



Alliance Business Park
275 O'Herns Road, Epping:
Edgars Creek Management Plan

Prepared for MAB Corporation

20 September 2013

Biosis offices

AUSTRALIAN CAPITAL TERRITORY

Canberra

Floor 1, Unit 3, 38 Essington Street
Mitchell ACT 2911

Phone: (02) 6241 2333
Fax: (03) 9646 9242
Email: canberra@biosis.com.au

NEW SOUTH WALES

Sydney

Unit 14 17-27 Power Avenue
Alexandria NSW 2015

Phone: (02) 9690 2777
Fax: (02) 9690 2577
Email: sydney@biosis.com.au

Wollongong

8 Tate Street
Wollongong NSW 2500

Phone: (02) 4229 5222
Fax: (02) 4229 5500
Email: wollongong@biosis.com.au

QUEENSLAND

Brisbane

Suite 4 First Floor, 72 Wickham Street
Fortitude Valley QLD 4006

Phone: (07) 3831 7400
Fax: (07) 3831 7411
Email: brisbane@biosis.com.au

VICTORIA

Ballarat

506 Macarthur Street
Ballarat VIC 3350

Phone: (03) 5331 7000
Fax: (03) 5331 7033
Email: ballarat@biosis.com.au

Melbourne (Head Office)

38 Bertie Street
Port Melbourne VIC 3207

Phone: (03) 9646 9499
Fax: (03) 9646 9242
Email: melbourne@biosis.com.au

Wangaratta

16 Templeton Street
Wangaratta VIC 3677

Phone: (03) 5721 9453
Fax: (03) 5721 9454
Email: wangaratta@biosis.com.au

Report to: MAB Corporation

Prepared by: Daniel Gilmore
Steve Mueck

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Summary

Biosis Pty Ltd was commissioned by MAB Corporation to prepare a Management Plan for the reach of Edgars Creek within Alliance Business Park at 275 O'Herns Road, Epping. The site is proposed to be developed into an industrial estate.

The priority for the management of this section of Edgars Creek will be to maintain habitat corridor suitable for the movement of Growling Grass Frog *Litoria raniformis*. Edgars Creek is recognised as an important dispersal corridor for Growling Grass Frog (GGF) in the Epping area and it is important that habitat connectivity is maintained along its length to link populations upstream and downstream of the study area.

This plan documents the actions that MAB has committed to undertake to ensure that habitat connectivity is maintained along Edgars Creek and incorporates the following principles:

1. Establishment of an average 50 m wide corridor along each side of Edgars Creek, which is will be protected by an appropriate on-title agreement.
2. Protection of the creek during the construction phase of the development.
3. Ongoing management of habitat within the creek corridor to maintain and improve its value as habitat for Growling Grass Frog.
4. The incorporation of mitigation measures (underpasses or culverts) to ensure habitat connectivity is maintained in the event that a road crossing is required to be built over Edgars Creek.
5. Manage the habitat of known populations of threatened plant species in the south of the creek corridor.

MAB is responsible for implementing the actions outlined in this plan until management of the creek corridor is handed over to the relevant responsible authority (expected to involve Whittlesea Council and Melbourne Water). Implementation of the actions outlined in this plan will then become the responsibility of the new land owner. This plan will be implemented over a 10 year period but the requirement to manage this corridor to provide suitable habitat for Growling Grass Frog is permanent. The plan should be reviewed every 2 years.

1. Introduction

1.1 Project background

Biosis Pty Ltd was commissioned by MAB Corporation to prepare an Edgars Creek Management Plan (ECMP) for the reach of Edgars Creek within the Alliance Business Park at 275 O'Herns Road, Epping (Figure 1). The broader property covers 62.2 ha and is proposed for industrial development. However, a corridor averaging 50 m either side of the creek is proposed to be retained within the subdivision to maintain habitat continuity for populations of Growling Grass Frog *Litoria raniformis* known to occur to the north and south of this property.

