In the matter of Casey Planning Scheme Amendment C228 (Amendment)

Minta Farm Precinct Structure Plan

Permit Application No PlnA00384/17

Planning Panels Victoria

Expert Witness Statement of Ian John Smales

1 Name and address

Ian John Smales
Biosis Pty. Ltd.
38 Bertie St.
Port Melbourne
Vic. 3207

2 Area of expertise

(a) I hold the degree of Master of Science from the University of Melbourne. My Masters dissertation was on the demography of a critically endangered bird, the Helmeted Honeyeater.

(b) I hold the position of Principal Zoologist with Biosis Pty. Ltd. Since 1978 I have been professionally engaged in management, research and assessment of south-eastern Australia's fauna. This has included completion of multiple investigations of amphibians, reptiles and birds. I have substantial experience in the ecological requirements of those groups. I have authored numerous consultant reports, including flora and fauna assessments, Environment Effects Statements, targeted fauna surveys, significance assessments and species management plans.

(c) My qualifications and experience are detailed in Annexure A.

3 Significant contributors

Biosis Senior Zoologist, Daniel Gilmore, prepared advice to Alluvium Consulting with regard to biodiversity values within Minta Farm PSP. The advice was provided to assist Alluvium in development of drainage assets in a manner that would maintain and, where possible enhance ecological values for key species. His advice was set out in a letter report to Mr Jonathon Mclean dated 20 November 2017. Mr Gilmore's expertise is as follows:

(a) He holds the degree of Batchelor of Conservation Ecology from Deakin University.

(b) He holds the position of Senior Zoologist with Biosis Pty. Ltd. Daniel has specialised in the ecology, conservation and management of the vertebrate fauna of south-eastern Australia. He has authored numerous consultant reports, including flora and fauna assessments, Environment Effects Statements, targeted fauna surveys, significance assessments and species management plans.

4 Scope

4.1 Instructions

I have been asked by Harwood Andrews, acting for the Victorian Planning Authority, to prepare this witness statement and to:

(a) Provide a summary, and include an annexure, of the ecological assessment completed that has facilitated the concept drainage options for the exhibited Minta Farm PSP area; and

(b) Consider the submissions made to the Amendment including any drainage and environmental assets of the Minta City Proposal. Copies of submissions were included in the brief to me, as well as summary tables prepared by the VPA in respect of the submissions.

5 Findings

5.1 Summary of opinions

Advice to Alluvium Consulting is contained in a letter report (Biosis report) dated 20 November 2017, addressed to Mr Jonathon Mclean. It is titled *Input into the Minta Farm Drainage Strategy*. A copy of the letter report is provided as an annexure to my statement. I adopt that letter report as the basis for my expert witness statement.

The primary biodiversity values of the site are within a zone along Cardinia Creek and adjacent artificial wetlands. This zone will be subject to some works for the purposes of improved drainage and surface water management. Nonetheless, design options will permit the retention or enhancement of the majority of habitat for significant species.

The most important values are the Dwarf Galaxias and Growling Grass Frog, both of which are listed as vulnerable under provisions of the *Environment Protection and Biodiversity Conservation Act* (1999) (EPBC Act) for threatened species; and Latham's Snipe which is listed under provisions of the EPBC Act for migratory species. Other values are a number of species of waterbirds that are listed as threatened under the *Flora and Fauna Guarantee Act* (1988) and/or on the *Advisory List of Threatened Vertebrate Fauna in Victoria* (DSE 2013).

The Biosis report lists areas within the Minta Farm PSP that provide high habitat values and those that are of lower quality. The high habitat value areas are all associated with wetlands, and are principally concentrated on Cardinia Creek and ponds in its immediate environs.

The Biosis report also makes recommendations for retention and enhancement of native vegetation and habitat values for key species or groups of species identified within the PSP. The recommendations offer principles and some specific guidance for management of wetlands intended to retain and enhance identified ecological values.

5.2 Review of submissions

I have reviewed submissions that were provided to me.

A small number of the submissions mention their general interest in retention of 'green' space and trees but not significant biodiversity values addressed by the advice of the Biosis report.

A submission from DELWP notes the importance of Cardinia Creek and adjacent Swamp Scrub as habitat for Dwarf Galaxias and Growling Grass Frog. The advice of the Biosis report related to management of wetlands is in overall agreement with the principles outlined in the DELWP submission.

