



Sites of Biological Significance in Knox

2nd Edition

Volume 2

Graeme S. Lorimer, PhD

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Volume 2

A Report to
Knox City Council

by

Graeme S. Lorimer, PhD

of

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Introduction to Volume 2

This volume provides descriptions and significance assessments of the sites of biological significance identified in this study. The sites are mapped in broad scale on the next page, colour-coded according to their levels of significance and the level of planning scheme protection recommended for them.

The principal method recommended for protecting the sites' significant attributes is by using overlays in the Knox Planning Scheme. The existing Schedules 1 and 3 of the Vegetation Protection Overlay (VPO), and the associated planning scheme maps, are recommended to be replaced by new overlays and maps.

There are also sites whose vegetation is not recommended to be covered by any overlay (at least, not for reasons of biological significance). Their native vegetation is regarded as adequately protected by the statewide 'native vegetation retention' provisions of Clause 52.17 of the Victoria Planning Provisions. These sites do not appear on the key map but are described in the text from p. 543 onward.

Sites 52, 64 and 89 have been destroyed or seriously marred by road construction projects since the sites were described in 2004 for the first edition of this report. The other sites in the range 1-98 retain high levels of biological significance and are recommended for the proposed Environmental Significance Overlay ESO2. Sites 1-87 are numbered in a generally anti-clockwise manner around the key map on the next page, starting in Upper Ferntree Gully near the centre of the map's right-hand edge. Sites 88-97 are road and rail corridors.

Site 99 (p. 496) is the only site recommended for ESO3, covering ten square kilometres at the foot of the Dandenong Ranges. This is followed by Sites 52, 100-110 and 112-114 (pp. 504-542), which are sites recommended for VPO.

Brief descriptions of the two sites that were completely destroyed during the six years since the first edition of this report follow. Another eighteen sites (mostly of State significance) have been reduced in extent due to clearing, mostly as a result of the EastLink project or other road work. Extensive tree removal at Site 111 (Brusco Close, Rowville) in early 2010 caused a major fall in biological significance, leading to the withdrawal of the recommendation in the first edition of this report that the site be covered by a Vegetation Protection Overlay.

Site 64. Yarra Gums, Ferntree Gully Rd, Scoresby (formerly of Regional significance)

In 1998, the southern verge of Ferntree Gully Rd in the path of the EastLink road corridor was reported by Williams *et al.** to include nine of the nationally rare Yarra Gums. In 2004, the present author found six small but mature eucalypts growing amid mown grass, and lodged specimens at the National Herbarium. As a stand of a nationally rare tree species, the site was of Regional significance under the criteria of Amos (2004). All vegetation in this area was cleared as part of roadwork for the EastLink road by 2007.

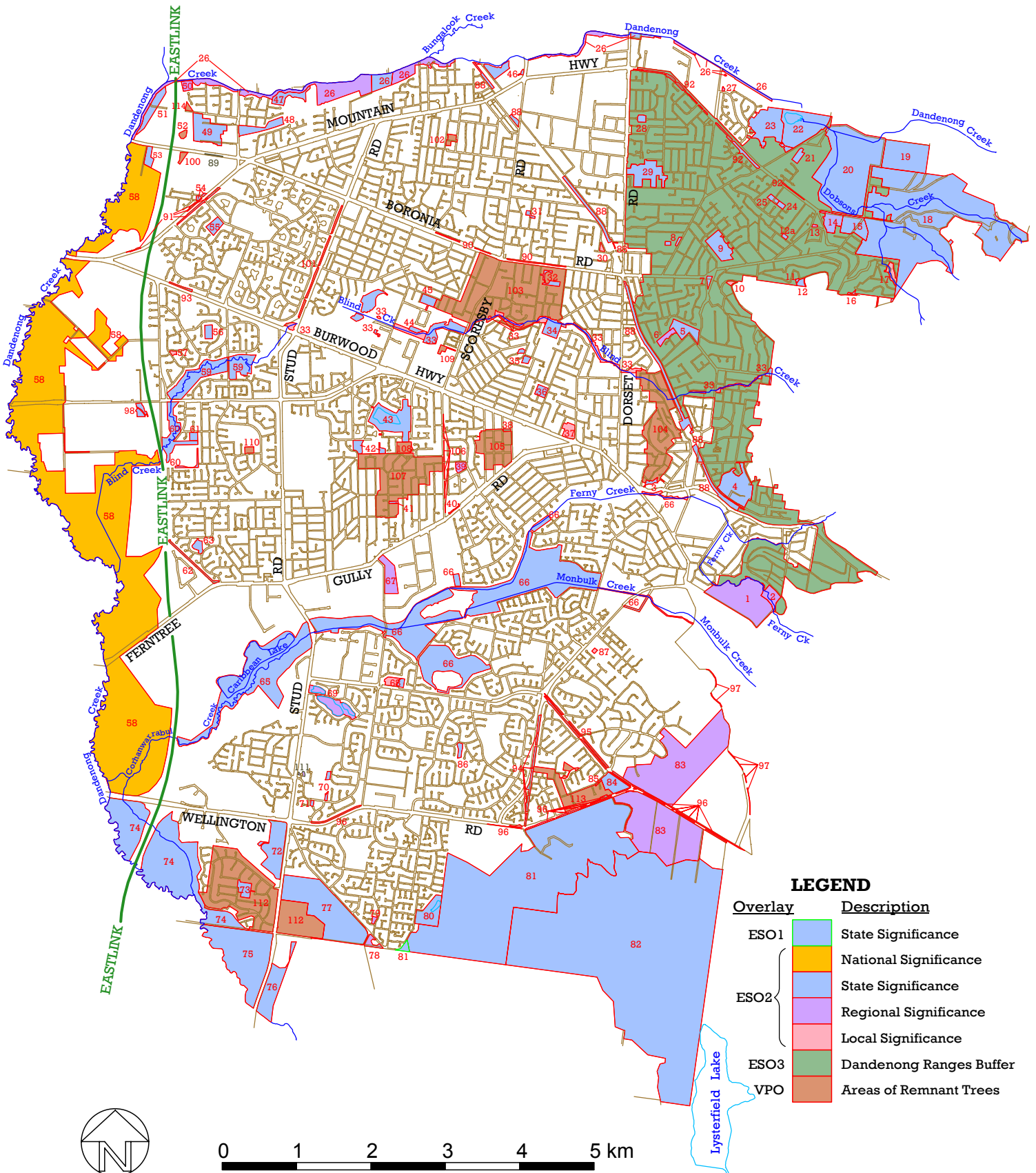
Site 89. Boronia Rd roadside, Wantirna (formerly of Regional significance)

In 2004, a 240-metre stretch of the southern verge of Boronia Rd just west of Wantirna Rd supported remnants and regrowth of the Endangered EVC, Valley Heathy Forest, with three locally rare or threatened plant species. The whole site was destroyed in 2006 or 2007 for road widening.

* Williams L.M., Yugovic J.V., McGuckin J., Humphrey P. and Larwill S. (1998) 'Scoresby Transport Corridor Environment Effects Statement, Supplement Volume H: Flora and Fauna'.

Key Map of Sites of Biological Significance in Knox

recommended for Planning Scheme Overlays



Sites Recommended for ESO2

Sites 1-98 below are proposed to be covered by the suggested Environmental Significance Overlay Schedule 2 that is discussed in Section 5.5 of Volume 1.

Sites 1-87 are numbered in a generally anti-clockwise manner around the key map on the previous page, starting in Upper Ferntree Gully near the centre of the map's right-hand edge. Roadsides and rail reserves are grouped as Sites 88-97, while creek corridors are included among the earlier sites. Some of the creek corridors have broader and more significant sections along them, and these are documented as separate sites.

Site 1. Glenfern Road Woodland, Upper Ferntree Gully

A grazing property abutting the Melbourne metropolitan area, plus abutting roadside. There is a hillside with woodland and native pasture, and a narrow strip of Riparian Forest along Ferny Ck on one boundary. Melway ref. 74 E8.

Site Significance Level: *Regional*

- Valley Grassy Forest is listed as regionally Vulnerable, and is rare in the Dandenong Ranges;
- There are many large, old trees in the Valley Grassy Forest and the Riparian Forest;
- Many regionally rare fauna species have been observed on adjoining land and there is strong potential for some of these species to be found within the site if a survey were to be conducted.



Aerial photograph taken February 2001

Boundaries

This site comprises 157 Glenfern Rd and the abutting road verges, as outlined in red and labelled 'Glenfern Road Woodland' above. The wavy part of the boundary follows either the creek or an adjacent fence. Site 2 can be seen abutting to the northeast, and part of Site 99 to the north.

The Knox Planning Scheme maps show a more complicated boundary between 157 Glenfern Rd and Gilmour Park than that shown above. The former does not accurately reflect the reality that there is a fence along the red line shown above, which divides the land between private grazing and public park management.

Land use & tenure: A single, private Rural Living lot, used for grazing.

Note: Permission was not obtained to enter this property, so the inspection was done from the fence and aerial photographs. The extent of native ground flora could not be reliably determined.

Site description

This 31-hectare site is on a ridge at the edge of the Dandenong Ranges volcanic geological formation, descending to the floodplain of Ferny Ck. Glenfern Rd runs along the ridge top, and there is a minor spur running roughly parallel to New Rd, as marked above. The ridgeline and spur appear on the aerial photograph above as paler areas. The western half of the site faces north, and the eastern half has contours encircling the knoll marked above. Elevations vary from 113 m where Ferny Ck exits the site (in the northwest) to 167 m on the top of the knoll.

The slope is very shallow in the untreed, alluvial floodplain of Ferny Creek. The slope becomes rather steep (approaching 30%) beside New Rd and near the boundary with Site 2, facing northeast to southeast. The remainder of the site has a typical slope of 20%, facing all directions (but mostly with northerly or easterly components).

The native vegetation on the site comprises Riparian Forest on the floodplain and Valley Grassy Forest elsewhere. The former would once have covered the floodplain, but is now probably confined to a narrow, fragmented strip along both banks of Ferny Ck. There is a slight chance that there are patches of Riparian Forest ground flora south of this strip, on the floodplain, but this could not be checked without obtaining permission to enter the property. There are substantial numbers of very large, old Manna Gums on the creek banks, as well as several locally rare shrubs (e.g. *Gynatrix pulchella*). Environmental weeds are a serious degrading influence, as usual along creek corridors.

The occurrence of Valley Grassy Forest is very unusual in the Dandenong Ranges. It contains some fine specimens of Yellow Box and there are Candlebarks, which are rare in Knox and the Dandenongs. The density of trees probably reaches the pre-European density in some parts, but is mostly thinner than natural. Even where trees are very sparse, the ground flora is often native pasture with a large or substantial component of indigenous ground flora. Therefore, the area of native vegetation is larger than the area of tree cover. The richness of ground flora species appears to be rather low, looking from the fenceline, which could be because the area is grazed. Environmental weeds seem not to be a significant problem in the Valley Grassy Forest at this site.

There has been some infill planting of indigenous species on the verge of Glenfern Rd, just northwest of the slight bend.

Relationship to other land

This site and Site 2 appear separately in this report because one is public land and the other is private. From an ecological point of view, the two should be considered together, and also in conjunction with the larger area of bushland on the other side of New Rd, in the Shire of Yarra Ranges. Some fauna no doubt rely on each site to provide different habitat needs; e.g. the lake in Site 2 provides water for woodland birds that forage in Site 1. Native birds and mammals are often seen moving across New Rd.

Probably the most biologically significant area on the other side of New Rd is the 'Glenfern Valley Bushlands' – a 40-hectare area of Crown Land recently reserved as a 'Conservation Area of Natural Interest and Recreation' and managed by a Committee of Management.

Ferny Ck no doubt acts to some degree as a habitat corridor through the area but it reaches a dead end in Site 1 due to the creek's highly unnatural state further downstream. The amount of Riparian Forest in Site 1 is similar to that on the opposite side of Ferny Ck, which is in Site 99 (the Dandenong Ranges buffer zone). Both sides of the creek are equally important for the ecological function and aesthetic appeal of the creek corridor.

Some native birds, mammals and insects that reside in, or visit, the treed neighbourhood to the north (in Site 99) no doubt use the creek corridor as a source of water and food and as a refuge from hot weather.

Bioregion: Highlands Southern Fall

Habitat types

The total area and ecological condition of native vegetation in either EVC is not known, due to absence of permission to enter the site. All the vegetation seen was in fair to poor ecological condition (rating C or D).

Perennial Stream (No EVC number). 6 aquatic flora species found.

Riparian Forest (EVC 18, 'Least Concern' conservation status in the bioregion): 22 indigenous plant species were found by Mr John Reid on 26/3/1997 along both sides of the creek.

Dominant canopy trees: *Eucalyptus viminalis*.

Dominant lower trees: *Acacia melanoxylon*, with fewer *Pomaderris aspera*.

Shrubs: *Coprosma quadrifida*, *Bursaria spinosa*, *Gynatrix pulchella*, *Ozothamnus ferrugineus* and *Prostanthera lasianthos*.

Vines: *Calystegia marginata* is present but very scarce.

Ferns: *Pteridium esculentum* is present.

Ground flora: Mostly weeds. Indigenous species include *Epilobium hirtigerum*, *Juncus gregiflorus*, *J. sarophorus*, *Lobelia anceps*, *Lomandra longifolia*, *Poa ensiformis*, *Senecio minimus* and *S. quadridentatus*.

Valley Grassy Forest (EVC 47, **regionally Vulnerable**): 32 indigenous plant species were found by G. Lorimer looking from the roadside. A substantially larger number might be detected with the benefit of being able to enter the private land.

Dominant canopy trees: *Eucalyptus melliodora* and *E. goniocalyx*, with fewer *E. rubida* and *E. radiata*, widely spaced.

Dominant lower trees: *Exocarpos cupressiformis*, with fewer *Acacia melanoxylon* and *Acacia mearnsii*.

Shrubs: Practically absent on the private property. On the roadsides, *Bursaria spinosa* and *Kunzea ericoides* are the dominant shrubs, and there are also small numbers of *Acacia myrtifolia*, *A. paradoxa* and *A. stricta*.

Vines: none could be seen from the roadside.

Ferns: none could be seen from the roadside.

Ground flora: The private property appears to have extensive areas of native pasture dominated by *Microlaena stipoides*, *Rytidosperma penicillatum*, *Themeda triandra* and other native grasses. The character species *Veronica gracilis* is also present.

Plant Species

The following plant species were observed in 1997. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered, 'E'=Endangered; and 'V'=Vulnerable. The *Calystegia* and *Potamogeton* are rare throughout the Melbourne area.

Risk	Indigenous Species (alphabetical)	Risk	Indigenous Species (alphabetical)
V	<i>Acacia mearnsii</i>		<i>Juncus sarophorus</i>
V	<i>Acacia melanoxylon</i>		<i>Kunzea ericoides</i> spp. agg.
	<i>Acacia paradoxa</i>	E	<i>Lobelia anceps</i>
E	<i>Acacia stricta</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
V	<i>Acaena echinata</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
	<i>Alisma plantago-aquatica</i>		<i>Lomandra longifolia</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>		<i>Microlaena stipoides</i>
	<i>Bursaria spinosa</i>	E	<i>Ozothamnus ferrugineus</i>
E	<i>Calystegia marginata</i>		<i>Persicaria decipiens</i>
V	<i>Coprosma quadrifida</i>	E	<i>Persicaria hydropiper</i>
	<i>Dianella admixta</i>		<i>Poa ensiformis</i>
V	<i>Dianella longifolia</i> s.l.		<i>Poa morrisii</i>
	<i>Dichondra repens</i>	E	<i>Pomaderris aspera</i>
	<i>Elymus scaber</i>	V	<i>Potamogeton crispus</i>
	<i>Epilobium hirtigerum</i>	E	<i>Prostanthera lasianthos</i>
	<i>Eucalyptus goniocalyx</i>		<i>Pteridium esculentum</i>
E	<i>Eucalyptus macrorhyncha</i>	E	<i>Rubus parvifolius</i>
V	<i>Eucalyptus melliodora</i>		<i>Rytidosperma laeve</i>
E	<i>Eucalyptus radiata</i>		<i>Rytidosperma penicillatum</i>
C	<i>Eucalyptus rubida</i>		<i>Rytidosperma racemosum</i>
E	<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>	E	<i>Senecio minimus</i>
V	<i>Exocarpos cupressiformis</i>		<i>Senecio quadridentatus</i>
E	<i>Gynatrix pulchella</i>		<i>Themeda triandra</i>
V	<i>Isolepis inundata</i>	E	<i>Typha ?orientalis</i>
	<i>Juncus gregiflorus</i>	V	<i>Veronica gracilis</i>

Introduced Species

<i>Anthoxanthum odoratum</i>	<i>Fraxinus angustifolia</i>	<i>Ranunculus repens</i>
<i>Aster subulatus</i>	<i>Genista monspessulana</i>	<i>Rosa rubiginosa</i>
<i>Callitriche stagnalis</i>	<i>Hedera helix</i>	<i>Rubus anglocandicans</i>
<i>Chrysanthemoides monilifera</i> subsp. <i>monilifera</i>	<i>Helminthotheca echioides</i>	<i>Rumex crispus</i>
<i>Cirsium vulgare</i>	<i>Ipomoea indica</i>	<i>Salix babylonica</i> s.l.
<i>Crataegus monogyna</i>	<i>Jasminum</i> sp.	<i>Solanum mauritianum</i>
<i>Crocasmia</i> × <i>crocasmiiiflora</i>	<i>Nassella trichotoma</i>	<i>Tradescantia fluminensis</i>
<i>Cyperus eragrostis</i>	<i>Pennisetum clandestinum</i>	<i>Ulex europaeus</i>
<i>Dactylis glomerata</i>	<i>Phalaris aquatica</i>	<i>Verbena bonariensis</i> s.l.
<i>Ehrharta erecta</i>	<i>Pittosporum undulatum</i>	
<i>Foeniculum vulgare</i>	<i>Prunus cerasifera</i>	

Fauna of special significance

Powerful Owls are Vulnerable in Victoria (DSE 2003b) and have been recorded as recently as 2003 in the adjacent Glenfern Valley Bushlands. They are likely to occasionally visit any forest in the district.

Platypus were found in the creek during a 1996-7 trapping campaign (Serena *et al.* 1998) but subsequent attempts to find platypus have failed and this species has probably ceased to visit this area, at least for the time being.

Many of the significant fauna listed for Site 2 would also occur occasionally in Site 1, but no data could be obtained in the absence of permission to enter the private property.

Fauna habitat features

- There are many large eucalypts with hollows that would suit roosting or nesting of certain birds and mammals;
- The stream supports Platypus (or at least, was known to do so until 1997) and hence is likely to have reasonable habitat for stream invertebrates.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Regionally Threatened Ecological Vegetation Class

According to the criteria of 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), even quite degraded examples of a regionally vulnerable EVC (including Valley Grassy Forest) have a conservation significance rating of Medium. This status applies to at least some of the vegetation in this site, and it is possible that the highest quality vegetation may reach High conservation significance. As a consequence, the site meets criterion 3.2.3 for a site of at least **Regional** significance. If a more detailed site inspection in accordance with the Framework were to show that the most significant part of the Valley Grassy Forest has a habitat score of at least 0.3 (which seems unlikely), the site's significance rating should be raised to State.

Threatened flora and fauna

The likely occasional visits of Powerful Owls to the site represent **Local** significance under criterion 3.1.3, given that Powerful Owl is a vulnerable species in Victoria.

The other species listed as 'Fauna of special significance' above, and all the locally threatened plant species listed under the heading 'Plant species', give the site **Local** significance under criterion 3.1.5 (except perhaps a few species that may not have viable populations).

Threats

- Possible future residential development;
- Rapid escalation of environmental weeds if grazing ceases and other control measures are not taken;
- Environmental weeds invading the Riparian Forest from properties to the north of the creek, the worst species being: Hawthorn (*Crataegus monogyna*), Ivy (*Hedera helix*), Sweet Pittosporum (*Pittosporum undulatum*), Blackberry (*Rubus discolor*), Willows (*Salix* species), Wandering Jew (*Tradescantia albiflora*) and introduced grasses such as Cocksfoot (*Dactylis glomerata*);
- Environmental weeds invading the Valley Grassy Forest, the worst species being: Sweet Vernal-grass (*Anthoxanthum odoratum*), Hawthorn (*Crataegus monogyna*), Montpellier Broom (*Genista monspessulana*) and Sweet Briar (*Rosa rubiginosa*);
- Possibly loss or decline of plant species that are present in dangerously small numbers, due to inbreeding, poor reproductive success or vulnerability to localised chance events, but population sizes could not be checked in this study;
- Predation of wildlife by pets;
- Damage to creek banks by stock.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its biological significance (known and potential), the possibility of future subdivision, the presence of riparian habitat and the presence of a threatened vegetation class (Valley Grassy Forest) that is highly fragmented and highly concentrated on private land;
- The site is included within Vegetation Protection Overlay VPO1 of the Knox Planning Scheme. This was partly because part of the site was recognised as biologically significant by Water Ecoscience (1998, Site 27), but the presence of indigenous ground flora had been overlooked. The site is also covered by Significant Landscape Overlay Schedule 2;
- The site is zoned Green Wedge Zone Schedule 2 (GWZ2). It abuts, and is just outside, the Urban Growth Boundary for Melbourne;
- The granting of planning permits for land development within areas of Valley Grassy Forest would be restricted because of the status of the vegetation as a regionally vulnerable EVC and the Victorian government's policy for native vegetation management (NRE 2002a; Victoria Planning Provisions). Any development proposal for the site would have to be accompanied by an ecological assessment that is much more thorough than was possible from the perimeter;

- Some of the site has a slope exceeding 20% and some lies within a riparian zone. Both of these attributes are given a Very High land protection hazard rating by the Native Vegetation Management Framework (NRE 2002a) and they trigger certain planning controls.

Information sources used in this assessment

- A site survey by Dr Lorimer on 19th December 1997 for the report, '*A Survey and Management Plan for Significant Vegetation of Roadsides in Knox*' by G.S. Lorimer for Knox City Council (May 1998, 137 pp.). This included a map of vegetation quality around the perimeter of the site and two lists of plant species (indigenous and introduced) for different areas of Valley Grassy Forest;
- The report '*Vegetation Survey of Linear Reserves – A Management Strategy for Riparian and Flood Plain Vegetation*' by J.C. Reid, H. Moss and G.S. Lorimer for Knox City Council (September 1997, 130 pp.), along with supporting field data gathered along the creek by Mr John Reid on 26th March 1997. This included a vegetation map showing EVCs and vegetation quality along the creek, and two lists of plant species (indigenous and introduced) – one for aquatics in the creek and the other for the Riparian Forest;
- A list of fauna observed during each of the above botanical surveys;
- Lists of fauna observed in the area during 2001-2003, carefully compiled by Mr Mark Fanthorpe for this project, based on surveys by him and his fellow members of the Friends of Glenfern Valley Bushlands: I. Rainbow, L. Living & R. Sinclair;
- '*Status and Habitat Relationships of Platypus in the Dandenong Creek Catchment – II. Results of Surveys and Radio-Tracking Studies, September 1997 - March 1998*', a report by M. Serena, J.L. Thomas and G.A. Williams of the Australian Platypus Conservancy to Melbourne Water, September 1998;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Acknowledgment

Thank you to Mr Mark Fanthorpe and his fellow volunteers in the Friends of Glenfern Valley Bushlands for their fauna list.

Site 2. Gilmour Park, Upper Ferntree Gully

Public park with a lake in a retarding basin and riparian vegetation along Ferny Creek. Melway ref. 74 F8.

Site Significance Level: *Regional*

- There are many majestic, large, old Manna Gums;
- Many regionally rare fauna species have been observed;
- Powerful Owls are likely to visit, given that they have been observed just over the road, in the Shire of Yarra Ranges.

Aerial photograph and plan: See page 4, which covers this site and Site 1.

Boundaries

This site comprises the Melbourne Water retarding basin reserve and contiguous public land along Ferny Creek, excluding the oval and its surrounding spectator area. It is outlined in red and labelled 'Gilmour Park' on p. 4. Site 1 (Glenfern Road Woodland) abuts to the southwest and Site 99 (Dandenong Ranges Buffer) abuts the remaining boundary.

The property boundaries shown on the Planning Scheme maps around Gilmour Park have not been followed for this site because they differ greatly from the fences and physical features that actually delimit areas of different land management and environmental significance.

Land use & tenure: Public land owned by Melbourne Water, including public parkland and a retarding basin with a lake. Management responsibilities are divided between Melbourne Water and Knox City Council.

Site description

This 4.3-hectare site contains a narrow strip along the natural course of Ferny Ck, plus an adjoining retarding basin and lake that were constructed in 1973. Elevations vary from 120 m to 130 m.

Between them, the creek and the retarding basin occupy the full width of the floodplain of Ferny Ck, and all of the soil is alluvium washed down by the creek. In places, the bed of Ferny Ck exposes the underlying Devonian volcanic rock (rhyodacite), part of the Dandenong Ranges.

The retarding basin fulfils an important drainage function. The lake and the rest of the land are used for public recreation and nature conservation. The City of Knox has placed signs around the park to explain the site's ecological significance and the fauna that is found there. Wildlife, including Platypus, represent a large part of the site's conservation significance.

The remnants of native vegetation on the site are of Riparian Forest. The artificial lake in the retarding basin has become colonised by predominantly indigenous wetland flora. There are substantial numbers of very large, old Manna Gums on the creek banks. Environmental weeds are a serious degrading influence, as usual along creek corridors, but they are being kept in check.

There is a 1997 management plan for the site and the contiguous public land upstream.

Relationship to other land

Ferny Ck no doubt acts to some degree as a habitat corridor through the area, particularly for Platypus and other aquatic fauna. The retarding basin wall would be a barrier to movement of fish other than eels.

Some native birds, mammals and insects that reside in, or visit, the surrounding hills no doubt use the creek corridor and the lake as sources of water and food and as a refuge from hot weather. Therefore, the ecology of this site should be considered in conjunction with the adjoining Site 1, Site 2, Site 99 and the 'Glenfern Valley Bushlands' in the Shire of Yarra Ranges.

Many nomadic and migratory birds have been recorded at the site. Some of these species probably migrate along the fragmented habitat corridor of Dandenong Creek, Corhanwarrabul Ck and Ferny Ck. Others, as well as Koalas, would migrate around the forested areas of the Dandenong Ranges and beyond.

Bioregion: Highlands Southern Fall

Habitat types

Perennial Stream (No EVC number). Includes *Alisma plantago-aquatica* and *Persicaria decipiens*.

Riparian Forest (EVC 18, 'Least Concern' conservation status in the bioregion): 1.3 hectares in total, of which approximately 1.1 ha is in fair ecological condition (rating C) and 0.2 ha is poor ecological condition (rating D). 26 indigenous plant species were found by G.S. Lorimer on 19/12/97 and/or J.C. Reid on 26/3/1997.

Dominant canopy trees: *Eucalyptus viminalis*, with fewer *E. ovata*.

Dominant lower trees: *Acacia melanoxylon*, with fewer *Pomaderris aspera* and *A. mearnsii*.

Shrubs: *Prostanthera lasianthos* and *Gynatrix pulchella* are the most characteristic species. Others include *Acacia paradoxa*, *A. stricta*, *A. verticillata*, *Kunzea ericoides*, *Ozothamnus ferrugineus* and *Senecio minimus*.

Vines: *Calystegia marginata* is present but very scarce.

Ferns: *Pteridium esculentum* is present.

Ground flora: Quite weedy. The dominant indigenous species is *Poa ensiformis*. Other indigenous species include *Rytidosperma setaceum*, *Epilobium hirtigerum*, *Juncus gregiflorus*, *J. pallidus* and *Schoenus apogon*.

Wetland (EVC 74): Wetland is listed as regionally Endangered, but in this case the occurrence is artificial, recent and readily replaceable). It is partly mapped by the Department of Sustainability & Environment as 'Aquatic Herbland', which is a component of EVC 74, and while there is some basis for this identification, the broader category of 'Wetland' is adopted here because of the absence of various species that are typically found in natural occurrences of Aquatic Herbland, such as *Myriophyllums* and *Potamogeton tricarlinatus*. The total area of the lake is 1.2 ha.

10 indigenous plant species were found by J.C. Reid in autumn 1997.

Dominant species: *Typha domingensis*, *T. orientalis*, *Eleocharis sphacelata*, *Juncus* species, *Persicaria* species.

Plant Species

The following 1997 data includes columns for the rarity of species in Knox and the Melbourne area. 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Acacia leprosa* (Dandenong Range variant) is listed as Rare nationally (Walsh & Stajsic 2007) but it may be planted at this site. *Calystegia marginata* is rare throughout the Melbourne area.

Risk	Indigenous Species (alphabetical)	Risk	Indigenous Species (alphabetical)
V	<i>Acacia leprosa</i> (Dandenong Range variant) – possibly planted		<i>Juncus gregiflorus</i>
V	<i>Acacia mearnsii</i>		<i>Juncus pallidus</i>
E	<i>Acacia stricta</i>		<i>Juncus sarophorus</i>
V	<i>Acacia verticillata</i> – possibly planted	E	<i>Kunzea ericoides</i> spp. agg. (planted?)
	<i>Alisma plantago-aquatica</i>		<i>Ozothamnus ferrugineus</i>
V	<i>Alternanthera denticulata</i>	E	<i>Persicaria decipiens</i>
C	<i>Amyema pendula</i>	E	<i>Persicaria hydropiper</i>
V	<i>Amyema quandang</i>		<i>Poa ensiformis</i>
E	<i>Calystegia marginata</i>	E	<i>Pomaderris aspera</i>
	<i>Eleocharis sphacelata</i>	E	<i>Prostanthera lasianthos</i>
	<i>Epilobium hirtigerum</i>		<i>Rytidosperma setaceum</i>
	<i>Eucalyptus goniocalyx</i>		<i>Rytidosperma</i> sp.
V	<i>Eucalyptus ovata</i>		<i>Schoenus apogon</i>
E	<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>	E	<i>Senecio minimus</i>
V	<i>Exocarpos cupressiformis</i>	E	<i>Typha domingensis</i>
E	<i>Gynatrix pulchella</i>	E	<i>Typha orientalis</i>

Introduced Species

<i>Acacia decurrens</i>	<i>Dactylis glomerata</i>	<i>Phalaris aquatica</i>
<i>Acacia longifolia</i> subsp. <i>longifolia</i>	<i>Delairea odorata</i>	<i>Pinus radiata</i>
<i>Agapanthus praecox</i>	<i>Festuca arundinacea</i>	<i>Pittosporum undulatum</i>
<i>Agrostis capillaris</i>	<i>Genista monspessulana</i>	<i>Plantago lanceolata</i>
<i>Anthoxanthum odoratum</i>	<i>Hedera helix</i>	<i>Quercus robur</i>
<i>Aster subulatus</i>	<i>Helminthotheca echioides</i>	<i>Ranunculus repens</i>
<i>Callitriche stagnalis</i>	<i>Holcus lanatus</i>	<i>Rubus anglocandicans</i>
<i>Chrysanthemoides monilifera</i> subsp. <i>monilifera</i>	<i>Hypericum tetrapterum</i>	<i>Rumex crispus</i>
<i>Cirsium vulgare</i>	<i>Leontodon taraxacoides</i>	<i>Salix babylonica</i> s.l.
<i>Cortaderia selloana</i>	<i>Paspalum dilatatum</i>	<i>Solanum mauritianum</i>
<i>Crataegus monogyna</i>	<i>Paspalum distichum</i>	<i>Sporobolus africanus</i>
<i>Cyperus eragrostis</i>	<i>Persicaria maculosa</i>	<i>Zantedeschia aethiopica</i>

Fauna of special significance

Vulnerable species listed under the *Flora and Fauna Guarantee Act*
Powerful Owl (in adjacent Glenfern Valley Bushlands)

Rare in the Melbourne Region

Platypus (probably no longer present)	Wedge-tailed Eagle	Australian King-Parrot
Hardhead	Australian Hobby	Little Grassbird
Darter	Peregrine Falcon	Australian Reed Warbler
White-necked Heron	Buff-banded Rail	
Nankeen Night Heron	Black-fronted Dotterel	Peron's Tree Frog
Whistling Kite	Little Corella	

Observed in the adjacent Glenfern Valley Bushlands

Koala	Collared Sparrowhawk	Olive Whistler
	Little Eagle	Satin Flycatcher
	Brush Cuckoo	Fairy Martin

Fauna habitat features

- There are large Manna Gums with hollows that would suit roosting or nesting of certain birds and mammals;
- The stream supports Platypus (or at least, was known to do so until 1997) and hence is likely to have reasonable habitat for stream invertebrates.
- The lake provides approximately one hectare of open water as well as islands and emergent plants that provide food and cover for waterbirds, invertebrates and potentially Platypus.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment'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 this site.

The site is also an ecological 'stepping stone' on the Ferny Creek habitat corridor. The corridor is probably important at a Local scale. Criterion 1.2.6 takes this to represent **Local** significance.

Richness and Diversity

The richness of recorded fauna is high for Knox, but this type of attribute is not formally recognised in the standard criteria. The site nevertheless stands out within Knox for its richness of fauna – particularly regionally rare or threatened fauna.

Regionally Threatened Ecological Vegetation Class

According to the criteria of '*Victoria's Native Vegetation Management – A Framework for Action*' (NRE 2002a), even quite degraded remnants of native vegetation belonging to an endangered EVC (including Wetland) have a conservation significance rating of High. In the present case, the wetland vegetation is not a remnant, but the result of natural colonisation of an artificial lake. All of its values would be expected to return within a decade if the lake were to be destroyed and rebuilt. It would therefore be unreasonable to confer State significance to the site, as if the lake were a natural wetland. Instead, the **Local** level is adopted here.

Rare or Threatened Flora

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

The site is probable habitat for Powerful Owls, which have been observed on the other side of New Rd (and are locally fairly common). This species is listed under the *Flora and Fauna Guarantee Act 1988* and is regarded by the Department of Sustainability & Environment as a vulnerable species in Victoria (DSE 2003b). Sites like Gilmour Park that are likely to support Powerful Owl and are adjacent to known habitat are accorded **Regional** significance under criterion 3.1.3.

The presence of fauna species that are threatened locally, particularly the resident Peron's Tree Frog, also makes the site significant at the **Local** level under criterion 3.1.5.

Threats

- Environmental weeds in the Riparian Forest, the worst species being: Hawthorn (*Crataegus monogyna*), Montpellier Broom (*Genista monspessulana*), Ivy (*Hedera helix*), Sweet Pittosporum (*Pittosporum undulatum*), Tobacco-bush (*Solanum mauritianum*) and introduced grasses such as Cocksfoot (*Dactylis glomerata*);
- Environmental weeds in the lake, the worst species being Water Couch (*Paspalum distichum*) and Creeping Buttercup (*Ranunculus repens*);
- Eucalypt dieback;
- Potential increases in creek flow fluctuations, water contamination and silt as a result of development upstream;
- An associated risk that the retarding basin will need to be enlarged;
- Predation of wildlife by pets and foxes;
- Displacement or out-competition of native birds by introduced birds, such as Mallards, Blackbirds, Mynas and Bell Miners.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its biological significance (discussed above) and the presence of riparian habitat and a lake;
- The site is included within Vegetation Protection Overlay VPO1 of the Knox Planning Scheme, notwithstanding that it was overlooked as a significant site by Water Ecoscience (1998);
- Knox City Council should maintain and foster cooperation and communication between itself, Melbourne Water, the Department of Primary Industry, the Friends of Glenfern Valley Bushlands and the Shire of Yarra Ranges so that the ecological links between the adjoining parcels of public land are properly reflected in such matters as fire prevention, town planning, weed control and drainage.

Information sources used in this assessment

- A vegetation map showing EVCs and vegetation quality, and two lists of plant species – one for aquatics in the stream and the other for the Riparian Forest – observed by Dr Lorimer on 19th December 1997, as described in the report, '*A Survey and Management Plan for Significant Vegetation of Roadsides in Knox*' by G.S. Lorimer for Knox City Council (May 1998, 137 pp.);
- A vegetation map showing EVCs and vegetation quality, and two lists of plant species (indigenous and introduced) observed by Mr John Reid on 6th April 1997, as described in the report '*Vegetation Survey of Linear Reserves – A Management Strategy for Riparian and Flood Plain Vegetation*' by J.C. Reid, H. Moss and G.S. Lorimer for Knox City Council (September 1997, 130 pp.);
- A list of fauna observed during each of the above botanical surveys;
- Lists of fauna observed in the area during 2001-2003, carefully compiled by Mark Fanthorpe for this project, based on surveys by him and his fellow members of the Friends of Glenfern Valley Bushlands: I. Rainbow, L. Living & R. Sinclair;
- Lists of flora and fauna, and other information, in '*A Management Plan for Gilmour Park at the Ferny Creek Retarding Basin, Upper Ferntree Gully*' by Knox City Council's Landscape Services Unit in collaboration with Melbourne Water (1997);
- '*Status and Habitat Relationships of Platypus in the Dandenong Creek Catchment – II. Results of Surveys and Radio-Tracking Studies, September 1997 - March 1998*', a report by Serena, Thomas and Williams of the Australian Platypus Conservancy to Melbourne Water, September 1998;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Acknowledgment

Thank you to Mr Mark Fanthorpe and his fellow volunteers in the Friends of Glenfern Valley Bushlands for their fauna list.

Site 3. End of The Avenue, Ferntree Gully

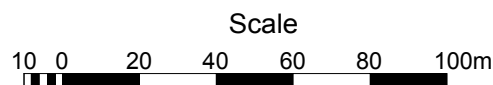
Private land and Council reserve between the dead end of The Avenue and Aldi supermarket. Melway ref. 74 B4.

Site Significance Level: *State*

- The Ecological Vegetation Class of the vegetation on the site (Valley Heathy Forest) is endangered;
- It is moderately degraded but has mature, remnant eucalypts and three lower strata of native vegetation;
- The site's flora is not particularly rich for Valley Heathy Forest due to the small area, past clearing and weed invasion.



Aerial photograph taken February 2007



Boundaries

The site is outlined in red above, measuring 7,900 m². It includes 56 The Avenue (two parcels), 59 The Avenue and adjacent Common Property on and above the cliff face from a former quarry.

Land use & tenure: 56 The Avenue is a Council reserve, acquired in 2007. 59 The Avenue is vacant private land, formerly an unused road reservation. The rest of the site (the cliff and its brow) is Common Property of the adjacent shops.

Site description

The site includes an old quarry cliff (5-15 m high) and two properties bordering the top of the cliff. Apart from the cliff, the slope is shallow (typically 1:6), lying midway down the southern slope of a knoll at the southern end of a ridge. The elevation varies from 100 m at the base of the cliff to 123m at the northwestern corner of 59 The Avenue. The quarry exposes the hornfels bedrock that was formed by metamorphosis at the interface between the Lower Devonian sedimentary geology to the west and the Upper Devonian volcanic flows of the Mt Dandenong group to the east. The hardness of hornfels has resulted in the formation of the north-south ridge on which the site is situated. The soil is a light grey loam over clay subsoil.

All of the native vegetation surveyed shows marked signs of past clearing, excavation and consequent weed invasion, but the extent of weed invasion is highly variable.

There are some large remnant eucalypts, many decades old. The understorey comprises three strata and has regrown following clearing several decades ago.

The most natural native understorey occurs in a strip along the brow of the cliff, on the shopping centre's Common Property. Several indigenous plant species in this strip are either not found elsewhere in the site or only in smaller numbers, including the locally threatened Sweet Hound's-tongue (*Cynoglossum suaveolens*) and a solitary Curved Rice-flower (*Pimelea curviflora*). This strip also supports a large population of Yellow Bulbine-lily (*Bulbine bulbosa*) in Knox, whose only other two recorded occurrences in Knox were over a decade ago, with much smaller numbers and quite likely since destroyed by residential development.

The vegetation of the cliff face is in a quite immature stage of regeneration, comprising a mixture of wildflowers, eucalypt saplings, young pines and other woody weeds. Depending on how it is managed in the next few years, it could become either an effective wildflower sanctuary or a grove of pines with a few hardy indigenous plants. A less steep section at the eastern end of the cliff supports substantial populations of some indigenous plant species that are absent elsewhere in the area, such as substantial numbers of *Leptorhynchus tenuifolius* and *Thelymitra ?peniculata*, but none of these species are rare or threatened throughout Knox.

The ecological condition of more than half of the survey area is the bottom rating, 'D'. The worst ecological condition is in the northwestern corner and on much of the lower slopes of the cliff.

Most of the native understorey on 59 The Avenue was bulldozed, sprayed with herbicide and sown with ryegrass in 2007. The ryegrass failed to establish properly and native understorey is regenerating. A proper assessment of the property's ecological condition will probably become possible by spring 2008, unless further destructive activities are conducted.

The site's history of clearing, excavation and weeds has resulted in the undoubted loss of some species, but the large number of indigenous plant species recorded (80 species of flowering plant and one fern) suggests that the vegetation retains a good basis for ecological recovery if properly managed.

Relationship to other land

There is a canopy of scattered remnant eucalypts over the kilometre-long ridge on which this site is situated. This canopy, combined with mature non-indigenous trees, appears to facilitate movement of some birds and possums to and from the site. However, the size of the site is too small for birds to spend much time there, and many species of native birds and insects may be discouraged from visiting because native understorey is practically non-existent for a radius of 700 m from the site. More mobile fauna may visit the site *en route* between more substantial areas of habitat, particularly the Dandenong Ranges National Park 1.2 km away. Some birds probably visit while following the general route of Ferny Creek (Site 66).

Overall, the tree canopy is moderately well connected to more substantial habitat, but the understorey is quite isolated. That isolation no doubt creates a significant risk of inbreeding of plants, given that the site is too small to have healthy numbers of many species.

Bioregion: Mapped by the Department of Sustainability & Environment as being a few hundred metres within the Gippsland Plain bioregion; however the topography, geology and botanical composition of the vegetation have some affinities with the Highlands Southern Fall bioregion.

Habitat type

Valley Heathy Forest (EVC 127, **regionally Endangered**), approaching Valley Grassy Forest (EVC 47, regionally Vulnerable). Estimated as 7,000 m² of native vegetation, comprising 200 m² in ecological condition B (good), 900 m² in ecological condition C (fair) and 6,800 m² in ecological condition D (poor).

Dominant canopy trees: In the more natural areas, *Eucalyptus melliodora* dominates, followed by (in decreasing order) *E. goniocalyx*, *E. macrorhyncha*, *E. radiata* and *E. obliqua*. The tree crowns overlap slightly except where clearing has opened the canopy. *Pinus radiata* (planted and wild) are abundant in the west and on the cliff face.

Dominant lower trees: *Exocarpos cupressiformis* is abundant and *Acacia melanoxylon* is scattered. *Acacia mearnsii* was present on 59 The Avenue until 2007, when the property was mostly cleared.

Shrubs: Mostly 2-3 m tall and of variable density, depending on the recent history of weed growth, weed control and other disturbance. *Bursaria spinosa* is abundant. *Cassinia aculeata*, *Coprosma quadrifida*, *Leptospermum scoparium* and *Ozothamnus ferrugineus* are scattered thinly. *Acacia leprosa* is represented by four individuals. Visibility is typically 50 m in the less weed-affected areas.

Vines: *Cassytha melantha* is in small numbers. *Clematis aristata* is represented by four plants. *Comesperma volubile* and *Hardenbergia violacea* are each represented by two plants. *Pandorea pandorana* is represented by a few individuals.

Ferns: The only fern is a single, small *Pteridium esculentum* whose above-ground parts had recently been destroyed during the November 2007 survey.

Ground flora: Densely grassy. The dominant indigenous species are *Poa morrisii*, *Rytidosperma racemosum* and *Microlaena stipoides*. The following species are abundant (at least in some parts of the site) but with less foliage cover than the dominant grasses: *Lomandra filiformis* subsp. *coriacea*, *Arthropodium strictum*, *Rytidosperma pallidum*, *Rytidosperma setaceum*, *Rytidosperma tenuius*, *Deyeuxia quadriseta*, *Elymus scaber*, *Dillwynia cinerascens*, *Dianella longifolia*, *Bulbine bulbosa*, *Leptorhynchos tenuifolius* and *Plantago varia*. The characteristic species *Themeda triandra*, *Lepidosperma laterale* and *Platylobium formosum* are present but not abundant.

Plant Species

In 2007-8, 80 indigenous species of flowering plant, one fern and two mosses were found – a large number for such a small patch of native vegetation. In the plant list below, the column headed ‘Risk’ indicates the indigenous species’ risk of extinction in Knox with ‘E’=Endangered and ‘V’=Vulnerable. In addition, *Acacia leprosa* (Dandenong Range variant) is listed by Walsh and Stajsic (2007) as Rare nationally.

Risk	Indigenous Species (alphabetical)	Risk	Indigenous Species (alphabetical)
V	<i>Acacia leprosa</i> (Dandenong Range variant)	V	<i>Hardenbergia violacea</i>
V	<i>Acacia mearnsii</i>	E	<i>Hypericum gramineum</i>
V	<i>Acacia melanoxydon</i>		<i>Hypnum cupressiforme</i>
E	<i>Acacia stricta</i>		<i>Juncus amabilis</i>
V	<i>Acrotriche prostrata</i>		<i>Juncus pallidus</i>
	<i>Acrotriche serrulata</i>	E	<i>Juncus subsecundus</i>
V	<i>Adiantum aethiopicum</i>	V	<i>Lepidosperma laterale</i>
	<i>Arthropodium strictum</i>	V	<i>Leptorhynchos tenuifolius</i>
	<i>Austrostipa pubinodis</i>	E	<i>Leptospermum scoparium</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Billardiera mutabilis</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
V	<i>Brunonia australis</i>		<i>Lomandra longifolia</i>
E	<i>Bulbine bulbosa</i> (120 plants, most of Knox’s entire population of the species)		<i>Microlaena stipoides</i>
	<i>Bursaria spinosa</i>		<i>Myoporum parvifolium</i>
	<i>Campylopus clavatus</i>	V	<i>Opercularia varia</i>
	<i>Carex breviculmis</i>		<i>Oxalis exilis/perennans</i>
	<i>Cassinia aculeata</i>	E	<i>Ozothamnus ferrugineus</i>
	<i>Cassinia arcuata</i>		<i>Pandorea pandorana</i>
V	<i>Cassinia longifolia</i>	E	<i>Pimelea curviflora</i> (one only)
E	<i>Cassythia melantha</i>	V	<i>Pimelea humilis</i>
V	<i>Clematis aristata</i>	V	<i>Plantago varia</i>
V	<i>Comesperma volubile</i>	V	<i>Platylobium formosum</i>
V	<i>Coprosma quadrifida</i>		<i>Poa morrisii</i>
E	<i>Cynoglossum suaveolens</i> (two plants)		<i>Poranthera microphylla</i>
E	<i>Daviesia leptophylla</i>		<i>Pteridium esculentum</i>
	<i>Deyeuxia quadriseta</i>	E	<i>Rytidosperma ?caespitosum</i> (one only)
	<i>Dianella admixta</i>		<i>Rytidosperma laeve</i>
V	<i>Dianella longifolia</i> s.l.		<i>Rytidosperma pallidum</i>
V	<i>Dianella tasmanica</i>		<i>Rytidosperma penicillatum</i>
	<i>Dichelachne rara</i>		<i>Rytidosperma racemosum</i>
	<i>Dichondra repens</i>		<i>Rytidosperma setaceum</i>
V	<i>Dillwynia cinerascens</i>		<i>Rytidosperma tenuius</i>
	<i>Elymus scaber</i>		<i>Schoenus apogon</i>
	<i>Eucalyptus goniocalyx</i>		<i>Senecio hispidulus</i>
E	<i>Eucalyptus macrorhyncha</i>	E	<i>Senecio prenanthoides</i>
V	<i>Eucalyptus melliodora</i>		<i>Senecio quadridentatus</i>
V	<i>Eucalyptus obliqua</i>	E	<i>Stackhousia monogyna</i>
E	<i>Eucalyptus radiata</i>	E	<i>Stylidium armeria/graminifolium</i>
V	<i>Exocarpos cupressiformis</i>		<i>Themeda triandra</i>
	<i>Gahnia radula</i>		<i>Thuidiopsis furfurosa</i>
V	<i>Geranium ?sp. 2</i>	E	<i>Wahlenbergia gracilis</i>
V	<i>Glycine clandestina</i>	V	<i>Xanthorrhoea minor</i>
	<i>Gonocarpus tetragynus</i>		

Introduced Species

<i>Agapanthus praecox</i>	<i>Crassula multicava</i>	<i>Malus pumila</i>
<i>Agrostis capillaris</i>	<i>Crataegus monogyna</i>	<i>Oxalis incarnata</i>
<i>Aira ?elegantissima</i>	<i>Cynosurus echinatus</i>	<i>Pinus radiata</i>
<i>Allium triquetrum</i>	<i>Dactylis glomerata</i>	<i>Pittosporum undulatum</i>
<i>Anthoxanthum odoratum</i>	<i>Ehrharta erecta</i>	<i>Plantago lanceolata</i>
<i>Arbutus unedo</i>	<i>Ehrharta longiflora</i>	<i>Prunus cerasifera</i>
<i>Asparagus scandens</i>	<i>Erica lusitanica</i>	<i>Romulea rosea</i>
<i>Briza maxima</i>	<i>Eriobotrya japonica</i>	<i>Rubus anglocandicans</i>
<i>Bromus catharticus</i>	<i>Hakea salicifolia</i>	<i>Solanum nigrum</i>
<i>Bromus diandrus</i>	<i>Hedera helix</i>	<i>Sonchus oleraceus</i>
<i>Centaureum erythraea</i>	<i>Holcus lanatus</i>	<i>Trifolium repens</i>
<i>Chrysanthemoides monilifera</i> subsp. <i>monilifera</i>	<i>Hypochoeris radicata</i>	<i>Vicia disperma</i>
<i>Cirsium vulgare</i>	<i>Ixia polystachya</i>	<i>Vicia hirsuta</i>
<i>Cotoneaster glaucophyllus</i>	<i>Ligustrum lucidum</i>	<i>Vicia sativa</i>
<i>Cotoneaster pannosus</i>	<i>Lolium perenne</i>	<i>Watsonia meriana</i> var. <i>bulbillifera</i>
<i>Cotoneaster simonsii</i>	<i>Lonicera japonica</i>	

Fauna habitat features

There are patches of dense shrubs, which are good habitat for small birds, but the isolation of the reserve from other understorey minimises the benefit of this. There are large, mature trees with hollows that may be used by birds, possums and bats.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Regionally Threatened Ecological Vegetation Class

This site contains a 'remnant patch' of an endangered EVC. According to 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), vegetation belonging to an endangered EVC has a conservation significance rating of either High or Very High, depending on its ecological condition. In either case, any site containing a remnant patch of such vegetation is of **State** significance under criterion 3.2.3.

Rare plants

The Dandenong Range variant of *Acacia leprosa* is listed as 'rare' nationally and in Victoria. The population in this site is so small that its long-term viability is in question and it does not make a significant contribution to the total population of the taxon. This represents **Local** significance under criterion 3.1.2 of the standard criteria.

Many of the other locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

The following are the main pressures threatening to lessen the reserve's conservation significance, in approximately decreasing order of severity:

- Invasion by grass weeds (particularly Sweet Vernal Grass);
- Invasion by Blackberry and woody weeds such as Sweet Pittosporum;
- Potential invasion by Asparagus Fern, which is present just southeast of the site;
- Loss or decline of plant species whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or elimination by incidents such as cubby house construction or digging by dogs;
- Reduced visitation of the site by small insect-eating birds due to its isolation from other areas with indigenous understorey, possibly leading to a worsening of plant pests and diseases;
- Potential site development. (The severity of this risk in relation to the others is not a biological matter and so its correct position in this list is indeterminate in this study.)

Management issues

- There has been excellent control of Blackberry and woody weeds in January 2003. Follow-up will be needed for this to have lasting effect, particularly where the ground has been laid bare;
- Grass weeds might be controlled by spot spraying with grass-specific herbicide.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its biological significance (discussed above) and the possibility of future subdivision;
- The site is included within Vegetation Protection Overlay VPO3 of the Knox Planning Scheme.

Information sources used in this assessment

- Detailed vegetation data and mapping in accord with this study's standard approach described in Section 2.4 of Vol.1, including a list of indigenous and introduced plant species, compiled by Dr Lorimer over one hour in January 2003;
- Detailed botanical assessment of the site by Dr Lorimer for a bushland management plan in 2008;
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 4. Former CSR Ferntree Gully Quarry

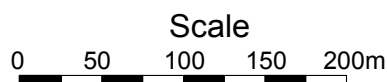
Former quarry land containing a lake, cliffs, revegetation areas and peripheral remnant vegetation.
Melway ref. 74 D4.

Site Significance Level: *State*

- Part of the remnant vegetation belongs to the vulnerable EVC, Grassy Forest, in reasonable condition;
- Peregrine Falcons nest annually on a cliff face;
- The site's vegetation and habitat buffers the adjacent Dandenong Ranges National Park.



Aerial photograph taken February 2007



Boundaries

This site's boundary appears in red above. Most of it coincides with property boundaries; however it includes the full vegetated width of the road verges along Ladys Walk, Butlers Rd and part of Quarry Rd.

Note: The steeper, more heavily vegetated slopes were not accessible due to hazards. Some native ground flora would have gone undetected.

Land use & tenure: Former quarry and adjoining roadside, all owned by Knox City Council.

Site description

This former quarry site is on the edge of the rhyodacite geology that forms the Dandenong Ranges. Elevations of the natural ground level vary from 127 m in the western corner to 216 m on the marked knoll. The natural soil is a light grey loam over clay subsoil.

The quarry benches on the eastern side have a steeply stepped profile, with some cliffs towards the bottom that provide nesting sites for Peregrine Falcons. These benches have been revegetated with a mixture of natural regeneration and planting with Australian species, many of which are indigenous. The benches on the other sides of the former quarry pit have been smoothed out to form a steep slope down to a lake at the base. There are some recent revegetation plots on these slopes.

When this area was inspected for this study in 2002, the area bordered by Butlers Rd, Railway Rd and the site described here contained regenerating indigenous plants, weeds and a patch of degraded native vegetation. All of this was destroyed by 2007 to develop the new subdivision seen on the aerial photograph. The patch of native vegetation belonged to two endangered vegetation types and the regenerating plants included at least twelve plants of the uncommon shrub species, Golden Spray (*Viminaria juncea*). The vegetation lost was of Regional significance.

Beside the eastern end of Butlers Rd, there is a narrow strip of vegetation that contains a mixture of remnant plants, weeds and planted plants that once provided visual screening of the quarry. This strip of vegetation continues beside Ladys Walk, where there is a transition from Grassy Forest to Grassy Dry Forest. The roadside verge of Ladys Walk is badly affected by environmental weeds that have become established largely because of the effects of the road's construction and ongoing runoff and soil disturbance.

The least modified native vegetation on the site is in a strip below Ladys Walk, between the old quarry fence and a vehicle track.

The quarry benches east and southeast of the lake have dense infestations of the declared noxious weeds,. Pines also threaten to become a serious problem.

Revegetation on the verge of Quarry Rd and on the slope that extends from there down to the lake is at an adolescent stage and is providing habitat for native birds and insects, but is starting to become invaded by Montpellier Broom and Boneseed. This area also contains a reasonable cover of naturally regenerated indigenous plants, particularly grasses.

Relationship to other land

The Peregrine Falcons that nest on the cliffs may hunt in the adjoining Dandenong Ranges National Park, a site of National significance.

Some other species of birds and insects probably undertake daily or seasonal movements along the railway corridor (Site 88) and into the park via the quarry site and treed properties on either side. The role of the quarry site for such movements will be substantially strengthened once the revegetation is more advanced and extensive.

The environmental weeds along Ladys Walk and within the quarry fence present a risk of infestation into the park. Fortunately, the park is uphill, and many weeds do not spread very rapidly uphill.

Bioregion: Highlands Southern Fall

Habitat types

Because hazards prevented access to some of the site, and because so much of the vegetation is in such a state of transition due to revegetation or natural regeneration, it has not been possible to fully quantify the amount of vegetation in each category of ecological condition (A to D).

Grassy Dry Forest (EVC 22, conservation status rated 'Least Concern' in the bioregion). Estimated as 1.2 ha in area, comprising 0.35 ha in good ecological condition (rating 'B') and 0.85 ha in fair ecological condition (rating 'C').

Dominant canopy trees: *Eucalyptus goniocalyx* and *E. macrorhyncha*.

Dominant lower trees: *Exocarpos cupressiformis*, abundant in the more intact areas.

Shrubs: *Acacia implexa*, *A. myrtifolia*, *A. pycnantha*, *A. stricta*, *Cassinia aculeata* and *C. longifolia*.

Vines: Sparse *Comesperma volubile*.

Ferns: *Adiantum aethiopicum* is present but not abundant.

Ground flora: Dominated by *Rytidosperma pallidum*. Other abundant species are *Rytidosperma* species, *Dianella* species, *Lomandra filiformis*, *Poa morrisii*, *Senecio* species and *Themeda triandra*. *Lepidosperma laterale* is a character species.

Herb-rich Foothill Forest (EVC 23, conservation status rated 'Least Concern' in the bioregion)

Based on the vegetation surrounding this site, combined with topographic and geological maps, it appears that Herb-rich Foothill Forest would once have occurred in the site's southeastern corner (as shown on the aerial photograph). Most of this has been quarried, but vestiges probably persist in a degraded state behind the houses on Jean St. Access to this part of the property could not be arranged.

Grassy Forest (EVC 128, regionally Vulnerable). Estimated as occupying 0.34 ha, comprising 0.23 ha in good ecological condition (rating 'B') and 0.11 ha in fair ecological condition (rating 'C').

Dominant canopy trees: *Eucalyptus obliqua*, *E. goniocalyx*, *E. macrorhyncha* and *E. radiata*.

Dominant lower trees: *Exocarpos cupressiformis* and *Acacia melanoxylon*, abundant in the more intact areas.

Shrubs: Dominated by *Bursaria spinosa* (a common phenomenon after disturbance of Grassy Forest). Other species include *Acacia pycnantha*, *A. stricta*, *Cassinia arcuata*, *C. aculeata*, *Olearia lirata* and *Ozothamnus ferrugineus*.

Vines: The light twiners *Comesperma volubile*, *Glycine clandestina* and *Hardenbergia violacea* are found in the less disturbed patches. The more vigorous *Pandorea pandorana* is present in small numbers.

Ferns: None seen, but perhaps present out of sight from the fenceline.

Ground flora: The indigenous ground flora is greatly reduced in density and depth. Dominated by *Gahnia radula* and *Themeda triandra*. Other abundant species are *Carex breviculmis*, *Rytidosperma* species, *Dianella longifolia*, *Lomandra filiformis*, *Microlaena stipoides*, *Poa morrisii*, *Schoenus apogon* and *Senecio* species.

Plant Species

The list below was compiled mostly in 2002 for the enlarged site described in the first edition of this report. Based on the areas that have since been cleared and my inability to gain entry through the security fence, I expect that at least 50 species remain in 2010, possibly more than 70. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; 'V'=Vulnerable. In addition, *Viminaria juncea* is uncommon throughout the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia implexa</i>	V	<i>Epacris impressa</i>
V	<i>Acacia mearnsii</i>		<i>Epilobium hirtigerum</i>
V	<i>Acacia melanoxylon</i>	V	<i>Eucalyptus cephalocarpa</i>
E	<i>Acacia myrtifolia</i>		<i>Eucalyptus goniocalyx</i>
	<i>Acacia paradoxa</i>	E	<i>Eucalyptus macrorhyncha</i>
E	<i>Acacia pycnantha</i>	V	<i>Eucalyptus obliqua</i>
E	<i>Acacia stricta</i>	V	<i>Eucalyptus ovata</i>
V	<i>Acaena agnipila/ echinata</i>	E	<i>Eucalyptus radiata</i>
	<i>Acaena novae-zelandiae</i>	V	<i>Euchiton collinus</i>
	<i>Acrotriche serrulata</i>	E	<i>Euchiton involucratus</i>
V	<i>Adiantum aethiopicum</i>	V	<i>Exocarpos cupressiformis</i>
	<i>Arthropodium strictum</i>		<i>Gahnia radula</i>
	<i>Austrostipa pubinodis</i>	V	<i>Glycine clandestina</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>		<i>Gonocarpus tetragynus</i>
	<i>Burchardia umbellata</i>		<i>Goodenia ovata</i>
	<i>Bursaria spinosa</i>	V	<i>Hardenbergia violacea</i>
	<i>Carex appressa</i>	V	<i>Helichrysum luteoalbum</i>
	<i>Carex breviculmis</i>	E	<i>Hypericum gramineum</i>
	<i>Cassinia aculeata</i>		<i>Juncus pallidus</i>
	<i>Cassinia arcuata</i>	E	<i>Juncus procerus</i>
V	<i>Cassinia longifolia</i>	E	<i>Juncus subsecundus</i>
E	<i>Cassutha melantha</i>		<i>Lachnagrostis filiformis</i>
E	<i>Cassutha pubescens</i>		<i>Lepidosperma elatius</i>
V	<i>Comesperma volubile</i>	V	<i>Lepidosperma laterale</i>
V	<i>Coprosma quadrifida</i>		<i>Leptospermum continentale</i>
E	<i>Daviesia latifolia</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Deyeuxia quadriseta</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
	<i>Dianella admixta</i>		<i>Lomandra longifolia</i>
V	<i>Dianella longifolia</i> s.l.	V	<i>Lythrum hyssopifolia</i>
	<i>Dichelachne rara</i>		<i>Microlaena stipoides</i>
	<i>Dichondra repens</i>	C	<i>Muellerina eucalyptoides</i>
E	<i>Dipodium roseum</i>	V	<i>Olearia lirata</i>
V	<i>Drosera peltata</i> subsp. <i>auriculata</i>	V	<i>Opercularia varia</i>
	<i>Elymus scaber</i>		<i>Oxalis exilis/perennans</i>

Risk Indigenous Species

E	<i>Ozothamnus ferrugineus</i>
	<i>Pandorea pandorana</i>
E	<i>Pimelea curviflora</i>
V	<i>Plantago varia</i>
V	<i>Platylobium formosum</i>
	<i>Poa morrisii</i>
	<i>Poranthera microphylla</i>
	<i>Rytidosperma linkii</i> var. <i>fulvum</i>
	<i>Rytidosperma pallidum</i>
V	<i>Rytidosperma pilosum</i>
	<i>Rytidosperma racemosum</i>

Risk Indigenous Species

	<i>Rytidosperma setaceum</i>
	<i>Rytidosperma tenuius</i>
	<i>Schoenus apogon</i>
	<i>Senecio hispidulus</i>
E	<i>Senecio prenanthoides</i>
	<i>Senecio quadridentatus</i>
	<i>Themeda triandra</i>
	<i>Tricoryne elatior</i>
C	<i>Viminaria juncea</i>
E	<i>Viola hederacea</i>

Introduced Species

<i>Acacia baileyana</i>	<i>Cynodon dactylon</i>	<i>Pennisetum clandestinum</i>
<i>Acacia longifolia</i> subsp. <i>longifolia</i>	<i>Cynosurus echinatus</i>	<i>Pinus radiata</i>
<i>Acetosella vulgaris</i>	<i>Cyperus eragrostis</i>	<i>Pittosporum undulatum</i>
<i>Agapanthus praecox</i>	<i>Dactylis glomerata</i>	<i>Plantago coronopus</i>
<i>Agrostis capillaris</i>	<i>Daucus carota</i>	<i>Plantago lanceolata</i>
<i>Allium triquetrum</i>	<i>Dittrichia graveolens</i>	<i>Plantago major</i>
<i>Anthoxanthum odoratum</i>	<i>Ehrharta erecta</i>	<i>Polygala myrtifolia</i>
<i>Asparagus asparagoides</i>	<i>Erica lusitanica</i>	<i>Prunella vulgaris</i>
<i>Asparagus scandens</i>	<i>Foeniculum vulgare</i>	<i>Rubus anglocandicans</i>
<i>Aster subulatus</i>	<i>Galium aparine</i>	<i>Rumex crispus</i>
<i>Briza maxima</i>	<i>Genista linifolia</i>	<i>Setaria parviflora</i>
<i>Bromus catharticus</i>	<i>Genista monspessulana</i>	<i>Sonchus oleraceus</i>
<i>Bromus diandrus</i>	<i>Hedera helix</i>	<i>Sporobolus africanus</i>
<i>Bromus hordeaceus</i>	<i>Helminthotheca echioides</i>	<i>Taraxacum officinale</i> spp. agg.
<i>Centaurium erythraea</i>	<i>Holcus lanatus</i>	<i>Tradescantia fluminensis</i>
<i>Centaurium tenuiflorum</i>	<i>Hypochoeris radicata</i>	<i>Trifolium angustifolium</i>
<i>Chamaecytisus palmensis</i>	<i>Juncus articulatus</i>	<i>Trifolium arvense</i>
<i>Chrysanthemoides monilifera</i> subsp. <i>monilifera</i>	<i>Leontodon taraxacoides</i>	<i>Trifolium dubium</i>
<i>Cirsium vulgare</i>	<i>Linum trigynum</i>	<i>Trifolium repens</i>
<i>Conyza bonariensis</i>	<i>Lolium rigidum</i>	<i>Ulex europaeus</i>
<i>Coprosma repens</i>	<i>Melaleuca armillaris</i>	<i>Vicia sativa</i>
<i>Cortaderia selloana</i>	<i>Modiola caroliniana</i>	<i>Vinca major</i>
<i>Cotoneaster glaucophyllus</i>	<i>Oxalis incarnata</i>	<i>Watsonia meriana</i> var. <i>bulbillifera</i>
<i>Cotoneaster pannosus</i>	<i>Oxalis pes-caprae</i>	
<i>Crataegus monogyna</i>	<i>Paspalum dilatatum</i>	

Fauna of special significance

Peregrine Falcons are regionally uncommon (LCC 1991) and regularly breed on the quarry wall.

Crescent Honeyeaters are locally uncommon and were observed by the author near the knoll.

Powerful Owls (a species listed as vulnerable in Victoria) are regularly sited or heard around Ferntree Gully generally and may sometimes visit the quarry. However, the habitat appears inferior to many nearby areas and it is not deemed here to be 'probable habitat' for the purposes of assessing the site's significance.

Fauna habitat features

- There are some large eucalypts that would suit roosting or nesting of certain birds and mammals (although most of these were cleared since the first edition of this report in 2004);
- The low, scrubby vegetation around the knoll and on the quarry benches forms good habitat for certain small birds.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Regionally Threatened Ecological Vegetation Class

According to the criteria of 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), remnant vegetation of regionally vulnerable EVCs (including Grassy Forest) have a conservation significance rating of

Medium or higher. The Grassy Forest in this site would have a habitat score of at least 0.3, raising the conservation significance to High. As a consequence, the site is of **State** significance under criterion 3.2.3 of Amos (2004).

Locally rare or threatened plants

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Locally rare or threatened fauna

On the same basis as the rare or threatened plants, the presence of Crescent Honeyeaters and a breeding site for Peregrine falcons is **Locally** significant.

Threats

- Continuing degradation by environmental weeds, including:
 - Very serious: Asparagus fern (*Asparagus scandens*), Boneseed (*Chrysanthemoides monilifera monilifera*) Panic Veldt-grass (*Ehrharta erecta*), Montpellier Broom (*Genista monspessulana*), Pale Wood-sorrel (*Oxalis incarnata*);
 - Serious: Angled Onion (*Allium triquetrum*), Bridal Creeper (*Asparagus asparagoides*), Cotoneaster (*Cotoneaster glaucophylla*), Tree Lucerne (*Chamaecytisus palmensis*), Sweet Pittosporum (*Pittosporum undulatum*), Gorse (*Ulex europaeus*), Bulbil Watsonia (*Watsonia meriana*).
- Possibly loss or decline of plant species that are present in dangerously small numbers, due to inbreeding, poor reproductive success or vulnerability to localised chance events, but population sizes could not be checked in this study.

Management issues

- The rehabilitation and revegetation of the steep slope between the lake and Quarry Rd have been very successful so far but are at serious risk of becoming overrun by Montpellier Broom and Boneseed. A high priority should be placed on removing this risk by killing the weeds before more seed are produced.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its biological significance;
- The site is zoned for Public Park and Recreation and it is covered by Vegetation Protection Overlay VPO1 of the Knox Planning Scheme. It is inside the Urban Growth Boundary.

Information sources used in this assessment

- A vegetation map showing EVCs and vegetation quality, and lists of plant species (indigenous and introduced) for the strips of vegetation along Butlers Rd and Ladys Walk, observed by Dr Lorimer on 19th December 1997, as described in the report, 'A Survey and Management Plan for Significant Vegetation of Roadsides in Knox' by G.S. Lorimer for Knox City Council (May 1998, 137 pp.);
- Vegetation mapping and a list of all introduced and indigenous plant species found within the quarry fence (viewed only from publicly accessible areas), compiled by Dr Lorimer on 28th August 2002;
- Detailed vegetation data for the adjoining roadside of Quarry Rd in accord with this study's standard approach described in Section 2.4 of Vol.1, including a list of indigenous and introduced plant species, compiled by Dr Lorimer on 28th August 2002;
- Reinspections of the site for one hour on 7/3/08 and 75 minutes on 7/5/08 to map the vegetation more accurately and update this report to take account of the extensive changes that had occurred to the site since 2002;
- A list of fauna observed during each of the above botanical surveys;
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- A map of EVCs within the adjoining Dandenong Ranges National Park prepared by Mr Doug Frood for Parks Victoria in 2002;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government. (Note that the EVC maps are not reliable in this area.)

Site 5. Koolunga Native Reserve, Ferntree Gully

Council reserve of 6 ha, half of it with native vegetation. Melway ref. 65 C11.

Site Significance Level: *State*

- Includes vegetation of the two endangered Ecological Vegetation Classes, Swampy Woodland and Valley Heathy Forest, some of it in good ecological condition;
- There are large numbers of plant species that are rare or threatened in Knox or more widely;
- There are frequent reports of the rare Powerful Owl in the reserve;
- The 150 naturally occurring, indigenous plant species represents rich flora by Knox standards.



Scale 1:3,500

0 50 100m

Aerial photograph taken February 2001

The areas on the aerial photograph with bright green outlines are Swampy Woodland and those with magenta outlines are Valley Heathy Forest. The remaining forest is Herb-rich Foothill Forest. The grey lines are paths and the dashed blue line is a gully, which is thought to be the pre-European course of the creek.

Boundaries

The site boundary mostly follows the property boundaries of the reserve. The exceptions are a deviation at the northeastern end of Elmo Av, the exclusion of the car park area and the exclusion of the lot that provides access to Daffodil Rd. The pine windbreaks and open grass are of much lower significance than the rest of the reserve, but these areas are included because of the large numbers of sun-orchids, sundews, crassulas and other indigenous ground flora that occur there, and because it is generally preferable for site boundaries to match property boundaries.

Land use & tenure: Council reserve with bushland and open expanses of lawn, for nature conservation, recreation and drainage.

