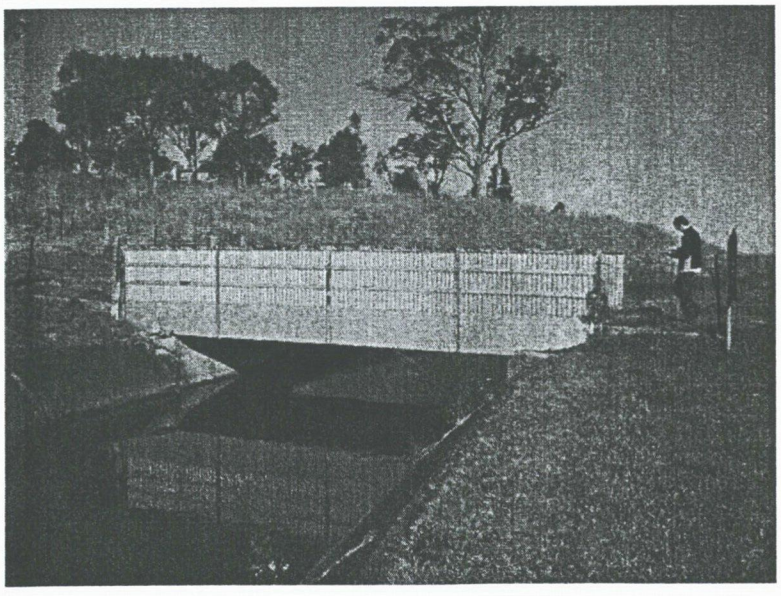


Figure 43: View of bridge at chainage 54260 (Section 10 Inventory 4).

TYPE C

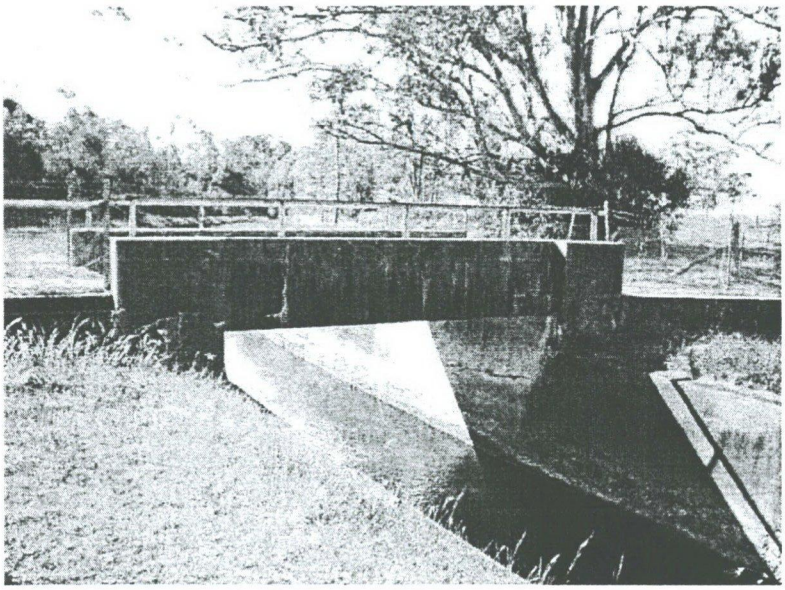


Figure 44: View of bridge at chainage 27614 (Section 4 Inventory 64).

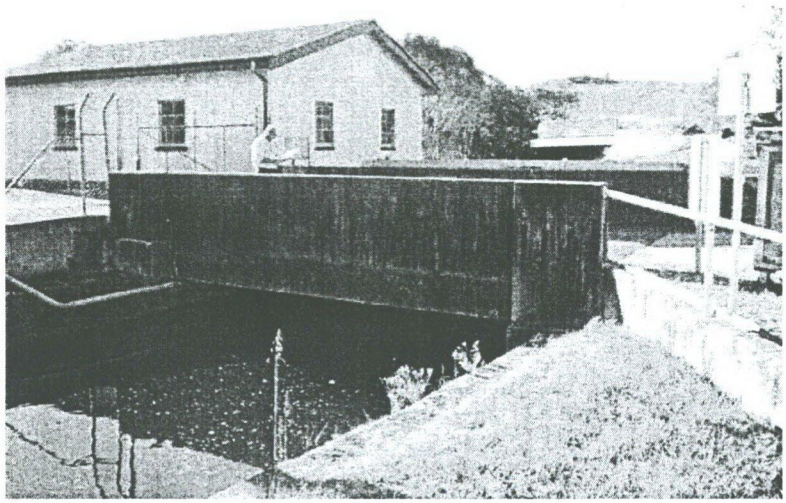


Figure 45: View of bridge at chainage 30784 (Section 5 Inventory 33).

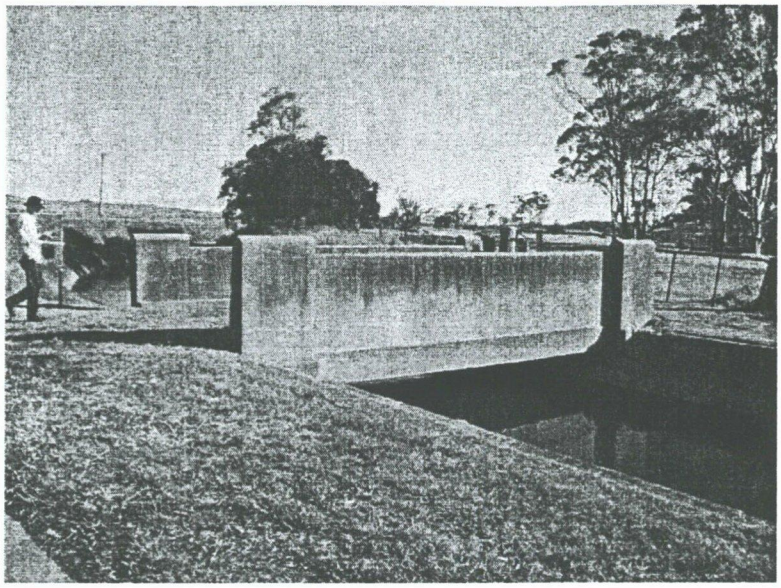


Figure 46: View of bridge at chainage 32012 (Section 5 Inventory 53).

TYPE D

Two bridges with reinforced concrete beam and slab deck, single lane width. Concrete footings on sides of canal. Flat steel railings without cladding.

Figure 47: View of bridge at chainage 11577 (Section 2 Inventory 24).

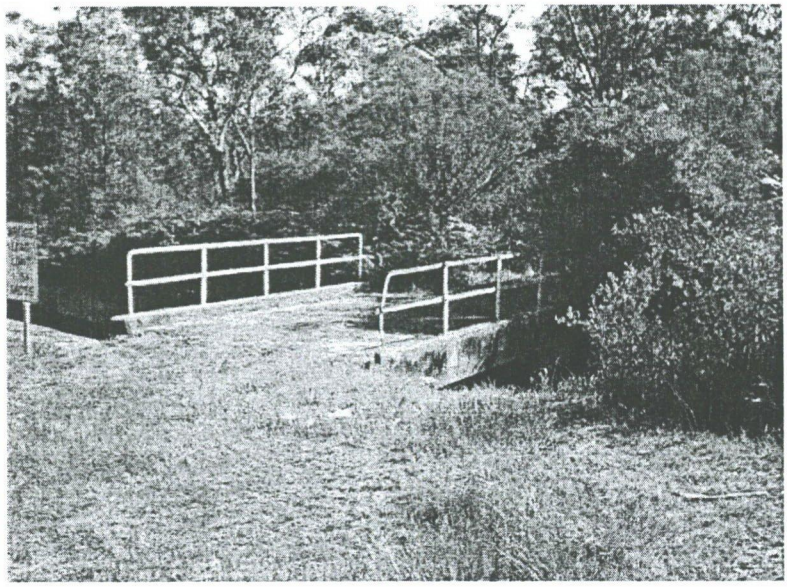


Figure 48: View of bridge at chainage 15272 (Section 2 Inventory 67).

Small, single span, arched footbridge constructed of concrete, rendered and struck to imitate masonry. The side walls have a rendered, sandstock brick coping/parapet.

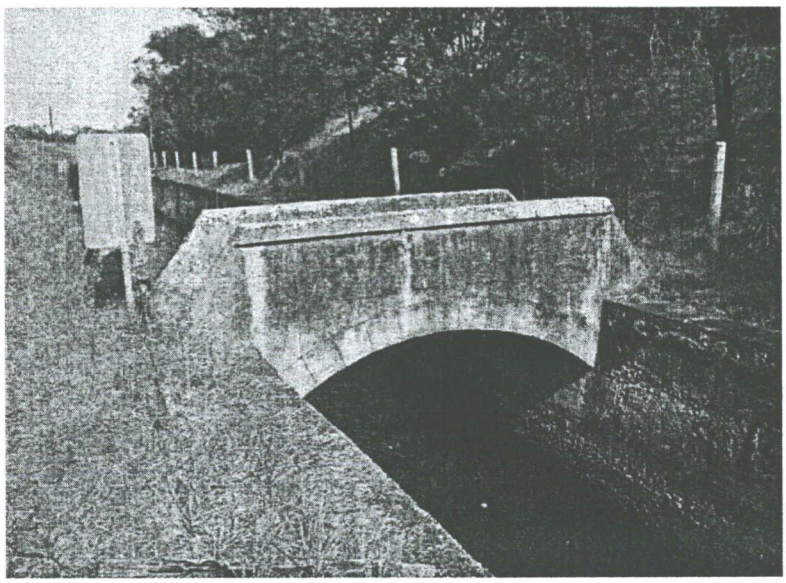


Figure 49: View of bridge at chainage 23387 (Section 4 Inventory 6).

4.2 Proposed works

A comprehensive series of tasks are proposed for the bridges that are of the nature of routine maintenance. These tasks focus on repairing cracks and spalling, with additional attention given to the bearings, girders and railing. In order to present these in tabular form the tasks have been given abbreviated titles. Initially there are five separate crack repairs each of which would be executed through cutting a V joint around the crack and filling it with Megapoxy H mixed with sand.

Crack repairs to the top of the deck (C1)

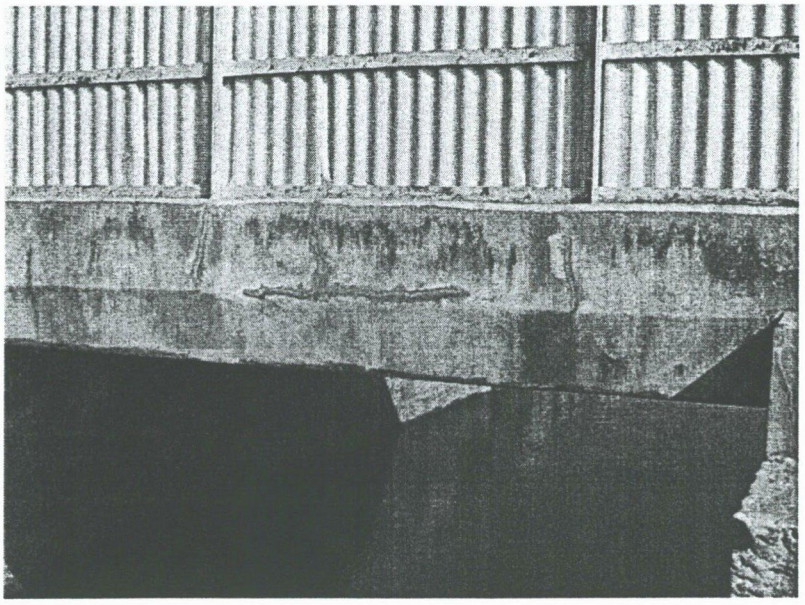


Figure 50: Repairs executed to the underside of the deck of a concrete bridge.

Crack repairs to the underside of the deck (C2) of the nature as that presented in **figure 50**.

Crack repairs to the kerb (C3) of the nature as that presented in **figure 51**.

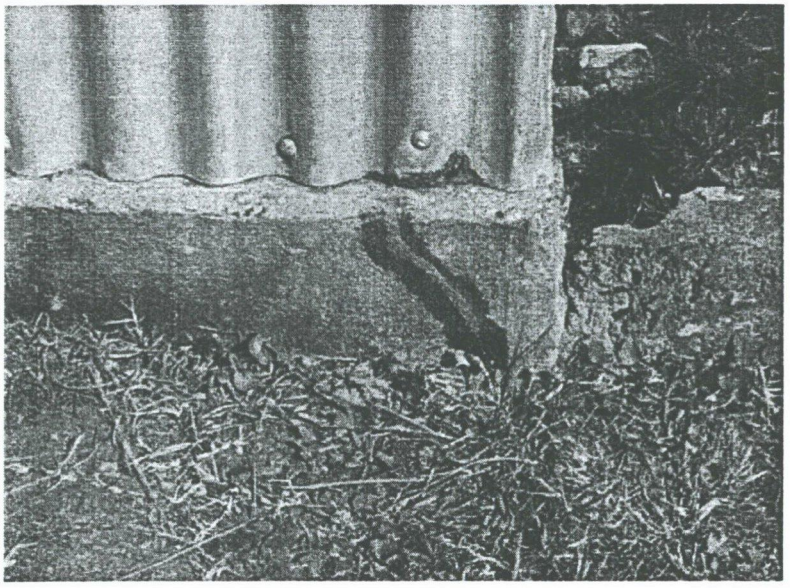


Figure 51: Crack repairs executed to the kerb of the deck of a concrete bridge.

Crack repairs to the abutment (C4) of the nature as that presented in **figure 52**.

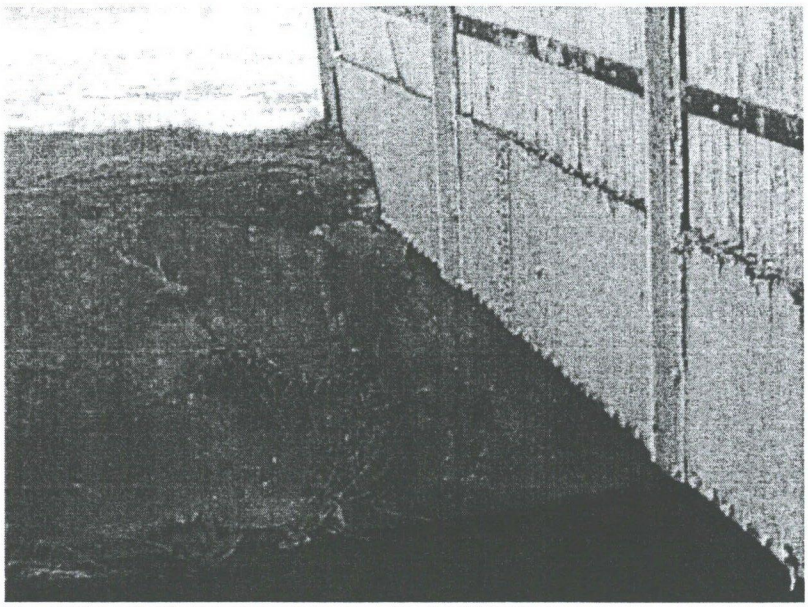


Figure 52: Detailed view of cracks in concrete abutment of bridge.

Crack repairs to concrete parapets (C5).

Spalling repairs are similar to crack repairs but cover a greater surface area. EMACO cement mortar would be used for this task.

Spalling repairs to the deck (S1). Spalling repairs to the kerbs (S2) of the nature as that presented in **figure 53**.

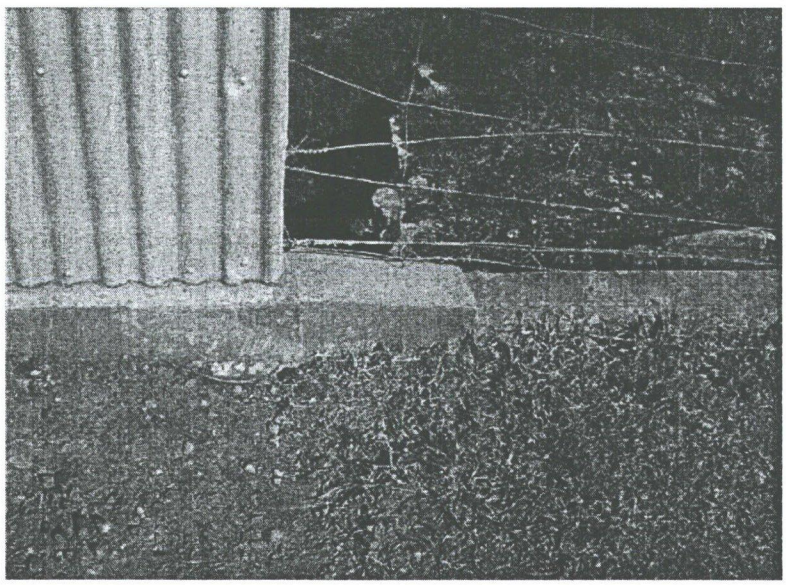


Figure 53: Spalling repairs executed to the kerb of the deck of a concrete bridge.

Spalling repairs to the abutments (S3) of the nature as that presented in **figure 54**.

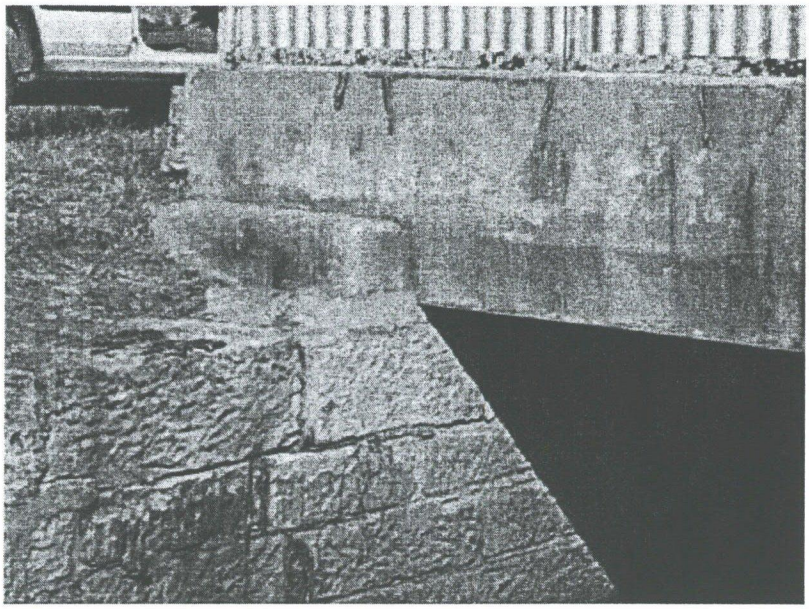


Figure 54: Spalling repairs executed to the abutment of a concrete bridge.

Spalling repairs to the parapet (S4).

Bearing repairs (B) to be undertaken through the cleaning out of loose concrete from the girder bearings and repair with EMACO cement mortar.

Additionally, the bottom flanges of the Girders (G) are to be wire brushed and painted.

Finally the Railings (R) are to be replaced in a like for like manner.

Bridge Number	C1	C2	C3	C4	S1	S2	S3	B	G	R
10586	x	x			x	x		x	x	x
10847	x	x								x
12166										x
13049										x
13786										x
14355										x
14769										x
18420								x	x	x
20160	x							x	x	x
21260		x				x		x	x	x
21874						x		x	x	x
25337	x								x	x
26651	x		x						x	x
29934									x	x
41176				X				x	x	x
41655				X				x	x	x
42309		x		X					x	x
43112			x	X					x	x
44417			x			x			x	x
47262				X	x				x	x
49052			x						x	x
50130			x						x	x
51635		x	x				x		x	x
52376	x	x	x	X					x	x
61412				X					x	x

Table 2: Schedule of proposed works for reinforced concrete bridges of Type A construction.

Bridge number	C1	C2	C3	C4	S1	S2	S3	B	G	R
45876						x		x	x	
48883						x		x	x	
53137	x									x
54260		x								x

Table 3: Schedule of proposed works for reinforced concrete bridges of Type B construction.

It is recommended that 48883 should be decommissioned as it is a disused occupation bridge that does not warrant the expense of repairing. Bollards should be placed on each of the approaches to prevent vehicular access to the Bridge. The three other bridges of this type are in relatively good condition and are more representative than this example.

Bridge number	C1	C2	C3	C4	C5	S1	S2	S3	S4	G
27614		x			x	x				x
30784				x		x				
32012	x						x			

Table 3: Schedule of proposed works for reinforced concrete bridges of Type C construction.

Bridge number	C1	C2	C3	C4	C5	S1	S2	S3	S4	B	G
11577					x						
15272	x	x			x						
23387		x	x	x						x	x

Table 4: Schedule of proposed works for reinforced concrete bridges of Type D construction.

4.3 Statement of Heritage Impact

The following questions are presented in the *NSW Heritage Manual* document "Statements of Heritage Impact" as the minimum response required to properly address the present proposals on the reinforced concrete bridges which would result in minor additions to the items (HO/DUAP 1996).

4.3.1 What aspects of the proposal respect or enhance the heritage significance of the bridges?

The proposed works respect the heritage significance of the bridges in that they are to be executed in similar materials. The works would enable the continued utility of the bridges in providing vehicular access to the Upper Canal, enabling the SCA to conduct essential maintenance and inspection duties.

4.3.2 What aspects of the proposal could have a detrimental effect on the heritage significance of the bridges?

While the spalling repairs would initially be distinct due to the grey colouring of the EMACO cement mortar the repairs would weather over time to blend with the existing colour of the concrete abutments. The new railings that are to be installed on the bridges would match the existing railings in appearance and would be painted the same colour.

4.3.3 Are the additions sympathetic to the heritage item? In what way (e.g. form, proportions and design)?

It is considered that the proposed works are the most sympathetic solutions available to ensure the continued utility of the bridges. In most instances the works fall under the umbrella of minor maintenance items. Each of the proposed additions has been designed so as to harmonise with the existing materials of the bridge. They are sympathetic in that they comply with the conditions laid out for :

Standard Exemption 1: Maintenance and Cleaning

The following maintenance and cleaning does not require approval under s.57 (1) of the *NSW Heritage Act*:

b) the maintenance of an item to retain its condition or operation without the removal of or damage to the existing fabric or the introduction of new materials

Standard Exemption 2: Repairs

Repair to an item which is of the type described in (a) or (b) below does not require approval under s.57 (1) of the *NSW Heritage Act*.

a) the replacement of services such as cabling, plumbing, wiring and fire services that uses extensive service routes, cavities or voids or replaces existing surface mounted services and does not involve damage to or the removal of significant fabric;

b) the repair (such as refixing and patching) or the replacement of missing, damaged or deteriorated fabric that is beyond further maintenance, which matches the existing fabric in appearance, material and method of affixing and does not involve damage to or the removal of significant fabric.

The proposed replacement of the railing would be considered a minor alteration and is covered by Standard Exemption 7.

Standard Exemption 7: Minor activities with no adverse impact on heritage significance

1. Anything which in the opinion of the Director is of a minor nature and will not adversely affect the heritage significance of the item does not require approval under s.57 (1) of the Act.
2. A person proposing to do anything of the kind described in paragraph 1 must write to the Director and describe the proposed activity. If the Director is satisfied that the proposed activity meets the criteria set out in paragraph 1, the Director shall notify the applicant.

The proposed alteration to the pedestrian bridge at chainage 15079 is sympathetic in that the form and fabric would remain unchanged.

4.4 Schedule of conservation works for reinforced concrete bridges

Sections of these policies have been taken from the NSW Heritage Office publication *The Investigation and Repair of Historic Concrete*, 2003.

Physical inspection and examination

A thorough physical investigation will be required to identify and diagnose problems and to quantify and specify the repair works. Mapping defects such as cover concrete, spalling, delamination, cracking, depth of friable surface layers, and other defects will offer information about the nature and extent of the problem. An experienced worker can determine much from the patterns of patent damage, such as reinforcement corrosion, alkali-aggregate reaction and structural damage. Such a survey will also assist in estimating the costs of rehabilitation.

Repair

As with any conservation project, there will be a number of different repair options available, each with advantages and disadvantages. The choice will be determined by:

- The results of the investigation works
- The severity of the deterioration
- The risk of future deterioration
- Required service life
- The practicality of applying the repair option
- Aesthetics
- Suitability for a heritage structure
- Cost

Most repair proposals for reinforced concrete structures include treatments that arrest or reduce future deterioration, and many products and systems are marketed as a package. When selecting the repair technique and any preventative treatments the following should be considered: significance of the bridge, technical defects, required performance and the particular environmental concerns in place on the Upper Canal.

Current repair methods and preventative treatments

Patch repair

Patch repair is the most common method of concrete repair and is required wherever there is patent damage. As a result it is likely to be required as part of most repair programmes.

Patch repair is carried out by mechanically breaking out the damaged, cracked or spalled concrete to fully expose the steel reinforcement. The steel must be thoroughly cleaned to the requisite Australian Standard and is then usually coated with a proprietary bar primer for protection. Severely corroded reinforcement (where there is a loss of 10% or more of the section) may require replacement by splicing in new sections if the loss of section is excessive.

Replacement of reinforcement should be done with the same material to avoid bimetallic corrosion. Therefore the replacement for plain steel with galvanised steel should be avoided.

The broken-out concrete is reinstated using either:

- A site-batched cementitious repair mortar, usually polymer modified to help reduce permeability, shrinkage and adhesion;
- A pre-bagged cementitious repair mix.

As the general principle in the repair of heritage structures is to replace like materials with like materials, cementitious-based mixes should be used in preference to epoxy-based repair materials.

Patch repairs should be cut out and reinstated as discreetly as possible, taking care to observe joints and distinguishing marks. The concrete is cut out to form right-angled or slightly re-entrant edges, avoiding feather edges. For deeper patches stainless steel pins should be considered to assist in securing the new patch repair.

It can be difficult to achieve a perfect match between the original concrete and the repair mortars, which tend to be modified with additives to improve performance (enhancing durability and reducing shrinkage and subsequent cracking). Patches which appear a close match when dry, can appear as blemishes on the structure when wet from rain. In time, the new concrete will weather and blend in more closely with the existing concrete. Regard to mimicking the existing surface texture will assist in replicating the original finish.

Trial patches are essential when attempting to replicate an existing surface finish. Sample patches should be viewed wet and dry and should represent the different textures and colour ranges found around the structure.

Maintenance

Until the 1970s when the relevant concrete codes of practice began to acknowledge issues of durability and long-term performance, reinforced concrete was believed to be a maintenance-free building material. It is now broadly acknowledged that this is not the case. Apart from all the usual maintenance issues such as drainage, reinforced concrete requires long-term care to counter potentially harmful environmental conditions and to cope with any material problems.

As the rate of deterioration is time dependent it may differ across the structure. At the time of inspection not all the defects may be evident. Ongoing maintenance is therefore needed for periodic examination and testing too determine whether further repairs are necessary. Inspections should be made in order to identify any latent damage or druminess.

Regular maintenance checks of concrete should include inspection of the repairs to ensure that they are fulfilling their function. Repair materials have their own maintenance cycles that need to be respected. A maintenance program should include upkeep of repairs to ensure their continued effectiveness, as well as that of the original fabric.

5 Brick Arch Bridges

5.1 Description of the brick arch bridges

Each of the three brick arch bridges are substantially the same (figures 52 – 54). They each consist of a four ring brick arch across the canal with English bond brick spandrels and widened piers and a widened brick parapet below the balustrade. The balustrades are formed by flat and angle iron with iron pipe railings clad with corrugated iron.

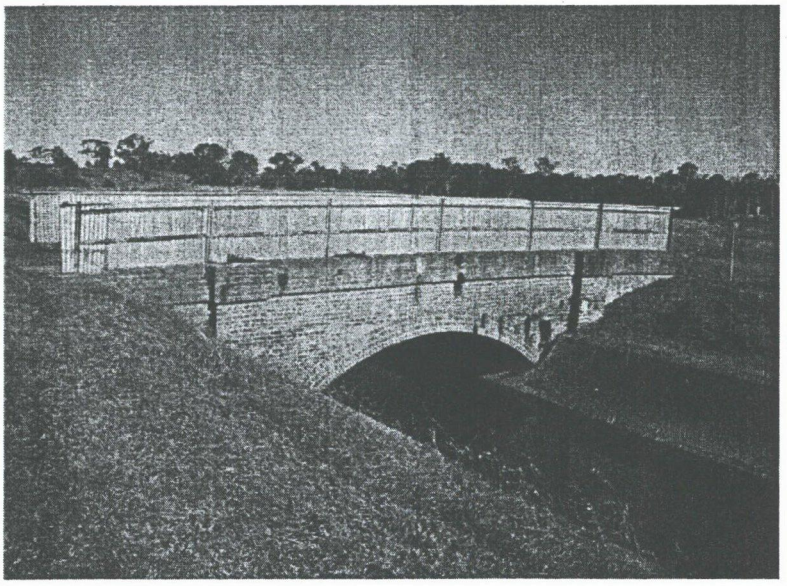


Figure 55: View of bridge at chainage 35280 (Section 6 Inventory 11).

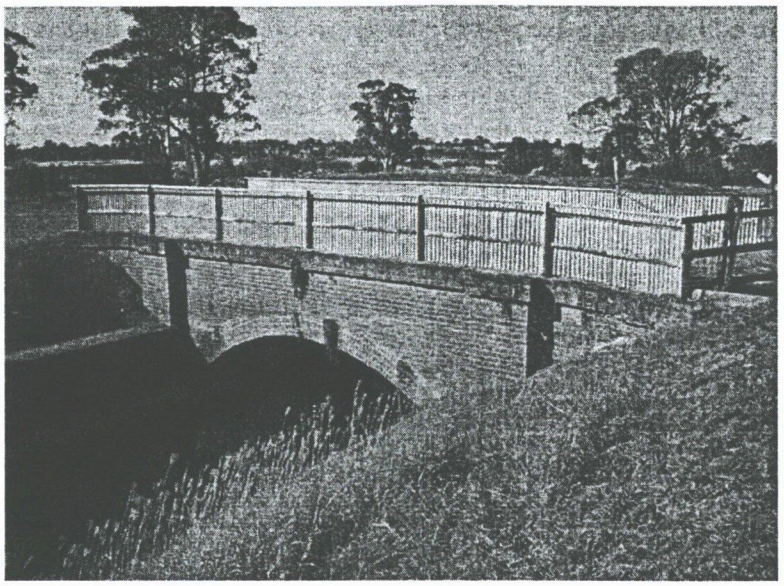


Figure 56: View of bridge at chainage 37394 (Section 6 Inventory 30).

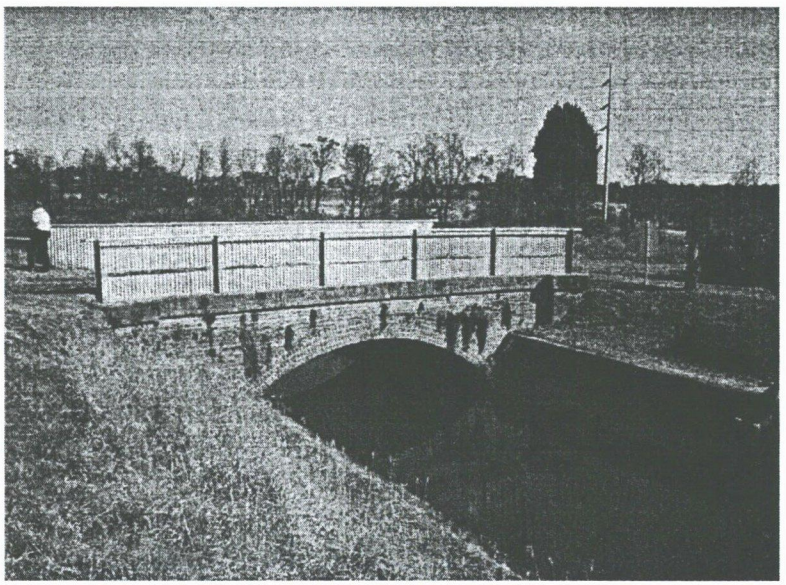


Figure 57: View of bridge at chainage 38636 (Section 6 Inventory 41).

5.2 Proposed works

It is proposed that maintenance works be undertaken on the bridges to ensure their continued safe operation. Initially, the weeds that are currently growing on the spandrels of the arches would be removed by hand and water blasted where necessary. The mortar that they have displaced would then be repointed with an approved lime mortar that conforms with that which was used in the bridges' construction. Finally, the railing in place on each of the bridges would be replaced in a like for like manner.

The brick arch bridge at chainage 35280 (**figure 55**) was observed as being in an advanced stage of deterioration and should be closed to traffic until such time as a full condition report is undertaken for the bridge. Incipient failure of the arch is a strong possibility in that step cracking extends down the western spandrel to the keystone. In addition the weight of the interior fill that supports the roadway appears to have shifted towards the north west. This is probably as a result of fluid movement as the roadway lacks a waterproof seal.

5.3 Statement of Heritage Impact

The following questions are presented in the *NSW Heritage Manual* document "Statements of Heritage Impact" as the minimum response required to properly address the present proposals on the brick arch bridges which would result in minor additions to the items (HO/DUAP 1996).

5.3.1 What aspects of the proposal respect or enhance the heritage significance of the bridges?

The proposed works respect the heritage significance of the bridges in that they are limited to routine maintenance only. The bridges are to be repointed with a lime mortar that conforms with that which was used in the construction of the bridges. Furthermore, the railings are to be replaced in a like for like manner.

5.3.2 What aspects of the proposal could have a detrimental effect on the heritage significance of the bridges?

While the mortar repairs would initially be distinct due to their pale colouring the repairs would weather over time to blend with the existing colour. The new railings that are to be installed on the bridges would match the existing railings in appearance and would be painted the same colour.

5.3.3 Are the additions sympathetic to the heritage item? In what way (e.g. form, proportions and design)?

It is considered that the proposed works are the most sympathetic solutions available to ensure the continued utility of the bridges. In most instances the works fall under the umbrella of minor maintenance items.

Standard Exemption 1: Maintenance and Cleaning

The following maintenance and cleaning does not require approval under s.57 (1) of the *NSW Heritage Act*:

c) the maintenance of an item to retain its condition or operation without the removal of or damage to the existing fabric or the introduction of new materials

Standard Exemption 2: Repairs

Repair to an item which is of the type described in (a) or (b) below does not require approval under s.57 (1) of the *NSW Heritage Act*.

a) the replacement of services such as cabling, plumbing, wiring and fire services that uses extensive service routes, cavities or voids or replaces existing surface mounted services and does not involve damage to or the removal of significant fabric;

b) the repair (such as refixing and patching) or the replacement of missing, damaged or deteriorated fabric that is beyond further maintenance, which matches the existing fabric in appearance, material and method of affixing and does not involve damage to or the removal of significant fabric.

The proposed replacement of the railing would be considered a minor alteration and is covered by Standard Exemption 7.

Standard Exemption 7: Minor activities with no adverse impact on heritage significance

1. Anything which in the opinion of the Director is of a minor nature and will not adversely affect the heritage significance of the item does not require approval under s.57 (1) of the Act.

A person proposing to do anything of the kind described in paragraph 1 must write to the Director and describe the proposed activity. If the Director is satisfied that the proposed activity meets the criteria set out in paragraph 1, the Director shall notify the applicant.

The closure of the brick arch bridge at chainage 35280 is considered necessary to ensure that effective management procedures can be put in place before it deteriorates further.

5.4 Schedule of conservation works for the brick arch bridges

Conservation advice

All conservation works shall be supervised by a suitably qualified and experienced conservation practitioner.

Maintenance and repair

All maintenance and repairs should be aimed at retarding the deterioration of all significant fabric, keeping it *in-situ* and in its current state and form.

Repointing defective joints

Repoint open joints. Remove defective and detrimental mortar from joints and repoint. The composition of the mortar used to repoint the joints should be more permeable than the adjacent stone. This is in order that any soluble salts are encouraged to migrate into the joints rather than accumulate in the stone.

In order to ensure that pointing and grouting is carried out effectively, quality control procedures will be implemented to ensure compliance with specification requirements for materials and workmanship.

a) Batch by weight not volume to ensure accurate mix proportions

d) Ensure satisfactory mixing

b) Ensure adequate adhesion, joint preparation, cleaning the joint surfaces properly

e) Eliminate unsuitable repointing techniques, shallow joint depth, unsuitable tools

f) Permit no tempering of mortar or additives

g) Ensure effective curing. Provide protection from hot windy conditions to ensure complete cement hydration, preventing shrinkage cracking and bond failure.

Repointing mortar must always be softer than the masonry units and the original mortar. If the new mortar is harder than the masonry or original mortar, it can cause serious stresses within the wall during thermal expansion and contraction, which can lead to deterioration of the masonry units rather than the mortar. If the mortar is softer, any deterioration that occurs will take place in the mortar, which is easily replaced during the next repointing project. The repointed areas should match the original pointing in joint thickness and tooling if it is to blend well with adjacent areas.

Cleaning methods

The amount and nature of the soiling and deterioration differs on various parts of the bridge and its approaches, due to variation in stone porosity, age, orientation, detail, exposure, history of cleaning and graffiti removal. Consequently more than one method of repair and cleaning will be required.

The reasons for cleaning should always be established and the likely benefits and risks assessed. In the past extensive damage has been caused by mechanical and chemical cleaning Sydney sandstone.

Clean masonry only when it becomes absolutely necessary and always use the gentlest method possible. Biological growth on the bridge is intermittently aesthetically unpleasing. It is, however, not feasible with today's technology to maintain the entire structure free from biological growth.

A cleaned structure will get dirty again. The periodic nature of the cleaning cycle highlights the importance of gentle, non-damaging methods. The fact that structures get dirty again is often sited as an objection to cleaning. Imagine there is no point in cleaning glass because it will only get dirty again.

Dirt hides decay and conceals defects. The cleaning of heavily soiled structures is an essential prerequisite to its proper investigation and conservation, irrespective of whether the dirt itself is causing any damage.

It is of paramount importance in any cleaning exercise to know when to halt the process. Cleaning should dislodge the surface dirt but stop before abrasive or chemical damage results to the surface of the stone. Ingrained deposits (stains) are left.

Only experienced skilled contractors and site operatives should be engaged on stone cleaning contracts.

Any cleaning operation should comply with the following conditions:

- it must not lead to the formation of deteriorating by-products (salts)
- it must cause minimal disruption to both the mineralogy and texture of the stone
- it must not increase surface porosity, as this is conducive to biological growth.
- it must not damage adjacent materials, metalwork or mortar joints
- it must not contaminate or stain other stone fabric and open joints with dissolved salts, dirt and biological growths.

Sandstone should only be cleaned when it becomes necessary and in association with other maintenance works. Tests should be carried out to evaluate any cleaning method. The selection of the most appropriate treatment should be based on objective analysis of the results obtained both from laboratory and on site tests.

Graffiti Management

In addition to the general policies regarding cleaning of stonework previously discussed there are a number of specific issues that relate to graffiti. A strategy should be developed that identifies graffiti prone areas and suggest methods for control in each area. Records of graffiti treatments and their technical specifications must be kept. It is necessary to keep records of graffiti applications, their technical data sheets, specifications, particularly the recommended method of removal, as the technology and contractors change so rapidly. As much damage is done by failed graffiti coatings and removing graffiti coatings as removing the original graffiti. It is difficult, expensive and sometimes next to impossible to identify the coating to be removed.

Early detection and removal of graffiti reduces the impact of graffiti. The limited use of anti-graffiti treatments is recommended.

The performance of graffiti removal methods should be tested. Criteria for the acceptance and assessment of these methods include the following:

- They should be chemically inert with regards the stone
- They should not lead to the formation of deteriorating by products (salts)
- They should cause minimal disruption to the colour and texture of the stone
- They should not increase the surface porosity of the stone
- They should not contaminate, damage or stain adjacent materials, metalwork, mortar joints or enter open joints
- They should meet health and safety requirements
- They should be compatibility with ecological requirements
- No residual chemicals should be left in the bridge fabric after the process is complete
- They should have high efficiency in removal of graffiti

A management system for the early detection and treatment of graffiti should be established.

6 Sandstone Arch Bridge

6.1 Description of sandstone arch bridge

A single sandstone arch bridge is the subject of the present study. This consists of an arched masonry bridge with masonry abutments placed on top of the walls of the open canal section. Semicircular arch with span of 3 metres constructed of 11 sandstone voussoirs (**figure 58**). The bridge is constructed of sandstone ashlar masonry using rock-faced blocks with drafted margins. The bridge also has a decorative projecting chamfered sandstone string course and a projecting sandstone coping above the balustrade. The side balustrade is curved at both ends of the bridge (**figure 59**).

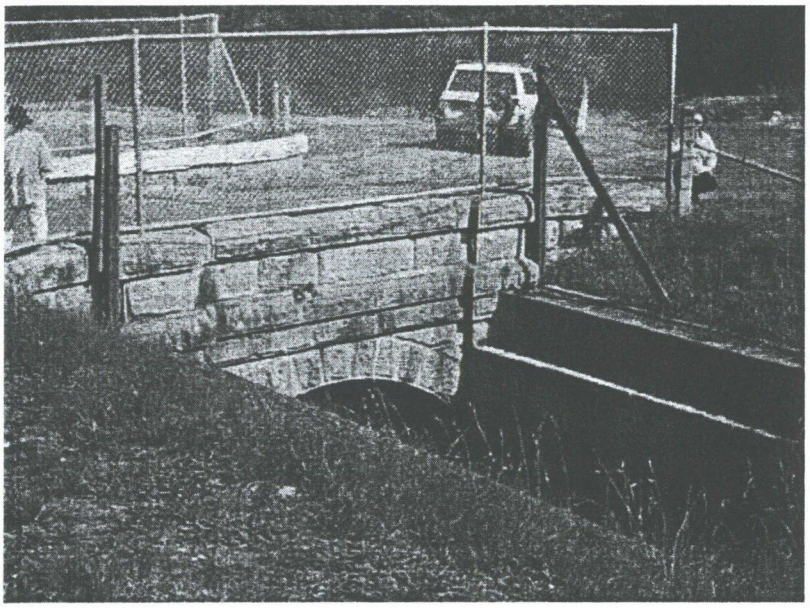


Figure 58: View of bridge at chainage 26526 (Section 4 Inventory 42).

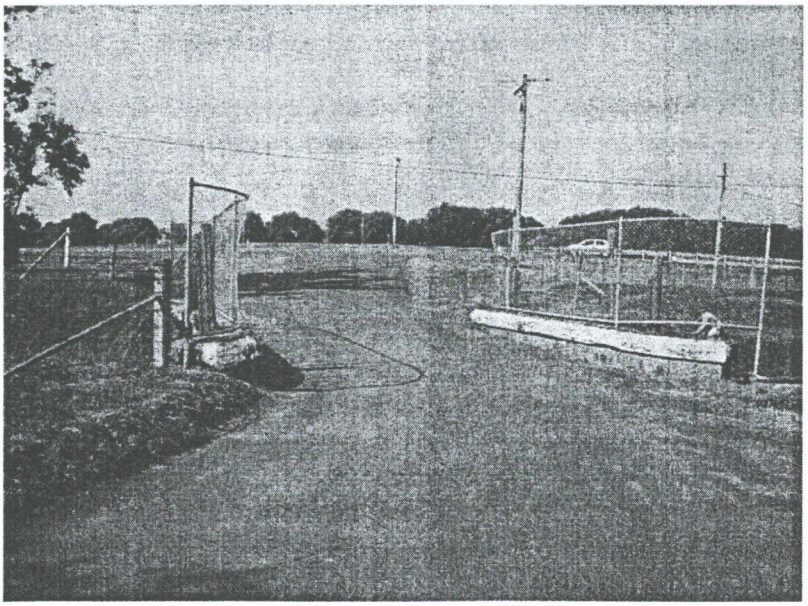


Figure 59: View of roadway looking east illustrating curved ends of balustrades.

6.2 Proposed works

It is proposed that maintenance works be undertaken on the bridge to ensure their continued safe operation. Initially, the weeds that are currently growing on the spandrels of the arches would be removed by hand and water blasted where necessary. The mortar that they have displaced would then be repointed with an approved lime mortar that conforms with that which was used in the bridge's construction. Methods would then be used to clean the mould and lichen from the sandstone as laid out in Section 6.4.

Repairs would be undertaken to the cracks on the top course of the road where vehicular impacts have removed some of the high visibility white paint. Finally, a concrete kerb would be constructed in front of the curved ends of the balustrades and a guardrail would be built on top of it to provide protection to the sandstone fabric. To make allowance for the resulting reduction in the width of the carriageway the bridge would be reduced to a single lane operation.

6.3 Statement of Heritage Impact

The following questions are presented in the *NSW Heritage Manual* document "Statements of Heritage Impact" as the minimum response required to properly address the present proposals on the bridge which would result in minor additions to the items (HO/DUAP 1996).

6.3.1 What aspects of the proposal respect or enhance the heritage significance of the bridge?

The proposed works respect the heritage significance of the bridge in that they are limited to routine maintenance only. The bridge is to be repointed with a lime mortar that conforms with that which was used in the construction of the bridge. Furthermore, a concrete kerb and steel guardrail would be constructed on the bridge deck in order to protect the sandstone balustrade form vehicular impacts.

6.3.2 What aspects of the proposal could have a detrimental effect on the heritage significance of the bridge?

While the mortar repairs would initially be distinct due to their pale colouring the repairs would weather over time to blend with the existing colour.

The proposed new guard railings would change the appearance of the deck and as such should be carefully designed so that they do not detract form the overall aesthetics of the bridge. Consideration should be given to leaving the existing deck configuration intact and changing the operation of the bridge to single lane only.

6.3.3 Are the additions sympathetic to the heritage item? In what way (e.g. form, proportions and design)?

Provided that the cleaning methods utilised on the bridge conform with the policies laid out in Section 6.4 than the proposed methods would be sympathetic to the bridge. In most instances the works fall under the umbrella of minor maintenance items.

Standard Exemption 1: Maintenance and Cleaning

The following maintenance and cleaning does not require approval under s.57 (1) of the *NSW Heritage Act*:

d) the maintenance of an item to retain its condition or operation without the removal of or damage to the existing fabric or the introduction of new materials

The construction of a guardrail may on the other hand diminish the aesthetics of the bridge and so would be considered unsympathetic unless carefully designed to conform with the structural lines of the bridge.

The proposed erection of guardrailing would be considered a minor alteration and is covered by Standard Exemption 7.

Standard Exemption 7: Minor activities with no adverse impact on heritage significance

3. Anything which in the opinion of the Director is of a minor nature and will not adversely affect the heritage significance of the item does not require approval under s.57 (1) of the Act.

A person proposing to do anything of the kind described in paragraph 1 must write to the Director and describe the proposed activity. If the Director is satisfied that the proposed activity meets the criteria set out in paragraph 1, the Director shall notify the applicant.

6.4 Schedule of conservation works for sandstone bridge

Conservation advice

All conservation works shall be supervised by a suitably qualified and experienced conservation practitioner.

Maintenance and repair

All maintenance and repairs should be aimed at retarding the deterioration of all significant fabric, keeping it *in-situ* and in its current state and form.

Stonework conservation works should be undertaken by skilled and experienced tradesmen and supervised by a suitably qualified experienced senior banker mason or master mason. The work should be executed under the continuous supervision and direction of an experienced heritage practitioner.

Conservation of stonework

Any proposed conservation works should aim at prolonging the life of any existing stone fabric that remains sound. To retain the cultural significance of the bridge both the form and the decorative detail need to be conserved.

Complete and accurate measured drawings showing each stone as built do not exist. Accurate CAD drawings of the bridge and its abutments should be prepared as part of the investigation/diagnostic process. Record drawings should include the location of any fixings, their condition and replacement fixings

Records are required:

a) to establish the rate of deterioration.

b) to record the removal of exfoliating and/or cracked stone

c) to monitor the advance of reinforcement failure

d) to monitor the impact of vehicles

e) to monitor the impact of graffiti removal

Record the causes of the damage, the form of deterioration, efflorescenece, sanding off, peeling off, exfoliation, fissuring, incrustations (coatings), dimensions of the deterioration (record representative profiles so the rate of deterioration can be accessed).

Stonework replacement

Replacement stone should be good quality stone of high durability, matching the original Hawkesbury sandstone in colour and texture. Independent, expert advice on stone selection should be sought prior to the purchase of stone from any quarry. Artificially coloured sandstone should not be used for stonework mortar repairs

Sacrificial mortars should be used to repoint and repair the underside of the voussoirs. Traditional soft composite mortars should not be used to repair and repoint the Bridge instead of reaction resin mortars.

Repointing defective joints

Repoint open joints. Remove defective and detrimental mortar from joints and repoint. The composition of the mortar used to repoint the joints should be more permeable than the adjacent stone. This is in order that any soluble salts are encouraged to migrate into the joints rather than accumulate in the stone.

In order to ensure that pointing and grouting is carried out effectively, quality control procedures will be implemented to ensure compliance with specification requirements for materials and workmanship.

c) Batch by weight not volume to ensure accurate mix proportions

h) Ensure satisfactory mixing

d) Ensure adequate adhesion, joint preparation, cleaning the joint surfaces properly

i) Eliminate unsuitable repointing techniques, shallow joint depth, unsuitable tools

j) Permit no tempering of mortar or additives

k) Ensure effective curing. Provide protection from hot windy conditions to ensure complete cement hydration, preventing shrinkage cracking and bond failure.

Repointing mortar must always be softer than the masonry units and the original mortar. If the new mortar is harder than the masonry or original mortar, it can cause serious stresses within the wall during thermal expansion and contraction, which can lead to deterioration of the masonry units rather than the mortar. If the mortar is softer, any deterioration that occurs will take place in the mortar, which is easily replaced during the next repointing project. The repointed areas should match the original pointing in joint thickness and tooling if it is to blend well with adjacent areas.

Cleaning methods

The amount and nature of the soiling and deterioration differs on various parts of the bridge and its approaches, due to variation in stone porosity, age, orientation, detail, exposure, history of cleaning and graffiti removal. Consequently more than one method of repair and cleaning will be required.

The reasons for cleaning should always be established and the likely benefits and risks assessed. In the past extensive damage has been caused by mechanical and chemical cleaning Sydney sandstone.

Clean masonry only when it becomes absolutely necessary and always use the gentlest method possible. Biological growth on the bridge is intermittently aesthetically unpleasing. It is, however, not feasible with today's technology to maintain the entire structure free from biological growth.

A cleaned structure will get dirty again. The periodic nature of the cleaning cycle highlights the importance of gentle, non-damaging methods. The fact that structures get dirty again is often sited as an objection to cleaning. Imagine there is no point in cleaning glass because it will only get dirty again.

Dirt hides decay and conceals defects. The cleaning of heavily soiled structures is an essential prerequisite to its proper investigation and conservation, irrespective of whether the dirt itself is causing any damage.

It is of paramount importance in any cleaning exercise to know when to halt the process. Cleaning should dislodge the surface dirt but stop before abrasive or chemical damage results to the surface of the stone. Ingrained deposits (stains) are left.

Only experienced skilled contractors and site operatives should be engaged on stone cleaning contracts.

Any cleaning operation should comply with the following conditions:

- it must not lead to the formation of deteriorating by-products (salts)
- it must cause minimal disruption to both the mineralogy and texture of the stone
- it must not increase surface porosity, as this is conducive to biological growth.
- it must not damage adjacent materials, metalwork or mortar joints
- it must not contaminate or stain other stone fabric and open joints with dissolved salts, dirt and biological growths.

Sandstone should only be cleaned when it becomes necessary and in association with other maintenance works. Tests should be carried out to evaluate any cleaning method. The selection of the most appropriate treatment should be based on objective analysis of the results obtained both from laboratory and on site tests.

Graffiti Management

In addition to the general policies regarding cleaning of stonework previously discussed there are a number of specific issues that relate to graffiti. A strategy should be developed that identifies graffiti prone areas and suggest methods for control in each area. Records of graffiti treatments and their technical specifications must be kept. It is necessary to keep records of graffiti applications, their technical data sheets, specifications, particularly the recommended method of removal, as the technology and contractors change so rapidly. As much damage is done by failed graffiti coatings and removing graffiti coatings as removing the original graffiti. It is difficult, expensive and sometimes next to impossible to identify the coating to be removed.

