Town of Cambridge

Galup (Lake Monger) Management Plan 2024-2034

Galup Boodja-k Kaaradjiny
(Caring for Country at Galup)

Town of Cambridge

The Town of Cambridge acknowledges the Traditional Owners (Whadjuk Noongar) of the land (Boodja) upon which we live and work and pay our respects to their Elders, past, present, and emerging.

NB: Aboriginal and Torres Strait Islander people are advised that this management plan contains the names and images of deceased persons.

Cover Photo – Swans congregating at the northern shore of Galup (Lake Monger) (Unknown 2023)

EXECUTIVE SUMMARY

Galup (Kaarlup), as it is known to the Whadjuk Noongar people, is rich in Aboriginal heritage and highly valued for its wetland conservation and recreational values. The reserve covers an area of approximately 106 hectares and is located around 3.6km north-west of the Perth CBD (see Appendix 1).

Galup (Lake Monger) is situated in Wembley, with Lake Monger Drive to the south, Dodd Street to the north, the Mitchell Freeway to the east and Gregory Street to the west. The lake occupies the greatest area of the reserve; around 70.1 hectares. The reserve also boasts a range of recreational facilities including a shared path and conservation trail around the lake, lookouts, barbecues, picnic facilities, children's playgrounds and a pump and jump track.

For millennia, the lake and its surrounds were an important Whadjuk Noongar camping and hunting ground, rich in food resources and cultural significance. In Whadjuk Noongar culture, Galup (Lake Monger) is associated with the Waugal, or rainbow serpent, recognised as a creator of Noongar country. When the Waugal moved over the landscape, it created waterways such as rivers, lakes, and waterholes. Galup (Lake Monger) was created when the Waugal rose from the ground on its journey towards the sea.

At the time of colonisation, Yellagonga was a known Whadjuk Noongar Elder of Mooro, the territory north of the Derbarl Yerrigan (Swan River). Galup (Lake Monger) was one of Yellagonga's campsites and has been used by Whadjuk Noongar people for camping, hunting, ceremonies, corroborees and cultural events for many millennia. In 1829, the lake was proclaimed by Britain as part of the Swan River Colony, which marked the beginning of land ownership conflicts and extensive landscape modifications.

Since the mid 1800's the area has been greatly modified and valued more for its recreational and aesthetic qualities. Sedges and fringing vegetation around the lake were removed to make way for exotic trees and grass, planted to the water's edge, creating a European style lake. The area was settled in the 1830's and the lake was named after a prominent lease holder of the site, John Henry Monger in 1831.

During the 1930s, land was reclaimed which included dumping of raw sewage and silt dredging from the lake. Between 1950 and 1964 around 97 hectares was reclaimed in the north-western corner of the site through a 1.8m deep landfill for domestic waste.

Over recent years the lake edges to the north and west have been replanted with native sedges and fringing vegetation to restore its natural state and provide habitat for local wildlife. Nutrient stripping swales on the east side of the lake have been heavily revegetated to improve water quality and reduce algal blooms in summer. Rehabilitation works will continue across the reserve, incorporating interpretive signage, to raise public awareness of Galup's (Lake Monger's) environmental and cultural significance.

Galup (Lake Monger) continues to be an important place to Whadjuk Noongar people for its cultural significance. It will also continue to be valued by the broader community who enjoy the lake and its surrounds for recreation and nature appreciation. This management plan will assist the Town to manage and improve the site over the next ten years in line with the Town's Strategic Community Plan 2023-2033 and consultations with Whadjuk Noongar Traditional Owners. The plan aims to improve the natural environment, recognise cultural heritage and provide a range of recreational experiences for reserve visitors to ensure Galup (Lake Monger) continues to be a popular landmark.

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1 Introduction

1.1 Background

Galup (Lake Monger) is a conservation category wetland and an important drought refuge for a range of fauna. The lake sits within a regionally significant recreation reserve which contains registered Aboriginal heritage sites of historic and cultural significance to Whadjuk Noongar people.

The initial Lake Monger Management Plan 1993-1998 was developed by the City of Perth. In accordance with the recommendations made in that management plan and the Lake Monger Rehabilitation Plan 1995, the Town of Cambridge has undertaken numerous rehabilitation works and upgrades of reserve facilities. The management plan was revised and following community and stakeholder consultation, including with Whadjuk Noongar Traditional Owners the Lake Monger Management Plan 2008-2018 was prepared and implemented.

The updated Management Plan identifies the remaining works from previous plans and highlights major initiatives to be undertaken over the next ten years. The plan was prepared following consultation with Whadjuk Traditional Owners for whom the reserve is culturally significant, reserve users, nearby residents and the broader community. Initiatives will be undertaken in accordance with aspirations of Traditional Owners and the goals set out in the Town's Strategic Community Plan 2018-2028.

Priorities for the next ten years are identified under the following management categories:

- Water Management
- Flora Management
- Fauna Management
- Cultural and Recreational Facility Management

For an overview of the proposed works for Galup (Lake Monger) from 2024-2034 refer to page 47.

1.2 Natural Area Management in the Town

Natural area management in the Town is summarised in Figure 1. The Town's Strategic Community Plan governs all areas of the Town's operations and management. The Natural Area Strategy provides high level strategic management of the Town's natural areas. Individual management plans sit under the Natural Area Strategy including the Management Plan– refer to Figure 1 over page.

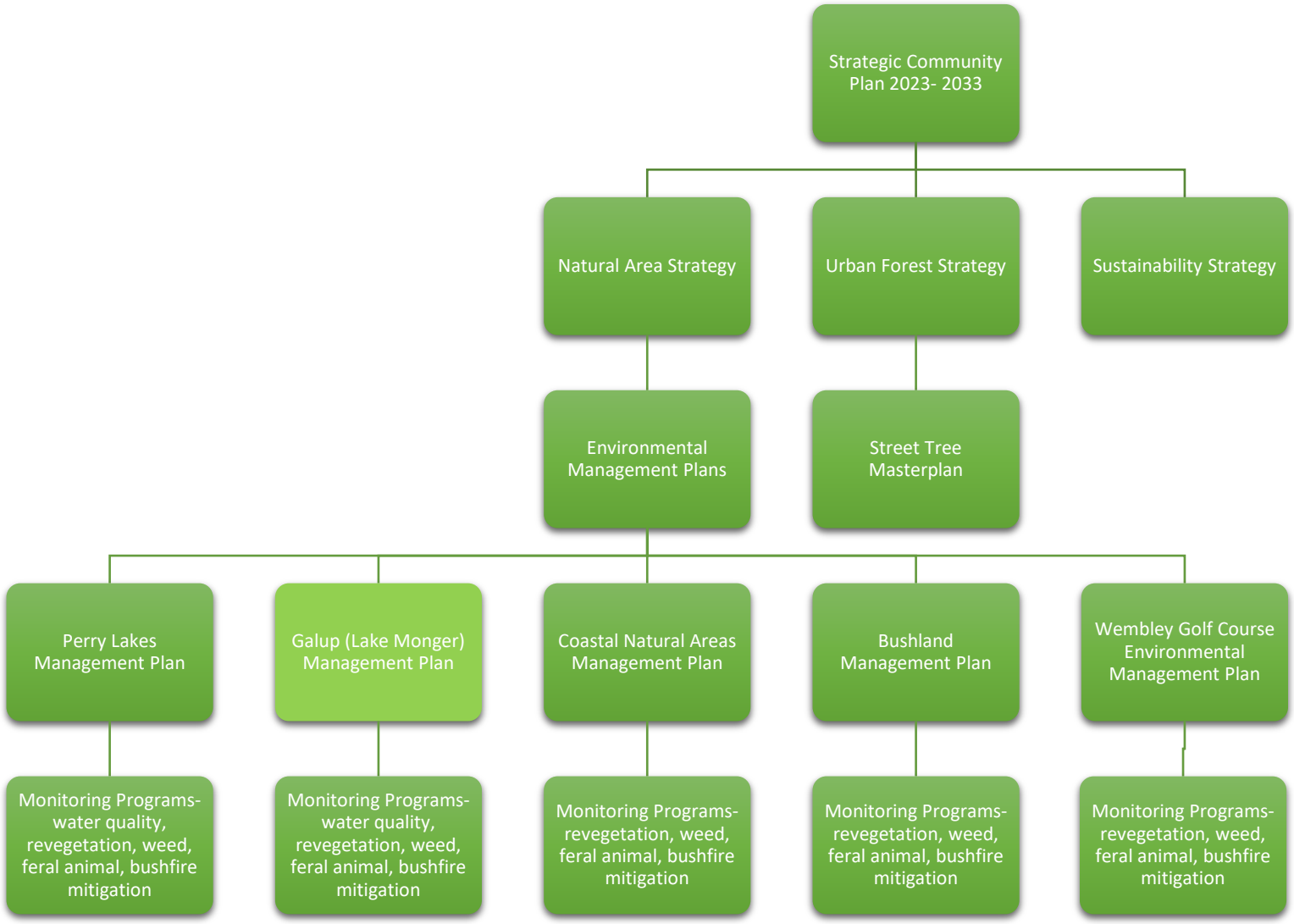


Figure 1. Natural Area Management Framework in the Town of Cambridge

2 Management Plan Objectives

A key goal of the Management Plan is the continued rehabilitation of the lake and surrounds to create a biodiverse and self-sustaining wetland ecosystem which provides a variety of fauna habitats. A main project under the plan is the ongoing restoration of the nutrient stripping swale on the eastern side of the lake to improve the quality of storm water entering the lake. Environmental goals will be carefully balanced with the need to provide a wide range of recreational opportunities for the local and greater community who regularly use the reserve as well as acknowledging and showcasing the significant heritage of the site.

Alignment with the Town's Strategic Community Plan ensures the management plan reflects community aspirations. The following management plan objectives align with the goals and strategies of the Town's Strategic Community Plan over the next ten years.

3 Environmental Issues

The major environmental issues identified at Galup (Lake Monger) are summarised below.

3.1 Water Levels

The ongoing management of water levels in the lake to limit localised flooding in the area while balancing the negative environmental impacts that can impact water quality;

3.2 Water Quality

Water quality issues related to inputs of nutrients, contaminants and the potential high bacterial levels associated with the large waterbird population on the lake in an urban setting;

3.3 Loss of Biodiversity

The impact of historical land clearing and wetland modification on the aesthetics and habitability of the site which reduces flora and fauna biodiversity;

3.4 Conservation

Conservation and restoration of lake ecology and biological diversity in the area to increase wetland resilience;

3.5 Weeds

Invasive weed impacts on the lake, fringing vegetation and associated natural areas;

3.6 Trees

Tree management to ensure existing trees are well maintained and managed to reduce woody weed establishment;

3.7 Fauna

Conservation of fauna including birds, reptiles, mammals, turtles, frogs and invertebrates through increased creation of habitat; and

3.8 Education

School and community environmental education and awareness.

4 Cultural and Recreational Issues

4.1 User Conflict

Reducing the conflict between pedestrians, cyclists and other park users;

4.2 Accessibility

Ensuring accessibility compliance of paths and facilities for users of all ages and abilities, including wheelchairs, scooters, prams, skateboards, bikes and walking frames;

4.3 Public Safety

The general safety and security of the users of the site and consideration of Crime Prevention Through Environmental Design (CPTED) principals; and

4.4 Activation

Increased activation of the site for other user groups as determined through public consultation and stakeholder engagement.

5 Strategic Context

5.1 Tenure and Zoning

The Town of Cambridge is the registered land manager of Galup (Lake Monger). The reserve consists of Freehold land Lots 1 to 14, Lot 100 and Lot 251 within the Town Planning Precinct P5 – West Leederville. It also encompasses Crown Land vested with the Town, R53797 and R8731 within the Town Planning Precinct P6 – Galup (Lake Monger), some road reserve and Lot 50 vested with the Water Corporation.

The legal description of all lots is:

- Lot 250, parcel 301697, volume 1769 and folio 74
- Lot 251, parcel 301697, volume 1769 and folio 72
- Lot 1 to 14 parcel 983, volume 2064 and folio 386 and 378
- Lot 100, parcel 45962, volume 2615 and folio 381
- Lot 50, parcel 3020, volume 555 and folio 43
- Res 53797, Lot 500, parcel 417221, volume 3172 and folio 350
- Res 8731, Lot 12663, parcel 220075, volume 3138 and folio 224

The reserve covers an area of 106 hectares and the majority is zoned Parks and Recreation in the Metropolitan Region Scheme (MRS) (see Appendix 7 & 8). It is bounded by Lake Monger Drive to the south, Gregory St to the west, Dodd St to the north and the Mitchell Freeway to the east.

5.2 Town of Cambridge Strategic Framework

The goals and strategies of the Town's Strategic Community Plan 2023-2033 are considered within the objectives of the Management Plan.

Vision			
"A naturally beautiful Town that connects our vibrant community and thriving local economy from inner city to beach"			
Outcomes			
Outcome 1 **Our People** A community that supports wellbeing, connection, and inclusion.	**Outcome 2** **Our Economy** An attractive destination to visit, full of opportunities and thriving businesses.	**Outcome 3** **Our Environment** An urban forest, that is protected and enhanced with tree-lined streetscapes, sweeping coastlines, natural bushland and accessible open spaces.	**Outcome 4** **Our Town** A transparent organisation that drives performance with leadership and integrity.
Strategic Objectives			
1.1 Connectedness and capacity building Encourage social connection by providing opportunities for the community to meet, socialise and collaborate. **1.2 Places for people** Together with our community, plan, create and activate neighbourhoods that are distinctive, welcoming and accessible. **1.3 Health and wellbeing** Promote a healthy community with access to opportunities for recreation, and support for wellbeing. **1.4 Culture, arts and heritage** Celebrate our culture, arts and heritage to retain the Town's unique character.	**2.1 Thriving local business** Encourage a resilient local economy by supporting local businesses to thrive. **2.2 Visitor economy** Attract visitors to the Town by providing exceptional experiences and iconic destinations. **2.3 Land and investment** Leverage and improve the Town's economic assets to grow the local economy. **2.4 Partnerships and connections** Develop strategic partnerships and relationships to ensure our community is well serviced.	**3.1 Natural environment** A natural environment that is respected and enhanced for future generations. **3.2 Sustainability and climate change** Improve the Town's environmental sustainability and adapt to climate change. **3.3 Built environment** Maintain quality suburbs and neighbourhoods full of treelined streets and green open spaces. **3.4 Movement and access** Improve our integrated transport networks, including infrastructure and programs that prioritise safety and connectivity for pedestrians and other sustainable transport modes**.**	**4.1 Continuous improvement and organisational performance** Develop a culture of continuous improvement and efficiency to improve value for money, customer service and accountability. **4.2 Own-source revenue** Enhance the Town's financial sustainability through opportunities to generate commercial revenue. **4.3 Local identity** Elevate the Town's identity as the best place to live, led by an organisation with a clear vision for our future. **4.4 Community engagement** Engage with the community to build partnerships, increase community capacity, inform and provide transparency in decision making.

5.3 Legal Framework

Galup (Lake Monger) is managed within a statutory and policy framework. The applicable legislation, policies and guidelines are summarised in Appendix 8.

6 Site History

Galup (Lake Monger) has a dual history, both Whadjuk Noongar and European. For millennia, the lake and its surrounds were a Whadjuk Noongar camping and hunting ground of great cultural significance. The Whadjuk Noongar people call the site, Galup, meaning “home fire or location of home”. After colonisation, it became known as either Large Lake or Triangle Lake by Europeans (based on its roughly triangular shape) before being named Monger’s Lake in 1831. In April 1932 it was changed to its current name of Lake Monger. (Cambridge Library, 2014)

Prior to European settlement the lake and its surrounds were a camping and hunting ground for Whadjuk Noongar people, important for its food resources and cultural significance. After the Europeans arrived the area was greatly modified and valued more for its recreational and aesthetic qualities.

Modifications included the removal of all the natural vegetation which led to the deterioration of the water quality. Throughout the 1980/90’s some native vegetation was returned to the reserve and rehabilitation of the wetland continues; today it provides an important habitat and drought refuge for a variety of waterbirds, turtles and other native animals including invertebrates, reptiles and frogs.

It is also a regionally significant recreation reserve and contains registered Aboriginal Heritage sites of historic and cultural significance.

Figure 2. Children punting and canoeing on Galup (Lake Monger), 1914 (courtesy of Battye Library-BA 1104/12, 000474D)

6.1 Whadjuk Noongar Land Use History

The Whadjuk Noongar name for the area currently known as Lake Monger Reserve, is Galup/Kalup which means 'home fire', 'place of fire', or 'location of home'. Galup (Lake Monger) was a traditional camping and meeting place for Whadjuk Noongar people for tens of thousands of years.

At the time of colonial settlement, the most prominent man of the Whadjuk Noongar group occupying Galup (Lake Monger) was Yellagonga. As the numbers of British settlers increased Yellagonga moved his preferred camping area from the Swan River settlement to Galup (Lake Monger).

