Site 22. Liverpool Road Retarding Basin, Boronia

A Melbourne Water retarding basin reserve on the Dandenong Creek floodplain, with artificial lakes, an open park area and areas of native vegetation.

Summary of significant features:

- Nationally significant: known habitat for the flat-pea, *Platylobium infecundum*, which is critically endangered globally;
- State significance: patches of five Ecological Vegetation Classes that are regionally endangered and one that is regionally vulnerable and in good condition;
- State significance: known habitat for Latham's Snipe (listed as vulnerable under Commonwealth law) and Swamp Skink, which are listed as endangered under Victorian law;
- Regionally significant: apparently high-quality habitat for Powerful Owl, which is listed as a vulnerable species under Victorian law;
- Locally significant: habitat for viable populations of many locally-threatened plant species (some unique in Knox) and several locally-threatened fauna species;
- Locally significant: a stream with riparian (streamside) vegetation, providing a habitat corridor.

Aerial photograph and plan: See page 159, which covers this site, Dobson's treed paddock (Site 21) and Sugarloaf Hill (Site 23).

Boundaries

This 22.4 ha site comprises the whole of the Melbourne Water property known as the Liverpool Road Retarding Basin. Not all of the vegetation is significant, but for the purposes of town planning and management, the property is here treated as a whole.

Land use & tenure: Melbourne Water reserve for drainage and flood mitigation, doubling as a public park and a dumping ground for unwanted earth.

Site description

Liverpool Road Retarding Basin has an important function in mitigating floods downstream and it is a popular public park, particularly for walking dogs. It also supports significant native flora and fauna. Its location abutting Sugarloaf Hill (Site 23) adds greatly to the conservation significance of both sites.

The retarding basin property is mostly on the floodplain of Dandenong Creek at elevations of 132–137 m but the western fringe includes the foot of Sugarloaf Hill to an elevation of 144 m. The floodplain soil is alluvium deposited in floods by Dandenong Ck and extensively excavated for drainage works. The soil in the areas marked 'Valley Heathy Forest' and 'Lowland Forest' on the aerial photograph of p. 159 comprises light grey loam over clay, derived from rhyolite of the Devonian volcanic system of the Dandenong Ranges. A fenced compound in the property's southern corner has been built up with dumped clay to a depth of 4 m or so on top of what had been highly significant native vegetation.

The course of Dandenong Ck through the property is an excavated channel feeding a wetland and lake within the retarding basin. Water exits the lake through a pipe into another channel outside the property's northern boundary. The eastern half of the site has a second artificial lake, south of Dandenong Creek.

Both lakes have some fringing wetland vegetation, particularly at their upstream ends. There are also wetlands in the site's southwest, surrounded by dense Swamp Scrub. Some indigenous wetland plants (including some locally-uncommon ones) grow in a swale located due north of the car park.

The lakes, wetlands and swale are used by waterbirds, frogs and probably reptiles like the site's Swamp Skinks (an endangered species).

The areas of Swamp Scrub are likely to be regrowth following clearing of Swampy Woodland. It is a common phenomenon that paperbarks regenerate far better than eucalypts following clearing of Swampy Woodland in seasonally inundated areas, leading to the formation of Swamp Scrub.

Similarly, clearing of Swampy Riparian Woodland and less flood-prone areas of Swampy Woodland can result in the formation of dense stands of wattles, such as the Blackwoods in the patches marked 'Wattle Scrub' on the aerial photograph of p. 159.

Despite the past clearing, the Swamp Scrub at Liverpool Road Retarding Basin supports a fairly rich range of understorey plant species and quite a few species that are unique in Knox or rare throughout metro Melbourne. Some of those rare species have been buried under many truckloads of dumped earth, both before and since the previous (2010) edition of this report. The dumped earth has been colonised by environmental weeds that are spreading into the adjacent significant vegetation. It has also altered the hydrology, which is critical for Swamp Scrub vegetation.

The site's western edge, and a narrow strip beside Liverpool Rd near the car park, retain mature vegetation and some large, old trees. The lowest lying sections are Swampy Woodland, with Lowland Forest above it, and Valley Heathy Forest on the lower northeast slopes of Sugarloaf Hill.

The unlabelled treed areas on the aerial photograph of p. 159 are generally planted trees of species that do not occur naturally in the district.

A high percentage of visitors to the park bring dogs and let them roam off their leads. This diminishes the enjoyment of the park for many other users due to safety concerns and the amount of excrement left behind. It also discourages waterbirds and other wildlife, particularly from breeding in what would otherwise be suitable habitat fringing the lakes. It is common to see people encouraging their dogs to chase waterbirds, even threatened species.

Forest birds and reptiles are rather abundant on the hill slopes in the site's west.

Relationship to other land

The site is treated in this report as separate from Sugarloaf Hill (Site 23) only because of the difference between the two sites' land uses and ownership. Ecologically, the two sites function as one and the conservation values of one cannot be considered in isolation from the other.

There are few ecological barriers for birds, bats, insects and pollen to travel between these sites and the large area of contiguous native vegetation in the Dandenong Ranges. The trees in Site 20 along Dandenong Creek and Pavitt Lane provide an almost continuous corridor. Dobson's treed paddock (Site 21) is nearby on the other side of Liverpool Rd, and it is close to vegetated corridors along Dobson's Creek (Site 20) and Mountain Hwy (Site 92). There are also patches of remnant vegetation downstream along the Dandenong Creek drain and every few hundred metres to the north of the site, in Maroondah municipality (see Lorimer *et al.* 1997).