The site supports several Matters of National Environmental Significance (MNES) protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) including a population of Golden Sun Moth *Synemon plana*, a small population of Matted Flax-lily *Dianella amoena* and small remnants of the Natural Temperate Grassland of the Victorian Volcanic Plain (Figure 1) as well as potential habitat for the Growling Grass Frog (GGF). The site also supports an undetermined population of Small Scurf-pea *Cullen parvum*, which is listed as endangered in Victoria. The biodiversity values of the site are documented in Biosis Research (2012).

Due to the presence of MNES on the site, the proposed subdivision was referred to the Australian Minister for the Environment to determine if approval was required under the EPBC Act (Referral 2012/6298). The proposal was deemed by the Department of Sustainability, Environment, Water Population and Communities (DSEWPaC) to be a controlled action and one of the requirements for the project approval was the preparation of a Growling Grass Frog Conservation Management Plan (CMP) for the relevant section of Edgars Creek. The state Department of Environment and Primary Industry (DEPI) also included a condition within the planning permit for the subdivision as follows:

An Edgars Creek Management Plan must be prepared to the satisfaction of the Department of Environment and Primary Industries that includes the revegetation, translocation, and GGF habitat issues. When approved the Plan will be endorsed by the Responsible Authority and form part of this planning permit.

This plan encompasses the requirements of both DEPI and DSEWPaC.

1.2 Scope

This plan deals with the management of the Edgars Creek corridor, primarily to maintain its value as dispersal habitat for GGF. It also deals with the management of these values in the context of construction activities associated with the development outside the creek corridor as these have the potential to impact on the values within the corridor itself. It also deals with proposals to control weeds within and revegetate the creek corridor particularly in relation to the remnant patch of native grassland in the south of the corridor and the associated populations of threatened plant species (Figure 1).

The area directly covered by CMP is shown in Figure 1.

1.3 Objectives

The objectives of this plan are to identify the necessary management actions which will:

- Protect the functioning Growling Grass Frog habitat corridor along Edgars Creek during construction.
- Allow for the long-term maintenance of Edgars Creek as habitat for Growling Grass Frog, by ensuring that animals can move unimpeded along the creek corridor.
- Improve habitat values along the creek corridor to benefit Growling Grass Frog.
- Protect and maintain other biodiversity values including habitat for threatened fauna (i.e. Golden Sun Moth *Synemon plana*), flora (i.e. Matted Flax-lily *Dianella amoena* and Small Scurf-pea *Cullen parvum*) and vegetation communities (i.e. Natural Temperate Grassland of the Victorian Volcanic Plain which equates to Plains Grassland).

1.4 Timeframe and implementation

This plan will be implemented over a 10 year period although the requirement to manage this corridor to provide suitable habitat for Growling Grass Frog is permanent. The CMP should be reviewed every 2 years.

Implementation of the plan will be the responsibility of MAB until such time as ownership of the creek corridor is transferred to the responsible authority (most likely either Melbourne Water or the City of Whittlesea).

Implementation of the actions outlined in this plan will then become the responsibility of the new land owner.



Legend

- ★ Lobed Needle-grass
- ★ State Prohibited Weed
- Significant flora records
 - ▲ Cullen parvum
 - Dianella amoena
- Trees
 - ★ Large Old Tree
 - ★ Medium Old Tree
- Vegetation impacts
 - Loss
 - Retain
- Native Vegetation
 - Plains Grassland
 - Creepline Tussock Grassland
 - Plains Grassy Woodland
- Significant Fauna records
 - ⊕ Baillons Crake
 - ⊕ Golden Sun Moth habitat
- Reserves
 - Edgars Creek corridor -
 - Grolwing Grass Frog habitat
 - Other reserves
 - Stage 1
 - Study Area

Figure 1. Location of the area affected by the Edgars Creek Management Plan, 275 O'Herns Road, Epping

0 30 60 90 120 150
Metres
Scale: 1:3,000 @ A3
Coordinate System: GDA 1994 MGA Zone 55



Matter: 16630,
Date: 29 May 2013,
Checked by: SGM, Drawn by: SKM, Last edited by: smitchell
Location: P:\16600s\16630\Mapping\16630_F1_Edgars_Ck_MP

2. Conservation Management Plan

The eastern margin of Alliance Business Park is traversed by Edgars Creek, an ephemeral waterway supporting native riparian vegetation. GGF is known to occur in constructed wetlands on Edgars Creek to the north of and south of O'Herns Road (Biosis Research 2012). It is likely that GGF use Edgars Creek to disperse throughout the landscape, including the section within Alliance Business Park. Within the study area, Edgars Creek currently supports few inherent habitat values for GGF activity other than its value as a route for dispersal. There are no areas within the study area that are likely to be used as a breeding site and targeted survey within the study area failed to detect the species (Biosis Research 2012).