Site description

This 5.8 ha site is at the edge of the volcanic geological formation of the Dandenong Ranges. Elevations vary from 110 m in the western corner to 135 m beside Forest Rd. The soil originates from higher up the slope, having eroded and slipped, or washed, downhill into the reserve. The parent rhyodacite rock is exposed in the creek bed at one location.

The site includes 3.2 hectares of forest and approximately two hectares of open grass and pine windbreaks. The latter conserves several plant species that are scant or absent in the forest (including the rarest plant in the reserve, *Montia fontana*), but it has lower conservation significance than the forest. The open grass and pine windbreaks north of the creek were daffodil fields until 1971, part of Chandlers' farm established 1913. Daffodils are still scattered through the reserve, including the bushland. The open grass south of the creek probably once had a house and garden.

The rest of the reserve appears superficially to be fairly natural, but was actually heavily modified by early settlers. The original course of the creek apparently followed the course of the dashed blue line on the aerial photograph, according to old contour maps and the author's interpretation of the topography and vegetation. Swampy Woodland vegetation occurs along most of the old creek course. Just upstream (east) of the eastern end of the dashed blue line on the photograph there appears to have been a levee constructed across the original creek.

The current-day creek enters the reserve in the southeast via a pipe, at a location within the original watercourse. It then flows west-northwest, whereas the natural course headed northwest. The natural and current-day creek courses converge just west of the centre of the reserve, near a boardwalk bridge.

There must have been substantial clearing of native vegetation associated with the creek diversion. Some trees on the slopes of the diversion channel are quite mature, indicating that the diversion must have been many decades ago. The vegetation type along the current-day creek is Herb-rich Foothill Forest, in contrast to the Swampy Woodland along the natural watercourse.

The indigenous plants within the reserve are, like the topography, not as natural as appears at first. Many plants indigenous to the district have been planted in the reserve, sometimes making it difficult to determine whether a species is naturally occurring or not (e.g. *Banksia marginata*). This is particularly so for species that have reproduced from planted specimens, such as *Solanum laciniatum*. There are specimens of non-indigenous fern species that are popular in cultivation, suggesting that a fern enthusiast may have been active in the reserve. This makes it very difficult to tell whether ferns such as *Doodia media* are planted or freak natural occurrences.

Plantings in the reserve are mostly not documented. The presence or absence of species from early plant lists for the reserve sometimes helps in a small way to determine whether a species is only present due to planting. However, the early lists are demonstrably incomplete, they do not always distinguish reliably between planted and natural occurrences, and some species that occur naturally today may not have been present or visible in the past (e.g. due to recent germination of seed brought in by wind or birds).

The author believes that it is much harder to distinguish the natural flora of Koolunga Native Reserve than any other bushland area in Knox. An uncommonly large number of indigenous plant species has been recorded in the reserve (201, as at mid-2006), including species that are present only due to planting. A substantial proportion of these species are present in such small numbers that it raises concerns about their vulnerability to reproductive problems or misadventure (e.g. a bicycle running over the last individual or colony of one of these species).

Whatever the origin of the native plants, the vegetation provides good habitat for birds and probably insects. This is enhanced by substantial areas of revegetation, although some of the species that have been chosen in years gone by are not ideally suited.

There is also a garden at the northeastern end of St Elmo Av, established in 2004, specifically to demonstrate indigenous plants suitable for gardens that need little watering.

Additional information about the reserve is in the 2006 management plan for the reserve, by Dr Lorimer.

Relationship to other land

The Vaughan Road Bushland (Site 6) abuts Koolunga Native Reserve and the two sites function to a large degree as a single ecological unit. However, the ecological functioning of the smaller and more degraded area of native vegetation in the Vaughan Road Bushland is more dependent on Koolunga Native Reserve than the converse.

The Vaughan Road Bushland appears to form a habitat link between Koolunga Native Reserve (Site 5) and the Belgrave Railway Line corridor (Site 88), which in turn provides a habitat link with the Blind Creek corridor (Site 33).

Koolunga Native Reserve is 600 m from the Chandlers Hill section of the Dandenong Ranges National Park. The scattered remnant indigenous trees between the two parks would be expected to encourage movements of birds, insects and perhaps bats between the parks. Almost certainly, the Powerful Owls that are regularly observed in and near the reserve would rely on the national park for most of their habitat.

Bioregion: On the margin between the Highlands Southern Fall and the Gippsland Plain. Maps of the Department of Sustainability & Environment show the site as being clearly within the Gippsland Plain bioregion, which is appropriate for the Valley Heathy Forest and perhaps also for the Swampy Woodland. However, the Herb-rich Foothill Forest and many species indicative of foothill forests (e.g. *Plantago debilis*, *Pterostylis alpina*, *Olearia argophylla*) are more strongly affiliated with the Highlands Southern Fall.

Habitat types

Perennial Stream (No EVC number) with semi-aquatic plants such as *Isolepis inundata*.

Wetland (EVC 74, regionally Endangered, but in this case the wetland has been created artificially): 100 m² in area, in fair ecological condition (rating C).

Trees, vines and ferns: Absent.

Shrubs: *Melaleuca ericifolia* is sparse and possibly present only due to planting.

Semi-aquatic flora: Strongly dominated by *Carex fascicularis* which has been planted, with very dense cover.

Swampy Woodland (EVC 937, **regionally Endangered**): Estimated to cover 0.27 ha in three patches along the original course of the creek. 0.17 ha is in good ecological condition (rating B) and 0.10 ha in fair ecological condition (rating C).

Dominant canopy trees: Pure stands of *Eucalyptus ovata*, moderately dense in the east and very sparse in the parts of the western patch that are least well drained.

Lower trees: Small numbers of *Exocarpos cupressiformis*.

Shrubs: Dominated by *Goodenia ovata*. Other shrubs are mostly sparse except at the edges, the main species being *Coprosma quadrifida*, *Leptospermum scoparium* and *Ozothamnus ferrugineus*.

Vines: *Clematis aristata* is fairly abundant. *Billardiera mutabilis*, *Rubus parvifolius* and *Pandorea pandorana* are present in small numbers.

Ferns: There are scattered patches of *Adiantum aethiopicum*, *Pteridium esculentum* and *Calochlaena dubia*. There is also an isolated *Doodia australis*.

Ground flora: A dense, deep layer of sedges, with typically 75% cover of *Lepidosperma elatius*. *Poa tenera* is abundant. Other common species are *Acaena novae-zelandiae*, *Rytidosperma semiannulare*, *Gahnia radula*, *Gonocarpus tetragynus*, *Juncus* species, *Microlaena stipoides*, *Oxalis perennans*, *Poa tenera* and *Tetrarrhena juncea*. The ecological indicator species, *Lobelia anceps*, is scattered through the vegetation.

Valley Heathy Forest (EVC 127, **regionally Endangered**): Estimated as 0.9 ha, comprising 200 m² in good ecological condition (rating B), 0.7 ha in fair ecological condition (rating C) and 0.2 ha in poor ecological condition (rating D). In addition to this area, an orchid-rich patch of vegetation on the northeast side of the bridge near the dead end of St Elmo Avenue is arguably a patch of Valley Heathy Forest that has become isolated as a result of the redirection of the creek, but it has not been segregated here from the surrounding Herb-rich Foothill Forest.

Canopy trees: *Eucalyptus obliqua*, *E. cephalocarpa*, *E. macrorhyncha*, *E. goniocalyx* and *E. radiata*.

Lower trees: *Exocarpos cupressiformis* is fairly abundant and *Acacia mearnsii* less so.

Shrubs: The shrub layer is dense and fairly rich in species, dominated by *Bursaria spinosa* and *Coprosma quadrifida*. Other species include *Acacia leprosa*, *A. stricta*, *Leptospermum continentale* and a range of other species.

Vines: *Billardiera mutabilis* and *Comesperma volubile* are fairly abundant. *Pandorea pandorana* is dense where soil has been disturbed.

Ferns: Minor occurrence, limited to occasional *Adiantum aethiopicum* and *Pteridium esculentum*.

Ground flora: Densely grassy, dominated by *Poa morrisii*, *Themeda triandra*, *Austrostipa rudis*, *S. pubinodis*, *Microlaena stipoides* and *Gahnia radula*. Other abundant species include *Acrotriche serrulata*, *Gonocarpus tetragynus*, *Oxalis perennans*, *Platylobium formosum*, *Thelymitra* species and *Xanthorrhoea minor*. The following additional species serve as ecological indicators: *Caesia parviflora*, *Dianella longifolia*, *D. admixta*, *Dipodium roseum* and *Pimelea humilis*.

Herb-rich Foothill Forest (EVC 23 – The conservation status is given as ‘Least Concern’ if the occurrence in Koolunga Native Reserve is taken to be part of the Highlands Southern Fall bioregion, or ‘Vulnerable’ if it is taken to be part of the Gippsland Plains bioregion): Estimated as 1.8 ha, comprising 0.1 ha in good ecological condition (rating B), 1.2 ha in fair ecological condition (rating C) and 0.5 ha in poor ecological condition (rating D).

Canopy trees: Dominated by *Eucalyptus obliqua*, with somewhat fewer *E. radiata*, *E. goniocalyx* and *E. macrorhyncha*, and small numbers of *E. cypellocarpa* and *E. cephalocarpa*.

Lower trees: *Exocarpos cupressiformis* is abundant. *Acacia melanoxylon* and *A. dealbata* are thinly scattered.

Shrubs: The shrub layer is moderately dense, not hard to walk through. Dominant species are *Coprosma quadrifida*, *Acacia leprosa* (Dandenong Range variant), and *Goodenia ovata*. Less abundant species include *Bursaria spinosa*, *Cassinia aculeata*, *Olearia lirata* and *Ozothamnus ferrugineus*.

Vines: Abundant, including the vigorous climbers *Clematis aristata* and *Pandorea pandorana*, the light twiners *Billardiera mutabilis* and *Glycine clandestina*, and the parasite *Cassytha pubescens*.

Ferns: Modest-sized, scattered patches of *Adiantum aethiopicum*, *Calochlaena dubia* or *Pteridium esculentum*.

Ground flora: Grassy, dominated by *Gahnia radula*, *Poa ensiformis* and *Lomandra longifolia*. Other abundant species include *Dianella tasmanica*, *Gonocarpus tetragynus*, *Oxalis perennans*, *Platylobium formosum* and *Tetrarrhena juncea*.

Plant species

Altogether, there are reliable records in recent years of approximately 177 indigenous plant species whose presence does not result solely from planting. The following plant list includes a column to indicate the most recent year that each species has been recorded. The column headed 'Risk' indicates the risk of species' extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; 'V'=Vulnerable. Species with names in bold have fewer than 10 localities listed in 'Flora of Melbourne'. In addition, *Acacia leprosa* (Dandenong Range variant) is listed by Walsh and Stajsic (2007) as rare nationally.

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
V	<i>Acacia leprosa</i> (Dandenong Range variant)	2007	V	<i>Coprosma quadrifida</i>	2007
V	<i>Acacia mearnsii</i>	2007	E	<i>Correa reflexa</i>	1999
V	<i>Acacia melanoxylon</i>	2007	V	<i>Cotula australis</i>	2005
E	<i>Acacia myrtifolia</i>	2001	V	<i>Crassula decumbens</i>	2005
	<i>Acacia paradoxa</i>	2004	E	<i>Cyathea australis</i>	2004
E	<i>Acacia pycnantha</i>	2004	E	<i>Cynoglossum suaveolens</i>	2004
V	<i>Acacia verticillata</i>	2007	E	<i>Daviesia latifolia</i>	
	<i>Acaena novae-zelandiae</i>	2007	E	<i>Daviesia leptophylla</i>	1985
V	<i>Acrotriche prostrata</i>	2007	C	<i>Derwentia derwentiana</i>	2004
	<i>Acrotriche serrulata</i>	2007	C	<i>Deyeuxia densa</i>	2004
V	<i>Adiantum aethiopicum</i>	2007		<i>Deyeuxia quadriseta</i>	2004
	<i>Alisma plantago-aquatica</i>	2004		<i>Dianella admixta</i>	2007
C	<i>Amphibromus archeri</i>	2004	V	<i>Dianella longifolia</i> s.l.	2007
C	<i>Amyema pendula</i>	2004	V	<i>Dianella tasmanica</i>	2007
	<i>Arthropodium strictum</i>	2004		<i>Dichelachne rara</i>	2007
C	<i>Asperula conferta</i>	2007	C	<i>Dichelachne sieberiana</i>	2001
	<i>Austrostipa pubinodis</i>	2007		<i>Dichondra repens</i>	2007
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	2007	V	<i>Dillwynia cinerascens</i>	2007
E	<i>Banksia marginata</i>	2004	E	<i>Dipodium roseum</i>	2007
	<i>Billardiera mutabilis</i>	2007	C	<i>Diuris orientis</i>	1984
C	<i>Blechnum minus</i> (perhaps planted)	2004	C	<i>Doodia australis</i> (perhaps planted)	1999
	<i>Bossiaea prostrata</i>	2001	V	<i>Drosera peltata</i> subsp. <i>auriculata</i>	2004
V	<i>Brunonia australis</i>	2004	V	<i>Drosera whittakeri</i>	1984
	<i>Burchardia umbellata</i>	2004		<i>Elymus scaber</i>	2001
	<i>Bursaria spinosa</i>	2007	V	<i>Epacris impressa</i>	2007
V	<i>Caesia parviflora</i>	2004		<i>Eragrostis brownii</i>	1999
V	<i>Calochlaena dubia</i>	2007	V	<i>Eucalyptus cephalocarpa</i>	2004
	<i>Campylopus introflexus</i>	2007	V	<i>Eucalyptus cypellocarpa</i>	2007
	<i>Carex appressa</i>	2004		<i>Eucalyptus goniocalyx</i>	2007
	<i>Carex breviculmis</i>	2007	E	<i>Eucalyptus macrorhyncha</i>	2007
	<i>Cassinia aculeata</i>	2007	V	<i>Eucalyptus obliqua</i>	2007
V	<i>Cassinia longifolia</i> (planted?)	2004	V	<i>Eucalyptus ovata</i>	2007
E	<i>Cassytha melantha</i>	2004	E	<i>Eucalyptus radiata</i>	2007
E	<i>Cassytha pubescens</i>	2004	V	<i>Euchiton collinus</i>	2004
E	<i>Centella cordifolia</i>	2007	E	<i>Euchiton involucratus</i>	1999
C	<i>Cheilanthes austrotenuifolia</i> (planted?)	2004	V	<i>Exocarpos cupressiformis</i>	2007
	<i>Chiloscyphus semiteres</i>	2007	E	<i>Exocarpos strictus</i>	2004
V	<i>Clematis aristata</i>	2007		<i>Gahnia radula</i>	2007
V	<i>Comesperma volubile</i>	2007	E	<i>Gahnia sieberiana</i> (perhaps planted)	2004
			E	<i>Galium gaudichaudii</i>	2004

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
C	<i>Gastrodia sesamoides</i>	2001		<i>Pescicaria decipiens</i>	2007
C	Geranium homeanum	2004	C	Pimelea axiflora	1999
V	<i>Geranium potentilloides</i>	2004	V	<i>Pimelea humilis</i>	2007
V	<i>Geranium</i> sp. 2	2007	C	Plantago debilis	2002
V	<i>Glyceria australis</i>	1999	V	<i>Plantago varia</i>	2007
V	<i>Glycine clandestina</i>	2007	V	<i>Platylobium formosum</i>	2007
	<i>Gonocarpus tetragynus</i>	2007	V	<i>Platylobium obtusangulum</i>	
	<i>Goodenia lanata</i>	2004		<i>Poa ensiformis</i>	2007
	<i>Goodenia ovata</i>	2007		<i>Poa morrisii</i>	2007
C	Gratiola pubescens	1994	E	<i>Poa tenera</i>	2007
V	<i>Hardenbergia violacea</i>	2004	E	<i>Polyscias sambucifolia</i>	2007
V	<i>Helichrysum scorpioides</i>	2004	E	Polystichum proliferum	2007
V	<i>Hemarthria uncinata</i>	2007		<i>Poranthera microphylla</i>	2004
V	<i>Hovea heterophylla</i>	2004	V	<i>Potamogeton ochreatus</i>	2004
V	<i>Hydrocotyle hirta</i>	2004	E	<i>Prostanthera lasianthos</i>	2007
E	<i>Hypericum gramineum</i>	2007		<i>Pteridium esculentum</i>	2007
C	Hypolepis muelleri	1999	E	Pteris tremula	2004
C	<i>Hypoxis hygrometrica</i>	1995	C	<i>Pterostylis alpina</i>	2005
E	<i>Imperata cylindrica</i>	2007	E	<i>Pterostylis melagramma</i>	2007
E	<i>Indigofera australis</i> (planted?)	1999		<i>Pterostylis nutans</i>	2007
V	<i>Isolepis inundata</i>	2004	C	<i>Pterostylis pedunculata</i>	2005
	<i>Juncus amabilis</i>	2004	V	<i>Pultenaea gunnii</i>	2007
	<i>Juncus bufonius</i>	2004		<i>Rosulabryum ?billarderi</i>	2007
	<i>Juncus gregiflorus</i>	2007	E	<i>Rubus parvifolius</i>	2007
C	<i>Juncus holoschoenus</i>	2004		<i>Rytidosperma laeve</i>	2004
	<i>Juncus pallidus</i>	2004		<i>Rytidosperma linkii</i> var. <i>fulvum</i>	2004
E	<i>Juncus pauciflorus</i>	2004		<i>Rytidosperma pallidum</i>	2007
E	<i>Juncus planifolius</i>	1994		<i>Rytidosperma penicillatum</i>	2007
E	<i>Juncus subsecundus</i>	2004	V	<i>Rytidosperma pilosum</i>	2004
	<i>Kunzea ericoides</i> spp. agg.	2004		<i>Rytidosperma racemosum</i>	2007
	<i>Lachnagrostis filiformis</i>	1999	E	<i>Rytidosperma semiannulare</i>	2007
E	<i>Lagenophora stipitata</i>	1999		<i>Rytidosperma setaceum</i>	2004
	<i>Lepidosperma elatius</i>	2007		<i>Rytidosperma tenuius</i>	2004
	<i>Leptospermum continentale</i>	2007		<i>Schoenus apogon</i>	2004
E	<i>Leptospermum scoparium</i>	2007	C	Schoenus maschalinus	1994
V	<i>Lindsaea linearis</i>	2004		<i>Senecio glomeratus</i>	2001
E	<i>Lobelia anceps</i>	2004		<i>Senecio hispidulus</i>	2007
	<i>Lomandra filiformis</i> ssp. <i>coriacea</i>	2007	E	<i>Senecio minimus</i>	2002
	<i>Lomandra filiformis</i> ssp. <i>filiformis</i>	2004	C	Senecio odoratus	1994
	<i>Lomandra longifolia</i>	2007	E	<i>Senecio prenanthoides</i>	2001
V	<i>Luzula meridionalis</i>	2004		<i>Senecio quadridentatus</i>	2004
V	<i>Lythrum hyssopifolia</i>	1999	V	<i>Solanum laciniatum</i>	2004
E	<i>Melaleuca ericifolia</i>	2004	E	<i>Stylidium armeria/graminifolium</i>	2004
	<i>Microlaena stipoides</i>	2007		<i>Tetrarrhena juncea</i>	2007
	<i>Microtis parviflora</i>	2004	E	<i>Tetrateca ciliata</i>	2002
C	Montia fontana	2005	C	<i>Thelymitra arenaria</i>	2004
C	<i>Muellerina eucalyptoides</i>	2001	V	<i>Thelymitra peniculata</i>	2004
E	Olearia argophylla	2004		<i>Themeda triandra</i>	2007
V	<i>Olearia lirata</i>	2007		<i>Thuidiopsis furfurosa</i>	2007
E	<i>Olearia myrsinoides</i>	2007	V	<i>Thysanotus patersonii</i>	2004
V	<i>Opercularia ovata</i>		E	<i>Thysanotus tuberosus</i>	2001
V	<i>Opercularia varia</i>	2004	E	<i>Viola hederacea</i>	2007
	<i>Oxalis exilis/perennans</i>	2007	E	<i>Wahlenbergia gracilis</i>	2004
E	<i>Ozothamnus ferrugineus</i>	2007	V	<i>Xanthorrhoea minor</i>	2007
	<i>Pandorea pandorana</i>	2007	E	<i>Xanthosia dissecta</i>	2004
C	<i>Patersonia occidentalis</i>				

In addition, the following significant species appear in Mr Andrew Paget's 1985 thesis for B.App.Sci. (Landscape Architecture) at RMIT, in a list for the reserve attributed to Mr Gary Cheers. However, these species are among numerous discrepancies between the list given by Paget and another list, purportedly also from Mr Cheers in the same year for the

same reserve, given by Mr Doug Western, in 'Knox Nature Trail' (self-published, 1985). At least one of the lists must be wrong, so records of the following species are regarded here as unreliable until firmer evidence is found.

Caladenia catenata (White Caladenia)

Caladenia dilatata (Green-comb Spider-orchid)

Glossodia major (Wax-lip Orchid)

Pterostylis × *ingens* (Sharp Greenhood)

Introduced Species

<i>Acacia elata</i>	<i>Ehrharta erecta</i>	<i>Plantago coronopus</i>
<i>Acacia longifolia</i> subsp. <i>longifolia</i>	<i>Ehrharta longiflora</i>	<i>Plantago lanceolata</i>
<i>Acer negundo</i>	<i>Epilobium ciliatum</i>	<i>Plantago major</i>
<i>Agapanthus praecox</i>	<i>Erigeron karvinskianus</i>	<i>Poa annua</i>
<i>Agrostis capillaris</i>	<i>Euphorbia peplus</i>	<i>Polycarpon tetraphyllum</i>
<i>Aira</i> sp.	<i>Fraxinus angustifolia</i>	<i>Potentilla indica</i>
<i>Allium triquetrum</i>	<i>Galium aparine</i>	<i>Prunella vulgaris</i>
<i>Anagallis arvensis</i>	<i>Gamochaeta purpurea</i>	<i>Prunus cerasifera</i>
<i>Anthoxanthum odoratum</i>	<i>Genista monspessulana</i>	<i>Pseudoscleropodium purum</i>
<i>Arctotheca calendula</i>	<i>Geranium yeoi</i>	<i>Quercus robur</i>
<i>Asparagus scandens</i>	<i>Gladiolus undulatus</i>	<i>Ranunculus repens</i>
<i>Aster subulatus</i>	<i>Grevillea robusta</i>	<i>Romulea rosea</i>
<i>Bellis perennis</i>	<i>Hedera helix</i>	<i>Rubus anglocandicans</i>
<i>Briza maxima</i>	<i>Holcus lanatus</i>	<i>Rumex conglomeratus</i>
<i>Briza minor</i>	<i>Homalanthus populifolius</i>	<i>Rumex crispus</i>
<i>Bromus catharticus</i>	<i>Hypochoeris radicata</i>	<i>Rumex obtusifolius</i>
<i>Bromus diandrus</i>	<i>Ipomoea indica</i>	<i>Sisyrinchium iridifolium</i>
<i>Callitriche stagnalis</i>	<i>Isolepis levynsiana</i>	<i>Solanum nigrum</i>
<i>Cardamine flexuosa</i>	<i>Ixia polystachya</i>	<i>Solanum nigrum</i>
<i>Cardamine hirsuta</i>	<i>Juncus articulatus</i>	<i>Soliva sessilis</i>
<i>Centaurium erythraea</i>	<i>Leontodon taraxacoides</i>	<i>Sonchus asper</i>
<i>Cerastium glomeratum</i>	<i>Ligustrum lucidum</i>	<i>Sonchus oleraceus</i>
<i>Chrysanthemoides monilifera</i> subsp. <i>monilifera</i>	<i>Linum trigynum</i>	<i>Sporobolus africanus</i>
<i>Cirsium vulgare</i>	<i>Lonicera japonica</i>	<i>Stachys arvensis</i>
<i>Conyza sumatrensis</i>	<i>Lotus corniculatus</i>	<i>Stellaria media</i>
<i>Cordyline australis</i>	<i>Lotus subbiflorus</i>	<i>Taraxacum officinale</i> spp. agg.
<i>Cortaderia selloana</i>	<i>Malus pumila</i>	<i>Tradescantia fluminensis</i>
<i>Cotoneaster glaucophyllus</i>	<i>Medicago polymorpha</i>	<i>Trifolium dubium</i>
<i>Cotoneaster pannosus</i>	<i>Mentha</i> × <i>piperita</i>	<i>Trifolium glomeratum</i>
<i>Crataegus monogyna</i>	<i>Modiola caroliniana</i>	<i>Trifolium repens</i>
<i>Crepis capillaris</i>	<i>Myosotis laxa</i> subsp. <i>caespitosa</i>	<i>Veronica persica</i>
<i>Crocasmia</i> × <i>crocasmiflora</i>	<i>Nasturtium officinale</i>	<i>Viburnum tinus</i>
<i>Cynodon dactylon</i>	<i>Oxalis incarnata</i>	<i>Vicia disperma</i>
<i>Cynosurus echinatus</i>	<i>Oxalis pes-caprae</i>	<i>Vicia ?sativa</i>
<i>Cyperus eragrostis</i>	<i>Oxalis ?purpurea</i>	<i>Vinca major</i>
<i>Dactylis glomerata</i>	<i>Paspalum dilatatum</i>	<i>Vulpia bromoides</i>
<i>Digitaria sanguinalis</i>	<i>Pennisetum clandestinum</i>	<i>Zantedeschia aethiopica</i>
<i>Dipogon lignosus</i>	<i>Pinus radiata</i>	
<i>Echinochloa crus-galli</i>	<i>Pittosporum undulatum</i>	

Fauna of special significance

Vulnerable in Victoria

Powerful Owl – according to the Atlas of Victorian Wildlife, recorded repeatedly, including recently. Such sightings are common around the Dandenong Ranges and the reserve is likely to be a small but frequently-visited part of the home range of one or more Powerful Owls.

Fauna habitat features

- The creek and wetland provide habitat for aquatic invertebrates and Southern Brown Tree Frogs;
- There are some large, old trees (alive and dead) with hollows that are likely to serve as roosting sites or nesting sites for birds, bats, possums or insects;
- Possum nest boxes have been installed, but their usage was not determined;
- The ground flora, logs and forest litter in the reserve represent suitable habitat for skinks, frogs and invertebrates. The abundant sedges and mat-rushes probably support many skipper butterflies;

- The high density and diversity of shrubs in parts of the reserve significantly improves the habitat for native insects and birds. The prickliness of many of the shrubs helps protect birds from cats;
- The site represents an ecological stepping-stone between the Dandenong Ranges National Park and the Blind Creek habitat corridor.

Significance ratings

This site is registered as Site 4802 on the Department of Sustainability & Environment's 'BioSites' database, where it is rated as 'Regional' significance. However, the rating was not based on a thorough assessment of the site's attributes against current criteria.

The following is an assessment of the site's significance against the Department of Sustainability & Environment'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 this site.

The site is also an ecological 'stepping stone' on the Blind Creek habitat corridor. The corridor is probably important at a Local scale. It follows that the site is of **Local** significance under criterion 1.2.6.

Regionally Threatened Ecological Vegetation Classes

Swampy Woodland is endangered in the Gippsland Plain bioregion and Valley Heathy Forest is endangered regardless of which bioregion. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that the patches of these EVCs are necessarily of at least High conservation significance, due to the endangered status. This, in turn, gives the site **State** significance under criterion 3.2.3.

The wetland vegetation is mainly the product of planting and its extent is very small. Therefore, it is not assigned any level of significance here despite the endangered status of wetland vegetation.

Rare or Threatened Flora

The site has a viable population of Water Blinks (*Montia fontana*), and the subspecies present in the reserve appears likely to be one that is listed in the Department of Sustainability & Environment's *Advisory List of Rare or Threatened Flora 2005*. As such, its presence is of **Regional** significance under criterion 3.1.2 of the standard criteria. The author discovered this species at Koolunga Native Reserve in October 2004 and in Bayswater North several days earlier, but the only prior record from the Melbourne area, by anyone, was in Croydon in 1940.

The Dandenong Range variant of *Acacia leprosa* is listed as 'rare' nationally and in Victoria. The large number of plants (approximately 100) in Koolunga Native Reserve form a viable local population, but still small compared with some other sites. This represents **Regional** significance under criterion 3.1.2 of the standard criteria.

Many of the other locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

The Powerful Owl is a vulnerable species in Victoria and one or more of them periodically use Koolunga Native Reserve for habitat. However, the reserve is unlikely to support a viable population in its own right. Criterion 3.1.2 attributes **Regional** significance to sites such as this.

Threats

- Invasion by environmental weeds, particularly near the creek and paths. See the forthcoming management plan for a full assessment;
- Eucalypt dieback disease, which is of moderate severity. It was noted as serious in a 1984 brochure about the reserve by the Knox Environment Society;
- Erosion along the creek;
- Trampling, particularly due to proliferation of shortcut paths;
- Loss or decline of many plant species that are present in dangerously small numbers due to inbreeding, poor reproductive success or vulnerability to localised chance events;
- Pet dogs and cats, which may affect wildlife by predation or marking habitat with their scent. Their faeces, urine and scratching also kills native flora. Very large numbers of dogs walk in the reserve daily;
- Plantings of species or strains of plants that are ecologically inappropriate (even if they occur naturally elsewhere in the district). Inappropriate plantings can lead to reproductive failure or outbreeding depression through breeding with naturally occurring species;
- Rubbish dumping.

Management issues

- Knox City Council's current management regimen is part of a regular monitoring program; see *'Monitoring of Bushland Reserves in Knox'* and *'Monitoring of Bushland Reserves in Knox – 2002 Review'*, both by Dr Lorimer for Knox City Council;
- Erosion along the creek behind private lots is to be investigated and corrected by Melbourne Water with high priority, according to the Blind Creek Waterway Management Activity Plan (Melbourne Water, 2002);
- Comprehensive, up-to-date management information and advice is being prepared by Dr Lorimer for a management plan to be released in spring 2004.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its waterway and the features discussed under the heading 'Significance ratings';
- Koolunga Native Reserve is included under the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, based in part on the description of Site 3 of the report by Water Ecoscience (1998). The boundary of the site described in the present report differs in omitting adjacent private land;
- The Planning Scheme zoning is Public Park and Recreation Zone (PPRZ).

Information sources used in this assessment

- A brochure about the reserve by the Knox Environment Society dated 1984;
- A plant list and data from ten quadrats (DSE numbers N13201-N13210) compiled by Mr Andrew Paget in March and April 1985;
- The 1994 report, *'Koolunga Flora and Fauna Reserve...Botanical Survey – Recorded Data, Analysis and Community Descriptions'*, including data from three quadrats and compilations of earlier plant records. Authorship was claimed by Mark Allaway and Associates, but the work was principally done by Mr Damien Cook;
- Vegetation data gathered by Dr Lorimer during fieldwork in the reserve for this report and for the reports, *'Monitoring of Bushland Reserves in Knox'* (Lorimer 1999), *'Monitoring of Bushland Reserves in Knox – 2002 Review'* (Lorimer 2002), *'Monitoring of Bushland Reserves in Knox – 2007 Review'* (Lorimer 2007a) and *'2006 Bushland Management Plan for Koolunga Native Reserve, Ferntree Gully'* for Knox City Council, comprising:
 - Lists of plant species (indigenous and introduced) observed by Dr Lorimer in five separate vegetation types in the reserve on 19/12/01, 20/12/01 and 26/2/02, February 1999 and frequently during 2004-6;
 - Maps and assessments of the population sizes and distributions of thirty-nine scarce plant species in each of 1999 and 2002;
 - Data from four quadrats (three of them matching the three of Damien Cook in 1994 mentioned above), surveyed by the author on 16/2/99 and again on either 20/12/01 or 26/2/02;
 - Incidental fauna observations on all of the above dates;
 - Spotlighting on one evening.
 - Checks for fauna habitat, ecological threats and management issues on 20/12/01 and 26/2/02;
 - Five photographs of scenes that capture the main ecological features of the reserve and that will be useful for long-term monitoring of the reserve, taken originally on 9/11/98 and then again on 19/12/01;
- Various newsletters and other documents from the Friends of Koolunga Native Reserve, kindly provided by group convenor, Ms Kathleen Loxton;
- Verbal and written information from Ms Loxton and Mr Darren Wallace (local naturalist and bushland manager) about their own observations of the reserve's flora and fauna over many years;
- A list of plant species reported by Paget (1985) and attributed to Mr Gary Cheers (a former local naturalist), but treated here as dubious (see the end of the section above headed 'Plants of special significance');
- A purportedly equivalent (but substantially divergent) list attributed to Mr Cheers, also from 1985, presented by Western (1985);
- Records from the Atlas of Victorian Wildlife;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Acknowledgment

Thanks to Kathleen Loxton of St Elmo Avenue for providing extensive background information about the reserve, its flora and fauna, and for helping to locate some of the less common plant species.

Site 6. Vaughan Road Bushland, Ferntree Gully

A reserve and adjoining residential properties along a tributary of Blind Creek downstream of Koolunga Native Reserve. Melway ref. 65 B11.

Site Significance Level: *Regional*

- Contains canopy and understorey vegetation in fair to poor ecological condition;
- The vegetation's Ecological Vegetation Class (Herb-rich Foothill Forest) is arguably regionally vulnerable (although this depends on whether one treats the site as being in the 'Highlands Southern Fall' or 'Gippsland Plain' bioregion);
- Supports a moderately large population of the rare Dandenong Ranges variant of Cinnamon Wattle (*Acacia leprosa*) and two plant species that are rare or threatened in Knox;
- Provides habitat for small forest birds and possums (despite weed invasions and other disturbances);
- Forms a component of a somewhat interrupted habitat link between Koolunga Native Reserve and Blind Creek.

Aerial photograph: See page 23, which covers this site and Koolunga Native Reserve.

Boundaries

The site encompasses the whole 0.56-hectare reserve abutting Vaughan Rd as well as 1.37 hectares of private land. The private land comprises 9, 11 & 13 Vaughan Rd as well as 14 Carmel Av (excluding its driveway). The public walkway from the turning circle of Carmel Av is not included.

Land use & tenure: Council reserve and private residential properties.

Site description

The site follows the course of an unnamed minor tributary of Blind Creek. Elevations are 114-116 m along the creek, ascending to 131 m on the northwestern boundary.

Within the site, the creek has cut its course through a band of metamorphic rock (hornfels) at the edge of the Mt Dandenong volcanic flows. This has left a steep embankment (40% gradient) of light grey loam and clay subsoil on the northwestern side of the creek and alluvium along the creek and to its southeast.

The embankment supports a fair to good cover of remnant trees and understorey vegetation, although moderate to severe infestations of introduced shrubs, creepers and ground flora occur in this area. Weed control activities in this area have been limited due to the steepness and poor access. The creek is more accessible and a former infestation of Box Elders has been removed along the creek.

The reserve's road frontage contains scattered remnant trees with scant indigenous understorey.

The private properties within the site at the northern end of Vaughan Rd support a fair to good cover of remnant trees and some understorey vegetation, particularly within the *Land for Wildlife* property at 13 Vaughan Rd.

Relationship to other land

The site forms a component of a habitat link between Koolunga Native Reserve (Site 5) immediately to the east, the Belgrave Railway Line corridor (Site 88) and the Blind Creek corridor (Site 33). In addition, a somewhat fragmented tree canopy extends eastward beyond Koolunga Native Reserve, through residential properties to the extensive flora and fauna habitat of the Dandenong Ranges National Park around Chandlers Hill (1km to the east).

The remnant canopy trees and shrub layer vegetation provide habitat suitable for the movement of birds, possums, bats and insects, although the canopy and its associated habitat corridor becomes fragmented downstream (west) of the site. Remnant vegetation is substantially depleted in residential properties flanking the site, particularly on Carmel Av.

Bioregion: On the border between Highlands Southern Fall and Gippsland Plain. The Department of Sustainability & Environment's BioMaps show the site to be just inside the Gippsland Plain, but the boundary on these maps is not claimed to be precise and there are aspects of the site (e.g. its bedrock) which are associated with the Highlands Southern Fall.

Habitat type

Herb-rich Foothill Forest (EVC 23 – **Vulnerable** in the Gippsland Plain bioregion and 'Least Concern' in the Highlands Southern Fall), tending toward Valley Heathy Forest along the top of the embankment and Swampy Riparian Woodland along the downstream (southwestern) section of the creek.

Total area of native vegetation: 1.6 ha, comprising 0.3 ha in fair ecological condition (rating C) (mainly in areas with remnant understorey on northern side of creek) and 1.3 ha in poor condition (rating D).

Canopy trees: Dominated by *Eucalyptus goniocalyx*, *E. obliqua* and *E. radiata*, with a few *E. ovata* trees towards the downstream end of the creek. A fair cover of remnant trees, some over 25 m tall (mainly 50-80 years old). Moderate foliage dieback is apparent.

Lower trees: A few scattered specimens of *Acacia melanoxylon* and *Exocarpos cupressiformis*.

Shrubs: Moderately dense shrub layer, including *Acacia leprosa* (Dandenong Range variant), *Coprosma quadrifida* and *Prostanthera lasianthos*.

Vines: Some *Clematis aristata*, *Pandorea pandorana* and *Rubus parvifolius*.

Ferns: Includes a number of specimens of *Cyathea australis* up to 3 m tall along the creek and patches of *Adiantum aethiopicum*.

Ground flora: Remnant ground layer vegetation is generally restricted to the northern side of the creek where it is dominated by *Gahnia radula*, *Dianella tasmanica*, *Tetrarrhena juncea* and *Poa ensiformis*. Composition is substantially affected by weed infestations.

Plant species

The following plant species were observed by Mr Rik Brown on 23/4/02 except for the asterisked species, which were in a Knox Environment Society brochure in 1986. Several other species would probably be found in summer, particularly grasses. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Acacia leprosa* (Dandenong Range variant) is listed by Walsh and Stajsic (2007) as rare nationally. There are over fifty in the site.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia leprosa</i> (Dandenong Range variant)		<i>Gonocarpus tetragynus</i>
V	<i>Acacia melanoxylon</i>		<i>Goodenia ovata</i>
V	<i>Adiantum aethiopicum</i>		<i>Juncus</i> sp.
	<i>Arthropodium strictum</i>	E	<i>Lemna disperma</i>
	<i>Bursaria spinosa</i>		<i>Lepidosperma elatius</i>
V	<i>Calochlaena dubia</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Cassinia aculeata</i>		<i>Lomandra longifolia</i>
V	<i>Chiloglottis valida</i> *	V	<i>Olearia lirata</i>
V	<i>Clematis aristata</i>		<i>Oxalis exilis/perennans</i>
V	<i>Coprosma quadrifida</i>		<i>Pandorea pandorana</i>
E	<i>Cyathea australis</i>		<i>Persicaria decipiens</i>
	<i>Dianella admixta</i>	V	<i>Platylobium formosum</i>
V	<i>Dianella longifolia</i> s.l.		<i>Poa ensiformis</i>
V	<i>Dianella tasmanica</i>		<i>Poa morrisii</i>
	<i>Dichondra repens</i> *	E	<i>Poa tenera</i>
V	<i>Epacris impressa</i>	E	<i>Prostanthera lasianthos</i>
	<i>Eucalyptus goniocalyx</i>		<i>Pteridium esculentum</i>
E	<i>Eucalyptus macrorhyncha</i>	E	<i>Rubus parvifolius</i>
V	<i>Eucalyptus obliqua</i>		<i>Rytidosperma penicillatum</i>
V	<i>Eucalyptus ovata</i>	C	<i>Solanum aviculare</i>
E	<i>Eucalyptus radiata</i>	E	<i>Stylidium armeria/graminifolium</i> *
V	<i>Exocarpos cupressiformis</i>		<i>Tetrarrhena juncea</i>
	<i>Gahnia radula</i>	E	<i>Viola hederacea</i> *
V	<i>Geranium potentilloides</i>		

Introduced Species

<i>Acer negundo</i>	<i>Genista monspessulana</i>	<i>Prunus cerasifera</i>
<i>Allium triquetrum</i>	<i>Hedera helix</i>	<i>Ranunculus repens</i>
<i>Cirsium vulgare</i>	<i>Ilex aquifolium</i>	<i>Rubus anglocandicans</i>
<i>Cordyline</i> sp.	<i>Ligustrum vulgare</i>	<i>Salix × rubens</i>
<i>Cotoneaster glaucophyllus</i>	<i>Lonicera japonica</i>	<i>Solanum nigrum</i>
<i>Cotoneaster pannosus</i>	<i>Paraserianthes lophantha</i>	<i>Sonchus asper</i> s.l.
<i>Crocsmia × crocosmiiflora</i>	<i>Passiflora tarminiana</i>	<i>Tradescantia fluminensis</i>
<i>Delairea odorata</i>	<i>Pennisetum clandestinum</i>	<i>Zantedeschia aethiopica</i>
<i>Eriobotrya japonica</i>	<i>Pinus radiata</i>	
<i>Fraxinus angustifolia</i>	<i>Pittosporum undulatum</i>	

Fauna of special significance

Little Corella and Yellow-tailed Black-cockatoo were seen or heard flying over during the field survey for this study. Although historically uncommon in Melbourne suburbs, both these bird species have greatly increased in frequency around the urban fringe in the past decade. The mature trees in the site provide limited habitat for these species on their passage through the area.

Fauna habitat features

The cover of remnant trees throughout the site, and shrubby understorey on the northwestern side of the creek, provide fair habitat for birds and possums. This includes a good population of Grey Fantails (over 10 birds) and other small forest birds such as the White-browed Scrubwren, Spotted Pardalote and Striated Thornbill recorded during field surveys. A few Common Ringtail Possum dreys were also present. Woody weeds along the northern side of the creek contribute to habitat values for small birds and possums to some degree.

A few older trees and dead stags occurring within the site contain natural hollows suitable as shelter and breeding locations for birds, bats and possums.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity & Viability

The site represents a habitat link in a local-scale corridor, as described under the heading 'Relationship to other land' above. This is of **Local** conservation significance according to criterion 1.2.6.

Regionally Threatened Ecological Vegetation Class

The habitat score of the site's most intact vegetation is predicted to be in the vicinity of 0.25-0.3. According to 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), it follows that the conservation significance would be Medium if the site is treated as within the Gippsland Plain bioregion (due to the Vulnerable status of Herb-rich Foothill Forest in that bioregion), or Low otherwise.

According to criterion 3.2.3 of the standard criteria, a site is of **Regional** significance if it includes any vegetation of Medium conservation significance resulting from the presence of a rare or threatened EVC. Similarly, vegetation of Low conservation significance gives the site **Local** significance.

There is a chance that a formally determined habitat score would reach or exceed 0.3 in the most intact part of the site, in which case the site's significance would rise to State level if regarded as part of the Gippsland Plain.

Rare or Threatened Flora

The Dandenong Range variant of *Acacia leprosa* is listed as 'rare' in Victoria. The population in this site is viable and substantial but it is still a small fraction of the total population of the taxon. This represents **Regional** significance under criterion 3.1.2 of the standard criteria.

Many of the other locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Waterway Protection

Remnant vegetation along the creek is significant for waterway protection. The Framework (NRE 2002a) gives a 'land protection hazard rating' of Very High to riparian zone vegetation and High to vegetation adjoining a riparian zone (such as the steep slope above the creek).

Threats

- Residential development of 14 Vaughan Rd, which was (until recently) part of Vaughan Rd Reserve;
- Invasion by environmental weeds along the creek and from adjacent residential properties (particularly those on the northwestern side), including:
 - Very serious: Montbretia (*Crococsmia × crocosmiiflora*), Cape Ivy (*Delairea odorata*), Ivy (*Hedera helix*), Japanese Honeysuckle (*Lonicera japonica*), Kikuyu (*Pennisetum clandestinum*) and Creeping Buttercup (*Ranunculus repens*);
 - Serious: Common Privet (*Ligustrum vulgare*), Blackberry (*Rubus discolor*), Black Nightshade (*Solanum nigrum*) and Wandering Jew (*Tradescantia albiflora*);
- Eucalypt dieback disease and poor regeneration where trees have died;
- Loss or decline of plant species that are present in dangerously small numbers, due to inbreeding, poor reproductive success or elimination by incidents such as cubby house construction or digging by dogs;

- Moderate erosion of the creek banks is evident in some locations, particularly around adjoining drains;
- Threats to trees and other remnant vegetation by possible future residential development within properties at the northeastern end of Vaughan Rd;
- Potential demands for increased fire prevention measures from adjoining properties.

Management issues

- Selective weed control is required along the creek and on the slope on its northwestern side, particularly control of the species listed under 'Threats' above. Weed control should be integrated with measures for the restoration of indigenous vegetation to minimise erosion and loss of habitat for birds and possums along the northwestern side of the creek;
- Encourage the natural regeneration of indigenous plants in areas supporting remnant vegetation through selective weed control and by restricting mowing activities and other physical disturbances;
- Revegetate with indigenous plants where depleted to enhance habitat connectivity and extent. There are substantial opportunities for enhancing values of the reserve through appropriate revegetation to re-establish understorey vegetation in areas which are currently mown on the southeastern side of the creek, and through the planting of trees in areas where the canopy is fragmented. Such habitat restoration has effectively been undertaken within the nearby Koolunga Native Reserve over recent years;
- Clearing of any native vegetation within properties at the northern end of Vaughan Rd should be avoided;
- Protect remnant vegetation during drainage or bank stabilisation works along the creek;
- Fire prevention requirements should be addressed through weed control before considering actions that would harm the native vegetation.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its biological significance (discussed above), the presence of a stream and the possibility of future subdivision of the private lots;
- Much of the site is included under the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, based on the description of Site 59 of the report by Water Ecoscience (1998). However, the boundary used here is substantially different to match cadastral boundaries and omit areas of little conservation value;
- The Planning Scheme zoning of the reserve is Public Park and Recreation Zone (PPRZ) and the rest of the site is zoned Residential 1 Zone (R1Z).

Information sources used in this assessment

- Detailed vegetation data in accord with this study's standard approach described in Section 2.4 of Vol.1, including a list of indigenous and introduced plant species, compiled by Rik Brown on 23rd April 2002. (Note that vegetation within the private properties was not surveyed in detail but these properties are unlikely to have additional significant attributes.);
- Incidental observations of birds, butterflies and signs of fauna generally while the above data was being gathered;
- A 1986 brochure titled '*Vaughan Road Bushland Regeneration Project*', produced by the Knox Environment Society;
- Records from the Atlas of Victorian Wildlife;
- Aerial photography from February 2001, April 2003 and January 2009;
- Satellite imagery of the district;
- Department of Sustainability & Environment's BioMaps of the area (whose depiction of Valley Heathy Forest on this site is taken here to be inaccurate);
- Maps of geology and topography produced by agencies of the Victorian government.

Site 7. Wirrianda Reserve, Boronia

A small Council reserve located between two branches of Forest Rd near the intersection of Boronia Rd and Forest Rd. Melway ref. 65 D9-10.

Site Significance Level: *State*

- A remnant of vegetation that is intermediate between the two regionally threatened Ecological Vegetation Classes, Grassy Forest and Valley Heathy Forest;
- Supports indigenous understorey vegetation which is significant despite previous clearing and mowing activities and a relatively small area;
- Supports significant plants including the Dandenong Ranges variant of Cinnamon Wattle (*Acacia leprosa*) and a large population of Pale Flax-lily *Dianella longifolia*;
- Provides habitat for forest birds and serves as a biological 'stepping stone' for flora and fauna within a larger buffer area for the Dandenong Ranges National Park.



Aerial photograph taken Feb 2007



Scale (metres)
0 20 40 60 80 100

Boundaries

The 0.69 ha site encompasses all of the reserve and the roadside verge abutting the reserve's western boundary.

Land use & tenure: Council bushland reserve and road verge.

Site description

The reserve is located near the base of the moderately steep west-facing spur of Chandlers Hill in the Dandenong Ranges, centred on an elevation of 160 m (Australian Height Datum). Upper Devonian volcanic rock (rhyodacite) from further uphill has eroded and slipped down onto Wirrianda Reserve in recent geological time (Quaternary period).

The reserve is depicted in an aerial photograph from the early 1970s with scant native vegetation and newly planted pine trees. Today, it supports a relatively intact cover of remnant forest vegetation, including a fair cover of indigenous ground flora despite its history of clearing and mowing. In recent years there has been regular weed control activity (including removal of mature pines) and revegetation with indigenous plants.

There is a mown firebreak approximately 10m wide inside the reserve's northern boundary.

Relationship to other land

The site is located approximately 300m west of the extensive remnant forest vegetation and wildlife habitat within the Chandlers Hill section of the Dandenong Ranges National Park.

Residential properties around the reserve support a fair to good cover of remnant indigenous and planted native trees (particularly on the northern and eastern sides), although indigenous understorey vegetation is substantially depleted. Some remnant understorey vegetation occurs on the roadside verge abutting the eastern boundary of the reserve (a minor branch of Forest Rd).

The roadside and treed neighbourhood form a buffer to the nearby Dandenong Ranges National Park (see Site 99 – Dandenong Ranges Buffer), and Wirrianda Reserve serves as a biological 'stepping stone' within that buffer.

Bioregion: On the border between Highlands Southern Fall and Gippsland Plain.

Habitat type

Intermediate between Valley Heathy Forest (EVC 127, **regionally Endangered**) and Grassy Forest (EVC 128, **regionally Vulnerable**) – If there were ever enough clearly distinguishing features to identify the reserve's EVC, they have gone since European settlement.

Total area 0.81 ha – 70% (0.57 ha) in fair ecological condition (rating C) and 30% (0.24 ha) in poor ecological condition (rating D).

Canopy trees: A good cover of remnant *Eucalyptus goniocalyx* up to 20m tall, with some *E. obliqua*.

Lower trees: Several scattered specimens of *Exocarpos cupressiformis*, with some *Acacia melanoxylon* and *A. dealbata*.

Shrubs: The shrub layer is diverse and moderately dense, including *Acacia pycnantha*, *A. stricta*, *Leptospermum continentale* and a range of other species.

Vines: A few scattered weak twiners, including *Billardiera mutabilis* and *Hardenbergia violacea*.

Ferns: A small amount of *Pteridium esculentum*.

Ground flora: Dominated by a good cover of indigenous grasses, including *Austrostipa rudis* and *Rytidosperma penicillatum*, with *Gahnia radula* dominating moister areas. A large number of *Dianella longifolia* are scattered throughout, which is the strongest indication of Valley Heathy Forest as opposed to Grassy Forest.

Plant species

Except where otherwise noted, the following plant species were observed by Mr Rik Brown on 11th April 2002 or (in the case of a few grasses) Dr G. Lorimer on 2nd March 2000. At least five more species would probably be added in a survey during spring or early summer. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Acacia leprosa* (Dandenong Range variant) is listed by Walsh and Stajsic (2007) as rare nationally. There are several in the reserve.

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Acacia dealbata</i>		<i>Dichondra repens</i>
V	<i>Acacia leprosa</i> (Dandenong Range variant)	V	<i>Dillwynia cinerascens</i>
V	<i>Acacia melanoxylon</i>	C	<i>Diuris pardina</i> ×1 (2008 – A. Van Vloten)
E	<i>Acacia myrtifolia</i>		<i>Elymus scaber</i>
E	<i>Acacia pycnantha</i>	V	<i>Epacris impressa</i>
E	<i>Acacia stricta</i>		<i>Epilobium hirtigerum</i>
	<i>Acaena novae-zelandiae</i>		<i>Eucalyptus goniocalyx</i>
	<i>Acrotriche serrulata</i>	V	<i>Eucalyptus obliqua</i>
	<i>Austrostipa pubinodis</i>	V	<i>Exocarpos cupressiformis</i>
	<i>Austrostipa rudis</i>		<i>Gahnia radula</i>
	<i>Billardiera mutabilis</i>	V	<i>Glycine clandestina</i>
	<i>Bursaria spinosa</i>		<i>Gonocarpus tetragynus</i>
	<i>Carex breviculmis</i>		<i>Goodenia ovata</i>
	<i>Cassinia aculeata</i>	V	<i>Hardenbergia violacea</i>
E	<i>Cassytha melanantha</i>	E	<i>Hypericum gramineum</i>
V	<i>Clematis aristata</i>		<i>Juncus pallidus</i>
	<i>Deyeuxia quadriseta</i>		<i>Kunzea ericoides</i> spp. agg.
	<i>Dianella admixta</i>		<i>Lachnagrostis filiformis</i>
V	<i>Dianella longifolia</i> s.l.		<i>Leptospermum continentale</i>
	<i>Dichelachne rara</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Lomandra longifolia</i>		<i>Pteridium esculentum</i>
	<i>Microlaena stipoides</i>	V	<i>Pultenaea gunnii</i>
E	<i>Olearia myrsinoides</i>		<i>Rytidosperma linkii</i> var. <i>fulvum</i>
	<i>Oxalis exilis/perennans</i>		<i>Rytidosperma pallidum</i>
E	<i>Ozothamnus ferrugineus</i>		<i>Rytidosperma penicillatum</i>
	<i>Pandorea pandorana</i>	V	<i>Rytidosperma pilosum</i>
V	<i>Plantago varia</i>		<i>Rytidosperma racemosum</i>
V	<i>Platylobium formosum</i>		<i>Rytidosperma tenuius</i>
	<i>Poa morrisii</i>		<i>Senecio quadridentatus</i>
E	<i>Poa tenera</i> (1985)	E	<i>Stackhousia monogyna</i>
E	<i>Polyscias sambucifolia</i>	E	<i>Stylidium armeria/graminifolium</i>
	<i>Poranthera microphylla</i>		<i>Themeda triandra</i>

Introduced Species

<i>Acacia baileyana</i>	<i>Erica lusitanica</i>	<i>Pittosporum undulatum</i>
<i>Acacia decurrens</i>	<i>Fraxinus angustifolia</i>	<i>Prunus cerasifera</i>
<i>Acacia podalyriifolia</i>	<i>Genista monspessulana</i>	<i>Rubus anglocandicans</i>
<i>Agapanthus praecox</i>	<i>Hedera helix</i>	<i>Viola odorata</i>
<i>Briza maxima</i>	<i>Lonicera japonica</i>	
<i>Cotoneaster pannosus</i>	<i>Pinus radiata</i>	

Fauna of special significance

None recorded during field surveys, although significant forest birds occurring within the nearby Dandenong Ranges National Park are likely to be frequent visitors.

Fauna habitat features

The good cover of remnant trees and shrubs within the reserve and surrounding private properties provide habitat for forest birds, butterflies. This includes a substantial population of Spotted Pardalotes (approx. 20 birds) recorded within the reserve during field surveys. The reserve is likely to provide a habitat refuge for forest birds occurring in the area despite its relatively small size. It would be subject to fewer disturbances (from noise, lighting, pets etc.) than residential properties in the surrounding area. Bats and insects are likely to use the habitat, also.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity & Viability

The site acts as an ecological 'stepping stone' within a network of native vegetation sites in the local area, including sites 5-9. Site 99 (the Dandenong Ranges Buffer) envelopes these sites, providing an expansive (but patchy) area of tree canopy and occasional patches of understorey, and a habitat connection with the Dandenong Ranges National Park. Criterion 1.2.6 of Amos (2004) recognises that 'stepping stone' sites within such a local-scale network are of **Local** conservation significance.

Regionally Threatened Ecological Vegetation Class

The site's most significant attribute is the presence of a regionally threatened Ecological Vegetation Class.

The vegetation has been modified from its pre-European state just enough to confound identification of its EVC, which is intermediate between Valley Heathy Forest and Grassy Forest. The former EVC is endangered and the latter is vulnerable in the Highlands Southern Fall bioregion.

According to the criteria of 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), the conservation significance rating of the site's most intact vegetation is predicted to be Very High if the vegetation is treated as Valley Heathy Forest, or High otherwise. A habitat score assessment would be required to confirm or correct these predictions, but a level below High is unlikely. According to criterion 3.2.3, a site is of **State** significance if it contains any vegetation that is of High or Very High conservation significance due to its EVC being threatened.

Rare or Threatened Flora

The Dandenong Range variant of *Acacia leprosa* is listed as 'rare' in Victoria. The several plants in this site are part of a larger, viable local population, but on their own they do not make a significant contribution to the total population of the taxon. This represents **Regional** significance under criterion 3.1.2 of the standard criteria.

Many of the other locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Invasion by environmental weeds, including:
 - Very serious: Ivy (*Hedera helix*);
 - Serious: Japanese Honeysuckle (*Lonicera japonica*), Montpellier Broom (*Genista monspeliensis*).

The weed problem is exacerbated by the reserve's small size, large edge-to-area ratio and the presence of invasive species in the neighbouring lot to the north;
- Dumping of garden refuse which has been occurring within the reserve;
- Loss or decline of plant species that are present in dangerously small numbers, due to inbreeding, poor reproductive success or vulnerability to localised chance events such as digging by dogs or a falling log;
- Potentially, fire prevention measures, if these were to be intensified without adequate regard to the native flora.

Management issues

- Weed control is the highest priority, particularly along the northern boundary and with a focus on the species listed above under the heading 'Threats';
- Slashing of roadside vegetation along the western boundary (main branch of Forest Rd) should continue to be done at a frequency and time of year that favours the native ground flora rather than weeds;
- Other undergrowth cutting should be confined to the existing firebreak along the northern boundary and along paths;
- Preparation of a management plan for the reserve would be ideal, but of only moderate priority on the municipal scale;
- Fire hazard and the potential ecological benefits of fire should be considered as part of the reserve's management;
- The large population of Pale Flax-lily (*Dianella longifolia*) deserves periodic monitoring.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its State biological significance (discussed above);
- The reserve is zoned 'Public Park and Recreation Zone' and is included within Vegetation Protection Overlay VPO1 of the Knox Planning Scheme;
- The site is inside the Urban Growth Boundary for Melbourne;
- The treed neighbourhood to the east of the site is part of Site 99 and is recommended to be covered by the proposed Environmental Significance Overlay, ESO3.

Information sources used in this assessment

- A site survey undertaken during this study by Mr Rik Brown on 11th April 2002, following this study's standard procedures discussed in Section 2.4 of Volume 1. This included a description of the composition and condition of the vegetation, compilation of lists of indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats, management issues and populations of scarce or threatened plant species;
- A list of grasses seen incidentally by Dr Lorimer during a brief visit to the reserve on 2/3/00;
- Data from one quadrat, as stored in the Department of Sustainability & Environment's Flora Information System and listed by Water Ecoscience (1998) – *some of which is clearly erroneous*;
- Aerial photography from the early 1970s, February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

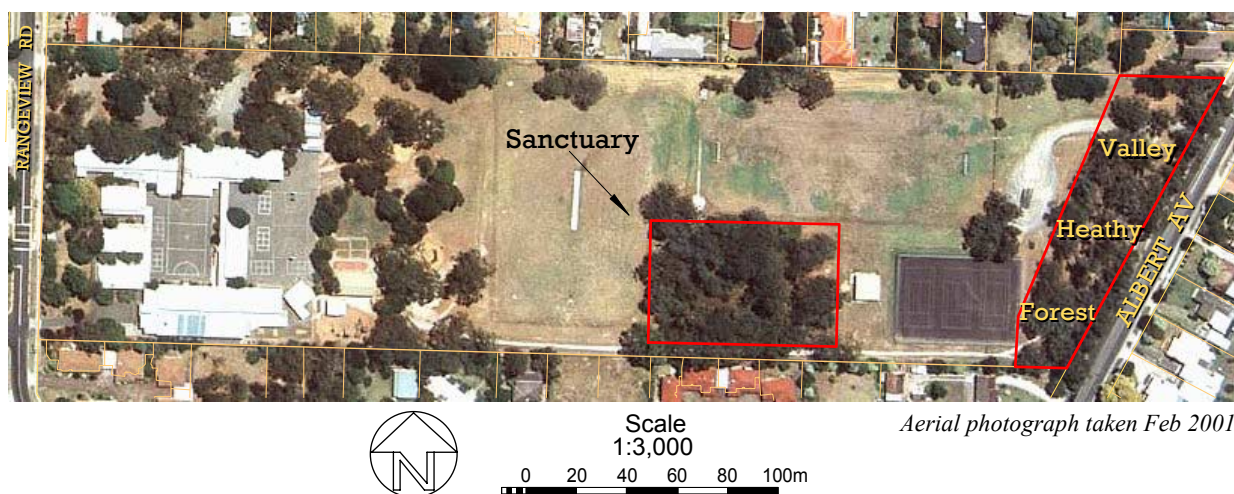
Site 8. Boronia Primary School

This school has rather modified native vegetation in a strip along Albert Avenue and much richer and more intact native vegetation in a sanctuary of 2,700 m², plus remnant eucalypts north and east of the buildings.

Melway ref. 65 B8.

Site Significance Level: *State*

- Some of the vegetation belongs to the regionally endangered Valley Heathy Forest;
- The vegetation in the sanctuary is intermediate between Valley Heathy Forest and Lowland Forest, serving an important scientific role in helping to define the limits and relationships between these two communities;
- There are ten plant species that are rare or threatened in Knox, of which two are rare or threatened throughout the Melbourne area.



Boundaries

The site comprises the two areas outlined in red above. The western part is a 75 m × 48.5 m rectangle (0.36 ha) that includes all of the school sanctuary as well as surrounding land with remnant ground flora and tree canopy. The eastern strip contains 0.40 ha of remnant vegetation beside Albert Av, matching cadastral boundaries to the north, south and east.

Land use & tenure: Primary school, including a sanctuary for nature conservation.

Site description

The site is almost level at an elevation of approximately 122 m (Australian Height Datum). The soil is light grey loam over clay, derived from decomposition of hornfels, possibly with some alluvial deposit at the surface in the school's northeast corner.

By far the most significant vegetation is in the sanctuary, which is marked on the aerial photograph above. The sanctuary is fenced, with an opening to the school grounds. The vegetation there is structurally intact and eight of the species of plants are rare or threatened in Knox. Two of these species are rare in the whole of metropolitan Melbourne, and another (*Banksia marginata*) is represented by approximately 26 individuals – the second-largest population in Knox (next to Site 29).

The band of trees along the eastern edge of the school grounds retains largely indigenous understorey flora, but the diversity and structure are suppressed by slashing.

There are remnant trees immediately to the north and east of the school buildings, with negligible understorey.

Relationship to other land

The site is 900 m from the Dandenong Ranges National Park and the intervening neighbourhood is relatively well treed, including the Boronia Heights College (Site 9). Many birds and insects no doubt visit the school from the park. This must assist with introduction of seeds and pollen to keep the indigenous flora viable, but note that the rare plant species in the school are absent from any nearby parts of the park.

Eucalypts in the vicinity of the school buildings are expected to encourage visitation to the school generally by birds and insects. This would facilitate exchange of pollen and seeds between the school's significant vegetation and nearby areas, reducing inbreeding and other problems associated with small, isolated bushland remnants such as this.

The treed backyards that can be seen on the aerial photograph above, immediately south of the school, no doubt encourage movement of many native birds and insects around the neighbourhood, and provide an ecological link to remnant vegetation in Chandler Park. These backyards have a good canopy of large Messmate Stringybarks (*Eucalyptus obliqua*) and Narrow-leafed Peppermints (*Eucalyptus radiata*) but no understorey other than hardy native species that persist in lawns.

Bioregion: Gippsland Plain

Habitat types

Valley Heathy Forest (EVC 127, regionally Endangered): 0.4 ha in the strip near Albert Avenue, all in ecological condition rating D (poor) but with a full tree canopy. 15 indigenous plant species were found on 30/3/02 and several others were probably undetected due to the poor time of year.

Dominant canopy trees: Pure *Eucalyptus cephalocarpa* typically 12-15 m tall with crowns overlapping and trunks often separated by as little as 2m.

Dominant lower trees: Very sparse *Acacia melanoxylon* and *Exocarpos cupressiformis*, typically 6-8 m tall.

Shrubs: Probably much thinner and with fewer species than the natural state, with visibility approximately 200 m. The only species are *Bursaria spinosa* and *Leptospermum continentale*.

Vines: *Billardiera mutabilis* is abundant.

Ferns: The only ferns are patches of bracken.

Ground flora: Nearly all mown and hence heavily modified from the natural state. Dominant species are *Gahnia radula*, *Microlaena stipoides*, *Austrostipa rudis* and *Rytidosperma penicillatum*. *Lomandra longifolia* is abundant but with too little foliage cover to be dominant.

Intermediate Valley Heathy Forest / Lowland Forest (EVCs 127 & 16 – the latter Vulnerable in the Gippsland Plain): comprising 2,700 m² inside the fenced sanctuary and 2,000 m² with little understorey surrounding the sanctuary, as well as eucalypts near the school buildings that are probably remnants of the same community. Within the sanctuary, approximately 130 m² is in excellent ecological condition (rating A), 2,450 m² is in good ecological condition (rating B) and 130 m² is in fair ecological condition (rating C). Elsewhere, the ecological condition is poor (rating D).

64 indigenous plant species were found on 30/3/02 (of which, *Lomandra filiformis* has two subspecies present) and about a dozen other species were probably undetected due to the poor time of year. Mr Andrew Paget recorded six additional species in June 1985, all of which may still be present.

Dominant canopy trees: *Eucalyptus cephalocarpa* and *E. obliqua* typically 15 m tall, separated by typically 4-5 m. *E. ovata* and *E. radiata* are present in smaller numbers.

Dominant lower trees: Very sparse *Acacia melanoxylon* and *Exocarpos cupressiformis*, typically 4 m tall.

Shrubs: Rather dense and rich and mostly <1½ m tall, dominated by *Pultenaea gunnii*, *Leptospermum continentale*, *Daviesia latifolia*, *Epacris impressa* and *Banksia marginata*. Other species present in small numbers are *Cassinia aculeata*, *Acacia myrtifolia*, *A. verticillata* (one only), *Olearia lirata* and *Ozothamnus ferrugineus*.

Vines: *Billardiera mutabilis* is abundant.

Ferns: There are patches of bracken with low overall average foliage cover. *Lindsaea linearis* is also present.

Ground flora: Almost 100% foliage cover, roughly knee-deep where not trampled. Quite heathy in character, with the dominant species being *Gahnia radula* (most abundant), *Xanthorrhoea minor*, *Platylobium formosum*, *Rytidosperma pallidum*, *Themeda triandra* and *Lepidosperma gunnii*. The ecological order of dominance is [tough sedges and Xanthorrhoeaceae] > [heathy shrubs (incl. Proteaceae)] > grass > *Platylobium formosum*. The wiry species *Tetrarrhena juncea* and *Empodisma minus* that are typical of Lowland Forest are present but not as abundant as expected for Lowland Forest. The following species are abundant but with too little foliage cover to be dominant: *Acrotriche serrulata*, *Hibbertia riparia*, *Poa morrisii*, *Deyeuxia quadriseta* and *Cassytha pubescens*. Less abundant species that are good ecological indicators include *Persoonia juniperina*, *Acrotriche prostrata*, *Lindsaea linearis* and *Xanthosia dissecta*.

Plant species

The following plant species were observed in March 2002 except where otherwise noted. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Comesperma ericinum* and *Lepidosperma filiforme* are rare throughout the Melbourne region. The 2002 survey would no doubt have missed at least ten naturally occurring indigenous species due to the time of year.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia melanoxylon</i>	E	<i>Hibbertia riparia</i>
E	<i>Acacia myrtifolia</i>	E	<i>Hypericum gramineum</i>
E	<i>Acacia stricta</i>	C	<i>Lachnagrostis aemula</i> s.l.
V	<i>Acacia verticillata</i>	E	<i>Lepidosperma filiforme</i>
V	<i>Acaena echinata</i>		<i>Lepidosperma gunnii</i>
	<i>Acaena novae-zelandiae</i>		<i>Leptospermum continentale</i>
V	<i>Acrotriche prostrata</i>	V	<i>Lindsaea linearis</i>
	<i>Acrotriche serrulata</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Arthropodium strictum</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
	<i>Austrostipa pubinodis</i>		<i>Lomandra longifolia</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>		<i>Microlaena stipoides</i>
E	<i>Banksia marginata</i>	V	<i>Olearia lirata</i>
	<i>Billardiera mutabilis</i>	V	<i>Opercularia varia</i>
	<i>Burchardia umbellata</i>		<i>Oxalis exilis/perennans</i>
	<i>Bursaria spinosa</i>	E	<i>Ozothamnus ferrugineus</i>
	<i>Carex breviculmis</i>		<i>Pandorea pandorana</i>
	<i>Cassinia aculeata</i>	C	<i>Patersonia occidentalis</i> (1985)
E	<i>Cassytha pubescens</i>	C	<i>Persoonia juniperina</i>
C	<i>Comesperma ericinum</i> (M. Belvedere, 2000)	V	<i>Pimelea humilis</i> (1985)
C	<i>Cryptostylis subulata</i>	V	<i>Platylobium formosum</i>
E	<i>Daviesia latifolia</i>	V	<i>Platylobium obtusangulum</i>
	<i>Deyeuxia quadriseta</i>		<i>Poa morrisii</i>
	<i>Dianella admixta</i>	E	<i>Polyscias sambucifolia</i>
V	<i>Dianella longifolia</i> s.l.		<i>Poranthera microphylla</i>
	<i>Dichelachne rara</i>		<i>Pteridium esculentum</i>
V	<i>Dillwynia cinerascens</i> (1985)	V	<i>Pultenaea gunnii</i>
V	<i>Epacris impressa</i>		<i>Rytidosperma pallidum</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Rytidosperma penicillatum</i>
V	<i>Eucalyptus obliqua</i>		<i>Schoenus apogon</i>
V	<i>Eucalyptus ovata</i>		<i>Senecio hispidulus</i>
E	<i>Eucalyptus radiata</i>	E	<i>Stylidium armeria/graminifolium</i>
V	<i>Exocarpos cupressiformis</i>		<i>Tetrarrhena juncea</i>
	<i>Gahnia radula</i>		<i>Themeda triandra</i>
E	<i>Galium gaudichaudii</i>	V	<i>Thysanotus patersonii</i> (1985)
	<i>Gonocarpus tetragynus</i>	E	<i>Viola hederacea</i>
	<i>Goodenia lanata</i> (1985)	V	<i>Xanthorrhoea minor</i>
	<i>Goodenia ovata</i>	E	<i>Xanthosia dissecta</i>
V	<i>Helichrysum scorpioides</i>		

Introduced Species

<i>Agrostis capillaris</i>	<i>Cytisus scoparius</i>	<i>Plantago lanceolata</i>
<i>Anthoxanthum odoratum</i>	<i>Dactylis glomerata</i>	<i>Prunus cerasifera</i>
? <i>Billardiera heterophylla</i>	<i>Hedera helix</i>	<i>Rosa rubiginosa</i>
<i>Briza maxima</i>	<i>Hypochoeris radicata</i>	<i>Rubus anglocandicans</i>
<i>Chrysanthemoides monilifera</i> ssp. <i>monilifera</i>	<i>Ilex aquifolium</i>	<i>Tradescantia fluminensis</i> *
<i>Conyza sumatrensis</i>	<i>Oxalis ?incarnata</i>	<i>Viburnum tinus</i>
<i>Cotoneaster pannosus</i>	<i>Paspalum dilatatum</i>	<i>Watsonia meriana</i> var.
<i>Crataegus monogyna</i>	<i>Pennisetum clandestinum</i>	<i>bulbillifera</i>
<i>Crocsmia</i> × <i>crocsmiiflora</i>	<i>Pittosporum undulatum</i>	

Fauna habitat features

Some of the large eucalypts (particularly *E. cephalocarpa*) have hollows that may be used by birds, possums and bats.