Bioregion: Gippsland Plain.

Habitat types

The following descriptions have only been updated from the previous (2010) edition of this report by the addition of a few species that the author saw in 2023–2024.

Perennial Stream (No EVC number). Flora includes *Isolepis inundata, Juncus gregiflorus* and *Potamogeton crispus*.

Lakes (No EVC number). Fringing vegetation dominated by rushes (*Juncus* species) and Marsh Club-rush (*Bolboschoenus medianus*; perhaps planted). Submerged species not investigated.

Lowland Forest (EVC 16, **regionally Vulnerable**): 0.9 hectares in total, comprising approximately 0.4 ha in excellent ecological condition (rating A), 0.4 ha in good ecological condition (rating B), 0.1 ha in fair ecological condition (rating C) and a few scattered trees around the car park.

Canopy trees: Dominated by *Eucalyptus obliqua* typically 22–25 m tall, with far fewer *E. radiata* and *E. ovata*.

Sub-canopy trees: *Acacia melanoxylon* and *Exocarpos cupressiformis*. *Melaleuca ericifolia* intrudes from adjoining Swampy Woodland.

Shrubs: Moderately dense. Dominated by various combinations of *Cassinia aculeata, Bursaria spinosa* and *Leptospermum scoparium*, and with substantial numbers of *Acacia verticillata* and *Pultenaea gunnii*. Members of the Proteaceae family are uncharacteristically absent, perhaps due to past clearing.

Ferns: Bracken is abundant almost throughout.

Groundcover: Rather dense, knee-deep and with an abundance of the wiry grass *Tetrarrhena juncea*, often sharing dominance with *Gahnia radula* or *Pteridium esculentum*. *Gahnia sieberiana* is conspicuous, as is common in Lowland Forest. *Lomandra* species are abundant but not dominant. Tufted grasses, particularly *Austrostipa rudis* and *Themeda triandra*, are present in low density.

Swamp Scrub (EVC 53, **regionally Endangered**): Total area 1.8 ha, assessed in 1997 as being equally divided between ecological condition ratings A (excellent) and B (good).

Canopy trees: Dominated by *Melaleuca ericifolia*. There are also emergent *Eucalyptus ovata* and *Acacia melanoxylon*.

Shrubs: Sparse, comprising *Acacia verticillata, Coprosma quadrifida, Goodenia ovata, Leptospermum scoparium* and *Senecio minimus*.

Vines: Indigenous vines absent, but the environmental weed Japanese Honeysuckle is fairly abundant.

Ferns: Ferns have become fairly abundant since the end of the Millennium Drought. The most abundant species are *Cyathea australis, Blechnum minus, Blechnum wattsii, Hypolepis muelleri* and *Hypolepis rugosula*. Significantly, *Dicksonia antarctica, Pellaea falcata* and *Polystichum proliferum* are present (though scarce).

Other groundcover: Members of the sedge family are fairly abundant, particularly *Eleocharis acuta*, *Isolepis* species, *Machaerina rubiginosa* and *Machaerina tetragona*. There are patches of *Triglochin striatum, Juncus,* grasses and *Lobelia anceps*.

Floodplain Wetland Complex (EVC 172, **regionally Endangered**): Includes perennial and seasonal wetland. Total area 1.1 ha, assessed in 1997 as comprising approximately 0.1 ha in excellent ecological condition (rating A) and 1.0 ha in good ecological condition (rating B). 21 indigenous species were found. Dominant indigenous species are variously rushes (*Juncus* species), Common Reed (*Phragmites australis*), sedges or knotweeds (*Persicaria* species). Marsh Club-rush (*Bolboschoenus medianus*) is fairly abundant.

Valley Heathy Forest (EVC 127, **regionally Endangered**): 0.3 ha in total, comprising approximately 2,200 m² in good ecological condition (rating B) and 800 m² in fair ecological condition (rating C). 40 indigenous plant species found.

Canopy trees: Dominated by *Eucalyptus goniocalyx*, 10–15 m tall, 30–40% foliage cover. There are also smaller numbers of *E. radiata, E. obliqua* and *E. ovata* (all present in larger densities in the adjoining EVCs).

Sub-canopy trees: Scattered *Exocarpos cupressiformis* and fewer *Acacia melanoxylon*.

Shrubs: Mostly up to 2–3 m tall, dense, dominated by *Bursaria spinosa*. *Acacia stricta* was fairly abundant prior to the Millennium Drought but now sparse.

Vines: *Pandorea pandorana* is quite common, as is the light twiner *Billardiera mutabilis*.

Ferns: *Adiantum aethiopicum* is abundant. *Pteridium esculentum* is also present close to the ecotone (boundary) with EVCs downhill, where it is more abundant.

Groundcover: A layer typically 20–30 cm deep with a foliage cover of approximately 80%. Dominated by *Themeda triandra, Austrostipa rudis* and other grasses. *Gahnia radula* is scarce.

Swampy Woodland (EVC 937, **regionally Endangered**): The area mapped on p. 159 as this EVC measures 6,200 m², of which approximately 4,400 m² is in good ecological condition (rating B) and 1,800 m² is in fair ecological condition (rating C).