To protect existing native vegetation and maintain habitat connectivity along Edgars Creek for GGF, a corridor averaging 50 m either side of Edgars Creek will be excluded from development. A single road crossing (yet to be confirmed) may be constructed over Edgars Creek during the later stages of the development process.

2.1 Pre-construction management actions

2.1.1 Establish and protect Edgars Creek corridor

The creek corridor needs to be protected by means of on-title agreement, zoning and/or overlay provisions. The Whittlesea Planning Scheme may need to be amended accordingly once the boundaries of the creek corridor are accurately defined by survey.

Actions

- MAB in consultation with City of Whittlesea and DEPI will determine and implement a suitable protection mechanism (e.g. a Section 173 agreement, Conservation Covenant or zoning and/or overlay provisions) to protect the creek reserve once the boundaries are formally defined. This will ensure ongoing management to maintain GGF habitat values as required under the EPBC Act and the planning permit.

2.1.2 Fencing

Temporary protection fencing will be required during construction to protect the creek corridor. In the longer term, the creek corridor will need to be delineated and protected through the installation of appropriate fencing (e.g. post and steel cable) to prevent illegal vehicular access and to clearly define the reserve boundary for management purposes. Any fencing will allow adequate and secure access for management vehicles only.

Actions

- *MAB will install secure temporary fencing clearly delineating the creek corridor prior to any construction works.*
- *'No go Zone' signs will be attached to all temporary fencing will be along the creek corridor to ensure contractors do not drive in or dump waste or store materials within the creek corridor. These signs will remain in place for the duration of the construction period.*
- *After the construction period has finished, suitable sturdy fencing (e.g. post and steel cable or similar) will be installed along the boundary of the creek reserve to prevent unauthorised vehicle access. This fencing will be maintained in good repair in perpetuity.*

2.2 Construction management actions

2.2.2 General construction management

The creek corridor will be protected through the construction phase by implementing the following actions.

Actions

- *Induction of all construction and site personnel will include information about GGF and its habitat within the development area, along with protection measures that will be in place and enforced during the construction period.*
- *If construction works are required within the proposed reserve (e.g. for drainage purposes), pre-construction survey for the GGF will be undertaken in areas of potential habitat.*
- *Any GGF found will be salvaged if appropriate under a protocol approved by DEPI.*
- *Construction trenches near the creek reserve will be monitored daily (in the event that any trench is left open overnight).*
- *Contractors will be inducted on the protocol to follow if GGF are found within a trench or work area.*
- *Rehabilitation and revegetation works along Edgars Creek will take account of the habitat requirements of the species, in accord with advice from a zoologist experienced with the species' habitat.*
- *Dust will be controlled during construction to prevent deposition on native vegetation in the creekline. Measures will include:*
 - ~ *minimise extent of exposed soil and/or soil stockpiles*
 - ~ *water as required to suppress dust emission*
 - ~ *revegetation / stabilisation of bare soil.*
- *Sediment control fences (e.g. geotextile or similar) will be placed at the limit of construction fence to prevent contaminated water and silt from entering the reserve. This fencing will have the dual effect of reducing the capacity for GGF to move away from the creek and into works areas. While not specifically a frog-proof design, observations suggest such fencing (provided it is maintained) can act as a deterrent to frog movement.*
- *Earth and debris will not be pushed through fences into the reserve.*
- *Protective fencing and sediment control measures will be regularly inspected and maintained in good repair at all times.*

2.2.3 Potential road underpass

It is imperative that connectivity is maintained along Edgars Creek. One potential road crossing is proposed over Edgars Creek may be required by Council. If required the following actions will be adhered to so that this crossing does not constitute a barrier to GGF movement. Recent research has shown that GGF will use large culverts under bridges, as has been the case in the Aurora subdivision in Epping North (Biosis in prep.).

