



Hawkesbury City Council

Attachment to item 245

Pughs Lagoon and Smith Park
Draft Plan of Management, including
Landscape Master Plan

date of meeting: 25 November 2008

location: council chambers

time: 5:00 p.m.

Pughs Lagoon & Smith Park

RICHMOND



Draft Plan of Management

19 November 2008

prepared by

LandArc Pty Limited

Landscape, Environmental and Heritage Consultants

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This Plan of Management for
Pughs Lagoon – Smith Park, Richmond
was prepared by



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1.0 INTRODUCTION

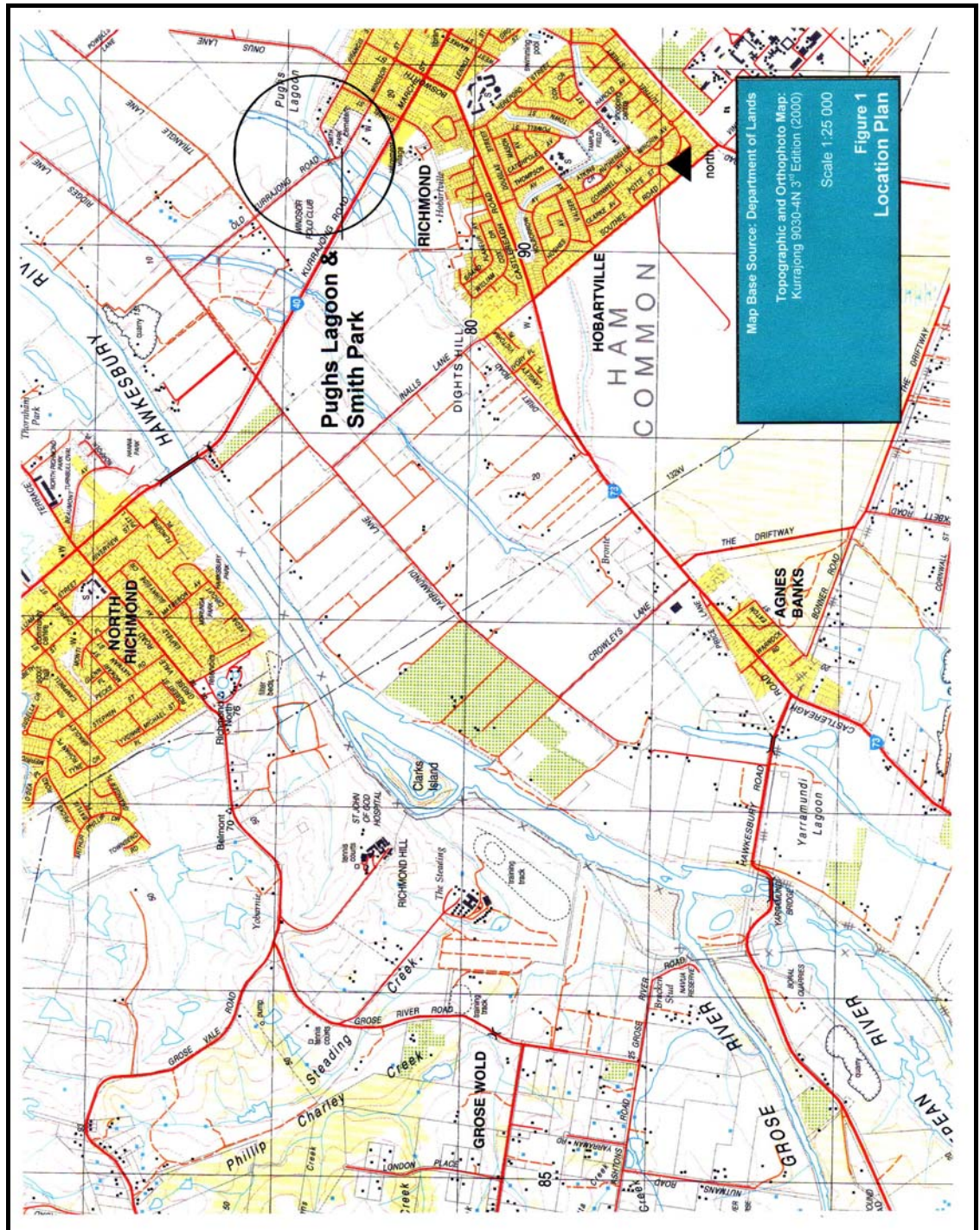
1.1 OVERVIEW

Pughs Lagoon and Smith Park are located on the Hawkesbury River floodplain on the north-western edge of Richmond, approximately one kilometre from the railway station. Smith Park can be accessed via Windsor Street or Francis Street (Richmond – eastern access) or via Old Kurrajong Road (western approach from North Richmond). The lagoon and wetlands are part of a much larger system of lagoons, backswamps and drainage channels which spread across the agriculturally productive floodplain. Pughs Lagoon is an integral part of Smith Park's natural and cultural setting (refer to *Figure 1: Location Plan*).

Pughs Lagoon was named after Edward Pugh who was transported to New South Wales as a convict in 1787 and was later granted 100 acres of land immediately west of Richmond near this lagoon. Smith Park, the public reserve adjoining the lagoon, lies within an historic precinct which includes St Peters Anglican Church and cemetery. The Hawkesbury landscape has been a popular romantic subject for artists since the mid-nineteenth century. The lagoon and church on the hill were painted by the renowned impressionist artist, Charles Conder in 1888. The park is now part of the Hawkesbury Artist's Trail. The lagoon and rural floodplain setting, the scenic and environmental qualities, the wetlands and water-birds and opportunities for relaxation, fishing, picnicking and barbeques make it a popular destination for local residents and tourists. In recent years the park has become increasingly popular for weddings and commercial photography.

All of these values are affected by a range of issues including altered drainage and flow patterns, erosion and sedimentation, drought and flooding, increased nutrient levels, loss of native vegetation, introduced exotic weeds and pests, recreational uses, activities and visitor numbers, adjoining agricultural land uses, irrigation and increasing urban development. It is important that the plan of management establishes how these values should be protected, managed and enhanced.

Accordingly, a balanced strategy needs to be established which provides for passive recreation and enjoyment by the community as well as protection, management and rehabilitation of environmental values. This plan of management aims to address these issues and provide an integrated and sustainable approach to future management and rehabilitation.



1.2 STUDY AREA

The Crown reserve (R1000505) known as Pughs Lagoon and Smith Park is located within the Parish of Ham Common, County of Cumberland, City of Hawkesbury. The Crown reserve is administered by the NSW Department of Lands under the *Crown Lands Act 1989*. Hawkesbury City Council has devolved control of the Crown reserve. A small portion of Smith Park (adjacent to Kurrajong Road) is owned by Hawkesbury City Council and classified as community land under the *Local Government Act 1993*. The water and land parcels included in this plan of management are as follows:-

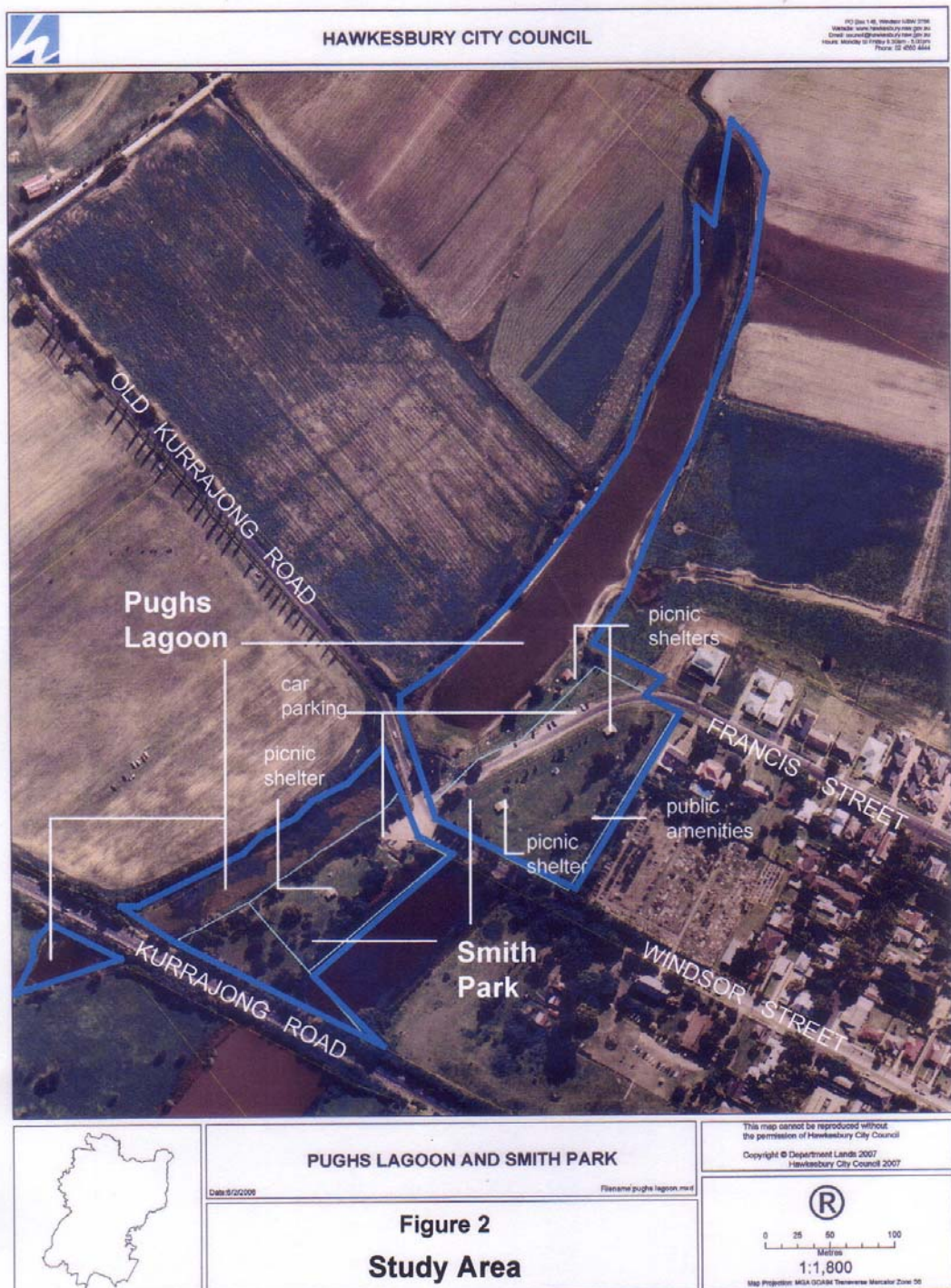
- ❖ Pughs Lagoon (Crown Water including all three portions separated by road reserves); and
- ❖ Smith Park (including two [2] Crown reserve parcels and one [1] community land parcel owned by Hawkesbury City Council).

Windsor Street – Old Kurrajong Road and Kurrajong Road divide the lagoon into three separate portions of varying size. Smith Park, located along the lagoon's south-eastern edge, is developed parkland for passive recreation. The Geographical Names Board assigned the name "Smith Park" on 11th June 1982 after J W Smith, Mayor of Richmond Council (1929-1934 and 1938-1948). Smith Park has a cultural focus dominated by open mown grassed areas, picnic facilities and cultivated trees. The parkland is physically divided into three separate portions by Windsor Street (central), Francis Street (north), Kurrajong Road (south) and adjoining lagoons. The freshwater lagoon and wetlands are listed as an endangered ecological community (TSC Act 1995).

A larger lagoon adjoins the southern portion of Smith Park (ie. along the south-eastern boundary). Only a small triangular portion of this lagoon (adjacent to Kurrajong Road) is included in this plan of management (refer to *Figure 2: Study Area*). For further details refer to *2.0 Land Description and Planning*.



PHOTO 1: View overlooking Pughs Lagoon towards Old Kurrajong Road from southern portion of Smith Park. Exotic deciduous trees [*Morus* and *Celtis* spp. in foreground] – a predominantly cultural rural setting.



1.3 AIMS AND OBJECTIVES

This plan of management has been prepared in accordance with the *Crown Lands Act 1989* and *Local Government Act 1993* and all other relevant policies, case law and legislation, including but not limited to the *Crown Lands Regulation 2000*, *Local Government (General) Regulation 1999* and the *Local Government Amendment (Community Land Management) Act 1998*. For further details refer to *Appendix I: Crown Lands Act 1989 and other legislative requirements*.

The plan of management aims to provide a clear, concise and practical framework for the protection of assets, sustainable development of recreational infrastructure and enhanced environmental management of the lagoon and parkland. This document also aims to be performance oriented in order to contribute towards Council achieving its strategic goals, vision, mission and strategic outcomes as identified in the *Hawkesbury City Council Management Plan 2006-2007*.

The Brief outlined the following aims for the plan of management:-

- *to prepare a plan of management for Pughs Lagoon and Smith Park in accordance with the Crown Lands Act 1989 and the Local Government Act 1993 that provides appropriate direction in the management and development of the lagoon and parkland. The plan is to be reviewed on a five year basis;*
- *to determine the future management of the reserve and to define a balance between the recreational needs of the wider community and the protection and conservation of the environment;*
- *to develop a staged management strategy identifying site rehabilitation and management needs as well as opportunities for enhancement; and*
- *to establish clear and achievable management strategies which address community expectations.*

The following specific objectives were highlighted in the Brief:-

- *to identify and assess values (ie. environmental, heritage, scenic, social, recreational) associated with the lagoon and parkland and define how they are valued by the community (ie. local community and regional visitors);*
- *to identify and assess the current status and health of the wetlands, to review existing and potential threats to its ecological integrity and to recommend appropriate management and rehabilitation strategies;*
- *to identify and assess potential Aboriginal and European heritage items/ places and to provide a conceptual strategy for their current and long-term management;*
- *to identify existing and proposed recreational facilities (ie. car parking areas, picnic shelters/ seating and tables, BBQs, public amenities, litter bins);*
- *to assess suitability of recreational facilities in relation to recreational needs (ie. visitor access and circulation, usage levels, types of recreational uses, access to water, OH&S,) and the reserve's environment including flood impacts (ie. flood heights/ duration of flooding and public safety) and economic factors;*
- *to address issues in relation to future leases and licences (eg. use of parkland/ facilities for wedding ceremonies, photography and other events);*

- *to develop a staged management strategy identifying site management, rehabilitation and development objectives which enable the enhancement of both natural processes and recreational opportunities;*
- *to establish appropriate performance measures for management objectives and the means of assessment;*
- *to prepare a landscape masterplan which identifies management strategies and future development; and*
- *to identify priorities for proposed works, approximate costs of these works and opportunities for funding.*

While preparation of the plan of management has ensured thorough consultation with the local community and key stakeholders it is important to recognise that it is a values-based approach rather than simply issues-driven. Accordingly, the plan of management focuses on the longer term objectives of sustainable management. The following steps have guided the preparation of this plan of management:-

Section 2.0 Land Description and Planning

- ensure consistency with the Objects of the *Crown Lands Act 1989*;
- identify existing public purpose and any proposed changes to public purpose, reserve ownership and management;
- identify current uses, activities and condition of the land, and any buildings or other improvements;
- review existing zoning provisions (under Council's LEP) and consistency with the reserve's public purpose;
- establish community land categories in accordance with *Local Government Act 1993* and *Local Government (General) Regulation 1999* and identify the core objectives for each of these categories;
- address future permitted uses and development (including intensity and scale) and existing and future leases/ licences.

Section 3.0 Community Consultation

- identify and assess community and stakeholder issues affecting the lagoon and parkland;
- ensure an adequate level of consultation with all stakeholders, including other Crown reserve uses (eg. irrigation pipeline and pump-site).
- determine community goals, values, needs and expectations for the future use and management of the lagoon and parkland;

Section 4.0 Basis for Management

- define the lagoon and parkland's role within the local government area and broader regional context;
- identify and assess key values including the lagoon and parkland's scenic qualities, aesthetics, Aboriginal, cultural and natural heritage, existing recreational uses, facilities and improvements and their condition;
- assess the impact of existing uses, activities and management regimes or future development and leases and licences on identified key values;
- review opportunities for future development, leases and licences;
- establish the framework for sustainable management strategies.

Section 5.0 Management Strategies

- establish appropriate management strategies in accordance with the Crown reserve's public purpose and community land objectives;
- ensure a balanced, sustainable approach to conservation, rehabilitation and the recreational needs of the wider community;
- specify the purposes for which any further development of the land, buildings or improvements will be permitted, whether under lease/ licence or otherwise;
- describe the scale and intensity of such permitted use or development;
- develop performance targets (management objectives), the means of achieving these targets (management actions) and the means of assessing Council's performance with respect to the plan of management's objectives;
- assign directions and priorities (spanning the next 5-years) and provide cost estimates for implementation of proposed works; and
- develop a master plan for implementation of the strategic plan.

1.4 SUSTAINABLE MANAGEMENT

The management strategy for Pughs Lagoon and Smith Park will need to be consistent with Council's vision of a sustainable future. Over the next 10 years it is likely that Pughs Lagoon and Smith Park will be shaped by major initiatives to reform water, land and natural resource management. These initiatives will seek to develop partnerships between councils, State government agencies, industry and the community to achieve sustainable outcomes. Hawkesbury City Council is actively involved in these initiatives through its principle policy statement – *Hawkesbury City Council Management Plan 2006-2007*. The Plan identifies Council's commitment to protecting the City's unique character which draws from and reflects natural and cultural heritage whilst growing and evolving in importance and influence. The Plan celebrates the City's diversity and vitality and continues to promote an environment of social equity and sustainability.

This plan of management aims to support the broad principle that all elements of the environment must stand in balance, contribute to an ecologically sustainable city and region and add to the quality of life within the Hawkesbury City LGA. Council's strategic planning process identified a number of significant/ priority areas which required the preparation of more detailed and specific management strategies. A number of significant area plans of management have been prepared (eg. Yarramundi Reserve and Argyle Bailey Memorial Reserve) or have been assigned priority for preparation (eg. Pughs Lagoon/ Smiths Park, Charles Kemp Reserve and Woodbury Reserve). This significant area plan of management for Pughs Lagoon and Smith Park supersedes the earlier generic plan of management covering this area.

1.5 LIST OF ABBREVIATIONS USED IN THIS STUDY

CLA	Crown Lands Act 1989
CAPs	Catchment Action Plans
CMA	Catchment Management Authorities
CPEECs	Cumberland Plain Endangered Ecological Communities
DCAC	Darug Custodian Aboriginal Corporation
DNR	NSW Department of Natural Resources
DofL	NSW Department of Lands

DofP	NSW Department of Planning
DEC	NSW Department of Environment and Conservation
HRCC	Hawkesbury River County Council
HRFC	Hawkesbury Rural Fire Service
LEP	Hawkesbury City Local Environmental Plan 1989
LGA	Local Government Area (Hawkesbury City Council)
NPWS	NSW National Parks & Wildlife Service
NSWRFS	New South Wales Rural Fire Services
SREP	Sydney Regional Environmental Plan
TSC Act	Threatened Species Conservation Act (1995)

2.0 LAND DESCRIPTION AND PLANNING

2.1 LAND TENURE

Pughs Lagoon and Smith Park is comprised of Crown reserve (Lots 7008 and 7009 in DP 93269) and community land (Lot 32 in DP 592300) within the Parish of Ham Common, County of Cumberland, City of Hawkesbury. Pughs Lagoon is Crown Water.

Crown reserve

The Crown reserve named “Pughs Lagoon and Smith Park”, including Crown land parcels (Lots 7008 and 7009 in DP 93269), was dedicated for the purpose of water and gazetted on 26th March 1886. The purpose is for provision of access to fresh water (ie. Pughs Lagoon) for livestock. The lagoon, possibly detailed under an old title system, is not part of the dedicated reserve. Under s.48 of the *Local Government Act (1993)*, Hawkesbury City Council has devolved control of this Crown reserve (refer to 2.5 *Control of reserve & trust management*).