6 Declaration

I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have to my knowledge been withheld from the Panel.

4th April 2018

Annexure A - Curriculum Vitae of Ian John Smales

Position

Principal Zoologist, Biosis Pty. Ltd.

Qualifications

MSc. University of Melbourne

Professional associations

Member: IUCN Species Survival Commission, Re-Introduction Specialist Group

Member: Australian Society of Herpetologists

Member: Helmeted Honeyeater National Recovery Team (1989 -)

Honorary Life Member: Friends of the Helmeted Honeyeater (bestowed 2015)

Past Member: Orange-bellied Parrot National Recovery Team (1994 – 2003)

Past Member: International Wader Study Group

Past member: Scientific Advisory Panel to the South-West Victoria Brolga Research Project

Employment history

2013–present	Principal Zoologist, Biosis Pty Ltd
2003–2013	Senior Consultant Zoologist, Biosis Research Pty Ltd
1990–2003	Conservation Biologist, Conservation and Research Department, Zoological Parks and Gardens Board of Victoria
1989	Contractor to Department of Conservation and Environment, Victoria for establishment of Recovery Team for the Helmeted Honeyeater.
1978–1987	Fisheries and Wildlife Division, Victoria (subsequently Department of Conservation, Forests and Lands).

Professional Experience:

Ian Smales, Principal Zoologist with Biosis Pty Ltd has over thirty years of professional experience in wildlife research and natural resource management with the public and non-government sectors. He has been with Biosis since 2003. Ian has broad field expertise investigating the ecology, distribution and habitat requirements of Australian vertebrate fauna and has undertaken comprehensive research projects for birds and reptiles. Ian has authored or co-authored more than eighty scientific papers and consultant reports in those fields.

Ian's career has included periods with the Wildlife Management Section of Victoria's former Fisheries and Wildlife Division (1978 - 87) and as Conservation Biologist with the Zoological Parks and Gardens Board of Victoria (1990 – 2003). He has been involved with research and management for threatened fauna throughout his career and has been a long-standing member of the national recovery teams for the Helmeted Honeyeater and the Orange-bellied Parrot.

Ian has designed and managed numerous flora and fauna assessments for multiple development projects including a number of major Government infrastructure projects.

Publications

Smales, I. 2017.Modelling collision risk *and populations.* Chapter 3 in M. Perrow (ed) Wildlife and Wind Farms: conflicts and solutions. Pelagic Publishing. UK.

Smales, I. 2014. Fauna Collisions with Wind Turbines: Effects and Impacts, Individuals and Populations. What Are We Trying to Assess? Pp 23 – 40 in Hull, C., Bennett, E., Stark, E., Smales, I., Lau, J. & Venosta, M. (eds) *Wind and Wildlife: Proceedings from the Conference on Wind Energy and Wildlife Impacts, October 2012,Melbourne, Australia.* Springer Dordrecht.

Pavlova, A., Selwood, P. Harrisson, K.A., Murray, N., Quin, B., Menkhorst, P., **Smales, I**. and Sunnucks, P. 2014. Integrating phylogeography and morphometrics to assess conservation merits and inform conservation strategies for an endangered subspecies of a common bird species. *Biological Conservation* 174: 136–146.

Smales, I., Muir, S., Meredith, C. & Baird, R. 2013. A description of the Biosis model to assess risk of bird collisions with wind turbines. *Wildlife Society Bulletin* 37(1): 59–65

Smales, I., Quin, B., Menkhorst, P. & Franklin, D. 2009. Demography of the Helmeted Honeyeater (*Lichenostomus melanops cassidix*) *Emu* 109: 352–359.

Chambers, L., Quin, B., Menkhorst, P., Franklin, D., & **Smales, I.** 2008. The effects of climate on breeding in the Helmeted Honeyeater. *Emu* 108: 15–22.

McCarthy, M. A., Menkhorst, P. W., Quin, B. R., **Smales, I.** J. & Burgman, M. A. 2004. Helmeted Honeyeater (*Lichenostomus melanops cassidix*) in southern Australia – Assessing options for establishing a new wild population. Pp 410 – 420 In H. R. Akçakaya, M. A. Burgman, O. Kindvall, C.C. Wood, P. Sjögren-Gulve, J. S. Hatfield & M. A. McCarthy (eds) *Species Conservation and Management*. Oxford University Press, Oxford.