There is also 4,800 m² of Wattle Scrub shown on p. 159 (excluding the strip along Dandenong Ck) that represents regrowth of Swampy Woodland, in poor ecological condition (rating D) relative to pristine Swampy Woodland.

Canopy trees: *Eucalyptus ovata*, fairly sparse.

Sub-canopy trees: *Acacia melanoxylon* and fewer *Melaleuca ericifolia*.

Tall Shrubs: Dominated by *Acacia verticillata, Coprosma quadrifida, Leptospermum scoparium, Ozothamnus ferrugineus* and (in one patch) *Bursaria spinosa*.

Lower Shrubs: *Goodenia ovata, Pultenaea gunnii* and *Senecio minimus*.

Vines: Sparse *Pandorea pandorana*. The vine weeds *Rubus anglocandicans* and *Lonicera japonica* are fairly abundant.

Ferns: *Pteridium esculentum* is abundant. There are also moderate numbers of *Cyathea australis*.

Groundcover: *Phragmites australis* and *Lepidosperma elatius* are each dominant in some areas. Elsewhere, the dominant groundcover species are *Lomandra longifolia* and various grasses, including *Microlaena stipoides, Austrostipa rudis*, several wallaby-grass species and the characteristic species *Poa tenera* and *Poa ensiformis*. *Gonocarpus tetragynus* is abundant but has low foliage cover.

Swampy Riparian Woodland (EVC 83, **regionally Endangered**): The area mapped on p. 159 as this EVC measures approximately 900 m^2 and is in fair ecological condition (rating C).

Canopy trees: *Eucalyptus ovata*, fairly sparse.

Sub-canopy trees: *Acacia melanoxylon* (once supporting the mistletoe, *Amyema quandang*), with fewer *Melaleuca ericifolia* and *Pomaderris aspera*.

Tall Shrubs: *Acacia verticillata, Leptospermum scoparium, Ozothamnus ferrugineus* and the characteristic species, *Prostanthera lasianthos*.

Lower Shrubs: *Goodenia ovata*.

Vines: The characteristic species *Calystegia marginata* is present in small numbers.

Ferns: *Pteridium esculentum* is the only fern recorded (although *Cyathea australis* and other species no doubt appear at times).

Groundcover: Greatly affected by environmental weeds and herbicide use. Survivors are *Acaena novae-zelandiae, Carex appressa, Epilobium hirtigerum, Juncus* species, *Lomandra longifolia, Persicaria hydropiper* and *Poa ensiformis*.

Plant species

The following wild plant species have been recorded as growing wild in the site's native vegetation (not just in areas where there are no indigenous plants). Most species were recorded in this study's 2023–2024 surveys, the exceptions being indicated by the species' name being followed by the year of the last record (mostly the author's surveys in 1991–1997 or herbarium specimens from Andrew Paget in the 1980s). The column headed 'Risk' indicates the indigenous species' risk of dying out in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; 'V'=Vulnerable; 'N'=Near threatened; 'X'=already locally extinct. In addition, *Platylobium infecundum* is critically endangered globally and the species with names in bold are rare throughout metro Melbourne.

Indigenous mosses and liverworts

Campylopus introflexus, Heath Star Moss
Chiloscyphus semiteres, Green Worms
Ditrichum cylindricarpum, a moss
Ptychomnion aciculare, Paper Moss, Pipe-cleaners
Rosulabryum capillare, Capillary Thread-moss
Sematophyllum homomallum, a moss
Thuidiopsis furfurosa, Golden Weft-moss

Risk Other wild indigenous species

Fern species

V *Adiantum aethiopicum*, Common Maidenhair
C ***Blechnum minus*, Soft Water-fern**
C ***Blechnum wattsii*, Hard Water-fern**
V *Calochlaena dubia*, Common Ground-fern (1991)
C *Cyathea australis*, Rough Tree-fern
C *Dicksonia antarctica*, Soft Tree-fern
C ***Histiopteris incisa*, Bat's Wing Fern**
C ***Hypolepis muelleri*, Harsh Ground-fern**
C *Hypolepis rugosula*, Ruddy Ground-fern
V *Lindsaea linearis*, Screw Fern (1997)
C ***Pellaea falcata*, Sickle Fern**
E *Polystichum proliferum*, Mother Shield-fern
Pteridium esculentum, Austral Bracken
Pteris tremula, Tender Brake

Risk Other wild indigenous species

Flowering species

V *Acacia mearnsii*, Black Wattle
V *Acacia melanoxylon*, Blackwood
E *Acacia stricta*, Hop Wattle
V *Acacia verticillata*, Prickly Moses
Acaena novae-zelandiae, Bidgee-widgee
E *Acrotriche serrulata*, Honey-pots (1997)
N *Alisma plantago-aquatica*, Water Plantain
V *Alternanthera denticulata*, Lesser Joyweed (2022)
C *Amyema pendula*, Drooping Mistletoe
E *Amyema quandang*, Grey Mistletoe (1997)
Anthosachne scabra, Common Wheat-grass
Arthropodium strictum, Chocolate Lily
Austrostipa rudis subsp. *rudis*, Veined Spear-grass
Billardiera mutabilis, Common Apple-berry
Bolboschoenus medianus, Marsh Club-rush
N *Bossiaea prostrata*, Creeping Bossiaea
V *Brunonia australis*, Blue Pincushion (1995)
Burchardia umbellata, Milkmaids (1997)
Bursaria spinosa, Sweet Bursaria
E ***Calystegia marginata*, Forest Bindweed**
Carex appressa, Tall Sedge
Carex breviculmis, Short-stem Sedge