The shrubs in the sanctuary are good habitat for small birds, but the benefit of this is somewhat diminished by the distance to the nearest bushland with understorey (which is large relative to the dimensions of the sanctuary).

The ground flora, logs and forest litter in the sanctuary probably provide habitat for skinks. The abundant sedges probably support many skipper butterflies, with good prospects that locally rare species are among them.

Significance ratings

The following assessment of the site's significance uses the Department of Sustainability & Environment's standard criteria (Amos 2004).

Richness of Flora

The 64 indigenous plant species recorded in the sanctuary in March 2002 is high for an area as small as 2,700 m² in Knox. This could reasonably be taken to represent Local significance but it is not formally recognised by the standard criteria.

Regionally Threatened Ecological Vegetation Class

According to the criteria of '*Victoria's Native Vegetation Management – A Framework for Action*' (NRE 2002a), the conservation significance rating of the site's most intact vegetation is at least High and quite probably reaches Very High, due to the presence of moderately intact vegetation in a regionally threatened Ecological Vegetation Class. It follows from criterion 3.2.3 of Amos (2004) that the site is of **State** significance.

Rare or Threatened Flora

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Representativeness

Oates and Taranto (2002) state that 'Valley Heathy Forest represents vegetation that is transitional...', 'Further sampling and analysis are required to clarify its status', and 'On the higher rainfall eastern edge of the study area, Valley Heathy Forest merges into Lowland Forest'. It seems likely that there are few (if any) better sites than the Boronia Primary School sanctuary to demonstrate the intergradation and relationship between Valley Heathy Forest and Lowland Forest. Criterion 4.2 of the standard criteria confer State or National significance to a site 'considered to represent a significant variant ... or marginal form ... of a particular ecological community or class or wetland type', depending on whether or not the EVC is common outside Victoria (which is unknown in this case). By contrast, NRE (2002a, Appendix 3) allows also for Regional significance for 'edge of range or other non-species values'. In view of the uncertainty, it appears reasonable to opt for **State** significance in this case.

Threats

- The main ecological threat to the site is invasion by environmental weeds in the sanctuary, particularly Sweet Pittosporum, Ivy, Watsonia and Blackberry. Boneseed is presently sparse but could undergo a population explosion if not controlled soon;
- Exclusion of fire represents a mild threat to the sanctuary's biodiversity in the long term;
- Some indigenous plant species have such small population sizes that they are at risk of loss or decline due to inbreeding, poor reproductive success or elimination by incidents such as cubby house construction or digging by dogs. This includes *Acacia verticillata*, *Acaena echinata*, *Agrostis aemula*, *Galium gaudichaudii* and *Polyscias sambucifolia*.
- Reduced visitation of the school's bushland by small insect-eating birds due to its isolation from other areas with indigenous understorey, possibly leading to a worsening of plant pests and diseases;

Management issues

During the field survey it was clear that a very competent effort had been made in prior months to control blackberry and woody weeds in the sanctuary. However, over a longer time frame the vegetation appeared to be slowly succumbing to environmental weeds for want of a higher level of effort. Additional skilled effort will be required to retain the high conservation value that the sanctuary holds, and even to make the effects of the recent work long-lasting.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its State biological significance (discussed above);
- The site approximately corresponds to areas presently covered by Vegetation Protection Overlay VPO1 in the Knox Planning Scheme, which was based on recognition of the habitat by Water Ecoscience (1998).
- Native vegetation in parts of the school outside the site delineated here are protected by Clause 52.17 of the Victoria Planning Provisions and are also proposed to be covered by ESO3 as part of Site 99 (the Dandenong Ranges buffer);
- The school is zoned 'Public Use Zone - Education'.

Information sources used in this assessment

- Detailed vegetation data in accord with this study's standard approach described in Section 2.4 of Vol.1, including two lists of indigenous and introduced plant species (one for the sanctuary and one for the rest of the school) compiled by Dr Lorimer over 2¼ hours on 30th March 2002;

- Field data, drawings and photographs by biologist Ms Maria Belvedere in November 2000;
- One quadrat record (N13174) from Andrew Paget in June 1985 (Paget 1985);
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 9. Boronia Heights College

This secondary school has rather modified native vegetation around the grounds, and much richer and more intact native vegetation in a ½ hectare sanctuary. Melway ref. 65D8.

Site Significance Level: *State*

- The Ecological Vegetation Community that occurs on the site (Lowland Forest) is very rare in Knox;
- In the school's sanctuary there is a thriving population of a plant species (*Lepidosperma neesii*) that is very rare regionally;
- There are several other plant species that are rare in Knox.



Aerial photograph taken Feb 2001

Boundaries

The site is the school property, as outlined in red above, measuring 8.04 ha. The areas of native vegetation are outlined in white. The rest of the school is not biologically significant in itself, but the whole school is included within the site boundary because the welfare of the significant habitat is strongly linked to what occurs elsewhere in the school, and because the recommended planning scheme overlay is best applied to whole lots in such cases. Note that the overlay is not intended to affect maintenance of buildings, roads, playing fields or other school assets.

Land use & tenure: Secondary school, including a sanctuary.

Site description

The site's elevation ranges from 132 to 162 m (Australian Height Datum) with a shallow slope facing northwest. The soil is loam and clay that originated from nearby Chandlers Hill and washed or slipped downhill.

By far the richest and most intact vegetation is in the sanctuary, at the northernmost (lowest and wettest) part of the school. The vegetation is structurally intact and there are many plants that are rare or unique in Knox and some that are rare in the whole of metropolitan Melbourne. The sanctuary is fenced, with an opening to the school grounds, and it is evident that children frequently enter, damage the vegetation and leave rubbish. Part of the sanctuary is slashed and the vegetation around the northwestern perimeter is rather badly degraded.

The sanctuary is the lowest-lying and least sloping part of the school. Its vegetation is Lowland Forest. There is a transition to Valley Heathy Forest a short distance uphill from the sanctuary, but the delineation between these vegetation types is indistinct (largely because of the degree of tree clearing and the heavy modification of the original understorey).

The southeastern corner of the school grounds (where there are cables suspended in the trees) is not particularly ecologically intact but it still retains each of the natural vegetation strata and a dominant cover of indigenous grasses, lilies and other ground flora. This area is being very actively degraded at the time of this study by insensitive use of herbicide on native vegetation while bypassing the declared noxious weed, Montpellier Broom (*Genista monspessulana*).

Relationship to other land

The site is only 200 m from the Dandenong Ranges National Park. Many birds and insects no doubt visit the school from the park. This must assist with introduction of seeds and pollen to keep the indigenous flora viable, but note that the rare plant species in the school are absent from the park, or at least from nearby parts of the park.

The school is like Wicks Reserve (Site 15) in that they both support Lowland Forest on clay that has washed down from Chandlers Hill to the foot of the hill. There are also similarities in the vegetation and geomorphology of the Old Joes Creek bushland area (Site 29), Boronia Primary School (Site 8) and Millers Reserve (part of Site 23). These five sites are the only ones in Knox with Lowland Forest (or closely related community). The closest occurrence of Lowland Forest with intact understorey is in Montrose.

Bioregion: On the border between Highlands Southern Fall and Gippsland Plain. The various BioMaps of the Department of Sustainability & Environment's BioMaps show the bioregional boundary as passing either through, or just to the southeast of, the site, always with the Lowland Forest and at least part of the Valley Heathy Forest in the Gippsland Plain.

Habitat types

Lowland Forest (EVC 16, Vulnerable on the Gippsland Plain and 'Least Concern' in the Highlands Southern Fall): Approximately 0.75 ha in total, of which approximately 0.5 ha is in the sanctuary.

In the sanctuary, approximately 350 m² is in excellent ecological condition (rating A), 2,300 m² is in good ecological condition (rating B), 1,550 m² in fair ecological condition (rating C) and 800 m² in poor ecological condition (rating D). 59 indigenous plant species were found on 26/3/02 (ignoring planted specimens) and about a dozen others were probably undetected due to the poor time of year. Mr Andrew Paget recorded two additional species in July 1985.

Dominant canopy trees: *Eucalyptus cephalocarpa* with fewer *E. obliqua* typically 18 m tall and with a foliage cover of 30-40%.

Dominant lower trees: *Acacia melanoxylon* approximately 10 m tall has foliage cover of 20%; *Kunzea ericoides* approximately 6 m tall is dense in patches due to past disturbance.

Shrubs: Moderately dense and rich, containing *Bursaria spinosa*, *Leptospermum continentale*, *L. scoparium*, *Banksia marginata*, *Hakea nodosa* (at least some of which are planted), *Pultenaea gunnii*, *Cassinia aculeata*, *Acacia verticillata* and *Ozothamnus ferrugineus*.

Vines: *Billardiera mutabilis* and *Pandorea pandorana* are abundant, but the latter represents only young plants.

Ferns: There are patches of dense bracken but the overall average foliage cover is much less than 10%. *Lindsaea linearis* is present, a characteristic species for Lowland Forest.

Ground flora: Very dense, tangled and at least knee-deep where not damaged or mown. Rather heathy with *Gahnia radula* dominant (~75% cover) and an abundance of the wiry species *Tetrarrhena juncea* and *Empodisma minus*. The other dominant species are *Xanthorrhoea minor* and the regionally rare *Lepidosperma neesii* (which suggests a tendency toward Damp Heathy Woodland). The following species are abundant but with too little foliage cover to be dominant: *Gonocarpus humilis*, *G. tetragynus*, *Platylobium obtusangulum*, *Poa tenera*, *Themeda triandra*, *Rytidosperma penicillatum* and (in mown areas) *Austrostipa rudis* and *Microlaena stipoides*. Less abundant species that are good ecological indicators include *Acrotriche prostrata*, *Centella cordifolia* and what appears to be *Mazus pumilio*.

Outside the sanctuary, the indistinct boundary with the Valley Heathy Forest confounds an estimate of area, but a reasonable estimate would be 0.25 ha, all in poor ecological condition (rating D).

Valley Heathy Forest (EVC 127, regionally Endangered): 50-100 m² is in fair ecological condition (rating C, in the southeastern corner) and the remainder (2.0 ha) is in poor ecological condition (rating D). 33 indigenous plant species were found on 26/3/02 and no doubt others would be found at other times of year (depending on whether they survive the recent herbicide use).

Dominant canopy trees: *Eucalyptus cephalocarpa* with fewer *E. obliqua* typically 20 m tall, and a few *E. goniocalyx* and *E. macrorhyncha* where the vegetation tends toward Grassy Forest (EVC 128) at the southeastern corner.

Dominant lower trees: *Acacia melanoxylon* is present in varying density.

Shrubs: Heavily diminished by clearing; Includes *Bursaria spinosa*, *Leptospermum continentale* and *Dillwynia cinerascens*.

Vines: *Billardiera mutabilis* is fairly abundant.

Ferns: None.

Ground flora: Dominated by *Rytidosperma* species, *Gahnia radula* and *Austrostipa rudis*. The presence of *Arthropodium strictum*, *Dianella admixta* and particularly *Dianella longifolia* helps to justify the diagnosis of Valley Heathy Forest. The ecological indicator species *Acrotriche prostrata* is present in small numbers.

Plant species

The following plant species were observed in March 2002 except for *Hibbertia riparia*. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Acacia leprosa* (Dandenong Range variant) is rare nationally and the asterisked species are rare throughout the Melbourne region. At least ten additional naturally occurring indigenous species would no doubt be found in other seasons.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia leprosa</i> (Dandenong Range variant) – quite likely planted		<i>Kunzea ericoides</i> spp. agg.
V	<i>Acacia mearnsii</i> – perhaps planted	C	<i>Lepidosperma gunnii</i>
V	<i>Acacia melanoxylon</i>		<i>Lepidosperma neesii</i> *
E	<i>Acacia myrtifolia</i>	E	<i>Leptospermum continentale</i>
V	<i>Acacia verticillata</i>	V	<i>Leptospermum scoparium</i>
	<i>Acaena novae-zelandiae</i>		<i>Lindsaea linearis</i>
V	<i>Acrotriche prostrata</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Arthropodium strictum</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
	<i>Austrostipa pubinodis</i>		<i>Lomandra longifolia</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	C	? <i>Mazus pumilio</i> *
E	<i>Banksia marginata</i>	C	<i>Melaleuca squarrosa</i> – perhaps planted
	<i>Billardiera mutabilis</i>		<i>Microlaena stipoides</i>
	<i>Burchardia umbellata</i>	V	<i>Opercularia ovata</i>
	<i>Bursaria spinosa</i>	V	<i>Opercularia varia</i>
	<i>Carex breviculmis</i>		<i>Oxalis exilis/perennans</i>
	<i>Cassinia aculeata</i>	E	<i>Ozothamnus ferrugineus</i>
E	<i>Cassytha pubescens</i>		<i>Pandorea pandorana</i>
E	<i>Centella cordifolia</i>	V	<i>Platylobium obtusangulum</i>
	<i>Deyeuxia quadriseta</i>		<i>Poa ensiformis</i>
V	<i>Dianella longifolia</i> s.l.		<i>Poa morrisii</i>
	<i>Dichondra repens</i>	E	<i>Poa tenera</i>
V	<i>Dillwynia cinerascens</i>		<i>Poranthera microphylla</i>
V	<i>Empodisma minus</i> *		<i>Pteridium esculentum</i>
V	<i>Epacris impressa</i>	V	<i>Pultenaea gunnii</i>
	<i>Eragrostis brownii</i>		<i>Rytidosperma laeve</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Rytidosperma pallidum</i>
	<i>Eucalyptus goniocalyx</i>		<i>Rytidosperma penicillatum</i>
E	<i>Eucalyptus macrorhyncha</i>		<i>Rytidosperma racemosum</i>
V	<i>Eucalyptus obliqua</i>		<i>Rytidosperma setaceum</i>
V	<i>Exocarpos cupressiformis</i>		<i>Rytidosperma tenuius</i>
	<i>Gahnia radula</i>		<i>Schoenus apogon</i>
E	<i>Gonocarpus humilis</i>		<i>Senecio hispidulus</i>
	<i>Gonocarpus tetragynus</i>		<i>Senecio quadridentatus</i>
C	<i>Hakea nodosa</i> (planted and natural)		<i>Tetrarrhena juncea</i>
V	<i>Helichrysum scorpioides</i>		<i>Themeda triandra</i>
E	<i>Hibbertia riparia</i> (A. Paget, 1985)	E	<i>Viola hederacea</i>
		V	<i>Xanthorrhoea minor</i>

Introduced Species

<i>Anthoxanthum odoratum</i>	<i>Holcus lanatus</i>	<i>Plantago lanceolata</i>
<i>Cotoneaster pannosus</i>	<i>Hypochoeris radicata</i> (A. Paget, 1985)	<i>Prunus cerasifera</i>
<i>Crococsmia</i> × <i>crococsmiiflora</i>	<i>Lonicera japonica</i>	<i>Quercus robur</i>
<i>Genista monspessulana</i>	<i>Pennisetum clandestinum</i>	<i>Rubus anglocandicans</i>
<i>Hedera helix</i>	<i>Pittosporum undulatum</i>	

Fauna habitat features

There are many large eucalypts (particularly *E. cephalocarpa*) with hollows that may be used by birds, possums and bats. Some have scratch marks at their entrance.

The thickets of dense shrubs in the sanctuary are good habitat for small birds, but the benefit of this is somewhat diminished by the distance to the nearest bushland with understorey (which is large relative to the dimensions of the sanctuary).

The ground flora, logs and forest litter in the sanctuary probably provide habitat for skinks and frogs. The abundant sedges probably support many skipper butterflies, with a substantial possibility of locally rare species among them.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Regionally Threatened Ecological Vegetation Classes

This site contains a 'remnant patch' of an endangered EVC, namely Valley Heathy Forest. According to 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), vegetation belonging to an endangered EVC has a conservation significance rating of either High or Very High, depending on its ecological condition. In either case, any site containing a remnant patch of such vegetation is of **State** significance under criterion 3.2.3.

If the Lowland Forest is taken to be in the Gippsland Plain bioregion (as shown on the Department of Sustainability & Environment's BioMaps), it must then be treated as regionally vulnerable and the conservation significance of the most intact parts of the sanctuary would rate as High to Very High conservation significance under the Framework. This would again be taken to represent **State** significance.

Rare or Threatened Flora

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

The following are the main pressures currently threatening to lessen the site's conservation significance:

- Invasion by environmental weeds, particularly Sweet Pittosporum and Ivy in the sanctuary;
- Vegetation damage in the sanctuary by trampling, hacking and smothering with rubbish, evidently by students;
- In the southeastern corner, spraying of herbicide onto native vegetation while avoiding the very serious weed, Montpellier Broom (which is Regionally Controlled under the *Catchment and Land Protection Act 1994*);
- Loss or decline of plant species whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or elimination by incidents such as cubby house construction or trampling. This problem is less serious than the problems listed above;
- Reduced visitation of the school's bushland by small insect-eating birds due to isolation from other areas with indigenous understorey, possibly leading to a worsening of plant pests and diseases.

Management issues

Vegetation management, and particularly weed control, should be conducted with a greater level of expertise, commensurate with the vegetation's State significance;

Use of the sanctuary should ideally be regulated or supervised.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay ESO2 because of its State biological significance. Much of the school has no biological significance, but decisions and actions in the built part of the school directly and indirectly influence the significant vegetation. ESO2 should exempt normal maintenance of existing sports facilities, car parks, buildings and other structures;
- The sanctuary would be more ecologically secure and could be given much better care and protection under Council ownership than under present management. It would make a significant contribution to the total conservation values within Council's network of bushland reserves.

Information sources used in this assessment

- Detailed vegetation data in accord with this study's standard approach described in Section 2.4 of Vol.1, including two lists of indigenous and introduced plant species (one for the sanctuary and one for the rest of the school) compiled by Dr Lorimer over 2¾ hours on 26th March 2002;

- Incidental observations of birds while the above data was being gathered;
- One quadrat record (N13175) from Andrew Paget in July 1985 (Paget 1985);
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 10. Corner Philippa Rd & Hansen Rd, Boronia

Two residential lots with rather rich native vegetation, immediately opposite a particularly important part of the Dandenong Ranges National Park. Melway ref. 65 E9.

Site Significance Level: *Local*

- Supports six plant species that are threatened in Knox, one of which is rare or threatened throughout the Melbourne area and another of which is the only occurrence in Knox;
- The site represents a small extension to the flora and fauna habitat of the adjacent Chandlers Hill block of the Dandenong Ranges National Park;
- Potential residential development and environmental weeds threaten the site's values.

Aerial photograph: See page 35, which covers this site and Wirrianda Reserve.

Boundaries

This 4,930 m² site comprises the whole of two lots and their abutting roadside verge along Hansen Rd and the batter on the verge of Philippa Rd, as shown on p. 35.

Land use & tenure: Private land, zoned 'Low Density Residential Zone' (LDRZ).

Note: The site had to be inspected from outside the property boundaries. Some species would have escaped detection.

Site description

The site is on the steep, northwest-facing slope of the main ridge of Chandlers Hill, overlooking Boronia from an elevation of 220 m. The soil is stony clay derived from the Mount Evelyn rhyodacite formation, part of the Dandenong Ranges volcanic complex. The steep slope and the soil composition result in rapid drainage, and the soil becomes very dry during the first quarter of each year.

Road construction and installation of utility services has altered the ground contours and modified the vegetation around the site's edges. Past clearing has occurred throughout the site long ago, but native vegetation has regenerated well and over 60 indigenous plant species were present when houses were constructed on both properties in (or about) 2005. Residential use and environmental weeds have taken a substantial environmental toll but much of the properties' native vegetation remains and most of the indigenous plant species remain.

Some of the environmental weeds on the properties have been planted and many others are declared noxious weeds. A hedge of Pincushion Hakeas was planted in 2007 along Philippa Rd (private and public land). The planting would have dug up some of Knox's last remaining population of Brown-Beaks orchid (*Lyperanthus suaveolens*) and if the Hakeas are allowed to survive, they could displace the remaining population as well as many other wildflowers. Slashing of the properties has destroyed many indigenous shrubs, and in 2008, the author could no longer see any of what had previously been Knox's only population of Rusty Bush-pea, *Pultenaea hispidula* (which is more abundant over the road in the Dandenong Ranges National Park).

The site may well contain rare orchids that have escaped detection, given the abundance of such plants within 20 m on the other side of Philippa Rd, particularly following fire.

The weeds present in the site pose some threat of spread into the National Park, but most of the serious weed species spread mainly downhill, away from the park.

Relationship to other land

The Dandenong Ranges National Park, just a few metres from this site, is of high National significance for its native vegetation and wildlife. Some of the plants and wildlife on the site owe their continuing existence to the park's proximity. Many seeds no doubt enter the site from the park, and there is no risk of inbreeding of flora or fauna because of the large, secure populations within the park.

Bioregion: Highlands Southern Fall

Habitat type

Grassy Dry Forest (EVC 22, conservation status rated 'Least Concern' in the bioregion): 3,000 m² in area, of which it is estimated that 1,300 m² is in good ecological condition (rating B), 1,600 m² is in fair ecological condition (rating C) and 100 m² around the houses is in poor ecological condition (rating D).

Dominant canopy trees: *Eucalyptus goniocalyx* and *E. macrorhyncha*. *E. melliodora* is also present.

Dominant lower trees: Scattered *Exocarpos cupressiformis* and patches of *Acacia implexa*.

Shrubs: Small numbers of *Acacia stricta*. Prior to house construction, there was also *Bursaria spinosa*, *Cassinia longifolia* and *Goodenia ovata*.

Vines: Sparse *Billardiera mutabilis*, *Hardenbergia violacea* and *Pandorea pandorana*.

Ferns: None detected.

Ground flora: Dominated by *Themeda triandra* and smaller numbers of *Rytidosperma pallidum*. The following species are abundant but not dominant: *Dianella admixta*, *Lomandra filiformis*, *Rytidosperma* species, *Poa morrisii*, *Plantago varia*, *Bossiaea prostrata*, *Burchardia umbellata*, *Drosera peltata* subsp. *auriculata*. *Lepidosperma laterale* is a character species.

Plant species

The following plant species were observed by the author in the years indicated in the last column (or in 2008 where not otherwise indicated). Other species would probably have been recorded if access to the private property had been available. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Pultenaea hispidula* is rare throughout the Melbourne region.

Indigenous Species	Risk	Year	Indigenous Species	Risk	Year
<i>Acacia implexa</i>	V	2008	<i>Hibbertia riparia</i>	E	2008
<i>Acacia myrtifolia</i>	E	2008	<i>Hovea heterophylla</i>	V	2008
<i>Acacia pycnantha</i>	E	2008	<i>Hypericum gramineum</i>	E	2003
<i>Acacia stricta</i>	E	2008	<i>Indigofera australis</i>	E	2008
<i>Acrotriche prostrata</i>	V	2008	<i>Lepidosperma laterale</i>	V	2008
<i>Acrotriche serrulata</i>		2003	<i>Linum marginale</i>	E	2003
<i>Arthropodium strictum</i>		2008	<i>Lomandra filiformis</i> subsp. <i>coriacea</i>		2008
<i>Austrostipa pubinodis</i>		2003	<i>Lomandra longifolia</i>		2002
<i>Billardiera mutabilis</i>		2003	<i>Lyperanthus suaveolens</i>	C	2004
<i>Bossiaea prostrata</i>		2008	<i>Microlaena stipoides</i>		2008
<i>Brunonia australis</i>	V	2003	<i>Opercularia varia</i>	V	2008
<i>Bulbine bulbosa</i>	E	2003	<i>Oxalis exilis/perennans</i>		2003
<i>Burchardia umbellata</i>		2003	<i>Pandorea pandorana</i>		2003
<i>Bursaria spinosa</i>		2002	<i>Pimelea curviflora</i>	E	2008
<i>Carex breviculmis</i>		2003	<i>Pimelea humilis</i>	V	2003
<i>Cassinia longifolia</i>	V	2003	<i>Plantago varia</i>	V	2003
<i>Daviesia latifolia</i>	E	2008	<i>Platylobium formosum</i>	V	2003
<i>Deyeuxia quadriseta</i>		2003	<i>Poa morrisii</i>		2003
<i>Dianella admixta</i>		2008	<i>Poranthera microphylla</i>		2002
<i>Dianella longifolia</i> s.l.	V	2008	<i>Pultenaea hispidula</i>	C	2003
<i>Dichondra repens</i>		2003	<i>Ranunculus lappaceus</i>	E	2003
<i>Dillwynia cinerascens</i>	V	2003	<i>Rytidosperma linkii</i> var. <i>fulvum</i>		2008
<i>Drosera peltata</i> subsp. <i>auriculata</i>	V	2003	<i>Rytidosperma pallidum</i>		2008
<i>Eucalyptus goniocalyx</i>		2008	<i>Rytidosperma penicillatum</i>		2003
<i>Eucalyptus macrorhyncha</i>	E	2008	<i>Rytidosperma racemosum</i>		2008
<i>Eucalyptus melliodora</i>	V	2008	<i>Rytidosperma tenuius</i>		2008
<i>Exocarpos cupressiformis</i>	V	2008	<i>Senecio quadridentatus</i>		2008
<i>Geranium</i> sp. 2	V	2002	<i>Stackhousia monogyna</i>	E	2003
<i>Glycine clandestina</i>	V	2008	<i>Themeda triandra</i>		2008
<i>Gonocarpus tetragynus</i>		2008	<i>Wahlenbergia stricta</i>	E	2003
<i>Goodenia ovata</i>		2003	<i>Wurmbea dioica</i>	E	2002
<i>Hardenbergia violacea</i>	V	2008			

Introduced Species

<i>Acacia floribunda</i>	<i>Chlorophytum comosum</i>	<i>Oxalis incarnata</i>
<i>Acacia podalyriifolia</i>	<i>Chrysanthemoides monilifera</i> ssp. <i>monilifera</i>	<i>Paspalum dilatatum</i>
<i>Agapanthus praecox</i>	<i>Crocospia</i> × <i>crocospiaiflora</i>	<i>Pinus radiata</i>
<i>Allium triquetrum</i>	<i>Ehrharta erecta</i>	<i>Pittosporum undulatum</i>
<i>Anagallis arvensis</i>	<i>Genista linifolia</i>	<i>Plantago lanceolata</i>
<i>Anthoxanthum odoratum</i>	<i>Genista monspessulana</i>	<i>Rubus anglocandicans</i>
<i>Briza maxima</i>	<i>Grevillea rosmarinifolia</i>	<i>Sonchus oleraceus</i>
<i>Bromus catharticus</i>	<i>Hakea salicifolia</i>	<i>Trifolium repens</i>
<i>Centaureum erythraea</i>	<i>Hypochoeris radicata</i>	<i>Vicia sativa</i>
<i>Chamaecytisus palmensis</i>	<i>Linum trigynum</i>	<i>Watsonia meriana</i> var. <i>bulbillifera</i>

Notes concerning some of the locally threatened plants

Bulbine bulbosa (Yellow Bulbine-lily). Approx. 50 plants were seen in 2002-3 scattered within the site (particularly towards southern corner). None could be seen in 2008 because of the time of year (March).

Linum marginale (Native Flax). A viable population.

Lyperanthus suaveolens (Brown Beaks). About 100 were seen in December 2004, close to Philippa Rd; the only remaining population in Knox. None could be seen in 2008 because of the time of year (March).

Pimelea curviflora (Curved Rice-flower). Dozens of plants, one of the biggest population in Knox.

Pultenaea hispidula (Rusty Bush-pea). A small number were present in 2002-3, the only records from Knox. There are many more on the other side of Philippa Rd in the national park. None could be seen from the property boundary in 2008.

Ranunculus lappaceus (Australian Buttercup). A few plants were seen in 2002-3 along Hansen Rd. None could be seen in 2008 because of the time of year (March).

Wahlenbergia stricta (Tall Bluebell). Scarce, but numbers not recorded. None could be seen from the property boundary in 2008.

Wurmbea dioica subsp. *dioica* (Common Early Nancy). Only a few plants seen in 2002, but others were possibly overlooked. None could be seen in 2008 because of the time of year (March).

Fauna of special significance

Because of the proximity to the Dandenong Ranges National Park, the site is bound to be occasionally visited by rare or threatened fauna from the park such as Powerful Owls. The site provides a small extension to the native habitat available for such species.

Fauna habitat features

- Remnant vegetation provides some habitat for native birds, including nesting Spotted Pardalotes beside Hansen Rd;
- Exposed rocks are likely to provide some habitat for skinks.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Vegetation Type and Condition

Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) states that vegetation of an EVC rated as 'Least Concern' (as in this case) is of either Medium or Low conservation significance, depending on whether the habitat score is above or below 0.6. Although no habitat score has been determined in this site, it seems most likely that the highest habitat score on the site would be below 0.6, corresponding to a Low conservation significance. This, in turn, confers **Local** significance on the site under criterion 3.2.3 of Amos (2004).

If the site's significance rating were to become an important issue, the habitat score of the best native vegetation would have to be determined by fieldwork to see whether it really is below the threshold of 0.6.

Rare or Threatened Flora

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

It is also quite possible that the site supports a threatened orchid such as *Caladenia oenochila*, which occurs in the adjoining part of the national park and could have escaped detection. This would raise the site's significance rating greatly, and should be considered as part of any development proposal for the site.

Threats

- Slashing, which has decimated the shrub cover since houses were built;
- Gardening. The Hakeas planted in 2007 beside 4 Philippa Rd are an extreme risk to Knox's last remaining population of Brown-beaks Orchids;
- Invasion by environmental weeds as listed below, with asterisks marking those that are controlled under the *Catchment and Land Protection Act 1994*:
 - Very serious: Bulbil *Watsonia** (*Watsonia meriana*), Pincushion Hakea (*Hakea laurina*);
 - Serious: African Lily or Agapanthus (*Agapanthus praecox*), Sweet Vernal-grass (*Anthoxanthum odoratum*); and
 - Moderate: Angled Onion* (*Allium triquetrum*), Large Quaking-grass (*Briza maxima*), Common Centaury (*Centaureum erythraea*), Boneseed* (*Chrysanthemoides monilifera monilifera*), Montbretia (*Crocasmia × crocosmiiflora*), Flax-leafed Broom* (*Genista linifolia*), Montpellier Broom* (*Genista monspessulana*), Cat's Ear (*Hypochoeris radicata*), Pale Wood-sorrel (*Oxalis incarnata*), Sweet Pittosporum (*Pittosporum undulatum*), Ribwort (*Plantago lanceolata*), Blackberry* (*Rubus discolor*) and vetches (*Vicia* species).

Management issues

- More effective weed control is highly desirable, and many of the weed species present must be controlled under the *Catchment and Land Protection Act 1994*.
- The site's fire risk needs to be managed, and this can be done harmoniously with proper care of the native vegetation. Slashing is an appropriate method as long as careful attention is paid to frequency, time of year and severity.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the significant plants and the quality of much of the site's native vegetation;
- The reserve is zoned 'Low Density Residential Zone';
- The site is protected under the existing Vegetation Protection Overlay Schedule 1 and Significant Landscape Overlay Schedule 2 of the Knox Planning Scheme;
- The site was included in 'Composite Area A' by Water Ecoscience (1998) without any substantial assessment;

Information sources used in this assessment

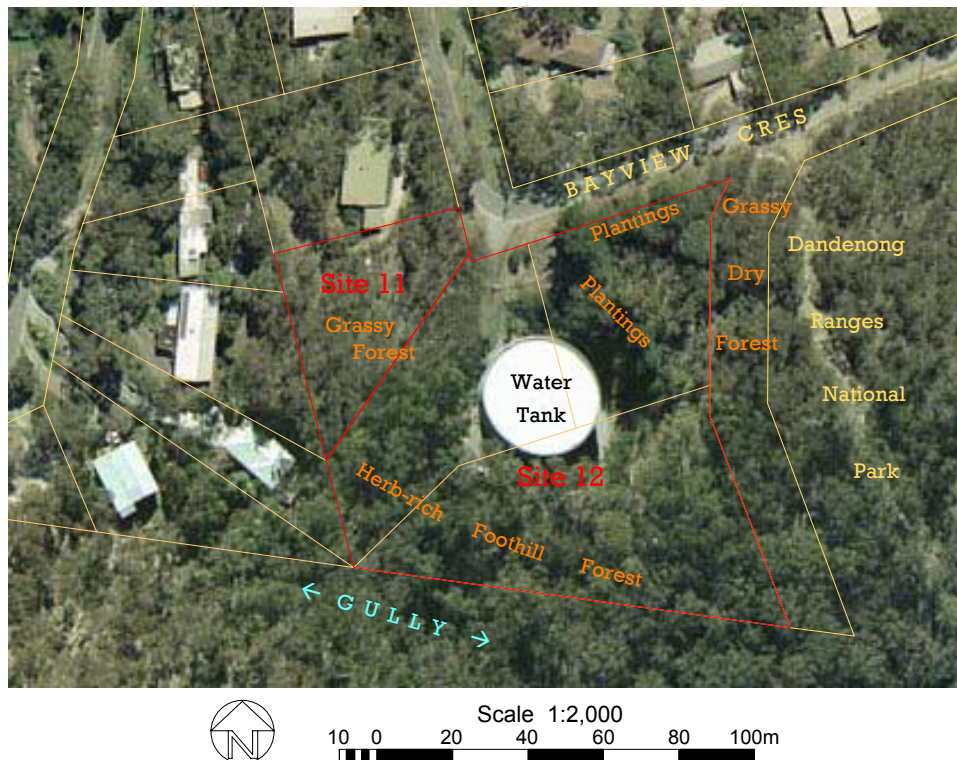
- A site survey undertaken during this study by Mr Rik Brown on 11/10/02 using this study's standard procedures discussed in Section 2.4 of Volume 1. This included a description of the vegetation composition, compilation of lists of indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats and management issues;
- A site inspection and list of flora species by Dr Lorimer in early 2003 to detect seasonal species and check earlier identifications;
- A site inspection by Dr Lorimer on 7/3/08 to check how much of the site's significance had survived. The plant species list was compiled and the vegetation quality was mapped;
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 11. Bayview Crescent Reserve, The Basin

Small Council bushland reserve in a bushland neighbourhood on Chandlers Hill. Melway ref. 65 G9.

Site Significance Level: *State*

- The native vegetation grades between three Ecological Vegetation Classes, one of which (Grassy Forest) is regionally Vulnerable;
- There are six plant species that are Vulnerable in Knox and one that is very likely to be Critically Endangered in Knox;
- The site represents a small extension to the flora and fauna habitat of the neighbouring Chandlers Hill block of the Dandenong Ranges National Park;
- A range of fauna found in the national park, including rare species, are likely to periodically use the reserve;
- The reserve has rich birdlife.



Aerial photograph taken April 2003

Boundaries

This 1,722 m² site comprises the whole lot outlined in red and marked 'Site 11' on the aerial photograph above.

Land use & tenure: Council reserve, zoned 'Low Density Residential Zone' (LDRZ).

Site description

This site and the abutting Site 12 are on the northern flank of a gully that drains westward from the northern slopes of Chandlers Hill. It has a steep southwesterly slope of typically 30% and an elevation range of approximately 247-267 m. The soil is stony clay derived from the Kalorama rhyodacite formation. On the upper slope (near Bayview Crescent), the steepness and the soil composition result in rapid drainage, and the soil becomes very dry during the first quarter of each year. The lowest parts of the site receive runoff water from uphill as well as topographic shade from the late afternoon sun in summer, thereby retaining higher soil moisture.

The resulting native vegetation communities grade indistinctly from Grassy Dry Forest near the road, through Grassy Forest to Herb-rich Foothill Forest in the southern corner.

Overall, the native vegetation's ecological condition is approximately equally divided between rating B (good) and C (fair).

Council only discovered that it owned the reserve in the past three years, and a major weed control effort has been under way since. No fewer than three declared noxious species of broom were rampant, creating a persistent problem.

Council has designated the reserve Significant Vegetation Site KN83.

Some neighbours have been using the reserve as an effective extension of their garden for many years, including planting of ornamentals and cutting of native vegetation. Other neighbours use a path through the reserve to access the Dandenong Ranges National Park from Bayview Crescent.

Relationship to other land

The Dandenong Ranges National Park, just 27 m from this site, is of high National significance for its native vegetation and wildlife. Its presence greatly increases the security of the flora in the reserve, because seeds and pollen from the park no doubt enter the reserve and hence prevent inbreeding of flora. Extensive movement of fauna was observed between the reserve and the park. Indeed, birdwatching in the reserve seemed to be as good as in the adjacent part of the national park, making it one of the best spots for birdwatching in Knox.

The adjoining South East Water land (Site 12) provides continuity of habitat between the national park and the reserve. Together, the two sites effectively represent a small extension to the habitat in the national park. The South East Water land contains some serious weeds, comparable to the reserve, and the landowners of both properties are conducting a joint effort to correct this.

The residential neighbourhood around the reserve presents a mild risk to the site's natural values due to spread of garden weeds and damaging activities by people and pets entering the property.

Bioregion: Highlands Southern Fall

Habitat types

Grassy Dry Forest (EVC 22, conservation status rated 'Least Concern' in the bioregion): estimated as 300 m² in fair ecological condition (rating C).

Dominant canopy trees: *Eucalyptus goniocalyx* and *E. macrorhyncha*, with an out-of-character *E. cypellocarpa*.

Dominant lower trees: *Exocarpos cupressiformis*.

Shrubs: Depleted by clearing, and comprising *Bursaria spinosa*, *Cassinia aculeata* and *Pultenaea scabra*.

Vines: *Pandorea pandorana*.

Ground flora: Dominated by *Themeda triandra* and *Rytidosperma pallidum*. The following species are abundant but not dominant: *Dianella admixta*, *Lomandra filiformis*, *Rytidosperma* species, *Poa morrisii*, *Plantago varia*, *Bossiaea prostrata*, *Burchardia umbellata*, *Drosera peltata* subsp. *auriculata*. *Lepidosperma laterale* is characteristically present, but it is not abundant.

Grassy Forest (EVC 128, **regionally Vulnerable**): estimated as 1,000 m² in area (but imprecise due to intergradation with the other EVCs), approximately equal proportions in ecological condition ratings B and C (good and fair).

Dominant canopy trees: *Eucalyptus goniocalyx*, *E. macrorhyncha* and *E. radiata*.

Dominant lower trees: *Exocarpos cupressiformis* and *Acacia melanoxylon* are rather abundant.

Shrubs: Dominated by *Bursaria spinosa*, *Cassinia aculeata* and *Pultenaea scabra*. Other species include *Acacia stricta*, *Bursaria spinosa*, *Epacris impressa*, *Exocarpos strictus*, *Goodenia ovata*, *Indigofera australis* and *Senecio* species.

Vines: *Billardiera mutabilis*, *Clematis aristata*, *Glycine clandestina* and *Rubus parvifolius*, as well as *Pandorea pandorana* where the soil has been recently disturbed.

Ferns: *Adiantum aethiopicum* forms large patches and *Pteridium esculentum* forms small patches.

Ground flora: The indigenous ground flora has reduced in density and depth and is recovering following weed control. Dominated by *Themeda triandra* and *Rytidosperma pallidum*, with abundant *Gonocarpus tetragynus* and *Lomandra filiformis* subsp. *coriacea*. Other species include *Acrotriche prostrata*, *A. serrulata*, *Asperula conferta*, *Burchardia umbellata*, *Carex breviculmis*, *Deyeuxia quadriseta*, three species of *Dianella longifolia*, *Drosera peltata auriculata*, *Geranium potentilloides*, *Goodenia ovata*, *Hydrocotyle hirta*, *Lepidosperma laterale*, *Lomandra longifolia*, *Microlaena stipoides*, *Olearia myrsinoides*, *Opercularia varia*, *Oxalis perennans*, *Pimelea humilis*, *Plantago varia*, *Platylobium formosum*, *Poranthera microphylla*, *Ranunculus lappaceus*, *Stackhousia monogyna*, *Stylidium armeria*, *Tetratheca ciliata*, *Veronica calycina*, *Viola hederacea* and *Wahlenbergia stricta*.

Herb-rich Foothill Forest (EVC 23, conservation status rated 'Least Concern' in the bioregion): estimated as 400 m² in area (but imprecise due to intergradation with the Grassy Forest), approximately equal proportions in ecological condition ratings B and C (good and fair). The composition of the Herb-rich Foothill Forest is best indicated by the description for Site 12 (p. 58), where this EVC is more expansive and the understorey not as modified.

Plant species

As listed below, the author observed 59 indigenous plant species on 6th November 2002 plus *Cynoglossum suaveolens* on 16th July 2004. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia melanoxydon</i>		<i>Goodenia ovata</i>
E	<i>Acacia stricta</i>	V	<i>Hydrocotyle hirta</i>
V	<i>Acrotriche prostrata</i>	E	<i>Indigofera australis</i>
	<i>Acrotriche serrulata</i>	V	<i>Lepidosperma laterale</i>
V	<i>Adiantum aethiopicum</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
C	<i>Arthropodium ?milleflorum</i>		<i>Lomandra longifolia</i>
	<i>Arthropodium strictum</i>		<i>Microlaena stipoides</i>
C	<i>Asperula conferta</i>	E	<i>Olearia myrsinoides</i>
	<i>Billardiera mutabilis</i>	V	<i>Opercularia varia</i>
	<i>Burchardia umbellata</i>		<i>Oxalis exilis/perennans</i>
	<i>Bursaria spinosa</i>		<i>Pandorea pandorana</i>
	<i>Carex breviculmis</i>	V	<i>Pimelea humilis</i>
	<i>Cassinia aculeata</i>	V	<i>Plantago varia</i>
V	<i>Clematis aristata</i>	V	<i>Platylobium formosum</i>
E	<i>Cynoglossum suaveolens</i>		<i>Poa ensiformis</i>
E	<i>Desmodium gunnii</i>		<i>Poranthera microphylla</i>
	<i>Deyeuxia quadriseta</i>		<i>Pteridium esculentum</i>
	<i>Dianella admixta</i>	C	<i>Pultenaea scabra</i>
V	<i>Dianella longifolia</i> s.l.	E	<i>Ranunculus lappaceus</i>
V	<i>Dianella tasmanica</i>	E	<i>Rubus parvifolius</i>
V	<i>Drosera peltata</i> subsp. <i>auriculata</i>		<i>Rytidosperma pallidum</i>
V	<i>Epacris impressa</i>		<i>Senecio hispidulus</i>
V	<i>Eucalyptus cypellocarpa</i>	E	<i>Senecio prenanthoides</i>
	<i>Eucalyptus goniocalyx</i>	E	<i>Stackhousia monogyna</i>
E	<i>Eucalyptus macrorhyncha</i>	E	<i>Stylidium armeria/graminifolium</i>
V	<i>Exocarpos cupressiformis</i>	E	<i>Tetrateca ciliata</i>
E	<i>Exocarpos strictus</i>		<i>Themeda triandra</i>
V	<i>Geranium potentilloides</i>	E	<i>Veronica calycina</i>
V	<i>Glycine clandestina</i>	E	<i>Viola hederacea</i>
	<i>Gonocarpus tetragynus</i>	E	<i>Wahlenbergia stricta</i>

Introduced Species

<i>Acacia longifolia</i> subsp. <i>longifolia</i>	<i>Ehrharta erecta</i>	<i>Plantago lanceolata</i>
<i>Agapanthus praecox</i>	<i>Erica lusitanica</i>	<i>Prunus cerasifera</i>
<i>Anthoxanthum odoratum</i>	<i>Genista linifolia</i>	<i>Rubus anglocandicans</i>
<i>Asparagus scandens</i>	<i>Genista monspessulana</i>	<i>Vicia disperma</i>
<i>Billardiera heterophylla</i>	<i>Hypochoeris radicata</i>	<i>Vicia sativa</i>
<i>Briza maxima</i>	<i>Ixia polystachya</i>	<i>Watsonia borbonica</i>
<i>Cotoneaster glaucophyllus</i>	<i>Oxalis pes-caprae</i>	
<i>Cytisus scoparius</i>	<i>Pittosporum undulatum</i>	

Notes about some of the locally threatened plant species

Arthropodium ?milleflorum (a vanilla-lily) – There are few individuals in the reserve, but many more in the adjoining Site 12.

Asperula conferta (Common Woodruff). Only one plant found.

Cynoglossum suaveolens (Sweet Hound's-tongue). A small group.

Desmodium gunnii (Southern Tick-trefoil). Secure; numbers not recorded.

Pultenaea scabra (Rough Bush-pea). A dominant species in the shrub layer.

Ranunculus lappaceus (Australian Buttercup). Two plants found.

Tetrateca ciliata (Pink-bells). Secure; numbers not recorded.

Veronica calycina (Hairy Speedwell). Recorded as scant, but no numbers recorded.

Wahlenbergia stricta (Tall Bluebell). Numbers not recorded.

Fauna of special significance

A Restless Flycatcher was observed during the fieldwork. This species is listed by the Land Conservation Council (1991) as uncommon in the 'Melbourne Area District 2', which extends eastwards slightly beyond Walhalla.

Local resident, Mr Don Hartland, reports having seen Koalas, Short-beaked Echidnas and Tawny Frogmouths periodically until shortly before he spoke to the author in November 2002. He also reported having seen a White-lipped Snake (a regionally uncommon species) around 1995.

Because of the proximity to the Dandenong Ranges National Park, the site is bound to be regularly visited by various rare or threatened fauna from the park; e.g. Powerful Owl. The site provides a small extension to the native habitat available for such species.

Fauna habitat features

- Native vegetation as intact as on this site provides habitat for a variety of native fauna;
- There are tree hollows that provide suitable roosting or nesting sites for certain fauna.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Vegetation Type and Condition

Grassy Forest is a regionally vulnerable EVC and the representation of it in the reserve is in fair to good ecological condition. No habitat score has been determined, but it is extremely likely that a score of at least 0.3 would be obtained. It would then follow from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that the Grassy Forest vegetation is of at least High conservation significance. This, in turn, gives the site **State** significance under criterion 3.2.3 of Amos (2004).

Rare or Threatened Flora

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

The Powerful Owl is a vulnerable species in Victoria. It is known to frequent the local neighbourhood and nearby parts of the Dandenong ranges National Park, and the vegetation in the site seems suitable as habitat for Powerful Owls. Criterion 3.1.3 confers **Regional** significance upon sites such as this.

Threats

- Invasion by environmental weeds as listed below, with asterisks marking those that are controlled under the *Catchment and Land Protection Act 1994*:
 - Very serious: Sweet Vernal-grass (*Anthoxanthum odoratum*), English Broom* (*Cytisus scoparius*);
 - Serious: Bridal Creeper* (*Asparagus scandens*), Large Quaking-grass (*Briza maxima*), Montpellier Broom* (*Genista monspessulana*); and
 - Moderate: Cotoneaster (*Cotoneaster glaucophyllus*), Panic Veldt-grass (*Ehrharta erecta*), Spanish Heath* (*Erica lusitanica*), Flax-leafed Broom* (*Genista linifolia*), Cat's Ear (*Hypochoeris radicata*), Variable Ixia (*Ixia polystachya*), Soursob (*Oxalis pes-caprae*), Sweet Pittosporum (*Pittosporum undulatum*), Ribwort (*Plantago lanceolata*), Blackberry* (*Rubus discolor*), Bluebell Creeper (*Sollya heterophylla*), vetches (*Vicia disperma* and *V. sativa*) and Rosy Watsonia (*Watsonia borbonica*).
- Damage to the native vegetation by use of parts of the reserve for domestic purposes such as a woodheap, parking, composting and gardening.

Management issues

- A persistent effort over several years will be required to get the weeds under control and prevent reinfestation. Brooms, in particular, are expected to keep germinating from a large bank of soil-stored seed. Grass weeds may require spraying with grass-specific herbicide.
- Knox City Council has been liaising with South East Water about complementary weed control work on the reserve and the adjoining water tank land (Site 12);
- The site's fire risk needs to be managed, and this can be done harmoniously with proper care of the native vegetation. Burning is not recommended because it would stimulate broom seeds to germinate and because the fire would pose unnecessary risk and nuisance to neighbours. A preferable alternative would be annual cutting and removal of fine ground fuel each year, around Christmas or New Year. No firewood should be kept on the reserve;

- The assistance of neighbours will be needed to prevent Council's good management efforts being overridden by activities such as gardening in the reserve.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the threatened EVC, the significant plant species and the quality of much of the site's native vegetation;
- The reserve is zoned 'Low Density Residential Zone', despite it being a Council reserve;
- The site is protected under the existing Vegetation Protection Overlay Schedule 1 and Significant Landscape Overlay Schedule 2 of the Knox Planning Scheme;
- The site was included in 'Composite Area A' by Water Ecoscience (1998) without any substantial assessment;
- The adjoining private property to the north has just been sold, offering an opportunity for Council to approach the new owners and foster greater respect for the reserve than previous owners have shown.

Information sources used in this assessment

- A site survey undertaken during this study by Dr Lorimer on 6/11/02 using this study's standard procedures discussed in Section 2.4 of Volume 1. This included a description of the vegetation composition, compilation of lists of indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats and management issues;
- A brief re-inspection of the site by Dr Lorimer on 16/7/04, primarily to see if EVCs could be better delineated (but in vain);
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 12. Bayview Crescent Water Tank, The Basin

South East Water property with a large water tank, ancillary equipment, a plantation of 'Australian natives' and bushland, adjoining the Dandenong Ranges National Park. Melway ref. 65 G9.

Site Significance Level: *State*

- The native vegetation grades between three Ecological Vegetation Classes, one of which (Grassy Forest) is regionally Vulnerable;
- There are seven plant species that are threatened in Knox, two of which are also rare throughout the Melbourne area;
- The site represents a small extension to the flora and fauna habitat of the abutting Chandlers Hill block of the Dandenong Ranges National Park;
- A range of fauna found in the national park, including rare species, are likely to periodically use the reserve;
- The reserve has rich birdlife.

Aerial photograph: See page 53, which covers this site and the adjoining Council reserve (Site 11).

Boundaries

This 9,005 m² site comprises the whole parcel of land outlined in red and marked 'Site 12' on the aerial photograph on p. 53. According to Land Victoria, the site comprises three separate properties (indicated by the yellow lines on the aerial photograph) that are subdivided into a total of seven parcels (Lots 235-6 and Lots 237-9 of LP6712, and TP193102-3).

Land use & tenure: The principal use is for water storage. The land is zoned 'Public Park and Recreation Zone' (PPRZ) but a tall fence prevents public access to most of the site.

Note: Permission was not obtained to enter this site, so the inspection was done from outside the fence with the aid of aerial photographs. Some native ground flora could have gone undetected.

Site description

The site and the abutting Site 11 are on the northern flank of a gully that drains westward from the northern slopes of Chandlers Hill. It has a steep southwesterly slope of typically 30% and an elevation range of approximately 250-285 m. There has been extensive excavation to provide vehicle access and a platform for the tank.

The soil is stony clay derived from the Kalorama rhyodacite formation. On the upper (northeastern) part of the site, the steepness and the soil composition result in rapid drainage, and the soil becomes very dry during the first quarter of each year. The lowest parts of the site (along the southern boundary) are topographically sheltered and receive runoff water from, thereby retaining higher soil moisture.

There has been extensive planting of 'Australian native' species along Bayview Crescent and northeast of the tank. Elsewhere, the types of native vegetation can be described the same as for Site 11, but there have been different histories of clearing between the sites. Excavation has been much more extensive in the water tank property.

The native vegetation's ecological condition is good (rating B) in the southwestern corner, and fair (rating C) elsewhere.

A neighbour to the west has planted ornamentals within the site recently. Neighbours also use the western edge of the site, just outside the fence, as a walkway between Bayview Av and the Dandenong Ranges National Park to the south.

Relationship to other land

See the discussion for Site 11 on p. 54.

Bioregion: Highlands Southern Fall

Habitat types

Grassy Dry Forest (EVC 22, conservation status rated 'Least Concern' in the bioregion): estimated as 1,000 m² in fair ecological condition (rating C). The composition is effectively the same as for Site 11.

Grassy Forest (EVC 128, **regionally Vulnerable**): estimated as 1,400 m² in area (but imprecise due to intergradation with the other EVCs), all in fair ecological condition (rating C). The composition is effectively the same as for Site 11, where the Grassy Forest is more expansive and less modified.

Herb-rich Foothill Forest (EVC 23, conservation status rated 'Least Concern' in the bioregion): estimated as 2,500 m² in area (but imprecise due to intergradation with the Grassy Forest), with 900 m² in good ecological condition (rating B) and 1,600 m² in fair ecological (rating C).

Dominant canopy trees: *Eucalyptus obliqua*, *E. goniocalyx*, *E. macrorhyncha* and *E. radiata*. *E. cypellocarpa* is sparingly present.

Dominant lower trees: *Exocarpos cupressiformis*, *Acacia melanoxylon* and *Acacia dealbata*.

Shrubs: *Coprosma quadrifida*, *Olearia lirata* and *Polyscias sambucifolia* are characteristically present, along with *Cassinia aculeata* and *Pultenaea scabra*.

Vines: *Pandorea pandorana* is abundant. There is less coverage of *Billardiera mutabilis*, *Clematis aristata*, *Glycine clandestina* and *Rubus parvifolius*.

Ferns: *Adiantum aethiopicum* forms large patches, while *Calochlaena dubia* and *Pteridium esculentum* form smaller patches. *Blechnum cartilagineum* is scarce within the site, but extends into the adjoining national park.

Ground flora: Dominated by *Tetrarrhena juncea* and *Poa ensiformis*. Characteristically, the ground flora includes *Acaena novae-zelandiae*, *Austrocynoglossum latifolium*, *Desmodium gunnii*, *Galium gaudichaudii*, *Platylobium formosum*, *Poa tenera* and *Tetradlea ciliata*.

Plant species

As listed below, 68 indigenous plant species were recorded on 6th November 2002, plus *Cymbonotus preissianus* on 16th July 2004. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, the two species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Acacia dealbata</i>	V	<i>Geranium potentilloides</i>
V	<i>Acacia melanoxylon</i>	V	<i>Glycine clandestina</i>
E	<i>Acacia stricta</i>		<i>Gonocarpus tetragynus</i>
V	<i>Acaena ?echinata</i>		<i>Goodenia ovata</i>
	<i>Acaena novae-zelandiae</i>	V	<i>Hydrocotyle hirta</i>
V	<i>Acrotriche prostrata</i>	E	<i>Indigofera australis</i>
V	<i>Adiantum aethiopicum</i>		<i>Kunzea ericoides</i> spp. agg.
C	<i>Arthropodium ?milleflorum</i>	E	<i>Lagenophora stipitata</i>
	<i>Arthropodium strictum</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
C	<i>Asperula conferta</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
E	<i>Austrocynoglossum latifolium</i>		<i>Lomandra longifolia</i>
	<i>Billardiera mutabilis</i>		<i>Microlaena stipoides</i>
E	<i>Blechnum cartilagineum</i>	V	<i>Olearia lirata</i>
	<i>Burchardia umbellata</i>	E	<i>Olearia myrsinoides</i>
	<i>Bursaria spinosa</i>		<i>Oxalis exilis/perennans</i>
V	<i>Calochlaena dubia</i>		<i>Pandorea pandorana</i>
	<i>Carex breviculmis</i>	V	<i>Platylobium formosum</i>
	<i>Cassinia aculeata</i>		<i>Poa ensiformis</i>
V	<i>Clematis aristata</i>		<i>Poa morrisii</i>
V	<i>Coprosma quadrifida</i>	E	<i>Poa tenera</i>
C	<i>Cymbonotus preissianus</i>	E	<i>Polyscias sambucifolia</i>
E	<i>Desmodium gunnii</i>		<i>Poranthera microphylla</i>
	<i>Deyeuxia quadriseta</i>		<i>Pteridium esculentum</i>
V	<i>Dianella longifolia</i> s.l.	C	<i>Pterostylis alpina</i>
V	<i>Dianella tasmanica</i>	C	<i>Pultenaea scabra</i>
	<i>Dichondra repens</i>	E	<i>Rubus parvifolius</i>
V	<i>Epacris impressa</i>		<i>Rytidosperma pallidum</i>
V	<i>Eucalyptus cypellocarpa</i>		<i>Rytidosperma ?penicillatum</i>
	<i>Eucalyptus goniocalyx</i>		<i>Senecio glomeratus</i>
E	<i>Eucalyptus macrorhyncha</i>	E	<i>Stylidium armeria/graminifolium</i>
V	<i>Eucalyptus obliqua</i>		<i>Tetrarrhena juncea</i>
E	<i>Eucalyptus radiata</i>	E	<i>Tetradlea ciliata</i>
V	<i>Exocarpos cupressiformis</i>		<i>Themeda triandra</i>
	<i>Gahnia radula</i>	E	<i>Viola hederacea</i>
E	<i>Galium gaudichaudii</i>		

Introduced Species

<i>Anthoxanthum odoratum</i>	<i>Genista linifolia</i>	<i>Pittosporum undulatum</i>
<i>Asparagus scandens</i>	<i>Genista monspessulana</i>	<i>Plantago lanceolata</i>
<i>Centaurium erythraea</i>	<i>Hedera helix</i>	<i>Prunus cerasifera</i>
<i>Cotoneaster glaucophyllus</i>	<i>Holcus lanatus</i>	<i>Rubus anglocandicans</i>
<i>Cotoneaster simonsii</i>	<i>Hypochoeris radicata</i>	<i>Vicia disperma</i>
<i>Cytisus scoparius</i>	<i>Ixia polystachya</i>	<i>Vicia sativa</i>
<i>Dactylis glomerata</i>	<i>Leontodon taraxacoides</i>	
<i>Erica lusitanica</i>	<i>Pinus radiata</i>	

Notes concerning some of the locally threatened plant species

Arthropodium ?milleflorum. Not able to be precisely identified due to absence of any reproductive organs, but believed to be a species that is Critically Endangered in Knox. There are substantial numbers near the site's southwestern corner.

Asperula conferta (Common Woodruff). Only one plant could be found from outside the fence.

Austrocynoglossum latifolium (Forest Hound's-tongue). 2 or 3 in a drain near the site's southeastern corner.

Blechnum cartilagineum (Gristle Fern). Scarce within the site, but part of a secure population that extends into the national park.

Cymbonotus preissianus (Austral Bear's-ear) – one plant found in 2004, the only one ever recorded in Knox.

Desmodium gunnii (Southern Tick-trefoil). Substantial numbers, also extending into the adjoining national park.

Galium gaudichaudii (Rough Bedstraw). Apparently scarce when viewed from outside the fence.

Lagenophora stipitata (Common Lagenophora). Apparently scarce when viewed from outside the fence.

Pterostylis alpina (Mountain Greenhood). Only one individual seen, but probably more would be seen in season from inside the site's fence.

Pultenaea scabra (Rough Bush-pea). A dominant species in the shrub layer.

Tetratea ciliata (Pink-bells). Secure; numbers not recorded.

Fauna of special significance

A Restless Flycatcher was observed during the fieldwork. This species is listed by the Land Conservation Council (1991) as uncommon in the 'Melbourne Area District 2', which extends eastwards slightly beyond Walhalla.

Local resident, Mr Don Hartland, reports having seen Koalas, Short-beaked Echidnas and Tawny Frogmouths periodically until shortly before he spoke to the author in November 2002. He also reported having seen a White-lipped Snake (a regionally uncommon species) around 1995.

Because the site abuts the Dandenong Ranges National Park, it is bound to be regularly visited by various rare or threatened fauna from the park; e.g. Powerful Owl. The site provides a small extension to the native habitat available for such species.

Fauna habitat features

- Native vegetation as intact as on this site provides habitat for a variety of native fauna;
- There are tree hollows that provide suitable roosting or nesting sites for certain fauna;
- Logs provide the type of cover required by ground-dwelling fauna.

Significance ratings

Vegetation Type and Condition

The Grassy Forest gives the site **State** significance on the same basis as Site 11.

Rare or Threatened Flora

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

The proximity to known habitat of Powerful Owls, and the suitability of habitat on this property, give the site **Regional** significance on the same basis as Site 11.

Threats

- Invasion by environmental weeds as listed below, with asterisks marking those that are controlled under the *Catchment and Land Protection Act 1994*:
 - Very serious: English Broom* (*Cytisus scoparius*), Montpellier Broom* (*Genista monspessulana*);
 - Serious: Sweet Vernal-grass (*Anthoxanthum odoratum*), Bridal Creeper* (*Asparagus scandens*); and

- Moderate: Cotoneaster (*Cotoneaster glaucophyllus* and *C. divaricatus*), Cocksfoot (*Dactylis glomerata*), Spanish Heath* (*Erica lusitanica*), Flax-leaved Broom* (*Genista linifolia*), Ivy (*Hedera helix*), Yorkshire Fog (*Holcus lanatus*), Cat's Ear (*Hypochoeris radicata*), Variable Ixia (*Ixia polystachya*), Monterey Pine (*Pinus radiata*), Sweet Pittosporum (*Pittosporum undulatum*), Ribwort (*Plantago lanceolata*), Blackberry* (*Rubus discolor*) and vetches (*Vicia disperma* and *V. sativa*).

Management issues

- A persistent effort over several years will be required to get the weeds under control and prevent reinfestation. Brooms, in particular, are expected to keep germinating from a large bank of soil-stored seed.
- South East Water has been liaising with Knox City Council about complementary weed control work on this site and the adjoining Council reserve (Site 11);
- The site's fire risk needs to be managed, and this can be done harmoniously with proper care of the native vegetation. Burning would not be desirable because it would stimulate broom seeds to germinate and pose unnecessary risk and nuisance to neighbours. A much preferable alternative would be annual cutting and removal of fine ground fuel each year, around Christmas or New Year.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the threatened EVC, the significant plant species and the effective extension of habitat that the site provides to the Dandenong Ranges National Park;
- The land is zoned 'Public Park and Recreation Zone' even though a tall fence prevents public access to most of it;
- The site is protected under the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, and partly by Significant Landscape Overlay Schedule 2;
- The site was included in 'Composite Area A' by Water Ecoscience (1998) without any substantial assessment;
- Cooperation should be sought from a neighbour to stop planting ornamentals within the site.

Information sources used in this assessment

- A site survey undertaken during this study by Dr Lorimer on 6/11/02 using this study's standard procedures discussed in Section 2.4 of Volume 1. This included a description of the vegetation composition, compilation of lists of indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats and management issues;
- A brief re-inspection of the site by Dr Lorimer on 16/7/04, primarily to see if EVCs could be better delineated (but in vain);
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 12a. Mortiboy Reserve, The Basin

Council reserve with bushland being encouraged to recover from decades of suppression by pines. Melway ref. 65 F8.

Site Significance Level: *State*

- Contains an example of vegetation intermediate between two regionally Endangered Ecological Vegetation Classes. Grassy Forest and Valley Heathy Forest;
- The tree cover and grassy ground layer represent good habitat for some native fauna.



Boundaries

The site is the whole of Mortiboy Reserve and the strip between the reserve and the Stuart St footpath. It measures 0.35 ha.

Land use & tenure: Bushland reserve, zoned Public Park and Recreation Zone (PPRZ).

Site description

This small reserve's native vegetation underwent substantial modification from a natural state over most of the twentieth century but has been steadily recovering over recent years. During private ownership from the 1920s to the 1970s, the land was partly cleared and used (in part) as a venue for the 6th Malvern scout troop. A bunkhouse was constructed and pines were planted. The bunkhouse was long since removed and the pines were culled by Council in 2008 to allow regeneration of native vegetation. Council has also begun planting of indigenous species to assist natural regeneration.

A surprising number of indigenous plant species remain. The presence of many Hyacinth Orchids (*Dipodium roseum*) in the western half of the block suggests that there has been little if any excavation of that area over the past century. Council's regenerative work is likely to stimulate a significant increase in the number of naturally occurring indigenous plant species over coming years. Planting is adding further species. Ideally, records will be retained to show which species have been planted.

The land slopes gently to the west-northwest at a gradient of 1:14, with an average elevation of 75 metres (AHD). The soil is clay loam derived from the underlying rhyodacite of the Mount Evelyn rhyodacite formation. This puts the reserve within the Highlands - Southern Fall bioregion, but quaternary soils of the Gippsland Plain bioregion are less than 100 m away. Consequently, the reserve's vegetation is best classified as the form of Grassy Forest that occurs in the Highlands - Southern Fall bioregion but some plant species present are suggestive of Valley Heathy Forest from the Gippsland Plain.

Relationship to other land

The site lies within a treed neighbourhood with a substantial cover of remnant eucalypts and occasional indigenous understorey plants. Consequently, substantial numbers of native birds and insects move through the neighbourhood, facilitating access to Mortiboy Reserve. Most indigenous birds, bats and insects that visit the site would spend part of their lives in the more substantial habitat of the Dandenong Ranges National Park, which is just under 600 m away. Movement of fauna between these sites and other nearby bushland (e.g. The Basin Scout Hall Reserve and St Bernadette's Primary School Sanctuary) helps to maintain the native vegetation of Mortiboy Reserve by pollination and maintaining ecological balance (e.g. control of insect pests). In recognition of the importance of fauna movements, the neighbourhood within which Mortiboy Reserve is located forms part of Site 99 (Dandenong Ranges Buffer).

Bioregion: Highlands Southern Fall, within 100 m of the Gippsland Plain to the west.

Habitat types

Grassy Forest (EVC 128, regionally **Vulnerable**), tending toward Valley Heathy Forest (EVC 12): 3,500 m², estimated to comprise 100 m² in good ecological condition (rating B), 3,000 m² in fair ecological condition (rating C) and 400 m² in poor ecological condition (rating D).

Canopy trees: *Eucalyptus obliqua* is clearly dominant, with fewer *E. macrorhyncha* and *E. radiata*, and just three *E. goniocalyx*; approximately 20 m tall. Mature *Pinus radiata* trees and a cypress grow close to the abutting nature strips.

Lower trees: The lower tree layer is very sparse, attributable to past vegetation removal. There are some *Acacia melanoxylon* and *Exocarpos cupressiformis* would undoubtedly have been present previously.

Shrubs: Patchy and reduced in diversity due to past land use and the effects of pines (most of which were removed in 2008). Dominated by *Bursaria spinosa*. Other shrubs include *Acacia myrtifolia*, *Cassinia arcuata*, *C. aculeata*, *C. longifolia*, *C. trinerva*, *Dillwynia cinerascens*, *Platylobium obtusangulum*, *Polyscias sambucifolia*, *Prostanthera lasianthos* and *Solanum laciniatum*.

Vines: The light twiner, *Billardiera mutabilis*, is fairly abundant and there are two *Clematis aristata*.

Ferns: Absent.

Ground flora: Variable, with the western half richer and more natural than the eastern half. The western half is densely grassy and dominated by *Rytidosperma racemosum*. *Rytidosperma tenuius* is abundant and there are substantial numbers of *Rytidosperma pilosum*, *Carex breviculmis*, *Dichelachne rara*, *Deyeuxia quadriseta*, *Gahnia radula*, *Rytidosperma pallidum*, *Lomandra filiformis* subsp. *coriacea*, *Microlaena stipoides*, *Poa morrisii*, *Tetrarrhena juncea* and *Themeda triandra*. Between the grasses are substantial numbers of *Acrotriche prostrata*, *Arthropodium strictum*, *Dipodium roseum*, *Opercularia ovata*, *O. varia*, *Oxalis perennans* and *Senecio quadridentatus*. The following species are less abundant but useful ecological indicators: *Austrostipa pubinodis*, *Caesia parviflora*, *Helichrysum scorpioides*, *Lagenophora gracilis*, *Lepidosperma gunnii* and *Stylidium armeria*.

Plant species

55 naturally occurring indigenous plant species were found by Dr Lorimer on the site on 8/12/08 and are listed below. Other species are likely to appear in regeneration following the 2008 removal of pines. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Cassinia trinerva* (of which there are two in the reserve) is rare throughout the Melbourne area.

Risk	Wild Indigenous Species	Risk	Wild Indigenous Species
V	<i>Acacia melanoxylon</i>		<i>Deyeuxia quadriseta</i>
E	<i>Acacia myrtifolia</i> (wild and planted)		<i>Dianella admixta</i>
V	<i>Acrotriche prostrata</i>	V	<i>Dianella longifolia</i> s.l. (planted)
	<i>Arthropodium strictum</i>	V	<i>Dianella tasmanica</i>
	<i>Austrostipa pubinodis</i>		<i>Dichelachne rara</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>		<i>Dichondra repens</i>
	<i>Billardiera mutabilis</i>	V	<i>Dillwynia cinerascens</i>
	<i>Bursaria spinosa</i>	E	<i>Dipodium roseum</i>
V	<i>Caesia parviflora</i>		<i>Elymus scaber</i>
	<i>Carex breviculmis</i>		<i>Eucalyptus goniocalyx</i>
	<i>Cassinia aculeata</i>	E	<i>Eucalyptus macrorhyncha</i>
	<i>Cassinia arcuata</i>	V	<i>Eucalyptus obliqua</i>
V	<i>Cassinia longifolia</i>	E	<i>Eucalyptus radiata</i>
C	<i>Cassinia trinerva</i> (1 of only 3 sites in Knox)	V	<i>Euchiton collinus</i>
V	<i>Clematis aristata</i>		<i>Gahnia radula</i>

Risk	Wild Indigenous Species	Risk	Wild Indigenous Species
E	<i>Gahnia sieberiana</i> (planted)	E	<i>Prostanthera lasianthos</i>
V	<i>Helichrysum scorpioides</i>	V	<i>Pultenaea gunnii</i>
V	<i>Lagenophora gracilis</i>		<i>Rytidosperma pallidum</i>
	<i>Lepidosperma gunnii</i>		<i>Rytidosperma penicillatum</i>
	<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	V	<i>Rytidosperma pilosum</i>
	<i>Lomandra filiformis</i> subsp. <i>filiformis</i>		<i>Rytidosperma racemosum</i>
	<i>Lomandra longifolia</i> (wild and planted)		<i>Rytidosperma tenuius</i>
	<i>Microlaena stipoides</i>		<i>Senecio hispidulus</i>
V	<i>Opercularia ovata</i>	E	<i>Senecio prenanthoides</i>
V	<i>Opercularia varia</i>		<i>Senecio quadridentatus</i>
	<i>Oxalis exilis/perennans</i>	V	<i>Solanum laciniatum</i>
V	<i>Platylobium formosum</i>	E	<i>Stylidium armeria/graminifolium</i>
	<i>Poa ensiformis</i> (planted)		<i>Tetrarrhena juncea</i>
	<i>Poa morrisii</i>		<i>Themeda triandra</i>
E	<i>Polyscias sambucifolia</i>		
Introduced Species			
	<i>Agrostis capillaris</i>		<i>Oxalis incarnata</i>
	<i>Anthoxanthum odoratum</i>		<i>Pinus radiata</i>
	<i>Briza maxima</i>		<i>Pittosporum undulatum</i>
	<i>Bromus catharticus</i>		<i>Plantago lanceolata</i>
	<i>Chlorophytum ?comosum</i>		<i>Sonchus oleraceus</i>
	<i>Cotoneaster pannosus</i>		<i>Vulpia bromoides</i>
	<i>Cupressus ?macrocarpa</i> (planted)		
	<i>Cynosurus echinatus</i>		
	<i>Dactylis glomerata</i>		
	<i>Ehrharta erecta</i>		
	<i>Ehrharta longiflora</i>		
	<i>Fraxinus angustifolia</i>		
	<i>Genista monspessulana</i>		
	<i>Hypochoeris radicata</i>		

Fauna habitat features

- The mature eucalypts and scattered shrubs would attract a modest diversity of forest birds, as well as the Southern Brown Tree Frog and probably bats;
- The ground layer of dense grasses in much of the site is excellent habitat for grass-reliant butterflies and darts (some of which were observed during the site inspection);
- The abundance of *Bursaria spinosa* would provide summer nectar for butterflies.