Lot 7009 is the largest portion bounded by Francis Street (north), St Peters cemetery (east) and Windsor Street (south) including the unmade section of Frances Street (foreshore to the lagoon). The parkland is bisected by Francis Street. Lot 7008 is a continuation of the Crown reserve south of Windsor Street and is bounded by two lagoons (south-east and north-west) and a triangular parcel of community land. These Crown reserves are predominantly cultural landscape settings with mown lawns, cultivated trees, visitor car parking areas and passive recreational facilities (ie. public amenities, picnic shelters, tables/ seating, BBQs and litter bins). For further details of existing facilities and improvements see *Figure 2: Study Area* and *Table 1: Pughs Lagoon – Smith Park*.

community land

The community land parcel (Lot 32 in DP 592300), adjoining Kurrajong Road, was originally set aside for the railway and is owned by Hawkesbury City Council. This triangular-shaped parcel of land and water includes a small portion of the adjoining south-eastern lagoon (see below). There are no existing recreational facilities on this community land.

2.2 LAND DESCRIPTION

Pughs Lagoon

Pughs Lagoon covers an area of approximately 3.68 hectares (Ha). It is 920 metres in length and averages 30-40 metres in width. This freshwater lagoon is at its widest (up to 55-60 metres) adjacent to Smith Park north of Windsor Street. Pughs Lagoon is believed to have an old system title (ie. no Lot No./ DP details) (*Connolly, S., NSW Department of Lands, pers. comm., 30.04.2007*). Further investigation of the original grant may provide these details.

The orientation of the water body is roughly north-east to south-west extending from a point mid-way between Triangle Lane and Onus Lane (northern boundary) and terminating approximately 70 metres south of Kurrajong Road (southern boundary). Pughs Lagoon is bounded by public parkland (Smith Park – part of this plan of management) and privately-owned agricultural lands including the Windsor Polo Club. The lagoon is bisected by Kurrajong Road (a regional road linking directly to March Street) and Old Kurrajong Road (a local road linking to Windsor Street and Francis Street). Effectively these roads divide the lagoon into three parts as follows:

northern portion

The northern portion of the lagoon (north of Windsor Road) is the largest expanse of open water. It is largely free of floating and semi-aquatic weed species. Much of this water body remains relatively isolated from public use. Two water licences are registered on adjoining freehold land for agricultural use. A water channel enters the lagoon along its eastern side north of the Francis Street residential sub-division. This channel connects to others which drain into the Hawkesbury River north of Windsor. The south-eastern portion of this largest water body adjoins an unmade road section of Francis Street. This foreshore land has been developed as parkland and forms the north-western portion of Smith Park. Francis Street has been set back east of the road reserve and water's edge (refer to Smith Park). This part of the lagoon has the highest level of visitor usage and waterbirds are a key attraction. The foreshore has been the subject of recent remedial works to address erosion damage.

mid-section

The mid-section of the lagoon lies between Windsor Street and Kurrajong Road and adjoins the Windsor Polo Club (western boundary) and Smith Park (eastern boundary). This water body is very shallow. It has a high level of sedimentation and invasion by aquatic and semi-aquatic weed species and colonising Willows (*Salix* sp.). Smith Park separates this lagoon from a larger eastern lagoon (part of the St Peters Anglican Church property and not part of this plan of management). Two open channels through Smith Park (near the southern car parking area) and along the boundary to Kurrajong Road connect the two lagoons.

southern portion

The far southern portion of the lagoon (south of Kurrajong Road) is a relatively small area adjoining agricultural land. It is largely over-grown with exotic weed species and is not easily accessible to the public.

Smith Park

Smith Park covers an area of approximately 2.95 hectares (Ha). Smith Park is comprised of three parcels of land, two of which are Crown reserve (R1000505), identified as Lots 7008 and 7009 in DP 93269 and one parcel is community land, identified as Lot 32 in DP 592300.

Adjoining south-eastern lagoon

A larger lagoon adjoins the southern portion of Smith Park (ie. along the south-eastern boundary). A small triangular portion of this lagoon is owned by Council, classified as community land and is therefore included in this plan of management. The balance of this lagoon (north of Kurrajong Road) is part of the St Peters Anglican Church property and other parcels (south of Kurrajong Road) are in private ownership and none of these are included in this plan of management.

Table 1: *Land Description – Existing Facilities & Improvements* is divided into four separate columns with the following information provided for each land parcel:-

- Land ownership – Crown reserve or community land (column 1);
- Lot/ DP number (column 2);
- description of land parcel, its facilities and improvements (column 3);
- condition of facilities and improvements (column 4).

Land ownership

Crown reserve (R1000505) is owned by the Crown and administered by the NSW Department of Lands under the *Crown Lands Act 1989*. Community land is owned by Hawkesbury City Council (HCC) and managed in accordance with the *Local Government Act 1993*.

Lot/ DP number

Lot and DP number provide land tenure information for the land parcel according to the Department of Lands and Hawkesbury City Council's property records.

Land description, facilities and improvements

This column provides a brief description of the land parcel, including facilities and improvements, landscape embellishment and the presence of remnant native vegetation and/ or exotic weeds. An indication of land management regimes (eg. mowing and general maintenance) is also provided.

Condition

This column refers to the general condition of facilities and improvements in accordance with the requirements of the *Local Government Act 1993*. The assessment of condition follows directly from the description of facilities and improvements (ie. same line) and provides a broad indicator of overall condition of these described items as follows:-

- | | |
|-------------|--|
| good | described items are in relatively good condition and repair under the current works and maintenance program. |
| fair | described items are in only fair condition and in need of repair/ improvements or an increased level of maintenance. |
| poor | described items are in relatively poor condition requiring repair in some instances, improvements or an increased level of maintenance with some items requiring urgent attention. |

The condition assessment refers primarily to built facilities and improvements. Refer to *4.0 Basis for Management* for a detailed description of environmental condition and status of the lagoon, wetlands and parkland and *5.0 Management Strategies* for proposed capital works, maintenance and management with respect to all items.

TABLE 1:
LAND DESCRIPTION – EXISTING FACILITIES AND IMPROVEMENTS

Land tenure	Lot/ DP	Existing Facilities/ Improvements	Condition
Crown	old system title	Pughs Lagoon Area = 3.68 Ha natural area – shallow lagoon/ wetlands, constructed open drainage channels & eroded banks [adj. private rural land] remnant native wetland vegetation/ exotic weeds culverts/ piped drainage channels [road reserves] old boundary fencing to adjoining properties [post & wire] no other facilities or improvements	varies varies n/a poor
Crown	Lot 7009 DP 93269	Smith Park – northern portion [incl. unmade road reserve along lagoon foreshore] Area = 1.70 Ha parkland/ open mown grass and cultivated trees new sandstone rock wall to lagoon edge [approx. 130m] turf edge to rock wall sealed bitumen roadway [part of Francis Street] unsealed gravel parking [90° angle and parallel] public amenities - brick building/ metal roof & tile floor conc. path/ steps to amenities block [no disabled ramps] adjoining grassed embankment/ eroded new picnic shelter [1] – steel frame/ roofing & conc. pad approx. 6m X 8m w. timber slat/ steel frame tables/ seats [3] picnic shelters [2] – log post & beam/ metal roof & conc. pad approx. 7m X 5m w. long timber slat tables/ seats* gas BBQ shelter – metal roof & conc. pad [incl. 2 X plates] picnic tables/ seating [5] – timber slat/ steel frame* park identification signage [1] – low brick wall w. time-capsule interpretive signage [1] – metal “Hawkesbury Artists Trail” log post & rail vehicular barriers metal boom-gate/ posts litter bins [4] – metal irrigation points [14] – fixed metal riser sub-surface drainage pipes/ pit covers drinking water [bubblers/ taps] light poles/ overhead electricity lines security lighting [over amenities building]	varies good poor good fair good poor poor good good good fair good fair good good good good good nil n/a good
Crown	Lot 7008 DP 93269	Smith Park – mid-section [south of Windsor Street] Area = 0.84 Ha natural area – wetland margins to shallow lagoons remnant native wetland vegetation/ exotic weeds parkland/ open mown grass and cultivated trees unsealed gravel parking area picnic shelter [1] – log post & beam/ metal roof & conc. pad approx. 7m X 5m w. long timber slat tables [damaged]/ seats* picnic tables/ seating [3] – timber slat/ steel frame* log post & rail vehicular barriers litter bins [2] – metal irrigation points [3] – fixed metal riser open stormwater overflow drain w. piped section [crossing] drinking water [bubblers/ taps] park identification or interpretive signage	poor poor varies fair good fair fair fair good good poor nil nil

Table 1 [continued]

Land tenure	Lot/ DP	Existing Facilities/ Improvements	Condition
HCC	Lot 32 DP 592300	Smith Park – southern portion Area = 0.415 Ha natural areas – wetland margins & shallow lagoon remnant native wetland vegetation/ exotic weeds parkland/ open mown grass and cultivated trees open stormwater channel [road reserve] no other facilities or improvements	poor poor varies n/a

Notes:

* All seating to picnic tables is fixed well above accepted standards of 390–440mm [top of seat height].

** Some picnic settings are being invaded by surface roots/ coppiced regrowth of cultivated Swamp Oaks raising public safety and risk management issues.

2.3 CROWN LANDS ACT 1989

The NSW Department of Lands, together with Reserve Trust/s appointed by the Minister, are responsible for management of the Crown reserve system throughout New South Wales. The *Crown Lands Act 1989* is the main government legislation affecting the planning, management and use of Crown land, including reservation or dedication for a range of public purposes and leasing and licensing. This NSW government legislation can be found on-line at the following URL:

www.legislation.nsw.gov.au

2.4 PLANS OF MANAGEMENT FOR CROWN RESERVES

This plan of management for Pughs Lagoon – Smith Park has been prepared according to the requirements of the *Crown Lands Act 1989*. In preparing a plan of management for a Crown reserve it is essential that the “public purpose” of the reserve establishes the basis for planning and management. Any proposed uses, activities, developments and management practices must conform to the public purpose for the reserve or dedicated land, and conform with particular policies of the Department of Lands regarding Crown reserves (s.87 CLA 1989). For further details refer to *Appendix I: Crown Lands Act 1989 – legislative requirements for Crown reserves*.

2.5 CONTROL OF RESERVE & TRUST MANAGEMENT

Hawkesbury City Council has devolved “control” of this Crown reserve under section 48 of the Local Government Act 1993. There is no reserve trust. Crown reserves under devolved control require the Minister to initiate a draft plan of management (s.112 (1) CLA 1989). A reserve trust is an incorporated entity that can be established and appointed to manage a Crown reserve (eg. community trust boards or administrators). It is a recommendation of this plan of management that a trust be appointed and charged with care, control and management of the Crown reserve (s.92 CLA 1989) and that Hawkesbury City Council be appointed trust manager to manage the affairs of the trust (s.95 CLA 1989). Refer to section 5.0 *Management Strategies: 5.3 Action Plan: item A2*). Hawkesbury City Council may enter into a lease or licence only as trust manager of the Crown reserve (refer to 2.9 *Leases and Licences*).

The reserve trust manager must separately account for all proceeds from activities on the reserve. Under section 122 of the *Crown Lands Act 1989*, the reserve trust must report on activities on the reserve as detailed in Clause 33 of the *Crown Lands Act Regulation (2000)*.

2.6 OBJECTS OF CROWN LANDS ACT

Section 10 – Objects of Act (s.10 CLA 1989) states, in part, that Crown land must be managed “*for the benefit of the people of New South Wales*” in accordance with the principles of Crown land management (s.11 CLA 1989) and the reservation or dedication of the Crown land for public purposes.

2.7 PRINCIPLES OF CROWN LAND MANAGEMENT

The *Crown Lands Act 1989* (s.11 CLA 1989) provides a set of principles for Crown land management which together form the basis for management and use of the Crown reserve as follows:-

- ❑ *environmental protection principles be observed in relation to the management and administration of Crown land;*
- ❑ *the natural resources of Crown land (including water, soil, flora, fauna and scenic quality) be conserved wherever possible;*
- ❑ *public use and enjoyment of appropriate Crown land be encouraged;*
- ❑ *where appropriate, multiple use of Crown land be encouraged;*
- ❑ *where appropriate, Crown land should be used and managed in such a way that both the land and its resources are sustained in perpetuity; and*
- ❑ *Crown land be occupied, used, sold, leased, licensed or otherwise dealt with in the best interests of the State consistent with the above principles.*

2.8 PUBLIC PURPOSE(S) OF CROWN LAND

The *Crown Lands Act 1989* provides for the reservation and dedication of Crown land for a range of “public purposes” which must deliver a public benefit. Uses, activities, development, leases/ licences, and any other agreements in a Crown reserve are broadly defined by the public purpose of the reserve. Pughs Lagoon and Smith Park were dedicated for the purpose of “water” in 1886.

Pughs Lagoon, as a freshwater wetland, is scheduled as an endangered ecological community under the *Threatened Species Conservation Act 1995*. The significance of this Crown reserve’s environmental and scenic values are further supported by *SREP No.20 Hawkesbury – Nepean River (No.2 – 1997)*. Accordingly, this plan of management recommends that the public purpose be reviewed and expanded to include “*environmental protection and public recreation*” to emphasise the significance of these broader values and to ensure their balanced management, protection and conservation (refer to 5.3 *Action Plan – item A3*). It is important that zoning provisions in Council’s Local Environmental Plan (LEP) are consistent with public purpose. In this instance, LEP zoning provides for environmental protection (lagoon) and open space/ recreation (parkland) – see section 2.13 *Zoning*.

2.9 LEASES AND LICENCES

There are no current leases or licences within the Crown reserve or community land portions of Smith Park. The granting of leases and licences are subject to provisions under the *Crown Lands Act 1989* (Crown reserve) and *Local Government Act 1993* (community land) and other relevant legislation, case law and policy guidelines. A lease or licence may be granted in accordance with an express authorisation by this plan of management providing it is consistent with the relevant provisions (refer to section 5.0 *Management Strategies: 5.3 Action Plan: items A8-A10*).

Crown reserve

Under existing devolved control Hawkesbury City Council may not enter into a lease or licence for the whole or part of the Crown reserve to which this plan of management applies. Subject to appointment of a reserve trust and Hawkesbury City Council to manage the affairs of the trust, Council may enter into a lease or licence over the Crown reserve (refer to *Appendix I: Crown Lands Act 1989* – legislative requirements for Crown reserves).

Community land

A lease, licence or other estate may be granted for the community land portion of Smith Park providing it is for a purpose prescribed in s.46 of the *Local Government Act 1993*. The purpose must be consistent with core objectives for the category of community land (refer to section 2.10 *Community land management*, 2.11 *Community land categories* and 5.0 *Management Strategies: 5.2 Core objectives*). A lease, licence or other estate must also be consistent with the public purpose of the adjoining Crown reserve.

Council must not grant a lease, licence or other estate for a period (including any period for which the lease could be renewed by the exercise of an option) exceeding 21 years. A lease, licence or other estate may be granted only by tender in accordance with s.46A of the *Local Government Act 1993* and cannot exceed a term of 5 years (including any period for which the lease could be renewed by the exercise of an option), unless it satisfies the requirements as scheduled in s.47 LGA 1993, or is otherwise granted to a non-profit organisation. Leases, licences or other estate must not be granted in respect of land categorised as a natural area, unless it is for a purpose prescribed in s.47B LGA 1993 (refer to *Appendix II: Local Government Act 1993* – legislative requirements for community land: *Leases, licences and other estate in respect of community land* – s.46, 46A, 47, 47A and 47B LGA 1993).

Existing water licences (registered on adjoining land)

The Department of Natural Resources (DNR) has confirmed that there are two existing water licences (10SL018765 and 10SL014361) registered on adjoining freehold land (*Galea, J., DNR, pers. comm., 02.04.2007*). These water licences permit the pumping and piping of water for irrigation from the northern portion of Pughs Lagoon.

2.10 COMMUNITY LAND MANAGEMENT

The small parcel of community land owned by Hawkesbury City Council (including a portion of the south-eastern lagoon adjoining Kurrajong Road) must be managed in accordance with the *Local Government Act 1993* and other relevant legislation and policies.

The ways in which community land can be used and managed are strictly governed in accordance with an adopted plan of management and any law permitting the use of the land for a specified purpose or otherwise regulating its use. The nature and use of community land may not change without an adopted plan of management. Community land must not be sold, exchanged or otherwise disposed of except in the instance of enabling the land to be added to Crown reserve or a protected area under the *National Parks and Wildlife Act 1974*. The use and management of community land must also be consistent with its designated categories and core objectives.

2.11 COMMUNITY LAND CATEGORISATION

In accordance with the *Local Government Act 1993* all community land must be categorised as either a natural area, a sportsground, a park, an area of cultural significance or for general community use, or a combination of these categories. A further requirement is that land categorised as a “natural area” must be given a sub-category of either bushland, wetland, escarpment, watercourse, foreshore or a category prescribed by the regulations. The *Local Government (General) Regulation 2005* provides guidelines for categorisation.

Although it is not a requirement of the *Crown Lands Act (1989)* to categorise Crown reserves, the process is encouraged by the Department of Lands for purposes of consistency with Council’s community land management objectives.

The *Draft Hawkesbury Generic Plans of Management – Natural Areas Plan of Management (2003)*, prepared by Hawkesbury City Council, categorised Smith Park into two categories – “Natural area: wetland” and “Park”. The current mapping data identifies the categories as “Natural Area: foreshore” and “Park”. The mapped area identified as “Natural area: foreshore” includes the wetland margins to lagoons and a portion of lagoon (water body).

This plan of management supports the community land categorisation of Natural area: wetland and Park as described in section 108 and 104, *Local Government (General) Regulation 2005* and recommends that the Natural area sub-category be amended accordingly (refer to *Figure 3: Land Categorisation*).

Natural Area

The *Local Government Act 1993* was amended from 1 January 1999 to integrate the management of community land with threatened species laws, in particular the preparation of plans of management. In accordance with the guidelines for categorising community land under *Section 102, Local Government (General) Regulation 2005*:-

“Land should be categorised as a natural area under s.36(4) of the Act if the land, whether or not in an undisturbed state, possesses a significant geological feature, geomorphological feature, landform, representative system or other natural feature or attribute that would be sufficient to further categorise the land as bushland, wetland, escarpment, watercourse or foreshore under section 36(5) of the Act”.



Natural Area: wetland

“Land that is categorised as a natural area should be further categorised as wetland under s.36(5) of the Act if the land includes marshes, mangroves, backwaters, billabongs, swamps, sedgelands, wet meadows or wet heathlands that form a waterbody that is inundated cyclically, intermittently or permanently with fresh, brackish or salt water, whether slow moving or stationary”.

Section 108, Local Government (General) Regulation 2005

In accordance with the *Local Government Act 1993* the management of each category and sub-category is guided by a set of core objectives. Furthermore, natural areas have specific requirements in terms of permissible development, leases and licences. The occurrence of freshwater wetlands, an endangered ecological community (TSC Act 1995), within the community land and broader Crown reserve adds further weight to the significance of these natural values and signals the need for an appropriate response (refer to following section 2.12 *Other Relevant Legislation And Policies: Threatened Species Legislation*).

Park

“Land should be categorised as a park under s.36(4) of the Act if the land is, or is proposed to be, improved by landscaping, gardens or the provision of non-sporting equipment and facilities, for use mainly for passive or active recreational, social, educational and cultural pursuits that do not unduly intrude on the peaceful enjoyment of the land by others”.

Section 104, Local Government (General) Regulation 2005

Most of the community land in Smith Park is categorised as “Park” in accordance with its landscaped character of open lawns, cultivated native and exotic trees and passive recreational uses.