Risk	Other wild indigenous species
E	***Carex gaudichaudiana*, Fen Sedge**
	Carex inversa, Knob Sedge
	Cassinia aculeata, Common Cassinia
	Cassinia longifolia, Shiny Cassinia
E	*Centella cordifolia*, Centella
V	*Clematis aristata*, Mountain Clematis
E	*Comesperma volubile*, Love Creeper
V	*Coprosma quadrifida*, Prickly Currant-bush
V	*Crassula helmsii*, Swamp Crassula
C	*Daviesia leptophylla*, Narrow-leaf Bitter-pea (2021)
	Deyeuxia quadriseta, Reed Bent-grass (1997)
	Dianella longifolia var. *longifolia*, Pale Flax-lily
	Dianella revoluta, Black-anther Flax-lily
	Dianella tasmanica, Tasman Flax-lily
	Dichelachne rara, Common Plume-grass (1997)
	Dichondra repens, Kidney-weed
V	*Dillwynia cinerascens*, Grey Parrot-pea (1995)
E	*Dipodium roseum*, Rosy Hyacinth-orchid (1995)
V	*Drosera auriculata*, Tall Sundew
N	*Drosera hookeri*, Branched Sundew (1986)
V	*Eleocharis acuta*, Common Spike-rush
C	*Epacris impressa*, Common Heath (1997)
	Epilobium hirtigerum, Hairy Willow-herb
	Eragrostis brownii, Common Love-grass (1997)
E	*Eucalyptus cephalocarpa*, Mealy Stringybark
V	*Eucalyptus goniocalyx*, Bundy
E	*Eucalyptus obliqua*, Messmate Stringybark
V	*Eucalyptus ovata*, Swamp Gum
E	*Eucalyptus radiata*, Narrow-leaved Peppermint
V	*Exocarpos cupressiformis*, Cherry Ballart
C	*Gahnia radula*, Thatch Saw-sedge
E	*Gahnia sieberiana*, Red-fruit Saw-sedge
	Geranium homeanum, Rainforest Crane's-bill
E	*Glycine clandestina*, Twining Glycine
V	*Gonocarpus humilis*, Shade Raspwort
	Gonocarpus tetragynus, Common Raspwort
C	***Goodenia elongata*, Lanky Goodenia** (1997)
N	*Goodenia lanata*, Trailing Goodenia
	Goodenia ovata, Hop Goodenia
C	***Goodia lotifolia*, Common Golden-tip** (1997)
E	*Gynatrix pulchella*, Hemp Bush (1997)
V	*Hemarthria uncinata*, Mat Grass (1997)
C	***Hookerochloa hookeriana*, Hooker Fescue**
	Hovea heterophylla, Common Hovea (1995)
V	*Hydrocotyle hirta*, Hairy Pennywort
E	*Hypericum gramineum*, Small St John's Wort
E	*Isolepis cernua*, Nodding Club-rush
	Isolepis inundata, Swamp Club-rush
V	*Isolepis platycarpa*, a club-rush
	Juncus amabilis, Hollow Rush

Risk	Other wild indigenous species
C	*Juncus australis*, Austral Rush
	Juncus bufonius, Toad Rush
	Juncus gregiflorus, Green Rush
C	*Juncus holoschoenus*, Joint-leaf Rush
	Juncus pallidus, Pale Rush
E	*Juncus pauciflorus*, Loose-flower Rush
E	*Juncus planifolius*, Broad-leaf Rush
E	*Juncus procerus*, Tall Rush
	Juncus sarophorus, Broom Rush
E	*Juncus subsecundus*, Finger Rush
	Lachnagrostis filiformis, Common Blown-grass (1997)
	Laphangium luteoalbum, Jersey cudweed
	Lemna disperma, Common Duckweed
	Lepidosperma elatius, Tall Sword-sedge
C	*Leptospermum continentale*, Prickly Tea-tree
	Leptospermum scoparium, Manuka
E	*Linum marginale*, Native Flax (1997)
E	*Lobelia anceps*, Angled Lobelia
	Lomandra filiformis subsp. *coriacea*, Wattle Mat-rush
	Lomandra filiformis subsp. *filiformis*, Wattle Mat-rush
	Lomandra longifolia subsp. *longifolia*, Spiny-headed Mat-rush
V	*Luzula meridionalis*, Common Woodrush
	Lythrum hyssopifolia, Lesser Loosestrife
C	*Machaerina acuta*, Pale Twig-rush (1985)
C	***Machaerina rubiginosa*, Soft Twig-rush**
C	***Machaerina tetragona*, Square Twig-rush**
E	*Melaleuca ericifolia*, Swamp Paperbark
	Microlaena stipoides, Weeping Grass
V	*Microtis parviflora*, Slender Onion-orchid (1986)
C	*Muellerina eucalyptoides*, Creeping Mistletoe (1995)
E	*Olearia lirata*, Snowy Daisy-bush
V	*Opercularia ovata*, Broad-leaf Stinkweed (1997)
V	*Opercularia varia*, Variable Stinkweed (1997)
	Oxalis exilis/perennans, Wood-sorrel
V	*Ozothamnus ferrugineus*, Tree Everlasting
	***Ozothamnus rosmarinifolius*, Rosemary Everlasting** (1997)
	Pandorea pandorana, Wonga Vine
	Persicaria decipiens, Slender Knotweed
E	*Persicaria hydropiper*, Water-pepper (1997)
E	*Persicaria lapathifolia*, Pale Knotweed (2004)
E	***Persicaria subsessilis*, Hairy Knotweed**
E	*Phragmites australis*, Common Reed
E	*Pimelea humilis*, Common Rice-flower
E	***Platylobium infecundum*, a flat-pea**
	Poa ensiformis, Sword Tussock-grass
	Poa morrisii, Soft Tussock-grass
E	*Poa tenera*, Slender Tussock-grass
V	*Polyscias sambucifolia*, Elderberry Panax