Early detection and removal of graffiti reduces the impact of graffiti. The limited use of anti-graffiti treatments is recommended.

The performance of graffiti removal methods should be tested. Criteria for the acceptance and assessment of these methods include the following:

- They should be chemically inert with regards the stone
- They should not lead to the formation of deteriorating by products (salts)
- They should cause minimal disruption to the colour and texture of the stone
- They should not increase the surface porosity of the stone
- They should not contaminate, damage or stain adjacent materials, metalwork, mortar joints or enter open joints
- They should meet health and safety requirements
- They should be compatibility with ecological requirements
- No residual chemicals should be left in the bridge fabric after the process is complete
- They should have high efficiency in removal of graffiti

A management system for the early detection and treatment of graffiti should be established.

Removal by hand abrasive means (for example by carborundum rubbing) should only be used as a last resort when the impact of chemical methods is likely to cause more damage than rubbing back.

When applying coatings and/or removing graffiti ensure that the areas treated have minimal aesthetic impact by treating whole stones or areas; delineated by architectural features such as joints, courses, piers, etc.

7 Conclusions and management recommendations

The majority of proposed works fall within the parameters of "Standard Exemption 1: Maintenance and cleaning" and "Standard Exemption 2: Repairs" and are of a minor nature only. These works are sympathetic to the structures in that they echo their existing form and fabric. The exception to this are the specific works proposed for the timber beam creek bridges which include the installation of single pipe rail crash barriers and steel deck joint plates. In order for these to be considered as falling within "Standard Exemption 7: Minor activities with no adverse impact on heritage significance" application would need to be made to the Director of the NSW Heritage Office in order to confirm that this is so.

The conduct of these works should be undertaken so as to conform with the specific schedule of conservation works for the structure. This is a requirement of the CMP that was prepared for the Canal by Higginbotham (2001) and endorsed by the NSW Heritage Office in November, 2003.

With regards to the deteriorated state of the brick arch bridge at chainage 35280 and the Type D concrete bridge at chainage 48883 it is recommended that it be closed to traffic until effective management procedures can be put in place that address and mitigate against its further deterioration. To this end bollards should be placed on each of the approaches to prevent vehicular access to these bridges.

The proposed guardrail on the sandstone arch bridge at chainage 26256 is considered to be unsympathetic to the overall aesthetics of the structure and so should be excluded from the schedule. Consideration should be given to leaving the existing deck configuration intact and changing the operation of the bridge to single lane only.

8 References

Secondary Sources

AWT Engineering 1999 *Inspection and assessment of bridges on the Upper Canal*, prepared for Sydney Water

Higginbotham, E. 1991 *Heritage Study of the Upper Canal, Prospect Reservoir & Lower Canal (Upper Nepean Scheme)*, prepared for Sydney Water

Higginbotham, E. 2001 *Conservation Management Plan for the Upper Canal, Pheasant's Nest to Prospect Reservoir*, volume 1, prepared for Sydney Catchment Authority

NSW Heritage Office 2003 *The Investigation and Repair of Historic Concrete*

Rosen, S. 1995 *Heritage Assessment for Nepean Tunnel Amplification Project*, prepared for Sydney Water

Sydney Catchment Authority Section 170 Heritage and Conservation Register

Thorpe, N. 1989 "Water supply and sewerage", in *Sydney from settlement to City: An engineering history of Sydney*, Don Fraser (ed)

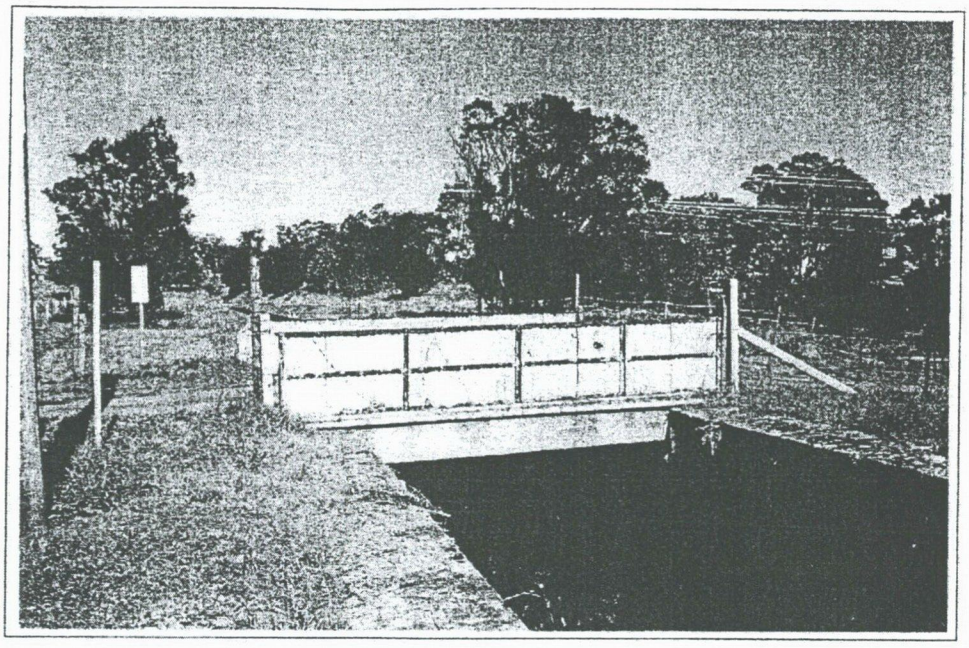
Appendix A:

Maps of Upper Canal

Appendix B:

Inventory sheets from Upper Canal Conservation Management Plan

Precinct no **Precinct** **Locality** Upper Canal **Section** 2 **Inventory** 6



Caption *Canal Overbridge, Brooks Point Road.* **Film** 2 **Frame** 23

Item name **Canal Overbridge, Brooks Point** **Item type** **Canal Overbridge**

Location Brooks Point Road **Date from** 1917 **Date to** 1918

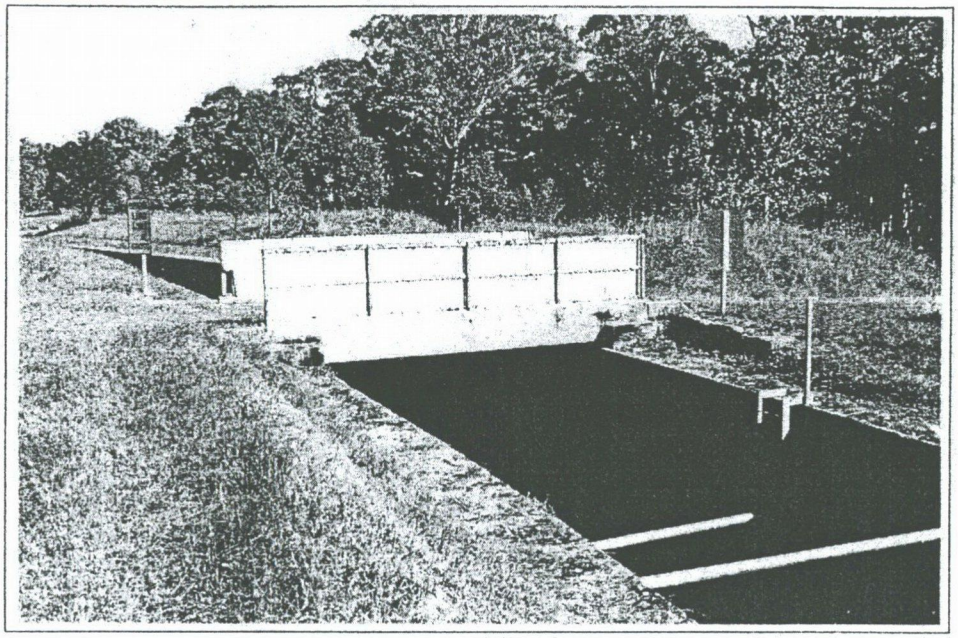
Item description Bridge with reinforced concrete beams set into top of canal, slab deck, single lane width. Railings of flat and angle iron clad with corrugated iron to form side balustrades.

Significance Considerable **References** T Kass, Historical Report - Chronology 1991

Notes on significance

Condition Corrosion apparent.

Precinct no **Precinct** **Locality** Upper Canal **Section** 2 **Inventory** 9



Caption *Canal overbridge, near Brooks Point Road* **Film** 2 **Frame** 26

Item name **Canal Overbridge** **Item type** **Canal Overbridge**

Location Just south of 6 3/4 miles **Date from** 1917 **Date to** 1918

Item description Bridge with reinforced concrete beam and slab deck, single lane width, with concrete abutments. Railings of flat and angle iron clad with corrugated iron to form side balustrade.

Significance Considerable **References** T Kass, Historical Report - Chronology 1991

Notes on significance Adjacent steel ladder not significant.

Condition Corrosion apparent.

Precinct no 1 **Precinct** Simpsons Creek Precinct **Locality** Upper Canal **Section** 2 **Inventory** 21

Caption *Simpson's Creek Aqueduct, road bridge* **Film** 3 **Frame** 4

Item name Simpsons Creek Aqueduct, Road Bridge **Item type** Road Bridge

Location **Date from** 1937 **Date to**

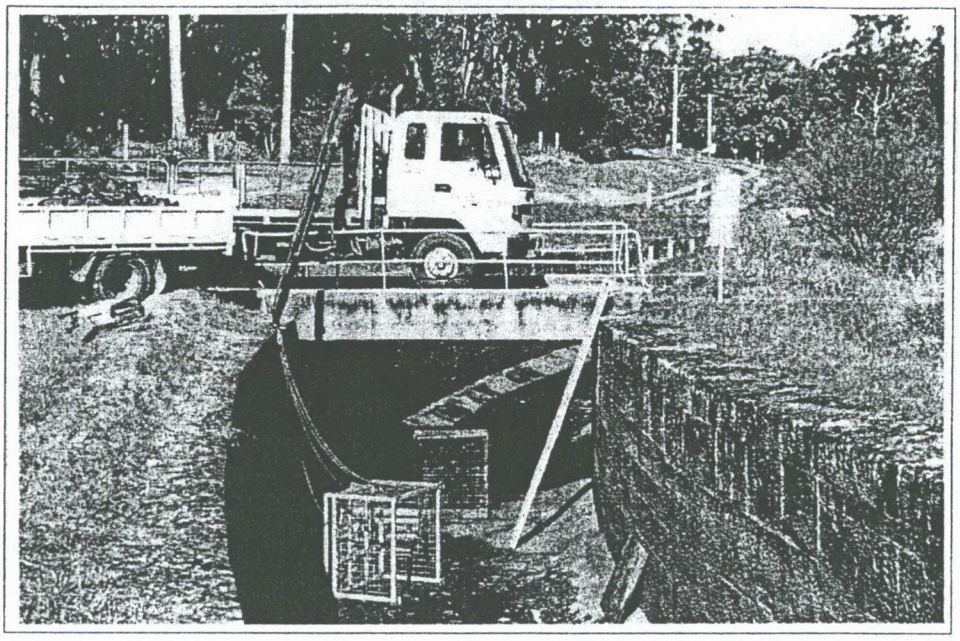
Item description Steel trestle and girder bridge with timber deck and concrete abutments. Trestles comprise rolled steel joists (RSJ's.) with steel cross-ties and beams. Three trestles set into concrete piers positioned across the gully support the girders for the bridge. Hardwood timber plank deck and kerb, timber post and 3 rail (top arris rail) handrail or balustrade.

Significance Considerable **References** T Kass, Historical Report - Chronology 1991

Notes on significance

Condition

Precinct no **Precinct** **Locality** Upper Canal **Section** 2 **Inventory** 24



Caption *Canal overbridge.* **Film** 3 **Frame** 7

Item name **Canal Overbridge** **Item type** **Canal Overbridge**

Location Between Simpsons Creek and 7 1/4 miles **Date from** 1919 **Date to**

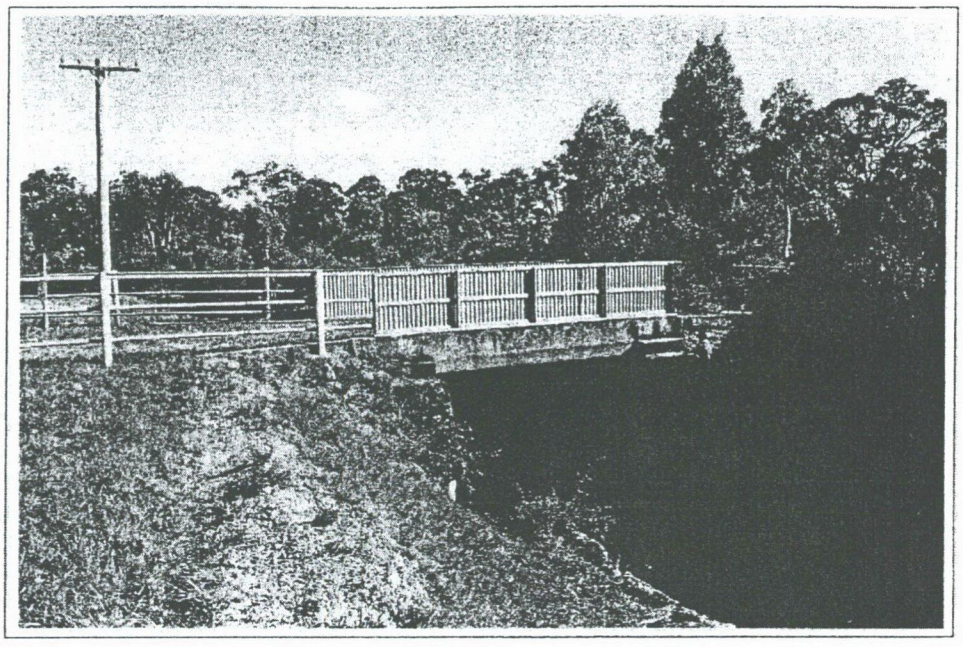
Item description Bridge with reinforced concrete beam and slab deck, single lane width. The beams are half set into the top of the canal and in extending beyond also serve as wing walls directing stormwater. Galvanised pipe or flat iron railings.

Significance Considerable **References** T Kass, Historical Report - Chronology 1991

Notes on significance

Condition

Precinct no **Precinct** **Locality** Upper Canal **Section** 2 **Inventory** 32



Caption *Canal overbridge.* **Film** 3 **Frame** 16

Item name **Canal Overbridge** **Item type** **Canal Overbridge**

Location 7 1/2 to 7 5/8 miles **Date from** 1917 **Date to** 1918

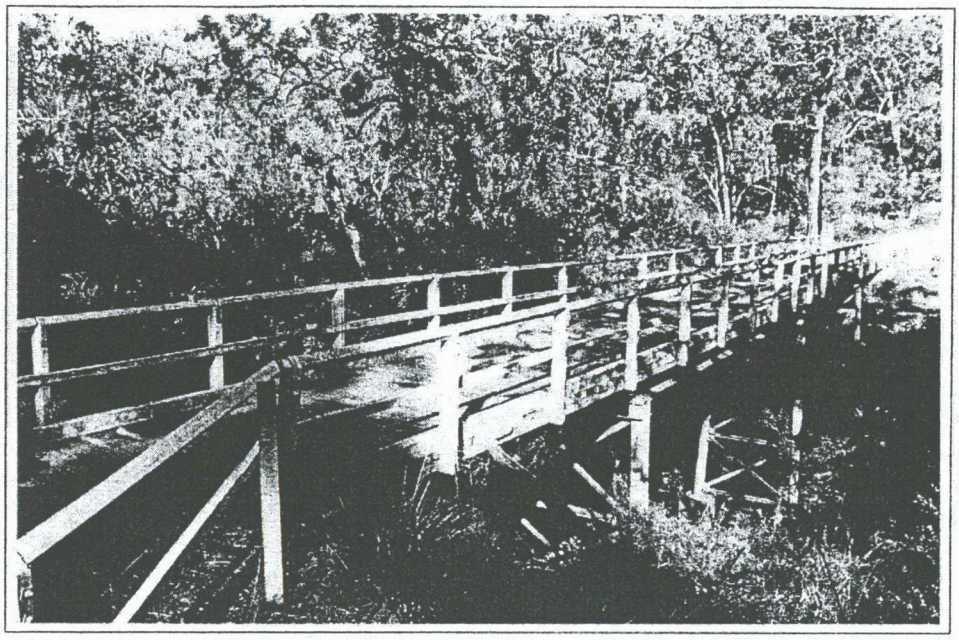
Item description Bridge with reinforced concrete beam and slab deck, single lane width, with masonry abutments. Railings of flat and angle iron clad corrugated iron to form side balustrades.
The low concrete approach walls show impression of earlier fence posts.
Adjacent cattle grids.

Significance Considerable **References** T Kass, Historical Report - Chronology 1991

Notes on significance

Condition Corrosion apparent.

Precinct no 2 **Precinct** Elladale Creek Precinct **Locality** Upper Canal **Section** 2 **Inventory** 39



Caption *Elladale Creek Aqueduct, road bridge.* **Film** 3 **Frame** 24

Item name **Elladale Creek Aqueduct, Road Bridge** **Item type** **Road Bridge**

Location East of aqueduct, crossing Elladale Creek. **Date from** 1936 **Date to**

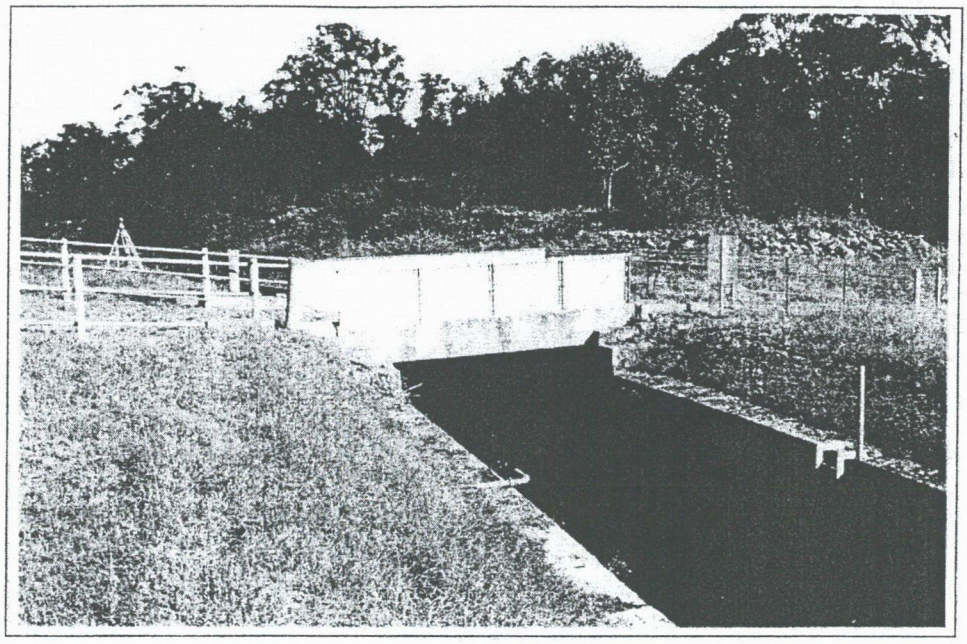
Item description Steel trestle and girder bridge with timber deck and concrete abutments. Trestles comprise rolled steel joists (RSJ's.) with steel cross-ties and beams. Three trestles set into concrete piers positioned across the gully supporting the girders for the bridge. Hardwood timber plank deck and kerb beams, timber post and 2 rail (top arris rail) balustrade.

Significance Considerable **References** T Kass, Historical Report - Chronology 1991

Notes on significance

Condition

Precinct no **Precinct** **Locality** Upper Canal **Section** 2 **Inventory** 41



Caption *Canal overbridge.* **Film** 3 **Frame** 26

Item name Canal overbridge **Item type** Canal Overbridge

Location 8 1/8 miles **Date from** 1917 **Date to** 1918

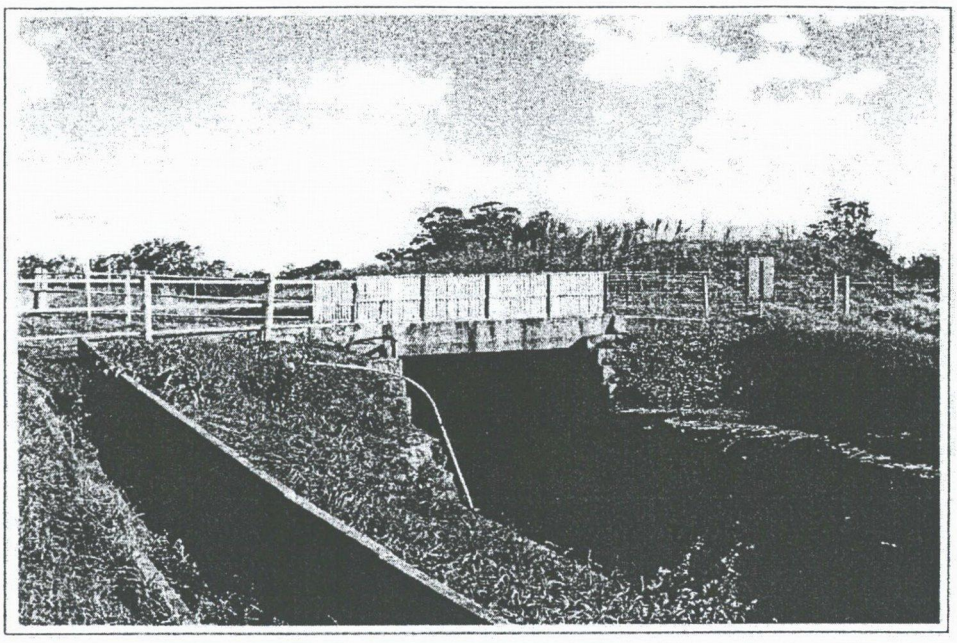
Item description Bridge with reinforced concrete beam and slab deck, usually single lane width, with masonry abutments. Iron railings of flat and angle clad with corrugated iron to form side balustrades.
Older posts mark post-and-rail fence noted in 1992, and low concrete approach walls on the west side retain impression of even earlier posts. On the east side these low approach walls are dry pressed brick.
Associated cattle grids.

Significance Considerable **References** T Kass, Historical Report - Chronology 1991

Notes on significance Adjacent steel ladder and tubular railing fences not significant.

Condition Corrosion apparent.

Precinct no **Precinct** **Locality** Upper Canal **Section** 2 **Inventory** 47



Caption *Canal overbridge* **Film** 3 **Frame** 32

Item name **Canal Overbridge** **Item type** **Canal Overbridge**

Location Just north of 8 1/2 miles. **Date from** 1917 **Date to** 1918

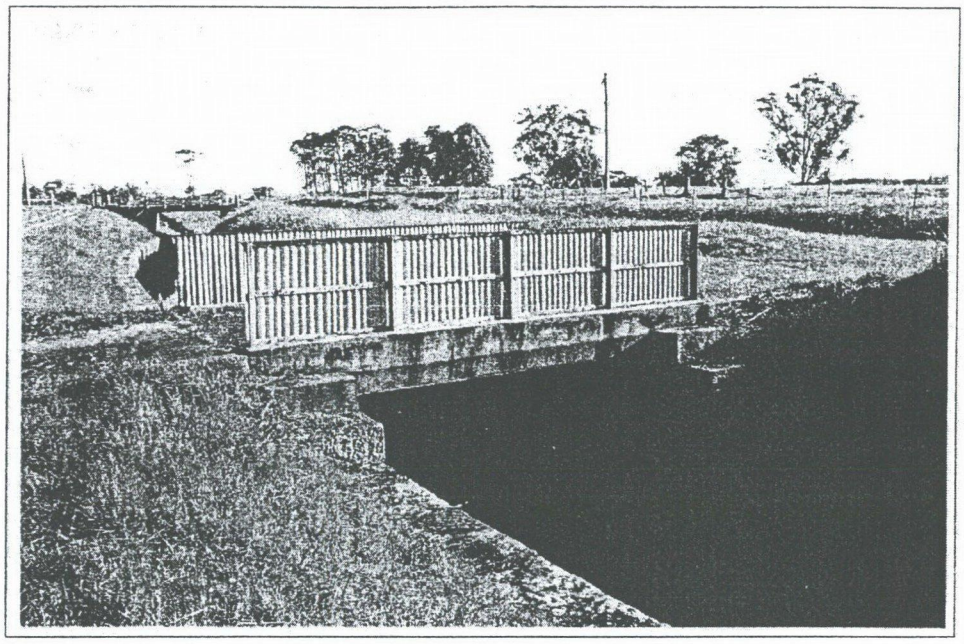
Item description Bridge with reinforced concrete beam and slab deck, usually single lane width, with masonry abutments. Railings of flat and angle iron clad with corrugated iron to form side balustrades.
Associated cattle grids.

Significance Considerable **References** T Kass, Historical Report - Chronology 1991

Notes on significance Concrete drain extending from bridge north to the next flume is not significant.

Condition Corrosion apparent.

Precinct no **Precinct** **Locality** Upper Canal **Section** 2 **Inventory** 51



Caption *Canal overbridge* **Film** 3 **Frame** 36

Item name **Canal Overbridge** **Item type** **Canal Overbridge**

Location 9 miles **Date from** 1917 **Date to** 1918

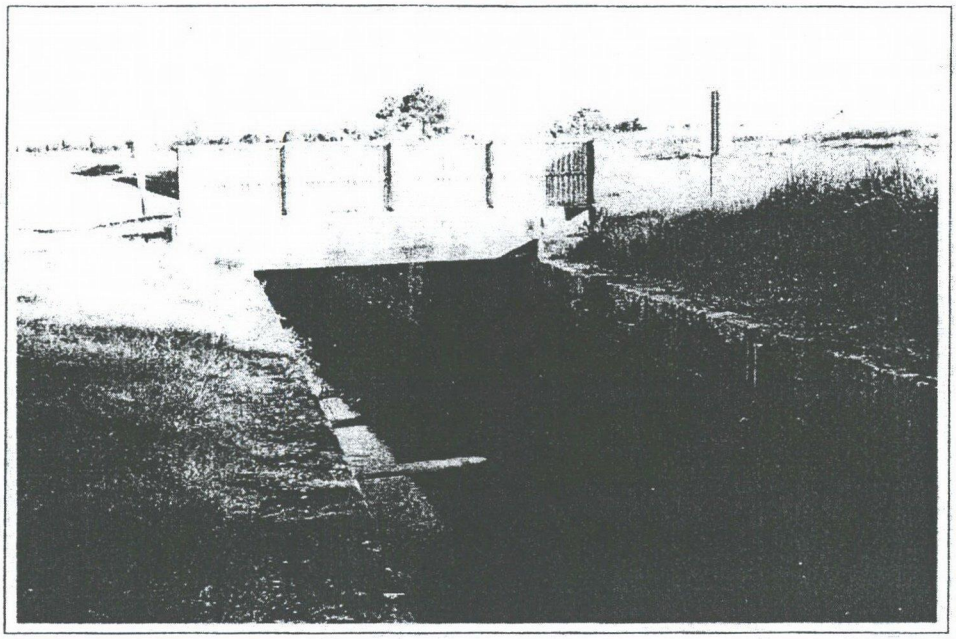
Item description Bridge with reinforced concrete beam and slab deck, single lane width, with either masonry abutments. Railings of flat and angle iron clad with corrugated iron to form side balustrades.

Significance Considerable **References** T Kass, Historical Report - Chronology 1991

Notes on significance

Condition Corrosion apparent.

Precinct no **Precinct** **Locality** Upper Canal **Section** 2 **Inventory** 58



Caption *Canal overbridge* **Film** 4 **Frame** 8

Item name **Canal Overbridge** **Item type** **Canal Overbridge**

Location 9 1/8 to 9 1/4 miles **Date from** 1917 **Date to** 1918

Item description Bridge with reinforced concrete beam and slab deck, single lane width, with concrete abutments. Railings of flat and angle iron clad with corrugated iron to form side balustrades.

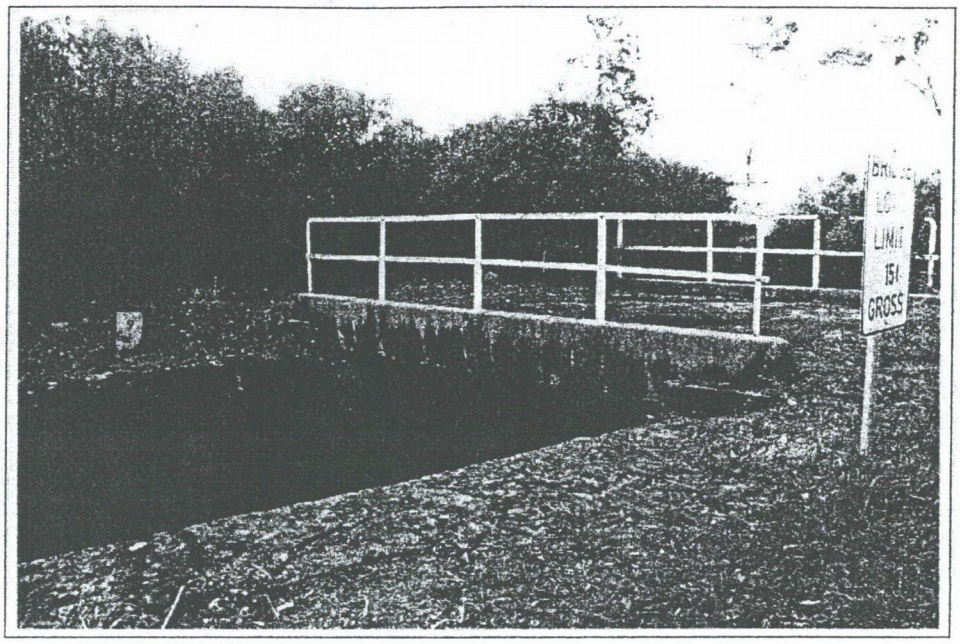
Note also adjacent bracing apparently related to inadequate drainage along either side of the canal.

Significance Considerable **References** T Kass, Historical Report - Chronology 1991

Notes on significance

Condition Corrosion apparent.

Precinct no | Precinct | Locality Upper Canal | Section 2 | Inventory 67



Caption *Canal overbridge.* Film 4 Frame 18

Item name **Canal Overbridge** Item type **Canal Overbridge**

Location 9 1/2 miles Date from 1919 Date to

Item description Bridge with reinforced concrete beam and slab deck, single lane width. Concrete footings on sides of canal. Flat iron railings (no cladding).

Concrete distance marker for 9 1/2 miles adjacent.

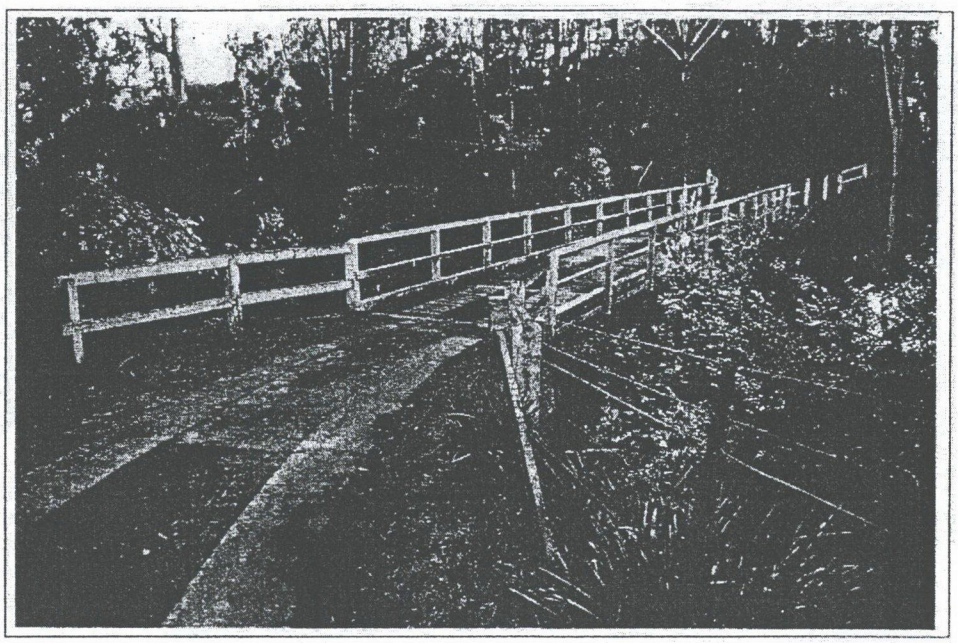
Significance Considerable References T Kass. Historical Report - Chronology 1991

Notes on significance

Condition

Edward Higginbotham & Associates Pty Ltd. (02) 9716-5154 Sydney Catchment Authority, 2001

Precinct no 1 **Precinct** Leafs Creek Aqueduct Precinct **Locality** Upper Canal **Section** 3 **Inventory** 7



Caption *Leafs Creek Aqueduct, Road bridge* **Film** 5 **Frame** 18

Item name **Leafs Creek Aqueduct, Road Bridge** **Item type** **Road Bridge**

Location **Date from** 1935 **Date to**

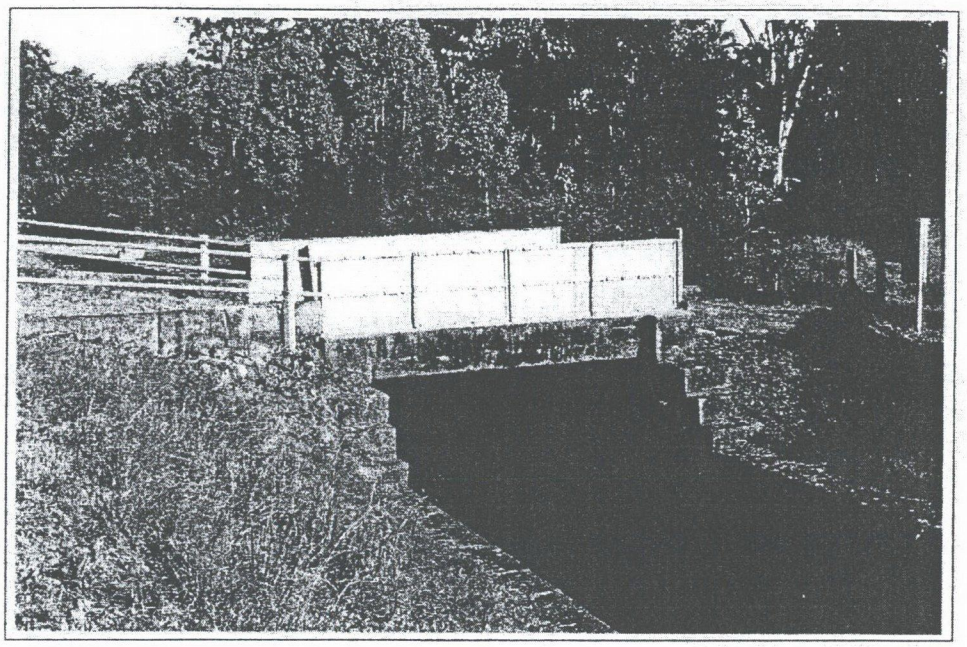
Item description Steel trestle and girder bridge with timber deck and concrete abutments. Trestles comprise rolled steel joists (RSJ's.) with steel cross-ties and beams. Two trestles set into concrete piers positioned across the gully supporting the girders for the bridge. Hardwood timber plank deck with kerb beams, timber post and 2 rail balustrade (top arris rail).

Significance Considerable **References** T Kass, Historical Report - Chronology 1991

Notes on significance

Condition

Precinct no **Precinct** **Locality** Upper Canal **Section** 3 **Inventory** 14



Caption *Canal overbridge* **Film** 5 **Frame** 27

Item name **Canal Overbridge** **Item type** **Canal Overbridge**

Location 11 3/8 to 11 1/2 miles **Date from** 1917 **Date to** 1918

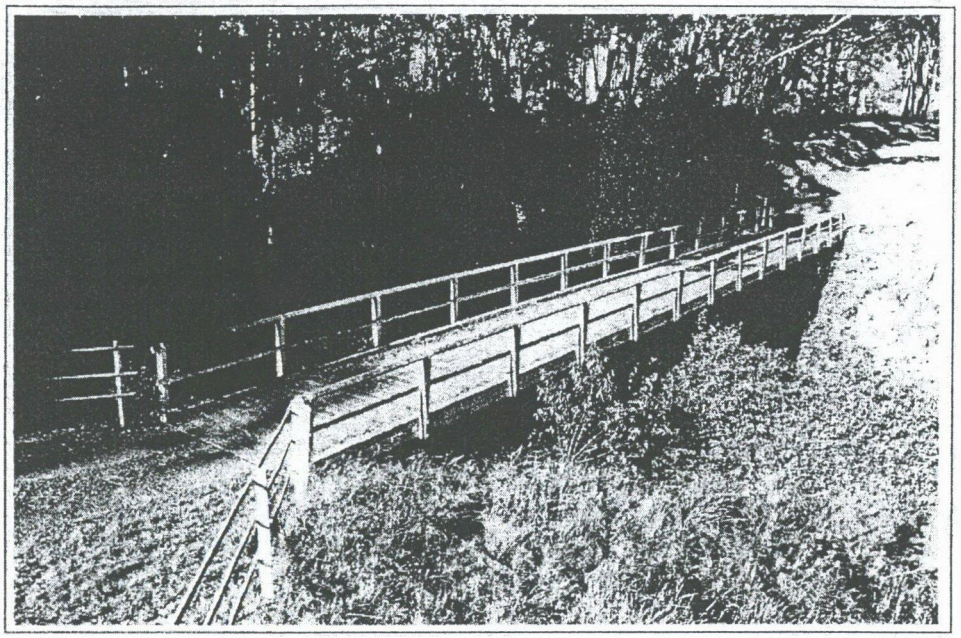
Item description Bridge with reinforced concrete beam and slab deck, single lane width, with masonry abutments. Railings of flat and angled iron clad with corrugated iron to form side balustrade.
Low concrete approach walls show impression of earlier fence posts.
Associated cattle grids.

Significance Considerable **References** T Kass, Historical Report - Chronology 1991

Notes on significance

Condition Corrosion apparent.

Precinct no 2 **Precinct** Nepean Creek Precinct **Locality** Upper Canal **Section** 3 **Inventory** 20



Caption *Nepean Creek Aqueduct, road bridge.* **Film** 5 **Frame** 31

Item name **Nepean Creek Aqueduct, Road Bridge** **Item type** **Road Bridge**

Location **Date from** 1935 **Date to**

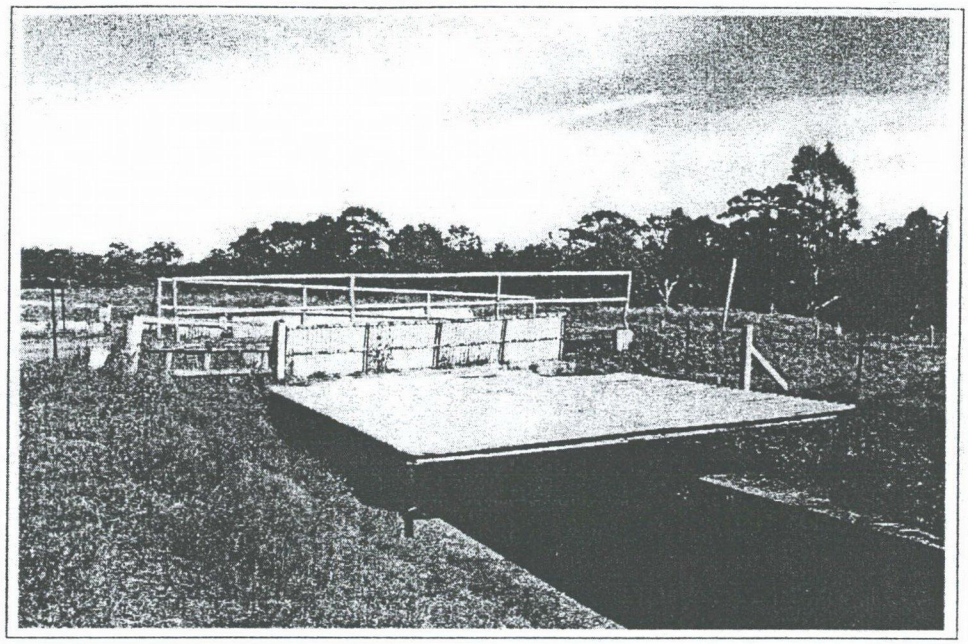
Item description RSJ girder bridge with timber deck and concrete abutments. The girders are supported on three substantial concrete piers positioned across the gully. Hardwood timber plank deck and kerb beams, timber post and 2 rail balustrade (top arris rail).

Significance Considerable **References** T Kass, Historical Report - Chronology 1991

Notes on significance

Condition

Precinct no **Precinct** **Locality** Upper Canal **Section** 3 **Inventory** 28



Caption *Canal overbridges.* **Film** 6 **Frame** 7

Item name Canal Overbridge **Item type** Canal Overbridge

Location Just north of 12 1/2 miles **Date from** 1917 **Date to** 1918

Item description Bridge with reinforced concrete beam and slab deck, single lane width, with concrete abutments. Railings of flat and angle iron clad with corrugated iron to form side balustrade.
A more recent timber deck set on RSJs with galvanised pipe rails. Damaged to railings. Canal covered on either side of bridge to assist with maintaining water quality.
Associated cattle grids.

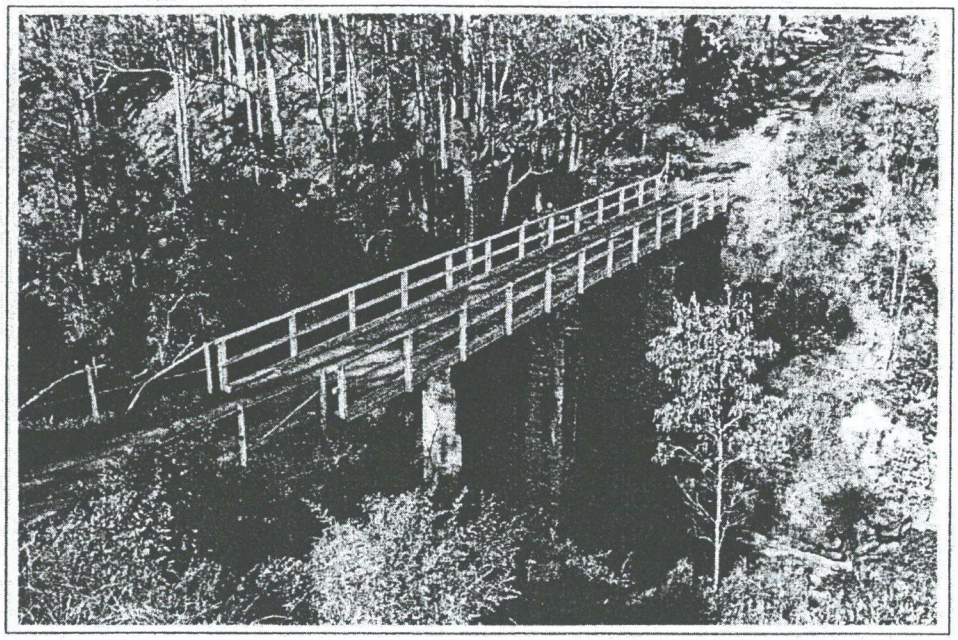
Significance Considerable
Intrusive

References T Kass, Historical Report - Chronology 1991

Notes on significance Covering to canal, timber deck and new iron railings over original bridge are intrusive

Condition Corrosion apparent. Damaged caused to handrail by traffic.

Precinct no 3 **Precinct** Woodhouse Creek Precinct **Locality** Upper Canal **Section** 3 **Inventory** 37



Caption *Woodhouse Creek Aqueduct, road bridge.* **Film** 6 **Frame** 12

Item name Woodhouse Creek Aqueduct, Road Bridge **Item type** Road Bridge

Location **Date from** 1877 **Date to** 1935

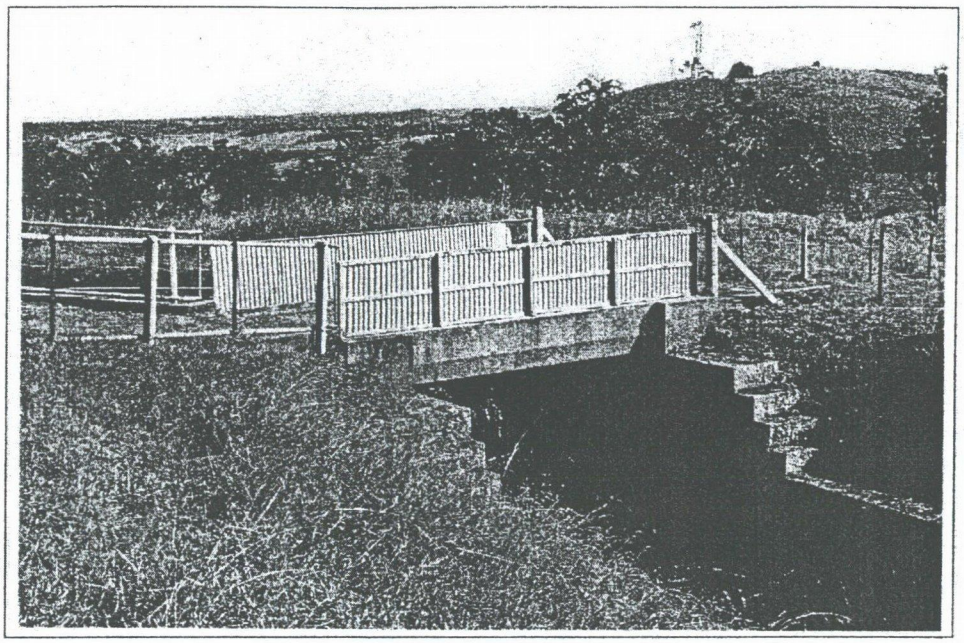
Item description Timber deck road bridge with timber kerb beams and timber post and 2 rail balustrade (top arris rail). The timber deck is supported on rolled steel joists/girders.
The steel bridge girders are placed on top of two massive masonry piers in the centre of the gully and masonry abutments on each side of the gully. The piers and abutments are constructed of coursed, chisel-picked blocks of sandstone. In the centre of the northern face of the northern pier is set a sandstone plaque bearing the following inscription:
ERECTED
E.B. WOODHOUSE
1877
ADVANCE AUSTRALIA
JACOB HERRMANN
BUILDER
These piers are therefore the oldest dated structure located along the Upper Canal.
The historical report indicates that the new deck (bridgework) was constructed in 1935.

Significance Exceptional **References** T Kass, Historical Report - Chronology 1991

Notes on significance

Condition

Precinct no **Precinct** **Locality** Upper Canal **Section** 3 **Inventory** 52



Caption **Film** 6 **Frame** 30

Item name Canal Overbridge **Item type** Canal Overbridge

Location 13 1/2 to 13 5/8 miles **Date from** 1917 **Date to** 1918

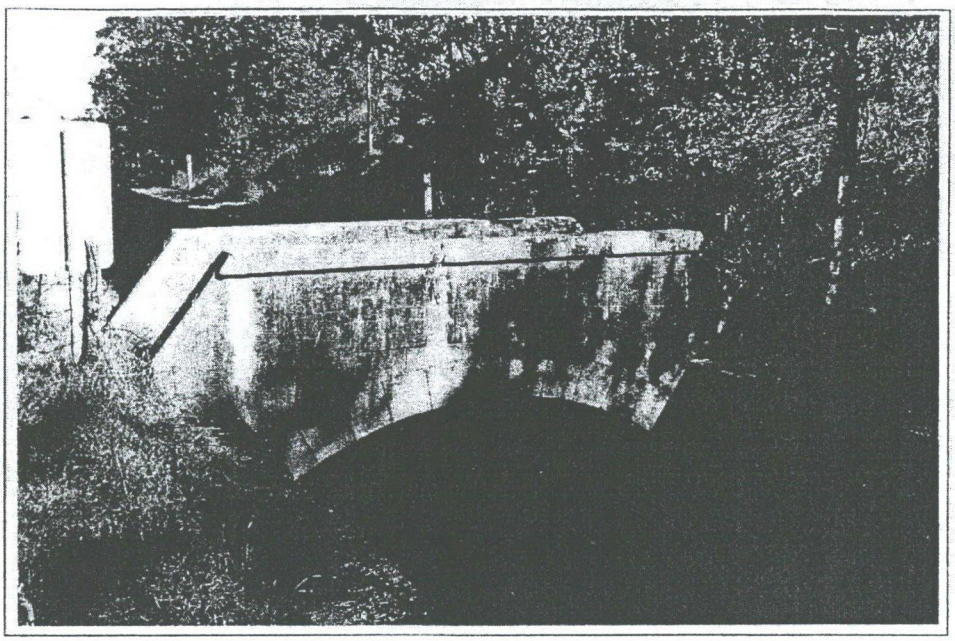
Item description Bridge with reinforced concrete beam and slab deck, single lane width, with masonry abutments. Railings of flat and angle iron clad with corrugated iron to form side balustrade.
Associated cattle grids.

Significance Considerable **References** T Kass, Historical Report - Chronology 1991

Notes on significance

Condition Corrosion apparent.

Precinct no | Precinct | Locality Upper Canal | Section 4 | Inventory 6



Caption *Arched concrete footbridge.* Film 7 Frame 19

Item name **Footbridge - Arched** Item type **Footbridge**

Location Approx. 500 feet (150 metres) S of entry to the Sugarloaf Tunnel Date from c1900s Date to

Item description Small, single span, arched footbridge constructed of concrete, rendered and struck to imitate masonry. The side walls have a rendered, sandstock brick coping / parapet. The bridge is 'built-in' to the concrete canal sides. It is about 12 feet long (span across the canal) with a width of about 5 feet.

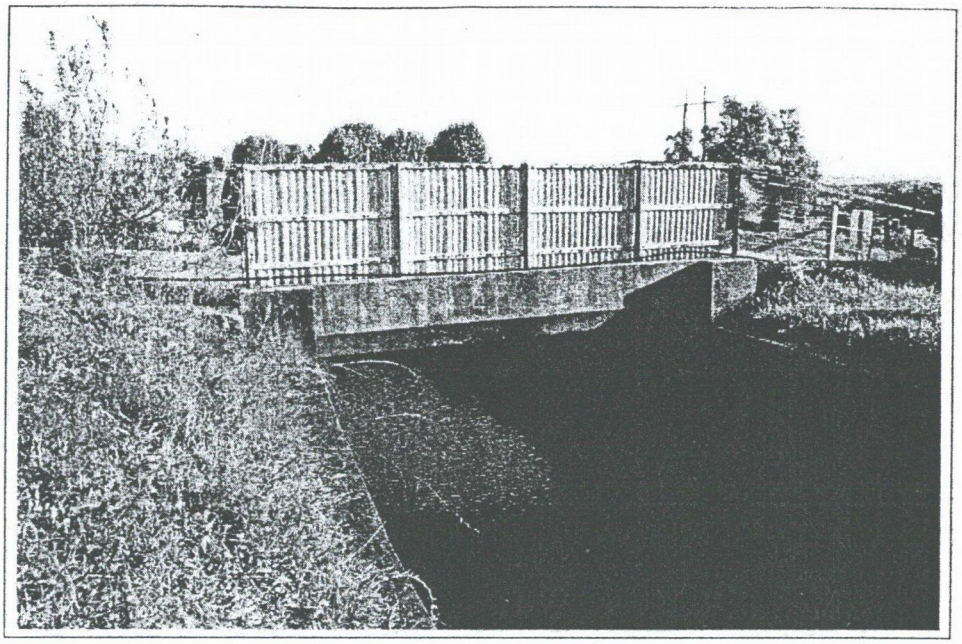
The original purpose of this footbridge is unknown.