2.12 OTHER RELEVANT LEGISLATION AND POLICIES

In addition to the requirements of the *Crown Lands Act 1989*, *Local Government Act 1993* and related policy this plan of management has been prepared in accordance with the provisions contained in other relevant legislation and policy guidelines, including but not limited to the following:-

- ☐ Native Title Act (Commonwealth) 1993
- ☐ Catchment Management Authorities Act 2003
- ☐ Native Vegetation Conservation Act 2003
- ☐ Environment Protection and Biodiversity Conservation Act 1999
- ☐ Threatened Species Conservation Act 1995
- ☐ Fisheries Management Act 1994
- ☐ National Parks and Wildlife Act 1974
- ☐ NSW Heritage Act 1977
- ☐ Noxious Weeds Act 1993
- ☐ Rural Fires Act 1997
- ☐ Environmental Planning and Assessment Act 1979
- ☐ Disability Discrimination Act 1992
- ☐ SREP No. 20 Hawkesbury-Nepean River (No.2 – 1997)

- ☐ SEPP 19: Bushland in Urban Areas
- ☐ Hawkesbury Lower Nepean Catchment Blueprint 2003
- ☐ Hawkesbury Nepean Floodplain Management Strategy 1998
- ☐ NSW Flood Policy 1984
- ☐ NSW State Rivers and Estuaries Policy 1993
- ☐ NSW Wetlands Management Policy 1996
- ☐ NSW Floodplain Management Manual 2001

- ☐ Hawkesbury City Council Management Plan 2006-2007
- ☐ Hawkesbury Local Environmental Plan 1989
- ☐ Section 94 Contributions Plan Review 2001
- ☐ Hawkesbury City Council Charter
- ☐ Hawkesbury Cultural Plan 2006-2011

Native Title Act (Commonwealth) 1993

This plan of management acknowledges the significance of the Hawkesbury River and floodplains as a traditional resource area for the Darug Aboriginal people. The consultative process has emphasised an open, transparent approach. Accordingly, this plan of management encourages broader involvement with traditional Aboriginal custodians in the future management of Pughs Lagoon and Smith Park (refer to 5.0 *Management Strategies: 5.3 Action Plan, item B1*).

The general area is subject to Native Title Claim No: NC 97/8 by the applicant – Darug Aboriginal Corporation however it appears that there are no specific claims under the *Native Title Act (Commonwealth) 1993* affecting the Crown reserve. If any significant proposal for development over this land is considered in the future a detailed investigation of Native Title will be required.

Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* forms the basis of statutory planning in New South Wales, including the preparation of Local Environmental Plans (LEPs) which regulate land use and development. Hawkesbury City Council, as the consent authority under the *Local Environmental Plan 1989 (LEP 1989)* and the *Environmental Planning and Assessment Act 1979* controls development and the use of land on parks and reserves in the Hawkesbury City Council local government area.

Native Vegetation Conservation Act 2003

The new *Native Vegetation Conservation Act 2003* applies to State Protected Land within the Hawkesbury City LGA. Such land is defined as being “within 20 metres of the bank or within the bed of a prescribed stream or lake, land mapped as having a slope in excess of 18 degrees, land mapped as environmentally sensitive or land subject to siltation or erosion”.

The NVC Act applies to Pughs Lagoon and Smith Park and it is important that the freshwater wetlands are managed in a way which provides consistency with the following objectives of the Act:-

- (a) to provide for the conservation and management of native vegetation on a regional basis;
- (b) to encourage and promote native vegetation management in the social, economic and environmental interests of the State;

- (c) to protect native vegetation of high conservation value;
- (d) to improve the condition of existing native vegetation;
- (e) to encourage the revegetation of land and the rehabilitation of land with appropriate native vegetation;
- (f) to prevent the inappropriate clearing of vegetation;
- (g) to promote the significance of native vegetation in accordance with the principles of ecological sustainable development.

Threatened species legislation

Pughs Lagoon, a freshwater wetland, is scheduled as scheduled as endangered ecological community (Part 3 of Schedule 1) under the *Threatened Species Conservation (TSC) Act 1995* (ie. “Freshwater wetlands on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions” (2004). The lagoon’s wetland margins, including Smith Park, also contain remnant components of the Sydney Coastal River-flat Forest (Alluvial Woodland/ Riparian Forest) also described as “River-flat eucalypt forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions” (2004), an endangered ecological community (TSC Act 1995). For further details refer to *4.0 Basis for Management*.

The TSC Act provides the legislative mechanisms for dealing with listed items. When endangered species, populations or ecological communities are scheduled under the TSC Act, the following legal responses are triggered:-

- (a) land can be declared as “critical habitat”; or
- (b) a “recovery plan” must be prepared; and where key threatening processes have been identified under Schedule 3
- (c) a “threat abatement plan” must be prepared.

To provide consistency with threatened species legislation this plan of management aims to address the following:-

- the plan must state whether the land has been declared as “critical habitat” or affected by a “recovery plan(s)” or “threat abatement plan”;
- must have consistency in the management objectives of the land and the *Threatened Species Conservation Act* or the *Fisheries Management Act*;
- the draft plan must be forwarded to the Director General of National Parks and Wildlife or the Director of NSW Fisheries and must incorporate any requirements made by either person;
- no change in the use of the land is permitted until a plan of management has been adopted that meets the above requirements;
- no lease or licence can be granted until a plan of management is in place – (leases and/or licences that are in place before the land was affected by threatened species laws can continue to operate);
- no native plant species of an endangered ecological community may be “picked” without the prior granting of a Section 91 Licence under the TSC Act 1995.

The National Parks and Wildlife Service (NPWS) is currently developing a Draft Recovery Plan for all of the Cumberland Plain Endangered Ecological Communities (CPEECs). The future management of Pughs Lagoon and Smith Park will need to be consistent with this Recovery Plan.

SREP No. 20 Hawkesbury-Nepean River (No.2 – 1997)

Pughs Lagoon is subject to the provisions under *SREP No.20 Hawkesbury – Nepean River (No.2 – 1997)* which controls any development which has the potential to impact on the river environment (ie. water quality, environmentally sensitive areas and riverine scenic quality). Wetland areas are to be protected as “environmentally sensitive areas” (Clause 6, Part 2, SREP No.20).

2.13 ZONING

Smith Park and Pughs Lagoon are zoned under the Hawkesbury City Council Local Environmental Plan (LEP – amended 18.08.2006) as follows (refer to *Figure 4:*

Existing Zoning):

1. Smith Park is zoned 6(a) *Open Space – Existing Recreation*;
2. most of Pughs Lagoon and the neighbouring south-eastern lagoon is zoned 7(a) *Environment Protection – Wetlands*; and
3. southern tip of Pughs Lagoon (south of Kurrajong Road) is zoned 7(d1) *Environmental Protection – Scenic*.

The public purpose of the reserved Crown land determines appropriate uses and development (refer to 2.8 *Public Purpose(s) of Crown Land*). It is therefore desirable that provisions in Council’s Local Environmental Plan (LEP), particularly zoning of the land, are consistent with the Crown reserve’s **public purpose** (ie. “water” to be amended to include “environmental protection and public recreation”). Council’s LEP is consistent with this broader definition which emphasises environmental protection (Pughs Lagoon) and public recreation (Smith Park).

This plan of management defines land uses, activities and developments that will be permitted in accordance with the Crown reserve’s public purpose (refer to 5.0 *Management Strategies: 5.3 Action Plan, item A6*).



3.0 COMMUNITY CONSULTATION

3.1 BACKGROUND

Community consultation is an important part of the plan of management process. The Department of Lands and Hawkesbury City Council promote an open, transparent approach to consultation, providing opportunities for stakeholders and members of the community to contribute comments and submissions or to discuss specific issues. The process is one of ongoing review and exploration of community attitudes, expectations and aspirations.

A community workshop was held during preparation of the draft plan of management (refer to 3.2 *Community Workshop*). Further consultation continued through to release of the draft plan of management (ie. public exhibition), at which time the community was able to make final comments and submissions. This process highlights the importance of community involvement and ownership in the adopted plan of management.

In accordance with the *Crown Lands Regulation 2000* and *Local Government Act 1993* the draft plan of management must be placed on public exhibition for a period of at least 28 days (ie. four weeks). A further two weeks are provided for completion of written submissions. During the public exhibition period the draft plan of management will be available for viewing at the Hawkesbury City Council Administrative Offices, Hawkesbury Central Library (in the Deerubbin Centre), Windsor and on Council's web-site <http://www.hawkesbury.nsw.gov.au/>

All public submissions and any comments submitted by other government agencies will be reviewed by the Department of Lands. The draft plan of management, as amended following public submissions and this review process, will be submitted to the Minister for adoption.

3.2 COMMUNITY WORKSHOP

A community workshop was held at the Senior Citizens Centre, March Street, Richmond at 7:00pm on Thursday 1st March 2007. The workshop was advertised by Hawkesbury City Council in the local press and notices in Council's Administrative Offices and Hawkesbury Central Library.

Apart from Councillors, council staff and individual participants, the key stakeholder groups contacted for the workshop included the following:-

- Richmond Rotary Club
- St Peters Anglican Church
- Windsor Polo Club
- other adjoining land owners and holders of irrigation licences
- Department of Environment and Conservation (DEC) – Richmond Office
- Darug Custodian Aboriginal Corporation (DCAC)
- Fishing clubs
- Cumberland Bird Watchers Club
- Hawkesbury Rural Fire Service

A total of 11 people attended the workshop (not including Council staff). The workshop proceeded with a brief description of the plan of management process and a short power-point presentation by Noel Ruting, a Director of LandArc Pty Limited (see *Appendix III: Community Consultation – presentation material and submissions*).

A Community Issues Questionnaire (pro-forma – refer to *Appendix III*) was distributed to all stakeholders at the workshop and ten written responses (including an issues annexure) were received. A total of four additional written submissions were received from the Rotary Club of Richmond, local residents of Francis Street (2) and a former member of Council's Access Committee. Cumberland Bird Observers Club also provided a list of bird species recorded over 20 years (*Brandwood, K., pers.comm., 2007*).

The workshop discussion focussed on a number of key issues including public safety and traffic management, pedestrian access and circulation, existing and proposed recreational facilities, visitor management and environmental issues. A number of issues have been discussed with stakeholders who could not attend the workshop. These issues have been noted and reviewed as part of the consultation process. NSW Department of Lands and Council's staff (including administration, land management and community and planning services) have been consulted during preparation of the plan of management.

3.3 COMMUNITY ISSUES

A summary of key community and stakeholder issues has been compiled (for further detailed analysis and review see the relevant sections as indicated):-

1. Natural and cultural environment (see *4.0 Basis for Management – 4.5 Natural and cultural setting, 4.6 Indigenous and cultural heritage & 4.7 Environment and Biodiversity*):

- ❖ significance of freshwater lagoons and wetland habitat;
- ❖ significance of cultural heritage issues, including importance to Indigenous people;
- ❖ protect the park and lagoon's peace and tranquillity;
- ❖ protect scenic qualities, biodiversity, particularly water-birds;
- ❖ opportunities for better management of "environmentally sensitive areas" including vital habitat and nesting sites of native waterbirds;

- ❖ need for improved management of catchment GPTs (Hobartville) and stormwater pollutants entering the lagoon;
- ❖ climate change and potential impacts on floodplain/ water management (current prolonged drought/ low water level and presence of algae);
- ❖ support for initiatives to control aquatic weeds (eg. *Eichhornia* sp.) and lagoon-edge weeds (eg. *Salix* sp.);
- ❖ suggestion for waterways to be sprayed (herbicides) – see following discussion;
- ❖ impact of introduced pest species such as European Carp (ie. turbidity, water quality, erosion and reduction in native fish populations) and the increase in the lagoon's feral duck population which inter-breed with native black ducks;
- ❖ increased nutrient levels/ reduction in water quality due to concentration of water-birds (especially non-native species);
- ❖ need for improved weed management and restoration strategies (including priority areas, planting stock, bank stabilisation, protective devices, visitor education and management, etc);
- ❖ protect scenic vistas (eg. managing tree planting and fast-growing/ high maintenance weed species and native colonising species);
- ❖ continue to protect and stabilise eroding edges/ banks to lagoon (eg. recent remedial work);
- ❖ increased road noise and traffic visibility since removing weed species in southern portion of Smith Park (adjoining Kurrajong Road);
- ❖ adjoining private property issues:-
 - cleared edges/ buffer impacts on freshwater lagoon/ wetlands (eg. continued clearing, livestock access, erosion and trampling)
 - application of fertilisers, herbicides and pesticides
 - environmental and noxious weed invasion
 - irrigation/ pumping from lagoon
 - reduced ecological durability and resilience of wetlands
 - relative isolation from recreational areas
 - opportunities for wetland habitat restoration

2. Public access, recreation and public safety issues (see 4.0 Basis for Management – 4.8 Public recreation and social values):

- ❖ concern over vehicular traffic through park (via Francis Street), traffic volumes, speeding and use of Francis Street as a commuter 'fast track' and safety of park visitors/ pedestrians, especially children in the park;
- ❖ narrow roads and number of parked cars combine to obstruct motorists' views of pedestrians, especially children;
- ❖ need for Francis Street road closure or traffic calming (eg. slow-points/ speed humps) and reduced speed limit through the park;
- ❖ poor pedestrian connections (no formed pathways) along Windsor Street and Francis Street (from Chapel Street);
- ❖ poor internal circulation/ no pedestrian pathways between car parking areas, park facilities and lagoon;
- ❖ poor disability access throughout the park (ie. no disabled access from car parking areas to lagoon, picnic shelters and toilets, no designated disabled parking spaces and restricted wheelchair access to picnic tables;

- ❖ recent installation of security lighting at public amenities building however poor lighting throughout the park affecting security;
- ❖ enhancing existing access between cemetery and Smith Park (north-east boundary) may encourage vandalism in the cemetery;
- ❖ late night anti-social behaviour (speeding cars/ “drag racing”, vandalism, alcohol and drink driving, loud music in the car parking area) affecting neighbourhood amenity;
- ❖ uncontrolled run-off/ erosion of unsealed car parking area (north-side) and need for improvements including grading and forming for angle parking (80 cars);
- ❖ opportunities for low-key, passive recreation (eg. fishing, feeding ducks/ geese and other water-birds, exercise, walking the dog, relaxing, family gatherings, weddings, photography, etc);
- ❖ range of existing facilities and opportunities for passive recreation (including public amenities, picnic shelters, picnic tables/ seating, gas BBQ facilities, large open grassed areas;
- ❖ dog issues (faeces not being picked up by owners, off-leash use of the park and disturbance to waterbirds including nest sites);
- ❖ need for two new picnic shelters and gas BBQs;
- ❖ need to maximise open space;
- ❖ opportunities to enhance visitor experience/ upgrade facilities and gardens for weddings (potential for bookings/ park funding);
- ❖ opposition to charges being levied on any group or persons using the park (Richmond Rotary Club);
- ❖ park is part of the Hawkesbury Artist's Trail (local cultural heritage/ opportunities for tourism);
- ❖ access to freshwater lagoon/ water's edge/ concentrated visitor use (feeding water-birds) and construction of elevated rock wall;
- ❖ loss of turf cover/ erosion along top of new rock wall;
- ❖ building rubble, broken glass and other waste near water's edge (exposed during periods of low flow);
- ❖ need for improved place signage (eg. identification) and opportunities for interpretive and advisory signage to make visitors more aware of environmental protection (eg. types of waterbirds on lagoon and presence of waterbirds with babies crossing roads);
- ❖ flooding and public safety issues (eg. limitations on public access and recreational infrastructure); and
- ❖ need for continuing consultation with key stakeholders (eg. Richmond Rotary Club).

For further discussion of key recreational issues including Francis Street – traffic management/ public safety, public access, pedestrian circulation and upgrading recreational facilities refer to *4.0 Basis for Management – 4.8 Public recreation and social values*).

4.0 BASIS FOR MANAGEMENT

4.1 OBJECTIVES

This section of the plan of management addresses the following objectives:-

- ❖ *to identify the values attached to this lagoon and parkland, why they are valued and the importance of each of these values;*
- ❖ *to define the lagoon and parkland's role in the lives of the community and broader context of the Hawkesbury LGA and regional open space system;*
- ❖ *to establish a mechanism for reviewing and assessing specific issues and threats in relation to identified values;*
- ❖ *to establish the framework for sustainable management strategies consistent with the Principles of Crown Land Management and Community Land objectives; and*
- ❖ *to provide a vision for the future of this Crown reserve.*

4.2 COMMUNITY VALUES

This section of the plan of management examines the way Pughs Lagoon and Smith Park are valued by the community. 'Values' can be simply described as the things which make a place important. This approach establishes a basis for managing these community assets so that they may be better protected, maintained and where possible, restored and enhanced through further improvements.

The recent community consultation has identified the importance of both the lagoon and parkland in defining the natural and cultural setting, its scenic and environmental quality, cultural and natural heritage values, recreational and social values. The following list (although not ranked in any order) provides a summary of community values:-

- public access to the park, its facilities and the lagoon
- natural freshwater lagoon and wetlands
- scenic vistas over the lagoon and visual character
- shade trees, open lawns and picnic areas
- range of recreational facilities – picnic shelters, tables/ seats, BBQ area and public amenities
- tranquillity, beauty and opportunities for relaxation
- opportunities for passive recreation:
 - relaxation and quiet solitude
 - picnics/ barbeques, family gatherings and children's play
 - sunsets over the lagoon
 - feeding the ducks, geese and native water-birds (including swans),

- exercise and walking the dog
- weddings
- photography
- observing wildlife/ bird-watching
- environmental education (eg. school excursions)
- level of maintenance, recreational facilities and public amenities
- biodiversity (eg. aquatic and wetland habitats, avifauna).

These community values are discussed in more detail in following sections.

4.3 DETERMINING KEY VALUES

The community values, as listed above, can be divided into four key value categories as follows:-

1. Natural and cultural setting
2. Indigenous and European cultural heritage
3. Environment and biodiversity
4. Public recreation and social values

These key value categories have been the subject of further investigation, research and assessment during preparation of this plan of management. Each category contains a list of identified values. A 'significance ranking' has been assigned to each of these values based on either a local, regional (ie. Sydney metropolitan area) or state level in accordance with the assessment process (see *Table 4: Values and Level of Significance*).

4.4 SIGNIFICANCE OF KEY VALUES

Pughs Lagoon, located on the north-western edge of Richmond, retains a special aesthetic quality and sense of place. The permanent natural water bodies, the wetlands and scenic character of the surrounding rural floodplain – the market gardens, grazing dairy cattle, cleared paddocks and views to distant hills are all important components of this visual character. The scenic vistas over the lagoon and the gentle sweep of open water disappearing in the distance creates a landscape of outstanding visual character and charm. The lagoon can be a place of relaxation, solitude and quiet contemplation. It can be a special place of reflection – to watch a brilliant sunset or to experience the sounds and sight of water-birds on the lagoon at dawn. These are intrinsic qualities of local and regional significance.

In terms of Indigenous heritage values, this is a traditional resource area of the Darug Aboriginal people. Wetlands have always been a focus for human communities in terms of their natural resources, social and spiritual significance. The Department of Environment and Conservation (DEC) has no records of archaeological relics or deposits for this site. It is unlikely that any physically intact evidence remains after a long history of disturbance and modification of this location. Nevertheless, there are opportunities to investigate potential archaeological deposits and to involve traditional custodians in the protection, management and interpretation of this special place.

Smith Park lies within an important heritage precinct – adjoining St Peters Anglican Church and cemetery. The Hawkesbury landscape has been the subject of artists

since the mid-nineteenth century. Pughs Lagoon has regional significance in terms of its connection with the famous artist Charles Conder. Pughs Lagoon – Smith Park is now part of the Hawkesbury Artists Trail, a regional tourism initiative. The groves of native and exotic cultivated trees, particularly within the southern portion of Smith Park, further reinforce this cultural landscape heritage. The park's connection with the lagoon and easy public access to the water's edge, combined with opportunities for relaxation, exercise, feeding the water-birds, family gatherings, weddings and photography further confirm the site's significance as a regional recreational asset.



PHOTO 2: View overlooking Pughs Lagoon from Smith Park (northern portion adjacent to Francis Street). The lagoon is an integral part of the park's scenic, environmental and recreational values.