Risk	Other wild indigenous species
V	*Pomaderris aspera*, Hazel Pomaderris
E	*Potamogeton crispus*, Curly Pondweed
V	*Prostanthera lasianthos*, Victorian Christmas-bush
V	*Pultenaea gunnii*, Golden Bush-pea (1997)
	Ranunculus lappaceus, Australian Buttercup (1995)
	Rytidosperma fulvum, Leafy Wallaby-grass (1986)
	Rytidosperma laeve, Smooth Wallaby-grass (1997)
E	*Rytidosperma pallidum*, Red-anther (or Silvertop) Wallaby-grass
	Rytidosperma penicillatum, Slender Wallaby-grass (1997)
E	*Rytidosperma semiannulare*, Tasmanian Wallaby-grass (1997)
	Rytidosperma setaceum, Bristly Wallaby-grass (1997)
	Rytidosperma tenuius, Purplish Wallaby-grass (1997)
	Schoenus apogon, Common Bog-rush
C	***Schoenus maschalinus*, Leafy Bog-rush**
E	*Senecio campylocarpus*, Bulging Fireweed
V	*Senecio glomeratus*, Annual Fireweed (2017)
	Senecio hispidulus, Rough Fireweed
	Senecio minimus, Shrubby Fireweed
V	*Senecio prenanthoides*, Common Fireweed (1995)
	Senecio quadridentatus, Cotton Fireweed
V	*Sigesbeckia orientalis*, Indian Weed
C	*Solanum* ?*aviculare*, Kangaroo Apple (1997)
V	*Solanum laciniatum*, Large Kangaroo Apple
E	*Stackhousia monogyna/subterranea*, Candles (1995)
	Tetrarrhena juncea, Forest Wire-grass
E	*Thelymitra peniculata*, Trim Sun-orchid (1986)
	Themeda triandra, Kangaroo Grass
V	*Triglochin striata*, Streaked Arrow-grass
	Typha orientalis, Cumbungi
E	*Veronica plebeia*, Trailing Speedwell (1995)
E	*Viola hederacea*, Ivy-leaf Violet

Wild introduced species
Acacia longifolia subsp. *longifolia*, Sallow Wattle
Agrostis capillaris, Brown-top Bent (1997)
Aira sp., a silvery hair grass (1997)
Allium triquetrum, Angled Onion
Anthoxanthum odoratum, Sweet Vernal-grass
Asparagus scandens, Asparagus Fern
Briza maxima, Large Quaking-grass
Callitriche stagnalis, Pond (or Common) Water-starwort
Cardamine flexuosa, Wood Bitter-cress
Cassinia sifton, Sifton Bush (1997)
Cenchrus clandestinus, Kikuyu

Wild introduced species
Centaurium erythraea, Common Centaury
Cirsium vulgare, Spear Thistle
Coprosma repens, Mirror-bush (1997)
Coprosma robusta, Karamu (1997)
Cortaderia selloana, Pampas Grass (1997)
Cotoneaster simonsii, Himalayan Cotoneaster (1997)
Cotula coronopifolia, Water Buttons
Crataegus monogyna, Hawthorn (1997)
Crocosmia × *crocosmiiflora*, Montbretia (2017)
Cyathea cooperi, Straw Tree-fern
Cynodon dactylon, Couch (2022)
Cyperus eragrostis, Drain Flat-sedge
Dactylis glomerata, Cocksfoot
Danthonia decumbens, Heath Grass (1997)
Echinochloa crus-galli, Common Barnyard Grass (1997)
Ehrharta erecta, Panic Veldt-grass
Erica lusitanica, Spanish Heath (1997)
Erigeron sumatrensis, Fleabane
Galium aparine, Cleavers
Gladiolus undulatus, Wild Gladiolus
Hedera helix/hibernica, Ivy
Holcus lanatus, Yorkshire Fog
Hypericum androsaemum, Tutsan
Hypericum tetrapterum, Square-stem St John's Wort
Hypochaeris radicata, Cat's Ear
Ilex aquifolium, Holly (1997)
Iris pseudacorus, Yellow Flag
Isolepis levynsiana, Tiny Flat-sedge
Juncus articulatus, Jointed Rush
Leontodon saxatilis, Lesser Hawkbit (1997)
Lonicera japonica, Japanese Honeysuckle
Lotus subbiflorus, Hairy Bird's-foot Trefoil (1997)
Lotus uliginosus, Greater Bird's-foot Trefoil
Lysimachia arvensis, Pimpernel
Matricaria matricarioides, Rounded Chamomile
Myosotis arvensis, Field Forget-me-not (1997)
Myosotis sylvatica, Wood Forget-me-not
Oxalis incarnata, Pale Wood-sorrel
Paspalum dilatatum, Paspalum (2022)
Paspalum distichum, Water Couch
Phalaris aquatica, Toowoomba Canary-grass (1997)
Pinus radiata, Monterey Pine (2017)
Pittosporum undulatum, Sweet Pittosporum
Plantago lanceolata, Ribwort
Plantago major, Greater Plantain
Prunella vulgaris, Self-heal
Prunus cerasifera, Cherry-plum (1997)
Pseudoscleropodium purum, Neat Feather-moss
Ranunculus repens, Creeping Buttercup
Rosa rubiginosa, Sweet Briar (1997)
Rubus anglocandicans, Blackberry
Rumex crispus, Curled Dock (1997)
Salix × *reichardtii*, Pussy Willow (1997)
Salix fragilis, Crack Willow (1997)
Selaginella kraussiana, Garden Selaginella