Significance Considerable References

Notes on significance

Condition

Precinct no **Precinct** **Locality** Upper Canal **Section** 4 **Inventory** 24



Caption *Canal overbridge.* **Film** 8 **Frame** 8

Item name **Canal Overbridge** **Item type** **Canal Overbridge**

Location 15 3/4 miles **Date from** 1917 **Date to** 1918

Item description Bridge with reinforced concrete beam and slab deck, single lane width, with either concrete. Railings of flat and angle iron clad with corrugated iron to form side balustrade.
This bridge post-dates reconstruction of the canal with concrete.
Adjacent iron rung ladder.
Associated gates.

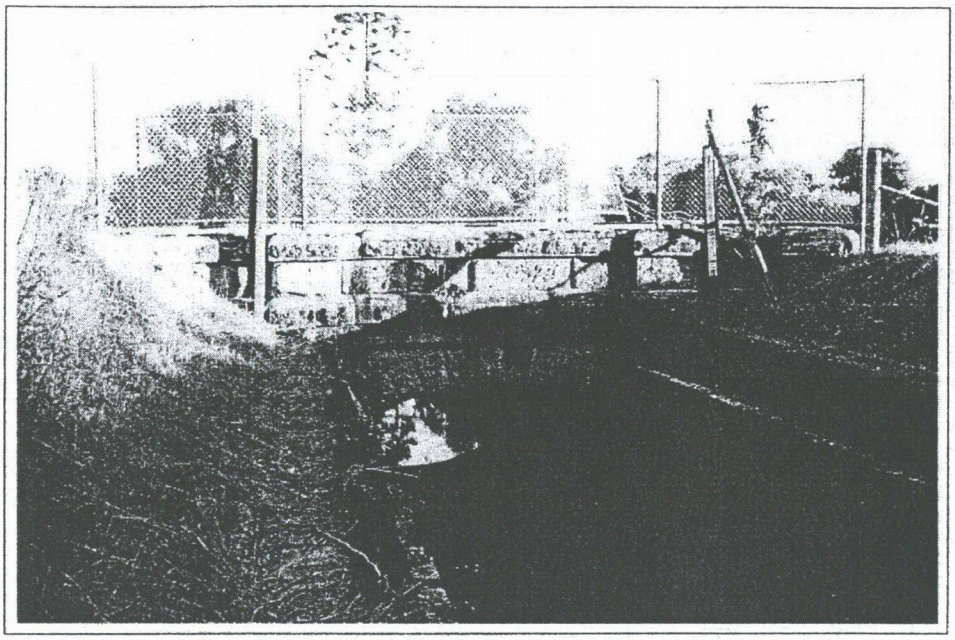
Significance Considerable
Exceptional

References T Kass, Historical Report - Chronology 1991

Notes on significance The association of the overbridge and gates is of exceptional significance, since it is one of the few instances where both gates and bridge are intact.
By itself the bridge is of considerable significance.

Condition Corrosion apparent.

Precinct no **Precinct** **Locality** Upper Canal **Section** 4 **Inventory** 42



Caption *Glenlee Road overbridge.* **Film** 8 **Frame** 26

Item name **Glenlee Road Bridge** **Item type** **Canal Overbridge**

Location Glenlee Road across (over) the Upper Canal **Date from** c1880s **Date to**

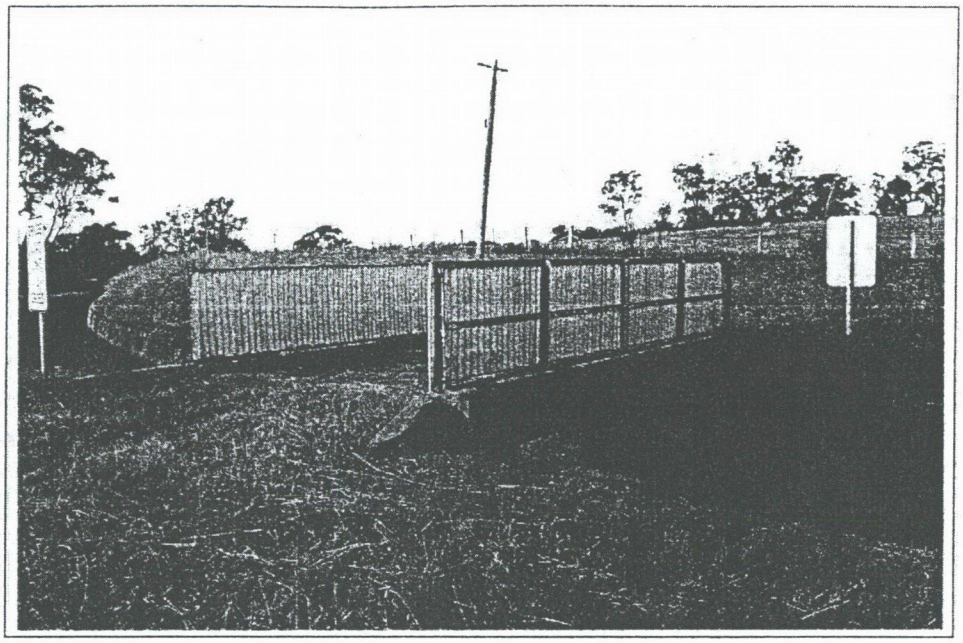
Item description Arched masonry bridge with masonry abutments placed on top of the walls of the open canal section. Semicircular arch with span of about 12 feet constructed of 11 sandstone voussoirs. The bridge is constructed of sandstone ashlar masonry using rock-faced blocks with draughted margins. The bridge also has a decorative projecting chamfered sandstone string-course and a projecting sandstone coping above the balustrade. The side balustrade is curved at both ends of the bridge.

Significance Exceptional **References**

Notes on significance

Condition

Precinct no **Precinct** **Locality** Upper Canal **Section** 4 **Inventory** 50



Caption *Canal overbridge.* **Film** 9 **Frame** 1

Item name Canal Overbridge **Item type** Canal Overbridge

Location **Date from** 1917 **Date to** 1918

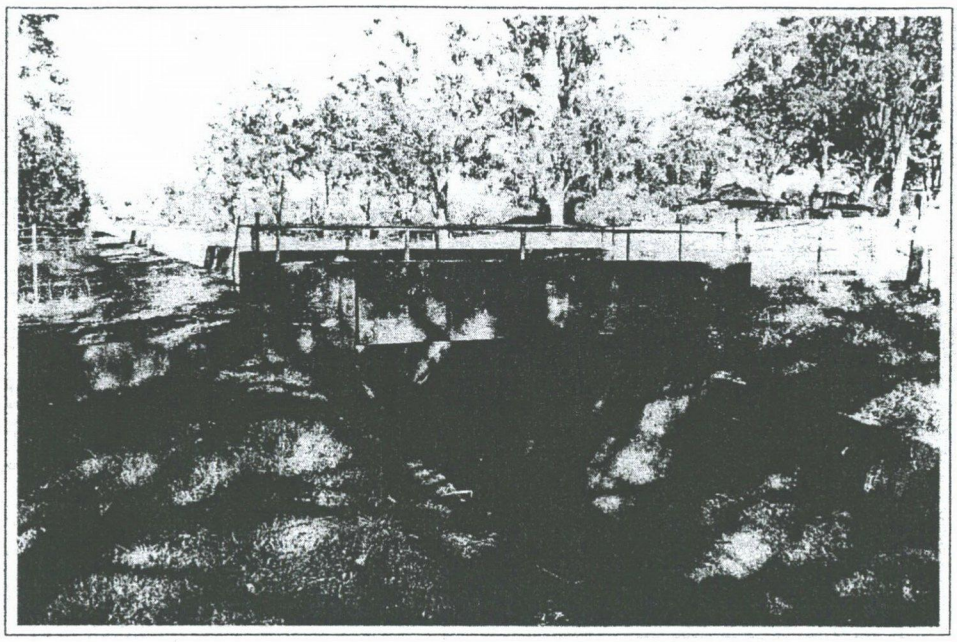
Item description Bridge with reinforced concrete beam and slab deck, single lane width, with concrete. Railings of flat and angle iron clad with corrugated iron to form side balustrade. Iron rung ladder nearby.
This bridge post-dates reconstruction of the canal in concrete

Significance Considerable **References** T Kass, Historical Report - Chronology 1991

Notes on significance

Condition Corrosion apparent.

Precinct no **Precinct** **Locality** Upper Canal **Section** 4 **Inventory** 64



Caption *Canal overbridge.* **Film** 9 **Frame** 18

Item name **Canal Overbridge** **Item type** **Canal Overbridge**

Location 17 1/8 to 17 1/4 miles **Date from** 1919 **Date to**

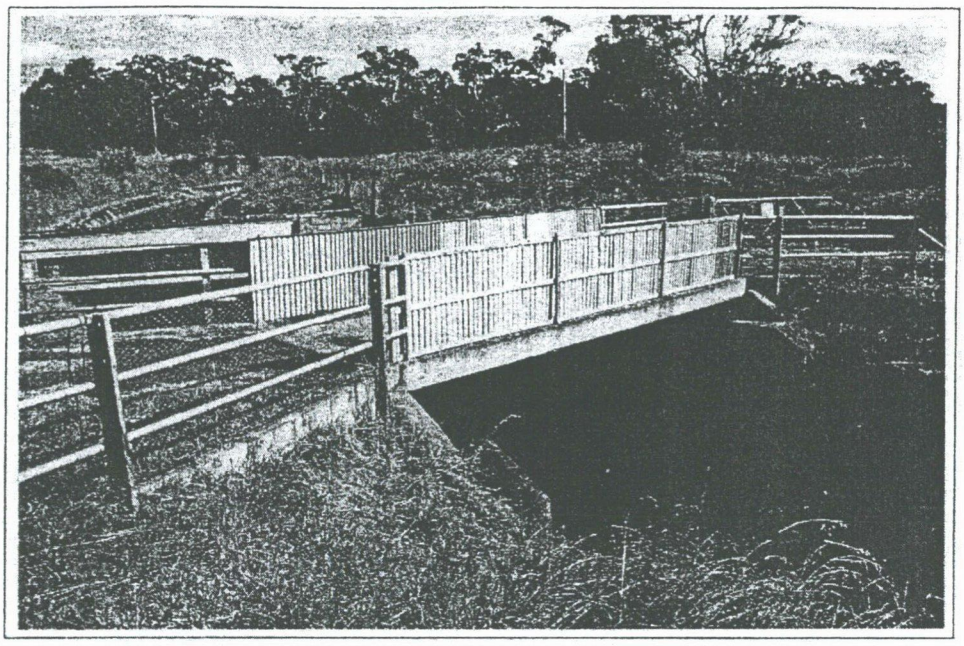
Item description Bridge with reinforced concrete slab deck on concrete abutments. Single lane width with raised concrete sides and angle iron railings. Low concrete approach walls.
Adjacent iron rung ladder giving access to canal.

Significance Considerable **References**

Notes on significance

Condition

Precinct no **Precinct** **Locality** Upper Canal **Section** 5 **Inventory** 15



Caption *Canal overbridge.* **Film** 10 **Frame** 18

Item name Canal Overbridge **Item type** Canal Overbridge

Location 18 5/8 miles **Date from** 1950s **Date to**

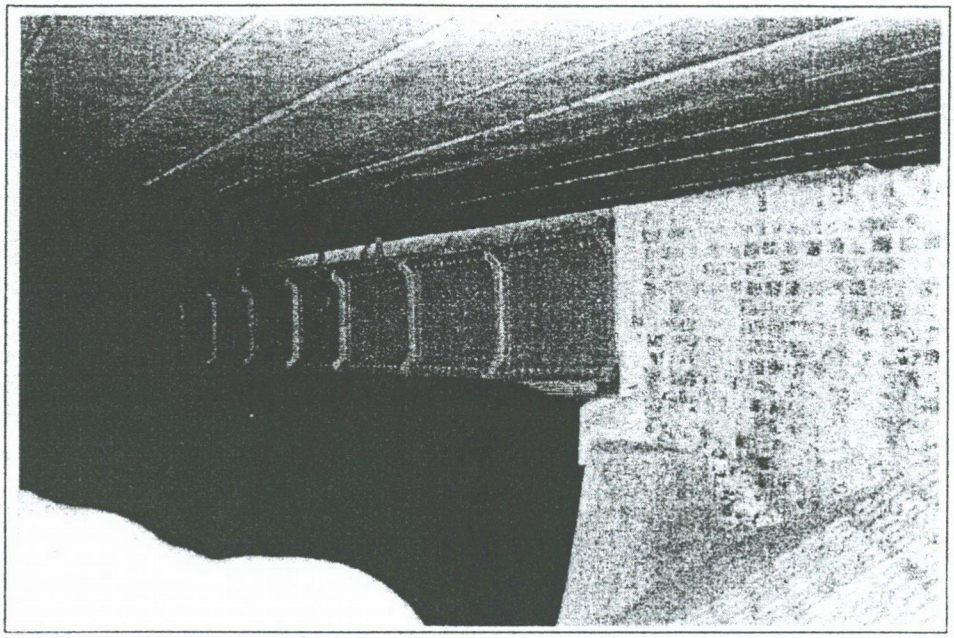
Item description Reinforced concrete slab deck supported on RSJ's below with concrete abutments. Galvanised pipe Railings angle iron clad with corrugated iron to form side balustrades.
Associated cattle grids.

Significance Considerable **References**

Notes on significance

Condition

Precinct no 1 **Precinct** Kenny Hill Precinct **Locality** Upper Canal **Section** 5 **Inventory** 33



Caption *Kenny Hill Precinct, canal overbridge.* **Film** 11 **Frame** 5

Item name Canal Overbridge **Item type** Canal Overbridge

Location Under modern concrete roadbridge on Camden Road over Canal **Date from** 1885 **Date to**

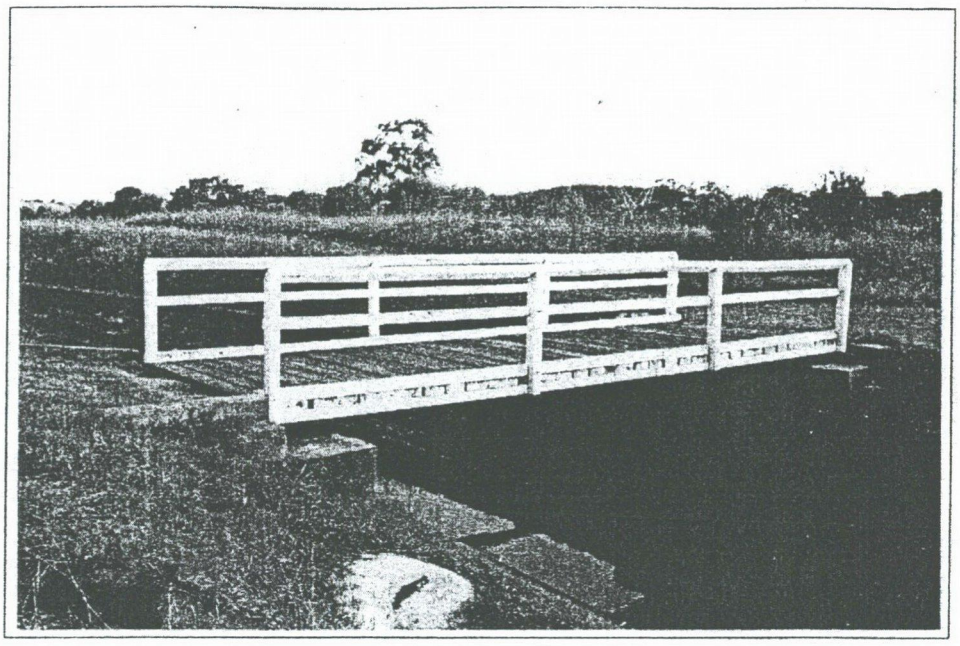
Item description Rectangular cross-section, riveted wrought iron bridge (box girder) with trough deck. Probably of single lane width, crossing the Upper Canal at an oblique angle. Abutments of English bond sandstock brick with a decorative sandstone coping.
The bridge bears an oval makers' plate affixed to both sides:
HAWKS , CRAWSHAY
& SONS
1885
GATESHEAD "

Significance Exceptional **References**

Notes on significance

Condition

Precinct no | Precinct | Locality Upper Canal | Section 5 | Inventory 46



Caption *Canal overbridge.* Film 11 Frame 21

Item name **Canal Overbridge** Item type **Canal Overbridge**

Location Date from c1930s ? Date to

Item description Timber deck bridge supported by two RSJs on with concrete abutments, single lane width. Timber kerb beam and Ari rail balustrade.

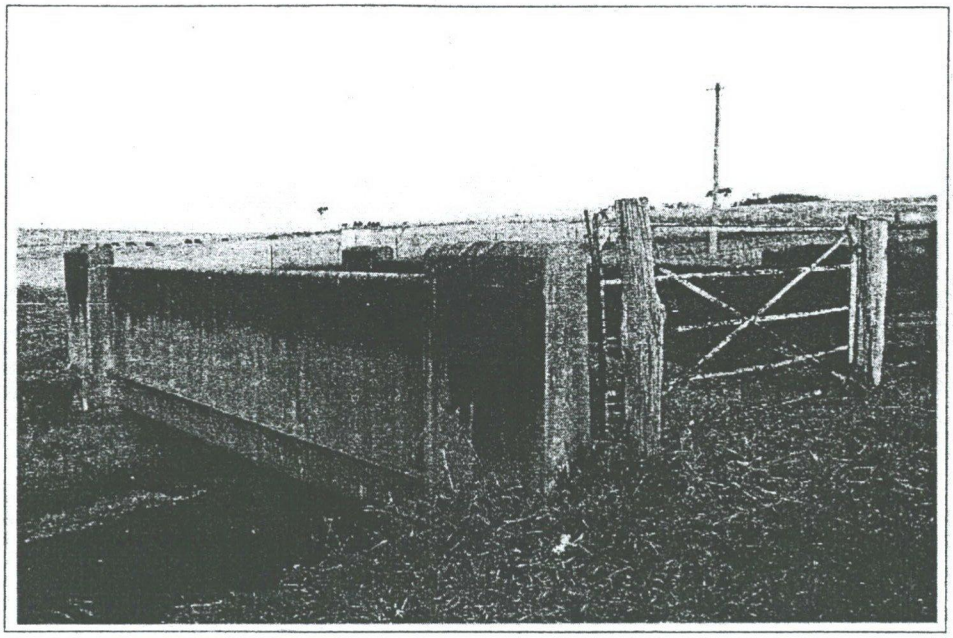
The avenue of pines ends just south of this bridge and the canal base here is masonry flagstones.

Significance Considerable References

Notes on significance

Condition

Precinct no | Precinct | Locality Upper Canal | Section 5 | Inventory 53



Caption *Canal overbridge.* Film 11 Frame 26

Item name **Canal Overbridge** Item type **Canal Overbridge**

Location 19 7/8 miles Date from c1919 Date to

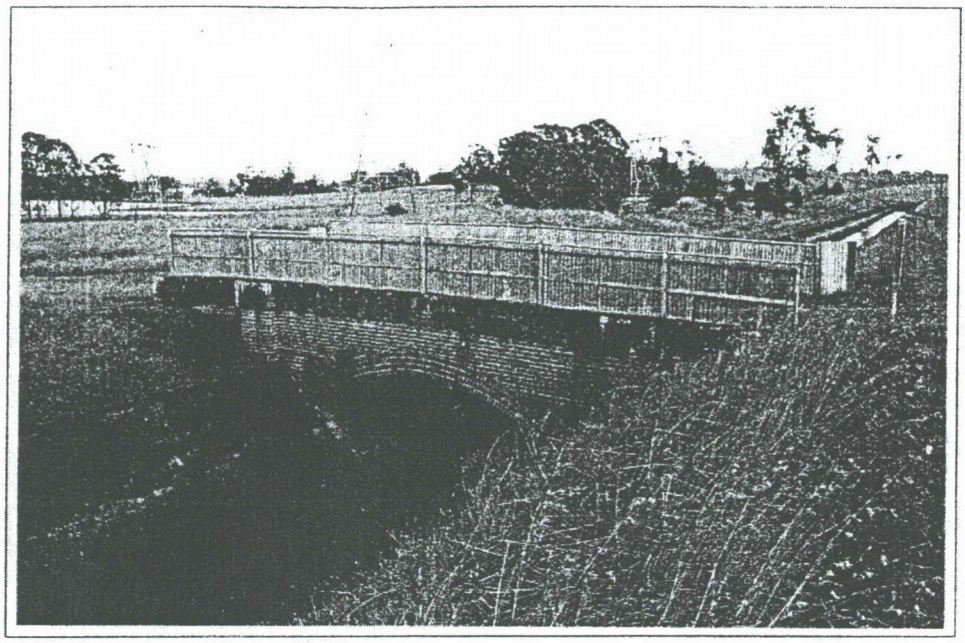
Item description Reinforced concrete slab deck with concrete abutments and concrete balustrade. Set into top of canal. Moulded concrete piers at each end of bridge.
Single lane width.
Closed with Gate Type 3, with five horizontal bars, two diagonal braces and small fish plates. Small curlicue finials and spring latch intact. The associated bush timber posts are not original and the gate has been moved to this position from the access road.

Significance Considerable References

Notes on significance

Condition Corrosion apparent on gate.

Precinct no | Precinct | Locality Upper Canal | Section 6 | Inventory 11



Caption *Canal overbridge.* Film 12 Frame 13

Item name **Canal Overbridge** Item type **Canal Overbridge**

Location Date from c1900s Date to

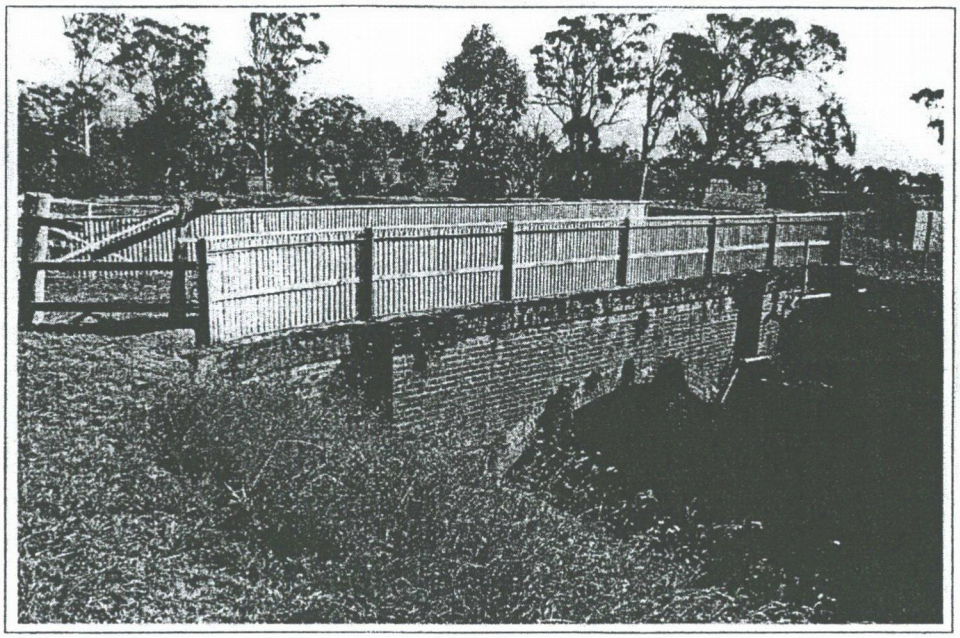
Item description Sandstock brick arched bridge. 4 ring brick arch across the canal with English bond brick wall above, widened brick piers on each side of the canal. Also a widened brick parapet below the balustrade. Balustrade formed by flat and angle iron with iron pipe railings clad with corrugated iron.

Significance Exceptional References

Notes on significance

Condition Major cracks in apex of arch.
Corrosion apparent.

Precinct no **Precinct** **Locality** Upper Canal **Section** 6 **Inventory** 30



Caption *Canal overbridge.* **Film** 12 **Frame** 34

Item name **Canal Overbridge** **Item type** **Canal Overbridge**

Location 23 1/4 miles **Date from** c1900s **Date to**

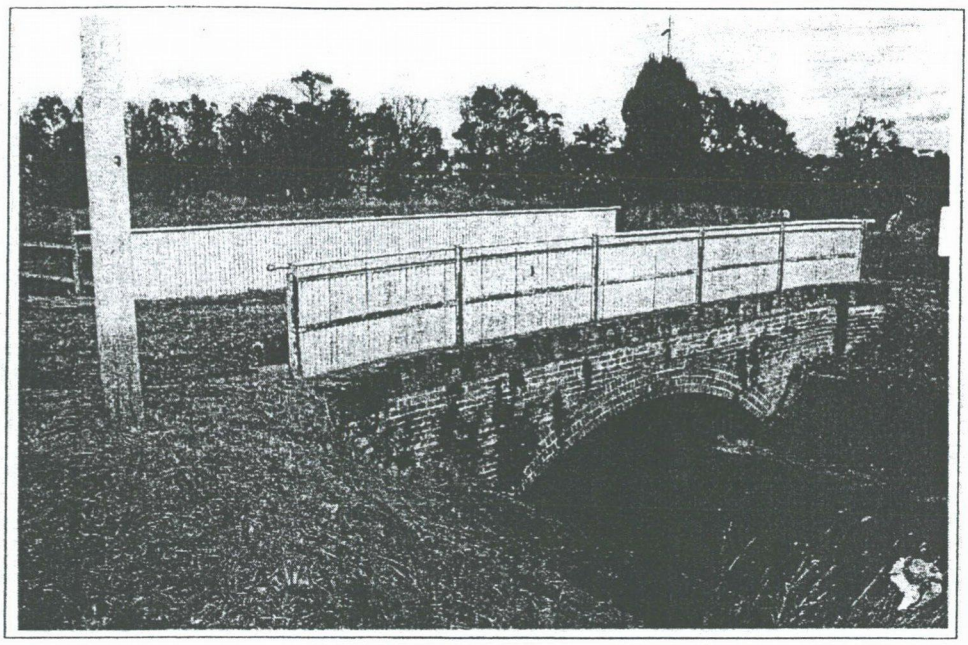
Item description Arched bridge of sandstock bricks. 4 ring brick arch across the canal with English bond brick wall above, widened brick piers on each side of the canal. Also a widened brick parapet below the balustrade. Balustrade formed by angle iron posts with iron pipe rails clad with corrugated iron.
Associated cattle grids.
Iron rung ladder adjacent downstream.

Significance Exceptional **References**

Notes on significance

Condition Corrosion apparent.

Precinct no **Precinct** **Locality** Upper Canal **Section** 6 **Inventory** 41



Caption *Canal overbridge.* **Film** 13 **Frame** 9

Item name Canal Overbridge **Item type** Canal Overbridge

Location 24 miles **Date from** c1900s **Date to**

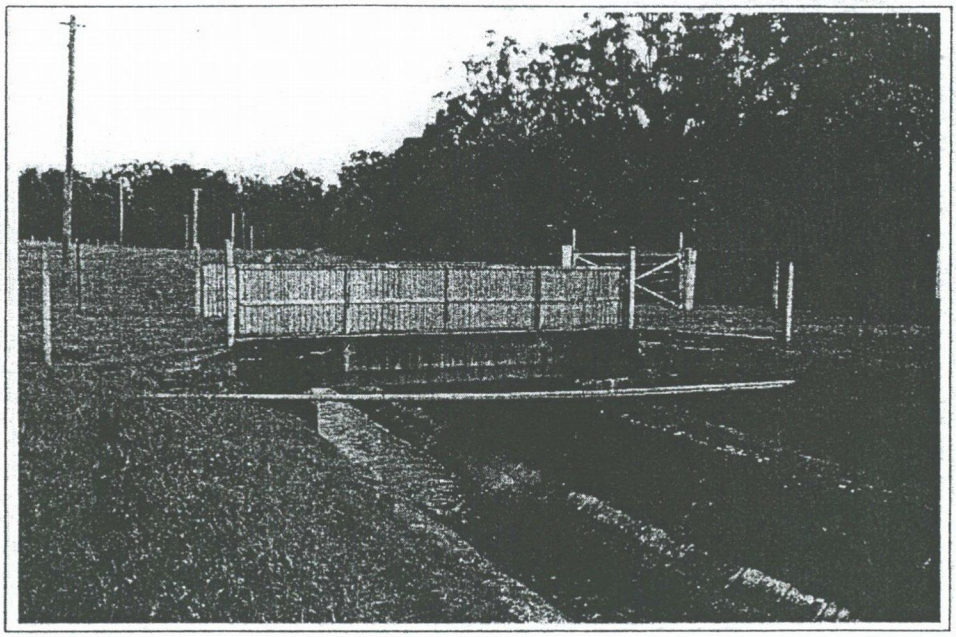
Item description Arched bridge of sandstock bricks. 4 ring brick arch across the canal with English bond brick wall above, widened brick piers on each side of the canal. Also a widened brick parapet below the balustrade. Balustrade formed by angle iron posts with iron pipe rails clad with corrugated iron.
Associated cattle grids.

Significance Exceptional **References**

Notes on significance

Condition Corrosion apparent.

Precinct no **Precinct** **Locality** Upper Canal **Section** 7 **Inventory** 25



Caption *Canal overbridge.* **Film** 14 **Frame** 20

Item name **Canal Overbridge** **Item type** **Canal Overbridge**

Location c. 25 5/8 miles **Date from** 1917 **Date to** 1918

Item description Bridge with reinforced concrete beam and slab deck, single lane width, with concrete abutments and dry stone retaining walls. Railings of flat and angle iron clad with corrugated iron to form side balustrade.

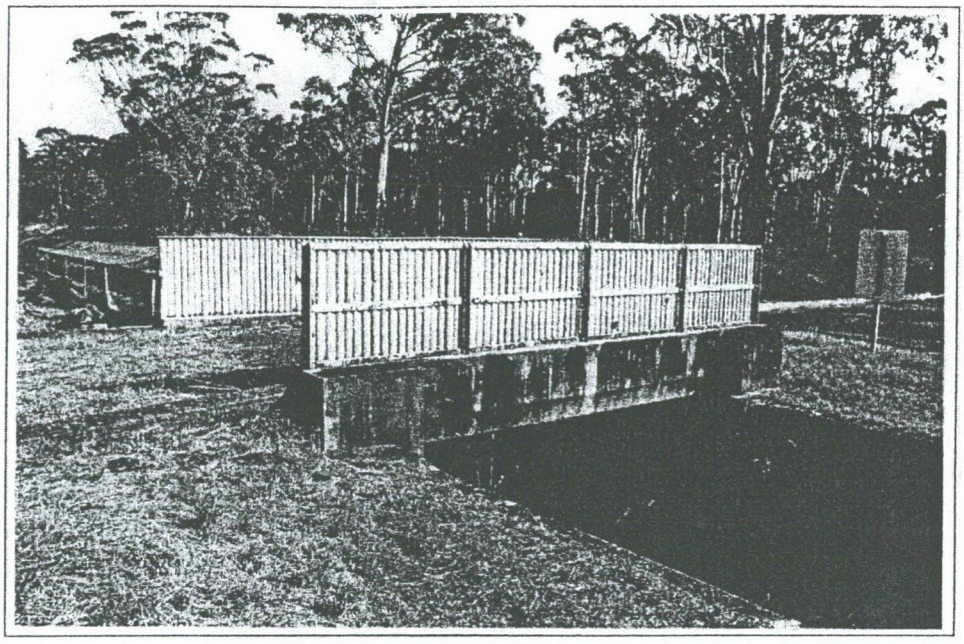
Associated cattle grids.

Significance Considerable **References** T Kass, Historical Report - Chronology 1991

Notes on significance Adjacent piping not significant.

Condition Corrosion apparent.

Precinct no **Precinct** **Locality** Upper Canal **Section** 7 **Inventory** 30



Caption *Canal overbridge.* **Film** 14 **Frame** 26

Item name **Canal Overbridge** **Item type** **Canal Overbridge**

Location c. 25 7/8 miles **Date from** 1917 **Date to** 1918

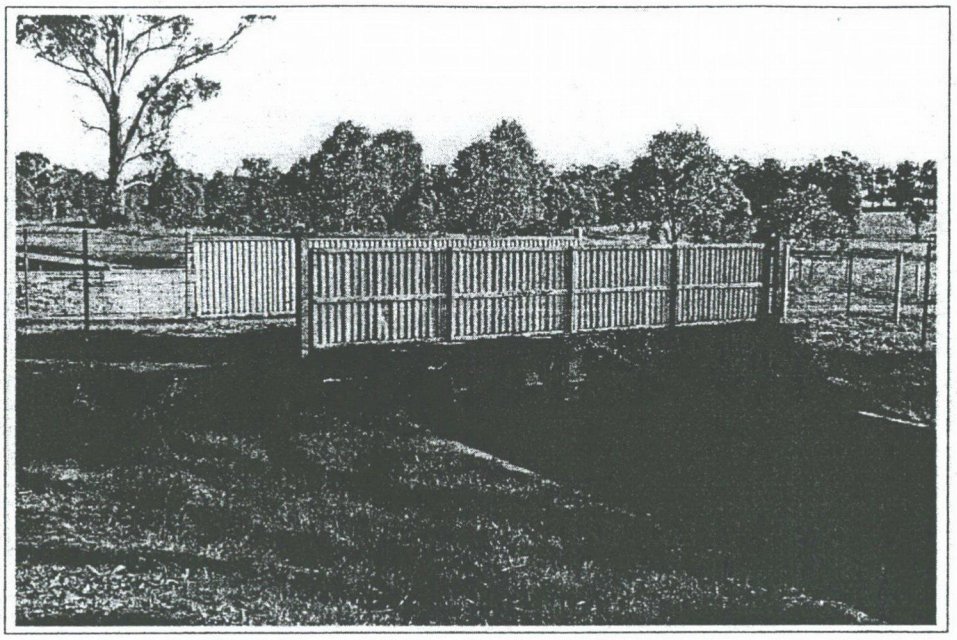
Item description Bridge with reinforced concrete beam and slab deck, single lane width, with either concrete. Railings of flat and angle iron clad with corrugated iron to form side balustrade.

Significance Considerable **References** T Kass, Historical Report - Chronology 1991

Notes on significance

Condition Corrosion apparent.

Precinct no **Precinct** **Locality** Upper Canal **Section** 7 **Inventory** 37



Caption *Canal overbridge.* **Film** 14 **Frame** 34

Item name **Canal Overbridge** **Item type** **Canal Overbridge**

Location 26 1/4 to 26 3/8 miles **Date from** 1917 **Date to** 1918

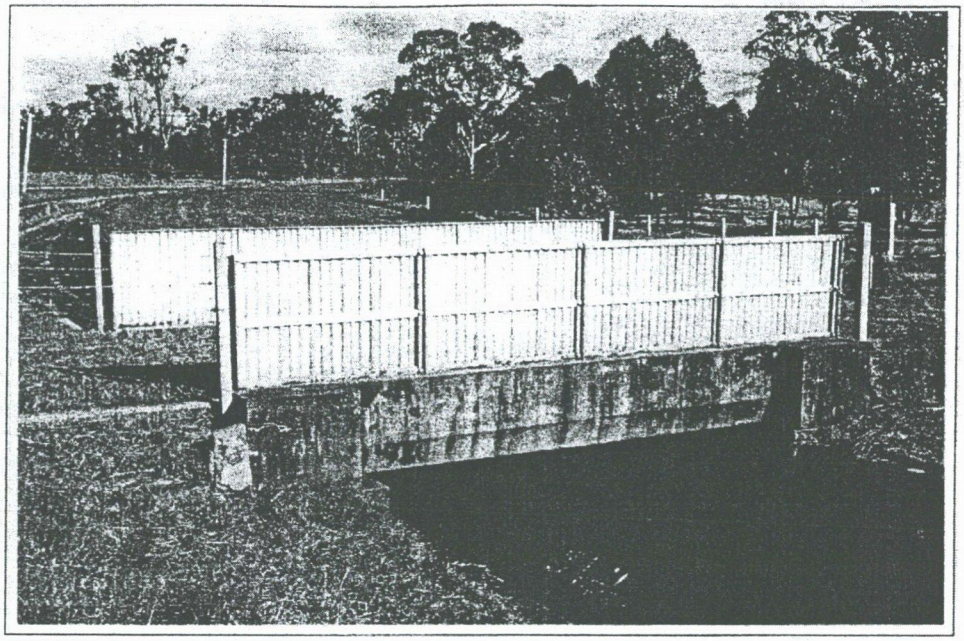
Item description Bridge with reinforced concrete beam and slab deck, single lane width, with concrete abutments. Railings of flat and angle iron clad with corrugated iron to form side balustrade.
Associated cattle grids.

Significance Considerable **References** T Kass, Historical Report - Chronology 1991

Notes on significance

Condition Corrosion apparent.

Precinct no **Precinct** **Locality** Upper Canal **Section** 7 **Inventory** 42



Caption *Canal overbridge.* **Film** 5 **Frame** 4

Item name **Canal Overbridge** **Item type** **Canal Overbridge**

Location 26 3/4 miles **Date from** 1917 **Date to** 1918

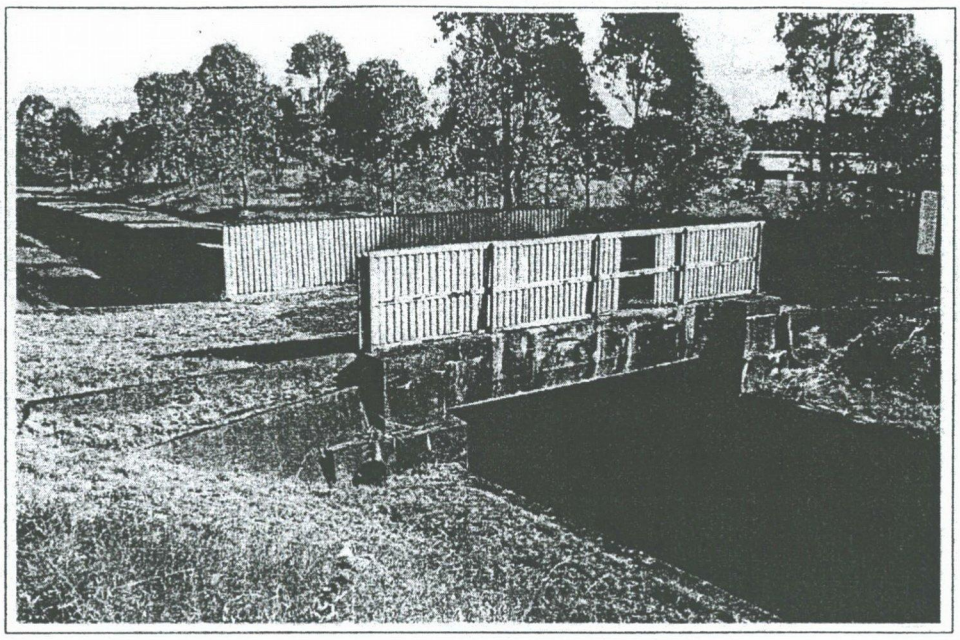
Item description Bridge with reinforced concrete beam and slab deck, single lane width, with either concrete abutments. Railings of flat and angle iron clad with corrugated iron to form side balustrade.

Significance Considerable **References** T Kass, Historical Report - Chronology 1991

Notes on significance

Condition Corrosion apparent.

Precinct no **Precinct** **Locality** Upper Canal **Section** 8 **Inventory** 12



Caption *Canal overbridge.* **Film** 15 **Frame** 19

Item name **Canal Overbridge** **Item type** **Canal Overbridge**

Location c. 27 5/8 miles **Date from** 1917 **Date to** 1918

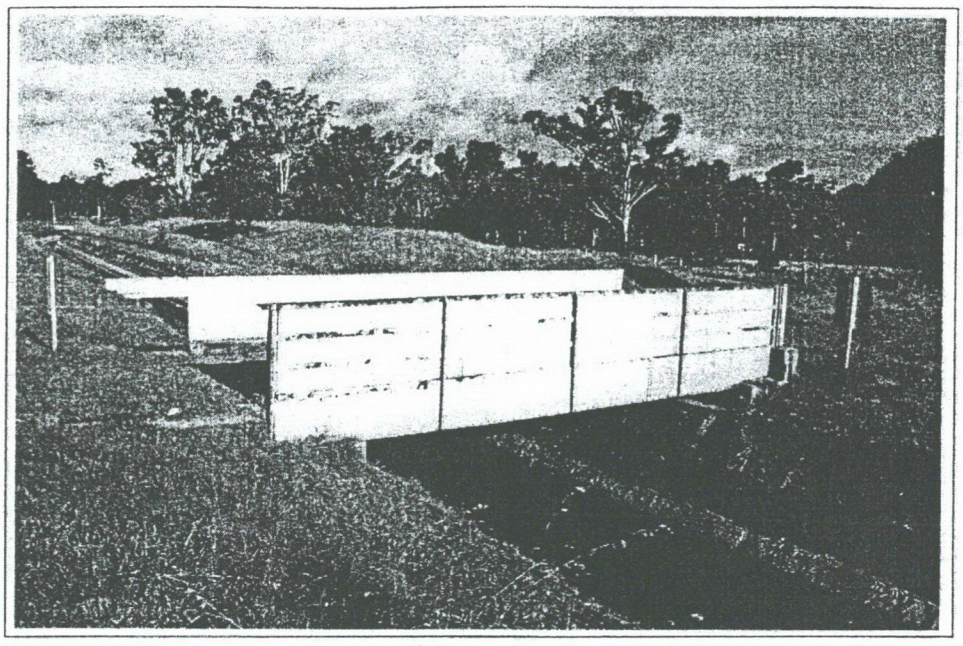
Item description Bridge with reinforced concrete beam and slab deck, single lane width, with concrete abutments. Railings of flat and angle iron clad with corrugated iron to form side balustrade.

Significance Considerable **References** T Kass, Historical Report - Chronology 1991

Notes on significance

Condition Corrosion apparent. Cracking in wing walls. Corrugated iron panel missing.

Precinct no **Precinct** **Locality** Upper Canal **Section** 8 **Inventory** 24



Caption *Canal overbridge.* **Film** 15 **Frame** 31

Item name **Canal Overbridge** **Item type** **Canal Overbridge**

Location 28 1/2 miles **Date from** c1904 **Date to** 1909

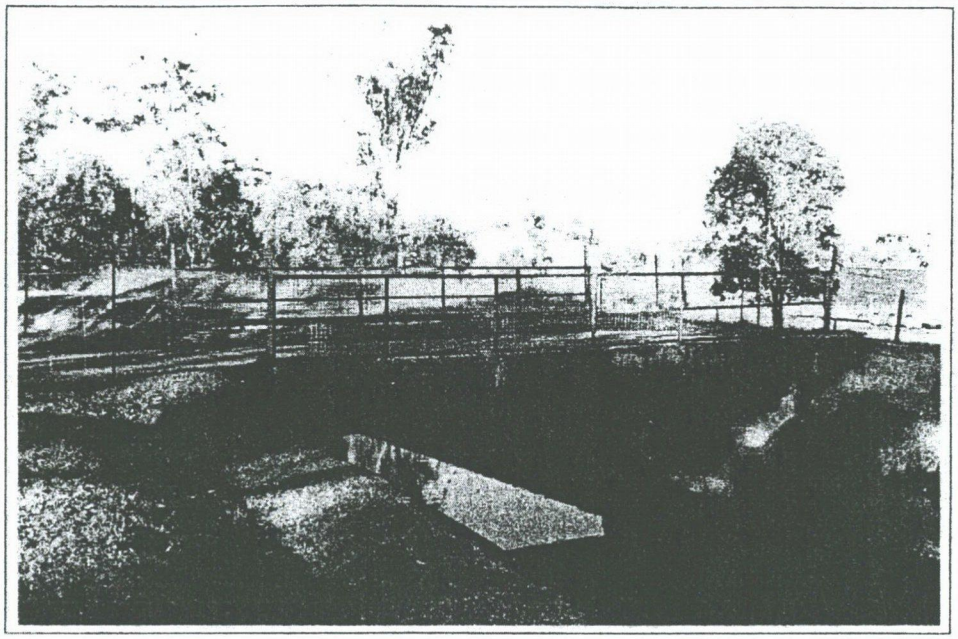
Item description Riveted iron trough base with concrete deck. Steel girders and concrete abutments, side plates bolted on. Single lane width. Railings of flat and angle iron clad with corrugated iron to form side balustrades.

Significance Exceptional **References** T Kass, Historical Report - Chronology 1991

Notes on significance

Condition Corrosion apparent on handrails and on trough base and sides.
The riveted iron trough and side plates should be immediately conserved.

Precinct no **Precinct** **Locality** Upper Canal **Section** 8 **Inventory** 41



Caption *Canal overbridge.* **Film** 16 **Frame** 16

Item name **Canal Overbridge** **Item type** **Canal Overbridge**

Location c. 29 3/8 miles, 6th Avenue **Date from** 1917 **Date to** 1918

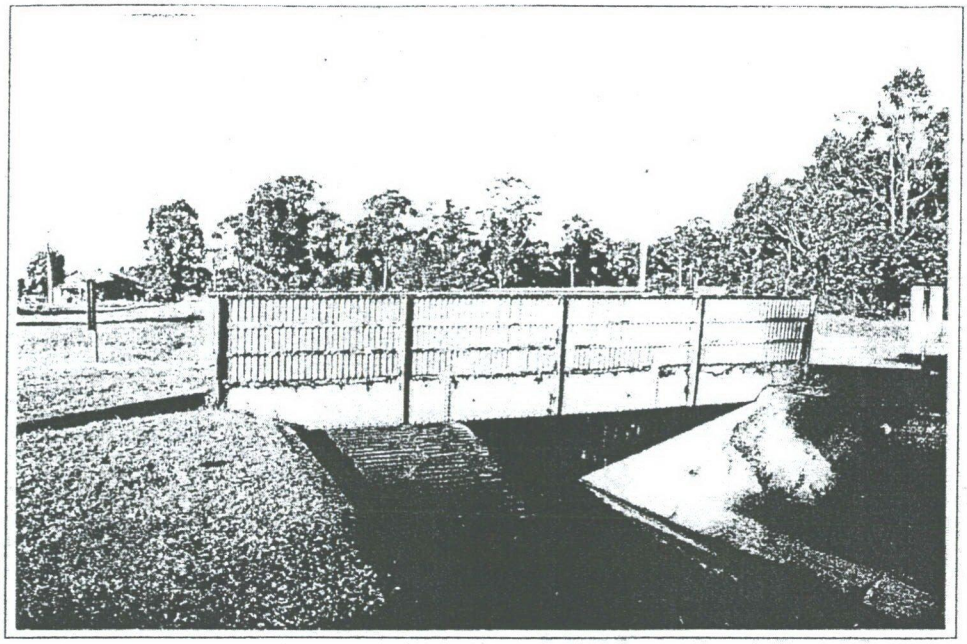
Item description Bridge with reinforced concrete beam and slab deck, single lane width, with concrete abutments. Railings of flat and angle iron clad with steel mesh to form side balustrade.

Significance Considerable **References** T Kass, Historical Report - Chronology 1991

Notes on significance

Condition Corrosion apparent.

Precinct no | Precinct | Locality Upper Canal | Section 8 | Inventory 52



Caption *Canal overbridge.* **Film** 16 **Frame** 27

Item name Canal Overbridge **Item type** Canal Overbridge

Location c. 30 3/8 miles **Date from** c1904 **Date to** 1909

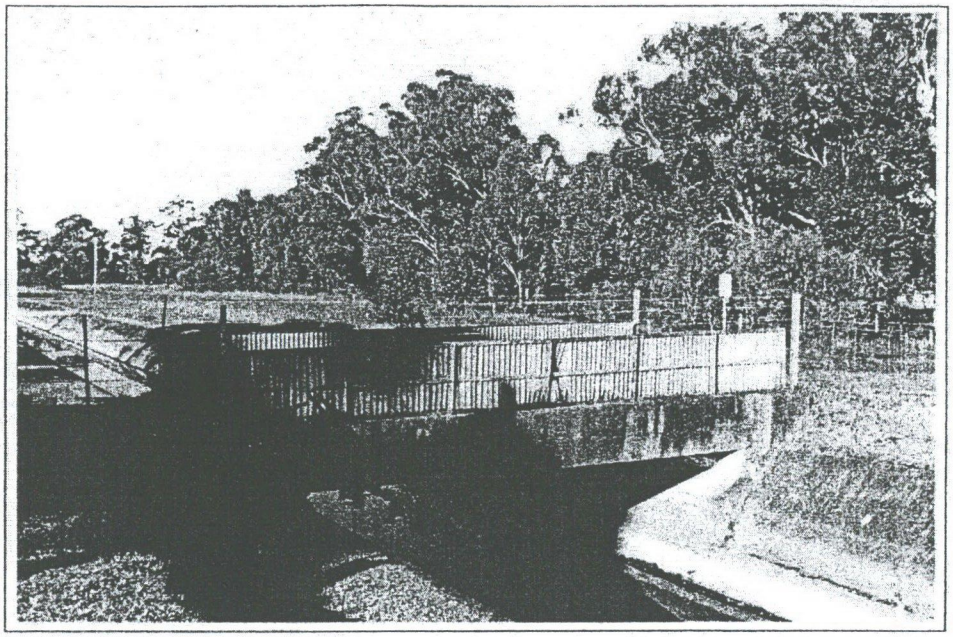
Item description Riveted iron trough base with concrete deck. Single lane width, concrete abutments. Railings of flat and angle iron clad with corrugated iron to form side balustrades.

Significance Exceptional **References** T Kass, Historical Report - Chronology 1991

Notes on significance

Condition Corrosion apparent on handrails and on trough base and sides.
The riveted iron trough and side plates should be immediately conserved.

Precinct no **Precinct** **Locality** Upper Canal **Section** 9 **Inventory** 3



Caption *Canal overbridge.* **Film** 16 **Frame** 30

Item name **Canal Overbridge** **Item type** **Canal Overbridge**

Location c. 30 1/2 miles **Date from** 1917 **Date to** 1918

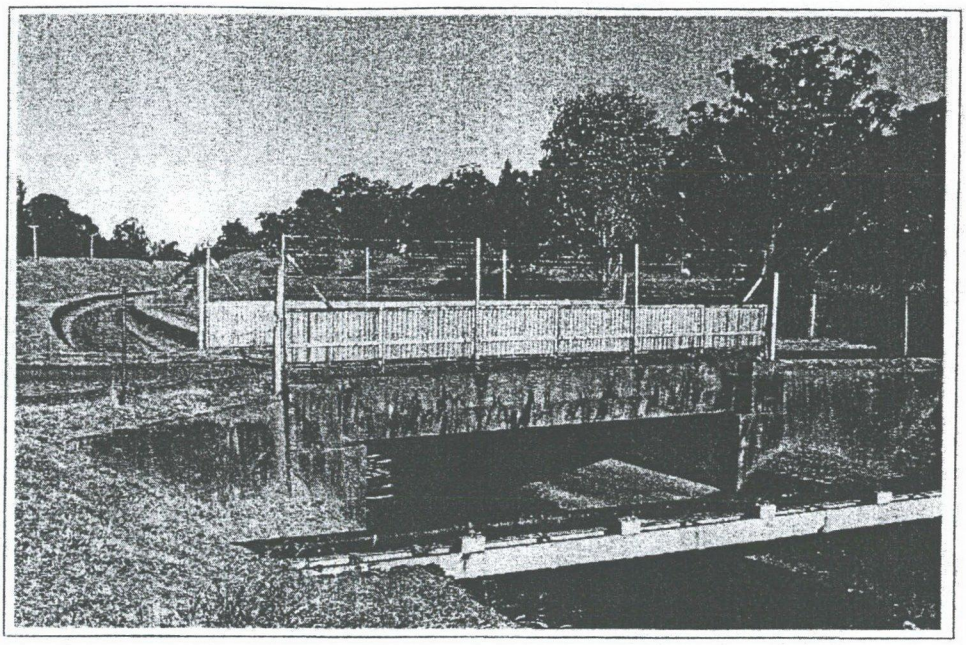
Item description Bridge with reinforced concrete beam and slab deck, single lane width, with concrete abutments. Railings of flat and angle iron clad with corrugated iron to form side balustrade.

Significance Considerable **References** T Kass, Historical Report - Chronology 1991

Notes on significance Main adjacent downstream not significant.

