Hawkesbury City Council

attachment 1 to item 197

Holmes Drive Reserve Park Draft Plan of Management and Master Plan Issue C

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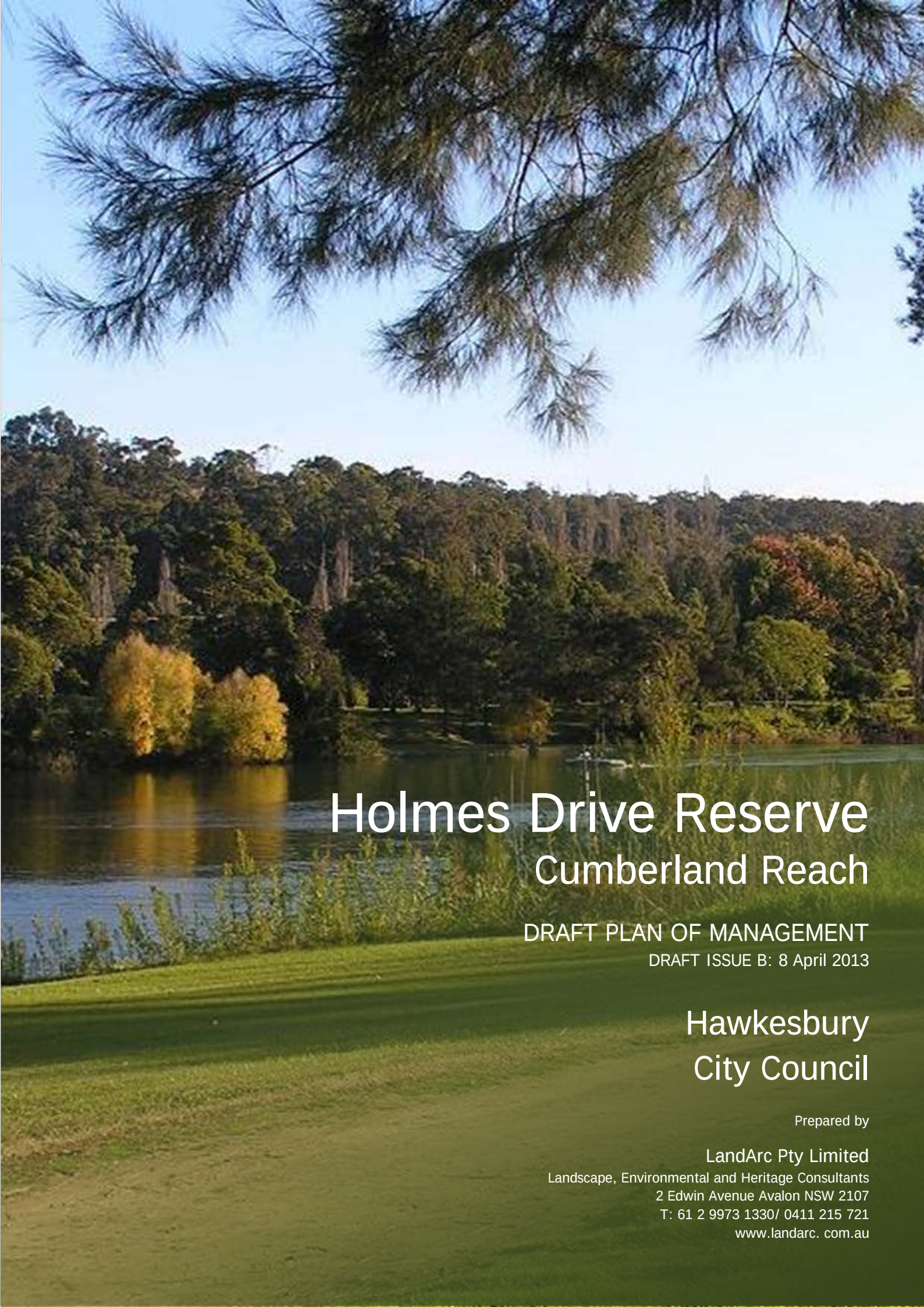

Holmes Drive Reserve
Cumberland Reach

DRAFT PLAN OF MANAGEMENT

DRAFT ISSUE B: 8 April 2013

Hawkesbury
City Council

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CONTROLLED DOCUMENT

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Draft Plan of Management

Holmes Drive Reserve, Cumberland Reach

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Executive Summary

A. Introduction

Holmes Drive Reserve is a public reserve (including Crown and community land) located on Cumberland Reach, Hawkesbury River. It is highly valued by the local community in terms of its river access (i.e. boat ramp), natural and cultural river-side setting, scenic qualities, quiet solitude and opportunities for passive and water-based recreational pursuits. This natural riverbank context however makes the reserve vulnerable to a range of cumulative environmental impacts. Riverbank clearing, fragmentation, bank instability and erosion, exotic weed invasion and recreational activities related to power boats, water skiing and wakeboarding continue to threaten key values.

A plan of management establishes measures of value, environmental performance and sustainability. This plan of management aims to provide a strategy which is balanced and sustainable – one which provides for river access and recreational opportunities for the community's enjoyment as well as ensuring future protection, management and restoration of environmental values.

B. Guiding Principles

The *Hawkesbury Community Strategic Plan 2010-2030* establishes a strategic framework for a green, connected and sustainable environment. Connectivity involves ecological, social and economic choices for a greener more sustainable living environment. This plan of management builds on Council's commitment to protecting and managing the Hawkesbury River's outstanding natural, cultural, scenic and recreational values.

In providing a sustainable framework for managing Holmes Drive Reserve it is important that all development proposals, uses and activities, leases/ licences and management practices are consistent with the *Crown Lands Act 1989* and *Local Government Act 1993*, case law, threatened species legislation and other relevant legislation and policy as follows:

- Demonstrate consistency with reserve's public purpose, community land categories, core objectives and environmental significance;

- Protection of natural/ cultural riparian setting, visual quality, biodiversity, cultural and recreational values;
- Ensure consistency with flood and bushfire management policy;
- Promote continuing dialogue with the community in relation to existing infrastructure, future development/ proposed restoration works, compatible uses and activities;
- Implement conservation measures to protect and restore riverbank stability and natural riparian vegetation in accordance with best-practice guidelines;
- Promote balanced, sustainable management and improvement of recreational infrastructure and opportunities for low-impact activities;
- Address public safety and risk management issues;
- Adequately provide for public access, connectivity, equity and broad community use;
- Protect the reserve's ecological/ habitat values (i.e. River-flat Eucalypt Forest scheduled as an EEC under *TSC Act 1995*) from further clearing and fragmentation due to inappropriate activities/ infrastructure; and
- Facilitate programs in community education and involvement in bank stabilisation and restoration of riparian vegetation including Bushcare.

C. Community Engagement

The NSW Department of Lands and Hawkesbury City Council support the use of inclusive models of engagement and collaboration with the community. This approach promotes transparency in the decision-making process by providing opportunities for the community to engage in these processes, helping to raise public awareness of issues and to contribute comments and submissions. The community workshop and written responses to the Questionnaire provided valuable input for this plan of management. The community identified four key issues in the following order of priority:

1. Retention and repair of existing boat ramp/ water access;
2. Riverbank stability, ongoing erosion and safety issues;
3. Condition of access road into reserve (need for repairs);
4. Weed management (i.e. eradicate ''noxious'' weeds).

Each of these issues is addressed in this plan of management (see sections *4.0 Community Engagement* and *5.0 Basis for Management*).

D. Values and Threats Statements

Guiding principles and management objectives must be based on a sound understanding of the resource base, identified values and level of significance as well as the threats and issues affecting these values. This plan of management divides key values into three categories:

1. Natural/ cultural riparian setting
2. Environment and biodiversity
3. Public recreation and reserve management.

Section *5.0 Basis for Management* also provides an assessment of issues, threats and impacts on these values. Key issues include:

1. Managing private water-based recreational facilities and access;
2. Upgrade or relocate boat ramp;
3. Improvements to public access and connectivity;
4. View protection and management;
5. Stabilising riverbanks and erosion control;
6. Weed management and restoration strategy.

The following statement provides a vision for Holmes Drive Reserve and the basis for establishing desired outcomes:

"To ensure appropriate protection and sustainable management of the reserve's riparian and cultural landscape setting, social, cultural 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".

E. Key Desired Outcomes

This plan of management ensures that desired outcomes are consistent with the Crown reserve's public purpose (as amended to include Public Recreation and Environmental Protection), community land categories and their respective core objectives. These include:

1. Crown reserve/ community land management – development, uses and activities, leases, licences and other estate:

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

2. Protecting and managing environmental quality, the riparian setting, riverbank stability, biodiversity and recreational values on a sustainable basis:

   To protect, manage and restore environmental quality, riverbank stability and riparian biodiversity whilst providing opportunities for sustainable passive and water-based recreational uses and activities.

F. Action Plan

This plan of management provides an Action Plan with performance targets, management actions, means of assessment and priority rankings (see *Table 8: Action Plan*). Key performance targets and management actions include the following:

- Future development, land uses and activities (Items A1-A4);
- Leases, licences and other estate (Items A5-A9);
- Managing unauthorised water-based recreational infrastructure and encroachments in reserve (Items B1-B4);
- Minimal upgrade to boat ramp (incl. widening, strengthening and re-surfacing) (Item C1);
- Future option for relocation/ new public ramp at Cumberland Reach Reserve (Items C2-C3);
- Improvements to public access and facilities (Items D1-D4);
- View protection and management (Items E1-E3);
- Stabilising the riverbank and erosion control (Items F1-F5);
- Weed management and restoration strategy (Items G1-G6);
- Targeting noxious weeds (Item G7); and
- Flood and bushfire management (Items F1-F3).

Opinions of probable construction costs (based on the Landscape Masterplan) are provided in the capital works program (see *Table 9*).

G. Landscape Masterplan

The Landscape Masterplan (see *Figure 10: Landscape Masterplan*) identifies key management actions to be implemented throughout the 5-year capital works program, subject to available funding.

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1.0 Introduction

Overview

Holmes Drive Reserve is located at Cumberland Reach on the Hawkesbury River approximately 25 kilometres north of Windsor (see *Figure 1: Hawkesbury River – Sackville to Lower Portland*). The public reserve is 2.3 hectares in area and accessed by road via Holmes Drive. It is largely comprised of two linear river-side parcels – community land (eastern portion) and Crown reserve (western portion). A third parcel – community land (northern portion) provides public access to the broader reserve. The community land portions are owned by Hawkesbury City Council and the Crown land is under Council's care, control and management.

Holmes Drive Reserve has a riparian context and is subject to periodic flooding. Although little known outside the local community, the reserve is highly valued by the local community in terms of its river access (i.e. boat ramp), natural and cultural river-side setting, scenic qualities, quiet solitude and opportunities for passive and active recreational pursuits. The outstanding environmental, heritage and scenic values of the river and its environs are protected under the *Sydney Regional Environmental Plan – SREP No.20 Hawkesbury-Nepean River (No.2 – 1997).* Furthermore, the reserve retains significant native riparian vegetation, known as River-flat Eucalypt Forest and scheduled as an endangered ecological community under the NSW *Threatened Species Conservation Act 1995* (TSC Act).

Environmental quality however continues to be affected by a range of cumulative negative impacts. Past and present riverbank clearing, bank instability and erosion and recreational impacts related to power boats, water skiing and wakeboarding threaten key values. Over many years, adjoining owners of private properties bordering the reserve have installed a range of recreational facilities in conjunction with various measures to control riverbank erosion. Past management, largely by the local community, has tended to be responsive, ad hoc and poorly resourced.

This plan of management aims to establish a balanced and sustainable strategy which provides for river access and recreational opportunities for the community's

enjoyment as well as ensuring the future protection, management and restoration of environmental values.

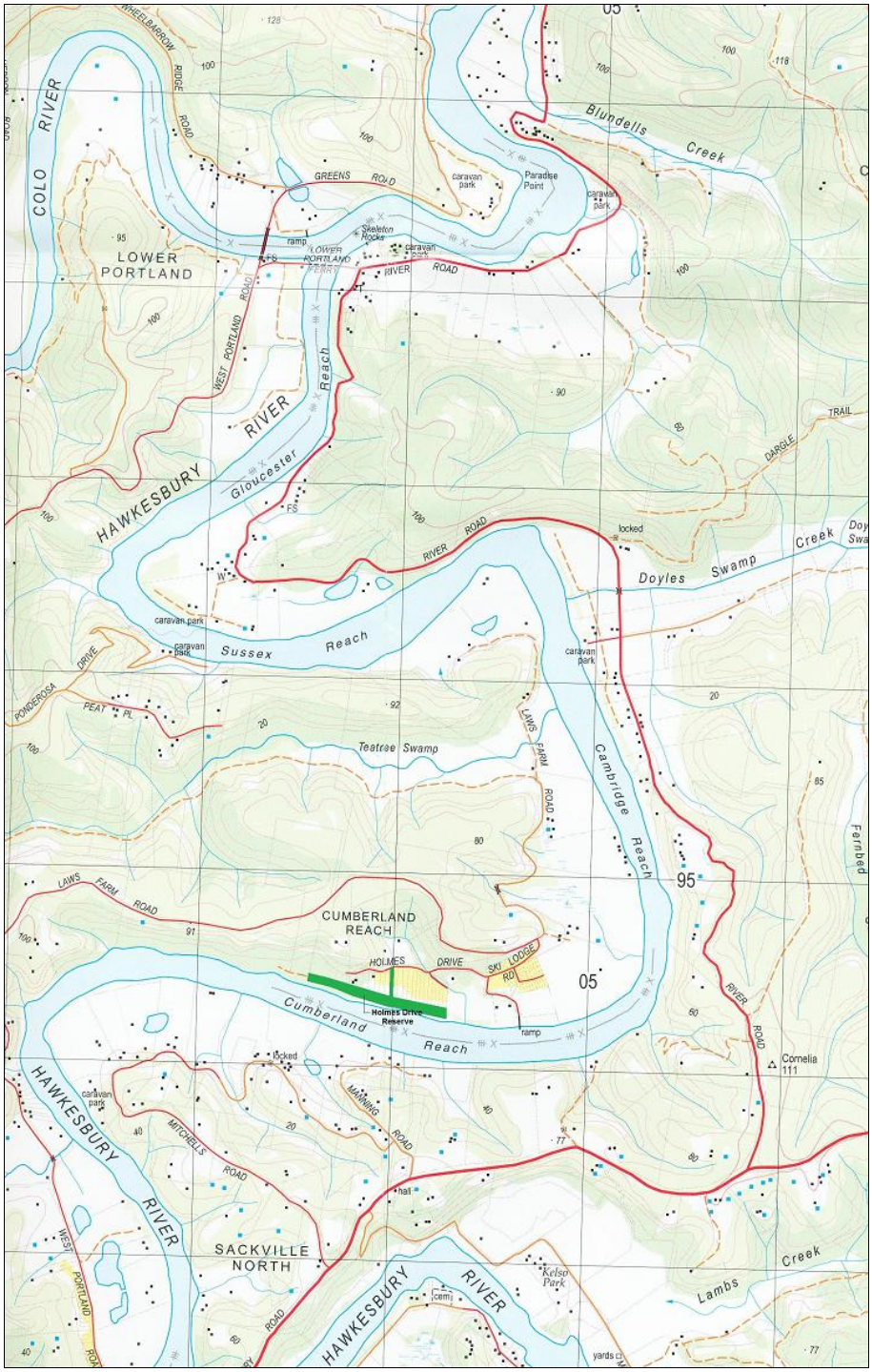

Figure 1:

Hawkesbury River – Sackville to Lower Portland

SOURCE: NSW Department of Lands (2006)
Topographic & Orthophotomap 1:25 000 LOWER PORTLAND 9031-2S

What is a Plan of Management?

A plan of management provides the framework for protecting and managing community land and/ or Crown reserve on a sustainable basis. The ways in which community land and Crown reserve 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. Plans of management must be prepared in accordance with the *Local Government Act 1993* and/or *Crown Lands Act 1989* (as applicable) as well as other relevant State and Federal legislation and policies.

Hawkesbury City Council has identified a number of significant parks and reserves which require the preparation of more detailed plans of management. Holmes Drive Reserve is one of these significant reserves. This plan of management, prepared by LandArc Pty Limited, applies to the public land described as Holmes Drive Reserve. It has been prepared in accordance with the objectives of the Brief and under the direction of Hawkesbury City Council's Parks and Recreation section. It supersedes information for this park in Council's PARKS – Draft Generic Plan of Management (2011).

Strategic Direction

This plan of management aims to contribute towards Hawkesbury City Council achieving its strategic goals, vision and outcomes as identified in the *Hawkesbury Community Strategic Plan 2010-2030.* Hawkesbury City Council has developed a strategic framework for a green, connected and sustainable environment. This key policy document reflects the community's visions, values and aspirations and provides an important guide for developing objectives for this plan of management.

Connectivity involves ecological, social and economic choices for a greener more sustainable living environment. This plan of management can play an important part in this process improving connectivity, restoring and enhancing significant natural, cultural, scenic and recreational values in this river-side setting. This document therefore aims to provide a clear and achievable framework for protecting the reserve's valuable assets, establishing a staged and prioritised restoration strategy and ensuring a balanced approach between community and recreational needs and sustainable environmental management.

The Brief

Hawkesbury City Council's Brief for this plan of management highlights the need *'to provide an integrated approach to the planning, management and development of the reserve'* (HCC, p.4, 2011). The Brief identifies the following broad aims and objectives for preparing the plan of management:

- To prepare a plan of management in accordance with relevant legislation and policies (plan to be reviewed on a five (5) year basis);
- To ensure consistency with the Objects of the *Crown Lands Act 1989*, policies and case law and requirements of the *Local Government Act 1993*;
- To identify the reserve's values (including natural, environmental, cultural, recreational, community and heritage values);
- To identify and assess existing and potential impacts on these values and develop strategies for addressing these threats;
- To identify community and stakeholder issues and priorities (including relevant government departments and authorities);
- To assess recreational needs and suitability of recreational infrastructure within this riparian context (i.e. subject to flooding, risk management, etc.)
- To engage the local community in the plan of management process and provide opportunities for involvement in future management;
- To establish a balanced strategy which addresses community and recreational needs while protecting and enhancing environmental values;
- To establish an appropriate scale and intensity of permitted uses, activities, improvements, including removal, replacement and/ or renewal of recreational facilities and infrastructure;
- To establish management objectives and performance targets, the means of achieving these targets and assessing performance; and

Specifically including the following objectives:

- To investigate the cause(s) of riverbank slumping, instability and erosion and to provide sustainable management solutions;
- To develop a staged strategy for riverbank rehabilitation/ restoration and enhancement of the reserve;
- To review existing recreational infrastructure, including intrusive elements, and to identify appropriate strategies for removal and/ or modification;
- To prepare a Landscape Masterplan and a detailed landscape remediation strategy to address riverbank instability and erosion including budgeting, staging and prioritizing the capital works program.

Key Objectives

A plan of management establishes measures of value, environmental performance and sustainability. This plan of management builds on Council's commitment to protecting and maintaining an expansive open space system of more than 200 parks and reserves throughout the Hawkesbury City LGA. This document provides a rationale for decision making and consistency in the management approach for this significant reserve and follows a values-based approach rather than being simply issues-driven. The following steps have guided preparation of this plan of management:

A. Land Description and Planning

- Ensure consistency with the Objects of the *Crown Lands Act 1989* and *Local Government Act 1993*;
- Establish the park's location and riparian context, natural/ cultural setting and management implications (e.g. flood impacts, threatened species, etc.);
- Identify existing public purpose, ownership/ land tenure, encumbrances on the title, easements, encroachments and the types of adjoining land uses;
- Identify current uses, activities, facilities and improvements, the condition of the land, scale and intensity of existing development and improvements;
- Review existing zoning provisions under Hawkesbury City Council's Local Environmental Plan (LEP 1989 as amended);
- Identify issues in relation to specific legislative requirements and policies (e.g. *Threatened Species Conservation Act 1995* (TSC Act), *Occupational Health and Safety Act 2000* and *Sydney Regional Environmental Plan – SREP No.20 Hawkesbury-Nepean River (No.2 – 1997)*;
- Establish community land categories in accordance with the *Local Government Act 1993* and *Local Government (General) Regulation 2005* and identify core objectives for each of these categories;
- Establish future permitted uses and development (including intensity and scale), existing and future leases/ licences.

B. Community Engagement

- Ensure inclusive models of collaboration and transparent decision-making processes that promote positive engagement with the community;
- Identify and assess community and stakeholder issues (e.g. river access/ private infrastructure, boat ramp, foreshore remedial works, clearing/ view management, reserve maintenance);

- Determine community goals, values, needs and expectations for the future use and management of the reserve.

C. Basis for Management

- Define the reserve's role within the local government area and regional context (Hawkesbury River/ Western Sydney)
- Identify the reserve's key values and significance including riparian context, biodiversity/ natural heritage, endangered ecological community, scenic character and cultural landscape setting, social and recreational values;
- Assess current threats to heritage values and the impact of existing uses, activities and management regimes (e.g. current visitor loadings, types of activities, concentrated use/ access points, riverbank stability/ site durability, clearing/ mowing regimes, etc.);
- Identify and assess potential future uses, development and leases and licences on identified key values;
- Establish the framework for sustainable management strategies consistent with relevant legislation and key policy documents.

D. Desired Outcomes and Implementation Plan

- Establish a balanced and sustainable management approach in accordance with the Crown reserve's public purpose and community land objectives;
- Protect, conserve and rehabilitate the riparian setting, its threatened natural biodiversity values and provide opportunities for appropriate low-impact recreational uses, activities and development;
- Establish priorities for improved connectivity, diversity and resilience within the reserve and provide healthier, cleaner, greener infrastructure;
- Develop community knowledge, skills and opportunities to actively engage in programs to enhance environmental quality and sustainability (e.g. ecologically sensitive riverbank remediation, Bushcare group, etc.);
- Specify the purposes for which any further development of the land 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), means of achieving these targets (management actions) and means of assessing Council's performance with respect to objectives;
- Assign directions and priorities for implementation (spanning the next 5-years);
- Develop a Landscape Master Plan and detailed strategy for riverbank restoration and remediation.

List of Abbreviations

CLA	Crown Lands Act 1989
CPEECs	Cumberland Plain endangered ecological communities
OE&H	Office of Environment and Heritage
HRCC	Hawkesbury River County Council
LEP	Hawkesbury City Local Environmental Plan 1989
LGA	Local Government Area (Hawkesbury City Council)
NSWRFS	NSW Rural Fire Service
RFEF	River-flat Eucalypt Forest
SREP	Sydney Regional Environmental Plan
TSC Act	Threatened Species Conservation Act 1995

2.0 Land Description

Study area

This plan of management applies to Holmes Drive Reserve, Cumberland Reach on the Hawkesbury River between Sackville and Lower Portland. Refer to *Figure 2: Aerial Photo – Cumberland Reach.* The reserve is accessed via Laws Farm Road (off West Portland Road) – Ski Lodge Road – Holmes Drive turning left into the reserve between neighbouring residential properties. Holmes Drive Reserve has approximately 770 metres of river-side frontage and a total area of approximately 2.3 hectares (Ha). It is not well known beyond this small community. The reserve was identified in Council's Draft Generic (Community Land) Plans of Management (2011) as 'Park 39 Unnamed – Cumberland Reach'. Holmes Drive Reserve is a composite of community land and Crown reserve.

Figure 2: Aerial Photo – Holmes Drive Reserve

Historic Context

The Darug – traditional custodians of Deerubbin

The Hawkesbury-Nepean River (known as 'Deerubbin' or 'Dyarrabin' by the Darug (Dharug) people) has been a focus for human communities for many thousands of years. The river and floodplain provided an abundance of natural resources and was a place with strong social and spiritual significance (Benson and Howell, 1994). Resources included fresh water, opportunities for fishing, hunting and special plants for food, fibres, tools, bark canoe making, transportation and medicine. The river provided important foods such as fish, eels, mussels, water birds and wild yams. The historian Grace Karskens writes in *The Colony ''when the Europeans arrived, the country was already richly named and divided"* (Karskens, 2009). Rivers and creeks formed boundaries between territories and clans. The main spoken language was Darug with many different dialects spoken by smaller groups or clans including the Boorooberongal, Caddie, Gomerigal, Kurrajong, Burramattagal, Warmuli and many others.

Cumberland Reach – early European settlement

In 1789, the first exploration party to the Hawkesbury area, led by Governor Phillip, found extensive evidence of Aboriginal occupation along the banks of the river including "hunting huts", bark canoes, marks on trees, possum traps and bird decoys. In 1791, a larger exploration party including Governor Phillip, Captains John Hunter and Watkin Tench led by two Aborigines, Colebee and Balladerry, set out to determine if in fact the Nepean and Hawkesbury were the same or separate rivers. They were joined on this journey by Gombeeree, Yellomundee (or Yarramundi) and Djimba, all members of the Boorooberongal clan. *(Nichols, M., 2004, p.4* and *Penrith City e-history – Themes: The Early Land Alienation Pattern*).

As early as the 1790s, Scottish and English free settlers took up local land grants in the area. This locality became known as Knight's Reach after William Knight established a farm. John Boston (?-1804) arrived in the colony in 1794 and in 1796 was granted 170 acres [70 Ha] in the vicinity. The arrival of new settlers signalled dramatic changes to the lives of Indigenous people and their culture. Aboriginal people found that access to the river and vital resources such as food and fresh water were being denied. A bitter conflict erupted and although Governor King intervened on behalf of the Aboriginal population and supported their claims, the Darug people became increasingly marginalised. For more than 220 years this area has been modified through land clearing, draining of wetlands and conversion to pastureland with exotic grasses and livestock. During the early nineteenth century the area assumed the name of Boston's Reach (Powell, 1994) and later

became known as Cumberland Reach. By the mid-nineteenth century the Darug people had been displaced from their traditional lands and decimated by diseases, conflict and malnutrition. The Darug people were reduced to only a few small groups located at La Perouse, Sackville Reach, Holdsworthy and Plumpton near Blacktown (Brook, p.11, 1994).