Smales, I., Brown, P., Menkhorst, P., Holdsworth, M. and Holz, P. 2000. Contribution of captive management of Orange-bellied Parrots *Neophema chrysogaster* to the recovery programme for the species in Australia. *International Zoo Yearbook* 37: 171-178

Smales, I., Holdsworth, M., Menkhorst, P., Starks, J. & Brown, P. 2000: Re-introduction of orange-bellied parrots, Australia. *Re-introduction News: Newsletter of the Re-introduction Specialist Group of the IUCN's Species Survival Commission*. 19: 32-34.

Smales, I., Quin, B., Krake, D., Dobrozczyk, D. & Menkhorst, P. 2000. Re-introduction of helmeted honeyeaters, Australia. *Re-introduction News: Newsletter of the Re-introduction Specialist Group of the IUCN's Species Survival Commission*. 19: 34 – 36.

Franklin, D., **Smales, I.**, Quin, B. and Menkhorst, P. 2000. Age and sex characteristics of the Helmeted Honeyeater *Lichenostomus melanops cassidix* in the hand. *Corella* 24(3): 30 - 35

Franklin, D., **Smales, I.**, Quin, B. and Menkhorst, P. 1999. The annual cycle of the Helmeted Honeyeater *Lichenostomus melanops cassidix*, a sedentary inhabitant of a predictable environment. *Ibis*. 141: 256-268

Smales, I., Quin, B., Krake, D., Dobrozczyk, D., & Menkhorst, P. 1999. Completing the cycle: reintroduction to the wild of captive-bred Helmeted Honeyeaters *Lichenostomus melanops cassidix*. In: Mann, A. & Phelps, G. (eds) ARAZPA/ASZK 1999 Conference Proceedings "*Getting the Message Across - Communication for Conservation*" Alice Springs, Australia: Parks and Wildlife Commission of the Northern Territory

Menkhorst, P., **Smales, I.** and Quin, B. 1999. *Helmeted Honeyeater Recovery Plan 1998 – 2002*. Department of Natural Resources and Environment. Melbourne.

Smales, I., Menkhorst, P. & Horrocks, G. 1995. The Helmeted Honeyeater recovery program: a view of its organization and operation. Pp 35-44 in '*People and Nature Conservation: Perspectives on Conservation on Private Land and Endangered Species Recovery*'. Transactions of the Royal Zoological Society of New South Wales.

Franklin, D., **Smales, I.**, Miller, M. & Menkhorst, P. 1995. The reproductive biology of the Helmeted Honeyeater Lichenostomus melanops cassidix. *Wildlife Research* 22: 173-191.

Smales, I., Miller, M., Middleton, D. & Franklin, D. 1992. Establishment of a captive-breeding programme for Helmeted Honeyeaters *Lichenostomus melanops cassidix*. *International Zoo Yearbook* 31: 57-63.

Smales, I. J., Craig, S. A., Williams, G. A. & Dunn, R. W. 1990. The Helmeted Honeyeater: decline, conservation and recent initiatives for recovery. Pp. 225-238 in *Management and Conservation of Small Populations*. Eds T.W. Clark & J.H. Seebeck. Chicago Zoological Society, Chicago.

Smales, I. J. 1988. *The status of the Helmeted Honeyeater Lichenostomus melanops cassidix (Gould) with recommendations for its continued conservation*. Department of Conservation, Forests and Lands, Dandenong.

Consultant reports

Smales, I. 2004. Avifauna Collision Risk Modelling for Stage 2 of the Lake Bonney Wind Farm, South Australia. Biosis Research Pty. Ltd (for Babcock & Brown Pty. Ltd.)