Significance ratings

Regionally Threatened Ecological Vegetation Class

According to the criteria of 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), remnants of a regionally vulnerable EVC (including Grassy Forest) have a conservation significance rating of Medium to Very High, depending on their habitat score (Volume 1, Section 2.4.4). Even a very cursory assessment of the native vegetation at Mortiboy Reserve shows it to have a habitat score above 0.3, which puts the conservation significance in the High or Very High category under the Framework. This gives the whole site **State** significance under criterion 3.2.3 of Amos (2004).

Rare or Threatened Flora

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Invasion by the environmental weeds listed below:
 - Serious: Sweet Vernal-grass (*Anthoxanthum odoratum*), Cat's Ear (*Hypochoeris radicata*), Panic Veldt-grass (*Ehrharta erecta*), Monterey Pine (*Pinus radiata*), Ribwort (*Plantago lanceolata*);
 - Moderate: Brown-top Bent (*Agrostis capillaris*), Prairie Grass (*Bromus catharticus*), Large Quaking-grass (*Briza maxima*), Cotoneaster (*Cotoneaster pannosus*), Dog's-tail grass (*Cynosurus echinatus*), Annual Veldt-grass (*Ehrharta longiflora*), Cocksfoot (*Dactylis glomerata*), Montpellier Broom (*Genista monspessulana*), Desert Ash (*Fraxinus angustifolia*), Sweet Pittosporum (*Pittosporum undulatum*), Pale Wood-sorrel (*Oxalis incarnata*) and Squirrel-tail Fescue (*Vulpia bromoides*);
- Loss or decline of plant species that are present in dangerously small numbers, due to inbreeding, poor reproductive success or vulnerability to localised chance events.

Management issues

- Council has been very actively and successfully rehabilitating the reserve's native vegetation by removal of pines, removal of smaller weeds and planting in areas left bare following weed removal.

Administration matters

- This reserve is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the endangered EVC and the consequent State significance;
- The reserve's vegetation is not protected under any existing planning overlay;
- The reserve is zoned Public Park and Recreation Zone (PPRZ).

Information sources used in this assessment

- A site survey undertaken during this study by Dr Lorimer for 1 hour on 8/12/08 using this study's standard procedures discussed in Section 2.4 of Volume 1. This included a description of the vegetation composition, compilation of a list of indigenous and introduced plant species, incidental fauna observations and checks for fauna habitat, ecological threats and management issues;
- Aerial photography from February 2007;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government;
- Chapter 12 of the online publication, *'History of The Basin'*, by Rick Coxhill, dated 18th November 2007.

Site 13. The Basin Scout Hall Reserve

Land surrounding the Scout Hall at the corner of Forest Rd and Church St, The Basin. Melway ref. 65 G8.

Site Significance Level: *Regional*

- The vegetation belongs to the regionally vulnerable Ecological Vegetation Class, Grassy Forest, but the remnant is rather small and substantially modified;
- The site is part of a network of sites of varying sizes that effectively expand the habitat for flora and fauna in the Dandenong Ranges National Park, which is good for the organisms and good for the amenity of the neighbourhood.

Aerial photograph and plan: See page 69, which covers this site and Site 14.

Boundaries

The site comprises Lots 17 and 18 of LP8116, which are jointly occupied by the scout hall (2,405 m²).

Land use & tenure: Council reserve, occupied by the scout hall. The site and most of the other land in the triangle north of Church St are zoned Public Park and Recreation Zone.

Site description

The site is located in the commercial and civic centre of The Basin. It includes a scout hall and a small, unsurfaced car park. It is on gently sloping land near the base of the north-facing spur of Chandlers Hill in the Dandenong Ranges, at elevations of 160-166 m. The soil comprises loam over clay subsoil, derived from decay of the underlying Mt Evelyn rhyodacite formation (part of the Mt Dandenong volcanic flows).

The land supports a fair to good cover of remnant trees, with patchy understorey whose condition varies according to the history of clearing, mowing etc. and consequent weed infestations. A few indigenous shrubs have been planted along the northern boundary.

Because of this site and many other properties like it in the neighbourhood (particularly within Site 14), the neighbourhood enjoys a very rich birdlife for an urban area, as well as other native fauna. This adds to the amenity of the area.

The site was included within Site 139 in the report of sites of significance by Water Ecoscience (1998), based on its 'natural landscape values'.

Relationship to other land

Residential properties in the surrounding area support a fair to good cover of remnant trees and some indigenous understorey vegetation, particularly in Site 14. There are also native trees in the civic area just north of the scout hall and the adjoining fire station. Most nearby roadsides, including Mountain Hwy, also retain some native tree cover and occasional patches of native understorey. The density of remnant trees in the area no doubt facilitates movement of native birds, insects and pollen between the scout hall reserve and the larger nearby areas of habitat, including the Dandenong Ranges National Park (600m away), the forested land adjoining the park (Site 18) and Wicks Reserve (Site 15, 300m to the east). This is evidenced by the abundance of Australian King-parrots, which are regarded as an uncommon species in the region generally (Land Conservation Council 1991).

Bioregion: Highlands Southern Fall

Habitat type

Grassy Forest (EVC 128, **regionally Vulnerable**), approximately 750 m² in fair ecological condition (rating C) and 750 m² in poor ecological condition (rating D), plus approximately 500 m² of eucalypt canopy extending over adjoining nature strips and roads. 25 indigenous plant species recorded, and likely to support additional seasonal species.

Canopy trees: A fair to good cover of *Eucalyptus macrorhyncha* up to 30m tall (mainly 50-80 years old), with some *E. goniocalyx* and *E. obliqua*. Moderate foliage dieback is apparent.

Lower trees: Includes a number of specimens of *Exocarpos cupressiformis*, with some *Acacia melanoxylon*.

Shrubs: Sparse shrub layer, including some *Acacia pycnantha*, *Bursaria spinosa* and *Cassinia aculeata*.

Vines: Absent, except for some *Billardiera mutabilis*.

Ferns: Scarce *Pteridium esculentum*.

Ground flora: Dominated by a good cover of indigenous grasses in the least disturbed areas, particularly *Rytidosperma pallidum* and *Rytidosperma penicillatum*. Orchids and lilies potentially occur in some locations.

Plant species

The following plant species were observed by Mr Rik Brown in April 2002. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. At least ten additional naturally occurring indigenous species would be expected in other seasons.

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Acacia dealbata</i>	V	<i>Exocarpos cupressiformis</i>
V	<i>Acacia melanoxylon</i>		<i>Gonocarpus tetragynus</i>
E	<i>Acacia myrtifolia</i>		<i>Leptospermum continentale</i>
E	<i>Acacia pycnantha</i>		<i>Lomandra filiformis</i>
V	<i>Acrotriche prostrata</i>		<i>Microlaena stipoides</i>
	<i>Austrostipa rudis</i>	C	<i>Olearia ramulosa</i> (probably planted)
	<i>Billardiera mutabilis</i>	V	<i>Platylobium formosum</i>
	<i>Bursaria spinosa</i>		<i>Poa morrisii</i>
	<i>Cassinia aculeata</i>		<i>Pteridium esculentum</i>
	<i>Dianella admixta</i>	V	<i>Pultenaea gunnii</i>
	<i>Eucalyptus goniocalyx</i>		<i>Rytidosperma pallidum</i>
E	<i>Eucalyptus macrorhyncha</i>		<i>Rytidosperma penicillatum</i>
V	<i>Eucalyptus obliqua</i>		<i>Themeda triandra</i>
Introduced Species			
	<i>Acacia elata</i>		<i>Crocasmia × crocosmiiflora</i>
	<i>Agapanthus praecox</i>		<i>Cytisus scoparius</i>
	<i>Briza maxima</i>		<i>Genista monspessulana</i>
	<i>Cotoneaster pannosus</i>		<i>Pittosporum undulatum</i>
			<i>Prunus cerasifera</i>
			<i>Tradescantia fluminensis</i>

Fauna of special significance

The regionally uncommon Australian King-parrot is fairly abundant in this neighbourhood. Various other uncommon or rare forest birds that occur within the nearby Dandenong Ranges National Park and Wicks Reserve are likely to visit here.

Fauna habitat features

Remnant vegetation, and particularly the mature trees, provide some habitat for forest birds in combination with remnant trees scattered throughout the surrounding area. The understorey supports native insects and no doubt skinks, but the site is too small to provide much habitat on its own. The presence of native vegetation in the surrounding neighbourhood is vital for this site to function as fauna habitat of any note.

Significance ratings

Regionally Threatened Ecological Vegetation Class

According to the criteria of 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), remnants of a regionally vulnerable EVC (including Grassy Forest) have a conservation significance rating of Medium to Very High, depending on their habitat score (Volume 1, Section 2.4.4). The vegetation around the scout hall would probably have a habitat score below 0.3, if it were to be measured, and this would put the conservation significance as Medium under the Framework. As a consequence, the significance criteria of Amos (2004) confer at least **Regional** significance on the site as a whole. If a more detailed site inspection in accordance with the Framework were to show that the most significant part of the Grassy Forest has a habitat score of at least 0.3 (which seems unlikely), the same criteria would give a State significance rating. On the other hand, if the vegetation becomes any more degraded, it will cease to qualify as a 'remnant patch' and its significance will then be 'None' by the standard criteria.

Locally threatened plant species

Most of the locally threatened plant species listed above have viable populations (in combination with surrounding vegetation), thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Invasion by environmental weeds. The weed species rated as 'Serious' on this site according to the criteria of Section 2.4.3 of Volume 1 are: Large Quaking-grass (*Briza maxima*); English Broom (*Cytisus scoparius*); Cape Broom (*Genista monspessulana*); and Wandering Jew (*Tradescantia albiflora*).
- The effects of habitat fragmentation. Ecological viability is threatened by edge effects and the relatively small extent of remnant vegetation.
- Physical disturbances to remnant understorey vegetation through mowing, clearing, fire prevention and vehicle access.

- Loss or decline of plant species that are present in dangerously small numbers, due to inbreeding, poor reproductive success or elimination by incidents such as digging by dogs;

Management issues

- Selective weed control should occur, focusing on the serious infestations just mentioned. Intensive control of exotic grasses and creepers will be required to restore areas supporting remnant ground layer vegetation.
- Clearly delineate and/or fence areas supporting remnant understorey vegetation to prevent disturbances.
- Remnant vegetation within the site could be substantially enhanced with appropriate management to prevent disturbances and control weeds. Ecological burning is likely to be ineffective in the short-term because of the small area of remnant understorey and potential for spread of fire-adapted weeds.
- Fire prevention requirements could be adequately addressed through weed control.

Administration matters

- This site is suited to inclusion under the proposed ESO2 overlay because it is of at least Regional significance under current criteria and it contains a viable remnant of a regionally threatened EVC. Note that the overlay is not proposed to affect maintenance of the facilities on the land;
- The land is zoned 'Public Park & Recreation Zone' and is presently covered by Vegetation Protection Overlay 3;
- Council should make the significance of the site known to its users and to those who manage its vegetation.

Information sources used in this assessment

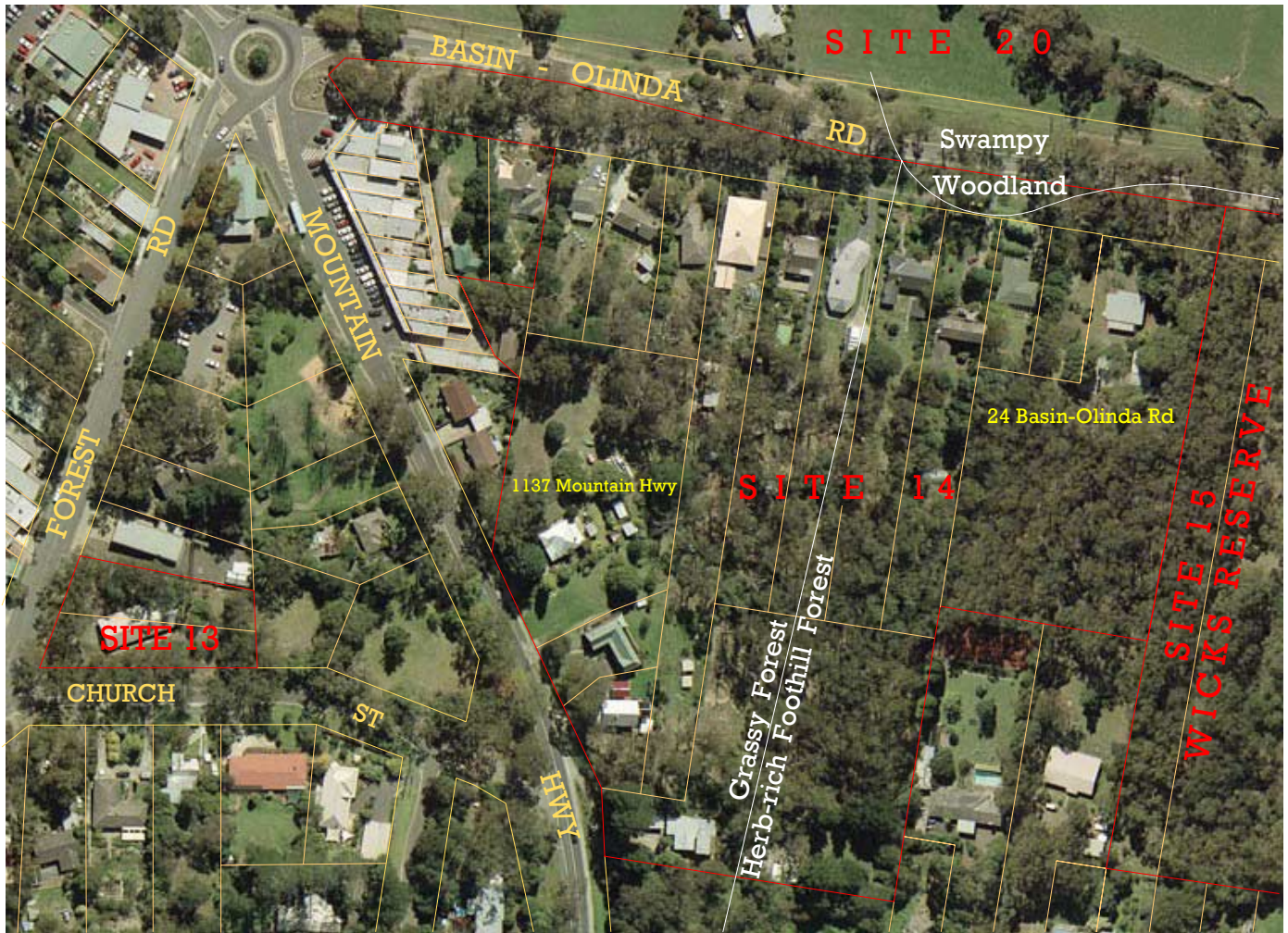
- Fieldwork undertaken during this study by Rik Brown (11/4/02), including compilation of lists of indigenous and introduced plant species, incidental fauna observations and vegetation mapping/descriptions according to the procedures discussed in Section 2.4 of Volume 1;
- Satellite imagery of the district and aerial photography from February 2001, April 2003 and February 2007;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 14. West of Wicks Reserve, The Basin

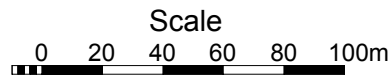
Residential properties located between Mountain Hwy and Wicks Reserve adjacent to The Basin township area. Melway ref. 65 H7-8.

Site Significance Level: *Regional or State*

- Contains remnants of two regionally vulnerable Ecological Vegetation Classes (Grassy Forest and Swampy Woodland) with patches of indigenous understorey vegetation that is moderately to heavily modified;
- Provides good habitat for forest birds and arboreal insects, and some understorey for ground-dwelling fauna;
- Provides some ecological protection and buffering to Wicks Reserve and the Dandenong Ranges National Park.



Aerial photograph taken April, 2003



Boundaries

The site encompasses the properties and road verge depicted above within the red outline for Site 14. The road verge extends as far north as the kerb of Basin-Olinda Rd. Other segments of the boundary generally follow cadastral boundaries, except that one property is dissected to exclude the southernmost shop building in the shopping centre. The whole site occupies 5.34 ha.

Note: Permission was not obtained to enter the private properties, so the site was inspected from public land, assisted by aerial photographs. Some native ground flora would have gone undetected.

Land use & tenure: Private residential properties and road verge. The westernmost residence is on the same lot as the southernmost shop in the shopping centre (which is excluded from the site).

Site description

The site is located on sheltered, gently sloping land near the base of the northeastern flank of Chandlers Hill in the Dandenong Ranges, at an approximate elevation of 180 m. The western two-thirds (or so) of the site has shallow loam over clay subsoil, derived from decay of the underlying Mt Evelyn rhyodacite formation (part of the Mt Dandenong volcanic flows). The remainder of the site, toward Wicks Reserve, is covered with soil and rock that slipped downhill from Chandlers Hill long ago, derived from a mixture of Mt Evelyn rhyodacite, Kalorama rhyodacite and the tuff at the interface between the two. This transported soil has almost filled a drainage line, and there is probably a substantial subsoil flow of water through it.

The site supports a fair to good cover of remnant trees, with understorey vegetation generally varying in accordance with levels of residential development and physical disturbances.

The highest quality areas of native vegetation that could be seen during the inspection were at the rear of 1,337 Mountain Hwy and the rear of 24 Basin-Olinda Rd adjacent to Wicks Reserve (marked on the aerial photograph). Indigenous ground layer vegetation appears relatively intact in these areas despite previous clearing and mowing.

Indigenous understorey vegetation is substantially depleted in areas immediately surrounding residences (generally maintained as garden areas and mown lawn). Small pockets of understorey vegetation may occur in parts of residential properties that could not be seen during the inspection of the area for this report.

The density of remnant flora (particularly trees) in this site no doubt contributes greatly to the rich birdlife found in the neighbourhood, including at the neighbouring shopping centre and civic buildings. This adds to the amenity of the area.

Relationship to other land

The site abuts the western edge of significant remnant vegetation and habitat within Wicks Reserve (Site 15). Extensive remnant forest vegetation and wildlife habitat also occurs within the Dandenong Ranges National Park, whose closest point is 500m to the south.

Other residential properties in the surrounding area support a fair to good cover of remnant trees and some indigenous understorey vegetation, although generally less extensive and diverse than properties within this site. Most nearby roadsides, including Mountain Hwy, also retain some native tree cover and occasional patches of native understorey. The density of remnant trees in the area facilitates movement of native birds, insects and pollen around the neighbourhood. This is evidenced by the abundance of Australian King-parrots, which are regarded as an uncommon species in the region generally (LCC 1991).

The site effectively extends the habitat of Wicks Reserve and the National Park, to the benefit of both the fauna and the amenity of the area.

Bioregion: Highlands Southern Fall

Habitat types

Note that the data below may not adequately represent parts of the site that could not be seen during the site inspection because permission was not obtained to enter private property.

Herb-rich Foothill Forest (EVC 23, conservation status rated 'Least Concern' in the bioregion). 1.5 ha in total, of which it is estimated that 0.5 ha is in fair ecological condition (rating C) and 1 ha is in poor ecological condition (rating D). 37 indigenous plant species were detected, and more would no doubt be found if the private properties were inspected from within.

Canopy trees: A good cover of *Eucalyptus obliqua* up to 30m tall (mainly 50-80 years old). Moderate foliage dieback is apparent.

Lower trees: Patches of *Acacia melanoxylon* and *Exocarpos cupressiformis*.

Shrubs: Patchy shrub layer, including *Leptospermum scoparium*, *Bursaria spinosa*, *Ozothamnus ferrugineus*, *Goodenia ovata*, *Epacris impressa* and *Coprosma quadrifida*. Some clearing of shrub layer vegetation has previously occurred.

Vines: Some *Billardiera mutabilis*.

Ferns: Some *Pteridium esculentum* and (characteristically) *Lindsaea linearis*, plus a few small specimens of *Cyathea australis*.

Ground flora: Supports a fair cover and diversity of indigenous sedges and herbs that have persisted despite mowing activities, including *Gahnia radula*, *Goodenia lanata*, *Bossiaea prostrata*, *Stylidium graminifolium*, *Dianella tasmanica*, *Poa tenera*, *Tetrarrhena juncea*, *Viola hederacea* and (in damper areas near Wicks Reserve) *Patersonia occidentalis*, *Gonocarpus humilis* and *Centella cordifolia*. Terrestrial orchids and lilies potentially occur in some locations.

Grassy Forest (EVC 128, regionally Vulnerable). Estimated as 2,500 m² in fair ecological condition (rating C) and 8,500 m² in poor ecological condition (rating D). 35 indigenous plant species were detected, and more would no doubt be found if the private properties were inspected from within.

Canopy trees: Dominated by *Eucalyptus obliqua*, *E. radiata*, *E. macrorhyncha* and *E. gonicalyx*. A good cover of remnant trees up to 25m tall (mainly 50-80 years old). Moderate foliage dieback is apparent.

Lower trees: A few scattered specimens of *Acacia melanoxyton* and *Exocarpos cupressiformis*.

Shrubs: Scattered thinly, including *Bursaria spinosa*, *Exocarpos strictus*, *Acacia stricta*, *Goodenia ovata* and *Coprosma quadrifida*. Most shrub layer vegetation has previously been cleared.

Vines: Some *Hardenbergia violacea*, *Clematis aristata* and *Billardiera mutabilis*.

Ferns: A small amount of *Pteridium esculentum*.

Ground flora: Dominated by a good cover of indigenous grasses that have persisted despite mowing activities, including *Themeda triandra*, *Rytidosperma pallidum*, *Microlaena stipoides*, *Rytidosperma penicillatum*, *Poa morrisii* and *Austrostipa rudis*. The characteristic creeper, *Platylobium formosum* is present. Indigenous herbs are scattered within less-disturbed areas, including *Drosera peltata* and *Viola hederacea*. Terrestrial orchids and lilies potentially occur in some locations.

Swampy Woodland (EVC 937, regionally Vulnerable). Roughly 1,000 m², all in poor ecological condition (rating D).

Canopy trees: Small numbers of *Eucalyptus ovata*.

Understorey: Very much reduced from its natural cover. The species belonging to this EVC cannot be well distinguished from those of the surrounding EVCs, because of the likelihood of intergradation of the EVCs in such a small area.

Plant species

The following plant species were observed in the years indicated. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Plantago debilis* is rare throughout the Melbourne region. Without permission to access the properties, the list is bound to be incomplete.

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
V	<i>Acacia melanoxyton</i>	2002		<i>Goodenia lanata</i>	2002
E	<i>Acacia stricta</i>	1997		<i>Goodenia ovata</i>	2002
V	<i>Acacia verticillata</i>	2002	V	<i>Hardenbergia violacea</i>	1997
	<i>Acaena novae-zelandiae</i>	2002	V	<i>Hydrocotyle hirta</i>	2002
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	2002		<i>Lepidosperma elatius/laterale</i>	2002
	<i>Billardiera mutabilis</i>	2002		<i>Leptospermum continentale</i>	2002
	<i>Bossiaea prostrata</i>	2002	V	<i>Lindsaea linearis</i>	2002
	<i>Burchardia umbellata</i>	2002		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	2002
	<i>Bursaria spinosa</i>	2002		<i>Lomandra longifolia</i>	1997
	<i>Carex breviculmis</i>	1997		<i>Microlaena stipoides</i>	2002
E	<i>Centella cordifolia</i>	2002		<i>Oxalis exilis/perennans</i>	2002
V	<i>Clematis aristata</i>	2002	E	<i>Ozothamnus ferrugineus</i>	2002
V	<i>Coprosma quadrifida</i>	2002	C	<i>Patersonia ?occidentalis</i>	2002
E	<i>Cyathea australis</i>	2002	C	<i>Plantago debilis</i>	2002
V	<i>Dianella tasmanica</i>	2002	V	<i>Platylobium formosum</i>	2002
	<i>Dichondra repens</i>	2002		<i>Poa morrisii</i>	1997
V	<i>Drosera peltata</i>	2002	E	<i>Poa tenera</i>	2002
V	<i>Epacris impressa</i>	2002	E	<i>Prostanthera lasianthos</i>	2002
	<i>Eucalyptus gonicalyx</i>	2002		<i>Pteridium esculentum</i>	2002
E	<i>Eucalyptus macrorhyncha</i>	2002	V	<i>Pultenaea gunnii</i>	2002
V	<i>Eucalyptus obliqua</i>	2002		<i>Rytidosperma pallidum</i>	2002
V	<i>Eucalyptus ovata</i>	2002		<i>Rytidosperma penicillatum</i>	2002
E	<i>Eucalyptus radiata</i>	2002		<i>Rytidosperma racemosum</i>	1997
V	<i>Exocarpos cupressiformis</i>	2002	E	<i>Stylidium armeria/graminifolium</i>	2002
E	<i>Exocarpos strictus</i>	1997		<i>Tetrarrhena juncea</i>	2002
	<i>Gahnia radula</i>	2002		<i>Themeda triandra</i>	2002
E	<i>Gonocarpus humilis</i>	2002	E	<i>Viola hederacea</i>	2002
	<i>Gonocarpus tetragynus</i>	2002			

Introduced Species

<i>Acacia baileyana</i>	<i>Galium aparine</i>	<i>Prunella vulgaris</i>
<i>Agapanthus praecox</i>	<i>Genista linifolia</i>	<i>Prunus cerasifera</i>
<i>Allium triquetrum</i>	<i>Genista monspessulana</i>	<i>Romulea rosea</i>
<i>Anthoxanthum odoratum</i>	<i>Hedera helix</i>	<i>Rubus anglocandicans</i>
<i>Briza maxima</i>	<i>Lonicera japonica</i>	<i>Trifolium repens</i>
<i>Cirsium vulgare</i>	<i>Oxalis incarnata</i>	<i>Vinca major</i>
<i>Crocasmia × crocosmiiflora</i>	<i>Pinus radiata</i>	<i>Watsonia meriana</i> var. <i>bulbillifera</i>
<i>Dactylis glomerata</i>	<i>Pittosporum undulatum</i>	

Fauna of special significance

Uncommon in the Melbourne region

Alisterus scapularis (Australian King-parrot). Rather abundant in this neighbourhood.

Uncommon in Knox

Oriolus sagittatus (Olive-backed Oriole).

Other significant forest birds occurring within the nearby Dandenong Ranges National Park and Wicks Reserve are likely to be frequent visitors.

Fauna habitat features

The cover of remnant trees extending throughout most of the site provides good habitat for birds and possums. Ground-dwelling fauna (particularly small mammals & lizards) and butterflies occurring in adjoining forest within Wicks Reserve are also likely to visit the site.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity & Viability

The site adjoins more extensive habitat within Wicks Reserve, Site 18 and the Dandenong Ranges National Park. The total area exceeds 100 ha, thereby giving the site **Local** conservation significance under criterion 1.1.2 of Amos (2004).

Regionally Vulnerable Ecological Vegetation Classes

According to the criteria of 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), vegetation belonging to a regionally vulnerable EVC (including Grassy Forest) has a conservation significance rating of Medium to Very High, depending on their habitat score (Volume 1, Section 2.4.4). The most intact Grassy Forest vegetation in this site would probably have a habitat score of approximately 0.3, if it were to be measured, and this would put the conservation significance on the cusp between Medium or High according to the Framework. As a consequence, the significance level under criterion 3.2.3 is on the cusp between **Regional** and **State**. To determine the significance more precisely would require a detailed inspection of the various properties to determine the area of most intact vegetation and then obtain its habitat score in accordance with the Framework.

Swampy Woodland is also listed as regionally vulnerable, but the quality of the vegetation within this EVC is poorer than the Grassy Forest and its extent is smaller. Therefore, the presence of the Swampy Woodland does not determine the site's significance rating.

Rare or Threatened Plants

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Invasion by environmental weeds, particularly Sweet Pittosporum (*Pittosporum undulatum*), which is rated as 'Serious' according to the scale in Section 2.4.3 of Volume 1;
- Loss of native trees and understorey vegetation associated with residential development;
- Dieback of remnant trees associated with altered drainage patterns (likely to be exacerbated by the ongoing establishment of buildings and other hard surfaces);
- Clearing and mowing of understorey vegetation for fire protection or garden establishment;
- The introduction and spread of weeds from residential gardens and through physical disturbances;
- Competition of indigenous ground flora with exotic grasses and herbs.

Management issues

- It would be environmentally very desirable to remove at least the female Sweet Pittosporums to reduce their spread.
- Remnant trees and understorey should be protected in any future development, including preventing alterations in drainage patterns that would potentially affect nearby vegetation.
- The present frequency and timing of mowing in most properties could be improved to reduce landowners' workload and favour wildflowers and wildlife. The optimum regimen varies according to the weed species present in each area.
- Landowners should not cultivate environmental weed species.

Administration matters

- As discussed above, the site should be administered almost the same as if it were definitely of State significance, based on the Precautionary Principle.
- This site is suited to inclusion under the proposed ESO2 overlay because it is of Regional or State significance under current criteria and it contains a viable remnant of a regionally threatened EVC.
- The site is protected under the existing Vegetation Protection Overlay Schedule 1 and Significant Landscape Overlay Schedule 2 of the Knox Planning Scheme;
- Council should make the significance of the site known to its users and to those who manage its vegetation.
- The apparently imminent development of land adjacent to Wicks Reserve is likely to require attention to adequately address potential environmental impacts.

Information sources used in this assessment

- Surveys of the private properties undertaken during this study by Rik Brown (5/9/02 & 11/9/02), including compilation of lists of indigenous and introduced plant species, incidental fauna observations and vegetation mapping/descriptions according to the procedures discussed in Section 2.4 of Volume 1. Note that visibility of vegetation on some residential properties was limited during field surveys;
- Survey of roadside vegetation by Dr Lorimer on 12/9/97 for the report, *'A Survey and Management Plan for Significant Vegetation of Roadsides in Knox'* (by G.S. Lorimer for Knox City Council, May 1998, 137 pp.);
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 15. Wicks Reserve & Wicks East Nature Reserve, The Basin

Council reserve with picnic facilities and lawns in a bushland environment with rich birdlife. Melway ref. 65 J8.

Site Significance Level: State

- Contains Knox’s only occurrence of Wet Heathland, an Ecological Vegetation Class listed as regionally Depleted;
- The regionally Vulnerable Ecological Vegetation Classes, Swampy Woodland and Grassy Forest, are present;
- There are at least twenty-seven plant species that are threatened with extinction in Knox, of which ten are rare or threatened throughout the Melbourne area and six are found nowhere else in Knox;
- There is a large, breeding population of the Swordgrass Brown butterfly, which is locally rare;
- There is excellent birdlife.



Aerial photograph taken April 2003

Boundaries

This 8.33 ha site is outlined in red above. It includes all of Wicks Reserve (4.42 ha, west of Wicks Rd), Wicks East Nature Reserve (2.86 ha east of Wicks Rd) and adjoining roadside verges.

Land use & tenure: Council reserves and roadside verges. Wicks Reserve has a car park, picnic shelters, barbecues, public toilets, park benches, a playground and lawns, all in a bushland setting. Wicks East Nature Reserve is only for nature conservation and walking, although horse riders also use it.

Site description

This site is at the foot of a northern slope of the Dandenong Ranges, with the valley floor of Dobsons Creek along the northern margin of Wicks Reserve. Elevations vary from 158 m to 195 m. The slope is less than 5% on the valley floor, and approximately 10% in the rest of Wicks Reserve (except where excavations have created a level lawn area west of the picnic shelters. The slope of Wicks East Nature Reserve increases steadily from 10% in the north to 16% in the south.

The site's bedrock is the Kalorama Rhyodacite formation, which is part of the Dandenong Ranges volcanic group. This weathers to an acidic, yellowish clay loam soil, but this has been buried in two places:

- Shallow alluvium has been deposited on the valley floor at the northern edge of Wicks Reserve; and
- Soil and rock has slipped downhill to fill an ancient gully that ran north-northeast through the area marked on the aerial photograph above as Wet Heathland. (This is inferred by the author from geological maps, topographic maps, soil moisture levels and vegetation.)

Groundwater seeping out of the soil deposited in the ancient gully has given rise to the Wet Heathland, a unique occurrence in Knox. Wet Heathland would once have continued further north prior to the clearing of a swathe through the vegetation (now partly under revegetation). There are many plant species within and close to the Wet Heathland that are very rare or absent in the rest of Knox.

There are many patches and strips of land within the reserves that have been cleared for tracks, pipes, recreational facilities and apparently a house (east of Wicks Rd). Most of the site must have been denuded of trees many years ago, judging from the paucity of large, old trees. A substantial proportion of the land has regenerated naturally, while other areas are under revegetation. Some planted native and exotic ornamental species persist around the reserves, and there are even some planted bottlebrushes in the otherwise-natural Wet Heathland.

The history of clearing, gardening, revegetation and natural regeneration confounds the delineation of vegetation types near the centre of Wicks Reserve and through the southern half of Wicks East Nature Reserve. A canopy of Swamp Gums (*Eucalyptus ovata*) is usually associated in Knox with the Ecological Vegetation Classes called Swampy Woodland or Swampy Riparian Woodland, but the excellent regenerative capacity of this species has allowed it to proliferate vigorously in areas where it would once have been very scarce.

Despite the history of clearing, the vegetation retains a very high number of indigenous plant species for such an area, and many of them are rare or threatened in Knox or more widely. Certain weed species such as brooms had become well established by the 1990s, but Council has brought them under control except for wood-sorrels (*Oxalis incarnata* and/or *Oxalis pes-caprae*).

Relationship to other land

From the southeastern corner of this site, the Clevedon Camp property and the rear of properties facing the Basin-Olinda Rd provide a continuous tree canopy (mostly with associated understorey) that extends right through Site 18 into the Dandenong Ranges National Park. The national park is of high National significance for its native vegetation and wildlife and Site 18 is of State significance for similar reasons. Wicks Reserve and Wicks East Nature Reserve undoubtedly function ecologically as extensions to the habitat of Site 18 and the national park, with extensive traffic of fauna, seeds and pollen between the sites. This explains why the site is so good for birdwatching.

Grazing land to the east of the site provides fodder for rabbits, some of which have a warren in Wicks East Nature Reserve. The proximity of pasture and forest cover favours these pests. Rabbit control would require cooperation between the public and private landowners.

Site 14, to the west of Wicks Reserve, provides a small extension to the reserve's habitat, but the habitat in Site 14 is inferior because the canopy is more fragmented and the understorey is mostly decimated or absent.

There is even less habitat to the south of Wicks Reserve and Wicks East Nature Reserve (in Site 99), but still enough to entice some birdlife such as Australian King-Parrots out of the aforementioned sites and into residential and civic areas where they contribute to the natural atmosphere of life in The Basin. Unfortunately, some of the residences neighbouring the reserves harbour environmental weeds that spread into the reserves, particularly Sweet Pittosporum.

Bioregion: Highlands Southern Fall

Habitat types

Wet Heathland (EVC 8, regionally Depleted): Estimated to cover 1,800 m², equally divided between ecological condition ratings A and B (i.e. very good and good). 56 indigenous plant species were found by the author since 2002, including a few that may be interpreted as outliers from the adjacent Lowland Forest.

Eucalypts: Sparse, young *Eucalyptus ovata*, not forming a canopy.

Lower trees: Small numbers of *Acacia melanoxylon*. There is also a solitary, unexpected, *Pomaderris aspera*.

Shrubs: Dominated by *Leptospermum scoparium*, forming dense patches of scrub 3-4 m tall. There are also substantial numbers of *Allocasuarina paludosa*, *Epacris impressa*, *Goodenia ovata*, *Kunzea ericoides* and *Pultenaea gunnii*. *Hakea nodosa* and *Polyscias sambucifolia* are scarce.

Vines: Represented only by *Billardiera mutabilis* and very sparse *Cassytha pubescens*.

Scramblers: *Empodisma minus* is very dense and *Tetrarrhena juncea* is abundant. *Lobelia anceps* is also present.

Ferns: *Lindsaea linearis* is abundant. There are patches of *Adiantum aethiopicum* and scattered *Cyathea australis*. The fern ally, *Selaginella uliginosa*, is present in substantial numbers, as expected in this EVC.

Ground flora: Very dense outside the patches of scrub (particularly due to the scramblers just mentioned) and less dense where the scrub blocks out the sunlight. Sedges are well represented, including *Gahnia radula*, *Gahnia sieberiana*, *Lepidosperma filiforme*, *Schoenus apogon* and *Tetraria capillaris*. The characteristic species, *Centella cordifolia*, *Cryptostylis subulata*, *Drosera pygmaea*, *Gonocarpus micranthus*, *Lobelia anceps* and *Patersonia occidentalis* are all present. Grasses are scarce, and include *Eragrostis brownii*, *Hemarthria uncinata*, *Poa tenera*, *Tetrarrhena juncea*, plus occasional outliers of species such as *Deyeuxia quadriseta* from the adjacent Lowland Forest.

Lowland Forest (EVC 16, conservation status rated 'Least Concern' in the bioregion): Estimated to cover 1.2 ha, comprising 1.1 ha in good ecological condition (rating B) and 0.1 ha in fair ecological condition (rating C). 72 indigenous plant species have been recorded by the author.

Dominant canopy trees: *Eucalyptus obliqua* with far fewer *E. ovata*.

Dominant lower trees: *Acacia melanoxylon* and *Exocarpos cupressiformis*, moderately dense.

Shrubs: Moderate density and fairly rich in species. *Goodenia ovata* is most abundant and other conspicuous species are *Allocasuarina paludosa*, *Coprosma quadrifida*, *Epacris impressa*, *Kunzea ericoides*, *Leptospermum scoparium*, *Ozothamnus ferrugineus*, *Polyscias sambucifolia* and *Pultenaea gunnii*. *Bursaria spinosa* is present but sparse. The usual abundance of members of the Protea family is missing, the only representation being three *Hakea ulicina* plants at the interface with Grassy Forest.

Vines: *Billardiera mutabilis* and *Pandorea pandorana* are fairly abundant.

Ferns: There are patches of *Pteridium esculentum* (bracken) but the overall average foliage cover is small. *Lindsaea linearis* is present, a characteristic species for Lowland Forest. *Cyathea australis* is sparse.

Ground flora: Very dense, tangled and knee-deep, not tussocky. Rather heathy with *Gahnia radula* and *Tetrarrhena juncea* dominant and patches of dense *Empodisma minus*. The following species are abundant but with too little foliage cover to be dominant: *Burchardia umbellata*, *Gahnia sieberiana*, *Gonocarpus tetragynus*, *Poa tenera*, *Austrostipa rudis*, *Stylidium armeria*, *Tetraria capillaris* and *Viola hederacea*. Less abundant species that are good ecological indicators include *Centella cordifolia*, *Cryptostylis leptochila*, *Cryptostylis subulata*, *Selaginella uliginosa* and *Xanthorrhoea minor*.

Herb-rich Foothill Forest (EVC 23, conservation status rated 'Least Concern' in the bioregion), tending toward Damp Forest at the foot of the slope: Estimated to cover 3.7 ha, comprising 0.4 ha in good ecological condition (rating B), 2.9 ha in fair ecological condition (rating C) and 0.4 ha in poor ecological condition (rating D). 100 indigenous plant species have been recorded by the author.

Canopy trees: Dominated by *Eucalyptus obliqua* and *E. ovata*, the latter quite possibly a result of the more vigorous regeneration of that species following clearing. Most *E. ovata* in Wicks East Nature Reserve are fairly young trees with trunk diameters of approximately 0.3 m, indicating a large regeneration event some years ago, whereas the old trees are overwhelmingly *E. obliqua*. *E. radiata* is absent in most of the Herb-rich Foothill Forest but becomes common toward the interface with Grassy Forest.

Lower trees: Rather dense, dominated by *Acacia melanoxylon* and a smaller number of *Exocarpos cupressiformis*. *Acacia dealbata* is present but sparse.

Shrubs: Moderately dense and rather rich in species. Dominated by *Coprosma quadrifida*, *Olearia lirata* and *Polyscias sambucifolia*. Other shrubs include *Acacia verticillata*, *Cassinia aculeata*, *Epacris impressa*, *Goodenia ovata*, *Leptospermum scoparium*, *Ozothamnus ferrugineus*, *Prostanthera lasianthos* and *Pultenaea gunnii*. Other shrub species occur in small numbers. The presence of two *Cassinia trinerva* and one *Olearia argophylla* reflects the tendency toward Damp Forest in the wettest areas and the close proximity to fully developed Damp Forest on Dobsons Creek in Site 18.

Vines: *Pandorea pandorana* is abundant. There are also substantial numbers of *Billardiera mutabilis*, *Clematis aristata* and *Glycine clandestina*.

Ferns: Patches of *Pteridium esculentum* are widespread. Patches of *Calochlaena dubia* and occasional small *Cyathea australis* are scattered at the foot of the slope.

Ground flora: Very variable in density due to different stages of recovery from clearing. Aside from the ferns, the ground flora is dominated by *Dianella tasmanica* and *Poa ensiformis*. The following species are abundant but with too little foliage cover to be dominant: *Gahnia radula*, *Austrostipa rudis*, *Tetrarrhena juncea*, *Themeda triandra* and *Viola hederacea*, as well as *Lepidosperma elatius* at the foot of the slope in Wicks East Nature Reserve.

Grassy Forest (EVC 128, regionally Vulnerable): Estimated to cover 0.85 ha, comprising 0.5 ha in good ecological condition (rating B), 0.25 ha in fair ecological condition (rating C) and 0.10 ha in poor ecological condition (rating D). 90 indigenous plant species have been recorded by the author.

Dominant canopy trees: *Eucalyptus obliqua*, *E. macrorhyncha* and *E. radiata*. *E. ovata* is sparingly present due to proximity of other EVCs.

Dominant lower trees: *Acacia melanoxylon* is abundant and *Exocarpos cupressiformis* is somewhat less so.

Shrubs: Mostly rather sparse, leaving clear visibility for a radius of typically 50 m. *Epacris impressa* is abundant, and the other conspicuous species are *Bursaria spinosa*, *Cassinia aculeata*, *Goodenia ovata*, *Leptospermum continentale*, *Leptospermum scoparium* and *Pultenaea gunnii*.

Vines: The light twiner, *Billardiera mutabilis*, is abundant and other climbers are scarce.

Ferns: There are patches of *Pteridium esculentum* and scattered *Lindsaea linearis* close to the Lowland Forest.

Ground flora: 80% ground coverage. Dominated by *Rytidosperma pallidum*, followed by *Gahnia radula*, *Microlaena stipoides*, *Poa morrisii* and *Austrostipa rudis*. There are also abundant *Burchardia umbellata*, *Gonocarpus tetragynus*, *Goodenia lanata*, *Lepidosperma gunnii*, *Microlaena stipoides*, *Platylobium formosum*, *Stylidium armeria* and *Tetrarrhena juncea*. *Dipodium roseum* is present in reasonable numbers, as is typically the case in Grassy Forest in the Dandenong Ranges. Other species whose presence helps confirm the EVC identity as Grassy Forest are *Acrotriche serrulata*, *Helichrysum scorpioides*, *Pimelea humilis* and *Themeda triandra*.

Swampy Woodland (EVC 937, regionally Vulnerable): Estimated to cover 1.6 ha, comprising 1.1 ha in good ecological condition (rating B) and 0.5 ha in fair ecological condition (rating C). 71 indigenous plant species have been recorded by the author.

Dominant canopy trees: *Eucalyptus ovata* to c.25 m tall and mostly slender, indicating regeneration after clearing some years ago.

Dominant lower trees: *Acacia melanoxylon* is dense and there are fewer *Melaleuca ericifolia*.

Shrubs: Dense to rather sparse, depending on the stage of natural regeneration. *Leptospermum scoparium* dominates areas that have regenerated greatly in the past 5-10 years but is sparse in older regrowth. Other conspicuous species are *Acacia verticillata*, *Cassinia aculeata*, *Coprosma quadrifida* and *Goodenia ovata*.

Vines: *Billardiera mutabilis*, *Glycine clandestina* and *Pandorea pandorana* are present.

Ferns: *Pteridium esculentum* and *Cyathea australis* are scattered thinly.

Ground flora: Moderately to very dense, dominated by *Gahnia radula*, *Gahnia sieberiana*, *Lepidosperma elatius* and *Lomandra longifolia*. Other abundant species are *Acaena novae-zelandiae*, *Gonocarpus tetragynus*, *Patersonia occidentalis*, *Poa tenera*, *Austrostipa rudis*, *Tetrarrhena juncea* and *Viola hederacea*.

Plant species

Separate plant lists follow for Wicks Reserve and Wicks East Nature Reserve. The years in the right-hand columns indicate when each indigenous species was last recorded. The columns headed 'Risk' indicate the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. Species with names in bold are rare throughout the Melbourne region.

Wicks Reserve Indigenous Species

Risk	Species name	Year
	<i>Acacia dealbata</i>	2007
V	<i>Acacia melanoxylon</i>	2007
E	<i>Acacia mucronata</i> subsp. <i>longifolia</i>	2007
E	<i>Acacia stricta</i>	2007
V	<i>Acacia verticillata</i>	2007
	<i>Acaena novae-zelandiae</i>	2007
V	<i>Acrotriche prostrata</i>	2007
	<i>Acrotriche serrulata</i>	2007
V	<i>Adiantum aethiopicum</i>	2007
C	<i>Allocasuarina paludosa</i>	2007
	<i>Arthropodium strictum</i>	2004

Wicks Reserve Indigenous Species

Risk	Species name	Year
E	<i>Austrocynoglossum latifolium</i>	2007
	<i>Austrostipa pubinodis</i>	2007
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	2007
	<i>Billardiera mutabilis</i>	2007
	<i>Bossiaea prostrata</i>	2004
	<i>Burchardia umbellata</i>	2007
	<i>Bursaria spinosa</i>	2007
V	<i>Caesia parviflora</i>	2007
V	<i>Calochlaena dubia</i>	2007
	<i>Campylopus introflexus</i>	2007
	<i>Cassinia aculeata</i>	2007

Wicks Reserve Indigenous Species

Risk	Species name	Year
C	<i>Cassinia trinerva</i>	2007
E	<i>Cassytha pubescens</i>	2007
E	<i>Centella cordifolia</i>	2007
C	<i>Centrolepis strigosa</i>	2003
C	<i>Chiloglottis reflexa</i>	2007
	<i>Chiloscyphus semiteres</i>	2007
V	<i>Clematis aristata</i>	2007
V	<i>Comesperma volubile</i>	2007
C	<i>Coprosma hirtella</i>	1999
V	<i>Coprosma quadrifida</i>	2007
E	<i>Cryptostylis leptochila</i>	2007
C	<i>Cryptostylis subulata</i>	2007
E	<i>Cyathea australis</i>	2007
E	<i>Daviesia leptophylla</i>	2007
	<i>Deyeuxia quadriseta</i>	2007
	<i>Dianella admixta</i>	2007
V	<i>Dianella longifolia</i> s.l.	1999
V	<i>Dianella tasmanica</i>	2007
	<i>Dichondra repens</i>	2007
E	<i>Dipodium roseum</i>	2007
V	<i>Drosera peltata</i> subsp. <i>auriculata</i>	2004
C	<i>Drosera pygmaea</i>	2002
V	<i>Empodisma minus</i>	2007
V	<i>Epacris impressa</i>	2007
	<i>Eragrostis brownii</i>	2007
E	<i>Eucalyptus macrorhyncha</i>	2007
V	<i>Eucalyptus obliqua</i>	2007
V	<i>Eucalyptus ovata</i>	2007
E	<i>Eucalyptus radiata</i>	2007
E	<i>Euchiton involucratu</i>	1999
V	<i>Exocarpos cupressiformis</i>	2007
E	<i>Exocarpos strictus</i>	2007
	<i>Gahnia radula</i>	2007
E	<i>Gahnia sieberiana</i>	2007
E	<i>Galium ?gaudichaudii</i>	1999
C	<i>Gastrodia sesamoides</i>	1999
C	<i>Geranium homeanum</i>	2004
V	<i>Geranium ?sp. 2</i>	2007
V	<i>Glycine clandestina</i>	2007
C	<i>Gonocarpus micranthus</i>	1999
	<i>Gonocarpus tetragynus</i>	2007
	<i>Goodenia lanata</i>	2007
	<i>Goodenia ovata</i>	2007
C	<i>Hakea nodosa</i>	2007
C	<i>Hakea ulicina</i>	2004
V	<i>Helichrysum scorpioides</i>	2004
V	<i>Hemarthria uncinata</i>	1999
V	<i>Hydrocotyle hirta</i>	2007
E	<i>Hypericum gramineum</i>	2007
E	<i>Indigofera australis</i> (planted)	2007
V	<i>Isolepis inundata</i>	2002
	<i>Juncus gregiflorus</i>	1997
	<i>Juncus pallidus</i>	2007
	<i>Juncus sarophorus</i>	1997
	<i>Kunzea ericoides</i> spp. agg.	2007
V	<i>Lagenophora gracilis</i>	2007
	<i>Lepidosperma elatius</i>	2007
E	<i>Lepidosperma filiforme</i>	2007

Wicks Reserve Indigenous Species

Risk	Species name	Year
V	<i>Lepidosperma laterale</i>	2007
	<i>Leptospermum continentale</i>	2007
E	<i>Leptospermum scoparium</i>	2007
V	<i>Lindsaea linearis</i>	2007
E	<i>Lobelia anceps</i>	1999
	<i>Lomandra filiformis</i> ssp. <i>coriacea</i>	2007
	<i>Lomandra filiformis</i> ssp. <i>filiformis</i>	2007
	<i>Lomandra longifolia</i>	2007
V	<i>Lythrum hyssopifolia</i>	2002
E	<i>Melaleuca ericifolia</i>	2007
	<i>Microlaena stipoides</i>	2007
C	<i>Muellerina eucalyptoides</i>	2004
V	<i>Olearia lirata</i> (wild & planted)	2007
V	<i>Opercularia varia</i>	2007
	<i>Oxalis exilis/perennans</i>	2007
E	<i>Ozothamnus ferrugineus</i>	2007
	<i>Pandorea pandorana</i>	2007
C	<i>Patersonia occidentalis</i>	2007
V	<i>Pimelea humilis</i>	2004
V	<i>Platylobium formosum</i>	2007
	<i>Poa ensiformis</i>	2007
	<i>Poa morrisii</i>	2007
E	<i>Poa tenera</i>	2007
E	<i>Polyscias sambucifolia</i>	2007
E	<i>Pomaderris aspera</i>	2007
	<i>Poranthera microphylla</i>	1999
E	<i>Prostanthera lasianthos</i> (wild & planted)	2007
	<i>Pteridium esculentum</i>	2007
E	<i>Pterostylis melagramma</i>	2007
	<i>Pterostylis nutans</i>	2007
	<i>Ptychomnion aciculare</i>	2007
V	<i>Pultenaea gunnii</i>	2007
	<i>Rytidosperma laeve</i>	1999
	<i>Rytidosperma pallidum</i>	2007
	<i>Rytidosperma penicillatum</i>	2007
	<i>Rytidosperma racemosum</i>	2007
E	<i>Rytidosperma semiannulare</i>	1999
	<i>Rytidosperma setaceum</i>	1999
	<i>Schoenus apogon</i>	2004
C	<i>Selaginella uliginosa</i>	2007
	<i>Senecio hispidulus</i>	2007
E	<i>Senecio minimus</i>	2007
V	<i>Solanum laciniatum</i>	2007
E	<i>Spyridium parvifolium</i>	2007
E	<i>Stylidium armeria/graminifolium</i>	2007
C	<i>Tetraria capillaris</i>	2007
	<i>Tetrarrhena juncea</i>	2007
C	<i>Thelymitra media</i>	1999
V	<i>Thelymitra peniculata</i>	1999
	<i>Themeda triandra</i>	2007
	<i>Thuidiopsis furfurosa</i>	2007
E	<i>Thysanotus tuberosus</i>	2007
	<i>Tricoryne elatior</i>	2004
E	<i>Viola hederacea</i>	2007
E	<i>Wahlenbergia gracilis</i>	2007
V	<i>Xanthorrhoea minor</i>	2007
E	<i>Xanthosia dissecta</i>	2007

Wicks Reserve Introduced Species

<i>Acacia floribunda</i>	<i>Ehrharta erecta</i>	<i>Paspalum dilatatum</i>
<i>Acacia longifolia</i> subsp. <i>longifolia</i>	<i>Erica lusitanica</i>	<i>Paspalum distichum</i>
<i>Acacia ?prominens</i>	<i>Euphorbia peplus</i>	<i>Passiflora tarminiana</i>
<i>Agapanthus praecox</i>	<i>Fraxinus angustifolia</i>	<i>Pinus radiata</i>
<i>Agrostis capillaris</i>	<i>Freesia alba</i> × <i>leichtlinii</i>	<i>Pittosporum undulatum</i>
<i>Allium triquetrum</i>	<i>Fumaria officinalis</i> spp. agg.	<i>Plantago lanceolata</i>
<i>Anagallis arvensis</i>	<i>Galium aparine</i>	<i>Plantago major</i>
<i>Anthoxanthum odoratum</i>	<i>Genista linifolia</i>	<i>Prunella vulgaris</i>
<i>Arrhenatherum elatius</i>	<i>Genista monspessulana</i>	<i>Prunus cerasifera</i>
<i>Asparagus scandens</i>	<i>Grevillea hybrids</i>	<i>Ranunculus repens</i>
<i>Briza maxima</i>	<i>Grevillea robusta</i>	<i>Romulea rosea</i>
<i>Centaurium erythraea</i>	<i>Hakea salicifolia</i>	<i>Rosa rubiginosa</i>
<i>Cirsium vulgare</i>	<i>Hedera helix</i>	<i>Rubus anglocandicans</i>
<i>Conyza ?sumatrensis</i>	<i>Holcus lanatus</i>	<i>Solanum nigrum</i>
<i>Coprosma repens</i>	<i>Hypericum androsæmum</i>	<i>Sonchus oleraceus</i>
<i>Cortaderia selloana</i>	<i>Hypochoeris radicata</i>	<i>Stellaria media</i>
<i>Cotoneaster glaucophyllus</i>	<i>Ilex aquifolium</i>	<i>Tradescantia fluminensis</i>
<i>Cotoneaster simonsii</i>	<i>Juncus tenuis</i>	<i>Trifolium repens</i>
<i>Crassula multicava</i>	<i>Lactuca serriola</i>	<i>Vicia disperma</i>
<i>Crataegus monogyna</i>	<i>Ligustrum lucidum</i>	<i>Vicia sativa</i>
<i>Crepis capillaris</i>	<i>Lonicera japonica</i>	<i>Vulpia bromoides</i>
<i>Crococsmia</i> × <i>crococsmiiflora</i>	<i>Lotus subbiflorus</i>	<i>Watsonia meriana</i> var. <i>bulbillifera</i>
<i>Cytisus scoparius</i>	<i>Lotus uliginosus</i>	<i>Zantedeschia aethiopica</i>
<i>Dactylis glomerata</i>	<i>Myosotis ?sylvatica</i>	
<i>Delairea odorata</i>	<i>Oxalis incarnata</i>	

Wicks East Nature Reserve Indigenous Species

Risk	Species name	Year
V	<i>Acacia melanoxylon</i> (wild & planted)	2007
E	<i>Acacia mucronata</i>	1999
E	<i>Acacia stricta</i>	2007
V	<i>Acacia verticillata</i>	2007
	<i>Acaena novae-zelandiae</i>	2007
V	<i>Acrotriche prostrata</i>	2007
V	<i>Amyema quandang</i>	1999
C	<i>Asperula conferta</i>	2007
E	<i>Austrocynoglossum latifolium</i>	2007
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	2007
	<i>Billardiera mutabilis</i>	2007
E	<i>Blechnum cartilagineum</i>	2007
	<i>Bursaria spinosa</i>	2007
	<i>Campylopus clavatus</i>	2007
	<i>Campylopus introflexus</i>	2007
	<i>Carex breviculmis</i>	2007
	<i>Cassinia aculeata</i>	2007
C	<i>Cassinia trinerva</i>	2007
V	<i>Chiloglottis valida</i>	1999
	<i>Chiloscyphus semiteres</i>	2007
V	<i>Clematis aristata</i>	2007
V	<i>Comesperma volubile</i>	2007
C	<i>Coprosma hirtella</i>	2007
V	<i>Coprosma quadrifida</i>	2007
V	<i>Crassula decumbens</i>	2007
E	<i>Cryptostylis leptochila</i>	2007
E	<i>Cyathea australis</i>	2007
E	<i>Cynoglossum suaveolens</i>	2002
	<i>Deyeuxia quadriseta</i>	2002
	<i>Dianella admixta</i>	2007
V	<i>Dianella tasmanica</i>	2007
	<i>Dichelachne rara</i>	2007

Wicks East Nature Reserve Indigenous Species

Risk	Species name	Year
E	<i>Dipodium roseum</i>	1999
V	<i>Epacris impressa</i>	2007
	<i>Epilobium hirtigerum</i>	2002
	<i>Eragrostis brownii</i>	2009
V	<i>Eucalyptus cypellocarpa</i>	2007
E	<i>Eucalyptus macrorhyncha</i>	2007
V	<i>Eucalyptus obliqua</i> (wild & planted)	2007
V	<i>Eucalyptus ovata</i>	2007
E	<i>Eucalyptus radiata</i>	2007
E	<i>Eucalyptus viminalis</i> ssp. <i>viminalis</i> (probably planted)	2007
E	<i>Euchiton involucratus</i>	2007
V	<i>Exocarpos cupressiformis</i>	2007
E	<i>Exocarpos strictus</i>	2007
	<i>Gahnia radula</i>	2007
E	<i>Gahnia sieberiana</i> (wild & planted)	2007
E	<i>Galium gaudichaudii</i>	2007
E	<i>Geranium gardneri</i>	2007
V	<i>Geranium potentilloides</i>	2002
V	<i>Glycine clandestina</i>	2007
E	<i>Gonocarpus ?humilis</i>	2007
	<i>Gonocarpus tetragynus</i>	2007
	<i>Goodenia ovata</i>	2007
V	<i>Helichrysum scorpioides</i>	2007
V	<i>Hemarthria uncinata</i>	2007
E	<i>Hydrocotyle geraniifolia</i>	2007
V	<i>Hydrocotyle hirta</i>	2007
E	<i>Hypericum gramineum</i>	2007
V	<i>Isolepis</i> sp.	1999
	<i>Juncus bufonius</i>	1999
	<i>Juncus pallidus</i>	2007
	<i>Kunzea ericoides</i> spp. agg.	2007

Wicks East Nature Reserve Indigenous Species

Risk	Species name	Year
E	<i>Lagenophora stipitata</i>	2007
	<i>Lepidosperma elatius</i>	2007
V	<i>Lepidosperma laterale</i>	2007
E	<i>Leptospermum scoparium</i> (wild & planted)	1999
	<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	2007
	<i>Lomandra filiformis</i> subsp. <i>filiformis</i>	2007
	<i>Lomandra longifolia</i>	2007
V	<i>Luzula meridionalis</i>	2007
V	<i>Lythrum hyssopifolia</i>	1999
E	<i>Melaleuca ericifolia</i>	2007
	<i>Microlaena stipoides</i>	2007
	<i>Microtis parviflora</i>	2002
C	<i>Muellerina eucalyptoides</i>	2007
E	<i>Olearia argophylla</i>	2007
V	<i>Olearia lirata</i>	2007
V	<i>Opercularia varia</i>	2007
	<i>Oxalis exilis/perennans</i>	2007
E	<i>Ozothamnus ferrugineus</i>	2007
	<i>Pandorea pandorana</i>	2007
V	<i>Platylobium formosum</i>	2007
	<i>Poa ensiformis</i> (wild and planted)	2007
	<i>Poa morrisii</i>	2007
E	<i>Poa tenera</i>	2007
E	<i>Polyscias sambucifolia</i>	2007
	<i>Polytrichum juniperinum</i>	2007
E	<i>Pomaderris aspera</i>	2007
	<i>Poranthera microphylla</i>	2007

Wicks East Nature Reserve Indigenous Species

Risk	Species name	Year
E	<i>Prostanthera lasianthos</i>	1999
	<i>Pteridium esculentum</i>	2007
E	<i>Pterostylis melagrumma</i>	2007
	<i>Pterostylis nutans</i>	2007
	<i>Ptychomnion aciculare</i>	2007
V	<i>Pultenaea gunnii</i>	2007
	? <i>Rosulabryum billarderi</i>	2007
	<i>Rytidosperma laeve</i>	1999
	<i>Rytidosperma pallidum</i>	2007
	<i>Rytidosperma penicillatum</i>	2007
	<i>Rytidosperma racemosum</i>	2007
	<i>Schoenus apogon</i>	1999
	<i>Senecio glomeratus</i>	2007
	<i>Senecio hispidulus</i>	2007
E	<i>Senecio minimus</i>	2007
E	<i>Senecio prenanthoides</i>	2007
	<i>Senecio quadridentatus</i>	1999
V	<i>Solanum laciniatum</i>	1999
E	<i>Spyridium parvifolium</i>	2002
E	<i>Stackhousia monogyna</i>	2007
E	<i>Stylidium armeria/graminifolium</i>	2007
	<i>Tetrarrhena juncea</i>	2007
	<i>Themeda triandra</i>	2007
	<i>Thuidiopsis furfurosa</i>	2007
E	<i>Veronica calycina</i>	2007
E	<i>Viola hederacea</i>	2007
E	<i>Wahlenbergia gracilis</i>	1999
V	<i>Xanthorrhoea minor</i>	2007

Wicks East Nature Reserve Introduced Species

<i>Acacia floribunda</i>	<i>Crocsmia × crocosmiiflora</i>	<i>Paspalum dilatatum</i>
<i>Acacia ?prominens</i>	<i>Dactylis glomerata</i>	<i>Pennisetum clandestinum</i>
<i>Acetosella vulgaris</i>	<i>Ehrharta erecta</i>	<i>Pinus radiata</i>
<i>Agapanthus praecox</i>	<i>Erica lusitanica</i>	<i>Pittosporum undulatum</i>
<i>Agrostis capillaris</i>	<i>Fraxinus angustifolia</i>	<i>Plantago lanceolata</i>
<i>Aira</i> sp.	<i>Fumaria ?officinalis</i> spp. agg.	<i>Potentilla indica</i>
<i>Allium triquetrum</i>	<i>Galium aparine</i>	<i>Prunella vulgaris</i>
<i>Anagallis arvensis</i>	<i>Gamochaeta purpurea</i>	<i>Prunus cerasifera</i>
<i>Anthoxanthum odoratum</i>	<i>Hedera helix</i>	<i>Pseudoscleropodium purum</i>
<i>Asparagus scandens</i>	<i>Holcus lanatus</i>	<i>Romulea rosea</i>
<i>Aster subulatus</i>	<i>Homalanthus populifolius</i>	<i>Rubus anglocandicans</i>
<i>Briza maxima</i>	<i>Hypochoeris radicata</i>	<i>Solanum nigrum</i>
<i>Bromus catharticus</i>	<i>Ilex aquifolium</i>	<i>Solanum nigrum</i>
<i>Centaureum erythraea</i>	<i>Juncus capitatus</i>	<i>Sonchus oleraceus</i>
<i>Cerastium glomeratum</i> s.l.	? <i>Kniphofia uvaria</i>	<i>Sporobolus africanus</i>
<i>Cirsium vulgare</i>	<i>Leontodon taraxacoides</i>	<i>Stellaria media</i>
<i>Coleonema pulchellum</i>	<i>Lonicera japonica</i>	<i>Taraxacum officinale</i> spp. agg.
<i>Conyza ?sumatrensis</i>	<i>Lotus corniculatus</i>	<i>Tradescantia fluminensis</i>
<i>Coprosma robusta</i>	<i>Lotus subbiflorus</i>	<i>Trifolium repens</i>
<i>Cotoneaster glaucophyllus</i>	<i>Lotus uliginosus</i>	<i>Viburnum tinus</i>
<i>Cotoneaster pannosus</i>	<i>Myosotis sylvatica</i>	<i>Vicia hirsuta</i>
<i>Crepis capillaris</i>	<i>Oxalis incarnata</i>	

Notes concerning some of the locally threatened plant species

Acacia mucronata (Narrow-leaf Wattle). Scarce; confined to the verge of the Basin-Olinda Rd.

Acianthus ?caudatus (Mayfly Orchid). A record attributed to Gary Cheers (date unknown) by Andrew Paget in 1985.

Allocasuarina paludosa (Scrub Sheoak). Dozens of plants were found in Wicks Reserve, concentrated in the south.

Only one other plant has been found in the whole of Knox.

Asperula conferta (Common Woodruff). Several plants were found in the south of Wicks East Nature Reserve.

- Austrocynoglossum latifolium* (Forest Hound's-tongue). A single, thriving specimen was found in Wicks East.
- Blechnum cartilagineum* (Gristle Fern). One clump of about 3 individuals was found in Wicks East Nature Res.
- Cassinia trinerva* (Three-nerved Cassinia). Two mature plants in Wicks East Nature Reserve and one in Wicks Reserve next to Wicks Rd. This is one of only three known occurrences of the species in Knox.
- Centrolepis strigosa* (Hairy Centrolepis). Small numbers germinate each year in a mown part of Wicks Reserve.
- Chiloglottis reflexa* (Autumn Bird-orchid) – two thriving colonies at Wicks Reserve. The only known occurrence in Knox.
- Chiloglottis valida* (Common Bird-orchid). Many were found in Wicks East Nature Reserve.
- Coprosma hirtella* (Rough Coprosma). Five plants were found in Wicks Reserve.
- Cryptostylis leptochila* (Small Tongue-orchid). Approximately 60 plants were found, mostly in Wicks East.
- Cryptostylis subulata* (Large Tongue-orchid). Six plants were found, but others are probably present in Wicks Res.
- Cynoglossum suaveolens* (Sweet Hound's-tongue). Scarce; only found in the south of Wicks East Nature Res.
- Drosera pygmaea* (Tiny Sundew). Twelve plants observed in the Wet Heathland. The only occurrence in Knox.
- Empodisma minus* (Spreading Rope-rush). Abundant in the south of Wicks Reserve.
- Epacris impressa* pink-flowered form (pink Common Heath) – The only stronghold in Knox. Fifteen were counted but there may well be over two dozen, mostly in or near the Grassy Forest in Wicks Reserve.
- Gahnia sieberiana* (Red-fruit Saw-sedge). A large population, mainly in the north of Wicks Reserve.
- Galium gaudichaudii* (Rough Bedstraw). A few plants seen in each of the two reserves.
- Gastrodia sesamoides* (Cinnamon Bells). Many, concentrated southwest of the car park in Wicks Reserve.
- Geranium gardneri* (Rough Cranesbill). Small numbers found scattered in Wicks Reserve and Wicks East Nature Reserve.
- Gonocarpus micranthus* (Creeping Raspwort). Fifteen plants found, mainly in the Wet Heathland.
- Hakea nodosa* (Yellow Hakea). Two plants only were found.
- Hakea ulicina* (Furze Hakea). Three individuals in the southeastern corner of Wicks Reserve.
- Hydrocotyle geraniifolia* (Forest Pennywort). Approximately 20 plants are found each year in Wicks East Nature Res.
- Lagenophora stipitata* (Common Lagenophora). Only found in the south of Wicks East Nature Reserve, numbers not recorded.
- Lepidosperma filiforme* (Common Rapier-sedge). Over 20 plants were found in the Wet Heathland.
- Microtis ?parviflora* (Slender Onion-orchid). A few individuals appeared in a revegetation plot near the centre of Wicks East Nature Reserve.
- Olearia argophylla* (Musk Daisy-bush). A solitary individual in Wicks East Nature Reserve.
- Patersonia occidentalis* (Long Purple-flag). Approximately fifty plants are in Wicks Reserve, mostly near the Wet Heathland.
- Pterostylis longifolia* (= *P. melagramma*) (Tall Greenhood). Scarce; only found south of the car park.
- Pterostylis parviflora* (Tiny Greenhood). A record attributed to Gary Cheers (date unknown) by Mr Andrew Paget in 1985.
- Selaginella uliginosa* (Swamp Selaginella) – more than 25 plants found, mostly in the south of Wicks Reserve. The only known occurrence in Knox.
- Spyridium parvifolium* (Australian Dusty Miller). Very scarce, found only near the uphill (southern) boundary, in both reserves.
- Tetraria capillaris* (Hair-sedge). The only known occurrence in Knox.
- Thelymitra media* (Tall Sun-orchid). Four plants were found in the south of Wicks Reserve.
- Thysanotus tuberosus* (Common Fringe-lily). Only a few seen, in the Herb-rich Foothill Forest and Grassy Forest in Wicks Reserve.
- Veronica calycina* (Hairy Speedwell). Many were found in the south of Wicks East Nature Reserve.

Fauna of special significance

Australian King-Parrots are rather abundant. This species is listed by the Land Conservation Council (1991) as uncommon in the 'Melbourne Area District 2', which extends eastwards slightly beyond Walhalla.

The large numbers of *Gahnia sieberiana* plants support a large, breeding population of the locally rare Swordgrass Brown butterfly.

Because of the proximity to the large area of habitat in Dandenong Ranges National Park and Site 18, the reserves are bound to be occasionally visited by rare or threatened fauna from the park; e.g. Powerful Owl. The site provides only a small extension to the native habitat available for such species, by comparison with the national park.

Fauna habitat features

- There are large eucalypts with hollows that provide suitable roosting or nesting sites for certain fauna;
- The ground layer of dense grasses and sedges in much of the site is excellent habitat for butterflies and probably skippers that rely on such plants. A survey for skippers would be worthwhile;
- Nest boxes have been installed;

- A bird-feeding table is provided for picnickers to attract birds, but this is of questionable benefit to native birdlife.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity and Viability

Criterion 1.1.2 attributes **Local** significance to 'Areas of 100 ha or more of contiguous native vegetation in a heavily fragmented landscape', which applies to the contiguous native vegetation of which this site is part.

Vegetation Type and Condition

Grassy Forest and Swampy Woodland are regionally vulnerable EVCs and the representation of them in the reserve is in fair to good ecological condition. Habitat scores in the reserve determined by Cropper (2006) were above the threshold of 0.3 for 'High' conservation significance almost. It follows that the site **State** significance under criterion 3.2.3.

Similarly, Cropper (2006) found habitat scores to be in the range 0.54-0.58 within the regionally depleted EVC, Wet Heathland. This gives the site Regional significance. The other EVCs would lead to Local or Regional significance.