Condition Corrosion apparent. Damage to handrail.

Precinct no **Precinct** **Locality** Upper Canal **Section** 9 **Inventory** 8



Caption *Canal overbridge.* **Film** 16 **Frame** 36

Item name **Canal Overbridge** **Item type** **Canal Overbridge**

Location 31 1/8 to 31 1/4 miles **Date from** 1917 **Date to** 1918

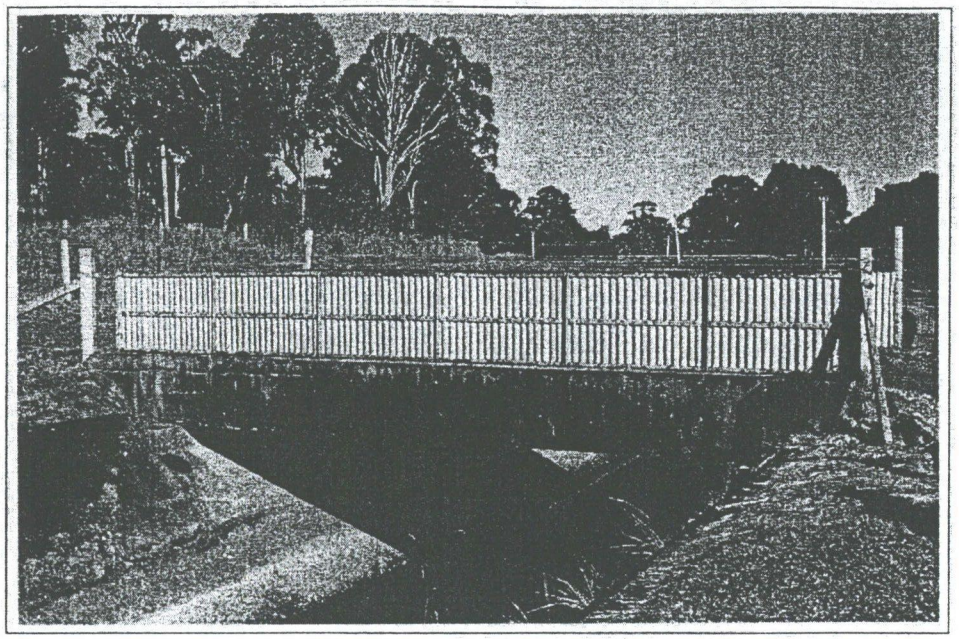
Item description Bridge with reinforced concrete beam and slab deck, single lane width, with concrete abutments. Railings of flat and angle iron clad with corrugated iron to form side balustrades, later heightened with angle iron strung with barbed wire.

Significance Considerable **References** T Kass, Historical Report - Chronology 1991

Notes on significance Main adjacent downstream not significant.

Condition Corrosion apparent.

Precinct no **Precinct** **Locality** Upper Canal **Section** 9 **Inventory** 22



Caption *Canal overbridge.* **Film** 17 **Frame** 20

Item name Canal Overbridge **Item type** Canal Overbridge

Location 32 to 32 1/8 miles **Date from** 1917 **Date to** 1918

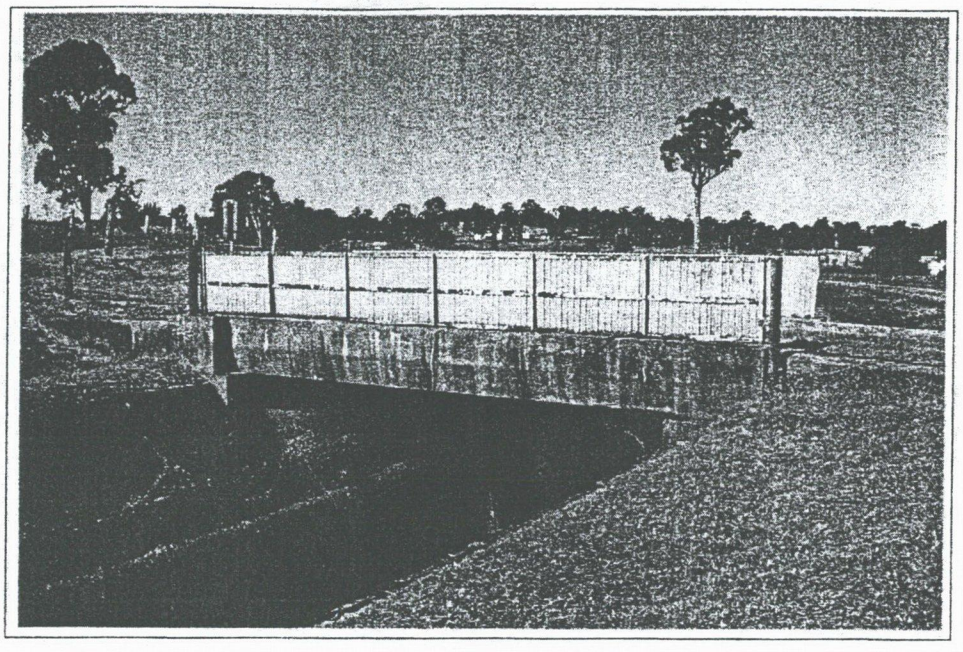
Item description Bridge with reinforced concrete beam and slab deck, single lane width, with concrete abutments. Railings of flat and angle iron clad with corrugated iron to form side balustrade.

Significance Considerable **References** T Kass, Historical Report - Chronology 1991

Notes on significance

Condition Corrosion apparent.

Precinct no **Precinct** **Locality** Upper Canal **Section** 9 **Inventory** 28



Caption *Canal overbridge.* **Film** 17 **Frame** 25

Item name **Canal Overbridge** **Item type** **Canal Overbridge**

Location 32 1/2 to 32 5/8 miles **Date from** 1917 **Date to** 1918

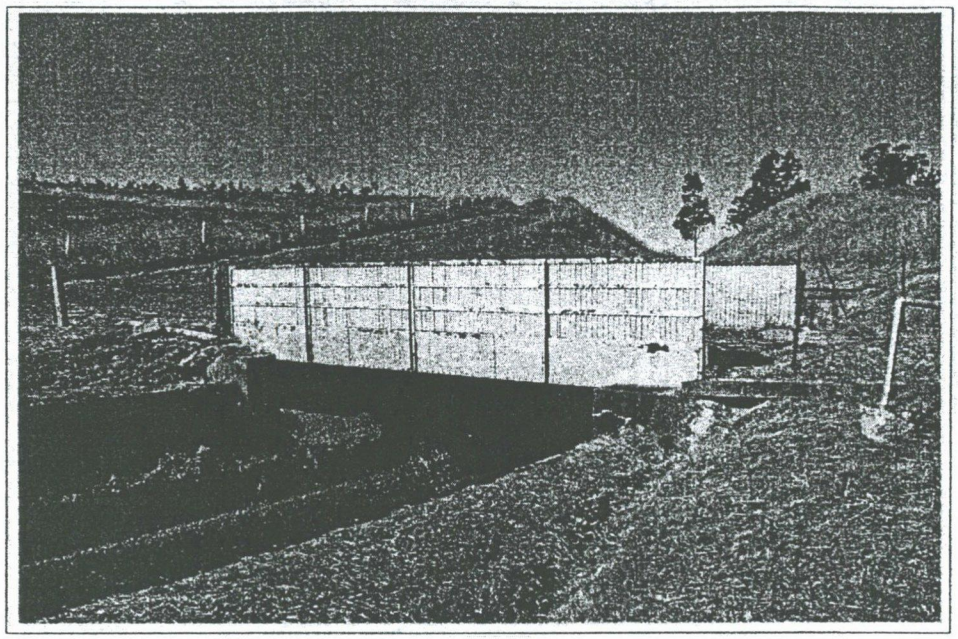
Item description Bridge with reinforced concrete beam and slab deck, single lane width, with concrete abutments. Railings of flat and angle iron clad with corrugated iron to form side balustrades.
Remnant post-and-rail approach fence, later partly altered to post-and-wire.
Associated cattle grids.

Significance Considerable **References** T Kass, Historical Report - Chronology 1991

Notes on significance

Condition Corrosion apparent.

Precinct no **Precinct** **Locality** Upper Canal **Section** 9 **Inventory** 37



Caption *Canal overbridge.* **Film** 17 **Frame** 34

Item name **Canal Overbridge** **Item type** **Canal Overbridge**

Location 33 to 33 1/8 miles **Date from** c1904 **Date to** 1909

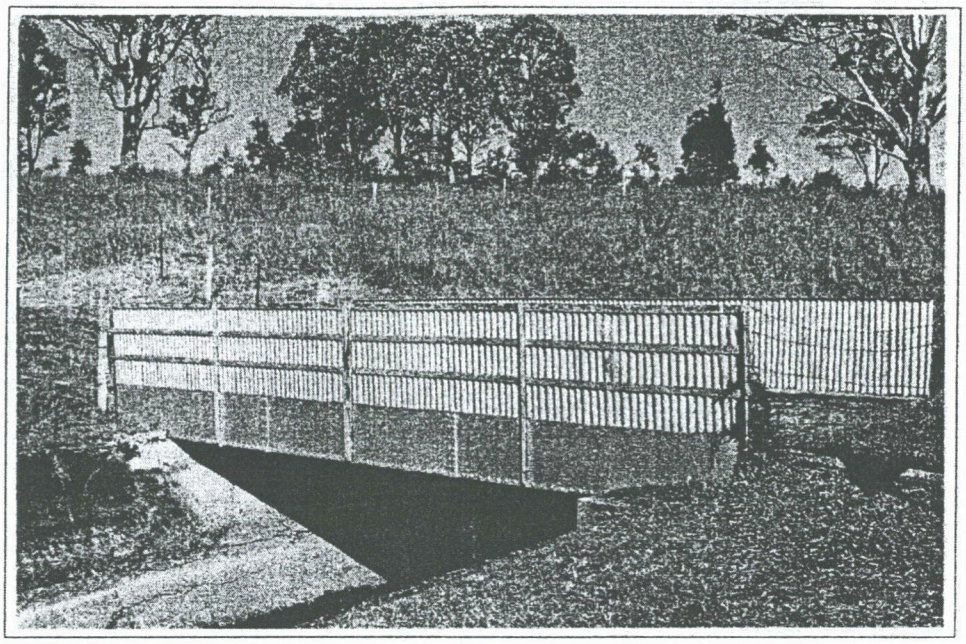
Item description Riveted iron trough base with concrete deck. Concrete abutments, single lane width. Railings of flat and angle iron clad with corrugated iron to form side balustrades.
Associated cattle grids.

Significance Exceptional **References** T Kass, Historical Report - Chronology 1991

Notes on significance

Condition Corrosion apparent on handrails and on trough base and sides.
The riveted iron trough and side plates should be immediately conserved.

Precinct no **Precinct** **Locality** Upper Canal **Section** 10 **Inventory** 4



Caption *Canal overbridge.* **Film** 18 **Frame** 6

Item name **Canal Overbridge** **Item type** **Canal Overbridge**

Location 33 5/8 to 33 3/4 miles **Date from** c1904 **Date to** 1909

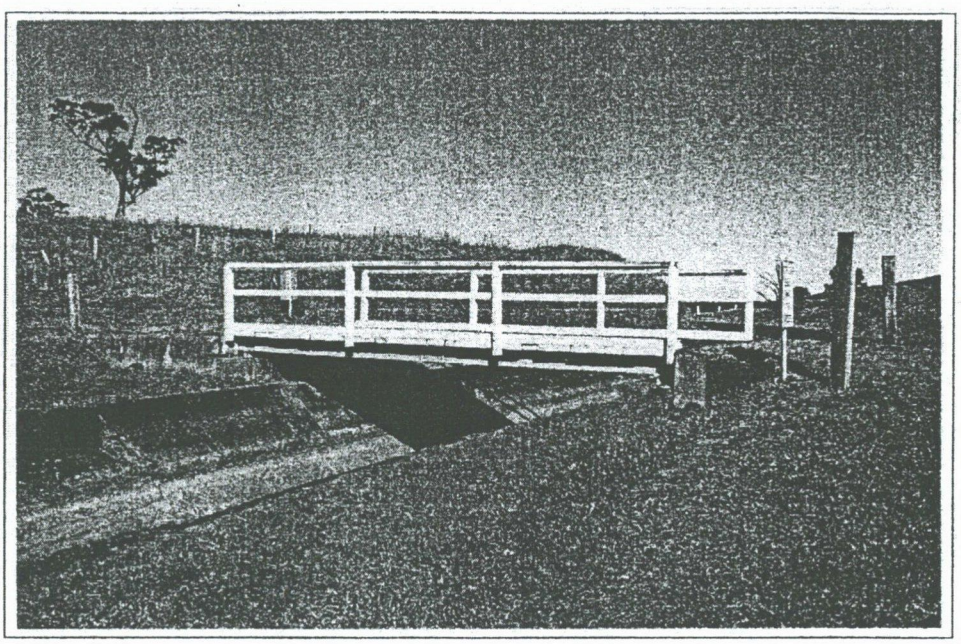
Item description Riveted iron trough base with concrete deck. Concrete abutments, single lane width. Railings of flat and angle iron clad with corrugated iron to form side balustrades.
Associated cattle grids.

Significance Exceptional **References** T Kass, Historical Report - Chronology 1991

Notes on significance

Condition Corrosion apparent on handrails and on trough base and sides.
The riveted iron trough and side plates should be immediately conserved.

Precinct no **Precinct** **Locality** Upper Canal **Section** 10 **Inventory** 9



Caption *Canal overbridge.* **Film** 18 **Frame** 11

Item name **Canal Overbridge** **Item type** **Canal Overbridge**

Location 33 7/8 to 34 miles **Date from** c1950s ? **Date to**

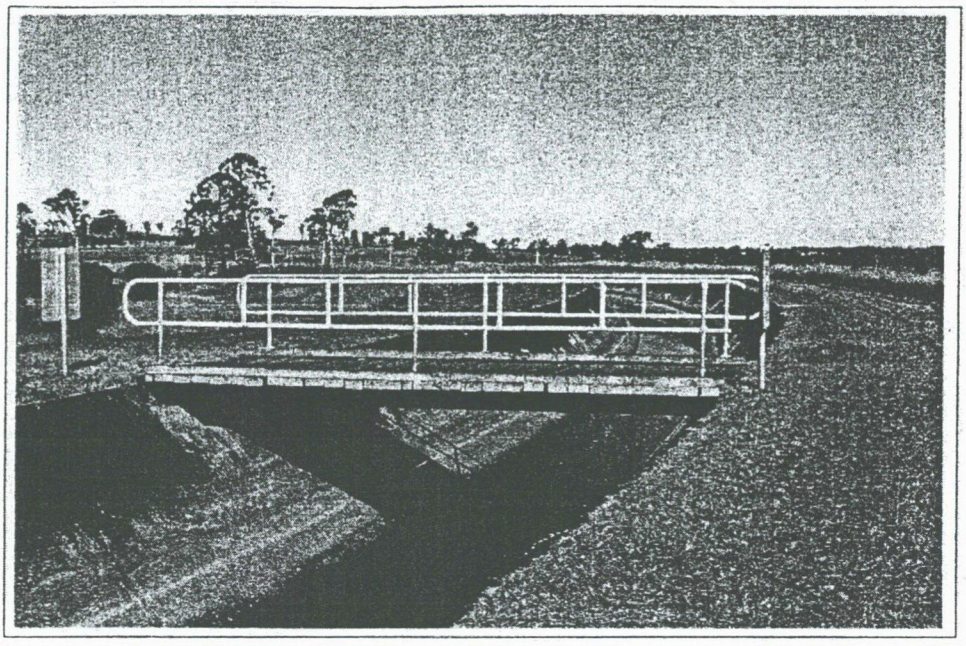
Item description Timber deck bridge supported on RSJs. Concrete abutments. Timber arris rail balustrade. Timber deck without bitumen surfacing.
Timber post-and-rail approach fences dismantled since 1992.
Associated cattle grids.

Significance Considerable **References**

Notes on significance

Condition Paint in poor condition.

Precinct no **Precinct** **Locality** Upper Canal **Section** 10 **Inventory** 20



Caption *Canal overbridge.* **Film** 18 **Frame** 25

Item name **Canal Overbridge** **Item type** **Canal Overbridge**

Location c. 34 3/8 miles **Date from** c 1960s ? **Date to**

Item description Timber deck supported on RSJs set into the top of the canal.
Timber kerb rail and galvanised pipe side rails. Deck without bitumen surfacing.

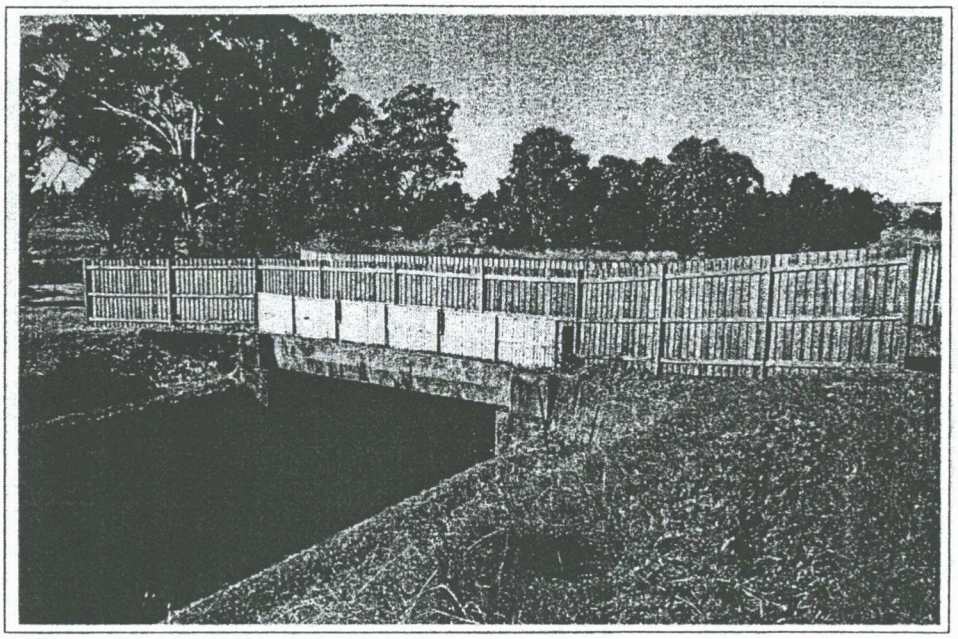
This bridge occurs at the end of the embankment section of canal passing Liverpool Dam

Significance Some **References**

Notes on significance

Condition

Precinct no **Precinct** **Locality** Upper Canal **Section** 11 **Inventory** 29



Caption *Canal overbridge.* **Film** 20 **Frame** 5

Item name **Canal Overbridge** **Item type** **Canal Overbridge**

Location c. 38 1/8 miles **Date from** 1917 **Date to** 1918

Item description Bridge with reinforced concrete beam and slab deck, single lane width, with concrete abutments. Railings of flat and angle iron clad with corrugated iron to form side balustrades.

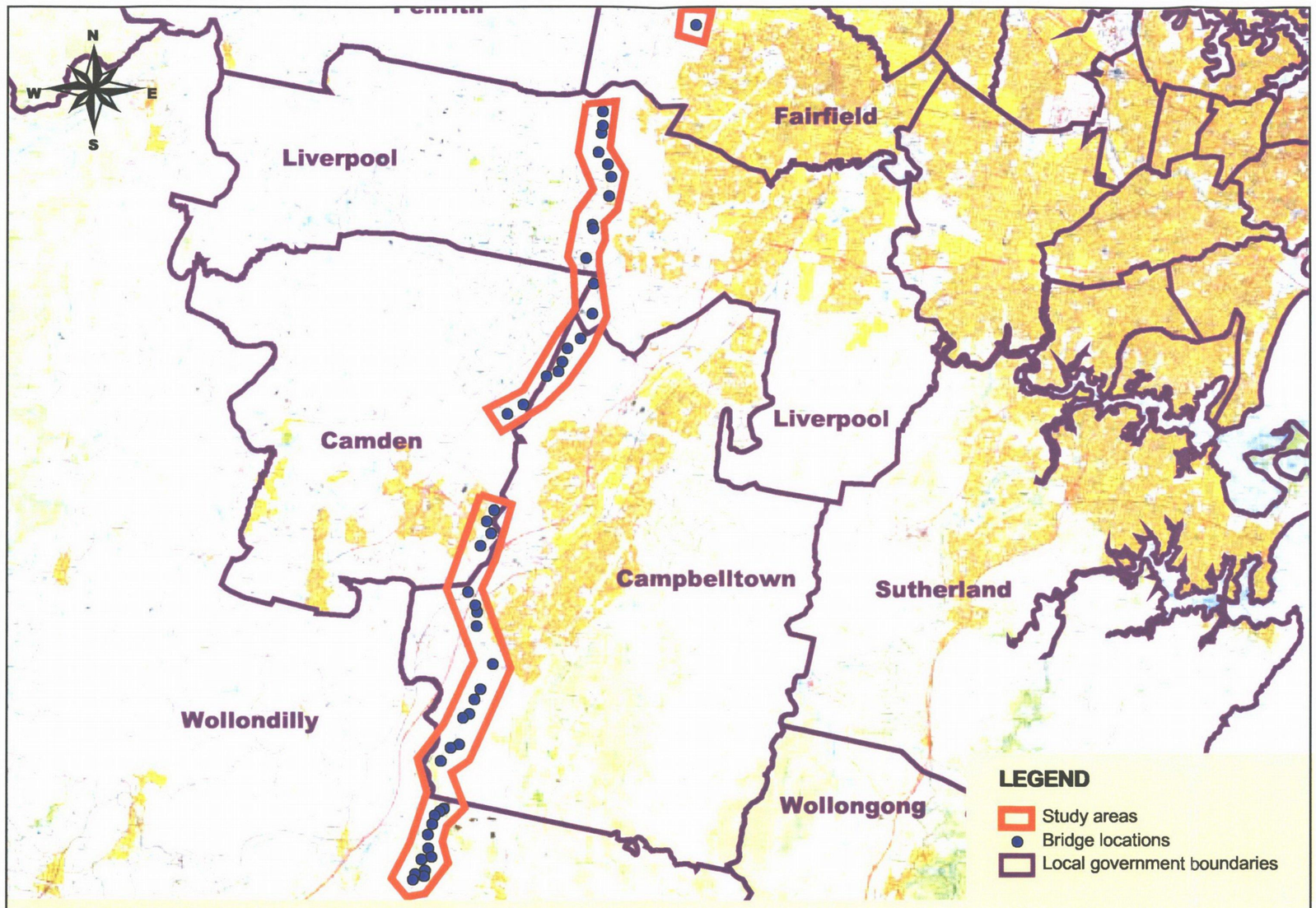
Significance Considerable
Intrusive

References T Kass, Historical Report - Chronology 1991

Notes on significance Recent paling fencing is not in keeping with fencing along the Upper Canal and is intrusive.

Condition Corrosion apparent.

Appendix B Study area and site photographs



Study area map - Bridge locations along the Sydney Catchment Authority Upper Canal

Map data © Copyright 2003 Telstra Corporation Limited (Sensis Pty Ltd) and Universal Press Pty Ltd.
Map produced by RTA Environmental Monitoring Section
Date: 20 November 2003

N

W

E

S

Bridge Chainage No. 14769

Bridge Chainage No. 15272

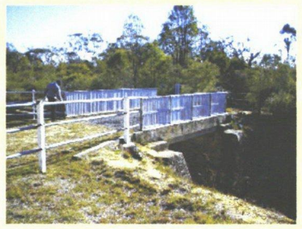
Bridge Chainage No. 14355

Bridge Chainage No. 15079

Bridge Chainage No. 13786

Bridge Chainage No. 13049

Bridge Chainage No. 12166



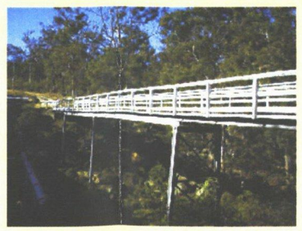
Bridge Chainage No. 12547

Bridge Chainage No. 10847

Bridge Chainage No. 11577

Bridge Chainage No. 10586

Bridge Chainage No. 11288



15272

15079

14769

14355

13786

13049

12547

12166

11577

11288

10847

10586

HIGH ST

HARRIS RD

NEPEAN RIVER

THE LACHLAN RD

UNNAMED ST

UNNAMED ST

MCQUARIEDALE RD

Map 1: Bridge locations along Sydney Catchment Authority Upper Canal
Section 1: From Chainage No. 10586 to 15272

010 Meters

Legend

- Site locations
- Rivers
- Roads

Map data © Copyright 2003 Telstra Corporation Limited (Sensis Pty Ltd) and Universal Press Pty Ltd.
Map produced by RTA Environmental Monitoring Section
Date: 9 September 2003

N
W
E
S

NEPEAN RIVER

HUME HWY

Wollondilly

WOODBRIDGE RD

MENANGLE RD

MORTON PARK RD

THE LACHLAN RD

APPIN RD

GEORGES RIVER

HEDDERSON RD

Campbelltown

HARRIS RD

UNNAMED ST

23387

21874

21260

20477

20160

18834

18420

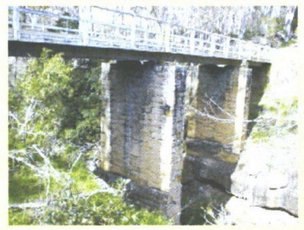
17582

Bridge Chainage No. 23387

Bridge Chainage No. 21874

Bridge Chainage No. 21260

Bridge Chainage No. 20477

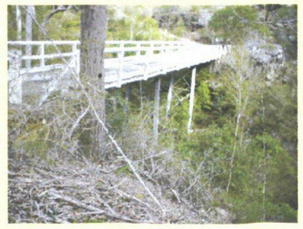


Bridge Chainage No. 20160

Bridge Chainage No. 18834

Bridge Chainage No. 18420

Bridge Chainage No. 17582



Map 2: Bridge locations along Sydney Catchment Authority Upper Canal
Section 2: From Chainage No. 17582 to 23387

0 30 Meters

Legend

- Site locations
- Rivers
- Roads
- Local government boundaries

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Map produced by RTA Environmental Monitoring Section
Date: 10 September 2003

Map 3: Bridge locations along Sydney Catchment Authority Upper Canal
Section 3: from Chainage No. 25337 to 32012, Camden

0 100 Meters

Legend

- Site locations
- Rivers
- Roads
- Local government boundaries

Map data © Copyright 2003 Telstra Corporation Limited (Sensis Pty Ltd) and Universal Press Pty Ltd.
Map produced by RTA Environmental Monitoring Section
Date: 10 September 2003

N

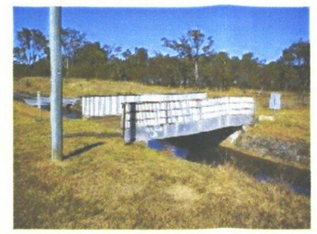
W

E

S

Bridge Chainage No. 44417

Bridge Chainage No. 45876



Bridge Chainage No. 42309

Bridge Chainage No. 43112

Bridge Chainage No. 41655

Bridge Chainage No. 41176

Bridge Chainage No. 37394

Bridge Chainage No. 38636

45876

44417

43112

42309

41655

41176

new bridge/41176

38636

37394

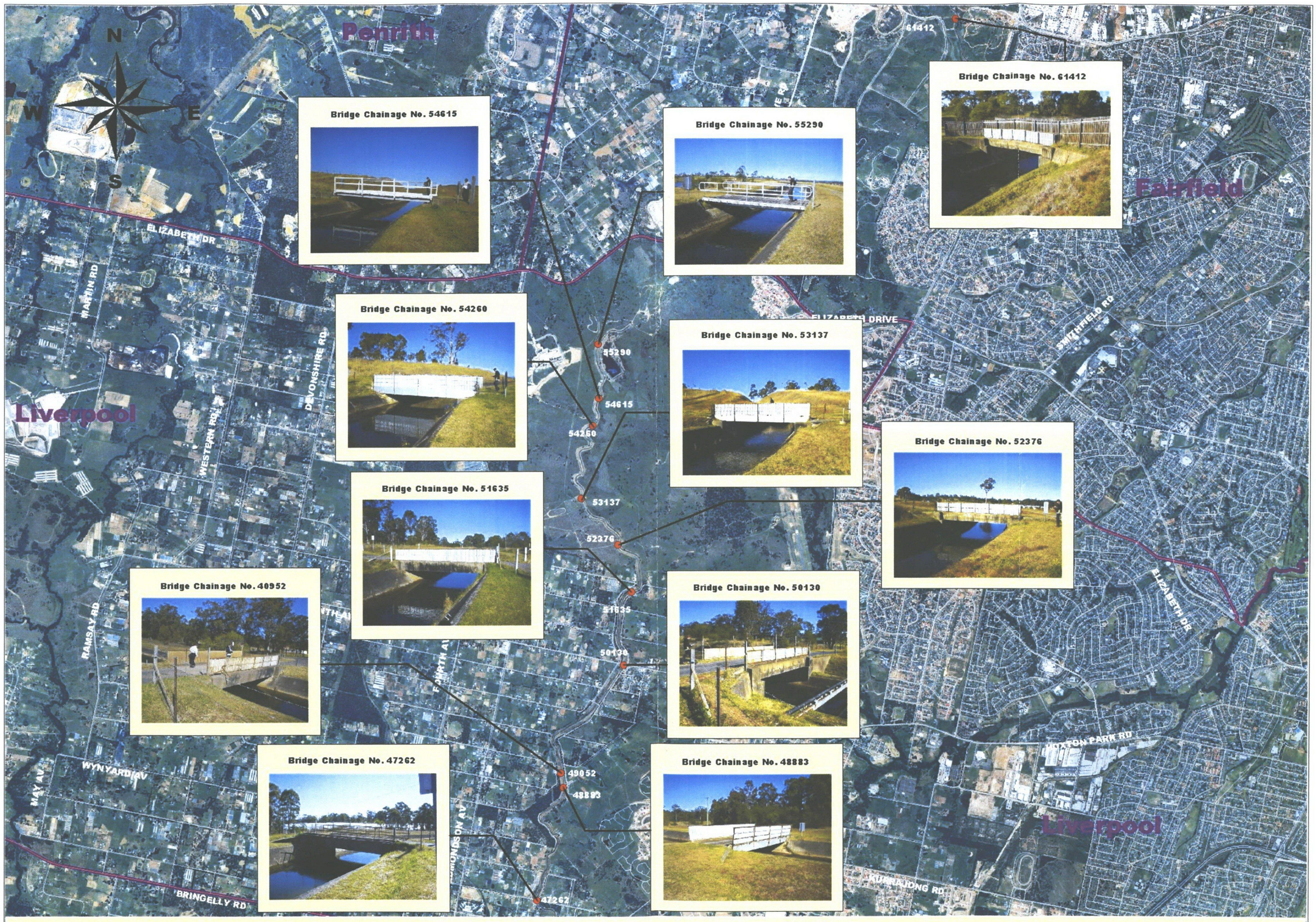
Map 4: Bridge locations along Sydney Catchment Authority Upper Canal
Section 4: From Chainage No. 37394 to 45876, Liverpool.

0100 Meters

Legend

- Site locations
- Rivers
- Roads
- Local government boundaries

Map data © Copyright 2003 Telstra Corporation Limited (Sensis Pty Ltd) and Universal Press Pty Ltd.
Map produced by RTA Environmental Monitoring Section
Date: 17 September 2003



Map 5: .Bridge locations along Sydney Catchment Authority Upper Canal
Section 5: From Chainage No. 47262 to 61412, Liverpool

0 900 Meters

Legend

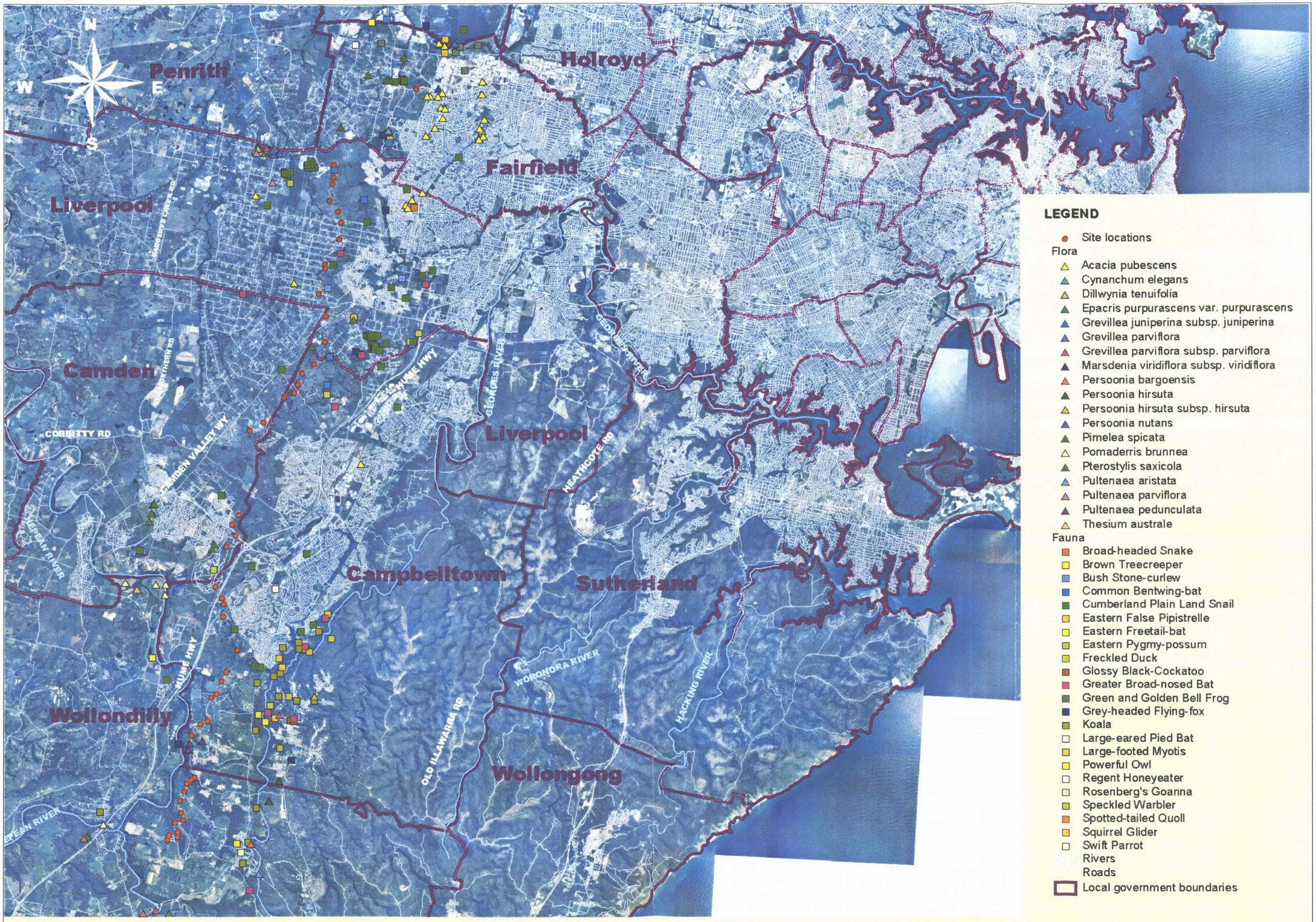
- Site locations
- Rivers
- Roads
- Local government boundaries

Map data © Copyright 2003 Telstra Corporation Limited (Sensis Pty Ltd) and Universal Press Pty Ltd.
Map produced by RTA Environmental Monitoring Section
Date: 17 September 2003

Appendix C Results of Background and Database Searches

SOIL TYPES: SCA UPPER CANAL BRIDGE MAINTENANCE WORKS

CHAINAGE	LATITUDE	LONGITUDE	SOIL LANDSCAPE	SOIL LANDSCAPE SHEET
61412	3351.07	15052.11	Luddenham	Penrith
55290	3353.22	15049.49	Luddenham	Penrith
54615	3353.57	15049.51	Luddenham	Penrith
54260	3353.74	15049.47	Luddenham	Penrith
53137	3354.21	15049.41	Luddenham	Penrith
52376	3354.49	15049.70	Luddenham	Penrith
51635	3354.79	15049.81	Luddenham	Penrith
50130	3355.25	15049.77	Luddenham	Penrith
49052	3355.95	15049.32	Luddenham	Penrith
48883	3356.04	15049.34	Luddenham	Penrith
47262	3356.76	15049.17	on border of Luddenham / Blacktown	Penrith
45876	3357.37	15049.42	Blacktown	Penrith
44417	3358.09	15049.41	Blacktown	Penrith
43112	3358.70	15049.09	Blacktown	Penrith
42309	3358.96	15048.71	Blacktown	Penrith
41655	3359.28	15048.58	Blacktown	Penrith
41176	3359.51	15048.47	Blacktown	Penrith
38636	3400.34	15047.50	Blacktown	Wollongong
37394	3400.58	15047.04	Blacktown	Wollongong
32012	3402.90	15046.75	Blacktown	Wollongong
31366	3403.18	15046.55	Blacktown	Wollongong
30784	3403.47	15046.69	on border of Luddenham / Blacktown	Wollongong
29934	3403.78	15046.40	Luddenham	Wollongong
27614	3404.89	15046.09	Blacktown	Wollongong
26651	3405.21	15046.31	Blacktown	Wollongong
26256	3405.37	15046.37	on border of Luddenham / Blacktown	Wollongong
25337	3405.71	15046.36	Blacktown	Wollongong
23387	3406.61	15046.88	Luddenham	Wollongong
21874	3407.24	15046.55	Theresa Park	Wollongong
21260	3407.48	15046.39	Blacktown	Wollongong
20477	3407.84	15046.25	Hawkesbury	Wollongong
20160	3407.94	15046.07	Blacktown	Wollongong
18834	3408.58	15045.99	Blacktown	Wollongong
18420	3408.68	15045.74	Blacktown	Wollongong
17582	3409.00	15045.47	Hawkesbury	Wollongong
15272	3410.14	15045.61	Hawkesbury	Wollongong
15079	3410.20	15045.50	Hawkesbury	Wollongong
14769	3410.31	15045.36	Blacktown	Wollongong
14355	3410.52	15045.29	Blacktown	Wollongong
13786	3410.78	15045.17	Blacktown	Wollongong
13049	3411.11	15045.20	Blacktown	Wollongong
12547	3411.32	15045.29	Hawkesbury	Wollongong
12166	3411.39	15045.01	on border of Hawkesbury / Blacktown	Wollongong
11577	3411.65	15045.12	Blacktown	Wollongong
11288	3411.78	15045.11	Blacktown	Wollongong
10847	3411.75	15044.84	Blacktown	Wollongong
10586	3411.88	15044.78	Blacktown	Wollongong



LEGEND

- Site locations

Flora

- Acacia pubescens
- Cynanchum elegans
- Dillwynia tenuifolia
- Epacris purpurascens var. purpurascens
- Grevillea juniperina subsp. juniperina
- Grevillea parviflora
- Grevillea parviflora subsp. parviflora
- Marsdenia viridiflora subsp. viridiflora
- Persoonia bargoensis
- Persoonia hirsuta
- Persoonia hirsuta subsp. hirsuta
- Persoonia nutans
- Pimelea spicata
- Pomaderris brunnea
- Pterostylis saxicola
- Pultenaea aristata
- Pultenaea parviflora
- Pultenaea pedunculata
- Thesium australe

Fauna

- Broad-headed Snake
- Brown Treecreeper
- Bush Stone-curlew
- Common Bentwing-bat
- Cumberland Plain Land Snail
- Eastern False Pipistrelle
- Eastern Freetail-bat
- Eastern Pygmy-possum
- Freckled Duck
- Glossy Black-Cockatoo
- Greater Broad-nosed Bat
- Green and Golden Bell Frog
- Grey-headed Flying-fox
- Koala
- Large-eared Pied Bat
- Large-footed Myotis
- Powerful Owl
- Regent Honeyeater
- Rosenberg's Goanna
- Speckled Warbler
- Spotted-tailed Quoll
- Squirrel Glider
- Swift Parrot

Rivers

Roads

Local government boundaries

Threatened Fauna and Flora Species located within 5km distance of Bridge locations along the Sydney Catchment Authority Upper Canal.

0 1 Kilometers

Map data © Copyright 2003 Telstra Corporation Limited (Sensis Pty Ltd) and Universal Press Pty Ltd.
NSW National Parks and Wildlife Services, Atlas of NSW Wildlife, 13 June 2003.
Map produced by RTA Environmental Monitoring Section
Date: 9 September 2003

EPBC Act

Environmental Reporting Tool

Australian Government
Department of the Environment and Heritage

16 September 2003 16:57

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

You may wish to print this report for reference before moving to other pages or websites.

The Australian Natural Resources Atlas at http://www.environment.gov.au/atlas may provide further environmental information relevant to your selected area. Information about the EPBC Act including significance guidelines, forms and application process details can be found at http://www.ea.gov.au/epbc/assessmentsapprovals/index.html

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Search Type: Line

Buffer: 10 km

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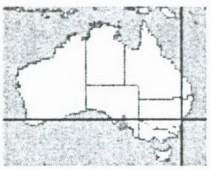

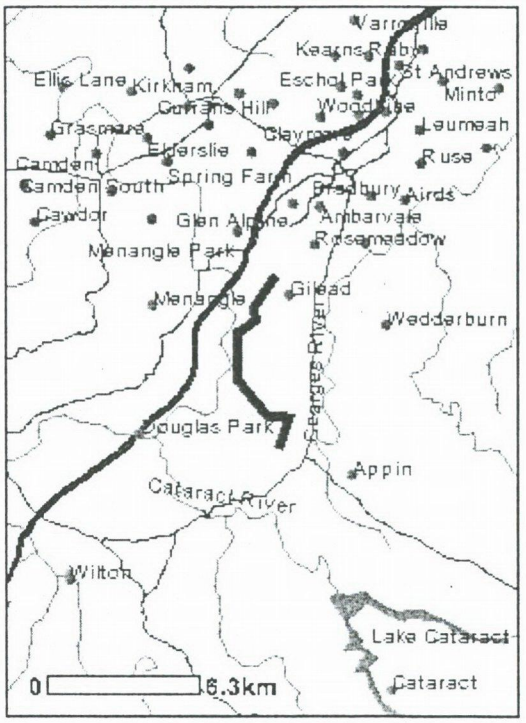

Report Contents:

Summary
Details
- Matters of NES
- Other matters protected by the EPBC Act
- Extra Information

Caveat
Acknowledgments

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance - see http://www.ea.gov.au/epbc/assessmentsapprovals/guidelines/index.html.

World Heritage Properties: None

Wetlands of International Significance: 1

(Ramsar Sites)

Commonwealth Marine Areas:	None
Threatened Ecological Communities:	2
Threatened Species:	30
Migratory Species:	8

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may be required for the Commonwealth or agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

Please note that the current dataset on Commonwealth land only includes Commonwealth reserves. Further information on Commonwealth land would need to be obtained from relevant sources including Commonwealth agencies, local agencies, and land tenure maps.

Commonwealth Lands:	5

A permit may be required for activities that may affect one or more of the following matters protected. Information on EPBC Act permit requirements and application forms can be found at http://www.ea.gov.au/epbc/permits/index.html.

Listed Marine Species:	8
Whales and Other Cetaceans:	None
Critical Habitats:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

Conservation Reserves:	None
Regional Forest Agreements:	None

Details

Matters of National Environmental Significance

Wetlands of International Significance [Dataset Information]

(Ramsar Sites)

TOWRA POINT NATURE RESERVE	Within same catchment as Ramsar site

Threatened Ecological Communities [Dataset Information]

	Status	Type of Presence
Cumberland Plain Woodlands	Endangered	Community likely to occur within area
Shale/Sandstone Transition Forest	Endangered	Community likely to occur within area

Threatened Species [Dataset Information]

	Status	Type of Presence
Birds		
Lathamus discolor Swift Parrot	Endangered	Species or species habitat may occur within area

Rostratula australis Australian Painted Snipe	Vulnerable	Species or species habitat may occur within area
Xanthomyza phrygia Regent Honeyeater	Endangered	Species or species habitat may occur within area
Fishes		
Macquaria australasica * Macquarie Perch	Endangered	Species or species habitat may occur within area
Prototroctes maraena Australian Grayling	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Heleioporus australiacus * Giant Burrowing Frog	Vulnerable	Species or species habitat likely to occur within area
Litoria aurea * Green and Golden Bell Frog	Vulnerable	Species or species habitat likely to occur within area
Litoria littlejohni Littlejohn's Tree Frog	Vulnerable	Species or species habitat likely to occur within area
Mixophyes balbus * Stuttering Frog, Southern Barred Frog (in Victoria)	Vulnerable	Species or species habitat likely to occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat	Vulnerable	Species or species habitat may occur within area
Dasyurus maculatus maculatus (s. lat.) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (south-east mainland and Tasmanian subspecies)	Vulnerable	Species or species habitat likely to occur within area
Isoodon obesulus obesulus Southern Brown Bandicoot	Endangered	Species or species habitat may occur within area
Petrogale penicillata Brush-tailed Rock-wallaby	Vulnerable	Species or species habitat may occur within area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE mainland)	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Hoplocephalus bungaroides * Broad-headed Snake	Vulnerable	Species or species habitat likely to occur within area
Plants		
Acacia bynoeana Bynoe's Wattle, Tiny Wattle	Vulnerable	Species or species habitat likely to occur within area
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs	Vulnerable	Species or species habitat likely to occur within area
Cryptostylis hunteriana Leafless Tongue-orchid	Vulnerable	Species or species habitat likely to occur within area
Cynanchum elegans * White-flowered Wax Plant	Endangered	Species or species habitat likely to occur within area
Eucalyptus benthamii Camden White Gum, Nepean River Gum	Vulnerable	Species or species habitat likely to occur within area
Grevillea parviflora subsp. parviflora	Vulnerable	Species or species habitat likely to occur within area
Leucopogon exolasius	Vulnerable	Species or species habitat likely to occur within area
Melaleuca deanei Deane's Melaleuca	Vulnerable	Species or species habitat likely to occur within area

Persoonia bargoensis *	Vulnerable	Species or species habitat likely to occur within area
Persoonia nutans *	Endangered	Species or species habitat likely to occur within area
Pimelea spicata	Endangered	Species or species habitat may occur within area
Pomaderris brunnea * Rufous Pomaderris	Vulnerable	Species or species habitat likely to occur within area
Pterostylis saxicola Sydney Plains Greenhood	Endangered	Species or species habitat likely to occur within area
Pultenaea aristata	Vulnerable	Species or species habitat likely to occur within area

Migratory Species [Dataset Information]

	Status	Type of Presence
Migratory Terrestrial Species		
Birds		
Haliaeetus leucogaster * White-bellied Sea-Eagle	Migratory	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail	Migratory	Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch	Migratory	Breeding may occur within area
Myiagra cyanoleuca Satin Flycatcher	Migratory	Breeding likely to occur within area
Rhipidura rufifrons Rufous Fantail	Migratory	Breeding may occur within area
Xanthomyza phrygia Regent Honeyeater	Migratory	Species or species habitat may occur within area
Migratory Wetland Species		
Birds		
Gallinago hardwickii Latham's Snipe, Japanese Snipe	Migratory	Species or species habitat may occur within area
Rostratula benghalensis s. lat. Painted Snipe	Migratory	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Dataset Information]

	Status	Type of Presence
Birds		
Gallinago hardwickii Latham's Snipe, Japanese Snipe	Listed - overfly marine area	Species or species habitat may occur within area
Haliaeetus leucogaster * White-bellied Sea-Eagle	Listed	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail	Listed - overfly marine area	Species or species habitat may occur within area
Lathamus discolor Swift Parrot	Listed - overfly marine	Species or species habitat may occur within area

	area	
Monarcha melanopsis Black-faced Monarch	Listed - overfly marine area	Breeding may occur within area
Myiagra cyanoleuca Satin Flycatcher	Listed - overfly marine area	Breeding likely to occur within area
Rhipidura rufifrons Rufous Fantail	Listed - overfly marine area	Breeding may occur within area
Rostratula benghalensis s. lat. Painted Snipe	Listed - overfly marine area	Species or species habitat may occur within area

Commonwealth Lands [Dataset Information]

Commonwealth Land -

Commonwealth Land - AUSTRALIAN POSTAL COMMISSION

Commonwealth Land - AUSTRALIAN TELECOMMUNICATIONS COMMISSION

Commonwealth Land - COMMONWEALTH BANK OF AUSTRALIA

Commonwealth Land - TELSTRA CORPORATION LIMITED

Caveat

The information presented in this database has been provided by a range of data sources as acknowledged at the end of each report.

This database is designed to assist in identifying the locations of places which may be relevant in determining obligations under the *Environment Protection and Biodiversity Conservation Act 1999*. It holds mapped locations of World Heritage properties, Wetlands of International Importance, Commonwealth reserves, listed threatened, migratory and marine species and listed threatened ecological communities. It does not map Commonwealth areas at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are delineated. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the migratory and marine provisions of the Act have been mapped.

The following species and ecological communities have not been mapped and do not appear in reports from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- cetaceans which are not listed as threatened
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites;
- seals which have only been mapped for breeding sites near the Australian continent.