Smales, I. 2005. Modelled cumulative impacts on the Swift Parrot of wind farms across the species' range in south-eastern Australia. Biosis Research Pty. Ltd (for Australian Department of the Environment and Heritage)

Smales, I. 2005. Modelled cumulative impacts on the White-bellied Sea-eagle of wind farms across the species' Australian range. Biosis Research Pty. Ltd (for Australian Department of the Environment and Heritage)

Smales, I. 2006. Impacts of avian collisions with wind power turbines: an overview of the modelling of cumulative risks posed by multiple wind farms. Biosis Research Pty. Ltd (for Australian Department of the Environment and Heritage)

Smales, I. 2006. Bird utilisation studies at Musselroe Wind Farm site, Tasmania: Overview of three seasons 2005/06. Biosis Research Pty. Ltd. (for Hydro Tasmania Consulting).

Smales, I. 2006. Modelled collision risk for Wedge-tailed Eagles at Yaloak Wind Farm for four seasons 2006. Biosis Research Pty. Ltd. (for Pacific Hydro Pty. Ltd.)

Smales, I. 2007. A review of collision risk modelling for Wedge-tailed Eagles at the Bluff Point Wind Farm, Tasmania. Biosis Research Pty. Ltd. (for Hydro Tasmania Consulting).

Smales, I. 2008. Assessment of marine mammals, birds and reptiles for the Victorian Desalination Project, Bass Coast, Victoria: Existing Conditions and Impact Assessment Report. Biosis Research Pty. Ltd (for GHD Pty. Ltd.)

Smales, I. 2009. Evaluating risk of Brolga collisions with powerlines for the proposed Dundonnell Wind Farm. Biosis Research Pty. Ltd (for Dundonnell Wind Farm Pty. Ltd.)

Smales, I. 2009. Modelled risk of Brolga collisions with turbines at the proposed Dundonnell Wind Farm. Biosis Research Pty. Ltd (for Dundonnell Wind Farm Pty. Ltd.)

Smales, I. 2010. Orange-bellied Parrot turbine collision risk assessment for Trial Harbour Wind Farm. Biosis Research Pty. Ltd (for Bass Energy Pty. Ltd.)

Smales, I. 2010. Orange-bellied Parrot turbine collision risk assessment for Granville Harbour Wind Farm. Biosis Research Pty. Ltd (for Bass Energy Pty. Ltd.)

Smales, I. & Dell, M. 2010. Flora and terrestrial fauna assessment of revised Collaby Hill Wind Farm. Biosis Research Pty. Ltd (for Origin Energy Pty. Ltd.)

Smales, I., Koehler, S., Venosta, M., Schnittler, N., Steer, R. & Bloink, C. 2008. Flora and Fauna Assessment: Desalination Project Desalination Plant Wonthaggi, Victoria: Existing Conditions and Impact Assessment. (for GHD Pty. Ltd.)

Smales, I., Meredith, C. & Koehler, S. 2007. Assessment of Matters of National Environmental Significance (EPBC Act) for the Victorian Desalination Project (for GHD Pty. Ltd.)

Smales, I., Meredith, C. & McCarthy, M. 2005. Stochastic modelling of the potential impacts on the Orange-bellied Parrot of a proposed wind farm at Heemskirk, Tasmania. Biosis Research Pty. Ltd. (for Hydro Electric Corporation)

Smales, I. & Muir, S. 2005. Modelled cumulative impacts on the Tasmanian Wedge-tailed Eagle of wind farms across the species' range. Biosis Research Pty. Ltd (for Australian Department of the Environment and Heritage)

Smales, I., Muir, S. & Meredith, C. 2005. Modelled cumulative impacts on the Orange-bellied Parrot of wind farms across the species' range in south-eastern Australia. Biosis Research Pty. Ltd (for Australian Department of the Environment and Heritage)

Smales, I. & Venosta, M. 2005. Risk level to select species listed under the EPBC Act, of collision at wind farms in Gippsland, Victoria. Biosis Research Pty. Ltd (for Australian Department of the Environment and Heritage)

Smales, I., Venosta, M. & Muir, S. 2009. Appendix D Birds and Bats *in* National Wind Farm Development Guidelines Public Consultation Draft (Environment Protection & Heritage Council, Commonwealth of Australia & all Australian States).

Garvey, N. & **Smales, I.** 2009. Wedge-tailed Eagle Turbine Collision Risk Modelling Yaloak South Wind Farm. Biosis Research Pty. Ltd. (for Pacific Hydro Pty. Ltd.)

Harvey, A. & **Smales, I.** 2008. Flora and terrestrial fauna assessment of the New Hotham Village Redevelopment, Victoria (for Ray Group Pty. Ltd.)