In 1830 Galup (Lake Monger) was the site of a colonial massacre of Whadjuk Noongar people. Waring had begun among some of the early settlers and displaced Whadjuk Noongar people. *"The Bennell family came from Lake Monger, and they were driven out by the Red Coats in the early 1800s (1830's). A lot of Nyungar were shot by the Red Coats in the days of Yagan's time and were rounded up… and so the Bennell family was cornered up at Lake Monger."* (Collard et al 2004).

"*They all ran into the bush to hide. The young men, women and teenagers ran into the thick bush of Lake Monger. The Red Coats chased them and gunned some of them down. There were sounds of gunfire, bang-bang-bang, screams, cries and shouts. Some got away, some were shot. It started to get dark, and the troopers got reinforcements surrounding the lake, and setting up camp in the hope of shooting all my grandmother's people on daybreak. But next morning, when the Red Coats raided the lake, no one was there. They had crept out in the early hours of the morning unseen by the troopers."* (Eatts, 2014).

In 1833 a rations depot was set up by the colonists to provide bread and rice to Whadjuk Noongar people at Galup (Lake Monger), then known by the colonisers as Monger's Lake. That same year a serious measles outbreak affected the colony and John Henry Monger's Aboriginal son, John Jack Monger Bennell was born (Tilbrook, 1983).1833 was also the year that Yagan (a prominent Noongar figure) was murdered and his father, Midgegooroo (an influential elder) was captured by Captain Ellis and executed. (The Perth Gazette, 1833)

Yellagonga passed away in 1843, "… *The death is notified of the Aboriginal king of Perth, Yella-Gonga, acknowledged by the natives as the possessor of vast tracts of land be-tween Perth and Fremantle. He fell from a rock on the riverbank and was drowned*". (Sunday Times, 1923)

In the 1840's, following the death of Yellagonga, it was recorded that Yellagonga's niece Balbin, and nephew Doolum, camped at Goobabilup. Goobabilup appears on maps (spelt Goolabilup) to be situated on the northern tip of Galup (Lake Monger) and was known as a source of red ochre; this area now lays beneath housing between Herdsman Lake and Galup (Lake Monger). (Bates and Bridge 1992)

Figure 3. Plan of Leederville 1910 – showing Goolabilup to the north.
(https://padlet.com/galup/galup-lake-monger-7msvzp8lv43si9g7/wish/2222631835)

In 1903 the Sisters of the Good Shepherd convent and asylum for 'fallen women' was established in Leederville, near Galup (Lake Monger) and provided food and clothing to Aboriginal people in the early 20th Century. (The Western Australian, 1903)

It is believed that Whadjuk Noongar people continued to camp and fish at Galup (Lake Monger) until sometime in the 1940's, when eventually the increased recreational use of the lake by Europeans, particularly since it was gazetted as a wild fowl reserve in 1884, forced the Whadjuk Noongar people to abandon the reserve. (O'Connor, Quartermaine and Bodney, 1989)

Figure 4. Camp at Galup (Lake Monger), north of Grantham Street Wembley, 1923.
(Courtesy of State Library: NR-0002957 https: /storylines.slwa.wa.gov.au/archive-store/view/6/2910)

Galup (Lake Monger) contains registered Aboriginal heritage sites including burial sites and artifact findings. In 1978 human and animal skeletal remains were discovered during works on the Aranmore School oval, in Leederville. Whadjuk oral history suggests that a burial ground is located near Galup (Lake Monger) on the hill, formerly occupied by the Home of the Good Shepard, now the location of the Catholic Education Office, at 50 Ruislip St, Leederville. (Find and Connect, 2023) This has not been precisely located.

In 1986 stone artefacts were uncovered around Galup (Lake Monger) that are now held at WA Museum, (now known as Boola Bardip). Other artifacts had been discovered since the 1950's, some of which are believed to date sometime before 4,000 years ago. (Hallam, 1986)

Whadjuk Noongar families and traditional owners including the descendants of Jack Monger Bennell, with ancestral ties to Galup (Lake Monger) maintain a strong cultural connection to Galup (Lake Monger) today. There are a number of families who have deep connections and ties to this significant meeting place.

The Traditional Owners and Elders (In particular Len Collard and the Bennell Family) initiated the process of renaming Lake Monger to its Whadjuk name Galup (Place of Fire) in recognition of the long history of Whadjuk Noongar occupation, use and connection with the lake and it's surrounds. (Wilkes, 2024). The Bennell Family have brought to light the history of the Massacre at Galup (Lake Monger) where around 30 Whadjuk Noongars were killed between 3-5 May 1830 (University of Newcastle, 2024).

The classification of and general location of all known Aboriginal heritage sites is publicly available through the Department of Planning, Lands and Heritage (DPLH) through the Aboriginal Heritage System. Figure 5 identifies the Aboriginal heritage sites at Galup (Lake Monger).

DPLH ID	DPLH Name	Size (ha)	DPLH Status	Description
3788	Lake Monger	90.51	Registered site	Burial; Camp; Creation / Dreaming Narrative; Hunting Place; Ochre; Quarry.
3318	Lake Monger NW & W	2.19	Registered site	Artefacts/scatter, camp
3323	Lake Monger Velodrome	0.33	Registered site	Artefacts/scatter, camp, other
3160	Lake Monger South	0.80	Stored data/not a site	Artefacts/scatter

Figure 5. Registered Aboriginal Heritage Places surrounding the Town of Cambridge (DPLH)

6.2 Post-European Land Use History

Captain James Stirling was appointed Lieutenant Governor of WA in 1828. At this time free British settlers were encouraged to come to the new colony with the promise of land grants. (Bolton, 2008). In 1829 the Western Australia Act was developed and stated *"…settlement of certain wild and unoccupied lands on the western coast of New Holland and the islands adjacent which are known by the name of Western Australia*". Settlement proceeded with the expropriation of land, which Governor James Stirling later referred to as 'invasion' in his address to Legislative Council. (Perth Gazette and Western Australian Journal, 1837)

In the early 1830's British colonist John Henry Monger and his wife Mary took up a land grant comprising 200 acres on the southern side of Galup (Lake Monger) and in 1831 the wetland was re-named Monger's Lake. (Town of Cambridge, 2020 and Cambridge Library, 2014)

William Henry Leeder (also a British colonist and whom the suburb Leederville was named after), and his wife Hannah obtained grants for land on the eastern side of Monger's Lake between 1830 and 1833 and the family retained ownership until the early 1890's. (Town of Cambridge, 2020)

Monger established a residence, stock yard and a sawmill on his land and lived there until March 1833. (Town of Cambridge, 2020) In 1835 he advertised the land for sale or lease; it was described as "*well adapted for a Dairy or Stock Farm*, *and particularly eligible for the Timber and Sawyers Business*" (The Perth Gazette and Western Australian Journal, 1835)

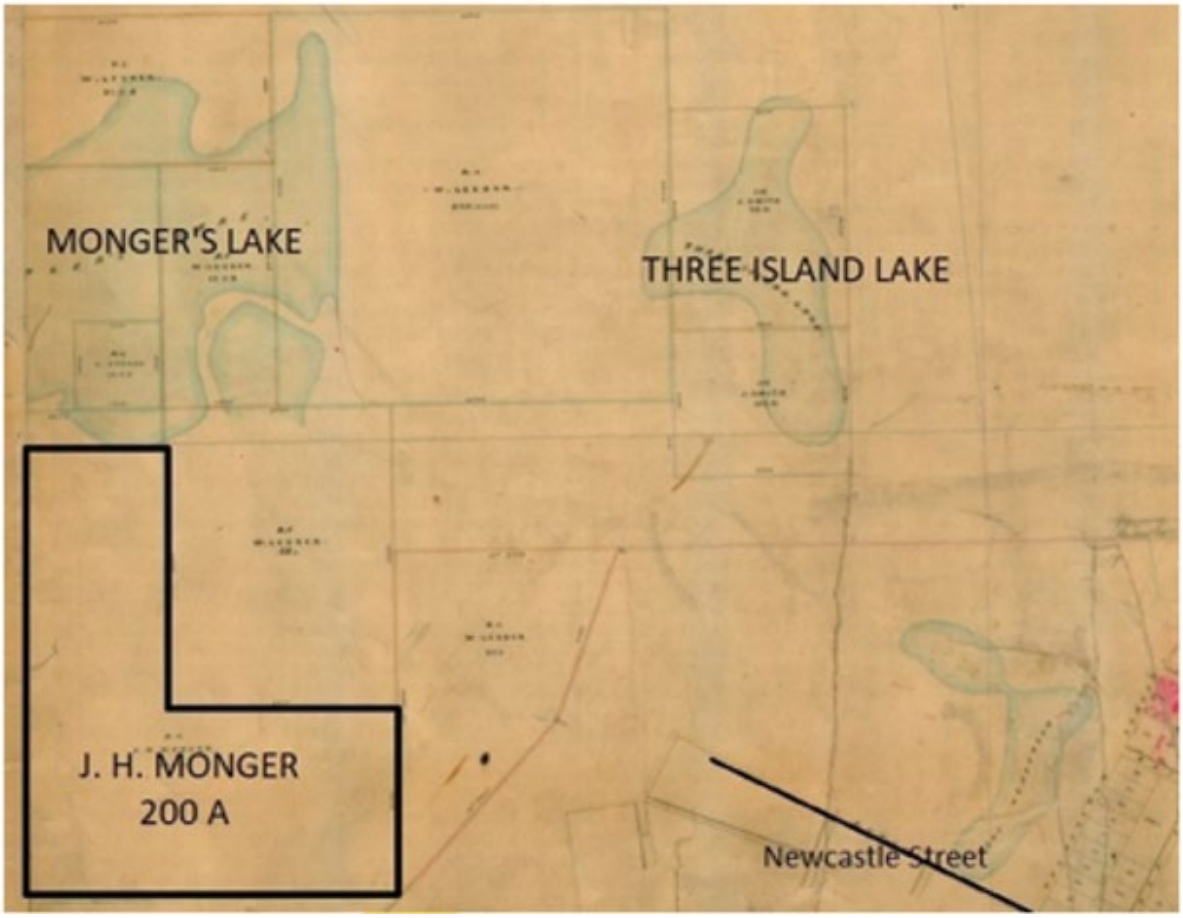


Figure 6. Land around Galup (Lake Monger).By William Phelps 1858 and 1860 (https://padlet-uploads.storage.googleapis.com/1702008125/12321503ecdc8facfdb10184ec974560/4.png)

In 1853 a portion of the Leeder's property was advertised for lease. The advertisement read "*210 ACRES of LAND within 20 minutes' walk of Perth, adjoining Monger's Lake and Mrs Leeder's property, well-watered, and a quantity of Banksia and other firewood, also Mahogany trees growing thereon; ten acres of the same is rich alluvial soil, suitable for a market garden. The RENT will be taken out in firewood…"* (The Perth Gazette and Independent Journal of Politics and News, 1853)

In 1848 plans were considered to drain Monger's Lake (The Perth Gazette and Independent Journal of Politics and News, 1848), then in 1877 it was proposed to use the lake as a water source for Perth (The Inquirer & Commercial News, 1877). Between 1900-1902 a proposal to dredge and beautify the lake was also considered (The West Australian, 1900) and in September of 1901 Monger's Lake Board was established "*for the purpose of controlling and beautifying the reserve*" (The West Australian, 1901)

Under the direction of the Monger's Lake Board, clearing and alteration to the lake led to an increase in clear water and by 1904 Monger's Lake had become a recreational area for bathing, fishing and sailing. A boat shed, yacht club, kiosk and a band stand were installed. Monger's Lake became a popular destination for recreational fishing, yachting regattas, swimming carnivals and concerts.

Figure 7. Postcards of Monger's Lake c 1910 (courtesy of City of Vincent Image Library https://cityofvincent.imagegallery.me/site/welcome.me?search=%7Etext:Monger%20postcard&search_str=Monger%20postcard)

Between 1907 and 1909 the Mounts Bay Drain was drain built to connect the lake with the Swan River allowing the water level to be managed; this drain is still in operation.

The lake and its surrounds were put under the administration of the City of Perth in 1917, for use as a public park. By 1930, the Chinese market gardens and dairies that had been operating around the lake had been acquired and a total of 50 hectares was under the control of the City of Perth to be developed as Lake Monger. (inHerit, 2021)

In 1932 Monger's Lake was renamed Lake Monger. In the same year dredging of the lake began to reclaim land and by June 1933, 110,000 tons of silt had been pumped from the lake, creating an additional 4.8 hectares of reclaimed land. Most of the fringing vegetation was removed and replaced with lawns; a kiosk, bathing sheds, boat house and a jetty were constructed. The lake was then used extensively for picnicking, yachting, swimming and fishing and further dredging was undertaken to accommodate yachting. The beautification program included planting an avenue of Norfolk Island Pine Trees and Date Palms, of which remnants remain today, bordering the northern side of Lake Monger Drive. (inHerit, 2021)

Figure 8. West end of Lake Monger Drive, February 1939 (Courtesy Cambridge Library Local Studies https://cambridgelocalstudies.files.wordpress.com/2014/05/ph0104-01-west-end-of-lake-monger-drive-feb-1939.jpg)

Land reclamation continued into the 1930s through a process of rubbish and raw sewage dumping on the northeast side of the lake. By 1936 the quality of the water had deteriorated, and infestations of midges were recorded. A decision was reached in the late 1930s, to ban boating and discourage swimming, following a series of drownings. (inHerit, 2021)

In the 1930s and 1940s Water Hyacinth, an introduced species, gradually spread across the lake, choking the waterway. It was poisoned annually, via aerial spraying, which further contributed to the decline in remnant native plants. (The West Australian, 1951)

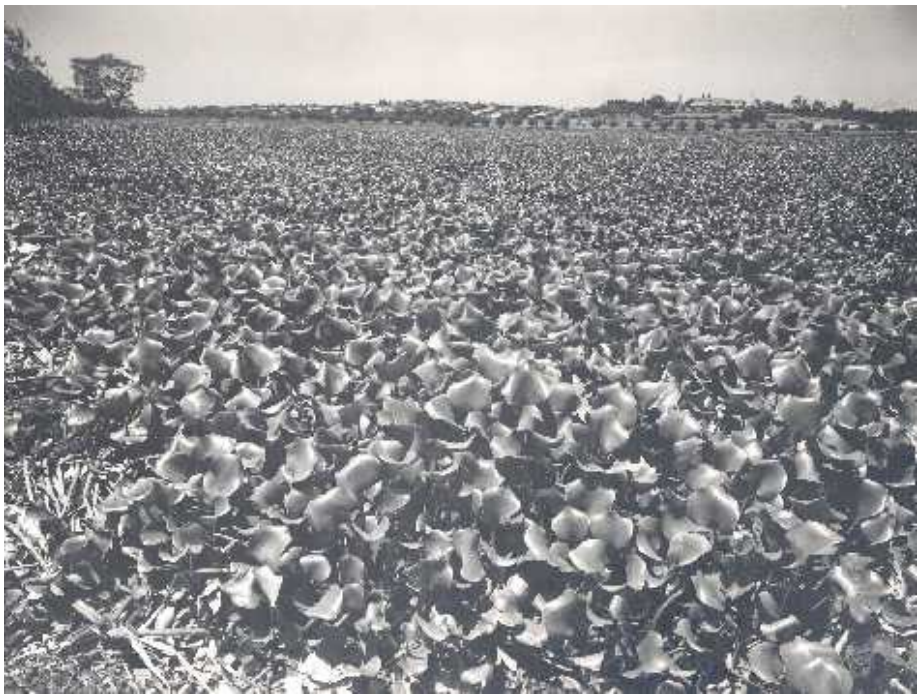


Figure 9. Galup (Lake Monger) choked by hyacinth, 1948 (Cambridge Library Local Studies https://cambridgelocalstudies.files.wordpress.com/2014/05/ph0119-03-lake-monger-choked-by-hyacinth-1948-small.jpg)

Between 1958 and 1959 a road was constructed around the lake and drainage pipes were installed. (State Library, 1959) Additionally in 1959 a Velodrome was built for the 1962 British Empire and Commonwealth Games in the location where Litis Stadium now stands, to the east of the Mitchell Freeway, in Mt Hawthorn.

During the 1960s a small island was built in the southwest corner of the lake to attract birdlife back to the lake. Since then, the lake and surrounding parklands have been managed using a more environmentally sensitive approach. The impact of fertiliser run off from the surrounding suburbs is one of many issues which continue to be a challenge. (Inherit 2021)

In the 1970's Mitchell Freeway construction cut through the eastern side of the original lake, separating Galup (Lake Monger) from Mount Hawthorn and Leederville.

In 1994, Galup (Lake Monger) came under the management of the Town of Cambridge. The reserve continues to be a culturally significant site to the Whadjuk Noongar people and the lake is a popular destination for passive recreation and bird watching.

