Report to:

Johnson Property Group

Aquatic Habitat Survey

Boat Ramp at Pitt Town Residential Precinct

29 November 2007

Report Number: 36/0708

Report prepared by:

The Ecology Lab Pty Ltd

4 Green Street, Brookvale, NSW 2100

Phone: (02) 9907-4440; Fax: (02) 9907-4446

E-mail: eprojects@theecologylab.com.au

The Ecology Lab Pty Ltd

Marine and Freshwater Studies

TABLE OF CONTENTS

1.0 INTRODUCTION

The Ecology Lab Pty Ltd has been engaged by Johnson Property Group to provide an aquatic habitat survey in the vicinity of the proposed boat ramp upgrade at Pitt Town. The existing boat ramp to be upgraded, located on the Hawkesbury River at the end of Punt Road, is an unformed, single lane boat ramp (Figures 1 – 2 and Plate 1). The proposed upgrade will replace the gravel and dirt road and boat ramp with a bitumen road leading onto precast concrete panels (typically 5 m in length each and supported by concrete piles) and extending into the river with precast concrete planks connected by stainless steel shackles. The exact design and specifications for the boat ramp are yet to be finalised, however, there is no plan to alter the width or location of the existing boat ramp. In association with this boat ramp upgrade, an area of grassland on the eastern side of Punt Road would be cleared to provide car and trailer parking along with future landscape work (Plate 1b). This part of the proposed works is outside the scope of this survey, and a stormwater management plan has already been prepared in conjunction with this.

Under the *Fisheries Management Act* 1994 there are requirements for the protection of the aquatic environment, including threatened or vulnerable aquatic vegetation. Macrophytes and algae are adapted to live in shallow, slow flowing waters and wetlands. They fulfil an array of ecological processes, including primary productivity, uptake of nutrients, provision of habitat and consolidation of sediments. Under the *Fisheries Management Act* it is an offence to remove or harm certain types of aquatic and riparian vegetation and a permit is required for this intent (Smith and Pollard, 1999).

The overall scope of this report is to provide information on the aquatic ecology and legislative requirements which would assist in planning for the proposal. More specifically, it aims to:

- Provide a review of existing information on the aquatic ecology of the survey area.
- Identify aquatic species and communities in the survey area with conservation significance and where required, provide an assessment of the proposal in relation to NSW Fisheries policy and guidelines, the *NSW Fisheries Management Act 1994*, *Threatened Species Conservation Act 1995* and the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999.*
- Provide a broad description of the riparian and aquatic habitats and species present
- Identify aquatic macrophyte species present and estimate the density and position in relation to the proposed works
- Identify possible impacts that may occur as a result of the construction of the proposed viewing platform upon aquatic vegetation. The significance of any such impacts will be assessed, and measures to mitigate these impacts will be recommended.

2.0 REVIEW OF EXISTING INFORMATION

2.1 Physical Setting

The Hawkesbury River is NSW's largest estuary, stretching from the river's mouth at Broken Bay upstream 145 km to Richmond. The estuary is a major economic and recreational

resource for Sydney - it supports the state's second largest commercial estuarine trawl industry and is home to a major oyster industry. The region also supports considerable agriculture and tourism activities such as recreational boating and fishing (Hawkesbury Nepean Catchment Management Authority, HNCMA 2007).

2.2 Water Quality

Pitt Town is located along York Reach, in the Hawkesbury River subcatchment, approximately 6 km downstream from Windsor. This subcatchment lies on the agricultural and peri-urban fringe of urbanised North Western Sydney in the Hawkesbury City Council LGA and is under threat from a multitude of land use impacts. The river receives highly reduced flows due to extensive upstream impoundment for Sydney's drinking water. Licensed surface water extraction from this subcatchment is also high, supporting the most intensive and productive agricultural operations in the Sydney basin. The floodplains and riverbanks have been largely cleared for agriculture and recreational use, and riverbank erosion is a serious issue causing high levels of turbidity. There are a number of major Sewerage Treatment Plants discharging into the Hawkesbury River subcatchment which impact on water quality and flow. The subcatchment has an extremely high social and economic value supporting significant agriculture, recreation and tourism industries, and there is a very high level of community based environment activity (HNCMA 2007).

In September 2001 Hawkesbury City Council commissioned Connell Wagner to prepare a Draft Local Environmental Study (LES) for the Pitt Town area (Connell Wagner 2003). The need for the Draft LES arose out of a process the Council commenced in 1997 to assess future residential options for the Hawkesbury Local Government Area. The key water quality issues of concern identified within this LES were algal blooms in this area of the river. The causes were indicated to be due to poor flushing of the river and high continuous nutrient inputs from upstream sources such as South Creek and to a lesser extent Cattai Creek.