Sackville Reach Aboriginal Memorial Reserve

In 1889 two Aboriginal reserves were proclaimed on Cumberland Reach and Kent Reach. The larger reserve on the Cumberland Reach was known as Sackville Reach Aborigines Reserve (Nichols, M., p.5, 2004) and later as Sackville Reach Aboriginal Memorial Reserve. This reserve has a magnificent focal point – an expansive old growth Port Jackson Fig *(Ficus rubiginosa* f. *rubiginosa)* growing over a large sandstone boulder. An obelisk stands in an adjacent clearing between the tree and the river. The sandstone memorial is dedicated to ''the Aborigines of the Hawkesbury for whom this area was originally reserved'' (unveiled in 1952). *Hawkesbury Local Environmental Plan 2012* identifies the reserve (Lot 201 DP 824060) as Heritage Item 1372 – "Monument to Aboriginal people". Sackville Reach Aboriginal Memorial Reserve adjoins Holmes Drive Reserve.

Aboriginal archaeological significance

Holmes Drive Reserve has a long history of disturbance and modification spanning more than two centuries. There is no record of Aboriginal archaeological relics or deposits in Holmes Drive Reserve (Office of Environment & Heritage). Given its long history of disturbance and riparian context (subject to flood events) much of the lower portion of the reserve is considered unlikely to conserve potential Aboriginal archaeological evidence. The elevated western portion (less disturbed area) may have higher potential for Aboriginal archaeological evidence. See *5.0 Basis for Management – Relationship with Sackville Reach Aboriginal Memorial Reserve and Potential Aboriginal archaeological evidence*).

Physical Context

Climate

This area lying to the north of Windsor and the Cumberland Plain has a warm temperate climate with considerable diurnal and seasonal ranges in temperature and little variation in average monthly relative humidity (Bannerman & Hazelton, 1990). The climate is characterised by warm to hot summers (mean summer max. 29.6°C) and mild winters (mean winter min. 3.6°C). Frosts occur during the winter months. Mean annual precipitation is approximately 850mm.

Topography, slope and aspect

This part of the Hawkesbury River – the Lower Hawkesbury Floodplain forms a relatively thin strip of low-lying land beside the meandering river. The floodplain is surrounded by steep Hawkesbury sandstone hillsides, scarps and plateaus. Holmes Drive Reserve is located on the 'levee' bank immediately beside the river. The reserve's topography is characterised by flat to gently undulating rises and swales of alluvial soil. The deep alluvium, deposited by the river during times of flood, supports a tall forest community including a range of mesic and rainforest plant species (Howell, et al., 1995).

The reserve has a linear east-west orientation with a general rise in elevation towards the western boundary. Most of the reserve lies below 10 metres and is subject to low flood events. An additional parcel of land (i.e. access corridor) rises to approximately 20 metres near the Holmes Drive intersection.

Reserve size and shape

Holmes Drive Reserve is approximately 2.3 Ha in area. The eastern and western portions of the reserve have a total river frontage of approximately 740 metres. These two river-side parcels of land are approximately 35 metres in width narrowing to 22 metres along the western half of the Crown reserve. The river forms the southern boundary of the reserve.

Geology and soils

Holmes Drive Reserve is located within the active floodplain of the Hawkesbury-Nepean system. The soil landscape is mapped as Fluvial – Freeman's Reach (Soil Landscape Series Sheet – St. Albans, Bannerman & Hazelton, 1990). The soils consist of deep brown sands and loams to sandy clay loam with apedal single-grained structure and porous sandy fabric. Texture may increase with depth. The pH ranges from strongly acid (pH 4.0) to moderately acid (pH 6.0) (Bannerman & Hazelton, 1990).

Environmental Context

River, water quality and flood events

The Hawkesbury – Nepean River system has a catchment area of almost 22,000 square kilometres. It extends from the Mulwaree River south of Goulburn to Broken Bay and Pittwater in the north-east and almost to Singleton in the north-west.

This section of the river is influenced by tidal flows. All of the reserve is subject to flooding. The La Nina event of 2012 brought extensive flooding across south eastern Australia, including the Hawkesbury-Nepean valley. Warragamba Dam spilled for the first time in 14 years. Further heavy rains in early 2013 again focused attention on the potential impacts of flooding. The NSW Government has

commenced a detailed review of the flood management arrangements for the Hawkesbury-Nepean valley. This review includes flood planning, flood mitigation and flood response (*NSW Office of Water, Hawkesbury-Nepean Valley Flood Management Review, 2013*).

The Hawkesbury-Nepean River is an important environmental asset. Water storages such as dams and weirs affect the natural flow of water, water quality, fish migration and habitat. The NSW government has upgraded existing dams and weirs with new environmental release outlets and fishways. A new flow scheme commenced in 2010 mimics the natural flows of the river allowing more water to be released during rain periods and less when it's dry. These modifications will improve environmental flows for a healthier river system, ensuring better water quality and fish habitat (ibid, 2013).

PHOTO 1: View looking east along the river – the reserve offers an outstanding riparian natural and cultural setting (5/04/2012).

Riverbank clearing and instability

Alluvial riverbanks are environmentally sensitive areas subject to instability and erosion. The sandy alluvial soil is poorly structured and inherently unstable. Most of the reserve is riverbank extending as a narrow, linear corridor (approx. 740 metres in length). It is largely cleared and modified with open mown grass adjoining steep eroded banks. Although there are some pockets of remnant and planted native vegetation along the riverbank (eastern portion) exotic weeds tend to dominate this community. Some native reeds and sedges occur along the toe of the riverbank though these are affected by access points, private infrastructure and erosion. Mowing tends to be infrequent within the reserve and supplemented by local residents. Illegal clearing of remnant native vegetation along the riverbank is an ongoing issue affecting bank stability and environmental quality.

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PHOTO 2: View looking east showing open landscape character and access track (boat ramp in foreground) (22/03/2013).

PHOTO 3: Northern view of road access into reserve – bitumen road continues [to left] and track to boat ramp [right] (22/03/2013).

PHOTO 4: Western road access along rear boundaries of adjoining private properties (22/03/2013).

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Fragmentation of endangered ecological communities

The western portion of the reserve (Crown reserve) is more elevated with steep alluvial banks and undulating slopes and swales supporting significant River-flat Eucalypt Forest, a scheduled endangered ecological community under the *Threatened Species Conservation Act* (TSC Act 1995). This community retains a number of mesic/ rainforest species across all strata (i.e. canopy, sub-canopy, shrubs/ vines and ground layer) and has been subject to unauthorised broad-scale clearing. A small ephemeral back-lagoon and freshwater wetland community is an important natural feature of this area (located largely within the adjoining private property). This freshwater wetland is also scheduled as an endangered ecological community (TSC Act 1995).

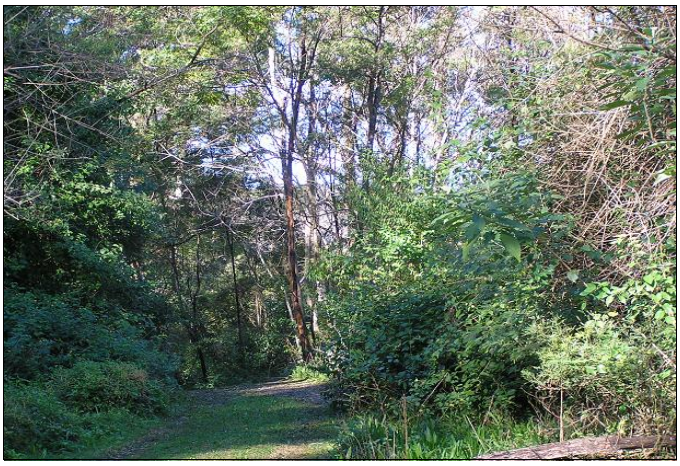

PHOTO 5: View looking east along vehicular access track (western portion of reserve). River-flat Eucalypt Forest is threatened by illegal clearing, fragmentation and weed invasion (27/05/2012).

Cumulative environmental impacts

The exposed riverbank interface, history of clearing, inherently unstable alluvial soils, narrow linear shape and high edge-to-area ratio of the reserve are key factors affecting environmental quality, resilience and sustainability. These impacts are cumulative. Over the years many private structures have been installed to improve access to the river. These structures include a steep boat ramp, jetties/ platforms, ramps, steps and ladders cut into the riverbank. Ad hoc measures to address erosion have been installed including walls. Much of this infrastructure is in a state of disrepair. Ongoing negative impacts created by power boats, water-skiing and wakeboarding on the river, vegetation clearing and current maintenance regimes, concentrated river access and recreational infrastructure affect the quality of this landscape setting. Environmental, scenic, social, cultural and recreational values need to be managed on a sustainable basis.

Land Tenure

Crown reserve and community land parcels

Holmes Drive Reserve, Cumberland Reach is located within the Parish of Meeham, County of Cook, City of Hawkesbury. The reserve is comprised of three parcels of public land with a total area of approx. 2.3 Ha (see *Figure 3: Land Tenure*):

- Lot 7009 in DP 93550 – Crown reserve (western portion);
- Lot 23 DP 230176 – community land (eastern portion);
- Lot 24 DP 230176 – community land (central access corridor).

Crown land

The Crown land portion (Lot 7009 DP 93550) is reserved for the public purpose of Public Recreation. Hawkesbury City Council is the Trust Manager for this Crown Reserve. See *Table 2: Crown Reserve* and *Trust Management* in this section.

Community land

The community land (Lots 23 and 24 in DP 230176) are owned in fee simple by Hawkesbury City Council (refer to *Table 3: Community land*).

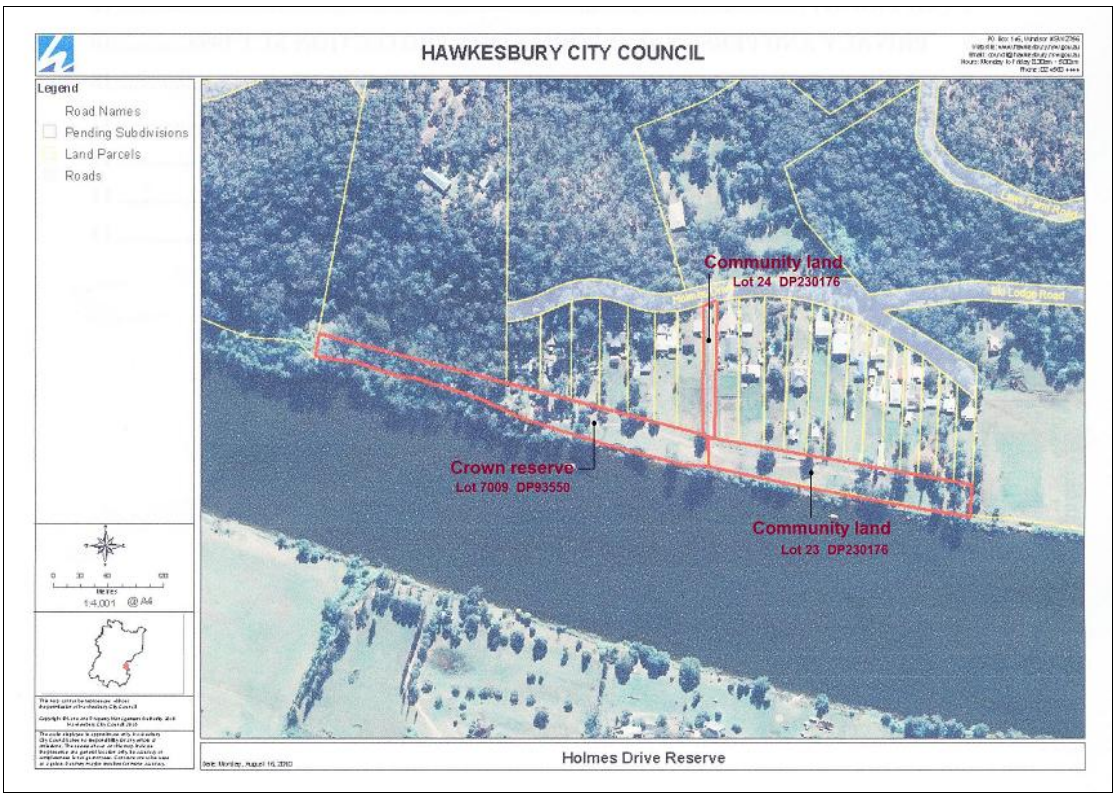

Figure 3: Land Tenure

SOURCE: Hawkesbury City Council (2000)

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Public Access

Riverbank access and adjoining land uses

Holmes Drive Reserve provides public access to the river for passive and water-based recreation (i.e. boating, skiing, fishing, etc.). Lot 24 DP 230176 functions as the public access corridor between Holmes Drive and the river-side reserve. A poorly maintained/ partly sealed road leads into the reserve and continues west along the rear boundaries of adjoining residential properties. This access road (on the Crown reserve portion) is used by Council to service adjoining properties (i.e. rubbish removal/ recycling). It continues as an unsealed vehicular track (one-lane width) for a short distance through riparian bushland (i.e. River-flat Eucalypt Forest). A single larger elevated bushland block and residence adjoins this Crown reserve portion of the reserve. An unlocked boom-gate is located near the far western boundary of Holmes Drive Reserve adjoining Sackville Reach Aboriginal Memorial Reserve (Lot 201 DP 824060 – not part of this plan of management).

To the east of the access road corridor, an unmade and unauthorised vehicular track services residential properties (i.e. providing rear boundary access to existing gates along the reserve's eastern portion – community land). Residential properties form the northern boundary to the reserve. The eastern boundary adjoins a cleared paddock (part of a large private block). Bundarra Ski Gardens, a river-side caravan park and private boat ramp lies to the east of this block adjacent to Cumberland Reach Road Reserve.

Existing Facilities and Improvements

Public recreational facilities

Holmes Drive Reserve has no public buildings or amenities. Sealed road access into the reserve is in poor condition with numerous potholes. The only public recreational facilities include two metal frame and timber slat picnic tables with seats and a bench seat. These items are in varying condition (i.e. fair to very poor) and should be replaced (see *Table 1: Existing Facilities and Improvements*).

Unauthorised private infrastructure

Environmental and social impacts

The local community maintain a high level of ownership and control over the public reserve and private infrastructure. In the past a number of unauthorised jetties, platforms, steps, ladders, ramps, walls, tables/ seats and other structures have been installed along the riverbank for private use by adjoining property owners. These private installations have included localised cutting and terracing of the riverbank increasing instability and erosion. Pipes and conduits have been laid for

private irrigation purposes. Sub-surface drainage lines and swales have also been established to re-direct overland flow from neighbouring properties across the riverbank. This action is causing further concentration of flows and erosion of the riverbank. In one location the upper bank has been terraced and rubble walls added. A blockwork fireplace pit, planted shrubs *(Nerium oleander)* and exotic palms *(Arecastrum romanzoffianum)* have also been introduced to provide recreational amenity. This process however tends to alienate the use of public open space, creating a sense of ambiguity over ownership and a perception of privately-owned land within the public reserve.

Public safety and risk management

Although many structures including 'private' signs have been removed by Council, some items have been retained in the interim. The ad hoc nature of this private infrastructure together with a general lack of appropriate maintenance and repair raise serious concerns over the potential public safety hazard. In addition, the number of structures, concentration of activities, removal of vegetation, cutting and benching of the riverbank, installing pipes and conduit are all contributing to increasing bank instability and long-term environmental degradation. These unauthorised activities are not consistent with the principles and legislative requirements of Crown reserve and community land management.

PHOTO 6: Bitumen road surface (public access road into reserve) is in need of urgent repair (LandArc image 22/03/2013).

PHOTO 7: Private recreational facilities (eastern end of reserve) including metal steps, handrails and jetty (22/03/2013).

PHOTO 8: Private fireplace, amenities and exotic garden within eastern end of public reserve (22/03/2013).

PHOTO 9: Timber steps and ladders on steeply eroded river-bank (3m HT) within eastern end of reserve (5/04/2012).

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PHOTO 10: Damaged private metal-grille steps/ handrail on eroded riverbank. Broken concrete rubble platform and tyre wall (22/03/2013).

PHOTO 11: Privately constructed metal steps/ handrails on eroded riverbank. Concrete rubble and tyres along water's edge (5/04/2012).

PHOTO 12: Private infrastructure – metal steps/ landings, handrails and seating within western portion of reserve (22/03/2013).

TABLE 1:
Existing facilities and improvements

Location / Item description	Condition
Community land – northern portion (Lot 24 DP 230176)	
Public:	
Sealed bitumen access road	poor
Community Land – eastern portion (Lot 23 DP 230176)	
Public:	
Unsealed track (access to adjacent private properties)	poor
Timber & metal picnic table/ seating on conc. slab (1)	fair
Temporary star-steel post fencing + hazard barrier	poor
Conc. pipe/ open swale drain w. bollard marker	poor
Private:	
Narrow steep concrete boat ramp w. sleeper/ conc. walls	v. poor
Timber & metal steps w. part handrail (on riverbank)	v. poor
Timber steps w. handrail (on riverbank)	v. poor
Timber & metal painted bench seat + table setting on conc. slab (on riverbank)	v. poor
Painted metal steps w. handrail w. planted palms (on riverbank)	v. poor
Metal steps w. handrail (incl. platform) (on riverbank)	v. poor
Timber & metal posts + wire fencing (reserve boundaries)	varies
Conc. block fireplace in mown lawn	v. poor
Miscellaneous plastic drain pipes, irrigation pipes, metal bars, building/ rubble fill	v. poor
Crown reserve – western portion (Lot 7009 in DP 93550)	
Public:	
Sealed bitumen access road (along rear boundaries – private properties)	fair/ poor
Unsealed gravel road/ metal boom-gate (link to Sackville Reach Memorial Reserve)	fair/ poor
Timber & metal picnic table/ seating on conc. slab (1)	fair
Timber slat & metal frame bench seat (1)	v. poor
Painted timber bollards w. hazard reflectors	good
Private:	
Concrete jetty/ platform, steps and metal rails	fair/ poor
Conc. steps (on riverbank)	v. poor
Timber & metal steps w. timber handrails/ metal stakes	v. poor
Metal steps (no handrail) (on riverbank)	v. poor
Major jetty structure (incl. metal steps/ landings + painted metal handrails)	fair
Conc. steps (large) (on riverbank)	v. poor
BBQ area (incl. terracing & conc./ rubble retaining wall)	poor

NOTES: Existing facilities inspected 5/04/2012, 25/07/2012 and 22/03/13. An assessed condition of 'v. poor' may indicate a potential public safety hazard and requires urgent remedial attention.

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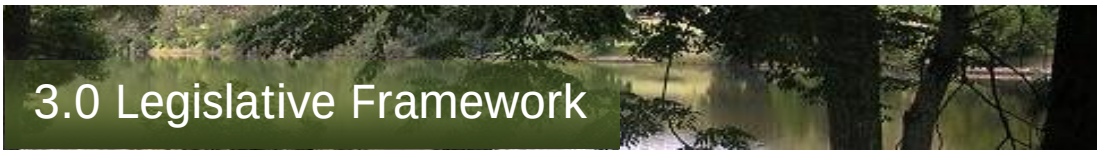

3.0 Legislative Framework

Introduction

As discussed in *2.0 Land Description*, Holmes Drive Reserve is a composite of Crown reserve (western portion) and community land (eastern and central portions). The following section reviews the legislative framework affecting future management of the reserve. It is divided into three parts:

1. Crown reserves management;
2. Community land management; and
3. Other legislative requirements.

Managing Crown Reserves

Crown Lands Act 1989

Crown reserves were first established in New South Wales during colonial times. These reserves are created to protect and manage important community resources and are administered under the 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 (refer to *Table 2: Crown Reserve [portion]).*

Plans of management for Crown reserves

This plan of management for Holmes Drive Reserve has been prepared according to the requirements of the *Crown Lands Act 1989*. A plan of management will satisfy the *Crown Lands Act 1989* providing the following points are addressed:

- The plan of management should be prepared by the reserve trust or trust manager, acting on behalf of the reserve trust (s.112 CLA) [see *Trust Management* in this section];
- Objects of Act (s.10 CLA) [see *Objects of Crown Lands Act*];
- The plan of management and its outcomes must incorporate and satisfy the *principles of Crown land management* (s.11 CLA) [see *Principles of Crown Land Management*];

- Existing and proposed land uses, developments, activities, leases, licences and management practices must be consistent with the dedicated *public purpose* of the reservation [see *Public Purpose(s) of Crown Land*];
- The plan of management must address any matters required by the Minister responsible for the Crown Lands (s.112 CLA);
- The Minister has the power to reserve land for a public purpose (s.87 CLA 1989);
- Public exhibition of the draft plan of management and submissions must be referred to the Minister (responsible for the *Crown Lands Act*) prior to adoption.

It is essential that the "public purpose" of the reserve establishes the basis for planning and management. Proposed uses, developments and management practices must conform to the public purpose for the reserve or dedicated land and conform to particular policies of the Department of Lands regarding Crown reserves (s.87 CLA 1989).

The Minister for Lands, under s.112 of the *Crown Lands Act 1989,* may initiate preparation of a draft plan of management for the reserve or the Minister may consent to a reserve trust or trust manager, acting on behalf of the reserve trust, to prepare a draft plan of management. It is important that the community has the opportunity to comment on the draft plan during public exhibition (not less than 28 days) to allow for public review and submissions.

The trust manager must take comments from the Department into account before completing the draft plan of management and requesting Ministerial adoption of the plan. The adopted plan of management becomes a regulatory instrument which binds the trust manager (acting on behalf of the reserve trust) to follow the plan.

Trust management

Managing Crown reserves

Crown reserves can be managed in different ways including:

- Reserve trust;
- Devolved management under s.48 of the *Local Government Act 1993*;
- Departmental (Department of Lands) direct;
- Administrative orders.

Reserve trust

A reserve trust is an incorporated entity that can be established and appointed to manage a Crown reserve (e.g. community trust boards or administrators). It is not a branch of a department of government and is not conducted for private profit.

Trusts are nominated by the Minister for Lands (s.92 CLA 1989). A trust board has functions conferred upon it under the *Crown Lands Act 1989*, including responsibility under the oversight of the Minister for Lands for care, control and management of a specific reserve, consistent with the public purpose of its reservation or dedication.

The Minister cannot direct the trust as to how it is to manage the reserve unless the trust exceeds its powers (i.e. if the trust was to act *ultra vires* – beyond the trust's legal power or authority). The Minister can otherwise only suggest or make representations to the trust with respect to management.

Trust manager

Hawkesbury City Council is charged with care, control and management of the Crown reserve (under s.92 CLA 1989) and manages the affairs of the trust (s.95 CLA 1989).

Leases and licences

Hawkesbury City Council, as trust manager, may enter into a lease or licence for the whole or part of the Crown reserve to which this plan of management applies (refer to *Community land – Leases and Licences*).

Proceeds

The net proceeds from a sale, easement, lease, or licence (including a temporary licence) on the Crown reserve should be applied in accordance with directions (if any) given by the Minister for Lands (s.106 CLA 1989). This may include:

- Direction that proceeds be paid to another reserve trust to be applied to the care, control and management of another trust's reserve.
- Direction to Consolidated Fund or to the Public Reserve Management Fund under the *Public Reserves Management Act 1987*. In the absence of a direction from the Minister (which is the case with Holmes Drive Reserve) the proceeds shall be invested or applied for the general purpose of the reserve trust (i.e. the proceeds must be spent within the reserve).

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

Accountability

Clause 33 of the *Crown Lands Act Regulation (2000)* states that the reserve trust must prepare an annual report detailing the income, expenditure, assets, liabilities and improvements of the reserve as well as the details of any leases or licences granted by the Trust. The Minister (or the community) may request this information at any time. (Clause 34 (Schedule 4) of the Regulation states the following:

"Where a reserve trust is managed by a council as defined in the Local Government Act 1993, the council is required to keep separate records to permit analysis of monetary details for each reserve. The account must among other things detail revenue and expenditure, improvements carried out on the reserve(s), and list all leases and licences granted or in force".

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"* and to provide for the following:

- *"A proper assessment of Crown land;*
- *The management of Crown land having regard to the principles of Crown land management contained in this Act;*
- *The proper development and conservation of Crown land having regard to those principles;*
- *The regulation of the conditions under which Crown land is permitted to be occupied, used, sold, leased, licensed or otherwise dealt with;*
- *The reservation or dedication of Crown land for public purposes and the management and use of the reserved or dedicated land; and*
- *The collection, recording and dissemination of information in relation to Crown land".*

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:

a) *Environmental protection principles be observed in relation to the management and administration of Crown land;*

b) *The natural resources of Crown land (including water, soil, flora, fauna and scenic quality) be conserved wherever possible;*

c) *Public use and enjoyment of appropriate Crown land be encouraged;*

d) *Where appropriate, multiple use of Crown land be encouraged;*

e) *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*

f) Crown land be occupied, used, sold, leased, licensed or otherwise dealt with in the best interests of the State consistent with the above principles….

TABLE 2: Crown Reserve [portion]	
Land tenure:	Lot 7009 DP3550
Reserve No:	R79779
Reserve name:	Holmes Drive Reserve
Reserve type:	Reserve
Public purpose(s):	Public recreation
Reserve gazetted:	2nd August 1957
Trust name:	Hawkesbury City Council Crown Reserves Reserve Trust
Reserve type:	Reserve Trust
Management type:	Council
Trust manager:	Hawkesbury City Council
Reserve categorisation:	Natural Area: bushland Natural Area: watercourse Park
Leases/ licences:	nil

SOURCE: HAWKESBURY CITY COUNCIL (2012)

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 and licences and any other agreements in a Crown reserve are broadly defined by the public purpose for the reserve. All uses of a Crown reserve must be in accordance with public purposes(s) and conform to particular policies of the NSW Department of Lands regarding Crown reserves (s.87 CLA 1989). Furthermore, zoning provisions in the *Hawkesbury Local Environmental Plan 2012* should be consistent with public purpose (see *Other Relevant Legislation – HLEP 2012).*

In preparing a plan of management for a Crown reserve, or a public reserve which includes a portion of Crown reserve, it is essential that the reserve's public purpose'(s) establishes the basis for planning and management. Public purpose may apply to environmental and heritage protection, recreation and sport, open space, community halls and special events. Holmes Drive Reserve was reserved in

1957 for the public purpose of Public Recreation however the Crown reserve serves a much broader purpose in terms of conserving environmental, ecological and scenic values.