Acknowledgments

This database has been compiled from a range of data sources. Environment Australia acknowledges the following custodians who have contributed valuable data and advice:

- New South Wales National Parks and Wildlife Service
- Department of Sustainability and Environment, Victoria
- Department of Primary Industries, Water and Environment, Tasmania
- Department of Environment and Heritage, South Australia Planning SA
- Parks and Wildlife Commission of the Northern Territory
- Environmental Protection Agency, Queensland
- Birds Australia
- Australian Bird and Bat Banding Scheme
- Australian National Wildlife Collection
- Natural history museums of Australia
- Queensland Herbarium
- National Herbarium of NSW
- Royal Botanic Gardens and National Herbarium of Victoria
- Tasmanian Herbarium
- State Herbarium of South Australia
- Northern Territory Herbarium
- Western Australian Herbarium
- Australian National Herbarium, Atherton and Canberra
- University of New England
- Other groups and individuals

ANUCLIM Version 1.8, Centre for Resource and Environmental Studies, Australian National University was used extensively for the production of draft maps of species distribution. Environment Australia is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

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Australian Government
Department of the Environment and Heritage

EPBC Act

Environmental Reporting Tool

Australian Government
Department of the Environment and Heritage

16 September 2003 17:01

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Search Type: Line

Buffer: 10 km

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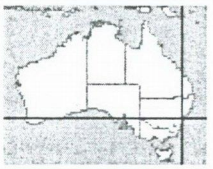

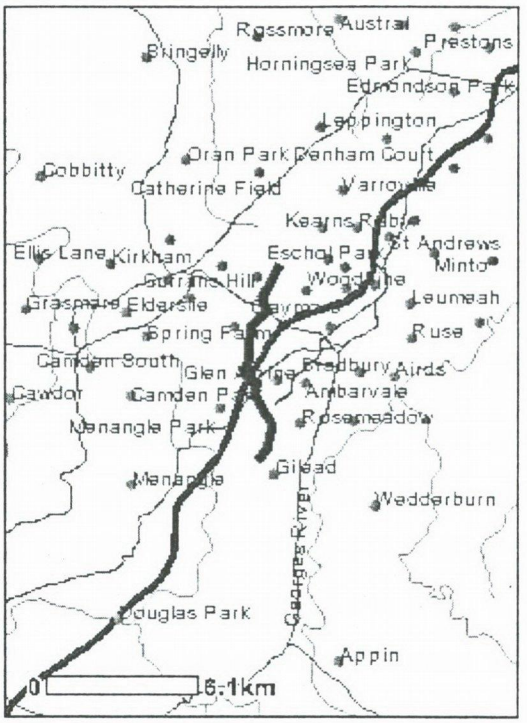

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World Heritage Properties:	None
Wetlands of International Significance: (Ramsar Sites)	1
Commonwealth Marine Areas:	None
Threatened Ecological Communities:	2
Threatened Species:	32
Migratory Species:	8

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may be required for the Commonwealth or agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

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Listed Marine Species:	8
Whales and Other Cetaceans:	None
Critical Habitats:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

Conservation Reserves:	None
Regional Forest Agreements:	None

Details

Matters of National Environmental Significance

Wetlands of International Significance [Dataset Information]
(Ramsar Sites)

TOWRA POINT NATURE RESERVE	Within same catchment as Ramsar site

Threatened Ecological Communities [Dataset Information]

	Status	Type of Presence
Cumberland Plain Woodlands	Endangered	Community likely to occur within area
Shale/Sandstone Transition Forest	Endangered	Community likely to occur within area

Threatened Species [Dataset Information]

	Status	Type of Presence

Birds

Lathamus discolor Swift Parrot	Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe	Vulnerable	Species or species habitat may occur within area
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Potorous tridactylus tridactylus Long-nosed Potoroo (SE mainland)	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Hoplocephalus bungaroides * Broad-headed Snake	Vulnerable	Species or species habitat likely to occur within area
Plants		
Acacia bynoeana Bynoe's Wattle, Tiny Wattle	Vulnerable	Species or species habitat likely to occur within area
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs	Vulnerable	Species or species habitat likely to occur within area
Cryptostylis hunteriana Leafless Tongue-orchid	Vulnerable	Species or species habitat likely to occur within area
Cynanchum elegans * White-flowered Wax Plant	Endangered	Species or species habitat likely to occur within area
Eucalyptus benthamii Camden White Gum, Nepean River Gum	Vulnerable	Species or species habitat likely to occur within area
Grevillea parviflora subsp. parviflora	Vulnerable	Species or species habitat likely to occur within area
Lepidium hyssopifolium Basalt Pepper-cress	Endangered	Species or species habitat likely to occur within area

Leucopogon exolasius	Vulnerable	Species or species habitat likely to occur within area
Melaleuca deanei Deane's Melaleuca	Vulnerable	Species or species habitat likely to occur within area
Persoonia bargoensis *	Vulnerable	Species or species habitat likely to occur within area
Persoonia nutans *	Endangered	Species or species habitat likely to occur within area
Pimelea spicata	Endangered	Species or species habitat may occur within area
Pomaderris brunnea * Rufous Pomaderris	Vulnerable	Species or species habitat likely to occur within area
Pterostylis saxicola Sydney Plains Greenhood	Endangered	Species or species habitat likely to occur within area
Pultenaea aristata	Vulnerable	Species or species habitat likely to occur within area
Pultenaea parviflora	Vulnerable	Species or species habitat may occur within area

Migratory Species [Dataset Information]

	Status	Type of Presence
Migratory Terrestrial Species		
Birds		
Haliaeetus leucogaster * White-bellied Sea-Eagle	Migratory	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail	Migratory	Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch	Migratory	Breeding may occur within area
Myiagra cyanoleuca Satin Flycatcher	Migratory	Breeding likely to occur within area
Rhipidura rufifrons Rufous Fantail	Migratory	Breeding may occur within area
Xanthomyza phrygia Regent Honeyeater	Migratory	Species or species habitat may occur within area
Migratory Wetland Species		
Birds		
Gallinago hardwickii Latham's Snipe, Japanese Snipe	Migratory	Species or species habitat may occur within area
Rostratula benghalensis s. lat. Painted Snipe	Migratory	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Dataset Information]

	Status	Type of Presence
Birds		
Gallinago hardwickii Latham's Snipe, Japanese Snipe	Listed - overfly marine area	Species or species habitat may occur within area
Haliaeetus leucogaster * White-bellied Sea-Eagle	Listed	Species or species habitat likely to occur within area

Hirundapus caudacutus White-throated Needletail	Listed - overfly marine area	Species or species habitat may occur within area
Lathamus discolor Swift Parrot	Listed - overfly marine area	Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch	Listed - overfly marine area	Breeding may occur within area
Myiagra cyanoleuca Satin Flycatcher	Listed - overfly marine area	Breeding likely to occur within area
Rhipidura rufifrons Rufous Fantail	Listed - overfly marine area	Breeding may occur within area
Rostratula benghalensis s. lat. Painted Snipe	Listed - overfly marine area	Species or species habitat may occur within area

Commonwealth Lands [Dataset Information]

Commonwealth Land -

Commonwealth Land - AUSTRALIAN POSTAL COMMISSION

Commonwealth Land - AUSTRALIAN POSTAL CORPORATION

Commonwealth Land - AUSTRALIAN TELECOMMUNICATIONS COMMISSION

Commonwealth Land - AUSTRALIAN TELECOMMUNICATIONS CORPORATION

Commonwealth Land - COMMONWEALTH BANK OF AUSTRALIA

Commonwealth Land - COMMONWEALTH TRADING BANK OF AUSTRALIA

Commonwealth Land - TELSTRA CORPORATION LIMITED

Caveat

The information presented in this database has been provided by a range of data sources as acknowledged at the end of each report.

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qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are delineated. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the migratory and marine provisions of the Act have been mapped.

The following species and ecological communities have not been mapped and do not appear in reports from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- cetaceans which are not listed as threatened
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites;
- seals which have only been mapped for breeding sites near the Australian continent.

Acknowledgments

This database has been compiled from a range of data sources. Environment Australia acknowledges the following custodians who have contributed valuable data and advice:

- New South Wales National Parks and Wildlife Service
- Department of Sustainability and Environment, Victoria
- Department of Primary Industries, Water and Environment, Tasmania
- Department of Environment and Heritage, South Australia Planning SA
- Parks and Wildlife Commission of the Northern Territory
- Environmental Protection Agency, Queensland
- Birds Australia
- Australian Bird and Bat Banding Scheme
- Australian National Wildlife Collection
- Natural history museums of Australia
- Queensland Herbarium
- National Herbarium of NSW
- Royal Botanic Gardens and National Herbarium of Victoria
- Tasmanian Herbarium
- State Herbarium of South Australia
- Northern Territory Herbarium
- Western Australian Herbarium
- Australian National Herbarium, Atherton and Canberra
- University of New England
- Other groups and individuals

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Australian Government
Department of the Environment and Heritage

EPBC Act
Environmental Reporting Tool

Australian Government
Department of the Environment and Heritage

16 September 2003 17:03

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

You may wish to print this report for reference before moving to other pages or websites.

The Australian Natural Resources Atlas at http://www.environment.gov.au/atlas may provide further environmental information relevant to your selected area. Information about the EPBC Act including significance guidelines, forms and application process details can be found at http://www.ea.gov.au/epbc/assessmentsapprovals/index.html

Search Type: Line

Buffer: 10 km

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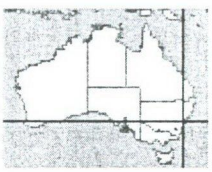

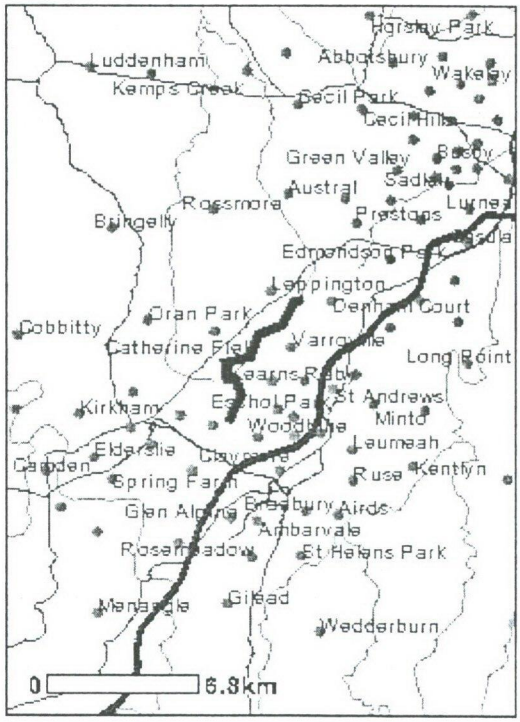

Report Contents:

Summary
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- Matters of NES
- Other matters protected by the EPBC Act
- Extra Information

Caveat
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Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance - see http://www.ea.gov.au/epbc/assessmentsapprovals/guidelines/index.html.

World Heritage Properties:	None
Wetlands of International Significance: (Ramsar Sites)	1
Commonwealth Marine Areas:	None
Threatened Ecological Communities:	2
Threatened Species:	29
Migratory Species:	8

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may be required for the Commonwealth or agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

Please note that the current dataset on Commonwealth land only includes Commonwealth reserves. Further information on Commonwealth land would need to be obtained from relevant sources including Commonwealth agencies, local agencies, and land tenure maps.

Commonwealth Lands:	9

A permit may be required for activities that may affect one or more of the following matters protected. Information on EPBC Act permit requirements and application forms can be found at http://www.ea.gov.au/epbc/permits/index.html.

Listed Marine Species:	8
Whales and Other Cetaceans:	None
Critical Habitats:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

Conservation Reserves:	None
Regional Forest Agreements:	None

Details

Matters of National Environmental Significance

Wetlands of International Significance [Dataset Information]
(Ramsar Sites)

TOWRA POINT NATURE RESERVE	Within same catchment as Ramsar site

Threatened Ecological Communities [Dataset Information]

	Status	Type of Presence
Cumberland Plain Woodlands	Endangered	Community likely to occur within area
Shale/Sandstone Transition Forest	Endangered	Community likely to occur within area

Threatened Species [Dataset Information]

	Status	Type of Presence

Birds

Lathamus discolor Swift Parrot	Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe	Vulnerable	Species or species habitat may occur within area
Xanthomyza phrygia Regent Honeyeater	Endangered	Species or species habitat may occur within area
Fishes		
Macquaria australasica * Macquarie Perch	Endangered	Species or species habitat may occur within area
Prototroctes maraena Australian Grayling	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Heleioporus australiacus * Giant Burrowing Frog	Vulnerable	Species or species habitat likely to occur within area
Litoria aurea * Green and Golden Bell Frog	Vulnerable	Species or species habitat likely to occur within area
Mixophyes iteratus * Southern Barred Frog, Giant Barred Frog	Endangered	Species or species habitat likely to occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat	Vulnerable	Species or species habitat may occur within area
Dasyurus maculatus maculatus (s. lat.) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (south-east mainland and Tasmanian subspecies)	Vulnerable	Species or species habitat likely to occur within area
Petrogale penicillata Brush-tailed Rock-wallaby	Vulnerable	Species or species habitat may occur within area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE mainland)	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Hoplocephalus bungaroides * Broad-headed Snake	Vulnerable	Species or species habitat likely to occur within area
Plants		
Acacia bynoeana Bynoe's Wattle, Tiny Wattle	Vulnerable	Species or species habitat likely to occur within area
Acacia pubescens Downy Wattle, Hairy Stemmed Wattle	Vulnerable	Species or species habitat likely to occur within area
Cynanchum elegans * White-flowered Wax Plant	Endangered	Species or species habitat likely to occur within area
Dillwynia tenuifolia	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus benthamii Camden White Gum, Nepean River Gum	Vulnerable	Species or species habitat likely to occur within area
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Melaleuca deanei Deane's Melaleuca	Vulnerable	Species or species habitat likely to occur within area

Persoonia bargoensis *	Vulnerable	Species or species habitat likely to occur within area
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Pimelea spicata	Endangered	Species or species habitat may occur within area
Pomaderris brunnea * Rufous Pomaderris	Vulnerable	Species or species habitat likely to occur within area
Pterostylis saxicola Sydney Plains Greenhood	Endangered	Species or species habitat likely to occur within area
Pultenaea parviflora	Vulnerable	Species or species habitat may occur within area

Migratory Species [Dataset Information]

	Status	Type of Presence
Migratory Terrestrial Species		
Birds		
Haliaeetus leucogaster * White-bellied Sea-Eagle	Migratory	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail	Migratory	Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch	Migratory	Breeding may occur within area
Myiagra cyanoleuca Satin Flycatcher	Migratory	Breeding likely to occur within area
Rhipidura rufifrons Rufous Fantail	Migratory	Breeding may occur within area
Xanthomyza phrygia Regent Honeyeater	Migratory	Species or species habitat may occur within area
Migratory Wetland Species		
Birds		
Gallinago hardwickii Latham's Snipe, Japanese Snipe	Migratory	Species or species habitat may occur within area
Rostratula benghalensis s. lat. Painted Snipe	Migratory	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Dataset Information]

	Status	Type of Presence
Birds		
Gallinago hardwickii Latham's Snipe, Japanese Snipe	Listed - overfly marine area	Species or species habitat may occur within area
Haliaeetus leucogaster * White-bellied Sea-Eagle	Listed	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail	Listed - overfly marine area	Species or species habitat may occur within area
Lathamus discolor Swift Parrot	Listed - overfly marine	Species or species habitat may occur within area

	area	
Monarcha melanopsis Black-faced Monarch	Listed - overfly marine area	Breeding may occur within area
Myiagra cyanoleuca Satin Flycatcher	Listed - overfly marine area	Breeding likely to occur within area
Rhipidura rufifrons Rufous Fantail	Listed - overfly marine area	Breeding may occur within area
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Commonwealth Lands [Dataset Information]

Commonwealth Land -

Commonwealth Land - AUSTRALIAN POSTAL COMMISSION

Commonwealth Land - AUSTRALIAN POSTAL CORPORATION

Commonwealth Land - AUSTRALIAN TELECOMMUNICATIONS COMMISSION

Commonwealth Land - AUSTRALIAN TELECOMMUNICATIONS CORPORATION

Commonwealth Land - COMMONWEALTH BANK OF AUSTRALIA

Commonwealth Land - COMMONWEALTH TRADING BANK OF AUSTRALIA

Commonwealth Land - OVERSEAS TELECOMMUNICATIONS COMMISSION (AUSTRALIA)

Commonwealth Land - TELSTRA CORPORATION LIMITED

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- Birds Australia
- Australian Bird and Bat Banding Scheme
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- Natural history museums of Australia
- Queensland Herbarium
- National Herbarium of NSW
- Royal Botanic Gardens and National Herbarium of Victoria
- Tasmanian Herbarium
- State Herbarium of South Australia
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Australian Government
Department of the Environment and Heritage

EPBC Act

Environmental Reporting Tool

Australian Government
Department of the Environment and Heritage

16 September 2003 17:06

EPBC Act Protected Matters Report

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Search Type: Line

Buffer: 10 km

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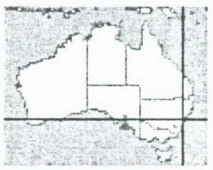

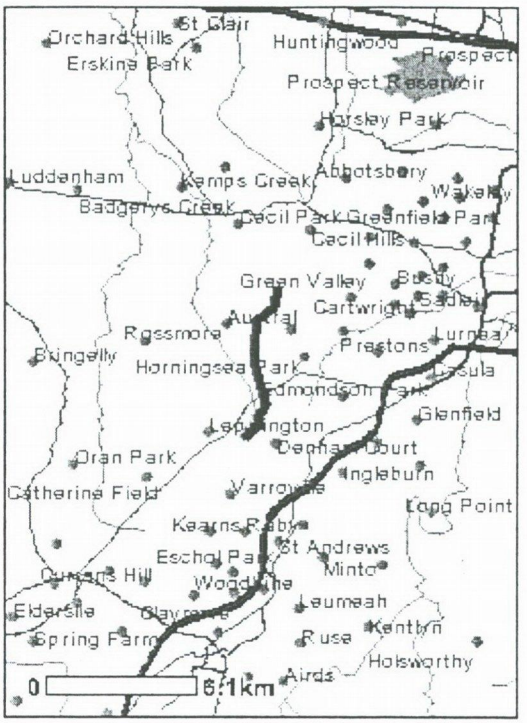

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World Heritage Properties: None

Wetlands of International Significance: (Ramsar Sites)	1
Commonwealth Marine Areas:	None
Threatened Ecological Communities:	2
Threatened Species:	24
Migratory Species:	8

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may be required for the Commonwealth or agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

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Listed Marine Species:	8
Whales and Other Cetaceans:	None
Critical Habitats:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

Conservation Reserves:	None
Regional Forest Agreements:	None

Details

Matters of National Environmental Significance

Wetlands of International Significance [Dataset Information]
(Ramsar Sites)

TOWRA POINT NATURE RESERVE	Within same catchment as Ramsar site

Threatened Ecological Communities [Dataset Information]

	Status	Type of Presence
Cumberland Plain Woodlands	Endangered	Community likely to occur within area
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Threatened Species [Dataset Information]

	Status	Type of Presence
Birds		
Lathamus discolor Swift Parrot	Endangered	Species or species habitat may occur within area

Rostratula australis Australian Painted Snipe	Vulnerable	Species or species habitat may occur within area
Xanthomyza phrygia Regent Honeyeater	Endangered	Species or species habitat may occur within area
Fishes		
Macquaria australasica * Macquarie Perch	Endangered	Species or species habitat may occur within area
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Mammals		
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Hoplocephalus bungaroides * Broad-headed Snake	Vulnerable	Species or species habitat likely to occur within area
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Cynanchum elegans * White-flowered Wax Plant	Endangered	Species or species habitat likely to occur within area
Dillwynia tenuifolia	Vulnerable	Species or species habitat likely to occur within area
Grevillea parviflora subsp. parviflora	Vulnerable	Species or species habitat likely to occur within area
Melaleuca deanei Deane's Melaleuca	Vulnerable	Species or species habitat likely to occur within area
Persoonia nutans *	Endangered	Species or species habitat likely to occur within area
Pimelea spicata	Endangered	Species or species habitat may occur within area
Pomaderris brunnea * Rufous Pomaderris	Vulnerable	Species or species habitat likely to occur within area
Pterostylis saxicola Sydney Plains Greenhood	Endangered	Species or species habitat likely to occur within area
Pultenaea parviflora	Vulnerable	Species or species habitat may occur within area

Migratory Species [Dataset Information]	Status	Type of Presence
Migratory Terrestrial Species		
Birds		
Haliaeetus leucogaster * White-bellied Sea-Eagle	Migratory	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail	Migratory	Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch	Migratory	Breeding may occur within area
Myiagra cyanoleuca Satin Flycatcher	Migratory	Breeding likely to occur within area
Rhipidura rufifrons Rufous Fantail	Migratory	Breeding may occur within area
Xanthomyza phrygia Regent Honeyeater	Migratory	Species or species habitat may occur within area
Migratory Wetland Species		
Birds		
Gallinago hardwickii Latham's Snipe, Japanese Snipe	Migratory	Species or species habitat may occur within area
Rostratula benghalensis s. lat. Painted Snipe	Migratory	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Dataset Information]	Status	Type of Presence
Birds		
Gallinago hardwickii Latham's Snipe, Japanese Snipe	Listed - overfly marine area	Species or species habitat may occur within area
Haliaeetus leucogaster * White-bellied Sea-Eagle	Listed	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail	Listed - overfly marine area	Species or species habitat may occur within area
Lathamus discolor Swift Parrot	Listed - overfly marine area	Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch	Listed - overfly marine area	Breeding may occur within area
Myiagra cyanoleuca Satin Flycatcher	Listed - overfly marine area	Breeding likely to occur within area
Rhipidura rufifrons Rufous Fantail	Listed - overfly marine area	Breeding may occur within area

Rostratula benghalensis s. lat. Painted Snipe	Listed - overfly marine area	Species or species habitat may occur within area

Commonwealth Lands [Dataset Information]

Commonwealth Land -

Commonwealth Land - AUSTRALIAN POSTAL COMMISSION

Commonwealth Land - AUSTRALIAN POSTAL CORPORATION

Commonwealth Land - AUSTRALIAN TELECOMMUNICATIONS COMMISSION

Commonwealth Land - AUSTRALIAN TELECOMMUNICATIONS CORPORATION

Commonwealth Land - COMMONWEALTH BANK OF AUSTRALIA

Commonwealth Land - COMMONWEALTH TRADING BANK OF AUSTRALIA

Commonwealth Land - OVERSEAS TELECOMMUNICATIONS COMMISSION (AUSTRALIA)

Commonwealth Land - TELSTRA CORPORATION LIMITED

Caveat

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This database is designed to assist in identifying the locations of places which may be relevant in determining obligations under the *Environment Protection and Biodiversity Conservation Act 1999*. It holds mapped locations of World Heritage properties, Wetlands of International Importance, Commonwealth reserves, listed threatened, migratory and marine species and listed threatened ecological communities. It does not map Commonwealth areas at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are delineated. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the migratory and marine provisions of the Act have been mapped.

The following species and ecological communities have not been mapped and do not appear in reports from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- cetaceans which are not listed as threatened
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites;
- seals which have only been mapped for breeding sites near the Australian continent.

Acknowledgments

This database has been compiled from a range of data sources. Environment Australia acknowledges the following custodians who have contributed valuable data and advice:

- New South Wales National Parks and Wildlife Service
- Department of Sustainability and Environment, Victoria
- Department of Primary Industries, Water and Environment, Tasmania
- Department of Environment and Heritage, South Australia Planning SA
- Parks and Wildlife Commission of the Northern Territory
- Environmental Protection Agency, Queensland
- Birds Australia
- Australian Bird and Bat Banding Scheme
- Australian National Wildlife Collection
- Natural history museums of Australia
- Queensland Herbarium
- National Herbarium of NSW
- Royal Botanic Gardens and National Herbarium of Victoria
- Tasmanian Herbarium
- State Herbarium of South Australia
- Northern Territory Herbarium
- Western Australian Herbarium
- Australian National Herbarium, Atherton and Canberra
- University of New England
- Other groups and individuals

ANUCLIM Version 1.8, Centre for Resource and Environmental Studies, Australian National University was used extensively for the production of draft maps of species distribution. Environment Australia is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

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Australian Government
Department of the Environment and Heritage

EPBC Act

Environmental Reporting Tool

Australian Government
Department of the Environment and Heritage

16 September 2003 17:10

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

You may wish to print this report for reference before moving to other pages or websites.

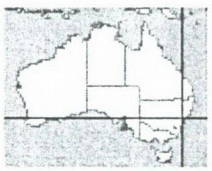
The Australian Natural Resources Atlas at http://www.environment.gov.au/atlas may provide further environmental information relevant to your selected area. Information about the EPBC Act including significance guidelines, forms and application process details can be found at http://www.ea.gov.au/epbc/assessmentsapprovals/index.html

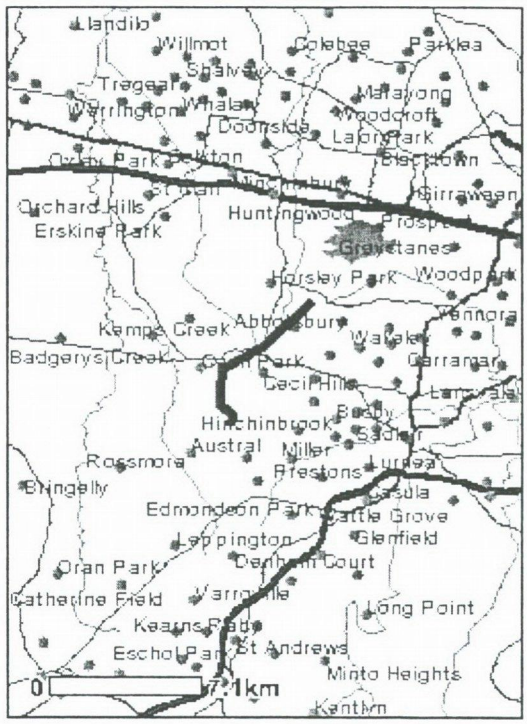
---

Search Type: Line

Buffer: 10 km

Coordinates: -33.91530,150.82807, -33.91020,150.82927, -33.90390,150.82267, -33.88650,150.82387, -33.87420,150.84547, -33.85110,150.86917





Report Contents:

Summary
Details
- Matters of NES
- Other matters protected by the EPBC Act
- Extra Information

Caveat
Acknowledgments

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance - see http://www.ea.gov.au/epbc/assessmentsapprovals/guidelines/index.html.

World Heritage Properties: None

Wetlands of International Significance: (Ramsar Sites) 1

Commonwealth Marine Areas:	None
Threatened Ecological Communities:	1
Threatened Species:	24
Migratory Species:	8

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may be required for the Commonwealth or agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

Please note that the current dataset on Commonwealth land only includes Commonwealth reserves. Further information on Commonwealth land would need to be obtained from relevant sources including Commonwealth agencies, local agencies, and land tenure maps.

Commonwealth Lands:	9

A permit may be required for activities that may affect one or more of the following matters protected. Information on EPBC Act permit requirements and application forms can be found at http://www.ea.gov.au/epbc/permits/index.html.

Listed Marine Species:	8
Whales and Other Cetaceans:	None
Critical Habitats:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

Conservation Reserves:	None
Regional Forest Agreements:	None

Details

Matters of National Environmental Significance

Wetlands of International Significance [Dataset Information]
(Ramsar Sites)

TOWRA POINT NATURE RESERVE	Within same catchment as Ramsar site

Threatened Ecological Communities [Dataset Information]

	Status	Type of Presence
Cumberland Plain Woodlands	Endangered	Community likely to occur within area

Threatened Species [Dataset Information]

	Status	Type of Presence
Birds		
Lathamus discolor Swift Parrot	Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe	Vulnerable	Species or species habitat may occur within area
Xanthomyza phrygia	Endangered	Species or species habitat may occur

Regent Honeyeater		within area
Fishes		
Macquaria australasica * Macquarie Perch	Endangered	Species or species habitat may occur within area
Prototroctes maraena Australian Grayling	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Heleioporus australiacus * Giant Burrowing Frog	Vulnerable	Species or species habitat likely to occur within area
Litoria aurea * Green and Golden Bell Frog	Vulnerable	Species or species habitat likely to occur within area
Mixophyes iteratus * Southern Barred Frog, Giant Barred Frog	Endangered	Species or species habitat likely to occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat	Vulnerable	Species or species habitat may occur within area
Dasyurus maculatus maculatus (s. lat.) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (south-east mainland and Tasmanian subspecies)	Vulnerable	Species or species habitat likely to occur within area
Petrogale penicillata Brush-tailed Rock-wallaby	Vulnerable	Species or species habitat may occur within area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE mainland)	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Hoplocephalus bungaroides * Broad-headed Snake	Vulnerable	Species or species habitat likely to occur within area
Plants		
Acacia pubescens Downy Wattle, Hairy Stemmed Wattle	Vulnerable	Species or species habitat likely to occur within area
Cynanchum elegans * White-flowered Wax Plant	Endangered	Species or species habitat likely to occur within area
Dillwynia tenuifolia	Vulnerable	Species or species habitat likely to occur within area
Grevillea parviflora subsp. parviflora	Vulnerable	Species or species habitat likely to occur within area
Melaleuca deanei Deane's Melaleuca	Vulnerable	Species or species habitat likely to occur within area
Persoonia nutans *	Endangered	Species or species habitat likely to occur within area
Pimelea spicata	Endangered	Species or species habitat may occur within area
Pomaderris brunnea * Rufous Pomaderris	Vulnerable	Species or species habitat likely to occur within area
Pterostylis saxicola Sydney Plains Greenhood	Endangered	Species or species habitat likely to occur within area
Pultenaea parviflora	Vulnerable	Species or species habitat may occur within area
Migratory Species [Dataset Information]	**Status**	**Type of Presence**
Migratory Terrestrial Species		

Birds

Haliaeetus leucogaster * White-bellied Sea-Eagle	Migratory	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail	Migratory	Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch	Migratory	Breeding may occur within area
Myiagra cyanoleuca Satin Flycatcher	Migratory	Breeding likely to occur within area
Rhipidura rufifrons Rufous Fantail	Migratory	Breeding may occur within area
Xanthomyza phrygia Regent Honeyeater	Migratory	Species or species habitat may occur within area

Migratory Wetland Species

Birds

Gallinago hardwickii Latham's Snipe, Japanese Snipe	Migratory	Species or species habitat may occur within area
Rostratula benghalensis s. lat. Painted Snipe	Migratory	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

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area

Commonwealth Lands [Dataset Information]

Commonwealth Land -

Commonwealth Land - AUSTRALIAN POSTAL CORPORATION

Commonwealth Land - AUSTRALIAN TELECOMMUNICATIONS COMMISSION

Commonwealth Land - AUSTRALIAN TELECOMMUNICATIONS CORPORATION

Commonwealth Land - COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION

Commonwealth Land - COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION

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- Queensland Herbarium
- National Herbarium of NSW
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Australian Government
Department of the Environment and Heritage

Your Ref:
Our Ref: AHIMS #8392

RTA Environment & Technology
Po Box 3035
Parramatta NSW 2150

RECEIVED
BY:.....

Thursday, 13 November 2003

Attention: Peter Ryan

Dear Sir or Madam:

NSW NATIONAL PARKS AND WILDLIFE SERVICE

ABN 30 841 387 271

Re: AHIMS Search for the following area at Liverpool/Camden/Wollondilliy **Zone 56 Eastings: see attached reports- Northings: see attached reports-**

I am writing in response to your recent inquiry in respect to Aboriginal objects and Aboriginal places registered with the NSW National Parks and Wildlife Service (NPWS) at the above location.

A search of the NPWS Aboriginal Heritage Information Management System (AHIMS) has shown that 138. Aboriginal objects and Aboriginal places are recorded in or near the above location. Please refer to the attached report for details.

The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not to be made available to the public.

The following qualifications apply to an AHIMS search:

- AHIMS only includes information on Aboriginal objects and Aboriginal places that have been provided to NPWS;
- Large areas of New South Wales have not been the subject of systematic survey or recording of Aboriginal history. These areas may contain Aboriginal objects and other heritage values which are not recorded on AHIMS;
- Recordings are provided from a variety of sources and may be variable in their accuracy. When an AHIMS search identifies Aboriginal objects in or near the area it is recommended that the exact location of the Aboriginal object be determined by re-location on the ground; and
- The criteria used to search AHIMS are derived from the information provided by the client and NPWS assumes that this information is accurate.

All Aboriginal places and Aboriginal objects are protected under the *National Parks and Wildlife Act 1974* (NPW Act) and it is an offence to destroy, damage or deface them without the prior consent of the NPWS Director-General. An Aboriginal object is considered to be known if:

- It is registered on AHIMS;
- It is known to the Aboriginal community; or
- It is located during an investigation of the area conducted for a development application.

Head Office
43 Bridge Street
PO Box 1967
Hurstville NSW
2220 Australia
Tel: (02) 9585 6444
Fax: (02) 9585 6555
www.npws.nsw.gov.au

If you are considering undertaking a development activity in the area subject to the AHIMS search, NPWS would recommend that an Aboriginal Heritage Assessment be undertaken. You should consult with the relevant consent authority to determine the necessary assessment to accompany your development application.

Yours Sincerely

Vanessa Kendall
Department of Environment & Conservation
Aboriginal Information Officer
Information Systems Unit
Cultural Heritage Division
Phone: (02) 9585 6345
Fax: (02) 9585 6325

AHIMS
Aboriginal Heritage Information Management System

List of Sites (List - Short)

8392 (a)

Grid Reference Type = AMG Zone = 56 Easting From = 301000 Easting to = 305000 Northing From = 6250000 Northing to = 6254000 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
45-5-0274	Bosley Park;	AMG	56	302028	6250129	AFT,	Open Camp Site		260, 1018, 98435,
		Status Valid							
		Primary Contact							
45-5-0766	PR 2;	AMG	56	303500	6254000	AFT, ACD,	Contact, Mission Open Camp Site	Rich,E (12-JAN-90)	1723, 1857, 98283,
		Status Valid							
		Primary Contact							
45-5-0800	Scarred Tree;Prospect Reservoir;	AMG	56	304525	6253950	TRE,	Scarred Tree	Comber,J (01-AUG-90)	1857,
		Status Valid							
		Primary Contact							
45-5-0870	Prospect Lagoon 1;Prospect Reservoir;(PL1);	AMG	56	304500	6253850	AFT,	Open Camp Site	Donlon,D (02-OCT-91)	2225,
		Status Valid							
		Primary Contact							
45-5-0920	Abbotsbury 1;	AMG	56	303150	6251700	AFT,	Open Camp Site	Navin,K (01-JUN-93)	
		Status Valid							
		Primary Contact							
45-5-0921	Abbotsbury 2;	AMG	56	302960	6251700	AFT,	Open Camp Site	Navin,K (01-JUN-93)	98435,
		Status Valid							
		Primary Contact							

Number of Sites :11

13/11/2003 11:21:49

This information is not guaranteed to be free from error omission. The NSW National Parks and Wildlife Service and it employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.

AHIMS
Aboriginal Heritage Information Management System

List of Sites (List - Short)

8392 (a)

Grid Reference Type = AMG Zone = 56 Easting From = 301000 Easting to = 305000 Northing From = 6250000 Northing to = 6254000 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
45-5-0922	Abbotsbury 3;	AMG	56	302680	6250830	AFT,	Open Camp Site	Navin,K (01-JUN-93)	98435,
		Status Valid							
		Primary Contact							
45-5-0948	Abbotsbury 4;	AMG	56	302600	6250700	AFT,	Open Camp Site	Rich,E (01-JUL-93)	2620, 98435,
		Status Valid							
		Primary Contact							
45-5-0980	Abbotsburry 4 - duplicate of 45-5-0948	AMG	56	302600	6250700	AFT,	Open Camp Site	Navin,K (01-JUL-94)	2950, 98435,
		Status Valid							
		Primary Contact							
45-5-2021	SCR;Abbotsbury;	AMG	56	302580	6250020	AFT,	Open Camp Site	Guider,M (01-JUL-97)	98435,
		Status Valid							
		Primary Contact							
45-5-2795	WSO-IF-1	AMG	56	301030	6251680	AFT,		Mills,R (01-JUL-97)	
		Status Valid							
		Primary Contact							

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AHIMS
Aboriginal Heritage Information Management System

List of Sites (List - Short)

8392 (b)

Grid Reference Type = AMG Zone = 56 Easting From = 293000 Easting to = 300000 Northing From = 6231000 Northing to = 6248500 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
45-5-0213	South Creek;	AMG	56	293700	6247000	AFT,	Open Camp Site		
		Status Valid							
		Primary Contact							
45-5-0214	Kemps Creek;	AMG	56	296100	6248300	AFT,	Open Camp Site		
		Status Valid							
		Primary Contact							
45-5-0787	WH-1;	AMG	56	299870	6242650	AFT,	Open Camp Site		1727, 98739,
		Status Valid							
		Primary Contact							
45-5-0965	WH3;	AMG	56	300000	6242750	AFT,	Open Camp Site	McDonald,J (01-AUG-92)	2738, 98369, 98370, 98371, 98443, 98739,
		Status Valid							
		Primary Contact							
45-5-0966	WH4;	AMG	56	299570	6242580	AFT,	Open Camp Site	McDonald,J (01-AUG-92)	2738, 98739,
		Status Valid							
		Primary Contact							
45-5-2008	SC4;Cecil Park Shooting Complex;	AMG	56	298360	6247790	AFT,	Isolated Find	Navin,K (01-MAR-97)	3857,
		Status Valid							
		Primary Contact							

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AHIMS
Aboriginal Heritage Information Management System

List of Sites (List - Short)

8392 (b)

Grid Reference Type = AMG Zone = 56 Easting From = 293000 Easting to = 300000 Northing From = 6231000 Northing to = 6248500 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
45-5-2009	SC5;Cecil Park Shooting Complex;	AMG	56	298340	6247790	AFT,	Isolated Find	Navin,K (01-MAR-97)	3857,
		Status Valid							
		Primary Contact							
45-5-2010	SC6;Cecil Park Shooting Complex;	AMG	56	298160	6247600	AFT,	Isolated Find	Navin,K (01-MAR-97)	3857,
		Status Valid							
		Primary Contact							
45-5-2011	SC3;Cecil Park Shooting Complex;	AMG	56	298050	6247790	AFT,	Isolated Find	Navin,K (01-MAR-97)	3857,
		Status Valid							
		Primary Contact							
45-5-2012	SC2;Cecil Park Shooting Complex;	AMG	56	297760	6247810	AFT,	Isolated Find	Navin,K (01-MAR-97)	3857,
		Status Valid							
		Primary Contact							
45-5-2013	SC1;Cecil Park Shooting Complex;	AMG	56	297800	6247960	AFT,	Isolated Find	Navin,K (01-MAR-97)	3857,
		Status Valid							
		Primary Contact							
45-5-2014	CPSC1;Cecil Park Shooting Complex;	AMG	56	298250	6247650	AFT,	Open Camp Site	Navin,K (01-MAR-97)	3857,
		Status Valid							
		Primary Contact							

This information is not guaranteed to be free from error omission. The NSW National Parks and Wildlife Service and its employ... claim liability for any ... or omissions made ... information ... consequences of ... or ...

AHIMS
Aboriginal Heritage Information Management System

List of Sites (List - Short)

8392 (b)

Grid Reference Type = AMG Zone = 56 Easting From = 293000 Easting to = 300000 Northing From = 6231000 Northing to = 6248500 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
45-5-2015	CPSC2;Cecil Park Shooting Complex;	AMG	56	298070	6247430	AFT,	Open Camp Site	Navin,K (01-MAR-97)	3857,
		Status Valid							
		Primary Contact							
45-5-2306	P-CP7;	AMG	56	299570	6246980	AFT,	Open Camp Site		
		Status Valid							
		Primary Contact							
45-5-2378	P-CP12;	AMG	56	299480	6247260	AFT,	Open Camp Site		
		Status Valid							
		Primary Contact							
45-5-2403	Varroville Open Site;	AMG	56	298710	6236700	AFT,	Open Camp Site	Watts,D (27-JUN-97)	
		Status Valid							
		Primary Contact							
45-5-2419	IFSC 9;Cecil Park;	AMG	56	297960	6247420	AFT,	Isolated Find		
		Status Valid							
		Primary Contact							
45-5-2426	IFSC 11;Cecil Park;	AMG	56	297990	6248110	AFT,	Isolated Find		
		Status Valid							
		Primary Contact							
45-5-2427	IFSC 10;Cecil Park;	AMG	56	297680	6247790	AFT,	Isolated Find		
		Status Valid							
		Primary Contact							

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List of Sites (List - Short)

8392 (b)

Grid Reference Type = AMG Zone = 56 Easting From = 293000 Easting to = 300000 Northing From = 6231000 Northing to = 6248500 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
45-5-2428	IFSC 8;Cecil Park;	AMG	56	298090	6247390	AFT,	Isolated Find		
		Status Valid							
		Primary Contact							
45-5-2429	CPSC 3;Cecil Park;	AMG	56	297710	6248020	AFT,	Open Camp Site		
		Status Valid							
		Primary Contact							
45-5-2430	IFSC 7;Cecil Park;	AMG	56	298590	6247980	AFT,	Isolated Find		
		Status Valid							
		Primary Contact							
45-5-2557	TLC7	AMG	56	297200	6237090	AFT,	Isolated Find		98739,
		Status Valid							
		Primary Contact							
45-5-2558	TLC2	AMG	56	297748	6237738	AFT,	Isolated Find		98739,
		Status Valid							
		Primary Contact							
45-5-2559	TLC1	AMG	56	298849	6240532	AFT,	Isolated Find Scarred Tree		98739,
		Status Valid							
		Primary Contact							
45-5-2560	GLC2	AMG	56	298512	6245749	ART, TRE, AFT,	Scarred Tree Shelter with Art		
		Status Valid							
		Primary Contact							

Number of Sites :42

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List of Sites (List - Short)

8392 (b)

Grid Reference Type = AMG Zone = 56 Easting From = 293000 Easting to = 300000 Northing From = 6231000 Northing to = 6248500 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
45-5-2689	B62	AMG	56	295050	6245290	AFT,		Navin Officer Heritage Consult (01-JUL-96)	
		Status Valid							
		Primary Contact							
45-5-2722	PAD-OS-6	AMG	56	299720	6248190	AFT,		Mills,R (01-APR-02)	
		Status Valid							
		Primary Contact							
45-5-2723	PAD-OS-5	AMG	56	299890	6247110	AFT,		Mills,R (01-APR-02)	
		Status Valid							
		Primary Contact							
45-5-2731	MCCANN ROAD #6	AMG	56	294920	6240790	AFT,		White,E (30-JUL-01)	
		Status Valid							
		Primary Contact							
45-5-2732	MCCANN ROAD #5	AMG	56	294360	6241130	AFT,		White,E (30-JUL-01)	
		Status Valid							
		Primary Contact							
45-5-2733	MCCANN ROAD #2	AMG	56	294260	6241100	AFT,		White,E (30-JUL-01)	
		Status Valid							
		Primary Contact							

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List of Sites (List - Short)

8392 (b)

Grid Reference Type = AMG Zone = 56 Easting From = 293000 Easting to = 300000 Northing From = 6231000 Northing to = 6248500 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
45-5-2734	MCCANN ROAD #1	AMG	56	294200	6240950	AFT,		White,E (30-JUL-01)	
		Status Valid							
		Primary Contact							
45-5-2759	McCann road #4	AMG	56	294320	6241120	AFT,		White,E (30-JUL-01)	
		Status Valid							
		Primary Contact							
45-5-2760	McCann road #3	AMG	56	294280	6241130	AFT,		White,E (30-JUL-01)	
		Status Valid							
		Primary Contact							
45-5-2793	PAD-OS-4	AMG	56	299910	6247020	AFT,		Mills,R (01-APR-02)	
		Status Valid							
		Primary Contact							
45-5-2854	Lot 70 PAD	AMG	56	294850	6240900	PAD,		White,E (18-MAR-03)	
		Status Valid							
		Primary Contact							
45-5-2855	Lot 127D	AMG	56	295600	6241100	PAD,		White,E (18-MAR-03)	
		Status Valid							
		Primary Contact							

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List of Sites (List - Short)

8392 (b)

Grid Reference Type = AMG Zone = 56 Easting From = 293000 Easting to = 300000 Northing From = 6231000 Northing to = 6248500 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
45-6-2427	IF1;AGL Gas;	AMG	56	299200	6239780	AFT,	Isolated Find	English,A (18-SEP-94)	98739,
		Status Valid							
		Primary Contact							
52-2-2122	MV5 - " Manooka Valley 5"	AMG	56	294470	6231530	AFT,		Benton,J (01-JUN-98)	
		Status Valid							
		Primary Contact							
52-2-2220	BRINGELLY SHALE (RWB)	AMG	56	294660	6231110	AFT,		Garling,J (09-JUN-00)	
		Status Valid							
		Primary Contact							
52-2-2221	MV1 - "MANOOKA VALLEY 1"	AMG	56	294510	6231100	AFT,		Garling,S (09-JUN-00)	
		Status Valid							
		Primary Contact							

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List of Sites (List - Short)

8392 (b)

Grid Reference Type = AMG Zone = 56 Easting From = 301000 Easting to = 303000 Northing From = 6205000 Northing to = 6207000 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
52-2-0925	Loddon;Site 6;	AMG	56	301420	6206850	ART,	Shelter with Art		
		Status Valid							
		Primary Contact							
52-2-0937	Loddon;Site 23;	AMG	56	302350	6205080	ART,	Shelter with Art		
		Status Valid							
		Primary Contact							
52-2-0948	Loddon;Site 9;	AMG	56	301900	6205320	GDG WTR	Axe Grinding Groove Water Hole/Well		
		Status Valid							
		Primary Contact							
52-2-0996	Loddon 28;Cataract Catchment;	AMG	56	301580	6205430	GDG	Axe Grinding Groove	ASRSYS, (01-JAN-00)	
		Status Valid							
		Primary Contact							
52-2-0997	Loddon 29;Cataract Catchment;	AMG	56	301580	6205720	AFT, ART,	Shelter with Art Shelter with Deposit	ASRSYS, (01-JAN-00)	
		Status Valid							
		Primary Contact							
52-2-1000	Loddon 32;Cataract Catchment;	AMG	56	301280	6206830	AFT, ART,	Shelter with Art Shelter with Deposit	ASRSYS, (01-JAN-00)	
		Status Valid							
		Primary Contact							

Number of Sites :6

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List of Sites (List - Short)

8392 (c)

Grid Reference Type = AMG Zone = 56 Easting From = 290000 Easting to = 297000 Northing From = 6211000 Northing to = 6229000 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
52-2-0020	Sugarloaf Tunnel, Mount Gilead 2	AMG	56	294550	6220896	ART,	Shelter with Art		1976,
		Status Valid							
		Primary Contact							
52-2-0021	Douglas Park;	AMG	56	294340	6217500	AFT,	Open Camp Site		98155,
		Status Valid							
		Primary Contact							
52-2-0022	Sugarloaf Tunnel	AMG	56	294731	6220991	ART,	Shelter with Art		1976,
		Status Valid							
		Primary Contact							
52-2-0023	Sugarloaf Tunnel, Mount Gilead 1	AMG	56	295190	6220909	AFT, ART,	Shelter with Art Shelter with Deposit	ASRSYS, (01-JAN-00)	1976,
		Status Valid							
		Primary Contact							
52-2-0024	Sugarloaf Tunnel, Mount Gilead 4	AMG	56	295197	6220543	ART,	Shelter with Art	ASRSYS, (01-JAN-00)	1976,
		Status Valid							
		Primary Contact							
52-2-0911	Glenlee 1;Mount Annan;	AMG	56	293505	6227553	AFT,	Open Camp Site		393, 1193, 1677,
		Status Valid							
		Primary Contact							
52-2-0912	Glenlee 2;Mount Annan;Cluthas;	AMG	56	293490	6228285	AFT,	Open Camp Site	Barton,H (01-JAN-82)	393, 401, 1193, 1677, 3687, 98267,
		Status Valid							
		Primary Contact							

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List of Sites (List - Short)

8392 (c)

Grid Reference Type = AMG Zone = 56 Easting From = 290000 Easting to = 297000 Northing From = 6211000 Northing to = 6229000 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
52-2-0913	Glenlee 3;Mount Annan;	AMG	56	293037	6228093	AFT,	Open Camp Site		393, 1193, 1677, 98267,
		Status Valid							
		Primary Contact							
52-2-0914	Glenlee 4;Mount Annan;	AMG	56	292953	6227725	AFT,	Open Camp Site		393, 1193, 1677, 98267, 98692,
		Status Valid							
		Primary Contact							
52-2-0915	Glenlee 5;Mount Annan;	AMG	56	292953	6227725	AFT,	Open Camp Site		393, 1193, 1677, 98267, 98692,
		Status Valid							
		Primary Contact							
52-2-0916	Glenlee 6;Mount Annan;	AMG	56	292409	6227440	AFT,	Open Camp Site		393, 1193, 1677, 98267, 98692,
		Status Valid							
		Primary Contact							
52-2-0917	Glenlee 7;Mount Annan;	AMG	56	292133	6227526	AFT,	Open Camp Site		393, 1193, 1677, 98267, 98692,
		Status Valid							
		Primary Contact							
52-2-0918	Glenlee 8;Mount Annan;	AMG	56	292495	6227716	AFT,	Open Camp Site		393, 1193, 1677, 98267, 98692,
		Status Valid							
		Primary Contact							
52-2-1213	Unit e rubbish Dummp;Didicoolum;	AMG	56	291258	6216167	GDG	Axe Grinding Groove	Demkiw,R (26-NOV-85)	
		Status Valid							
		Primary Contact							

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List of Sites (List - Short)

8392 (c)

Grid Reference Type = AMG Zone = 56 Easting From = 290000 Easting to = 297000 Northing From = 6211000 Northing to = 6229000 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
52-2-1214	Unit D ground axe Paddock;Didicoolum;	AMG	56	291800	6216600	AFT,	Open Camp Site	Demkiw,D (26-NOV-85)	
		Status Valid							
		Primary Contact							
52-2-1219	MT.Annan Tunnel.;	AMG	56	293920	6227320	AFT,	Open Camp Site	Haglund,L (01-APR-85)	32,
		Status Valid							
		Primary Contact							
52-2-1597	Menangle Park 1;	AMG	56	292890	6222870	AFT,	Open Camp Site	McDonald,J (01-AUG-91)	2038, 2149,
		Status Valid							
		Primary Contact							
52-2-1598	Mengal Park 2;	AMG	56	293470	6225080	AFT,	Open Camp Site	McDonald,J (01-AUG-91)	2038, 2149,
		Status Valid							
		Primary Contact							
52-2-1607	Menangle Park 3;	AMG	56	292490	6222870	AFT,	Open Camp Site		2149,
		Status Valid							
		Primary Contact							

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List of Sites (List - Short)

8392 (c)

Grid Reference Type = AMG Zone = 56 Easting From = 290000 Easting to = 297000 Northing From = 6211000 Northing to = 6229000 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
52-2-1610	Ousedale Creek 1;	AMG	56	294680	6212300	ETM, SHL, AFT,	Midden	Navin,K (01-JUN-91)	2148,
		Status Valid							
		Primary Contact							
52-2-1680	Ousedale Creek 4;	AMG	56	294530	6215200	TRE,	Scarred Tree		2451, 98155,
		Status Valid							
		Primary Contact							
52-2-1681	Ousedale Creek 2;	AMG	56	294380	6215220	AFT,	Open Camp Site		2451,
		Status Valid							
		Primary Contact							
52-2-1682	Ousedale Creek 3;	AMG	56	294460	6215190	AFT,	Shelter with Deposit		2415, 98155,
		Status Valid							
		Primary Contact							
52-2-1716	Narellan Site 2b;NS-2b;	AMG	56	293090	6228380	AFT,	Open Camp Site	Haglund,L (05-JUN-93)	98267,
		Status Valid							
		Primary Contact							
52-2-1717	Narellan Site 2a;NS-2a;	AMG	56	293020	6228300	AFT,	Open Camp Site	Haglund,L (05-JUN-93)	98267,
		Status Valid							
		Primary Contact							
52-2-1725	IF 2;	AMG	56	294780	6228640	AFT,	Isolated Find		
		Status Valid							
		Primary Contact							

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List of Sites (List - Short)

8392 (c)

Grid Reference Type = AMG Zone = 56 Easting From = 290000 Easting to = 297000 Northing From = 6211000 Northing to = 6229000 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
52-2-1794	Rocky Ponds Creek IF;	AMG	56	291170	6212050	AFT,	Isolated Find	Navin,K (01-JUN-95)	3579,
		Status Valid							
		Primary Contact							
52-2-1795	Rocky Ponds Creek 1;	AMG	56	291170	6212050	AFT,	Open Camp Site	Navin,K (01-JUN-95)	3579,
		Status Valid							
		Primary Contact							
52-2-1796	BP-1;Brooks Point;	AMG	56	290600	6213620	TRE,	Scarred Tree		3500,
		Status Valid							
		Primary Contact							
52-2-1877	Brooks Point 2;	AMG	56	292960	6213290	AFT, GDG	Axe Grinding Groove Shelter with Deposit	Sefton,C (10-JUL-96)	3655,
		Status Valid							
		Primary Contact							
52-2-1878	Brooks Point 3;	AMG	56	292890	6214430	ART,	Shelter with Art	Sefton,C (10-JUL-96)	3655,
		Status Valid							
		Primary Contact							
52-2-1879	Brooks Point 4;	AMG	56	290800	6211880	AFT,	Shelter with Deposit	Sefton,C (10-JUL-96)	3655,
		Status Valid							
		Primary Contact							

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List of Sites (List - Short)

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Grid Reference Type = AMG Zone = 56 Easting From = 290000 Easting to = 297000 Northing From = 6211000 Northing to = 6229000 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
52-2-1880	Brooks Point 5;	AMG	56	292890	6213030	ART,	Shelter with Art	Sefton,C (10-JUL-96)	3655,
		Status Valid							
		Primary Contact							
52-2-1881	Brooks Point 6;	AMG	56	292880	6213050	ART,	Shelter with Art	Sefton,C (10-JUL-96)	3655,
		Status Valid							
		Primary Contact							
52-2-1887	Clutha 1;	AMG	56	292300	6227300	AFT,	Open Camp Site	Barton,H (26-JUN-96)	3687, 98267,
		Status Valid							
		Primary Contact							
52-2-1888	Clutha 2;	AMG	56	292000	6227500	AFT,	Open Camp Site	Barton,H (26-JUN-96)	3687, 98267,
		Status Valid							
		Primary Contact							
52-2-1921	Brooks Point 8	AMG	56	290920	6215280	ART,	Shelter with Art	Sefton,C (22-JAN-98)	4213,
		Status Valid							
		Primary Contact							