Wild introduced species

Sisyrinchium micranthum, Blue Pigroot (2017)
Solanum americanum, Glossy Nightshade
Solanum nigrum, Black Nightshade
Sonchus asper, Rough Sow-thistle
Sonchus oleraceus, Sow-thistle
Stellaria media, Chickweed (1997)
Symphyotrichum subulatum, Aster-weed (1997)

Wild introduced species

Taraxacum sect. *Taraxacum*, Garden Dandelion
Torilis arvensis, Spreading Hedge-parsley (1997)
Tradescantia fluminensis, Wandering Trad
Ulex europaeus, Gorse (Furze) (2021)
Viburnum tinus, Laurustinus (1997)
Viola odorata, Common Violet
Vulpia bromoides, Squirrel-tail Fescue

Notes concerning some of the plant species

Austrostipa rudis (Veined Spear-grass) – A 2017 record of the endangered subspecies *australis* is discounted here because the list in which it occurs does not include the common subspecies *rudis* (which is fairly abundant in the site) and it does include some clear misidentifications of other species.

Blechnum minus (Soft Water-fern) – the stronghold of this disappearing species in Knox, with juveniles plus c. 70 mature plants in 2024 in the Swamp Scrub.

Blechnum wattsii (Hard Water-fern) – three plants were discovered in the Swamp Scrub in 2023 – the first record of the species for Knox and perhaps for metro Melbourne outside the Dandenong Ranges.

Bolboschoenus medianus (Marsh Club-rush) – fairly abundant; present at least as long ago as 1991, so it is presumed that at least some of the plants present in 2024 are of natural origin.

Calystegia marginata (Forest Bindweed) – small numbers beside Dandenong Ck.

Carex gaudichaudiana (Fen Sedge) – a small patch in Swamp Scrub, 150 m south of the main lake.

Gahnia sieberiana (Red-fruit Saw-sedge) – in 2023, about ten scattered plants grew around the southwest of the Swamp Scrub.

Goodenia elongata (Lanky Goodenia) – small amounts grew in the Swamp Scrub in 1997, not seen since.

Goodia lotifolia (Golden-tip) – several grew in the Swamp Scrub in the 1990s but they were destroyed by dumping of earth. Some have been planted recently along Dandenong Creek within the site.

Gynatrix pulchella (Hemp Bush) – several grew on the large mound of dumped clay fill in 1997 and then died out. Some have been planted recently along Dandenong Creek within the site.

Histiopteris incisa (Bat's Wing Fern) – two young plants were found in 2023, colonising small craters formed when eucalypts had recently fallen over. The species has come and gone sporadically in the site, always as one or two individuals.

Hookerochloa hookeriana (Hooker Fescue) – dozens were scattered around the site's southwestern corner in 2002, reduced to c. 21 in 2023–2024.

Hypolepis muelleri (Harsh Ground-fern) – in 2024, the dominant understorey species in part of the Swamp Scrub – the stronghold (and perhaps last remaining occurrence) of this species in Knox.

Hypolepis rugosula (Ruddy Ground-fern) – in 2024, fairly abundant in part of the Swamp Scrub.

Isolepis platycarpa (a Club-rush) – abundant when conditions are suitable.

Juncus australis (Austral Rush) – not particularly scarce; scattered around the lake margins.

Juncus holoschoenus (Joint-leaf Rush) – in wetland, scarce.

Linum marginale (Native Flax) – not seen since 1997, when moderate numbers grew in a small area beside a path.

Machaerina rubiginosa (Soft Twig-rush) – in 2024, approximately 20 m² in the Swamp Scrub.

Machaerina tetragona (Square Twig-rush) – in 2024, scattered throughout the Swamp Scrub. The only other occurrence of the species in Knox is a small patch beside Basin-Olinda Rd at Wicks Reserve.

Ozothamnus rosmarinifolius (Rosemary Everlasting) – one plant grew in Swampy Woodland in the SW of the site, in 1997; not seen since.

Persicaria lapathifolia (Pale Knotweed) – in 2004 following earthworks, moderate numbers grew in sediment where Dandenong Ck enters the main lake. It died out later in the Millennium Drought, consistent with the species' opportunistic ecology. The species was possibly not present in Victoria prior to colonisation.

Persicaria subsessilis (Hairy Knotweed) – two plants were found on the northern shore of the lake in 2023.

Platylobium infecundum (a flat-pea) – critically endangered globally; At least three plants grow around the highest part of the site, near the western fence – part of a larger population that is mostly in the abutting Site 23.

Polystichum proliferum (Mother Shield-fern) – in 2023, four grew in the Swamp Scrub.