Miller, J., Koehler S, **Smales, I.**, Barnes N., Venosta M. & Brown L. 2005. Flora and fauna of the area proposed for the Long Term Containment Facility, Nowingi, Victoria: Existing Conditions Report. Biosis Research Pty. Ltd. (for Major Projects Victoria)

Miller, J. & **Smales, I.** 2005. Flora and fauna assessment of proposed extension to the Readymix quarry at Colac. Biosis Research Pty. Ltd. (for FOCUS - Creative Development Solutions)

Miller, J. & **Smales, I**. 2005. Flora & Fauna assessment of the proposed Huntly Landfill site, Huntly, Victoria. Biosis Research Pty. Ltd. (for City of Greater Bendigo)

Miller, J., **Smales, I.** & Koehler S. 2005. Flora and fauna of the area proposed for the Long Term Containment Facility, Nowingi, Victoria: Impact Assessment Report. Biosis Research Pty. Ltd. (for Major Projects Victoria)

Mueck, S., Gilmore, D., **Smales, I.** & Miller, J. 2005. Flora and terrestrial vertebrate fauna assessment of the proposed Wyndham Cove development site, Werribee South, Victoria. Biosis Research Pty. Ltd. (for Wyndham Cove Marina Pty. Ltd.)

Mueck, S. & **Smales,** I. 2004 Potential impacts on flora and fauna of a proposed landfill at Nyora, Victoria. Biosis Research Pty. Ltd. (for TGS Sands and Soil Pty. Ltd)

Mueck, S. & **Smales,** I. 2004 Flora and fauna of the Point Lonsdale Residential and Golf Course Development, Point Lonsdale, Victoria. Biosis Research Pty. Ltd. (for Stockland (Development) Pty Ltd)

Annexure B – Letter of advice from Biosis to Alluvium Consulting dated 20 November 2017

20 November 2017

Mr Jonathon Mclean
Alluvium Consulting
Level 1, 105-115 Dover St,
Cremorne Vic 3121

Dear Jonathon,

Re: Input into the Minta Farm Drainage Strategy

Project no. 25215

This report provides background information and guiding principles to inform the Minta Farm Development Services Strategy.

This information is intended to assist Alluvium in developing drainage assets within Minta Farm PSP in a manner which maintains and where possible enhances biodiversity values, particularly populations of Dwarf Galaxias (EPBC-listed migratory shorebirds, Growling Grass Frog and various species of threatened and notable waterbirds.

The information addresses Task 1.4 Ecological Function. A separate report will address Task 2.3 Ecological Response. The aim of this report is to;

- Provide background information on the biodiversity habitat values from existing information sources
- Undertake a site inspection to confirm values and identify ecological constraints and opportunities
- Identify areas that provide high quality habitat values or that could conceivably be modified to provide drainage assets that serve as potentially valuable wetland habitats for key species.
- Identify areas of low habitat value that may be suitable for remodelling to a stormwater treatment asset.

The information provided here is based on a review of available literature pertinent to the site, as outlined in the References and a site inspection conducted by Alluvium and Melbourne Water.

Ecological values

Native vegetation

The ecological values of the site are described in Practical Ecology (2011). Most of the PSP supports non-native vegetation of low ecological value. Native vegetation is mostly confined to the riparian area along Cardinia Creek. The predominant ecological vegetation class (EVC) is Swamp Scrub, which is dominated by Swamp Paperbark *Melaleuca ericafolia* and extensive areas of wetland EVCs and all these plant communities are listed as threatened in the Gippsland Plain bioregion. There are two wetlands (online dams west of Gum Scrub Creek that support native vegetation and provide waterbird habitat but these are not considered to have the conservation significance of the created wetlands adjacent to Cardinia Creek.

Waterbirds

The constructed wetland complex on Cardinia Creek is very high quality habitat for waterbirds and a number of threatened waterbirds have been recorded here including ducks (Blue-billed Duck, Australasian Shoveler, Musk Duck and Freckled Duck), and wading birds such as the Intermediate Egret, Great Egret and Royal Spoonbill. The large southern wetland (Pond 3) also supports breeding colonies of waterbirds including Little Pied Cormorant, Little Black Cormorant and Pied Cormorant as well as ibises and spoonbills. The wetlands also provide extensive habitat for frogs. Pond 3 is the most significant wetland for waterbirds within the PSP.