7 Regional Setting

7.1 Location and General Description

Galup (Lake Monger) is located approximately 3.6km from the City of Perth within the suburb of Wembley and covers an area of 109ha. It consists of a lake (70.1ha) surrounded by a mixture of open parkland, scattered trees and native revegetated areas (38ha).

Galup (Lake Monger) is zoned under the Metropolitan Region Scheme and the Town of Cambridge Planning Scheme to be used for the purposes of Parks and Recreation. It is currently used as a recreational/public open space surrounding the lake. Its features include children's playgrounds, ablution blocks, a bowling club, community shed, community garden, sealed pedestrian pathways, stormwater inlets and outlets, a nutrient stripping swale, parking areas, a pump and jump track, a lake and its associated banks and irrigated grassland.

The park provides many benefits to the surrounding urban environment including:

- Significant site of Whadjuk Noongar heritage, spirituality, and culture;
- Visual Relief – by breaking up the uniform areas of suburbia;
- Recreation – by enabling large numbers of people to pursue many kinds of recreational pursuits such as walking, jogging, cycling, nature studies, picnics;
- Conservation – the lake and overall structure of the parkland provide potential for a valuable habitat for an abundance of wildlife and plants; and
- Education – the landscape character provides a biological laboratory accessible to schools, universities and the general public.

7.2 Regional Characteristics

Galup (Lake Monger) is situated within an interdunal swale and is part of the Perth group of wetlands which include Big Carine Swamp, Lake Gwelup, Jackadder Lake and Herdsman Lake. This chain of freshwater lakes occupies a shallow valley that runs northwest to south-east towards the Swan River.

According to the Interim Biogeographical Regionalisation of Australia (IBRA) descriptions Galup (Lake Monger) is located within the Swan Coastal Plain (SWA 02 – Swan Coastal Plan subregion). This area is described as a low-lying coastal plain with sands of colluvial and aeolian origin, as well as alluvial river flats and coastal limestone (Mitchell, Williams & Desmond, 2002). The region is dominated by Banksia and/or Jarrah Woodland over sandy soils associated with the dune systems, with Paperbark (Melaleuca) in swampy/damp areas and Jarrah Woodland to the east where the Swan Coastal Plain rises (Mitchell, Williams & Desmond, 2002). (NACMS, 2022)

7.3 Surrounding Land Use

Galup (Lake Monger) is surrounded by urban development, bounded on two sides by important regional access routes, Lake Monger Drive to the south and Mitchell Freeway to the east. The surrounding areas consist of urban development, which was identified in the Lake Monger Management Plan 1993-1998 as having a negative impact on the reserve through contaminants entering the lake via the groundwater and numerous stormwater drains. These impacts have been significantly addressed through installation of nutrient stripping channels and sediment ponds on the east perimeter of the reserve and other management strategies, such as public education.

8 Biophysical Environment

8.1 Climate

Perth has a Mediterranean climate characterised by hot dry summers and mild, wet winters. Mean temperature and rainfall data for the period between 1994 and 2020 is provided below.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Rainfall (mm)	19.1	13.4	19.7	35.2	87.7	127.8	144.5	125.5	82.8	38.8	21.7	10.6	733.2
Mean Max Temp (°C)	31.2	31.6	29.6	25.9	22.3	19.5	18.4	19.1	20.4	23.4	26.8	29.3	24.8
Mean Min Temp (°C)	18.1	18.4	16.8	13.8	10.4	8.6	7.9	8.3	9.5	11.6	14.4	16.4	12.8

Figure 10. Mean Rainfall and Temperature Data for the Perth Area (1994 – 2020) Source: Bureau of Meteorology.

8.2 Rainfall

The pattern of rainfall is strongly seasonal with most rainfall occurring between May and October and the highest levels recorded in June and July. The average annual rainfall is 733.2 mm and has steadily declined since last century.

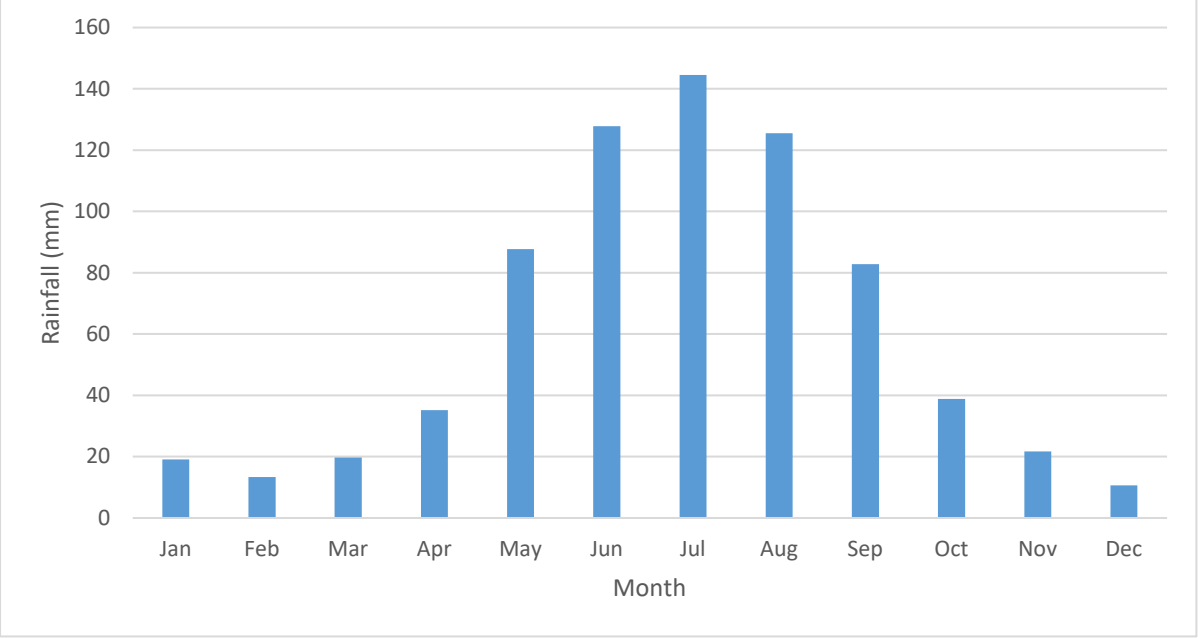


Figure 11. Mean Monthly Rainfall for Perth: 1994 – 2020 Source: Bureau of Meteorology

8.3 Temperature

Maximum temperatures in summer average 30.7°C while the minimum temperatures average 17.6°C. The maximum temperatures for winter average 19°C while the minimum temperatures average 8.3°C. Temperatures have gradually increased over the last century.

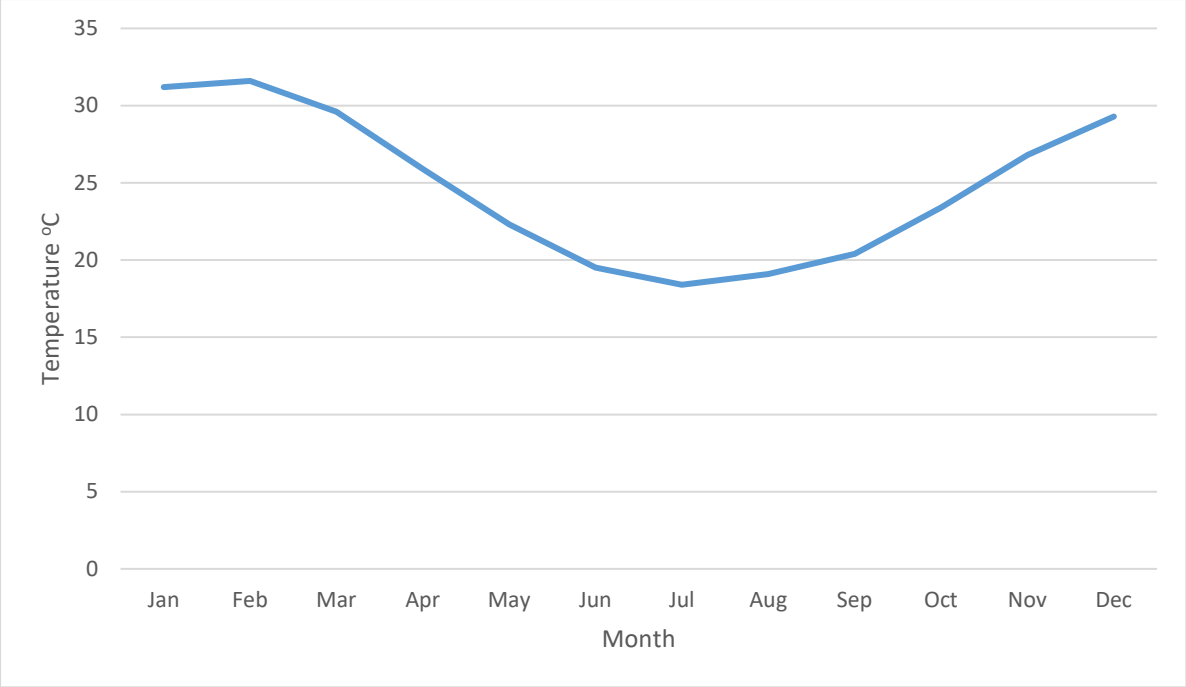


Figure 12. Mean Monthly Maximum Temperature for Perth: 1994 – 2020 Source: Bureau of Meteorology, 2020

8.4 Changing Climate

Between 1910 and 2013 the average annual temperature in the southwest of Western Australia has increased by 1.1ºC (Department of Primary Industries and Regional Development, 2020). There has also been an increase in the number of hot spells (heatwaves) which the Bureau of Meteorology define as three or more consecutive days where the maximum and minimum temperatures are unusually high for the location (Department of Primary Industries and Regional Development, 2020). In Perth the frequency of heatwaves has generally increased. Between 1981 and 2011 the annual average intensity of hot spells increased by 1.5ºC and the annual average number of heatwave days increased by three (Department of Primary Industries and Regional Development, 2020).

Since 1970 there has been 20% decline in May to July rainfall in the southwest of Australia (CSIRO, 2020). This is also consistent with the 20% reduction in annual rainfall totals during the same period. The resulting outcome has been reductions of up to 80% in both streamflow and groundwater recharge of the superficial aquifer.

Reduced water availability associated with the hotter and drier climate in the southwest of Western Australia is placing greater stress on native flora and fauna. Several of the management actions in this plan aim to address declining water availability and improve ecosystem resilience.

8.5 Wind

The winds are strongest during summer with 51% of winds in December exceeding 20km/hr at 1500 hours compared with only 20% in May and 25% in June, July and August (Bureau of Meteorology, 2020). The typical summer pattern is strong easterly winds in the morning swinging to a strong south-westerly wind or sea breeze in the afternoon.

In February the ocean and land temperatures are closer resulting in a weaker sea breeze or no sea breeze at all. In late summer, dissipating tropical cyclones may also pass through Perth

bringing rain and strong winds. During winter winds are generally lighter, the stronger westerly and north-westerly winds are associated with rain bearing depressions.

8.6 Fire Season

The fire season typically extends from September to early May. High to extreme fire danger periods occur from April to October. Lightening associated with summer thunderstorms can be an ignition source of bush fires. The combination of hot, dry, windy and lightening prone weather can result in severe fire risk in the region.

Galup (Lake Monger) is not considered a designated Bushfire Prone Area by the Department of Planning, Lands and Heritage due to the large areas of irrigated grasslands within the site.

8.7 Geology and Geomorphology

Galup (Lake Monger) is located on the Swan Coastal Plain which lies on the eastern, onshore edge of the Perth Basin. The basin contains approximately 13,000m of Permian to Quaternary aged sedimentary rock. The uppermost plain formations are late Tertiary and Quaternary, comprising sand, limestone and interbedded silt and clay, up to 100m thick. (Town of Cambridge, 2022)

The Swan Coastal Plain is characterised topographically by a series of distinct dunal systems aligned approximately north south and extending from the coast to the Darling Scarp. The Quindalup and Spearwood Dune Systems lie closest to the coast, with the Bassendean Dune System further to the east. Wetlands occur in the intertidal depressions within and between these systems. Galup (Lake Monger) lies in the Spearwood Dune System (360 Environmental, 2019).

The superficial sediments of the Spearwood Dune System comprise aeolian calcarenite (reverted Tamala Limestone) and are underlain by leached yellow sands of the Tamala Limestone. These sediments are typically pale brown to yellow calcarenite, becoming more calcareous at depth. The sediments may yield large quantities of high-quality groundwater and often have a capacity to absorb some contaminants, particularly phosphorus.

A search using NationalMap identifies three soil types which occur on site, including Spearwood wet, Lake Phase, EnvGeol S7 Phase and EnvGeol P Phase, which are described in Figure 13 and shown in Figure 14 (Department of Primary Industries and Regional Development (DPIRD), 2022). (NAMS, 2022)

Name	Symbol	Description
Spearwood wet, Lake Phase	211SpW_LAKE	Lake
EnvGeol S7 Phase	211Sp S7	SAND – pale and olive yellow, medium to coarse-grained, sub-angular to sub-rounded quartz, trace of feldspar, moderately sorted, of residual origin
EnvGeol P Phase	211Sp_P	PEAT – black, clayey in part, saturated fibrous organic soil

Figure 13: Soil types within the survey site (NAMS, 2022)

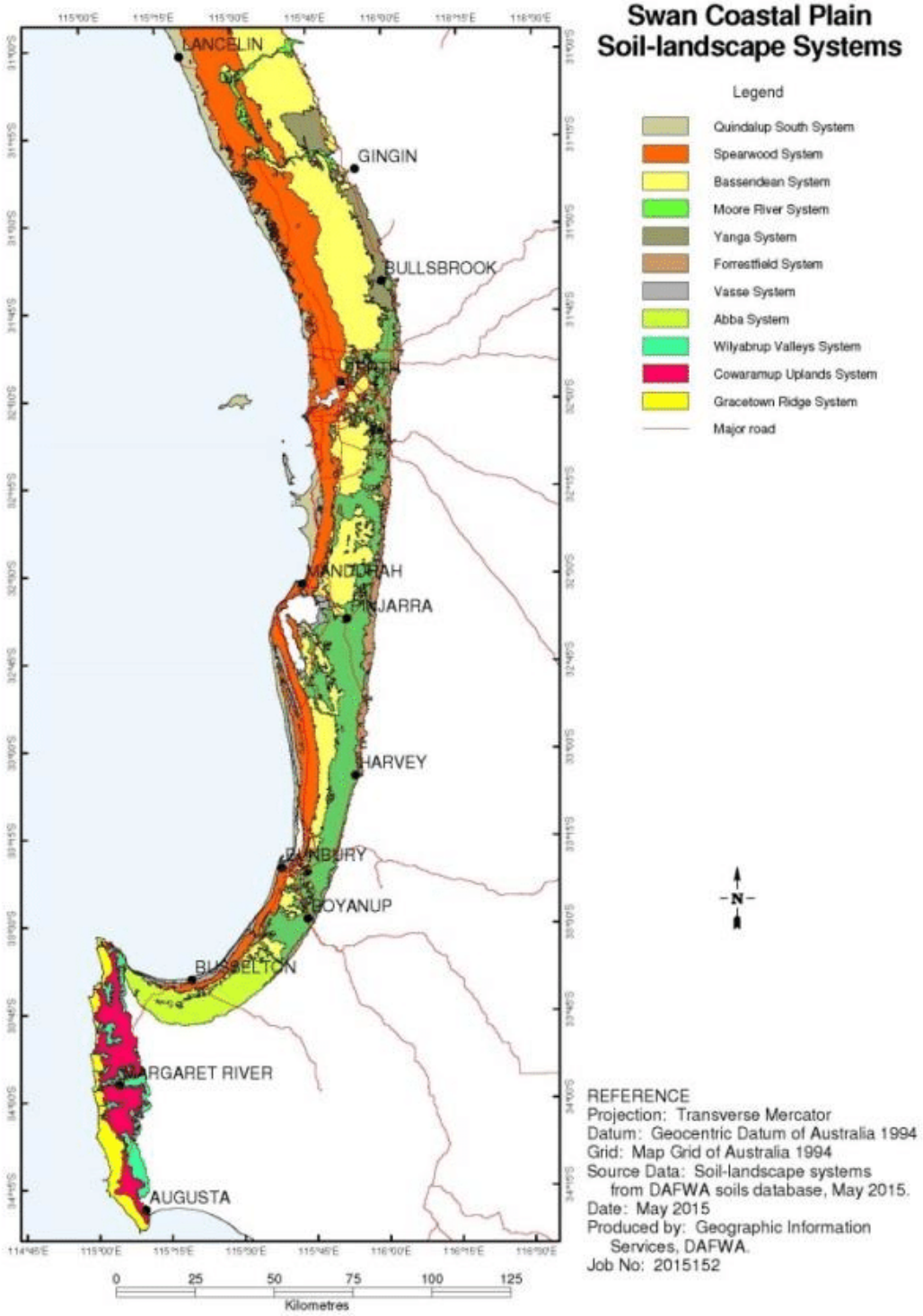


Figure 14. Soils of the Swan Coastal Plain Source: Department of Agriculture and Food WA 2015