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TABLE 2: VALUES AND LEVEL OF SIGNIFICANCE

Key Values	Level of Significance		
	Local	Regional	State
Natural & Cultural Setting			
scenic vistas over lagoon/ visual and aesthetic character		regional	
natural wetlands & cultural landscape setting		regional	
Indigenous & European Cultural Heritage Values			
Darug cultural heritage values – traditional resource area	subject to further investigation		
European – historic precinct/ artist's trail		regional	
Environmental and Biodiversity Values			
geodiversity – floodplain/ lagoons & wetlands	local	regional	
lagoon water quality	local	regional	
biodiversity – aquatic/ wetland habitat values		regional	state
endangered ecological community			state
educational/ scientific values		regional	
Public Recreation and Social Values			
public access/ access to lagoon foreshore		regional	
passive recreation – picnic areas/ shelters & public amenities	local	regional	
feeding water-birds/ bird watching		regional	
opportunities for enhanced facilities – weddings/ gardens	local	regional	
opportunities for educational/ interpretive facilities	local	regional	

Notes: Regional opportunities exist for passive/ cultural and nature-based recreation subject to promotion of heritage values, wetland restoration and improvements to recreational infrastructure.

4.5 NATURAL & CULTURAL SETTING

Natural landscape setting

Freshwater wetlands are among the most threatened ecosystems in the Hawkesbury River floodplain. Pughs Lagoon, like most of the wetlands on this floodplain, has been subject to a long history of human-induced impacts since Edward Pugh first took up a land grant in the area in 1787. Much of its wetland habitat has been lost to past clearing, agricultural land uses, weed invasion, hydrological modification, filling and waste dumping, erosion and siltation, road construction and urban development.

It is important to recognise that wetlands serve a number of important functions including:-

- provide habitat for native plants and animals
- support a complex food chain

- help maintain overall health of the environment
- provide filtration, cleansing and control of water passing through
- control and mitigate flood waters
- provide economic benefits (enhanced agricultural productivity)
- beauty – aesthetic and visual qualities
- cultural, historic and educational values

Pughs Lagoon retains unique ecological values as a freshwater wetland. It has state significance scheduled as an endangered ecological community (TSC Act 1995). The lagoon provides vital habitat for a large range of native species of animals (waterbirds, fish, frogs, freshwater tortoises and invertebrates) and water-loving plants (floating aquatic and water's edge species). The lagoon's waterbirds include black swans, herons, cormorants, egrets, ibis, coots, moorhens, swamp hens and many others. The scenic values associated with the Hawkesbury floodplain and ecological significance of freshwater wetlands are recognised in *State Regional Environmental Plan - SREP No. 20 Hawkesbury-Nepean River (No.2 – 1997)*. The significance of these wetlands and remnant floodplain vegetation in Pughs Lagoon and Smith Park is discussed in section 4.7 *Environment and biodiversity – Endangered ecological communities*.

Scenic and aesthetic values

The perennial freshwater lagoon and wetlands form an integral part of the scenic character, environmental quality and aesthetics of Smith Park and the surrounding rural landscape. The natural water bodies are an outstanding landscape feature and create a distinctive sense of place. They provide a key visual, aesthetic and environmental focus within the cleared floodplain. Artists and photographers have long been attracted to Pughs Lagoon for its natural beauty and quality of light.

Furthermore, the location of Smith Park provides the perfect public viewpoint along Pughs Lagoon. The natural curvilinear shape of this lagoon draws the viewers eye towards its northern extremity. The water body appears to go on indefinitely thus accentuating its significance in the landscape. In reality the lagoon terminates shortly after this most northerly visible point. The visual affect however adds a sense of drama to the location, particularly on early fog shrouded mornings or on evenings when the sunsets can be spectacular. The illusion of distance and greater scale heighten the viewer's experience leaving a lasting impression – one which continues to resonate in the viewer's psyche. The sound and sight of water-birds add to this sensory palette.

The artful manipulation of the viewers reference point and the use of other artificial constructs have been traditionally used to create a sense of grander scale in the landscape (ie. a small lake disappearing in the distance can look like a much larger lake). The approach was used extensively in the creation of English landscape gardens during the eighteenth century, notably the works of 'Capability' Lancelot Brown (1716-83) and his successor Humphrey Repton (1752-1818). It therefore remains an interesting question as to whether the public parkland and the primary viewpoint (adjacent to Windsor Road) are incidental to the road alignment rather than planned with this special view in mind.

The residential development along the north-eastern ridgeline (Francis Street) has little impact on the important view corridor over the lagoon and surrounding rural landscape. Nevertheless, this elevated and visually prominent development intrudes upon the park's broader scenic character and thematic qualities. Consideration should be given

to reducing the scale and impact of housing by sensitive planting within the park (northern boundary) and along Francis Street (outside the park boundary).

Cultural landscape setting – a recent history of development

Smith Park is predominantly a cultural landscape of mown open lawns interspersed with informal groups and rows of cultivated native and exotic trees. The type of recreational facilities are typical of the local parks and reserves. Smith Park has been largely created through the efforts of the Richmond Rotary Club. The Club has been involved in extensive drainage, reclamation earthworks, construction and landscaping since 1972. The large flat grassed area below the amenities building was a former natural wetland and part of the south-eastern lagoon. By 1968, following a long period of neglect, the wetlands had become an uncontrolled and illegal rubbish dump for a large assortment of materials and waste. The Richmond Rotary Club initiated a reclamation project to develop this public parkland beside the lagoon. Most of the reclamation work was conducted during the period 1972-1978. The distinctive log shelters, built by Richmond Rotary Club in 1975, are an important part of the park's character and cultural setting.

Southern grove and wetlands

Smith Park has been turfed with exotic Kikuyu Grass (*Pennisetum clandestinum*) and Common Couch Grass (*Cynodon dactylon*). The grove of exotic trees, located in the southern portion of the park and lagoon edges, consists of self-sown colonisers and garden escapes. They were not planted. Most of these mature trees are deciduous species with an autumn colour display (mainly pale buttercup yellows and brown). These species are typical of the Hawkesbury River floodplain and rural landscape. Many are now considered environmental weeds. These trees include Mulberry (*Morus alba*), Hackberry (*Celtis occidentalis*) and Weeping Willow (*Salix babylonica*). The park and lagoon contains a large number of other exotic introductions which further reinforce the cultural landscape character. It is believed that Crack Willow (*Salix fragilis*), a scheduled noxious weed species, may also be colonising the lagoon edges and shallows (refer to 4.7 Environment and biodiversity – Exotic weeds).

There are opportunities to further consolidate and enhance the grove of ornamental exotics in the park while reinforcing the use of local native species in vital restoration work around the lagoon and levee banks. The planting palette should be consistent with the area's cultural and natural heritage values. The recent removal of exotic weed species (*Ligustrum* sp.) in the southern portion of Smith Park (adjoining Kurrajong Road) will require appropriate buffer planting to reduce road noise and visual impacts (refer to following section on managing *Exotic weeds*).

Eastern embankment – adjoining the cemetery

Notably, the local native deciduous species, White Cedar (*Melia azedarach*), occurs along the upper eastern embankment and along Windsor Street. A number of ornamental exotic and native tree species are colonising this embankment including Silky Oak (*Grevillea robusta*), Purple Flowering Bauhinia (*Bauhinia purpurea*), Chinese Tallow Tree (*Sapium sebiferum*), Jacaranda (*Jacaranda mimosifolia*) and Oleander (*Nerium oleander*). These species combine with environmental weeds such as Camphor Laurel (*Cinnamomum camphora*), Honey Locust (*Gleditsia triacanthos*), Cotoneaster (*Cotoneaster glaucophyllus*), Privets (*Ligustrum* spp.) and Wild Olive (*Olea europaea* subsp. *africana*) to create a dense thicket along this upper eastern boundary. Many of these species are likely to have historic associations with St Peters

Cemetery and St Peters Church. Together they cast a dense shade and reduce opportunities for natural regeneration. This embankment contains significant remnant components of the original river-flat eucalypt forest community (refer to 4.7 *Environment and biodiversity – endangered ecological communities*).

Windsor Street cutting

The dense canopy of weed species extends to the Windsor Street cutting creating a memorable tunnel effect and dramatic entry to Smith Park and Pughs Lagoon. It is believed that the railway line connecting Richmond to Kurrajong passed through this cutting. This vegetation has been locally recognised as a significant grove of trees, albeit dominated by weed species (*Ligustrum/ Gleditsia/ Celtis/ Ailanthus* spp.). These trees raise a complex range of issues relating to management, restoration, visibility and road safety – affecting both pedestrian and vehicle access along this narrow carriageway. These road and traffic issues (separate to the Francis Street issues) were raised during the community workshop but are not specifically covered by this plan of management. Nevertheless, they require further investigation by Council.

Recent landscaping – generic natives

A generic native overlay of evergreen species has been introduced to the park since 1985. In 1993 up to 50 advanced trees were planted in the park. Most of these trees, sourced from nursery stock from a range of geographical locations, were planted as either informal groups or within rows along the road-side. They provide aesthetic and amenity value (eg. shade to picnic areas) and some habitat value for native birds (eg. food source and shelter). These immature trees include Swamp Oak (*Casuarina glauca*), Tallowwood (*Eucalyptus microcorys*), Swamp Mahogany (*Eucalyptus robusta*), Sydney Blue Gum (*Eucalyptus saligna*), Maiden's Gum (*Eucalyptus globulus* ssp. *maidenii*), River Red Gum (*Eucalyptus camaldulensis*), Turpentine (*Syncarpia glomulifera*) and Bottlebrush (*Callistemon* sp.).

The protruding surface roots and suckering habit of the Swamp Oaks (*Casuarina glauca*) are causing serious damage to picnic settings and paved surfaces raising accessibility, public safety and risk management issues. The scalping of surface roots during mowing is promoting secondary woody growth and further suckering. These trees will need to be selectively removed and replaced with other more appropriate species. In addition, some of the planted immature Eucalypts are beginning to block views and scenic vistas over the lagoon and floodplain. It is important to ensure appropriate management and protection of these scenic assets. Native floodplain canopy species, sourced from local genetic stock, should be used to supplement the landscape scheme and assist in the creation of enhanced habitat and bio-linkages.



PHOTO 3: View looking north over lagoon from Smith Park. The park is located on the Hawkesbury floodplain in a predominantly rural setting. Weeping Willows (*Salix babylonica*) [right foreground].



PHOTO 4: Tunnel-view looking north-west along Windsor Street cutting towards Smith Park. The park lies within an historic precinct – St Peters Church grounds are on the left and St Peters Cemetery to the right. The canopy trees are predominantly exotic weed species.

4.6 INDIGENOUS AND CULTURAL HERITAGE VALUES

Indigenous cultural values

The Hawkesbury River, with its floodplains, lagoons, back swamps and marshes, was a traditional resource area for the Darug people for at least 30,000 years. Natural resources included fresh water, opportunities for fishing, hunting and special plants for food, fibres, tools, bark canoe making, transportation and medicine. The wetlands provided important foods such as fish, eels, mussels, tortoises, water birds and wild yams. Wetlands have social, cultural and spiritual significance. They may support special 'totemic' plants and animals and have relevance in terms of dreaming stories. They may include places connected to important people and may contain physical evidence of past uses and occupation (*Water Information System for the Environment, DEC, 2007*).

The archaeological research conducted within the Hawkesbury – Nepean catchment area has revealed a rich archaeological context. The Hawkesbury area currently has approximately 200 recorded Aboriginal sites on the Department of Environment and Conservation (NSW) Aboriginal Sites Register. It is believed that this number may be as large as 4000 sites in the Hawkesbury LGA with more being discovered each year. The combination of elevation above water and proximity to water are considered important factors influencing prehistoric Aboriginal site locations. It is important to recognise that this location has a long history of disturbance and modification spanning more than 200 years. The Department of Environment and Conservation (DEC) currently has no recorded evidence for this site.

Recent research however has confirmed that archaeological lithic assemblages (eg. whole or fragmentary stone artefacts) may be preserved in sub-surface layers even where there has been significant disturbance to the land surface (*McDonald, 2001*). This may have important implications for potential archaeological deposits in Smith Park, particularly within the elevated eastern embankment adjoining St Peter's Cemetery. This area still retains remnants of the original floodplain eucalypt forest indicating a lower level of disturbance.

The DCAC has expressed concern over past protection and care of Aboriginal cultural heritage within the Hawkesbury area (*Watson, L., DCAC, pers. comm. 2006*). It is considered that the significance of these wetlands, as a traditional resource area, should be used for continuing education in Indigenous heritage. Pughs Lagoon offers particular opportunities for developing interpretive signage. In addition, Aboriginal heritage should be further investigated to determine if relics or potential archaeological deposits (PAD) exist and if so, ensure that they are properly protected and managed. Under the *National Parks and Wildlife Act (1974)* and the *Heritage Act (1977)* all Aboriginal sites, whether recorded or not, are protected. This plan of management encourages a continuing consultative strategy with the traditional Aboriginal custodians (refer to 5.0 Management Strategies, 5.2 Action Plan: items B1-B2).

European cultural heritage

Edward Pugh, a carpenter, was convicted for stealing in 1784 and transported to New South Wales in 1787. Following completion of his sentence in 1791 Pugh was granted 70 acres [27.6 Ha] at Prospect Hill. In 1802 Pugh received a second land grant of 100 acres [39.4 Ha] immediately west of Richmond near a lagoon – to become known as

Pughs Lagoon. Pugh died a pauper in the Windsor District Hospital in 1837 (*IFHAA Biographies Library, 2007*)

Pughs Lagoon and Smith Park lies within an historic precinct immediately adjacent to St Peter's Cemetery. The cemetery and sites for the future church and schoolhouse were laid out in 1811 under Governor Macquarie's direction. The cemetery contains the graves of many of the district's pioneer families including John and Honour Bowman, Paul Randall, Margaret Catchpole, William Cox Senior and Joseph Onus Junior. The main entrance to the cemetery is off Windsor Street. A second unformed and overgrown pedestrian track and steps link directly to Smith Park (cemetery's west boundary). Due to concerns over unregulated through access, security and potential for vandalism this secondary track would not be upgraded under this plan of management.

The original St Peters Church and school room was built by William Cox under the direction of Governor Macquarie. A small obelisk in the courtyard commemorates this earlier building. The existing Anglican church was designed by Francis Clarke and consecrated by Bishop Broughton in 1841. The rectory was added in 1847. The church has a panoramic view of the Blue Mountains and Pughs Lagoon (*Hawkesbury Valley Web – Walking Tour of Richmond, 2007*).

The landscape we see today, its character and moods, retain strong connections with the nineteenth century Arcadian vision of the Australian landscape. It was this vision that captured the imagination of many artists, attracting them to the Hawkesbury area during the late nineteenth century. In 1888 the impressionist painter, Charles Conder painted the view looking up towards the church from the southern end of Pughs Lagoon. The painting of Pughs Lagoon, Richmond (oil on cardboard) is held at the National Gallery of Victoria (NGV). Charles Conder arrived in Sydney in 1884 and soon became known as a young and talented member of the Heidelberg School. Conder achieved a lasting international reputation with paintings hung in the Tate Britain, the Victoria and Albert Museum and National Portrait Gallery in London and Metropolitan Museum in New York (*National Gallery of Victoria, 2007 and Charles Conder – The Last Bohemian, Melbourne University Publishing, 2007*).

The Hawkesbury Artist's Trail signage, located in Smith Park near the Francis Street/ Windsor Street junction, commemorates this artist's work at Pughs Lagoon. It is an important part of the Hawkesbury Valley's cultural heritage. Although the foreground landscape has changed (no public through access to the church), the historic buildings are still clearly visible today. Unfortunately, the sign is located some distance from where Conder painted the picture and the original view from the artist's perspective cannot be easily interpreted. A second complimentary sign would be useful to re-direct visitors to the appropriate vantage point at the southern end of the park.

4.7 ENVIRONMENT AND BIODIVERSITY

Climate change

The Hawkesbury River Valley has a warm temperate climate (ie. with a summer and winter season). Rain may occur at any time throughout the year. Median annual rainfall is 1000 millimetres. The catchment has recorded significant changing rainfall patterns, oscillating between periods of high and low rainfall. These patterns have defined alternating flood and drought regimes which affect the management of this site.

The Inter-governmental Panel on Climate Change, in its fourth and latest report re-confirms earlier conclusions in relation to global climate change. Human release of greenhouse gases into the atmosphere has caused, and will continue to cause, global warming for many decades (*IPCC Assessment Report, 2007*). For New South Wales each decade since 1950 has recorded a 0.15°C increase in annual mean maximum temperature and a 14.3mm decrease in annual rainfall (*Water Information System for the Environment, DEC, 2007*). In accordance with the latest CSIRO modelling our climate will continue to change over coming decades producing a range of impacts including the following:-

- increased risk of drought
- increased soil erosion and dryland salinity
- more hot days
- greater bushfire risk.

The existing reduced flow regimes, poor water quality and restricted amount of water filtering through floodplain lagoons and wetlands will be further affected by climate change. It is likely that unless flow rates are improved Pughs Lagoon and its wetlands will continue to be threatened. The NSW Scientific Committee has identified “alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands” as a key threatening process in NSW.

During preparation of this plan of management, water levels in the lagoons had fallen dramatically (up to 1-1.2 metres below top of sandstone wall in northern lagoon by the end of February 2007). The lagoon’s foreshore mudflats were exposed to further drying and public access was possible around much of the northern lagoon at this time. Following rainfall in March 2007 water levels returned within a few days to near the top of the sandstone wall. Water levels are controlled by connecting channels between the lagoons and a stormwater outlet.

Flooding

Floodplains are typically subject to active erosion and aggradation by channelled and over bank stream flow with an average recurrence interval of 100 years or less (*Freshwater wetlands – NSW Scientific Committee Final Determination, DEC, 2007*). The Hawkesbury River floodplain is characterised by long periods of relative stability followed by periodic flood events of short duration but with long lasting impacts on bank stability, erosion and sedimentation. The affects of these natural processes can also be magnified and exacerbated by human-induced impacts. Refer to the City’s *Flood (1:100 year) Maps*.

Flood records at Windsor have been kept since 1790. In 1817, Governor Lachlan Macquarie recorded the catastrophic impact of successive floods which devastated early settlements along the Hawkesbury River floodplain. Twenty-seven major floods were recorded during the nineteenth century claiming the lives of many early settlers. The great flood of 1867 was the highest flood ever recorded at Windsor following a long dry period. Diversion weirs were first constructed in the early 1880s. This was followed by the completion of four dams on the upper Nepean River between 1907 and 1935 and Warragamba Dam in 1960. The November 1961 flood was the largest recorded in the twentieth century. This event was followed by smaller floods in 1978, 1987, 1988, 1989 and 1990. The flood of August 1990 was the largest event since March 1978. It is evident that flooding can occur at any time of the year. Although linked to periods of higher rainfall, flood events follow no regular pattern.

Flood Planning

Flood planning needs to be in accordance with Council's Floodplain Risk Management Plan, *NSW Flood Policy (1984)*, *NSW Floodplain Management Manual (2001)* and *Hawkesbury Nepean Floodplain Management Strategy (adopted 1998)*. The design and construction of roads, car parking areas, pathways, public amenities, picnic shelters and other existing and proposed infrastructure in the park need to consider the implications of flood events. New structures should not obstruct, reduce or interfere with upstream or downstream flood behaviour or adversely impact occupiers of the floodplain. The potential magnitude of flood impacts including the rate of rise and duration need to be considered in the design.

Catchment-scale disturbance

The Hawkesbury – Nepean catchment has a long history of vegetation clearing, agricultural land-uses, ecosystem disturbance and modification, flood mitigation and dam construction and urban development. The allocation of water for irrigation purposes and diversion of Sydney's drinking water (approximately 90% of river flow) have significantly altered downstream flows and reduced the frequency and impact of storm and flood events.