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List of Sites (List - Short)

8392 (c)

Grid Reference Type = AMG Zone = 56 Easting From = 290000 Easting to = 297000 Northing From = 6211000 Northing to = 6229000 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
52-2-1922	Nepean River 2;Douglas Park;	AMG	56	291350	6215450	ART,	Shelter with Art	Sefton,C (22-JAN-98)	4213,
		Status Valid							
		Primary Contact							
52-2-1924	Brooks Point 7	AMG	56	293050	6214480	ART,	Shelter with Art	Sefton,C (22-JAN-98)	4213,
		Status Valid							
		Primary Contact							
52-2-1933	Rocky Pond Creek Massacre/Burial;	AMG	56	291964	6211661	BUR,	Burial/s		
		Status Valid							
		Primary Contact							
52-2-2052	Nepean River 2;Douglas Park;	AMG	56	291350	6215450	ART,	Shelter with Art	Sefton,C (22-JAN-98)	
		Status Valid							
		Primary Contact							
52-2-2059	Ousedale Creek 1;Georges River Appin;	AMG	56	295452	6214981	ART, PAD,	Shelter with Art Shelter with PAD	Sefton,C (08-APR-98)	98155,
		Status Valid							
		Primary Contact							

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List of Sites (List - Short)

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Grid Reference Type = AMG Zone = 56 Easting From = 290000 Easting to = 297000 Northing From = 6211000 Northing to = 6229000 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
52-2-2062	Sawpit Gully 11;Georges River Appin;	AMG	56	296900	6215430	PAD,	Shelter with PAD	Sefton,C (08-APR-98)	98155,
		Status Valid							
		Primary Contact							
52-2-2066	Sawpit Gully 14;Georges River Appin;	AMG	56	296900	6215350	PAD,	Shelter with PAD	Sefton,C (08-APR-98)	98155,
		Status Valid							
		Primary Contact							
52-2-2094	Nepean River 5	AMG	56	292093	6216664	AFT,	Shelter with Deposit		
		Status Valid							
		Primary Contact							
52-2-2095	Nepean River 6	AMG	56	292057	6216852	AFT,	Shelter with Deposit		
		Status Valid							
		Primary Contact							
52-2-2096	Nepean River 7	AMG	56	291800	6216980	TRE,	Scarred Tree		
		Status Valid							
		Primary Contact							
52-2-2097	Nepean river 4	AMG	56	292101	6216532	ETM, SHL, AFT,	Shelter with Midden		
		Status Valid							
		Primary Contact							

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List of Sites (List - Short)

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Grid Reference Type = AMG Zone = 56 Easting From = 290000 Easting to = 297000 Northing From = 6211000 Northing to = 6229000 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
52-2-2098	Nepean River 3	AMG	56	292084	6216493	AFT,	Shelter with Deposit		
		Status Valid							
		Primary Contact							
52-2-2099	Brooks Point 9	AMG	56	292383	6216630	ART, AFT,	Shelter with Art Shelter with Deposit		
		Status Valid							
		Primary Contact							
52-2-2101	Ousedale Creek 1	AMG	56	295452	6214981	GDG ART, AFT,	Axe Grinding Groove Shelter with Art Shelter with Deposit		98155,
		Status Valid							
		Primary Contact							
52-2-2104	Sawpit Gully 11	AMG	56	296900	6215430	ART, GDG	Axe Grinding Groove Shelter with Art		98155,
		Status Valid							
		Primary Contact							
52-2-2113	Sawpit Gully 14	AMG	56	296900	6215350	AFT,	Shelter with Deposit		98155,
		Status Valid							
		Primary Contact							
52-2-2116	TLC4	AMG	56	294802	6227005	AFT,	Open Camp Site		
		Status Valid							
		Primary Contact							
52-2-2198	MARHYVYES HOLE 1 (MH1)	AMG	56	296600	6213860	PAD,		Navin Officer Heritage Consult (01-OCT-01)	
		Status Valid							
		Primary Contact							

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List of Sites (List - Short)

8392 (c)

Grid Reference Type = AMG Zone = 56 Easting From = 290000 Easting to = 297000 Northing From = 6211000 Northing to = 6229000 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
52-2-2213	PICTON	AMG	56	292390	6212070	AFT,		Saunders,T (21-NOV-00)	97779,
		Status Valid							
		Primary Contact							
52-2-2231	ACC2	AMG	56	291810	6213220	AFT,		Navin Officer Heritage Consult (01-FEB-02)	
		Status Valid							
		Primary Contact							
52-2-2232	ACC1	AMG	56	292450	6212260	AFT,		Navin Officer Heritage Consult (01-FEB-02)	
		Status Valid							
		Primary Contact							
52-2-2236	OUSEDALE CREEK NO.2	AMG	56	294354	6214988	AFT, ART,		Sefton,C (31-AUG-01)	
		Status Valid							
		Primary Contact							
52-2-2237	OUSEDALE CREEK NO.3	AMG	56	294285	6217298	ART, AFT,		Sefton,C (03-SEP-01)	
		Status Valid							
		Primary Contact							

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AHIMS
Aboriginal Heritage Information Management System

List of Sites (List - Short)

8392 (c)

Grid Reference Type = AMG Zone = 56 Easting From = 290000 Easting to = 297000 Northing From = 6211000 Northing to = 6229000 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
52-2-2238	OUSEDALE CREEK NO.4	AMG	56	293421	6217096	AFT, ART,		Sefton,C (06-SEP-01)	
		Status Valid							
		Primary Contact							
52-2-2239	NEPEAN RIVER NO.8	AMG	56	293106	6219660	AFT,		Sefton,C (06-SEP-01)	
		Status Valid							
		Primary Contact							
52-2-2242	GEORGES RIVER NO.4	AMG	56	296594	6217358	ART,		Sefton,C (23-AUG-01)	
		Status Valid							
		Primary Contact							
52-2-2244	GEORGES RIVER NO.3	AMG	56	296800	6217061	AFT,		Sefton,C (23-AUG-01)	
		Status Valid							
		Primary Contact							
52-2-2251	SF-ST-1	AMG	56	290104	6227704	AFT,		Baker,N (17-FEB-99)	
		Status Valid							
		Primary Contact							
52-2-2265	Leafs Gully 1	AMG	56	294150	6218190	AFT,		Navin Officer Heritage Consult (01-NOV-02)	
		Status Valid							
		Primary Contact							

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List of Sites (List - Short)

8392 (c)

Grid Reference Type = AMG Zone = 56 Easting From = 290000 Easting to = 297000 Northing From = 6211000 Northing to = 6229000 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
52-2-2266	Georges River 2	AMG	56	296630	6215790	AFT,		Navin Officer Heritage Consult (01-NOV-02)	
		Status Valid							
		Primary Contact							
52-2-2269	GL14	AMG	56	293448	6225840	AFT,		Dibden ,J (01-SEP-02)	
		Status Valid							
		Primary Contact							
52-2-2270	GL4	AMG	56	292711	6227060	AFT,		Dibden ,J (17-OCT-02)	
		Status Valid							
		Primary Contact							
52-2-2271	GL 16-14	AMG	56	293803	6226072	AFT,		Dibden ,J (17-OCT-02)	
		Status Valid							
		Primary Contact							
52-2-2272	GL2	AMG	56	292547	6227620	AFT,		Dibden ,J (17-OCT-02)	
		Status Valid							
		Primary Contact							
52-2-2273	RP2.	AMG	56	294260	6221910	AFT,		Dibden ,J (01-DEC-02)	
		Status Valid							
		Primary Contact							

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List of Sites (List - Short)

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Grid Reference Type = AMG Zone = 56 Easting From = 290000 Easting to = 297000 Northing From = 6211000 Northing to = 6229000 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
52-2-2274	GL15	AMG	56	293932	6225688	AFT,		Dibden ,J (01-SEP-02)	
		Status Valid							
		Primary Contact							
52-2-2275	GL12	AMG	56	293050	6226340	AFT,		Dibden ,J (01-SEP-02)	
		Status Valid							
		Primary Contact							
52-2-2276	GL11	AMG	56	293190	6226000	AFT,		Dibden ,J (01-SEP-02)	
		Status Valid							
		Primary Contact							
52-2-2277	GL18	AMG	56	294961	6226573	AFT,		Dibden ,J (01-SEP-02)	
		Status Valid							
		Primary Contact							
52-2-2278	RP1.	AMG	56	294760	6222300	AFT,		Dibden ,J (01-DEC-02)	
		Status Valid							
		Primary Contact							
52-2-2279	Glenlee 1	AMG	56	292842	6227700	AFT,		Dibden ,J (01-SEP-02)	
		Status Valid							
		Primary Contact							

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List of Sites (List - Short)

8392 (c)

Grid Reference Type = AMG Zone = 56 Easting From = 290000 Easting to = 297000 Northing From = 6211000 Northing to = 6229000 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
52-2-2280	GL10	AMG	56	292331	6225733	AFT,		Dibden ,J (16-OCT-02)	
		Status Valid							
		Primary Contact							
52-2-2281	GL16	AMG	56	293956	6225876	AFT, TRE,		Dibden ,J (17-OCT-02)	
		Status Valid							
		Primary Contact							
52-2-2282	PAD.2	AMG	56	295510	6214650	PAD,		Dibden,J (15-NOV-02)	
		Status Valid							
		Primary Contact							
52-2-2283	PAD.1	AMG	56	295500	6214610	PAD,		Dibden,J (15-NOV-02)	
		Status Valid							
		Primary Contact							
52-2-2284	MD2	AMG	56	295440	6215030	ART,		Dibden,J (15-NOV-02)	
		Status Valid							
		Primary Contact							
52-3-0763	Narellan Site 2a;	AMG	56	293090	6228380	AFT,	Open Camp Site	Haglund,L (05-JUN-93)	
		Status Valid							
		Primary Contact							

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AHIMS
Aboriginal Heritage Information Management System

List of Sites (List - Short)

8392 (c)

Grid Reference Type = AMG Zone = 56 Easting From = 290000 Easting to = 297000 Northing From = 6211000 Northing to = 6229000 Feature Search Type = AHIMS Features

Site ID	Site Name	Grid.Ref Type	Zone	Easting	Northing	Site Features	Site Types (recorded prior to June 2001)	Recording (Primary)	Reports (Catalogue Number)
52-3-0764	Narellan Site 2b;	AMG	56	293020	6228300	AFT,	Open Camp Site	Haglund,L (05-JUN-93)	
		Status Valid							

Primary Contact

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Listing Heritage Items

State Heritage Register Search Results

Items listed on the State Heritage Register

Back to Search

The search results can be re-sorted by clicking on the **(sort)** option at the top of each column.

Item Name (sort)	Address (sort)	Suburb (sort)	LGA (sort)	SHR
Camden Park	Elizabeth Macarthur Avenue	Menangle	Camden	0034
Camelot	Kirkham Lane	Narellan	Camden	0038
Kirkham Stables and Precinct	Kirkham Lane	Narellan	Camden	0141
Macquarie Grove Cottage	Macquarie Grove Road	Camden	Camden	0049
Nant Gwylan and Garden	Exeter Street	Camden	Camden	0024
Studley Park	Camden Valley Way	Narellan	Camden	0038

There was a total of **6** records matching your search criteria.

Note: The Heritage Office seeks to keep the State Heritage Register (SHR) up to date, however the latest listings may not yet be check with the NSW Heritage Office for the most recent listings.

Listing Heritage Items

State Heritage Inventory Search Results

Statutory Listed Items

Information and items listed in the State Heritage Inventory come from a number of sources. This mean several entries for the same heritage item in the database. For clarity, the search results have been divi

- The first section contains items listed on the State Heritage Register, covered by an Interim Herita under section 130 of the NSW Heritage Act. This information is provided by the NSW Heritage Offi
- The second section contains items listed by Local Councils & Shires and State Government Agenci also contain additional information on some of the items listed in the first section.

Section 1. Items listed under the NSW Heritage Act.

The search results can be resorted by clicking on the **(sort)** option at the top of each column.

Item Name (sort)	Address (sort)	Suburb (sort)	LGA (sort)	St
Camelot	Kirkham Lane	Narellan	Camden	Ye
Macquarie Grove Cottage	Macquarie Grove Road	Camden	Camden	Ye
Nant Gwylan and Garden	Exeter Street	Camden	Camden	Ye

There were **3** records in this section matching your search criteria.

Section 2. Items listed by Local Government and State agencies.

Item Name (sort)	Address (sort)	Suburb (sort)	LGA (sort)	In (s
1 MENANGLE ROAD	1 MENANGLE ROAD	CAMDEN	Camden	LG
20 HILL STREET	20 HILL STREET	CAMDEN	Camden	LG
21 HILL STREET	21 HILL STREET	CAMDEN	Camden	LG
25 HILL STREET	25 HILL STREET	CAMDEN	Camden	LG
27 HILL STREET	27 HILL STREET	CAMDEN	Camden	LG
28 HILL STREET	28 HILL STREET	CAMDEN	Camden	LG
5 MENANGLE ROAD	5 MENANGLE ROAD	CAMDEN	Camden	LG
66 JOHN STREET	66 JOHN STREET	CAMDEN	Camden	LG
68 JOHN STREET	68 JOHN STREET	CAMDEN	Camden	LG
7 MENANGLE ROAD	7 MENANGLE ROAD	CAMDEN	Camden	LG
70 JOHN STREET	70 JOHN STREET	CAMDEN	Camden	LG

72 JOHN STREET	72 JOHN STREET	CAMDEN	Camden	LG
74 JOHN STREET	74 JOHN STREET	CAMDEN	Camden	LG
76 JOHN STREET	76 JOHN STREET	CAMDEN	Camden	LG
78 JOHN STREET	78 JOHN STREET	CAMDEN	Camden	LG
80 JOHN STREET	80 JOHN STREET	CAMDEN	Camden	LG
9 MENANGLE ROAD	9 MENANGLE ROAD	CAMDEN	Camden	LG
ALLENBY	661 BRINGELLY ROAD	ROSSMORE	Camden	LG
ANGLICAN CEMETERY	6 RICHARDSON ROAD	NARELLAN	Camden	LG
ARGYLE INN	75-79 ARGYLE STREET	CAMDEN	Camden	LG
BEGENNY FARM (GROUP)	100 ELIZABETH MACARTHUR AVENUE	CAMDEN SOUTH	Camden	LG
BOARDMAN BUTCHER SHOP	110 ARGYLE STREET	CAMDEN	Camden	LG
BOYD GALLERY	2 SHARMAN CLOSE	HARRINGTON PARK	Camden	LG
BRUCHHAUSER HOUSE	23 BRUCHHAUSER CRESCENT	ELDERSLIE	Camden	LG
BURNHAM GROVE	332 CAWDOR ROAD	CAWDOR	Camden	LG
BURTON ARMS INN	332 CAMDEN VALLEY WAY	NARELLAN	Camden	LG
BUTCHER SHOP	151 ARGYLE STREET	CAMDEN	Camden	LG
CAMDEN AGRICULTURAL HALL	195 ARGYLE STREET	CAMDEN	Camden	LG
CAMDEN DISTRICT HOSTPITAL	61 MENANGLE ROAD	CAMDEN	Camden	LG
CAMDEN LIBRARY, MUSEUM & FIRE STN	40 - 42 JOHN STREET	CAMDEN	Camden	LG
CAMDEN PARK GATELODGE, Former	224 OLD HUME HIGHWAY	CAMDEN SOUTH	Camden	LG
CAMDEN POLICE STATION & RESIDENCE	35 JOHN STREET	CAMDEN	Camden	LG
CAMDEN POST OFFICE	135 ARGYLE STREET	CAMDEN	Camden	LG
CAMELOT	151 KIRKHAM LANE	KIRKHAM	Camden	LG
CARRINGTON HOSTPITAL	90 WEROMBI ROAD	CAMDEN	Camden	LG
COBBITTY MASTER RECTORY HOUSE	COBBITTY ROAD	COBBITTY	Camden	LG
DANIELLE BUILDING	64 ARGYLE STREET	CAMDEN	Camden	LG
DENBIGH	421 THE NORTHERN ROAD	COBBITTY	Camden	LG
DR CROOKSTONS HOUSE	75 JOHN STREET	CAMDEN	Camden	LG
EDITHVILLE	18 MITCHELL STREET	CAMDEN	Camden	LG
Elizabeth Macarthur Agricultural Institute	Woodbridge Rd.	Menangle	Camden	SG
Elizabeth Macarthur Agricultural Institute	Woodbridge Rd.	Menangle	Wollondilly	SG
GLEDSWOOD	900 CAMDEN VALLEY WAY	CATHERIN FIELD	Camden	LG

HARRINGTON PARK HOMESTEAD	499 CAMDEN VALLEY WAY	HARRINGTON PARK	Camden	LG
HARRINGTON PARK HOMESTEAD	499 CAMDEN VALLEY WAY	HARRINGTON PARK	Camden	LG
HILSYDE	56 HILDER STREET	ELDERSLIE	Camden	LG
KIRKHAM STABLES	130 KIRKHAM LANE	KIRKHAM	Camden	LG
MACARIA	37 JOHN STREET	CAMDEN	Camden	LG
MACARTHUR PARK	13 - 13A MENANGLE ROAD	CAMDEN	Camden	LG
MACQUARIE GROVE	MACQUARIE GROVE ROAD	COBBITTY	Camden	LG
MARYLANDS	773 THE NORTHERN ROAD	BRINGELLY	Camden	LG
MASONIC LODGE	36 HILL STREET	CAMDEN	Camden	LG
MITCHELL HOUSE	29-31 MITCHELL STREET	CAMDEN	Camden	LG
NANT GWYLAN AND GARDEN	33A EXETER STREET	CAMDEN	Camden	LG
NATIONAL BANK AUSTRALIA	125 ARGYLE STREET	CAMDEN	Camden	LG
NEPEAN HOUSE	1-3 MITCHELL STREET	CAMDEN	Camden	LG
NESBITT	196 MACARTHUR ROAD	SPRING FARM	Camden	LG
OLD DAIRY FARMERS CO OP DEPOT	11 ARGYLE STREET	CAMDEN	Camden	LG
OLD METHODIST PARSONAGE	33 HILL STREET	CAMDEN	Camden	LG
ORAN PARK	931 COBBITTY ROAD	ORAN PARK	Camden	LG
ORIELTON	179 NORTHERN ROAD	NARELLAN	Camden	LG
PLOUGH & HARROW	75-79 ARGYLE STREET	CAMDEN	Camden	LG
RABY	1025 CAMDEN VALLEY WAY	CATHERINE FIELD	Camden	LG
ST JOHNS CHURCH	6 MENANGLE ROAD	CAMDEN	Camden	LG
ST JOHNS CHURCH, CEMETERY & SLOPES	10 MENANGLE ROAD	CAMDEN	Camden	LG
ST PAULS CHURCH/ HEBER CHAPEL	330 COBBITTY ROAD	CAMDEN	Camden	LG
ST PAULS ROMAN CATHOLIC CHURCH	26 - 36 JOHN STREET	CAMDEN	Camden	LG
ST THOMAS CHURCH HALL	1A WILSON CRESCENT	NARELLAN	Camden	LG
ST. PAULS RECTORY	335 COBBITTY ROAD	COBBITTY	Camden	LG
STUDLEY PARK HOUSE	52 LODGES ROAD	ELDERSLIE	Camden	LG
TAPLIN COTTAGE	17 MITCHELL STREET	CAMDEN	Camden	LG
TEEN RANCH	352 - 356 COBBITTY ROAD	CAMDEN	Camden	LG

There were **72** records in this section matching your search criteria.

There was a total of **75** records matching your search criteria.

Key:
LGA = Local Government Area
GAZ= NSW Government Gazette (statutory listings prior to 1997), HGA = Heritage Grant Application, HS = Heritage Study, LGOV = Local G
Government Agency.

Note: The Heritage Office seeks to keep the State Heritage Inventory (SHI) up to date, ho listings in Local and Regional Environmental Plans (LEPs and REPs) may not yet be include with the relevant Local Council or Shire for the most recent listings.

Listing Heritage Items

State Heritage Register Search Results

Items listed on the State Heritage Register

Back to Search

The search results can be re-sorted by clicking on the **(sort)** option at the top of each column.

Item Name (sort)	Address (sort)	Suburb (sort)	LGA (sort)
Beulah House, Outbuilding, timber bridge and gazebo	Appin Road	Appin	Campbelltown
Campbelltown Post Office (former)	261 Queen Street	Campbelltown	Campbelltown
CBC Bank	263 Queen Street	Campbelltown	Campbelltown
Coach House	298 Queen St	Campbelltown	Campbelltown
Denfield	Appin Road	Campbelltown	Campbelltown
Denham Court & Chapel	Campbelltown Road	Ingleburn	Campbelltown
Dredges Cottage	303 Queen Street	Campbelltown	Campbelltown
Epping Forest	Mississippi Crescent	Kearns	Campbelltown
Glenalvon	8 Lithgow Street	Campbelltown	Campbelltown
Glenlee, outbuildings, garden & gatelodge	Glenlee Road	Menangle	Campbelltown
Holly Lea & Plough Inn	Holly Lea Road	Leumeah	Campbelltown
Macquarie Field House	Quarter Sessions Road	Macquarie Fields	Campbelltown
Menangle rail bridge over Nepean River	Main Southern railway	Menangle	Wollondilly
Queen Street Buildings Group	284 - 298 Queen Street	Campbelltown	Campbelltown
Robin Hood Farm	196 Campbelltown Road	Ingleburn	Campbelltown
St Helen's Park	Appin Road	Bradbury	Campbelltown
St Johns Roman Catholic Church & cemetery (former)	Broughton Street	Campbelltown	Campbelltown
Stone Cottage	Lot 315 Ben Lomond Road	Minto	Campbelltown
Sugarloaf Farm	Menangle Road	Gilead	Campbelltown
Varroville	St Andrews	Minto	Campbelltown
Warbys Barn & Warbys Stables	14 - 20 Queen Street	Campbelltown	Campbelltown

There was a total of **21** records matching your search criteria.

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Listing Heritage Items

State Heritage Inventory Search Results

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Section 1. Items listed under the NSW Heritage Act.

The search results can be resorted by clicking on the **(sort)** option at the top of each column.

Item Name (sort)	Address (sort)	Suburb (sort)	LGA (sort)
Beulah House, Outbuilding, timber bridge and gazebo	Appin Road	Appin	Campbelltown
Brookdale	Appin Road	Gilead	Campbelltown
Campbelltown Reservoir	Narellan Road	Kenny Hill	Campbelltown
Charcoal Pits	Wedderburn Road	Wedderburn	Campbelltown
Glenlee, outbuildings, garden & gatelodge	Glenlee Road	Menangle	Campbelltown
Glenlorne	Appin Road	Gilead	Campbelltown
Hansen's Cottage	Hansens Road	Minto Heights	Campbelltown
Hume Monument	Appin Road		Campbelltown
Humewood Forest	Appin Road	Gilead	Campbelltown
Ingleburn Dam	St. Andrews Road	Varroville	Campbelltown
Jug, The	Ben Lomond Road	Minto Heights	Campbelltown
Kiera-ville	Hansens Road	Minto Heights	Campbelltown
Kilbride	Glendower Street	Gilead	Campbelltown
Macquarie Field House	Quarter Sessions Road	Macquarie Fields	Campbelltown
Morning Glory	Minerva Road	Wedderburn	Campbelltown
Mount Gilead group	Appin Road	Gilead	Campbelltown
Osbaldeston	Georges River Road	Kentlyn	Campbelltown
Pines, The	Menangle Road	Menangle Park	Campbelltown

Riverview	Menangle Road	Menangle Park	Campbelltown
Robin Hood Farm	196 Campbelltown Road	Ingleburn	Campbelltown
Sydney Water Supply Upper Canal		(not given)	Campbelltown
Union Church site	Aberfoyle Road	Wedderburn	Campbelltown

There were **22** records in this section matching your search criteria.

Section 2. Items listed by Local Government and State agencies.

Item Name (sort)	Address (sort)	Suburb (sort)	LGA (sort)
Airds Cottage (formerly Farrier's Arms) and Water Trough	13 Queen Street	Campbelltown	Campbelltown
Ashton and site of Esplanade Cottage (Draft)	Guernsey Avenue	Campbelltown	Campbelltown
Blair Athol	23 Blair Athol Drive, Blair Athol	Campbelltown	Campbelltown
Blair Athol Group	Blair Athol Drive, Blair Athol	Campbelltown	Campbelltown
Blairmount	Badgally Road	Blairmount	Campbelltown
Boronia	6 Dove Place	Ingleburn	Campbelltown
Briar Cottage	Waterhouse Place	Airds	Campbelltown
Campbelltown Community Centre (formerly Fieldhouse's Produce Store and Campbellt	317 Queen Street	Campbelltown	Campbelltown
Campbelltown Court House	95 Queen Street	Campbelltown	Campbelltown
Campbelltown Railway Station	Hurley Street, SRA Land	Campbelltown	Campbelltown
Caversham	26 Oxley Street	Campbelltown	Campbelltown
Clark House Museum - Hurlstone Agricultural High School	Roy Watts Road	Glenfield	Campbelltown
Coaching House (The)	298 Queen Street	Campbelltown	Campbelltown
Coaching House (The)	298 Queen Street	Campbelltown	Campbelltown
Commercial Bank of Sydney (former)	263 Queen Street	Campbelltown	Campbelltown
Cransley	104 Warminda Avenue	Campbelltown	Campbelltown
Denfield	Appin Road	St Helens Park	Campbelltown
Denham Court Group	Campbelltown Road, Denham Court	Campbelltown	Campbelltown
Dredges Cottage	303 Queen Street	Campbelltown	Campbelltown
Eagleview House	107 Eagleview Road	Minto	Campbelltown
Emily Cottage	Old Menangle Road	Campbelltown	Campbelltown
Englorie Park House	2 Parkholme Circuit	Englorie Park	Campbelltown
Epping Forest	Mississippi Crescent	Kearns	Campbelltown
Eschol Park	1 Eschol Park Drive	Eschol Park	Campbelltown
Fisher's Ghost Restaurant	316 Queen Street	Campbelltown	Campbelltown

Glen Alpine (second house)	12 Belltrees Close	Glen Alpine	Campbelltown
Glen Alpine - Site of original house	Arlington Crescent, Heritage Park	Glen Alpine	Campbelltown
Glenalvon and Water Trough	4 Lithgow Street	Campbelltown	Campbelltown
Glenroy	Badgally Road	Claymore	Campbelltown
Gold Wheel Restaurant	38 Queen Street	Campbelltown	Campbelltown
Hill Crest	Bells Line of Road	North Richmond	Hawkesbury City
Hillcrest	Badgally Road	Claymore	Campbelltown
Hollylea and former Plough Inn	185 Airds Road, Hollylea Road	Leumeah	Campbelltown
House	2 Condamine Street	Campbelltown	Campbelltown
House	64 Lithgow Street	Campbelltown	Campbelltown
House	8 Sturt Street	Campbelltown	Campbelltown
House	10 Sturt Street	Campbelltown	Campbelltown
House	14 Sturt Street	Campbelltown	Campbelltown
House	60 Warby Street	Campbelltown	Campbelltown
House	296 Queen Street	Campbelltown	Campbelltown
House	300 Queen Street	Campbelltown	Campbelltown
House	3 Allman Street	Campbelltown	Campbelltown
House	5 Allman Street	Campbelltown	Campbelltown
House	Bradbury Avenue	Campbelltown	Campbelltown
House	2 Bradbury Avenue	Campbelltown	Campbelltown
House - MYOB	24 Oxley Street	Campbelltown	Campbelltown
Hurlstone Agricultural High School	Roy Watts Road	Glenfield	Campbelltown
Ingleburn Community Hall	Oxford Road	Ingleburn	Campbelltown
Ingleburn Horse Trough	14 Oxford Road	Ingleburn	Campbelltown
Ingleburn Primary School	Oxford Road	Ingleburn	Campbelltown
Kia (The)	21 Blair Athol Drive, Blair Athol	Campbelltown	Campbelltown
Kiera-villa	20 Hansens Road	Minto Heights	Campbelltown
Kraal (The)	29 Blair Athol Drive, Blair Athol	Campbelltown	Campbelltown
McGuanne House	286 Queen Street	Campbelltown	Campbelltown
McGuanne House	286 Queen Street	Campbelltown	Campbelltown
Methodist/Congregational Cemetery	St Johns Road, Pioneer Park	Campbelltown	Campbelltown
Milestones	Campbelltown Road	Campbelltown	Campbelltown
Mount St Joseph	13A Moonstone Place	Eagle Vale	Campbelltown

Old Ford Road	end of Georges River Road	Kentlyn	Campbelltown
Old Railway Hotel	288 Queen Street	Campbelltown	Campbelltown
Old Railway Hotel	288 Queen Street	Campbelltown	Campbelltown
Pines (The)	13 Macquarie Road	Ingleburn	Campbelltown
Post Office - Campbelltown (former)	261 Queen Street	Campbelltown	Campbelltown
Presbyterian Cemetery	Broughton Street	Campbelltown	Campbelltown
Queen Street Group/Conservation Area	286-298 Queen Street	Campbelltown	Campbelltown
Queen Street Heritage Conservation Area	Queen Street	Campbelltown	Campbelltown
Quondong	Old Menagle Road	Campbelltown	Campbelltown
Raith	Fern Avenue	Bradbury	Campbelltown
Richmond Villa	12 Lithgow Street	Campbelltown	Campbelltown
Robin Hood Farm	Campbelltown Road	Ingleburn	Campbelltown
Silos	Appin Road reservation	Bradbury	Campbelltown
St Andrews	11 Shiel Place	St Andrews	Campbelltown
St Davids Presbyterian Church and former Manse	32 Lithgow Street	Campbelltown	Campbelltown
St Elmo	94 Broughton Street	Campbelltown	Campbelltown
St Helens Park House and Dam	St Helens Park Drive	St Helens Park	Campbelltown
St John the Evangelist Church	Cordeaux Street	Campbelltown	Campbelltown
St Johns Church group	George Street	Campbelltown	Campbelltown
St Peters Anglican Church group	Cordeaux Street	Campbelltown	Campbelltown
Stations of the Cross	Narellan Road	Campbelltown	Campbelltown
Stone Cottage	26 Mercedes Road	Ingleburn	Campbelltown
Town Hall and former Fire Station	297 Queen Street	Campbelltown	Campbelltown
Warby's Dams 1 and 2 on Leumeah Creek	Leumeah Creek	Leumeah	Campbelltown
Warby's Dams 3 and 4 on Leumeah Creek	Lindesay Street	Leumeah	Campbelltown
Warby's Stables and Barn	12-14 Queen Street	Campbelltown	Campbelltown
Water Supply Reservoir, Cattle Tank and Silt Traps	Allman Street, Hurley Park	Glen Alpine	Campbelltown
Water Trough	Broughton Street (cnr), within Civic Centre	Campbelltown	Campbelltown
Wesleyan Chapel (now part of Uniting Church)	Oxley Street	Campbelltown	Campbelltown
William Bursill's Shop	292-294 Queen Street	Campbelltown	Campbelltown
William Bursill's Shop	292-294 Queen Street	Campbelltown	Campbelltown
Woodcrest	111 Oxford Road	Ingleburn	Campbelltown

There were **90** records in this section matching your search criteria.

There was a total of **112** records matching your search criteria.

Key:
LGA = Local Government Area
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Government Agency.

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listings in Local and Regional Environmental Plans (LEPs and REPs) may not yet be include
with the relevant Local Council or Shire for the most recent listings.**

Listing Heritage Items

State Heritage Register Search Results

Items listed on the State Heritage Register

Back to Search

The search results can be re-sorted by clicking on the **(sort)** option at the top of each column.

Item Name (sort)	Address (sort)	Suburb (sort)	LGA (sor
Bonnyrigg House	Cartwright Street	Bonnyrigg	Fairfield City
Fairfield Railway Station group	Great Southern Railway	Fairfield	Fairfield City
Horsley complex (homestead, outbuildings, garden, farm)	52-58 Jamieson Close	Horsley Park	Fairfield City
Land Next to Male Orphan School	Lot 1 Cartwright St	Bonnyrigg	Fairfield City
Lansdowne Bridge	Hume Highway	Lansvale	Multiple LGAs
Prospect Reservoir, part of the Upper Nepean Scheme	Reservoir Road	Prospect	Fairfield City
Villawood Railway Station group	Regents Park-Cabramatta railway	Villawood	Fairfield City

There was a total of **7** records matching your search criteria.

Note: The Heritage Office seeks to keep the State Heritage Register (SHR) up to date, however the latest listings may not yet be check with the NSW Heritage Office for the most recent listings.

Listing Heritage Items

State Heritage Inventory Search Results

Statutory Listed Items

Information and items listed in the State Heritage Inventory come from a number of sources. This mean several entries for the same heritage item in the database. For clarity, the search results have been divic

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- The second section contains items listed by Local Councils & Shires and State Government Agenci also contain additional information on some of the items listed in the first section.

Section 1. Items listed under the NSW Heritage Act.

The search results can be resorted by clicking on the **(sort)** option at the top of each column.

Item Name (sort)	Address (sort)	Suburb (sort)	LGA (sort)	St
Bonnyrigg House	Cartwright Street	Bonnyrigg	Fairfield City	Ye
Horsley complex (homestead, outbuildings, garden, farm)	52-58 Jamieson Close	Horsley Park	Fairfield City	Ye
Lansdowne Bridge	Hume Highway	Lansvale	Multiple LGAs	Ye

There were **3** records in this section matching your search criteria.

Section 2. Items listed by Local Government and State agencies.

Item Name (sort)	Address (sort)	Suburb (sort)	LGA (sort)	In (s
Bandstand Cabravale Park	Railway Parade	Cabramatta	Fairfield City	GA
Blands Oak Oakdene Park	Bland Street	Fairfield	Fairfield City	GA
Bossley Park Public School	Marconi Road	Bossley Park	Fairfield City	GA
Brick Federation House	716 The Horsley Drive	Smithfield	Fairfield City	GA
Brick Railway Building	Railway Parade	Cabramatta	Fairfield City	GA
Bridge	Cross Street	Guildford	Fairfield City	GA
Bunya Pine Tree nth-west corner	The Horsley Drive	Horsley Park	Fairfield City	GA
Bunya Pines ridgetop	Victoria Street	Cabramatta West	Fairfield City	GA
Cabramatta Civic Hall	165-178 Railway Parade	Canley Vale	Fairfield City	GA
Carramar Station	Wattle Avenue	Carramar	Fairfield City	GA

Christ Church Anglican Church and Trees	130 Orchardleigh Street	Old Guildford	Fairfield City	GA
Church	Justin Street	Smithfield	Fairfield City	GA
Church	136 John Street	Cabramatta	Fairfield City	GA
Church	7 Bowden Street	Cabramatta West	Fairfield City	GA
Church	103 Cabramatta Road East	Cabramatta	Fairfield City	GA
City Farm	Darling Street	Abbotsbury	Fairfield City	GA
Corner Shop	2 Canley Vale Road	Canley Vale	Fairfield City	GA
Crane	The Crescent	Fairfield	Fairfield City	GA
Ettinger House	214 Sackville Street	Canley Vale	Fairfield City	GA
Fairfield Showground, grandstand & trees	Smithfield Road	Prairiewood	Fairfield City	GA
Fairfield Station	The Crescent	Fairfield	Fairfield City	GA
Federation Cottage	26,28,30 Frederick Street	Fairfield	Fairfield City	GA
Federation Cottage	2 Kay Street	Guildford	Fairfield City	GA
Federation Cottage	23 Lawson Street	Fairfield	Fairfield City	GA
Federation Cottage	16 North Street	Fairfield	Fairfield City	GA
Federation House	59 Hamilton Road	Fairfield	Fairfield City	GA
Federation House	9 Hawkesbury Street	Fairfield West	Fairfield City	GA
Federation House	7 Haughton Street	Fairfield	Fairfield City	GA
Federation House	63 Hamilton Road	Fairfield	Fairfield City	GA
Federation House	40 Frederick Street	Fairfield	Fairfield City	GA
Federation House	18 Cunninghame Street	Fairfield	Fairfield City	GA
Federation House	322 Canley Vale Road	Canley Heights	Fairfield City	GA
Federation House	87 Thorney Road	Fairfield West	Fairfield City	GA
Federation House	91 Corinda Street	St Johns Park	Fairfield City	GA
Federation House and garden	13 Prout Street	Cabramatta	Fairfield City	GA
Federation Worker's Cottage	132 Broomfield Street	Cabramatta	Fairfield City	GA
Federation Worker's Cottage	62 Campbell Street	Fairfield	Fairfield City	GA
Fire Station	1-3 William Street	Fairfield	Fairfield City	GA
Forest of Spotted Gums	Chandos Road	Horsley Park	Fairfield City	GA
Georgian House	43 Stimson Street	Guildford	Fairfield City	GA
Georgian House	10 Rosedale Street	Canley Heights	Fairfield City	GA
Georgian House	24 Shackel Avenue	Old Guildford	Fairfield City	GA
Hoop Pine	Alick Street	Cabramatta West	Fairfield City	GA
Hoop Pines	Trivett Street	Wetherill Park	Fairfield City	GA
Horse Water Trough opposite Hughes Street	Railway Parade	Cabramatta	Fairfield City	GA
House	5 Waratah Street	Old Guildford	Fairfield City	GA

Indigenous Flora	Moonlight Street	Prairiewood	Fairfield City	GA
Inter-War Bungalow	11 Hunter Street	Fairfield	Fairfield City	GA
Inter-War Bungalow	452 The Horsley Drive	Fairfield	Fairfield City	GA
Inter-War Bungalow	118 Nelson Street	Fairfield	Fairfield City	GA
Inter-War Bungalow	10 Riverview Road	Fairfield	Fairfield City	GA
Inter-War House	16 Granville Street	Fairfield	Fairfield City	GA
Inter-War House	43 Myddleton Avenue	Fairfield	Fairfield City	GA
Inter-War Houses	Artie Street	Fairfield	Fairfield City	GA
Inter-War Spanish Mission House	Warana Road	Cecil Park	Fairfield City	GA
Kaluna Cellars	Kaluna Avenue	Smithfield	Fairfield City	GA
Male Orphan School Bonnyrigg House	Cartwright Street	Bonnyrigg	Fairfield City	GA
Mid Victorian Church	704 The Horsley Drive	Smithfield	Fairfield City	GA
Milestone Lansdowne Road & Hollywood Drive Sth	Hume Highway	Lansvale	Fairfield City	GA
Museum Collection	632 The Horsley Drive	Smithfield	Fairfield City	GA
Oak and Peppercorn Tree	275 River Avenue	Carramar	Fairfield City	GA
Oak tree	12 Bowden Street	Cabramatta West	Fairfield City	GA
Oak Tree nature strip	1 Matthews Street	Fairfield	Fairfield City	GA
Pailau Gateway south end	Park Road	Cabramatta	Fairfield City	GA
Public School	Smart Street	Fairfield	Fairfield City	GA
Railway Bridge	Sandal Crescent	Carramar	Fairfield City	GA
Railway Viaduct	Fairfield Street	Fairfield	Fairfield City	GA
Railway Viaduct Cabramatta Creek	Railway Parade	Cabramatta	Fairfield City	GA
Railway Viaduct Stuart & Canley Vale Road	Railway Parade	Canley Vale	Fairfield City	GA
Red Gums Cabramatta Golf Course	Cabramatta Road West	Cabramatta West	Fairfield City	GA
Relics of early homestead & exotic vegetation	Elizabeth Drive	Abbotsbury	Fairfield City	GA
Remnants of Abbotsbury House relic	Southdown Road	Horsley Park	Fairfield City	GA
School	Cabramatta Road East	Cabramatta	Fairfield City	GA
School of Arts	19 Harris Street	Fairfield	Fairfield City	GA
Site of Toll House and Gates	Hume Highway	Lansvale	Fairfield City	GA
Slab Cottage	76 Chifley Street	Smithfield	Fairfield City	HC
Slab Hut - Museum	632 The Horsley Drive	Smithfield	Fairfield City	GA
Smithfield Cemetery	Dublin Street	Smithfield	Fairfield City	GA
Stone Pine Tree	320 Canley Vale Road	Canley Heights	Fairfield City	GA
Uniting Church & Hall	21-25 Harris Street	Fairfield	Fairfield City	GA
Uniting Church Cemetery	711 The Horsley Drive	Smithfield	Fairfield City	GA

Victorian Church	269 Canley Vale Road	Canley Heights	Fairfield City	GA
Victorian Cottage	542 The Horsley Drive	Fairfield	Fairfield City	GA
Victorian Cottage	65 Sackville Street	Canley Vale	Fairfield City	GA
Victorian House	1 Kay Street	Guildford	Fairfield City	GA
Victorian House	1 Matthews Street	Fairfield	Fairfield City	GA
Victorian House	63 Station Street	Fairfield	Fairfield City	GA
Victorian House	1 Stuart Street	Canley Vale	Fairfield City	GA
Victorian House	63 Wolseley Street	Fairfield	Fairfield City	GA
Victorian House	11 Melbourne Road	St Johns Park	Fairfield City	GA
Victorian House	161 Polding Street	Fairfield	Fairfield City	GA
Victorian Museum Building	632 The Horsley Drive	Smithfield	Fairfield City	GA
Victorian/Federation Cottage	94 Canley Vale Road	Canley Vale	Fairfield City	GA
Victorian/Georgian Cottage	45 Chifley Street	Smithfield	Fairfield City	GA
Victorian/Georgian House	8 Megan Avenue	Smithfield	Fairfield City	GA
Villawood Railway Station	Villawood Road	Villawood	Fairfield City	GA
Von Heiden Gardens	Haughton Street	Fairfield	Fairfield City	GA
Westacott Victorian Cottage	110 Railway Parade	Canley Vale	Fairfield City	GA

There were **98** records in this section matching your search criteria.

There was a total of **101** records matching your search criteria.

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Government Agency.

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Listing Heritage Items

State Heritage Register Search Results

Items listed on the State Heritage Register

Back to Search

The search results can be re-sorted by clicking on the **(sort)** option at the top of each column.

Item Name (sort)	Address (sort)	Suburb (sort)	LGA (sort)	SH
Cecil Hills Farm	Sandringham Drive	Cecil Park	Liverpool City	00
Glenfield Farm	88 Leacocks Lane	Casula	Liverpool City	00
Homestead, The	Charlton Avenue	Chipping Norton	Liverpool City	00
Horningsea Park	Hume Highway	Edmondson Park	Liverpool City	00
Kelvin	Badgerys Creek Road	Bringelly	Liverpool City	00
Liverpool Railway Station group	Great Southern Railway	Liverpool	Liverpool City	01
St Luke's Anglican Church	Elizabeth Drive	Liverpool	Liverpool City	00
Voyager Point Precinct	Lots 72 & 75 Sirius Road	Voyager Point	Liverpool City	00

There was a total of **8** records matching your search criteria.

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Listing Heritage Items

State Heritage Inventory Search Results

Statutory Listed Items

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Section 1. Items listed under the NSW Heritage Act.

The search results can be resorted by clicking on the **(sort)** option at the top of each column.

Item Name (sort)	Address (sort)	Suburb (sort)	LGA (sort)	Sta
Cecil Hills Farm	Sandringham Drive	Cecil Park	Liverpool City	Yes
Glenfield Farm	88 Leacocks Lane	Casula	Liverpool City	Yes
Homestead, The	Charlton Avenue	Chipping Norton	Liverpool City	Yes
Horningsea Park	Hume Highway	Edmondson Park	Liverpool City	Yes
Liverpool Railway Station group	Great Southern Railway	Liverpool	Liverpool City	Yes
South Western Sydney Institute of TAFE	College Street	Liverpool	Liverpool City	No

There were **6** records in this section matching your search criteria.

Section 2. Items listed by Local Government and State agencies.

Item Name (sort)	Address (sort)	Suburb (sort)	LGA (sort)	Inf (sc
Alexander's Bar & Bistro	267-269 Macquarie Street	Liverpool	Liverpool City	GA
All Saints Roman Catholic Church	George Street	Liverpool	Liverpool City	GA
Apex Park	Elizabeth Drive	Liverpool	Liverpool City	GA
Avenue of Trees	Riverside Road	Chipping Norton	Liverpool City	GA
Badgerys Creek Public School	Badgerys Creek Road	Badgerys Creek	Liverpool City	GA
Belfield Farm Group	Rossmore Ave West	Rossmore	Liverpool City	GA
Benera site of	Yarrunga Road	Hoxton Park	Liverpool City	GA
Bents Basin Inn Site		Bents Basin	Liverpool City	GA

Bigge Park	Moore Street	Liverpool	Liverpool City	GA2
Bringelly Public School Group	The Northern Road	Bringelly	Liverpool City	GA2
Carnes Hill Vegetation Group	Bringelly Road (off)	Austral	Liverpool City	GA2
Cast Iron Letter Box	College Street	Liverpool	Liverpool City	GA2
Cecil Hills Farm	Elizabeth Drive (off)	Cecil Park	Liverpool City	GA2
Chipping Norton Public School	Epsom Road	Chipping Norton	Liverpool City	GA2
Church of the Holy Innocents Roman Catholic Group	Church Road	Rossmore	Liverpool City	GA2
Clinch's Pond	Heathcote Road	Moorebank	Liverpool City	GA2
Collingwood Group	Birkdale Crescent	Liverpool	Liverpool City	GA2
Collingwood Inn Hotel	Hume Highway	Liverpool	Liverpool City	GA2
Commercial Hotel	Scotts Street	Liverpool	Liverpool City	GA2
Community Aid & Resource Centre	251 Bigge Street	Liverpool	Liverpool City	GA2
Del Rosa	7 Speed Street	Liverpool	Liverpool City	GA2
Dimos Aristocratz & Southwest Newsagency	Macquarie Street	Liverpool	Liverpool City	GA2
Dockra	8 Dunmore Crescent	Casula	Liverpool City	GA2
Dr James Pirie Child Welfare Centre	Moore Street	Liverpool	Liverpool City	GA2
Eugen's Self Service Laundry	Scotts Street	Liverpool	Liverpool City	GA2
Golden Fleece Hotel	Terminus Street	Liverpool	Liverpool City	GA2
Greendale Roman Catholic Cemetery	Greendale Road	Greendale	Liverpool City	GA2
H&R Block Tax Agent (former)	14 Scott Street	Liverpool	Liverpool City	GA2
Hammondville Homes for Senior Citizens		Hammondville	Liverpool City	GA2
Holsworthy Group off Heathcote Road		Holsworthy	Liverpool City	GA2
Homestead, The (land in)	Charlton Avenue	Chipping Norton	Liverpool City	GA2
Horningsea Park Group	Hume Highway	Prestons	Liverpool City	GA2
Ingleburn Army Camp		Ingleburn	Liverpool City	GA2
Innisvale	43 Passefield Street	Liverpool	Liverpool City	GA2
Item	37 Terminus Street	Liverpool	Liverpool City	GA2
Item	Castlereagh Street	Liverpool	Liverpool City	GA2
Item	443 Hume Highway	Casula	Liverpool City	GA2
Item	28 Canberra Avenue	Casula	Liverpool City	GA2
Item	65 Castlereagh Street	Liverpool	Liverpool City	GA2
Item	20 Webster Road	Liverpool	Liverpool City	GA2
Item	115 Castlereagh Street	Liverpool	Liverpool City	GA2
Item	Fifteenth Avenue	West Hoxton	Liverpool City	GA2
Item	47 Mill Road	Liverpool	Liverpool City	GA2
Item	147 Reilly Street	Lurnea	Liverpool City	GA2

Item	13 Bigge Street	Liverpool	Liverpool City	GA2
Karm Farm landscaping	Riverside Road	Moorebank	Liverpool City	GA2
Kelvin Park Group off Kelvin Park Drive	Kelvin Park Drive	Bringelly	Liverpool City	GA2
Kitchener House	Moorebank Avenue	Moorebank	Liverpool City	GA2
Lawson's Inn Site	The Northern Road	Luddenham	Liverpool City	GA2
Liverpool Dam Liverpool Weir	Newbridge Road	Liverpool	Liverpool City	GA2
Liverpool General Cemetery	Moore Street	Liverpool	Liverpool City	GA2
Liverpool Hospital incl recreation hall	Elizabeth Street	Liverpool	Liverpool City	GA2
Liverpool Hotel	Macquarie Street	Liverpool	Liverpool City	GA2
Liverpool Memorial Olympic Pool	Memorial Avenue	Liverpool	Liverpool City	GA2
Liverpool Offtake Reservoir	Elizabeth Drive	Liverpool	Liverpool City	GA2
Liverpool Pioneer's Memorial Park	Macquarie Street	Liverpool	Liverpool City	GA2
Liverpool Public School	Bigge Street	Liverpool	Liverpool City	GA2
Luddenham public School	The Norhern Road	Luddenham	Liverpool City	GA2
Lyndeer House & Stables	2 Charles Street	Liverpool	Liverpool City	GA2
Massongs Jewellery	275-277 Macquarie Street	Liverpool	Liverpool City	GA2
McGrath Services Centre	Shepherd Street	Liverpool	Liverpool City	GA2
Memorial Gates Ashcroft High School	Maxwells Road	Ashcroft	Liverpool City	GA2
Memorial School of Arts	306 Macquarie Street	Liverpool	Liverpool City	GA2
Memorial to Private A E Smith	Memorial Avenue	Liverpool West	Liverpool City	GA2
Milestone	George Street	Liverpool	Liverpool City	GA2
MM Cables Factory off Newbridge Road		Liverpool	Liverpool City	GA2
Mount Pleasant	3 Shannon Road	Bringelly	Liverpool City	GA2
Murrays Pharmacy	275-277 Macquarie Street	Liverpool	Liverpool City	GA2
National Trust Centre and SH Ervin Gallery	101 Flowerdale Road	Liverpool	Liverpool City	GA2
Obelisk, Discovery Park	Atkinson Street	Liverpool	Liverpool City	GA2
OTC Site Group	Badgerys Creek Road	Bringelly	Liverpool City	GA2
Pemberton off Greendale Road Part	1 82072	Greendale	Liverpool City	GA2
Powerhouse Regional Arts Centre	Casula Road	Casula	Liverpool City	GA2
Railway Viaduct	Mill Road	Liverpool	Liverpool City	GA2
Road Bridge	Pitt Street	Badgerys Creek	Liverpool City	GA2
Rosebank	17 Speed Street	Liverpool	Liverpool City	GA2
Row of Bunya Pines	Bringelly Road	Austral	Liverpool City	GA2
Second Avenue Cottage	Second Avenue	West Hoxton	Liverpool City	GA2
Shadforth Monument	Greendale Road	Greendale	Liverpool City	GA2

South Western Sydney Institute of TAFE	College Street	Liverpool	Liverpool City	GAZ
Speed Street Cottage Group	25-29 Speed Street	Liverpool	Liverpool City	GAZ
St Anne's Anglican Church & Stewart Ave	Walder Road	Hammondville	Liverpool City	GAZ
St John's Anglican Church and Cemetery	Pitt Street	Badgerys Creek	Liverpool City	GAZ
St Luke's Anglican Church Group	Elizabeth Drive	Liverpool	Liverpool City	GAZ
St Marks Anglican Church Group (former)	Greendale Road	Greendale	Liverpool City	GAZ
St Mary the Virgin Anglican Church & Cemetery Group	Church Road	Denham Court	Liverpool City	GAZ
State Bank	Memorial Avenue	Liverpool	Liverpool City	GAZ
Sydney Water Supply Upper Canal		Denham Court	Liverpool City	GAZ
Sydney Water Supply Upper Canal		Cecil Hills	Liverpool City	GAZ
Vegetation Group	Governor Macquarie Drive	Chipping Norton	Liverpool City	GAZ
Vicary's Winery Group	The Northern Road	Luddenham	Liverpool City	GAZ
Warwick Farm Racecourse Group	Hume Highway	Liverpool	Liverpool City	GAZ
Water Tanks two	Badgerys Creek Road	Bringelly	Liverpool City	GAZ
West Hoxton Union Church	Kirkpatrick Avenue	West Hoxton	Liverpool City	GAZ

There were **94** records in this section matching your search criteria.