2.3 Aquatic Habitats

The HNCMA management recommendations, for the reach that Pitt Town is located within, document threats including:

- Removal/replacement of exotic riparian vegetation
- Management of aquatic weeds
- Encourage adoption of sustainable land management practices in riparian lands
- Manage human impacts at public recreation river access points
- Water flow management and nutrient management

The influx of invasive weeds in aquatic systems has detrimental effects on the ecology and functioning of these systems, and is a significant consideration in the management of waterways. Major aquatic weeds recorded in the Hawkesbury include Salvinia, Water Hyacinth, Ludwigia, Alligator weed and Dense Waterweed (Sainty and Jacobs 1981; Roberts et al. 1999; HNCMA 2003).

2.4 Threatened Species and Ecological Communities and Key Threatening Processes

There are provisions under both state and commonwealth legislation to ensure that the effects of proposed developments on threatened species, populations, communities and threatening processes are considered. The following legislation is relevant to the proposed boat ramp upgrade; *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*), *Threatened Species Conservation Act 1995* (*TSC Act*), *Fisheries Management Act 1994* (*FM Act*) and the *Fisheries Management Amendment Act 1997* (*FMA Act*). Threatened species, populations, ecological communities and key threatening processes listed in these legislative documents that are likely to occur in the vicinity of the study area, are identified and described in the subsequent sections.

2.4.1 Threatened Species and Ecological Communities

Database searches of 'BioNet' (27 November 2007), Commonwealth Protected Matters (27 November 2007) and previous searches done by Connell Wagner (2003) indicated two threatened amphibians: the Giant Burrowing Frog (*Heleioporus australiacus*) and the Red-crowned Toadlet (*Pseudophryne australis*). Both species are associated with vegetation of the Hawkesbury Sandstone formation in the local area, however, as the survey area occurs on alluvial and clayey soils, it is considered unlikely that these species have any potential habitat in the survey area.

2.4.2 Key Threatening Processes

There are two key threatening processes listed under Schedule 6 of the FM Act (1994) which are relevant to the development proposal and require consideration:

- The removal of large woody debris (snags);
- The degradation of native vegetation along New South Wales water courses;

Removal of Large Woody Debris

Large woody debris plays an important role in freshwater ecosystems by providing essential habitat for aquatic organisms. For fish, they provide refuge from predation and a resting place away from the main flow of the waterway. It is also thought that large logs and branches act as home range markers for some migratory species (NSW DPI, 2005a). In-stream woody debris also provide habitat for a number of plants, algae, micro-organisms and invertebrates. It is therefore highly recommended that during the construction phase of the boat ramp, efforts should be made to reduce impacts of this key threatening process by adhering to the Policy and Guidelines for Aquatic Habitat Management and Fish Conservation (Smith and Pollard 1999), regarding the removal of large woody debris. These guidelines advise that large woody debris should be retained to the greatest extent possible, or to relocate the snag to another location within the stream rather than removal.

Degradation of Native Vegetation

Riparian habitats include the zone of land immediately adjacent to creeks and rivers and form an important part of healthy ecosystem functioning (DPI, 2005b). Degradation of riparian vegetation is caused by the complete removal or modification of native trees and plants. Suggested measures to mitigate for potential impacts on the riparian zone are as follows:

- Health of existing native vegetation should be encouraged by the recruitment of juvenile trees and shrubs with the incorporation of weed control;
- Areas where little or no vegetation remains should be rehabilitated by replanting of native species or by natural regeneration;
- At areas where exotic vegetation is found (such as Privet and Willow) vegetation should be replaced with native species.

3.0 SURVEY METHODS

The study site was visited at 14:30 on 26 November 2007. At the time of the survey, weather conditions were hot and overcast with minimal breeze.

The study site included the area of the proposed boat ramp upgrade and extended a further 20m in both directions up and downstream (see Figure 2). The riparian vegetation survey was conducted from the riverbank and macrophytes were identified and assessed instream using a viewing tube. Macrophytes not readily identifiable in the field were collected and identified using the relevant literature (Sainty & Jacobs, 1981). Photos of each habitat and species were taken and species of riparian and aquatic vegetation observed were recorded.

4.0 RESULTS

The access road to the boat ramp (Punt Road) consisted of loose gravel and dirt, with the edge of the unformed boat ramp at the water's edge consisting of a mixture of loose gravel and broken chunks of concrete (Plate 1). There is space for one car/trailer to park on a grassy and dirt verge, just off to the upstream side of the boat ramp (Plate 1c). Approximately 20 m upstream of the ramp is the mouth of a creek called Bardenerang Gully that is fed by Pitt Town Lagoon, located 2 km south of the river (Figure 2 and Plate 1d). The creek and its banks are located such that they should not be adversely impacted by the construction and operation of the new boat ramp.