A bridge crossing of the creek would be the preferred crossing as this would provide a large open space allowing for frog movement. If culverts/underpasses were proposed at the potential road crossings over Edgars Creek, this would be designed and constructed to maximise its potential to facilitate frog movement of GGF under the road. Detailed design will be determined specifically for the crossing when details of the potential road crossing become available. However, the following general design elements will be incorporated:

Actions

- *A bridge crossing of the creek would be the preferred design.*
- *If culverts were proposed then these will be as short as possible with smooth surfaces along the base and their design will provide for wet, but generally not flooded, passage of frogs.*
- *Culvert entrances will be kept clear of rubbish, hard litter and other debris at all times.*
- *Two-way access is required to allow frog movement along the creek, and any openings along the length of culverts must prevent frogs from accessing the road surface.*
- *Artificial lighting (e.g. street lights) near culvert entrances will be designed to avoid light spill from the road.*
- *No obstructions such as rocks or logs will be placed within culverts.*

2.2.4 Constructed wetlands

In the event a road crossing is constructed over Edgars Creek dedicated GGF wetlands will be built either side of the crossing to provide additional connectivity between populations upstream and downstream of the crossing and to provide additional habitat. These wetlands will also provide a focal point of frog activity, thereby increasing the likelihood that frogs will disperse under the road. Wetlands will be designed as follows:

Actions

- *Wetlands will be established either side (upstream and downstream) of the road crossing to encourage the frogs to move under the road. These waterbodies will be designed in consultation with an appropriately qualified person/s.*
- *New ponds along Edgars Creek will be designed to maximise habitat value for GGF incorporating:*
 - *a variety of slope and water depth.*
 - *a variety of edge types.*
 - *different microhabitats such as rocks and vegetation to create a diversity of habitats.*
 - *minimum surface dimensions of 15-20m x 12-15m (180 – 300m² surface area).*
 - *plantings of locally indigenous wetland plants with floristics, composition and structural characteristics and plant orientation resembling habitat used by GGF elsewhere. Vegetation is to be planted in three distinct zones: 1) shallow verge zone, located along the banks of wetlands; 2) emergent macrophyte zone dominated by emergent aquatic or semi-aquatic, and located within the waterbody; 3) submerged and floating vegetation zone (i.e. inundated up to 1.2 metres). A list of plants that can be used for wetland establishment is provided in Appendix 1.*
 - *bottom depths grading to a minimum of 1.5 metres containing shallower areas that will dry out periodically, and deeper sections, which will hold water permanently.*
 - *a design, including the aquatic plants, to minimise suspension of particulates as this is important for tadpole development.*
 - *no plantings of trees or large shrubs that will densely shade wetlands as this renders them unsuitable for GGF.*
 - *refuge sites such as rock piles and large woody debris around the edges of wetlands and the creek banks. The spaces between refugia and their orientation vary to optimise habitat variability.*
 - *Rocks or boulders can be sourced from construction areas within the development and can be relocated along the creek as additional habitat.*
 - *the capacity to drain them if unwanted fish or pollution enter the waterbody.*

2.2.5 Drift fencing

If the potential road crossing is built, MAB will incorporate measures at the interface between constructed wetlands and the road crossing to funnel frogs towards the underpasses and reduce the risk of GGF being killed on the road. Typically, such 'funnels' would take the form of drift fencing, but features that achieve the appropriate funnelling effect may be incorporated into the design of hard embankment structures. While the final design details to achieve the appropriate funnel effect will be determined specifically for the crossing, the following design aspects are recommended:

- *Materials will be chosen for functionality as well as aesthetic appeal in a landscaping context.*
- *Features designed to funnel frogs toward culverts will be installed along both sides of the underpass entrance.*
- *Features designed to funnel frogs toward culverts will be the width of the creek corridor reserve.*
- *'Funnel' structures should achieve the function of frog fences by being at least 500mm high incorporating a 150mm (at least) overhang at the top angled outwards (away from the road).*
- *Vegetation, rock and other debris will not be placed within 500mm of the 'funnel' structures.*
- *'Funnel' structures will be inspected at least every 2 years and maintained in good repair.*

2.3 Habitat management

2.3.2 Biomass control in terrestrial areas

It is likely that Council will require a regular biomass control program to be implemented within the creek corridor to prevent any potential fire hazard. Much of the creek corridor is typified by infestations of grassy weeds such as Chilean Needle-grass *Nassella neesiana* and Toowoomba Canary-grass *Phalaris aquatica*. This is currently grazed by stock and Kangaroos and these animals are effective in reducing biomass in years of average rainfall. However, once stock are removed a dense grassy sword is likely to quickly develop in the creek reserve. This will compromise the conservation values of the creek corridor through competitive exclusion. There is also evidence to suggest that GGF may avoid using areas of thick biomass as it impedes their ability to move and forage effectively (Heard et al. 2008).

Biomass reduction will also benefit any Golden Sun Moth populations retained within the creek corridor, as this species requires the maintenance of relatively open grassland for successful reproduction and will also assist with the control of weeds.

The reserve has an abundance of embedded rock, which makes slashing problematic. However, there are some areas that could conceivably be slashed. Other areas could be subjected to periodic controlled burning (subject to Council approval) or slashing with a "whipper-snipper" (or equivalent).

There is some potential for biomass control to negatively affect individual GGF through direct mortality (killed during slashing or burning) or indirectly (increased predation from being exposed following removal of vegetation). However, this is likely to be a relatively low risk and is more than offset by the increased improvements in habitat quality. To reduce this risk, no more than 50% of the creek reserve should be burnt or slashed in any one year. This will provide a protected area where biomass control has not been undertaken and hence be a fire a refuge for fauna such as GGF.

Actions

- A regime of annual slashing will be undertaken in those parts of the creek reserve where slashing can be achieved. These areas will be delineated and mapped for slashing contractors.
- All slashing equipment used for biomass control will be free of weed seeds.
- Where possible, burning will be undertaken annually within the creek reserve, but burning will only be applied to 50% of the reserve in any given year.
- In particular burning will provide biomass control for vegetation associated with populations of threatened plant species in the south of the creek reserve (Figure 1).

2.3.3 Weed control

Weed levels in the reserve area are very high. Weeds include the highly invasive Chilean Needle-grass and other introduced perennial grasses including Toowoomba Canary-grass Brown-top Bent *Agrostis capillaris* and potentially the State prohibited noxious weed Lobed Needle-grass *Nassella charruana*. Thistles (Spanish Artichoke *Cynara cardunculus* and Spear Thistle *Cirsium vulgare*) are also prominent in several areas. Eradicating and even controlling perennial grassy weeds within the reserve would prove extremely difficult and may be prohibitively costly although any occurrence of Lobed Needle-grass will be the target of State funded control measures. For this reason, and because Chilean Needle-grass is a food plant for Golden Sun Moth, a reduction in the extent of these grassy weeds (except for Lobed Needle-grass) in the reserve is not required as part of this plan.

However, more intensive weed control works around the remnant patch of Plains Grassland and associated threatened flora populations will occur in the south of the reserve (Figure 1). Vegetation management objectives for the western bank of the reserve south of the potential road crossing (i.e. around Habitat Zone 7 in Figure 1) will include the targeted reduction of all grassy and herbaceous weeds to less than 10% of the vegetation cover over the ten year timeframe of this plan.

Woody weeds such as Sweet Briar *Rosa rubiginosa*, Hawthorn *Crataegus monogyna*, and African Boxthorn *Lycium ferocissimum* do not currently occur within the reserve but do have the potential to become established if not appropriately managed.