Potamogeton crispus (Curly Pondweed) – a viable population in the Dandenong Ck channel. Others may grow in the lakes, not visible from the shores. The distribution and abundance of this species in the region is poorly known because of the small number of botanists who investigate submerged plants.

Senecio campylocarpus (Bulging Fireweed) – listed as Endangered in Victoria; In 2023, found scattered around the lakes.

Solanum ?*aviculare* (Kangaroo Apple) – recorded by the author in 1997 without any details.

Triglochin striatum (Streaked Arrow-grass) – substantial numbers.

Fauna of special significance

Listed as Vulnerable under Commonwealth law

Latham's Snipe – recorded most years (32 records since 2014), 1–3 birds at a time.

Listed as Endangered under Victorian law

Swamp Skink – a viable population was found in c. 1999 (e.g. Clemman 2000). Any subsequent records of the species in this site are unavailable from the Department of Energy, Environment and Climate Action, presumably due to concern about poaching.

Listed as Vulnerable under Victorian law

Lewin's Rail – one or two individuals were recorded in 2014, 2017, 2020 and 2021, quite likely overlooked in other years.

Powerful Owl – bound to visit occasionally (but not actually observed); observed roosting in adjoining Site 20 in 2002.

Rare or threatened in metro Melbourne

Platypus – apparently now no longer present in this part of the catchment but at least one was trapped in Dandenong Ck at Liverpool Rd in 2001, with indications of visitation to the retarding basin (Williams 2002).

Swamp Rat – This species has not been recorded in Knox before this study but the author is fairly confident that Swamp Rats made the tunnels he saw within this site in 2023 (and central Ferntree Gully). Swamp Rats have been increasingly spreading west from the Dandenong Ranges over the past two decades, e.g. at nearby Bungalook Conservation Reserves in Kilsyth South.

Spotless Crake – recorded most years (26 records since 2014), 1–3 birds at a time.

Black-fronted Dotterel – 19 records between 2002 and 2023 (including this study), up to four birds at a time.

Yellow-faced Honeyeater – 119 records between 2005 and 2023, up to eight birds at a time. This site is clearly a stronghold of the species in Melbourne's eastern suburbs.

White-eared Honeyeater – This sedentary species was observed during this study and in 2019. It has disappeared from most other parts of metro Melbourne during this century.

Fauna habitat features

- The Liverpool Road Retarding Basin and the abutting Sugarloaf Hill (Site 23) form a substantial-sized area of bushland with diverse composition, from aquatic habitat and open space to tall, moist forest and low, grassy woodland, and much of it in good condition. They represent a major ecological stepping-stone on the Dandenong Creek habitat corridor, through to the large area of contiguous native vegetation in the Dandenong Ranges;
- The creek channel, lakes and wetlands support native aquatic fauna such as invertebrates, fish, frogs and Water Rats;
- There is plenty of good cover for wrens and ground-dwelling fauna such as reptiles, including logs and dense undergrowth;
- There are substantial numbers of large, old trees with hollows;
- Fauna on the site always have access to water, even during drought.

Significance ratings

This site is registered as Site 4801 on the Department of Energy, Environment & Climate Action's 'BioSites' database, where it was rated as 'Regional' significance two decades ago. However, the rating was not based on a thorough assessment of the site's attributes against current criteria and the site's most significant component – *Platylobium infecundum* – hadn't even been described as a species.

The following is an assessment of the site's biological significance against the Department of Energy, Environment & Climate Action's standard criteria (Amos 2004).

Ecological Integrity and Viability

Criterion 1.1.1 attributes **Local** significance to 'All parts of riparian systems with riparian vegetation present', which applies to the section of Dandenong Creek within this site.

Together with Sugarloaf Hill, the site is a major 'stepping stone' on the Dandenong Creek habitat corridor. It follows from criterion 1.2.6 that this attribute of the site is of **Regional** significance.

Richness and Diversity

The site's tally of 165 wild, indigenous, vascular plant species (some no longer present) is high for Knox, but this type of attribute is not formally recognised in the standard criteria. Despite the absence of a fauna survey, the abundance of bird life also stands out in Knox.

Vegetation Type and Condition

According to the criteria of *'Victoria's Native Vegetation Management – A Framework for Action'* (NRE 2002a), a 'remnant patch' of a regionally-endangered EVC has a conservation significance rating of High or Very High, depending on its habitat score. Standard criterion 3.2.3 translates both the 'High' and 'Very High' ratings to **State** significance. All the EVCs at the Liverpool Road Retarding Basin property except Lowland Forest fall into this category. Lowland Forest is regionally vulnerable and its habitat score in this site is clearly above the threshold of 0.3 for it, too, to be of **State** significance.

Threatened Plants

The site contains part of a population of the flat-pea, *Platylobium infecundum*, which extends into the adjacent Site 23 (Sugarloaf Hill). That species is listed under the *Flora and Fauna Guarantee Act* as Critically Endangered and it does not occur outside Victoria. As a result, the habitat provided for *Platylobium infecundum* in the site qualifies as **National** significance under criterion 3.1.2.

Platylobium infecundum had not been scientifically described in 2010 when the previous edition of this report was written. As a result, the site's significance level has risen from State to National.

Many of the locally-threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for **Local** significance. Species such as *Blechnum wattsii* and *Machaerina tetragona* are extremely high in significance at the local scale, as this site is the only one in Knox where they persist or have a reasonable prospect of medium-term survival.