Topographically, the majority of the site is flat at approximately 13m Australian Height Datum (AHD) with the exception of raised ground on the western boundary at approximately 16m AHD. The northern and southern elevations surrounding the lake are flat at approximately 14m AHD. The wetland itself is relatively flat with gentle banks. (360 Environmental, 2019)

A geotechnical investigation conducted in 2002 encountered fill sands from the surface up to a depth of about 0.5 metres below ground level (mbgl). The peat layer, which is generally

underlying the landfill waste material (found between 0.8m and 1.0m to 2.6m mbgl) is generally black, clayey in part and contains saturated fibrous organic soils to a depth of about 500mm, followed by pale grey/white sand (Bassendean sands). (360 Environmental, 2019)

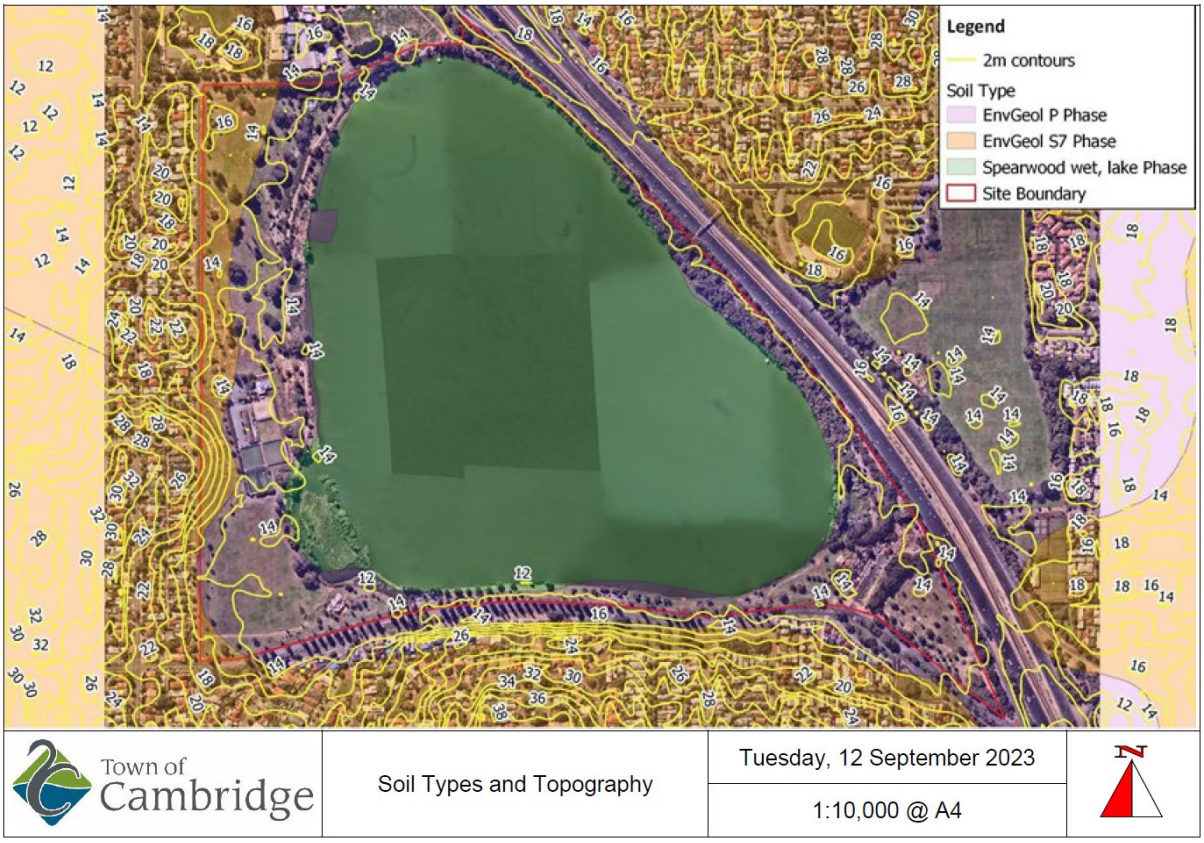


Figure 15. Galup (Lake Monger) Soil Types and Topography

9 Water Resources

9.1 Hydrogeology

The Quaternary sediments of the Swan Coastal Plain form a heterogeneous, unconfined aquifer which varies in composition both vertically and laterally. The aquifer is recharged from rainfall and drains laterally to the ocean and the Swan/Canning River System, and vertically to the underlying deep Leederville aquifer. Groundwater also leaves the shallow aquifer by evapotranspiration and extraction via irrigation bores. The combination of topography, sediment thickness and drainage has resulted in the formation of two superficial groundwater mounds, the Gnangara Mound and the Jandakot Mound within the Perth urban area. Both mounds have contributed to Perth's water supply. (Town of Cambridge, 2022)

Galup (Lake Monger) is an *"expression of the unconfined aquifer above the ground surface and water levels vary in sympathy with the elevation of the water table"* (Cargeeg et al., 1987). Galup (Lake Monger) is part of a series of freshwater wetlands running northwards from the Swan River. Historic works at the site have altered the natural expression of the wetland system. The primary aquifer systems present at Galup (Lake Monger) are the Superficial and Leederville aquifers. Groundwater in the unconfined superficial aquifer flows into the lake from the north-east and exits the lake towards Herdsman Lake to the west and towards the Swan River to the south. Groundwater at the site is located at approximately 4 mbgl with a regional groundwater flow in a westerly direction. There are five production bores on the western and southern boundary. The average depth to groundwater is at 13.5m AHD with groundwater flowing to the south-west". (360 Environmental, 2019)

9.2 Hydrology

Lake Hydrology

Galup (Lake Monger) is lies within an interdunal swale and is part of the Perth group of wetlands which includes Big Carine Swamp, Lake Gwelup, Jackadder Lake and Herdsman Lake. This chain of lakes occupies a shallow valley that runs northwest to south-east towards the Swan River. Galup (Lake Monger) is defined as having perennial surface water and is considered fresh alkaline and eutrophic in winter and hypereutrophic in summer. The eastern boundary of the lake is an inundation zone. The freshwater body collects local stormwater drainage from the adjoining suburbs of Leederville, Mount Hawthorn, Wembley, Jolimont and Floreat as well as drains from the Mitchell Freeway. The site's surface elevation declines towards Galup (Lake Monger), with is situated centrally. (360 Environmental, 2019)

The lake and surrounding area have been highly modified as a result of historical uses of the lake, clearing, urban development and changes to the natural hydrology.

Surface Catchments and Drainage

The lake at Galup (Lake Monger) is both a surface through-flow waterbody connected to the superficial Gnangara aquifer and a compensation basin which receives stormwater from 23 drainage outlets around the lake. The lake discharges into the Swan River at the freeway interchange via the Mounts Bay Drain. Nutrient stripping channels on the eastern side of the lake filter storm water to manage nutrient input.

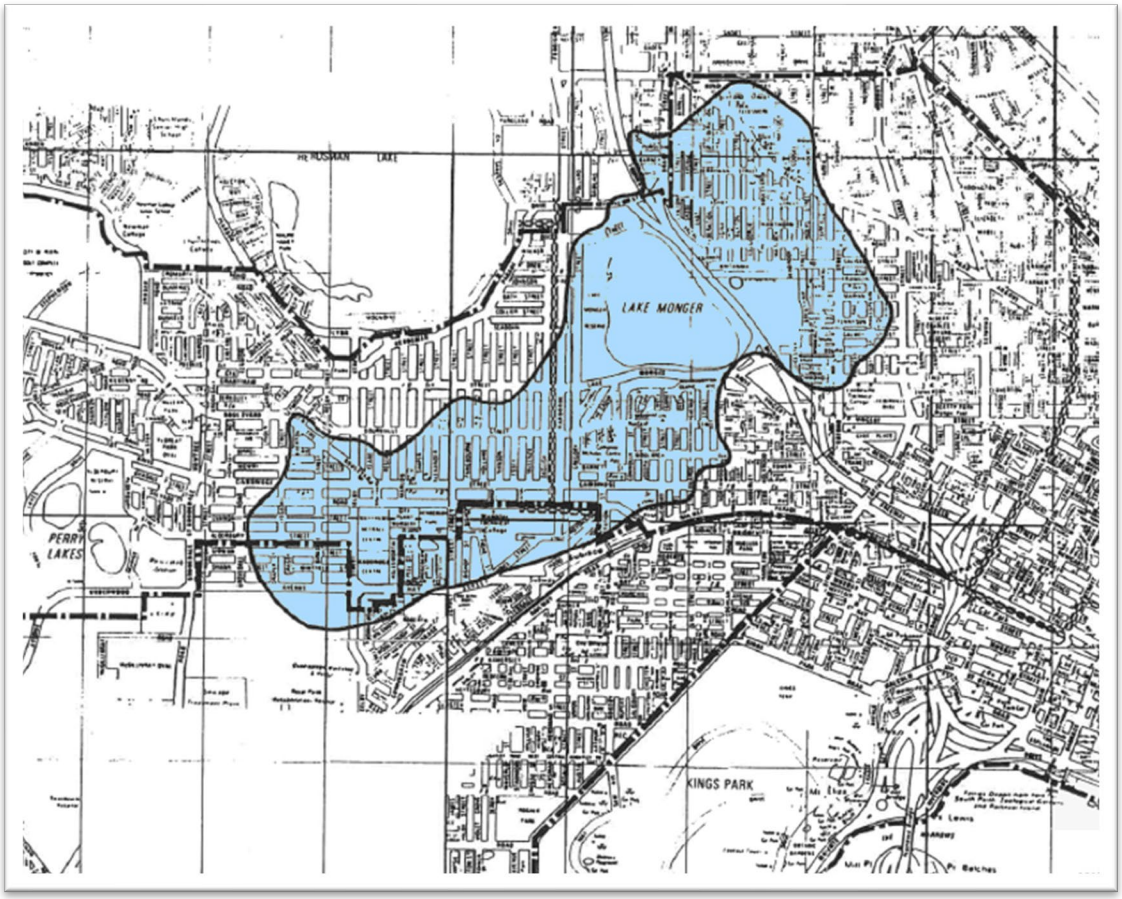


Figure 16. Catchment Area (in blue) of Galup (Lake Monger) (City of Perth 1992b)

Water Levels

Water level data has been collected at Galup (Lake Monger) since 1959 at varying times of year. Recorded levels fluctuate between 12.5m Australian Height Datum (AHD) and 13.433m (AHD). Generally, the lake levels are highest during and following winter rains, in the second half of the year, with lower levels usually occurring in the first half of the year, during and following the hotter and drier months. On average the lake level sits at around 12.88m (AHD).

Water Quality

Galup (Lake Monger) has traditionally suffered poor water quality as a result of previous land uses and nutrient-enriched inputs from groundwater, stormwater and run-off. (Regeneration Technology, 1995)

Surface water samples are collected twice annually at the beginning and end of the wet season, from the north, east, south and western sides of the lake as well as from stormwater drains located on the lakes' east. Tests are performed to measure a range of nutrients, minerals and metals as well as physical and biological parameters such as pH, dissolved oxygen and E. coli. Other testing undertaken, relevant to wetland health, includes macroinvertebrate, algal and sediment sampling.

Ongoing water quality monitoring is critical for managing water quality and avoiding issues such as algal blooms. The results of the most recent sampling are summarised in the following sections. All water quality measurements are compared with Australian New Zealand

Guidelines (ANZG) (2018) default guideline values (DGVs) for protection of freshwater wetlands in South-West Australia. (SLR, June 2023)

Water quality data collected indicate exceedance of ANZG (2018) DGVs in ammonia as nitrogen, chlorophyll a, ammonia (N-NH3), nitrogen oxides (N-Nox), total nitrogen, total phosphorus, copper, fenitrothion, hydrogen sulphide, nitrogen, phosphorus, and zinc. These levels will continue to be monitored and reflect the importance of addressing issues leading to poor water quality such as run off, pesticide use and filtration.

Water quality monitoring has also detected values below ANZG (2018) guidelines for protection of freshwater wetlands in South-West Australia for dissolved oxygen and pH. Overall low values comparative to the DGVs for protection of freshwater wetlands in South-West Australia were likely a function of high microbial activity associated with abundant organic detritus. (SLR, June 2023)

It should be noted that a singular reading of exceedances in pH does not indicate an impact event, as pH levels can fluctuate, particularly in response to weather events. The mixing of rainfall with compounds such as nitrogen oxides can cause an increase in pH, which may be why pH values were higher than the DGV during the June 2023 monitoring event. (SLR, June 2023)

Exceedances of nutrients DGVs in Galup (Lake Monger) are not unusual, however exceedances of both total phosphorus and total nitrogen DGVs can lead to eutrophication. These should be monitored, in conjunction with any large algal bloom events, which can impact DO levels, as organic blooms decay. This is supported by exceedances of chlorophyll *a* in the collected samples, indicating the presence of algae in the water column. (SLR, June 2023)

Samples collected in June 2023 also recorded exceedances of the ANZG (2018) DGVs for copper and nitrate (NO_3). *Copper concentrations in excess of the sediment DGV were detected in Lake Monger in February 2023 sampling (SLR 2023). Heavy rainfall events, coinciding with inflows from stormwater drains, may have disturbed the sediment allowing resuspension of particulate matter and releasing copper. Exceedances of these should be monitored carefully, as prolonged exposure to heavy metals, such as copper, can have detrimental impacts on macroinvertebrate assemblages*. (SLR, June 2023)

Escherichia coli (*E. coli*) was detected at all sites within Galup (Lake Monger) and has been detected in previous water quality and sediment sampling events. (SLR, June 2023)

In 2023 a project was undertaken to refurbish the nutrient stripping channels (swale) along the eastern edge of the lake, with the aim to divert drainage water from the Mitchell Freeway through the swale and significantly improve the quality of storm water entering the body of the lake. The project included a redesign of the gradient and depth of the swale and revegetation of the low gradient banks. As the native sedges and other fringing vegetation establish over time they will facilitate the removal of nutrients, sediment, hydrocarbons, and other pollutants from the water.

The improved water quality is expected to reduce the risk of algal blooms, which will in turn reduce fish and bird deaths, odour, and nuisance midges. It is anticipated that improvements will be reflected in future water quality monitoring results.

10 Flora

10.1 Original Vegetation

Two vegetation complexes have been identified at Galup (Lake Monger); the Karrakatta Complex-Central and South and Herdsman Complex. Descriptions of these complexes are provided in Figure 17 and shown in Figure 18. The pre- European extent of the Karrakatta Complex – Central and South remaining is:

- 23.49 % within the Swan Coastal Plain
- 1.75 % within the Town of Cambridge (Government of Western Australia, 2019).