The *Hawkesbury Lower Nepean Catchment Blueprint (2002)* has the primary objective of establishing a sustainable approach to catchment management. It aims to address issues at the sub-catchment level by adopting an integrated approach across several local government areas and delivering the following outcomes:-

- better management of river flows and groundwater;
- reduced degradation of water, biodiversity and land;
- improved quality and quantity of water; and
- improved quality, extent and connectivity of native habitat.

Catchment Management Authorities (CMAs) were established under the *Catchment Management Authorities Act 2003* (CMA Act) to coordinate an integrated approach to natural resource management in each of the catchments. The CMAs are statutory bodies working in partnership with the community, local government, state government and industry. The Hawkesbury Nepean CMA is responsible for preparing Catchment Action Plans (CAPs) and managing incentive programs to implement these plans in the Hawkesbury–Nepean catchment area.

Sub-catchment – Pughs Lagoon

Pughs Lagoon and Smith Park are located within the Richmond floodplain. The lagoon is part of a system of back swamps, marshes and wetlands which stretch across this floodplain from Yarramundi Lagoon to the Richmond Lowlands. This system may be an old anabranch of the Hawkesbury River. The sub-catchment is predominantly rural – cleared agricultural land but also includes the urbanised areas of Agnes Banks, Hobartville, Richmond and extends to the grounds of the University of Western Sydney (Hawkesbury Campus) and into parts of the Penrith LGA. The southern portion of the sub-catchment contains areas of natural vegetation including wetlands and natural springs. A gross pollutant trap (GPT) was recently constructed at Hobartville to reduce gross pollutants and coarse sediments entering the lagoon system (refer to *Changes to wetland hydrology and water quality*). The catchment typically has a low flow regime and the system of lagoons act as natural sink for fine sediments (*Richardson, P., HCC, pers. comm., 2007*).

Geology and soil landscapes

This is a fluvial landscape described as Freemans Reach (fr) and Richmond (ri) in accordance with “*Soil Landscapes of the Penrith 1:100 000 Sheet*” (Bannerman and Hazelton, 1990).

The Freemans Reach (fr) soil landscape typically includes meander scrolls, levees and wetlands within the present active floodplain. These wetlands have been largely drained and filled for agricultural uses. Soils typically consist of deep brown sands and loams, apedal to moderately structured and generally friable, low fertility and highly erodible. They vary from strongly acid (pH 4.0) to moderately acid (pH 6.0). These soil landscapes are subject to flood hazard, localised high water tables and seasonal waterlogging, water and wave erosion hazard.

The Richmond (ri) soil landscape occurs on the higher Quaternary terraces (ie. upper eastern portion of Smith Park). The soils are typically alluvium consisting of sand, silt and gravels derived from sandstone and shale deposited during periods of flood. The topsoil tends to be reddish brown loamy sand to brown sandy clay loam and varies from moderately acid (pH 5.5) to slightly acid (pH 6.5). While topsoils are moderately erodible, subsoils tend to have a much higher erodibility due to very low organic matter and a high fine sand and silt content. These soil landscapes are subject to minor localised flood hazard and high erosion hazard on terrace edges (ie. along the eastern embankment near the public amenities building and pathway).

Topography

The overall topography of Smith Park is flat (< 10 metres AHD) with a moderate rise to the terrace along the north-eastern boundary (approx. 20 metres AHD adjoining the cemetery). The lower north-eastern portion of Smith Park, adjacent to Windsor Street and Francis Street, is located on a former illegal tip site and the soil has been largely modified through imported fill material and reclamation of former wetlands. Soil levels were raised in this process and merge with original ground levels along the toe of the eastern embankment. The less disturbed soils along the embankment retain remnant groundcovers and understorey components of the original river-flat eucalypt forest community. The reclaimed area supports only cultivated species.

The shoreline to the lagoon varies from flat to moderately steep banks up to 1.5-2.5 metres in height, particularly within the northern portion of the lagoon. The ground level

adjoining the southern portion of the lagoon (Smith Park south of Windsor Street) tends to be lower and gradually merges with the water's edge. A battered sandstone rock wall, recently constructed along the north-western edge of Smith Park has raised the shoreline ground level to address localised erosion.

Changes to wetland hydrology and water quality

The construction of Kurrajong Road during the 1960s and subsequent landscape reclamation of wetlands in the 1970s to create Smith Park significantly altered the hydrology of this chain of lagoons. The road works included alterations to invert levels at culverts under the road and further modifications for the purpose of post-flood drainage control. A system of sub-surface drains, culverts and open drains link all of the lagoons. There is only one small stormwater outlet in the park connecting surface run-off to the lagoon. There are no other stormwater outlets entering the lagoon from urban areas.

The importance of protecting environmental values were highlighted in the community workshop. Although Council's Stormwater Levy is coming to an end it will be important to ensure that water sensitive urban design solutions continue to be implemented. It was stated at the workshop that although the lagoon may still have an odour or smell at times (eg. low flow periods) it is believed to be much cleaner than a few years ago. This may relate more to the reduction in gross pollutants and visual factors. Urban and agricultural run-off continues to discharge pollutants such as oil, heavy metals, herbicides, fertilisers (eg. nitrogen and phosphorus) and other contaminants into the lagoon. Hawkesbury City Council has recently installed a new gross pollutant trap (GPTs) at Hobartville replacing an older GPT with poor access. The new GPT lies within a deep swale to capture floodwaters for slow release thus reducing the impact of high volume/ velocity flows, erosion and sedimentation. The GPT is monitored on a monthly basis for accumulated rubbish and is cleaned out when it reaches 80% capacity. The major benefits of this system are as follows :-

- reduces urban gross pollutants (ie. accumulated rubbish) entering the chain of lagoons;
- reduces the amount of coarse sediments entering the system (ie. more than 80% of coarse sediments are captured);
- reduces carbon inflows which can lower oxygen levels in the lagoon (ie. captures organic material which cannot be easily broken down, particularly the leaves of planted deciduous street trees – *Platanus/ Jacaranda* spp.); and
- promotes a natural lagoon hydrology (*Richardson, P., HCC, pers. comm., 2007*).

Changes brought by agriculture and urban development are having a profound impact on the ecological functioning of Pughs Lagoon and its aquatic systems. The recent low water level in the lagoon was accompanied by extensive surface algal blooms. This green algae may adversely affect sediment chemistry and water quality. The nutrient loadings and suspended solids provide an ideal environment for introduced exotic weeds and pest animals such as the European carp. The numbers of these introduced species tend to increase under the altered conditions and become dominant to the exclusion of native aquatic and wetland species. Native fish stocks which were once plentiful have now plummeted. The population dynamics of European carp are the subject of current study to determine how the changes are impacting on native fish

stocks. It is believed that lagoons such as Pughs Lagoon may act as refugia for this pest species to re-colonise major waterways following flood events. Control may be an option in these ecological “hot-spots”. Further data on the composition of the lagoon’s fish population, including age structure and breeding dynamics, is needed. Community education is also required to address the environmental issues associated with people dumping unwanted aquarium fish, invertebrates and weeds into lagoons and other waterways (Richardson, P., HCC, pers. comm., 2007).

Livestock access to the lagoon (northern end) is another issue which affects water quality, nutrient levels, bank erosion and sedimentation. Fencing and pumping of water (fully piped) to a distribution point for livestock would be a preferable solution avoiding ongoing degradation of the lagoon, its banks and native wetland habitat.

Aquatic water-weeds such as Water Hyacinth (*Eichhornia* sp.) have flourished under the reduced flow regime and current drought. Willows (*Salix* spp.) have expanded rapidly in the shallows following the build up of sediments and low flow regime. The control of such noxious weed species creates an ongoing demand on resources.

Water quality is further affected by feeding the geese, ducks and native waterfowl. This popular activity is artificially increasing numbers of waterbirds adding further nutrients (faeces) to the lawns which are washed into the lagoon. The increasing population of domesticated and feral ducks raises further concerns with respect to inter-breeding with native black ducks and competition for food and habitat. These issues will need to be monitored to establish an appropriate balance. It is important to understand the cumulative impacts of each of these factors affecting water quality in the lagoon.

Pughs Lagoon displays the following physical characteristics:

- reduced flows and flooding as a result of upstream dams and weirs, water diversions (including irrigation licences for agricultural use) and local flood mitigation measures;
- reduction in size of lagoons and wetlands due to road works and past filling/reclamation works;
- cleared/ disturbed and eroding lagoon banks with continuing disturbance to edges/ wetlands (eg. park visitors and livestock);
- modification of natural hydrology (sub-surface culverts/ drains and open channels connecting lagoons);
- reduced water holding capacity and filtration qualities;
- high nutrient loadings, turbidity and reduced oxygen levels in water column;
- ongoing sedimentation of the lagoon (particularly southern portion);
- shoreline recession (Smith Park) due to concentrated visitor use and wind-driven wave action;
- recent reclamation and remedial work including installation of battered sandstone boulder edge to address erosion;
- low level of natural vegetation/ recruitment along lagoon edges and wetlands;
- continuing aquatic and wetland weed infestation (particularly within southern lagoon) and pest animal species (eg. European carp); and
- indiscriminate use of herbicides (eg. over-spray onto native wetland species) and mowing practices (restricting native regeneration).



PHOTO 5: View looking south from Old Kurrajong Road over Pughs Lagoon (southern portion). Past clearing and high nutrient levels are encouraging the growth of exotic weeds such as Crack Willow (*Salix fragilis*) [right foreground]. Weed growth and low water flows are increasing the rate of sedimentation.



PHOTO 6: Water Hyacinth (*Eichhornia* sp.) on Pughs Lagoon (southern end near Kurrajong Road) – a noxious aquatic floating weed species which needs to be “continuously suppressed”.

Remnant native habitat – endangered ecological communities

Although the native vegetation of Pughs Lagoon and Smith Park has been largely cleared and modified over a long period of time it still retains unique ecological values as a freshwater wetland and has state significance listed as an endangered ecological community (TSC Act 1995). The eastern embankment of Smith Park also retains some remnant native groundcovers and understorey components of the original river-flat eucalypt forest, an endangered ecological community (TSC Act 1995). Both of these communities are listed in Part 3, Schedule 1 of the *Threatened Species Conservation Act 1995* and described in the Final Determination of the NSW Scientific Committee as follows:-

- ❖ Freshwater wetlands on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions; and
- ❖ River-flat eucalypt forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions.

Freshwater wetlands on coastal floodplains

This ecological community is typically associated with periodic or semi-permanent inundation by freshwater and occurs on silts, muds or humic loams in depressions, flats, drainage lines, back swamps and lagoons on the coastal floodplain. Freshwater wetlands are dominated by herbaceous plants consisting of sedgelands, reedlands and herbfields with few woody species. This community typically forms mosaics with other floodplain communities such as river-flat eucalypt forest.

The structure and composition of the community varies both spatially and temporally according to the water regime. Wetlands which are subject to regular inundation and drying tend to display emergent sedges such as *Baumea articulata*, *Eleocharis equisetina* and *Lepironia articulata* and emergent or floating herbs such as *Ludwigia peploides* subsp. *montevidensis* (water primrose), *Marsilea mutica* (nardoo), *Philydrum lanuginosum* (frogmouth) and *Hydrocharis dubia* (frogbit). The presence of deep standing water typically includes floating and submerged aquatic herbs such as *Azolla filiculoides* var. *rubra*, *Hydrilla verticillata* (water thyme), *Nymphaea gigantea* (giant waterlily), *Ottelia ovalifolia* (swamp lily), *Lemna* spp. (duckweeds) and *Potamogeton* spp. (pondweeds).

Pughs Lagoon retains only a very limited suite of persistent aquatic and semi-aquatic/lagoon edge species as a result of its long history of disturbance. Only 11 species were recorded. The Common Reed (*Phragmites australis*) dominates the margins of the two southern lagoons and northern lagoon area immediately north of Windsor Street. Other wetland species include the Common Rush (*Juncus usitatus*), Slender Knotweed (*Persicaria decipiens*), Tall Sedge (*Carex appressa*), Sedge (*Cyperus polystachyos*), Swamp Pennywort (*Centella asiatica*), Lesser Joyweed (*Alternanthera denticulata*), Mullumbimby Couch (*Cyperus brevifolius*), Water Primrose (*Ludwigia peploides* ssp. *montevidensis*), Scurvy Weed (*Commelina cyanea*) and Duckweed (*Spirodela* sp.). Refer to Appendix IV – Schedule of Existing Native Plant Species.

The field work for the current species list was undertaken during a prolonged drought (February 2007). The number and relative abundance of species changes with time, significant rainfall and flooding as well as any changes to current management regimes – agricultural uses (eg. grazing/ trampling), water diversions, broad-scale herbicidal treatments, mowing practices, visitor impacts and exotic weed invasion. Floating or

standing (ie. above ground) individuals of some species may be absent however the species may be represented below ground in the soil seed banks or as dormant structures such as bulbs, corms, rhizomes, rootstocks or lignotubers (*Freshwater wetlands – NSW Scientific Committee Final Determination, DEC, 2007*). Further investigations, depending on flooding, may reveal a much larger composition.

Freshwater wetlands have a distinctive fauna including waterbirds, frogs (southern and tree frogs), fish, freshwater tortoises, lizards, snakes and a range of macro and micro-invertebrates. The community also supports micro-organisms and cryptogamic plants (algae, fungi, bacteria, etc.) which are poorly documented. Over the past twenty years more than eighty (80) native bird species, including thirty-three (33) native waterbird species, have been recorded at Pughs Lagoon and Smith Park by Keith Brandwood (*Cumberland Bird Observers Club. pers. comm., 2007*). The waterbirds include Black Swan (*Cygnus atratus*), Pacific Black Duck (*Anas superciliosa*), Australian Grey Teal (*Anas gracilis*), White-faced Heron (*Ardea novaehollandiae*), Great Egret (*Ardea alba*), Intermediate Egret (*Ardea intermedia*), Little Egret (*Ardea garzetta*), Straw-necked Ibis (*Threskiornis spinicollis*), Royal Spoonbill (*Platalea regia*), Yellow-billed Spoonbill (*Platalea flavipes*), Black-winged Stilt (*Himantopus himantopus*), Dusky Moorhen (*Gallinula tenebrosa*), Eurasian Coot (*Fulica atra*) and Purple Swamphen (*Porphyrio porphyrio*). Recent research has shown that coastal wetlands, such as Pughs Lagoon, provide vital habitat for inland waterbirds during long periods of drought.



PHOTO 7: Black Swans (*Cygnus atratus*) at Pughs Lagoon. The lagoon's waterbirds are a major attraction for local visitors.

River-flat eucalypt forest on coastal floodplains

In 1998 the National Parks and Wildlife Service (now part of DEC) commenced the Western Sydney Native Vegetation Mapping Project to provide data on the distribution and relative condition of all remnant vegetation in Western Sydney. Special attention was given to vegetation communities listed in the *Threatened Species Conservation Act (TSC Act 1995)*. It is important to recognise the limitations of this data, particularly with respect to accuracy of aerial photographs, polygon size, mapping scale and other environmental data layers (eg. resolution of soil landscape layer at 1: 100000 scale).

The data identified Freshwater Wetlands (Map Unit 36) and Alluvial Woodland (Map Unit 11) in Pughs Lagoon – Smith Park (*NPWS Native Vegetation of the Cumberland Plain – Map 14 of 16 Hawkesbury LGA Eastern Section*). Half of the southern portion of Smith Park was shown as supporting Alluvial Woodland (Map Unit 11 – canopy cover <10%). This area includes the exotic grove of trees (*Morus* and *Celtis* spp.) between the lagoons, the western lagoon margins and road-side embankments to Kurrajong Road. Ground truthing during this study however confirmed that there are no remnant native canopy species in this location – only exotic species, many of which are weeds.

Alluvial Woodland, formerly included under the description of “Sydney Coastal River-flat Forest” is now scheduled as “River-flat eucalypt forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions” in accordance with the Final Determination of the NSW Scientific Committee (17 Dec 2004).

The mapping failed to identify the eastern embankment of Smith Park, an area which supports remnant native groundcovers and understorey components of the original river-flat eucalypt forest. This community, occurring in a narrow strip, is largely overgrown with exotic weeds and colonising ornamental tree and shrub species. Eleven (11) species were recorded, three of which were from the same genus.

White Cedar (*Melia azedarach* var. *australasica*) is believed to be the only remaining native canopy species in the park. This mesic (rainforest) species has traditionally been cultivated as an ornamental garden specimen and has been favoured by altered site conditions. The parks trees are likely to be self-sown from the seeds of local cultivated trees. The understorey components include Blackthorn (*Bursaria spinosa*), Weeping Grass (*Microlaena stipoides*), Blady Grass (*Imperata cylindrica* var. *major*), Plume Grass (*Dichelachne rara*), Love Creeper (*Glycine clandestina*, *G. microphylla* and *G. tabacina*), Tufted Bluebell (*Wahlenbergia communis*) and *Einadia trigonos*. Refer to Appendix IV – Schedule of Existing Native Plant Species.

Notably, a single native canopy species, Broad-leaved Apple (*Angophora subvelutina* X *A. floribunda*), still occurs within the cemetery grounds (adjoining the Windsor Street cutting). This mature tree, with branches hanging low to the ground, provides an easily accessible seed source (ie. local genotype) for future restoration work in the park. Moreover, the embankment offers significant opportunities for developing an easily accessible and visually prominent demonstration site for environmental education and community involvement in bush regeneration.

River-flat eucalypt forest on coastal floodplains has no particular tree species occurring frequently across all sample sites. Canopy species on this embankment may have included Forest Red Gum (*Eucalyptus tereticornis*), Cabbage Gum (*Eucalyptus amplifolia* subsp. *amplifolia*), Rough-barked Apple (*Angophora floribunda*) and Broad-leaved Apple (*Angophora subvelutina*). The small tree and shrub stratum may have included *Acacia parramattensis*, *Melaleuca styphelioides*, *Melaleuca linariifolia*, *Tristaniopsis laurina*, *Callistemon salignus*, *Hymenanthera dentata*, *Ozothamnus diosmifolium*, *Trema aspera*, *Backhousia myrtifolia* and *Bursaria spinosa* (one specimen still remaining on site). Typically, the ground stratum may have included *Adiantum aethiopicum*, *Doodia aspera*, *Microlaena stipoides* var. *stipoides*, *Lomandra longifolia*, *Pteridium esculentum*, *Pratia purpurascens*, *Desmodium varians*, *Entolasia marginata* and *E. stricta*, *Oplismenus aemulus*, *Themeda australis*, *Austrostipa*

ramosissima, *Einadia hastata* and *E. trigonis*, *Cayratia clematidea*, *Eustrephus latifolius*, *Geitonoplesium cymosum* and *Clematis aristata*.

Exotic weeds

As discussed in the previous section *Cultural landscape setting – a recent history of development*, the park is primarily a cultural landscape, dominated by exotic tree species. These tend to be self-sown (ie. garden escapes) and include ornamental species such as Silky Oak (*Grevillea robusta*), Purple Flowering Bauhinia (*Bauhinia purpurea*), Hackberry (*Celtis occidentalis*) Chinese Tallow Tree (*Sapium sebiferum*), Mulberry (*Morus alba*), Jacaranda (*Jacaranda mimosifolia*) and Oleander (*Nerium oleander*). All of these exotic tree species continue to reproduce and compete aggressively with native regenerating species of the wetland and river-flat eucalypt forest communities. Weeping Willows (*Salix babylonica*) are another prominent exotic component with many hybrid forms (all declared noxious weeds) well established in the Hawkesbury Valley. Since the 1970s-80s period, generic native trees of nursery origin, including *Casuarina*, *Eucalyptus* and *Callistemon* spp. have been introduced to further embellish the park.