Rare or Threatened Plants

Most of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

The Powerful Owl is a vulnerable species in Victoria and is known to roost within several hundred metres of the site. It is also known to frequent nearby parts of the Dandenong ranges National Park and the vegetation in the site seems quite suitable as habitat for Powerful Owls. Criterion 3.1.3 confers **Regional** significance upon sites such as this.

Threats

- Damage to the Wet Heathland by trampling and breaking down of the tea-tree scrub;
- Decay of the Wet Heathland due to climate change and consequent drought;
- Invasion by environmental weeds as listed below, with asterisks marking those that are controlled under the *Catchment and Land Protection Act 1994*:
 - Serious: English Broom* (*Cytisus scoparius*), Sweet Pittosporum (*Pittosporum undulatum*);
 - Moderate: African Lily or Agapanthus (*Agapanthus praecox*), Brown-top Bent (*Agrostis capillaris*), Sweet Vernal-grass (*Anthoxanthum odoratum*), Pampas Grass (*Cortaderia selloana*), Cotoneaster (*Cotoneaster glaucophyllus*), Montbretia (*Crocsmia ×crocsmiiflora*), Spanish Heath* (*Erica lusitanica*), Cleavers (*Galium aparine*), Montpellier Broom* (*Genista monspessulana*), Ivy (*Hedera helix*), Cat's Ear (*Hypochoeris radicata*), Japanese Honeysuckle (*Lonicera japonica*), Pale Wood-sorrel (*Oxalis incarnata*), Blackberry* (*Rubus discolor*) and Tiny Vetch (*Vicia hirsuta*);
- Damage to native vegetation and spread of *Oxalis* weeds due to slashing in the Grassy Forest of Wicks East Nature Reserve;
- Rabbits in Wicks East Nature Reserve;
- Horses, causing trampling of vegetation and spread of weeds in Wicks East Nature Reserve.

Management issues

- Knox City Council's current management regimen is part of a regular monitoring program; see '*Monitoring of Bushland Reserves in Knox*' and '*Monitoring of Bushland Reserves in Knox – 2002 Review*', both by Dr Lorimer for Knox City Council;
- Revegetation is required in the area around the recently removed large pines marked on the aerial photograph (p. 74);
- Slashing should cease in and near the dense colony of *Cryptostylis leptochila* in the Grassy Forest of Wicks East Nature Reserve;
- It appears that the continual trampling and damage which has been done to the Wet Heathland may be abating due to police patrols. In case this does not solve the problem, a fence should be erected to deter the perpetrators;
- The identity of the dense and widespread *Oxalis incarnata* and/or *Oxalis pes-caprae* (particularly in Wicks East Nature Reserve) should be established during flowering time (spring), and options should be explored for its control;
- The feasibility, cost and likely efficacy of rabbit control should be investigated, including consideration of cooperative action with neighbours to the east;

- A strip along the western margin of Wicks Reserve was burned in 2003 or early 2004. Many brooms are germinating and it will be very important to kill them before they reach reproductive maturity. Other weeds may also need attention.

Administration matters

- It would be desirable to have an expert on skippers (insects that are intermediate between butterflies and moths) survey the site in spring and summer, due to the distinct possibility that rare species are present;
- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its State significance, the threatened EVCs, the intact areas of native vegetation with all strata present, the large number of significant plant species, the richness of the site's native vegetation and the habitat that it provides for fauna;
- The reserves are zoned 'Public Park and Recreation Zone' (PPRZ), the Basin-Olinda Rd reservation is zoned Road Zone Category 1 (RDZ1) and the Wicks Rd reservation is zoned 'Low Density Residential Zone' (LDRZ) like the abutting residential properties;
- The Wicks Rd reservation is inside the Urban Growth Boundary and the rest of the site is outside (but bordering) the Urban Growth Boundary;
- The site is included under the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme and the Significant Landscape Overlay Schedule 2 covers the narrow strip along the western edge. The latter seems anomalous;
- The site was recognised by Water Ecoscience (1998) as their Site 2, but the report seems to have mixed up features of this site with their Site 1 (W.G. Morris Reserve, Wantirna).

Information sources used in this assessment

- A report on the reserves' flora and fauna by Cropper (2006), including habitat scores;
- An investigation of the roadside verge of the Basin-Olinda Rd by Dr Lorimer on 12/9/97 to delineate vegetation communities, assess their ecological condition, compile lists of flora and fauna, document populations of rare plants and assess management issues, as reported by Lorimer G.S. (1998), *'A Survey and Management Strategy for Significant Roadsides in Knox'*, for Knox City Council;
- Detailed flora data compiled during several days of fieldwork between November 1998 and February 1999 by Dr Lorimer for the report, *'Monitoring of Bushland Reserves in Knox'* (for Knox City Council), including (in part) compilation of lists of indigenous and introduced plant species in each of six parts of the sites (based mainly on vegetation types), population details of uncommon plants, four quadrats and a set of photographs;
- A reinspection of the site by Dr Lorimer lasting five hours on 16/7/04 to fill gaps between the above data and this study's standard data-gathering specifications discussed in Section 2.4 of Volume 1. This particularly focused on delineation of EVCs, determination of the vegetation's ecological condition and the severity of weeds;
- Surveys of the site by Dr Lorimer for *'Monitoring of Bushland Reserves in Knox – 2002 Review'* (Lorimer 2002) and *'Monitoring of Bushland Reserves in Knox – 2007 Review'* (Lorimer 2007a) for Knox City Council;
- Teaching visits to Wicks Reserve by Dr Lorimer and groups of students each December for approximately eight years;
- Incidental fauna records (birds and butterflies) from the above projects;
- Data from eight quadrats (DSE numbers N13234-N13241) compiled by Mr Andrew Paget in March and April 1985, in which all species have been recorded recently by Dr Lorimer;
- A list of plant species compiled by Mr Gary Cheers, as reported by Paget (1985);
- A Deakin University student's project report by Kath Davies in 1996 titled *'Wicks Reserve Draft Management Plan'*;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 16. Inverness Avenue Reserve, The Basin

Bushland on a broad road verge at the corner of Mountain Hwy, with the Dandenong Ranges National Park opposite. Melway ref. 65 J10.

Site Significance Level: *State*

- Most of the site supports the regionally Vulnerable Ecological Vegetation Class, Grassy Forest, much of which is in good ecological condition;
- The flora are uncommonly rich for Knox;
- There are six plant species that are threatened in Knox, two of which are also rare or threatened in the whole Melbourne area;
- The site represents a small extension to the flora and fauna habitat of the neighbouring Dandenong Ranges National Park;
- A variety of fauna found in the national park, including rare species, are likely to periodically use the reserve.



Boundaries

This site comprises the two areas outlined in red above - 2,008 m² east of Inverness Av and 785 m² to the west. Boundaries along Inverness Av follow the kerbs. The western extremity corresponds to the current eastern edge of a driveway. The eastern boundary is the alignment of the eastern boundary of 62 Inverness Av (the property occupied by the house with the green roof on the aerial photograph). The remaining boundaries are property boundaries.

Land use & tenure: Council reserve and road reserve, partly serving as roadside verge and partly used by neighbours for domestic purposes (e.g. driveway, parking, planting, woodheap, garden waste).

Site description

This site is on the lower, north-facing slope of One Tree Hill. It has a moderately steep slope of 20-25% (excluding the steep embankment of Mountain Hwy) and an elevation range of 238-257 m. The slope is substantially steeper between this elevation and the summit of One Tree Hill, which results in the site having higher soil moisture than would otherwise be the case. The soil is an acidic, orange clay loam derived from the Ferny Creek rhyodacite formation – the uppermost volcanic stratum of the Dandenong Ranges.

The ecological condition of the vegetation was very good when it was inspected by the author in December 1997. Since then, a neighbour has cleared part of the site for their own use, including a second driveway. Some indigenous plants were removed to facilitate planting of the environmental weed, *Agapanthus*.

Nevertheless, few if any indigenous plant species have been totally removed from the site between 1997 and the author's last detailed inspection in September 2009. Substantial numbers of orchids remain present.

Relationship to other land

The Dandenong Ranges National Park, on the opposite side of Mountain Hwy, is of high National significance for its native vegetation and wildlife. Its presence greatly increases the security of the flora in the reserve, because seeds and pollen from the park no doubt enter the reserve and hence prevent inbreeding of flora. Many birds were observed crossing the highway, which is also the municipal boundary.

The whole of the surrounding residential area is included in Site 99, the Dandenong Ranges Buffer area.

The reserve's conservation values have suffered greatly from its location next to 62 Inverness Av, whose owners (past or present) have used the reserve for clearing, driveway construction, brushcutting, inappropriate gardening, dumping of garden waste and rubbish, vehicle parking, firewood storage and similar activities. Serious weeds have established as a result of vegetation disturbance during construction of driveways.

A much smaller level of environmental impact has arisen from use of the western part of the site by the adjoining landholders.

Bioregion: Highlands Southern Fall

Habitat types

Grassy Forest (EVC 128, **regionally Vulnerable**) with minor influences of the Herb-rich Foothill Forest immediately to the west. The area measures 2,700 m², of which it is estimated that 1,200 m² is in good ecological condition (rating B), 900 m² is in fair ecological condition (rating C) and 600 m² is in poor ecological condition (rating D).

Dominant canopy trees: *Eucalyptus macrorhyncha* with somewhat fewer *E. obliqua*, *E. goniocalyx* and *E. radiata*. *E. cypellocarpa* is scarce in the east and more common westward with transition toward Herb-rich Foothill Forest.

Dominant lower trees: *Exocarpos cupressiformis* are typically 7 m apart, interspersed with smaller numbers of *Acacia melanoxylon*. There is a *Pomaderris aspera* that can be interpreted as an outlier of the neighbouring Damp Forest and Herb-rich Foothill Forest.

Shrubs: Depleted by manual removal. Dominated by *Acacia stricta*, *Goodenia ovata*, *Pultenaea scabra*, *Cassinia aculeata*, *Leptospermum continentale*. Also present are *Olearia lirata*, *Polyscias sambucifolia*, *Spyridium parvifolium* and two *Exocarpos strictus*.

Vines: *Clematis aristata*, *Glycine clandestina*, *Comesperma volubile* and *Pandorea pandorana* are present.

Ferns: There are patches of *Adiantum aethiopicum* and *Pteridium esculentum*.

Ground flora: 80% ground coverage. Dominated by *Rytidosperma pallidum*, *Poa morrisii*, *Tetrarrhena juncea*, *Lepidosperma laterale* and patches of *Gahnia radula*, as well as *Poa ensiformis* in the west. There are also abundant *Acrotriche prostrata*, *Gonocarpus tetragynus*, *Goodenia lanata*, *Thysanotus tuberosus* and *Viola hederacea*. *Dipodium roseum* is present in reasonable numbers, as is typically the case in Grassy Forest in the Dandenong Ranges.

Plant species

The author has observed the following plant species in the site, mostly in 2009. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Acacia leprosa* (Dandenong Range variant) is rare nationally and species whose names are in bold are rare throughout the Melbourne region.

Risk	Indigenous Species
V	<i>Acacia leprosa</i> (Dandenong Range variant)
V	<i>Acacia melanoxylon</i>
E	<i>Acacia stricta</i>
V	<i>Acacia verticillata</i>
V	<i>Acrotriche prostrata</i>
V	<i>Adiantum aethiopicum</i>
	<i>Austrostipa pubinodis</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>
	<i>Billardiera mutabilis</i>
V	<i>Caesia parviflora</i>

Risk	Indigenous Species
	<i>Campylopus introflexus</i>
	<i>Carex breviculmis</i>
	<i>Cassinia aculeata</i>
V	<i>Cassinia longifolia</i>
E	<i>Cassytha pubescens</i>
V	<i>Clematis aristata</i>
V	<i>Comesperma volubile</i>
V	<i>Coprosma quadrifida</i>
E	<i>Cryptostylis leptochila</i>
	<i>Deyeuxia quadriseta</i>

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Dianella admixta</i>		<i>Lomandra longifolia</i>
V	<i>Dianella tasmanica</i>		<i>Microlaena stipoides</i>
	<i>Dichelachne rara</i>	V	<i>Olearia lirata</i>
E	<i>Dipodium roseum</i>	V	<i>Opercularia varia</i>
V	<i>Drosera peltata</i> subsp. <i>auriculata</i>	V+	<i>Orchidaceae</i> sp.
V	<i>Epacris impressa</i>		<i>Oxalis exilis/perennans</i>
V	<i>Eucalyptus cypellocarpa</i>	E	<i>Ozothamnus ferrugineus</i>
	<i>Eucalyptus goniocalyx</i>		<i>Pandorea pandorana</i>
E	<i>Eucalyptus macrorhyncha</i>	C	<i>Pelargonium inodorum</i>
V	<i>Eucalyptus obliqua</i>	C	<i>Pimelea axiflora</i>
E	<i>Eucalyptus radiata</i>	V	<i>Pimelea humilis</i>
V	<i>Euchiton collinus</i>	V	<i>Platylobium formosum</i>
V	<i>Exocarpos cupressiformis</i>		<i>Poa ensiformis</i>
E	<i>Exocarpos strictus</i>		<i>Poa morrisii</i>
	<i>Gahnia radula</i>	E	<i>Polyscias sambucifolia</i>
E	<i>Gahnia sieberiana</i>	E	<i>Pomaderris aspera</i>
E	<i>Galium gaudichaudii</i>		<i>Pteridium esculentum</i>
V	<i>Glycine clandestina</i>	E	<i>Pterostylis melagramma</i>
	<i>Gonocarpus tetragynus</i>	C	<i>Pultenaea scabra</i>
	<i>Goodenia lanata</i>		<i>Rytidosperma laeve</i>
	<i>Goodenia ovata</i>		<i>Rytidosperma pallidum</i>
C	<i>Hakea nodosa</i>		<i>Rytidosperma penicillatum</i>
V	<i>Helichrysum scorpioides</i>		<i>Rytidosperma setaceum</i>
E	<i>Hypericum gramineum</i>		<i>Schoenus apogon</i>
E	<i>Imperata cylindrica</i>		<i>Senecio glomeratus</i>
E	<i>Indigofera australis</i>		<i>Senecio hispidulus</i>
	<i>Juncus amabilis</i>	E	<i>Senecio prenanthoides</i>
	<i>Juncus pallidus</i>		<i>Senecio quadridentatus</i>
	<i>Kunzea ericoides</i> spp. agg.	E	<i>Spyridium parvifolium</i>
C	<i>Lachnagrostis aemula</i> s.l.	E	<i>Stackhousia monogyna</i>
	<i>Lachnagrostis filiformis</i>	E	<i>Stylidium armeria/graminifolium</i>
E	<i>Lagenophora stipitata</i>		<i>Tetrarrhena juncea</i>
V	<i>Lepidosperma laterale</i>		<i>Themeda triandra</i>
	<i>Leptospermum continentale</i>	E	<i>Thysanotus tuberosus</i>
C	<i>Lobelia gibbosa</i>	E	<i>Viola hederacea</i>
	<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	E	<i>Wahlenbergia gracilis</i>
	<i>Lomandra filiformis</i> subsp. <i>filiformis</i>	V	<i>Xanthorrhoea minor</i>

Introduced Species

<i>Agapanthus praecox</i>	<i>Cytisus scoparius</i>	<i>Oxalis pes-caprae</i>
<i>Agrostis capillaris</i>	<i>Dactylis glomerata</i>	<i>Paspalum dilatatum</i>
<i>Allium triquetrum</i>	<i>Danthonia procumbens</i>	<i>Pennisetum clandestinum</i>
<i>Anthoxanthum odoratum</i>	<i>Daucus carota</i>	<i>Piptatherum miliaceum</i>
<i>Asparagus scandens</i>	<i>Ehrharta erecta</i>	<i>Pittosporum undulatum</i>
<i>Billardiera heterophylla</i>	<i>Erica lusitanica</i>	<i>Plantago lanceolata</i>
<i>Centaureum erythraea</i>	<i>Galium aparine</i>	<i>Prunus cerasifera</i>
<i>Chamaecytisus palmensis</i>	<i>Genista monspessulana</i>	<i>Rubus anglocandicans</i>
<i>Conyza</i> sp.	<i>Hedera helix</i>	<i>Sonchus oleraceus</i>
<i>Cortaderia selloana</i>	<i>Hypochoeris radicata</i>	<i>Ulex europaeus</i>
<i>Cotoneaster glaucophyllus</i>	<i>Lonicera japonica</i>	<i>Vicia hirsuta</i>
<i>Crocsmia</i> × <i>crocsmiiflora</i>	<i>Oxalis incarnata</i>	

Notes concerning some of the locally threatened plant species

Agrostis aemula (Purplish Blown Grass). Not seen in the 2002 inspection, but likely to reappear occasionally.

Cryptostylis ?subulata (Large Tongue-orchid). One concolorous leaf seen.

Cryptostylis leptochila (Small Tongue-orchid). Dozens seen in 1997; nine seen in 2002 (due to the time of year).

Gahnia sieberiana (Red-fruit Saw-sedge). One plant, out of its usual habitat.

Galium gaudichaudii (Rough Bedstraw). Six plants counted in 2002.

Lobelia gibbosa (Tall Lobelia). Only two dead stems seen, which was on 31st May 2002.

Pimelea axiflora (Bootlace Bush). Scant, representing outliers from neighbouring Herb-rich Foothill Forest

Pterostylis melagramma (Tall Greenhood). Two plants seen in 2002.

Pultenaea scabra (Rough Bush-pea). Abundant, one of the dominant shrubs on this site.

Thysanotus tuberosus (Common Fringe-lily). Abundant, probably the largest population in Knox.

Fauna of special significance

Australian King-Parrots are rather abundant. This species is listed by the Land Conservation Council (1991) as uncommon in the 'Melbourne Area District 2', which extends eastwards slightly beyond Walhalla.

Short-beaked Echidnas and Black Wallaby droppings were observed on the opposite side of Mountain Hwy and probably visit the reserve occasionally.

Because of the proximity to the Dandenong Ranges National Park, the site is bound to be regularly visited by various rare or threatened fauna from the park; e.g. Powerful Owl. The site provides a small extension to the native habitat available for such species.

Fauna habitat features

- There are large eucalypts with hollows that provide suitable roosting or nesting sites for certain fauna;
- The grassy ground layer is excellent habitat for reptiles and grass-reliant butterflies such as Xenicas and Common Browns, except that brushcutting and domestic activities by neighbours would kill or displace some such fauna;
- This type of vegetation has been observed in nearby Montrose to be excellent ant habitat, but no survey was done on this site.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Vegetation type and condition

Grassy Forest is a regionally vulnerable EVC and the representation of it in the reserve is in fair to good ecological condition. No habitat score has been determined, but it is clear that a score above 0.3 would apply to most of the site. It would then follow from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that the Grassy Forest vegetation is of at least High conservation significance. This, in turn, gives the site **State** significance under criterion 3.2.3 of Amos (2004).

Rare or Threatened Flora

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Damage to the native vegetation by use of the reserve for domestic purposes by the neighbours;
- Invasion by environmental weeds as listed below, with asterisks marking those that are controlled under the *Catchment and Land Protection Act 1994*:
 - Serious: English Broom* (*Cytisus scoparius*) invading the reserve from the weedy embankment of Mountain Hwy, as well as Sweet Pittosporum (*Pittosporum undulatum*); and
 - Moderate: African Lily or Agapanthus (*Agapanthus praecox*), Brown-top Bent (*Agrostis capillaris*), Sweet Vernal-grass (*Anthoxanthum odoratum*), Pampas Grass (*Cortaderia selloana*), Cotoneaster (*Cotoneaster glaucophyllus*), Montbretia (*Crocasmia ×crocosmiflora*), Spanish Heath* (*Erica lusitanica*), Cleavers (*Galium aparine*), Montpellier Broom* (*Genista monspessulana*), Ivy (*Hedera helix*), Cat's Ear (*Hypochoeris radicata*), Japanese Honeysuckle (*Lonicera japonica*), Pale Wood-sorrel (*Oxalis incarnata*), Blackberry* (*Rubus discolor*) and Tiny Vetch (*Vicia hirsuta*).

Management issues

- The effectiveness of any land management by Council will be greatly diminished as long as neighbours use the reserve for domestic purposes;
- Weed control should have two focuses: preventing serious weeds on the embankment of Mountain Hwy from migrating downhill into the intact understorey; and hand weeding elsewhere. The planted Agapanthus should also be dug out;
- The site's fire risk needs to be managed, and this can be done harmoniously with proper care of the native vegetation. Careful brushcutting in the Christmas - New Year period would be appropriate, ideally combined with burning at the same time that Parks Victoria burns the national park over the road;
- The neighbours' stockpiling of firewood on the reserve may provide habitat for fauna but it could be hazardous in case of fire.

Administration matters

- The most important measure to conserve the site's State significance is to remove damaging domestic uses from the land. Fences between the site and the adjacent residential properties would help. The need for the house to have two driveways through the reserve's State-significant forest should be critically reconsidered;
- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the threatened EVC, the significant plant species, the richness of the site's native vegetation and the habitat that it provides for fauna;
- The part of the reserve west of 62 Inverness Av is zoned 'Low Density Residential Zone', despite it being a Council reserve. The remainder of the site is zoned 'Public Park and Recreation Zone';
- The site is included under the existing Vegetation Protection Overlay Schedule 1 and of the Knox Planning Scheme and the Significant Landscape Overlay Schedule 2 covers the part of the site west of 62 Inverness Av;
- The site was included in 'Composite Area A' by Water Ecoscience (1998) without any substantial assessment.

Information sources used in this assessment

- A site survey undertaken during this study by Dr Lorimer on 31/5/02 using this study's standard procedures discussed in Section 2.4 of Volume 1. This included a description of the vegetation composition, compilation of lists of indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats and management issues;
- Discussions with the neighbouring landowners on the same occasion;
- Another botanical survey by Dr Lorimer on 2/9/09, expanded to include more detailed assessment of the area west of Inverness Avenue (including a list of plant species and their abundances);
- A prior investigation of the site by Dr Lorimer on 23/12/97 for *A Survey and Management Strategy for Significant Roadside Vegetation in Knox* (published by Knox City Council in May 1998). This included compilation of a list of flora species;
- A brief viewing of the site by Dr Lorimer on 16/7/04, which confirmed the ongoing use of the land by the neighbours;
- Aerial photography from February 2001, April 2003, January 2009 and December 2009;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 17. 'The Ravine', The Basin

A creek corridor whose Damp Forest provides a distinctive Dandenong Ranges atmosphere. Melway ref. 65 K9.

Site Significance Level: *Local*

- Contains Damp Forest with very large trees, some native understorey and extensive (but reducing) weed invasion;
- There are six plant species that are threatened in Knox and eight that are rare or threatened in the whole Melbourne area;
- The site represents a small extension to the flora and fauna habitat of the abutting Dandenong Ranges National Park;
- A range of fauna found in the national park, including rare species, are likely to periodically use the reserve.



Boundaries

This 2.25 hectare site is outlined in red on the aerial photograph above. Its boundaries coincide with property boundaries except the downstream (northwest) creek crossing, where a straight line is drawn between two property corners. The site includes private properties with native vegetation that forms part of the continuous corridor of native vegetation along the creek. A few of these properties retain no more native vegetation than a few indigenous trees at one end of their lots.

Land use & tenure: Residential land zoned 'Low Density Residential Zone' (LDRZ) and a reserve zoned Public Park and Recreation Zone (PPRZ) for Golden Grove and the adjacent creek.

Site description

This site follows a corridor of tall Damp Forest along a tributary of Dobsons Creek, at elevations of 198-228 m. The valley has historically been known as The Ravine*. The creek has carved a steep-sided channel several metres deep (hardly a true ravine), and Golden Grove has been constructed on the western bank, raised above the natural ground level. Above the eastern bank, the hillside has a slope of almost 30%, facing west. The slope west of Golden Grove faces north and is much shallower, at 10%.

The soil is an acidic, orange clay loam derived from the Ferny Creek rhyodacite formation. The uppermost volcanic stratum of the Dandenong Ranges.

Despite rampant weed invasion that pervades the understorey and climbs into some of the trees, the site retains populations of some plant species that are very rare or threatened in Knox. The rarity of these species results from the paucity in Knox of the Ecological Vegetation Class represented here (Damp Forest). The species and the EVC are much more common in the wetter parts of the Dandenong Ranges.

Road construction, residential development and weed invasion have decimated the shrub layer. Trees have been removed for the same reasons, but some of the remaining trees are very large and old. These trees and the tree ferns along the creek create the distinctive atmosphere of gullies in the Dandenong Ranges.

As is common in wet gullies, the worst weeds are vines such as Ivy, Wandering Jew and Banana Passionfruit.

A program of extensive weed control was under way in The Ravine when it was inspected for this report in 2008. A substantial fraction of the weeds had been removed, along with some inadvertent destruction of indigenous plants. Seeds were germinating in the exposed soil, including locally rare plants such as *Hydrocotyle geraniifolia* as well as weeds. The success of this program will depend on the extent of follow-up weed control. If successful, the site's conservation significance will increase (along with the site's undoubted scenic qualities).

Some of the private properties in the site retain most of the natural tree canopy and some understorey. Some others retain only a few remnant trees. Some also harbour serious environmental weeds, as does the reserve.

Relationship to other land

The Dandenong Ranges National Park, immediately east of this site, is of high National significance for its native vegetation and wildlife. Its presence greatly increases the security of the flora in the reserve, because seeds and pollen from the park no doubt enter the reserve and hence prevent inbreeding of flora. Extensive movement of fauna was observed between the site and the park.

The degree of weed invasion in the national park is lower than along Golden Grove, but there is still a large reservoir of weeds whose seeds and fragments migrate down the creek into the site. Any weed control work in the site would benefit greatly from complementary weed control work in the national park to reduce the rate of re-infestation. Conversely, weeds with seeds dispersed by birds, such as Sweet Pittosporums and Cestrum, are presently migrating in both directions along the creek, so any weed control work in the national park would benefit from complementary work along Golden Grove and the surrounding private properties.

The part of the national park that abuts this site is also part of Site 18 (The Basin - Sassafras Forest Precinct) and the whole of the surrounding residential area is included in Site 99 (the Dandenong Ranges Buffer area).

Bioregion: Highlands Southern Fall

Habitat types

Damp Forest (EVC 29, conservation status listed as of 'Least Concern' in the bioregion): 1.4 ha, of which approximately 10% (0.4 ha) is in fair ecological condition (rating C) and the remainder (1.26 ha) is in poor ecological condition (rating D).

Dominant canopy trees: *Eucalyptus cypellocarpa* with a few *E. obliqua* and *E. radiata*. Some trees are very large.

* 'Fire on the Hill, Flowers in the Valley – The Basin, 1868-1992' by Rick Coxhill, published by The Basin Progress Association, 1992.

Lower trees: *Acacia melanoxylon* and *Pomaderris aspera* are abundant. *Acacia dealbata* is also conspicuous. The characteristic species *Bedfordia arborescens* and *Olearia argophylla* are present but scarce.

Shrubs: Clearing and weed invasion have reduced the indigenous shrubs to very sparse *Coprosma quadrifida*, *Ozothamnus ferrugineus*, *Pimelea axiflora* and *Sigesbeckia orientalis*.

Vines: Vine weeds are very abundant, dominated by *Delairea odorata*, *Hedera helix* and *Passiflora mollissima*. Indigenous vines are represented by *Clematis aristata*, *Pandorea pandorana* and a solitary *Calystegia marginata*. There is also the climbing grass, *Tetrarrhena juncea*.

Ferns: Very abundant, dominated by *Cyathea australis* and *Calochlaena dubia*, and with many *Dicksonia antarctica*. *Adiantum aethiopicum* and *Blechnum cartilagineum*.

Ground flora: Low in species-richness. Dominated by the weeds *Tradescantia albiflora* and *Delairea odorata*. The dominant indigenous species are the ferns mentioned above and the grass, *Poa ensiformis*. *Tetrarrhena juncea*, often along with *Poa ensiformis*. *Dianella tasmanica* is a good ecological indicator species.

Plant species

The following plant species were observed in the years indicated by the final column. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, the species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
	<i>Acacia dealbata</i>	2002	E	<i>Hydrocotyle geraniifolia</i>	2008
V	<i>Acacia melanoxylon</i>	2002	V	<i>Isolepis inundata</i>	2002
	<i>Acaena novae-zelandiae</i>	1997	E	<i>Juncus procerus</i>	2002
V	<i>Adiantum aethiopicum</i>	2002		<i>Lepidosperma elatius</i>	2002
C	<i>Bedfordia arborescens</i>	2002		<i>Microlaena stipoides</i>	1997
E	<i>Blechnum cartilagineum</i>	2002	E	<i>Olearia argophylla</i>	1997
E	<i>Blechnum nudum</i>	2008		<i>Oxalis exilis/perennans</i>	1997
V	<i>Calochlaena dubia</i>	2002	E	<i>Ozothamnus ferrugineus</i>	1997
E	<i>Calystegia marginata</i>	2002		<i>Pandorea pandorana</i>	2002
V	<i>Clematis aristata</i>	2008		<i>Persicaria decipiens</i>	1997
V	<i>Coprosma quadrifida</i>	2002	C	<i>Pimelea axiflora</i>	2002
E	<i>Cyathea australis</i>	2002		<i>Poa ensiformis</i>	2002
V	<i>Dianella tasmanica</i>	1997	E	<i>Pomaderris aspera</i>	2002
E	<i>Dicksonia antarctica</i>	2002	E	<i>Prostanthera lasianthos</i>	1997
V	<i>Eucalyptus cypellocarpa</i>	2002		<i>Pteridium esculentum</i>	1997
V	<i>Eucalyptus obliqua</i>	2002		<i>Rytidosperma racemosum</i>	1997
E	<i>Eucalyptus radiata</i>	2002		<i>Senecio hispidulus</i>	1997
	<i>Gahnia radula</i>	1997	C	<i>Sigesbeckia orientalis</i>	2008
C	<i>Geranium homeanum</i>	2002	C	<i>Stellaria flaccida</i>	2002
C	<i>Histiopteris incisa</i>	2008		<i>Tetrarrhena juncea</i>	2002

Introduced Species

<i>Allium triquetrum</i>	<i>Delairea odorata</i>	<i>Pittosporum undulatum</i>
<i>Asparagus scandens</i>	<i>Ehrharta erecta</i>	<i>Prunus laurocerasus</i>
<i>Cestrum elegans</i>	<i>Hedera helix</i>	<i>Ranunculus repens</i>
<i>Coprosma repens</i>	<i>Hypericum tetrapterum</i>	<i>Rubus anglocandicans</i>
<i>Coprosma robusta</i>	<i>Jasminum polyanthemum</i>	<i>Selaginella kraussiana</i>
<i>Cortaderia selloana</i>	<i>Lonicera japonica</i>	<i>Tradescantia fluminensis</i>
<i>Cotoneaster glaucophyllus</i>	<i>Oxalis incarnata</i>	<i>Zantedeschia aethiopica</i>
<i>Crocsmia × crocosmiiflora</i>	<i>Passiflora tarminiana</i>	
<i>Dactylis glomerata</i>	<i>Pennisetum clandestinum</i>	

Notes concerning some of the locally threatened plant species

Bedfordia arborescens (Blanket-leaf). Scarce, but more abundant just upstream in the national park.

Blechnum cartilagineum (Gristle Fern). Numbers not recorded, but appearing secure and known to be abundant nearby in the national park.

Blechnum nudum (Fishbone Water-fern). Several, first found on 10/3/08 following weed removal.

Calystegia marginata (Forest Bindweed). A solitary plant, but probably more abundant just upstream.

Dicksonia antarctica (Soft Tree-fern). Abundant.

Hydrocotyle geraniifolia (Forest Pennywort). First found in exposed soil on 10/3/08. No search was conducted to determine the population size, but only one was seen.

Olearia argophylla (Musk Daisy-bush). Very scarce.

Pimelea axiflora (Bootlace Bush). Numbers not recorded, but abundant in the adjacent national park.

Sigesbeckia orientalis (Indian Weed). Only one seen, but likely to turn up frequently in the right conditions.

Stellaria flaccida (Forest Starwort). Formerly growing densely on the fence at 10 Golden Grove but not visible in 2008.

Fauna of special significance

Australian King-Parrots are rather abundant. This species is listed by the Land Conservation Council (1991) as uncommon in the 'Melbourne Area District 2', which extends eastwards slightly beyond Walhalla.

The Eastern Whipbird, observed during fieldwork, is very uncommon in Knox, but more common in the adjacent national park.

Because of the proximity to the Dandenong Ranges National Park, the site is bound to be regularly visited by various rare or threatened fauna from the park, including Powerful Owl. The site provides a small extension to the native habitat available for such species.

Fauna habitat features

- There are very large eucalypts with hollows that provide suitable roosting or nesting sites for certain fauna;
- The stream may provide habitat for important fauna, based on the presence of the rare Dandenong Freshwater Amphipod nearby on Dobsons Creek. No stream survey has been done to check.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment'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 this site. Criterion 1.2.6 might also be taken to accord Local significance to the site as 'Important at local scale - Link between individual remnant habitat blocks or within subcatchment'.

Vegetation Type and Condition

Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) states that vegetation of an EVC rated as 'Least Concern' (as in this case) is of either Medium or Low conservation significance, depending on whether the habitat score is above or below 0.6. Although no habitat score has been determined in this site, it seems likely that the highest habitat score in the site would be below 0.6, corresponding to a Low conservation significance. This, in turn, confers **Local** significance on the site under criterion 3.2.3.

If the site's significance rating were to become an important issue, the habitat score of the best native vegetation would have to be determined by fieldwork to see whether it really is below the threshold of 0.6.

Rare or Threatened Plants

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Invasion by environmental weeds as listed below, with asterisks marking those that are controlled under the *Catchment and Land Protection Act 1994*:
 - Very serious: Cape Ivy (*Delairea odorata*), Ivy (*Hedera helix*), Wandering Jew (*Tradescantia albiflora*);
 - Serious: Angled Onion* (*Allium triquetrum*), Red Cestrum (*Cestrum elegans*), Banana Passionfruit (*Passiflora mollissima*), Kikuyu Grass (*Pennisetum clandestinum*);
 - Moderate: Asparagus fern (*Asparagus scandens*), Montbretia (*Crocasmia × crocosmiiflora*), Cocksfoot (*Dactylis glomerata*), Panic Veldt-grass (*Ehrharta erecta*), Pale Wood-sorrel (*Oxalis incarnata*), Sweet Pittosporum (*Pittosporum undulatum*), Creeping Buttercup (*Ranunculus repens*), Blackberry* (*Rubus discolor*), Garden Selaginella (*Selaginella kraussiana*) and White Arum Lily (*Zantedeschia aethiopica*).
- Dumping of weeds in garden waste.

Management issues

- The combination of occasional floodwaters and a huge reservoir of weed seeds around the site means that weeds will tend to reinfest the site fairly quickly after weed control work. Nevertheless, this should not discourage putting some effort into restraining the worst and most tractable weeds. For example, it is desirable to periodically cut the climbing stems of the very serious vine weeds before they smother their host plants, even though this will not kill the weeds. The

most significant species of plants should receive highest priority for removal of vine weeds. Angled Onion may be gradually reduced in severity on the slopes of the embankment beside Golden Grove by appropriate use of herbicide, commencing at the upstream end and on the upper slope near the street. Additional weed control advice would require a more detailed investigation of the site than is possible in this study.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the reasons listed above for attributing it Local significance and because it has a substantial amount of understorey (including locally significant species);
- The reserve for the road and creek is zoned 'Public Park and Recreation Zone' and the private land is zoned 'Low Density Residential Zone';
- The site is included under the existing Vegetation Protection Overlay Schedule 1 and Significant Landscape Overlay Schedule 2 of the Knox Planning Scheme;
- The site was described by Water Ecoscience (1998) under the title 'Site 37. Golden Grove Creekside'.

Information sources used in this assessment

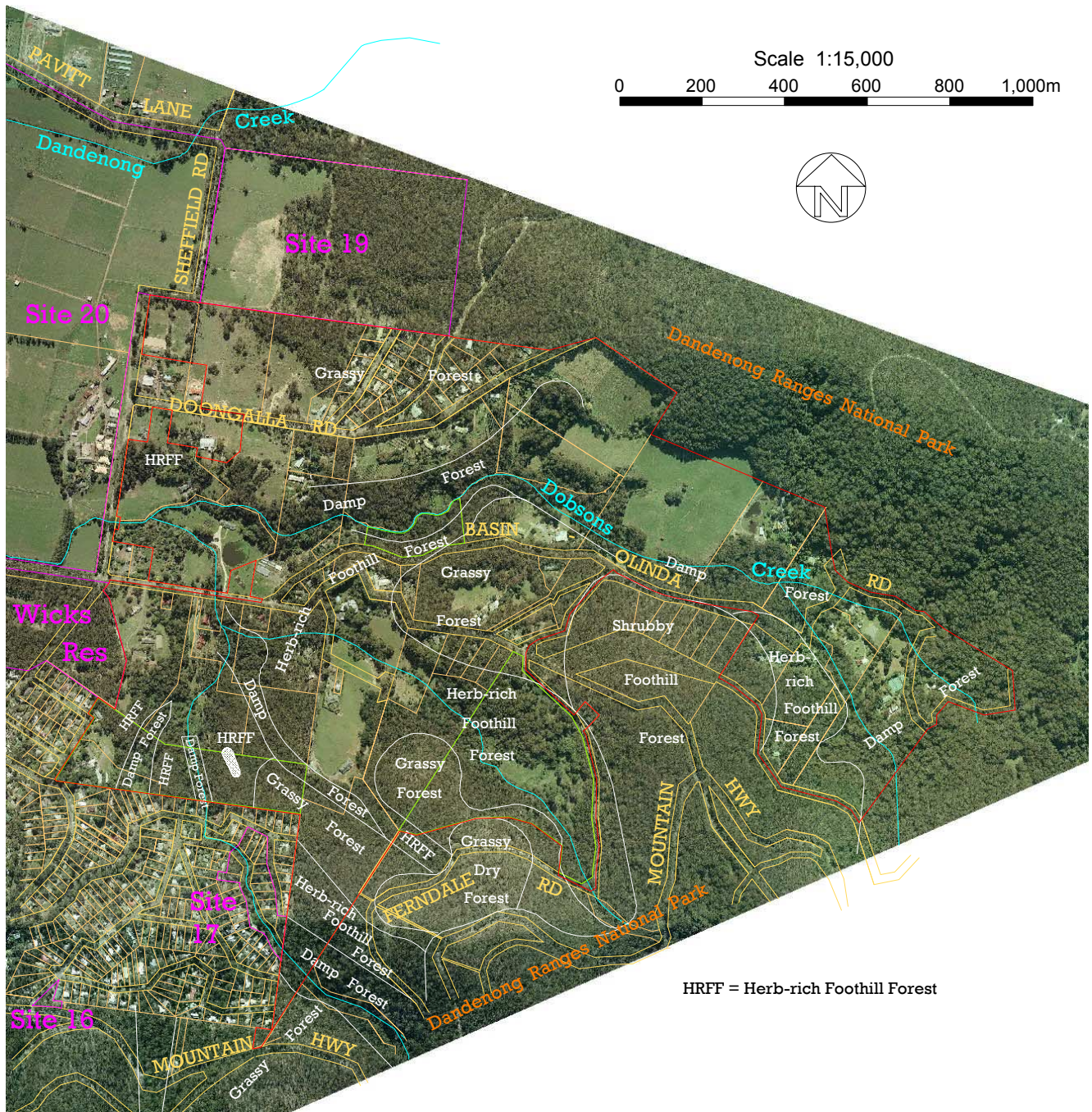
- A site survey undertaken during this study by Dr Lorimer on 31/5/02 using this study's standard procedures discussed in Section 2.4 of Volume 1. This included a description of the vegetation composition, compilation of lists of indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats and management issues;
- A brief reinspection of the site on 10/3/08 to update the site description, finding several additional plant species;
- A prior investigation of the site by Dr Lorimer on 23-24/12/97 for *A Survey and Management Strategy for Significant Roadside Vegetation in Knox* (published by Knox City Council in May 1998). This included compilation of lists of flora and fauna species;
- Satellite imagery of the district and aerial photography from February 2001 and April 2003;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 18. The Basin - Sassafras Forest Precinct

A small section of Dandenong Ranges National Park along with larger private properties neighbouring the park, with native forest and clearings. Centred on Melway reference 66A8.

Site Significance Level: State

- The largest and most spatially complex area of native habitat in Knox, with by far the largest areas in good or excellent ecological condition;
- Six Ecological Vegetation Classes are represented. This includes approximately 26ha of Grassy Forest, which is regionally Vulnerable
- 187 indigenous plant species were found overall, a very large number by Knox standards. This includes numerous species that are rare or threatened locally, regionally or at State level;
- Dobsons Creek and its tributaries support rare fauna, including Platypus and the Dandenong Freshwater Amphipod.



Aerial photograph taken April 2003

Boundaries

This 182.2 ha site is outlined in red on the aerial photograph above. The eastern two-thirds (approximately) of the site is bounded by the municipal boundary. The remaining site boundary coincides with property boundaries. The boundary was drawn to include all properties that contribute to the canopy of indigenous trees that is contiguous (more or less) with the Dandenong Ranges National Park, as well as one property with stream habitat used by Platypus.

Other sites from this report are outlined in magenta, labelled with their site numbers. White curves delineate different Ecological Vegetation Classes, as labelled in white (with 'HRFF' meaning Herb-rich Foothill Forest). Bright green outlines mark the three properties chosen for particularly intensive survey (see below).

Land use & tenure: A small section of the Dandenong Ranges National Park in the southern tip, otherwise private. There is residential land in the vicinity of Doongalla Rd, low density residential properties along the Basin-Olinda Rd, a church conference centre and small farms with clearings.

Site description

This site is Knox's eastern extremity, extending well up the Dandenong Ranges into the outskirts of Sassafras. The Dandenong Ranges National Park abuts most of the boundary. Dobsons Creek and its tributaries flow through the site, with mostly well-defined, steep-sided gullies. Elevations are in the approximate range 150-350 m and the slope varies from slight to steep, including aspects from north, through west, to south. This topography generates a strong rise in annual average rainfall from west to east through the site.

The bedrock of this site is from the Dandenong Ranges volcanic flows, overlaid with deposits of silty alluvium or colluvium on valley floors toward the western edge of the site.

Because this is the largest site in this report, with the greatest variation in topography, it also has the most complex spatial pattern of vegetation types. Ecological Vegetation Classes have been mapped on top of the aerial photograph on the previous page. The mapping was done by the author from visual inspection of every property within the site, but many properties had to be inspected from their perimeters because their owners did not grant permission to enter.

The size of the site precluded intensive surveys of every part of every property where access was granted. Three large, representative properties were chosen for intensive survey that met all the fieldwork specifications described in Volume 1, and they are outlined in bright green on the aerial photograph.

The ecological condition of some of the native vegetation could only be estimated from a distance, impairing the precision of statistics for the whole site.

A substantial part of the native vegetation in the site is in excellent ecological condition, which is very rare in the rest of Knox but much less so in the Dandenong Ranges. There are also numerous plant species that are rare or threatened in Knox or more widely, but a significant proportion of these are much less rare when viewed in the context of the whole Dandenong Ranges.

Relationship to other land

This site is contiguous with the Dandenong Ranges National Park. There is undoubtedly extensive movement of seeds, pollen and fauna between the park and the properties within the site, thereby contributing to a healthier and more robust ecosystem.

Environmental weeds are among the plants that cross each way between the site and the national park. Those species spread by water or with the aid of gravity will not move rapidly from the site into the park because the park is uphill from the site.

Bioregion: Highlands Southern Fall, except for a small part of the Gippsland Plain on the flats just north and east of the corner of Basin-Olinda Rd and Sheffield Rd.

Habitat types

Farm dams (wetland EVC 74, but not remnants of a natural habitat): Six indigenous plant species found growing in water or mud.

Herb-rich Foothill Forest (EVC 23, conservation status listed as of 'Least Concern' in the bioregion): Estimated as 42 ha, comprising 6.2 ha in excellent ecological condition (rating A), 10.2 ha in good ecological condition (rating B), 16.3 ha in fair ecological condition (rating C) and 9.3 ha in poor ecological condition (rating D). 128 indigenous plant species recorded.

Canopy trees: Dominated by *Eucalyptus cypellocarpa* and *E. obliqua* with fewer *E. radiata*.

Lower trees: Dominated by *Acacia melanoxylon* and sometimes *Exocarpos cupressiformis*. *Acacia dealbata* is locally abundant. *Pomaderris aspera* or *Bedfordia arborescens* sometimes appear near Damp Forest.

Shrubs: Very variable in density and composition. Sometimes there are few shrubs other than scattered *Coprosma quadrifida* and *Cassinia aculeata* (usually draped with climbers). In proximity to Shrubby Foothill Forest, there may be dense shrubs including those just mentioned, along with *Acacia verticillata*, *Acacia leprosa* (Dandenong Range variant), *Goodenia ovata*, *Ozothamnus ferrugineus*, *Pimelea axiflora*, *Polyscias sambucifolia*, *Prostanthera lasianthos* and *Spyridium parvifolium*.

Vines: Abundant, including the light twiners *Billardiera mutabilis*, *Comesperma volubile* and *Glycine clandestina* and the vigorous vines, *Calystegia marginata*, *Clematis aristata* and *Pandorea pandorana*. *Rubus parvifolius* is often abundant and sometimes also the parasite *Cassytha pubescens*.

Ferns: Abundant. *Pteridium esculentum* is nearly always present and *Calochlaena dubia* is mostly present, often densely. *Adiantum aethiopicum* is often present and there are typically scattered tree ferns (usually *Cyathea australis*).

Ground flora: Along with the ferns, the dominant species are usually *Poa ensiformis* and *Tetrarrhena juncea*. The richness of herbs suggested by the name of this EVC is variable, depending on past management and recency of fire. Other species that are usually abundant are *Acaena novae-zelandiae*, *Carex breviculmis*, *Gonocarpus tetragynus*, *Microlaena stipoides*, *Oxalis perennans* and *Viola hederacea*.

Damp Forest (EVC 29, conservation status listed as of 'Least Concern' in the bioregion), tending toward Wet Forest in the east: Estimated as 34 ha, comprising 4 ha in excellent ecological condition (rating A), 6 ha in good ecological condition (rating B), 18 ha in fair ecological condition (rating C) and 6 ha in poor ecological condition (rating D). 79 indigenous plant species recorded.

Dominant canopy trees: *Eucalyptus obliqua* and/or *E. cypellocarpa*, sometimes with a few *E. radiata*.

Dominant lower trees: Abundant *Acacia melanoxylon* to 20 m tall; smaller numbers of *Pomaderris aspera* and/or *Bedfordia arborescens*.

Shrubs: The range of visibility through the shrub layer is typically 30 m, but may be much less where the soil has been disturbed. The most common species are *Coprosma quadrifida*, *Ozothamnus ferrugineus* and *Prostanthera lasianthos*. The ecological indicator species, *Sigesbeckia orientalis* and *Urtica incisa* are sometimes present.

Vines: Abundant, dominated by *Pandorea pandorana* and *Clematis aristata*. *Rubus parvifolius* is often abundant and sometimes also the parasite *Cassytha pubescens*.

Ferns: Ferns are one of the dominant parts of the understorey. Tree ferns (mostly *Cyathea australis*) are abundant and consistently present. *Calochlaena dubia* or one of several *Blechnum* species is also abundant, representing a high foliage cover. Unlike Herb-rich Foothill Forest, *Pteridium esculentum* is not a significant part of the understorey.

Ground flora: Apart from the ferns, the ground flora is heavily dominated by *Lepidosperma elatius*, *Poa ensiformis* and/or *Tetrarrhena juncea*. Forbs are not rich due to suppression by the dominant species.

Shrubby Foothill Forest (EVC 45, conservation status listed as of 'Least Concern' in the bioregion): Estimated as 1.5 ha, comprising 1 ha in excellent ecological condition (rating A), 0.3 ha in good ecological condition (rating B) and 0.2 ha in fair ecological condition (rating C). 68 indigenous plant species recorded.

Dominant canopy trees: *Eucalyptus radiata* with fewer *E. obliqua* and often various other eucalypt species.

Dominant lower trees: *Acacia melanoxylon* and sometimes *Exocarpos cupressiformis* are present.

Shrubs: There is most commonly a dense layer of shrubs in the height range 1.5 - 3 metres, largely made up of shrubby wattles (characteristically including *Acacia mucronata* and *Acacia verticillata*), *Spyridium parvifolium*, *Pultenaea scabra* and/or *Pultenaea gunnii*. This may eventually thin out somewhat if fire does not occur for many years. The smaller shrub, *Goodenia ovata*, is usually also abundant.

Ferns: *Pteridium esculentum* and *Adiantum aethiopicum* may be scattered beneath the shrubs.

Ground flora: Grassy but not densely so due to suppression by the dense shrubs. The species present are those found commonly in the adjacent EVCs, including *Gonocarpus tetragynus* and *Stylidium armeria*.

Grassy Forest (EVC 128, **regionally Vulnerable**), grading into the Endangered EVC, Valley Heathy Forest (EVC 127), along the western third of Doongalla Rd. Estimated as 25.7 ha, comprising 6.0 ha in excellent ecological condition (rating A), 5.7 ha in good ecological condition (rating B), 7.6 ha in fair ecological condition (rating C) and 6.4 ha in poor ecological condition (rating D). 130 indigenous plant species recorded.

Dominant canopy trees: Usually dominated by a mixture of *Eucalyptus goniocalyx*, *E. macrorhyncha*, *E. obliqua* and *E. radiata*, but with *E. melliodora* replacing *E. macrorhyncha* along the western third of Doongalla Rd (where the vegetation grades into Valley Heathy Forest). *E. cypellocarpa* or *E. cephalocarpa* are sparingly present in some places.

Dominant lower trees: *Exocarpos cupressiformis*, *Acacia melanoxylon*.

Shrubs: Low to moderate density and rich in species, the most common of which are *Acacia mucronata*, *A. stricta*, *Bursaria spinosa*, *Cassinia aculeata*, *Goodenia ovata*, *Pultenaea scabra* and *Spyridium parvifolium*.

Vines: The light twiners *Billardiera mutabilis*, *Comesperma volubile* and *Glycine clandestina* are rather abundant. There are fewer of the vigorous vines, *Clematis aristata* and *Pandorea pandorana*. The parasite *Cassytha pubescens* is also present in places.

Ferns: *Pteridium esculentum* is usually quite conspicuous and other ferns are scarce.

Ground flora: Fairly rich and densely grassy with many species of graminoids, of which the most commonly present are *Gahnia radula*, *Rytidosperma pallidum*, *Lomandra filiformis* and *Poa morrisii*. The numbers of species of creepers and forbs are high. *Drosera peltata* subsp. *auriculata*, *Gonocarpus tetragynus* and *Stylidium armeria* are typically abundant.

Swampy Woodland (EVC 937, regionally Endangered) in the form of a small strip beside the Basin-Olinda Rd just east of Wicks Rd, in the Gippsland Plain bioregion. Estimated to occupy 1,500 m², comprising 100 m² in fair ecological condition (rating C) and 1,400 m² in poor ecological condition (rating D). 14 indigenous plant species recorded.

Dominant canopy trees: *Eucalyptus ovata*.

Lower trees: *Acacia melanoxylon* and *Exocarpos cupressiformis*.

Shrubs: *Acacia mucronata*, *Goodenia ovata*.

Vines: None found.

Ferns: None found. This is not a natural condition.

Ground flora: Grassy, with *Gahnia radula*, *Microlaena stipoides*, *Austrostipa rudis*, *Poa ensiformis*, *Rytidosperma pilosum*, *Lomandra filiformis*, *Lomandra longifolia* and *Gonocarpus tetragynus*.

Shrubby Gully Forest (EVC 938, regionally Vulnerable): A small drainage line in the Clevedon Camp property shown cross-hatched on the aerial photograph on p. 94. The area is estimated as 300 m², in fair ecological condition (rating C). 15 indigenous plant species recorded.

Dominant canopy trees: Scarce *Eucalyptus obliqua*.

Lower trees: *Melaleuca squarrosa* 6 m tall and fewer *Acacia melanoxylon*.

Shrubs: *Acacia verticillata*, *Prostanthera lasianthos*, plus a *Pomaderris aspera*.

Vines: The parasite, *Cassytha pubescens* is present.

Ferns: The tree fern, *Cyathea australis*, is dense in the shrub layer. *Calochlaena dubia* and fewer *Blechnum minus* are in the ground flora.

Ground flora: Dominated by the ferns above and *Lepidosperma elatius*.

Plant species

The following plant species were observed in various years and the author believes that few if any would have died out since. Additional species are bound to have escaped detection, particularly orchids. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Acacia leprosa* (Dandenong Range variant) is rare nationally and the species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Acacia dealbata</i>	E	<i>Blechnum cartilagineum</i>
C	<i>Acacia genistifolia</i>	C	<i>Blechnum minus</i>
V	<i>Acacia leprosa</i> (Dandenong Range variant)	E	<i>Blechnum nudum</i>
V	<i>Acacia melanoxylon</i>		<i>Bossiaea prostrata</i>
E	<i>Acacia mucronata</i>		<i>Burchardia umbellata</i>
E	<i>Acacia myrtifolia</i>		<i>Bursaria spinosa</i>
E	<i>Acacia stricta</i>	C	<i>Caladenia carnea</i>
V	<i>Acacia verticillata</i>	V	<i>Calochlaena dubia</i>
	<i>Acaena novae-zelandiae</i>	E	<i>Calystegia marginata</i>
V	<i>Acrotriche prostrata</i>		<i>Carex appressa</i>
	<i>Acrotriche serrulata</i>		<i>Carex breviculmis</i>
V	<i>Adiantum aethiopicum</i>		<i>Cassinia aculeata</i>
C	<i>Amyema pendula</i>	E	<i>Cassytha pubescens</i>
	<i>Arthropodium strictum</i>	E	<i>Centella cordifolia</i>
C	<i>Asperula conferta</i>	V	<i>Chiloglottis valida</i>
C	<i>Australina pusilla</i>	V	<i>Clematis aristata</i>
E	<i>Austrocynoglossum latifolium</i>	V	<i>Comesperma volubile</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	C	<i>Coprosma hirtella</i>
E	<i>Banksia marginata</i>	V	<i>Coprosma quadrifida</i>
C	<i>Bedfordia arborescens</i>	E	<i>Correa reflexa</i>
	<i>Billardiera mutabilis</i>	E	<i>Cryptostylis leptochila</i>

Risk	Indigenous Species
E	<i>Cyathea australis</i>
C	Cyperus lucidus
E	<i>Desmodium gunnii</i>
	<i>Deyeuxia quadriseta</i>
C	Deyeuxia rodwayi
	<i>Dianella admixta</i>
V	<i>Dianella tasmanica</i>
	<i>Dichelachne rara</i>
	<i>Dichondra repens</i>
E	Dicksonia antarctica
E	<i>Dipodium roseum</i>
V	<i>Drosera peltata</i> subsp. <i>auriculata</i>
E	<i>Echinopogon ovatus</i>
	<i>Elymus scaber</i>
V	<i>Epacris impressa</i>
V	<i>Epilobium billardierianum</i> subsp. <i>cinereum</i>
	<i>Epilobium hirtigerum</i>
V	<i>Eucalyptus cephalocarpa</i>
V	<i>Eucalyptus cypellocarpa</i>
	<i>Eucalyptus goniocalyx</i>
E	<i>Eucalyptus macrorhyncha</i>
V	<i>Eucalyptus melliodora</i>
V	<i>Eucalyptus obliqua</i>
V	<i>Eucalyptus ovata</i>
E	<i>Eucalyptus radiata</i>
E	<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>
V	<i>Euchiton collinus</i>
E	<i>Euchiton involucratus</i>
V	<i>Exocarpos cupressiformis</i>
E	<i>Exocarpos strictus</i>
	<i>Gahnia radula</i>
E	<i>Gahnia sieberiana</i>
E	<i>Galium gaudichaudii</i>
E	<i>Galium propinquum</i>
C	<i>Gastrodia sesamoides</i>
V	<i>Geranium potentilloides</i>
V	<i>Geranium</i> ?sp. 2
V	<i>Glycine clandestina</i>
E	<i>Gonocarpus humilis</i>
	<i>Gonocarpus tetragynus</i>
	<i>Goodenia lanata</i>
	<i>Goodenia ovata</i>
C	Goodia lotifolia
E	<i>Gynatrix pulchella</i>
V	<i>Hardenbergia violacea</i>
C	Hedycarya angustifolia
V	<i>Helichrysum scorpioides</i>
V	<i>Hovea heterophylla</i>
E	Hydrocotyle geraniifolia
V	<i>Hydrocotyle hirta</i>
E	<i>Hypericum gramineum</i>
C	Hypolepis glandulifera
C	Hypolepis muelleri
C	Hypolepis rugosula
E	<i>Imperata cylindrica</i>
V	<i>Isolepis inundata</i>
	<i>Juncus amabilis</i>
	<i>Juncus gregiflorus</i>
C	<i>Juncus holoschoenus</i>
	<i>Juncus pallidus</i>

Risk	Indigenous Species
E	<i>Juncus pauciflorus</i>
E	<i>Juncus procerus</i>
	<i>Juncus sarophorus</i>
E	<i>Juncus subsecundus</i>
	<i>Kunzea ericoides</i> spp. agg.
C	<i>Lachnagrostis aemula</i> s.l.
	<i>Lachnagrostis filiformis</i>
V	<i>Lagenophora gracilis</i>
E	<i>Lagenophora stipitata</i>
C	Lastreopsis acuminata
	<i>Lepidosperma elatius</i>
	<i>Lepidosperma gunnii</i>
V	<i>Lepidosperma laterale</i>
	<i>Leptospermum continentale</i>
E	<i>Leptospermum scoparium</i>
V	<i>Lindsaea linearis</i>
	<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
	<i>Lomandra longifolia</i>
C	Lomatia ilicifolia
V	<i>Luzula meridionalis</i>
C	<i>Melaleuca squarrosa</i>
	<i>Microlaena stipoides</i>
C	<i>Muellerina eucalyptoides</i>
E	Olearia argophylla
V	<i>Olearia lirata</i>
E	<i>Olearia myrsinoides</i>
	<i>Olearia</i> ?sp. nov. (aff. <i>argophylla</i>)
V	<i>Opercularia varia</i>
	<i>Oxalis exilis/perennans</i>
E	<i>Ozothamnus ferrugineus</i>
	<i>Pandorea pandorana</i>
	<i>Persicaria decipiens</i>
C	Pimelea axiflora
V	<i>Pimelea humilis</i>
C	Pittosporum bicolor
C	Plantago debilis
V	<i>Plantago varia</i>
V	<i>Platylobium formosum</i>
	<i>Poa ensiformis</i>
	<i>Poa morrisii</i>
E	<i>Poa tenera</i>
E	<i>Polyscias sambucifolia</i>
E	Polystichum proliferum
E	<i>Pomaderris aspera</i>
	<i>Poranthera microphylla</i>
E	<i>Prostanthera lasianthos</i>
	<i>Pteridium esculentum</i>
E	Pteris tremula
E	<i>Pterostylis melagramma</i>
V	<i>Pultenaea gunnii</i>
C	<i>Pultenaea scabra</i>
E	<i>Rubus parvifolius</i>
	<i>Rytidosperma linkii</i> var. <i>fulvum</i>
	<i>Rytidosperma pallidum</i>
	<i>Rytidosperma penicillatum</i>
V	<i>Rytidosperma pilosum</i>
	<i>Rytidosperma racemosum</i>
	<i>Rytidosperma setaceum</i>
C	Sambucus gaudichaudiana

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Schoenus apogon</i>	E	<i>Stylidium armeria/graminifolium</i>
C	<i>Schoenus maschalinus</i>		<i>Tetrarrhena juncea</i>
	<i>Senecio glomeratus</i>	E	<i>Tetradthea ciliata</i>
	<i>Senecio hispidulus</i>	C	<i>Thelymitra ?media</i>
C	<i>Senecio linearifolius</i>		<i>Themeda triandra</i>
E	<i>Senecio minimus</i>	E	<i>Typha domingensis</i>
E	<i>Senecio prenanthoides</i>	C	<i>Urtica incisa</i>
	<i>Senecio quadridentatus</i>	E	<i>Veronica calycina</i>
C	<i>Sigesbeckia orientalis</i>	E	<i>Viola hederacea</i>
C	<i>Solanum prinophyllum</i>	E	<i>Wahlenbergia gracilis</i>
E	<i>Spyridium parvifolium</i>	E	<i>Wahlenbergia stricta</i>
E	<i>Stackhousia monogyna</i>	V	<i>Xanthorrhoea minor</i>
C	<i>Stellaria flaccida</i>	E	<i>Xanthosia dissecta</i>

Introduced Species

<i>Acacia elata</i>	<i>Cyperus eragrostis</i>	<i>Myosotis sylvatica</i>
<i>Acer pseudoplatanus</i>	<i>Cytisus scoparius</i>	<i>Oxalis incarnata</i>
<i>Agapanthus praecox</i>	<i>Dactylis glomerata</i>	<i>Passiflora tarminiana</i>
<i>Agrostis capillaris</i>	<i>Delairea odorata</i>	<i>Pinus radiata</i>
<i>Allium triquetrum</i>	<i>Dodonaea viscosa</i>	<i>Pittosporum undulatum</i>
<i>Anthoxanthum odoratum</i>	<i>Ehrharta erecta</i>	<i>Plantago lanceolata</i>
<i>Arundo donax</i>	<i>Erica lusitanica</i>	<i>Potentilla indica</i>
<i>Asparagus scandens</i>	<i>Erigeron karvinskianus</i>	<i>Prunella vulgaris</i>
<i>Berberis darwinii</i>	<i>Freesia alba</i> × <i>leichtlinii</i>	<i>Prunus cerasifera</i>
<i>Billardiera heterophylla</i>	<i>Galium aparine</i>	<i>Ranunculus repens</i>
<i>Briza maxima</i>	<i>Genista linifolia</i>	<i>Rubus anglocandicans</i>
<i>Callitriche stagnalis</i>	<i>Genista monspessulana</i>	<i>Salix</i> sp.
<i>Centaurium erythraea</i>	<i>Hedera helix</i>	<i>Selaginella kraussiana</i>
<i>Cestrum elegans</i>	<i>Holcus lanatus</i>	<i>Senecio jacobaea</i>
<i>Cirsium vulgare</i>	<i>Hypericum androsæmum</i>	<i>Sisyrinchium iridifolium</i>
<i>Conyza sumatrensis</i>	<i>Hypericum tetrapterum</i>	<i>Solanum nigrum</i>
<i>Coprosma repens</i>	<i>Hypochoeris radicata</i>	<i>Sonchus oleraceus</i>
<i>Coprosma robusta</i>	<i>Ilex aquifolium</i>	<i>Taraxacum officinale</i> spp. agg.
<i>Cortaderia selloana</i>	<i>Jasminum</i> sp.	<i>Tradescantia fluminensis</i>
<i>Cotoneaster glaucophyllus</i>	<i>Leycesteria formosa</i>	<i>Ulex europæus</i>
<i>Cotoneaster pannosus</i>	<i>Ligustrum lucidum</i>	<i>Vicia ?hirsuta</i>
<i>Cotoneaster simonsii</i>	<i>Lilium formosanum</i>	<i>Vicia sativa</i>
<i>Crataegus monogyna</i>	<i>Lonicera japonica</i>	<i>Vinca major</i>
<i>Crocasmia</i> × <i>crocasmiflora</i>	<i>Mentha</i> sp.	<i>Zantedeschia aethiopica</i>

Notes concerning some of the locally threatened plant species

Olearia ?sp. nov. (aff. *argophylla*). Two plants found and others possibly overlooked. Taxonomic and genetic research is required to clarify this taxon's status.

Melaleuca squarrosa (Scented Paperbark). The dominant shrub in a small patch of Shrubby Gully Forest on the Clevedon property.

Fauna of special significance

Vulnerable in Victoria

Powerful Owl. The comparatively large population of this species in the Dandenong Ranges uses this site as part of their habitat, for feeding and roosting.

Suspected of being Rare or Threatened in Victoria

Dandenong Freshwater Amphipod. Repeatedly detected by stream ecologists from the Arthur Rylah Institute at the eastern extremity of this site, including in recent years.

Uncommon in the Port Phillip and Westernport Region

Platypus. Trapped in this site in Dobsons Ck in 2002 (Williams 2002).

Rare or Threatened in suburban Melbourne

Broadfin Galaxias. Trapped in this site in Dobsons Ck in 2001 (Williams 2002).

The site is probably also regularly visited by other significant fauna such as Koala, Tree Goanna or Wedge-tailed Eagle, but there has been too little investigation to provide evidence.

Fauna habitat features

The comparatively large areas of mature, high quality native vegetation, contiguous with the Dandenong Ranges National Park, make good habitat for many forest species, including gliders, other possums, koalas, bats, forest birds and insects.

Waterbirds use the dams within the site and probably the streams. Frogs also use the dams.

Dobsons Creek provides habitat for Platypus, Water Rat, Broadfin Galaxias and Shortfin Eel, as demonstrated by observations of these species by the Australian Platypus Conservancy in 2001. Other native fish may exist, undetected. Aquatic invertebrates are also present (as indicated by repeated observations of the Dandenong Freshwater Amphipod at the upstream end).

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment'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 sections of this site along Dobsons Ck and its tributaries.

Regionally Threatened Ecological Vegetation Classes

According to the criteria of 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), areas of native vegetation belonging to a regionally Vulnerable EVC (such as the Grassy Forest in this site) have a conservation significance rating of High or Very High provided their ecological condition is at least fair (with a habitat score of at least 0.3). A large part of the Grassy Forest in this site is in better ecological condition than this. As a result, it follows from criterion 3.2.3 that the site is of **State** significance.

The tiny, degraded patch of the regionally Endangered Swampy Woodland may or may not achieve State significance under criterion 3.2.3, depending on whether it will qualify as a 'remnant patch' under a definition of this term that is being devised by the Department of Sustainability & Environment.

The highest quality patches of the other EVCs within the site (with habitat scores of at least 0.6) each confer **Regional** significance on the site under criterion 3.2.3. Lower quality patches represent **Local** significance.

Rare or Threatened Flora

The Dandenong Range variant of *Acacia leprosa* is listed as 'rare' in Victoria. This site makes a modest contribution to the large and viable population that spreads across the Dandenong Ranges. This represents **Regional** significance under criterion 3.1.2 of the standard criteria.

The site's less abundant species include an *Olearia* which may belong to a rare, undescribed taxon related to *Olearia argophylla* but distinguished by the smaller stature, drier habitat and different chemical composition of its leaves (as determined by flavonoid analysis of plants from 1½ km to the northeast). This would be of State significance if the identity is confirmed.

Many of the other locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

The Powerful Owl is a vulnerable species in Victoria. It is known to frequent the nearby parts of the Dandenong ranges National Park, and the vegetation in the site seems suitable as habitat for Powerful Owls. Criterion 3.1.3 confers **Regional** significance upon sites such as this.

Threats

- Invasion by environmental weeds, including:
 - Square-stemmed St John's Wort (*Hypericum tetrapterum*), a weed that is Regionally Prohibited under the *Catchment & Land Protection Act* and which is infesting the stream flowing through, and downstream from, 121 Ferndale Rd;
 - Very serious: Sweet Pittosporum (*Pittosporum undulatum*), Ivy (*Hedera helix*), Blackberry (*Rubus discolor*), Karamu (*Coprosma robusta*), Red Cestrum (*Cestrum elegans*), Wandering Jew (*Tradescantia albiflora*);
 - Serious: Montpellier Broom (*Genista monspeliensis*), Montbretia (*Crocasmia × crocosmiiflora*), Cape Ivy (*Delairea odorata*), Sycamore (*Acer pseudoplatanus*), Pale Wood-sorrel (*Oxalis incarnata*), Giant Reed (*Arundo*

donax), Japanese Honeysuckle (*Lonicera japonica*), Creeping Buttercup (*Ranunculus repens*), Garden Selaginella (*Selaginella kraussiana*), Arum Lily (*Zantedeschia aethiopica*);

- Ongoing residential development;
- Inappropriate fire prevention works involving clearing of shrubs and ground flora;
- Grazing;
- Nutrient pollution in the streams, from fertiliser, manure and unsewered properties.

Management issues

- There is plenty of scope for most landowners to improve their control of environmental weeds, particularly Sweet Pittosporum, Ivy and those species that they are legally required to control under the *Catchment and Land Protection Act*;
- It would be very desirable to fence the high quality remnant vegetation at 4B and 6A Doongalla Rd to prevent access by horses from adjoining pasture.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the attributes discussed under the heading 'Significance ratings' above, as well as (in parts of the site) the riparian habitat and the potential for ongoing subdivision;
- This site is presently covered by Schedule 1 of the Vegetation Protection Overlay in the Knox Planning Scheme, except for some lots on the north side of Doongalla Rd;
- The site is outside the Urban Growth Boundary and is mostly zoned Rural Conservation Zone - Schedule 1 (RCZ1).

Information sources used in this assessment

- Several days of site survey undertaken during this study by Dr Lorimer between July and December 2002, using this study's standard procedures discussed in Section 2.4 of Volume 1. For at least part of each patch of each vegetation type, this included descriptions of the vegetation composition, compilation of a list of indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats and management issues;
- Vegetation field data and mapping along many roads in the site, gathered by Dr Lorimer in spring 1997, as described in the report, '*A Survey and Management Plan for Significant Vegetation of Roadsides in Knox*' by G.S. Lorimer for Knox City Council (May 1998, 137 pp.);
- From the two studies just mentioned, a total of 38 lists of plant species were compiled, each with descriptions of dominant species and other information about vegetation composition;
- Spotlighting observations for approximately one hour on the night of 10th July 2002 (Common Brushtail Possum, roosting Wood Duck, *Crinia signifera*), including unsuccessful attempts to lure owls by playing taped owl calls;
- '*Distribution of Platypus along Upper Dandenong and Dobsons 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.
- Discussions with invertebrate expert, Nick Papas, in 2002 about the population of Dandenong Freshwater Amphipod;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- A map of EVCs within the adjoining Dandenong Ranges National Park prepared by Mr Doug Frood for Parks Victoria in 2002;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Acknowledgment

Thank you to the owners of 141 Basin-0linda Rd, 121 Ferndale Rd and the Clevedon Camp for permission to survey their land.

Site 19. Hillside above Sheffield Road, The Basin

Salvation Army land east of Sheffield Rd, mostly forested. Melway ref. 65 A6 & 66 A5-6.

Site Significance Level: *State*

- Contains extensive areas of intact Grassy Forest with a moderately high diversity of indigenous ground flora;
- Supports several significant plant species, including a substantial population of the Small Tongue-orchid *Cryptostylis leptochila*, which is rare in the Melbourne area;
- Provides relatively undisturbed habitat for native wildlife in conjunction with the adjoining Dandenong Ranges National Park, particularly for forest birds, butterflies and ground-dwelling fauna;
- Includes remnant trees containing natural hollows suitable for hollow-dependent fauna;
- Functions as an ecological buffer to the Dandenong Ranges National Park and the habitat corridor along Dandenong Creek.