No vegetation statistical information for the remaining Herdsman Complex is available for the remaining percentage within the Town of Cambridge, although there is 32.11 % remaining within the Swan Coastal Plain (Government of Western Australia, 2019). (NACMS, 2022)

Name	Description
Herdsman Complex	Vegetation within this complex is dominated by sedgelands and also woodlands consisting of *Eucalyptus rudis* and *Melaleuca* spp. This vegetation is associated with lake and swamp systems, with other flora species consisting of *Typha, Machaerina sp. (syn. Baume asp.) and Juncus spp.*
Karrakatta Complex – Central and South	Vegetation within this complex consists of open forests of Jarrah, Marri and Tuart. Flora species associated with this vegetation complex include *Banksia attenuata, B. menziesii, B. grandis, Agonis flexuosa, Jacksonia furcellata* and *Calothamnus quadrifidus.*

Figure 17. Vegetation Complexes Description Source: Heddle et al., 1980 (NAMS, 2022)

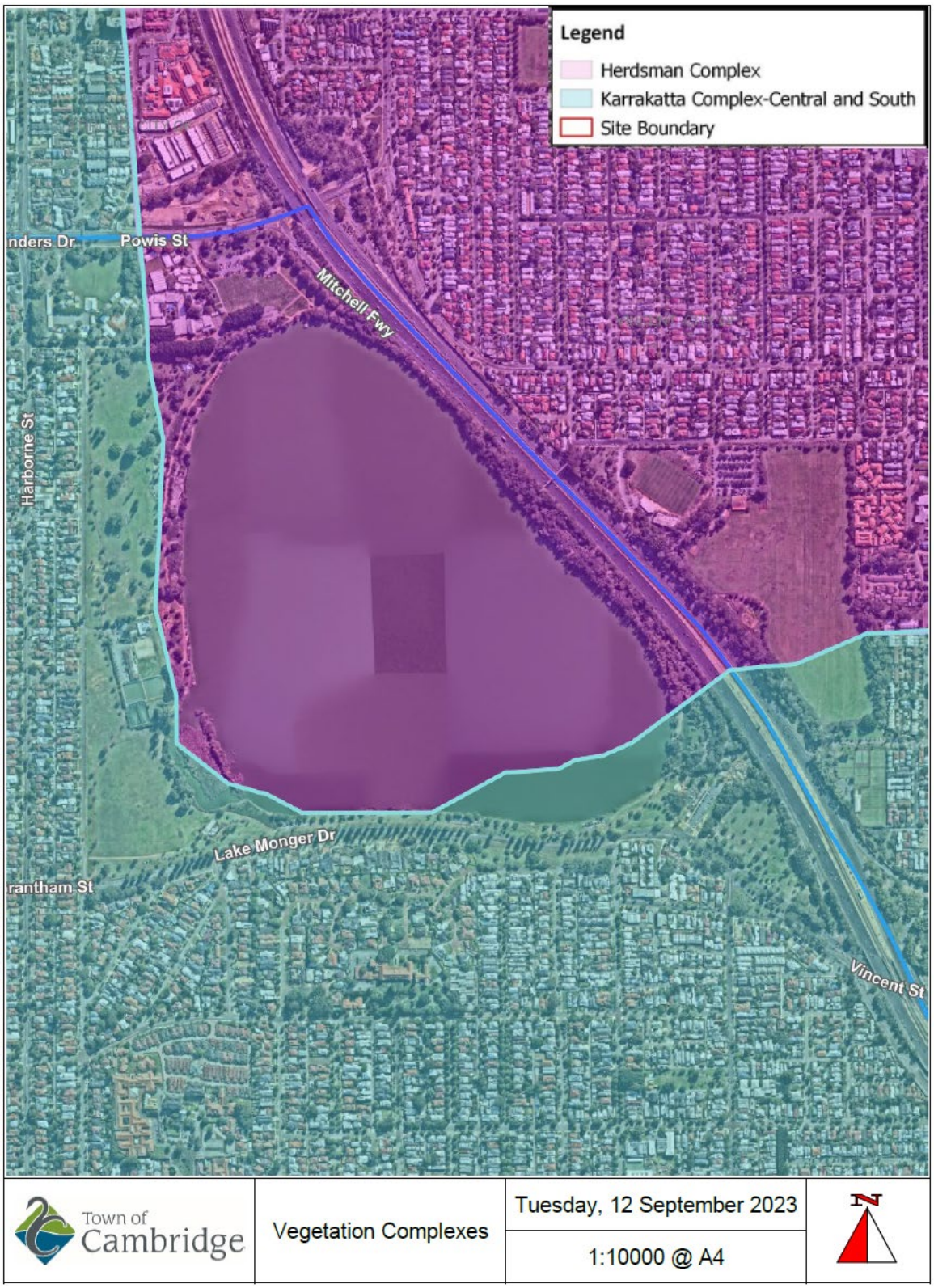


Figure 18. Vegetation Complexes

10.2 Existing Vegetation Condition

Galup (Lake Monger) and the fringing vegetation is an Environmentally Sensitive Area, although the surrounding parkland is not classified (Department of Water and Environmental Regulation 2022). The lake is classed as a Conservation Category Wetland, which covers approximately 70.1ha; the site is not listed as a Bush Forever area (DPLH 2022).

The flora at Galup (Lake Monger) contains:

- a total of 108 species, from 36 families;
- a total of 53 introduced (weeds), seven dubious (planted) species and 32 native flora species;
- reintroduction of a further 16 species as part of the swale refurbishment in 2023;
- one threatened flora species, *Grevillea thelemanniana,* was found on site and is considered to have been planted;
- six vegetation types; and
- vegetation condition across the reserve ranges from Completely Degraded to Good, with majority of the site (89.2%) in Completely Degraded condition (Figures 19 to 22).

The majority of the site is classified as Completely Degraded due to the lack of natural vegetation and consisting mainly of maintained lawns and gardens. Areas which do not include vegetation have not been categorised on the maps.

Vegetation Condition	Pristine	Excellent	Very Good	Good	Degraded	Completely Degraded	Total
Area (ha)	0	0	0	1.2	2.61	31.54	35.35
Area (%)	0	0	0	3.4	7.4	89.2	100

Figure 19. Vegetation condition within the survey area

Category	Description
1 Pristine	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.
2 Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.
3 Very Good	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
4 Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds, partial clearing, dieback and grazing.
5 Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing.
6 Completely Degraded	The structure of the vegetation is no longer intact, and the area is completely or almost completely without native species. These areas are often described as ‘parkland cleared’ with the flora comprising weed or crop species with isolated native trees or shrubs.

Figure 20. Vegetation condition ratings. Source: EPA, 2016 (NAMS, 2022)

Figure 21. Vegetation condition

10.3 Vegetation Types

The June 2022 survey recorded a total of six vegetation types within Galup (Lake Monger), which are described in Figure 22 and shown in Figure24. Areas which do not include vegetation have not been categorised.

Vegetation types within Galup (Lake Monger), *denotes introduced species

Vegetation Type	Description
Parkland	A planted parkland consisting of **Casuarina cunninghamiana, Ficus macrophylla and *Eucalyptus cladocalyx* over maintained lawns.
Mixed Native Sedgeland	Mixed native sedgeland consisting of *Juncus pallidus, Machaerina juncea* (syn. *Baumea juncea*) over an understorey of **Cynodon dactylon* (Couch).
Typha orientalis Grassland	Grassland dominated by *Typha orientalis.*
Mixed *Grevillea* spp. Shrubland	Mixed planted shrubland consisting of *Grevillea thelemanniana* and #*Grevillea crithmifolia*.
Eucalyptus rudis and *Casuarina* spp. Open Woodland	An overstorey consisting of *Eucalyptus rudis* and **Casuarina cunninghamiana* over a sparse understorey of introduced herbs and grasses.
Melaleuca rhaphiophylla Open Woodland	An overstorey of *Melaleuca rhaphiophylla* over an understory of *Persicaria decipiens,* which was fully inundated with water.

Figure 22. Vegetation type descriptions

Figure 23. Vegetation type

10.4 Threatened and Priority Communities

No threatened or priority ecological communities (as defined under the *Environment Protection and Biodiversity Conservation Act 1999)* occur on site due to the lack of dominant species that is used to categorise and define these communities.

One threatened flora species was identified during the June 2022 field survey, *Grevillea thelemanniana*, which is considered to have been planted at the site. DBCA searches identified this as a priority species (P3) within the site boundary, towards the south-eastern corner of the site. This portion of the site is parkland cleared consisting of trees over maintained lawns and is considered very unlikely that this species is present. (NAMS, 2022)

10.5 Flora Diversity

A total of 92 flora species from 36 families were recorded during the 2022 field survey, including 53 (39%) introduced (weeds), seven (19.4%) planted species and 32 (34.6%) native species. Additional native species were re-introduced through the swale refurbishment project in 2023 bringing the total number of flora species to 108. A comprehensive list of the existing flora is provided in Appendix 11.

The flora diversity is not representative of the natural floristic diversity of the local area. The site is significantly degraded from weed invasion and a long history of disturbance including clearing.

10.6 Introduced Flora

Many of the introduced flora are invasive environmental weeds which pose a threat to the ecological integrity of Galup (Lake Monger). These weeds outcompete native flora and modify suitable habitat or food resources for native fauna. Ongoing weed control is necessary to improve ecosystem health and resilience.

One species of declared pests, which is also listed as a Weed of National Significance (WoNS) is present within the site, Athel Tree (**Tamarix aphylla*). The *Biosecurity and Agriculture Management Act 2007* requires the landowner/land manager to control the population.

The presence of *Typha orientalis* and *Typha domingensis*, both native species, poses a threat to the site as both species are aggressive invaders which can transform wetland ecosystems unless actively managed.

11 Fauna

11.1 Fauna Habitat

Galup (Lake Monger) is situated next to major roads and surrounded by houses, therefore limiting opportunity for ground dwelling species movements to other reserves. Anthropogenic barriers such as roads and urban areas limit movement, especially for native ground dwelling species such as turtles and other reptiles.

The site does provide good habitat for aquatic species and birds which rely on large permanent fresh water sources. The area surveyed during the June 2022 survey has the potential to provide habitat for small reptile and amphibian species due to the accumulation of leaf litter, logs and a permanent water source, particularly within the eastern portion of the site. The site also provides potential roosting habitat for threatened black cockatoo species in the form of several large trees which meet the habitat roosting requirements of a diameter at breast height (DBH) of 500 mm or greater, although the site may provide low to moderate foraging sources in the form of *Eucalyptus* spp. and *Pinus* sp. species. (NAMS, 2022)

Four types of fauna habitat are present within the site, Grassland/ Sedgeland, Parkland, Shrubland and Woodland; these are described in Figure 24 and shown in Figure 25.

Habitat Type	Description
Grassland/ Sedgeland	Foraging and nesting habitat for small bird species including those which nest on the ground.
Parkland	Limited foraging and roosting habitat for bird species due to the parkland cleared nature of the area.
Shrubland	Foraging habitat for small bird species which feed on the nectar of flowering plants.
Woodland	Foraging and roosting habitat for bird species.

Figure 24. Fauna habitat types

Figure 25. Fauna habitat types, northern end Galup (Lake Monger)

Fauna habitat in the form of hollows was noted in two parkland trees (London Plane tree, *Plantanus* x *acerifolia*). One was a small hollow which has the potential to be used by small bird species with the potential to become suitable nesting habitat for larger birds in the future. A larger hollow with current potential to provide habitat for these larger birds was observed within a partially dying London Plane tree. Locations of the trees with hollows is shown in Figure 25.

11.2 Fauna Diversity

A total of 31 species were observed during the field survey in June 2022, including 29 bird species, one introduced mammal, Black Rat (**Ratus ratus*) and one introduced aquatic pest fish species, Gambusia (**Gambusia holbrooki*). It was noted that a large flock of the Little Corella's (*Cacatua sanguinea*) was observed to be present within the survey area feeding on seeding plants. (NAMS, 2022), however, while not observed during the field survey, the South-western snake-necked turtle (*Chelodina colliei*) has been observed as well as a species of introduced Carp (*Cyprinus sp*.). For a complete list of fauna recorded at Galup (Lake Monger) refer to Appendix 12.

11.3 Conservation significant fauna

During the field survey, one Priority 4 species was observed, the Blue-billed Duck (*Oxyura australis*), within the main body of water of the lake. (NAMS, 2022)

A desktop survey of online databases indicated the potential for a total of 53 conservation significant fauna species to occur within 10 km of the survey area and after evaluating the suitability of habitats at Galup (Lake Monger), it was determined that the three threatened Western Australian Black Cockatoos have the potential to be present, namely, the endangered Baudin's Black-Cockatoo (*Zanda baudinii*) and Carnaby's Black-Cockatoo (*Zanda latirostris*), and the vulnerable Forest Red-tailed Black-Cockatoo (*Calyptorhynchus banksii naso*) (DCCEEW, 2023)

11.4 Birds and other water dependent species

Open freshwater areas and fringing vegetation provide important habitat and food resources for fauna particularly waterbirds, frogs, turtles, fish and invertebrates. The fringing sedgelands provide nursery for fish and breeding habitat for fauna particularly the Snake-necked Turtle and waterbirds such as the Black Swan, Purple Swamphen, Dusky Moorhen and the occasional Pelican.

The grasslands areas around the lake periphery may be used as hunting grounds by birds of prey. The lack of understory offers little structural diversity and micro-habitats to support a greater diversity of bird species.

11.5 Aquatic Invertebrates

Macroinvertebrate sampling at Galup (Lake Monger) indicate a total of 21 families and 69 distinct species have been recorded at the site and it was noted that species richness in the open lake sites was higher than at the drain sites. (SLR, July 2023)

Macroinvertebrate 'groups' included Microcrustacea (Ostracoda, Cladocera, Copepoda), Water Mites (Acarina), Fly and Mosquito Larvae (Diptera), Water Beetles (Coleoptera), True Bugs (Hemiptera), Worms and Leeches (Hirudinea, Nematoda, Oligochaeta), Pond Snails (Gastropoda), Springtails (Collembola), Hydras (Cnidaria), Caddisfly Larvae (Trichoptera), Crustacea (Amphipoda), and Dragonfly Larvae (Odonata). (SLR, July 2023)

12 Management Strategies

12.1 Water Management

Figure 26 - Fauna refuge island and nutrient stripping channel on eastern side of the lake

Since the development of the Lake Monger Management Plan 1993-1998 there have been several supporting documents pertaining to stormwater and groundwater quality with the significant contribution of nutrients recognised as coming from the groundwater particularly from the areas east of the Lake. Studies were undertaken to determine the nutrient loads and levels of other contaminants entering the lake through stormwater drains and locate point sources and investigate various methods of treating stormwater to improve the quality of drainage waters.

An intensive rehabilitation program was then implemented to mitigate some of the impacts of the stormwater drains and the contributing nutrient input. This was achieved by creating nutrient stripping channels and sediment ponds in front of the drains from the north along the eastern edge near the freeway and planting fringing and emergent native vegetation. On-going water quality monitoring and lake level management has also continued annually.

Management Aims and Objectives

The objectives for the management of water quality in Galup (Lake Monger) include:

To improve and maintain the lake's water quality to an acceptable level ensuring that the lake environment is able to support a variety of environmental and social values.

1. Enhance water quality in the lake;

2. Investigate exceedances of ANZECC trigger values to determine causes and implement appropriate management responses to address the exceedances;

3. Manage the lake as a Conservation Category Wetland;

4. Increase efficiency of irrigation systems; and

5. Educate the community about waterwise irrigation, garden design and how they impact stormwater quality.

12.1.1 Groundwater/Surface Water

The lake has been highly modified over time. has suffered from extensive weed invasion and declining water quality due to nutrient inputs.

The water quality of the lakes is generally within ANZECC Guidelines and within the range exhibited by other Perth wetlands. Exceedances are generally limited to Nitrogen, Ammonia, Phosphorous, Zinc, Copper and Hydrogen Sulphide. Water quality can be improved by minimising fertiliser application and irrigation of turf areas, frequent street sweeping and encouraging residents to minimise fertilising and irrigation of their gardens. Ongoing water quality monitoring will also aid in identifying any water quality issues and informing management actions. In addition, ongoing macro-invertebrate monitoring may act as an indicator of wetland health.

Management Recommendations

Recommendations include:

1. Continue to undertake a water quality monitoring program as a key indicator of wetland health in conjunction with macroinvertebrate sampling, as outlined in Fauna Management;

2. Investigate measures to reduce nutrients entering Galup (Lake Monger) from stormwater;

3. Continue to monitor lake water levels;

4. Continue to develop management responses to address any exceedances of ANZECC trigger values;

5. Implement sediment control in bioretention areas;

6. Continue to manage bore water to ensure abstraction is within allocation;

7. Develop a nutrient and irrigation management plan (NIMP), annual reporting of leaf and soil nutrient levels, water extraction and water quality testing of ground water bores; and

8. Continue to educate the community about waterwise initiatives including efficient irrigation design, soil improvement and low water demand landscaping.

12.1.2 Irrigation

Improvements in irrigation efficiency through the installation of central controlled irrigation has assisted in reducing bore water consumption however the impact of a drying climate has continued to put pressure on ground water levels.

Private bores place significant pressure on the superficial aquifer. By continuing to support the Waterwise Council, Golf Course and Pool programs along with regular community workshops and education regarding groundwater efficiency the impacts from abstraction can be reduced.

The current irrigation infrastructure at the site is aged, inefficient and in need of upgrades and redesign. Currently there is a section in the Dog Off Lead area which is unirrigated and other areas very close to the lake (Buffer areas) are watered with overspray going into the lakes.

Irrigation of the lake buffer areas increases the likelihood weed invasion. It is anticipated that by modifying irrigation will also improve turf health, conserve ground water and decrease abstraction.

Management Recommendations

Recommendations include:

1. Continue to reduce areas irrigated within the buffer around the lake;

2. Replace aged irrigation infrastructure with a more efficient system; and

3. Continue to conduct regular bore and pump maintenance;

12.2 Flora Management

Figure 27 - Rehabilitation of east fauna refuge island

From the recommendations within the Lake Monger Rehabilitation Plan 1995 restoration activities have been undertaken along the entire eastern edge of the lake including a complete reconstruction of the lake edge and the creation of a habitat island, nutrient stripping ponds and channels.

Management Aims and Objectives

The objectives for the management of flora at Galup (Lake Monger) include:

1. Improve the abundance and richness of native endemic floral species of the Lake and increase the condition rating of degraded and completely degraded areas to very good or excellent;

2. Reduce invasive exotic grasses, herbaceous weeds and woody weeds through targeted chemical and manual weed control;

3. Manage plant pathogens; and

4. Improve habitat diversity for local fauna species.

12.2.1 Natural Areas

Due to colonisation of swamp sheoak (*Casuarina obesa*) on the eastern side of the lake which soon created a monoculture, a vegetation thinning program was required to allow for continued views of the lake from the walk trail. Weed control and other maintenance procedures have also been ongoing within the reserve.