The riparian zone within the survey area consisted mainly of soils dominated by sand and silt, covered with grasses and weeds, dropping steeply off into the river. Minimal riparian flora was observed, with common couch grass (*Cynodon dactylon* - which is regarded as an Australian native and is widely planted as a lawn grass) the dominant flora both up and downstream of the ramp (Plates 2 and 3). In addition, upstream of the ramp there were small patches of weeds including lantana (*Lantana camara*) amongst the grass and several privet trees (*Ligustrum* sp.; Plate 2*)* at the river's edge and in the creek. A weeping willow (*Salix babylonica*) and ferns were also located along the creek.

In-stream habitat consisted of moderately sloping silt and sandy banks, dropping into a broad river channel greater than 100 m wide. The turbidity of the river at the time of the survey was relatively high – this may have been due to recent rains in the preceding week. Aquatic vegetation in the survey area was minimal. Several small patches (< 0.5 m^2) of the introduced Elodea (*Elodea canadensis*) were present close to shore between the ramp and the creek (Plate 2d). Three small patches of the native Common Rush (*Juncus usitatus)* were observed in the creek and a single small patch (approximately 0.5 m^2) was observed just on the upstream side of the ramp (indicated by red arrow in Plate 2a-b). The native Common Reed (*Phragmites australis*) was observed in a small area of the creek (approximately 1.5 m^2). A fallen dead tree (located approximately 3 m upstream of the ramp; Plate 2) and a dead log

(located 1 m downstream of the ramp; Plate 3), provided an in-stream timber snag. There were very few other timber snags along this area of the river's edge.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The riparian vegetation within the survey area consisted mainly of exotic grass and weeds (privets and lantana) and dropped off steeply into the river. Bank erosion was minimal due to the extensive cover of couch grass down to the river's edge. Minimal in-stream aquatic vegetation was present and only located upstream of the boat ramp. The aquatic vegetation included small patches of the introduced plant Elodea, and small patches of Common Rush and Reed. Two dead timber snags were present on either side of the boat ramp.

At present, due to the nature of the un-sealed road and dirt car-parking alcove, there is a potential for sedimentation in the immediate vicinity of the river due to run-off and erosion of the boat ramp edge due to car and trailer activities. However, this area of the Hawkesbury River is prone to high turbidity levels anyway (see section 2.2).

The following are potential impacts that may occur as a result of both the construction and operation of the new boat ramp on the Hawkesbury River.

5.1 Impacts from Construction of Upgraded Boat Ramp

The placement of structures on the riverbank and riverbed (piles and concrete panels/planks) would result in mobilisation of sediments at the banks and in-stream, along with removal of riparian vegetation and potential damage to nearby aquatic vegetation and timber snags.

Recommendations for mitigation of impacts

i. Sediment control devices including silt fencing along the bank, and silt curtains within the river, should be utilised during construction to prevent runoff causing increased turbidity and smothering of aquatic habitat. Given the implementation of these mitigating measures, it is likely that water quality issues during the construction phase will be short term and relatively localised.

ii. Invasive weeds surrounding the boat ramp should be removed prior to construction to prevent increased dispersal.

iii. Following completion of the proposed works, revegetation of the riparian zone with native species in accordance with the HNCMA management plan would act to provide stabilisation of the bank and instream substrate, preventing erosion and providing improved habitat.

iv. Construction workers should be made aware of the position of the nearby common reeds, 1 metre upstream of the boat ramp, so as to reduce potential damage to these plants.

v. Where possible, the movement of the two existing dead timber snags (a key threatening process) should be avoided. If this cannot be avoided, then snags should be moved a small distance along the bank and placed the same distance off the bank.

5.2 Impacts in Relation to the Ongoing Operation of the Boat Ramp

The ongoing operation of the new boat ramp has the potential to increase run-off into the river from the increase in area of hard and paved surfaces. At present there are no stormwater or run-off controls in place at the unformed boat ramp.

Recommendations for mitigation of impacts

i. A stormwater management plan (SMP) should be put into place. A preliminary SMP has been undertaken that includes the installation of a collection grate, between the car park and the start of the boat ramp, which would feed into a Gross Pollutant Trap adjacent to the road and then be piped overground into the river once coarse pollutants are trapped and removed. An SMP has already been developed for the car and trailer parking area.

Overall, the impacts on the aquatic and riparian habitats and vegetation from the construction and use of an upgraded boat ramp on Punt Road, Pitt Town are expected to be minimal, temporary and not likely to cause any significant harm. As there is an existing boat ramp at the site that is regularly used, the riparian zone is already fragmented, so the upgrade of the boat ramp will not increase the fragmented area. The majority of the riparian zone consists of exotic grasses and weeds and should be re-planted with native vegetation post construction. There is very minimal in-stream aquatic vegetation in the survey area, but the rushes and reeds that are there, just upstream of the boat ramp, should not be harmed if possible. Similarly, the dead timber snags that provide habitat for aquatic invertebrates and fish, should remain in place or be moved only a short distance away to a similar habitat. It is considered that no further monitoring is necessary following construction of the proposed structure.