Threatened species legislation

The River-flat Eucalypt Forest occurring along the riverbanks and back-swales of Holmes Drive Reserve is scheduled as an endangered ecological community under the *Threatened Species Conservation Act 1995* (TSC Act 1995). A portion of an ephemeral back-lagoon and freshwater wetland also occurs within the Crown reserve. This freshwater wetland is also scheduled as an endangered ecological community (TSC Act 1995).

Sydney Regional Environmental Plan – SREP No.20

The significance of this reserve's environmental and scenic values is further supported by *Sydney Regional Environmental Plan – SREP No.20 Hawkesbury-Nepean River (No.2 – 1997).*

Protecting key values

This plan of management recommends that the public purpose be expanded to include "Environmental Protection and Public Recreation" to emphasise the significance of environmental, ecological and scenic values and to ensure that appropriate protection and conservation measures are implemented (see *Table 8: Action Plan – item A2*).

Case law judgements

Case law judgements influence policy and practice of the NSW Department of Lands and reserve trust(s) appointed by the Minister. The following case law judgements have relevance to this Crown reserve:

- *Use of the reserve must be consistent with the public purpose for which the land is dedicated or reserved. This includes uses ancillary to or supportive of the reserve purpose;*
- *Improvements and developments to land which is reserved or dedicated are confined to those which support, or are ancillary to, the public purpose of the reservation;*
- *A reserve cannot be used for a purpose relating to an activity that is occurring off the reserve and that is not consistent with the reserve purpose (e.g. car parking on a Crown reserve for "public recreation" that serves an adjoining land use would not be acceptable);*
- *Land reserved or dedicated for "public recreation" must be open to the public generally as a right. Exclusive use of the reserve should be minimised to avoid sections of the community becoming alienated from*

using the reserve. The public may only be restricted from access to parts of the reserve and buildings if it is necessary for the public's enjoyment of the reserve or for health and safety reasons to be excluded, for example from a workshop, equipment storage or operational facilities.

- *Access as of right does not mean entirely free access. Reasonable entry fees and charges may be imposed, as well as other legal constraints to restrict entry (e.g. health and safety or requirements for maintenance/ operational facilities or equipment storage relating to the reserve's public purpose;*
- *A lease or license must be consistent with the reason or purpose of the land's reservation or dedication.*

Source: Extract from notes provided by Ferguson, I. Department of Lands (2006)

Crown reserve – Leases and licences

There are no existing leases, licences or related easements (including permissive occupancy or licences for the purposes of "pipeline and pump-site") within the Crown reserve or community land portions of Holmes Drive Reserve (HCC, 2012). The following section refers to the granting of leases and licences with respect to Crown reserve. Refer to *Community land – Leases, licences and other estate* for community land (eastern) portion of reserve.

A lease or licence may be granted in accordance with an express authorisation by this plan of management providing the lease or licence is consistent with the reserve's public purpose, the *Crown Lands Act 1989* (s.102 CLA 1989), the *Crown Lands Regulation 2000,* case law and policy guidelines of the NSW Department of Lands, Council's Land Management Goals, adopted policies and other relevant legislation. For express authorisation of future permitted leases and licences on Crown reserve see *Table 8: Action Plan.* The following is applicable:

- The reserve trust has significant interest in the estate over the reserved land;
- The reserve trust (not council) leases and licences uses in the reserve (s.102 CLA 1989);
- Crown land may be leased or licensed by the reserve trust – subject to the Minister's consent; (refer to s.102A for a reserve trust managed by council and appointed under s.95 CLA 1989);
- Any lease over five years (including options) must be publicly notified;
- Any proceeds are to be applied by the trust towards the care control and management of the reserve (s.106 CLA 1989).

Temporary licences may be issued by the reserve trust to authorise uses or occupation of the reserve for a period less than twelve (12) months for prescribed activities in accordance with the *Crown Lands Act 1989 (s.108)* and the *Crown Lands Regulation 2000*. These temporary licences are not required to be referred to the Minister for consent *Crown Lands Act 1989 (s.102 (d) CLA 89).* Hawkesbury City Council, as reserve trust manager, may enter into a lease or licence for the whole or part of the Crown reserve to which this plan of management applies provided that:

- The uses and activities within the reserve are in accordance with this plan of management and relevant Crown land management policies;
- The uses/ activities are consistent with the public purpose of the reserve and is considered to be in the public interest;
- The granting of the lease or licence is in accordance with the provisions of the *Crown Lands Act 1989*.

Managing Community Land

Local Government Act 1993

The *Local Government Act 1993* requires all public land to be classified as either community land or operational land. This reserve's community land owned by Hawkesbury City Council (including the central strip [roadway] and eastern portion) must be managed in accordance with the *Local Government Act 1993* and other relevant legislation and policies.

TABLE 3: Community Land	
Land tenure:	Lot 23 DP 230176 (eastern portion) Lot 24 DP 230176 (central corridor)
Reserve name:	Holmes Drive Reserve
Community land:	Hawkesbury City Council
Reserve categorisation:	Natural Area: bushland Natural Area: watercourse Park
Leases/ licences:	nil

SOURCE: HAWKESBURY CITY COUNCIL (2012)

The ways in which community land can be used and managed are 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.

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 bushland, wetland, escarpment, watercourse, foreshore or a category prescribed by the regulations. Refer to Part 4 of the *Local Government (General) Regulation 2005* for guidelines on how these categories are determined. Although it is not a requirement of the *Crown Lands Act 1989* to categorise Crown reserves, the practice is encouraged by the Department of Lands for purposes of consistency with Council's community land management objectives. The *Draft Generic Plans of Management 2011* categorises Holmes Drive Reserve into three categories as follows:

- Natural area – watercourse;
- Natural area – bushland; and
- Park

This plan of management supports the current community land categorisation and mapping contained in the *Draft Generic Plans of Management Appendix 2 – Community Land Category Maps* (dated 15/02/2011). Refer to *Figure 4: Land Categorisation.*

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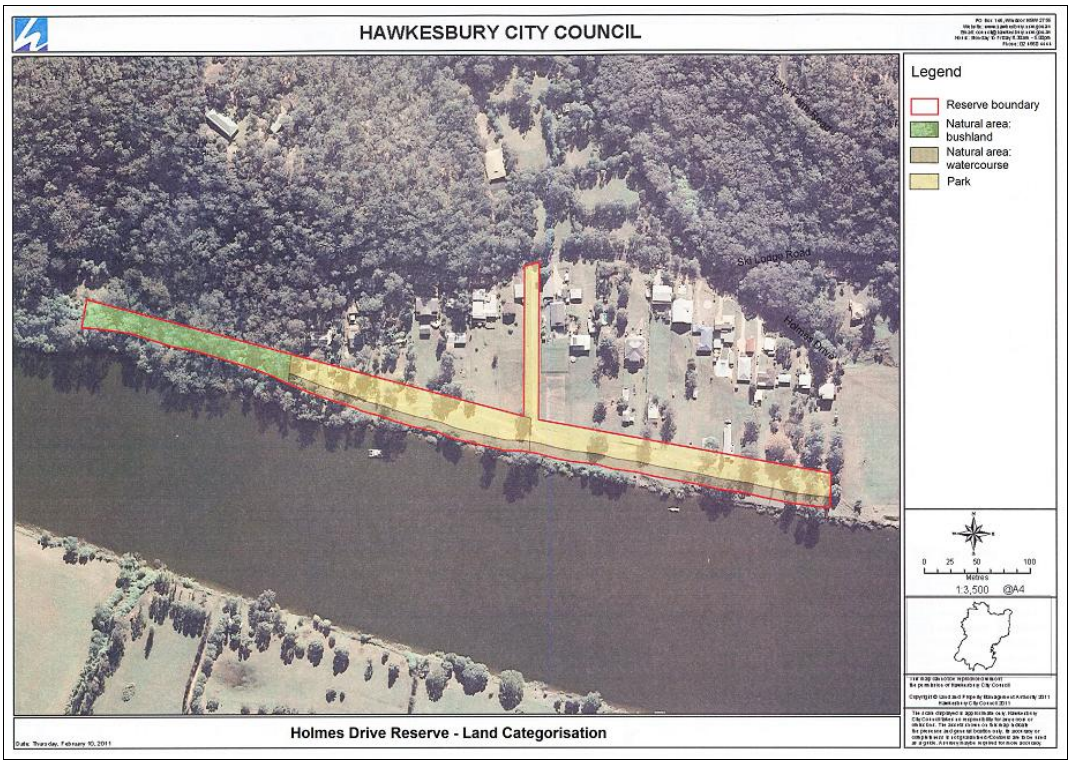


Figure 4: Land Categorisation – Holmes Drive Reserve

BASE SOURCE: Hawkesbury City Council (15/02/2011)

Natural Area

"Land should be categorised as a natural area under section 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".

Section 102, Local Government (General) Regulation 2005

Natural Area – watercourse

"Land that is categorised as a natural area should be further categorised as a watercourse under section 36(5) of the Act if the land includes:

(a) Any stream of water, whether perennial or intermittent, flowing in a natural channel, or in a natural channel that has been artificially improved, or in an artificial channel that has changed the course of the stream of water, and any other stream of water into or from which the stream of water flows, and

(b) Associated riparian land or vegetation, including land that is protected land for the purposes of the Rivers and Foreshores Improvement Act 1948 or State protected land identified in an order under section 7 of the Native Vegetation Conservation Act 1997".

Section 110, Local Government (General) Regulation 2005

The riverbank is categorised as "natural area – watercourse" (except for the eastern half of the Crown reserve portion which is natural area – bushland). This category includes isolated individual trees and remnant regrowth (including all strata) of River-flat Eucalypt Forest, an endangered ecological community (TSC Act 1995). The riverbank is an environmentally sensitive zone subject to low flood events. The alluvial soils are inherently unstable and susceptible to erosion. The *Native Vegetation Conservation Act 2003* applies to this land and native riparian vegetation. Threats include ongoing disturbance and vegetation clearing, inappropriate maintenance regimes, concentrated visitor use/ access to water, private infrastructure, water-based recreation and exotic weed invasion. This zone has high conservation values and is in need of an integrated restoration strategy.

Natural Area – bushland

"(1) Land that is categorised as a natural area should be further categorised as bushland under section 36(5) of the Act if the land contains primarily native vegetation and that vegetation:

(a) Is the natural vegetation or a remainder of the natural vegetation of the land, or
(b) Although not the natural vegetation of the land, is still representative of the structure or floristics, of the natural vegetation in the locality.

(2) Such land includes:

(a) Bushland that is mostly undisturbed with a good mix of tree ages, and natural regeneration, where the understorey is comprised of native grasses and herbs or native shrubs, and which contains a range of habitats for native fauna (such as logs, shrubs, tree hollows and leaf litter), or
(b) Moderately disturbed bushland with some regeneration of trees and shrubs, where there may be a regrowth area with trees of even age, where native shrubs and grasses are present in the understorey even though there may be some weed invasion, or
(c) Highly disturbed bushland where the native understorey has been removed, where there may be significant weed invasion and where dead and dying trees are present, where there is no natural regeneration of trees or shrubs, but where the land is still capable of being rehabilitated".

Section 107, Local Government (General) Regulation 2005

The eastern half of the Crown reserve portion (adjoining the Sackville Reach Aboriginal Memorial Reserve) is categorised as “natural area – bushland”. This riparian zone includes steep riverbanks and undulating hills and swales on alluvium dominated by more or less contiguous River-flat Eucalypt Forest, an endangered ecological community (EEC) (TSC Act 1995). This community is generally in good condition with varying levels of disturbance and weed invasion. Although more elevated than the eastern portion of the reserve it is subject to periodic flooding. This community adjoins a small ephemeral back-lagoon and wetland (an EEC under TSC Act 1995), most of which is on privately-owned land.

Threats include unauthorised vegetation clearing, inappropriate maintenance regimes and exotic weed invasion. The *Native Vegetation Conservation Act 2003* applies to this land and native vegetation. This zone has very high conservation values and would respond to a minimal disturbance bush regeneration strategy.

Park

“Land should be categorised as a park under section 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 is categorised as “park”. This area is largely cleared with a landscape setting of open mown grass, cultivated native and exotic trees and passive recreational uses. The topography is predominantly flat to gently undulating rising to the north (access corridor) and west (Crown reserve portion). This area retains isolated remnant native trees (e.g. *Casuarina cunninghamiana*), components of the River-flat Eucalypt Forest, an endangered ecological community (TSC Act 1995).

In accordance with the *Local Government Act 1993* management of each category and sub-category is guided by a set of core objectives. The reserve’s natural area categories have specific requirements in terms of permissible development, leases and licences. The occurrence of River-flat Eucalypt Forest (EEC) particularly as a contiguous community within the Crown reserve portion adds further weight to the significance of these natural values and signals the need for establishing an appropriate conservation strategy.

Community land – Leases and licences

A lease, licence or other estate may be granted for the community land portion of Holmes Drive Reserve 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 *Table 7: Core objectives*). A lease, licence or other estate must also be consistent with the public purpose of the adjoining Crown reserve portion. For express authorisation of future permitted leases, licences or other estate refer to *Table 8: Action Plan.*

Hawkesbury City 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 IV).* All of the riverbank within Holmes Drive Reserve and western half of the Crown reserve portion are categorised as a natural area (sub-categories of watercourse and bushland).

No existing water licences are registered on adjoining freehold land. Such water licences permit the pumping and piping of water for irrigation from the river.

Other Relevant Legislation and Policies

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

- Environmental Planning and Assessment Act 1979
- Native Title Act (Commonwealth) 1993
- SREP No. 20 Hawkesbury-Nepean River (No.2 – 1997)
- Native Vegetation Conservation Act 2003
- Threatened Species Conservation (TSC) Act 1995
- Catchment Management Authorities Act 2003
- Fisheries Management Act 1994
- National Parks and Wildlife Act 1974
- NSW Heritage Act 1977
- Noxious Weeds Act 1993

- Rural Fires Act 1997
- Disability Discrimination Act 1992
- Hawkesbury Nepean Floodplain Management Strategy 1998
- Hawkesbury Lower Nepean Catchment Blueprint 2003
- Hawkesbury-Nepean Valley Flood Management Review 2013
- Draft Catchment Action Plan 2013
- NSW Flood Policy 1984
- NSW State Rivers and Estuaries Policy 1993
- NSW Wetlands Management Policy 1996
- NSW Floodplain Management Manual 2001
- Hawkesbury Local Environmental Plan 2012
- Hawkesbury Community Strategic Plan 2010-2030
- Hawkesbury City Council Charter
- Section 94 Contributions Plan Review 2001

Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act (EP&A) 1979* forms the basis of statutory planning in New South Wales. The Act includes preparation of Local Environmental Plans (LEPs) which broadly regulate land use and development.

Hawkesbury Local Environmental Plan 2012

Hawkesbury City Council, as the consent authority under the *Hawkesbury Local Environmental Plan 2012* controls development and the use of land on parks and reserves in the Hawkesbury City Council local government area. The *Hawkesbury Local Environmental Plan 2012* commenced on 21 September 2012. The current version accessed is dated 7 January 2013.

Land Use Zones

Under the *Hawkesbury Local Environmental Plan 2012* Holmes Drive Reserve is zoned RU2 – RURAL LANDSCAPE. Refer to Hawkesbury City Council's website for *Hawkesbury Local Environmental Plan 2012 – Land Zoning Map* (SHEET LZN_012). The objectives of this zone include the following:

- *"To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
- *To maintain the rural landscape character of the land.*
- *To provide for a range of compatible land uses, including extensive agriculture.*
- *To minimise the fragmentation and alienation of resource lands.*
- *To minimise conflict between land uses in the zone and land uses in adjoining zones.*
- *To ensure that development occurs in a way that does not have a significant adverse effect on water catchments, including surface and*

groundwater quality and flows, land surface conditions and important ecosystems such as waterways.

- *To ensure that development retains or enhances existing landscape values including a distinctive agricultural component.*
- *To preserve the river valley systems, scenic corridors, wooded ridges, escarpments, environmentally sensitive areas and other features of scenic quality.*
- *To ensure that development does not detract from the existing rural character or create unreasonable demands for the provision or extension of public amenities and services".*

Holmes Drive Reserve adjoins W2 – RECREATIONAL WATERWAYS which has the following objectives:

- *"To protect the ecological, scenic and recreation values of recreational waterways.*
- *To allow for water-based recreation and related uses.*
- *To provide for sustainable fishing industries and recreational fishing".*

Terrestrial biodiversity

Hawkesbury Local Environmental Plan 2012 – Terrestrial Biodiversity Map (SHT BIO_012) identifies all the vegetation within Holmes Drive Reserve as "Significant Vegetation", subject to the following provisions:

1) "The objective of this clause is to maintain terrestrial biodiversity by:
   a) Protecting native fauna and flora;
   b) Protecting the ecological processes necessary for their continued existence;
   c) Encouraging the conservation and recovery of native fauna and flora and their habitats.
2) This clause applies to land identified as "Significant vegetation" and "Connectivity between significant vegetation" on the Terrestrial Biodiversity Map.
3) Before determining a development application for development on land to which this clause applies, the consent authority must consider:
   a) whether the development:
      i) is likely to have any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and
      ii) is likely to have any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and
      iii) has any potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land, and

iv) is likely to have any adverse impact on the habitat elements providing connectivity on the land.

b) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.

4) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that:

a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or

b) if that impact cannot be reasonably avoided by adopting feasible alternatives—the development is designed, sited and will be managed to minimise that impact, or

c) if that impact cannot be minimised—the development will be managed to mitigate that impact".

Native Title Act (Commonwealth) 1993

This plan of management acknowledges the significance of the Hawkesbury River and its 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 this reserve. 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 reserve.

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

Holmes Drive Reserve is subject to the provisions under the *Sydney Regional Environmental Plan – SREP No.20 Hawkesbury-Nepean River (No.2 – 1997).* SREP No.20 controls any development which has the potential to impact on the river environment (i.e. water quality, environmentally sensitive areas and riparian scenic quality).

Native Vegetation Conservation Act 2003

The *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 Holmes Drive Reserve. It is important that the reserve's riverbank vegetation (i.e. River-flat Eucalypt Forest including remnant trees and regrowth) is 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

Endangered ecological communities (EECs)

Holmes Drive Reserve's "Significant Vegetation" (HELP 2012) is River-flat Eucalypt Forest (previously known as Sydney Coastal River Flat Forest). River-flat Eucalypt Forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions is a listed endangered ecological community (Part 3 of Schedule 1 – *Threatened Species Conservation Act 1995*). The reserve also includes a small portion of a Freshwater Wetland community, also scheduled as an endangered ecological community.

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:

- 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 Cumberland Plain Recovery Plan (2010) aims to provide for the long-term survival and protection of threatened biodiversity on the Cumberland Plain. Holmes Drive Reserve is affected by the recovery plan due to the presence of River-flat Eucalypt Forest (listed as an endangered ecological community). Future management of the reserve will need to be consistent with the recovery plan.

…

4.0 Community Engagement

Introduction

Community consultation is an important part of the plan of management process. The NSW Department of Lands and Hawkesbury City Council support the use of inclusive models of engagement and collaboration with the community. This approach promotes transparency in the decision-making process by providing opportunities for the community to engage in these processes, helping to raise public awareness of issues and to contribute comments and submissions. A community workshop was held during the initial phase of preparing the draft plan of management. Further opportunities for community input continued through to release of the draft document (i.e. public exhibition phase). This process highlights the importance of community engagement and ownership in the adopted plan of management.

Public Exhibition

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 (four weeks). A further two weeks are provided for acceptance of written submissions. During public exhibition the draft plan of management is made available for viewing at the Hawkesbury City Council Administrative Offices, Hawkesbury Central Library (in the Deerubbin Centre) Windsor and on Council's web-site: www.hawkesbury.nsw.gov.au/

The draft plan of management, as amended following public submissions and review, will be submitted to Council for adoption.

Community Workshop

Purpose

The main purpose of the community workshop is to learn more about how the community values Holmes Drive Reserve. It also aims to identify key issues affecting these values and to promote opportunities for future sustainable management and conservation. Sustainability is a key principle guiding this process. The workshop aims to engage the community and to provide a transparent and equitable forum for all user groups, stakeholders and individuals.

A community workshop was held at Holmes Drive Reserve, Cumberland Reach on Sunday 27 May 2012 (between 2.00-4.00pm). The workshop was advertised by Hawkesbury City Council in the local press and notices in Council's Administrative Offices and Hawkesbury Central Library. Council also contacted relevant stakeholders. It was a fine day and the workshop was attended by thirty-two (32) local residents as well as two Councillors, Cr. Reardon and Cr. Williams.

Proceedings

After a brief introduction by Sean Perry, Manager – Parks and Recreation (HCC) the workshop was convened by Noel Ruting, Director of LandArc Pty Limited (see *Appendix I: Community Engagement – Preparing plans of management*). The workshop commenced with a brief overview of the plan of management process, a discussion of key values and review of some of the issues affecting environmental quality. This introduction also provided the context, administrative and legislative framework which would guide preparation of the plan of management. Participants were able to engage in a broad discussion of issues at the workshop. Sean Perry, Manager – Parks and Recreation (HCC) provided clarification of specific items.

Community Issues

Workshop and Questionnaire

To promote further discussion of community values and issues and to help in answering questions relating to future management strategies, a Community Issues Questionnaire (see *Appendix II – Questionnaire Pro Forma)* was distributed to participants. Copies were also sent (mailed/ emailed) to other stakeholders who were unable to attend the workshop.

A total of six (6) written responses were initially received, all of which were local residents (postcode 2756). A further twenty-two (22) written (email) responses were received via a single stakeholder/ coordinator. It was advised by the coordinator that a further meeting was held after the workshop (including people who could not attend on the day) and it was agreed by all that the key issues and priorities were the same. Essentially, the grouped responses identified four key issues in the following order of priority (refer to *Key Issues* in this section):

1. Retention and repair of existing boat ramp/ water access;
2. Riverbank stability, ongoing erosion and safety issues;
3. Condition of access road into reserve (need for repairs);
4. Weed management (i.e. eradicate ''noxious'' weeds).

In total, twenty-four (24) written responses were from local residents and four (4) from people outside the local area. Although this represents a relatively small

sample size with respect to the Hawkesbury LGA and broader western Sydney area it provides important community feed-back, particularly from local residents and stakeholders who use the park on a regular basis and have a strong interest in its future management.

FIGURE 5: Age groupings of respondents

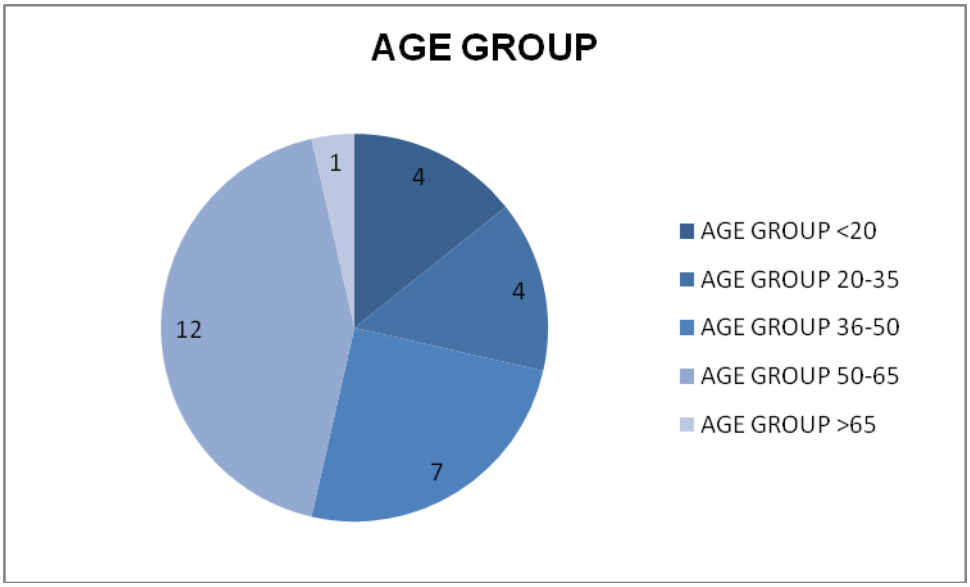
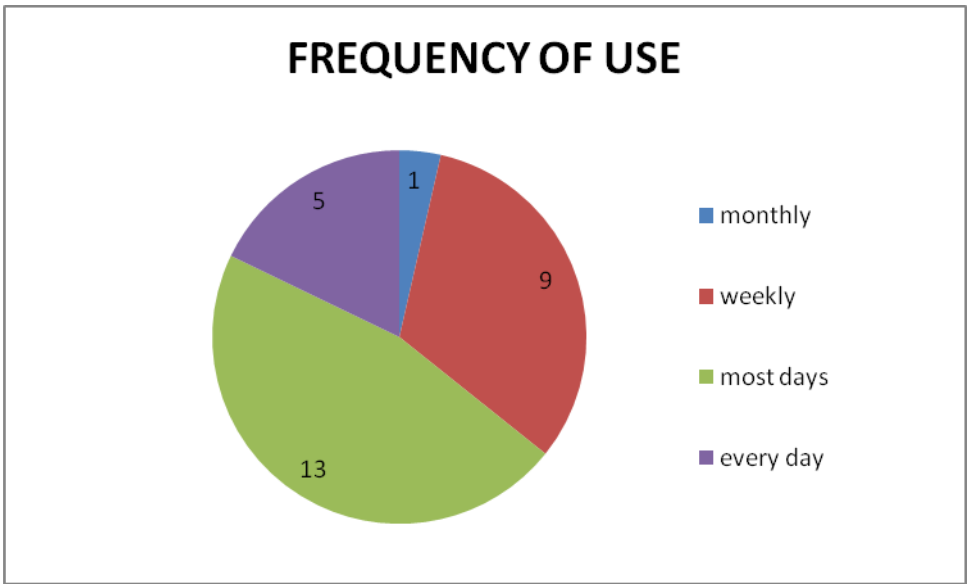


FIGURE 6: How often do you visit the reserve?