Ongoing work to restore the ecological communities within Galup (Lake Monger) is required in order to provide a variety of fauna habitats for breeding, feeding and nesting. Additionally, restoration will improve water quality and enhance and protect both the natural and historical value, understanding and appreciation of the reserve. This includes the further development of buffer areas around the water body to reduce impacts from irrigation, nutrient loads while providing additional habitat for wildlife.

Management Recommendations

Recommendations include:

1. Continue to revegetate in the buffer areas to increase habitat, support species diversity and to minimise nutrient input into the lake;

2. Continue to support annual planting program and weed control activities by Friends of Galup/Lake Monger; and

3. Continue to manage exotic plants in all natural areas to support revegetation and biodiversity;

12.2.2 Trees and turf

Careful consideration needs to be given to placement of new trees to avoid overcrowded or dense canopy cover which can adversely impact turf health, quality and increase weed invasion within turf areas.

Canopy cover over the lake bodies conversely can increased to reduce impacts from the sunlight on water quality and temperature which can reduce likelihood of eutrophication and botulism outbreaks in the wildlife. However there needs to be careful placement of new trees to ensure areas of open water remain for water birds to land, tortoises and reptiles to bask and wide range of habitats for all fauna.

Long-term management focuses on retaining, conserving and enhancing the significant parkland. It includes managing trees to promote sound health, improve public safety and indigenous planting to improve a mixed age class of the urban forest.

Management Recommendations

Recommendations include:

1. Continue to conduct annual visual tree inspections;

2. Develop a Significant Tree Register;

3. Continue to undertake strategic tree planting within the reserve, to provide shade and reduce heat for park users;

4. Provide avenue street tree planting in surrounding street verges;

5. Continue to retain iconic avenue of Norfolk Island Pines on Lake Monger Drive;

6. Continue to retain palms in grassed areas outside of lake buffer; and

12.2.3 Weed and Pathogens

The invasion of weeds is a significant management issue for the wetlands of Galup (Lake Monger) and the surrounding area. Invasive weeds out-compete native flora and impact biodiversity values of the lakes. Weeds compete with native plant species for space and moisture and usually do not provide suitable habitat or food resource for native fauna.

A flora and fauna survey was conducted in 2022 which documented weed species to be targeted. This will assist in identifying weed management priorities. Ongoing weed management and monitoring is required to eradicate weeds and maximise revegetation success.

Mulching is an important part of weed suppression however careful consideration of pathogens such as phytophthora needs to be managed through good hygiene and composting of material.

Management Recommendations

Recommendations include:

1. Undertake weed mapping of the natural areas and update every five years;

2. Continue to ensure regular weed monitoring to track effectiveness;

3. Continue to undertake weed control according to Australian Pesticide and Veterinary Medical Authority (APVMA) and Department of Health guidelines; and

4. Develop a phytophthora management procedure.

12.2.4 Endemic Vegetation

The western side of the lake has some fringing vegetation in a degraded condition, while the island in the southwest corner is the only area of good condition due to previous revegetation efforts, as seen in Figure 21. Much of the remaining site has been completely degraded due to the loss of naturally occurring wetland species. The invasion of weeds has not only been exacerbated by irrigation and hydrological changes but also through the loss and lack of buffer vegetation necessary for a healthy Conservation Category Wetland. It is expected that newly revegetated areas, including the extensive work completed in 2023 to upgrade the nutrient stripping channels and sediment ponds along the eastern side of the lake, will improve condition ratings over the coming years as plants and habitat re-establishes.

Best practice recommends a fifty-metre buffer of natural vegetation which encompass the lake to provide habitat for breeding tortoises, frogs, birds and reptiles. This also has the added effect of reducing weed invasion into the nutrient rich and moist soils which increases weed vigour and germination. However, as the community have been used to open access to the lake edges for a number of decades, therefore careful planning of access to the lake surrounds for both conservation and recreation will need to occur.

Sections of the lake buffer should be mulched and planted with low growing floristic vegetation to allow wetland and wildflower views. The existing paths and lookouts onto the lake edge provide closer access to the water to retain human connection. Some areas should remain grassed to provide a number of different recreational experiences within the site.

Management Recommendations

Recommendations include:

1. Develop a revegetation plan for Galup (Lake Monger) to improve flora species abundance and richness within the wetlands and within the wetland buffer zone and to guide Friends of Galup/Lake Monger Landcare activities;

2. Investigate the potential establishment of an Aboriginal Ranger Program to assist in the management of native flora, incorporating traditional Noongar ways of land management.

3. Develop revegetation to incorporate opportunities for education e.g. bush tucker and the Noongar six seasons;

4. Develop a vegetation monitoring program to track rehabilitation success – including winter and summer photo monitoring; and

5. Undertake vegetation surveys at five-year intervals.

12.3 Fauna Management

Galup (Lake Monger) is an important habitat and drought refuge for water birds, turtles, reptiles frogs and invertebrates. It is recommended that management strategies focus on determining and maintaining the habitat requirements of the snake-necked turtle and local bird species, particularly the Priority 4 species, Blue-billed Duck.

Introduced bird species such as rainbow lorikeets can significantly impact on the ecological and recreational values of the reserve by competing with local birds for food and habitat. Honeybees are an introduced species that compete with local insects for nectar and their hives, when built in tree hollows, prevent local birds from nesting. Monitoring of pest species is recommended to determine impacts on native bird species.

It is also important that nutrient levels in the lakes are regularly monitored to help prevent outbreaks of avian botulism. Signage educating about the impacts of feeding waterbirds are installed around the lake to help reduce impacts to water quality. Baseline water quality sampling was undertaken in June 2019. Ongoing water quality and macroinvertebrate monitoring will aid in managing water quality.

Snake-necked turtles (*Chelodina colliei*) are found within the lake. Good nesting sites adjacent to the lakes are necessary for breeding. Road fatalities have been recorded along Lake Monger Drive and the Mitchell Freeway. It is recommended that the earth banks and gentle slopes are maintained along the shoreline with some gaps in the vegetation to facilitate the movement of females for nesting. However nesting females do appear to like nesting on the eastern and western sides of the lake. Further protection is desired through the installation of a barrier fence along the freeway boundary to stop nesting turtles getting killed on this main arterial road.

Dogs are required to be on leash within the reserve with the exception of the off-leash dog exercise area on the southeast corner of the reserve. Dogs off lead can interfere with wildlife and other reserve users. Cats may also impact on native species within the Reserve,

particularly birds. It is recommended that the Town continue to raise awareness of responsible dog and cat ownership including registration, sterilisation, microchipping, vaccination, and confinement at night.

Management Aims and Objectives

The following management objectives aim to support fauna and improve biodiversity.

1. Undertake measures to support *Chelodina colliei* (Southwestern Snake-necked Turtle) habitat;

2. Implement measures to support birdlife;

3. Provide a diversity of habitats to support a diverse range of local fauna; and

4. Work with the community and schools to support local faunal biodiversity.

Management Recommendations

Recommendations include:

1. Investigate the potential establishment of an Aboriginal Ranger Program to assist in the management of native fauna, incorporating traditional Noongar ways of land management.

2. Undertake biennial fauna surveys and compare to baseline fauna survey data;

3. Continue to undertake annual macroinvertebrate surveys as an indicator of wetland health and to determine diversity and richness of species;

4. Collaborate with the friends group to monitor turtle nesting and conduct annual surveys of *Chelodina colliei*;

5. Request upgrades to barrier fencing along Mitchell Freeway by Main Roads WA to stop nesting turtles from entering the freeway reserve;

6. Monitor and control feral pests such as foxes, rabbits, feral cats, lorikeets and honeybees;

7. Continue to monitor and manage mosquito and midge larvae in the Lake;

8. Continue to enforce the Dog Act and Town of Cambridge Animals Local Law to ensure dog lead compliance in on-lead areas;

9. Develop management protocols to manage health issues affecting fauna (e.g. botulism outbreaks); and

10. Install fauna attracting structures - insect hotels, bat, bird and possum boxes.

12.4 Cultural and Recreational Management

Galup (Lake Monger) is a popular tourist attraction promoted in postcards, leaflets and tourist bureaus as a place where you can experience and be part of an Australian wetland as well as see our state emblem, the black swan.

The site is a significant site to the Whadjuk Noongar people of southwestern Australia. It was a site of significance for camping, hunting, meeting and large ceremonies. Cultural heritage information has been incorporated into interpretive signage within the site.

Management Aims and Objectives

The following management objectives aim to support cultural and recreational facility management;

1. Provide appropriate infrastructure that caters for the varied uses of the reserve;

2. Manage the site as a mixed-use public open space with environmental, cultural, sporting and recreational uses and values;

3. Preserve the wetlands as a Conservation Category Wetland;

4. Recognise the social and cultural and heritage values of the reserve held by the community; and

5. Work closely with Whadjuk Elders and Traditional Owners with heritage links to Galup (Lake Monger), to recognise the Whadjuk Noongar and European heritage values of the reserve.

6. Identify, conserve and promote the cultural heritage of Galup (Lake Monger);

7. Work closely with Whadjuk Elders and Traditional Owners with heritage links to Galup (Lake Monger), to continue to promote the cultural history through interpretive signage and art;

8. Design facilities and undertake management that considers and retains Galup (Lake Monger) cultural attributes;

9. Continue collaborating with organisations and relevant Whadjuk Noongar Groups and families that have a cultural link and ongoing interest in Galup (Lake Monger).

12.4.1 Cultural Management

Significant engagement was undertaken with relevant groups and Whadjuk Noongar families prior to and during the development of the Management Plan and Masterplan to ensure cultural heritage values were recognised. Future updates to the Management Plan will require collaboration with Traditional Owners and Cultural Knowledge Holders of the site to ensure the Whadjuk Noongar cultural values of the area are acknowledged, protected, promoted and interpreted for visitors.

Management Recommendations

Recommendations include:

1. Collect, document and promote Galup's (Lake Monger's) Whadjuk Noongar, colonial and contemporary history to increase public awareness of Galup's (Lake Monger's) cultural heritage;

2. Restore the name of Lake Monger back to its Whadjuk Noongar name Galup;

3. Incorporate the Whadjuk Noongar heritage of Galup (Lake Monger) in interpretive material including signs, sculptures, paintings, art etc;

4. In collaboration with descendants of the survivors of the 1830 massacre at Galup (Lake Monger), design and install a memorial at the lake;

5. Create a space for a Yarning Circle; a place for meeting and learning, that can be used by local schools for environmental and cultural education;

6. Seek Whadjuk Noongar Traditional Owners' feedback on and approval of the Management Plan prior to implementation of the plan's recommended actions; and

7. Ensure all development and ground-disturbing activities conducted on the reserve are in accordance with the Western Australian *Aboriginal Heritage Act 1972,* and in consultation with local Whadjuk Noongar knowledge holders.

12.4.2 Recreational Management

The major facilities at Galup (Lake Monger) include the Community Shed, Community Garden, full and halfcourt basketball, fitness equipment, toilets, playgrounds, barbecues, picnic tables, bins, pump/jump track and the Recreation Club which hosts Lawn Bowls and five a side soccer.

The southwest grassed areas are also currently used for junior soccer training and archery practice. This grassed area is also used for large scale community events including the Cambridge Christmas Celebration and so should remain open to allow that use to continue.

Management Recommendations

Recommended actions include:

1. Install accessible pathway connections to BBQ, Picnic, Playgrounds and seating within the reserve;

2. Install dog agility equipment in the off-lead area to facilitate improved dog control and raise turf levels to address puddling;

3. Upgrade the viewing platforms, when they require replacement and use cantilever structures to avoid lakebed damage and ensure they are accessible;

4. Install a new lookout and outdoor learning area;

5. Continue to ensure adequate separation of recreational activities from other uses to avoid conflicts;

6. Continue to implement the Foreshore Landscape Concept, including additional picnic facilities, basketball court, amenities, boardwalk jetty, native trees, break out turf areas, ecozone and wetland plantings, and gravel beaches for wildlife, ensuring they meet accessibility requirements;

7. Continue to support and promote mobile food vans and al fresco dining facilities;

8. Undertake strategic lighting and safety audit of carparks and pathways;

9. Install site map signs at the main entrances to the reserve, identifying key features of the reserve;

10. Upgrade pedestrian access through formal crossings across Lake Monger Drive to the east and west of the site;

11. Update and install the Galup (Lake Monger) display boards with information about the site, working closely with the Whadjuk Elders group;

12. Upgrade Dodd Street playground to include sensory areas for all abilities play;

13. Install viewing platforms and educational signage at key locations along the southern shore to permit the public to get a closer view and appreciation of the flora and fauna of the wetlands, and

14. Investigate the installation of conservation fencing and gates on the eastern side of the lake to protect flora and fauna.

12.4.3 Community Engagement and Education

An information shelter was built in 2000 near the Powis Street carpark along with interpretive and informative signage about the vesting of Galup (Lake Monger); the aims and progress of the rehabilitation; the function of the eastern edge as a nutrient biofilter and fauna habitat; key vegetation types and illustrations of key fauna; requests to owners to keep their dogs on leads and on the path; educational signage to inform visitors of acceptable activities within the reserve; and fauna management.

Galup (Lake Monger) has important education and scientific value as a waterbird habitat and drought refuge. It offers students and the community an opportunity to study a functioning wetland with its complex inter-relationships between flora and fauna. The proposed revegetation and increased natural areas also give rise to the opportunity of creating a longer-term revegetation plan for implementation by the “Friends of Galup/Lake Monger” who will foster the site as part of the Towns volunteer program and provide opportunities and access to grants not available to the Town directly.

It is recommended that the Town encourage schools to use Galup (Lake Monger) as a local historical and environmental education site. Display boards should be installed at four locations around the main entrances to the reserve. Seasonal information can be displayed on these boards, about the history of the lake, to help educate and inform the community of these values.

Management Aims and Objectives

The following management objectives aim to support community engagement and education;

1. Promoting Galup (Lake Monger) as a demonstration area for urban wetland management through education programs, tours, publications and community activities;

2. Environmental and cultural heritage interpretative and education planning using a variety of techniques to reach a wider audience and to be conducted in collaboration with Whadjuk Noongar Traditional Owners and Cultural Knowledge Holders; and

3. Promoting Galup (Lake Monger) as a significant wildlife refuge, recreational facility and culturally significant urban wetland.

Management Recommendations

Recommended actions include:

1. Continue to promote the Friends of Galup/Lake Monger as well as events that connect the community with Galup (Lake Monger), to build capacity of the Friends group and encourage public awareness and direct involvement in lake restoration efforts;

2. Continue to encourage schools to get involved with activities at the reserve, which could be run in conjunction with the Friends Group;

3. Upgrade the current interpretive and information signage strategically around the lake. Signs to detail the fauna species that inhabit the lake, the vegetation and the Whadjuk Noongar and European historical background to create a sense of identity and affiliation with Galup (Lake Monger);

4. Support the development and implementation of an educational program that encompasses the environmental and cultural history of Galup (Lake Monger);

5. Continue to support the Community Garden;

6. Continue to promote education and community awareness of activities occurring within Galup (Lake Monger) Reserve; and

7. Continue to support the use of the Reserve in research programmes to enhance understanding of the environmental, social and historical values of the reserve.