6.0 ACKNOWLEDGMENTS

This report was written by Rick Johnson and reviewed by Kate Reeds. Rick Johnson and Kate Reeds conducted the field work.

7.0 REFERENCES

Connell Wagner Pty Ltd (2003). Hawkesbury City Council – Pitt Town Local Environment Study, April 2003.

Gregg, W.W. & Rose, F.L. (1982) The effects of aquatic macrophytes on the stream microenvironment. *Aquatic Botany*. **14**, 309-324.

Hawkesbury Nepean Catchment Management Authority (2007). Available from http://www.hn.cma.nsw.gov.au/topics/2041.html

NSW Department of Primary Industries. (2005a) Pimefacts 11. Removal of large woody debris from NSW rivers and streams.

NSW Department of Primary Industries. (2005b) Pimefacts 12. Degradation of native riparian vegetation along NSW water courses.

Riding, T. (1992). *NSW State Rivers and Estuaries Policy. Environmental Indicators - a Literature Review*, State of the Rivers and Estuaries, Dept of Water Resources, NSW.

Roberts, D.E., Church, A.G. and Cummins, S.P. (1999) Invasion of Egeria into the Hawkesbury-Nepean River, Australia. *Journal of Aquatic Plant Management*. **37**, 31-34.

Sainty, G.R. and Jacobs, S.W.L. (1981). *Waterplants of New South Wales*. Water Resources Commission NSW, Sydney, Australia, 550 pp. (Filed in Book Section of TEL Library)

Smith, A. K. and Pollard, D. A. (1999). *Policy and Guidelines Aquatic Habitat Management and Fish Conservation: 1999 Update.* Policy and Guidelines Aquatic Habitat Management and Fish Conservation , 1999 Update. NSW Fisheries, Port Stephens Research Centre.

Web Reference 1. NSW government combined agency biological search database (Bionet). Accessed 27/11/07. http://www.bionet.nsw.gov.au

Web Reference 2: Department of Environment and Conservation, National Parks and Wildlife website, Key Threatening Processes/Threat Abatement Plan. Accessed 17/11/2007. http://www.nationalparks.nsw.gov.au/npws.nsf/Content/Key+threatening+processes+by+doctype

FIGURES

Figure 1. Aerial image of Pitt Town and surrounding areas and geographic features (source: GoogleEarth).

Figure 2. Aerial image of Pitt Town boat ramp and surrounding areas, with survey area indicated by a blue dotted line (source: GoogleEarth)

PLATES

Plate 1. (a.) existing unformed boat ramp on Punt Road, Pitt Town; (b.) unsealed Punt Road leading down to the existing boat ramp (with area to be levelled for future car park at left); (c.) eroded edge of boat ramp along with dirt alcove used currently for trailer parking; (d.) creek (Bardenerang Gully) located approximately 20 m upstream of the boat ramp.

Plate 2. (a.) riparian and aquatic vegetation on the upstream side of the boat ramp – the position of the Common Rush (*Juncus usitatus*) is indicated by a red arrow; (b.) close up of same patch of common rush (red arrow) just out from the boulder (timber snag can be seen in background); (c.) privet trees and timber snag on upstream side of the ramp; (d.) small patch of aquatic vegetation *(Elodea*) upstream of the ramp.

Plate 3. (a.) riparian vegetation and dead log timber snag on the downstream side of the boat ramp; (b.) steep bank edge covered in couch grass on the downstream side of the ramp.

a.

b.

c.

d.

Plate 1. (a.) existing unformed boat ramp on Punt Road, Pitt Town; (b.) unsealed Punt Road leading down to the existing boat ramp (with area to be levelled for future car park at left); (c.) eroded edge of boat ramp along with dirt alcove used currently for trailer parking; (d.) creek (Bardenerang Gully) located approximately 20 m upstream of the boat ramp.

a.

b.

c.

d.

Plate 2. (a.) riparian and aquatic vegetation on the upstream side of the boat ramp – the position of the Common Rush (*Juncus usitatus*) is indicated by a red arrow; (b.) close up of same patch of common rush (red arrow) just out from the boulder (timber snag can be seen in background); (c.) privet trees and timber snag on upstream side of the ramp; (d.) small patch of aquatic vegetation (*Elodea*) upstream of the ramp.

a.

b.

Plate 3. (a.) riparian vegetation and dead log timber snag on the downstream side of the boat ramp; (b.) steep bank edge covered in couch grass on the downstream side of the ramp.