…

All age groups were well represented with the exception of over 65 years old (single response). Gender responses were equally distributed. The 50-65 year age group was the largest (representing 43% of total respondents) followed by 36-50 year olds (25% of respondents). Notably, the younger age cohorts (<35 years old) were well represented (29%) which is unusual for the majority of plans of management. This likely reflects the significance of boating and water-based recreational use of the reserve. Refer to *Figure 5: Age Groupings of Respondents*.

All respondents indicated that they visited Holmes Drive Reserve all year round with no specific seasonal preference. The frequency of use is very high with all respondents (except one person) visiting the reserve weekly, most days or every day. This frequent use highlights the reserve's importance in the daily lives of local residents and its significance in terms of providing safe and easy access to the river and scenic amenity. Refer to *Figure 6: Frequency of Use.*

Community Values

The Questionnaire presented a table listing the reserve's key features, existing infrastructure and possible improvements. It asked respondents to assign a value (i.e. important, neutral or not important) to these items. The list is not exhaustive and other items were added by respondents including "access to obelisk" (referring to the Aboriginal Memorial Reserve) and provision of "slow-points/ speed humps" to reduce vehicular speed in the reserve. For a summary of responses see *TABLE 4: Community Values – Key Features, Existing Infrastructure and Improvements* and *Figure 7: Community Values – What is important?*

Out of an original list of sixteen (16) ''values'', two key items received the highest possible ranking for "importance" (i.e. 28 out of 28 responses):

- Safe easy access to the river (100%); and
- Public boat ramp (100%).

All respondents believe these two items are important. These were followed by:

- Open views over reserve (89%);
- Beach access (82%);
- Open grassed areas (75%);
- Existing road access (71%);
- Quiet solitude/ place to relax (68%);
- Stable natural riverbanks (61%);
- Improved river health (58%); and
- Existing structures (access to river) (54%).

…

TABLE 4: Community Values – Key features, existing infrastructure and improvements

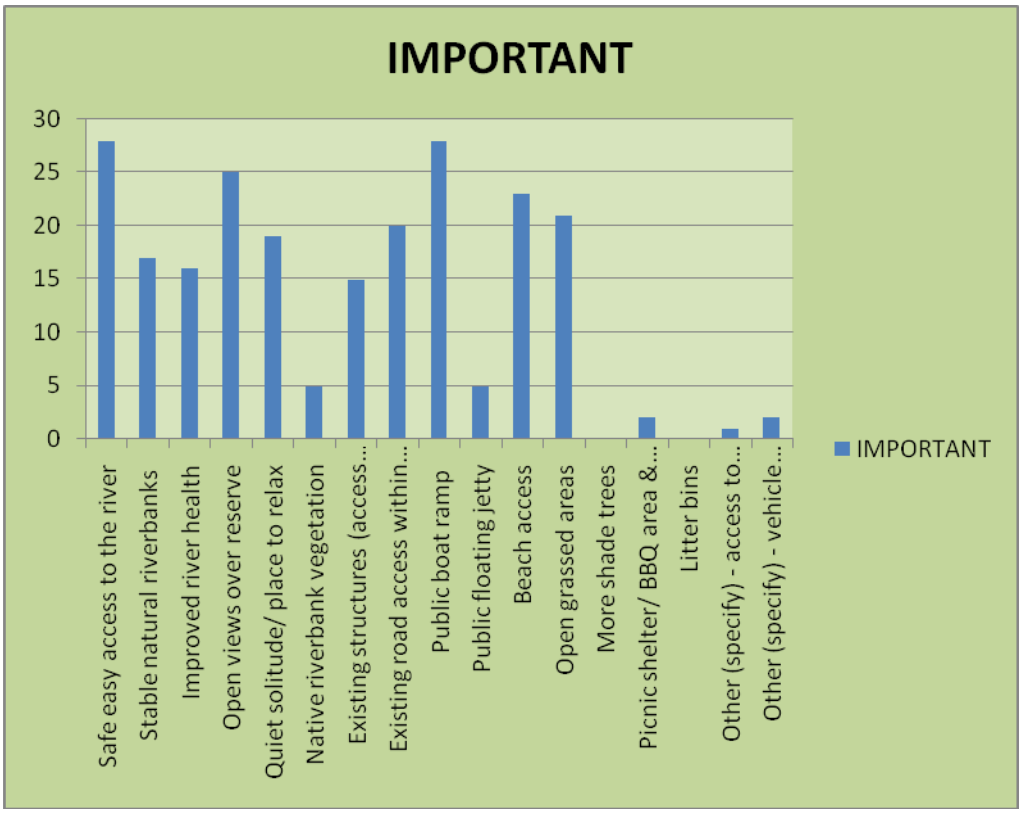
	DESCRIPTION	IMPORTANT	NEUTRAL	NOT IMPORTANT
KEY FEATURES/ ASSETS	Safe easy access to the river	28		
	Stable natural riverbanks	17	7	4
	Improved river health	16	12	
	Open views over reserve	25	3	
	Quiet solitude/ place to relax	19	9	
	Native riverbank vegetation	5	19	4
	Existing structures (access to river)	15	12	1
	Existing road access within reserve	20	7	1
	Public boat ramp	28		
	Public floating jetty	5	1	22
	Beach access	23	2	3
	Open grassed areas	21	5	2
	More shade trees		12	16
	Picnic shelter/ BBQ area & seating	2	2	24
	Litter bins		8	20
	Other (specify) - access to obelisk	1		
	Other (specify) - vehicle slow-points	2		

Notably, key value preferences relate to safe, easy access (including boat ramp access) for water-based recreational activities, protection of open views over the reserve and open grassed areas. Existing structures (access to the river) ranked well-down the list (i.e. ranked as “important” by only 54% of respondents). Nevertheless, only one respondent ranked this item as “not important”.

Most of this unauthorised private infrastructure is in very poor condition and potentially poses a safety hazard to the general public. Although safe, easy access to the river was given top ranking by respondents there appears to be an implied acceptance of these poorly maintained structures in the reserve.

…

FIGURE 7: Community Values – What is important?



Items which ranked very poorly (i.e. ranked as “not important”) included:

- Picnic shelter/ BBQ area & seating (86% - not important);
- Public floating jetty (79% - not important);
- Litter bins (71% - not important); and
- More shade trees (57% - not important).

Possible future infrastructure such as a picnic shelter/ BBQ area & seating, public floating jetty and litter bins in the reserve were not supported by respondents. Although ranking as “important” by some people, each of these items was overwhelmingly considered as “not important” by most respondents. Notably, any new/ possible public infrastructure that may encourage further use of the reserve was rejected by respondents.

In terms of the reserve’s environmental, social and recreational sustainability, “stable natural riverbanks” and “improved river health” were considered important values by only 61% and 58% of respondents (respectively). Furthermore, “native riverbank vegetation” was ranked as important by only five (5) respondents (18%). The majority (68%) ranked this item as having “neutral” importance and four (4) people believed this was “not important”. Similarly, the planting of more shade

trees was considered “not important”. Indeed, none of the respondents ranked this item as “important”. It may be perceived that trees planted in the reserve pose a potential threat to other “important” values such as open views over the reserve. From the data, it appears that there is a lack of appreciation of the fragility of this riparian system and environmental values. Recreational, social and economic values appear to be in conflict with the reserve’s long-term environmental sustainability.

Key Issues

The community workshop and Community Issues Questionnaire identified a broad range of issues. Respondents to the questionnaire were asked to identify the three most important issues affecting the reserve and what actions would you suggest to address these issues? The following discussion reviews these issues, identifies potential threats and challenges and examines opportunities for improved management.

As previously outlined twenty-two (22) of the twenty-eight (28) written responses to the questionnaire identified four key community issues. The remaining six (6) responses also focussed on these issues as well as general maintenance and repairs within the reserve. For a summary of comments see *Appendix III – Summary of Community Responses to Questionnaire*. In order of priority the key issues include:

1. Retention and repair of existing boat ramp/ water access;
2. Riverbank stability, ongoing erosion and safety issues;
3. Condition of access road into reserve (need for repairs);
4. Weed management (i.e. eradicate ‘’noxious’’ weeds).

At the opening of the public workshop, the local community expressed its dissatisfaction with Council and its management of the reserve dating back many years. Workshop attendees felt deep frustration with the process. They believed there was a lack of commitment by Council in following up long-standing issues. A number of workshop attendees expressed considerable concern over a general lack of maintenance, services and standards.

Key issues identified include the condition of the boat ramp and access road, the general lack of repair work and/or refurbishment, extent of riverbank erosion and related public safety issues and proliferation of exotic weeds. Some of the general issues such as regular mowing/ edging, weed control, rubbish collection and minor repairs should be addressed in day-to-day maintenance scheduling while others will require considerable capital expenditure, particularly public access, erosion control measures/ bank stabilisation and restoration works.

Simply providing funding for repairs, replacement and control measures will not necessarily provide lasting solutions. It is clear that there needs to be a departure from past ad hoc management practices which have seriously diminished the quality and integrity of the reserve's riparian setting. These issues have arisen from a range of natural and cultural processes, recreational impacts, intervention strategies and economic realities.

The following section *5.0 Basis for Management* identifies the reserve's broader values, its role in providing access to the river, recreational opportunities and protection of environmental values. It provides further discussion and analysis of the issues and assesses key threats in relation to identified values. Moreover, it establishes the basis for a new management model – one which promotes a balanced approach to resource management, enhances social and ecological resilience and is guided by principles of sustainability.

…

5.0 Basis for Management

Objectives

This section of the Plan of Management has the following objectives:

- *To define the reserve's role in the local area and Hawkesbury LGA;*
- *To identify the reserve's key values and significance including the natural/ cultural landscape setting, biodiversity and recreational values;*
- *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 Crown reserve and community land objectives;*
- *To provide a vision for the future.*

Key Values and Significance

Values can be simply described as the things which make a place important. Community values have been reviewed in *4.0 Community Engagement* (see *Table 4: Community Values*). Guiding principles and management objectives must be based on a sound understanding of the resource base, identified values and level of significance as well as the threats and issues affecting these values. The following key values have been developed through consultation, review of relevant literature, site investigations, analysis and assessment in terms of their local or State significance (see *Table 5: Key Values and Level of Significance)*. Key values are divided into three categories:

1. Natural/ cultural riparian setting
2. Environment and biodiversity
3. Public recreation and reserve management

TABLE 5: Key Values and Level of Significance

Key Values	Level of Significance	
	Local	State
Natural/ cultural riparian setting		
Scenic quality and natural riparian character		State
Cultural setting – open grassed areas/ shade trees	Local	
Links with Sackville Reach Aboriginal Memorial Reserve	Local	
Potential Aboriginal archaeological heritage	Local	
Environment and biodiversity		
Endangered ecological communities (EECs)		State
Natural riparian bushland & habitat values		State
Water quality, river condition and ecological flows	Local	
Public recreation and reserve management		
Public access, circulation and linkages	Local	
Safe river access/ boat ramp	Local	
Recreational facilities (private and public)	Local	
Open space maintenance	Local	

Natural and Cultural Riparian Setting

Significance of landscape setting

Holmes Drive Reserve's scenic river setting, diversity of natural and cultural landscapes, rural and bushland character, open spaces, river access and recreational opportunities combine to make this a significant recreational asset. As a Crown reserve (in part) within the broader Crown lands system, it also serves the public purpose of providing recreation for the people of New South Wales.

These values have the potential to attract a much larger pool of regional visitors seeking passive recreational opportunities such as picnicking, fishing and quiet relaxation as well as more active pursuits such as boating and water-skiing. The reserve has commanding views of the river and is popular for watching big river events such as the "Bridge to Bridge" water ski and jet boat races.

PHOTO 13: Scenic river-side setting with a diversity of natural and cultural landscapes, open spaces and river access (22/03/2013).

PHOTO 14: Scenic qualities, river access and water-based recreation combine to make this a significant recreational asset. (22/03/2013).

PHOTO 15: The reserve's mix of native and exotic trees create seasonal variation in landscape character (25/05/2010).

…

The outstanding scenic values of the Hawkesbury River Valley are recognised at the State level under SREP No. 20 Hawkesbury-Nepean River (No.2 – 1997). Holmes Drive Reserve offers magnificent vistas along this stretch of the river. The reserve's topography varies from flat to gently undulating rises and swales offering a diverse range of filtered and open views along the river. Adjoining residents place a very high value on the protection of open views of the river. The eastern portion of the reserve has been largely cleared and modified forming a predominantly open, mown grassed landscape with some remnant native trees including River Oak *(Casuarina cunninghamiana)* and other mixed exotics. The western (Crown reserve) portion of the reserve retains a mix of cultural/ exotic planting as well as a wild aesthetic character, particularly along the upper western track leading to Sackville Reach Aboriginal Memorial Reserve. This is a natural riparian setting providing visual and ecological connectivity between the riverbank and bushland along the adjoining slopes and gullies. It is a place of quiet solitude, reflection and tranquillity dominated by the ever-present sounds of Bellbirds or Bell Miners *(Manorina melanophrys).* The significance of this native vegetation is discussed in this section (see *Environment and biodiversity – Endangered ecological communities)*.

PHOTO 16: Sackville Reach Aboriginal Memorial Reserve – obelisk [foreground] and Port Jackson Fig [background] (LandArc image 22/03/2013).

Relationship with Sackville Reach Aboriginal Memorial Reserve

The Sackville Reach Aboriginal Memorial Reserve, located adjacent to the western boundary of Holmes Drive Reserve, is dedicated to the traditional custodians of this land and the river – the Darug Aboriginal people.

An expansive Port Jackson Fig *(Ficus rubiginosa* f. *rubiginosa)*, a native of the natural riparian community, is located in a clearing. This is an exceptional specimen of massive scale and proportions. The fig's buttressed roots sprawl over a large sandstone boulder. A sandstone obelisk is located nearby.

Sackville Reach Aboriginal Memorial Reserve (located at the western end of Holmes Drive Reserve) is not part of this plan of management however it is worth noting its cultural heritage significance and its links with Holmes Drive Reserve. *Hawkesbury Local Environmental Plan 2012* identifies Sackville Reach Aboriginal Memorial Reserve (Lot 201 DP 824060) as Heritage Item 1372 – "Monument to Aboriginal people" (see *2.0 Land Description – Historic context*).

Potential Aboriginal archaeological significance

The combination of elevation above water and proximity to water (particularly within the upper western portion of the reserve) are considered important factors influencing prehistoric Aboriginal site locations. Research has shown that archaeological lithic assemblages (e.g. 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 plan of management supports the precautionary principle in providing opportunities for investigation of archaeological evidence during any routine siteworks. This plan also encourages a continuing consultative strategy with traditional Aboriginal custodians to ensure the best outcomes for protection of cultural heritage.

Environment and Biodiversity

Stream condition and water quality

The catchment has a long history of vegetation clearing, ecosystem disturbance and modification, agricultural uses, flood mitigation, dam construction, water diversion for drinking water and urban development. Water quality, aquatic biodiversity and recreational opportunities are all affected by restricted flow regimes, agricultural land uses, urban run-off, elevated nutrients and exotic weeds.

During the latter part of the twentieth century water quality, aquatic biodiversity and weed issues on the Hawkesbury – Nepean River began to impact on a range of recreational uses, particularly fishing, swimming and water-skiing. Fish stocks which were once plentiful had plummeted by the 1950s *(Athol Kemp, pers. comm., 2006).* Although fishing has remained a popular recreational activity on the river, the quality of the catch can be variable. Notably, introduced European carp have been favoured under the disturbed conditions. Before the recent La Nina event and the NSW government's introduction of an ecological flow regime (see *2.0 Land Description – Environmental Context),* the health threat posed by blue-green algae on the river significantly impacted water-based recreational values.

Aquatic water-weeds such as *Egera* and *Salvinia* spp. also flourished under the low flow regime and long periods of drought. By the summer of 2003-2004 prolonged hot weather and reduced flows provided perfect conditions for the floating water-weed *Salvinia* sp. to completely choke large stretches of the river. This had a huge impact on the use of the river for recreational purposes. Economically and socially, the event had significant repercussions for local businesses and regional tourism.

The Hawkesbury River at Holmes Drive Reserve displays the following stream condition and riverbank characteristics:

- Modified stream flows as a result of weirs and upstream dams;
- Broadening and shallowing of the river bed;
- High nutrients, turbidity and reduced oxygen levels in water column;
- Poorly structured, highly erodible alluvial soils;
- Flood and wave erosion hazard;
- Largely cleared/ highly disturbed river banks dominated by exotic weed species (particularly in the lower eastern portion of the reserve);
- Extensive bank instability and erosion with very steep ‘’cliff’’ profiles;
- High performance power boats, water-skiing and wake-boarding;
- Potential for increased levels of aquatic weeds when weather pattern returns to El Nino/ drought periods (including *Egera/ Salvinia* spp.);
- Continuing spread of noxious weeds along steep river banks/ water’s edge including Black Willow *(Salix nigra)* and many other environmental weeds.

PHOTO 17: Riverbank instability, erosion and sedimentation can be exacerbated by human-induced impacts (LandArc image 5/04/2012).

This riparian corridor is subject to flooding and high stream bank erosion hazard as well as deposition of sedimentary materials as the flood waters recede. Long periods of relative stability and deposition are 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.

Significance of natural riparian vegetation

Natural riparian vegetation has many important values including, but not limited to the following:

- Assists in maintaining good water quality;
- Assists in riverbank stability and prevention of erosion;
- Reduces turbidity and enhances biological productivity for aquatic invertebrates and fish;
- Provides valuable habitat for both terrestrial and aquatic species;
- Maintains a reservoir of natural heritage and biodiversity values;
- Enhances opportunities for connectivity, gene pool exchange, faunal corridors and bio-linkages;
- Provides high visual qualities; and
- Improves recreational opportunities and diversity in the landscape.

The importance of protecting natural riparian vegetation is identified in key legislation affecting management of this reserve including:

- *Crown Lands Act (1989)* (see Principles of Land Management);
- *Local Government Act 1993* (see Land Categorisation – Natural Areas);
- *Local Government (General) Regulation 2005;*
- *Native Vegetation Conservation Act 2003;* and
- *Threatened Species Conservation Act* (TSC Act 1995).

Sydney Regional Environmental Plan – SREP No.20 Hawkesbury-Nepean River (No.2 – 1997) also recognises these values at the regional level. The *Hawkesbury Local Environmental Plan 2012* – Terrestrial Biodiversity Map (SHT BIO_012) identifies all the (riparian) vegetation within Holmes Drive Reserve as "Significant Vegetation" triggering a broad range of protection measures with respect to any development which may have a negative impact. Moreover, the *Threatened Species Conservation Act* (TSC Act 1995) schedules two naturally occurring communities in the reserve as endangered ecological communities.

Endangered ecological communities

Although much of the eastern (Community land) portion of Holmes Drive Reserve has a long history of clearing, modification and weed invasion this area still retains dynamic ecological processes, ongoing natural evolution and opportunities for genetic exchange. Remnant components of the natural riparian vegetation are still present along the riverbank, albeit highly fragmented. For example, native canopy trees and understorey shrubs include River Oak *(Casuarina cunninghamiana),* Mountain Blue Gum *(Eucalyptus deanei),* Green Wattle *(Acacia parramattensis)* and Cheese Tree *(Glochidion ferdinandi).* Native ground layer plants include large drifts of Weeping Grass (*Microlaena stipoides* var. *stipoides)* and Harsh Ground Fern (*Hypolepis muelleri).* This natural riparian community, described as River-flat Eucalypt Forest (RFEF), is scheduled as endangered ecological community (EEC) in the NSW *Threatened Species Conservation Act 1995*.

PHOTO 18: Cabbage Gum *(Eucalyptus amplifolia)* is a dominant native canopy species and vital part of the River-flat Eucalypt Forest (27/05/2012).

Notably, the natural communities in the upper western (Crown reserve) portion of the reserve retain a high level of structural integrity, floristic and faunal species diversity and connectivity. These are vital criteria defining the reserve's natural heritage values. Refer to *Appendix V – Schedule of Existing Native Plant Species.*

The western portion of the reserve also protects (in part) a small portion of Freshwater Wetlands (i.e. small ephemeral back-lagoon/ wetland) also scheduled as an EEC under the TSC Act 1995. Most of this is located on adjoining private land (i.e. not part of this plan of management).

1. River-flat Eucalypt Forest (RFEF)

Full description:

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

Former descriptions:

Sydney Coastal River-flat Forest (Alluvial Woodland/ Riparian Forest)

Conservation significance:

Listed endangered ecological community (Part 3 of Schedule 1, TSC Act 1995)

Condition/ status:

Eastern and central portion of reserve: Highly fragmented/ modified; projective foliage cover PFC <10-30%; including remnant native canopy trees, sub-canopy/ understorey shrubs and ground layer; exotic weeds dominate sub-canopy, understorey and ground stratum.

Upper western portion of reserve: Partially fragmented grading to largely intact (all levels)/ high biodiversity, high structural and floristic integrity; exotic weeds present in shrub and ground layers (varies 10-90% weed invasion).

Current threats:

Unauthorised clearing, bank erosion, exotic weeds and recreational impacts

Canopy species:

River Oak *(Casuarina cunninghamiana),* Mountain Blue Gum *(Eucalyptus deanei),* Rough-barked Apple *(Angophora floribunda),* Port Jackson Fig *(Ficus rubiginosa)* and White Cedar *(Melia azedarach* var. *australasica)*

Small tree/ shrub stratum:

Green Wattle *(Acacia parramattensis),* Red Ash *(Alphitonia excelsa),* Cheese Tree *(Glochidion ferdinandi),* Sandpaper Fig *(Ficus coronata),* Corkwood *(Duboisia myoporoides),* Murrogun *(Cryptocarya microneura),* Poison Peach (*Trema tomentosa* var. *aspera),* Tree Violet *(Hymenanthera dentata),* Bolwarra *(Eupomatia laurina),* Hairy Clerodendrum *(Clerodendrum tomentosum), Myrsine variabilis* and *Notelaea longifolia* var. *longifolia*

PHOTO 19: The endangered River-flat Eucalypt Forest along the western track (Crown reserve) conserves a number of rare and regionally significant mesic/ rainforest species in the understorey such as Murrogun *(Cryptocarya microneura)* (LandArc image 27/05/2012).

…

Ground stratum:

Pteridium esculentum, Hypolepis muelleri, Oplismenus aemulus, Microlaena stipoides var. *stipoides, Lomandra longifolia, Einadia* spp., *Entolasia stricta* and *Pratia purpurascens.*

Climbers:

Cissus antarctica, Eustrephus latifolius, Geitonoplesium cymosum, Stephania japonica, Pandorea pandorana, Cayratia clematidea, Glycine spp. and *Desmodium* spp.

Shallow-water and semi-aquatics:

Phragmites australis, Juncus usitatus, Persicaria decipiens and *P. hydropiper*

2. Freshwater Wetlands (FW)

Full description:

Freshwater wetlands on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions

Former descriptions:

None

Conservation significance:

Listed endangered ecological community (Part 3 of Schedule 1, TSC Act 1995)

Condition/ status:

Fragmented/ modified (ephemeral back swamp/ small lagoon); native herbaceous cover varies (40-100%); exotic grasses/ weeds; excavated drainage channel/ sub-surface drain (under road)/ now blocked.

PHOTO 20: The natural biodiversity values of this ephemeral wetland (southern portion located within reserve) are impacted by ongoing disturbance, indiscriminate clearing, herbicides and exotic weed invasion (LandArc image 22/03/2013).

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Current threats:
Excavated open drainage channel/ sub-surface drain; unauthorised clearing, mowing/ slashing and exotic weeds

Ground stratum:
Common Rush *(Juncus usitatus),* Slender Knotweed *(Persicaria decipiens),* Sedge *(Cyperus polystachyos),* Lesser Joyweed *(Alternanthera denticulata),* Swamp Pennywort *(Centella asiatica)* and *Pratia purpurascens*

Biodiversity – faunal habitat values

The reserve is believed to provide habitat for common marsupials such as Swamp Wallaby *(Wallabia bicolor),* Common Wombat *(Vombatus ursinus),* Common Brush-tailed Possum *(Trichosurus vulpecula),* Ring-tailed Possum *(Pseudocheirus peregrinus)* and Sugar Glider *(Petaurus breviceps).* The reserve may also offer potential habitat for threatened species such as the Squirrel Glider, Yellow-bellied Glider, Grey-headed Flying Fox, Eastern Free-tail Bat, Greater Broad-nosed Bat and Eastern False Pipistrelle. Micro-chiropteran bats may use the small hollows and fissures in older canopy trees, particularly old growth specimens.

Common reptiles include Long-necked Tortoise *(Chelodina longicollis)*, Eastern Water Dragon *(Physignathus lesueurii),* Eastern Water Skink *(Eulamprus quoyii),* Blue-tongued Lizard *(Tiliqua scincoides)*, Copper-tailed Skink *(Ctenotus taeniolatus),* Red-bellied Black Snake *(Pseudechis porphyriacus)* and Eastern Brown Snake *(Pseudonaja textilis)*. Common invertebrates may include the Striped Marsh Frog *(Eimnodynastes perionii),* Common Eastern Froglet *(Crinia signfera)* and Peron's Tree Frog.

The Hawkesbury-Nepean catchment is inhabited by more than 190 species of birds, of which at least 46 are associated with aquatic/ riparian habitats. The reserve's riparian habitat and dense undergrowth is important for small bird species such as the Azure Kingfisher *(Alecedo azurea),* Superb Fairy-wren *(Malurus cyaneus)*, Double-barred Finch, Eastern Yellow Robin and Silvereye *(Zosterops lateralis)*. The reserve's understorey provides protection from the more aggressive and group territorial species such as the Noisy Miner *(Manorina melanocephala)* and Pied Currawong *(Strepera graculina).* Many common bird species were either observed or calls recorded during the study including Galah, King Parrot, Eastern Rosella, Welcome Swallow, Australian Magpie, Australian Magpie-lark, Crested Pigeon, Masked Lapwing, Noisy Miner, Pied Currawong, Eastern Whipbird and Bell Miner (*see BMAD discussion in this section*). The river valley is frequented by many larger birds of prey including the White-bellied Sea

Eagle, Whistling Kite and Australian Kestrel. The river environs provide habitat for the Australian Pelican, Little Pied Cormorant and many other water-birds.