13 Implementation Program

The following implementation program addresses the areas requiring ongoing management and tracks works over the next ten years. The works have been broken down into the following four areas:

1. Water Management
2. Flora Management
3. Fauna Management
4. Cultural and Recreational Facility Management

TOWN OF CAMBRIDGE

GALUP (LAKE MONGER) MANAGEMENT PLAN 2024-2034 - IMPLEMENTATION PROGRAM

ITEM	LOC No	PROPOSED WORKS DETAIL	2024/ 2025	2025/ 2026	2026/ 2027	2027/ 2028	2028/ 2029	2029/ 2030	2030/ 2031	2031/ 2032	2032/ 2033	2033/ 2034
		WATER MANAGEMENT										
1	12.1.1	Continue to undertake a water quality monitoring program as a key indicator of wetland health in conjunction with macroinvertebrate sampling, as outlined in Fauna Management.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	12.1.1	Investigate measures to reduce nutrients entering Galup (Lake Monger) from stormwater.		✓		✓		✓		✓		✓
3	12.1.1	Continue to monitor lake water levels	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	12.1.1	Continue to develop management responses to address any exceedances of ANZECC trigger values.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
5	12.1.1	Implement sediment control in bioretention areas					✓					✓
6	12.1.1	Continue to manage bore water to ensure abstraction is within allocation.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
7	12.1.1	Develop a nutrient and irrigation management plan (NIMP), annual reporting of leaf and soil nutrient levels, water extraction and water quality testing of ground water bores		✓	✓							
8	12.1.1	Continue to educate the community about waterwise initiatives including efficient irrigation design, soil improvement and low water demand landscaping	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

1	12.1.2	Continue to reduce areas irrigated within the buffer around the lake		✓	✓	✓	✓					
2	12.1.2	Replace aged irrigation infrastructure with a more efficient system			✓							
3	12.1.2	Continue to conduct regular bore and pump maintenance	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

TOWN OF CAMBRIDGE

GALUP (LAKE MONGER) MANAGEMENT PLAN 2024-2034 - IMPLEMENTATION PROGRAM

ITEM	LOC No	PROPOSED WORKS DETAIL	2024/ 2025	2025/ 2026	2026/ 2027	2027/ 2028	2028/ 2029	2029/ 2030	2030/ 2031	2031/ 2032	2032/ 2033	2033/ 2034
		FLORA MANAGEMENT										
1	12.2.1	Continue to revegetate in the buffer areas to increase habitat, support species diversity and to minimise nutrient input into the Lake.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	12.2.1	Continue to support annual planting program and weed control activities by Friends of Galup/Lake Monger	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	12.2.1	Continue to manage exotic plants in all natural areas to support revegetation and biodiversity	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1	12.2.2	Continue to conduct annual visual tree inspections	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	12.2.2	Develop a Significant Tree Register		✓								
3	12.2.2	Continue to undertake strategic tree planting within the reserve to provide shade and reduce heat for park users			✓			✓			✓	
4	12.2.2	Provide avenue street tree planting in surrounding street verges			✓	✓						
5	12.2.2	Continue to retain iconic avenue of Norfolk Island Pines on Lake Monger Drive	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

6	12.2.2	Continue to retain palms in grassed areas outside of Lake buffer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1	12.2.3	Undertake weed mapping of the natural areas and update every five years				✓					✓	
2	12.2.3	Continue to ensure regular weed monitoring to track effectiveness	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	12.2.3	Continue to undertake weed control according to Australian Pesticide and Veterinary Medical Authority (APVMA) and Department of Health guidelines	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	12.2.3	Develop a phytophthora management procedure		✓								
1	12.2.4	Develop a revegetation plan for Galup (Lake Monger) to improve flora species abundance and richness within the wetlands and within the wetland buffer zone and to guide Friends of Galup/Lake Monger land care activities		✓	✓							
2	12.2.4	Investigate the potential establishment of an Aboriginal Ranger Program to assist in the management of native flora, incorporating traditional Noongar ways of land management.		✓								
3	12.2.4	Develop revegetation to incorporate opportunities for education e.g. bush tucker and the Noongar six seasons		✓	✓							
4	12.2.4	Develop a vegetation monitoring program to track rehabilitation success – including winter and summer photo monitoring	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
5	12.2.4	Undertake vegetation surveys at five-year intervals				✓					✓	

TOWN OF CAMBRIDGE

GALUP (LAKE MONGER) MANAGEMENT PLAN 2024-2034 - IMPLEMENTATION PROGRAM

ITEM	LOC No	PROPOSED WORKS DETAIL	2024/ 2025	2025/ 2026	2026/ 2027	2027/ 2028	2028/ 2029	2029/ 2030	2030/ 2031	2031/ 2032	2032/ 2033	2033/ 2034
		FAUNA MANAGEMENT										
1	12.3	Investigate the potential establishment of an Aboriginal Ranger Program to assist in the management of native fauna, incorporating traditional Noongar ways of land management.		✓								
2	12.3	Undertake biennial fauna surveys and compare to baseline fauna survey data		✓		✓		✓		✓		✓
3	12.3	Continue to undertake annual macroinvertebrate surveys as an indicator of wetland health and to determine diversity and richness of species	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	12.3	Collaborate with the friends group to monitor turtle nesting and conduct annual surveys of *Chelodina colliei*		✓	✓	✓	✓	✓	✓	✓	✓	✓
5	12.3	Request upgrades to barrier fencing along Mitchell Freeway by Main Roads WA to stop nesting turtles from entering the freeway reserve	✓	✓	✓							
6	12.3	Monitor and control feral pests such as foxes, rabbits, feral cats, lorikeets and honeybees	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
7	12.3	Continue to monitor and manage mosquito and midge larvae in the Lake	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
8	12.3	Continue to enforce the Dog Act and Town of Cambridge Animals Local Law to ensure dog lead compliance in on-lead areas	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

9	12.3	Develop management protocols to manage health issues affecting fauna (e.g. botulism outbreaks).	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
10	12.3	Install fauna attracting structures - insect hotels, bat, bird and possum boxes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

TOWN OF CAMBRIDGE

GALUP (LAKE MONGER) MANAGEMENT PLAN 2024-2034 - IMPLEMENTATION PROGRAM

ITEM	LOC No	PROPOSED WORKS DETAIL	2024/ 2025	2025/ 2026	2026/ 2027	2027/ 2028	2028/ 2029	2029/ 2030	2030/ 2031	2031/ 2032	2032/ 2033	2033/ 2034
		CULTURAL AND RECREATIONAL FACILITY MANAGEMENT										
1	12.4.1	Collect, document and promote Galup's (Lake Monger's) Whadjuk Noongar, colonial and contemporary history to increase public awareness of Galup's (Lake Monger's) cultural heritage**		✓	✓							
2	12.4.1	Restore the name of Lake Monger back to its Whadjuk Noongar name Galup**	✓	✓								
3	12.4.1	Incorporate the Whadjuk Noongar heritage of Galup (Lake Monger) in interpretive material including signs, sculptures, paintings, art etc**		✓	✓	✓	✓	✓				
4	12.4.1	In collaboration with descendants of the survivors of the 1830 massacre at Galup (Lake Monger), design and install a memorial at the lake;			✓	✓	✓					
5	12.4.1	Create a space for a Yarning Circle; a place for meeting and learning, that can be used by local schools for environmental and cultural education**		✓	✓	✓	✓	✓				
6	12.4.1	Seek Whadjuk Noongar Traditional Owners' feedback on and approval of the Management prior to implementation of the plan's recommended actions**	✓									
7	12.4.1	Ensure all development and ground-disturbing activities conducted on the reserve are in accordance with the Western Australian Aboriginal Heritage Act 1972 and in consultation with local Whadjuk Noongar knowledge holders**	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
1	12.4.2	Install accessible pathway connections to BBQ, Picnic, Playgrounds and seating within the reserve	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

2	12.4.2	Install dog agility equipment in the off-lead area to facilitate improved dog control and raise turf levels to address puddling				✓						
3	12.4.2	Upgrade the viewing platforms, when they require replacement and use cantilever structures to avoid lake bed damage and ensure they are accessible						✓				
4	12.4.2	Install new lookout and outdoor learning area					✓	✓	✓			
5	12.4.2	Continue to ensure adequate separation of recreational activities from other uses to avoid conflicts	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
6	12.4.2	Continue to implement the Foreshore Landscape Concept, including additional picnic facilities, basketball court, amenities, boardwalk jetty, native trees, break out turf areas, ecozone and wetland plantings, and gravel beaches for wildlife ensuring they meet accessibility requirements**	✓	✓	✓	✓	✓					
7	12.4.2	Continue to support and promote mobile food vans and al fresco dining facilities	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
8	12.4.2	Undertake strategic lighting and safety audit of carparks and pathways		✓								
9	12.4.2	Install site map signs at the main entrances to the reserve, identifying key features of the reserve			✓							
10	12.4.2	Upgrade pedestrian access through formal crossings across Lake Monger Drive to the east and west of the site		✓	✓	✓						
11	12.4.2	Update and install the Galup (Lake Monger) display boards with information about the site, working closely with the Whadjuk Elders group			✓							
12	12.4.2	Upgrade Dodd Street playground to include sensory areas for all abilities play		✓								

13	12.4.2	Install viewing platforms and educational signage at key locations along the southern shore to permit the public to get a closer view and appreciation of the flora and fauna of the wetlands.		✓	✓	✓						
14	12.4.2	Investigate the installation of conservation fencing and gates on the eastern side of the lake to protect flora and fauna.		✓	✓						✓	✓
1	12.4.3	Continue to promote the Friends of Galup/Lake Monger as well as events that connect the community with Galup (Lake Monger), to build capacity of the Friends group and encourage public awareness and direct involvement in lake restoration efforts	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	12.4.3	Continue to encourage schools to get involved with activities at the reserve which could be run in conjunction with the Friends Group	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	12.4.3	Upgrade the current interpretive and information signage strategically around the lake. Signs to detail the fauna species that inhabit the lake, the vegetation and the Whadjuk Noongar and European historical background to create a sense of identity and affiliation with Galup (Lake Monger).**			✓	✓	✓					
4	12.4.3	Support the development and implementation of an educational program that encompasses the natural and cultural history of Galup (Lake Monger).			✓	✓	✓	✓	✓	✓	✓	✓
5	12.4.3	Continue to support the Community Garden	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
6	12.4.3	Continue to promote education and community awareness of activities occurring within Galup (Lake Monger) Reserve.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
7	12.4.3	Continue to support the use of the Reserve in research programmes to enhance understanding of the environmental, social and historical values of the reserve.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes: - (**) - denotes projects that have implications under the Aboriginal Heritage Act 1972

14 Appendices

Appendix 1 Galup (Lake Monger) Site Location

Town of Cambridge

The Town of Cambridge does not warrant the accuracy of information in this publication and any person using or relying upon such information does so on the basis that the Town of Cambridge shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.

Galup (Lake Monger) Site Location

Thursday, 20 June 2024

Appendix 2 Galup (Lake Monger) Picnic and BBQ Facilities

Town of Cambridge	Picnic and Barbeque Facilities	Facilities Benches – purple Barbeque – Red Shelter - Green	Tuesday, 12 September 2023 1:10000 @ A4	N

Appendix 3 Galup (Lake Monger) Playgrounds, Exercise Equipment and Drink Fountains

Town of Cambridge	Playgrounds, Exercise Equipment and Drink Fountains	Playground – Red Drink Fountains – Blue Exercise Equipment - Green	Tuesday, 12 September 2023 1:10000 @ A4	N

Appendix 4 Galup (Lake Monger) Access

Appendix 5 Galup (Lake Monger) Zoning Aboriginal Registered Site

Appendix 6 Galup (Lake Monger) Zoning MRS Parks and Recreation

Appendix 7 Galup (Lake Monger) Zoning TPS Zones and Reserves 2023

Town of Cambridge	The Town of Cambridge does not warrant the accuracy of information in this publication and any person using or relying upon such information does so on the basis that the Town of Cambridge shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.	Galup (Lake Monger) Zoning TPS Zones and Reserves Public Purposes – hashed yellow Parks and Recreation – pale green (sth-east corner)	Monday, 31 July 2023 1:5000 @ A3	N

Appendix 8 Legal Framework

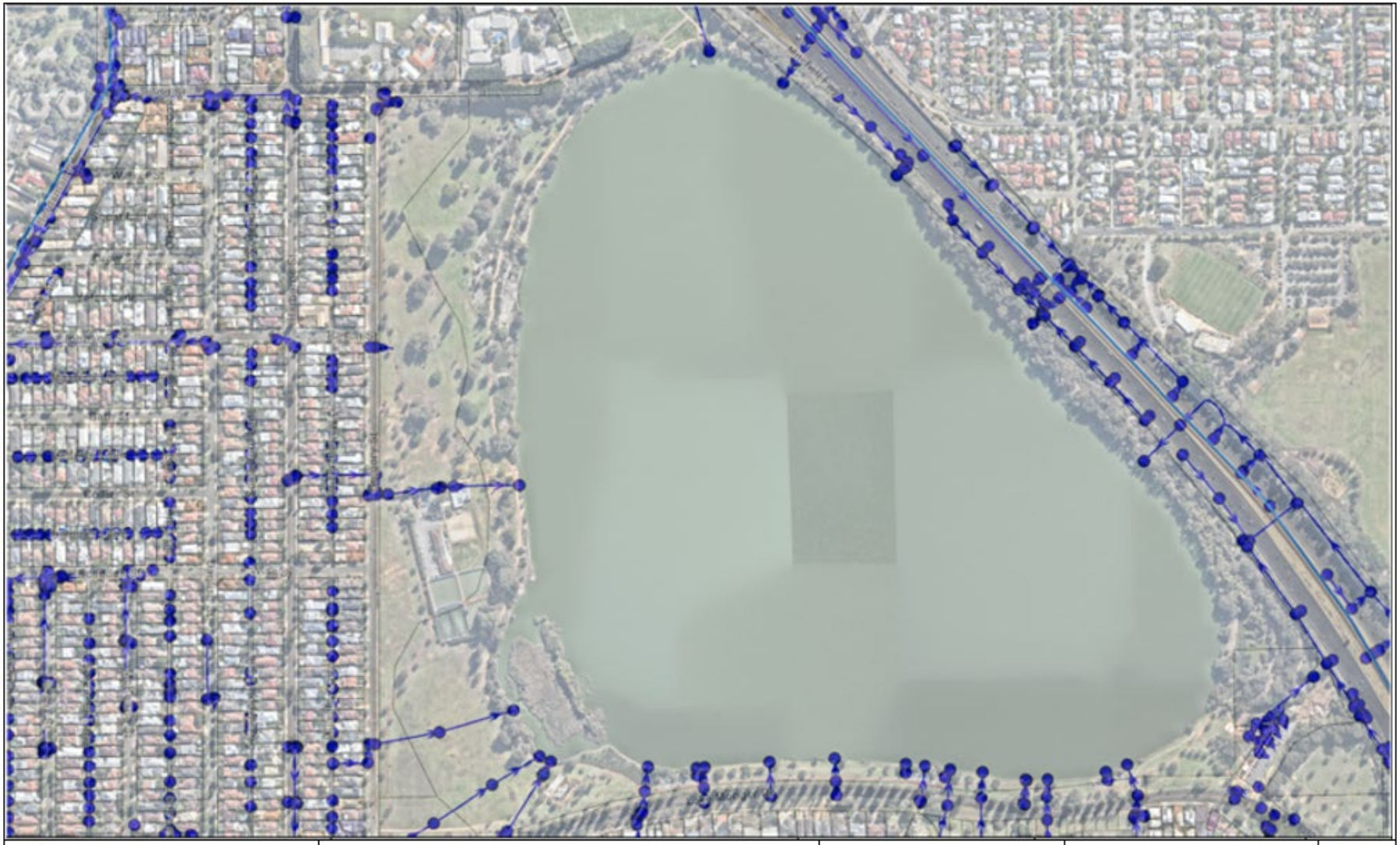
Legislation	Policies and Guidelines	Relevance
Commonwealth		
Environment Protection and Biodiversity Conservation Act 1999	Threatened species guidelines and information sheets. Migratory birds' information	• Matters of national environmental significance
Disability Discrimination Act 1992		• Ensure facilities and access to facilities within Galup (Lake Monger) comply with the standards set by this Act.
Western Australia		
Aboriginal Heritage Act 1972		• Four registered Aboriginal Heritage sites are recorded at Galup (Lake Monger) • Reserve (site IDs; 3160, 3318, 3323 and, 3788) (Department of Planning Lands and Heritage 2022) • These sites are protected under the Aboriginal Heritage Act 1972 (WA) (AHA), which protects all Aboriginal sites in Western Australia. • Pursuant to section 18 of the Act, traditional owners must be consulted regarding any development that may disturb a registered Aboriginal heritage site
Biodiversity Conservation Act 2016		• Protection of native flora and fauna • Presence of declared rare fauna species. • Presence of priority 4 listed flora species
Biosecurity and Agriculture Management Act 2007	Declared Plant Control Handbook West Australian Organism List	• Control of declared flora (weeds) and fauna organisms. • Off label permit use of herbicides
Bush Fires Act 1954		• Reducing the risk of bushfires addressing prevention, control and extinguishment of fires
Cat Act 2011	Creates statutory responsibilities for cat owners to register and control their cat/s. Implemented at a local level through local cat law	• Responsibilities of local cat owners relating to registration and control and authority of council to trap and remove roaming cats