In terms of native vegetation management, a weed is defined as any non-indigenous plant, including native species which may have been introduced from other genetic sources or geographical regions. Weeds create management problems for local councils as they draw scarce resources away from other areas of management. Community consultation identified weed management as an important continuing issue affecting the lagoon and wetlands. Pughs Lagoon and Smith Park are affected by a broad range of introduced weed species. The survey conducted in February 2007 recorded more than 50 exotic weed species and a further 10 generic native and exotic ornamental species (refer to *Appendix V – Schedule of Exotic Weed Species*). The number of weed species is likely to be far greater than this current figure.

The level of weed invasion has a close correlation with past clearing of native vegetation, soil disturbance and dumping of landfill, rubbish and garden refuse, eutrophication and polluted run-off from urban and agricultural areas, construction of roads and drainage modifications and grazing by domestic livestock. Management and maintenance regimes, including mechanical and chemical methods of aquatic weed control also continue to impact upon recruitment and recovery of native species. Weeds tend to be fast-growing colonising species with highly aggressive reproductive strategies and can be divided into three main groups:-

- woody weeds (including trees and shrubs); and
- vines and climbers;
- persistent perennials/ groundcovers and annuals.

The major woody weeds in the lagoon and wetland margins include Weeping Willow (*Salix babylonica*) and possibly Crack Willow (*Salix fragilis*) or a similar hybrid, which is scheduled as a noxious weed species. The *Salix* sp. (hybrid form) is actively colonising the shallow waters where sediment has built up in the southern lagoon. They are reducing areas of open water, restricting the growth of native aquatic species and promoting the processes of sedimentation and infilling. These trees will need to be selectively removed under a staged program and carefully monitored. Water Hyacinth (*Eichhornia crassipes*), a floating aquatic and declared noxious weed species, is also present in large numbers in this part of the lagoon (near Kurrajong Road). The exotic

weed species, Brazilian Water Milfoil (*Myriophyllum aquaticum*) and exotic sedges including (*Cyperus congestus* and *C. exaltata*) are also present. It is not clear whether mechanical removal of sediments following removal of the trees (*Salix* spp.) would have any long term benefit for the lagoon's ecology. It is doubtful that the Department of Lands and Department of Natural Resources would support this intervention strategy. It is possible that a large flood event would flush out sediments and increase water depth in the lagoon.

Woody weed species which favour the drier lagoon banks and adjoining terraces include Camphor Laurel (*Cinnamomum camphora*), Honey Locust (*Gleditsia triacanthos*), Tree of Heaven (*Ailanthus altissima*), Cotoneaster (*Cotoneaster glaucophyllus*), Large-leaved and Small-leaved Privets (*Ligustrum lucidum* and *L. sinense*), Wild Olive (*Olea europaea* subsp. *africana*), Lantana (*Lantana camara*), Green Cestrum (*Cestrum parqui*) and Blackberry (*Rubus fruticosus*). These tree and shrub species create dense weed thickets along Windsor Street, Kurrajong Road embankments and along the upper eastern boundary of Smith Park.

Balloon Vine (*Cardiospermum grandiflorum*), Moth Vine (*Araujia hortorum*) and Madeira Vine (*Anredera cordifolia*) are the major vine weed species. Persistent perennials include Paddy's Lucerne (*Sida rhombifolia*), Fennel (*Foeniculum vulgare*), Fleabane (*Conyza bonariensis*), Paspalum (*Paspalum dilatatum*), Barnyard Grass (*Echinochloa crus-galli*), Pigeon Grass (*Setaria* spp.) and African Love Grass (*Eragrostis* spp.). Pigweed (*Portulaca oleracea*) is a persistent broad-leaf weed growing in all mown grassed areas (Kikuyu Grass/ Couch Grass).

Some of these weed species have been declared as noxious under the *Noxious Weeds Act 1993* for the control area of Hawkesbury River County Council (refer to *Table 5: Noxious Weed Species – Pughs Lagoon and Smith Park*). All declared noxious weed species are to be managed in accordance with the legal requirements for each category. All treatments should be carefully targeted to avoid harm to native recruitment and regeneration. Indiscriminate broad-scale chemical applications should be avoided. For a full list of noxious weed declarations for Hawkesbury River County Council (HRCC) refer to: <http://www.dpi.nsw.gov.au/agriculture/noxweed/noxious-app>

TABLE 3:
Noxious Weed Species – Pughs Lagoon and Smith Park

Weed Description	Class	Legal Requirements
Water Hyacinth (<i>Eichhornia crassipes</i>)	3	continuously suppressed
Green Cestrum (<i>Cestrum parqui</i>)	3	continuously suppressed
Blackberry (<i>Rubus fruticosus</i> agg. spp.)	4	control growth & spread
Prickly Pear (<i>Opuntia stricta</i>)	4	control growth & spread
Privet (Broad-leaf) (<i>Ligustrum lucidum</i>)	4	control growth & spread
Privet (Narrow-leaf) (<i>Ligustrum sinensis</i>)	4	control growth & spread
Lantana (<i>Lantana</i> spp.)	5	notifiable weed
Willows (<i>Salix nigra</i> / <i>S. fragilis</i> agg. spp.)	5	notifiable weed

Weed management and rehabilitation strategy

The following definitions have been adapted from the *Australian Natural Heritage Charter* (1999) and relate specifically to weed management and rehabilitation strategies for natural areas affected by human-induced impacts:

1. **Regeneration** – the recovery of natural integrity following disturbance or degradation (using minimal disturbance methods appropriate to ecological communities retaining a moderate to high level of resilience).
2. **Restoration** – returning existing habitats to a known past state or to an approximation of the natural condition by repairing degradation, by removing introduced species, or by reinstatement (moderate to high level of ecological disturbance and modification/ low resilience).
3. **Enhancement** – the introduction to a place of additional individuals of one or more organisms, species or elements of habitat or geodiversity that naturally exist there (moderate to high level of ecological disturbance and modification/ low resilience).
4. **Reinstatement** – to introduce to a place one or more species or elements of habitat or geodiversity that are known to have existed there naturally at a previous time but can no longer be found at that place (moderate to high level of ecological disturbance and modification/ low resilience).

It is important that these strategies are carefully integrated within a future rehabilitation program for the lagoon and parkland. The program needs to address the cultural significance of the setting, view corridors, visitor and recreational preferences as well as environmental and economic constraints such as level of disturbance/ weed invasion, relative resilience and integrity, habitat protection and enhancement and appropriate funding.

The recent history of the park and its wetlands has focussed on reclamation and embellishment within a cultural landscape context. There has been tremendous local effort over many years by the Richmond Rotary Club in improving the park's recreational assets. Noxious and environmental weeds within the lagoon and wetlands have been intermittently targeted by the HRCC and Council as part of the overall management package (eg. recent *Ligustrum* sp. removals along the lagoon margins). This work has been conducted on an "as needed" basis rather than under an integrated management program. For example, the removal of *Ligustrum* sp. in the southern portion of Smith Park (adjoining Kurrajong Road) has increased the level of road noise and traffic visibility for park visitors in this location. The embankment and lagoon margins will require appropriate buffer planting using locally-sourced native species (including shrubs and trees) to reduce these impacts.

Although there has been some recent restoration initiatives conducted by Council in the southern lagoon area (eg. open channels) these efforts have been adversely affected by the drought, maintenance and current mowing regime. The next phase should aim to integrate the park's cultural assets with a new focus on enhancement of broader natural, environmental and biodiversity values. This may include establishing a

volunteer Bushcare/ Landcare group and/ or contract bush regenerators to begin restoration work.

It is important to recognise the dynamic nature and inherent instability of floodplain communities. They pose significant challenges for ongoing weed management and rehabilitation. The program needs to target and control re-invasion by exotic weed species and provide an enhanced level of resilience. The relatively small size and configuration of the lagoons and wetland areas present opportunities to effectively stage these works under an appropriately funded program.

Future management

Key aims and objectives for weed management and rehabilitation of Pughs Lagoon and Smith Park's natural areas include the following:-

- ❖ address long term objectives of building ecosystem resilience and durability in natural areas;
- ❖ selectively target and control noxious and environmental weeds in conjunction with appropriately staged restoration and enhancement strategies including the following priority target areas:
 - southern lagoon area (ie. *Salix* spp. in shallows/ margins and open water aquatics – *Eichhornia* and *Myriophyllum* spp.);
 - wetland channels/ margins adjoining southern lagoons;
 - north-eastern embankment (adjoining the cemetery);
 - adjoining embankment to Kurrajong Road and western foreshore; and
 - northern lagoon (north-eastern and western shoreline).
- ❖ develop opportunities for consolidating gains (eg. reduce edge to area ratios, enhance buffers and bio-linkages);
- ❖ promote opportunities for using skilled labour (ie. qualified and experienced contract bush regenerators) to drive implementation of the strategy;
- ❖ promote involvement by community volunteers (ie. Landcare group), school groups and employment training programs;
- ❖ improve community education/ interpretation, involvement and stewardship in the ongoing management and restoration of the lagoon and its wetlands;
- ❖ protect areas under regeneration/ restoration (as necessary) and control potential for trampling and multiple-tracking;
- ❖ protect and manage recreational values, scenic/ rural qualities and view corridors (ie. restoration should be sensitive to cultural/ historic values, visitor preferences and recreational needs);
- ❖ maintain a high level of visibility, passive surveillance and public safety (ie. establish appropriate planting palettes/ layouts with respect to potential height/ massing of native plant species);
- ❖ promote opportunities for partnerships with adjoining land owners to assist in biodiversity conservation and restoration; and
- ❖ seek appropriate funding to fully implement these long term objectives and deliver a sustainable outcome.

The strategy should be consistent with Best Practice Guidelines for Bush Regeneration on the Cumberland Plain (DLWC and Australian Association of Bush Regenerators, 2003), Management Principles to Guide the Restoration and Rehabilitation of

Indigenous Vegetation (Greening Australia) and Florabank Guidelines for native seed collection, production, handling and storage. Only local provenance-sourced native plant species should be used in restoration, enhancement and reinstatement works. The strategy should aim to establish a representative level of species and structural diversity appropriate to the area's ecological communities and site-specific conditions.

4.8 PUBLIC RECREATION AND SOCIAL VALUES

Regional context – open space

Pughs Lagoon and Smith Park is an important part of Hawkesbury City Council's public parks and reserves system. The park's recreational opportunities and range of facilities are typically passive, low-key and consistent with the park's unique natural and cultural setting. The park presents a high standard of maintenance and care. Richmond Rotary Club has been the driving force behind the park's landscape reclamation from neglected tip site in 1968 to parkland, including design and development of much of its recreational infrastructure. The lagoon and parkland have regional significance drawing on a large catchment of local residents and visitors to the Hawkesbury Valley. Furthermore, it is important to recognise the lagoon and parkland's significance within the broader Crown reserves system. In accordance with the *Crown Lands Act* (s.10 CLA 1989) the reserve must be managed for the benefit of the people of New South Wales (refer to 2.6 *Objects of Crown Lands Act*).

Demographics and regional demand

In 2001 the Hawkesbury City LGA had a population of 63,548. A total of 94% of the population lives in the far south-eastern portion of the LGA. It is a culturally diverse community with more than 12% of the population born overseas (43% of this group were born to mainly non-English speaking countries). In 2001, the LGA's Indigenous population was 1,023 (1.7% of total population) with 45% being under 15 years of age. The ABS projections estimate a population of 83,920 by 2031 (ie. overall increase of 25.2% over this time frame). Although recent demographic trends show an ageing population shift across Australia and within the Hawkesbury LGA, the City also has substantial numbers of younger families with children.

Recent research into regional demand and opportunities in the broader Western Sydney metropolitan area, prepared by the Department of Planning (formerly DIPNR), identified a number of key issues and needs which are relevant to the future management of Pughs Lagoon and Smith Park as follows:-

- demand for quality recreational settings (eg. natural areas/ parks);
- public access to water (eg. fishing);
- need for broad community access for a culturally diverse community, range of age groups and abilities (including people with a disability); and
- growing community participation in informal passive recreation activities (eg. walking, picnics and socialising with friends).

In terms of visitor preferences and recreational choices the research identified "nature reserves and waterways" as the top priority for further improvements. Recreational values are closely linked with environmental quality and the opportunities provided by

the setting. This research is supported by the community consultation undertaken for this plan of management. Community responses highlighted the following recreational values associated with Pughs Lagoon and Smith Park (see 4.2 *Community Values*):-

Key issues affecting recreational values

The following key issues affecting recreational values at Pughs Lagoon and Smith Park were raised at the community workshop:-

- ❖ traffic management;
- ❖ public access and safety;
- ❖ pedestrian linkages and circulation;
- ❖ access for the disabled;
- ❖ car parking areas;
- ❖ security and park lighting;
- ❖ existing and proposed recreational facilities;
- ❖ weddings and bookings;
- ❖ waterbirds and interpretive signage; and
- ❖ dog issues.

Francis Street – traffic management

The issues of traffic volume on Francis Street, traffic speed, peak periods of use and public safety, particularly for families and children using the park, rank as possibly the number one area of community concern. Most of the responses to questionnaires and submissions included this item as the top ranking issue. Francis Street is currently a through residential road splitting the northern portion of Smith Park into two separate areas. The road was originally constructed across the Crown reserve parcel rather than via the lagoon foreshore road reserve. Francis Street intersects with Windsor Street – Old Kurrajong Road near Pughs Lagoon and this thoroughfare is used as a fast-track alternative route into and out of Richmond, particularly during commuter hours. The speed limit is 50 kph however speeds are frequently much higher.

The park and its facilities cater for family groups and children (eg. pedestrian traffic, children feeding ducks, playing games, etc). It is believed that there is a serious conflict between the safety needs of visitors engaged in recreational activities and commuters using this road as a time saving short cut. Over the past ten years traffic volumes have increased significantly further raising concerns over pedestrian safety in the park. The park's narrow roads and large numbers of parked cars on weekends also combine to obstruct motorists' views of pedestrians, especially children. The proposal for future expansion of adjoining polo fields on Old Kurrajong Road may also increase traffic volumes in this area, particularly on weekends.

A proposal to close Francis Street to vehicular traffic at Smith Park was first raised at the Local Traffic Committee Meeting in 1987. In 1998 Council recommended that an investigation be conducted with a view to closure of Francis Street at its western end and adjacent to Smith Park. The proposal was linked to plans for upgrading of the park and preparation of a plan of management. In 2000, following public exhibition of the proposed road closure, submissions were received by Council. The community was split over the proposed road closure with a clear majority against the proposal (*HCC Infrastructure Meeting 27.06.2000*). Concerns were raised over a potential increase in traffic volume in Windsor Street, greater traffic congestion and pedestrian safety issues (especially near the church and cemetery). Council decided not to proceed and a

further petition by supporters of the proposal was submitted.

Workshop participants suggested developing ways to slow the traffic through the park rather than closure altogether (eg. traffic calming devices such as slow-points and threshold/ gateway treatments). Raised crossings/ road humps are not recommended. The configuration of existing vehicular barriers would need to be revised to ensure that drivers were unable to go around these traffic calming points. A reduced speed limit of 25 kph through the park was also suggested in a written submission. An appropriate traffic management solution would potentially re-define the local road's character and change motorist's perceptions of the road as a suitable short cut. It would also reinforce the importance of the surrounding parkland and recreational uses.

The issue regarding the narrow roadway through the Windsor Street cutting was also raised at the workshop. The tree cover over the roadway can make it difficult to see oncoming traffic, particularly at times of low light levels (eg. dusk). Although the Windsor Street cutting is not within the study area the issue of pedestrian safety in this location was discussed.

Public access – pedestrian circulation and car parking areas

Issues relating to public access and safety were a second key area of concern for the community. There is no easy safe pedestrian access along Windsor Street cutting to Pughs Lagoon and Smith Park. A higher unsealed pedestrian track and steps connects to the grassed area of Smith Park and runs along side St Peters Cemetery. This old pathway is poorly graded with no finished surfacing and no connecting pathways. Similarly, there is no pedestrian pathway linking Francis Street to Smith Park.

Although there is reasonably flat access through the park and to the lagoon (over mown grass) there is no all-weather sealed pathway circulation linking car parking areas to the water and recreational facilities (including the new picnic shelter). The lack of pathways for prams and disabled access, especially at the northern end of the park, was another key issue identified at the workshop. The design of disabled access to the lagoon foreshore would need to consider appropriate safety treatments (eg. suitable grades and safety railings for disabled access and prams).

The existing public amenities building, located on the eastern embankment, has no disabled access ramps or connecting pathways into the reserve and no link to car parking areas. The existing steps and hand-rails are in poor condition. Localised bank erosion near the steps has created further issues with regard to potential trip points and public safety.

A number of specific issues have been raised with regard to disability access as follows:

- overall lack of provision for disabled access from parking areas to lagoon and park facilities (ie. picnic shelters/ public amenities);
- no designated disabled parking spaces in car parking areas;
- existing earth batters/ surface drainage in car parking areas prevent wheelchair access to lagoon and facilities (too steep);
- only one table next to lagoon is suitable for wheelchair access – need more tables with signage (identifying disabled access);
- no disabled access to toilets (currently stepped access to toilets with no ramps) and need for unisex disabled toilet; and

- need for connecting concrete pathways, including a new pathway along the edge of the lagoon.

It is important to find a balance in terms of desirable change in this unique lagoon setting – to protect and manage intrinsic natural qualities or to follow a path of incremental change. The northern lagoon area adjoining Smith Park has recently undergone significant changes with stabilisation and reclamation (ie. new battered sandstone wall) re-shaping the foreshore to the lagoon. The addition of a concrete pathway along the edge or set-back from the edge would significantly change the visual character of the lagoon and intensify the level of development in the park.

Currently, the car parking areas have an unsealed gravel surface and during periods of rain become very “chopped up” and eroded. Water tends to pond in local depressions and scour sections of the car park (particularly the northern area). Existing parking areas provide for approximately 80-90 vehicles. The Richmond Rotary Club installed the vehicular log barriers approximately 10 years ago. The current status of the car parking areas remains low-key with no sealed surfaces and no kerb and guttering. These are typical of many parks in the Hawkesbury LGA. Community consultation identified a need for grading and formalisation of angle parking on both sides of Francis Street and re-surfacing with a bitumen seal. Line-marking would also optimise parking spaces. An open grass cell paving system is likely to fail under the high levels of visitor usage. Any future improvements need to consider the potential impact of encouraging more visitors and greater traffic volumes in the park as well as the environmental issues such as increased run-off and pollutants into the lagoon. It is possible to address the environmental issues using a suitable bio-filtration system. Direct piping of car park surface run-off to the lagoon would not be acceptable.

There are also issues relating to the car parking area's late-night and week-end use with anti-social behaviour (eg. speeding cars, vandalism, drink driving, playing of loud music, etc.) causing ongoing problems for residents. To address anti-social behaviour some local councils have moved to restrict parking after dark (eg. Tench Reserve – Penrith City Council) or to establish “alcohol free zones”. This area is already designated as an “alcohol free zone”. All of these options require additional policing.

Recreational facilities – picnic shelters and barbeques

Recreational infrastructure in Smith Park is low-key and typical of many of Hawkesbury City's parks and reserves. For a detailed description of facilities, improvements and their condition, refer to *Table 2: Description of Crown Reserve – Existing Facilities & Improvements*.

Some park facilities such as the old log shelters (built in 1975 by the Richmond Rotary Club) should be inspected to assess any structural issues and potential replacement (ie. possible wood rot in supporting members). Picnic tables and seats in these shelters should also be included for further investigation. The gas-fuelled BBQ area, installed in 2002 in the northern portion of Smith Park, is particularly popular on week-ends and public holidays. Consideration should be given to installing additional gas BBQ facilities (including a shelter and BBQ plates), possibly located in the southern portion of Smith Park.

Two new shelters and BBQ facilities are proposed by the Richmond Rotary Club under current funding from local donations. While dispersal of facilities can improve service to

the public and reduce concentrated visitor use in the park, it is important to avoid additional clutter and filling open spaces. The integration of recreational facilities (ie. installation of larger combined BBQ areas and picnic tables/ seating under the same shelter) may provide significant cost savings and reduce the need for more smaller facilities.