Notably, the reserve provides potential habitat for endangered bird species such as the Swift Parrot, Superb Parrot, Turquoise Parrot, Major Mitchell's Cockatoo, Barking Owl, Powerful Owl, Black-chinned Honeyeater, Regent Honeyeater, Square-tailed Kite, Bush Stone Curlew and Speckled Warbler.

Bell Miner Associated Dieback (BMAD)

The unique 'bell-like' call of Bellbirds or Bell Miners *(Manoria melanophrys)* creates a distinctive character and atmosphere within the upper western portion of the reserve. Scientific studies however have identified an association with Bell Miners and increases in psyllid (and other sap sucking insect) infestations, tree stress/ Eucalypt dieback, clearing, weed invasion (especially *Lantana camara*), nutrient enrichment, loss of biodiversity and altered fire regimes. Bell Miner Associated Dieback (BMAD) appears to be spreading throughout the forest ecosystems of eastern Australia and has been recognised as having national significance. In NSW BMAD is recognised as a Key Threatening Process under the *Threatened Species Conservation Act 1995.* This research has implications for management of the reserve.

Managing introduced species

Feral animal populations including European foxes, cats and rabbits have been known to occur in the reserve and surrounding areas. Predation by foxes and cats has a significant impact on the recruitment of native faunal populations, particularly ground-dwelling species. Natural regeneration of native plants species can be adversely affected by rabbit populations and a restoration strategy would need to consider these potential impacts. Control and monitoring programs have been very successful in assisting re-establishment of native plant populations.

Introduced exotic weeds

The community workshop identified the impact of exotic weeds as one of four key issues affecting the quality of the reserve. Many of the recorded exotic plant species in the reserve are transformer weeds (i.e. capable of transforming natural ecosystem processes and function). For details refer to *Appendix VI – Schedule of Cultivated Plants and Exotic Weed Species.* All of the weed species are typical of the Hawkesbury Valley floodplain. 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. Holmes Drive Reserve currently has no weed management/ bush regeneration program.

Transformer weed species tend to be fast-growing exotic colonisers, typically displaying highly aggressive reproductive strategies with an ability to capitalise on ecosystem disturbances. These species can be divided into three main groups:

- Vines and climbers;
- Woody weeds (including trees and shrubs); and
- Persistent perennials/ groundcovers and annuals.

The level of weed invasion has a close correlation with past and current clearing of native vegetation and soil disturbance (i.e. highly disturbed/ modified areas tend to have high levels of weeds). Throughout the Hawkesbury-Nepean valley exotic pasture grasses were introduced and wetlands were drained. Livestock grazing, altered fire regimes and introduced weed species further modified the structure and floristic composition of these natural communities. Holmes Drive Reserve's fertile alluvial river banks and associated vegetation (River-flat Eucalypt Forest) have a long history of clearing, disturbance, drainage modification, erosion, sedimentation, nutrient enrichment and weed invasion.

PHOTO 21: Balloon Vine *(Cardiospermum grandiflorum)* forming weed-dominated climber towers along the riverbank. Exotic weed invasion is closely correlated with past and ongoing clearing and soil disturbance (LandArc image 5/04/2012).

Although providing some protection and stability to unstable river banks, exotic weed species continue to have a negative impact on the reserve's endangered ecological communities, natural biodiversity, scenic and visual amenity. Dense weed thickets of exotic trees, shrubs and smothering vines crowd the river bank and suppress remnant native riparian species. This weed growth severely inhibits natural recruitment and reduces habitat values for a host of endangered native fauna and flora species. Canopy forming weed tree species include Camphor Laurel *(Cinnamomum camphora),* Coral Tree *(Erythrina X sykesii)* and Black

Willow *(Salix nigra/* agg.spp.*).* The dominant tall shrubby weeds along the river bank include Lantana *(Lantana camara)*, Privets *(Ligustrum* spp.*)* and Green Cestrum *(Cestrum parqui).* Shrubs such as Castor Oil Plant *(Ricinus communis)*, Wild Tobacco *(Solanum mauritianum),* Mickey Mouse Bush *(Ochna serrulata)* and Paddy's Lucerne *(Sida rhombifolia)* are also present*.* The most common exotic vines and climbers are Balloon Vine *(Cardiospermum grandiflorum),* Turkey Rhubarb *(Acetosa sagittata),* Moth Vine *(Araujia hortorum),* Madeira Vine *(Anredera cordifolia)* and Bridal Creeper *(Asparagus asparagoides).* Persistent perennials include Trad *(Tradescantia fluminensis),* Crofton Weed *(Ageratina adenophora)* and Fennel *(Foeniculum vulgare).*

Exotic pasture grasses such as African Love Grass (*Eragrostis curvula),* Paspalum *(Paspalum dilatatum),* Whiskey Grass *(Andropogon virginicus),* Rhodes Grass *(Chloris gayana),* Barnyard Grass *(Echinochloa crus-galli),* Pigeon Grass *(Setaria* sp.*), Ehrharta* sp. and Kikuyu Grass *(Pennisetum clandestinum)* dominate the open grassed areas.

Some of the scheduled weeds are declared as noxious under the *Noxious Weeds Act 1993* (Hawkesbury River County Council control area). See *Table 6: Noxious Weed Species – Holmes Drive Reserve* for required action).

PHOTO 22: The cleared riverbank contains a mix of exotic weed species and regenerating native species (components of River-flat Eucalypt Forest (LandArc image 22/03/2013).

TABLE 6: Noxious Weed Species

Weed	Class	Legal Requirements
Blackberry *(Rubus fruticosus/ agg. spp.)*	4	control growth & spread
Crofton Weed *(Ageratina adenophora)*	4	control growth & spread
Green Cestrum *(Cestrum parqui)*	3	continuously suppressed
Fleabane *(Conyza bonariensis)*	3	continuously suppressed
Lantana *(Lantana* spp.*)*	5	notifiable weed
Ludwigia *(Ludwigia peruviana)*	3	continuously suppressed
Prickly Pear *(Opuntia sp.)*	4	control growth & spread
Privet (Broad-leaf) *(Ligustrum lucidum)*	4	control growth & spread
Privet (Small-leaf) *(Ligustrum sinense)*	4	control growth & spread
Willows *(Salix nigra/ agg. spp.)*	5	notifiable weed

PHOTO 23: The declared noxious weed species, Ludwigia *(Ludwigia peruviana)* [Class 3] and other noxious weeds are actively colonising parts of the riverbank (LandArc image 27/05/2012).

Aquatic and semi-aquatic weeds

The Hawkesbury-Nepean River is subject to infestation by noxious aquatic and semi-aquatic species (not shown in Table 6). These species include Alligator Weed *(Alternanthera philoxeroides),* Salvinia *(Salvinia molesta),* Water hyacinth *(Eichhornia crassipes),* Cabomba *(Cabomba caroliniana)* and Ludwigia *(Ludwigia peruviana).* Ribbon Water-weed *(Egera densa)* has not yet been declared noxious however the rapid infestation of the river by this submerged aquatic species is of

concern. Ludwigia *(Ludwigia peruviana)* is actively colonising a collapsed section of riverbank in the reserve.

Aquatic and semi-aquatic weed species are highly adaptive and invasive under prevailing river conditions. They have a rapid capability for expansion creating stream blockages, modifying and reducing native aquatic habitat and affecting water quality and recreational opportunities *(LandArc, 2007).* For details of the weed management and restoration strategy, refer to *Managing Riverbank instability and erosion* in this section.

Public Recreation and Reserve Management

Public reserve, private infrastructure and ownership

Holmes Drive Reserve provides access to the river for water-based recreational pursuits (i.e. boating, skiing, fishing, etc.). It also provides passive open space within a riparian context. These and other key values however have been affected by past management decisions, loss of direction in management and a general lack of maintenance of public and private infrastructure. These issues are having a negative impact on the reserve's environmental and scenic quality, its recreational setting, public access and safety.

The following discussion examines each of the key issues raised in *4.0 Community Engagement*. In addition, private facilities and encroachments and management issues such as view protection have been added to this discussion. Key values and significance are assessed in relation to issues and threats and appropriate strategies developed for sustainable outcomes for the following items:

1. Managing private water-based recreational facilities and access;
2. Upgrade or relocate boat ramp;
3. Improvements to public access and connectivity;
4. View protection and management;
5. Stabilising riverbanks and erosion control;
6. Weed management and restoration strategy.

Private Water-based Recreational Facilities

KEY ISSUE 1

Current risk of bank instability/ erosion: HIGH
Maintenance/ condition of structures: VARIES
Public safety risk: VARIES

Management issues

The reserve's geographical isolation, use by relatively few visitors from outside the local area and Council's infrequent maintenance regime have helped to establish a strong sense of ownership by local landholders. These factors have helped to establish a management model based on self-sufficiency, community spirit and private enterprise however over the years a strong sense of private ownership has become entrenched. Adjacent property owners have introduced a wide range of "improvements" to the reserve to facilitate water access and amenity. Recreational infrastructure includes unauthorised jetties, boat ramp, terraces, decking, steps, hand-rails, ladders, walls and other items installed along the riverbank for private and exclusive use. The scale of private structures ranges from simple metal ladders to multiple terraces and platforms.

PHOTO 24: Private recreational infrastructure with exotic Queen Palms have been introduced incrementally into the public reserve over many years (LandArc image 22/03/2013).

The construction of private infrastructure and related activities, including removal of native vegetation in front of private properties, threaten riverbank stability and exacerbate long-term environmental impacts. Illegal clearing, cut and fill benching for construction of these facilities and installation of hard reflective edges along the water's edge have exacerbated erosion impacts and riverbank retreat. Other structures and amenities such as private fire-places and BBQs, tables and seating, edging, exotic trees/ palms have also been added incrementally to the reserve.

These items add to a sense of “private space” within the public reserve. The reserve’s values of passive recreational open space, natural riparian biodiversity and cultural setting have been diminished and alienated by these activities.

Furthermore, additional structures have been built to combat the negative effects of concentrated recreational uses and bank erosion. The river’s edge is littered with concrete aprons and walls, old tyres set into concrete, building waste/ rubble and other ad hoc and failed erosion devices dating back over many years. These items present significant risks to public safety and should be removed.

This private infrastructure has been introduced incrementally over some decades. These structures have become significant encroachments within both the Crown reserve and community land portions of the reserve. Although ‘private’ signs and many unsafe structures have been removed in recent years the local community maintains a high level of ownership over the reserve and remaining structures. The Brief notes that *“many of these structures were removed several years ago, with some retained until an alternative to the current use of these access points is developed”* (HCC, 2010, p.5).

Although these facilities have no development approval, Council has not pursued their removal. Generally, public access is not restricted however there is an implied private use within a public reserve. Furthermore, this private infrastructure exists with no structural inspections or regular maintenance regime. Although some structures are in reasonable condition, many items are in a state of disrepair. Recent flooding has further damaged or destroyed this ageing infrastructure and some items require urgent remedial action or demolition/ removal to rectify public safety issues. Facilities within a public reserve need to be safe and compliant with the relevant legislation. Current management is inconsistent with the legislative requirements for Crown reserve and community land.

Options: managing private water-based recreational infrastructure

OPTIONS	DISCUSSION	POSSIBLE OUTCOMES
OPTION 1 *Retain status quo (i.e. existing private infrastructure and unregulated encroachments within the public reserve)*	Council considers the status quo as untenable due to the nature of unregulated and poorly maintained private infrastructure presenting serious public safety issues.	Continuing issues of public safety and risk management are not addressed. Poorly maintained and unregulated private infrastructure continues to impact on reserve's environmental values, public use/ activities within the reserve and public safety. Concentrated recreational impacts along riverbank leading to long-term environmental decline of reserve values. Riverbank stability and riparian ecological values are further degraded over time.
OPTION 2 *Provide notice to residents to remove private facilities/ encroachments in reserve. Council to provide new public access to the river and facilities.*	If structures are not removed Council to demolish. Council to provide new public facilities to enhance recreational opportunities and improved water access for the broader community.	This strategy would focus on liaison with residents to remove/ demolish all existing private infrastructure. Council may implement an option to establish new public facilities and opportunities for easy and safe river access (e.g. steps/ terraced bank, public floating pontoon, etc.). Capital works staged as funds become available. No requirement or ongoing costs associated with safety inspections, compliance and licensing of private infrastructure. Option may increase maintenance costs for capital items/ facilities and infrastructure.
OPTION 3 *Improved regulation and licensing of existing private infrastructure within the reserve. Take actions to restrict existing and future encroachments. Provide notice to residents to remove items which are deemed unsafe.*	Establish ownership of existing private infrastructure. Implement a program of inspections and certification by a qualified structural engineer. No new infrastructure should be introduced – option only for existing items in the reserve. All items would be subject to licensing in accordance with the *Crown Lands Act* and *Local Government Act.* Council may seek to improve public facilities and river access.	This strategy would aim to create working partnerships with the local community. The owners of private infrastructure would need to provide evidence that the structure meets appropriate standards. This would include regular inspections and certification. Licensing will also be required subject to the provisions of the *Crown Lands Act* and *Local Government Act.* If ownership cannot be established and the structure was deemed unsafe it should be removed by Council. This solution would have ongoing administrative costs (i.e. the need for safety inspections, compliance and licensing). Council would have the option to provide alternate public access to the river and recreational facilities.

RECOMMENDATION: OPTION 3 (preferred option)

Upgrade or Relocate Boat Ramp

KEY ISSUE 2

Current risk of bank instability/ erosion: HIGH
Maintenance/ condition of existing boat ramp: VERY POOR
Public safety risk: HIGH

Management issues

The existing boat ramp is part of the private water-based infrastructure described in KEY ISSUE 1. The ramp is considered by water-sports enthusiasts to be vital infrastructure on this part of the river. This single item is highly valued by a majority of local residents, particularly those adjoining the reserve.

PHOTO 25: Existing boat ramp – very narrow access with high risk of damage to boats and vehicles (LandArc image 22/03/2013).

PHOTO 26: Boat launching ramp – ad hoc armouring to adjacent walls. Ramp conditions pose public safety risks, particularly at high tides/ fast river flows (LandArc image 27/05/2012).

All responses to the Community Issues Questionnaire noted this item as 'important'. Most people believe it is the reserve's No.1 priority for action. This privately-built structure is located to the east of the central access road (i.e. community land portion of reserve). Like all other water-based access/ facilities in the reserve the ramp was built with no Council approvals. It is in very poor condition and barely functions for the purpose intended. Access for 4WD vehicles is extremely narrow with high potential to damage boats and vehicles. Many submissions noted the potential danger associated with the ramp's narrow and slippery conditions and issues with launching boats on different tides, particularly high tides with fast river flow. The ramp adjoins ad hoc timber walls, concrete and tyre barriers, rubble reinforcement and other miscellaneous accretions.

A number of submissions identified the potential break-up and collapse of the ramp under its existing state of repair. Most people believe the existing ramp is beyond repair and requires a complete redesign/ re-build including widening to promote a safe environment. In spite of these issues, the ramp continues to have a high level of local use. A number of written submissions stated that the ramp's location was a big factor in purchasing their properties on Holmes Drive.

There is no doubt that an upgraded public ramp will bring greater usage. A government-funded boat ramp would attract a broad range of visitors and increase the number of potential user groups. Improvements to accessibility and provision of recreational infrastructure will likely follow to accommodate these levels of use. For example, improved access, a formalised car parking area for trailers, picnic facilities and other amenities may be required as visitor use increases. While addressing key safety issues and recreational needs, these improvements have the potential to increase negative impacts in the reserve. Alternatively, the boat ramp could be relocated to a more durable site in Cumberland Reach Road Reserve (east of the privately-owned boat ramp). A further option may include negotiations for public use of the Bundarra Ski Gardens boat ramp.
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Options: upgrade or relocate boat ramp

OPTIONS	DISCUSSION	POSSIBLE OUTCOMES
OPTION 1 *Major upgrade of boat ramp in existing location or below access road (including re-design/ widening ramp), sealed road access and associated public infrastructure*	Subject to attracting government funding, a new design would be prepared and construction would follow within the existing location or directly below the central access road. The public boat ramp would require sealed road access and a car parking area for trailers to accommodate increased numbers of visitors. Other public facilities may also be required.	This option addresses key safety issues and recreational needs however these improvements have the potential to increase negative impacts in the reserve. These impacts may be environmental and social. Increased visitor loadings may increase the level of natural resource degradation. Larger numbers of weekend visitors could impact on the tranquillity and solitude of the reserve, important values expressed in community consultation. Social impacts may include difficulty in accessing the ramp during peak periods, crowding and conflict between adjoining residents and other user groups. This option may provide a revenue source (e.g. boat launching/ parking fees) to assist in riverbank stabilisation, better weed management and restoration works.
OPTION 2 *Minimal upgrade to boat ramp including strengthening, widening and re-surfacing.* *OPTION 2A* *Future option for relocation to Cumberland Reach Reserve.*	Retain boat ramp in situ. Provide minimal upgrade/ necessary repairs and widening to existing ramp to improve public safety. This option is a temporary measure. Subject to funding, new ramp to be built in Cumberland Reach Reserve.	This option is a temporary measure to address key safety issues. Consider future option to build a new public boat ramp in Cumberland Reach Reserve (east of private boat ramp). This location is close to Cumberland Reach Road and offers easy water access with a relatively low bank profile compared to Holmes Drive Reserve. The location also provides ample flat land for trailer parking.
OPTION 3 *Demolish existing boat ramp and restore/ stabilise riverbank (no provision for public boat ramp).*	Liaise with local residents advising of demolition/ removal of the ramp and other accretions. Restore river-bank using techniques described in following section. No further works to provide a public boat ramp or other structures.	Removal of the boat ramp would ensure a safer environment minimising potential risk for Council. It may provide a catalyst for initiating bank stabilisation and restoration works as well as improving visual amenity and ecological values in the reserve. This solution however provides no alternative arrangements for boat launching other than the private ramp adjacent to Bundarra Ski Gardens.
OPTION 4 *Investigate options for public use of the Bundarra Ski Gardens boat ramp.*	Liaise with current owner of private boat ramp (Bundarra Ski Gardens) to establish options for broader public use.	This option provides a possible alternative to the existing ramp in Holmes Drive Reserve without the capital cost of constructing a new boat ramp.

RECOMMENDATION: OPTIONS 2/ 2A and 4 (preferred options)

Improvements to Public Access

KEY ISSUE 3

Maintenance/ condition of existing access road: VERY POOR

Management issues

Vehicular access into the reserve is off Holmes Drive and via a partly sealed, extensively pot-holed roadway. The road directly follows the fall-line and has a moderately steep grade, increasing the impact of storm events and concentrated water flows across the surface. Vehicles tend to use the shoulder and adjacent verges to negotiate a passage and this is further contributing to its current disrepair. Large vehicles (including Council waste collection) use the road for servicing residential properties adjoin the reserve. The road is unsuitable for 4WD vehicles towing large boats.

All responses to the Community Issues Questionnaire noted this item as 'important' (i.e. the same ranking as the boat ramp as a priority for action). Notably, some local residents identified the current condition as a 'positive' with respect to slowing the speed of traffic in the reserve. It is important that any new work to upgrade the roadway should include provision of traffic calming devices (e.g. speed humps).

Vehicular access into and through the reserve is currently not restricted or regulated in any way. The residential properties adjoining the reserve have long-standing vehicular access through the reserve. Some properties have driveways, sheds and gates adjoining the reserve. Properties adjoining the western portion (Crown reserve) have more formalised lower entry access via a bitumen roadway. This road is also in poor condition.

Private properties adjoining the eastern portion of the reserve also have lower rear access to their properties via a rough unsealed track. This track also links to the boat ramp (see previous discussion). The condition of the track is very poor. Maintenance is generally carried out by local residents. The installation of illegal subsurface drainage pipes directing flows away from adjoining properties to the riverbank have likely contributed to scouring and collapse during storm and flood events.

The unsealed vehicular service track leading to Sackville Reach Aboriginal Memorial Reserve is also in very poor condition. It is recommended that this track remains unsealed. Some grading should be implemented. A long-standing active wombat burrow located within the edge of the track should be clearly identified (e.g. marker posts) for visitors and the track diverted around this point.

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Options: improvements to public access

OPTIONS	DISCUSSION	POSSIBLE OUTCOMES
OPTION 1 *Minimal repairs to access road (i.e. fixing pot-holes). Residents retain use and access through reserve.*	Repair bitumen road surface (central access corridor and access to rear western properties). Continue regular maintenance of bitumen surface. Regrade unsealed eastern section for access to boat ramp. Provide minimal grading/ safety works (see above) to western vehicular track.	Essential repairs made to road surface with ongoing repairs/ maintenance as necessary. Local residents would retain an implied 'right-of-way' through public reserve. No action to restrict private access. This option basically retains the status quo and would be incompatible with a major upgrade to boat ramp (see BOAT RAMP OPTION 1).
OPTION 2 *Upgrade central access roadway with new sealed bitumen surface. Construct a new formalised parking area for boat ramp. Restrict private vehicular access.*	Major upgrade to bitumen road surface/ entry into the reserve. Provide directional/ entry signage. Local residents have a long-standing, albeit not formalised, 'right of way' to their properties. In the past Council has allowed access and development to occur without any restrictions or formal development application. This option would formalise restrictions on private vehicle access. Maintain Council service vehicle access.	Enhanced opportunities for access to boat launching facilities on reserve. This option would be consistent with a major upgrade to boat ramp (see BOAT RAMP OPTION 1). New public facilities (incl. trailer car parking area) and formalisation/ restrictions on private vehicles accessing residential properties from the reserve. This option would require significant capital expenditure and ongoing management. Visitor use of the reserve is likely to increase and other facilities may be required. Parking fees could partially offset ongoing costs.
OPTION 3 *Upgrade central access roadway with new sealed bitumen surface. Maintain low-key access to boat ramp (interim) and private access to adjacent properties.*	Regrade and consolidate road-base and apply new bitumen seal coat (central access road and access to rear western properties). Provide directional/ entry signage. Continue regular maintenance of bitumen surface. Regrade unsealed eastern section for access to boat ramp. Provide minimal grading/ safety works (see above) to western vehicular track.	This option significantly improves access to the reserve and boat ramp facilities whilst maintaining a low-key approach with minimal formalisation of facilities. Local residents would retain an implied 'right-of-way' through public reserve. No action to restrict private access. This option would be consistent with repairs/ widening to the existing boat ramp and future relocation options (see BOAT RAMP OPTIONS 2/ 2A and 4).

RECOMMENDATION: OPTION 3 (preferred option)

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View Protection and Management

KEY ISSUE 4

Protection of private views over the river: HIGH

Management issues

Past clearing of native riparian and semi-aquatic vegetation has allowed the riverbank to become unstable and susceptible to ongoing recreational and environmental impacts. This is a key issue affecting the reserve's long-term sustainability (Office of Hawkesbury-Nepean, pers. comm., 2010). The natural multi-layered riverbank vegetation (incl. tall trees, sub-canopy, shrubs and groundcovers) provided a high level of bank stability, particularly during and after floods (CRC Technical Report, pp.13-14, 1999). Historically, most of the vegetation on the floodplain was cleared for agriculture during early settlement and this open, cleared character has been retained as the status quo.

Written submissions have expressed the view that the reserve's open character is highly valued. Most of the elevated neighbouring private properties have largely cleared frontages to the river with uninterrupted views over the reserve and river environs. This level of clearing offers a sense of security and safety to adjoining properties, providing opportunities for private surveillance and monitoring of recreational uses and behaviour in the reserve. It also protects and maintains valuable private open views and vistas along the river. Measures to extend the visual boundaries of private land also have further impacts on the reserve's visual and environmental integrity.

In combination the level of visual surveillance, private river-side facilities and lack of boundary definition between private properties and the reserve effectively reduce opportunities for broader public use and enjoyment. This ambiguity between public and private land, lack of public signage and level of private infrastructure raises issues of exclusivity and alienation of the public reserve. The status quo is not consistent with the principles of Crown reserve and community land management. Nevertheless, the community workshop identified a desire to retain this sense of privacy and exclusivity over the reserve. Notably, a number of written submissions signalled the importance of restricting any future development of public infrastructure that may encourage broader visitor use and enjoyment of the river-side environs.

Furthermore, current management practices have continued to restrict natural recruitment and regeneration through regular vegetation clearing, weed removal and mowing practices. Illegal clearing of native vegetation within the reserve is still being undertaken by land-holders unaware of the significance of this vegetation and listing under the TSC Act.

The potential loss or partial loss of views as a result of riverbank restoration works remains a contentious issue. This plan of management recognises the importance of working with the community to understand the issues affecting bank instability and the need to develop sustainable solutions based on an integrated weed management and restoration strategy.

Options: view protection and management

OPTIONS	DISCUSSION	POSSIBLE OUTCOMES
OPTION 1 *Retain status quo (i.e. retain open views and mown grass). No action to restore riparian vegetation.*	This option maintains all private infrastructure/ encroachments in reserve and sense of privacy and exclusivity. Open mown grassed areas throughout much of the eastern portion of the reserve are maintained. Protection of open landscape character and uninterrupted views. No action to address key environmental issues.	Private infrastructure dominates most of the riverbank and the reserve. Bank stability, public safety and environmental values continue to be compromised. Loss of last vestiges of natural riparian vegetation through a combination of bank instability, weed invasion and over-clearing to protect views. Weeds totally dominate the water's edge and eroded riverbank. Continue ad hoc solutions for armouring portions of the riverbank against scouring and slumping. Recreational impacts increasing over time and further loss of experiential qualities.
OPTION 2 *Establish a long-term strategy which aims for a balanced and sustainable approach. Protect key values and address issues threatening these values.*	Implement sustainable management practices consistent with best-practice methods. Enhancement of riverbank stability, visual qualities, public safety and recreational opportunities.	Restoration of native riparian vegetation on the riverbank is a key component of this strategy. A mix of open and framed vistas would be retained in the design. Current issues of bank instability and erosion would be addressed (see following key issue). Clustering or grouping of a full suite of species (incl. trees, shrubs, climbers and groundcovers) would be balanced with other sections of open canopy planting and densely-spaced groundcovers. The design would include open grassed/ terraced areas and public access to the river.