There was a total of **100** records matching your search criteria.

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Listing Heritage Items

State Heritage Register Search Results

Items listed on the State Heritage Register

Back to Search

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Item Name (sort)	Address (sort)	Suburb (sort)	LGA (sort)
Abbotsford	Oaks Road	Picton	Wollondilly
Bargo Railway Viaduct	Main Southern railway	Bargo	Wollondilly
Brownlow Hill Estate	Brownlow Hill Loop Road	Camden	Wollondilly
Cataract Dam	Cataract Dam Road	Cataract Dam	Wollondilly
Cordeaux Dam	Cordeaux River	Cordeaux	Wollondilly
Couridjah Railway Station	Main Southern railway	Couridjah	Wollondilly
Jarvisfield	Hume Hwy Deviation	Picton	Wollondilly
Megarritys Bridge	Warragamba Dam	Warragamba	Wollondilly
Menangle rail bridge over Nepean River	Main Southern railway	Menangle	Wollondilly
Menangle Railway Station group	Main Southern railway	Menangle	Wollondilly
Nepean Dam - Wall & Valve House	Avon Dam Road	Bargo	Wollondilly
Picton Railway Station group	Main Southern railway	Picton	Wollondilly
Picton railway viaduct over Stonequarry Creek	Main Southern railway	Picton	Wollondilly
Rail Paybus FP1		Thirlmere	Wollondilly
Tahmoor Railway Station group	Main Southern railway	Tahmoor	Wollondilly
Upper Canal System	From Prospect to Wollondilly		Wollondilly
Victoria Bridge over Stonequarry Creek	Prince Street	Picton	Wollondilly
Warragamba Dam - Haviland Park	Warragamba Dam	Warragamba	Wollondilly
Warragamba Emergency Scheme	Warragamba Dam	Warragamba	Wollondilly
Wilton Park	Wilton Park Road	Maldon	Wollondilly
Wirrimbirra Sanctuary	Hume Highway	Bargo	Wollondilly

There was a total of **21** records matching your search criteria.

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Listing Heritage Items

State Heritage Inventory Search Results

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Section 1. Items listed under the NSW Heritage Act.

The search results can be resorted by clicking on the **(sort)** option at the top of each column.

Item Name (sort)	Address (sort)	Suburb (sort)	LGA (sort)
Bargo Railway Viaduct	Main Southern railway	Bargo	Wollondilly
Brownlow Hill Estate	Brownlow Hill Loop Road	Camden	Wollondilly
Couridjah Railway Station	Main Southern railway	Couridjah	Wollondilly
Megarritys Bridge	Warragamba Dam	Warragamba	Wollondilly
Upper Canal System	From Prospect to Wollondilly		Wollondilly

There were **5** records in this section matching your search criteria.

Section 2. Items listed by Local Government and State agencies.

Item Name (sort)	Address (sort)	Suburb (sort)	LGA (sort)
Abbotsford Group	Oaks Rd	Picton	Wollondilly
Anglican Church (Former): Cawdor Village Group	Cawdor Rd	Cawdor	Wollondilly
Anglican Rectory	99-103 Argyle St	Picton	Wollondilly
Barrigal Monument and Vista	Camden Park Drive	Menangle	Wollondilly
Bellefield	33 Pitt St	Tahmoor	Wollondilly
Blaxlands Crossing; Nepean River		Wallacia	Wollondilly
Blaxlands Farm	Silverdale Rd	Wallacia	Wollondilly
Broughtons Pass Weir		Appin	Wollondilly

Brownlow Hill Aviary	Brownlow Hill Loop Rd	Camden / Brownlow Hill	Wollondilly
Brownlow Hill Garden and Trees	Brownlow Hill Loop Rd	Camden / Brownlow Hill	Wollondilly
Brownlow Hill Group	Brownlow Hill Loop Rd	Camden / Brownlow Hill	Wollondilly
Brownlow Hill Homestead	Brownlow Hill Loop Rd	Camden / Brownlow Hill	Wollondilly
Brownlow Hill Homestead	Brownlow Hill Loop Rd	Camden / Brownlow Hill	Wollondilly
Brownlow Hill Round House	Brownlow Hill Loop Rd	Camden / Brownlow Hill	Wollondilly
Brownlow Hill Stables	Brownlow Hill Loop Rd	Camden / Brownlow Hill	Wollondilly
Bunya Pine	Remembrance Driveway	Tahmoor	Wollondilly
Buxton house	57-59 East Pde	Buxton	Wollondilly
Buxton Primary School	Wallaroo Rd and Norwood Rd	Buxton	Wollondilly
Camden Park Estate Central Creamery	Station St	Menangle	Wollondilly
Camden Park Estate Group	Camden Park Estate	Camden	Wollondilly
Camden Park Garden	Camden Park Estate Rd	Camden	Wollondilly
Camden Park Mansion (The)	Camden Park Estate	Camden	Wollondilly
Camden Park Rotolactor	Station St	Menangle	Wollondilly
Camden Valley Inn	Remembrance Driveway	Camden	Wollondilly
Cataract Dam		(not given)	Wollondilly
Cemetery	Old Southern Rd	Bargo	Wollondilly
Cemetery and Trees	Station St	Thirlmere	Wollondilly
Charleville	Bents Basin Rd	Wallacia	Wollondilly
Cordeaux Dam and Pumping Station		(not given)	Wollondilly
Cottages (3) on ridge above the orchard	Camden Park Estate	Camden	Wollondilly
Cottages (3) on slope above the orchard	Camden Park Estate Rd	Camden	Wollondilly
Courthouse (Former)	62 Main St	Appin	Wollondilly
Courthouse (former): East Yerranderie Group		Yerranderie	Wollondilly
Courthouse: Commercial & Civic Group	Old Hume Hwy	Picton	Wollondilly
Creamery Site	Cawdor Rd	Cawdor	Wollondilly
Dairy No 4	EMAI Woodbridge Rd.	Menangle	Wollondilly
Dairy No 8	Remembrance Dr	Camden	Multiple LGAs
Dairy No 8	Remembrance Dr	Camden	Wollondilly
Dairy No 9	Remembrance Drive	Camden	Multiple LGAs
Dairy No 9	Remembrance Drive	Camden	Wollondilly
Dairy No 4	Camden Park Estate	Camden	Wollondilly

Dairy No.8	Remembrance Dr	Camden	Wollondilly
Dairy No.9	Camden Park Estate	Camden	Wollondilly
Darcy's House (Site of)	Main St	Appin	Wollondilly
Denfield Villa	Old Hume Hwy	Tahmoor	Wollondilly
Elizabeth Macarthur Agricultural Institute	Woodbridge Rd.	Menangle	Camden
Elizabeth Macarthur Agricultural Institute	Woodbridge Rd.	Menangle	Wollondilly
Elladale	Elladale Rd	Appin	Wollondilly
Fairley Residence (Former)	426 Old Hume Hwy	Picton	Wollondilly
Furniture Store: Commercial & Civic Group	Menangle Rd	Picton	Wollondilly
Gatehouse (former) and Tollkeeper's Cottage	236 Argyle St	Picton	Wollondilly
George IV Inn	Hume Hwy	Picton	Wollondilly
Gilbulla (Anglican Conference Centre)	Moreton Park Rd	Menangle	Wollondilly
Glendiver	Glendiver Rd	The Oaks	Wollondilly
Glenmore House: Glenmore Group	Moores Way	Glenmore	Wollondilly
Hamlet Cottages, The	Camden Park Drive	Menangle	Wollondilly
Hawthorne	Hawthorne Rd	Bargo	Wollondilly
Hermitage Group	Hermitage Rd	The Oaks	Wollondilly
Hotel Bargo	Southern Rd	Bargo	Wollondilly
Hotel Picton (former)	Argyle St	Picton	Wollondilly
House	42 Argyle St	Picton	Wollondilly
House	53 Argyle St	Picton	Wollondilly
House	51 Argyle St	Picton	Wollondilly
House	49 Argyle St	Picton	Wollondilly
House, Slab House and Hayshed	Cawdor Rd	Cawdor	Wollondilly
James Cottage	404 Hume Hwy	Picton	Wollondilly
Jarvisfield Group	Off Rememberance Drive	Picton	Wollondilly
Koorana Homestead & Outbuildings: Koorana Group	Old Hume Hwy	Picton	Wollondilly
Koorana Trees: Koorana Group	off Old Hume Hwy	Picton	Wollondilly
Larkin Cottage	1 Elizabeth St	Picton	Wollondilly
Larkin Cottage	5 Elizabeth St	Picton	Wollondilly
Macquarie House	55 Argyle St	Picton	Wollondilly
Macquarie Monument near Barragal Lagoon	Camden Park Estate	Camden	Wollondilly
Menangle Gate Lodge	46 Woodbridge Rd.	Menangle	Wollondilly
Menangle Gate Lodge (Former)	46 Woodbridge Rd	Menangle	Wollondilly
Menangle Store	57 Menangle St	Menangle	Wollondilly

Methodist Church Group	Cawdor Rd	Cawdor	Wollondilly
Mountbatten Garden Building: Mountbatten Group	Duggan St	Douglas Park	Wollondilly
Mountbatten House: Mountbatten Group	Duggan St	Douglas Park	Wollondilly
Mountbatten Stone Chapel: Mountbatten Group	Duggan ST	Douglas Park	Wollondilly
Mowbray Park Group: gatehouse, group of buildings	Barkers Lodge Rd	Mowbray Park	Wollondilly
Mt Hercules Group	Mt Hercules Rd	Razorback	Wollondilly
Mt Hunter Creamery	Burragorang Rd	Mt Hunter	Wollondilly
Myrtle Creek Bridge	Old Hume Hwy	Tahmoor	Wollondilly
National Australia Bank & Coachhouse: Commercial & Civic Grp	23 Menangle St	Picton	Wollondilly
Noakes Store	John St	The Oaks	Wollondilly
Northamptondale Group	Brooks Point Rd	Appin	Wollondilly
Oakdale Timber Mill	Mill Rd	Oakdale	Wollondilly
Oakdale Winery Cottage	Burragorang Rd	Oakdale	Wollondilly
Oaks Schoolhouse (The)	John St/Burragorang St	The Oaks	Wollondilly
Old Coomeroo Homestead: Old Coomeroo Group	Old Southern Rd	Bargo	Wollondilly
Orchard Site including Camellia Garden, trees, piggery and storage shed	Camden Park Estate	Camden	Wollondilly
Pheasants Nest Weir (Nepean River)		Wilton	Wollondilly
Picton cottage	87 Menangle St	Picton	Wollondilly
Picton Loopline Level Crossing Site	Hume Hwy	Picton	Wollondilly
Picton Mainline Railway Loop and Tunnel		Picton	Wollondilly
Picton Urban Conservation Area		Picton	Wollondilly
Police Station (former): East Yerranderie Group		Yerranderie	Wollondilly
Post Office: Commercial & Civic Group		Picton	Wollondilly
Queen Victoria Hospital	Thirlmere Way	Thirlmere	Wollondilly
Railway Bridge (hole in the wall)	Argyle St	Picton	Wollondilly
Railway Bridge North of Railway Station	Wellers Rd	Bargo	Wollondilly
Railway Bridge South of Railway Station	Tylers Rd	Bargo	Wollondilly
Railway Station		Menangle	Wollondilly
Railway Station	Bargo St	Couridjah	Wollondilly
Railway Station Complex	Southern Rd	Bargo	Wollondilly
Railway Viaduct	Menangle Rd	Menangle	Wollondilly
Railway Viaduct		Bargo	Wollondilly

Ravenswood	Bents Basin Rd	Wallacia	Wollondilly
Razorback Inn	Hume Hwy/Remembrance Driveway	Picton	Wollondilly
Redbank Range Railway Tunnel		Picton	Wollondilly
Redbank Uniting Church	Hume Hwy	Picton (Redbank)	Wollondilly
Robert Moore's House: Glenmore Group	Moores Way	Glenmore	Wollondilly
Rockford Crossing	Remembrance Dr	Picton	Wollondilly
Rogers Stone Cottage	402 Old Hume Hwy	Picton (Redbank)	Wollondilly
Roman Catholic Church: East Yerranderie Group		Yerranderie	Wollondilly
Sarahville	Bents Basin Rd	Wallacia	Wollondilly
Schoolmasters Residence	Main Rd	Appin	Wollondilly
Silky Oaks: Glenmore Uniting Church Group	Lot 21 Moores Way	Glenmore	Wollondilly
Slab Hut & Trees	470 Cawdor Rd	Cawdor	Wollondilly
St Aloysius Church	Merlin St	The Oaks	Wollondilly
St Aloysius Presbytery	Merlin St	The Oaks	Wollondilly
St Aloysius Presbytery (Old)	Merlin St	The Oaks	Wollondilly
St Aloysius Roman Catholic Church Group	Merlin St	The Oaks	Wollondilly
St Aloysius Schoolhouse	Merlin St	The Oaks	Wollondilly
St Bedes Roman Catholic Church and graveyard	King St	Appin	Wollondilly
St James Anglican Church	Menangle Road	Menangle	Wollondilly
St James Anglican Church	Menangle Rd	Menangle	Wollondilly
St Lukes Anglican Church	Argyle Street	Wilton	Wollondilly
St Lukes Anglican Church and Trees	Merlin St	The Oaks	Wollondilly
St Marks Anglican Church: St Mark the Evangelist Group	Bulli Rd	Appin	Wollondilly
St Marks Anglican Church: St Marks Anglican Group	Menangle St West	Picton	Wollondilly
St Marks Graveyard: St Mark the Evangelist Group	Bulli Rd	Appin	Wollondilly
St Marks Rectory (Former): St Mark the Evangelist Group	5 Glebe Cl	Appin	Wollondilly
St Marys Towers	Mt Kiera Rd	Douglas Park	Wollondilly
St Matthews Church: St Mathews Group	Old Oaks Road	The Oaks	Wollondilly
St Patricks Roman Catholic Church	Menangle St	Menangle	Wollondilly
Stone Cottage	Main St	Appin	Wollondilly
Stone Culverts		Couridjah	Wollondilly
Stonequarry Creek Bridge piers	Hume Hwy/Argyle St	Picton	Wollondilly

Stonequarry Creek Quarry Site		Picton	Wollondilly
Stratford House	Old Hume Hwy	Tahmoor	Wollondilly
Suspension Bridge (Nepean River)	Wilton Park Rd	Maldon	Wollondilly
Tahmoor House	Old Hume Hwy	Tahmoor	Wollondilly
Theresa Park Church	Taylor Pl	Theresa Park	Wollondilly
Thirlmere House	Burns Rd	Thirlmere	Wollondilly
Thirlmere Public School: Thirlmere School Group	Oaks St	Thirlmere	Wollondilly
Thirlmere Pumping Station		Couridjah	Wollondilly
Thirlmere Urban Conservation Area	Thirlmere Way	Thirlmere	Wollondilly
Union Revived Inn (Former)	Main St/Appin Rd	Appin	Wollondilly
Uniting Church Group	Moores Way	Glenmore	Wollondilly
Upper Canal Water Supply System		(not given)	Wollondilly
Vault Hill Cemetery	Remembrance Driveway	Picton	Wollondilly
Victorian House	Menangle St West	Picton	Wollondilly
Warragamba Dam		Warragamba	Wollondilly
Weatherboard Shop (Former)	20 Main St	Appin	Wollondilly
Wellington Park Iceworks Site	Rays Lane	Mowbray	Wollondilly
Wendover House	83 Menangle St	Picton	Wollondilly
Wilton Park Stables Group	Wilton Road	Wilton	Wollondilly
Windmill Hill House Ruin	Wilton Road	Appin	Wollondilly
Wirrimbirra Sancturary		Bargo	Wollondilly
Wollondilly Shire Offices: Commercial & Civic Group	Menangle Rd	Picton	Wollondilly
Wooden Mile Post	Razorback Rd	Razorback	Wollondilly
Yerranderie Silver Mining Field and Settlement		Yerranderie	Wollondilly

There were **164** records in this section matching your search criteria.

There was a total of **169** records matching your search criteria.

Key:
LGA = Local Government Area
GAZ= NSW Government Gazette (statutory listings prior to 1997), HGA = Heritage Grant Application, HS = Heritage Study, LGOV = Local G
Government Agency.

**Note: The Heritage Office seeks to keep the State Heritage Inventory (SHI) up to date, ho
listings in Local and Regional Environmental Plans (LEPs and REPs) may not yet be include
with the relevant Local Council or Shire for the most recent listings.**

Register of the National Estate

Search Results

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29 results found.

Bents Basin State Recreation Area and Adjacent Areas Bents Basin Rd	Greendale, NSW	(Registered)
Bernera including Site and Knoll Yarrunga St	Prestons, NSW	(Registered)
Black Jack Sill	Gunnedah, NSW	(Registered)
Bringelly Radio Receiving Station Complex Badgerys Creek Rd	Bringelly, NSW	(Indicative Place)
Burburgate Graves	Burburgate, NSW	(Indicative Place)
Church of the Holy Innocents Church St	Rossmore, NSW	(Registered)
Collingwood Birkdale Cr	Liverpool, NSW	(Registered)
Cubbitch Barta National Estate Area Old Illawarra Rd	Holsworthy, NSW	(Registered)
Defence National Storage and Distribution Centre Moorebank Av	Moorebank, NSW	(Identified Place)
Denham Court and St Marys Anglican Chapel Campbelltown Rd	Denham Court, NSW	(Registered)
Glenfield Farm Leacocks La	Casula, NSW	(Registered)
Horningsea Park Horningsea Park Dr	Horningsea Park, NSW	(Registered)
Hoxton Park Airport Cowpasture Rd	Cecil Park, NSW	(Interim List)
Indigenous Place	Burburgate, NSW	(Registered)
Ingleburn Army Camp Campbelltown Rd	Ingleburn Village, NSW	(Interim List)
Kelvin State Forest and Adjacent Areas Eastern Forest Rd	Kelvin, NSW	(Removed from Register or IL)
Kelvin, Outbuildings and Curtilage The Retreat	Bringelly, NSW	(Registered)
Kemps Creek Natural Area Exeter Rd	Cecil Park, NSW	(Registered)
Kitchener House 208 Moorebank Av	Moorebank, NSW	(Registered)
Liverpool Courthouse (former) 251 Bigge St	Liverpool, NSW	(Registered)
Liverpool Dam Heathcote Rd	Liverpool, NSW	(Registered)
Liverpool Fire Station 70-78 Terminus St	Liverpool, NSW	(Indicative Place)
Liverpool Hospital (former) College St	Liverpool, NSW	(Registered)
Old Army / Internment Camp Group Holsworthy Artillery Rd	Holsworthy, NSW	(Registered)
Pilliga Nature Reserve (1980 boundary) Newell Hwy	Coonabarabran, NSW	(Registered)
Ruvigne Homestead Complex Ruvigne Rd	via Gunnedah, NSW	(Indicative Place)
St Lukes Anglican Church 156 Northumberland St	Liverpool, NSW	(Registered)
Tambar Springs Palaeontological Site Mullaley Rd	Tambar Springs,	(Indicative Place)

Voyager Point Sirius Rd	NSW Voyager Point, NSW	(Registered)

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AUSTRALIAN HERITAGE COMMISSION

Register of the National Estate

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6 results found.

Fairfield Fire Station 3 Williams St	Fairfield, NSW	(Indicative Place)
Horsley Garden The Horsley Dr	Horsley Park, NSW	(Registered)
Horsley Homestead, Outbuildings and Surrounds The Horsley Dr	Horsley Park, NSW	(Registered)
Lansdowne Bridge Hume Hwy	Lansvale, NSW	(Registered)
Prospect Reservoir Area	Prospect, NSW	(Indicative Place)
The Homestead Brown Rd	Bonnyrigg Heights, NSW	(Registered)

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Register of the National Estate

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52 results found.

Campbelltown Courthouse Queen St	Campbelltown, NSW	(Registered)
Campbelltown Police Station Railway St	Campbelltown, NSW	(Removed from Register or IL)
Campbelltown Post Office (former) Queen St	Campbelltown, NSW	(Registered)
Cattle Watering Tank and Reservoir Allman St	Campbelltown, NSW	(Registered)
Claymore Farm	Claymore, NSW	(Removed from Register or IL)
Coaching Inn now a Pair of Houses 298 Queen St	Campbelltown, NSW	(Registered)
Cottage 303 Queen St	Campbelltown, NSW	(Indicative Place)
Cubbitch Barta National Estate Area Old Illawarra Rd	Holsworthy, NSW	(Registered)
Denfield and Curtilage Appin Rd	St Helens Park, NSW	(Registered)
Denham Court and St Marys Anglican Chapel Campbelltown Rd	Denham Court, NSW	(Registered)
Englorie Park Parkholme Cct	Ambarvale, NSW	(Registered)
Epping Forest Epping Forest Dr	Kearns, NSW	(Registered)
Fire Station (former) 307 Queen St	Campbelltown, NSW	(Indicative Place)
Glen Alpine 12 Belltrees Cl	Glen Alpine, NSW	(Registered)
Glen Alpine Site of Original Menangle Rd	Glen Alpine, NSW	(Rejected Place)
Glenalvon and Stables Lithgow St	Campbelltown, NSW	(Registered)
Glenlee Glenlee Rd	Menangle Park, NSW	(Registered)
Indigenous Place	Campbelltown, NSW	(Indicative Place)
Indigenous Place	Helensburgh, NSW	(Registered)
Indigenous Place	Helensburgh West, NSW	(Registered)
Ingleburn Army Camp Campbelltown Rd	Ingleburn Village, NSW	(Interim List)
James Ruses Grave Sturt St	Campbelltown, NSW	(Registered)
Lacks Hotel original Stone Wing only Queen St	Campbelltown,	(Destroyed)

	NSW	
Macquarie Field Garden Quarter Sessions Rd	Glenfield, NSW	(Registered)
Macquarie Field House Quarter Sessions Rd	Glenfield, NSW	(Registered)
Masonic Hall (excluding modern addition at rear) Allman St	Campbelltown, NSW	(Destroyed)
Matthew Healeys Grave Sturt St	Campbelltown, NSW	(Registered)
Menangle House Menangle Rd	Menangle Park, NSW	(Registered)
Menangle Railway Viaduct Menangle Rd	Menangle Park, NSW	(Registered)
O'Hares Creek Catchment Bulli Rd	Appin, NSW	(Registered)
Pair of Houses 284-286 Queen St	Campbelltown, NSW	(Registered)
Pair of Houses and Slab Outbuildings 288-290 Queen St	Campbelltown, NSW	(Registered)
Prefabricated Cottages Ingleburn Village Bass Rd	Ingleburn Village, NSW	(Interim List)
Queen Street Group 284-94,298 Queen St	Campbelltown, NSW	(Registered)
Quondong Old Menangle Rd	Campbelltown, NSW	(Registered)
Richmond Villa 12 Lithgow St	Campbelltown, NSW	(Registered)
Robin Hood Farm Campbelltown Rd	Ingleburn, NSW	(Registered)
Shop and Residence (former) 292-294 Queen St	Campbelltown, NSW	(Registered)
St Elmo 94 Broughton St	Campbelltown, NSW	(Registered)
St Helens Park House and Outbuildings St Helens Park Dr	St Helens Park, NSW	(Registered)
St Johns Catholic Church Group Sturt St	Campbelltown, NSW	(Registered)
St Johns Church, Cemetery and Trees Sturt St	Campbelltown, NSW	(Registered)
St Peters Anglican Cemetery Broughton St	Campbelltown, NSW	(Registered)
St Peters Anglican Church 12 Cordeaux St	Campbelltown, NSW	(Registered)
St Peters Anglican Church Group Cordeaux St	Campbelltown, NSW	(Registered)
St Peters Rectory and Stables 12 Cordeaux St	Campbelltown, NSW	(Registered)
Stationmasters House Patrick St	Campbelltown, NSW	(Removed from Register or IL)
The 13th Jyotirlinga (icon) 203 Eagleview Rd	Minto, NSW	(Indicative Place)
Town Hall (former) 315 Queen St	Campbelltown, NSW	(Registered)
Varro Ville St Andrews Rd	Varroville, NSW	(Registered)
Wedderburn Plateau Wedderburn Rd	Wedderburn, NSW	(Indicative Place)

Wesleyan Chapel Oxley St	Campbelltown, NSW	(Registered)

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AUSTRALIAN HERITAGE COMMISSION

Register of the National Estate

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35 results found.

Camden Airport Airport Rd	Camden, NSW	(Indicative Place)
Camden Courthouse 31 John St	Camden, NSW	(Registered)
Camden Park Camden Park Estate Rd	Camden Park, NSW	(Registered)
Camelot Kirkham La	Kirkham, NSW	(Registered)
Camelot Gardeners Lodge Kirkham La	Kirkham, NSW	(Registered)
Camelot Stables Kirkham La	Kirkham, NSW	(Registered)
Cobbitty Weir Ellis La	Ellis Lane, NSW	(Indicative Place)
Cottage 39 John St	Camden, NSW	(Registered)
Cottage rear Macquarie Grove House Macquarie Grove Rd	Camden, NSW	(Identified Place)
Denbigh including Slab Outbuildings and Grounds The Northern Rd	Cobbitty, NSW	(Registered)
Gledswood Camden Valley Way	Catherine Field, NSW	(Registered)
Gledswood Garden Camden Valley Way	Catherine Field, NSW	(Registered)
Harrington Park Homestead Camden Valley Way	Harrington Park, NSW	(Registered)
Heber Chapel Cobbitty Rd	Cobbitty, NSW	(Registered)
Home Farmhouse Camden Park Estate Rd	Camden South, NSW	(Registered)
John Street Group John St	Camden, NSW	(Registered)
Kirkham Stables and Curtilage Kirkham La	Kirkham, NSW	(Registered)
Macaria 37 John St	Camden, NSW	(Registered)
Macarthur Family Cemetery Camden Park Estate Rd	Camden South, NSW	(Registered)
Macquarie Grove House Macquarie Grove Rd	Cobbitty, NSW	(Registered)
Maryland Garden and Setting The Northern Rd	Bringelly, NSW	(Registered)
Maryland and Outbuildings The Northern Rd	Bringelly, NSW	(Registered)
Mount Hunter Rivulet Weir Werombi Rd	Theresa Park, NSW	(Indicative Place)
National Australia Bank Argyle St	Camden, NSW	(Registered)
Police Station and Residence 33-35 John St	Camden, NSW	(Registered)
St John the Evangelist Anglican Church Menangle Rd	Camden, NSW	(Registered)
St Johns Anglican Church Group Menangle Rd	Camden, NSW	(Registered)
St Johns Hill and John Street Conservation Area	Camden, NSW	(Registered)
St Johns Rectory and Stables Menangle Rd	Camden, NSW	(Registered)
St Pauls Anglican Church Group Cobbitty Rd	Cobbitty, NSW	(Registered)
St Pauls Anglican Church and Graveyard Cobbitty Rd	Cobbitty, NSW	(Registered)

St Pauls Catholic Church John St	Camden, NSW	(Registered)
St Pauls Rectory Cobbitty Rd	Cobbitty, NSW	(Registered)
Studley Park Camden Valley Way	Narellan, NSW	(Registered)
Wivenhoe including Conservatory Macquarie Grove Rd	Cobbitty, NSW	(Registered)

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AUSTRALIAN HERITAGE COMMISSION

Register of the National Estate

Search Results

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51 results found.

Abbotsford Homestead and Curtilage Abbotsford Rd	Picton, NSW	(Registered)
Bargo Railway Station Old Hume Hwy	Bargo, NSW	(Indicative Place)
Bargo River Gorge & Mermaids Pool	Tahmoor, NSW	(Indicative Place)
Bents Basin State Recreation Area and Adjacent Areas Bents Basin Rd	Greendale, NSW	(Registered)
Blue Mountains National Park (1980 boundary) Great Western Hwy	Glenbrook, NSW	(Registered)
Brownlow Hill Garden Brownlow Hill Loop Rd	Orangeville, NSW	(Registered)
Brownlow Hill Homestead Brownlow Hill Loop Rd	Orangeville, NSW	(Registered)
CBC Bank (former) Argyle St	Picton, NSW	(Registered)
Camden Park Camden Park Estate Rd	Camden Park, NSW	(Registered)
Camden Park Garden and Nursey Camden Park Estate Rd	Camden Park, NSW	(Registered)
Cataract Dam & Reservoir Appin Rd	Appin, NSW	(Indicative Place)
Concrete Arch Bridge Across Megarritys Creek	Warragamba, NSW	(Indicative Place)
Indigenous Place	Appin, NSW	(Registered)
Indigenous Place	Appin, NSW	(Registered)
Indigenous Place	Appin, NSW	(Registered)
Indigenous Place	Wilton, NSW	(Registered)
Jarvisfield Group Remembrance Dr	Picton, NSW	(Registered)
Jarvisfield and Stone Barn Remembrance Dr	Picton, NSW	(Registered)
Kanangra Boyd National Park (1977 boundary) Kanangra Rd	Kanangra, NSW	(Registered)
Kanangra Wilderness Area Kanangra Rd	Oberon, NSW	(Indicative Place)
Maldon Bridge Wilton Park Rd	Maldon via Picton, NSW	(Registered)
Menangle Railway Viaduct Menangle Rd	Menangle Park, NSW	(Registered)
Morton Park Bakery Dowle St	Douglas Park, NSW	(Indicative Place)
Morton Park Circular Brick Garden Structure Dowle St	Douglas Park, NSW	(Indicative Place)
Morton Park Early Dwelling Dowle St	Douglas Park, NSW	(Indicative Place)
Morton Park Group Dowle St	Douglas Park, NSW	(Indicative Place)
Morton Park Homestead Dowle St	Douglas Park,	(Indicative Place)

	NSW	
Morton Park Stone Stable Dowle St	Douglas Park, NSW	(Indicative Place)
Mount Hunter Rivulet Weir Werombi Rd	Theresa Park, NSW	(Indicative Place)
O'Hares Creek Catchment Bulli Rd	Appin, NSW	(Registered)
Picton Courthouse Argyle St	Picton, NSW	(Registered)
Picton Post Office (former) Argyle St	Picton, NSW	(Registered)
Picton Railway Station Group Station St	Picton, NSW	(Indicative Place)
Queen Victoria Memorial Hospital Thirlmere Way	Thirlmere, NSW	(Indicative Place)
Razorback Inn Remembrance Dr	Picton, NSW	(Registered)
St Bedes Catholic Church and Graveyard King St	Appin, NSW	(Registered)
St James Anglican Church Menangle Rd	Menangle, NSW	(Registered)
St Mark the Evangelist Anglican Church Church St	Appin, NSW	(Registered)
St Marys Towers Douglas Park Rd	Douglas Park, NSW	(Registered)
St Matthews Anglican Church & Churchyard Old Oaks Rd	The Oaks, NSW	(Registered)
Stonequarry Creek Railway Viaduct Station St	Picton, NSW	(Registered)
Tahmoor House Remembrance Dr	Tahmoor, NSW	(Registered)
The Blue Mountains	Katoomba, NSW	(Indicative Place)
The Hermitage The Oaks Rd	The Oaks, NSW	(Registered)
Thirlmere Lakes National Park West Pde	Couridjah, NSW	(Registered)
Upper Nepean Water Catchment Mount Keira Rd	Mount Keira, NSW	(Indicative Place)
Warragamba Emergency Scheme	Warragamba, NSW	(Indicative Place)
Wedderburn Plateau Wedderburn Rd	Wedderburn, NSW	(Indicative Place)
Wilton Park Stables Group Wilton Park Rd	Maldon via Picton, NSW	(Registered)
Wirrimbirra Sanctuary Remembrance Dr	Bargo, NSW	(Registered)
Yerranderie Silver Mining Field	Yerranderie, NSW	(Registered)

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AUSTRALIAN HERITAGE COMMISSION

Appendix D RTA's Environmental Protection (Management Plan) - QA Specification G35

RTA QA SPECIFICATION G35

ENVIRONMENTAL PROTECTION (MANAGEMENT PLAN)

NOTICE

"This document is a copy of one of the Authority's QA Specifications.

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- to ensure that you, as a member of the public who may be affected by the operation of this document, have access to the document

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RTA QA SPECIFICATION G35

ENVIRONMENTAL PROTECTION (MANAGEMENT PLAN)

REVISION REGISTER

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed1 / Rev0		First issued to replace RTA G5.	GM, RNIC	26.04.99
Ed1 / Rev1	1.2	Additional references added to list.	GM, RNIC	06.12.99
	1.3	Definition (c) - definition of "Environmental Incident" removed and replaced by definition of "Pollution Incident".		
	4.1 (d)	"(b) and" added.		
	4.1 (n)	Item (n) added.		
	4.1 (o)	New item		
	4.2 1st para	More specific provisions regarding deficiencies; "and keeping the Contractor's environmental records" added.		
	4.2 2nd para	"status of" deleted; "environmental incidents" replaced with "pollution incidents"; "control of environmental nonconformances" added.		
	4.4 (e)	Reference to "the register" and "Waste Minimisation and Management Act" added.		
	4.7	Reworded to clarify the requirement for Contractor to advise EPA and Superintendent.		
	4.8 1st para	Reworded. Contractor's notification requirements to local residents made more specific.		
	4.9 2nd para	Reworded. Contractor's obligation under the POEO Act to notify EPA of pollution incidents.		
	4.10 3rd line	The word "taken" added after the word "action".		
	4.13	New sentence concerning records and summary reports of performance evaluations.		
	4.14	Clause renamed.		
	4.14.1	New clause number with revised wording.		
	4.14.2	New clause number.		

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed1 / Rev1 (cont'd)	6.2.1 1st para	Reworded. CEMP to identify "Contractor's obligations" under legislation relevant to the work; list of relevant legislation revised.		
	6.2.2	List of legislation repealed and replaced by POEO Act added; paragraph on Waste Minimisation and Management Act added.		
	6.5.1 1st para	Second sentence revised.		
	6.5.2	New clause - "Soil Stockpile Management".		
	6.5.3	Clause renumbered from 6.5.2; 1st paragraph, reference to "Clean Waters Act, Clean Waters Regulations" replaced by "POEO Act".		
	6.5.4	New clause – Water Extraction.		
	6.6	First paragraph, reference to "Clean Air Act" replaced by "POEO Act"; 3rd paragraph, "such as" replaced by "including"; "as required" inserted after "listed below".		
	6.6 (g)	Wording revised.		
	6.6 (h)	Wording revised.		
	6.7	First paragraph, reference to "Noise Control Act 1975" replaced by "POEO Act"; point (iii) revised; new point (iv); previous point (iv) renumbered to point (v).		
	6.9 1st para	Third line, "CEMP and implement" replaced by "CEMP, and then implement".		
	6.11.2 (c)	The word "shall" replaced by "does".		
	6.13	First paragraph, "any" waterways replaced by "land or" waterways; 2nd paragraph, "on any road with drainage" replaced by "on any location with direct drainage"; two new sentences on refuelling added; 3rd paragraph, new sentence on location of storage areas added.		
	6.15	"immediately who will arrange" replaced by "immediately, who will then arrange".		
	6.17	First paragraph revised; example box added.		

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed1 / Rev1 (cont'd)	6.18	The words "to the satisfaction of the Superintendent" deleted.		
	Annexure G35/3	Clause numbers revised.		
	Annexure G35/4	Clause numbers revised.		
Ed1 / Rev2	4.1	Title changed.	GM, RNIC	21.01.00
	4.1.1	New clause number and title; "meet" replaced by "comply with".		
	4.1.2	New clause number and title; second paragraph revised; new second last and last paragraphs added.		
	5, 6.5.3, 6.6	Examples revised.		
	6.7	First paragraph revised; example revised; new paragraph added after item (v); example deleted		
	6.8	Example revised; fourth paragraph "monitored" replaced by "managed".		
	6.16	Example revised.		
	Annexure G35/1	Clause 4.1 of the table revised.		
	Annexure G35/4	Example contents of the table deleted.		
Ed1 / Rev3	1.1, 1.3, 4.7	Reference to "Special Conditions of Contract" changed to "Conditions of Contract".	GM, RNIC	17.07.01
Ed 1/Rev 4	4.1.1.(g), 4.1.2, 6.3,	Minor editorial changes. 6.7, Annex G35/1 (4.1)	GM, RNIC	07.09.01
	1.2	New references added		
	1.2, 1.3	ISO 9000 replaces ISO 8402		
	2(5),4.1.1e	Monitoring of high risks required		
	3.8	Quality system requirements added		
	4.1.1	CEMP to comply with legislation and approval conditions Additional details required.		
	4.1.2	CEMP submission to others changed		
	4.5	Minimum training levels to be shown		
	4.9, Annex G35/1	Notification to EPA of contact persons changed.		
	5	Include construction related problems/risks		

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed 1/Rev 4	6.2.1	List of legislation updated		
(Cont'd)	6.5.3, 6.6	Use EPA methods in monitoring		
	6.6	Visually check exhaust systems		
	6.7	Comply with EPA requirements		
	6.9	Observe limits of clearing		
	6.11.2	EPA regulation and guideline added		
	6.13	Store away from vegetated areas EPA guideline added		
	6.16	Requirements defined as a Hold Point		
	6.17(c)	New guideline added Consider waste management in design, planning and purchasing		
Ed 2/Rev 0		Specification reformatted "Superintendent" changed to "Principal"	GM, RNIC	22.10.03
	1.1	Responsibilities defined		
	1.2	New clause		
	4.1.1, 4.3 4.5, 4.8, 4.9	Minor changes. 4.12, 6.6, 6.10		
	4.7	Notification only if a licence requirement		
	4.13	Risk based performance evaluation program is required		
	4.14.1	Auditing program to consider risks		
	6.2	References include regulations Legislation list updated & transferred to Anx G35/M		
	6.3	Guidance on application for a licence		
	6.5	Detailed requirements transferred to RTA G38 and RTA G39		
	6.7	Refer to EPA road traffic noise Guideline		
	6.8	Consult with EPA, Principal's presence no longer mandatory		
	6.9	Clearing and lopping may require statutory approvals		
	6.10	Use a NPWS licensed ecologist Legislation listed		
	6.11	Clause rewritten with new Hold Point		
	6.12	Scope changed to dangerous goods and incorporates previous clause 6.13. Procedure to include fuel and chemical deliveries.		

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed 2/Rev 0 (Cont'd)	6.12	Additional bunding requirements added with a Hold Point		
	6.12.2	New subclause - Pesticides		
	6.13 - 6.18	Clauses renumbered		
	6.13	Ensure training is implemented		
	6.15	Clause rewritten		
	6.17	Restoration requirements added		
	6.18	New clause		
	Annex G35/C	Schedule of Identified Records added.		
	Annex G35/B, -/F	New annexure.		
	Annex G35/M	New annexure with new details.		

NOTICE

Using RTA G35

Specification RTA G35 contains the RTA's requirements for a contractor's project specific environmental management plan. When a corporate environmental management system is to be implemented by the Contractor, Specification RTA G36 should be used in lieu of RTA G35.

Specification RTA G35 is a "proforma" model specification and must be customised by the TENDER DOCUMENTER for each specific project. Customisation requires insertion of the various environmental conditions and constraints from the REF, EIS, Decision Report and associated information into the body of G35. It is recommended that G35 is project customised parallel with the RTA's project environmental management plan.

Some typical examples of customisation are shown in boxes within the text, as illustrated below:

Example: List or cross-refer to specific topsoil management requirements

The reuse of weed contaminated topsoil by surface spreading is not permitted. Where necessary, horticultural advice must be sought to determine whether the type and/or proportion of weed cover is significant for the topsoil to be deemed weed contaminated.

If any issue is not relevant for your project, delete the boxed text.

If an issue is relevant, delete the borders around the text, modify the text to suit your circumstances, adjust the margins so the customised paragraphs line up with the general text, match the font size and set the customised paragraphs in bold italic.

After completing the customisation, check the pagination of the whole document and insert page breaks if necessary to achieve continuity within Clauses. Then return to CONTENTS page to highlight and automatically revise listing and page numbers.

This customisation must be done carefully because tenderers will rely on G35 to price in their environmental obligations for the project.

QA SPECIFICATION G35

ENVIRONMENTAL PROTECTION
(MANAGEMENT PLAN)

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RNIC-QA-G35

VERSION FOR:
DATE:

Edition 2 / Revision 0
October 2003

ROADS and TRAFFIC AUTHORITY NSW

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RTA QA SPECIFICATION G35

ENVIRONMENTAL PROTECTION (MANAGEMENT PLAN)

REVISIONS TO EDITION 2

This document is based on RTA Specification G35 Edition 2 Revision 0 — October 2003.

All revisions to RTA G35 Ed 2 / Rev 2 (other than minor editorial and project specific changes) have been indicated by a vertical line in the margin as shown here.

PROJECT SPECIFIC CHANGES

Any project specific changes have been indicated in the following manner:

(a) Text which is additional to the base document and which is included in the Specification is shown in bold italics e.g. ***Additional Text***.

(b) Text which has been deleted from the base document and which is not included in the Specification is shown struck out e.g. ~~Deleted Text~~.

1 GENERAL

1.1 SCOPE

The Principal recognises that construction of the Works in accordance with the Contract will result in some unavoidable damage to the environment. The Contractor must undertake all activities in such a manner as to limit damage to the environment to that which is unavoidable.

All actions, work, supply of materials and services, responsibilities, etc described in this Specification must be carried out by the Contractor unless specifically stated otherwise.

RTA G35 describes an environmental protection management process which the Contractor must implement to provide environmental protection during execution of the Works.

RTA G35 also identifies environmental conditions of approval for the project which the Contractor must satisfy.

The environmental protection requirements in RTA G35, together with the Conditions of Contract, are complementary to, and not in substitution for, any statutory requirements nor any of the technical requirements of the Specifications and Drawings.

The Contractor is responsible for ensuring compliance with all relevant environmental statutory requirements and procedures defined within the CEMP and all supplementary plans

Compliance with this Specification must continue while carrying out the Work Under the Contract, including application of a project specific Contractor's Environmental Management Plan (CEMP) - (refer to RTA G35 Clause 4).

1.2 STRUCTURE OF THE SPECIFICATION

This Specification includes a series of annexures that detail additional requirements and information.

1.2.1 Supplementary Project Information

Supplementary Project Information is shown in Annexure G35/A.

1.2.2 Measurement and Payment

The method of measurement and payment must comply with Annexure **G35/B**.

1.2.3 Schedules of HOLD POINTS, WITNESS POINTS and Identified Records

The schedules in Annexure G35/C list the **HOLD POINTS** and **WITNESS POINTS** that must be observed. Refer to RTA G2 for the definitions of **HOLD POINTS** and **WITNESS POINTS**.

The records listed in Annexure G35/C are Identified Records for the purposes of RTA Q Annexure Q/E.

1.2.4 Referenced Documents and Legislation

Unless otherwise specified the applicable issue of a reference document, other than an RTA Specification, must be the issue current at the date one week before the closing date for tenders, or where no issue is current at that date, the most recent issue.

Standards, specifications and test methods are referred to in abbreviated form (e.g. AS 2350). For convenience, the full titles are given in Annexure G35/M:

Environmental legislation which may be relevant to the Work Under the Contract is listed in Annexure G35/M. Refer to Clause 6.2. The list may not be current or complete for this Contract. .

1.3 DEFINITIONS

The following definitions are applicable:

(a) "Environment": refer to the definition in the Conditions of Contract;

(b) Clauses 3.1 and 3.3 to 3.13 of ISO 14001;

(c) The definitions used in ISO 9000 for nonconformance (see "nonconformity"), corrective action and preventive action, where they can be extended to apply to environmental management and are not inconsistent with ISO 14001;

(d) "Pollution Incident": means an incident or set of circumstances during or as a consequence of which there is, has been or is likely to be a leak, spill or other escape of a substance, as a result of which pollution has occurred, is occurring or is likely to occur. It includes an incident or set of circumstances in which material (including waste) has been placed or disposed of on premises unlawfully, but it does not include an incident or set of circumstances involving only the emission of any noise or odour.

(e) "Pesticide" has the same meaning as within the Pesticides Act 1999.

(f) "Dangerous Goods" have the same meaning as within the Dangerous Goods Act 1975.

(g) "Contamination of land" is the presence of a substance in, on or under the land at a concentration above that which it is normally found in that locality, such that there presents a risk of harm to human health or to the environment. (Contaminated land is generally the result of polluting practices of commercial, agricultural or industrial land uses.)

(h) "Work Under the Contract" has the same meaning as in the Conditions of Contract.

2 ENVIRONMENTAL PROTECTION MANAGEMENT PROCESS

The Contractor must undertake the following tasks:

1. Identify statutory requirements, compliance limits and adverse environmental effects which could occur during execution of the Works (refer to Clause 6).

2. Plan work activities and environmental protection measures to minimise environmental risks and comply with specified environmental protection requirements (refer to Clause 4.1). The CEMP is the outcome of this planning process.

3. Set up the planned environmental protection measures (refer to Clause 6) and train site personnel to be environmentally aware (refer to Clause 4.5).

4. Monitor the effectiveness of the environmental protection measures (refer to Clause 4.1.1e).

5. Set up response procedures which will initially contain then remedy any environmental damage which does arise (refer to Clause 4.4).

6. Improve environmental protection measures and revise the CEMP promptly when deficiencies are identified (refer to Clauses 3 and 4.1).

3 NONCONFORMANCE CONTROL, CORRECTIVE AND PREVENTIVE ACTION

The Contractor must apply nonconformance control and corrective and preventive action procedures in accordance with RTA Q to address any environmental management deficiencies.

Nonconformance control must apply to containment measures, clean-up and restoration of the environment as well as rectification of deficient environmental protection measures.

If surveillance or an audit by the Principal indicates a nonconforming operational control or event which has not been addressed by a Nonconformance Report, the Principal may issue a 'Nonconformity Notification'. The Contractor shall deal with this nonconforming product or event in the same manner as if it had been identified by the Contractor.

The Contractor must review, analyse and record the cause of all detected nonconformances and develop corrective action to eliminate the cause of nonconformities. This must include both the determination of immediate action to prevent recurrence, as well as long term corrective action.

If surveillance or an audit by the Principal indicates that the CEMP does not comply with the provisions of the Contract or that an environmental risk is identified, the Principal may issue a 'Corrective Action Request'.

Rectify any nonconformance or environmental risk notified by the Principal, initiate and implement corrective/preventive action to prevent recurrence of the nonconformity or remove the identified environmental risk and return the completed Corrective Action Request, all within seven days after the Corrective Action Request is given to the Contractor.

The Corrective Action Request must be dealt with in accordance with the Contractor's procedure for handling customer complaints as required by Clause 4.10.

4 CONTRACTOR'S ENVIRONMENTAL MANAGEMENT PLAN (CEMP)

4.1 PREPARATION OF CEMP

4.1.1 Scope

Prepare the Contractor's Environmental Management Plan (CEMP) for the Works Under the Contract. The CEMP must cover the environmental protection practices, resources and sequence of activities required to comply with all the requirements of relevant environmental legislation, conditions of any applicable licence, approval and permit and this Specification.

The CEMP must include the following:

(a) assignment of responsibility for planning, approving, implementing, maintaining, assessing and monitoring of environmental controls (refer to Clause 4.2);

(b) copies of approvals, licences and permits to meet statutory requirements (refer to Clauses 6.2, 6.3);

(c) details of the potential environmental impacts and the operational control measures which are to be implemented to comply with statutory requirements and provide environmental protection in accordance with the requirements of the Contract (refer to Clause 6);

(d) details of how the environment will be protected for each subcontractor's activities (refer to Clause 4.6), including full details in accordance with (b) and (c) above;

(e) environmental monitoring programme and report forms for recording all monitoring activities, including periodic inspections and inspections essential for monitoring high risk events, of the adequacy of operational controls together with measurements for aspects where compliance limits have been specified;

(f) locations of environmental controls and environmentally sensitive areas, with particular reference to how the effectiveness of such controls will be ensured in any environmentally sensitive areas (refer to Clause 5);

(g) supplementary plans for environmental protection and operational control (including, if specified, Erosion and Sedimentation Control Plan, Soil and Water Management Plan, Noise Management Plan, Waste Management Plan, Vegetation Management Plan (see RTA G40), Contaminated Land Management Plan and a Vibration and Air Blast Management Plan;

(h) how nonconformance control, corrective and preventive actions will be implemented and closed out (refer to Clause 3)

(i) communication procedures (refer to Clause 4.3);

(j) emergency response procedures for containing environmental damage and procedures for planning restoration activities (refer to Clause 4.4);

(k) environmental training plan and procedures (refer to Clause 4.5);

(l) authorised personnel and procedure for changing and issuing the CEMP (refer to Clause 4.2);

(m) details of how the changes to the environmental management documentation and data are to be identified and communicated to relevant project personnel;

(n) mechanism for regular evaluation of environmental performance (refer to Clause 4.13); and

(o) environmental auditing programme (refer to Clause 4.14).

The CEMP must identify potential adverse environmental effects, applicable regulatory requirements and/or compliance limits for the physical, human and biological environment. Appropriate environmental protection measuresmust be documented to keep environmental effects within compliance limits and must show the person responsible for implementation in each case.

Three distinct phases of activity must be addressed, as appropriate:

(i) before construction and site establishment;

(ii) during construction; and

(iii) after construction (including rehabilitation activities and maintenance of erosion and sedimentation controls).

Detail any specific CEMP requirements, such as from the REF, EIS, Decision Report or Determination.

4.1.2 Submission of Documents to the Principal

The CEMP must be a "controlled" document and may be submitted progressively, if agreed with the Principal, to suit construction stages in accordance with the specified requirement in RTA Q for the submission of the PROJECT QUALITY PLAN.

HOLD POINT

Process Held.	Commencement of Work not previously addressed by CEMP documents and authorised by earlier Hold Point release.
Submission Details.	At least 10 working days prior to the proposed commencement of work nominated in the submission by the Contractor, the Contractor must submit its CEMP, addressing the issues listed in Clause 4.1 for the nominated work.
Release of Hold Point.	The Principal will consider the documents prior to authorising the release of the Hold Point for the nominated work. The Principal may release work covered by the CEMP progressively, consistent with the Contractor's programme for the Works.

The CEMP must be either incorporated as part of the PROJECT QUALITY PLAN (refer to RTA Q) or be consistent with the PROJECT QUALITY PLAN. Appropriate cross-referencing to the Contractor's quality management system and PROJECT QUALITY PLAN must be included.

Revise the CEMP and implement better environmental protection measures if the original protection measures prove to be not fully effective (refer to Clause 3).

Submit copies of the CEMP and environmental management documents as specified in RTA Q for quality system documentation.

Where submission to a statutory authority is nominated in Annexure G35/A or directed by the Principal, an additional copy of the CEMP at each stage, including any proposal for staged submission, for each of the nominated authorities must be submitted to the Principal. The staging of CEMP submissions must comply with the requirements of the nominated authorities. The submissions of the CEMP at each stage must contain sufficient information and detail explain the proposed environmental protection measures for the understanding of the nominated authority.

The CEMP must include a matrix or index which clearly shows where the environmental protection requirements of this Specification have been addressed in the submitted documents.

Detail any specific requirements, for submission of documents identified from the REF, EIS, Decision Report or Determination (eg.....).

4.2 RESOURCES

The CEMP must indicate the names, responsibilities and authority of the Contractor's site management personnel who have primary responsibility for implementing the CEMP for the Works Under the Contract, monitoring its effectiveness, rectifying any environmental deficiencies, controlling further construction activities until deficiencies are rectified and keeping the Contractor's environmental records. Provide a sufficient level of resources at the site to ensure effective environmental management throughout the duration of the Contract.