Park lighting – security

The recent installation of security lighting over the amenities building has significantly reduced vandalism. Park lighting should also be considered in other parts of the park to improve security, particularly in car parking areas and proposed pedestrian links.

Children's play area – option

The potential for a new children's play area was also discussed at the workshop. The park once contained some play equipment but these items were removed as part of a maintenance and risk management review. The large grassed areas currently serve as informal play areas for ball games and other children's play. A purpose-built children's play area would need to address specific needs of the community, type of age group(s) to target, site suitability and most importantly child safety, particularly in relation to through roads (Francis Street and Windsor Street) and the adjoining lagoon. Enclosure of the play area with child safety fencing/ gates would be necessary adding further to construction costs.

Weddings and bookings

Workshop participants supported the use of the park for weddings (particularly in the southern portion) but were against over commercialisation. Bookings for weddings may offer a potential source of funding for future park upgrades. The Richmond Rotary Club stated in its submission (dated 7th March 2007) that "no financial charges [are] to be levied on any group or persons in this Park" (item 8). Further landscape embellishment (eg. ornamental gardens) may be an option however these elements would be costly to maintain.

Visitor education and signage

The lagoon and its waterbirds are a major attraction for families and young children. Accordingly, it is believed that there are opportunities to improve visitor interpretation of the lagoon's natural history, its wetland habitat and identification of bird species through suitably designed vandal-resistant signage. The location's cultural heritage has already been highlighted through the Hawkesbury Artist's Trail signage.

Companion animal issues

Walking dogs in the park is one of the more popular local pastimes. Dogs need to be kept on leash at all times. The installation of dog waste bins (or sponsored supply of dog faeces bags) were suggested in the community workshop as a means to better manage the large numbers of local visitors with dogs.

Managing recreational values

While upgrading facilities would be desirable as part of a broader program of maintenance and replacement, it is important to ensure that existing identified values are retained and protected. The upgrading of facilities and access may increase potential negative impacts such as greater visitor numbers, increased traffic volumes, parking and congestion issues, perceived crowding in picnic areas and dissatisfaction with the overall experience.



PHOTO 8: View from Francis Street looking south-west over Pughs Lagoon and Smith Park. The road cuts through the park. Peak traffic flows together with speeding vehicles are a major safety issue for local residents.



PHOTO 9: Smith Park has a range of recreational facilities including picnic shelters/ seating, gas barbeques, public amenities and car parking areas. The upgrading of facilities and public access, including disabled access, needs to protect the park's low key character and natural/ cultural setting.

The potential also exists for increased natural resource impacts through increased visitor loadings (eg. need for additional picnic shelters and BBQs, more paved areas, increased discharge of surface pollutants into the lagoon, less open space, trampling of wetland plants, disruption of waterbird nesting sites, etc). Larger numbers of weekend visitors may also impact on the tranquillity and peacefulness of the lagoon and park, important values expressed in the community consultation. The need for further intervention, such as recent construction of the sandstone wall, will continue to grow with increases in visitor numbers. Over time these creeping or incremental changes may gradually lead to natural resource degradation, loss of cultural and scenic values and reduce experiential qualities for park visitors. An understanding of this process has important implications for future management.

It is essential that all environmental and social impacts are managed on a sustainable basis. This section of the plan of management has defined Pughs Lagoon and Smith Park's key values and established objective limits on the types and amounts of change that are either desirable or acceptable. Accordingly, visitor and site management strategies should focus on the following objectives:-

- ❖ maintain and promote long term sustainability of the lagoon and parkland as a limited and finite resource;
- ❖ continue to address water quality, environmental flows, weeds and pest species and bank stability and erosion issues which potentially reduce the recreational experience and other values;
- ❖ address traffic management issues and promote safe, easy access to the lagoon, parkland and recreational facilities;
- ❖ implement measures to improve visitor management and education in low-impact activities;
- ❖ provide for recreational infrastructure and activities within the most durable sites having regard for public safety and security;
- ❖ provide enhanced protection of sensitive ecological areas under regeneration/ restoration;
- ❖ implement an integrated weed management and restoration strategy including promotion of volunteer involvement, public education and partnerships with adjoining land owners; and
- ❖ promote opportunities for interpretation of natural, cultural and Indigenous heritage and environmental issues.

In establishing limits of desirable or acceptable change, this plan of management provides a framework for the reserve's future management.

4.9 VISION STATEMENT

The following statement provides a vision for Pughs Lagoon and Smith Park which forms the basis for the following management strategies:-

"To ensure appropriate protection, sustainable management and enhancement of the lagoon and parkland's unique natural and cultural setting, its scenic qualities, heritage, environmental and recreational values in accordance with the principles of Crown land and community land management for the benefit of the broader community and for future generations".

...

5.0 MANAGEMENT STRATEGIES

5.1 OVERVIEW

This section of the plan of management addresses the following objectives:-

- ❑ to establish core objectives for the community land categories;
- ❑ to develop an action plan for implementing core objectives and management strategies (ie. desired outcomes);
- ❑ to develop performance targets to assess and monitor strategies;
- ❑ to assign directions and priorities (spanning the next 5-years);
- ❑ to address future leases and licences; and
- ❑ to develop a master plan for implementation of the strategic plan.

5.2 COMMUNITY LAND – CORE OBJECTIVES

In accordance with the *Local Government Act 1993*, each category and sub-category are provided with a set of core objectives. Refer to section 2.11 *Community Land Categorisation* and *Table 4: 5.2 Schedule of Core Objectives*.

5.3 ACTION PLAN

Table 5: 5.3 Action Plan is divided into six separate columns as follows:-

- *key management objectives or desired outcomes* (column 1);
- *performance targets* (column 2);
- *item or reference number* (column 3);
- *means of achievement or management actions* (column 4);
- *means of assessment of the actions* (column 5);
- *priority ranking* for each management action (column 6).

Desired Outcomes (column 1)

There are four sections to the action plan. These sections are divided into the following headings in accordance with the desired outcomes as shown:-

1. Crown reserve/ community land management – development, activities, leases and licences

To establish an appropriate management framework and guidelines for assessing development, activities, leases and licenses in accordance with the requirements of the Crown Lands Act 1989, Local Government Act 1993, case law judgements and other relevant policy.

2. Indigenous and cultural heritage

To protect, manage and promote understanding and interpretation of Aboriginal and Non-Aboriginal cultural heritage values.

3. Environment/ biodiversity

To protect, manage and enhance the lagoon and wetland's environmental quality, scenic character, health and biodiversity values.

4. Recreation, access and facilities

To maintain and enhance appropriate recreational infrastructure including safe public access/ linkages and opportunities for passive recreation.

Performance targets (column 2)

The *desired outcomes* and *core objectives* are in accordance with the discussion and recommendations in *4.0 Basis for Management* which in turn have guided the development of *performance targets* in the action plan.

Management actions/ item no. (columns 3 and 4)

The performance targets or management objectives provide the framework for developing specific *management actions* or the *means of achievement*. Each action is assigned an item number based on the relevant section (eg. Sec. 1: Crown land/ community land management – development, activities, leases and licences **A1** to **A11**, followed by Sec. 2 – **B1** to **B5**, etc.).

Performance measures (column 5)

The action plan establishes a system of checks and balances to assess actions in relation to performance (ie. *means of assessment*).

Priorities

Priorities for each management action are assigned according to relative importance – very high, high, medium and low. It is envisaged that actions will be addressed on a priority basis, by the Policy and Services Unit responsible, and in accordance with the means of assessment as follows:-

VERY HIGH	= 1 year
HIGH	= 1-2 years
MEDIUM	= 3-4 years
LOW	= up to 5 years

5.4 CAPITAL WORKS PROGRAM

Priorities and cost estimates are further developed in the 5-year capital works program (refer to *Table 6: Capital Works Program*). The Opinion of Probable Landscape Construction Costs is based on the Landscape Masterplan and is indicative only.

5.5 LANDSCAPE MASTER PLAN

The Landscape Masterplan (see *Figure 5: Landscape Masterplan*) identifies key management actions to be implemented throughout the 5-year capital works program, subject to available funding.

5.0 MANAGEMENT STRATEGIES
5.2 Schedule of Core Objectives

Table 4

community land management	core objectives
	<p>Management strategies must be consistent with community land categories and their respective core objectives as identified in this plan of management.</p> <p>Core Objectives: Management of community land categorised as a Park (36G)</p> <p>"The core objectives for management of community land categorised as a park are:</p> <ul style="list-style-type: none">a) to encourage, promote and facilitate recreational, cultural, social and educational pastimes and activities; and;b) to provide for passive recreational activities or pastimes and for the casual playing of games; and;c) to improve the land in such a way as to promote and facilitate its use to achieve the other core objectives for its management."<p>Core Objectives: Management of community land categorised as a Natural Area (36E)</p><p>"The core objectives for management of community land categorised as a natural area are:</p><ul style="list-style-type: none">a) to conserve biodiversity and maintain ecosystem function in respect of the land, or the feature or habitat in respect of which the land is categorised as a natural area; and;b) to maintain the land, or that feature or habitat, in its natural state and setting; and;c) to provide for the restoration and regeneration of the land; and;d) to provide for community use of and access to the land in such a manner as will minimise and mitigate any disturbance caused by human intrusion; and;e) to assist in and facilitate the implementation of any provisions restricting the use and management of the land that are set out in a recovery plan or threat abatement plan prepared under the Threatened Species Conservation Act 1995 or the Fisheries Management Act, 1994."<p>Core Objectives: Management of community land categorised as a Natural Area: Wetland (36K)</p><p>"The core objectives for management of community land categorised as wetland are:</p><ul style="list-style-type: none">a) to protect the biodiversity and ecological values of wetlands, with particular reference to their hydrological environment (including water quality and water flow), and to the flora, fauna and habitat values of the wetlands; andb) to restore and regenerate degraded wetlands; and;c) to facilitate community education in relation to wetlands, and the community use of wetlands, without compromising the ecological values of wetlands."

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5.0 MANAGEMENT STRATEGIES
5.3 Action Plan

Table 5

Performance Target (Management objectives)	Item	Means of Achievement (Management Actions)	Means of Assessment (of the actions)	Priority
Desired Outcome: To establish an appropriate management framework and provide guidelines for assessing development, land uses, activities, leases and licences.				
Guiding legislation: To ensure the reserve's planning and management are in accordance with relevant legislation and policy.	A1	Implement actions identified in this plan of management [refer to A2-D17] in accordance with Crown Lands Act 1989, Local Government Act 1993, case law and all other relevant legislation and policy.	Adoption of plan of management. Level of implementation over 5-years.	high ongoing
Trust management: To address issues of devolved control of Crown reserve (s.48 LGA 1993) and to appoint a reserve trust and trust manager (s.92 s.95 CLA 1989)	A2	Establish a reserve trust changed with care, control and management of the Crown reserve (under s.92 CLA 1989) and appoint Hawkesbury City Council as the trust manager to manage the affairs of the trust (under s.95 CLA 1989).	Appointment of reserve trust for Crown reserve. Appointment of HCC as reserve trust manager.	very high
Public purpose: To recognise reserve's broader environmental, scenic and heritage values and to address issues relating to existing dedicated public purpose of the reservation.	A3	Review and expand Crown reserve's dedicated purpose of "water" (1888) to include "Public Recreation and Environmental Protection" to promote the significance of identified values and to ensure an appropriate balance between low-impact recreational activities/development and conservation values.	Crown reserve's dedicated public purpose addressed and amended accordingly.	very high
Community land categorisation: To ensure consistency in community land categorisation in accordance with legislation.	A4	Address existing anomalies in community land categorisation [see discussion in 2.11 Community Land Categorisation]. Amend Natural Area sub-category to "wetland".	Community land sub-category amended in compliance with s.108 Local Government (General) Regulation 2005.	high
Future development, land uses and activities: To satisfy the principles of Crown land management in accordance with the Crown Lands Act 1989.	A5	Development proposals, land uses, activities, leases, licences and management practices must be consistent with the following requirements: - Crown Lands Act 1989, case law judgements and other relevant policy; - demonstrate consistency with dedicated public purpose of the reservation; - provide a clear connection with role of Crown reserve and recreational setting; - demonstrate consistency with community land core objectives - protect and enhance natural and cultural setting, scenic quality, heritage, social and recreational values and promote environmental sustainability; - ensure consistency with existing character, scale and intensity of development; - protect and restore the lagoon and wetland habitat, bank stability and bio-linkages; - improve water quality and promote a natural lagoon hydrology; - address flood planning, public safety, security and risk management issues; - address traffic management and pedestrian safety issues; - maintain and enhance low-key recreational infrastructure; - contribute to diversity and quality of recreational and community uses; - adequately provide for public access, equity and broad community use; - facilitate programs in community education and interpretation of identified values; - ensure that the lagoon and parkland's ecological/ habitat values are not adversely affected, alienated or fragmented in any way by adjoining land uses or activities.	Number and % of proposed developments that address and adhere to development guidelines. Measure trends over time.	ongoing
To implement actions which will prevent incremental impacts and address threatening processes. To properly address flood planning, public safety and security issues. To provide a balanced and appropriate level of recreational infrastructure and to implement actions which will prevent incremental impacts. To improve visitor education and interpretation. To protect identified values from inappropriate uses, activities and development on adjoining land. To ensure that development proposals will have a net positive impact in relation to identified values. To permit the use of the land for sustainable development of appropriate recreational and community facilities.	A6 A7	Development proposals which may directly or indirectly threaten the natural and cultural setting and/ or other identified values are not permissible. This Plan of Management expressly authorises improvements to park facilities and infrastructure [as shown in Figure 5: Landscape Masterplan] subject to compliance with development guidelines [see A5-A6].	as above Proposed staged development/ capital works items completed subject to available funding and priorities.	ongoing ongoing

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5.3 Action Plan

[illegible]

5.0 MANAGEMENT STRATEGIES
5.3 Action Plan

	Performance Target (Management objectives)	Item	Means of Achievement (Management Actions)	Means of Assessment (of the actions)	Priority
heritage	Desired Outcome: To protect, manage and promote understanding and interpretation of Aboriginal and Non-Aboriginal cultural heritage values.				
	To promote opportunities for dialogue and consultation with traditional Aboriginal custodians.	B1	Promote opportunities for consultation with the Indigenous community and encourage the support, interpretation and communication of Aboriginal cultural heritage.	Number of programs initiated/ level of involvement.	high
	To establish appropriate conservation and/ or interpretation elements in relation to Indigenous cultural and archaeological heritage.	B2	Install interpretive signage describing the importance of the floodplain and wetlands in the lives of the traditional owners, the Darug people (eg. fishing, hunting and plants for food, fibres, tools, bark canoe-making and medicine) and the changes which followed European settlement of the valley. Develop text and graphics for signage in consultation with the Indigenous community. Install signage panels under cover (ie. open information shelter/ kiosk) within the southern portion of the park.	Measure trends over time. Research undertaken and recommendations implemented. Interpretive signage developed and installed.	ongoing high
	To promote research and interpretation of cultural heritage and social values associated with early European settlement of this area.	B3	Continue to research and expand upon the community's understanding of the park and precincts rich local history (eg. Edward Pugh, Governor Macquarie, William Cox, St Peter's Church and cemetery and links with the impressionist artist, Charles Conder).	Research undertaken and recommendations implemented.	high
	To improve visitor interpretation and understanding of the historic precinct.	B4	Integrate interpretive signage within the information kiosk (see items B2, D9 & D17) and provide links (incl. maps) to viewing points (eg. Hawkesbury Artists Trail signage) and other local historic sites. Relocate existing Artist's Trail signage to the appropriate vantage point at the southern end of the park to facilitate interpretation of the artist's perspective.	Interpretive signage developed and installed. Existing Artist's Trail signage relocated.	high
	To promote community-based heritage programs.	B5	Continue to develop community-based local heritage programs through Council's web-site, brochures and library.	Number of programs initiated/ level of involvement. Measure trends over time.	high ongoing
environment and biodiversity	Desired Outcome: To protect, manage and enhance the lagoon and wetland's environmental quality, scenic character, health and biodiversity values.				
	Catchment management and water quality: To address water quality and health targets as identified in the <i>Hawkesbury Lower Nepean Catchment Blueprint</i> and <i>Catchment Action Plan</i> .	C1	Continue to implement and review Stormwater Management Strategy on a catchment priorities basis including determination of pollutant sources, risk assessment, measures to control gross pollutants, monitoring and maintenance.	Works implemented in accordance with Strategy. Measure trends over time.	high ongoing
	To promote strategies which improve water quality and natural lagoon hydrology.	C2	Continue monthly monitoring and maintenance of the Hobartville GPT (clean out accumulated sediments and rubbish at 80% capacity).	Works implemented in accordance with catchment objectives and this Plan of Management.	ongoing
	To minimise the impact of coarse sediments, carbon inflows and high volume velocity flows, erosion and sedimentation.	C3	Review the use of large-leaved and fine-leaved deciduous ornamental trees (eg. London Plane Trees/ Jacarandas) in the design of new urban areas. The use of local native species as an alternative will reduce the impact of accumulated carbon inflows of exotic material which affect lagoon water quality and biodiversity.	Recommendations implemented in Council policy for new subdivisions.	high ongoing
	To promote dialogue and partnerships with adjoining land owners to address environmental and conservation issues affecting the lagoon and wetlands.	C4	Liaise with DoL, DNR and adjoining land owners to address environmental issues, particularly livestock access to the lagoon. Establish opportunities/ partnerships for enhancing conservation values (ie. reducing trampling of wetlands and bank erosion/ sedimentation of lagoon, improving water quality and wetland holding capacity, improved weed management, creation of buffers/ bio-linkages along banks of lagoon, conservation agreements and incentives).	Number and type of programs/ agreements initiated. Measure trends over time.	medium ongoing
	To protect natural bank stability and to monitor the current reclamation strategy.	C5	Monitor bank stability, compaction and erosional impacts affecting recently constructed sandstone boulder wall (northern portion of lagoon). Maintain even surface along top of bank and replace worn and damaged turf as necessary. Remove accumulated rubbish and debris from lower banks. Restrict any further site-hardening along the lagoon banks.	Monitoring, maintenance and remedial works implemented in accordance with this Plan of Management.	ongoing

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5.0 MANAGEMENT STRATEGIES
5.3 Action Plan