Aerial photograph taken April 2003

Boundaries

The site boundaries are as shown in red on the aerial photograph, and encompass a whole parcel of land (part of the Salvation Army's farm). The northern and eastern edges abut the Dandenong Ranges National Park. To aid the discussion below, the site is divided into the four sections labelled above. Section 4 has negligible native vegetation but is included within the site because it is still environmentally important, particularly in the sense that any development or change in land use there may impact on either the rest of the site, the National Park or Site 20.

Land use & tenure: Part of a Salvation Army farm, used for grazing of cattle and horses.

Site description

The native vegetation in this 22.94 ha site is located on gently sloping land near the base of a west-facing slope in the Dandenong Ranges (approx. 160-200m elevation). A few drainage lines extend down the slope through the site. The soil is shallow loam over clay subsoil, derived from decay of the underlying Mt Evelyn rhyodacite formation (part of the Mt Dandenong volcanic flows).

The western, pastoral section of the site (Section 4) extends onto the alluvial flats of Dandenong Ck and Dobsons Ck. It has negligible native vegetation other than a few remnant trees.

The upper, most easterly section of the site (Section 1 on the aerial photograph) supports predominantly intact forest with moderately high quality understorey vegetation. This area has been fenced to exclude livestock access until relatively recently, however the fence has become dilapidated and no longer restricts access by cattle from intensively grazed pastures on the western side. Several informal vehicle tracks occur within this section of the site. Substantial recent clearing of remnant trees has occurred in a strip approximately 50 m wide along the southern boundary of this land, particularly adjacent to the end of Milleara St (presumably for the establishment of a firebreak, with collection of firewood also apparent).

Sections 2 & 3 support a fair to good cover of remnant trees, however understorey vegetation has been substantially depleted by cattle grazing except for scattered prickly shrubs such as Sweet Bursaria and Prickly Moses. Dieback and death of remnant trees is apparent from ringbarking by cattle and altered natural drainage. Moderate to severe infestations of pasture weeds occur in this area, particularly of Blackberry and Spear Thistle, with some Ragwort.

Relationship to other land

The site adjoins the extensive, intact forest vegetation and wildlife habitat in the Doongalla Forest section of the Dandenong Ranges National Park, which is a site of National significance. The southern edge abuts Site 18 and the western edge abuts Site 20. There is no doubt extensive movement of native fauna, as well as the pollen and seeds that they carry, between these sites.

Many residential properties in the surrounding area to the south and east (along Milleara St, Simpsons Rd and Doongalla Rd) support a fair to good cover of remnant trees and some indigenous understorey vegetation. The treed areas on 4B and 6A Doongalla Rd, adjoining the southern edge of the site, also contain some understorey in good ecological condition. Taken as a whole, the site and its neighbours provide an effective extension of the habitat in the National Park, and act as an ecological buffer. However, they also function as a source of environmental weeds entering the park.

The site is located near the headwaters of Dandenong Creek, forming a component of the wildlife corridor along the creek.

Bioregion: The native vegetation practically all lies in the Highlands Southern Fall bioregion. The alluvial flats of Dandenong Ck and Dobsons Ck are taken here to be part of the Gippsland Plain, although this differs from the interim boundary of the Department of Sustainability & Environment.

Habitat types

Grassy Forest (EVC 128, regionally Vulnerable) in Sections 1 and 2, grading into Swampy Woodland (also regionally vulnerable) on poorly drained lower sections of the slope.

Section 1: Area 12.4 ha, of which 10% (1.2 ha) is in good ecological condition (rating B) and 90% (11.2 ha) is in fair ecological condition (rating C). 57 indigenous plant species recorded, and likely to support additional seasonal species.

Canopy trees: Intact cover of remnant trees up to 30m tall dominated by *Eucalyptus obliqua* and *E. radiata*, with some *E. goniocalyx* and *E. ovata*. Trees are of ages up to around 100 years old.

Lower trees: Scattered specimens of *Acacia melanoxylon* and *Exocarpos cupressiformis*.

Shrubs: Patchy shrub layer, including *Leptospermum scoparium*, *Bursaria spinosa*, *Acacia verticillata* and several other species. Density reduced by clearing and grazing activities.

Vines: Some *Clematis aristata*, *Pandorea pandorana*, *Billardiera mutabilis* and *Hardenbergia violacea*.

Ferns: Widespread *Pteridium esculentum* and a few small specimens of *Cyathea australis*.

Ground flora: Dominated by a mix of indigenous herbs and grasses, including *Tetrarrhena juncea*, *Platylobium formosum*, *Rytidosperma penicillatum*, *Acrotriche prostrata*, *Goodenia lanata* and a range of additional ground layer species. Includes substantial populations of *Cryptostylis leptochila* and *Dipodium roseum* and is likely to support additional terrestrial orchids and lilies in some locations. Species diversity is reduced by grazing to some extent, however the ground layer is remarkably weed-free, with excellent potential for rehabilitation. No recent fire apparent.

Section 2: Area 1.7 ha, all in poor ecological condition (rating D). 13 indigenous plant species recorded.

Canopy trees: A fair cover of remnant trees up to 30m tall. Mainly dominated by *Eucalyptus obliqua*, with some *E. radiata*, *E. goniocalyx*, *E. cephalocarpa* and *E. ovata*. Moderate to severe foliage dieback and tree death from ringbarking by cattle and altered natural drainage (cleared understorey). No regeneration apparent.

Lower trees: A few scattered specimens of *Acacia melanoxylon*.

Shrubs: Scattered prickly shrubs that have tolerated grazing, including *Bursaria spinosa* and *Acacia verticillata*.

Vines and ferns: Absent.

Ground flora: Heavily depleted by grazing.

Swampy Woodland (EVC 937, **regionally Vulnerable**) in Section 3, grading into Grassy Forest uphill. Area 1.3 ha, all in poor ecological condition (rating D). 7 indigenous plant species recorded.

Canopy trees: A fair to good cover of *Eucalyptus cephalocarpa* trees up to 20m tall, with some *E. obliqua* and *E. radiata*. Moderate to severe foliage dieback and tree death from ringbarking by cattle and altered natural drainage (cleared understorey). No regeneration apparent.

Lower trees: Absent.

Shrubs: Scattered prickly shrubs that have tolerated grazing, including *Bursaria spinosa* and *Acacia verticillata*.

Vines and ferns: Absent.

Ground flora: Depleted by grazing, except for some *Microlaena stipoides*.

Plant species

The following plant species were observed by Mr Rik Brown on 8th April 2002. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Lomatia ilicifolia* and *Cryptostylis leptochila* are rare throughout the Melbourne region. More than a dozen additional wild indigenous species would no doubt be found in other seasons.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia melanoxydon</i>	V	<i>Hydrocotyle hirta</i>
V	<i>Acacia verticillata</i>		<i>Juncus</i> sp.
	<i>Acaena novae-zelandiae</i>		<i>Lepidosperma elatius</i>
V	<i>Acrotriche prostrata</i>	E	<i>Leptospermum scoparium</i>
	<i>Austrostipa rudis</i>	E	<i>Lobelia anceps</i>
	<i>Billardiera mutabilis</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
V	<i>Brunonia australis</i>	C	<i>Lomatia ilicifolia</i>
	<i>Bursaria spinosa</i>		<i>Microlaena stipoides</i>
	<i>Cassinia aculeata</i>		<i>Microtis ?unifolia</i>
E	<i>Centella cordifolia</i>	V	<i>Olearia lirata</i>
V	<i>Clematis aristata</i>	E	<i>Olearia myrsinoides</i>
V	<i>Coprosma quadrifida</i>	E	<i>Ozothamnus ferrugineus</i>
E	<i>Cryptostylis leptochila</i>		<i>Pandorea pandorana</i>
E	<i>Cyathea australis</i>	V	<i>Pimelea humilis</i>
	<i>Dianella admixta</i>	V	<i>Platylobium formosum</i>
	<i>Dichondra repens</i>		<i>Poa ensiformis</i>
E	<i>Dipodium roseum</i>		<i>Poa morrisii</i>
V	<i>Epacris impressa</i>	E	<i>Poa tenera</i>
V	<i>Eucalyptus cephalocarpa</i>	E	<i>Pomaderris aspera</i>
	<i>Eucalyptus goniocalyx</i>		<i>Poranthera microphylla</i>
V	<i>Eucalyptus obliqua</i>		<i>Pteridium esculentum</i>
V	<i>Eucalyptus ovata</i>	V	<i>Pultenaea gunnii</i>
E	<i>Eucalyptus radiata</i>		<i>Rytidosperma pallidum</i>
V	<i>Exocarpos cupressiformis</i>		<i>Rytidosperma penicillatum</i>
	<i>Gahnia radula</i>	E	<i>Stylidium armeria/graminifolium</i>
	<i>Gonocarpus tetragynus</i>		<i>Tetrarrhena juncea</i>
	<i>Goodenia lanata</i>		<i>Themeda triandra</i>
	<i>Goodenia ovata</i>	E	<i>Veronica calycina</i>
V	<i>Hardenbergia violacea</i>	E	<i>Viola hederacea</i>
V	<i>Hovea heterophylla</i>	V	<i>Xanthorrhoea minor</i>
Introduced Species			
	<i>Cirsium vulgare</i>		<i>Ilex aquifolium</i>
	<i>Hedera helix</i>		<i>Pittosporum undulatum</i>
			<i>Rubus anglocandicans</i>
			<i>Senecio jacobaea</i>

Notes concerning some of the locally threatened plant species

Cryptostylis leptochila (Small Tongue-orchid): Substantial population (>100 plants) scattered throughout the eastern section of the Salvation Army land (Section 1).

Lomatia ilicifolia (Holly Lomatia): A few plants along the eastern boundary of the Salvation Army land (section 1), more numerous in the adjacent National Park.

Microtis ?unifolia (Common Onion-orchid): A few plants along the eastern boundary of Section 1.

Veronica calycina (Hairy Speedwell): Scattered occurrence (>30 plants) throughout Section 1.

The substantial population of Rosy Hyacinth-orchid (*Dipodium roseum*) scattered within higher quality ground layer vegetation in Section 1 is notable for its size and extent.

Additional significant terrestrial orchids and lilies potentially occur within the least-disturbed areas. They were not likely to be visible during the field surveys.

Fauna of special significance

None recorded during field surveys, although significant fauna occurring within the adjoining Dandenong Ranges National Park are bound to visit the site frequently (e.g. Tree Goanna and Powerful Owl).

Fauna habitat features

The extensive cover of remnant trees within the site provides substantial habitat for forest birds, including extensive foraging habitat for parrots and potential owl roosting sites. A substantial population of Crimson Rosellas was apparent during field surveys and a diverse range of small forest birds was present, including the Eastern Spinebill, Grey Fantail, Striated Thornbill, Superb Fairy-wren, White-eared Honeyeater and White-throated Treecreeper. A Southern Boobook owl feather was also found.

A number of the larger remnant trees (around 100 years old) scattered within the site contain natural hollows suitable as shelter and breeding locations for birds, possums and bats.

Substantial habitat is provided for butterflies by Sweet Bursaria shrubs and remnant ground layer vegetation within much of the site, particularly Sections 1 & 4 on the aerial photograph.

Thickets of Manuka (*Leptospermum scoparium*) within properties on the southern side are likely to provide nesting habitat and shelter for smaller forest birds (section 4).

Higher quality ground layer vegetation and fallen branches within the properties fronting Doongalla Rd (Section 4) provide good habitat for lizards and other ground-dwelling fauna.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity & Viability

Section 1 of the site is part of an extensive area of contiguous, intact native vegetation on the western slopes of the Dandenong Ranges, within an otherwise heavily fragmented landscape. As the combined area is above 100 ha, the site has at least **Local** conservation significance under criterion 1.1.2.

The site forms a component of a buffer to more extensive habitat within the adjoining Dandenong Ranges National Park, and a link between the park and other sites such as the Dandenong Creek wildlife corridor. This represents **Local** significance under criterion 1.2.6.

Regionally Threatened Ecological Vegetation Classes

According to 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), remnants of a regionally vulnerable EVC (including Grassy Forest) have a conservation significance rating of Medium to Very High, depending on their habitat score (Volume 1, Section 2.4.4). The most intact Grassy Forest vegetation in this site would have a habitat score well above 0.3 (although it has not been measured), and this would put the conservation significance as High or Very High according to the Framework. In either case, criterion 3.2.3 of criterion 3.2.3 confers **State** significance on the site as a whole.

Swampy Woodland is also listed as regionally vulnerable, but the quality of the vegetation within this EVC is poorer than the Grassy Forest and its extent is smaller. Therefore, the presence of the Swampy Woodland does not alter the site's significance rating.

Rare or Threatened Flora

Many of the locally threatened plant species listed above, including *Cryptostylis leptochila* and *Lomatia ilicifolia*, have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

The Powerful Owl is a vulnerable species in Victoria. It is known to frequent nearby parts of the Dandenong ranges National Park, and the vegetation in the site seems suitable as habitat for Powerful Owls. Criterion 3.1.3 confers **Regional** significance upon sites such as this.

Threats

- Impacts on remnant vegetation associated with grazing by livestock, particularly the apparent recent increase in grazing intensity within relatively intact forest areas in Section 1;
- Clearing of native trees and understorey vegetation for fire prevention and firewood;
- Physical disturbances associated with uncontrolled vehicle access and the dumping of rubbish and fill within the Salvation Army land;
- Invasion by environmental weeds, of which Blackberry rates 'Very serious' and Spear Thistle rates 'Serious'.

Management issues

- Further clearing of native vegetation should be resisted.
- Grazing should be excluded within areas supporting remnant understorey vegetation, particularly through the repair or replacement of the fence along the western boundary of Section 1.
- The site is becoming weedier and needs greater weed control to maintain condition and reduce the invasion of weeds into the adjoining national park.
- Ecological burning may be suitable in some areas if appropriately undertaken.
- Remnant trees within paddock areas would ideally be fenced to prevent further dieback and ringbarking by cattle, and to provide opportunities for regeneration.

Administration matters

- This site is suited to inclusion under the proposed ESO2 overlay because of its State significance and because of the various significant attributes discussed above;
- It was included within Site 12 in the report of sites of biological significance by Water Ecoscience (1998), but it has not been included under any of the Vegetation Protection Overlays in the Knox Planning Scheme;
- The planning scheme zoning is 'Special Use Zone 1' for 'Community, Recreation, Education and Religious Purposes', under which agriculture is subject to a permit;
- There may be government assistance or incentives to support fencing and rehabilitation of areas supporting remnant vegetation;
- Relevant people should be informed of permit requirements for removal or destruction of native vegetation on the site.

Information sources used in this assessment

- A site survey undertaken during this study by Rik Brown on 8th April 2002, following this study's standard procedures discussed in Section 2.4 of Volume 1. This included vegetation mapping, descriptions of the composition and condition of the vegetation types, compilation of a list of indigenous and introduced plant species in each of Sections 1-3 on the aerial photograph, incidental fauna observations, and checks for fauna habitat, ecological threats, management issues and populations of scarce or threatened plant species;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- A map of EVCs within the adjoining Dandenong Ranges National Park prepared by Mr Doug Frood for Parks Victoria in 2002;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Acknowledgment

Thanks to the Salvation Army for granting permission to inspect their land.

Site 20. Lower Dobson Creek, The Basin

River flats with pasture and a playing field, as well as an adjacent forested hillside. Melway ref. 65 H6.

Site Significance Level: *State*

- Being on Dandenong Creek, the site is on a corridor for daily and seasonal movements of birds and insects;
- The floodplain is important for waterway function. It also attracts thousands of waterbirds during floods (even where there is no native vegetation), and some of the waterbird species are threatened;
- There is at least one roosting site for the Powerful Owl, which is listed as Vulnerable in Victoria;
- The waters of Dandenong Ck and Dobsons Ck support platypus, fish (including a locally rare species) and the smaller organisms that support them;
- Two regionally endangered Ecological Vegetation Classes are represented as well as one regionally vulnerable one.



Aerial photograph taken April 2003

Boundaries

This 76.3 ha site is outlined in red and labelled on the aerial photograph above. The northern boundary is the municipal boundary along Pavitt Lane. The other edges follow property boundaries or fence lines where practicable. The boundary is

completed with a few straight lines, mainly between well-defined locations such as fence straining posts or intersections between fences and property boundaries.

Land use & tenure: Freehold farmland and road reservations.

Site description

This site mostly occupies the uppermost parts of the broad floodplain drained by Dandenong Ck and Bungalook Ck, at elevations of approximately 140-170 m. Within a few hundred metres upstream from here, Dandenong Ck, Dobsons Ck and an unnamed creek are mountain streams with steep gradients and narrow, steep-sided valleys. The water flowing down these streams dissipates its energy on reaching the floodplain, causing silt to deposit and form the alluvial soil that has attracted farming to the area.

It has been some years since major flooding occurred, but inundation occurs more frequently than recent years suggest. The floods attract thousands of waterbirds of numerous species. Even when there is no flood, birds such as pelicans, spoonbills and egrets can often be seen moving along the floodplain and the course of Dandenong Ck further downstream, presumably following an ancestral route between the coast and the floodplain.

Floods would have caused the streams' natural courses to move greatly around the floodplain over the millennia. The present channels are mostly artificial, having been re-routed and straightened (as indicated by comparison with maps from the late 19th century). Dobsons Ck used to flow into Dandenong Ck downstream from Liverpool Rd, passing through the middle of the plant nursery on Liverpool Rd that is marked on the aerial photograph.

As can be seen from the aerial photograph, most of the floodplain's native vegetation has been cleared for pasture. The remaining strips along the watercourses still serve some habitat function (as evidenced by a roosting Powerful Owl) as well as protecting the waterway and its aquatic environment for the benefit of humans and fauna such as Platypus and Broadfin Galaxias. There are also some locally rare plants along the streams. In addition to the strips outlined in white along the streams, labelled 'Riparian Forest' or 'Swampy Riparian Woodland', there are scattered trees and tiny patches of native vegetation along the watercourses, as well as patches of woody weeds such as Hawthorn (*Crataegus monogyna*).

Dandenong Ck is particularly deficient in native vegetation, so it is important that the verge of Pavitt Lane provides a parallel corridor that links more substantial habitat further upstream and downstream. Unfortunately, most of the road verge is too distant from Dandenong Ck to provide the creek with shade, nutrient input and other habitat values. Due to a long history of slashing and grading, the understorey of the road verge mostly comprises introduced plants such as woody weeds and pasture grass.

The site includes two areas on slopes beside the floodplain. One is the area occupied by buildings (see the aerial photograph), where the Salvation Army provides residential rehabilitation programs for addicts. This area is of no environmental significance and is included within the site only because changed land use there could have significant consequences on the adjacent floodplain. The other elevated land is west of Dobsons Ck, included within the site mainly because of the remnant Herb-rich Foothill Forest that is marked on the aerial photograph. The bedrock beneath this forest is Mount Evelyn Rhyodacite, which has formed an acidic clay loam soil. The slope is between 15% and 20%, facing east-southeast.

Within the Herb-rich Foothill Forest, a southern strip has no understorey other than exotic pasture, which is grazed by livestock. A larger area is fenced to keep livestock out. It has very serious infestations of Sweet Pittosporum and Blackberry that have greatly reduced the density of native ground flora, but the area retains a good cover of canopy trees, a fair cover of indigenous lower trees and shrubs and a modest number of ground flora species.

Relationship to other land

The native vegetation along both sides of Pavitt Lane provides a corridor between the Dandenong Ranges National Park and Liverpool Road Retarding Basin (Site 22).

Birds, bats, possums, frogs, insects and pollen undoubtedly move between the site and the various other sites marked on the aerial photograph to the east and southeast, as well as into the westward continuation of the Herb-rich Foothill Forest on Melbourne Water's property with the marked tank (or covered reservoir). The Melbourne Water land is included in Site 99, the Dandenong Ranges Buffer.

The Platypus that were found in 2002 at the Sheffield Rd crossings of both Dandenong Ck and Dobsons Ck no doubt move both upstream and downstream of those locations, between this site and land upstream. They also probably move into Liverpool Road Retarding Basin.

Bioregion: The floodplain is part of the Gippsland Plain bioregion and the slopes are within the Highlands Southern Fall.

Habitat types

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

Riparian Forest (EVC 18, **Vulnerable** in the Gippsland Plain bioregion): Estimated to cover 3.2 ha, comprising 0.3 ha in fair ecological condition (rating C) and 2.9 ha in poor ecological condition (rating D). 50 indigenous plant species were found.

Dominant canopy trees: *Eucalyptus viminalis* with smaller numbers of *E. obliqua* in some places and *E. ovata* in others.

Dominant lower trees: *Acacia melanoxylon*, with fewer *Pomaderris aspera*, *Melaleuca ericifolia* and *Exocarpos cupressiformis*.

Shrubs: *Coprosma quadrifida* is the most numerous indigenous shrub species. Others include *Cassinia aculeata*, *Goodenia ovata*, *Gynatrix pulchella*, *Olearia lirata*, *Ozothamnus ferrugineus* and *Prostanthera lasianthos*. The shrubby herb, *Senecio minimus*, is also present.

Vines: *Calystegia marginata* is present but very scarce. *Rubus parvifolius* is scattered. The weeds *Lonicera japonica* and *Rubus discolor* are well established.

Ferns: *Adiantum aethiopicum*, *Cyathea australis* and *Pteridium esculentum* are present.

Ground flora: The indigenous ground flora has been heavily replaced by weeds. The natural ground layer is tussocky due to abundant *Carex appressa*, *Juncus* species and *Poa ensiformis*, but with large patches dominated by *Phragmites australis*. Creepers and scramblers are conspicuous, including *Acaena novae-zelandiae* and *Austrocynoglossum latifolium*. Amphibious species are well represented, particularly by *Persicaria* species.

Herb-rich Foothill Forest (EVC 23, conservation status rated 'Least Concern' in the bioregion): Estimated to cover 2.5 ha, with 0.25 ha in fair ecological condition (rating C) and 2.25 ha in poor ecological condition (rating D). 26 indigenous plant species were recorded on 8/4/02, and others would be detected in late spring or summer.

Canopy trees: Dominated by *Eucalyptus obliqua* with smaller numbers of *E. goniocalyx*, *E. ovata* and *E. radiata*, forming a fair to good cover up to >25 m tall.

Lower trees: *Acacia melanoxylon* and a smaller number of *Exocarpos cupressiformis*.

Shrubs: Absent in grazed areas and mostly dominated by a very serious infestation of *Pittosporum undulatum* elsewhere. The most abundant of the indigenous species are *Coprosma quadrifida* and *Ozothamnus ferrugineus* and there are also *Acacia stricta*, *Bursaria spinosa*, *Cassinia aculeata*, *Goodenia ovata*, *Indigofera australis*, *Polyscias sambucifolia* and *Prostanthera lasianthos*.

Vines: *Clematis aristata* is present.

Ferns: There are large patches of *Pteridium esculentum* and more localised patches of *Calochlaena dubia*.

Ground flora: The indigenous ground flora is all but absent in grazed areas and heavily suppressed by the very serious weeds, *Pittosporum undulatum* and *Rubus discolor* elsewhere. The dominant indigenous species are *Poa ensiformis* and *Pteridium esculentum*. *Gahnia radula*, *Lomandra longifolia* and *Viola hederacea* are also present, along with grasses that could not be identified.

Swampy Riparian Woodland (EVC 83, **regionally Endangered**): Estimated to cover 0.8 ha, comprising 0.1 ha in fair ecological condition (rating C) and 0.7 ha in poor ecological condition (rating D). 36 indigenous plant species were found.

Dominant canopy trees: *Eucalyptus ovata* to nearly 30 m tall, fairly sparse.

Dominant lower trees: *Acacia melanoxylon* (characteristically supporting the mistletoe, *Amyema quandang*), with fewer *Melaleuca ericifolia* and *Pomaderris aspera*.

Shrubs: *Goodenia ovata* and *Prostanthera lasianthos* dominate. *Cassinia aculeata*, *Coprosma quadrifida* and *Ozothamnus ferrugineus*, *Olearia lirata* and *Polyscias sambucifolia* are also present, and so is the shrubby herb, *Senecio minimus*.

Vines: *Billardiera mutabilis* is present but scarce.

Ferns: *Blechnum minus*, *Cyathea australis* and *Pteridium esculentum* were recorded.

Ground flora: Confined to patches that are less accessible to grazing. Dominated by *Phragmites australis*, *Poa ensiformis* and *Tetrarrhena juncea*. Other species include *Acaena novae-zelandiae*, *Dianella tasmanica*, *Gahnia radula*, *G. sieberiana*, *Juncus gregiflorus*, *J. procerus*, *Lepidosperma elatius*, *Lomandra longifolia*, *Persicaria decipiens* and *P. praetermissa*.

Swampy Woodland (EVC 937, **regionally Endangered**): Estimated to cover 2.55 ha, comprising 0.05 ha in fair ecological condition (rating C) and 2.5 ha in poor ecological condition (rating D). 32 indigenous plant species were found.

Dominant canopy trees: Pure or near-pure stands of *Eucalyptus ovata*, except along most of Sheffield Rd where the canopy is overwhelmingly *E. cephalocarpa* and the vegetation approaches Valley Heathy Forest.

Dominant lower trees: *Acacia melanoxylon* is dominant. *Melaleuca ericifolia* is abundant but not dominant. *Exocarpos cupressiformis* is much less abundant.

Shrubs: Greatly reduced in density by past clearing and slashing. The most common shrubs are *Bursaria spinosa*, *Coprosma quadrifida* and *Goodenia ovata*.

Vines: Sparse *Pandorea pandorana*.

Ferns: *Pteridium esculentum* is abundant, a dominant species of the ground flora. There are no other ferns.

Ground flora: The indigenous ground flora has been drastically reduced by past clearing, slashing, excavation and consequent weed invasion. *Gahnia radula* and *Lomandra longifolia* are the most common indigenous species.

Plant species

In the following plant list, the column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, the species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia melanoxyton</i>	E	<i>Indigofera australis</i>
E	<i>Acacia stricta</i>	V	<i>Isolepis inundata</i>
	<i>Acaena novae-zelandiae</i>		<i>Juncus amabilis</i>
V	<i>Adiantum aethiopicum</i>		<i>Juncus gregiflorus</i>
V	<i>Alternanthera denticulata</i>		<i>Juncus pallidus</i>
V	<i>Amyema quandang</i>	E	<i>Juncus procerus</i>
E	<i>Austrocynoglossum latifolium</i>	E	<i>Lemna disperma</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>		<i>Lepidosperma elatius</i>
	<i>Billardiera mutabilis</i>		<i>Leptospermum continentale</i>
C	<i>Blechnum minus</i>		<i>Lomandra longifolia</i>
	<i>Bursaria spinosa</i>	V	<i>Lythrum hyssopifolia</i>
V	<i>Calochlaena dubia</i>	E	<i>Melaleuca ericifolia</i>
E	<i>Calystegia marginata</i>	C	<i>Melaleuca squarrosa</i>
	<i>Carex appressa</i>		<i>Microlaena stipoides</i>
	<i>Cassinia aculeata</i>	V	<i>Olearia lirata</i>
	<i>Cassinia arcuata</i>	E	<i>Ozothamnus ferrugineus</i>
V	<i>Clematis aristata</i>		<i>Pandorea pandorana</i>
V	<i>Coprosma quadrifida</i>		<i>Persicaria decipiens</i>
E	<i>Cyathea australis</i>	E	<i>Persicaria hydropiper</i>
	<i>Deyeuxia quadriseta</i>	E	<i>Persicaria praetermissa</i>
V	<i>Dianella tasmanica</i>	C	<i>Persicaria subsessilis</i>
	<i>Dichondra repens</i>	E	<i>Phragmites australis</i>
	<i>Epilobium hirtigerum</i>		<i>Poa ensiformis</i>
V	<i>Eucalyptus cephalocarpa</i>	E	<i>Poa tenera</i>
	<i>Eucalyptus goniocalyx</i>	E	<i>Polyscias sambucifolia</i>
V	<i>Eucalyptus obliqua</i>	E	<i>Pomaderris aspera</i>
V	<i>Eucalyptus ovata</i>	E	<i>Prostanthera lasianthos</i>
E	<i>Eucalyptus radiata</i>		<i>Pteridium esculentum</i>
E	<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>	E	<i>Rubus parvifolius</i>
V	<i>Exocarpos cupressiformis</i>		<i>Senecio hispidulus</i>
E	<i>Exocarpos strictus</i>	E	<i>Senecio minimus</i>
	<i>Gahnia radula</i>		<i>Senecio quadridentatus</i>
E	<i>Gahnia sieberiana</i>		<i>Tetrarrhena juncea</i>
V	<i>Geranium potentilloides</i>	E	<i>Viola hederacea</i>
	<i>Gonocarpus tetragynus</i>	E	<i>Wahlenbergia gracilis</i>
	<i>Goodenia ovata</i>	V	<i>Xanthorrhoea minor</i>
E	<i>Gynatrix pulchella</i>		

Introduced Species

<i>Acer pseudoplatanus</i>	<i>Crepis capillaris</i>	<i>Fumaria ?officinalis</i> spp. agg.	<i>Oxalis pes-caprae</i>
<i>Allium triquetrum</i>	<i>Crococsmia</i> × <i>crococsmiiflora</i>	<i>Galium aparine</i>	<i>Pennisetum clandestinum</i>
<i>Anthoxanthum odoratum</i>	<i>Cyperus eragrostis</i>	<i>Genista monspessulana</i>	<i>Phalaris aquatica</i>
<i>Asparagus scandens</i>	<i>Dactylis glomerata</i>	<i>Hedera helix</i>	<i>Pinus radiata</i>
<i>Aster subulatus</i>	<i>Delairea odorata</i>	<i>Hypericum androsæmum</i>	<i>Pittosporum undulatum</i>
<i>Callitriche stagnalis</i>	<i>Ehrharta erecta</i>	<i>Hypericum tetrapterum</i>	<i>Plantago lanceolata</i>
<i>Chlorophytum comosum</i>	<i>Euphorbia peplus</i>	<i>Hypochoeris radicata</i>	<i>Prunella vulgaris</i>
<i>Cirsium vulgare</i>	<i>Festuca arundinacea</i>	<i>Ilex aquifolium</i>	<i>Prunus cerasifera</i>
<i>Coryza sumatrensis</i>	<i>Foeniculum vulgare</i>	<i>Juncus articulatus</i>	<i>Quercus robur</i>
<i>Coprosma robusta</i>	<i>Fraxinus angustifolia</i>	<i>Lonicera japonica</i>	<i>Ranunculus repens</i>
<i>Cotoneaster pannosus</i>	<i>Fraxinus angustifolia</i>	<i>Malus pumila</i>	<i>Romulea rosea</i>
<i>Crataegus monogyna</i>		<i>Oxalis incarnata</i>	<i>Rosa rubiginosa</i>

<i>Rubus anglocandicans</i>	<i>Salix × rubens</i>	<i>Tradescantia fluminensis</i>	<i>Zantedeschia aethiopica</i>
<i>Rumex crispus</i>	<i>Solanum nigrum</i>	<i>Trifolium repens</i>	
<i>Salix babylonica</i> s.l.	<i>Sonchus oleraceus</i>	<i>Vinca major</i>	

Notes concerning some of the locally threatened plant species

- Austrocynoglossum latifolium* (Forest Hound's-tongue). Several plants were found beside Dandenong Ck.
- Blechnum minus* (Soft Water-fern). A few plants were found around a small dam adjacent to Dobsons Ck.
- Calystegia marginata* (Forest Bindweed). About a dozen plants found, and others on the other side of Liverpool Rd.
- Gahnia sieberiana* (Red-fruit Saw-sedge). Scarce near the eastern bend in Sheffield Rd; more abundant near Basin-Olinda Rd.
- Gynatrix pulchella* (Hemp Bush). Five plants found, threatened by grazing.
- Juncus holoschoenus* (Joint-leaf Rush). Small numbers seen beside Sheffield Rd, and quite likely others overlooked.
- Lemna disperma* (Common Duckweed). In several patches along the creeks.
- Melaleuca squarrosa* (Scented Paperbark). A solitary, sick specimen was found amid weeds beside Sheffield Rd.
- Persicaria praetermissa* (Spotted Knotweed). Several patches were found along Dobsons Ck.
- Persicaria subsessilis* (Hairy Knotweed). Plants scattered along Dandenong Ck, particularly near Liverpool Rd.

Fauna of special significance

Vulnerable in Victoria and listed under the *Flora and Fauna Guarantee Act 1988*

Powerful Owl. Observed roosting close to Dobsons creek during this study (8/4/02).

Threatened in Victoria

Little, Intermediate and/or Great Egrets. Observed in substantial numbers at times of flood in the past decade.

Uncommon in the Melbourne Region

Platypus. Trapped and released at the edge of this site in Dandenong Ck in 2001 and in Dobsons Ck in 2002 (Williams 2002).

White-necked Heron. Observed in substantial numbers at times of flood in the past decade.

Cattle Egret. Frequently seen foraging on the floodplain and the pasture on the slopes.

Australian King-parrot. Locally common around The Basin.

Rare or Threatened in suburban Melbourne

Broadfin Galaxias. Trapped in Dandenong Ck in 2002 at Sheffield Rd (Williams 2002).

Fauna habitat features

- Vegetation on the slope on the western side of Dobsons Ck includes a roosting site for the Powerful Owl and the creek corridor is likely to form an important component of its territory;
- Native vegetation along Dobsons Ck and on the western slope supports substantial populations of smaller forest birds, including several nests observed within dense thickets of shrubs on the western slope;
- The larger Manna Gums and Swamp Gums along the creeks contain hollows;
- The floodplain provides foraging habitat for waterbirds, which congregate there in thousands during times of flood;
- The waters of Dandenong Ck and Dobsons Ck support Platypus, fish and the smaller organisms that support them;
- Fauna on the site always have access to water from the streams or dams, even during drought.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment'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 part of this site.

The site is known as a feeding site for nomadic species listed as threatened in Victoria (specifically, Little Egrets, Intermediate Egrets and/or Great Egrets). Criterion 1.2.3 confers State significance on such sites if the species are deemed to be 'reliant on defined, dispersed feeding sites'. This might or might not apply to the egrets. The significance is taken here to be **Regional** because of the relatively low frequency with which the birds use the site.

For a broader range of fauna, the site is an ecological 'stepping stone' for the reasons discussed above in the section on 'Relationship to other land'. In terms of criterion 1.2.6, it is 'Important at local scale - Link between individual remnant habitat blocks or within subcatchment', which confers **Local** significance on the site.

Regionally Threatened Ecological Vegetation Class

Criterion 3.2.3 confers at least Local significance on any site containing native vegetation that meets the Department of Sustainability & Environment's definition of a 'remnant patch'.

The central part of the Herb-rich Foothill Forest clearly qualifies as a 'remnant patch'. Because of the conservation status and ecological condition of this area, it gives the site only Local significance. The Riparian Forest and Swampy Riparian Woodland both have substantial areas that qualify as remnant patches because of their fully developed tree canopies. Riparian forest is listed as vulnerable and gives the site Regional significance. Swampy Riparian Woodland is Endangered and gives the site **State** significance.

Rare or Threatened Flora

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

The use of the site by Powerful Owl for roosting, combined with the additional habitat features that the site possesses for that species (e.g. large tree hollows), gives the site at least **Regional** significance under Criterion 3.1.

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance. The same is probably also true for some of the significant fauna species listed above.

Threats

- Grazing access by livestock along most of the creek has resulted in substantial depletion of remnant vegetation and fragmentation of habitat;
- Invasion of native vegetation by environmental weeds, the worst of which are:
 - Square-stemmed St John's Wort (*Hypericum tetrapterum*), a weed that is Regionally Prohibited under the *Catchment & Land Protection Act* and which is spreading down the valley;
 - Very serious: Sweet Pittosporum (*Pittosporum undulatum*) and Blackberry (*Rubus discolor*), particularly in the Herb-rich Foothill Forest;
 - Serious: Asparagus Fern (*Asparagus scandens*), Cape Ivy (*Delairea odorata*), Japanese Honeysuckle (*Lonicera japonica*);
- Moderate to severe eucalypt dieback disease within unfenced areas on the western slope, probably associated with altered drainage, grazing and consequent loss of understorey;
- Ringbarking of trees by cattle;
- Disturbances to Powerful Owl roosting site on the western slope;
- Fertiliser, manure and farm chemicals causing elevated concentrations of phosphorus, nitrogen, trace elements, pesticides etc. in the streams and in the soil of naturally vegetated areas, rendering the habitat less suitable for native flora or fauna;
- Loss or decline of plant species that are present in dangerously small numbers (e.g. the solitary, unhealthy *Melaleuca squarrosa*), due to inbreeding, poor reproductive success or vulnerability to localised chance events;
- Predation of fauna (particularly birds) by foxes;
- Potential site development.

Management issues

- Grazing should be excluded from all native vegetation, extended to a distance of at least 10 m from each stream, to prevent a further decline in native vegetation and to provide opportunities for regeneration. Revegetation and a weed control program would also be required. The Port Phillip and Westernport Catchment Management Authority should assist this project, consistent with their Draft Native Vegetation Plan;
- Weeds should be brought under control, particularly Blackberry, Square-stem St John's Wort and Sweet Pittosporum. Note that the first two, and some of the woody weeds, are declared noxious;
- Disturbances to Powerful Owls should be minimised by restricting access to the western slope as far as possible.

Administration matters

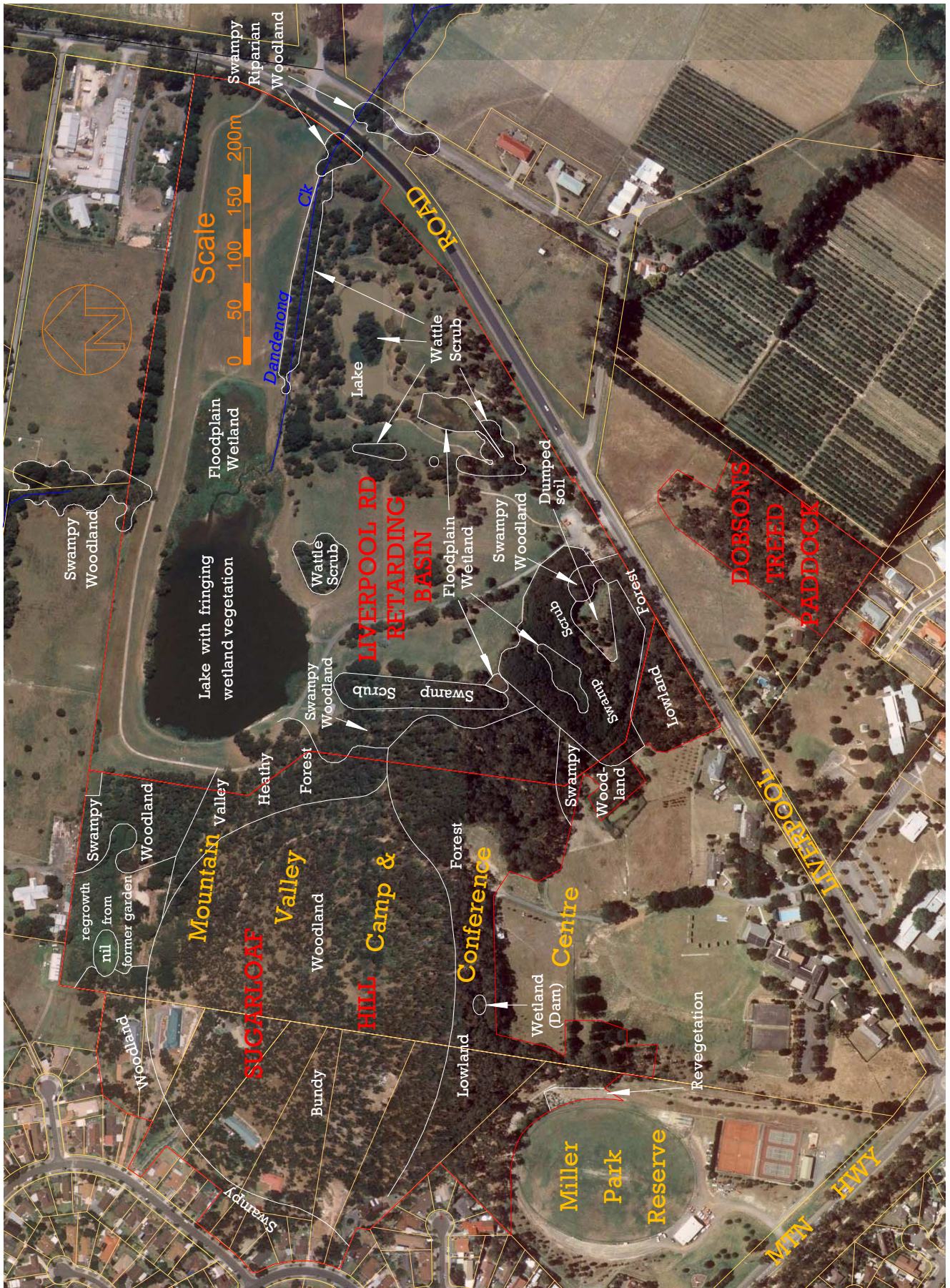
- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its riparian vegetation and the biologically significant attributes discussed under the heading 'Significance ratings';
- The native vegetation is mostly covered at present by overlay VPO1, having been listed by Water Ecoscience (1998) as their Site 64, but the floodplain is not similarly protected despite its importance to waterway function;
- The site is outside the Urban Growth Boundary;
- Planning scheme zones within the site are GWZ2, SUZ1 and UFZ, plus a trace of RDZ2 at the Liverpool Rd bridge and a trace of RCZ1 on the east-west section of Sheffield Rd.

Information sources used in this assessment

- 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 several separate areas of the site;
- Similar data for all vegetation in proximity to the roads around the site, gathered by Dr Lorimer in September 1997, as described in the report, *'A Survey and Management Plan for Significant Vegetation of Roadsides in Knox'* by G.S. Lorimer for Knox City Council (May 1998, 137 pp.);
- Detailed vegetation data and mapping along Dobsons Ck and in the Herb-rich Foothill Forest by Mr Rik Brown on 8/4/02, in accord with this study's standard approach described in Section 2.4 of Vol.1. This included lists of indigenous and introduced plant species within each of three EVCs;
- Incidental observations of birds and frogs while the above data were being gathered, as well as by Dr Lorimer when periodically passing through the area over at least a decade;
- *'Distribution of Platypus along Upper Dandenong and Dobsons 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.
- 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 photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Aerial Photograph and Plan of Sites 21-23

The sites are outlined and labelled in red. This is a composite of several photographs from February 2001.



Site 21. Dobson's Treed Paddock, The Basin

A treed area of 1.6 ha with grazed native understorey vegetation, in a semi-rural landscape, close to suburbia and also to more substantial areas of habitat for native flora and fauna. Melway ref. 65 G5.

Site Significance Level: State due to the presence of a Vulnerable EVC

Aerial photograph and plan: See page 114, which covers this site, Liverpool Road Retarding Basin and Sugarloaf Hill.

Boundaries

This site is outlined in red and labelled 'Dobson's Treed Paddock' on page 114. The site boundary is intended to be a simple shape that circumscribes the treed area that can be seen on the aerial photograph. It lies within a single lot, and while it is usually preferable to make site boundaries align with property boundaries, it does not seem reasonable in this case. Otherwise, if the lot is subdivided (as seems possible), there could be lots with no conservation significance, still covered by the Environmental Significance Overlay that is proposed here.

Land use & tenure: Part of a private Rural Living lot, used for horse agistment.

Site description

The site is on a lower, north-facing slope at the very edge of the Dandenong Ranges. The elevations are 143-165m and the slope is 1:8 (12-13%). The soil is loam over clay subsoil, derived from the Mt Evelyn rhyodacite formation of the Dandenong Ranges volcanic group.

This area has been previously fenced, but the only substantial fences that remain are on the southwestern and southeastern boundaries (corresponding to lot boundaries). Horses have grazed the native vegetation, eliminating many shrub species and stunting the remainder. The ground flora has survived rather better, retaining a substantial number of wildflowers. Environmental weeds have secured a foothold, particularly where there are signs of digging many years ago, but the grazing is suppressing many weeds as much as it is suppressing the indigenous species.

There are many mature Monterey Pines in the easternmost corner of the site. They are seriously degrading the quality of the native vegetation there, due to their shade, soil modification and competition for moisture and nutrients. This area also has serious eucalypt dieback, no doubt exacerbated or caused by the pines. Lesser dieback is spread across the rest of the site.

Overall, the site has many large eucalypts in fair to good condition, up to approximately 25 m tall. This is significant because of the importance of such trees for nesting and roosting of wildlife (bats, birds, possums) and the severe depletion of large eucalypts in Knox and the metropolitan area as a whole. Such trees become much more common east of nearby Sheffield Rd.

The treeless band of land through the northern projection of the site has very little native vegetation.

Relationship to other land

The site is 60 m from Liverpool Road Retarding Basin (Site 21) and 320m from native vegetation of the Dobsons Ck habitat corridor (Site 20), each of which are well connected to other native habitat. Dobson's treed paddock may act as an ecological stepping-stone between these sites for movement of birds, bats and insects. Apart from their intrinsic value, birds and insects can play an important role in dispersal of pollen and seeds.

Bioregion: The site is on the border between the Highlands Southern Fall and the Gippsland Plain, and is better taken as being in the former bioregion because the site is geologically and topographically part of the Dandenong Ranges and its vegetation best matches the form of Grassy Forest (EVC 128) that occurs in the Highlands Southern Fall.

Habitat type

Grassy Forest (EVC 128, **regionally Vulnerable**, or Endangered if the bioregion is taken to be the Gippsland Plain): Total area 1.6 hectares, of which approximately 0.5 ha is in fair ecological condition (rating C) and 1.1 ha is in poor ecological condition (rating D).

Dominant canopy trees: *Eucalyptus obliqua*, *E. gonicalyx*, *E. macrorhyncha* and *E. radiata*, to 25 m tall and typically not much more than 2 m apart.

Dominant lower trees: Abundant *Exocarpos cupressiformis* and some *Acacia melanoxylon*, both about 8 m tall.

Shrubs: Heavily grazed, allowing visibility up to 200 m. The main species left are *Coprosma quadrifida* and *Bursaria spinosa*. *Acacia stricta* and *Cassinia aculeata* are also present (the latter very scarce).

Vines: *Clematis aristata* is abundant and *Pandorea pandorana* is present, but both are grazed to ground level.

Ferns: *Pteridium esculentum* is abundant, no doubt encouraged by grazing.

Ground flora: Greatly reduced in density and depth by grazing. Dominated by *Microlaena stipoides*, *Rytidosperma penicillatum*, *Gahnia radula* and pasture grasses; also with many *Carex breviculmis* and *Austrostipa rudis*. Character species include *Gonocarpus tetragynus*, *Platylobium formosum* and *Veronica calycina*.

Plant species

The following plant species were observed by the author in April 2002. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox with 'E'=Endangered and 'V'=Vulnerable. A spring or summer survey would probably detect about 5-10 additional species.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia melanoxylon</i>		<i>Juncus amabilis</i>
E	<i>Acacia stricta</i>		<i>Lachnagrostis filiformis</i>
	<i>Acaena novae-zelandiae</i>	E	<i>Lagenophora stipitata</i>
V	<i>Acrotriche prostrata</i>	E	<i>Leptospermum scoparium</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Billardiera mutabilis</i>		<i>Microlaena stipoides</i>
	<i>Bursaria spinosa</i>	V	<i>Opercularia ovata</i>
	<i>Carex breviculmis</i>	V	<i>Opercularia varia</i>
	<i>Cassinia aculeata</i>		<i>Oxalis exilis/perennans</i>
V	<i>Clematis aristata</i>		<i>Pandorea pandorana</i>
V	<i>Coprosma quadrifida</i>	V	<i>Platylobium formosum</i>
E	<i>Cynoglossum suaveolens</i>		<i>Poa morrisii</i>
	<i>Dichondra repens</i>		<i>Poranthera microphylla</i>
	<i>Eucalyptus goniocalyx</i>		<i>Pteridium esculentum</i>
E	<i>Eucalyptus macrorhyncha</i>		<i>Rytidosperma penicillatum</i>
V	<i>Eucalyptus obliqua</i>		<i>Rytidosperma racemosum</i>
E	<i>Eucalyptus radiata</i>		<i>Rytidosperma tenuius</i>
V	<i>Euchiton collinus</i>		<i>Senecio hispidulus</i>
V	<i>Exocarpos cupressiformis</i>	E	<i>Senecio prenanthoides</i>
	<i>Gahnia radula</i>		<i>Tetrarrhena juncea</i>
	<i>Gonocarpus tetragynus</i>		<i>Themeda triandra</i>
	<i>Goodenia ovata</i>	E	<i>Veronica calycina</i>
V	<i>Hardenbergia violacea</i>		
Introduced Species			
	<i>Acacia baileyana</i>		<i>Dactylis glomerata</i>
	<i>Agrostis capillaris</i>		<i>Ehrharta erecta</i>
	<i>Anthoxanthum odoratum</i>		<i>Hedera helix</i>
	<i>Centaurium erythraea</i>		<i>Hypochoeris radicata</i>
	<i>Crataegus monogyna</i>		<i>Ilex aquifolium</i>
	<i>Crepis capillaris</i>		<i>Pinus radiata</i>
			<i>Pittosporum undulatum</i>
			<i>Plantago lanceolata</i>
			<i>Prunella vulgaris</i>
			<i>Rubus anglocandicans</i>
			<i>Trifolium repens</i>
			<i>Vinca major</i>

Fauna of special significance

Powerful Owls are Vulnerable in Victoria (DSE 2003b) and are bound to visit occasionally, even though they were not actually observed in this study. This species was found roosting 500 m away in Site 20. The habitat on Dobson's treed paddock would form only a small fraction of the range of a Powerful Owl.

Fauna habitat features

- A substantial sized patch of large eucalypts (many of which are diseased), some with hollows;
- The possible role as a stepping-stone for movement of birds, bats and insects (see above).

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Regionally Threatened Ecological Vegetation Class

According to the criteria of 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), remnants of a regionally vulnerable EVC (including Grassy Forest) have a conservation significance rating of Medium

to Very High, depending on their habitat score (Volume 1, Section 2.4.4). No habitat score has been determined in the present site, but it is likely that some of the vegetation would reach the threshold of 0.3 that would make the conservation significance High according to the Framework criteria. On this basis, criterion 3.2.3 of Amos (2004) confers **State** significance to the site. This may reduce to Regional in light of a formal assessment of habitat scores after the vegetation is allowed to recover from grazing.

Faced with some uncertainty between the State and Regional ratings, it is recommended that the Precautionary Principle be applied, as summarised in the Glossary of Volume 1. This principle is well established in Australian and Victorian environmental law and would mean that the site should be treated almost the same as if it were definitely of State significance.

Locally Threatened Plant Species

At least some of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threatened Fauna

Criterion 3.1.3 confers **Regional** significance upon sites like Dobson's treed paddock that are likely to support Powerful Owl (a vulnerable species in Victoria) and are very close to known habitat of that species.

Threats

- Gradual loss of indigenous understorey due to the effects of grazing;
- Likely future residential development (although the planning scheme theoretically provides protection for the native vegetation);
- Rapid escalation of environmental weeds if grazing ceases and other control measures are not taken;
- Invasion by environmental weeds:
 - Very serious: Monterey Pine (*Pinus radiata*);
 - Serious: Sweet Vernal-grass (*Anthoxanthum odoratum*), Ribwort (*Plantago lanceolata*), Blue Periwinkle (*Vinca major*);
 - Lower level: Hawthorn (*Crataegus monogyna*), Cocksfoot (*Dactylis glomerata*), Panic Veldt-grass (*Ehrharta erecta*), Ivy (*Hedera helix*), Cat's Ear (*Hypochoeris radicata*), Holly (*Ilex aquifolium*), Blackberry (*Rubus discolor*);
- Eucalypt dieback disease that is severe in the eastern corner and moderately severe elsewhere;
- Loss or decline of plant species that are present in dangerously small numbers, due to inbreeding, poor reproductive success or vulnerability to localised chance events.

Management issues

The abundance of plants species such as *Kennedia prostrata* after fire on the nearby Mountain Valley property (part of Site 23) shows the value of fire in recovering plant species that have suffered massive decline in Knox. It is ecologically desirable for Council to support the use of fire on this site if the owner seeks it.

Administration matters

- As discussed above, the site should be administered almost the same as if it were definitely of State significance, based on the Precautionary Principle.
- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its biological significance and the possibility of future subdivision;
- The site is not, and has not been, included within a planning overlay to protect the vegetation, even though the site was recognised as biologically significant by Water Ecoscience (1998) (included within their Site 267);
- The land is zoned RLZ, for which the schedule in the Planning Scheme specifies a minimum area of 4 ha for subdivision and for construction of a dwelling without a planning permit. The lot in question is slightly smaller;
- The granting of planning permits for land development within the site would be restricted because of the status of the vegetation as a regionally vulnerable EVC and the Victorian government's policy for native vegetation management (NRE 2002a; Victoria Planning Provisions).

Information sources used in this assessment

- Detailed vegetation data in accord with this study's standard approach described in Section 2.4 of Vol.1, including a list of indigenous and introduced plant species, compiled by Dr Lorimer over 1½ hours on 3rd April 2002;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;

- The Department of Sustainability & Environment's BioMaps of the area (which are taken here to be inaccurate for this lot);
- Maps of geology and topography produced by agencies of the Victorian government.

Acknowledgment

Thanks to Mr Jim Dobson for granting permission to inspect the site.

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 sections of native vegetation. Melway ref. 65 G4.

Site Significance Level: *State*

- There are five regionally endangered Ecological Vegetation Classes and one that is regionally vulnerable;
- The site is known habitat for Swamp Skink and likely habitat for Powerful Owl, which are both vulnerable species listed under the *Flora and Fauna Guarantee Act*;
- Together with Sugarloaf Hill, the site is a major ecological 'stepping stone' on the Dandenong Creek habitat corridor for daily and seasonal movements of birds and insects;
- 113 indigenous plant species were found on the site in this study, or 170 if one takes this site and the adjoining Sugarloaf Hill together - large numbers by Knox standards;
- There are numerous plant species and several fauna species that are rare or threatened in the Melbourne area;
- The waters of Dandenong Creek and adjacent wetlands support aquatic life that deserves further investigation.

Aerial photograph and plan: See page 114, which covers this site, Sugarloaf Hill and Dobson's treed paddock.

Boundaries

This 22.45 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 needs to be treated as a whole.

Land use & tenure: Melbourne Water reserve for drainage purposes, doubling as a public park.

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 131-137 m, but the western fringe includes the foot of Sugarloaf Hill to an elevation of 144 m. The floodplain soil is alluvium washed down 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. 114 comprises light grey loam over clay, derived from the Devonian volcanic flows of the Dandenong Ranges

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. There is a second artificial lake to the south of the channel within the property.

Both lakes have some fringing semi-aquatic vegetation and wetlands at their respective upstream ends. There are also wetlands in the site's southwest, surrounded by dense Swamp Scrub. The lakes and wetlands are used by waterbirds, frogs and probably reptiles.

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. 114.

Despite the past clearing, the Swamp Scrub at Liverpool Road Retarding Basin supports a fairly rich range of understorey plant species. This richness appears to be slowly dwindling as the vegetation matures, and may need a fire to regenerate it. The Wattle Scrub has probably never supported many understorey species at all, except on the banks of the creek channel.

The site's western edge, and a narrow strip beside Liverpool Rd near the car park, have not been cleared and 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 dark green areas on the aerial photograph of p. 114 are generally planted trees of species or forms that do not occur naturally in the district. The main exception is the small patches within the area west of the car park marked

'Dumped soil', which contain eight indigenous species that have volunteered themselves, including the locally uncommon species *Calystegia marginata*, *Goodia lotifolia* and *Gynatrix pulchella*.

Although there is a disfigured sign at the car park which used to state that dogs must be kept on leads, a high percentage of all 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.

Forest birds and reptiles are rather abundant on the hill slopes in the site's west. The Swamp Skink (a vulnerable species listed under the *Flora & Fauna Guarantee Act*) has been found on the site in recent years.

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 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 also every few hundred metres to the north of the site, in Maroondah municipality (see Lorimer *et al.* 1997).

Bioregion: Gippsland Plain.

Habitat types

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). Aquatic species not determined.

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. 56 indigenous plant species were found.

Dominant canopy trees: *Eucalyptus obliqua* typically 22-25 m tall, with far fewer *E. radiata* and *E. ovata*.

Dominant lower trees: *Acacia melanoxylon* and *Exocarpos cupressiformis*.

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*. *Melaleuca ericifolia* intrudes from adjoining Swampy Woodland. Members of the Proteaceae family are uncharacteristically absent, perhaps due to past clearing.

Ferns: Bracken is abundant almost throughout.

Ground flora: Rather dense, knee-deep and with an abundance of the wiry grass *Tetrarrhena juncea*, often sharing dominance with *Gahnia radula* or *Pteridium esculentum*. *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). 42 indigenous plant species were found.

Dominant canopy trees: *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 weed Japanese Honeysuckle is a serious problem.

Ferns: *Cyathea australis* and *Blechnum minus* are relatively sparse but are nevertheless still fairly prominent features of the ground flora.

Ground flora: Apart from the ferns, there are sparse patches of *Triglochin striatum*, *Juncus*, *Isolepis inundata*, 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 species are variously rushes, Common Reed, sedges or *Persicaria* species.

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.

Dominant canopy trees: *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).

Dominant lower trees: Scattered *Exocarpos cupressiformis*, 12 m tall and fewer *Acacia melanoxylon*.

Shrubs: Mostly up to 2-3 m tall and dense with *Bursaria spinosa* (typically 60% foliage cover). *Acacia stricta* is fairly abundant.

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.

Ground flora: 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. 114 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). 41 indigenous plant species were found.

There is also 4,800 m² of Wattle Scrub shown on p. 114 (excluding the strip along Dandenong Ck) that represents regrowth of Swampy Woodland, in poor ecological condition (rating D) relative to pristine Swampy Woodland.

Dominant canopy trees: *Eucalyptus ovata*, fairly sparse.

Dominant lower 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 discolor* and *Lonicera japonica* are a significant threat.

Ferns: *Pteridium esculentum* is abundant. There are also moderate numbers of *Cyathea australis* and small numbers of *Histiopteris incisa* and *Polystichum proliferum*. *Hypolepis rugosula* was present until recently but could not be found in 2002 or 2003 during drought.

Ground flora: *Phragmites australis* and *Lepidosperma elatius* are each dominant in some areas. Elsewhere, the dominant ground flora species are *Lomandra longifolia* and various grasses, including *Microlaena stipoides*, *Austrostipa rudis*, several wallaby-grass species and the characteristic species *Austrofestuca hookeriana*, *Poa tenera* and *Poa ensiformis*. *Gonocarpus tetragynus* is abundant but not dominant.

Swampy Riparian Woodland (EVC 83, regionally Endangered): The area mapped on p. 114 as this EVC measures approximately 900 m² and is in fair ecological condition (rating C). 19 indigenous plant species found.

There is also 3,100 m² of Wattle Scrub along the Dandenong Ck channel that represents regrowth of Swampy Riparian Woodland, in fair ecological condition (rating C) relative to pristine Swampy Riparian Woodland.

Dominant canopy trees: *Eucalyptus ovata*, fairly sparse.

Dominant lower trees: *Acacia melanoxylon* (characteristically 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).

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

Plant species

In the following plant list, the column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia melanoxylon</i>		<i>Alisma plantago-aquatica</i>
E	<i>Acacia stricta</i>	V	<i>Alternanthera denticulata</i>
V	<i>Acacia verticillata</i>	C	<i>Amyema pendula</i>
	<i>Acaena novae-zelandiae</i>	V	<i>Amyema quandang</i>
	<i>Acrotiche serrulata</i>		<i>Arthropodium strictum</i>
V	<i>Adiantum aethiopicum</i>	C	<i>Austrofestuca hookeriana</i>

Risk	Indigenous Species
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>
C	Baumea acuta
C	Baumea ?rubiginosa
C	Baumea tetragona
	<i>Billardiera mutabilis</i>
C	Blechnum minus
V	Bolboschoenus medianus (perhaps planted)
	<i>Burchardia umbellata</i>
	<i>Bursaria spinosa</i>
E	Calystegia marginata
	<i>Carex appressa</i>
E	Carex gaudichaudiana
	<i>Cassinia aculeata</i>
	<i>Cassinia arcuata</i>
E	<i>Centella cordifolia</i>
V	<i>Coprosma quadrifida</i>
E	<i>Cyathea australis</i>
	<i>Deyeuxia quadriseta</i>
	<i>Dianella admixta</i>
	<i>Dichelachne rara</i>
	<i>Dichondra repens</i>
V	<i>Drosera peltata</i> subsp. <i>auriculata</i>
E	<i>Drosera peltata</i> subsp. <i>peltata</i>
V	<i>Eleocharis acuta</i>
V	<i>Epacris impressa</i>
	<i>Epilobium hirtigerum</i>
	<i>Eragrostis brownii</i>
V	<i>Eucalyptus cephalocarpa</i>
	<i>Eucalyptus goniocalyx</i>
V	<i>Eucalyptus obliqua</i>
V	<i>Eucalyptus ovata</i>
E	<i>Eucalyptus radiata</i>
V	<i>Exocarpos cupressiformis</i>
	<i>Gahnia radula</i>
E	<i>Gahnia sieberiana</i>
V	<i>Glycine clandestina</i>
	<i>Gonocarpus tetragynus</i>
C	Goodenia elongata
	<i>Goodenia lanata</i>
	<i>Goodenia ovata</i>
C	Goodia lotifolia
E	<i>Gynatrix pulchella</i>
V	<i>Hemarthria uncinata</i>
C	Histiopteris incisa
V	<i>Hydrocotyle hirta</i>
E	<i>Hypericum gramineum</i>
C	Hypolepis ?rugosula
E	<i>Isolepis cernua</i> var. <i>cernua</i>
E	<i>Isolepis cernua</i> var. <i>platycarpa</i>
V	<i>Isolepis inundata</i>
E	<i>Isolepis marginata</i>
	<i>Juncus amabilis</i>
C	Juncus australis
	<i>Juncus bufonius</i>
	<i>Juncus gregiflorus</i>
C	<i>Juncus holoschoenus</i>

Risk	Indigenous Species
	<i>Juncus pallidus</i>
E	<i>Juncus pauciflorus</i>
	<i>Juncus sarophorus</i>
	<i>Lachnagrostis filiformis</i>
	<i>Lepidosperma elatius</i>
	<i>Leptospermum continentale</i>
E	<i>Leptospermum scoparium</i>
V	<i>Lindsaea linearis</i>
E	<i>Linum marginale</i>
E	<i>Lobelia anceps</i>
	<i>Lomandra filiformis</i>
	<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Lomandra longifolia</i>
V	<i>Lythrum hyssopifolia</i>
E	<i>Melaleuca ericifolia</i>
	<i>Microlaena stipoides</i>
	<i>Microtis parviflora</i>
V	<i>Opercularia ovata</i>
V	<i>Opercularia varia</i>
	<i>Oxalis exilis/perennans</i>
E	<i>Ozothamnus ferrugineus</i>
C	Ozothamnus rosmarinifolius
	<i>Pandorea pandorana</i>
	<i>Persicaria decipiens</i>
E	<i>Persicaria hydropiper</i>
E	<i>Persicaria lapathifolia</i>
E	<i>Phragmites australis</i>
V	<i>Pimelea humilis</i>
V	<i>Platylobium formosum</i>
	<i>Poa ensiformis</i>
	<i>Poa morrisii</i>
E	<i>Poa tenera</i>
E	Polystichum proliferum
E	<i>Pomaderris aspera</i>
V	Potamogeton crispus
E	<i>Prostanthera lasianthos</i>
	<i>Pteridium esculentum</i>
V	<i>Pultenaea gunnii</i>
	<i>Rytidosperma laeve</i>
	<i>Rytidosperma linkii</i> var. <i>fulvum</i>
	<i>Rytidosperma pallidum</i>
	<i>Rytidosperma penicillatum</i>
E	<i>Rytidosperma semiannulare</i>
	<i>Rytidosperma setaceum</i>
	<i>Rytidosperma tenuius</i>
	<i>Senecio glomeratus</i>
	<i>Senecio hispidulus</i>
E	<i>Senecio minimus</i>
C	Sigesbeckia orientalis
	<i>Tetrarrhena juncea</i>
V	<i>Thelymitra peniculata</i>
	<i>Themeda triandra</i>
E	<i>Triglochin striata</i> (flat leaf variant)
E	<i>Typha orientalis</i>
E	<i>Viola hederacea</i>

Introduced Species

<i>Acacia longifolia</i> subsp. <i>longifolia</i>	<i>Cyperus eragrostis</i>	<i>Paspalum distichum</i>
<i>Agrostis capillaris</i>	<i>Dactylis glomerata</i>	<i>Phalaris aquatica</i>
<i>Aira elegantissima</i>	<i>Echinochloa crus-galli</i>	<i>Plantago coronopus</i>
<i>Aira caryophylla/elegantissima</i>	<i>Ehrharta erecta</i>	<i>Plantago lanceolata</i>
<i>Allium triquetrum</i>	<i>Erica lusitanica</i>	<i>Plantago major</i>
<i>Anthoxanthum odoratum</i>	<i>Galium aparine</i>	<i>Prunus cerasifera</i>
<i>Asparagus scandens</i>	<i>Hedera helix</i>	<i>Ranunculus repens</i>
<i>Aster subulatus</i>	<i>Holcus lanatus</i>	<i>Rosa rubiginosa</i>
<i>Atriplex prostrata</i>	<i>Hypericum androsæmum</i>	<i>Rubus anglocandicans</i>
<i>Briza maxima</i>	<i>Hypericum tetrapterum</i>	<i>Rumex crispus</i>
<i>Briza minor</i>	<i>Hypochoeris radicata</i>	<i>Salix fragilis</i>
<i>Callitriche stagnalis</i>	<i>Ilex aquifolium</i>	<i>Salix × reichardtii</i>
<i>Conyza sumatrensis</i>	<i>Isolepis levynsiana</i>	<i>Solanum nigrum</i>
<i>Coprosma repens</i>	<i>Juncus articulatus</i>	<i>Sonchus asper</i> s.l.
<i>Coprosma robusta</i>	<i>Leontodon taraxacoides</i>	<i>Sonchus oleraceus</i>
<i>Cortaderia selloana</i>	<i>Lonicera japonica</i>	<i>Stellaria media</i>
<i>Cotoneaster simonsii</i>	<i>Lotus subbiflorus</i>	<i>Torilis arvensis</i>
<i>Cotula coronopifolia</i>	<i>Lotus uliginosus</i>	<i>Tradescantia fluminensis</i>
<i>Crataegus monogyna</i>	<i>Myosotis arvensis</i>	<i>Viburnum tinus</i>
<i>Crococsmia × crocosmiiflora</i>	<i>Paspalum dilatatum</i>	<i>Vulpia bromoides</i>
<i>Cynodon dactylon</i>	<i>Pinus radiata</i>	
<i>Danthonia procumbens</i>	<i>Pittosporum undulatum</i>	

Notes concerning some of the locally threatened plant species

- Austrofestuca hookeriana* (Hooker Fescue). Dozens scattered around the site's southwestern corner.
- Baumea ?rubiginosa* (Soft Twig-rush). One patch in seasonal wetland.
- Baumea tetragona* (Square Twig-rush). Small amounts in Swamp Scrub.
- Blechnum minus* (Soft Water-fern). A viable population in Swamp Scrub.
- Bolboschoenus medianus* (Marsh Club-rush). Beside the southern lake, perhaps planted.
- Calystegia marginata* (Forest Bindweed). Small numbers beside Dandenong Ck.
- Carex ?gaudichaudiana* (Fen Sedge). In Swamp Scrub, 150 m south of the main lake.
- Gahnia sieberiana* (Red-fruit Saw-sedge). About ten scattered plants.
- Goodenia elongata* (Lanky Goodenia). Small amounts in Swamp Scrub.
- Goodia lotifolia* (Golden-tip). Several grow in the dumped soil marked on the aerial photograph on p. 114.
- Gynatrix pulchella* (Hemp Bush). Several on the large mound of clay fill.
- Histiopteris incisa* (Bat's Wing Fern). Very scarce, perhaps just a single individual.
- Hypolepis ?rugosula* (Ruddy Ground-fern). One patch present in the mid- to late 1990s, but not visible in 2002-3.
- Isolepis platycarpa* (a Club-rush). Abundant when conditions are suitable.
- Juncus australis* (Austral Rush). In wetland, numbers not recorded.
- Juncus holoschoenus* (Joint-leaf Rush). In wetland, numbers not recorded.
- Linum marginale* (Native Flax). Moderate numbers appear seasonally in a small area beside a path.
- Ozothamnus rosmarinifolius* (Rosemary Everlasting). One plant in Swampy Woodland in the SW of the site, in 2002.
- Persicaria lapathifolia* (Pale Knotweed). Moderate numbers where Dandenong Ck enters the lake, possibly not present locally prior to European settlement.
- Polystichum proliferum* (Mother Shield-fern). Small numbers scattered beneath Swamp Gums.
- Potamogeton crispus* (Curly Pondweed). Viable population in the Dandenong Ck channel. This species is not well recorded because of the small number of botanists who investigate flora in streams in the region.
- Solanum ?aviculare* (Kangaroo Apple). Recorded by the author in 1994 without any details.
- Triglochin striatum* (Streaked Arrow-grass). Substantial numbers.

Fauna of special significance

Vulnerable in Victoria

- The three species below are listed under the *Flora and Fauna Guarantee Act 1988* as well as being listed as Vulnerable:
- Swamp Skink. A viable population was found c. 1999 (e.g. Clemman 2000); also another at nearby Bungalook Conservation Reserves.
- Great Egret. A 1999 record from the Atlas of Victorian Wildlife.
- Powerful Owl. Bound to visit occasionally (but not actually observed); known to roost in adjoining Site 20.
- Hardhead. Recorded by the U3A Knox Birdwatching Group on 20th October 2000 and 29th October 1999.

Rare or Threatened in suburban Melbourne

Platypus. Trapped in Dandenong Ck at Liverpool Rd in 2001, with indications of visitation to the retarding basin (Williams 2002).

Buff-banded Rail. Recorded by the U3A Knox Birdwatching Group on 2nd March 2001.

Black-fronted Dotterel

Dusky Woodswallow

Scarlet Robin

Fauna habitat features

- The site is part of a major stepping-stone on the Dandenong Creek habitat corridor;
- The site is well connected to the large area of contiguous native vegetation in the Dandenong Ranges;
- The creek channel and lakes are likely to support aquatic fauna from invertebrates and eels to Platypus;
- The wetlands are breeding grounds for frogs and they support reptiles and invertebrates;
- When considered in conjunction with the abutting Site 23, there is 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;
- 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 Sustainability & Environment's 'BioSites' database, where it is rated as 'Regional' significance. However, the rating was not based on a thorough assessment of the site's attributes against current criteria.