RECOMMENDATION: OPTION 2 (preferred option)

Stabilising the Riverbank and Erosion Control

KEY ISSUE 5

Current risk of bank instability/ erosion: HIGH
Maintenance/ condition: VERY POOR
Public safety risk: HIGH

Management issues

Riverbank erosion and ongoing instability is a key issue impacting on the quality, amenity and public safety in this river-side reserve. Riverbank alluvial sandy-loam soils are typically poorly structured and unstable. In the past native vegetation (riparian and semi-aquatic) has been largely cleared from the reserve and riverbanks. The high level of community disturbance has provided opportunities for exotic plant species, including transformer weed species. These invasive species are favoured by the altered conditions and have the capability to transform fragile and endangered riparian communities. Exotic weeds dominate sections of the riverbank within the reserve creating further management issues.

During flood events large sections of riverbank can scour or slump and be washed away leaving steep cliffs of unstable alluvium. Some sections of the riverbank have experienced extensive erosion over the past two years (forming cliffs up to 3-4 metres+ in height). This damage tends to be located in cleared and/ or highly disturbed areas, often with steep bank profiles and where recreational activities are concentrated. Private infrastructure has been damaged or destroyed in these flood events posing further safety issues.

Drainage from adjacent private properties (including constructed open drainage channels and subsurface drains within the reserve) tends to concentrate the effects of scouring and erosion particularly along the riverbank. This channelled and piped water is discharged either within grassed swales (adjacent to the riverbank) or piped directly to the riverbank intensifying localised scouring and erosion.

Bank erosion is exacerbated by water-based recreational activities (boating, skiing, wake-boarding, foot-traffic/ water access, etc.). The wave action from speed boats is believed to be a primary ongoing cause of riverbank erosion, river widening and shallowing (Office of Hawkesbury-Nepean, pers. comm., 2010).

This plan of management supports opportunities for water-based recreation and enjoyment on a sustainable basis. Visitors and residents are attracted to the water's edge. The steep riverbanks provide a potentially hazardous barrier. Visitor loadings are currently focussed on a number of poorly maintained access points and structures spread along the entire riverbank. It may be preferable to establish a broad, graded slope (possibly terraced in some locations and including steps) to

provide durable and safe access to the water's edge. A floating pontoon/ jetty or beach area with a natural battered bank are possible options providing opportunities for relaxation, sunbaking, fishing, swimming or viewing water-sports. Moreover, bank stabilisation would need to include significant planting and re-establishment of riparian vegetation to ensure a sustainable long-term solution.

Options: stabilising the riverbank and erosion control

OPTIONS	DISCUSSION	POSSIBLE OUTCOMES
OPTION 1 *Retain status quo*	Council considers the status quo as untenable due to the need for ongoing maintenance and public safety issues. Sustainable management of these riverbanks needs to be addressed.	Continuing bank instability, slumping and erosion leading to long-term re-alignment of bank (widening), in-channel sedimentation (shallow), declining water-based recreational opportunities, visual amenity and increasing public safety issues.
OPTION 2 *Provide bank stabilisation strategy (hard engineering solution)*	High use areas/ river access points could be 'hardened' to provide a rock batter embankment (or wall) and a mixture of hardstand surfacing (paving) and mown grass.	This is an expensive solution and is likely to cause further problems. The solution cannot be implemented in isolation (e.g. within a small section of the reserve) without having further negative impacts. Bank erosion will likely increase at the upstream and downstream edge of any hard-works. Generally, constructed vertical walls and rock embankments have the greatest level of reflectance of wave energy (from speed boats). This often increases erosion impacts on adjacent banks and properties downstream and is therefore not recommended in this context (OHN, 2010).
OPTION 3 *Ecological approach using a mix of hard construction (toe of embankment), bank regrading and stabilisation with native vegetation.*	Establish a demonstration strip within the reserve with the aim of restoring long-term bank stability and improved safe public access to the river. This solution will maximise benefits in terms of river health, scenic values, recreational setting and environmental sustainability. It will deliver long-term, cost-effective positive benefits for the community. Opportunities also exist for developing partnerships and volunteer involvement.	This restoration strategy would focus on developing a more sustainable outcome based on river dynamics and the riparian ecosystem. Ad hoc encroachments/ accretions (e.g. rubble walls, tyres, etc.) would be removed from the riverbank. The toe or free-board area at the base of the bank would be reinforced with a low rock batter (or alternatively using inter-woven geotextile bags filled with sand), bank regrading up to 1:3 batter (preferable 1:4 batter), jute matting (weed control) and planted with native long-stem tubestock. Steeper banks may require terracing using coconut-fibre "coir-logs" Sections would be left open with mown grassed areas providing easy graded access to the river. Semi-aquatic plants and snags would be introduced and secured to reduce wave action and enhance habitat qualities.

RECOMMENDATION: OPTION 3 (preferred option)

...

Proposed strategy for riverbank stabilisation works

All capital works would be subject to government funding. The proposed riverbank stabilisation works have been guided by the findings of the Cooperative Research Centre for Catchment Hydrology Guidelines for Stabilising Streambanks with Riparian Vegetation – Technical Report 99/10 (1999) and other recent reports and studies. The CRC document notes that clearing, fragmentation and modification of vegetation cover (including weed invasion) combined with changes in flow regimes, has increased the incidence of riverbank erosion. Riverbank instability leads to accelerated changes in channel morphology, reduced water quality and impacts on the recreational setting.

It is proposed that a demonstration site is established within the eastern portion of the reserve (community land) between the large wash-out area at the timber steps to approximately 15 metres west of the existing boat ramp (i.e. a total of 90 metres in length). This section of the riverbank is believed to have the highest priority for restoration works. This area has a high level of use and includes the boat ramp/ access. It has numerous scour points and extensive slumping resulting in steep eroded banks up to 3.0m – 4.0m in height. These eroded banks pose a serious public safety issue. A varying level of weeds (e.g. *Salix, Ligustrum, Lantana* and *Cardiospermum* spp.) are present along the lower bank profiles. Most of the upper bank is mown grass with some mature native and exotic trees present (e.g. *Eucalyptus* and *Fraxinus* spp.), particularly at the eastern end (near the steps). The proximity of these trees to the upper eroded bank edge will require a terraced approach rather than bank battering (see *Figure 8: Terraced Riverbank Treatment and Figure 9: Battered Riverbank/ Restored Riparian Vegetation*).

PHOTO 27: Extensive slumping has created a steeply eroded riverbank profile within the eastern portion of the reserve. This location is designated as a demonstration site for proposed restoration works (LandArc image 22/03/2013)

…

Restoration works would need to provide adequate armouring of the toe to counter tidal flows and wave action generated by boating, skiing and wake-boarding. This would include excavation and installation of a geotextile liner and packed rockwork (sandstone) along the regraded toe of the bank. Alternatively, ELCOROCK® geotextile bags filled with sand (each 0.3m³) could be laid with inter-woven flaps (sewn together on-site with a portable machine). This product would reduce the risk of reflective wave action and further impacts immediately downstream (cf. rockwork batter). This application is also suitable for boat ramp construction. The base of the armouring should be below approximate low water level and the top should be above potential wave heights (approx. 500mm above MHWM) to reduce erosion impacts at the toe. Logs should also be strategically placed to break up wave action and provide fish habitat.

The eroded bank would require cut and fill operations to establish a new batter of approximately 1:4 (1:3 maximum). In areas restricted in width (e.g. near trees), the bank would need to be terraced. It is proposed that the eastern end of the site is terraced using biodegradable Coir Log™ a flexible 300 x 300 x 3000 square-log wall (packed with coconut fibre), staked and secured into the bank. The lower terraces (and beach area) would be accessed via existing timber steps or ramped terracing of the slope. This would provide safe, easy access to the water and opportunities for viewing water-sports on a broad mown grassed area (see *Figure 8: Terraced Riverbank Treatment*). Coir Log™ is a relatively inexpensive solution and biodegradable with a life of approximately 3 years. These low battered walls would need to be planted to ensure stability over the longer term. Coir Log™ should not be used as an alternative to rock armouring of the toe as immersion will significantly reduce life expectancy.

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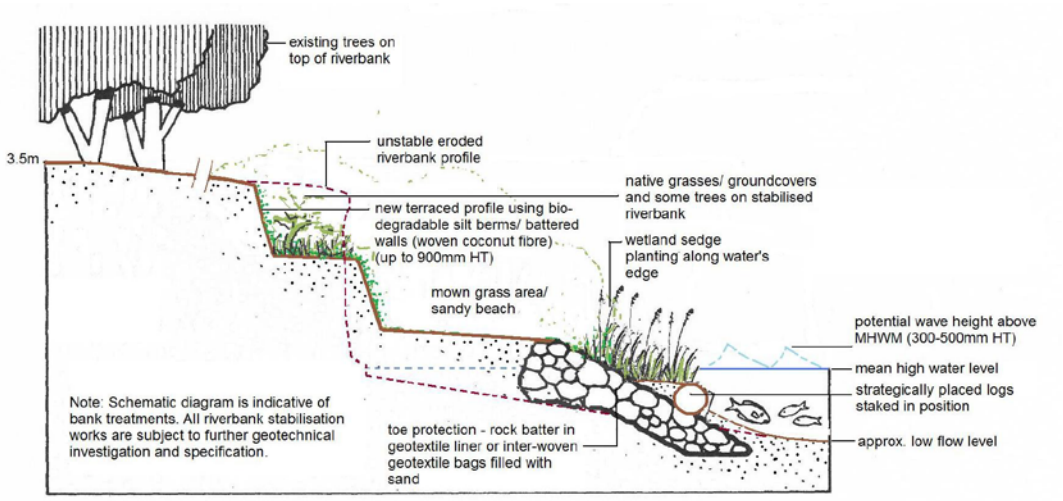
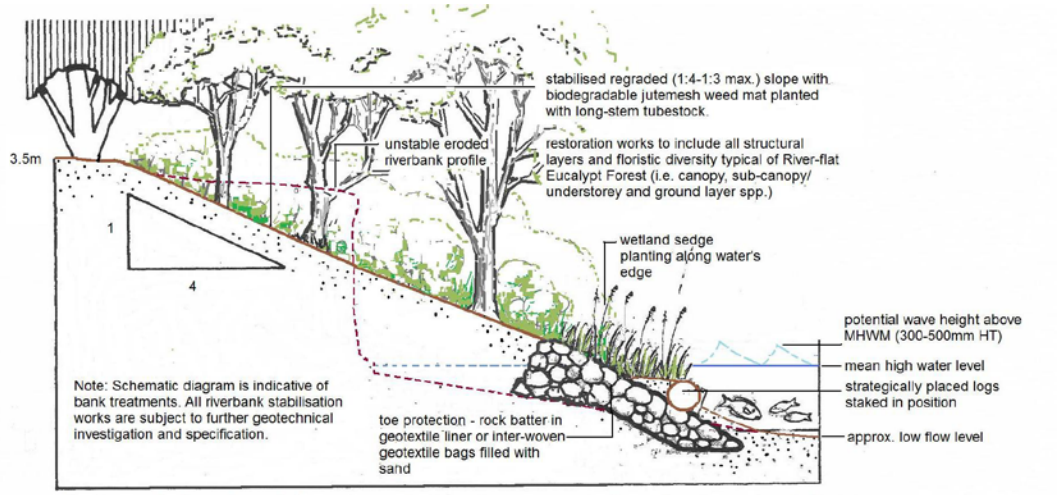


Terraced riverbank treatment (not to scale)

FIGURE 8:
Proposed terraced riverbank treatment



Battered riverbank/ restored riparian vegetation (not to scale)

FIGURE 9:
Proposed battered riverbank treatment/ restored riparian vegetation

Restoring riparian vegetation to the riverbank

Restoration works would include both open grassed areas and planting of riparian vegetation. It is proposed that the establishment of revegetated areas to open grassed areas would be in the ratio of approximately 40:60. Continuity of cover and structural diversity are key considerations in designing for long-term stability. The density and type of riparian vegetation cover strongly influence riverbank stability.

How is fluvial scour reduced by riparian vegetation?

Scour occurs along riverbanks when the force of flowing water exceeds the resistance of the bank surface to withstand those forces. Riparian vegetation reduces scour by directly binding and strengthening the bank through a network of dense roots, particularly the finer roots (CRC, pp.13-14, 1999).

Why is it important to restore all structural layers?

Riparian forests are composed of canopy trees, understorey, groundcovers and macrophyte species. The design of the bank's riparian vegetation should include, where possible, all structural levels to ensure long-term stability of the system. Native groundcovers alone do not contribute to the mass stability of banks because of their limited root depth. Although the roots of native grasses, forbs/ herbs and ferns can be seen at depths of over a metre on exposed bank profiles, their potential for bank reinforcement is negligible at depth (i.e. the maximum zone of influence for groundcovers is restricted to the top 30 cm of topsoil).

Notably, inclusion of understorey, sub-canopy and canopy tree species in the structural mix will significantly increase riverbank stability over time. This is due to development over time of extensive root systems and a network of fine roots which bind the soil profile to much greater depth compared to only groundcovers. Species such as She-oak (*Casuarina cunninghamiana*), Bottlebrushes (*Callistemon spp.*), Paperbarks (*Melaleuca spp*.) and Tee-trees (*Leptospermum spp.*) have been used successfully in riverbank restoration (ibid., pp.13-14, 1999).

Why is width of restoration works important to bank stability?

Restoration works should be designed with adequate width to promote and maintain a healthy root mass and buffer, particularly during flood events. A single line of trees or individual scattered trees on the riverbank increases susceptibility to wind-throw. These impacts, caused during high winds or storm events, are exacerbated when trees occur in isolation or as a narrow band on the river's edge (Thorne, 1990). The width of the restoration site should be consistent with the design principles identified in the CRC document.

Why is it important to retain macrophytes along the water's edge?

Bank scour can also result from wave action. Reed-beds are particularly useful where wave action from boat traffic is responsible for bank attack because they absorb wave energy. A reed-bank 2 m wide can absorb about two thirds of the wave energy generated by wash from pleasure craft (Bonham, 1980). Additionally, emergent aquatic macrophytes restrict the near-bank flow velocity and provide some reinforcement to the bank surface through their shallow root mat. Research regarding the positive benefits of *Phragmites* sp. has shown reduced erosion rates when this species is present along the water's edge (Frankenberg *et al*., 1996).

What is the time frame for improving bank stability?

It is important to recognise that plants cannot provide instant bank stability. Plants would be introduced to the site following regrading/ battering and/ or terracing of the eroded bank (cut and fill including coir log treatment) and strengthening/ reinforcing of the toe of the bank (i.e. using rockwork or geotextile bags filled with sand). Long-stem tubestock and a thick biodegradable jute weed mat would be used to improve establishment rates and minimise exotic weed competition in this environment. Weeds would need to be managed, particularly during the early establishment phase (4-5 years). Local volunteer involvement such as 'Friends of Holmes Drive Reserve' could make a big difference to the outcome. This is a long process for recovery but it is the best option in terms of sustainable recreational, ecological and economic outcomes for this reserve.

Planting and maintenance regime

Riparian restoration works within the demonstration site should consider the following (see best-practice guidelines):

- Determine availability of suitable local-provenance sourced long-stem tubestock (see *Appendix V: Schedule of Existing Native Species*);
- Ensure correct zoning of species and structural and floristic diversity;
- Provide temporary fencing (steel stakes/ wire) to delineate restoration area/ demonstration site and identify management regimes (i.e. mown grass areas vs. restoration areas);
- Plant preferably in autumn (cooler temperatures, higher soil moisture and less stress on new plants to establish root systems);
- Plant in high density (plan for some losses) to maintain adequate structural/ species diversity as the scheme matures;
- Thin selectively or add plants as necessary, maintaining flexibility and ensuring issues such as loss of views are addressed;
- Continue to provide maintenance, targeting weed species, as necessary.

Weed Management and Restoration Strategy

KEY ISSUE 6

Current risk of bank instability/ erosion: HIGH
Maintenance/ condition: VERY POOR

Strategic approach

Weed management should adopt a strategic approach involving bank stabilisation and an integrated riparian restoration/ regeneration strategy with following aims:

- To seek an appropriate level of government funding assistance and grants for works to be implemented in stages (starting with a demonstration site);
- To encourage local community (volunteer) involvement as an integral part of the program including supervision, teaching of skills and support;
- To promote community education, involvement and stewardship in the management of the reserve's natural riparian vegetation;
- To provide long-term stability to riverbanks, reducing erosion impacts, improving water quality and habitat values;
- To maintain focus on recovery, recruitment, long term durability, expansion and consolidation of fragmented natural habitat, native populations and species.

This plan of management aims to establish a demonstration/ restoration site to address key issues of bank instability, continuing erosion and risk to public safety. See *KEY ISSUE 5: Riverbank instability and erosion* in this section. 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.

Community volunteer involvement

This plan of management supports the establishment of a community-based volunteer BushCare group to assist in bank stabilisation, management and rehabilitation of the reserve's riparian vegetation. Formation of a volunteer group – ''Friends of Holmes Drive Reserve'' was discussed at the community workshop and the idea received some support in written submissions. These programs have been very successful in other reserves within the Hawkesbury LGA and across the metropolitan area.

A Bushcare program would be coordinated through Council staff. Volunteers are provided with direction and technical advice including training, tools, signage for work sites, rubbish removal, newsletters and use of a community nursery to

propagate local native plants. The program is an integral part of managing Hawkesbury City's bushland. NSW government youth training initiatives and natural heritage grant funding provide further opportunities for establishing and maintaining the program.

Bushfire and flood management

The native riparian vegetation restoration strategy and conservation management needs to be integrated with the objectives of bushfire and flood management plans and policies.

Vision Statement

The following statement provides a vision for Holmes Drive Reserve and the basis for establishing desired outcomes:

"To ensure appropriate protection and sustainable management of the reserve's riparian and cultural landscape setting, social, cultural 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".

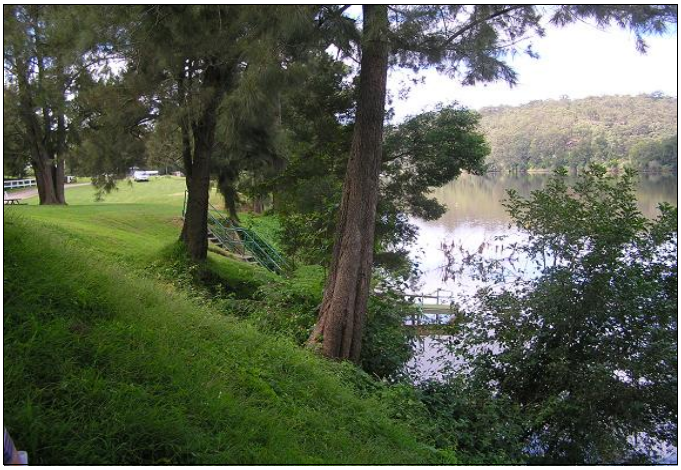


PHOTO 28: Protection of native riparian vegetation, riverbank stabilisation and restoration works, including weed management are vital components of the proposed strategy (LandArc image 5/04/2012)

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6.0 Management Strategies

Objectives

This section provides a framework for implementing management strategies as follows:

1. Ensure consistency with Crown reserve public purpose(s) and establish core objectives for community land categories;
2. Develop an Action Plan for implementation of core objectives and management strategies (i.e. desired outcomes);
3. Develop performance targets to assess and monitor strategies;
4. Assign directions and priorities (spanning the next 5-years)
5. Provide a Landscape Masterplan.

Public purpose (Crown reserve)

In preparing a plan of management for a public reserve which includes a portion of Crown reserve, the reserve's public purpose(s) must establish the basis for planning and management. Holmes Drive Reserve was originally reserved for the public purpose of "public recreation". This plan of management recommends that the public purpose be expanded to "environmental protection and public recreation" to recognise the significance of environmental, ecological and scenic values in the reserve and to ensure that appropriate protection and conservation measures are implemented.

Core objectives

In accordance with the *Local Government Act 1993,* the community land portion of Holmes Drive Reserve is categorised as Natural area – watercourse, Natural area – bushland and Park. The *Crown Lands Act 1989* has no requirement for land categorisation however it is important to provide consistency in management objectives for both community land and Crown reserve portions. The Crown reserve portion has been categorised as Natural area – watercourse, Natural area – bushland and Park (see *2.0 Land Description and Planning* and *Figure 4: Land Categorisation*). Each of the categories must be managed in accordance with the core objectives (i.e. desired outcomes must be consistent with land categories and their core objectives). See *Table 7: Schedule of Core Objectives.*

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TABLE 7 – SCHEDULE OF CORE OBJECTIVES

Core Objectives: Management of community land categorised as a Natural Area (36E)

"The core objectives for management of community land categorised as a natural area are:

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;

f) 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."

Core Objectives: Management of community land categorised as a Natural Area – Watercourse (36M)

"The core objectives for management of community land categorised as watercourse are:

a) To manage watercourses so as to protect the biodiversity and ecological values of the in-stream environment, particularly in relation to water quality and water flows, and

b) To manage watercourses so as to protect the riparian environment, particularly in relation to riparian vegetation and habitats and bank stability, and

c) To restore degraded watercourses, and

d) To promote community education, and community access to and use of the watercourse, without compromising the other core objectives of the category".

Core Objectives: Management of community land categorised as a Natural Area – Bushland (36J)

"The core objectives for management of community land categorised as bushland are:

a) To ensure the ongoing ecological viability of the land by protecting the ecological biodiversity and habitat values of the land, and flora and fauna (including invertebrates, fungi and micro-organisms) of the land and other ecological values of the land, and;

b) To protect the aesthetic, heritage, recreational, educational and scientific values of the land, and;

c) To promote the management of the land in a manner that protects and enhances the values and quality of the land and facilitates public enjoyment of the land, and to implement measures directed to minimising or mitigating any disturbance caused by human intrusion, and;

d) To restore degraded bushland, and;

e) To protect existing landforms such as natural drainage lines, watercourses and foreshores, and;

f) To retain bushland in parcels of a size and configuration that will enable the existing plant and animal communities to survive in the long term, and;

g) To protect bushland as a natural stabiliser of the soil surface".

Core Objectives: Management of community land categorised as a Park

"The core objectives for management of community land categorised as a park are:

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." [LGA 1993 s.36G]

Action Plan

The previous section (*5.0 Basis for Management*) identified the reserve's key values and significance:

- Natural/ cultural riparian setting
- Environment and biodiversity
- Public recreation and reserve management

Section *5.0 Basis for Management* provided an assessment of issues, threats and impacts on these values and established a framework for sustainable management strategies (i.e. desired outcomes) consistent with Crown reserve and community land objectives. Key issues included:

- Managing private water-based recreational facilities and access;
- Upgrade or relocate boat ramp;
- Improvements to public access and connectivity;
- View protection and management;
- Stabilising riverbanks and erosion control;
- Weed management and restoration strategy.

Preferred options (i.e. desired outcomes) were developed from this process. The following desired outcomes are identified with core objectives in the Action Plan:

1. Crown reserve/ community land management – development, uses and activities, leases, licences and other estate:

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

2. Protecting and managing environmental quality, the riparian setting, riverbank stability, biodiversity and recreational values on a sustainable basis:

To protect, manage and restore environmental quality, riverbank stability and riparian biodiversity whilst providing opportunities for sustainable passive and water-based recreational uses and activities.

The Action Plan establishes the means of achieving these desired outcomes and objectives (see *Table 8: Action Plan*). The table is divided into five columns:

- Performance targets or management objectives (column 1);
- Item or reference number (column 2);
- Management actions or means of achievement (column 3);
- Means of assessment of the actions (column 4);
- Priority ranking for each management action (column 5).

Performance targets (management objectives)

The *desired outcomes* and *core objectives* for Holmes Drive Reserve have guided the development of *performance targets* in the Action Plan.

Item number

Each action is assigned an item number based on the desired outcomes.

Management actions (means of achievement)

The performance targets provide the framework for developing *management actions* or the *means of achievement*.

Means of assessment (of the actions)

The Action Plan establishes a system of checks and balances to assess actions in relation to performance (i.e. *means of assessment)*.

Priorities

Priorities for management actions are assigned according to relative importance – very high, high, medium and low. It is envisaged that actions will be addressed on a priority basis and in accordance with the means of assessment. All capital works are subject to availability of funding and assistance from sources such as NSW and Federal government grant funding schemes.

Capital works program

Priorities and opinions of probable construction costs (based on the Landscape Masterplan) are provided in the capital works program (see *Table 9: Capital Works Program*). The Opinion of Probable Landscape Construction Costs should be considered as indicative only and provided for budgeting purposes in relation to government funding applications.

Landscape masterplan

The Landscape Masterplan identifies key management actions to be implemented throughout the 5-year capital works program, subject to available funding. Refer to *Figure 10: Landscape Masterplan*.