When the conditions of approval require a full time environmental officer, provide details of the requirements, addressing relevant specific requirements of the conditions, skills and training of the person to:
appreciate the environmental issues and proposed environmental measures of the project and monitor and audit environmental performance;
provide advice on environmental issues and improvements to environmental performance; and
liaise with EPA and the Principal on environmental issues.

Nominate a full time member of the Contractor's site management team to be the authorised contact person for communications with the Principal and the Environment Protection Authority (EPA) on environmental matters. This person must be fully conversant with the CEMP, operational controls, monitoring programme, complaints, pollution incidents, control of environmental nonconformances and environmental records and must promptly provide access to or copies of environmental records to the Principal as required.

Where the Contractor has established corporate responsibilities for environmental management, the relationship between the Contractor's site management personnel with environmental responsibility and the corporate environmental functions must be detailed in the CEMP.

Detail any specific requirements for resources, such as from the REF, EIS, Decision Report or Determination.

4.3 COMMUNICATION

Establish site communication, external communication and communication with subcontractors in relation to notification of environmental problems and pollution incidents. Maintain a current list of relevant contact names, telephone numbers and facsimile numbers for the project.

Detail any specific requirements for communication, such as from the REF, EIS, Decision Report or Determination.

4.4 EMERGENCY PLANNING AND RESPONSE

The CEMP must include details of:

(a) a list of the Contractor's key emergency response personnel showing responsibilities and contact details including all-hours telephone numbers;

(b) details of emergency services (eg. ambulance, fire brigade, spill clean-up services);

(c) communications strategy (internal and external) - (refer to Clause 4.3);

(d) details of containment measures to be taken in the event of emergency situations that may arise during the Work Under the Contract; and

(e) location on site of the register and information on hazardous materials (as defined in the Waste Minimisation and Management Act) including MSDS sheets.

Detail any specific requirements for emergency planning, such as from the REF, EIS, Decision Report or Determination.

4.5 TRAINING, AWARENESS AND COMPETENCE

Ensure that all staff and subcontractors working on the site are provided with environmental training to achieve a level of awareness and competence appropriate to their assigned activities before they commence their assigned activities. Persons, including subcontractors' personnel, without appropriate environmental training are not permitted to work on the site.

CEMP documents must include a site specific induction and training plan and induction and training procedures that describe the minimum level of training and/or qualifications staff and subcontractors working on site shall require, who is to be trained, when and how.

Induction training must include, when applicable:

(a) purpose, objectives and key issues of the CEMP;

(b) due diligence and duty of care;

(c) conditions of environmental licences, permits and approvals;

(d) environmental emergency plans;

(e) reporting process for environmental harm/incidents;

(f) key issues related to the CEMP and its sub-plans (such as the erosion and sedimentation control plan); and

(g) site specific issues such as boundaries for vegetation clearing, location of refuse bins, washing, refuelling and maintenance of vehicles, plant and equipment.

Train relevant employees to use the plant and materials on site efficiently and minimise all potential environmental impacts including noise, air and water quality, waste generation, minimisation and disposal, effluent control, management of contamination of land and groundwater and on the use of spill kits to contain any fuel or oil spills.

Establish and maintain a register of environmental training carried out including dates, names of persons trained and trainer details.

Detail any specific training requirements, such as from the REF, EIS, Decision Report or Determination.

4.6 SUBCONTRACTORS

When complying with the purchasing requirements of RTA Q, include environmental management requirements in the planning, selection and management of subcontractors.

When the Contract specifies RTA Prequalification for a subcontractor and the Prequalification level nominated includes environmental management requirements, the subcontractor must apply its RTA Accredited environmental management system for its construction activities.

Undertake appropriate monitoring of each subcontractor's environmental protection measures to ensure that the specified environmental protection requirements are effectively implemented and maintained. Refer to Clauses 4.13 and 4.14 when determining an appropriate level of monitoring.

For subcontracted work, include in the CEMP the processes the Contractor will implement to ensure subcontractor compliance, including details of:

(a) the duties of each subcontractor for planning, implementing and monitoring environmental protection measures and for keeping environmental records;

(b) the duties the Contractor will retain for environmental protection of subcontracted work;

(c) how environmental protection measures on subcontracted work interface with adjacent work areas, as applicable; and

(d) the Contractor's surveillance programme to monitor effectiveness of each subcontractor's environmental protection measures.

Detail any specific requirements for control of subcontractors, such as from the REF, EIS, Decision Report or Determination.

4.7 HOURS OF WORK

Any approval by the Principal (refer to Clause 32 of the Conditions of Contract) to extend working hours or working days (except for Saturday work between 8.00am - 1.00pm), shall be conditional on the Contractor completing relevant community consultation (see Clause 4.8), advising the EPA in writing (if this is a requirement of an Environment Protection Licence) then submitting a copy of the advice to the Principal (together with EPA's concurrence, where this is a condition of any consent by Planning NSW) at least 2 working days before the commencement of the extended period.

The CEMP must provide a mechanism for notifying the Principal and all relevant Authorities in advance of any proposed extension to hours of work. Take responsibility for ensuring that such changes in work hours comply with all licences, permits, approvals, consents and statutory requirements.

List any additional restrictions on working hours such as noise generating activities

Detail any specific requirements, such as from the REF, EIS, Decision Report or Determination.

4.8 COMMUNITY LIAISON

Notify local residents about new or changed construction activities which will affect access to their properties or otherwise significantly disrupt residents' use of their premises. Such notification must be made at least 5 working days before commencing work affecting residents and must advise the nature of the work, why it is necessary, indicate the expected duration plus any changes to

arrangements for traffic or property access. The name and contact telephone number of the Contractor's representative who can respond to resident concerns must also be provided to residents.

On each instance when approval to extend working hours is being sought, inform residents by letter of the extent, times and duration of the proposed work outside normal working hours prior to requesting approval from the EPA (where required) and the Principal. A contact name and telephone number must be included so residents can notify any concerns about altered working hours.

Any concerns raised by residents must be addressed in accordance with the complaints procedure in the CEMP.

Detail any specific requirements for community consultation, such as from the REF, EIS, Decision Report or Determination.

4.9 LIAISON WITH EPA

The CEMP must identify at least two (2) persons (and their contact telephone numbers) who will be available to the EPA on a 24-hour basis and who have authority to take immediate action to shut down any activity, or to effect any pollution control measure, as directed by an authorised officer of the EPA. The Contractor (if nominated in Annexure G35/A) or the licensee (if an Environmental Protection Licence is issued) must notify the EPA Regional Manager of these contacts.

Notify the EPA Regional Manager (or the EPA Pollution Line on telephone 131555 should the incident occur outside normal EPA business hours) of pollution incidents on or around the site which have occurred in the course of the Contractor's activities or during the Contractor's possession of the site (to comply with the POEO Act - refer to Clause 6.2), in the following circumstances:

a) if the actual or potential harm to the health or safety of human beings or ecosystems is not trivial,

b) if actual or potential loss or property damage (including clean-up costs) associated with a pollution incident exceeds $10,000.

Notify the Principal verbally within 2 hours and in writing within 24 hours of any pollution incidents which involve the EPA.

Prepare a report on each occasion when the site is visited by the EPA, notifying the Principal of the purpose and outcome of the EPA visit and of all actions being taken by the Contractor in response to the EPA visit. This report must be submitted to the Principal within 5 working days of the EPA site visit.

Detail any specific requirements for liaison with EPA, such as from the REF, EIS, Decision Report or Determination.

4.10 COMPLAINTS

Within one (1) working day of receiving a complaint about any environmental issue, including pollution, arising from the Work Under the Contract, supply a written report to the Principal detailing the complaint and the action taken to alleviate the problem. A final report with proposed measures to prevent the occurrence of a similar incident must be submitted to the Principal within 5 working days.

Keep a register of all such complaints, together with the following records:

(a) date, time and nature of complaint;

(b) type of communication (telephone, letter, meeting, etc);

(c) name, address, contact number of complainant;

(d) nature of complaint;

(e) action taken in response; and

(f) any monitoring to confirm that the complaint has been satisfactorily resolved.

Detail any specific requirements for responding to complaints, such as from the REF, EIS, Decision Report or Determination.

4.11 RECORDS OF ENVIRONMENTAL ACTIVITIES

Maintain (as part of the quality records in accordance with RTA Q Annexure Q/E) legible records of all environmental control issues and activities required under this Specification.

These records must be held for at least 5 years after the date of issue of the Final Certificate and be accessible to staff of the Principal and to authorised EPA officers.

Detail any specific record keeping requirements, such as from the REF, EIS, Decision Report or Determination.

4.12 CONSEQUENCES OF NONCOMPLIANCE

If the Contractor fails to comply with its environmental obligations under the Contract, including failure to:

(a) comply with, and to ensure compliance by subcontractors with, any requirements of the Specification; or

(b) act promptly when environmental controls are observed not to be effective by the Contractor, the Principal, or by any Statutory Authority having jurisdiction over the Works,

a Hold Point may apply.

HOLD POINT	(Where required by the Principal)
Process Held.	The Process/es relevant to the Noncompliance.
Submission Details.	Verification that the failure has been corrected and measures have been implemented to prevent recurrence.
Release of Hold Point.	The Principal will consider the submitted documents and may inspect the work subject to the failure prior to authorising the release of the Hold Point.

4.13 PROJECT ENVIRONMENTAL PERFORMANCE

Develop and implement a risk-based performance evaluation program to verify that Work Under the Contract is in compliance with RTA G35. Refer to the RTA Audit Pack for guidance. This program must be documented and records kept. Evaluated the effectiveness of the Contractor's environmental protection measures for compliance during the Contract, at least once per month. The minimum frequency for performance evaluation may be reduced by the Principal when the Contractor submits a risk based review and evidence of consistent compliance. Keep detailed records of the environmental performance evaluations and provide a summary report of the evaluations at intervals of six months or when requested by the Principal.

Detail any specific environmental performance requirements, such as from the REF, EIS, Decision Report or Determination.

4.14 ENVIRONMENTAL AUDITING

4.14.1 Audits During Construction

Develop and implement a risk-based auditing program to verify that work under the contract is in compliance with RTA G36. This program must be documented and records kept.

The first audit must be scheduled within the first three months from the commencement of work on site and then at least every six months. The Principal may require more frequent auditing if environmental performance evaluations (refer to Clause 4.13) indicate significant deficiencies with the Contractor's environmental management of the site. Keep detailed records of these audits and the audit reports.

4.14.2 Concluding Audit

Carry out an environmental compliance audit

(a) on completing site works for each Milestone; and

(b) on completing the whole of the Works Temporary Works,

including:

(i) site inspection;

(ii) full review of environmental records;

(iii) identification of any environmental protection measures (refer to Clause 4.1) that have not yet been finalised;

(iv) the condition of existing environmental protection controls must be recorded; and

(v) environmental protection controls which need ongoing management must be itemised.

An audit report, attaching verification that environmental protection measures identified in (iii) above have been implemented, must be submitted to the Principal at least 5 working days prior to the relevant Contractual Completion Date

5 ENVIRONMENTALLY SENSITIVE AREAS

Pay particular attention to ensuring that environmental protection measures are effective in any environmentally sensitive areas identified by the Principal or detected during the progress of the Contract.

The Principal has identified the following environmentally sensitive areas:
List significant items identified in REF or EIS and include construction related problems/risks.
Delete this paragraph if there are no significant items.

6 ENVIRONMENTAL PROTECTION REQUIREMENTS

6.1 GENERAL

Comply with all the environmental protection requirements specified in Clause 6. These are minimum requirements. The documents listed in Annexure G35/A are available on request and for the Contractor's information only; they do not form part of the Contract.

Ascertain any additional environmental protection requirements resulting from the Contractor's operations and incorporate these additional requirements in the CEMP.

Particular measures to protect the environment which are specified may, with the Principal's approval, be substituted by measures which achieve the same environmental result but which are superior in terms of cost or operational efficiency.

6.2 LEGISLATION

The CEMP must identify the Contractor's obligations under environmental legislation which is relevant to the Work Under the Contract including those listed in Annexure G35/M (as amended): (References to Acts includes any amendments to Acts together with a reference to Regulations made under them.)

6.3 APPROVALS, LICENCES AND PERMITS

The following approvals, licences and permits will be obtained by the Principal:

List any or insert NIL. NOTE: The Principal should only apply for an EPA Licence when authorised by the Director, Client Services.

Ascertain from the appropriate authorities what other approvals, licences and permits are required for the Work Under the Contract.

Each necessary approval, licence and permit not obtained by the Principal must be obtained by the Contractor prior to the commencement of any work which relates to that approval, licence or permit. This constitutes a HOLD POINT in accordance with Clause 4.1.

Comply with the terms and conditions of all approvals, licences and permits.

6.4 ACCESS AND TRAFFIC MANAGEMENT, SITE FACILITIES

Identify construction activities and site access requirements which are likely to:

(a) interfere with traffic flow and pedestrian thoroughfare through and adjacent to the site; and/or

(b) interfere with access to nearby properties.

Plan and implement traffic control measures in accordance with RTA G10 to minimise disruption to traffic and pedestrians.

Locate the Contractor's site facilities (refer RTA G2 or RTA G5) to minimise impacts on the environment and the community.

6.5 SOIL AND WATER MANAGEMENT

6.5.1 Erosion and Sedimentation Control

Plan and carry out the whole of the Work Under the Contract to avoid erosion and sedimentation of the site, surrounding country, watercourses, waterbodies, wetlands and stormwater drainage systems (refer to RTA G38 or RTA G39). This must include careful location of site compounds (refer to RTA G2), access tracks, stockpile sites and temporary work areas plus staging of work to minimise the extent and duration of disturbance to vegetation.

All water quality compliance limits as detailed in the REF, Decision Report or EPA approval are to be inserted in G38
Insert any other specific erosion/sedimentation control measures into G38 or G39

6.5.2 Water Extraction

The proposed water source(s) which the Contractor intends to use for construction activities (such as dust control, earthworks/pavement compaction, on-site concrete batching and the like) and any required approvals shall be identified in the CEMP.

Detail any specific water extraction requirements, such as from the REF, EIS, Decision Report or Determination or through negotiations with DIPN,R, water authorities or landowners.

6.6 AIR QUALITY

Comply with the requirements of the POEO Act and all other relevant laws and by-laws in force from time to time in the State of New South Wales.

Ensure that all its construction facilities erected on the site of the Works are designed and operated to minimise the emission of smoke, dust, cement dust, pesticides, herbicides and other substances into the atmosphere. Comply with any conditions of licences or approvals in relation to maximum air pollutant levels (refer to Clause 6.3).

Insert any specific air quality compliance limits as detailed in the REF, Decision Report or EPA approval

Where monitoring is required, the monitoring must comply with the EPA Approved Methods for Sampling and Analysis of Air Pollutants in NSW.

Employ construction methods that will keep the air pollution to a minimum and apply appropriate measures to ensure that airborne pollutants from the Contractor's and subcontractors' activities do not cause undue disruption or inconvenience in the vicinity of the Works.

Measures, for example, may include:

(a) the spraying of earthwork formations and roads with water or other suitable liquids approved by the Principal;

(b) the removal of mud from the wheels and bodies of haulage equipment before it enters public roads or other sealed pavements by means of facilities such as truck washdowns and wheel washes;

(c) the removal of mud spilt by construction equipment on to public roads or other sealed pavements;

(d) the establishment of suitable cover crop or provision of other covering over topsoil stockpiles;

(e) the erection of dust screens around and/or spraying of stockpiles with suitable stabilising agents;

(f) cease dust generating activities which cannot be adequately controlled by water or other means;

(g) maintaining dust control equipment so that this equipment is available when required including periods of dust generating activities or high wind speed, and

(h) maintaining exhaust systems of construction plant, vehicles and machinery in accordance with manufacturer specifications, and undertaking periodic visual checks of exhaust systems emissions.

The materials and methods used for effective dust control, including the recording and monitoring arrangements, must be detailed in the CEMP.

6.7 NOISE CONTROL

When developing and implementing management strategies, the Contractor must make all practical efforts to comply with the requirements of the POEO Act, and, where applicable, the EPA Noise Control Manual, EPA Industrial Noise policy, EPA Environmental Criteria for Road Traffic Noise and the RTA Environmental Noise Management Manual..

Insert all noise compliance limits as detailed in the REF, Decision Report or EPA approval

Prepare a Noise Management Plan as part of the CEMP to show how construction will be carried out to minimise the impact of noise from the Contractor's operations on adjacent properties. This could include operational controls such as:

(i) substitution by an alternative process

(ii) restricting times when noisy work is carried out

(iii) placement of work compounds, parking areas, equipment and material stockpile sites away from noise-sensitive locations

(iv) where noise barriers/walls are to be constructed, program this as early as possible to reduce noise impacts from other construction work on neighbouring residents

(v) screening or enclosures

(vi) consultation with affected residents

The Noise Management Plan must cover all significant noise generating activities.

HOLD POINT

Process Held.	Offending process producing noise at adjacent property above specified noise levels.
Submission Details.	Nonconformance Report and Revised Noise Management Plan.
Release of Hold Point.	The Principal will consider the submitted documents prior to authorising the release of the Hold Point.

All construction plant and equipment used on the Works must, in addition to other requirements, be:

(a) fitted with properly maintained noise suppression devices in accordance with the manufacturer's recommendations;

(b) maintained in an efficient condition; and

(c) operated in a proper and efficient manner.

6.8 GROUND VIBRATION AND AIR BLAST

The Contractor must take due care in all construction activities to prevent damage to adjacent public utilities, structures and buildings resulting from construction vibration and air blast. To protect the amenity of the occupiers of buildings the blasting activities must be carried out to meet the ANZECC Guidelines "*Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Over pressure and Ground Vibration - September 1990*". Where the amenity guidelines are likely to be exceeded, the Contractor must manage the impacts in consultation with, and in accordance with, the requirements stipulated by the EPA.

The contractor must meet the requirements of Chapter 174 "Vibration in Buildings" of the EPA Noise Control Manual. Where the requirements of Chapter 174 are likely to be exceeded, the Contractor must manage the impacts in consultation with, and in accordance with, the requirements stipulated by the EPA.

To avoid structural damage, the activities must be carried out to meet the requirements of BS 7385.

Detail any specific ground vibration and/or air blast requirements, such as from the REF, EIS, Decision Report or Determination. Alternatively insert such requirements in the Earthworks Specification and insert a cross reference in G35 6.8.

Where construction activities including blasting, pile driving, excavation by hammering or ripping, dynamic compaction or demolition of structures may cause damage through vibration or air blast to nearby public utilities, structures, buildings and their contents or if the items are located within the distance from the construction activity as specified in Annexure G35/E, a Building Condition Inspection of these items must be undertaken.

A written report of the Building Condition Inspection supported by photographs, details of the expertise of the inspectors, together with a list of any existing defects in the items, must be submitted to the owner of each item and to the Principal before the construction activity commences.

The Contractor must prepare a Vibration and Air Blast Management Plan as part of the CEMP to show how construction will be carried out to minimise the impacts from the Contractor's operations on adjacent properties. This could include operational controls such as:

(a) substitution by an alternative process

(b) restricting times when work is carried out

(c) screening or enclosures

(d) consultations with affected residents

The Vibration and Air Blast Management Plan must detail how construction vibration and air blast will be managed for various plant items working adjacent to buildings. Records must be kept as evidence of compliance with these construction vibration and air blast restrictions.

HOLD POINT

Process Held.	Commencement of blasting, pile driving, excavation by hammering or ripping, dynamic compaction or demolition operations or other activities which may cause damage through vibration or air blast.
Submission Details.	Copy of Building Condition Inspection.
Release of Hold Point.	The Principal will consider the submitted documents prior to authorising the release of the Hold Point.

Notwithstanding the above, the Contractor must be liable for any accident or damage to any property, person, or thing resulting from vibration and air blast from construction activity.

6.9 VEGETATION

The Contractor must preserve existing trees, plants, and other vegetation that are to remain within or adjacent to the Works and must use every precaution necessary to prevent damage or injury thereto (refer to RTA G40). The Contractor must include in the CEMP, and then implement, procedures for monitoring clearing and grubbing operations to ensure that trees and other vegetation are not unnecessarily cleared or otherwise disturbed.

Clearing, lopping or trimming of vegetation must occur without the required approvals under the Native Vegetation Conservation Act 1997 (NSW), Environmental Planning and Assessment Act 1979 (NSW), Threatened Species Conservation Act 1995 (NSW), and Environmental Protection and Biodiversity Conservation Act 1999 (Cth).

Detail any specific requirements for preservation of vegetation, such as from the REF, EIS, Decision Report or Determination. Alternatively insert such requirements in the RTA G40 and insert a cross reference in G35 6.9.

Procedures for controlling the spreading or introduction of weeds caused by works under the Contract, including the monitoring arrangements, must be included in the CEMP.

Example: List or cross-refer to specific topsoil management requirements

The reuse of weed contaminated topsoil by surface spreading is not permitted. Where necessary, horticultural advice must be sought to determine whether the type and/or proportion of weed cover is significant for the topsoil to be deemed weed contaminated.

The Contractor must ensure that all site personnel observe the limits of clearing and are made aware of the importance of any trees of significant value.

6.10 FAUNA

Include habitat conservation measures in the CEMP.

All native wildlife must be protected. No firearms will be allowed on site except for security purposes permitted by law.

Where the Contractor proposes to remove vegetation during the nesting and breeding season, all trees to be removed must first be inspected to establish whether nesting of native fauna is evident. If so, advice must be sought from an ecologist on whether disturbance of fauna is feasible. Disturbance of fauna must only proceed under the guidance of an ecologist and with the concurrence of NPWS where threatened species occur.

Example: (modify to suit any conditions of consent or delete if not applicable)

The following protected wildlife has been identified on, and in the vicinity of, the site: (list any from REF)

Tree hollows affected by clearing (refer to RTA G40) must be relocated to suitable undisturbed bushland sites within the Bypass corridor.

Winding Creek is designated as a wildlife corridor. The Contractor must conduct its operations to minimise any disturbance to fauna in the vicinity of Winding Creek and must erect suitable fencing to assist with "funnelling" fauna towards Winding Creek.

Injury to protected wildlife caused through or because of any construction activity must be reported by the Contractor to NPWS

The Contractor shall keep WIRES and NPWS contact details on site, and contact these organisations in the event of injury to fauna.

6.11 FIRE PRECAUTIONS

6.11.1 General

At all times comply with the requirements of the Rural Fires Act, 1997 and the Local Government Act, 1993 and be guided by the NSW rural Fire Service publication Equipment and Machinery Use in Bush fire Prone Areas.

The Contractor is be responsible for any damage to fences, trees, grass, cultivation, buildings or other property caused by fires lit, whether intentionally or not, for any purpose in connection with the Work Under the Contract.

Ensure fire fighting equipment is provided, as required, to ensure the safety of public and property.

All items of plant used during proclaimed high fire danger periods that could discharge sparks must be fitted with spark arresters. No cutting, welding, grinding or other activities likely to generate fires must be undertaken in the open on "total fire ban" days.

When there is a risk of fire being caused by "hot work" (such as welding, thermal or oxygen cutting, heating or other fire producing or spark producing operations) or when burning off is proposed, ensure that all personnel are adequately trained with regard to fire prevention, safety and basic fire fighting skills. All such personnel and vehicles involved in such activities shall be adequately equipped with fire fighting equipment and safety gear.

Detail any specific requirements to minimise the risk of fires, such as from the REF, EIS, Decision Report or Determination.

6.11.2 Burning Off

Annexure G35/A indicates whether the Principal will allow disposal of cleared and grubbed vegetation by burning off, subject to the requirements of the Protection of the Environment Operations (Control of Burning) Regulation 2000.

Where burning off is planned, obtain a fire permit from the relevant Statutory Authorities and comply with the requirements of the Statutory Regulations and be guided by the EPA guideline Regulation of Open Burning in NSW.

On receipt of a fire permit, the Contractor must notify the Principal and occupiers of adjoining properties of the proposed burning off operation at least twenty four (24) hours before burning off is commenced. The burning off operation must be controlled so that:

(a) vegetation outside the limits of clearing is not damaged;

(b) fences, buildings or other property is not damaged; and

(c) smoke does not cause a traffic hazard, nuisance nor contravene air quality requirements.

Detail any specific requirements for burning off, such as from the REF, EIS, Decision Report or Determination.

HOLD POINT

Process Held.	Commencement of burning operations.
Submission Details.	Proposals for burning off and the relevant fire permit..
Release of Hold Point.	The Principal will consider the submitted documents prior to authorising the release of the Hold Point.

6.12 CHEMICALS, DANGEROUS GOODS AND OTHER POTENTIAL CONTAMINANTS

Plan and execute the Work Under the Contract so as to minimise the possibility of pollution of areas adjoining the construction area from chemicals, dangerous goods and other potential contaminants.

The use and storage of chemicals and dangerous goods must be strictly in accordance with all relevant legislation, manufacturer's instructions and the relevant Materials Safety Data Sheets (MSDS). Transporting, handling, storage and application methods that will prevent chemical, fuel and lubricant spillage on or around the site caused by construction activity must be employed. Polluting or permitting pollution of land or waterways by a chemical, fuel or lubricant, or any waste material or imported fill is not permitted.

6.12.1 Spillage Prevention and Containment

Refuelling or maintenance of plant and equipment, mixing of cutting oil with bitumen, or any other activity which may result in the spillage of a chemical, fuel or lubricant on any location with direct drainage to a waterway or environmentally sensitive areas is not permitted without appropriate temporary bunding being provided. Refuelling operations must not be left unattended while in progress. Adequate quantities of suitable material to counteract spillage must be kept readily available.

Bunding and spill management must be undertaken according to requirements within:

(a) Relevant legislation and Australian Standards.

(b) EPA's Bunding and Spill Management Guidelines contained within the EPA Environmental Protection Manual for Authorised Officers.

(c) RTA Code of Practice for Water Management, 1999.

Chemical, fuel and lubricant storage areas must be suitably located and protected to minimise the impact of any spillage or contamination on or around the site. Storage areas must not be located within 20 metres of natural or built drainage lines, flood prone areas, or on slopes steeper than 1:10,

or near vegetated areas. Impervious bunds of sufficient capacity to contain at least 120% of the stored chemical, fuel and lubricant volume, must be constructed around all chemical, fuel and lubricant storage areas. Detail in the CEMP how bunded areas will be monitored and drained to meet environmental requirements and to ensure bund capacity is maintained.

Where it is essential to remove chemical drums from bunded areas, they must not be left unattended. Where this is not practical, the unbunded and unattended drums must be managed to minimise the risk of spillage and must only be for use on that day, and a procedure must be implemented for both safe overnight storage and removal to bunded areas when conditions change creating a risk to the environment. Drums used as markers must not contain chemicals or fuels.

HOLD POINT

Process Held.	On-site storage of chemicals, fuels and lubricants requiring additional bunding.
Submission Details.	A report detailing completion of the required bunds (including aspects such as chemicals to be stored, location and bunding details) 10 working days prior to commencement of storage of chemicals on site and also confirming that the bunded areas meet all specified requirements.
Release of Hold Point.	The Principal will consider the submitted report prior to authorising the release of the Hold Point.

Before discharging any water from bunded areas, the Contractor must verify that the water complies with any applicable legislation or water quality criteria nominated by the EPA (refer to Clause 6.5). Arrange appropriate treatment if the water quality is not suitable for discharge.

Keep records of all water quality checks, discharges and any remedial actions.

Do not store any chemicals outside the works without the approval of the Principal.

Procedures for controlling and removing chemical, fuel and lubricant spillage on or around the site caused by works under the Contract must be included in the CEMP. These procedures must cover, at a minimum, the following activities if applicable to Work Under the Contract:

(a) refuelling or maintenance/cleaning of plant and equipment including concrete agitators, bitumen spraybars and asphalt pavers;

(b) on-site batching of concrete or asphalt;

(c) mixing of cutting oil and additives with bitumen;

(d) application of liquid membranes, including paint and thermoplastic, resin, emulsion, precoat agent and curing compound;

(e) bulk fuel or chemical deliveries;

(f) removal and disposal of excess chemicals and equipment washdown wastewater in an environmentally sound manner with adequate capture and treatment controls to ensure pollution does not occur;

(g) pumping out of oil and grease collection pits well before overflow is likely and residual material disposed of in accordance with regulatory requirements;

(h) decanting operations such as for fuel, chemicals or bitumen;

(i) routine checking of machinery, pumps and other equipment for leaks and prompt cleanup and repair of leakages;

(j) adequate runoff controls for the capture and filtering of all chemicals that may runoff in storms, including wax and hydrocarbon curing compounds, bitumen tack and saw cutting material, including primary and secondary controls;

(k) provision of adequate pits in number and size for concrete disposal (where no reuse options exist) and concrete washdown must be provided in non-environmentally sensitive areas; and

(l) adequate quantities of suitable materials and equipment to counteract spillage must be kept readily available. All chemical spills must be promptly cleaned up.

6.12.2 Pesticides

Pesticides must be used in accordance with the Pesticides Act, 1999, other relevant legislation, label directions and any relevant industry codes of practice. Records must be completed within 24 hours of applying the pesticide and a copy submitted to the Principal. The Sample Pesticides Application Records Sheet may be used for guidance when preparing pesticide application records. The Contractor is exempt from completing this Record Sheet where all of the following are satisfied:

(a) The pesticide is only applied by hand or by using hand-held equipment; and

(b) If applied outdoors on any one occasion is no more than 5 litres/ 5 kilograms of concentrated product or 20 litres/ 20 kilograms of the ready-to-use product, or if applied indoors in quantities of no more than 1 litre/ 1 kilogram of concentrated product or 5 litres/ 5 kilograms of the ready-to-use product.

SAMPLE PESTICIDES APPLICATION RECORD SHEET		
Information to be Recorded	**Brief Description**	**Enter Data Here**
1. Date and time	Start Date and Time: Finish Date and Time:	
2. Who applied the pesticide	Full operator name: Operator contact address: Operator contact phone:	
3. Who owns/occupies the land	Full owner/occupier's name: Owner/occupier's contact address: Owner/occupier's contact phone:	
4. Boundaries of treated area and order of treatment	List treated areas and order of treatment, preferably with reference to a map: List order of treatment:	
5. Problem treated	Identify the pest or problem treated (eg controlling of spot weed infestation):	
6. Product used	Record either the full name, or a product code if a list of full product names of pesticides you use is kept at the front of your logbook:	
7. Equipment used	Describe the equipment used (eg boom-spray, hand-held backpack sprayer etc.):	
8. Quantity applied and dilution	Total amount of pesticide product mix used: Write down whether the mix was concentrated product or a diluted mixture (note down rate of dilution):	
9. Area covered by application	Area of application (in square metres or hectares):	
10. Wind speed and direction	Estimate of wind speed and direction (only if the pesticide is applied through the air): Write down any changes in weather during application:	
11. Other weather details	Record any weather details such as temperature, humidity and/or rainfall where the pesticide product label requires you to assess these:	

All personnel managing and using pesticides must receive appropriate training prior to commencing work. Only pesticides registered for use near water may be used near water.

Avoid applying pesticides:

(i) on hot days when plants are stressed;

(ii) after seed has set;

(iii) within 24 hours of rain or when rain is imminent

(iv) when winds will cause drift into non-target areas.

Detail specific requirements for chemical storage, handling, transporting and pollution control procedures.

List any other specific EIS, REF, Decision Report or Determination requirements:

6.13 INDIGENOUS HERITAGE

Should any relic, artefact or material (including skeletal remains) suspected of being of Aboriginal origin be encountered, the Contractor must cease all construction work that might affect the relic, artefact or material and protect the relic, artefact or material from damage or disturbance. The Contractor must notify the Principal immediately, who will then arrange for an officer of the National Parks and Wildlife Service and a member of the appropriate Local Aboriginal Land Council to be consulted.

Ensure that all personnel working on site have received training regarding their responsibilities under the National Parks and Wildlife Act and are made aware of any relevant sites/areas (identified in the EIS/REF) which must be avoided.

Detail specific requirements, such as from the REF, EIS, Decision Report or Determination.

Example: Protect the aboriginal cave site and surroundings located on the banks of Shark River approximately 50 m upstream of the bridge site from construction related activities.

This is to include the provision of a man-proof fence located as shown on the Drawings and constructed in accordance with the provisions of RTA R161.

The fencing must be paid for in accordance with RTA R161.

6.14 NON-INDIGENOUS HERITAGE

Should any item be encountered which is suspected to be a relic of heritage value, the Contractor must cease all construction work that might affect the item and protect the item from damage or disturbance. The Contractor must notify the Principal immediately, who will then arrange for an officer from the Heritage Office to be consulted.

Under the Heritage Act 1977, 'relic' means any deposit, object or material evidence:

(a) which relates to the settlement of the area that comprises NSW, not being aboriginal settlement; and

(b) which is 50 or more years old.

Ensure that all personnel working on site have received training regarding their responsibilities under the Heritage Act and are made aware of any relevant sites/areas (identified in the EIS/REF) which must be avoided. Such sites/areas must be identified on a site map, to be made available to all relevant personnel during the works.

Detail any specific requirements for non-indigenous heritage such as from the REF, EIS, Decision Report or Determination.

6.15 CONTAMINATED LAND

Detail any known areas of potential contaminated ground, such as from the REF, EIS, Decision Report or Determination.

Contaminated land may have associated contaminated groundwater. Disturbance of contaminated soils and/or groundwater may also result in the release of contaminated surface waters.

Promptly notify the Principal of any suspected or potentially contaminated ground exposed during construction activities. Implement any control measures needed to divert surface runoff away from contaminated ground and to capture and manage any surface runoff contaminated by exposure to contaminated ground.

The Contractor must comply with the Contaminated Land Management Act and EPA Guidelines made under it in relation to disturbance or treatment of potentially contaminated ground.

Prepare a Contaminated Land Management Plan for any areas identified as contaminated ground or any ground contamination caused by the Contractor as part of the CEMP that details the processes to:

(a) protect the environment by taking control measures to divert surface runoff away from the potentially contaminated ground

(b) capture and manage any surface runoff contaminated by exposure to the contaminated ground

(c) investigate the contamination to determine the concentration and type of contaminants and the extent of contamination

(d) assess the requirements to notify the EPA

(e) manage the remediation and validation of the contaminated area, including any certification required.

HOLD POINT

Process Held.	Activities within the vicinity of actual or suspected contaminated ground.
Submission Details.	Notification to Principal of actual or suspected contaminated ground exposed during construction activities and a Contaminated Land Management Plan.
Release of Hold Point.	The Principal will consider the submitted documents prior to authorising the release of the Hold Point.

6.16 WASTE MANAGEMENT

The CEMP must include a Waste Management Plan. The Contractor must be guided by the following publications when preparing the Waste Management Plan:

(a) Green Waste Action Plan and Construction and Demolition Waste Action Plan;

(b) Environmental Guidelines: Assessment, Classification and Management of Liquid and Non Liquid Wastes;

(c) NSW Government's Waste Reduction and Purchasing Policy;

The Waste Management Plan must:

(i) identify the major waste streams that will be generated during execution of the Contract including: green waste; construction waste including spoil, asphalt, concrete and metal; demolition waste; office waste including paper and toner cartridges and sewage effluent;

(ii) detail for each of the identified waste streams:

  (A) the waste classification (refer to the EPA's Environmental Guidelines: Assessment, Classification & Management of Liquid & Non-Liquid Wastes);

  (B) how and where the waste is to be reused, recycled, stockpiled or disposed;

  (C) the receptacles that will be used for storing identified waste materials prior to reuse, recycling, stockpiling or disposal; and

  (D) how and who will transport the waste between generation, storage and point of reuse, recycling, stockpiling or disposal;

(iii) methods for monitoring the implementation of the Waste Management Plan; and

(iv) comply with the requirements of the POEO Act for any non-licensed as well as licensed waste activities that involve the generation, storage and/or disposal of waste.

Detail any specific waste management requirements, such as from the REF, EIS, Decision Report or Determination..

Maintain records to demonstrate that all surplus materials are recycled, reused or disposed of in accordance with statutory requirements. Ensure that all subcontract agreements contain this requirement.

Waste information that is reportable under the NSW Government Waste Reduction and Purchasing Policy must be reported as detailed within Annexure G35/F by 31 July for each financial year and at project completion.

Ensure that all effluent from the amenities for which the Contractor is responsible must be discharged into the local sewerage system, where available. Otherwise, septic tanks and portable self-contained toilets of suitable capacity may be used subject to acceptable arrangements for disposal of the effluent. Pit toilets are not permitted.

Do not litter or dump or dispose of unwanted waste or dispose of surplus construction materials including bitumen, asphalt or concrete, or permit such activities on any land on or around the site, unless specifically permitted in the Specifications.

Comply with the POEO Act requirements not to cause actual or potential harm to the environment when: disposing of and transporting surplus materials, including excavated materials. Dispose to a place that can lawfully accept the waste.

Provide appropriate receptacles for depositing of litter and other waste materials, and dispose of their contents off site at a suitable waste disposal station on a regular basis. The disposal of chemical, fuel and lubricant containers, solid and liquid wastes must be in accordance with the requirements of the local Council or the EPA.

6.17 RESTORATION OF SITE

Reinstate all areas disturbed by the Contractor's construction operations. Restoration must include remedying of any ground contaminated by incidents such as oil or fuel spills (particularly in fuel storage areas), appropriate revegetation (refer to Clause 6.9) and any other measures to restore the land to a condition at least similar to the existing condition before disturbance.

On completion of the Works, all areas disturbed by the Contractor's construction activities (such as areas for compounds, material storage, access and haul roads and the provision of the Principal's accommodation) must be restored to conditions similar to their original condition. Restoration must include ripping, topsoiling of the area, weed control and seeding, planting, watering and maintenance. If RTA R178 is included in the Contract, areas disturbed by the Contractor's activities must be restored in accordance with RTA R178.

6.18 MATERIALS WITH RECYCLED CONTENT

Propose materials and products with recycled content wherever these are cost- and performance-competitive, and they are environmentally preferable to the non-recycled alternative.

HOLD POINT

Process Held.	Use of a specific material with recycled content not specified in the Contract, within the Works, in the manner proposed.
Submission Details.	Proposed type of material, quantities, and planned application areas, the cost savings to the Principal, verification that the materials conform to the Contract and verification that the single or repeated use of the materials in the manner proposed will not result in immediate, delayed or cumulative damage to the local environment.
Release of Hold Point.	The Principal will examine details prior to authorising the release of the Hold Point. The Principal is not bound to accept the proposal.

Detail any specific requirements for the use of materials with recycled content within the Works, or other specific requirements, such as from the REF, EIS, Decision Report or Determination.

For example: The Contractor must include in the Waste Management Plan the percentage of reused, recycled or substituted materials as detailed in the following specifications:

3051	*Unbound and Modified Base and Subbase Materials for Surfaced Road Pavements*
3052	*Material to be Bound (MTBB) for Base and Sub-Base Materials for Surfaced Road Pavements*
3252	*Polymer Modified Binder*
3256	*Comminuted Scrap Rubber*
3151	*Cover Aggregate for Sprayed Bituminous Surfacing*
R116	*Asphalt (Dense Graded and Open Graded)*
R84	*Continuously Reinforced Concrete Base*

This list may be augmented as appropriate to incorporate any specifications that allow the reuse, recycling or substitution of materials.

7 PRINCIPAL'S SURVEILLANCE AND AUDITS

Environmental management audits by the Principal may be conducted on a scheduled basis on all aspects of the CEMP and will be performed in accordance with recognised audit procedures.

The Principal shall give the Contractor at least five days notice that an environmental management audit is to be conducted and shall advise the scope of this audit.

Surveillance and process audits by the Principal may be conducted at any time.

The Principal may authorise environmental specialists as agents of the Principal to enter the site for the purposes of inspection and liaison with the Principal and to attend appropriately convened site meetings to discuss aspects of the work.

If surveillance or an audit indicates a significant nonconformance of environmental requirements, the Principal shall be entitled to conduct an environmental management audit at twenty four hours notice to the Contractor.

The Contractor must make available at the site suitable facilities to accommodate an audit team of three persons. The cost of providing such facilities must be borne by the Contractor.

Detail any specific requirements, such as from the REF, EIS, Decision Report or Determination.

ANNEXURE G35/A - SUPPLEMENTARY PROJECT INFORMATION

CLAUSE	DETAILS	
4.1	Submission of the CEMP to the Principal is required for forwarding to: *[insert (as applicable)]:* *(a) Department of Urban Affairs and Planning* *(b) Environmental Protection Authority* *(c) [ ]*	 *Yes* *Yes* *[Yes]*
4.9	Notification to EPA Regional Manager is required of at least two (2) persons (and their contact telephone numbers) who will be available to the EPA on a 24-hour basis.	*Yes/No*
6.1	Documents relevant to Environmental Protection: (NOTE: These documents are available on request and are for information only, they do not form part of the Contract.) *[insert (as applicable) REF, EIS, Environmental Impact Assessment Report, Determination of the Chief Executive, Decision Report, Conditions of Approval, Project EMP, any other relevant documents]*	
6.11.2	Disposal of cleared and grubbed vegetation by burning off is conditionally allowed by the Principal	Yes/No

ANNEXURE G35/B - MEASUREMENT AND PAYMENT

Refer to Clause 1.2.2.

Except where specific pay items are provided, all costs associated with environmental protection shall be deemed to be included in the rates and prices generally for the work under the Contract.

Measurement for payment defined in other specifications shall, unless otherwise stated in RTA G35, exclude works which are only carried out to comply with RTA G35.

NOTES TO TENDER DOCUMENTER: (Delete this boxed text after drafting G35)

The documenter may include Pay Items for specific items such as monitoring of dust, monitoring of water quality, building condition inspections, etc

Example:

Pay Item G35 P1 - Building Condition Inspections

This is a provisional item.

Payment will be made for all activities associated with performing and reporting building condition inspections in accordance with G35 Clause 6.8. The unit of measurement is "each" building inspected.

Pay Item G35 P2 - Site Monitoring

Payment will be made for all activities associated with the measurement and provision of records associated with the site monitoring required under G35 Clauses 6.5 to 6.8 under the following items:

a) Air Pollution

b) Noise

c) Ground Vibration

Progress payments shall be made on a pro rata basis, having due regard to the duration of the Contract.

ANNEXURE G35/C - SCHEDULES OF HOLD POINTS AND IDENTIFIED RECORDS

Refer to Clause 1.2.3

C1 SCHEDULE OF HOLD POINTS

CLAUSE	DESCRIPTION
4.1	Submission of CEMP
4.12	Failure to comply with environmental requirements
6.3	Environmental Protection Licences
6.7	Noise levels above specified limits
6.8	Building Condition Inspections
6.11.2	Proposal for burning off.
6.12	On-site storage of chemicals requiring additional bunding
6.15	Suspected or potentially contaminated ground
6.18	New Application for Materials with Recycled Content

C2 (RESERVED)

C3 SCHEDULE OF IDENTIFIED RECORDS

Clause	Description of the Identified Record
4.1	CONTRACTOR'S ENVIRONMENTAL MANAGEMENT PLAN (CEMP), supplementary plans and procedures
4.9	The report on each occasion when the site is visited by the EPA.
4.10	The reports on complaints about any environmental issue and actions.
4.13	The summary report of the risk-based performance evaluations.
4.14.2	Post completion audit report.
6.7	Nonconformance reports.
6.8	Building Condition Inspection reports
6.12.2	Pesticides Application Records

ANNEXURE G35/D - (RESERVED)

ANNEXURE G35/E - DISTANCE FROM CONSTRUCTION ACTIVITY FOR BUILDING CONDITION INSPECTION

Refer to Clause 6.8.

The Contractor must carry out a Building Condition Inspection for each public utility, structure and building within the distance from the appropriate activity listed below, however, where the risk of damage to an item is assessed to be very low, the requirement for a Building Condition Inspection may be waived with the Principal's agreement.

ACTIVITY	DISTANCE
Blasting Operations	*(Eg. 500 metres)*
Pile Driving	*(Eg. 200 metres)*
Excavation by hammering or ripping	*(Eg. 100 metres)*
Vibrating Compaction > 7 tonne plant	*(Eg. 50 metres)*
Vibrating Compaction < 7 tonne plant	*(Eg. 25 metres)*
Demolition of Structures	*(Eg. 50 metres)*

***NOTES TO TENDER DOCUMENTER:** (Delete this boxed text after drafting G35)*

The documenter shall ascertain from the REF if any structures are potentially susceptible to damage from construction vibration or air blast and amend the distances in the table for actual site circumstances.

ANNEXURE G35/F – WASTE AVOIDANCE AND RESOURCE RECOVERY REPORTING

Refer to Clause 6.16.

F1 ANNUAL REPORT - MATERIAL PURCHASE DATA

Field	Material	Quantity Purchased (tonnes)	% Containing Recycled Content	% Estimated Recycled Content by mass *(for those materials containing recycled content)*	*Comments*
1	Fill/ VENM *				
2	Concrete				
3	Asphalt				
4	Aggregates				
5	Landscaping Materials				

Notes:

- ** VENM: Virgin excavated natural materials. Materials classified as "aggregates" (see below) must be excluded from this reporting category.*
- ***Aggregates** for the purpose of reporting, include rock and other hard materials (such as concrete, crushed stone or bricks) between 4.25 mm and 100 mm size.*
- ***Landscaping Materials** includes bark, chips, soil amenders, mulches and compost*
- ***Asphalt** includes pavement materials containing hydrocarbons.*
- *Where figures are only available in cubic metres, the EPA have requested that the following conversion factors be used to calculate tonnes: 2.3 for concrete; 2.0 for fill/ VENM; 1.65 for asphalt. and 1.5 for aggregates*
  Note: these factors are only to be used for material delivered to site)

F2 ANNUAL REPORT - WASTE AND RECYCLING DATA

Field	Material	Quantity of Waste Landfilled (tonnes)	Quantity of Material Recycled or Reused (tonnes)	Comments
6	Concrete			
7	Fill/ VENM *			
8	Asphalt			
9	Aggregates			
10	Vegetation Waste			

Notes:

- ** VENM: Virgin excavated natural materials. Materials classified as "aggregates" (see below) must be excluded from this reporting category.*
- ***Aggregates** for the purpose of reporting, include rock and other hard materials (such as concrete, crushed stone or bricks) between 4.25 mm and 100 mm size.*

- ***Quantity of Waste Landfilled*** *includes all materials disposed of to licensed landfills, or otherwise to land as waste with no intended environmental or engineering improvement to the application site.*
- ***Quantity of Material Recycled or Reused*** *includes all wastes that are not landfilled, and reuse or recycling of these materials is intended.*

Where figures are only available in cubic metres, the EPA have requested that the following conversion factors be used to calculate tonnes: 1.1 for concrete; 2.0 for fill/ VENM; 1.6 for asphalt and 1.5 for aggregates. (Note: these factors are only to be used for waste and recycling).

F3 ANNUAL REPORT - ADDITIONAL SUPPORTING INFORMATION

The following information is to be provided at the end of each financial year and on project completion

Field	Heading	Comments *(for financial year just completed)*
1	Initiatives *reducing waste generation* for: i) concrete ii) asphalt iii) fill/VENM iv) vegetation wastes v) aggregates during the year	▪ *list and briefly discuss initiatives*
2	Estimated amount of waste being avoided through these initiatives	▪ *estimates in tonnes.*
3	Initiatives for *reuse and recycling* of i) concrete ii) asphalt iii) fill/VENM iv) vegetation v) aggregates during the year	▪ *list and briefly discuss initiatives*
4	Barriers preventing reuse and recycling of i) concrete ii) asphalt iii) fill/VENM iv) vegetation v) aggregates during the year	▪ *list and briefly discuss barriers*
5	Initiatives to *increase the recycled content* of: i) concrete ii) asphalt iii) fill/VENM iv) landscaping materials v) aggregates	▪ *list and briefly discuss initiatives*
6	Barriers preventing increased recycled content of: i) concrete ii) asphalt iii) fill/VENM iv) landscaping materials v) aggregates	▪ *list and briefly discuss barriers*

Note:

- ***Reducing waste generation*** *means avoiding the generation of materials that need to be managed by recycling, reuse, storage or disposal.*

ANNEXURES G35/G TO G35/L - (RESERVED)

ANNEXURE G35/M - REFERENCED DOCUMENTS AND LEGISLATION

M1 REFERENCED DOCUMENTS

Refer to Clause 1.2.4.

Australian Standards

AS 1055	Acoustics – Description and measurement of environment noise
AS 3580	Methods of sampling and analysis of ambient air
ISO 14001	AS/NZS/ISO 14001, Environmental management systems - Specification with guidance for use
ISO 9000	AS/NZS ISO 9000, Quality management systems – Fundamentals and vocabulary

British Standards

BS 7385	Evaluation and measurement for vibration in buildings

RTA Specifications

RTA G2	General Requirements
RTA G10	Control of Traffic
RTA G22	Occupational Health and Safety (Major Works)
RTA G40	Clearing and Grubbing
RTA Q	Quality Management System
RTA R178	Vegetation

RTA Publications

Environmental Noise Management Manual

EPA Publications

Noise Control Manual
Green Waste Action Plan
Construction and Demolition Waste Action Plan
Industrial Noise Policy
Assessment, Classification and Management of Liquid and Non Liquid Wastes
Bunding and Spill Management
Approved Methods for Sampling and Analysis of Air Pollutants in NSW
Approved Methods for Sampling and Analysis of Water Pollutants in NSW
Regulation of Open Burning in NSW
Environmental Criteria for Road Traffic Noise

Department of Housing Publication

Managing Urban Stormwater: Soils and Construction

NSW Rural Fire Service Publication

Equipment and Machinery Use in Bush Fire Prone Areas

ANZECC Publications

Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Over pressure and Ground Vibration - September 1990

M2 LEGISLATION

Refer to Clauses 1.2.4 and 6.2.

Environmental Planning Legislation

Environmental Planning and Assessment Act, 1979 (NSW) (and instruments made under it)

Local Government Act, 1993 (NSW)

Roads Act, 1993 (NSW)

Soil Conservation Act, 1938 (NSW)

Native Vegetation Conservation Act, 1997 (NSW)

Environment Protection and Biodiversity Conservation Act, 1999 (Cth)

Land and Environment Court Act, 1979 (NSW)

Rivers and Foreshores Improvement Act, 1948 (NSW)

Conservation and Heritage Legislation

Dams Safety Act, 1978 (NSW)

Native Vegetation Conservation Act, 1997 (NSW)

Coastal Protection Act, 1979 (NSW)

National Parks and Wildlife Act, 1974 (NSW)

Threatened Species Conservation Act, 1995 (NSW)

Environment Protection and Biodiversity Conservation Act, 1999 (Cth)

Fisheries Management Act, 1994 (NSW)

Marine Pollution Act, 1987 (NSW)

Noxious Weeds Act, 1993 (NSW)

Rivers and Foreshores Improvement Act, 1948 (NSW)

Water Act, 1912 (NSW)

Water Management Act, 2000 (NSW)

Heritage Act, 1977 (NSW)

Wilderness Act, 1987 (NSW)

Plantations and Reafforestation Act, 1999 (NSW)

Australian Heritage Commission Act, 1975 (Cth)

Aboriginal and Torres Strait Islander Heritage Protection Act, 1984 (Cth)

Pollution and Waste Management Legislation

Ozone Protection Act, 1989 (NSW)

Protection of the Environment Operations Act, 1997 (NSW)

Sydney Water Act, 1994 (NSW)

Pesticides Act, 1999 (NSW)

Waste Avoidance and Resource Recovery Act, 2001 (NSW)

Contaminated Land Legislation

Contaminated Land Management Act, 1997 (NSW)

Unhealthy Building Land Act, 1990 (NSW)

Fire Control

Rural Fires Act, 1997 (NSW)

Hazardous Substances

Environmentally Hazardous Chemicals Act, 1985 (NSW)

Dangerous Goods Act, 1975 (NSW)

Road and Rail Transport (Dangerous Goods) Act, 1997 (NSW)

Radiation Control Act, 1990 (NSW)