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity and Viability

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 presence of seven EVCs on the site and the abutting Sugarloaf Hill stands out in the region as a particularly diverse assemblage of EVCs in a relatively small area, corresponding to steep geomorphological gradients. The standard criteria take this to confer **Regional** significance on the site.

The totals of 113 indigenous plant species in the site and 170 including Sugarloaf Hill are 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.

Regionally Threatened Ecological Vegetation Class

As indicated above, the site's most intact vegetation has a conservation significance rating under 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a) which is at least High, and probably reaches Very High in some places due to the presence of regionally threatened EVCs in good condition. On this basis, criterion 3.2.3 confers **State** significance to the site.

Rare or Threatened Flora

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

The site is known habitat for Swamp Skink and Hardhead, which are both listed by the Department of Sustainability & Environment as vulnerable species. The skink is also listed under the *Flora and Fauna Guarantee Act 1988*. The known presence of such listed species is recognised as significant under criterion 3.1.2 of Amos (2004). The level of significance depends on where this site ranks among all other habitat sites for the species in Victoria or the Gippsland Plain Bioregion. The site provides a small but valuable area of habitat for Hardhead, which makes the site **Regionally** significant. The report by N. Clemman cited below indicates how hard it is to determine the presence and abundance of Swamp Skinks, but he concludes that the population at the retarding basin is small (but evidently viable) and that the habitat is limited. This gives the site as a whole **Regional** significance.

The Powerful Owl has the same conservation status in Victoria as the Swamp Skink, and it is known to roost in the adjoining Site 20. Criterion 3.1.3 confers **Regional** significance upon sites like Liverpool Road Retarding Basin that are likely to support a vulnerable species and are adjacent to known habitat for the species.

Threats

- Invasion by environmental weeds, the main threats being Square-stem St.John's Wort (or St.Peter's Wort) (*Hypericum tetrapterum*), Blackberry (*Rubus discolor*), willows (*Salix* species), Montpellier Broom (*Genista monspessulana*), Cleavers (*Galium aparine*) and exotic grasses;
- Damage such as trampling from recreational activities;
- Loss or decline of plant species that are present in dangerously small numbers, due to inbreeding, poor reproductive success or vulnerability to localised chance events;
- 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 issues

- Heightened weed control is important to the retention of the site's high conservation significance;
- A bushland management plan would be desirable to guide better management of the site or better ranking of priorities;
- 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.

Administration matters

- This site is very worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its biological significance (including that of the lakes) and its importance to a waterway;
- It is partly covered at present by overlay VPO1 on the basis that Water Ecoscience (1998) included most of the native vegetation within their Site 7;
- Some liaison may be required between Council and Melbourne Water to deal with the problem of dogs off leads.

Information sources used in this assessment

- 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 1991, 1993, 1995, 2001 and 2002 during brief visits to the site;
- Incidental observations of birds, reptiles and frogs while the above data was being gathered;
- '*Distribution of Platypus along Upper Dandenong and Dobsons 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 from the Atlas of Victorian Wildlife;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 23. Sugarloaf Hill, Boronia

A prominent, treed hill near the foot of the Dandenong Ranges, with the floodplain of Dandenong Creek at its base. The site includes parts of Miller Park Reserve and the Salvation Army's 'Mountain Valley Camp and Conference Centre', and some private residential properties. Melway ref. 65 F5.

Site Significance Level: *State*

- The site is part of a major stepping-stone on the Dandenong Creek habitat corridor;
- There are five (or arguably six) regionally threatened vegetation communities, partly in good ecological condition;
- 129 indigenous plant species were found on the site in this study, or 170 if one takes this site and the adjoining Liverpool Road Retarding Basin together - large numbers by Knox standards;
- Twenty-one of these species are rare or threatened in Knox, two of which are rare throughout the Melbourne area;
- Even in the absence of a fauna survey, it is clear that the site has rich bird life, some excellent fauna habitat features (such as diverse vegetation and many large trees with hollows) and the likelihood of many reptile species.

Aerial photograph and plan: See page 114, which covers this site, Liverpool Road Retarding Basin and Dobson's treed paddock.

Boundaries

The site comprises the area outlined in red and labelled in red as 'Sugarloaf Hill' on the aerial photograph of p. 114, measuring 17.8 ha. The boundary follows cadastral boundaries or fences wherever feasible, but this is not reasonable along the site's southern edge, where a boundary is drawn to circumscribe all the crowns of trees within the contiguous area of native vegetation. Each lot contains a section that is not biologically significant in itself, but whole lots are included within the site boundary wherever reasonable because the welfare of the significant habitat is strongly linked to what occurs elsewhere on the properties.

Land use & tenure: Several private residential lots, the adjoining edge of a Council sports reserve and part of a Salvation Army property used as a youth camp and conference centre.

Site description

Sugarloaf Hill is a small but prominent foothill to the Dandenong Ranges, a remnant of a Devonian volcanic flow ('Coldstream rhyolite'). At an elevation of 179 m (Australian Height Datum), its summit rises 50 m above the surrounding floodplain of Dandenong Creek. The areas marked on the aerial photograph as 'Swampy Woodland' correspond to places where the floodplain extends into the site around its perimeter.

The soil of the floodplain has been washed down Dandenong Creek and deposited there, and supports quite different vegetation from the stonier, less friable and more freely drained loam and clay of the hill slopes. Tree stature and vegetation composition on the hill also varies from the sunnier northern slopes to the southern slopes.

Most of the site has been subject to past grazing and clearing of vegetation which has since regenerated. The most sensitive plant species that would once have occurred there (particularly orchids) have been lost through clearing, grazing, slashing and reduced fire frequency, but there is still a fairly high number of species and some uncommon ones.

It is quite possible that the vegetation marked on the aerial photograph as 'Bundy Woodland' was substantially different prior to European settlement. It may once have been partly Box-Stringybark Woodland (part of EVC 22) and lost most of the characteristic *Eucalyptus macrorhyncha* because that species is much less capable of regenerating after clearing and grazing than the Bundy which dominate today. It is shown on the Department of Sustainability & Environment's BioMaps as 'Grassy Forest' (EVC 128) even though it does not conform to the published descriptions of Grassy Forest. As explained in Appendix A of Volume 1, the name 'EVC 128a – Bundy Woodland' has been coined in this report for such vegetation to distinguish it from typical Grassy Forest.

The area marked on the aerial photograph (and the Department of Sustainability & Environment's BioMaps) as Valley Heathy Forest may once have been very similar to the hilltop vegetation, but it differs now in the presence of a dense layer of the prickly shrub, *Bursaria spinosa*. This layer may not have been present 200 years ago, but its presence is typical of previously grazed Valley Heathy Forest.

The Mountain Valley Camp and Conference Centre contains the most significant vegetation of the whole site, including the most intact forest and viable populations of seven plant species that are vulnerable to local extinction in Knox. It also has localised areas of ecological degradation. Some areas of bushland are used for campfires, tree climbing and other outdoor activities, which has caused slight to moderate damage to the vegetation. There has been extensive dumping of soil and rubbish to the east of the main north-south track where it enters the forest, which has initiated a problem of environmental

weeds invading the surrounding significant vegetation. An abandoned garden at the northern end of the property is being reclaimed mostly by blackberry in the west and native vegetation in the east (particularly by *Ozothamnus ferrugineus*, *Pteridium esculentum* and *Melaleuca ericifolia*).

The properties that front Tolhurst Avenue and Torresdale Drive have been subjected to widely varying levels of recent grazing, clearing, slashing and planting. The degree of ecological degradation increases down the slope, so that the Swampy Woodland is represented by little more than trees and some rushes. These properties were only inspected from their boundaries, but the author still found fifty indigenous plant species at a poor time of year. Two of these species are endangered in Knox and another two are vulnerable.

The northern end of Miller Park Reserve is periodically slashed, but with a degree of sensitivity so that indigenous ground flora can survive (and flourish in some patches). It contains substantial populations of sun-orchids, greenhood orchids, bird-orchids and onion-orchids, as well as small populations of many local wildflowers. Fifty indigenous plant species were found there, and about ten more would no doubt be found in a summer inspection. There has also been recent revegetation work on the embankment of the oval (not evident on the aerial photograph), which is beginning to complement the adjacent remnant habitat.

Notwithstanding past clearing, the site supports a good number of large old trees. This is significant because of the importance of such trees for nesting and roosting of wildlife (bats, birds, possums) and their severe depletion in Knox and the metropolitan area as a whole.

Relationship to other land

The site is treated in this report as separate from Liverpool Road Retarding Basin (Site 21) 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 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 other patches every few hundred metres to the north of the site, in Maroondah municipality (see Lorimer *et al.* 1997).

There are some mature remnant trees (but no understorey) adjacent to the site in the backyards of several houses on Beresford Dr and Paloma Ct. These are included within Site 99, which is recommended to be protected under Environmental Significance Overlay ESO3.

Bioregion: Gippsland Plain (although in some respects, the Lowland Forest might be regarded as having greater affinity with the nearby Highlands Southern Fall).

Habitat types

Lowland Forest (EVC 16, regionally Vulnerable): 4 hectares in total, comprising approximately 8,600 m² in good ecological condition (rating B), 16,400 m² in fair ecological condition (rating C) and 15,000 m² in poor ecological condition (rating D). At least 98 indigenous plant species found, including 2 subspecies of one species.

Dominant canopy trees: *Eucalyptus obliqua* typically 22-25 m tall, with far fewer *E. radiata*. In places, there are also some *E. cephalocarpa*, *E. ovata* or *E. goniocalyx* that might be construed as outliers of adjacent EVCs.

Dominant lower trees: *Acacia melanoxylon* and *Exocarpos cupressiformis* are present in varying density, mostly less than 10 m tall.

Shrubs: Moderately dense where allowed to accumulate, but thin where suppressed by grazing or manual removal. Dominated by various combinations of *Cassinia aculeata*, *Bursaria spinosa* and *Leptospermum scoparium*, and with substantial numbers of *Acacia verticillata* and *Pultenaea gunnii*. *Melaleuca ericifolia* intrudes from adjoining Swampy Woodland. Members of the Proteaceae family are uncharacteristically absent, perhaps due to past clearing.

Ferns: Bracken is abundant almost throughout, except where it is suppressed by slashing.

Ground flora: At maturity, dense, ferny, knee-deep and with an abundance of the wiry grass *Tetrarrhena juncea*, often sharing dominance with *Gahnia radula* or *Pteridium esculentum*. Other abundant species are *Lomandra* species, *Acrotriche prostrata* and *Goodenia lanata*. Tufted grasses, particularly *Austrostipa rudis* and *Themeda triandra*, are present but in low density except where slashing or mowing suppresses the bracken and *Tetrarrhena juncea* (as in Miller Park Reserve).

Swamp Scrub (EVC 53, regionally Endangered): A small amount extends into the southeast of the site from Liverpool Rd Retarding Basin. Total area 640 m², equally divided between ecological conditions C (fair) and D (poor). 18 indigenous plant species found.

Dominant canopy trees: 8 m-tall *Melaleuca ericifolia* dominates, reaching up to 70% cover but with gaps. There are also emergent *Eucalyptus ovata* and *Acacia melanoxylon*.

Dominant lower trees: *Pittosporum undulatum* is conspicuous beneath the canopy.

Shrubs: Sparse, comprising *Coprosma quadrifida* and *Senecio minimus*.

Vines: None.

Ferns: *Cyathea australis* and *Blechnum minus* occur in clusters and are the most prominent features of the ground flora.

Ground flora: Apart from the ferns, there are sparse patches of *Triglochin striatum*, *Juncus*, *Isolepis inundata*, grasses and *Lobelia anceps*.

Wetland (EVC 74, listed as regionally Endangered, but artificially created in this case): A small dam within Lowland Forest on the Mountain Valley property, apparently not holding much water in recent years. Dimensions not recorded, but estimated at roughly 100 m². In fair ecological condition (rating C). Four indigenous species found: *Isolepis inundatus*, *Juncus gregiflorus*, *J. holoschoenus*, *J. procerus*.

Valley Heathy Forest (EVC 127, **regionally Endangered):** 8,000 m² in total, comprising approximately 7,000 m² in good ecological condition (rating B) and 1,000 m² in poor ecological condition (rating D). 90 indigenous plant species found. Two other species (*Cassinia trinerva* and *Ranunculus lappaceus*) were recorded by AN Paget in 1985.

Dominant canopy trees: *Eucalyptus goniocalyx*, 10-15 m tall, 30-40% foliage cover.

Dominant lower trees: Scattered *Exocarpos cupressiformis*, 12 m tall and fewer *Acacia melanoxylon*.

Shrubs: Mostly up to 2-3 m tall and dense with *Bursaria spinosa* (typically 60% foliage cover). *Acacia stricta* is abundant.

Vines: *Pandorea pandorana* is quite common, as are the light twiners *Billardiera mutabilis* and *Glycine clandestina*. Creepers are also fairly abundant, including *Dichondra repens*, *Goodenia lanata*, *Oxalis perennans* and *Platylobium formosum*.

Ferns: *Adiantum aethiopicum* is abundant. *Pteridium esculentum* is very scarce.

Ground flora: A layer typically 20-30 cm deep with a foliage cover of approximately 80% in mature vegetation. Dominated by *Themeda triandra*, with *Austrostipa rudis* also abundant. The grasses *Poa morrisii* and *Microlaena stipoides* are not abundant, as they are in the adjoining Bundy Woodland, and *Gahnia radula* is very scarce. The most abundant other species are *Adiantum aethiopicum*, *Dichondra repens*, *Opercularia varia* and *Pimelea humilis*. The ground flora species are a subset of those in the Bundy Woodland, perhaps lower in diversity due to the density of *Bursaria*.

EVC 128a – Bundy Woodland (treated by the Department of Sustainability & Environment as part of EVC 128, which is **regionally Endangered):** Total area 8.0 hectares, of which approximately 5.0 ha is in good ecological condition (rating B), 1.5 ha is in fair ecological condition (rating C) and 1.5 ha is in poor ecological condition (rating D). 71 indigenous plant species were found, including 6 that are rare or threatened in Knox. One other (*Ranunculus lappaceus*) was found by AN Paget in 1985.

Dominant canopy trees: *Eucalyptus goniocalyx* and very few *E. macrorhyncha*, to 15 m tall, 25% foliage cover, with plenty of open sky between the tree crowns.

Dominant lower trees: *Exocarpos cupressiformis* 12 m tall are liberally scattered.

Shrubs: Mostly up to 2-3 m tall and sparse, allowing visibility up to 100 m. In most of the area, *Acacia stricta* dominates with fewer *Cassinia aculeata*. *Bursaria spinosa* is not dense, as it is in the Valley Heathy Forest.

Vines: *Pandorea pandorana* is quite common in localised patches. Light twiners are common: *Billardiera mutabilis*, *Comesperma volubile*, *Glycine clandestina* and *Hardenbergia violacea*. Creepers are also abundant, particularly *Dichondra repens*, *Goodenia lanata* and (after fire) *Kennedia prostrata*.

Ferns: Scarce. *Adiantum aethiopicum* occurs around some rocks. *Pteridium esculentum* is notably absent.

Ground flora: A layer typically less than 30 cm deep with a foliage cover of nearly 100% in mature vegetation. Dominated in patchwise fashion by different species, *Themeda triandra* being most common, then *Austrostipa rudis* and *Lomandra filiformis* subsp. *coriacea*, and locally *Goodenia lanata*. The grasses *Poa morrisii* and *Microlaena stipoides* are abundant but not dominant, as is *Carex breviculmis*. There are numerous small wildflowers, the most frequent being *Arthropodium strictum*, *Brunonia australis*, *Gonocarpus tetragynus*, *Goodenia lanata*, *Hovea linearis*, *Hypericum gramineum*, *Pimelea humilis* and *Poranthera microphylla*. Notably, *Gahnia radula* is completely absent.

Swampy Woodland (EVC 937, **regionally Endangered):** Total area 16,000 m², of which approximately 50 m² is in fair ecological condition (rating C, in the southeastern patch) and the remainder is in poor ecological condition (rating D). 35 indigenous plant species found.

Dominant canopy trees: Almost pure *Eucalyptus ovata*, 20-25 m tall, fairly sparse.

Dominant lower trees: *Acacia melanoxylon* 10-12 m tall and fewer *Melaleuca ericifolia* 10 m tall.

Tall Shrubs: Dominated by *Ozothamnus ferrugineus* up to 6 m tall in the north, and by *Leptospermum scoparium* and *Bursaria spinosa* 3-4 m tall in the southeast. *Cassinia aculeata* is common but not dominant. The density of tall shrubs is variable, becoming high in regrowth several years old. *Coprosma quadrifida* is uncharacteristically scarce.

Lower Shrubs: *Senecio minimus* is abundant in the northern patch. *Goodenia ovata* is uncharacteristically scarce.

Vines: Sparse *Pandorea pandorana*; bad outbreaks of *Rubus discolor* and *Lonicera japonica*.

Ferns: *Pteridium esculentum* is very dense in one patch of the abandoned garden but ferns are otherwise absent.

Ground flora: Variable due to human modification, and almost totally destroyed on the residential properties. On the Mountain Valley property, *Phragmites australis* dominates one patch and other conspicuous species are *Gonocarpus tetragynus*, *Lepidosperma elatius*, *Microlaena stipoides* and *Austrostipa rudis*.

Plant species

The following plant species were observed mostly in 2002-3. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia mearnsii</i>	V	<i>Dillwynia cinerascens</i>
V	<i>Acacia melanoxylon</i>	E	<i>Dipodium roseum</i>
	<i>Acacia paradoxa</i>	V	<i>Drosera peltata</i>
E	<i>Acacia pycnantha</i>	V	<i>Drosera peltata</i> subsp. <i>auriculata</i>
E	<i>Acacia stricta</i>	V	<i>Epacris impressa</i>
V	<i>Acacia verticillata</i>		<i>Eragrostis brownii</i>
DD	<i>Acaena agnipila</i>	V	<i>Eucalyptus cephalocarpa</i>
V	<i>Acaena echinata</i>		<i>Eucalyptus goniocalyx</i>
	<i>Acaena novae-zelandiae</i>	E	<i>Eucalyptus macrorhyncha</i>
V	<i>Acrotriche prostrata</i>	V	<i>Eucalyptus obliqua</i>
	<i>Acrotriche serrulata</i>	V	<i>Eucalyptus ovata</i>
V	<i>Adiantum aethiopicum</i>	E	<i>Eucalyptus radiata</i>
C	<i>Amyema pendula</i>	V	<i>Euchiton collinus</i>
V	<i>Amyema quandang</i>	E	<i>Euchiton involucratus</i>
	<i>Arthropodium strictum</i>	V	<i>Exocarpos cupressiformis</i>
C	<i>Astroloma humifusum</i>	E	<i>Exocarpos strictus</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>		<i>Gahnia radula</i>
	<i>Billardiera mutabilis</i>	E	<i>Gahnia sieberiana</i>
C	<i>Blechnum minus</i>		<i>Geranium</i> sp.
	<i>Bossiaea prostrata</i>	V	<i>Glycine clandestina</i>
V	<i>Brunonia australis</i>	E	<i>Gonocarpus humilis</i>
	<i>Burchardia umbellata</i>		<i>Gonocarpus tetragynus</i>
	<i>Bursaria spinosa</i>		<i>Goodenia lanata</i>
V	<i>Caesia parviflora</i>		<i>Goodenia ovata</i>
	<i>Carex breviculmis</i>	V	<i>Hardenbergia violacea</i>
	<i>Cassinia aculeata</i>	V	<i>Helichrysum luteoalbum</i>
	<i>Cassinia arcuata</i>	V	<i>Helichrysum scorpioides</i>
V	<i>Cassinia longifolia</i>	V	<i>Hemarthria uncinata</i>
C	<i>Cassinia trinerva</i>	C	<i>Histiopteris incisa</i>
E	<i>Centella cordifolia</i>	V	<i>Hovea heterophylla</i>
V	<i>Chiloglottis valida</i>	E	<i>Hydrocotyle foveolata</i>
V	<i>Clematis aristata</i>	V	<i>Hydrocotyle hirta</i>
V	<i>Comesperma volubile</i>	E	<i>Hypericum gramineum</i>
C	<i>Coprosma hirtella</i>	E	<i>Indigofera australis</i>
V	<i>Coprosma quadrifida</i>	V	<i>Isolepis inundata</i>
E	<i>Correa reflexa</i>		<i>Juncus amabilis</i>
E	<i>Cyathea australis</i>		<i>Juncus bufonius</i>
E	<i>Cynoglossum suaveolens</i>		<i>Juncus gregiflorus</i>
	<i>Deyeuxia quadriseta</i>	C	<i>Juncus holoschoenus</i>
	<i>Dianella admixta</i>		<i>Juncus pallidus</i>
V	<i>Dianella longifolia</i> s.l.	E	<i>Juncus planifolius</i>
	<i>Dichelachne rara</i>	E	<i>Juncus procerus</i>
C	<i>Dichelachne sieberiana</i>	E	<i>Juncus subsecundus</i>
	<i>Dichondra repens</i>	C	<i>Kennedia prostrata</i>

Risk	Indigenous Species
	<i>Kunzea ericoides</i> spp. agg.
	<i>Lachnagrostis filiformis</i>
V	<i>Lagenophora gracilis</i>
E	<i>Lagenophora stipitata</i>
	<i>Lepidosperma elatius</i>
V	<i>Lepidosperma laterale</i>
	<i>Leptospermum continentale</i>
E	<i>Leptospermum scoparium</i>
V	<i>Lindsaea linearis</i>
E	<i>Linum marginale</i>
E	<i>Lobelia anceps</i>
	<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
	<i>Lomandra longifolia</i>
V	<i>Luzula meridionalis</i>
V	<i>Lythrum hyssopifolia</i>
E	<i>Melaleuca ericifolia</i>
	<i>Microlaena stipoides</i>
	<i>Microtis parviflora</i>
C	<i>Muellerina eucalyptoides</i>
V	<i>Olearia lirata</i>
V	<i>Opercularia ovata</i>
V	<i>Opercularia varia</i>
	<i>Oxalis exilis/perennans</i>
E	<i>Ozothamnus ferrugineus</i>
	<i>Pandorea pandorana</i>
E	<i>Phragmites australis</i>
V	<i>Pimelea humilis</i>
V	<i>Platylobium formosum</i>
E	<i>Poa labillardierei</i> var. <i>labillardierei</i>
	<i>Poa morrisii</i>
E	<i>Poa tenera</i>
E	<i>Polyscias sambucifolia</i>

Risk	Indigenous Species
	<i>Poranthera microphylla</i>
	<i>Pteridium esculentum</i>
	<i>Pterostylis nutans</i>
V	<i>Pultenaea gunnii</i>
C	<i>Pultenaea hispidula</i>
E	<i>Ranunculus lappaceus</i>
E	<i>Rubus parvifolius</i>
E	<i>Rytidosperma caespitosum</i>
	<i>Rytidosperma pallidum</i>
	<i>Rytidosperma penicillatum</i>
	<i>Rytidosperma racemosum</i>
	<i>Rytidosperma setaceum</i>
	<i>Rytidosperma tenuius</i>
	<i>Schoenus apogon</i>
	<i>Senecio glomeratus</i>
	<i>Senecio hispidulus</i>
E	<i>Senecio minimus</i>
E	<i>Senecio prenanthoides</i>
	<i>Senecio quadridentatus</i>
V	<i>Solanum laciniatum</i>
E	<i>Stackhousia monogyna</i>
E	<i>Stylidium armeria/graminifolium</i>
	<i>Tetrarrhena juncea</i>
E	<i>Tetratheca ciliata</i>
V	<i>Thelymitra</i> sp.
	<i>Themeda triandra</i>
E	<i>Triglochin striata</i> (flat leaf variant)
E	<i>Typha</i> sp.
E	<i>Veronica calycina</i>
E	<i>Veronica plebeia</i>
E	<i>Viola hederacea</i>
V	<i>Xanthorrhoea minor</i>
E	<i>Xanthosia dissecta</i>

Introduced Species

<i>Acacia baileyana</i>	<i>Cotoneaster glaucophyllus</i>	<i>Leontodon taraxacoides</i>	<i>Raphanus raphanistrum</i>
<i>Acacia longifolia</i> subsp. <i>longifolia</i>	<i>Cotoneaster pannosus</i>	<i>Lepidium africanum</i>	<i>Romulea rosea</i>
<i>Acetosella vulgaris</i>	<i>Cotoneaster simonsii</i>	<i>Ligustrum vulgare</i>	<i>Rubus anglocandicans</i>
<i>Agrostis capillaris</i>	<i>Crataegus monogyna</i>	<i>Linum trigynum</i>	<i>Rumex crispus</i>
<i>Aira elegantissima</i>	<i>Crepis capillaris</i>	<i>Lolium</i> sp.	<i>Rumex obtusifolius</i>
<i>Anagallis arvensis</i>	<i>Cynodon dactylon</i>	<i>Lonicera japonica</i>	<i>Setaria parviflora</i>
<i>Anthoxanthum odoratum</i>	<i>Cyperus eragrostis</i>	<i>Lotus corniculatus</i>	<i>Sisymbrium orientale</i>
<i>Arbutus unedo</i>	<i>Dactylis glomerata</i>	<i>Lotus uliginosus</i>	<i>Sisyrinchium iridifolium</i>
<i>Asparagus scandens</i>	<i>Delairea odorata</i>	<i>Malva parviflora</i>	<i>Solanum mauritianum</i>
<i>Aster subulatus</i>	<i>Ehrharta erecta</i>	<i>Modiola caroliniana</i>	<i>Solanum nigrum</i>
<i>Briza maxima</i>	<i>Eleusine tristachya</i>	<i>Oxalis</i> sp.	<i>Sonchus oleraceus</i>
<i>Bromus catharticus</i>	<i>Erica lusitanica</i>	<i>Paspalum dilatatum</i>	<i>Sporobolus africanus</i>
<i>Centaurium erythraea</i>	<i>Galium aparine</i>	<i>Pennisetum clandestinum</i>	<i>Taraxacum officinale</i> spp. agg.
<i>Chenopodium album</i>	<i>Genista linifolia</i>	<i>Phalaris aquatica</i>	<i>Tradescantia fluminensis</i>
<i>Cirsium vulgare</i>	<i>Genista monspessulana</i>	<i>Pinus radiata</i>	<i>Trifolium fragiferum</i>
<i>Conium maculatum</i>	<i>Hedera helix</i>	<i>Pittosporum undulatum</i>	<i>Trifolium repens</i>
<i>Conyza sumatrensis</i>	<i>Helminthotheca echioides</i>	<i>Plantago lanceolata</i>	<i>Tropaeolum majus</i>
<i>Coprosma repens</i>	<i>Holcus lanatus</i>	<i>Plantago major</i>	<i>Vicia</i> sp.
<i>Cordyline australis</i>	<i>Hypochoeris radicata</i>	<i>Polygonum aviculare</i> s.l.	<i>Vinca major</i>
<i>Cortaderia selloana</i>	<i>Ilex aquifolium</i>	<i>Prunella vulgaris</i>	<i>Watsonia marginata</i>
	<i>Isolepis levynsiana</i>	<i>Ranunculus repens</i>	

Notes concerning some of the locally threatened plant species

Blechnum minus (Soft Water-fern). Twelve plants found in the Swamp Scrub.

Cassinia trinerva (Three-nerved Cassinia). Recorded by AN Paget in 1985 on the Mountain Valley property in Valley Heathy Forest.

Correa reflexa (Common Correa). Very scarce, only found at Miller Park Reserve.

Cynoglossum suaveolens (Sweet Hound's-tongue). Three plants found in Bundy Woodland.

Dichelachne sieberiana (Plume-grass). Found in Bundy Woodland, numbers indeterminate.

Euchiton ?sphaericus (Annual Cudweed). Two plants found in Bundy Woodland.

Gahnia sieberiana (Red-fruit Saw-sedge). Four plants found in the east of the Mountain Valley property.

Gonocarpus humilis (Shade Raspwort). Eight plants confirmed in the east of the Mountain Valley property.

Histiopteris incisa (Bat's Wing Fern). One plant found at the site's northern extremity.

Hydrocotyle foveolata (Yellow Pennywort). One patch found on private land next to Miller Park Reserve.

Juncus holoschoenus (Joint-leaf Rush). Four plants found in the dam.

Kennedia prostrata (Running Postman). Numerous in burnt patches in Bundy Woodland.

Lagenophora stipitata (Common Lagenophora). One large patch found in Miller Park Reserve.

Linum marginale (Native Flax). Found in Lowland Forest slightly south of the Valley Heathy Forest.

Luzula meridionalis (Common Woodrush). Rather abundant in Miller Park Reserve.

Ranunculus lappaceus (Australian Buttercup). Last recorded in 1985.

Tetratheca ciliata (Pink-bells). Two plants found in Bundy Woodland on the Mountain Valley property.

Triglochin striatum (Streaked Arrow-grass). A patch of 1 m² in the Swamp Scrub.

Veronica calycina (Hairy Speedwell). A few plants seen in and north of Miller Park Reserve.

Veronica plebeia (Trailing Speedwell). Thriving patches in the northeast of the Lowland Forest.

Fauna of special significance

Vulnerable in Victoria

Powerful Owl. Bound to visit occasionally (but not actually observed); known to roost in nearby Site 20.

Rare or Threatened in suburban Melbourne

Dusky Woodswallow

Scarlet Robin

In addition, the habitat features suggest the likelihood of rich wildlife that may well include significant species such as Swamp Skinks, which have been seen nearby. Weather and seasonal conditions at the time of the field survey were not conducive to detecting wildlife.

Fauna habitat features

- A substantial sized area of bushland with diverse composition, from swampy ground to tall, moist forest and low, grassy woodland, and much of it in good condition;
- The site is part of a major stepping-stone on the Dandenong Creek habitat corridor;
- Well connected to the large area of contiguous native vegetation in the Dandenong Ranges;
- There are many large, old trees with hollows;
- In parts of the Mountain Valley property, there is good cover for wrens and ground-dwelling fauna such as reptiles, including logs and dense undergrowth;
- The dam is a breeding ground for frogs;
- Fauna on this site never need to travel further than the neighbouring lake in Liverpool Road Retarding Basin to obtain water, even during drought.

Significance ratings

According to the criteria of 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), most of the site's native vegetation has a conservation significance rating of at least High, probably reaching Very High in the more intact parts of the Mountain Valley property (and perhaps Miller Park Reserve in future, with a little management effort). This is due to the presence of vegetation in at least five regionally threatened Ecological Vegetation Classes, some of it in good condition.

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity and Viability

Together with Liverpool Road Retarding Basin, 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 presence of six EVCs in the site, and others in Liverpool Road Retarding Basin, stands out in the region as a particularly diverse assemblage of EVCs in a relatively small area, corresponding to steep geomorphological gradients. The standard criteria take this to confer **Regional** significance on the site.

The totals of 129 indigenous plant species in the site and 170 including Liverpool Road Retarding Basin are 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.

Regionally Threatened Ecological Vegetation Class

As indicated above, the site's most intact vegetation has a conservation significance rating under 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a) which is at least High, and probably reaches Very High due to the presence of regionally threatened EVCs in fairly good condition. On this basis, criterion 3.2.3 confers **State** significance to the site.

Rare or Threatened Flora

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

Criterion 3.1.3 confers **Regional** significance to sites like Sugarloaf Hill that are likely to support Powerful Owl (a vulnerable species in Victoria) and are very close to known habitat of that species.

Representative of a Type

The occurrence of Bundy Woodland is apparently the most northerly one in the Gippsland Plain bioregion, naturally isolated from all other occurrences. It is in better ecological condition than the nearest occurrence (on the Lysterfield Hills). Its transition into Valley Heathy Forest on the Mountain Valley property, and its proximity to typical Grassy Forest on the other side of Sheffield Rd, helps to show the limits of Bundy Woodland's composition relative to related communities. It seems likely that there is no better site in the Port Phillip and Westernport Region to demonstrate the limits of Bundy Woodland. Criterion 4.2 confers State or National significance to a site 'considered to represent a significant variant ... or marginal form ... of a particular ecological community or class', depending on whether or not the EVC is common outside Victoria (which is unknown in this case). By contrast, NRE (2002a, Appendix 3) allows also for Regional significance for 'edge of range or other non-species values'. In view of the uncertainty, it appears reasonable to opt for **State** significance in this case.

Threats

- Invasion by environmental weeds, including:
 - Very serious: Sweet Pittosporum (*Pittosporum undulatum*), Sallow Wattle (*Acacia longifolia longifolia*), Blackberry (*Rubus discolor*) and (in the wettest areas) Japanese Honeysuckle (*Lonicera japonica*);
 - Serious: Sweet Vernal-grass (*Anthoxanthum odoratum*), Asparagus fern (*Asparagus scandens*), Panic Veldt-grass (*Ehrharta erecta*), Spanish Heath (*Erica lusitanica*), Montpellier Broom (*Genista monspessulana*), Yorkshire Fog (*Holcus lanatus*), Monterey Pine (*Pinus radiata*) and, in grazed and slashed areas like Miller Park Reserve, Cat's Ear (*Hypochoeris radicata*);
- Planting of serious environmental weeds on a Torresdale Drive property;
- Potential site development that could lead to loss of habitat (which may be partly redressed if weed control improves);
- Grazing;
- Damage such as trampling from recreational activities;
- Deliberate cutting down of shrubs and trees;
- Slashing or mowing at the wrong time, frequency or height;
- Eucalypt dieback disease of moderate severity;
- Loss or decline of plant species that are present in dangerously small numbers, due to inbreeding, poor reproductive success or vulnerability to localised chance events;
- Predation of fauna (particularly birds) by cats and foxes.

Management issues

- There is little if any control of serious environmental weeds on most of the private properties, even though many of them are listed as 'Regionally Controlled' under the *Catchment and Land Management Act 1994*;
- Council could expand the area of rich ground flora at Miller Park Reserve by progressively controlling grass weeds, vetch etc around the perimeter, including use of grass-specific herbicide;
- There are signs of illegal clearing of native vegetation on some residential properties;

- Mowing or slashing of indigenous ground flora is not intrinsically bad (as shown by Miller Park Reserve), but the timing and frequency on some of the residential properties is adverse, taking into account the plant species present in each case;
- The abundance of plants species such as *Kennedia prostrata* after fire on the Mountain Valley property shows the value of fire in recovering plant species that have suffered massive decline in Knox. It is ecologically desirable for Council to support periodic use of fire on these properties provided that safety is properly assured and neighbours are properly informed.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its biological significance and the subdivision potential of some private lots;
- It is mostly covered at present by overlay VPO1 on the basis that Water Ecoscience (1998) included it (with some boundary variations) as part of their Site 7;
- The granting of planning permits for subdivision or land development on any native vegetation within the site would be severely restricted by the predominance of regionally threatened vegetation communities and the Victorian government's policy for native vegetation management (NRE 2002a; Victoria Planning Provisions);
- It is recommended that consideration of any development proposal within the site should take into account a survey of birds, reptiles and nocturnal mammals, preferably conducted over at least two days in late spring. The vegetation may well be important as habitat for significant fauna not recorded so far;
- Removal of environmental weed species would help to improve the ecological quality of the vegetation and hence support the state government objective of 'Net Gain'.

Information sources used in this assessment

- Detailed vegetation data and mapping in accord with this study's standard approach described in Section 2.4 of Vol.1, including a list of indigenous and introduced plant species within each of thirteen separate areas of the site, compiled by Dr Lorimer over approximately 9½ hours during this study (mostly 8th-9th April 2002);
- Incidental observations of birds and frogs while the above data was being gathered;
- Data from eleven quadrats on the Mountain Valley property, compiled by Mr Andrew Paget in May 1985;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Acknowledgment

Thanks to the Salvation Army for granting permission to inspect the Mountain Valley Camp and Conference Centre.

Site 24. St Bernadette's Primary School, The Basin

Treed playground area and a small school sanctuary. Melway ref. 65 F7.

Site Significance Level: *State*

- Contains representations of two vegetation types that are regionally Endangered, albeit with substantial modification by humans and weeds;
- Two of the indigenous plant species present are rare (but not threatened) in Knox.

Aerial photograph and plan: See page 137, which covers this site and Site 25.

Boundaries

Three sides of the site boundary coincide with the school's property boundary, and the fourth (northeastern) side is parallel to, and 65.5 m from, the southwestern property boundary. The total area is 6,835 m².

Land use & tenure: Primary school playground and sanctuary.

Site description

This site comprises a treed playground for the school's children and a small, fenced sanctuary (marked on the aerial photograph) with young regrowth along a drainage line.

The site is within a narrow transition zone between the Gippsland Plain bioregion and the Highlands - Southern Fall bioregion. The vegetation types are intermediate between those that one would expect to find in similar topography in each of these bioregions. In particular, the main vegetation in the playground is intermediate between the Valley Heathy Forest that one would associate with the Gippsland Plain and Grassy Forest that one would associate with the Highlands Southern Fall.

The school sanctuary's vegetation is mostly young Swampy Woodland, with a narrow strip of the intermediate Grassy Forest / Valley Heathy Forest just inside the western edge. The ecological condition of vegetation in the sanctuary is patchy, with localised serious infestations of environmental weeds. This is a common problem along drainage lines, due to the good growing conditions for weeds.

Native vegetation in the playground is less affected by weeds and more affected by trampling and other effects of children playing. The number of indigenous plant species outside the sanctuary is actually higher than inside, despite the comparable area. This probably reflects a worse history of vegetation degradation along the drainage line prior to creation of the sanctuary.

Relationship to other land

The site abuts Site 25 and there would no doubt be substantial traffic of fauna, seeds and pollen between the two sites. Other treed properties in the neighbourhood help to keep native birds in the area.

Bioregion: Gippsland Plain, on the edge where it abuts the Highlands Southern Fall.

Habitat types

Intermediate Valley Heathy Forest / Grassy Forest (EVCs 127 and 128, both regionally **Endangered**): Estimated to cover 2,500 m², comprising 50 m² in good ecological condition (rating B), 150 m² in fair ecological condition (rating C) and 2,300 m² in poor ecological condition (rating D). 38 indigenous plant species were recorded by the author on 3/4/02.

Dominant canopy trees: *Eucalyptus obliqua*, with fewer *E. radiata* and even fewer *E. cephalocarpa*.

Dominant lower trees: *Exocarpos cupressiformis* and *Acacia melanoxylon* dominate, and *Acacia mearnsii* is also present.

Shrubs: Dominated by *Bursaria spinosa* (typical of Valley Heathy Forest), and also with abundant *Kunzea ericoides* and smaller numbers of other species.

Vines: None found.

Ferns: *Pteridium esculentum* is present but not abundant.

Ground flora: Grassy, with 80% ground coverage. Dominated by *Austrostipa rudis*. Other abundant species include *Rytidosperma penicillatum*, *Microlaena stipoides*, *Lomandra filiformis*, *L. longifolia*, *Tetrarrhena juncea*, *Gonocarpus tetragynus* and *Platylobium formosum*. *Gahnia radula*, *Rytidosperma pallidum*, *Dianella admixta*,

Dipodium roseum, *Pimelea humilis* and *Hypericum gramineum* are present, as they usually are in Grassy Forest and Valley Heathy Forest locally.

Swampy Woodland (EVC 937, regionally Endangered): Estimated to cover 1,500 m², all in fair ecological condition (rating C). 21 indigenous plant species were recorded by the author on 3/4/02.

Dominant canopy trees: Young *Eucalyptus obliqua* to 12 m tall and 150 mm trunk diameter, indicating regeneration after clearing some years ago. *E. ovata* is usually dominant in local Swampy Woodland, but not in this case.

Dominant lower trees: *Acacia melanoxylon* is dense, with approximately 70% cover.

Shrubs: Patchy in density due to uneven natural regeneration. *Leptospermum scoparium*, *Kunzea ericoides* and *Ozothamnus ferrugineus* are the main species.

Vines: *Billardiera mutabilis* is present.

Ferns: *Pteridium esculentum* is dense among blackberries, beneath gaps in the tree canopy.

Ground flora: Dominated by *Gahnia sieberiana* and *Lepidosperma elatius*. The characteristic species, *Centella cordifolia* and *Lobelia alata* are present.

Plant species

The following plant species were observed on 3rd April 2002. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox with 'E'=Endangered and 'V'=Vulnerable. Additional wild indigenous species would no doubt be found in other seasons.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia mearnsii</i>		<i>Kunzea ericoides</i> spp. agg.
V	<i>Acacia melanoxylon</i>		<i>Lepidosperma elatius</i>
V	<i>Acacia verticillata</i>	E	<i>Leptospermum scoparium</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	E	<i>Lobelia anceps</i>
	<i>Billardiera mutabilis</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Bursaria spinosa</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
E	<i>Centella cordifolia</i>		<i>Lomandra longifolia</i>
	<i>Deyeuxia quadriseta</i>		<i>Microlaena stipoides</i>
	<i>Dianella admixta</i>		<i>Microtis ?parviflora</i>
V	<i>Dianella tasmanica</i> (perhaps planted)	V	<i>Opercularia varia</i>
E	<i>Dipodium roseum</i>	E	<i>Ozothamnus ferrugineus</i>
V	<i>Epacris impressa</i>	V	<i>Pimelea humilis</i>
	<i>Eragrostis brownii</i>	V	<i>Platylobium formosum</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Poa morrisii</i>
V	<i>Eucalyptus obliqua</i>	E	<i>Poa tenera</i>
E	<i>Eucalyptus radiata</i>		<i>Pteridium esculentum</i>
V	<i>Euchiton collinus</i>		<i>Rytidosperma pallidum</i>
V	<i>Exocarpos cupressiformis</i>		<i>Rytidosperma penicillatum</i>
	<i>Gahnia radula</i>	E	<i>Rytidosperma semiannulare</i>
E	<i>Gahnia sieberiana</i>		<i>Schoenus apogon</i>
	<i>Gonocarpus tetragynus</i>		<i>Senecio quadridentatus</i>
	<i>Goodenia ovata</i>	E	<i>Stylidium armeria/graminifolium</i>
E	<i>Hypericum gramineum</i>		<i>Tetrarrhena juncea</i>
V	<i>Isolepis inundata</i>		<i>Themeda triandra</i>

Introduced Species

<i>Agrostis capillaris</i>	<i>Hakea salicifolia</i>	<i>Paspalum dilatatum</i>	<i>Ranunculus repens</i>
<i>Crocsmia × crocosmiiflora</i>	<i>Holcus lanatus</i>	<i>Pinus radiata</i>	<i>Rubus anglocandicans</i>
<i>Dactylis glomerata</i>	<i>Hypochoeris radicata</i>	<i>Pittosporum undulatum</i>	

Notes concerning some of the locally threatened plant species

Gahnia sieberiana (Red-fruit Saw-sedge). A dominant species in the Swampy Woodland of the fenced sanctuary.

Microtis ?parviflora (Slender Onion-orchid). Found in the Grassy Forest of the fenced sanctuary, numbers unclear.

Fauna of special significance

None found.

Fauna habitat features

- The substantial numbers of *Gahnia sieberiana* would provide good habitat for the locally uncommon Swordgrass Brown butterfly, whose conservation has been made a priority by Knox City Council and the Knox Environment Society;

- The ground layer of dense grasses and sedges in much of the site is excellent habitat for insects that rely on such habitat, including butterflies and probably skippers (insects that are intermediate between butterflies and moths). A survey for skippers would be worthwhile;
- The trees would attract a reasonable diversity of forest birds, and probably also bats;
- The damp vegetation along the drainage line, and its proximity to drier vegetation, are ideal for the Southern Brown Tree Frog, which was observed at the site.

Significance ratings

Vegetation Type and Condition

Grassy Forest, Valley Heathy Forest and Swampy Woodland are all regionally endangered EVCs. The Department of Sustainability & Environment's significance criterion 3.2.3 (Amos 2004) assigns **State** significance to any site containing a remnant patch of an Endangered EVC, which applies to the patch extending from this site into George Grumont Reserve.

Locally Threatened Plant Species

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Invasion by the environmental weeds listed below:
 - Serious: Monterey Pine (*Pinus radiata*), Sweet Pittosporum (*Pittosporum undulatum*), Blackberry (*Rubus discolor*);
 - Moderate: Montbretia (*Crocoshmia × crocosmiflora*), Cocksfoot (*Dactylis glomerata*), Willow Hakea (*Hakea salicifolia*), Yorkshire Fog (*Holcus lanatus*), Cat's Ear (*Hypochoeris radicata*), Paspalum (*Paspalum dilatatum*) and Creeping Buttercup (*Ranunculus repens*);
- Loss or decline of plant species that are present in dangerously small numbers, due to inbreeding, poor reproductive success or vulnerability to localised chance events;
- Potentially trampling in the playground, but the vegetation appears to have reached a stable state with the current level of trampling and other play activities.

Management issues

- The sanctuary's vegetation is rather young regrowth and its condition suggests recovery from a less natural state, for which the school is to be congratulated. A little more effort on Sweet Pittosporum, blackberry and pines around the drainage line would substantially help, and perhaps stave off serious deterioration (and consequent harder work) over the next few years.

Administration matters

- It would be desirable to have an expert on skippers (insects that are intermediate between butterflies and moths) survey the site in spring and summer, due to the possibility that rare species are present;
- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the endangered EVCs;
- The site is included under the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme. This is partly on the basis of the investigation by Water Ecoscience (1998), in which this is part of their Site 34;
- The whole school is zoned R1Z, like the abutting residential properties.

Information sources used in this assessment

- A site survey undertaken during this study by Dr Lorimer for 1 hour 30 minutes on 3/4/02 using this study's standard procedures discussed in Section 2.4 of Volume 1. This included a description of the vegetation composition, compilation of lists of indigenous and introduced plant species for three separate parts of the site, incidental fauna observations, and checks for fauna habitat, ecological threats and management issues;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Acknowledgment

Thank you to the school for permission to inspect the site.

Site 25. George Grumont Reserve, The Basin

Council bushland reserve, with native vegetation recovering from years of slashing. Melway ref. 65 F7.

Site Significance Level: *State*

- Contains an example of vegetation intermediate between two regionally Endangered Ecological Vegetation Classes. Grassy Forest and Valley Heathy Forest;
- The tree cover and grassy ground layer represent good habitat for some native fauna.



Aerial photograph taken April 2003

Boundaries

The site is the whole of George Grumont Reserve, measuring 1.03 ha.

Land use & tenure: Bushland reserve with playground, zoned Public Park and Recreation Zone (PPRZ).

Site description

This bushland reserve includes gentle slopes with natural tree cover and understorey, and a westward-flowing drainage line that has been cleared. Some of the cleared drainage line has been revegetated in recent years with indigenous species that now provide worthwhile augmentation of the naturally occurring habitat. There is also a small playground.

The whole site has a long history of slashing, but most of the native understorey has been relieved from slashing in recent years. This has brought about excellent recent regeneration of indigenous grasses and many wildflowers, but the fieldwork failed to detect some species that one would expect to find if the vegetation had not had a history of slashing, such as *Hardenbergia violacea* and *Hovea linearis*.

The site is within a narrow transition zone between the Gippsland Plain bioregion and the Highlands - Southern Fall bioregion. The vegetation is mainly intermediate between the Valley Heathy Forest that is associated with the Gippsland Plain and Grassy Forest that is associated with the Highlands - Southern Fall. There are also traces of the Swampy Woodland that would once have occurred along the drainage line.

Relationship to other land

The site abuts Site 24 and there would no doubt be substantial traffic of fauna, seeds and pollen between the two sites. There are also about a dozen mature eucalypts immediately to the west of the reserve, providing some additional habitat for arboreal fauna, but grazing in that property has destroyed the understorey. Other treed properties in the neighbourhood help to keep native birds in the area.

Bioregion: Gippsland Plain, close to the edge where it abuts the Highlands Southern Fall.

Habitat types

Intermediate Valley Heathy Forest / Grassy Forest (EVCs 127 and 128, both regionally **Endangered**): Estimated to cover 7,300 m², comprising 2,000 m² in good ecological condition (rating B), 3,100 m² in fair ecological condition (rating C) and 2,200 m² in poor ecological condition (rating D).

Dominant canopy trees: *Eucalyptus obliqua*, *E. macrorhyncha* and *E. radiata*; 20 m tall. There is also one *E. cephalocarpa*.

Dominant lower trees: *Exocarpos cupressiformis* and *Acacia melanoxylon* dominate, and *Acacia mearnsii* is also present.

Shrubs: Sparse due to past slashing. Dominated by *Bursaria spinosa* (typical of Valley Heathy Forest) along with *Acacia myrtifolia*, *Coprosma quadrifida*, *Pultenaea gunnii* and smaller numbers of other species such as *Cassinia aculeata*, *Epacris impressa* and *Leptospermum continentale*.

Vines: The light twiner, *Billardiera mutabilis*, is abundant.

Ferns: *Pteridium esculentum* is present but only in a few small patches.

Ground flora: Grassy, with 80% ground coverage. Dominated by *Poa morrisii* and *Rytidosperma pallidum* with somewhat less coverage of *Rytidosperma penicillatum* and *Platylobium formosum*. Species that are abundant but not dominant in foliage cover include *Acrotriche prostrata*, *Goodenia lanata*, *Olearia myrsinoides*, *Austrostipa pubinodis*, *Austrostipa rudis*, *Tetrarrhena juncea*, *Gahnia radula*, *Microlaena stipoides* and *Viola hederacea*. Smaller numbers of *Caesia parviflora*, *Dianella admixta*, *Dipodium roseum*, *Pimelea humilis* and *Deyeuxia quadriseta* are present. The presence of *Centella cordifolia* and *Eragrostis brownii* in lower-lying areas are pointers to what would once have been Swampy Woodland along the drainage line.

Plant species

The following plant species were observed by Dr Lorimer on the site on 3/4/02. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox with 'E'=Endangered and 'V'=Vulnerable. Additional wild indigenous species would no doubt be found in other seasons.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia mearnsii</i>	E	<i>Eucalyptus radiata</i>
V	<i>Acacia melanoxylon</i>	V	<i>Euchiton collinus</i>
E	<i>Acacia myrtifolia</i>	V	<i>Exocarpos cupressiformis</i>
V	<i>Acacia verticillata</i>		<i>Gahnia radula</i>
	<i>Acaena novae-zelandiae</i>		<i>Gonocarpus tetragynus</i>
V	<i>Acrotriche prostrata</i>		<i>Goodenia lanata</i>
	<i>Austrostipa pubinodis</i>		<i>Goodenia ovata</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>		<i>Leptospermum continentale</i>
	<i>Billardiera mutabilis</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Bursaria spinosa</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
V	<i>Caesia parviflora</i>		<i>Lomandra longifolia</i>
	<i>Carex breviculmis</i>		<i>Microlaena stipoides</i>
	<i>Cassinia arcuata</i>	E	<i>Olearia myrsinoides</i>
E	<i>Centella cordifolia</i>		<i>Oxalis exilis/perennans</i>
V	<i>Coprosma quadrifida</i>	V	<i>Platylobium formosum</i>
	<i>Deyeuxia quadriseta</i>		<i>Poa morrisii</i>
	<i>Dianella admixta</i>	E	<i>Poa tenera</i>
	<i>Dichelachne rara</i>		<i>Poranthera microphylla</i>
E	<i>Dipodium roseum</i>		<i>Pteridium esculentum</i>
V	<i>Epacris impressa</i>	V	<i>Pultenaea gunnii</i>
	<i>Eragrostis brownii</i>		<i>Rytidosperma ?laeve</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Rytidosperma pallidum</i>
E	<i>Eucalyptus macrorhyncha</i>		<i>Rytidosperma penicillatum</i>
V	<i>Eucalyptus obliqua</i>	V	<i>Rytidosperma pilosum</i>

Risk Indigenous Species		Risk Indigenous Species	
E	<i>Rytidosperma semiannulare</i> <i>Rytidosperma setaceum</i> <i>Schoenus apogon</i>	E	<i>Tetrarrhena juncea</i> <i>Themeda triandra</i> <i>Viola hederacea</i>
Introduced Species			
<i>Agrostis capillaris</i>	<i>Cytisus scoparius</i>	<i>Hedera helix</i>	<i>Pittosporum undulatum</i>
<i>Aira sp.</i>	<i>Dactylis glomerata</i>	<i>Hypochoeris radicata</i>	<i>Plantago lanceolata</i>
<i>Anthoxanthum odoratum</i>	<i>Ehrharta erecta</i>	<i>Ilex aquifolium</i>	<i>Prunella vulgaris</i>
<i>Centaureum erythraea</i>	<i>Hakea salicifolia</i>	<i>Paspalum dilatatum</i>	<i>Trifolium repens</i>

Fauna habitat features

- Birds nests were observed during the site inspection;
- The many mature trees would attract a reasonable diversity of forest birds, as well as the Southern Brown Tree Frog and probably bats;
- The ground layer of dense grasses in most of the site is excellent habitat for grass-reliant butterflies and darts (some of which were observed during the site inspection);
- The planted *Gahnia sieberiana* would provide good habitat for the locally uncommon Swordgrass Brown butterfly, whose conservation has been made a priority by Knox City Council and the Knox Environment Society.

Significance ratings

Vegetation Type and Condition

This site contains a 'remnant patch' of an endangered EVC. The Department of Sustainability & Environment's significance criterion 3.2.3 (Amos 2004) assigns **State** significance to any site containing a remnant patch of an Endangered EVC, which applies to the patch extending from this site into St Bernadette's Primary School.

Locally Threatened Plant Species

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Invasion by the environmental weeds listed below:
 - Serious: Brown-top Bent (*Agrostis capillaris*), Sweet Vernal-grass (*Anthoxanthum odoratum*), Cocksfoot (*Dactylis glomerata*), Cat's Ear (*Hypochoeris radicata*);
 - Moderate: English Broom (*Cytisus scoparius*), Panic Veldt-grass (*Ehrharta erecta*), Willow Hakea (*Hakea salicifolia*), Ivy (*Hedera helix*), Yorkshire Fog (*Holcus lanatus*), Sweet Pittosporum (*Pittosporum undulatum*) and Ribwort (*Plantago lanceolata*);
- Dumping of garden waste into the reserve from over the fences of houses to the southwest.
- Loss or decline of plant species that are present in dangerously small numbers, due to inbreeding, poor reproductive success or vulnerability to localised chance events.

Management issues

- Cessation of slashing of native ground flora has been very successful. The resources previously put into slashing are better invested in weed control;
- The reserve's ecology could be improved and the reserve's management costs reduced if certain neighbours could be persuaded not to dump garden waste there;
- If the density of indigenous shrubs does not increase naturally, it would be desirable to plant some shrub species appropriate for the site. This could improve the wildflower display and the habitat for native birds and insects.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the endangered EVC and the consequent State significance;
- The site is included under the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme. This is partly on the basis of the investigation by Water Ecoscience (1998), in which this is part of their Site 34;
- The reserve is zoned Public Park and Recreation Zone (PPRZ).

Information sources used in this assessment

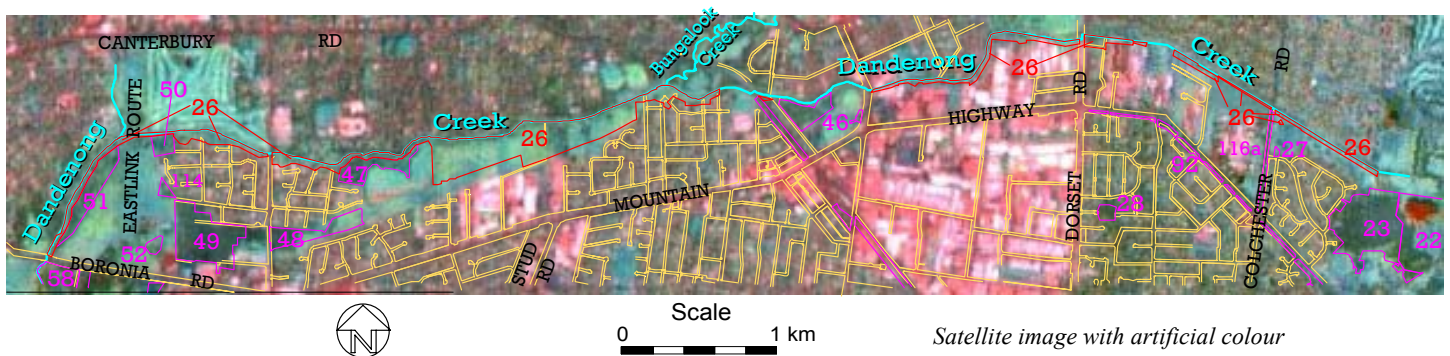
- A site survey undertaken during this study by Dr Lorimer for 1 hour 35 minutes on 3/4/02 using this study's standard procedures discussed in Section 2.4 of Volume 1. This included a description of the vegetation composition, compilation of a list of indigenous and introduced plant species, incidental fauna observations (birds, frog, butterflies, darts), and checks for fauna habitat, ecological threats and management issues;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 26. Dandenong Creek Corridor

Disjoint patches or strips of habitat along one of Knox's three main streams. Melway map references 63 D4 to 65 F4.

Site Significance Level: *variously State to Local*

- All the native vegetation in this site belongs to Ecological Vegetation Classes that are regionally Endangered or Vulnerable, but only a small fraction of it is in fair ecological condition or better;
- Even open pasture within the site contains substantial areas of indigenous wetland plants in depressions, and these are habitat for frogs and their predators;
- This is an important corridor for daily and seasonal movements of birds and insects (particularly waterbirds and parrots), as well as for pollen and plant propagules that the fauna may transport;
- Revegetation is playing an important role in reducing the extensive fragmentation of habitat that has occurred historically.



Boundaries

The site comprises the eight strips shown above that are outlined in red and labelled '26', from Boronia Rd in the west to near Liverpool Road Retarding Basin in Boronia (Site 22). The magenta-outlined shapes are other sites from this report, labelled with their site numbers. The total area is 52.0 ha, reduced from 53.6 ha in the first edition of this report due to loss of habitat from construction of EastLink.

Land use & tenure: Public land, mostly managed by Melbourne Water and Knox City Council.

Site description

The segments of this site represent stretches of the waterway with native vegetation or other habitat, excluding sites described separately in their own right. The natural course of the creek has been replaced by man-made channels, mostly in the form of a barrel drain with a low-flow pipe beneath. Shortfin Eels, which still migrate from the Coral Sea to the Dandenong Ranges and back, are probably the only aquatic vertebrate species that can survive such heavy modification to the stream.

The nature and condition of the native vegetation is very variable along the corridor.

Upstream (east) of Dorset Rd

This stretch has few mature eucalypts, but most of it has a narrow gallery of regrowth dominated by Blackwood (*Acacia melanoxylon*) and Swamp Paperbark (*Melaleuca ericifolia*), dense in parts. The habitat that this provides is being bolstered by extensive revegetation that will soon leave hardly any substantial gaps in the corridor's tree canopy. The few mature eucalypts that remain in this stretch of the corridor are mostly right at each end, where there are patches of Swampy Riparian Woodland (ecological condition rating C) that may well deserve a State significance rating. There is also a small wetland just upstream from Colchester Rd.

Dorset Rd to Bayswater Rd

The native vegetation in the eastern third of this stretch is more fragmented. It includes two substantially degraded patches of Swampy Riparian Woodland, some patches of Common Reed (*Phragmites australis*) and some scattered remnant eucalypts. The western third of this stretch has hardly any remnant native vegetation at all, and so has been extensively revegetated to fill the wide gap in the habitat corridor.

King St Bayswater to just east of Manson Reserve

There is very little remnant native vegetation on the Knox side of the creek between King St and a patch of Swampy Woodland opposite The Greenway (which is on the north side of the creek). Fortunately, the continuity of the habitat corridor is maintained by native vegetation on the north side of the creek, as seen on the satellite image on the previous page. Just west of The Greenway on the Knox side of the creek, the aerial photograph shows a substantial patch of Swampy Riparian Woodland and associated Floodplain Wetland Complex, which qualifies for State significance because of the endangered vegetation types.

The site includes a substantial area of the Healesville Freeway Reservation and adjacent floodplain. This area has many native wetland plants in depressions within pasture, and it is used for hunting mice by Black-Shouldered Kites.

Manson Reserve to Wantirna Rd

This stretch of the site has little native vegetation, but is flanked by substantial areas of Riparian Forest, Swampy Riparian Woodland and Swampy Woodland to the north, the south or both. It has also been extensively revegetated to improve the continuity of habitat.

Wantirna Rd to the EastLink road

This stretch includes some impressive, large Manna Gums (*Eucalyptus viminalis*) and some other scattered remnant trees, but hardly any other native vegetation. Some mature planted trees occupy some of the remaining space, but this stretch is a major gap in the continuity of the habitat corridor.

Beside Winton Wetlands

This stretch has practically no native vegetation but it is flanked by the habitat of Winton Wetlands (Site 51) to the east and Campbell's Croft Reserve on the west. It is included within the site because of its strategic importance for ecology and the role that its revegetation plots play in improving the continuity of the habitat corridor.

More detailed descriptions of the segments of this site can be found in the 1997 report, '*Vegetation Survey of Linear Reserves. A Management Strategy for Riparian and Flood Plain Vegetation*', by Reid, Moss and Lorimer for Knox City Council.

Relationship to other land

One of the site's main ecological attributes is the role that it is believed to play in facilitating movement of fauna along the corridor, and the consequent transport of pollen and plant propagules. Such movements are corroborated by the regular observations along the corridor of nomadic or highly mobile waterbirds (e.g. egrets, ducks and pelicans) and forest birds such as Eastern Rosellas.

The satellite image on p. 141 has been marked with magenta outlines to show separately described sites along the corridor. These sites serve as ecological stepping-stones. The corridor helps to facilitate movement of some birds, insects and frogs between these stepping-stones.

Some types of birds (particularly parrots) have been observed by the author to spend their nights along the corridor and disperse away from the corridor during the daytime.

Treed residential neighbourhoods each side of the corridor are likely to improve the corridor's ecological function. This is particularly true of Heathmont.

Bioregion: Gippsland Plain

Habitat types

Stream Channel (No EVC number or conservation status available). 8 naturally occurring indigenous plant species recorded.

Wetland (EVC 74, **regionally Endangered**). 44 naturally occurring indigenous plant species recorded.

Riparian Forest (EVC 18, **regionally Vulnerable**). 64 naturally occurring indigenous plant species recorded.

Swampy Riparian Woodland (EVC 83, **regionally Endangered**). 51 naturally occurring indigenous plant species recorded.

Swampy Woodland (EVC 937, **regionally Endangered**). 25 naturally occurring indigenous plant species recorded.

Plant species

In the following plant list, the column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, species with names in bold are rare throughout the Melbourne region. If the identity of a particular eucalypt in the site is confirmed as *Eucalyptus yarraensis*, it is rare nationally.

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Acacia dealbata</i>	V	<i>Isolepis inundata</i>
V	<i>Acacia mearnsii</i>		<i>Juncus amabilis</i>
V	<i>Acacia melanoxylon</i>		<i>Juncus bufonius</i>
	<i>Acacia paradoxa</i>		<i>Juncus gregiflorus</i>
E	<i>Acacia stricta</i>	C	<i>Juncus ?holoschoenus</i>
V	<i>Acacia verticillata</i>		<i>Juncus pallidus</i>
	<i>Acaena novae-zelandiae</i>	E	<i>Juncus planifolius</i>
	<i>Alisma plantago-aquatica</i>	E	<i>Juncus procerus</i>
V	<i>Allocasuarina littoralis</i>		<i>Juncus sarophorus</i>
V	<i>Alternanthera denticulata</i>	E	<i>Juncus subsecundus</i>
C	<i>Amyema pendula</i>		<i>Kunzea ericoides</i> spp. agg.
V	<i>Amyema quandang</i>		<i>Lachnagrostis filiformis</i>
	<i>Austrostipa pubinodis</i>	E	<i>Lemna disperma</i>
	<i>Austrostipa rudis</i>		<i>Lepidosperma elatius</i>
E	<i>Azolla pinnata</i>	E	<i>Leptospermum lanigerum</i>
	<i>Billardiera mutabilis</i>	E	<i>Lobelia anceps</i>
E	<i>Blechnum cartilagineum</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Bursaria spinosa</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
	<i>Carex appressa</i>		<i>Lomandra longifolia</i>
E	<i>Carex fascicularis</i>	V	<i>Lythrum hyssopifolia</i>
E	<i>Carex gaudichaudiana</i>	E	<i>Melaleuca ericifolia</i>
DD	<i>Carex inversa</i>		<i>Microlaena stipoides</i>
	<i>Cassinia aculeata</i>	C	<i>Muellerina eucalyptoides</i>
	<i>Cassinia arcuata</i>	V	<i>Olearia lirata</i>
E	<i>Centella cordifolia</i>		<i>Oxalis exilis/perennans</i>
V	<i>Coprosma quadrifida</i>	E	<i>Ozothamnus ferrugineus</i>
E	<i>Crassula helmsii</i>		<i>Persicaria decipiens</i>
E	<i>Cyathea australis</i>	E	<i>Persicaria hydropiper</i>
	<i>Deyeuxia quadriseta</i>	E	<i>Persicaria lapathifolia</i>
	<i>Dianella admixta</i>	E	<i>Persicaria praetermissa</i>
V	<i>Dianella longifolia</i> s.l.	C	<i>Persicaria subsessilis</i>
V	<i>Dianella tasmanica</i>	E	<i>Phragmites australis</i>
V	<i>Eleocharis acuta</i>		<i>Poa ensiformis</i>
	<i>Eleocharis sphacelata</i>	E	<i>Poa labillardierei</i> var. <i>labillardierei</i>
	<i>Epilobium hirtigerum</i>		<i>Poa morrisii</i>
	<i>Eragrostis brownii</i>	E	<i>Polystichum proliferum</i>
V	<i>Eucalyptus cephalocarpa</i>	E	<i>Pomaderris aspera</i>
V	<i>Eucalyptus melliodora</i>	C	<i>Pomaderris racemosa</i>
V	<i>Eucalyptus obliqua</i>		<i>Poranthera microphylla</i>
V	<i>Eucalyptus ovata</i>	V	<i>Potamogeton crispus</i>
E	<i>Eucalyptus radiata</i>	V	<i>Potamogeton ochreatus</i>
E	<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>	E	<i>Prostanthera lasianthos</i>
C	<i>Eucalyptus ?yarraensis</i>		<i>Pteridium esculentum</i>
E	<i>Euchiton involucratus</i>	C	<i>Rytidosperma duttonianum</i>
V	<i>Exocarpos cupressiformis</i>		<i>Rytidosperma linkii</i> var. <i>fulvum</i>
E	<i>Exocarpos strictus</i>		<i>Rytidosperma penicillatum</i>
	<i>Gahnia radula</i>		<i>Rytidosperma racemosum</i>
E	<i>Gahnia sieberiana</i>	E	<i>Rytidosperma semiannulare</i>
C	<i>Geranium homeanum</i>		<i>Rytidosperma setaceum</i>
V	<i>Glyceria australis</i>		<i>Schoenus apogon</i>
	<i>Gonocarpus tetragynus</i>		<i>Senecio glomeratus</i>
	<i>Goodenia ovata</i>		<i>Senecio hispidulus</i>
E	<i>Gynatrix pulchella</i>	E	<i>Senecio minimus</i>
E	<i>Isolepis cernua</i> var. <i>platycarpa</i>		<i>Senecio quadridentatus</i>

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Tetrarrhena juncea</i>	E	<i>Triglochin striata</i> (flat leaf variant)
	<i>Themeda triandra</i>	E	<i>Typha domingensis</i>
	<i>Tricoryne elatior</i>	E	<i>Typha orientalis</i>
C	<i>Triglochin procera</i>		
Introduced Species			
	<i>Agrostis capillaris</i>		<i>Cyperus eragrostis</i>
	<i>Allium triquetrum</i>		<i>Dactylis glomerata</i>
	<i>Anthoxanthum odoratum</i>		<i>Egeria densa</i>
	<i>Aster subulatus</i>		<i>Ehrharta erecta</i>
	<i>Briza maxima</i>		<i>Erica lusitanica</i>
	<i>Bromus catharticus</i>		<i>Eriobotrya japonica</i>
	<i>Calystegia silvatica</i>		<i>Festuca arundinacea</i>
	<i>Chrysanthemoides mon- ilifera monilifera</i>		<i>Fraxinus angustifolia</i>
	<i>Cirsium vulgare</i>		<i>Galium aparine</i>
	<i>Cortaderia selloana</i>		<i>Genista monspessulana</i>
	<i>Crataegus monogyna</i>		<i>Grevillea rosmarinifolia</i>
	<i>Crepis capillaris</i>		<i>Hedera helix</i>
	<i>Cynodon dactylon</i>		<i>Holcus lanatus</i>
			<i>Hypericum tetrapterum</i>
			<i>Hypochoeris radicata</i>
			<i>Ilex aquifolium</i>
			<i>Juncus articulatus</i>
			<i>Leontodon taraxacoides</i>
			<i>Lonicera japonica</i>
			<i>Lotus subbiflorus</i>
			<i>Lotus ?uliginosus</i>
			<i>Malus pumila</i>
			<i>Paspalum dilatatum</i>
			<i>Paspalum distichum</i>
			<i>Pennisetum clandestinum</i>
			<i>Persicaria maculosa</i>
			<i>Phalaris aquatica</i>
			<i>Phalaris arundinacea</i>
			<i>Pittosporum undulatum</i>
			<i>Plantago lanceolata</i>
			<i>Prunella vulgaris</i>
			<i>Prunus cerasifera</i>
			<i>Ranunculus repens</i>
			<i>Rubus anglocandicans</i>
			<i>Rumex crispus</i>
			<i>Salix ?babylonica</i> s.l.
			<i>Salix fragilis</i>
			<i>Salix</i> sp.
			<i>Salix × reichardtii</i>
			<i>Sonchus oleraceus</i>
			<i>Verbena bonariensis</i> s.l.
			<i>Zantedeschia aethiopica</i>

Notes concerning some of the locally threatened plant species

Carex gaudichaudiana (Fen Sedge). Apparently present at several locations, but identity only 75% certain in some cases due to lack of stems.

Rytidosperma duttonianum (Brown-back Wallaby-grass). One patch, several metres across. The only population in the outer eastern suburbs.

Eucalyptus ?yarraensis (Yarra Gum). A single individual opposite the northern end of Derwent Drive, Bayswater, identity unconfirmed. (The '?' in the scientific name is the scientists' way of indicating uncertain identity.)

Fauna of special significance

No records of significant fauna were found, but the significant fauna reported at other sites along the corridor clearly get there by moving along the corridor.

Fauna habitat features

- There are some large eucalypts, particularly Manna Gums (*Eucalyptus viminalis*) with tree hollows that would make suitable locations for nesting or roosting of certain birds, bats, possums and insects;
- Patches of scrub and revegetation plots provide habitat for small insect-eating birds such as wrens;
- Swampy depressions are used by waterbirds and frogs.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment'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 all the segments of this site.

Criterion 1.2.6 attributes **Regional** significance to any corridor that meets the description 'Important at regional scale (link within bioregion or catchment)'. The Dandenong Creek corridor site described here is important for facilitating movements of waterbirds between the more significant sites along it, between the Lower Dobson Creek floodplain (Site 20) and the Dandenong Valley Parklands (Site 58).