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TABLE 8: HOLMES DRIVE RESERVE ACTION PLAN

Performance Target (management objectives)	Item	Management Actions (means of achievement)	Means of Assessment (of the actions)	Priority
Desired Outcome: To establish an appropriate management framework and guidelines for assessing development, land uses, activities, leases, licences and other estate. Core objectives: Management of Crown reserve/ community land categorised as natural area - watercourse (36M), natural area - bushland (36J) and park (36G).				
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 in accordance with *Local Government Act 1993*, *Crown Lands Act 1989*, case law and other relevant legislation and policy.	Adoption of plan of management. Level of implementation over 5-yrs.	High Ongoing
Public purpose: To recognise the reserve's broader significance in terms of environmental and ecological values.	A2	Review and amend existing public purpose (Crown reserve portion) to ''public recreation and environmental protection" to recognise significance of environmental values and need for improving conservation measures.	Public purpose amended and appropriate conservation measures implemented.	High
Future development, land uses and activities: To satisfy the principles of Crown land management in accordance with the *Crown Lands Act 1989*. To ensure consistency with community land categories and core objectives for *natural area – watercourse, natural area – bushland and park.* To protect the reserve's natural and cultural riparian setting, scenic, ecological and other identified values from inappropriate uses, activities and development. To improve public access and opportunities for safe passive and water-based recreational activities. To provide a balanced and appropriate level of recreational infrastructure and to restrict incremental negative impacts on natural values. To actively engage with the community to protect, manage and enhance the reserve's values. To ensure sustainable solutions are implemented including addressing threatening processes. To ensure that development proposals will have a net positive benefit in relation to identified values. To promote the reserve's role as a broadly accessible, equitable and safe community asset. To engage with the community in new initiatives.	A3	Development proposals, uses and activities, leases and licences and management practices must be consistent with the following requirements: • Demonstrate consistency with reserve's public purpose, community land categories, core objectives and environmental significance; • Protection of natural/ cultural riparian setting, visual quality, biodiversity, cultural and recreational values; • Ensure consistency with flood and bushfire management policy; • Promote continuing dialogue with the community in relation to existing infrastructure, future development/ proposed restoration works, compatible uses and activities; • Implement conservation measures to protect and restore riverbank stability and natural riparian vegetation in accordance with best-practice guidelines; • Promote balanced, sustainable management and improvement of recreational infrastructure and opportunities for low-impact activities; • Address public safety and risk management issues; • Adequately provide for public access, connectivity, equity and broad community use; • Protect the reserve's ecological/ habitat values from further clearing and fragmentation due to inappropriate activities/ infrastructure; • Facilitate programs in community education and involvement in bank stabilisation and restoration of riparian vegetation.	Adoption of plan of management. Level of implementation over 5-yrs. Number and % of proposed developments that address and adhere to development guidelines. Measure trends over time.	High Ongoing

Performance Target (management objectives)	Item	Management Actions (means of achievement)	Means of Assessment (of the actions)	Priority
Desired Outcome: To establish an appropriate management framework and guidelines for assessing development, land uses, activities, leases, licences and other estate. Core objectives: Management of Crown reserve/ community land categorised as natural area - watercourse (36M), natural area - bushland (36J) and park (36G).				
To protect identified values and significance from inappropriate development, uses and activities.	A4	Development proposals, uses and activities which may directly or indirectly threaten or adversely impact identified value(s), including aesthetic/ scenic quality, natural and cultural riparian setting, archaeological or low-key passive and active recreational values are not permissible.	As above	Ongoing
Leases and licences (Crown reserve): To provide express authorisation for appropriate leases or licences over Crown reserve (portion). To ensure consistency with *Crown Lands Act 1989*, public purpose, case law and other relevant policy.	A5	This plan of management expressly authorises the granting of leases or licences over the Crown reserve portion of the reserve for the purposes of providing goods, services and facilities, and the carrying out of activities appropriate to current and future needs of the local community and of the wider public providing the purpose for which the lease or licence is granted is consistent with the reserve's public purpose [see item A2], the *Crown Lands Act 1989* (s.102 CLA 1989), *Crown Lands Regulation 2000*, case law judgements and other relevant policy.	Leases and/or licences granted in accordance with public purpose and relevant legislation and this plan of management.	Ongoing
To ensure consistency with community land categorisation and core objectives.	A6	For this reserve, the granting of leases or licences should also be consistent with community land categories and their core objectives.	Assess against Council policies, principles and permitted uses consistent with community land categories and core objectives.	Ongoing
Leases, licences & other estate (community land): To provide express authorisation for appropriate leases, licences or other estate over community land. To ensure consistency with relevant legislation affecting the uses and activities on community land. To permit the granting of leases, licences or other estate which are consistent with relevant legislation, community needs and community land core objectives.	A7	This plan of management expressly authorises the granting of leases, licences or other estate over the community land for the purposes of providing goods, services and facilities, and the carrying out of activities appropriate to current and future needs within the local community and of the wider public in relation to any of the following: • Public recreation, social and educational activities; • The physical, cultural, social and intellectual welfare or development of persons; and • Only if the purpose for which it is granted is consistent with the core objectives of its categorisation [see *Appendix IV*: s.47B - lease or licence in respect of natural area]. 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.	Leases, licences or other estate granted in accordance with relevant legislation and this plan of management. Assess against Council policies, principles and permitted uses consistent with community land categories and core objectives.	Ongoing

Performance Target (management objectives)	Item	Management Actions (means of achievement)	Means of Assessment (of the actions)	Priority
Desired Outcome: To establish an appropriate management framework and guidelines for assessing development, land uses, activities, leases, licences and other estate. Core objectives: Management of Crown reserve/ community land categorised as natural area - watercourse (36M), natural area - bushland (36J) and park (36G).				
To permit the granting of short-term and casual leases or licences consistent with relevant legislation, community needs and community land core objectives.	A8	In accordance with Pt.4, Div.3 Cl.117 of the Local Government (General) Regulation 2005, leases, licences and other estate granted for the following purposes are exempt from the provisions of s.47A of the *Local Government Act 1993*: 1) The provision of pipes, conduits or other connections under the surface of the ground for connection of premises adjoining the community land to a facility of the Council or other public utility provider that is situated on the community land; 2) Use and occupation of community land for events such as: a) A public performance (i.e. a theatrical, musical or other entertainment for amusement of the public; b) The playing of a musical instrument, or singing for a fee or reward; c) Engaging in a trade or business; d) Playing of any lawful game or sport; e) Delivering a public address; f) Conducting a commercial photographic session; g) Picnics and private celebrations such as weddings and family gatherings; h) Filming. The use or occupation of community land for such short-term or casual events listed is exempt only if the use or occupation does not involve the erection of any building or structure of a permanent nature.	Short-term and casual licences granted in accordance with relevant legislation and this plan of management. Assess against Council policies, principles and permitted uses consistent with community land categories and core objectives.	Ongoing
Easements: To permit the granting of easements which area consistent with the *Local Government Act 1993*.	A9	This plan of management expressly authorises the granting of easements over the community land for the purpose of providing pipes, conduit or other connections under the surface of the ground. This is limited to easements that connect land adjoining community land to an existing water, sewer, drainage or electrical facility of Council or other public utility provider that is situated on community land.	Easements granted in accordance with relevant legislation, State heritage listing [see exemptions] and this plan of management. Assess against Council policies, principles and permitted uses consistent with community land categories and core objectives.	Ongoing

Performance Target (management objectives)	Item	Management Actions (means of achievement)	Means of Assessment (of the actions)	Priority
Desired Outcome: To protect, manage and restore environmental quality, riverbank stability and riparian biodiversity providing opportunities for sustainable passive and water-based recreation. Core objectives: Management of Crown reserve/ community land categorised as natural area - watercourse (36M), natural area - bushland (36J) and park (36G).				
Managing unauthorised water-based recreational infrastructure and encroachments in reserve To establish working partnerships with the community to resolve key issues/ threats affecting riverbank stability, public safety and broader use of the reserve.	B1	Liaise with the local community to establish ownership of existing private infrastructure. The owners of unauthorised structures would need to provide evidence that the structure meets appropriate standards (see item B2). If ownership cannot be established and the structure is deemed unsafe the item will be removed by Council.	Ownership and audit of private infrastructure conducted and recommendations implemented.	Very High
To protect environmental quality and restrict uses and activities which are not consistent with public purpose and core objectives.	B2	Owner must maintain structure(s) to relevant standards. Retained items would require regular inspections and certification by a qualified structural engineer.	Regular inspections/ certification procedures implemented.	Ongoing
To take actions to minimise existing and future encroachments including notice to remove unsafe or inappropriate private recreational infrastructure.	B3	Leases, licenses or permissive occupancy will be required subject to the provisions of the *Crown Lands Act* and *Local Government Act.*	Leases or licences granted in accordance with this plan.	Ongoing
	B4	No further private encroachments, facilities, amenities and/ or structures will be permitted in the reserve. Unauthorised building works will be removed at owner's expense.	Removal of unauthorised works in accordance with this plan.	Ongoing
Minimal upgrade to boat ramp (incl. widening, strengthening and re-surfacing) To address public access, safety and risk management issues ensuring a low-key approach to any future improvement of facilities.	C1	Retain boat ramp in situ. Provide minimal upgrade/ necessary repairs and widening to existing ramp to improve public safety and facilitate river access/ launching boats. All current accretions/ armouring to the bank in this location are to be removed (see riverbank stabilisation).This option is considered a temporary measure.	Works implemented in accordance with this plan of management and subject to available funding.	High
Future option for relocation/ new public ramp at Cumberland Reach Reserve To disperse concentrated activities within a fragile riverbank location and relocate facilities to a more accessible and durable site.	C2	Subject to funding, new ramp to be built in Cumberland Reach Reserve (east of existing private boat ramp owned by Bundarra Ski Gardens). This location is close to Cumberland Reach Road and offers easy water access with a relatively low bank profile compared to current location in Holmes Drive Reserve. The new location also provides ample flat land for trailer park	As above	Medium
To protect environmental quality and provide long-term solutions for riverbank stabilisation and restoration. To investigate options for broad public access/ boat launching facilities.	C3	Liaise with owner of private boat ramp (Bundarra Ski Gardens) to establish options for broader public use. This option may provide a possible alternative to the existing ramp in Holmes Drive Reserve without the capital cost of constructing a new boat ramp.	Relocation options reviewed and recommendations implemented in accordance with this plan of management.	Medium

Performance Target (management objectives)	Item	Management Actions (means of achievement)	Means of Assessment (of the actions)	Priority
Desired Outcome: To protect, manage and restore environmental quality, riverbank stability and riparian biodiversity providing opportunities for sustainable passive and water-based recreation. Core objectives: Management of Crown reserve/ community land categorised as natural area - watercourse (36M), natural area - bushland (36J) and park (36G).				
Improvements to public access and facilities To improve visitor access into the reserve and boat ramp whilst maintaining a low-key approach with minimal formalisation of facilities. To address public safety and risk management issues. To manage cumulative negative impacts affecting the quality of the reserve including soil erosion.	D1	Regrade and consolidate road-base and apply new bitumen seal coat (central access road and access to rear western properties). Consolidate road shoulder and provide adequate drainage to reduce erosion impacts within the reserve. Install directional/ entry signage at turn-off into reserve (Holmes Drive) and reserve identification signage at T-junction. Continue regular maintenance of bitumen surface.	Works implemented in accordance with this plan of management and subject to available funding.	Very High Ongoing
To maintain low-key access to boat ramp (interim) and private access to adjacent properties.	D2	Regrade unsealed eastern section for access to existing boat ramp. Car and trailer parking to remain informal (i.e. adjacent grass area). Continue to maintain unsealed surface ensuring run-off is not directed towards riverbank.	As above	High Ongoing
To maintain existing unsealed access to adjacent reserve including improving visitor safety.	D3	Provide minimal grading to western vehicular track linking to Sackville Reach Aboriginal Memorial Reserve. To improve visitor safety, install marker posts/ bollards to identify an active wombat burrow on the edge of the track and adjust track alignment.	As above	High Ongoing
To replace/ upgrade existing ageing park furniture.	D4	Remove ageing and damaged tables/ seating. Replace with new timber picnic tables (2No.) and bench seating (3No.). Site to take advantage of river views.	As above	High
View protection and management To focus on developing a more sustainable outcome based on river dynamics and the riparian ecosystem. To minimise cumulative recreational impacts on the reserve's environmental quality.	E1	Implement an integrated strategy for riverbank stabilisation including restoration of riparian vegetation (see items F1-F5). A mix of open and framed vistas would be retained. Clustering or grouping of plant species (incl. trees, shrubs, climbers and groundcovers) would be balanced with open grassed areas and open canopy planting with native groundcovers (no understorey).	Works implemented in accordance with this plan of management and subject to available funding.	High Ongoing
To enhance riverbank stability, visual qualities, public safety and recreational opportunities.	E2	Assist community in establishing ''Friends of Holmes Drive Reserve'' volunteer group to protect, manage and restore environmental qualities.	Number of volunteers involved in program. Area under management.	High Ongoing
To improve control over illegal clearing of vegetation.	E3	Liaise with OEH to improve regulatory control of illegal clearing of native riparian vegetation protected under the TSC Act and NVC Act.	Number of incidents/ breaches of the Acts. Measure trends over time.	High Ongoing
Stabilising the riverbank and erosion control To establish a demonstration site within the reserve with the aim of restoring long-term bank stability and improved safe public access to the river. To maximise benefits in terms of river health, scenic values, recreational setting and sustainability.	F1	Implement an integrated riverbank stabilisation and restoration strategy using a mix of hard construction (toe of embankment), bank re-grading/ battering and terracing, as necessary, and stabilisation with native riparian vegetation. Establish a demonstration site along the steep eroded riverbank (approx. 90 metres in length) within the eastern (community land) portion of the reserve (including the boat ramp) [see *Figure 10: Landscape Masterplan*].	Works implemented in accordance with this plan of management and subject to available funding.	Very High

Performance Target (management objectives)	Item	Management Actions (means of achievement)	Means of Assessment (of the actions)	Priority
Desired Outcome: To protect, manage and restore environmental quality, riverbank stability and riparian biodiversity providing opportunities for sustainable passive and water-based recreation. Core objectives: Management of Crown reserve/ community land categorised as natural area - watercourse (36M), natural area - bushland (36J) and park (36G).				
Stabilising the riverbank and erosion control (continued) To enhance riverbank stability, visual qualities, public safety and recreational opportunities. To implement an integrated riverbank stabilisation and restoration strategy using native riparian vegetation. To design for continuity of vegetation cover and structural diversity to enhance long-term stability. To deliver long-term, cost-effective positive benefits for the community and establish partnerships including volunteer involvement in the restoration strategy. To protect environmental quality and restrict uses and activities which are not consistent with public purpose and core objectives. To address long-term objectives of building ecosystem resilience and durability. To ensure appropriate local native species/ provenance sourcing are used in restoration strategy	F2	Restoration works would include both open grassed areas (with easy, graded river access).and planting of riparian vegetation. It is proposed that the establishment of revegetated areas to open grassed areas would be in the ratio of approximately 40:60. The density and type of riparian vegetation cover strongly influence riverbank stability.	Works implemented in accordance with this plan of management and subject to available funding.	Very High
	F3	Remove ad hoc erosion control measures, encroachments/ accretions (e.g. rubble walls, tyres, concrete platforms/ ramps, ladders, etc.) from the riverbank and water's edge. Reinforce the toe or free-board area at the base of the bank with a low rock batter or alternatively, using inter-woven geotextile bags filled with sand. Re-grade riverbank (i.e. cut and fill) to form slope with maximum 1:3 batter (preferably 1:4 batter), secure biodegradable jute weed thick mat over batter to reduce weed competition and plant with long-stem tubestock (see *Figure 9: Proposed battered riverbank treatment/ restored riparian vegetation*). For very steep eroded banks, terracing may be required. Stabilise these areas with coconut-fibre "coir log" walls (to engineer's specification). Stake and secure coir log walls and plant with native long-stem tubestock (see *Figure 8: Proposed terraced riverbank treatment*).	As above	Very High
	F4	Introduce aquatic and semi-aquatic plants and snags in-stream (adjacent to armoured toe) to reduce wave energy and enhance habitat qualities. The protection/ re-introduction of emergent aquatic macrophytes will restrict the near-bank stream flow velocity and provide reinforcement to the bank surface through their shallow root mat.	In-stream area under restoration strategy. Measure trends over time.	Very High
	F5	Riparian restoration works within the demonstration site should consider the following (see best-practice guidelines): • Determine availability of local-provenance sourced long-stem tubestock (see *Appendix V: Schedule of Native Plant Species*); • Ensure correct zoning of species and structural and floristic diversity; • Provide temporary fencing (steel stakes/ wire) to delineate restoration area/ demonstration site and identify management regimes (i.e. mown grass areas vs. restoration areas); • Plant preferably in autumn (cooler temperatures, higher soil moisture and less stress on new plants to establish root systems);	Works implemented in accordance with this plan of management and subject to available funding.	High Ongoing

Performance Target (management objectives)	Item	Management Actions (means of achievement)	Means of Assessment (of the actions)	Priority
Desired Outcome: To protect, manage and restore environmental quality, riverbank stability and riparian biodiversity providing opportunities for sustainable passive and water-based recreation. Core objectives: Management of Crown reserve/ community land categorised as natural area - watercourse (36M), natural area - bushland (36J) and park (36G).				
Stabilising the riverbank and erosion control (continued) To address long-term objectives of building ecosystem resilience and durability. To ensure appropriate local native species/ provenance sourcing are used in restoration strategy	/F5	• Plant in high density (plan for some losses) to maintain adequate structural/ species diversity as the scheme matures; • Thin selectively, or add plants as necessary, maintaining flexibility and ensuring issues such as loss of views are addressed; • Continue to provide maintenance, targeting weed species, as necessary.	Works implemented in accordance with this plan of management and subject to available funding.	High Ongoing
Weed management and restoration strategy To promote partnerships with state government agencies, industry and local land-holders to secure sustainable environmental outcomes. To provide long-term riverbank stability, reducing erosion, improving water quality and habitat values.	G1	It is envisaged that the proposed demonstration site (see item F1) would establish best-practice methods for riverbank stabilisation, weed management and restoration strategy) [see *Figure 10: Landscape Masterplan*]. Following consolidation and establishment, further stabilisation/ restoration works could be initiated, subject to appropriate funding.	Works implemented in accordance with this plan of management and subject to available funding.	High Ongoing
To encourage local community (volunteer) involvement and stewardship as an integral part of the program in restoring the reserve's natural and scenic values. To provide appropriate assistance and support for community volunteers.	G2	Provide assistance to the local community in establishing a volunteer BushCare group "Friends of Holmes Drive Reserve" to assist in targeted weed management/ regeneration and restoration strategies, rubbish removal, monitoring unauthorised activities and community education. Provide support in leadership training/ education, supply of materials/ removal of stockpiled weeds, staging the program of works, reporting, grant applications, etc.).	Number of local volunteers engaged in program. Measure trends over time.	High Ongoing
To maintain focus on recovery, recruitment, long term durability, expansion and consolidation of fragmented natural habitat, native populations and species.	G3	Seek an appropriate level of government funding assistance and grants for works to be implemented in stages (starting with the demonstration site).	Level of funding per annum linked to positive net gains.	High Ongoing
	G4	Consolidate core habitat areas along the riverbank through staged removal of weed species and buffer enhancement. Apply minimal disturbance bush regeneration techniques where positive net gains are achievable (i.e. patches demonstrating high levels of resilience). Apply restoration, enhancement and reinstatement strategies for areas which display a high level of soil disturbance, fragmentation and weed invasion. Use local native, provenance-sourced species (i.e. local genotypes). Ensure that the program protects and enhances vital habitat for dependent and threatened species.	Area % of reserve under weed management, bush regeneration and restoration [over 5 years]. Annual progress reports	High Ongoing
	G5	Clearly delineate management zones and ensure that current management practices/ regimes (e.g. mowing, edging, etc.) do not impact designated regeneration/ restoration sites.	Works implemented in accordance with this plan of management.	High Ongoing

Performance Target (management objectives)	Item	Management Actions (means of achievement)	Means of Assessment (of the actions)	Priority
Desired Outcome: To protect, manage and restore environmental quality, riverbank stability and riparian biodiversity providing opportunities for sustainable passive and water-based recreation. Core objectives: Management of Crown reserve/ community land categorised as natural area - watercourse (36M), natural area - bushland (36J) and park (36G).				
Weed management and restoration strategy (continued) To ensure implementation of best-practice guidelines for the management of the reserve's natural areas, including threatened ecological communities. To enhance habitat values and improve connectivity and recovery of fragmented River-flat Eucalypt Forest. To promote genetic integrity as a key component of the overall strategy. To establish a representative level of plant species, structural diversity and integrity.	G6	Ensure that the reserve's River-flat Eucalypt Forest (as scheduled under the TSC Act, NVC Act and mapped in HLEP 2012 – Terrestrial Biodiversity) and proposed riverbank restoration works are managed in accordance with the prescribed best-practice standards of the following: • *Cumberland Plain Recovery Plan (2010) 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 • series of *Florabank Guidelines* for native seed collection, production, handling and storage; and • *Hawkesbury-Nepean Riverbank Management Program.*	Works implemented in accordance with best-practice methods and guidelines.	High Ongoing
Targeting noxious weeds To monitor and control noxious weed species and to provide support for targeted programs. To target noxious weed species within the reserve and water's edge.	G7	Target noxious weed infestations along the riverbank and water's edge, including aquatic and semi-aquatic species (see Table 6: Noxious Weed Species). Continue to support targeted programs to control noxious weeds.	Noxious weed species controlled in accordance with *Noxious Weeds Act 1993*.	High Ongoing
Flood and bushfire management To address flood planning, public safety and risk management issues. To maintain emergency vehicle access. To address post flood or bushfire procedures.	H1 H2 H3	Ensure that public access and provision of recreational infrastructure (including upgrades) are consistent with flood planning strategies. Ensure that procedures for emergency evacuation are in accordance with relevant flood and bushfire plans. Following flooding or bushfire and prior to re-opening the reserve, assess any damage to property/ infrastructure and public risk and prepare an inventory for repairs.	All capital works in accordance with relevant flood planning. Procedures in accordance with relevant plans. Post flood/ fire inventory prepared.	Ongoing Ongoing Ongoing

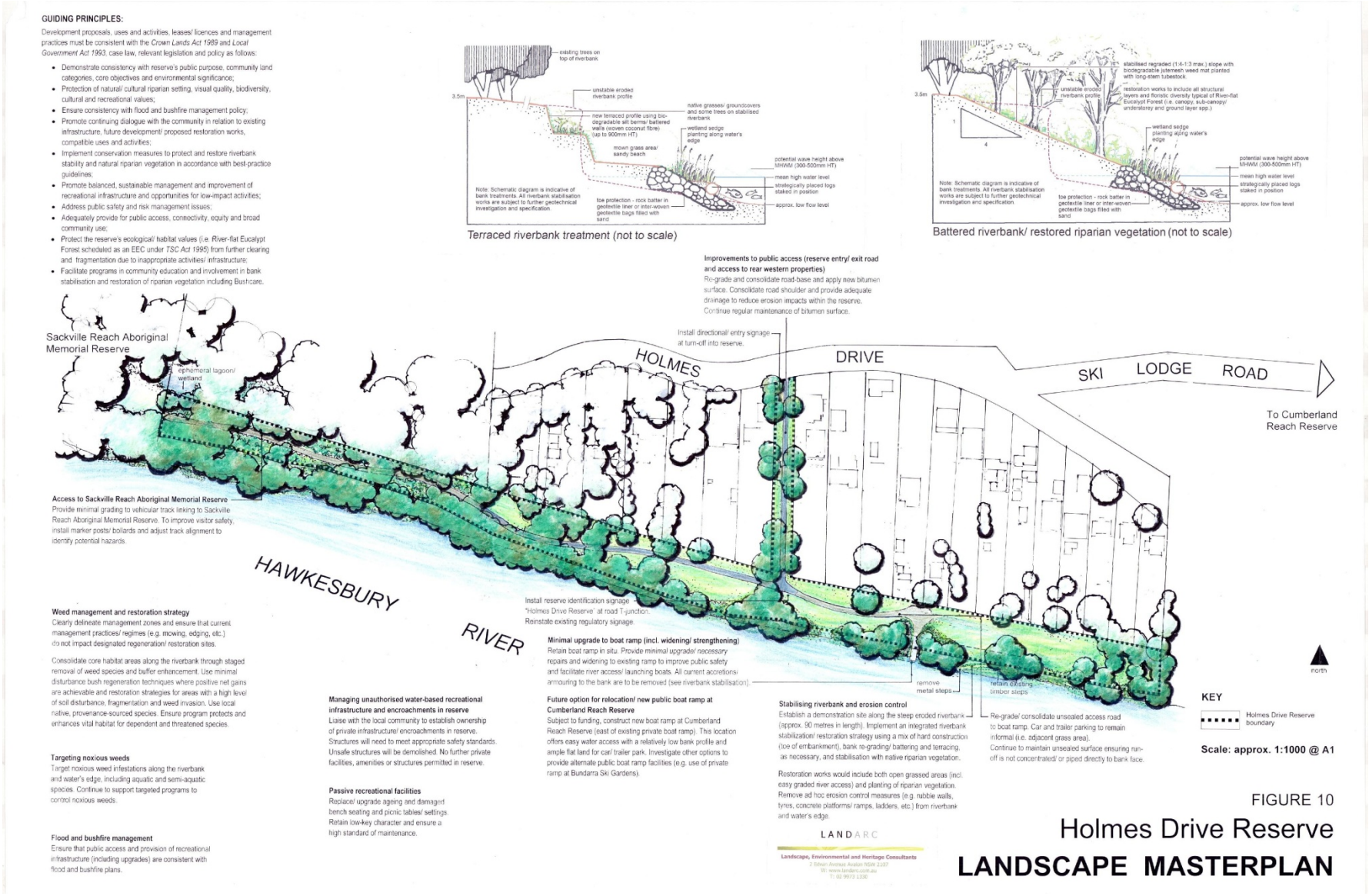
GUIDING PRINCIPLES:
Development proposals, uses and activities, leases/ licences and management practices must be consistent with the Crown Lands Act 1989 and Local Government Act 1993, case law, relevant legislation and policy as follows:
• Demonstrate consistency with reserve's public purpose, community land categories, core objectives and environmental significance;
• Protection of natural/ cultural riparian setting, visual quality, biodiversity, cultural and recreational values;
• Ensure consistency with flood and bushfire management policy;
• Promote continuing dialogue with the community in relation to existing infrastructure, future development/ proposed restoration works, compatible uses and activities;
• Implement conservation measures to protect and restore riverbank stability and natural riparian vegetation in accordance with best-practice guidelines;
• Promote balanced, sustainable management and improvement of recreational infrastructure and opportunities for low-impact activities;
• Address public safety and risk management issues;
• Adequately provide for public access, connectivity, equity and broad community use;
• Protect the reserve's ecological/ habitat values (i.e. River-flat Eucalypt Forest scheduled as an EEC under TSC Act 1995) from further clearing and fragmentation due to inappropriate activities/ infrastructure;
• Facilitate programs in community education and involvement in bank stabilisation and restoration of riparian vegetation including Bushcare.
existing trees on top of riverbank
unstable eroded riverbank profile
native grasses/ groundcovers and some trees on stabilised riverbank
new terraced profile using bio-degradable silt berms/ battered walls (woven coconut fibre) (up to 900mm HT)
wetland sedge planting along water's edge
mown grass area/ sandy beach
potential wave height above MHWM (300-500mm HT)
mean high water level
strategically placed logs staked in position
approx. low flow level
toe protection - rock batter in geotextile liner or inter-woven geotextile bags filled with sand
Note: Schematic diagram is indicative of bank treatments. All riverbank stabilisation works are subject to further geotechnical investigation and specification.
3.5m
Terraced riverbank treatment (not to scale)
stabilised regraded (1:4-1:3 max.) slope with biodegradable jutemesh weed mat planted with long-stem tubestock
restoration works to include all structural layers and floristic diversity typical of River-flat Eucalypt Forest (i.e. canopy, sub-canopy/ understorey and ground layer spp.)
Battered riverbank/ restored riparian vegetation (not to scale)
Improvements to public access (reserve entry/ exit road and access to rear western properties)
Re-grade and consolidate road-base and apply new bitumen surface. Consolidate road shoulder and provide adequate drainage to reduce erosion impacts within the reserve. Continue regular maintenance of bitumen surface.
Install directional/ entry signage at turn-off into reserve.
Sackville Reach Aboriginal Memorial Reserve
ephemeral lagoon/ wetland
HOLMES
DRIVE
SKI LODGE ROAD
To Cumberland Reach Reserve
Access to Sackville Reach Aboriginal Memorial Reserve
Provide minimal grading to vehicular track linking to Sackville Reach Aboriginal Memorial Reserve. To improve visitor safety, install marker posts/ bollards and adjust track alignment to identify potential hazards.
HAWKESBURY RIVER
Weed management and restoration strategy
Clearly delineate management zones and ensure that current management practices/ regimes (e.g. mowing, edging, etc.) do not impact designated regeneration/ restoration sites.
Consolidate core habitat areas along the riverbank through staged removal of weed species and buffer enhancement. Use minimal disturbance bush regeneration techniques where positive net gains are achievable and restoration strategies for areas with a high level of soil disturbance, fragmentation and weed invasion. Use local native, provenance-sourced species. Ensure program protects and enhances vital habitat for dependent and threatened species.
Targeting noxious weeds
Target noxious weed infestations along the riverbank and water's edge, including aquatic and semi-aquatic species. Continue to support targeted programs to control noxious weeds.
Flood and bushfire management
Ensure that public access and provision of recreational infrastructure (including upgrades) are consistent with flood and bushfire plans.
Install reserve identification signage "Holmes Drive Reserve" at road T-junction. Reinstate existing regulatory signage.
Minimal upgrade to boat ramp (incl. widening/ strengthening)
Retain boat ramp in situ. Provide minimal upgrade/ necessary repairs and widening to existing ramp to improve public safety and facilitate river access/ launching boats. All current accretions/ armouring to the bank are to be removed (see riverbank stabilisation).
remove metal steps
retain existing timber steps
Managing unauthorised water-based recreational infrastructure and encroachments in reserve
Liaise with the local community to establish ownership of private infrastructure/ encroachments in reserve. Structures will need to meet appropriate safety standards. Unsafe structures will be demolished. No further private facilities, amenities or structures permitted in reserve.
Passive recreational facilities
Replace/ upgrade ageing and damaged bench seating and picnic tables/ settings. Retain low-key character and ensure a high standard of maintenance.
Future option for relocation/ new public boat ramp at Cumberland Reach Reserve
Subject to funding, construct new boat ramp at Cumberland Reach Reserve (east of existing private boat ramp). This location offers easy water access with a relatively low bank profile and ample flat land for car/ trailer park. Investigate other options to provide alternate public boat ramp facilities (e.g. use of private ramp at Bundarra Ski Gardens).
Stabilising riverbank and erosion control
Establish a demonstration site along the steep eroded riverbank (approx. 90 metres in length). Implement an integrated riverbank stabilization/ restoration strategy using a mix of hard construction (toe of embankment), bank re-grading/ battering and terracing, as necessary, and stabilisation with native riparian vegetation.
Restoration works would include both open grassed areas (incl. easy graded river access) and planting of riparian vegetation. Remove ad hoc erosion control measures (e.g. rubble walls, tyres, concrete platforms/ ramps, ladders, etc.) from riverbank and water's edge.
Re-grade/ consolidate unsealed access road to boat ramp. Car and trailer parking to remain informal (i.e. adjacent grass area). Continue to maintain unsealed surface ensuring run-off is not concentrated/ or piped directly to bank face.
north
KEY
Holmes Drive Reserve boundary
Scale: approx. 1:1000 @ A1
LANDARC
Landscape, Environmental and Heritage Consultants
FIGURE 10
Holmes Drive Reserve
LANDSCAPE MASTERPLAN