Performance Target (Management objectives)	Item	Means of Achievement (Management Actions)	Means of Assessment (of the actions)	Priority
Desired Outcome: To protect, manage and enhance the lagoon and wetland's environmental quality, scenic character, health and biodiversity values.				
Lagoon/ wetland biodiversity: To investigate the lagoon's aquatic environment and to develop an improved data base for management of pest species. To enhance recreational opportunities. To address raise visitor awareness of environmental issues and impacts associated with cumulative factors.	C6	Seek co-operative initiatives with UWS in investigating the environmental status and condition of Pughs Lagoon (i.e. natural hydrology, water quality, biodiversity) and recommendations for recovery. Determine fish populations, types of species (native and exotic), age structure and breeding dynamics to assist in management strategies, particularly introduced European carp. Seek to involve local fishing clubs in the program. Install interpretive signage highlighting the significance of the freshwater lagoon and wetland habitat for a broad range of species including native waterbirds (incl. identification of common species). Provide information on water quality and impact of feeding feral ducks/ native waterbirds and inter-breeding. Ensure that the Crown reserve's lagoon and wetlands, all community land categorised as <i>Natural Area</i> , wetland and upper eastern embankment (remnant River-flat eucalypt forest) is managed in accordance with the prescribed best-practice standards of management consistent with the following: - Draft Recovery Plan for the Cumberland Plain Endangered Ecological Communities (CPEECs); - Draft Best Practice Guidelines for Bush Regeneration on the Cumberland Plain (DLWC and the Australian Association of Bush Regenerators, 2003); - Management Principles to Guide the Restoration and Rehabilitation of Indigenous Vegetation (Greening Australia); and - the series of Florabank Guidelines for native seed collection, production, handling and storage.	Co-operative study completed and recommendations implemented for improving water quality and biodiversity. Measure trends over time.	medium
Weed management and restoration: To ensure the implementation of best-practice standards for the management of natural areas. To assist in and facilitate the implementation of any provisions restricting the use and management of the land that are set out in a recovery plan or threat abatement plan prepared under the <i>Threatened Species Conservation Act 1995</i> or <i>Fisheries Management Act 1994</i> .	C7		Works implemented in accordance with this plan of management. Measure trends over time.	medium
	C8		Compliance in all respects with the national goal of the <i>BustCare National Vegetation Initiative</i> - i.e. to halt any further losses and to achieve a positive net gain. Number of incidences/ area affected by non-compliance with threatened species legislation and policy. Measure trends over time.	high ongoing
To address the long term objectives of building ecosystem resilience and durability.	C9	Implement an integrated and targeted restoration strategy which focuses on the recovery, recruitment, long term durability, expansion and consolidation of fragmented natural habitat, native populations and species. Continue to identify, monitor and address key threatening processes (see item C8). Selectively target and control noxious and environmental weeds in conjunction with appropriately staged restoration and enhancement strategies including the following priority target areas:- 1. southern lagoon area (i.e. <i>Salix</i> spp. in shallows/ margins and open water aquatics - <i>Elchornia</i> and <i>Myriophyllum</i> spp.); 2. wetland channels/ margins adjoining southern lagoons; 3. upper north-eastern embankment (adjoining the cemetery); 4. adjoining embankment to Kurralong Road and western foreshore; and 5. northern lagoon (north-eastern and western shoreline).	Level of funding per annum linked to positive net gains. Areal % of park under restoration [over 5 years]. Measure trends over time.	high ongoing
To secure and consolidate habitat values, bio-linkages and buffers. To address current issues affecting the integrity, resilience and durability of native vegetation.	C10		Level of funding per annum linked to positive net gains. Areal % of park under restoration [over 5 years].	very high ongoing
To target noxious and environmental aquatic and semi-aquatic weed species in the lagoon and adjoining wetland. To protect existing native wetland species.	C11	Monitor and control noxious aquatic and semi-aquatic weeds in accordance with the <i>Noxious Weeds Act 1993</i> . Eradicate Crack Willows (<i>Salix nigra</i> / <i>S. fragilis</i> spp.) within the lagoons and wetland areas. Continue to monitor and target all open water aquatic weeds. Avoid the use of non-selective spraying applications of herbicides (over-spray) and broad-scale removal/ slashing and mowing of wetland species.	Noxious aquatic and semi-aquatic weeds controlled in accordance with legislation. Crack Willows eradicated in lagoon/ park area. Measure trends over time.	high ongoing

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5.0 MANAGEMENT STRATEGIES
5.3 Action Plan

	Performance Target (Management objectives)	Item	Means of Achievement (Management Actions)	Means of Assessment (of the actions)	Priority
environment and biodiversity	Desired Outcome: To protect, manage and enhance the lagoon and wetland's environmental quality, scenic character, health and biodiversity values.				
	Weed management and restoration [cont'd]:				
	To establish viable natural areas and to promote long-term sustainability.	C12	Use a minimal disturbance bush regeneration approach where positive net gains are achievable [ie. relatively high level of resilience - upper north-eastern embankment].	Area under bush regeneration/ restoration per annum.	very high ongoing
	To secure genetic integrity as a key component of the restoration and enhancement strategy.	C13	Ensure dependent and threatened species habitat is protected and enhanced. Establish restoration, enhancement and reinstatement strategies for areas which display a high level of soil disturbance and modification. Use local native, provenance-sourced species in the program [ie. local genotypes]. Ensure that existing site soils are not amended and that soils or mulches are not imported for use in these strategies, including translocation or use of ex situ soil profiles and seed banks.	Measure trends over time. Area under restoration/ enhancement strategy per annum. Measure trends over time.	high ongoing
	To establish a representative level of species and structural diversity.	C14	Seek grant funding for the weed management and restoration strategy from various State and Federal government sources [eg. Natural Heritage Fund, Hawkesbury Nepean CMA, HRCC, Metropolitan Greenspace, etc].	Level of funding per annum. Measure trends over time.	very high ongoing
	To promote partnerships with state government agencies, industry and local land holders to secure sustainable environmental outcomes.	C15	Establish a program using skilled contract labour [ie. qualified and experienced contract bush regenerators] to implement the restoration strategy.	Level of funding for contract bush regeneration per annum. Annual/ quarterly progress reports.	ongoing
	To ensure a high level of expertise in implementing the strategy.	C16	Promote environmental education and opportunities for local volunteer involvement in the program. Seek to establish a LandCare group to assist in rehabilitation work, preferably in association with the Richmond Rotary Club.	Numbers of people/ groups actively involved in the environmental program. Measure trends over time.	high ongoing
	To involve local volunteers in weed management and restoration of the park's natural areas.	C17	Clearly delineate management zones [ie. wetland and river-flat eucalypt forest habitat under regeneration/ restoration strategy]. Provide signage to identify and protect fragile natural areas from inappropriate maintenance regimes or where trampling may occur.	as above Measure trends over time.	high ongoing
	To provide protective measures for areas under bush regeneration/ restoration.	C18	Selectively target Weeping Willows [Salix babingtonia] [southern lagoon area] for staged removal in accordance with SULE rating [arborist report] and tree replacement program. Maintain the balance of natural/ cultural values. Replace Willows with local native tree species along edges to wetlands. Consider use of some selected exotic deciduous species [ie. sterile cultivars] as components in lawn/ picnic areas [see item C3].	Number of Willows removed [over 5 years].	medium ongoing
	To ensure that restoration strategy is consistent with protection of scenic and recreational values.	C19	Expand targeted weed management/ restoration strategy to include highly disturbed embankment to Kurrup Road/ western foreshore [southern lagoon]. Liaise with adjoining land-owners to include northern lagoon [north-eastern and western shoreline] in restoration strategy [see item C4].	Works implemented in accordance with this plan of management. Area/ % under restoration [over 5 years].	low ongoing
	To expand the restoration strategy to include reconstruction of ecological communities.	C20	Establish a maintenance regime which affords a high level of passive surveillance and security for visitors. Protect important sight-lines [ie. roads and car parking areas, entry exit points, open grassed picnic areas, shelters and amenities building].	Works implemented in accordance with this plan of management. Visitor security issues addressed.	medium ongoing
	To maintain broad public use of the parkland and to ensure a high level of public safety and security.	C21	Protect and manage scenic vistas and view corridors, particularly along the lagoon foreshores and adjacent open grassed areas. Selectively remove generic, immature native planting [eg. Eucalyptus spp.] which may restrict vistas over the lagoon or adversely affect paved/ picnic areas [eg. Casuarina sp./ surface tree root damage].	Scenic quality and view corridors protected. Visitor safety issues addressed.	medium ongoing
	To ensure appropriate tree management and to maintain a high level of safety and presentation.	C22	Establish a group of local native trees/ groundcovers [no shrubs] along north-eastern slope of park [adjacent to Francis Street] to provide visual buffer to residential area.	Works implemented in accordance with this plan of management. as above	medium ongoing

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5.0 MANAGEMENT STRATEGIES
5.3 Action Plan

Performance Target (Management objectives)	Item	Means of Achievement (Management Actions)	Means of Assessment (of the actions)	Priority
recreation, access and facilities				
Desired Outcome: To maintain and enhance appropriate recreational infrastructure including safe public access/ linkages and opportunities for passive recreation.				
Public safety/ emergency services: To protect life, property and the environment and to address post fire or flood recovery procedures.	D1	Ensure that procedures for emergency evacuation are implemented in accordance with Council's relevant flood and bushfire plans. Following flooding or bushfire and prior to re-opening the park, assess any damage to property/ infrastructure and public risk and prepare an inventory for repairs.	Procedures implemented in accordance with relevant plans. Post flood/ bushfire inventory prepared.	ongoing
To address flood planning, public safety and risk management.	D2	Ensure that flood planning, management and provision of recreational infrastructure [incl. improvements/ upgrades] are consistent with relevant strategies and plans.	as above	ongoing
Traffic management and public safety: To address public concerns over traffic speed/ volume and public safety issues.	D3	Investigate options for installation of traffic calming devices such as slow-points or threshold treatments and 25 kph speed limit for the portion of Francis Street crossing through the park. Avoid use of narrow raised crossings and speed humps. Promote a 'pedestrian safe' environment within the park. Liaise with Richmond Rotary Club.	Investigation conducted and recommendations implemented. Works implemented in accordance with this plan of management subject to capital works funding.	very high
To address other local traffic management and pedestrian safety issues [external to the park].	D4	Ensure that investigation includes potential impacts on Windsor Street, particularly traffic flow/ volumes and pedestrian safety along narrow cutting linking to Richmond [centre].	as above	very high
To address poor drainage, scouring and ponding issues in car parking areas.	D5	Upgrade and integrate car parking area [northern] within the 'slow-zone'. Re-align existing low vehicular fog barriers to manage traffic flow ensuring slow-points cannot be avoided. Retain low-key character with a sealed gravel/ aggregate car park surface, angled parking [approx. 70-80 car spaces]. Provide designated disabled parking spaces [to Australian standards]. Ensure run-off, scouring and pedestrian access issues are addressed in detailed design. Incorporate an appropriate bio-filtration drainage system. Similarly, formalise southern car parking area [adjoining Windsor Street] as in item D5.	Proposed staged development/ capital works items completed subject to appropriate funding.	high
To improve pedestrian [incl. disabled] access and linkages with adjoining parkland.	D6	Review options to restrict parking after dark and maintain "alcohol free zone". Seek to improve level of policing in park at night, particularly on weekends.	as above Review conducted and recommendations implemented.	low high
To provide a safer pedestrian environment within the park.	D7	Install pedestrian pathway [concrete] and linkages with directional signage, turfing and landscaping works in the following locations [see Figure 5: Landscape Masterplan]: - shared pedestrian/ cycleway connection along Francis Street [from Chapel Street] through the park and linking to Windsor Street; and	Proposed staged development/ capital works items completed subject to appropriate funding.	ongoing
To address anti-social behaviour in car parking areas after dark.	D8	- internal pedestrian connections linking car parking area to picnic and BBQ shelters, public amenities building [see item D14] and existing steps adjacent to Windsor Street cutting and cemetery. Upgrade this pathway and steps [external to park].	as above	high
Pedestrian access and linkages: To improve pedestrian access to the park and to provide all-weather linkages to facilities. To promote opportunities for all user groups [eg. pedestrians, joggers, cyclists, people with disabilities, frail, aged, children, strollers, etc].	D9	- shared pedestrian/ cycleway connection along Francis Street [from Chapel Street] through the park and linking to Windsor Street; and - internal pedestrian connections linking car parking area to picnic and BBQ shelters, public amenities building [see item D14] and existing steps adjacent to Windsor Street cutting and cemetery. Upgrade this pathway and steps [external to park]. Retain open grassed foreshore area to lagoon [ie. no formalised pathway/ handstand]. Continue to maintain and enhance existing passive open spaces and facilities, including picnic settings/ picnic shelters, BBQs, car parking areas, public amenities and signage; - assess condition of older picnic shelters, tables and seats [built in 1975]. Review options for repair or replacement. Liaise with Richmond Rotary Club; - review options to install additional BBQ shelter [incl. 2 X gas hot-plates] and an information kiosk located in southern portion of reserve [south of Windsor Street]; - review options to integrate new recreational facilities [eg. 4 X picnic tables and seating, a central BBQ/ bench top with 4 X gas hot plates under one roof]. - design of new facilities needs to address disability access, including wheelchair access to picnic tables [with signage].	Maintenance in accordance with service standards. Proposed staged development/ capital works items completed subject to appropriate funding. Disability access issues addressed.	ongoing very high medium medium high

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5.0 MANAGEMENT STRATEGIES
5.3 Action Plan

recreation, access and facilities	Performance Target (Management objectives)	Item	Means of Achievement (Management Actions)	Means of Assessment (of the actions)	Priority
Desired Outcome: To maintain and enhance appropriate recreational infrastructure including safe public access/ linkages and opportunities for passive recreation.					
<p>Passive open space: To maintain passive open spaces for family-based recreation. To address companion animal issues.</p> <p>To review options for formalising a children's play area.</p> <p>Public amenities building: To provide a high standard of maintenance and to address security and vandalism. To improve overall amenity value and facilitate broad community access.</p> <p>Security lighting: To improve park security and reduce level of vandalism and anti-social behaviour.</p> <p>Signage & visitor education: To improve visitor orientation and awareness of environmental and heritage values. To inform visitors of facilities/ amenities, activities, linkages and places of interest.</p>		D10	Retain informal, low-key character in accordance with design guidelines [see item A5]. Maintain open mown grassed areas for children's play, exercising, informal games [eg. kicking a ball] and walking the dog [on leash at all times]. Control weeds in lawns. Review options to install dog waste bins and provide sponsor-supplied dog faeces bags in the eastern grassed area.	Maintenance in accordance with service standards. Review conducted and recommendations implemented.	ongoing medium
		D11	Investigate options for installation of a children's play area with purpose-built play equipment subject to an assessment of site suitability, child safety, recreational need [local level] and targeted age group(s). Enclosure of the area with child-proof fencing/ gates and appropriate soft fall areas would be required.	Investigation conducted and recommendations implemented. All child safety issues addressed.	low
		D12	Continue to maintain a high level of general maintenance, cleaning, repairs, building security/ lighting and lock-up after sunset to address vandalism and anti-social behaviour.	Maintenance in accordance with service standards. Number of instances/ targets of vandalism per annum.	ongoing
		D13	Construct graded pedestrian pathway link between northern car parking area and public amenities building. Remove existing steps/ hand-rails and eroded pathway [with step up to toilets]. Provide ramped access with handrails and an additional cubicle for disabled access [to Australian standards]. Re-grade and turf embankment.	Proposed staged development/ capital works items completed subject to appropriate funding.	high
		D14	Review options for installation of additional park lighting, including security lighting [as in public amenity area] in car parking areas and proposed pedestrian linkages between Windsor Street and Francis Street.	as above	medium
		D15	Install identification signage "Pughs Lagoon" and "Smith Park" at key entry points off Francis Street and Windsor Street [northern and southern side].	Proposed staged development/ capital works items completed subject to appropriate funding. as above	high medium
		D16	Continue to improve identification, directional, regulatory and interpretive signage. Install an information kiosk [see item D9]. Interpretive signage should focus on the lagoon's natural history, the Darling people's traditional use of the area, wetland habitat and identification of native waterbirds and cultural heritage. Signage should be durable, vandal- resistant and include use of maps, sensory and multi-lingual options [see items B2 & B4].		

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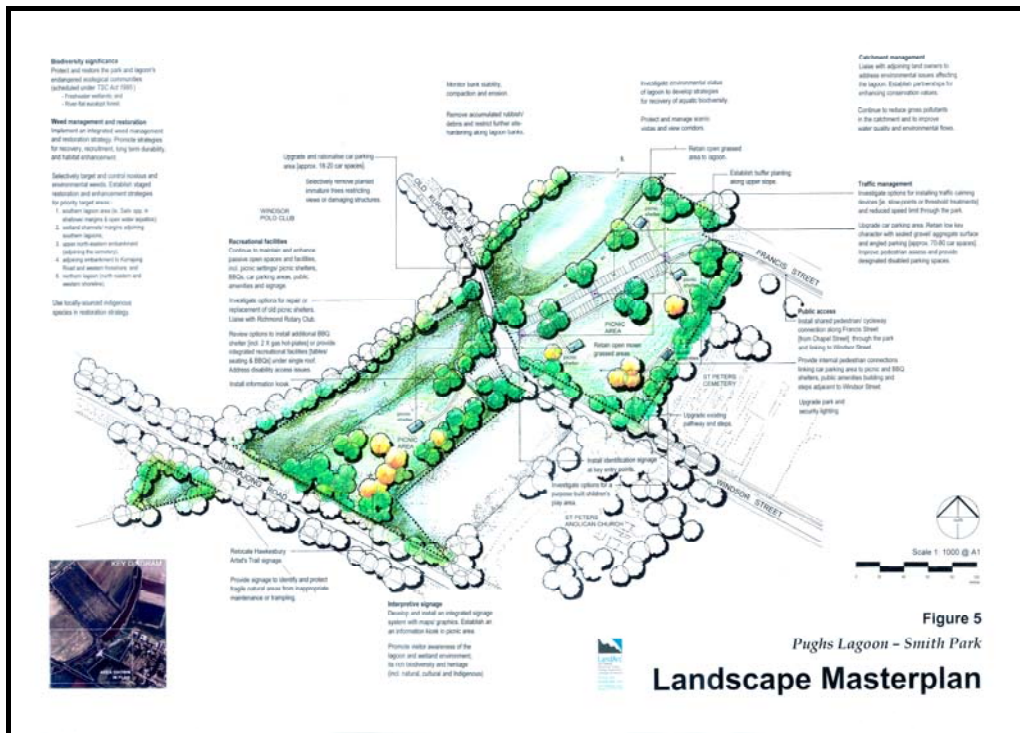
TABLE 6:

5.4 CAPITAL WORKS PROGRAM

ITEM	ACTION	CAPITAL COST (\$)	IMPLEMENTATION				
			2008	2009	2010	2011	2012
A1-A11	Crown reserve/ community land management						
A1	see following items for details	see below					
A2-A4	no capital works component	not costed					
A5-A7	see following items for details	see below					
A8-A11	no capital works component	not costed					
B1-B5	Heritage						
B1	research, consultation/ interpretation (Indigenous heritage)	\$5,000.00					
B2	develop and install interpretive signage/ information kiosk & relocate signage	\$50,000.00					
B3	research, consultation/ interpretation (Non-Indigenous heritage)	\$5,000.00					
B4	see item B2 above	see above					
B5	continuing local heritage programs	not costed					
C1-C22	Environment and biodiversity						
C1-C2	continue current catchment management program	not costed					
C3	conduct review/ recommendations	not costed					
C4/ C6	promote opportunities for partnerships & research	not costed					
C5	monitor bank stability/ remove accumulated rubbish & debris	see below					
C7	see item B2 above	not costed					
C8-C9	implement weed management/ restoration program - see following items	see below					
C10-C19	weed management and restoration strategy [5 priority areas]	\$125,000.00					
C20-C22	manage scenic vistas/ selective tree removal	not costed					
D1-D17	Recreation, access and facilities						
D1-D2	no capital works component	not costed					
D3-D4	investigation of proposed traffic calming to Francis Street [see item D5]	see below					
D5-D6	implementation of traffic calming/ upgrade car parking areas	\$120,000.00					
D7	parking regulation and policing	not costed					
D8	install concrete shared pedestrian/ bikepaths [460m - park network only]	\$45,000.00					
D9	review options/ upgrade recreational facilities [picnic shelters/ BBQs]	\$60,000.00					
D10-D11	park maintenance/ review options for dog waste bins	not costed					
D12	investigate children's play area [equipment, soft fall/ safety fencing & landscaping]	see below					
D13	general park maintenance	not costed					
D14	pedestrian pathway [see item D8]/ improve public amenities disability access	\$20,000.00					
D15	upgrade park/ security lighting	\$40,000.00					
D16-D17	install additional identification signage/ interpretive signage [see item B2]	\$3,000.00					
TOTALS		\$473,000.00					

Notes: Opinion of probable landscape constructions costs is based on Fig 5: Landscape Masterplan. All figures shown are indicative only.
Item D12 - installation of children's play area is not included in the above figures [estimate \$60,000 - \$80,000].

SUMMARY OF ANNUAL BUDGETS	CAPITAL COST (\$)
2008	\$85,000.00
2009	\$155,000.00
2010	\$98,000.00
2011	\$80,000.00
2012	\$55,000.00
TOTALS	\$473,000.00



FOR ENLARGEMENT REFER TO ADOBE READER FILE:
FIGURE 5 – LANDSCAPE MASTERPLAN

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