Actions

- Weed levels within the reserve will be monitoring every 2 years from the commencement date of this plan.
- All woody weeds will be promptly eradicated from the reserve if regular monitoring shows that these species have become established.
- Spanish Artichoke and Spear Thistle will be eradicated within the reserve within 2 years of the approval of this plan.
- If regular monitoring shows the establishment of Lobed Needle-grass or other novel perennial grassy weeds then these will be promptly eradicated.
- Areas or individuals of threatened flora species will be pegged to ensure that weed control contractors avoid accidental damage to them during management works.
- Land on the western bank of the reserve, south of the potential road crossing (i.e. around Habitat Zone 7 in Figure 1) will be subject to more intensive weed control works to improve the existing habitat for threatened plant species and native vegetation.

2.3.4 Management of created wetlands

It is envisaged that once established, any created wetlands built in association with the potential bridge over Edgars Creek will be largely self-sustaining. However, the following actions will be undertaken to maintain the suitability of these wetlands for GGF:

Actions

- *In the event that construction material or rubbish enters wetlands it will be removed promptly.*
- *The entry of sediment, surfactants and other pollutants into the main waterbody will be minimised as a result of the water sensitive urban design strategy implemented for stormwater quality treatment including but not necessarily limited to streetscape bioswales, nodal streetscape raingardens, and stormwater treatment wetlands.*
- *Use of herbicides and pesticides within, or surrounding, wetlands and the creek will be avoided. If absolutely necessary, a 'frog-friendly' glyphosate product such as Roundup Bio-active will be used.*
- *Damage to aquatic vegetation by waterfowl, particularly immediately after planting will be prevented by using protective netting until vegetation is established.*
- *Mowing around constructed waterbodies should incorporate a mix of mown and unmown areas to allow provision of both foraging opportunities and cover for frogs.*
- *During the first 5 years after construction a suitably qualified consultant will be engaged to monitor the wetlands every 12 months. Vegetation condition and refuge/shelter sites around the perimeter of the wetlands will be checked to ensure habitat establishment and maintenance is suitable. The suitability of vegetation for the Growling Grass Frog will be determined and, if deemed necessary, supplementary plantings will be undertaken and/or additional refuge sites will be provided.*
- *Water quality in the wetlands will be monitored every six months for the first two years after wetland construction. The water quality monitoring program will be reviewed after two years. It is not possible to set water quality targets specific to the Growling Grass Frog as there is little information available. Recent studies have indicated that bell frogs have relatively wide tolerances in relation to the water quality parameters above.*

2.3.5 Revegetation

The creek and associated reserve is currently treeless. This is not considered to be the natural structure for Edgars Creek. Revegetation works are therefore appropriate for the creek corridor and may in future provide refuge areas for GGF within the movement corridor (i.e. by generating coarse woody debris). However, a dense contiguous cover of trees is inappropriate for the objectives of this corridor.

The broader study area supports scattered River Red-gums *Eucalyptus camaldulensis* and single individuals of Swamp Gum *E. ovata* and Yellow Box *E. melliodora*. Trees to be established along the creek corridor will therefore be planted in the following proportions: 10% Yellow Box (dry areas only), 45% Swamp Gum and 45% River Red-gum. The total tree cover will not exceed 10% of this environment. Initially it is proposed that no more than 50 trees will be planted with a view to the corridor supporting no more than 20 mature trees.

Potential species for wetland revegetation works are listed in Appendix 1. Planting or otherwise reintroducing other ground cover species in drier grasslands on the rocky ground which otherwise dominates the creek corridor will help displace weeds. Potential species for revegetation works include a variety of indigenous grasses, sedges and herbs such as:

Sheep's Burr	<i>Acaena echinata</i>
Supple Spear-grass	<i>Austrostipa mollis</i>
Rough Spear-grass	<i>Austrostipa scabra</i>

Blue Grass-lily	<i>Caesia calliantha</i>
Plains Sedge	<i>Carex bichenoviana</i>
Knob Sedge	<i>Carex inversa</i>
Kidney-weed	<i>Dichondra repens</i>
Blue Devil	<i>Eryngium ovinum</i>
Weeping Grass	<i>Microlaena stipoides</i> var. <i>stipoides</i>
Common Tussock-grass	<i>Poa labillardierei</i>
Wallaby-grass	<i>Rytidosperma</i> spp. (see Biosis Research 2012)
Kangaroo Grass	<i>Themeda triandra</i>
Tufted Bluebell	<i>Wahlenbergia communis</i>
Bronze Bluebell	<i>Wahlenbergia luteola</i>

This list is not comprehensive and other locally indigenous species can also be included in any revegetation works.