TABLE 9:
CAPITAL WORKS PROGRAM (KEY ITEMS)

ITEM	ACTION	CAPITAL COST ($)
B1-B4	Managing unauthorised water-based recreational infrastructure and encroachments in reserve	Not costed
C1	Minimal upgrade to boat ramp (incl. widening, strengthening and re-surfacing)	$12,500.00
C2-C3	Future option for relocation/ new public boat ramp at Cumberland Reach Reserve	Not costed
D1	Improvements to public access: entry road (140m) and western section (190m) - regrade/ road base & bitumen (incl. signage)	$40,000.00
D2-D3	Improvements to public access: regrade western access (220m- incl. safety works) & boat ramp unsealed access (90m)	$4,500.00
D4	Improvements to facilities (incl. park benches/ picnic settings and park signage)	$7,000.00
E1-E3	View protection and management (see items F1-F5)	Not costed
F1-F5	Stabilising the riverbank and erosion control (incl. establish demonstration site approx 90m length)	$75,000.00
G1-G7	Weed management and restoration strategy (additional to F1-F5) including targeted noxious weeds program	$15,000.00
TOTALS		$154,000.00

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Appendices

Appendix I: Preparing plans of management

Holmes Drive Reserve, Cumberland Reach

DRAFT PLAN OF MANAGEMENT

Why do we need a plan of management?

Holmes Drive Reserve is a public reserve (including Crown and community land) located on Cumberland Reach, Hawkesbury River. It is highly valued by the local community in terms of its river access (i.e. boat ramp), natural and cultural river-side setting, scenic qualities, quiet solitude and opportunities for passive and water-based recreational pursuits. This natural riverbank context however makes the reserve vulnerable to a range of cumulative environmental impacts. Past and present riverbank clearing, bank instability and erosion and recreational activities related to power boats, water skiing and wakeboarding continue to threaten key values.

A plan of management provides a framework for managing public land. This plan of management aims to provide a strategy which is balanced and sustainable – one which provides for river access and recreational opportunities for the community's enjoyment as well as ensuring future protection, management and restoration of environmental values. Sustainability is a key principle guiding this process. It is important that the draft plan of management establishes how these values should be protected, managed and enhanced for the existing community and for future generations.

What is the purpose of a community workshop?

A community workshop will help guide the preparation of the plan of management. The aim is to learn more about how the community values Holmes Drive Reserve and to identify important issues affecting these values and to suggest ways to improve management. The workshop also aims to provide a transparent and equitable forum for all user groups, stakeholders and individuals to discuss issues specific to this reserve.

To support any comments you wish to make please fill out the ***Community Issues Questionnaire***. If you need more time these can be mailed to:

LandArc Pty Limited
PO Box 304
Avalon NSW 2107

Please return questionnaires within ten (10) days.
If there are any further issues you need to discuss following the community workshop, please contact the Director of LandArc, Noel Ruting during office hours on 9973 1330. All issues raised at the workshop will be addressed in the draft plan of management. Further comments on the draft will be invited during the public exhibition period.

What are the expected outcomes for the draft plan of management?

The draft plan of management will establish a framework for managing Holmes Drive Reserve in accordance with the *Crown Lands Act 1989*, *Local Government Act 1993* and other relevant legislation. The following will be addressed:

- establish the reserve's role in the local area and Hawkesbury City LGA;
- identify existing uses, activities, improvements and condition of recreational infrastructure (private and public);
- identify and assess the reserve's values (i.e. natural/ cultural riparian setting, environmental, cultural and recreational);
- identify and assess key issues and threats affecting these values;
- establish future permitted uses, activities and development (including intensity and scale);
- develop appropriate management strategies and actions based on a balanced, sustainable approach to resource management;
- assign priorities for a strategic plan (5-years) and estimated capital works expenditure; and
- prepare a landscape master plan.

When will the draft plan of management be exhibited?

Upon completion of the draft plan of management will go on public exhibition at Council's Administration Centre, Hawkesbury Central Library (in the Deerubbin Centre), Windsor and Council's web-site.

The draft plan of management goes on public display for four weeks and a further two weeks are allowed for final written submissions (i.e. a total of 6 weeks for submissions from commencement of public exhibition to closure).

The public exhibition dates will be advertised by Council.
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Community Issues Questionnaire

Holmes Drive Reserve, Cumberland Reach

DRAFT PLAN OF MANAGEMENT

Holmes Drive Reserve includes both community land owned by Hawkesbury City Council and Crown reserve. A draft plan of management is being prepared for this river-side reserve.

Community consultation will help guide the preparation of the plan of management. Please take a few minutes to fill out the following questionnaire.

1. May we have some personal details? *(Please circle item)*

a) AGE

<20 20-35 36-50 50-65 >65

b) SEX

MALE FEMALE

2. Please provide your residential postcode

☐

3. **How often do you visit the reserve?** *(Please tick box)*

☐ Less than once a year

☐ 1-3 times a year

☐ 4-6 times a year

☐ Frequent visitor *(please circle item below)*

Monthly Weekly Most days

4. Do you have a seasonal preference for visiting the reserve?
(Please circle items as applicable)

Summer Winter All year round

5. How important are the following reserve values and what improvements would you like to see in the reserve?
(please tick box)

Item Description	Important	Neutral	Not Important
Safe easy access to the river			
Stable natural riverbanks			
Improved river health			
Open views over reserve			
Quiet solitude/ place to relax			
Native riverbank vegetation			
Existing structures (access to river)			
Existing road access within reserve			
Public boat ramp			
Public floating jetty			
Beach access			
Open grassed areas			
More shade trees			
Picnic shelter/ BBQ area & seating			
Litter bins			
Other (specify)			

Please continue over page…

6. What do you believe are the three most important issues affecting the reserve?

What actions would you suggest to address these issues?

a) Please describe below the first issue you wish to raise.

b) Please describe below the second issue.

c) Please describe below the third issue.

Thank you.
Please return this survey to the desk before you leave or mail within 10 days to:

LandArc Pty Limited
PO Box 304
Avalon NSW 2107

Appendix III
Summary of Community Responses to Questionnaire

ISSUE	DISCUSSION
BOAT RAMP Narrow and dangerous condition Becoming unusable Almost unusable at low tide & dangerous at high tide due to fast river flow Needs to be a high priority Used by a wide range of people with various size boats and vehicles; big boats need 4WD at low tide to pull boat out of water. Easy for boat trailer to go off edge of ramp at high tide – ramp also narrows towards the water. Dangerous to have someone in the water to guide in this situation. Water washing under ramp/ likely collapse. Need to minimise safety risk to comply with OH&S.	Boat ramp beyond simple repair – will require re-design and re-building. Ramp is vital infrastructure for water-sports on this part of the river. Repair or relocate. Install floating jetty (similar to one near Brooklyn/ F3). Needs re-design and urgent repair (including re-concreting) Urgent repair of existing ramp/ including widening around ramp to maintain safe environment. Existing ramp is too narrow – not wide enough for larger ski boats; potholes make it hard to back trailer safely; overgrown vegetation on sides scratch boats; eroding riverbank/ danger of collapse; slippery to walk on. If left in current condition, further undermining will occur. Proximity of boat ramp was a big factor in purchase of property on Holmes Drive – expressed by a number of people. Regular use by a lot of residents on Holmes Drive. Want to see further growth in water-skiing community – a better ramp will bring greater usage.
RIVERBANK STABILISATION Erosion and safety – eroding quickly/ very steep Erosion/ unstable bank due to tidal flows. Bank collapsing in places making it unsafe.	Banks need to be supported to prevent washing away/ matter of safety. Regrade bank/ form gentle sloping grassed bank with steps/ access to river. Repair bank urgently. Need to batter

Erosion causing uprooting of trees/ falling into river. Dangerous to public/ serious concern for families with young children. A lot of erosion over the past 10 years and significant erosion after recent floods.	back and retain with sandstone boulders. Create large grassy areas and planting small shrubs only where required. Retain existing large trees. Maintain existing views. Create wide grassed areas sloping to water/ no need for steps. Preference for gentle graded slope to water and beach. Stabilise riverbank against high tides, wake-boards and floods. Stabilise banks with natural sandstone obtained locally. Recent floods and concrete block walls constructed on opposite side of river have increased erosion here. No planting of trees – do not want to lose open views.
RIVER ACCESS & PUBLIC SAFETY Riverbank is unsafe Safe access along the riverbank is crucial to a safe boating environment. Few safe areas to access the river/ overgrown with weeds or in danger of collapse.	Boats need to be able to drop their tow safely (i.e. skier, wake-boarder, tube rider, etc.) free of boat crowding and other obstacles (e.g. trees/ snags). Important to keep a good view of the river from the reserve.
EXISTING STRUCTURES Steps adj. to 30 Holmes Drive (on Crown reserve) now isolated/ unsafe	Steps were used by local residents and scouts/ no longer safe to use.
ACCESS ROAD (ENTRY/EXIT) Sealed road is in very poor condition/ completely deteriorated Damage to cars. No repairs for at least 8-10 years/ deteriorated badly. Very difficult to drive on road especially when towing a boat.	Need urgent repair of surface/ pot-holes damaging motor vehicles. Strip surface and replace. At least (in short term) make minor gravel repairs to avoid damage to cars. Allow residents to fill pot-holes. Damage to vehicles from pot-holes/ one advantage – people drive slower. Motorists driving along grass shoulder to avoid pot-holes creating further damage to reserve.

	Introduce speed humps. Access road is only way in for a couple of residents, postal services and waste collection. Needs to be repaired but need speed humps to slow motorists.
ROAD TO ABORIGINAL MEMORIAL RESERVE Unsealed road/ track is in very poor condition; almost non-existent.	Fix the dirt road.
WEED CONTROL Weeds growing through trees Lantana/ blackberry control	Eradicate/ control noxious weeds. Remove all noxious weeds on Council and Crown land.
OPEN VIEWS Need to maintain open views over the reserve to the river.	River-views were an important reason for purchasing the property on Holmes Drive.
VISITOR USE Mostly used by locals/ problems when visitors don't respect the reserve.	
FRIENDS OF RESERVE COMMITTEE Suggested at public workshop as way of encouraging volunteer management of the reserve.	Minimal support for formation/ need committed people.
PARK SEATING Urgent repairs required. Maintain new tables/ seating.	Remove old timber on tables & seating/ replace with new timber slats.

Appendix IV:
Leases and licences with respect to natural areas (47B)

http://www.legislation.nsw.gov.au/fullhtml/inforce/act+30+1993+CD+0+N#ch.6-pt.2-div.2-sec.47b

47B Lease or licence in respect of natural area

(1) A lease, licence or other estate must not be granted, in respect of community land categorised as a natural area:
  (a) to authorise the erection or use of a building or structure that is not a building or structure of a kind prescribed by this section or the regulations, or
  (b) to authorise the erection or use of a building or structure that is not for a purpose prescribed by this section or the regulations.

(2) A lease, licence or instrument granting any other estate is void to the extent that its provisions are inconsistent with this section.

(3) In this section, ***erection*** of a building or structure includes rebuilding or replacement of a building or structure.

(4) The following buildings and structures are prescribed for the purposes of subsection (1) (a):
  (a) walkways,
  (b) pathways,
  (c) bridges,
  (d) causeways,
  (e) observation platforms,
  (f) signs.

(5) The following purposes are prescribed for the purposes of subsection (1) (b):
  (a) information kiosks,
  (b) refreshment kiosks (but not restaurants),
  (c) work sheds or storage sheds required in connection with the maintenance of the land,
  (d) toilets or rest rooms.

(6) Despite subsection (1), a lease, licence or other estate may be granted, in respect of community land categorised as a natural area, to authorise the erection or use of any building or structure necessary to enable a filming project to be carried out, subject to the conditions prescribed by subsection (7) and the regulations.

(7) It is a condition of any lease, licence or other estate referred to in subsection (6):
  (a) that any building or structure so erected must be temporary in nature, and
  (b) that as soon as practicable after the termination of the lease, licence or other estate:

(i) any building or structure erected must be removed, and
(ii) any damage to the land caused by the erection or use of a building or structure must be made good, and
(iii) the land must be restored as nearly as possible to the condition that it was in at the time the lease, licence or other estate was granted, at the expense of the person to whom the lease, licence or other estate was granted.

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Appendix V:

Schedule of Existing Native Plant Species

The following scheduled native plant species were recorded by Noel Ruting, Director of LandArc during site investigations (2011-13). These plants provide a base list for future restoration works in Holmes Drive Reserve.

NOTE:
* These native species may also be present in the reserve.

Botanic Name	Common Name
Canopy and sub-canopy species:	
Acacia parramattensis	Sydney Green Wattle
Alphitonia excelsa	Red Ash
Angophora floribunda	Rough-barked Apple
Casuarina cunninghamiana	River Oak
Eucalyptus amplifolia	Cabbage Gum
Eucalyptus deanei	Mountain Blue Gum
Eucalyptus robusta	Swamp Mahogany
Eucalyptus saligna	Sydney Blue Gum
Ficus rubiginosa	Port Jackson Fig
Melia azedarach	White Cedar
Small tree/ shrub stratum:	
Acmena smithii	Lilly Pilly
Alectryon subcinereus	Native Quince
Backhousia myrtifolia	Grey Myrtle
Breynia oblongifolia	Common Breynia
Callistemon salignus	Willow Bottlebrush
Clerodendrum tomentosum	Hairy Clerodendrum
Cryptocarya microneura	Murrogun
Dodonea triquetra	Common Hop Bush
Duboisia myoporoides	Corkwood
Eupomatia laurina	Bolwarra
Ficus coronata	Creek Sandpaper Fig
Glochidion ferdinandi	Cheese Tree
Hibiscus heterophyllus	Native Rosella
Hymenanthera dentata	Tree Violet
Leptospermum polygalifolium	Yellow Tea-tree
Melaleuca lineariifolia	Snow-in-summer
Myrsine variabilis	Muttonwood
Notelaea longifolia	Large Mock Olive
Pittosporum revolutum	Rough Fruit Pittosporum

Solanum prinophyllum	Forest Nightshade
Trema tomentosa var. *aspera*	Native Poison Peach

Ground stratum:

Adiantum aethiopicum	Maidenhair Fern
Adiantum flabellifolium	Necklace Fern
Agrostis avenacea	Blown Grass*
Alternanthera denticulata	Lesser Joyweed
Aristida ramosa	Wire Grass*
Aristida vagans	Wire Grass
Austrodanthonia tenuior	Wallaby Grass
Austrostipa ramosissima	Stout Bamboo Grass
Calochlaena dubia	Rainbow Fern
Cheilanthes sieberi subsp. *sieberi*	Poison Rock Fern
Commelina cyanea	Scurvy Weed
Davallia solida var. *pyxidata*	Hare's Foot Fern
Dianella caerulea	Flax Lily
Dichondra repens	Kidney Weed
Doodia aspera	Prickly Rasp Fern
Echinopogon caespitosus	Tufted Hedgehog Grass
Entolasia marginata	Wiry Panic
Entolasia stricta	Wiry Panic
Eragrostis brownii	Brown's Love Grass*
Geranium homeanum	Northern Cranesbill
Goodenia ovata	Hop Goodenia
Hydrocotyle peduncularis	Pennywort
Hypolepis muelleri	Harsh Ground Fern
Juncus usitatus	Common Rush
Lomandra longifolia	Spiny-headed Mat-rush
Microlaena stipoides	Weeping Grass
Opercularia aspera	Coarse Stinkweed
Oplismenus aemulus	Basket Grass
Oplismenus imbecillis	Basket Grass
Pellaea falcata	Sickle Fern
Peperomia blanda var. *floribunda*	
Plectranthus parviflorus	Cockspur Flower
Pratia purpurascens	White Root
Pteridium esculentum	Bracken Fern
Ranunculus lappaceus	Common Buttercup
Pteridium esculentum	Common Bracken
Pteris tremula	Tender Brake
Pyrrosia rupestris	Rock Felt-fern
Stellaria flaccida	
Veronica plebeia	Trailing Speedwell

Viola hederacea	Ivy-leaved Violet
Wahlenbergia gracilis	Australian Bluebell

Climbers:

Aphanopetalum resinosum	Gum vine
Cayratia clematidea	Slender Grape
Cissus antarctica	Water Vine
Cissus hypoglauca	Water Vine
Clematis glycinoides	Old Man's Beard
Desmodium varians	Tick-trefoil
Eustrephus latifolius	Wombat Berry
Geitonoplesium cymosum	Scrambling Lily
Glycine tabacina	Love Creeper
Maclura cochinchinensis	Cockspur Thorn
Morinda jasminoides	Morinda
Pandorea pandorana	Wonga Wonga Vine
Parsonsia straminea	Common Silkpod
Rubus moluccanus var. *trilobus*	Molucca Bramble
Rubus parvifolius	Native Raspberry*
Smilax australis	Austral Sarsaparilla
Stephania japonica	Snake Vine
Tylophora barbata	Bearded Tylophora

Shallow-water and semi-aquatics:

Cyperus difformis	Sedge
Eleocharis equisetina	Tall Spike-rush*
Eleocharis sphacelata	Tall Spike-rush
Juncus kraussii ssp. *australiensis*	Sea Rush
Juncus prismatocarpus	
Ludwigia peploides subsp. *montevidensis*	Water Primrose*
Lycopus australis	Australian Gypsywort
Paspalum distichum	Water Couch
Persicaria decipiens	Slender Knotweed
Persicaria hydropiper	Water Pepper
Persicaria lapathifolia	Pale Knotweed*
Persicaria orientalis	Princes Feathers*
Persicaria praetermissa	*
Persicaria strigosa	Spotted Knotweed*
Persicaria subsessilis	Bristly Knotweed*
Phragmites australis	Common Reed
Pseudoraphis spinescens	Mud Grass
Ranunculus inundatus	River Buttercup

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Appendix VI:

Schedule of Cultivated Plants and Exotic Weed Species

The following schedule includes cultivated generic native plants and exotic weed species recorded in Holmes Drive Reserve by Noel Ruting, Director of LandArc during site investigations (2012-13).

NOTE:
* Noxious and transformer weed species (see *Table 6: Noxious Weed Species*).

Botanic Name	Common Name
Canopy species:	
Acer negundo	Box Elder
Cinnamomum camphora	Camphor Laurel*
Corymbia citriodora	Lemon-scented Gum
Cupressus macrocarpa	Monterey Cypress
Eucalyptus microcorys	Tallowwood
Erythrina X sykesii	Coral Tree
Ficus microcarpa var. *hillii*	Hill's Weeping Fig
Fraxinus angustifolia 'Raywood'	Claret Ash
Jacaranda mimosifolia	Jacaranda
Liquidambar styraciflua	Liquidambar
Lophostemon confertus	Brush Box
Salix nigra/ agg.spp.	Black Willow*
Salix fragilis	Crack Willow*
Salix matsudana X alba	New Zealand Hybrid Willow*
Small trees/ palms and shrubs	
Prunus cerasifera 'Nigra'	Purple-leaved Cherry-plum
Senna pendula var. *glabrata*	Cassia
Solanum nigrum	Black-berry Nightshade
Syagrus romanzoffiana	Queen Palm
Nerium oleander	Oleander
Cestrum parqui	Green Cestrum*
Cotoneaster glaucophyllus	Cotoneaster
Lantana camara	Lantana*
Ligustrum lucidum	Large-leaved Privet*
Ligustrum sinensis	Small-leaved Privet*
Ochna serrulata	Mickey Mouse Bush
Olea europaea subsp. *cuspidata*	Wild Olive*
Pavonia hastata	

Ricinus communis	Castor Oil Plant
Rubus fruticosus agg.	Blackberry*
Sida rhombifolia	Paddy's Lucerne
Solanum mauritianum	Wild Tobacco Tree

Ground stratum:

Ageratina adenophora	Crofton Weed*
Ageratina riparia	Crofton Weed*
Andropogon virginicus	Whiskey Grass
Avena sativa	Oats
Bidens pilosa	Cobbler's Peg
Brassica rapa	Field Mustard
Briza maxima	Quaking Grass
Briza minor	Shivery Grass
Bromus catharticus	Prairie Grass
Bromus diandrus	Prairie Grass
Cerastium glomeratum	Chick Weed
Chloris gayana	Rhodes Grass
Cirsium vulgare	Spear Thistle
Conyza bonariensis	Fleabane
Cynodon dactylon	Common Couch
Digitaria sanguinalis	Summer Grass
Echinochloa crus-galli	Barnyard Grass
Ehrharta erecta	Panic Veldtgrass
Eragrostis curvula	African Love Grass
Foeniculum vulgare	Fennel
Fumaria spp.	Fumitory*
Hypochoeris radicata	Catsear
Paspalum dilatatum	Paspalum
Paspalum urvillei	Tall Paspalum
Pennisetum clandestinum	Kikuyu Grass
Phalaris minor	Lesser Canary Grass
Plantago lanceolata	Lamb's Tongue
Poa annua	Winter Grass
Raphanus raphanistrum	Wild Radish
Setaria palmifolia	Palm Grass
Soliva sessilis	Bindyi
Sporobolus indicus	Parramatta Grass
Stenotaphrum secundatum	Buffalo Grass
Tagetes minuta	Stinking Roger
Taraxacum officinale	Dandelion
Tradescantia fluminensis	Trad*
Trifolium repens	White Clover
Verbena officinalis	Verbena

Climbers:

Acetosa sagittata	Turkey Rhubarb*
Anredera cordifolia	Madeira Vine*
Araujia sericiflora	Moth Vine*
Asparagus asparagoides	Bridal Creeper*
Cardiospermum grandiflorum	Balloon Vine*
Ipomoea indica	Morning Glory*

Shallow-water and semi-aquatics:

Alternanthera philoxeroides	Alligator Weed*
Cyperus eragrostis	Umbrella Sedge
Ludwigia peruviana	Ludwigia*

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