Conservation and Land Management Act 1984	Wetlands Conservation Policy for Western Australia 1997	• Primary wetland conservation policy for Western Australia
Contaminated Sites Act 2003		• Contamination risks present in the parts of Galup (Lake Monger) reclaimed with domestic landfill
Dog Act 1976	Creates statutory responsibilities for dog owners to register and control their dog/s. Implemented at a local level through local dog laws	• Responsibilities of local dog owners relating to registration, control, on and off-leash exercise areas and the removal of faecal material
Environmental Protection Act 1986	• Designated Conservation Category Wetlands • Clearing of Native Vegetation Regulations • EPA Position Statement no.4 Environmental Protection of Wetlands • Bush Forever (State Planning Policy 2.8) Bushland Policy for the Perth Metropolitan Region.	• Prevention of environmental harm • Protection of wetlands listed in the Geomorphic Wetlands Swan Coastal Plain dataset including requirements relating to filling, effluent disposal and drainage management – proposed changes must be referred to the EPA for environmental impact assessment. • Native vegetation clearing requirements to be adhered to
Health Act 1911		• Water quality within the lake from a human health perspective
Litter Act 1979	Keep Australia Beautiful initiatives	• Reduction of litter in the environment
Local Government Act 1995		• Local Government responsibilities: duty of care and safety
Planning and Development Act 2005	• Planning Policies • State Planning Policy 2 – Environment and Natural Resources Policy • State Planning Policy 2.8 – Bushland Policy for the Perth Metropolitan Region • Planning Guidelines • Better Urban Water Management	• Zoning/land purpose • Protection of natural values through appropriate planning • Bush Forever listing and protection. • Protection of water resources and prevention of impacts to surface and groundwater • Prevention of contamination during development activities from ASS

	• Acid Sulphate Soils (ASS) • Bush Forever Fact Sheet	
Wildlife Conservation Act 1950		• Protection of native flora and fauna
Local Government		
Town of Cambridge Natural Area Strategy 2022 - 2032		• Provides strategic direction for the management of the Town's natural areas across bushland remnant, coastal dunes and wetland environments.
Town of Cambridge Galup (Lake Monger) Management Plan – 2024-2034		• Ongoing management of Galup (Lake Monger)
Town of Cambridge Urban Forest Strategy		Management of the Town's urban forest to: • Protect and enhance the urban forest. • To foster public appreciation of the urban forest • To ensure the resilience or the urban forest • To improve connectivity of the urban forest
Town of Cambridge Sustainability Strategy		• Incorporates protection of natural assets, fostering of green public realms and rehabilitation of natural areas
Town of Cambridge Local Planning Scheme No 1		• The southeast corner of the Galup (Lake Monger) reserve is zoned Local Parks and Recreation under the Town Planning Scheme
Western Australian Planning Commission Metropolitan Region Scheme		• A large proportion of Galup (Lake Monger) is zoned 'Parks and Recreation' under the Metropolitan Region Scheme
WESROC Greening Plan 2002		• Promotes regional ecological linkages through greening corridors
Animals Local Law		• Requirements of responsible dog ownership including control of dogs, removal of dog faeces and the provision of dog exercise areas where dogs may be off leash. • Requirements of responsible cat ownership including effective control of cats

	Town of Cambridge Dog Control Policy No 4.4.1	• Provides for dog exercise areas (off-leash). All other areas are designated on-leash areas at all times. • Requirement that dogs must be under effective control at all times and that dog owners must pick up and remove their dog faeces
	Your Dog and You pamphlet	Responsibilities of dog owners
	Responsible Cat Ownership pamphlet	Responsibilities of cat owners

Appendix 9 Galup (Lake Monger) Stormwater pipes and pits



Appendix 10 Lake Monger Southwest Node & Lake Foreshore Landscape Concept

Appendix 11 Galup (Lake Monger) Flora Species

The complete flora list for the site is provided in the table below with flora listed by species. *Denotes introduced species.

Family	Species Name	Common Name	Noongar Name
Anacardiaceae	**Schinus terebinthifolia*		
Apiaceae	*Centella asiatica*	Centella	
Apocynaceae	**Nerium oleander*		
Araucariaceae	**Araucaria heterophylla*	Norfolk Island Pine	
Arecaceae	**Phoenix dactylifera*	Date Palm	
Arecaceae	**Washingtonia filifera*		
Asteraceae	**Arctotheca calendula*	Capeweed	
Asteraceae	**Erigeron bonariensis*		
Asteraceae	**Erigeron sumatrensis*		
Asteraceae	**Hypochaeris glabra*	Smooth Cats-ear	
Asteraceae	**Lactuca serriola*	Prickly Lettuce	
Asteraceae	**Pseudognaphalium luteoalbum*	Jersey Cudweed	
Asteraceae	**Sonchus oleraceus*	Common Sowthistle	
Asteraceae	**Symphyotrichum squamatum*	Bushy Starwort	
Bignoniaceae	**Pyrostegia venusta*	Orange Trumpet Vine	
Caryophyllaceae	**Stellaria media*	Chickweed	
Casuarinaceae	**Casuarina cunninghamiana*		
Casuarinaceae	**Casuarina glauca*		
Casuarinaceae	**Casuarina sp.*		
Chenopodiaceae	**Atriplex prostrata*	Hastate Orache	
Chenopodiaceae	*Rhagodia baccata*	Berry Saltbush	
Cupressaceae	*Callitris preissii*	Rottnest Island Pine	Marro
Cyperaceae	**Carex divisa*	Divided Sedge	
Cyperaceae	**Cyperus compressus*		
Cyperaceae	**Cyperus eragrostis*	Umbrella Sedge	
Cyperaceae	*Bolboschoenus caldwellii*	Marsh Club-rush	Belilah or Waakal Ngarnak
Cyperaceae	*Carex appressa*	Tall Sedge	Waakal Ngarnak
Cyperaceae	*Carex fascicularis*	Tassel Sedge	Waakal Ngarnak
Cyperaceae	*Ficinia nodosa*	Knotted Club Rush	Waakal Ngarnak
Cyperaceae	*Lepidosperma gladiatum*	Coat Sword-sedge	Kerbein or Waakal Ngarnak
Cyperaceae	*Machaerina (Baumea) articulata*	Jointed rush	Waakal Ngarnak, Waugal Ngamak Waargyl Ngarnak or Kuiarch
Cyperaceae	*Machaerina (Baumea) juncea*	Bare Twigrush	
Cyperaceae	*Machaerina (Baumea) preissii*		Waakal Ngarnak
Cyperaceae	*Machaerina (Baumea) rubiginosa*		
Cyperaceae	*Schoenoplectus tabernaemontani*	Lake Club-rush	Waakal Ngarnak
Euphorbiaceae	**Euphorbia maculate*		
Euphorbiaceae	**Ricinus communis*	Castor Oil Plant	
Fabaceae	**Acacia iteaphylla*		

Fabaceae	*Acacia cyclops*	Coast Wattle	Woolya Wah, Wilyawa, Munyuret, Woolya, or Bulyee
Fabaceae	*Acacia pulchella*	Prickly Moses	Mindaleny
Fabaceae	*Acacia saligna*	Orange Wattle	Kudjong, Coojong, Cujong or Kalyiung
Fabaceae	*Acacia saligna (prostrate variety)*		
Fabaceae	*Daviesia trifloral*		
Fabaceae	*Jacksonia furcellata*	Grey Stinkwood	
Fabaceae	*Templetonia retusa*	Cockies Tongues	Yakal Diarr
Goodeniaceae	*Lechenaultia linarioides*	Yellow Leschenaultia	
Juncaceae	*Juncus kraussii*	Sea Rush	
Juncaceae	*Juncus pallidus*	Pale Rush	Waakal Ngamak
Lamiaceae	*Hemiandra pungens*	Snakebush	
Malvaceae	**Lagunaria patersonia*		
Malvaceae	**Malva parviflora*	Marshmallow	
Moraceae	**Ficus carica*	Common Fig	
Moraceae	**Ficus macrophylla*	Morton Bay Fig	
Myrtaceae	*Callistemon phoeniceus*	Lesser Bottlebrush	Tubada or Toobada
Myrtaceae	*Eucalyptus camaldulensis*		
Myrtaceae	*Eucalyptus lehmannii*		Mo or Yate
Myrtaceae	*Melaleuca laetifica*		
Myrtaceae	*Metrosideros excelsa*		
Myrtaceae	**Callistemon citrinus*		
Myrtaceae	**Eucalyptus botryoides*		
Myrtaceae	**Eucalyptus cladocalyx*		
Myrtaceae	**Eucalyptus grandis*		
Myrtaceae	**Eucalyptus leucoxylon*		
Myrtaceae	**Foreign Eucalyptus sp.*		
Myrtaceae	**Melaleuca quinquenervia*		
Myrtaceae	**Melaleuca styphelioides*	Prickly Paperbark	
Myrtaceae	*Eucalyptus gomphocephala*	Tuart	
Myrtaceae	*Eucalyptus petiolaris*		
Myrtaceae	*Eucalyptus rudis*	Flooded Gum	Kulurda or Moitch
Myrtaceae	*Hypocalymma robustum*	Swan River Myrtle	
Myrtaceae	*Hypocalymma angustifolium*	White Myrtle	
Myrtaceae	*Kunzea glabrescens*	Spearwood	Condil, Kitia Boorn or Pondil
Myrtaceae	*Melaleuca cuticularis*	Saltwater Paperbark	Yaularung or Bewel or Koll
Myrtaceae	*Melaleuca huegelii*	Chenille Honeymyrtle	
Myrtaceae	*Melaleuca preissiana*	Stout Paperbark	Moonah or Modong
Myrtaceae	*Melaleuca rhaphiophylla*	Swamp Paperbark	Yowarl or Bibool Boorn
Myrtaceae	*Melaleuca systena*	Coastal Honeymyrtle	
Myrtaceae	*Melaleuca teretifolia*	Banbar	
Oleaceae	**Olea europaea*		
Onagraceae	*Epilobium hirtigerum*	Hairy Willow Herb	
Papaveraceae	**Fumaria capreolata*	Whiteflower Fumitory	

Pinaceae	**Pinus pinaster*	Pinaster Pine	
Plantaginaceae	**Bacopa monnieri*		
Platanaceae	**Platanus × hispanica*		
Poaceae	**Arundo donax*	Giant Read	
Poaceae	**Cenchrus clandestinus*		
Poaceae	**Cortaderia selloana*	Pampas Grass	
Poaceae	**Cynodon dactylon*	Couch	
Poaceae	**Stenotaphrum secundatum*	Buffalo Grass	
Polygonaceae	**Rumex crispus*	Curled Dock	
Polygonaceae	*Persicaria decipiens*		
Proteaceae	*Adenanthos cygnorum*	Common Woollybush	
Proteaceae	*Banksia littoralis*	Swamp Banksia	Pungura, Mangati
Proteaceae	*Grevillea crithmifolia*		Berrung
Proteaceae	*Grevillea preissii*		
Proteaceae	*Grevillea thelemanniana (T)*	Spider Net Grevillea	
Proteaceae	*Grevillea vestita*		
Proteaceae	*Hakea prostrata*	Harsh Hakea	Berrung or Pulgur
Rubiaceae	*Coprosma repens*		
Rubiaceae	**Galium murale*	Small Goosegrass	
Salicaceae	**Populus sp.*		
Salicaceae	**Salix babylonica*		
Scrophulariaceae	*Eremophila glabra*	Tar Bush	
Tamaricaceae	**Tamarix aphylla*	Athel Tree (DP, WoNS)	
Thymelaeaceae	*Pimelea rosea*	Rose Banjine	
Typhaceae	*Typha orientalis*	Bulrush	Yangeti, Yanget, Lirimbi, Yanjidi, Ynjeedie, Yunjid, Tanjil, Yandijut or Jetta
Verbenaceae	**Phyla nodiflora*		

Appendix 12 Galup (Lake Monger) Fauna Species

Fauna observations within Galup (Lake Monger), * denotes introduced species.

Family	Species Name	Common Name	Noongar Name
Bird			
Acrocephalidae	*Acrocephalus australis*	Australasian Reed Warbler	
Anatidae	*Anas superciliosa*	Pacific Black Duck	
Anatidae	*Biziura lobata*	Musk Duck	
Anatidae	*Chenonetta jubata*	Australian Wood Duck	
Anatidae	*Cygnus atratus*	Black Swan	
Anatidae	*Oxyura australis* (P4)	Blue-billed Duck	
Anatidae	*Spatula rhynchotis*	Australasian Shoveler	
Anhingidae	*Anhinga novaehollandiae*	Australasian Darter	
Ardeidae	*Egretta garzetta*	Little Egret	
Ardeidae	*Egretta novaehollandiae*	White-faced Heron	
Artamidae	*Gymnorhina tibicen dorsalis*	Australian Magpie	Kulbardi
Cacatuidae	*Cacatua sanguinea*	Little Corella	
Corvidae	*Corvus coronoides*	Australian Raven	Wardong
Hirundinidae	*Hirundo neoxena*	Welcome Swallow	
Meliphagidae	*Anthochaera carunculata*	Red Wattlebird	
Meliphagidae	*Lichenostomus virescens*	Singing Honeyeater	
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater	
Monarchidae	*Grallina cyanoleuca*	Magpie-lark	
Pelecanidae	*Pelecanus conspicillatus*	Australian Pelican	
Phalacrocoracidae	*Microcarbo melanoleucos*	Little Pied Cormorant	
Phalacrocoracidae	*Phalacrocorax sulcirostris*	Little Black Cormorant	
Phalacrocoracidae	*Phalacrocorax varius*	Pied Cormorant	
Podicipedidae	*Tachybaptus novaehollandiae*	Australasian Grebe	
Psittacidae	**Trichoglossus haematodus*	Rainbow lorikeet	
Rallidae	*Fulica atra*	Eurasian Coot	
Rallidae	*Gallinula tenebrosa*	Dusky Moorhen	
Rallidae	*Porphyrio porphyrio*	Purple Swamphen	
Rhipiduridae	*Rhipidura albiscapa*	Grey Fantail	
Rhipiduridae	*Rhipudura leucophrys*	Willie Wagtail	Djidi Djidi
Threskiornithidae	*Platalea flavipes*	Yellow-billed Spoonbill	
Threskiornithidae	*Threskiornis molucca*	Australian White Ibis	
Reptile			
Cheluidae	*Chelodina colliei*	Snake-necked Turtle	Yargan
Amphibian			
Limnodynastidae	*Lymnodynastes dorsalis*	Western Banjo Frog	Kyooya
Fish			
Cyprinidae	*Cyprinus sp.*	Carp	Dtiljit (fish)
Poeciliidae	**Gambusia holbrooki*	Gambusia	Dtiljit (fish)
Mammal			
Muridae	**Rattus rattus*	Black Rat	
Invertebrate			

Hydridae	*Hydra spp.*		
	Nematoda sp.		
Physidae	*Physella acuta*		
Planorbidae	*Glyptophysa sp.*		
	Hirundine asp.		
	Oligochaeta spp.		
	Turbellaria sp.		
Diplostraca	*Cladocera sp.*		
	Copedoda sp.		
Ostracoda	*Ostracoda sp.*		
Chiltoniidae	*Austrochiltonia subtenuis*		
Amiphisopidae	*Amphisopida sp.*		
	Acarina spp.		
Sarcoptiformes	*Orbitida spp.*		
Limnocharidae	*Limnochares australica*		
Pionidae	*Pionidae sp.*		
Entomobryomorpha	*Entomobryoidea spp.*		
	Poduroidea sp.		
	Symphypleona sp.		
Dytiscidae	*Copelatus sp. (L)*		
	Hyphydrus sp. (L)		
	Berosus approximans		
	Enochrus eyrensis		
	Helochares sp. (L)		
	Limnoxenus sp. (L)		
Dolichopodidae	*Dolichopodidae spp.*		
Stratiomyidae	*Stratiomyidae spp.*		
Ceratopogonidae	*Ceratopogonidae spp. (P)*		
	Ceratopogonidae spp.		
Chironomidae	*Chironomidae spp. (P)*		
Chironomini	*Chironomus sp.*		
	Cryptochironomus sp.		
	Parachironomus sp.		
	Polypedilum sp.		
Tanytarsini	*Rheotanytarsus sp.*		
	Tanytarsus sp.		
Orhocladiinae	*Botryocladius sp.*		
	Corynoneura sp.		
	Cricotopus sp.		
	Eukiefferiella sp.		
	Limnophyes sp.		
Tanypodinae	*Procladius sp.*		
Culicidae	*Aedes sp.*		
	Culex sp.		
	Culicidae sp. (P)		
Ephydridae	*Ephydridae sp.*		
Psychodidae	*Psychodidae sp.*		

Syrphidae	*Syrphidae sp.*		
Aeshnidae	*Anax papuensis*		
Coenagrionidae	*Ischnura aurora*		
	Ischnura heterosticta		
Lestidae	*Austrolestes annulosus*		
	Anisoptera sp.		
	Zygoptera sp.		
Ecnomidae	*Ecnomus sp.*		
Leptoceridae	*Leptoceridae sp.*		
	Triplectides australicus		
	Triplectides australis		
Veliidae	*Veliidae sp.*		
Corixoidea	*Agraptocorixa eurynome*		
	Agraptocorixa sp.		
	Corixoidea sp.		
	Sigara sp.		
	Sigara truncatipala		
Notonectidae	*Anisops sp.*		
	Anisops thienemanni		
	Notonectidae sp.		
Micronectidae	*Micronecta annae*		
	Micronecta sp.		

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