Dwarf Galaxias

Surveys conducted in Cardinia Creek on the eastern boundary of the site confirmed the presence of this threatened fish species (Biosis Research 2012). The record along an anabranch of Cardinia Creek at Minta Farm is a new site located 900m downstream of most of the existing records of the species and the habitat at this location is considered high quality breeding and drought refuge sites (Biosis Research 2012). Cardinia Creek is known to be nationally important habitat for Dwarf Galaxias and this been one of the reasons for the designation of the conservation area along Cardinia Creek in the Biodiversity Conservation Strategy (BCS (DEPI 2013b). Dwarf Galaxias have not been recorded in any of the existing constructed wetlands in Minta Farm (west of Cardinia Creek). The wetlands are likely to be infested with exotic predatory fish of various species and in their current form, may not provide high quality habitat for Dwarf Galaxias.

Growling Grass Frog

Under the BCS, Conservation Area 36 (Cardinia Creek) has been established to provide habitat for the nationally threatened Growling Grass Frog (DELWP 2017). Areas of Strategic Importance (ASI) for Growling Grass Frog have been identified through population modelling and expert elicitation. The areas of Strategic Importance have been identified so that critically important current and future (created) habitat for the species is protected from incompatible urban development. The existing wetland complex on the west side of Cardinia Creek in Minta Farm and Cardinia Creek itself are not identified as ASI within Conservation Area 36 but this area incorporates areas of "other terrestrial habitat" and "terrestrial habitat buffers to ASI and waterway" (Page 49 of the Growling Grass Frog Masterplan). Areas marked on the Masterplan mapping as "other terrestrial habitat" are generally the most suitable areas for urban infrastructure (Figure 1). However, ASI are identified within the PSP on the west side of Cardinia Creek.

Migratory species

Under the Biodiversity Conservation Strategy for Melbourne's Growth Corridors (DEPI 2013), there is a requirement for the protection of wetlands (and buffers around wetlands) known or likely to contain nationally important populations of migratory species. The Program Report for the Melbourne Strategic Assessment (REF) commits to conservation outcomes for migratory species as follows:

- A network of small and large conservation areas including a diversity of wetland areas managed for their migratory species and other wetland values, particularly in areas distant from urban development
- Improved management and design of retained and constructed wetlands to maximise habitat opportunities for migratory species
- Major new area of re-established wetlands managed for water quality mitigation and biodiversity conservation
- Improved water quality entering Port Phillip Bay Ramsar site
- Limited indirect disturbances (e.g. dogs) to identified wetlands.

The Minta Farm wetlands in the Minta Farm Precinct are considered likely to support nationally important populations of some migratory waterbirds (DEPI 2013). The importance of these wetlands for migratory bird species is based on a biodiversity report prepared for the Growth Areas Authority by Practical Ecology for C21 Business Park (Practical Ecology 2011). This report lists a number of migratory bird species that are either known or predicted to occur within the Minta Farm wetlands (Table 1). However, apart from Latham's Snipe, the majority of these species are in fact not listed as migratory species under the EPBC Act.

No other listed migratory waterbirds are known or considered likely to occur within the Minta Farm wetlands.

Unfortunately the errors in the Practical Ecology report have flowed on to the Melbourne Strategic Assessment team at the Department of Environment, Land, Water and Planning (DELWP) and this has driven migratory bird impact assessment requirements within the PSP for waterbird species that are in fact not migratory. Many of these species are nonetheless listed as threatened in Victoria under either the *Flora and Fauna Guarantee Act 1988* (FFG Act) and/or the DELWP Advisory List of threatened vertebrate fauna (DSE 2013). Biosis have advised the MSA team at DELWP these errors in relation to the mistaken significance of the PSP to migratory shorebirds (Hugh Stanford, pers. comm.) It was subsequently agreed that the only migratory shorebird species likely to use the site is Latham's Snipe (albeit not necessarily supporting an ecologically significant population) and that any Drainage Strategy should have regard to maintaining or improving habitat for Latham's Snipe. The MSA team also advised that the Strategy should have regard to the maintenance of recognised high quality waterbird foraging and breeding habitat, particularly the values identified in Pond 3.