A more intensive revegetation effort to establish indigenous grasses and herbs will be conducted in the south western corner of the creek reserve, around HZ7 (Figure 1).

2.3.6 Storm-water management

At present the existing subdivision design does not identify any stormwater discharge into Edgars Creek. If stormwater is required to be discharged into Edgars Creek then this discharge must occur in a manner which does not threaten the habitat suitability for GGF. Any stormwater discharge will utilise a series of water treatment ponds which enhance the habitat for GGF. Such ponds will be constructed in a manner consistent with the requirements outlined by Heard et al. (2010).

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Appendices

Appendix 1: Plants suitable for created Growling Grass Frog wetlands

The following is a guide to indigenous species useful for the recreation of wetland habitat within a landscaped environment. It is not a detailed specification and other locally indigenous plants should also be used.

Table A1.1: Wetland planting list

Scientific name	Common name
Zone 1 – shallow verge vegetation along banks of waterbody	
<i>Agrostis avenacea</i>	Common Blown-grass
<i>Agrostis punicia</i>	Gilgai Blown-grass
<i>Calystegis sepium</i>	Large Bindweed
<i>Carex appressa</i>	Tall Sedge
<i>Carex fascicularis</i>	Tassel Sedge
<i>Epilobium billardierianum</i>	Smooth Willow-herb
<i>Eryngium vesiculosum</i>	Prickfoot
<i>Glyceria australis</i>	Australian Sweet-grass
<i>Juncus amabilis</i>	Hollow Rush
<i>Juncus flavidus</i>	Yellow Rush
<i>Juncus holoschoenus</i>	Joint-leaf Rush
<i>Juncus procerus</i>	Tall Rush
<i>Lobelia pratioides</i>	Poison Lobelia
<i>Lomandra longifolia</i>	Spiny-headed Mat-rush
<i>Microlaena stipoides</i> var. <i>stipoides</i>	Weeping Grass
<i>Neopaxia australasica</i>	White Purslane
<i>Poa labillardierei</i>	Common Tussock-grass
Zone 2 – emergent vegetation within the waterbody	
<i>Amphibromus nervosus</i>	Common Swamp Wallaby-grass
<i>Carex tereticaulis</i>	Poong'ort
<i>Craspedia paludicola</i>	Swamp Billy-buttons
<i>Crassula helmsii</i>	Swamp Crassula
<i>Eleocharis acuta</i>	Common Spike-sedge

Scientific name	Common name
<i>Eleocharis pusilla</i>	Small Spike-sedge
<i>Eleocharis sphacelata</i>	Tall Spike-sedge
<i>Glyceria australis</i>	Australian Sweet-grass
<i>Lycopus australis</i>	Gypsywort
<i>Neopaxia australasica</i>	White Purslane
<i>Myriophyllum crispatum</i>	Upright Water-milfoil
<i>Myriophyllum simulans</i>	Amphibious Water-milfoil
<i>Persicaria praetermissa</i>	Spotted Knotweed
<i>Persicaria decipiens</i>	Slender Knotweed
<i>Ranunculus inundatus</i>	River Buttercup
<i>Stellaria angustifolia</i>	Swamp Starwort
Zone 3 – submerged and floating vegetation with the waterbody	
<i>Marsilea drummondii</i>	Common Nardoo
<i>Myriophyllum caput-medusea</i>	Coarse Water-milfoil
<i>Potamogeton tricarinatus</i>	Floating Pondweed
<i>Potamogeton ochreatus</i>	Blunt Pondweed
<i>Schoenoplectus tabernaemontani</i>	River Club-sedge
<i>Triglochin procerum</i>	Common Water-ribbons
<i>Vallisneria americana</i>	Ribbon-weed