Threatened Fauna

The site has known habitat for Swamp Skink, which is listed as an endangered species under Victorian law and it occurs also interstate. Such habitat is of **State** significance under criterion 3.1.2 of Amos (2004).

Latham's Snipe is listed under Commonwealth law as a vulnerable species and there are 32 records of it in this site since 2014 – up to three birds at a time. That many records of such a cryptic species indicates that the site is regularly used as habitat but not an 'important site' in the terms of the standard criteria. Criterion 3.1.1 treats such habitat as **State** significance.

Lewin's Rail and Powerful Owl are listed as vulnerable species under Victorian law and both occur beyond Victoria's borders. This site's known habitat for Lewin's Rail and in proximity to known habitat for Powerful Owl qualify for **Regional** significance under criteria 3.1.2 and 3.1.3, respectively.

The habitat the site provides for the fauna species mentioned in the section above headed 'Rare or threatened in metro Melbourne' qualifies as **Local** significance under criterion 3.1.5, excluding Platypus.

Threats

The following appear to be the main threats to the site's conservation significance, in roughly decreasing order of severity or urgency:

- Human-induced climate change, which is predicted to cause more severe droughts, heatwaves, floods, fires and storms, as well as substantially lower rainfall (particularly in winter);
- Potential resumption of dumping of earth spoil on the State-significance vegetation behind the fence in the site's southwest;
- Displacement of indigenous flora and fauna by environmental weeds, exacerbated by debilitation of the native vegetation by the impacts of climate change;
- Loss or decline of plant species that are present in such precariously small numbers that they are vulnerable to inbreeding, poor reproductive success, the other threats listed here or localised chance events;
- Eucalypt dieback, exacerbated by the impacts of climate change;
- Damage such as trampling from recreational activities;
- Continual harassment of fauna by dogs off leads (often unwittingly), particularly of waterbirds that would otherwise breed around the lakes;
- Predation of fauna (particularly birds) by foxes.

Management

- There should be no further dumping of earth spoil on significant native vegetation;
- Control of environmental weeds is important to the retention of the site's high conservation significance;
- Dogs off leads are a substantial problem for wildlife and human visitors. A sign could provide an alert to the threat to waterbirds. An approved 'off lead' area may contain the practice to somewhere where the impact is acceptable. Improved signs and some policing will be necessary to ameliorate the problem.

Strategic planning

- This site is covered by Schedule 2 of the Environmental Significance Overlay (ESO2) on the basis of the previous (2010) edition of this report. That edition cited the matters of biological significance that were known at that time. Since then, *Platylobium infecundum* has been scientifically described as a species and recognised to be critically endangered, raising the importance of planning protection. In addition, the threat rating of the Swamp Skink has since risen from Vulnerable to Endangered. Despite these changes, ESO2 remains an appropriate protective instrument and no changes are recommended to the site's planning controls;
- The whole site is covered by 'Public Use Zone – Service and Utility (PUZ1) and the Special Building Overlay (SBA). The Bushfire Management Overlay affects the half of the site that is closest to the forest on Sugarloaf Hill (Site 23);
- The property is larger than 0.4 ha and therefore does not qualify for the size-based exemption from the state-wide baseline planning controls over removal of native vegetation (clause 52.17);
- The site is outside the Urban Growth Boundary for Melbourne.

Information sources used in this assessment

- Plant lists for the forest and swamp scrub from botanical surveys by G.S. Lorimer on 30th September 1991, 13th December 1993 and 18th June 1995;
- Vegetation field data and mapping by G.S. Lorimer in 1997, as reported by Reid J.C., Moss H. and Lorimer G.S. (1997), *'Vegetation Survey of Linear Reserves. A Management Strategy for Riparian and Flood Plain Vegetation'*, for Knox City Council. This includes a list of indigenous and introduced plant species within each of nine separate areas of the site;
- Additional observations of plant species recorded by G.S. Lorimer in 2001, 2002 and 2004 during brief visits to the site;
- A fairly thorough survey of the site's indigenous plant species by Dr Lorimer in June 2024 for this edition, including tabulation of all species and their abundances in different parts of the site, and mapping of the scarcest and most significant species;
- Incidental observations of birds, reptiles and frogs while the above surveys were being done;
- *'Distribution of Platypus along Upper Dandenong and Dobson Creeks. Results of Live Trapping Surveys, October 2001 - February 2002*', a report by G.A. Williams of the Australian Platypus Conservancy to Knox City Council, April 2002;
- *'Distribution, Habitat Utilisation and Management of the Threatened Swamp Skink (Egernia coventryi*) *at Liverpool Road Retarding Basin, Boronia'*, a report by N. Clemman of the Arthur Rylah Institute for Environmental Research for Melbourne Water, April 2000;

- Bird lists from U3A Knox Birdwatching Group, who visit the site from time to time;
- Records of flora and fauna observations stored in the Atlas of Living Australia. Note that many of the plant records are of planted plants but are not flagged as such;
- The Victorian Government's 'NatureKit' website (but note that its mapping of vegetation types and the bioregional boundary are spurious);
- A map of the area from c.1890, reproduced in a Deakin University student's project report by Kath Davies in 1996 titled *'Wicks Reserve Draft Management Plan'*;
- Aerial and satellite imagery from between 1946 and 2024;
- Maps of geology, topography and strategic planning information produced by agencies of the Victorian Government.