Significance of Minta Farm to Latham's Snipe

To understand the significance of Minta Farm to migratory shorebirds, including Latham's Snipe, Biosis completed targeted surveys for them within the wetland complex and in the farm dams within the cropping areas (Wetlands A and B or Practical Ecology 2011). The surveys were carried out in accordance with the *EPBC Act Policy Statement 3.21- Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species* (Commonwealth of Australia 2017). Biosis undertook five targeted surveys for Latham's Snipe during both the migratory season (21 December 2011, 19 & 31 January 2012 and 14 February 2012) and non-migratory season (20 June 2012). No Latham's Snipe were recorded during survey. No other migratory shorebirds were recorded. Under Policy Statement, important Latham's Snipe is described as areas that have been previously identified as internationally important for the species, or areas that support at least 18 individuals of the species. Based on these results, is unlikely to meet the the minimum criteria for classification as Important Habitat for Latham's Snipe or any other migratory shorebird.

However, given that the species (number unknown) was recorded by Practical Ecology (2011), and given there are areas of suitable wetland habitat available, it is likely that small numbers use the site on occasion.

Table 1 Waterbird species listed as migratory by Practical Ecology (2011) known or considered likely to occur at Minta Farm

Species	Listed as migratory under the EPBC Act?*	Victorian Status	Likelihood of occurrence
Anas rhynchotis **Australasian Shoveler**	No	vu	Recorded at Minta Farm and the large, well-vegetated wetlands provide high quality habitat for the species.
Oxyura australis **Blue-billed Duck**	No	en,L	Recorded at Minta Farm and the large, well-vegetated wetlands provide high quality habitat for the species.

Species	Listed as migratory under the EPBC Act?*	Victorian Status	Likelihood of occurrence
Ardea modesta **Eastern Great Egret**	No	vu,L	Recorded at Minta Farm and all the wetlands provide high quality habitat for the species.
Aythya australis **Hardhead**	No	vu	Recorded at Minta Farm and the large, well-vegetated wetlands provide high quality habitat for the species.
Platalea regia **Royal Spoonbill**	No	nt	Recorded breeding at Minta Farm (Practical Ecology 2011).
Gallinago hardwickii Latham's Snipe	Yes	nt	Recorded on site by Practical Ecology. The site only supports foraging habitat for this species which breeds in Japan and spends time in Australia during the austral summer. Highest quality habitat for this species at Minta Farm are shallow, well-vegetated wetlands (or parts thereof) with significant fluctuations in water level, particularly Pond 0. Deeper, steep-sided more permanent waterbodies are not preferred habitat.

Areas that currently provide high habitat value

Areas that currently provide high habitat value within the Minta Farm PSP (in order of importance)

- Cardinia Creek main channel and anabranch (Dwarf Galaxias habitat and significant native vegetation)
- Pond 3 (high quality, large, deep-water waterbird habitat, including several threatened ducks and rookeries of several waterbird species and shallow, muddy area at its northern end that provides habitat for crakes, rails and potentially Latham's Snipe.
- Pond 0 (ephemeral / fluctuating wetland providing habitat for Latham's Snipe and wading waterbirds and habitat for numerous frogs. Provides seasonally dry conditions that allow for a wetland free of predatory/exotic fishes.
- Pond 2 (foraging habitat for waterbirds and habitat for frog species)
- Pond 1 (foraging habitat for waterbirds and habitat for frog species)
- Wetlands A and B and Drainage Lines identified in Practical Ecology (2011).

Lower quality habitat areas

Areas that could conceivably be developed as stormwater treatment assets without compromising important biodiversity values on the site include the following:

- Drainage lines
- Areas identified as "Other Terrestrial Habitat" in Conservation Area 36 (DELWP 2017a, P42)
- Areas of non-native vegetation/degraded Treeless Vegetation
- Pond 1 (this has high value as waterbird habitat but could be modified to a stormwater treatment asset without significantly altering its value as waterbird habitat)

Recommendations

The aim of the drainage strategy at Minta Farm should be to maintain and where possible enhance native vegetation and habitat values for the key species or groups of species identified within the PSP. When developing the Drainage Strategy for Minta Farm, the key ecological attributes that should be maintained within the site include:

- Large, deep (>1.5m) waterbodies which is preferred habitat for threatened ducks (Hardhead, Musk Duck, Freckled Duck, Australasian Shoveler) and other species including fish-feeding birds (e.g. cormorants).
- The islands in Pond 3.
- To the fullest extent practicable, minimise disturbance to any native vegetation in the vicinity of Cardinia Creek especially within BCS Conservation Area 36.
- Shallow and or ephemeral wetlands (e.g. Pond 0 and shallow northern end of Pond 3, which provide habitat for Latham's Snipe and egrets and also provide excellent frog breeding habitat.
- Cardinia Creek, especially anabranches which provide important habitat for Dwarf Galaxias.

The key ecological attributes that should be enhanced within the site include:

- Develop water quality treatment assets in areas identified as low quality habitat.
- Development of one or more wetlands designed specifically for Growling Grass Frog adopting the habitat design standards. In particular, investigate the opportunity to create wetlands that are not hydrologically connected to Cardinia Creek (potentially Pond 2).
- Areas of native vegetation to provide greater protection to the riparian values along Cardinia Creek.
- Smaller wetlands with connectivity to Cardinia Creek that should be planted with shade-casting shrubs such as Swamp Paperbark, to act as potential refuge habitat for Dwarf Galaxias.
- Wetlands (including stormwater treatment assets) or parts of wetlands with extensive areas of well-vegetation shallow water (<0.5m deep) and areas of exposed mud to provide Latham's Snipe habitat.
- Ephemeral wetlands that provide high quality habitat for many frog species and may be utilised at times by Dwarf Galaxias as well as providing muddy substrates as they draw down.

In summary, the guiding principles should aim to:

- Maintain hyrological regime in Pond 0.
- Retain the current hydrological regime in Pond 3 (areas of permanent open water for foraging and breeding habitat for threatened duck species).
- Retain the breeding waterbird islands within Pond 3.
- Retain and enhance Dwarf Galaxias habitat.
- Develop at least some wetlands to include key Growling Grass Frog wetland habitat design principles as described in
- Maintain and enhance shallow areas within existing wetlands and create new shallow, well-vegetated wetlands.

References

Biosis Research (2012) Melbourne's Strategic Assessment: Dwarf Galaxias Surveys for the South East Growth Corridor. Report to the Department of Sustainability and Environment.

Commonwealth of Australia (2017) EPBC Act Policy Statement 3.21- Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species, Department of the Environment and Energy, Canberra.

DSE (2013) Advisory List of Threatened Vertebrate Fauna in Victoria. Victorian Government, East Melbourne

DELWP (2017a) Growling Grass Frog Masterplan for Melbourne's Growth Corridors – Melbourne Strategic Assessment. Victorian Government, East Melbourne.

DELWP (2017b) Growling Grass Frog Habitat Design Standards – Melbourne Strategic Assessment. Victorian Government, East Melbourne.

DEPI (2013) Biodiversity Conservation Strategy for Melbourne's Growth Corridors. Victorian Government, East Melbourne.

Practical Ecology (2011c) Biodiversity Assessment Report C21 Business Park, PSP Area 11, Prepared for Growth Areas Authority, Melbourne

Victorian Government (2009) Delivering Melbourne's Newest Sustainable Communities – Program Report. Department of Planning and Community Development, East Melbourne

Appendices

Appendix 1 Figure 1 – ASI Mapping For GGF, Minta Farm

Legend

- Parcel boundary

GGF areas of strategic importance

- Area of Strategic Importance - Buffer around water
- Area of Strategic Importance - Existing retained w
- Other terrestrial habitat
- Terrestrial habitat buffer to ASI and waterway

Figure X Growling Grass Frog areas of strategic importance

0 50 100 150 200 250

Metres
Scale: 1:5,000 @ A3
Coordinate System: GDA 1994 MGA Zone 55

N

Biosis Pty Ltd
Albury, Ballarat, Melbourne, Newcastle, Sydney, Wangaratta & Wollongong

Matter: 25212,
Date: 10 November 2017,
Checked by: DG, Drawn by: LDM, Last edited by: lmilne
Location:P:\25200s\25215\Mapping\25212_FX_GGF.mxd