Regionally Threatened Ecological Vegetation Classes

According to the criteria of 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), areas of native vegetation belonging to an endangered EVC (such as most of the remnant native vegetation in this site) have a conservation significance rating of High if they are in a substantially degraded state (as in this case). According to criterion 3.2.3, sites that include a remnant patch with High conservation significance due to the presence of a threatened EVC are of State significance.

The area of native vegetation immediately south of The Greenway belongs to Endangered EVCs and it meets the definition of a 'remnant patch'. This gives the **State** significance. The patches of Swampy Riparian Woodland just east

of Dorset Rd and at the eastern extremity of this site also qualify for State significance on the same basis if they are found to qualify as 'remnant patches'.

It is somewhat doubtful whether the remaining segments of the Dandenong Ck corridor site described here meet the definition for a 'remnant patch', in which case criterion 3.2.3 accords them no significance.

Locally Threatened Flora

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Invasion by environmental weeds, particularly woody weeds (e.g. Hawthorn) and grass weeds (e.g. Cocksfoot and Water Couch). Blackberries would also be a serious problem if they were not subjected to repeated control;
- Loss or decline of plant species whose populations are dangerously small, due to inbreeding, poor reproductive success or vulnerability to localised chance events;
- Foxes, which kill wildlife and spread woody weeds and blackberries. Many were seen along the creek.

Management issues

Refer to the 1997 report, '*Vegetation Survey of Linear Reserves. A Management Strategy for Riparian and Flood Plain Vegetation*', by Reid, Moss and Lorimer for Knox City Council.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the riparian habitat, the threatened EVCs and the other attributes discussed under the heading 'Significance ratings' above;
- Some segments of the site are presently covered by Schedule 1 of the Vegetation Protection Overlay in the Knox Planning Scheme, on the basis of their recognition by Water Ecoscience (1998) as their Site 83.

Information sources used in this assessment

- The 1997 report, '*Vegetation Survey of Linear Reserves. A Management Strategy for Riparian and Flood Plain Vegetation*', by Reid, Moss and Lorimer for Knox City Council, along with the supporting field data. This included descriptions of vegetation composition, compilation of lists of indigenous and introduced plant species for each of fifteen parts of the site, incidental fauna observations, and checks for fauna habitat, ecological threats and management issues;
- The 2002 report, '*Biologist's Assessment of the Proposed Wantirna Golf Park*' by G.S. Lorimer for Knox City Council, along with the underlying research and field data. The study area was generally between Havelock Rd and Dandenong Ck. The fieldwork took 1¼ hours on 15th August 2002, and included gathering the same kinds of data as was standard for the other sites assessed in this report;
- A report, '*Assessment of Native Vegetation on the Mitcham to Frankston Freeway Alignment in Knox*', by Dr Lorimer in July 2003 for Knox City Council;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 27. Colchester Reserve Wetland, Boronia

A wetland of 800 m² beside the driveway to a sports ground, close to Dandenong Creek. Melway ref. 65 D3.

Site Significance Level: *Regional*

- The vegetation type (wetland) is regionally endangered;
- The vegetation's ecological condition varies between good and fair;
- There are small to modest numbers of four uncommon plant species, two of which are rare or threatened throughout the Melbourne area;
- Grass weeds are the main ecological threat, and may be controlled with grass-specific herbicide.



Aerial photograph taken April 2003



Scale 1:2,000
10 0 20 40 60 80 100m

Boundaries

The significant vegetation is the seasonally inundated depression outlined in white on the aerial photograph above. The site, outlined in red above, is larger than the wetland because what happens in the wetland's immediate surroundings can significantly affect the wetland. The total site area is 1,500 m².

The site's western edge is a straight line parallel to, and 40.5 m from, Colchester Rd. The southern boundary coincides with part of the title boundary of Colchester Reserve. The eastern edge coincides with an edge of the reserve's driveway and car park, extending to the western tip of the car park. The boundary is closed at its northern tip by a short segment that continues the alignment of the northwestern end of the car park.

Land use & tenure: Council recreation reserve, zoned PPRZ. The wetland is kept for biodiversity conservation and the surrounding grass is regularly mown.

Site description

The site is a depression on the floodplain of Dandenong Creek, with alluvial soil. The elevation of 121 m is extremely close to the natural level of the soil at this location, but shallow excavations have influenced or defined the current depth and shape of the depression. Even if the contours of the wetland have been artificially created, this is not much of a departure from the natural processes of such a floodplain, where depressions are periodically created and destroyed by floods.

The wetland's biological significance is treated here as being materially the same as if there had been no excavations in or around the wetland. The indigenous plant species present in the wetland have not been planted and the vegetation composition is very similar to that found in natural depressions along Dandenong Creek – dominated by Tall Sedge (*Carex appressa*) and rushes, particularly *Juncus amabilis* and *Juncus sarophorus*.

Immediately east of the wetland, the aerial photograph shows the darker green of young shrubs and trees in a revegetation area on the slope leading up to the driveway.

The wetland includes two wetland plant species (*Baumea ?rubiginosa* and *Juncus vaginatus*) that are rare throughout the Melbourne area, but it is threatened by drought, changing climate and grass weeds that have invaded from the reserve's lawns.

When the author most recently inspected the site, drought had substantially damaged the wetland's ecology. However, wetlands are intrinsically dynamic environments and the Colchester Reserve wetland can be expected to recover with future floods (as it has following historical disturbance).

Relationship to other land

There is another, slightly smaller wetland 145 m to the north, in the reserve's northern corner. It is treated in this report as part of the Dandenong Creek corridor (Site 26) because it is less than 20 m from a corridor of trees and shrubs along the modified creek's straightened channel. The vegetated corridor is narrow, fragmented and has few mature trees in this vicinity, but waterbirds such as egrets and ibis nevertheless move along the broad Dandenong Creek valley. Straw-necked Ibis were observed in the wetlands within Colchester Reserve.

Common Froglets are present in both of the reserve's wetlands and along the creek. They are no doubt capable of moving between these three areas and to the roadside vegetation along Colchester Rd (Site 116a), including across the playing fields at times.

Bioregion: Gippsland Plain

Habitat type

Wetland (EVC 74, regionally Endangered): 650 m² in area, of which it was estimated in 2002 that 20% (130 m²) was in good ecological condition (rating B) and 80% (520 m²) is in fair ecological condition (rating C).

Trees, vines and ferns: Absent.

Shrubs: sparse, immature, *Melaleuca ericifolia* and *Leptospermum scoparium* within the wetland and continuing into the revegetation area on the eastern edge.

Aquatic and semi-aquatic flora: Dominated by *Carex appressa* and rushes, particularly *Juncus amabilis* and *J. sarophorus*, along with *Epilobium hirtigerum* in season. There are six native species of *Juncus* and none of the usual wetland weed, *Juncus articulatus*.

Plant species

The following plant species were observed by Dr Lorimer on 15th May 2002. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Juncus vaginatus* is rare throughout the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Carex appressa</i>		<i>Juncus sarophorus</i>
E	<i>Crassula helmsii</i>	C	<i>Juncus vaginatus</i>
	<i>Epilobium hirtigerum</i>		<i>Lachnagrostis filiformis</i>
	<i>Juncus amabilis</i>	E	<i>Leptospermum scoparium</i>
	<i>Juncus gregiflorus</i>		<i>Lomandra longifolia</i> (perhaps planted)
C	<i>Juncus holoschoenus</i>	E	<i>Melaleuca ericifolia</i>
E	<i>Juncus planifolius</i>		<i>Persicaria decipiens</i>
E	<i>Juncus procerus</i>		
Introduced Species			
	<i>Cynodon dactylon</i>		<i>Pennisetum clandestinum</i>
	<i>Lotus corniculatus</i>		<i>Plantago lanceolata</i>
	<i>Cyperus eragrostis</i>		<i>Ranunculus repens</i>
	<i>Paspalum dilatatum</i>		
	<i>Holcus lanatus</i>		
	<i>Paspalum distichum</i>		

Notes concerning some of the locally threatened plant species

Baumea ?rubiginosa (Soft Twig-rush) – three young plants close to Beresford Drive, not yet reproductively mature.

Crassula helmsii (Swamp Crassula) – one patch only was detected.

Juncus holoschoenus (Joint-leaf Rush) – seven individuals were detected.

Juncus vaginatus (Clustered Rush) – at least two plants present, and probably more.

Fauna habitat features

- The wetland provides good habitat for frogs, but only one species (Common Froglet) was noticed incidentally;
- There are no doubt other aquatic fauna in the wetland;
- The pond life attracts waterbirds, as evidenced by Straw-necked Ibis observed foraging.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Regionally Threatened Ecological Vegetation Class

According to 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), remnant patches of native vegetation belonging to an endangered EVC (including wetlands) have a conservation significance rating of either High or Very High, depending on their ecological condition. In either case, any site containing a remnant patch of such vegetation is of State significance under criterion 3.2.3 of Amos (2004).

The Colchester Reserve wetland meets the Department of Sustainability & Environment's current definition of a remnant patch, but at the time Amos (2004) prepared the significance criteria, the unpublished convention was that native vegetation only qualified as a remnant patch if it occupied at least 2,500 m². Because this threshold is so much larger than the Colchester Reserve wetland, the author has reduced the significance level of the site to **Regional**.

Rare or Threatened Flora

None of the wetland's plants listed as 'Plants of special significance' above have been listed by the Department of Sustainability & Environment as rare or threatened, but *Juncus vaginatus* might qualify as regionally threatened when and if its conservation status is formally assessed. In any case, the significance of the *Juncus vaginatus* plants in the wetland under consideration is diminished by the small population size.

Some of the other locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Drought and climate change;
- Loss or decline of plant species whose populations are so small that they are vulnerable to decline or loss through inbreeding, poor reproductive success, drought or disease;
- Invasion by environmental weeds:
 - Very serious: Couch (*Cynodon dactylon*); and
 - Serious: Yorkshire Fog (*Holcus lanatus*), Water Couch (*Paspalum distichum*), Kikuyu Grass (*Pennisetum clandestinum*), Ribwort (*Plantago lanceolata*) and Creeping Buttercup (*Ranunculus repens*);
- Expansion of the indigenous paperbarks and Manuka into the presently open part of the wetland (see below).

Management issues

- The grass weeds mentioned in the previous section should be controlled with a grass-specific herbicide that has been shown to have low aquatic toxicity. The WA Water and Rivers Commission has found Fusilade[®] to be suitable in such conditions (see their 'Water Notes' no. 22 of 2001, available via internet).
- Spraying of the grass weeds and the Creeping Buttercup along the southern edge should occur during active growth but not when there is surface water around the target plants. December would typically be a suitable time of year to spray. Follow-up would be required, mindful of the risk that other weeds such as Ribwort (*Plantago lanceolata*) may move in to occupy the space freed up from grass weeds.
- As the planted trees and shrubs next to the wetland mature, they may encroach into the open part of the wetland and their roots will extract more and more water to support the larger plants. A balance would eventually be reached where the trees' and shrubs' growth will be limited by the diminishing availability of water. It is not clear whether equilibrium would be reached before or after conditions become too dry for the rare wetland plants, or whether grass weeds might flourish with increasing dryness and hence overwhelm the rare species. Culling of the revegetation may be needed.
- To safeguard against the loss of the locally rare wetland plant species, it would be desirable to collect propagating material and raise young plants for planting in nearby wetlands, including in the northern corner of Colchester Reserve.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because wetlands are regionally endangered and because rare plants are present;
- The reserve is zoned 'Public Park and Recreation Zone';
- The site is not protected under the existing Vegetation Protection Overlays of the Knox Planning Scheme, but it gains limited protection under clause 52.17 of the scheme.

Information sources used in this assessment

- A site survey of thirty minutes duration undertaken by Dr Lorimer on 19/6/02 using this study's standard procedures discussed in Section 2.4 of Volume 1. This included a description of the vegetation composition, compilation of lists of

indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats and management issues;

- A prior inspection and list of flora and fauna species by Dr Lorimer on 12/4/97 for the report '*Vegetation Survey of Linear Reserves – A Management Strategy for Flood Plain and Riparian Vegetation*' by Reid, Moss and Lorimer (for Knox City Council in 1997);
- A re-inspection of the site by Dr Lorimer for approximately thirty minutes on 13/12/03, which successfully found the *Juncus vaginatus* that had been discovered in the 1997 inspection but not seen in the 2002 inspection;
- A re-inspection of the site by Dr Lorimer for approximately ten minutes on 16/7/04, mainly to check for frogs and fertile *Baumea* material for identification;
- A brief overview of the site in March 2008 to check the state of the wetland;
- Aerial photography from February 2001 and April 2003 and satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 28. Blamey Court Reserve, Boronia

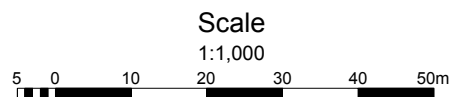
A small Council bushland reserve on the steep, western slope of ridge between Dorset Rd and Army Rd. Melway ref. 65A4.

Site Significance Level: *State*

- The forest is dominated by Red Box trees, which are very rare in Knox;
- The Ecological Vegetation Class that best matches the forest is Valley Heathy Forest, which is regionally threatened;
- Part of the reserve supports vegetation in near-pristine condition with excellent botanical diversity;
- There are viable populations of several plant species that are threatened in Knox.



Aerial photograph taken February 2001



Boundaries

The site is the area outlined in red above, measuring 1.04 ha. It comprises the Council reserve lot except for the narrow walkway through to Robertson Crescent in the north.

Land use & tenure: Council nature reserve.

Site description

The site's elevation ranges from 115 to 140 m (Australian Height Datum) with a steep slope of typically 1:4 and an aspect of west-northwest. The soil is shallow and stony, derived from hornfels.

The vegetation's ecological condition is highly patchy due to past excavations, firebreaks and mistreatment by some neighbours. The most intact parts are botanically very rich indeed.

Knox City Council is managing the bushland very actively, including the use of fire to control weeds, regenerate plant species and provide a broader variety of habitat for fauna.

Relationship to other land

There is a canopy of scattered remnant eucalypts from the eastern (uphill) edge of the reserve, along the ridge to Mountain Hwy in the north and to the south as far as a few hundred metres beyond the Old Joes Creek bushland area (Site 29). This canopy, combined with mature non-indigenous trees, facilitates movement of some bird life to and from the reserve. However, the size of the reserve is too small for most birds to spend much time there, and many species of native birds and insects do not visit because native understorey is practically non-existent within 600 m of the reserve. These impressions are evidenced by the poor bird list that was accumulated during the several days in spring when the flora survey was conducted.

Nevertheless, the movements of birds and insects that do occur are likely to be very important for introducing seeds and pollen of indigenous plant species, which in many cases are at risk of inbreeding.

Bioregion: Gippsland Plain.

Habitat type

Valley Heathy Forest (EVC 127, regionally Endangered) is the EVC that best matches this rare or unique vegetation community characterised by the dominance of Red Box (*Eucalyptus polyanthemos*) and an abundance of Black Sheoak (*Allocasuarina littoralis*). There is approximately 0.95 ha of native vegetation, comprising 0.075 ha in excellent ecological condition (rating A), 0.34 ha in good ecological condition (rating B), 0.28 ha in fair ecological condition (rating C) and 0.25 ha in poor ecological condition (rating D).

Dominant canopy trees: *Eucalyptus polyanthemos* is most abundant, *E. goniocalyx* is almost as abundant, and there are smaller numbers of *E. radiata* and fewer still of *E. obliqua*. There is a single *E. cephalocarpa* at the bottom of the hill. The tree crowns overlap slightly except where clearing has opened the canopy.

Dominant lower trees: *Allocasuarina littoralis* and fewer *Exocarpos cupressiformis*.

Shrubs: Mostly up to 2-3 m tall and of variable density, depending on the recent history of clearing, digging and other disturbance. The common shrub species include *Kunzea ericoides*, *Cassinia aculeata*, *Leptospermum continentale*, *Bursaria spinosa*, *Acacia* species, *Correa reflexa*, *Pultenaea gunnii* and *Epacris impressa*. Thickets of *Kunzea* have appeared in response to vegetation clearance in some areas. Visibility is typically 30 m except for thickets that have developed in response to soil disturbance.

Vines: Sparse and delicate, comprising *Comesperma volubile* and *Billardiera mutabilis*.

Ferns: *Pteridium esculentum* is dense in patches, but with low percentage foliage cover overall.

Ground flora: Densely grassy and rich in wildflowers. Less than knee deep and with a total foliage cover of typically 80%. Different areas are dominated by different grass species. The most abundant ground flora species is *Rytidosperma pallidum* but some patches are dominated by any of *Themeda triandra*, *Poa morrisii* or *Gahnia radula*. *Lomandra filiformis* subsp. *coriacea* and *Austrostipa rudis* are both fairly abundant but not dominant. Other frequent species include *Platylobium formosum* (creeping form), *Acrotiche serrulata*, *Gonocarpus tetragynus*, *Goodenia lanata*, *Helichrysum scorpioides*, *Arthropodium strictum*, *Lepidosperma gunnii*, *L. laterale* and *Pimelea humilis*. Orchids and lilies are abundant.

Plant species

In the following plant list, the column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Acacia leprosa* (Dandenong Range variant) is rare nationally.

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Acacia dealbata</i>		<i>Carex breviculmis</i>
V	<i>Acacia leprosa</i> (Dandenong Range variant)		<i>Cassinia aculeata</i>
V	<i>Acacia mearnsii</i>	V	<i>Cassinia longifolia</i>
V	<i>Acacia melanoxylon</i>	V	<i>Comesperma volubile</i>
E	<i>Acacia myrtifolia</i>	E	<i>Correa reflexa</i>
	<i>Acrotiche serrulata</i>	E	<i>Cynoglossum suaveolens</i>
V	<i>Allocasuarina littoralis</i>	E	<i>Daviesia leptophylla</i>
	<i>Arthropodium strictum</i>		<i>Deyeuxia quadriseta</i>
	<i>Austrostipa pubinodis</i>		<i>Dianella admixta</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>		<i>Dichondra repens</i>
	<i>Billardiera mutabilis</i>	V	<i>Dillwynia cinerascens</i>
V	<i>Brunonia australis</i>	C	<i>Diuris orientis</i>
	<i>Burchardia umbellata</i>	V	<i>Drosera peltata</i> subsp. <i>auriculata</i>
	<i>Bursaria spinosa</i>	V	<i>Drosera whittakeri</i>
V	<i>Caesia parviflora</i>	V	<i>Epacris impressa</i>

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Eucalyptus cephalocarpa</i>	V	<i>Plantago varia</i>
	<i>Eucalyptus goniocalyx</i>	V	<i>Platylobium formosum</i>
V	<i>Eucalyptus obliqua</i>	V	<i>Platylobium obtusangulum</i>
E	<i>Eucalyptus polyanthemos</i>		<i>Poa morrisii</i>
E	<i>Eucalyptus radiata</i>	E	<i>Polyscias sambucifolia</i>
V	<i>Exocarpos cupressiformis</i>		<i>Poranthera microphylla</i>
	<i>Gahnia radula</i>		<i>Pteridium esculentum</i>
	<i>Gonocarpus tetragynus</i>		<i>Pterostylis nutans</i>
	<i>Goodenia lanata</i>	V	<i>Pultenaea gunnii</i>
V	<i>Hardenbergia violacea</i>		<i>Rytidosperma linkii</i> var. <i>fulvum</i>
V	<i>Helichrysum scorpioides</i>		<i>Rytidosperma pallidum</i>
E	<i>Hibbertia riparia</i>		<i>Rytidosperma penicillatum</i>
V	<i>Hovea heterophylla</i>	V	<i>Rytidosperma pilosum</i>
E	<i>Hypericum gramineum</i>		<i>Rytidosperma tenuis</i>
E	<i>Indigofera australis</i>		<i>Senecio glomeratus</i>
	<i>Juncus pallidus</i>		<i>Senecio hispidulus</i>
C	<i>Kennedia prostrata</i>	E	<i>Senecio prenanthoides</i>
	<i>Kunzea ericoides</i> spp. agg.		<i>Senecio quadridentatus</i>
V	<i>Lagenophora gracilis</i>	E	<i>Spyridium parvifolium</i>
	<i>Lepidosperma gunnii</i>	E	<i>Stackhousia monogyna</i>
V	<i>Lepidosperma laterale</i>	E	<i>Stylidium armeria/graminifolium</i>
	<i>Leptospermum continentale</i>		<i>Tetrarrhena juncea</i>
C	<i>Leucopogon virgatus</i>	C	<i>Thelymitra ixioides</i> group
	<i>Lomandra filiformis</i> subsp. <i>coriacea</i>		<i>Themeda triandra</i>
	<i>Lomandra longifolia</i>	V	<i>Thysanotus patersonii</i>
	<i>Microlaena stipoides</i>		<i>Tricoryne elatior</i>
	<i>Microtis parviflora</i>	E	<i>Viola hederacea</i>
V	<i>Opercularia varia</i>	E	<i>Wurmbea dioica</i>
	<i>Oxalis exilis/perennans</i>	V	<i>Xanthorrhoea minor</i>
V	<i>Pimelea humilis</i>		

Introduced Species

<i>Agapanthus praecox</i>	<i>Ehrharta longiflora</i>	<i>Pittosporum undulatum</i>
<i>Allium triquetrum</i>	<i>Euphorbia peplus</i>	<i>Plantago lanceolata</i>
<i>Anthoxanthum odoratum</i>	<i>Fraxinus angustifolia</i>	<i>Prunus cerasifera</i>
<i>Briza maxima</i>	<i>Galium aparine</i>	<i>Romulea rosea</i>
<i>Centaureum erythraea</i>	<i>Hedera helix</i>	<i>Rubus anglocandicans</i>
<i>Chrysanthemoides monilifera</i> ssp. <i>monilifera</i>	<i>Holcus lanatus</i>	<i>Sonchus oleraceus</i>
<i>Conyza sumatrensis</i>	<i>Hypochoeris radicata</i>	<i>Sparaxis</i> sp.
<i>Cotoneaster simonsii</i>	<i>Muscari armeniacum</i>	<i>Trifolium</i> sp.
<i>Cynosurus echinatus</i>	<i>Oxalis incarnata</i>	<i>Ulex europaeus</i>
<i>Dactylis glomerata</i>	<i>Oxalis pes-caprae</i>	<i>Vicia disperma</i>
<i>Ehrharta erecta</i>	<i>Pinus radiata</i>	<i>Vicia sativa</i>

Notes concerning some of the locally threatened plant species

- Acacia leprosa* (Cinnamon Wattle), Dandenong Range variant. Very scarce.
- Correa reflexa* (Common Correa), red-flowering form. A single plant, the only one found in the whole study.
- Cynoglossum suaveolens* (Sweet Hound's-tongue). Recorded by Andrew Paget in April 1985.
- Daviesia leptophylla* (Narrow-leaf Bitter-pea). Apparently secure.
- Diuris corymbosa* (Wallflower Orchid). One colony of seven plants found.
- Eucalyptus polyanthemos* (Red Box). Dominant in the reserve and the immediate neighbourhood, but absent everywhere else in Knox.
- Kennedia prostrata* (Running Postman). Two observed on 18/7/04 in a quick inspection, 20 months after a fire.
- Spyridium parvifolium* (Australian Dusty Miller). A solitary individual.
- Thelymitra ixioides* var. *ixioides* (Dotted Sun-orchid). One colony of five plants found.
- Thysanotus patersonii* (Twining Fringe-lily). Recorded by Andrew Paget in April 1985.
- Wurmbea dioica* (Common Early Nancy). Only four plants seen, but others may have been overlooked.

Fauna habitat features

The site appears from incidental observations to have mediocre bird life, but no formal survey has been done. Nesting activity seemed scarce during the flora survey in spring 2001.

Thickets of dense shrubs are good habitat for small birds, but the isolation of the reserve from other understorey minimises the benefit of this.

There are mature trees with hollows that may be used by birds, possums and bats. Nest boxes have also been installed.

The ground flora, logs and forest litter provide extensive habitat for skinks.

The ant fauna seems superficially to be rich, but no survey has been conducted to determine if this is significant.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Richness of Flora

The 89 indigenous plant species recorded for the reserve is a high number for one hectare in Knox. The standard criteria do not provide recognition of sites that stand out in this regard at a municipal scale, but vegetation ecologists would usually regard this as Locally significant.

Regionally Threatened Ecological Vegetation Class

The site's vegetation best matches Valley Heathy Forest, which is listed by the Department of Sustainability & Environment as Endangered in the Gippsland Plain bioregion. Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) states that vegetation of an Endangered EVC is of Very High conservation significance if the habitat score (as outlined by Parkes *et al.* 2003) is at least 0.4, which would undoubtedly be the case in the more natural parts of Blamey Reserve.

According to criterion 3.2.3, a site is of **State** significance if it contains any vegetation that is of High or Very High conservation significance due to the presence of a threatened EVC, as in this case.

The significance of the vegetation at Blamey Reserve is higher than would be attributed to a similar area of typical Valley Heathy Forest because Red Box dominates the tree canopy and (to a lesser degree) because Black Sheoak dominates the lower tree stratum.

Rare or Threatened Flora

The Dandenong Range variant of *Acacia leprosa* is listed as 'rare' in Victoria. The population in Blamey Reserve is viable but does not make a substantial contribution to the total population of the taxon. This represents **Regional** significance under criterion 3.1.2 of the standard criteria.

Blamey Reserve's populations of the locally threatened plant species *Eucalyptus polyanthemus*, *Diuris corymbosa* and *Thelymitra ixioides* are large enough to add considerably to these species' long-term prospects of survival in Knox. These species are sufficiently rare and threatened locally that the presence of any one of them confers **Local** significance upon the site as a whole under criterion 3.1.5. Many of the other locally threatened plant species listed above also have viable populations, again meeting criterion 3.1.5 for a site of **Local** significance.

Representativeness

The reserve is possibly unique in representing a distinctive and extreme variant of an endangered vegetation community (Valley Heathy Forest) in which Red Box dominates the tree canopy and Black Sheoak dominates the lower tree stratum. Apart from its interest value, the reserve helps to define the limits of composition of Valley Heathy Forest, and hence helps the developing field of vegetation taxonomy (or classification). These features could be argued to represent National or State significance under the standard criteria, but only **Regional** significance is accepted here due to mitigating factors such as the size of the site. Regardless, the 'Native Vegetation Management Framework' document (NRE 2002a) deems such sites to have **Medium** conservation significance.

Threats

The following are the main pressures currently threatening to lessen the reserve's conservation significance, in no particular order:

- Loss or decline of plant species whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or elimination by incidents such as cubby house construction or digging by dogs;
- Reduced visitation of the site by small insect-eating birds due to its isolation from other areas with indigenous understorey, possibly leading to a worsening of plant pests and diseases;

- Herbaceous weeds along the uphill fringe of the bushland, potentially drifting downhill;
- Grass weeds (particularly Large Quaking-grass and Sweet Vernal Grass) that are being targeted by Council;
- Sweet Pittosporum seedlings, which should be kept in check by annual removal;
- Trampling.

Management issues

- This reserve's biological significance deserves concerted management effort. Knox City Council is responding actively.
- Fire is an important issue for safety and ecological reasons. Boronia Fire Brigade assisted Council by burning part of the reserve on 16th November 2002. This is expected to be followed by burns in other parts of the reserve at intervals of a few years, for continued fire protection and so that the reserve will have vegetation in various stages of ecological succession at any one time. Burning is to be timed in such a way as to maximise the benefit for native flora relative to weeds. A brief inspection on 16th July 2004 detected that Running Postman (*Kennedia prostrata*) had germinated after not having been recorded previously in the reserve.
- The risk of plant inbreeding and loss of species from the reserve should be monitored by periodic checks for decline of species. Where decline of a species is apparent, planting can be used to compensate, using plants propagated from similar vegetation nearby.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its State biological significance (discussed above);
- The reserve is zoned 'Public Park and Recreation Zone';
- The site is included within Vegetation Protection Overlay VPO3 of the Knox Planning Scheme, but its significance is as great as other sites in VPO1;
- The surrounding residential area is zoned Residential 1;
- The site is enveloped by Site 99 (the Dandenong Ranges Buffer), which is recommended to be covered by the proposed Environmental Significance Overlay, ESO3.

Information sources used in this assessment

- Detailed vegetation data in accord with this study's standard approach described in Section 2.4 of Vol.1, including a list of indigenous and introduced plant species compiled by Dr Lorimer over at least six hours in September-November 2001;
- A reinspection of the site by Dr Lorimer for 25 minutes on 16/7/04 to check on the effects of recent burning;
- Detailed mapping of rare plant populations and the vegetation's ecological condition in the report, 'Fire in Knox Bushland Reserves 2001' by Dr Lorimer for Knox City Council;
- Incidental observations of birds and mammals while the above data was being gathered;
- A list of grasses seen incidentally by Dr Lorimer during a brief visit to the reserve on 2/3/00;
- Six quadrat records (N13165-70) and other plant records, all from Andrew Paget in April 1985 (Paget 1985) (but note that the record of *Eucalyptus dives* is apparently erroneous);
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 29. Old Joes Creek Bushland, Boronia

Fragmented forest in a mixture of private land, Council reserve and Melbourne Water drainage reserve, supporting several threatened forest types. There is an ecologically degraded creek and a retarding basin with no natural vegetation. Knox City Council has been purchasing some of the privately owned bushland for annexation to the existing reserves.

Melway ref. 65A6.

Site Significance Level: *State*

- 138 indigenous plant species were found overall in this study, a large number by Knox standards;
- Seventeen of these species are rare or threatened in Knox, one of which is rare throughout the Melbourne area;
- There are four regionally threatened vegetation communities and a fifth community that is significant as an outlier occurrence beyond its normal rainfall limits;
- Even in the absence of a fauna survey, it is clear that the site is a local hotspot for bird life and the locally rare Swordgrass Brown Butterfly.



Aerial photograph taken February 2007

Boundaries

The site comprises the area outlined in red above, measuring 11.9 ha. The boundary follows cadastral boundaries except across the southern extension of Army Rd, between corners of units 2 and 3 of 41 Stewart St, and beside the street at Debson Close (where the exact location is unimportant). Each private residential lot contains a section that is not biologically significant in itself, but the whole lot is included within the site boundary because the welfare of the significant habitat is strongly linked to what occurs elsewhere on the property.

Land use & tenure: Several private residential lots, Council bushland reserves and a Melbourne Water drainage reserve with retarding basin.

Site description

The site is where a stream (Old Joes Creek) has eroded a gap through the north-south ridge that runs just east of Dorset Rd from Kilsyth South to Ferntree Gully. The gap forms a drainage constriction, giving rise to alluvial deposits almost as far southeast as Forest Rd. The slopes have shallow, sometimes stony loam over clay subsoil derived from hornfels at the interface between the sedimentary geology to the west and the Dandenong Ranges volcanics to the east.

Elevations vary from 110 m to 140 m. The south-facing slope has a maximum gradient of 25% and the north-facing slope has a maximum gradient of approximately 18%.

Within the site, Swampy Riparian Woodland occurs on the alluvium, flanked by Damp Forest on the sheltered, northern side and Lowland Forest on the less steep and sheltered southern side. There is a typical progression from Damp Forest to Herb-rich Foothill Forest to Grassy Forest as one climbs the northern slope. The Lowland Forest changes gradually and patchily to forest that is intermediate between Grassy Forest and Valley Heathy Forest up the southern slope. All these communities are threatened except for the Damp Forest (which is significant due to its occurrence as a naturally isolated outlier).

The site hosts surprisingly rich plant- and bird-life, partly owing to the treed environment of the ridge between Dorset Rd and Army Rd, and the mixture of different types of vegetation.

The wide range of land use and ownership have made the ecological condition of the vegetation very variable, from the weedy grass floor of the retarding basin to the highly intact vegetation of 8 Lucas Close. Some of the residential properties, such as 23 Stewart St, have had active, sensitive management that has maintained high biodiversity, low weed invasion and low fire hazard. Other properties are becoming overrun with woody environmental weeds such as Boneseed, Brooms and Sweet Pittosporums, with no sign of attempted control.

Eucalypt dieback is a significant problem in the area and has been investigated by Smith and Loyn*. It appears to be worst where the woody weeds have been allowed to thrive, and it is likely that the weeds are partly to blame. For this reason, and because of the spread of weed seeds, landowners who fail to control their weeds are causing ecological harm to the area in general.

Relationship to other land

There is a canopy of scattered remnant eucalypts to the north of the site as far as Mountain Hwy and to the south for a few hundred metres. This canopy, combined with mature non-indigenous trees scattered across the residential area to the east, facilitates movement of bird life to the Old Joes Creek area, as evidenced by the many rosellas and cockatoos that are regularly present. These birds no doubt move between this site, the Dandenong Ranges National Park and other forested land in The Basin. There is very little indigenous understorey within one kilometre, which must limit the movement of smaller fauna. This, in turn, reduces the available gene pool for the small fauna and understorey plants.

However, many butterfly species are able to fly over large distances – including suburbia – and so the Knox Environment Society has initiated a project to use the Old Joes Creek bushland as a staging post for the attractive and locally rare Sword-grass Brown Butterfly. This butterfly relies on certain species of saw-sedge, of which *Gahnia sieberiana* occurs at the Old Joes Creek bushland and in the nearby Dandenong Ranges. For this reason, the saw-sedge is being planted in reserves between the Old Joes Creek bushland and the nearest natural occurrence, at Wicks Reserve (Site 15).

Bioregion: Gippsland Plain, although the Damp Forest and Herb-rich Foothill Forest have affinities with the Highlands Southern Fall bioregion.

Habitat types

Lowland Forest (EVC 16, regionally Vulnerable): 13,700 m² as mapped, in part blending gradually with forest that is intermediate between Grassy Forest and Valley Heathy Forest (see below) on the southern edge. Approximately 3,100 m² is in good ecological condition (rating B), 7,600 m² in fair ecological condition (rating C) and 3,000 m² in poor ecological condition (rating D). 72 indigenous plant species were found.

Dominant canopy trees: *Eucalyptus obliqua* typically 20-22 m tall, with lesser numbers of *E. radiata* and some *E. cephalocarpa* where the vegetation tends toward Valley Heathy Forest (EVC 127).

Dominant lower trees: *Acacia melanoxylon* and *Exocarpos cupressiformis* are present in varying density.

Shrubs: Moderately to very dense when allowed to accumulate, dominated by various combinations of *Leptospermum scoparium*, *Cassinia aculeata*, *Acacia verticillata*, *Acacia leprosa*, *Olearia lirata* and *Banksia marginata*. *Kunzea ericoides* has formed thickets in response to clearing or soil disturbance. The proportions of these species varies greatly with the recent history of clearing and cutting.

* Smith I.W. and Loyn R.H. (2000). 'Dieback of Eucalypts in Old Joes Creek Retarding Basin and William Morris Reserve, City of Knox'. Report prepared for Knox City Council, report no. 2000/35 of the Centre for Forest Tree Technology, Dept of Natural Resources & Environment.

Ferns: Patches of dense bracken are scattered liberally.

Ground flora: At maturity, dense, tangled and knee-deep. Rather heathy and with an abundance of the wiry grass *Tetrarrhena juncea*. Other abundant species are *Gahnia radula*, *Lepidosperma elatius*, *Lomandra* species and *Xanthorrhoea minor*. The density of the wiry, tangled ground flora can make movement through the vegetation awkward. Tufted grasses, particularly *Rytidosperma pallidum* and *Themeda triandra*, are present but in lower density than Grassy Forest.

Herb-rich Foothill Forest (EVC 23, regionally Vulnerable): Effectively the transition zone between Grassy Forest uphill and Damp Forest downhill. Total area 6,000 m², of which approximately 1,000 m² is in excellent ecological condition (rating A), 1,700 m² is in good ecological condition (rating B), 2,300 m² is in fair ecological condition (rating C) and 1,000 m² is in poor ecological condition (rating D). 58 indigenous plant species were found.

Dominant canopy trees: Crowns touching, approximately 25 m tall. *Eucalyptus obliqua* and *E. radiata* dominate, with a few *E. goniocalyx* that may be interpreted as outliers from the Grassy Forest uphill.

Dominant lower trees: *Acacia melanoxylon* and *Exocarpos cupressiformis* in moderate density.

Shrubs: Moderate density. Key indicator species are *Coprosma quadrifida*, *Ozothamnus ferrugineus*, *Acacia leprosa*, *A. verticillata*, *Olearia lirata*, *Cassinia aculeata* and *Pultenaea gunnii*.

Vines: A high proportion of the shrubs (excluding thickets) support vines, particularly *Clematis aristata*, *Pandorea pandorana* or *Glycine clandestina*.

Ferns: *Pteridium esculentum* and *Adiantum aethiopicum* occur in patches, with *Calochlaena dubia* near the border with Damp Forest.

Ground flora: Densely grassy (except where shrub thickets suppress grasses) and with many species of forbs between the tussocks. The dominant species vary in a patchwork fashion, with patches dominated by any of *Themeda triandra*, *Poa* species (mixtures of *P. ensiformis*, *P. morrisii* and *P. tenera*) and *Microlaena stipoides*. *Rytidosperma pallidum* only occurs as outliers from the Grassy Forest above. *Tetrarrhena juncea* is rather abundant, as is typical in proximity to Lowland Forest or Damp Forest. There are many species of forbs, scarcely distinguishable from the adjoining Grassy Forest.

Damp Forest (EVC 29, regionally Endangered): Total area 11,000 m², of which approximately 300 m² is in excellent ecological condition (rating A), 1,200 m² is in good ecological condition (rating B), 9,000 m² in fair ecological condition (rating C) and 500 m² is in poor ecological condition (rating D). 54 indigenous plant species were found.

Dominant canopy trees: Tall (typically 25 m), dominated by *Eucalyptus obliqua* with much smaller numbers of similarly tall *E. radiata*.

Dominant lower trees: *Acacia melanoxylon* is present but quite sparse.

Shrubs: Sparse, the most abundant being *Acacia leprosa*, *Coprosma quadrifida* and *Goodenia ovata* (the last of which is part of the deep layer of ground flora).

Vines: Rather abundant, mainly *Clematis aristata* and *Pandorea pandorana*.

Ferns: Dense and more than waist-high, dominating the ground flora. *Pteridium esculentum* and *Calochlaena dubia* are the main ferns.

Ground flora: Dense and typically waist- or chest-deep, dominated by ferns interspersed with large sedges (*Lepidosperma elatius*), and with abundant grass below (particularly *Poa ensiformis*, *Poa tenera* and *Tetrarrhena juncea*). *Lomandra longifolia* and *Acaena novae-zelandiae* are abundant.

Swampy Riparian Woodland (EVC 83, regionally Endangered): Total area 4,800 m², of which approximately 800 m² is in fair ecological condition (rating C) and 4,000 m² is in poor ecological condition (rating D). 27 indigenous plant species were found.

Dominant canopy trees: *Eucalyptus ovata* typically 18 m tall, with fewer *E. cephalocarpa*.

Dominant lower trees: *Acacia melanoxylon* and *A. dealbata* are sparse, and would have been more numerous prior to clearing.

Tall Shrubs: 4-5 m tall, dominated in patchwise fashion by *Melaleuca ericifolia*, *Leptospermum scoparium* or *Ozothamnus ferrugineus*. Density variable, becoming very dense where several years old.

Lower Shrubs: Similarly variable density. Dominants are *Coprosma quadrifida* and *Goodenia ovata*.

Vines: No native vines seen.

Ferns: *Pteridium esculentum* dense in patches.

Ground flora: All but destroyed by heavy machinery and excavation. *Pteridium esculentum* dominates some patches and the hardy grass, *Microlaena stipoides*, is thick in patches.

Intermediate between Valley Heathy Forest (EVC 127) and Grassy Forest (EVC 128) – both regionally Endangered. The bias is toward Grassy Forest north of the creek and Valley Heathy Forest south of the creek. The total area is 27,800 m² as mapped, in part blending gradually with Lowland Forest. Approximately 1,600 m² is in excellent ecological condition (rating A), 4,600 m² in good ecological condition (rating B), 13,000 m² in fair

ecological condition (rating C) and 8,600 m² in poor ecological condition (rating D). 90 indigenous plant species were found.

Dominant canopy trees: *Eucalyptus obliqua*, *E. radiata* and *E. goniocalyx*, approximately 20 m tall with the tree crowns overlapping slightly.

Dominant lower trees: *Exocarpos cupressiformis* is moderately dense and *Acacia melanoxyton* is sparser. *Allocasuarina littoralis* is fairly abundant on some southern properties, which is suggestive of Valley Heathy Forest.

Shrubs: Mostly up to 2-3 m tall and of variable density, depending on the recent history of clearing and other disturbance. A sparse cover is the most common natural state. The most common species are *Cassinia aculeata*, *Leptospermum scoparium*, *L. continentale*, *Bursaria spinosa*, *Acacia* species, *Correa reflexa*, *Pultenaea gunnii*, *Olearia lirata* and *Epacris impressa*. Thickets of *Kunzea ericoides* have appeared in response to vegetation clearance in some areas. Visibility is typically 30 m except for the thickets or woody weeds.

Vines: Moderately common but representing a very low percentage of foliage from all plants collectively. Frequent species are *Billardiera mutabilis*, *Comesperma volubile*, *Clematis aristata*, *Pandorea pandorana* and *Glycine clandestina*.

Ferns: *Pteridium esculentum* is dense in patches, but not with high percentage foliage cover overall.

Ground flora: Mostly less than knee deep and with a foliage cover of typically 80% in mature vegetation. Dominated in patchwise fashion by *Themeda triandra*, *Poa morrisii*, *Rytidosperma pallidum* and *Gahnia radula*. *Lomandra filiformis* subsp. *coriacea*, *Microlaena stipoides*, *Austrostipa rudis* and *Austrostipa pubinodis* are each conspicuous in some areas but not dominant. There are numerous ground flora species, the most frequent being *Platylobium formosum* (creeping form), *Acrotriche* species, *Gonocarpus tetragynus*, *Goodenia lanata*, *Helichrysum scorpioides*, *Arthropodium strictum*, *Lepidosperma gunnii*, *L. laterale* and *Pimelea humilis*.

Plant species

In the following plant list, the column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Acacia leprosa* (Dandenong Range variant) is rare nationally and species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Acacia dealbata</i>	V	<i>Comesperma volubile</i>
V	<i>Acacia leprosa</i> (Dandenong Range variant)	V	<i>Coprosma quadrifida</i>
V	<i>Acacia melanoxyton</i>	E	<i>Correa reflexa</i>
E	<i>Acacia myrtifolia</i>	E	<i>Cyathea australis</i>
E	<i>Acacia pycnantha</i>	E	<i>Cynoglossum suaveolens</i>
E	<i>Acacia stricta</i>	E	<i>Daviesia latifolia</i>
V	<i>Acacia verticillata</i>	E	<i>Daviesia leptophylla</i>
V	<i>Acaena agnipila/echinata</i>		<i>Deyeuxia quadriseta</i>
	<i>Acaena novae-zelandiae</i>		<i>Dianella admixta</i>
V	<i>Acrotriche prostrata</i>	V	<i>Dianella longifolia</i> s.l.
	<i>Acrotriche serrulata</i>	V	<i>Dianella tasmanica</i>
V	<i>Adiantum aethiopicum</i>		<i>Dichelachne rara</i>
V	<i>Allocasuarina littoralis</i>		<i>Dichondra repens</i>
C	<i>Amyema pendula</i>	V	<i>Dillwynia cinerascens</i>
	<i>Arthropodium strictum</i>	E	<i>Dipodium roseum</i>
	<i>Austrostipa pubinodis</i>	V	<i>Drosera peltata</i> subsp. <i>auriculata</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>		<i>Elymus scaber</i>
E	<i>Banksia marginata</i>	V	<i>Epacris impressa</i>
	<i>Billardiera mutabilis</i>		<i>Eragrostis brownii</i>
V	<i>Brunonia australis</i>	V	<i>Eucalyptus cephalocarpa</i>
	<i>Burchardia umbellata</i>		<i>Eucalyptus goniocalyx</i>
	<i>Bursaria spinosa</i>	E	<i>Eucalyptus macrorhyncha</i>
V	<i>Caesia parviflora</i>	V	<i>Eucalyptus melliodora</i>
V	<i>Calochlaena dubia</i>	V	<i>Eucalyptus obliqua</i>
	<i>Carex appressa</i>	V	<i>Eucalyptus ovata</i>
	<i>Carex breviculmis</i>	E	<i>Eucalyptus radiata</i>
	<i>Cassinia aculeata</i>	E	<i>Euchiton involucratus</i>
V	<i>Cassinia longifolia</i>	V	<i>Exocarpos cupressiformis</i>
E	<i>Cassytha pubescens</i>		<i>Gahnia radula</i>
E	<i>Centella cordifolia</i>	E	<i>Gahnia sieberiana</i>
V	<i>Chiloglottis valida</i>		<i>Geranium</i> sp.
V	<i>Clematis aristata</i>	V	<i>Glycine clandestina</i>

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Gonocarpus tetragynus</i>	V	<i>Pimelea humilis</i>
	<i>Goodenia lanata</i>	V	<i>Plantago varia</i>
	<i>Goodenia ovata</i>	V	<i>Platylobium formosum</i>
V	<i>Hardenbergia violacea</i>	V	<i>Platylobium obtusangulum</i>
V	<i>Helichrysum scorpioides</i>		<i>Poa ensiformis</i>
V	<i>Hemarthria uncinata</i>	E	<i>Poa labillardierei</i> var. <i>labillardierei</i>
E	<i>Hibbertia riparia</i>		<i>Poa morrisii</i>
V	<i>Hovea heterophylla</i>	E	<i>Poa tenera</i>
V	<i>Hydrocotyle hirta</i>	E	<i>Polyscias sambucifolia</i>
E	<i>Hypericum gramineum</i>	E	<i>Polystichum proliferum</i>
E	<i>Imperata cylindrica</i>	C	<i>Pomaderris ?racemosa</i> (perhaps planted)
E	<i>Indigofera australis</i>		<i>Poranthera microphylla</i>
E	<i>Juncus procerus</i>	E	<i>Prostanthera lasianthos</i>
C	<i>Kennedia prostrata</i>		<i>Pteridium esculentum</i>
	<i>Kunzea ericoides</i> spp. agg.	E	<i>Pterostylis melagramma</i>
C	<i>Lachnagrostis aemula</i> s.l.	V	<i>Pultenaea gunnii</i>
	<i>Lachnagrostis filiformis</i>		<i>Rytidosperma laeve</i>
V	<i>Lagenophora gracilis</i>		<i>Rytidosperma linkii</i> var. <i>fulvum</i>
E	<i>Lagenophora stipitata</i>		<i>Rytidosperma pallidum</i>
	<i>Lepidosperma elatius</i>		<i>Rytidosperma penicillatum</i>
	<i>Lepidosperma gunnii</i>	V	<i>Rytidosperma pilosum</i>
V	<i>Lepidosperma laterale</i>		<i>Rytidosperma racemosum</i>
	<i>Leptospermum continentale</i>		<i>Rytidosperma setaceum</i>
E	<i>Leptospermum scoparium</i>		<i>Rytidosperma tenuius</i>
V	<i>Lindsaea linearis</i>		<i>Schoenus apogon</i>
	<i>Lomandra filiformis</i> subsp. <i>coriacea</i>		<i>Senecio hispidulus</i>
	<i>Lomandra filiformis</i> subsp. <i>filiformis</i>	E	<i>Senecio ?prenanthoides</i>
	<i>Lomandra longifolia</i>		<i>Senecio quadridentatus</i>
E	<i>Melaleuca ericifolia</i>	V	<i>Solanum ?laciniatum</i>
	<i>Microlaena stipoides</i>	E	<i>Stackhousia monogyna</i>
	<i>Microtis parviflora</i>	E	<i>Stylidium armeria/graminifolium</i>
V	<i>Olearia lirata</i>		<i>Tetarrhena juncea</i>
E	<i>Olearia myrsinoides</i>	E	<i>Tetratheca ciliata</i>
V	<i>Opercularia ovata</i>	V	<i>Thelymitra peniculata</i>
V	<i>Opercularia varia</i>		<i>Themeda triandra</i>
	<i>Oxalis exilis/perennans</i>	E	<i>Thysanotus tuberosus</i>
E	<i>Ozothamnus ferrugineus</i>		<i>Tricoryne elatior</i>
C	<i>Ozothamnus obcordatus</i>	E	<i>Veronica plebeia</i>
	<i>Pandorea pandorana</i>	E	<i>Viola hederacea</i>
C	<i>Patersonia occidentalis</i>	V	<i>Xanthorrhoea minor</i>
	<i>Persicaria decipiens</i>	E	<i>Xanthosia dissecta</i>

Introduced Species

<i>Acacia baileyana</i>	<i>Chrysanthemoides monilifera</i>	<i>Genista linifolia</i>	<i>Plantago lanceolata</i>
<i>Acacia decurrens</i>	<i>Conyza sumatrensis</i>	<i>Genista monspessulana</i>	<i>Prunella vulgaris</i>
<i>Acacia elata</i>	<i>Coprosma repens</i>	<i>Grevillea cultivar</i>	<i>Prunus cerasifera</i>
<i>Acacia longifolia</i> subsp. <i>longifolia</i>	<i>Coprosma robusta</i>	<i>Hakea salicifolia</i>	<i>Pyracantha</i> sp.
<i>Agapanthus praecox</i>	<i>Cortaderia selloana</i>	<i>Hedera helix</i>	<i>Ranunculus repens</i>
<i>Agrostis capillaris</i>	<i>Cotoneaster glaucophyllus</i>	<i>Holcus lanatus</i>	<i>Rubus anglocandicans</i>
<i>Aira cupaniana</i>	<i>Cotoneaster pannosus</i>	<i>Hypochoeris radicata</i>	<i>Salpichroa origanifolia</i>
<i>Allium triquetrum</i>	<i>Cotoneaster simonsii</i>	<i>Ilex aquifolium</i>	<i>Solanum americanum</i>
<i>Anthoxanthum odoratum</i>	<i>Crocsmia × crocosmiiflora</i>	<i>Ligustrum lucidum</i>	<i>Solanum nigrum</i>
<i>Arbutus unedo</i>	<i>Cynodon dactylon</i>	<i>Ligustrum vulgare</i>	<i>Sonchus oleraceus</i>
<i>Asparagus scandens</i>	<i>Cytisus scoparius</i>	<i>Lonicera japonica</i>	<i>Sporobolus africanus</i>
<i>Billardiera heterophylla</i>	<i>Dactylis glomerata</i>	<i>Nasturtium officinale</i>	<i>Taraxacum officinale</i>
<i>Briza maxima</i>	<i>Ehrharta erecta</i>	<i>Oxalis incarnata</i>	<i>Tradescantia fluminensis</i>
<i>Bromus catharticus</i>	<i>Erigeron karvinskianus</i>	<i>Paspalum dilatatum</i>	<i>Tropaeolum majus</i>
<i>Callitriche stagnalis</i>	<i>Eriobotrya japonica</i>	<i>Pennisetum clandestinum</i>	<i>Ulex europaeus</i>
<i>Centaurium erythraea</i>	<i>Fraxinus angustifolia</i>	<i>Pinus radiata</i>	<i>Vicia hirsuta</i>
	<i>Galium aparine</i>	<i>Pittosporum undulatum</i>	<i>Vicia sativa</i>

*Vinca major**Watsonia borbonica**Watsonia meriana***Notes concerning some of the locally threatened plant species**

Acacia leprosa (Cinnamon Wattle), Dandenong Range variant. Dozens scattered across the site, most dense in the northwest.

Agrostis aemula (Purplish Blown Grass). Found only at 8 Lucas Close, but likely to appear sporadically.

Banksia marginata (Silver Banksia). The biggest population in Knox, confined to two Stewart St properties.

Chiloglottis valida (Common Bird-orchid). Found only at 8 Lucas Close.

Correa reflexa (Common Correa). Widely spread across the site, and apparently secure.

Cynoglossum suaveolens (Sweet Hound's-tongue). Modest numbers at 8 Lucas Close and a Stewart St property.

Gahnia sieberiana (Red-fruit Saw-sedge). Abundant in the less disturbed, moister areas.

Gonocarpus ?humilis (Shade Raspwort). Abundant in the less disturbed, moister areas.

Imperata cylindrica (Blady Grass). A small amount in Lowland Forest within the drainage reserve.

Kennedia prostrata (Running Postman). Small numbers on 25 Stewart St, where germinated after soil disturbance.

Lagenophora stipitata (Common Lagenophora). Small numbers at 8 Lucas Close.

Microtis parviflora (Slender Onion-orchid). Details not recorded, but likely to occur in infrequently mown areas.

Ozothamnus obcordatus (Grey Everlasting). A single plant, the only one left in Knox. The only other record of the species in Boronia is on a field trip of the Field Naturalists Club of Victoria in 1928 (*Victorian Naturalist* 45:181).

Patersonia occidentalis (Long Purple-flag). Small numbers at a Stewart St property.

Polystichum proliferum (Mother Shield-fern). Only one plant found, in the Damp Forest.

Tetratheca ciliata (Pink-bells). At 8 Lucas Close and a nearby private property.

Thysanotus tuberosus (Common Fringe-lily). Small numbers at 8 Lucas Close.

Veronica plebeia (Trailing Speedwell). Last recorded in 1985 by Mr Andrew Paget.

Fauna of special significance

Smith and Loyn (*ibid.*) reported Red-capped Robin (regionally rare), Pink Robin (regionally uncommon) and Scarlet Robin (locally rare). Other locally rare species include Chestnut Teal, White-browed Scrubwren (resident), Superb Fairy-wren (resident), Tawny Frogmouth (roosting), Red-browed Finch, Eastern Yellow Robin, Australian Raven and Australian King-parrot.

Fauna habitat features

The site clearly has rich bird life, even though no formal survey has been done. The bird species include large, mobile species such as cockatoos down to small, sedentary species such as Superb Fairy-wrens and White-browed Scrubwrens. The latter category relies heavily on the presence of areas of dense shrubs or ground flora (particularly close to the creek). The tree cover is also important for nearly all the wildlife.

There are many mature trees with hollows, some of which show scratch marks at their openings. Bats, possums and birds such as rosellas are likely to be roosting or nesting in these hollows, including in the many dead trees.

The ground flora, logs and forest litter provide extensive habitat for skinks, particularly on the southern side of the creek.

The many plants of *Gahnia sieberiana* (Red-fruit Saw-sedge) are eaten by larvae of the locally rare Sword-grass Brown Butterfly, as confirmed during frequent checks by members of the Knox Environment Society over many years up to 2003.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment'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 might be taken to apply to this site (although the amount of riparian vegetation is small).

The Old Joes Creek bushland is the breeding site for at least 25% of the local population of Swordgrass Brown Butterflies, and it is a site from which expansion of the population is occurring. Criterion 1.2.1.1 takes this to represent **Local** significance.

Richness and Diversity

138 indigenous plant species is high for a site in Knox. Despite the absence of a fauna survey, the abundance of bird life also stands out in Knox. Such attributes are not recognised by Amos (2004), but a vegetation ecologist would usually take them to represent Local significance

*'Rare or Threatened' Status**a. Regionally Threatened Ecological Vegetation Classes*

The EVCs Damp Forest, Valley Heathy Forest, Grassy Forest and Swampy Riparian Woodland are all listed by the Department of Sustainability & Environment as Endangered in the Gippsland Plain bioregion. According to *'Victoria's Native Vegetation Management – A Framework for Action'* (NRE 2002a), remnant patches of native vegetation belonging to an endangered EVC (as in the case of this site) have a conservation significance rating of either High or Very High, depending on the vegetation's habitat score. It follows from criterion 3.2.3 of Amos (2004) that the Old Joes Creek Bushland is of **State** significance.

Lowland Forest is listed as Vulnerable in the Gippsland Plain bioregion, which leads to a conservation significance of at least High in the most natural areas, according to the 'Framework' procedure. This would translate to **State** significance under criterion 3.2.3.

b. Plant Species

The Dandenong Range variant of *Acacia leprosa* is listed as 'rare' in Victoria and it does not occur outside Victoria. The population in this site is substantial and viable and it makes a modest contribution to the total population of the taxon. This represents **State** significance under criterion 3.1.2 of the standard criteria.

Many of the other locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Representativeness

The occurrences of Lowland Forest and Damp Forest around Old Joes Creek are the most westerly in the region, naturally isolated from all other occurrences. The Lowland Forest is at the limit of its tolerance of soil type, whereas Damp Forest is at the limit of its tolerance of rainfall. It seems likely that there are few (if any) better sites in the Port Phillip and Westernport Region to demonstrate the limits of Damp Forest. These features are regionally significant to a vegetation ecologist, which is classified by *Victoria's Native Vegetation Management - a Framework for Action* as representing Medium conservation significance. The standard criteria provide no recognition of such features.

Waterway Protection

The Swampy Riparian Woodland is in very poor ecological condition and is being degraded by further excavation while this report is being written. Nevertheless, all riparian vegetation has a Very High hazard rating for waterway protection according to Appendix 1 of *Victoria's Native Vegetation Management - a Framework for Action*. This is separate from conservation significance, and indicates the level of importance that should be placed on protecting, restoring and revegetating riparian vegetation such as that at Old Joes Creek.

The Lowland Forest also extends to the creek margins upstream from the retarding basin, and it is of similar importance to the Swampy Riparian Woodland.

Victoria's Native Vegetation Management - a Framework for Action also assigns a High hazard rating to 'vegetation immediately adjacent to the riparian zone', which encompasses both the Lowland Forest and the Damp Forest around Old Joes Creek.

Threats

The following are the main pressures currently threatening to lessen the area's conservation significance (as well as its ecological wellbeing and amenity). They are presented in approximately decreasing order of severity:

- Invasion by environmental weeds, particularly woody weeds such as Sweet Pittosporum;
- Eucalypt dieback disease, evidently associated in part with removal of understorey and overabundance of Bell Miners;
- Residential development of private lots, including that which may result from possible subdivision;
- Loss or decline of plant species that are present in dangerously small numbers, due to inbreeding, poor reproductive success or elimination by incidents such as cubby house construction or digging by dogs;
- Vegetation damage or removal beside or in the creek by Melbourne Water, to access pipes, stabilise creek banks or for related purposes;
- Mowing;
- Trampling of vegetation by walkers, bicycles and dogs;
- Predation of fauna (particularly birds) by cats and foxes.

Management issues

- Eucalypts should be planted to replace the many dead and dying trees;
- There is little if any control of serious environmental weeds on most of the private properties in and around the site, even though many of them are listed as 'Regionally Controlled' under the *Catchment and Land Management Act 1994*;

- Revegetation with indigenous plants is succeeding in enhancing vegetation cover and habitat connectivity, but more needs to occur (if only to redress loss of vegetation due to stream engineering that is occurring in 2003);
- There are signs of illegal clearing of native vegetation on some residential properties;
- Mowing of indigenous ground flora is not intrinsically bad, but the timing and frequency on this site is generally adverse;
- Some ecological burning of remnant vegetation on the southern side of the creek might regenerate some presently absent plant species, increase the size of species with dangerously small populations, and make the vegetation more robust against degrading influences.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its State biological significance (discussed above), the possibility of future subdivision and the presence of riparian habitat;
- The site is enveloped by Site 99 (the Dandenong Ranges Buffer), which is recommended to be covered by the proposed Environmental Significance Overlay, ESO3;
- The site is included within Vegetation Protection Overlay VPO3 of the Knox Planning Scheme but its significance is as great as other sites in VPO1;
- The granting of planning permits for land development within the site would be tightly restricted because of the predominance of threatened EVCs, which are given high protection under the Victorian government's policy for native vegetation management (NRE 2002a; Victoria Planning Provisions);
- Some of the site has a slope exceeding 20% and some lies within a riparian zone. Both of these attributes are given a Very High land protection hazard rating by the Native Vegetation Management Framework (NRE 2002a) and they trigger certain planning controls;
- The commitments that Council makes to conservation and amenity in this precinct in the future would be best done within the framework of a strategy that looks at the options for land purchase, landowner assistance, conservation agreements with landowners and so on. The report *'Assessment of Habitat Values of Bushland around Old Joes Creek, Boronia'* by Lorimer (2003) provides an ecological basis for such a strategy;
- It is recommended that consideration of any development proposal within the site (other than 350 Dorset Rd) should take into account a survey of birds and nocturnal mammals, preferably conducted over at least two days in late spring. The vegetation may well be important as habitat for significant fauna not recorded so far.
- Removal of environmental weed species would help to improve the ecological quality of the vegetation and hence support the state government objective of 'Net Gain'.

Information sources used in this assessment

- Detailed vegetation data and mapping in accord with this study's standard approach described in Section 2.4 of Vol.1, including a list of indigenous and introduced plant species within the 'sanctuary' and another for the rest of the grounds, compiled by Dr Lorimer over approximately 10 hours during this study (mostly April and May 2003);
- Eight similar lists compiled by Mr Rik Brown, five of them in April 2002 and three in April-August 2000;
- An earlier list of plant species on 8 Lucas Close compiled by Dr Lorimer on 10th November 1988, as reported to Council in *'Biological Survey of 8 Lucas Close, Boronia'*, dated 11th November 1998;
- Incidental observations of birds and mammals while the above data was being gathered;
- Two quadrat records in the drainage reserve (N13163 & N13164) and nine quadrat records from what are now properties on the south side of Lucas Close prior to the site's development, all recorded by Andrew Paget in his 1985 unpublished RMIT thesis for B.App.Sci. (but note that the record of *Poa labillardierei* is erroneous);
- Bird observations reported by Smith and Loyn (*ibid.*);
- Monitoring of Swordgrass Brown Butterflies by the Knox Environment Society;
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Acknowledgment

Thanks to the manager of the common property at Debson Close and to the owner of 39-41 Stewart St for granting permission to inspect those properties.

Site 30. Sundew Reserve, Boronia

A small Council park which supports some remnant trees and some native ground flora. Melway ref. 64 K8.

Site Significance Level: *Local*

- There are small, fragmented patches of the endangered Valley Heathy Forest with native ground flora;
- There is a large population of the locally vulnerable Pale Sundew (*Drosera peltata* subsp. *peltata*).



Boundaries

The site is the whole of the reserve, augmented by the nature strip along Sundew Avenue. It measures 4,852 m². The boundary is shown above in red. The white outlines indicate areas with native ground flora.

Land use & tenure: Council park with a playground.

Site description

This park appears to have no official name. It has been known among the municipal park managers as Genista Reserve in recognition of one of the abutting street names, but the name Sundew Reserve is coined here because Sundew St abuts it and because the park is notable for the abundance of Pale Sundews, an uncommon but characteristic species of the reserve's pre-European, endangered vegetation type, Valley Heathy Forest.

The park is almost flat, at an elevation of just under 120 m. It is on the interface between the Lower Devonian sedimentary bedrock of the Humevale formation to the west and a more recent metamorphic stratum to the east. The soil is shallow, poorly draining, light grey loam over clay subsoil.

The areas within the white outlines on the aerial photograph support native ground flora with a surprising number of species, given that the whole reserve has a long history of mowing. Mowing has been relieved from some of these areas to allow regeneration of the ground flora.

A small number of the remnant trees occur in the park, both inside and outside the white outlines on the aerial photograph. There are also some large Monterey Pines.

Relationship to other land

This site is quite ecologically isolated, but the author's observations of native birds including Musk Lorikeets and Little Corellas indicate that such birds visit the park as they move around nearby treed neighbourhoods and the Belgrave Railway Line corridor (100m away).

Bioregion: Gippsland Plain

Habitat types

Valley Heathy Forest (EVC 127, Endangered): 1,200 m² with native ground flora plus several additional scattered trees. The 1,200 m² comprises 175m² in fair ecological condition (rating C) and 1,025 m² in poor ecological condition (rating D).

Dominant canopy trees: *Eucalyptus obliqua*, *E. cephalocarpa*.

Dominant lower trees: There are two *Acacia melanoxylon* (mown) and one *Allocasuarina littoralis*.

Shrubs: One each of *Epacris impressa* and *Pultenaea gunnii*.

Vines and Ferns: None found.

Ground flora: Grassy and with abundant herbs. Dominated by *Themeda triandra*, *Microlaena stipoides*, *Poa morrisii* and *Solenogyne dominii*. Species that are abundant but not dominant in foliage cover include *Acrotriche prostrata*, *Rytidosperma racemosum*, *Drosera peltata* subsp. *peltata*, *Gonocarpus tetragynus*, *Hypericum gramineum*, *Lomandra filiformis* (two subspecies) and *Poranthera microphylla*. Typical of Valley Heathy Forest, orchids are represented by *Microtis* and *Thelymitra*.

Plant species

The following plant species were observed by Dr Lorimer on the site in August 2002. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox with 'E'=Endangered and 'V'=Vulnerable. Additional wild indigenous species would no doubt be found in other seasons.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia melanoxylon</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
V	<i>Acaena echinata</i>	V	<i>Luzula meridionalis</i>
V	<i>Acrotriche prostrata</i>		<i>Microlaena stipoides</i>
V	<i>Allocasuarina littoralis</i>		<i>Microtis parviflora</i>
	<i>Austrostipa pubinodis</i>	V	<i>Opercularia ovata</i>
	<i>Carex breviculmis</i>		<i>Oxalis exilis/perennans</i>
E	<i>Centella cordifolia</i>		<i>Poa morrisii</i>
E	<i>Drosera peltata</i> subsp. <i>peltata</i>		<i>Poranthera microphylla</i>
V	<i>Epacris impressa</i>	V	<i>Pultenaea gunnii</i>
	<i>Eragrostis brownii</i>		<i>Rytidosperma ?penicillatum</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Rytidosperma racemosum</i>
V	<i>Eucalyptus obliqua</i>		<i>Schoenus apogon</i>
V	<i>Euchiton collinus</i>	V	<i>Solenogyne dominii</i>
	<i>Gonocarpus tetragynus</i>	V	<i>Thelymitra ?peniculata</i>
E	<i>Hypericum gramineum</i>		<i>Themeda triandra</i>
	<i>Lomandra filiformis</i> subsp. <i>coriacea</i>		

Introduced Species

<i>Anthoxanthum odoratum</i>	<i>Erica lusitanica</i>	<i>Plantago coronopus</i>
<i>Arctotheca calendula</i>	<i>Genista monspessulana</i>	<i>Plantago lanceolata</i>
<i>Centaurium erythraea</i>	<i>Hypochoeris radicata</i>	<i>Prunella vulgaris</i>
<i>Coprosma repens</i>	<i>Linum trigynum</i>	<i>Romulea rosea</i>
<i>Cotoneaster pannosus</i>	<i>Paspalum dilatatum</i>	<i>Stenotaphrum secundatum</i>
<i>Crepis capillaris</i>	<i>Pennisetum clandestinum</i>	<i>Trifolium repens</i>
<i>Ehrharta erecta</i>	<i>Pinus radiata</i>	<i>Vulpia bromoides</i>
<i>Ehrharta longiflora</i>	<i>Pittosporum undulatum</i>	

Notes concerning some of the locally threatened plant species

Drosera peltata ssp. *peltata* (Pale Sundew) – many dozens along the Sundew Avenue side.

Luzula meridionalis (Common Woodrush) – only one seen, but others quite possibly undetected.

Fauna of special significance

None observed.

Fauna habitat features

The eucalypts provide food for the numerous Musk Lorikeets observed during the fieldwork, even though it was winter.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Regionally Threatened Ecological Vegetation Class

According to 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), remnant patches of native vegetation belonging to an endangered EVC (including Valley Heathy Forest) have a conservation significance rating of either High or Very High, depending on their ecological condition. In either case, any site containing a remnant patch of such vegetation is of State significance under criterion 3.2.3 of Amos (2004).

The native vegetation at Sundew Reserve meets the Department of Sustainability & Environment's current definition of a remnant patch, but at the time Amos (2004) prepared the significance criteria, the unpublished convention was that native vegetation only qualified as a remnant patch if it occupied at least 2,500 m². Because this threshold is so much larger than the area of native vegetation at Sundew Reserve, the author has reduced the significance level of the site to **Local**.

Rare or Threatened Flora

Some of the locally threatened plant species listed above, and particularly the Pale Sundew (*Drosera peltata* subsp. *peltata*), have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Mowing;
- Invasion by the environmental weeds listed below:
 - Serious: Brown-top Bent (*Agrostis capillaris*) and Ribwort (*Plantago lanceolata*);
 - Moderate: Sweet Vernal-grass (*Anthoxanthum odoratum*), Centaury (*Centaureum erythraea*), Cotoneasters (*Cotoneaster pannosus*), Panic Veldt-grass (*Ehrharta erecta*), Annual Veldt-grass (*Ehrharta longiflora*), Spanish Heath (*Erica lusitanica*), Montpellier Broom (*Genista monspessulana*), Cat's Ear (*Hypochoeris radicata*), Paspalum (*Paspalum dilatatum*), Kikuyu Grass (*Pennisetum clandestinum*), Common Onion-grass (*Romulea rosea*), Buffalo Grass (*Stenotaphrum secundatum*) and Squirrel-tail Fescue (*Vulpia bromoides*);
- Loss or decline of plant species that are present in dangerously small numbers, due to inbreeding, poor reproductive success or vulnerability to localised chance events.

Management issues

- It would be desirable to cease mowing any of the two main areas outlined in white on the aerial photograph. A small amount of weed control work would be necessary to compensate for the suppression of weeds that mowing has provided;
- If practicable, burning of the areas just referred to would assist weed control and stimulate germination of indigenous species;
- The Blackwood saplings at the northern end of the park should be staked to prevent them from being mowed again;
- The areas of native ground flora could become quite ecologically viable with very modest weed control and preferably with a small amount of planting to increase the wildflower display, the number of species and the security of existing species that are presently scarce.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the endangered EVC and the sundews;
- The site is not protected under the existing schedules of the Vegetation Protection Overlay in the Knox Planning Scheme;
- The reserve is zoned Public Park and Recreation Zone (PPRZ). The nature strip is zoned Residential 1 zone (R1Z).

Information sources used in this assessment

- A site survey undertaken during this study by Dr Lorimer for 1 hour 25 minutes on 15th and 20th August 2002, using this study's standard procedures discussed in Section 2.4 of Volume 1. This included a description of the vegetation composition, compilation of a list of indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats and management issues;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 31. Knox Jaycees Reserve & Haering Rd Child Centre, Boronia

Part of a small park and the grounds of a child centre with kindergarten. Melway ref. 64 G7.

Site Significance Level: *State*

- Despite decades of mowing, there is a fairly intact tree canopy and patches of unexpectedly rich indigenous ground flora, including orchids.



Boundaries

The site is outlined in red above, enclosing the treed part of the Haering Rd Child Centre and the western part of the Knox Jaycees Reserve. All edges coincide with property boundaries. The area measures 5,816 m².

Land use & tenure: Kindergarten playground, a park with a public playground, and pedestrian connections between these and adjacent roads.

Site description

This site has a shallow slope to the west, with the 110 m elevation contour running along Murene Ct and Catesby Ct. The soil is shallow, poorly draining, light grey loam over clay subsoil derived from Lower Devonian sedimentary bedrock of the Humevale formation.

The aerial photograph above shows areas with an intact canopy of the site's original eucalypts. The more vivid green trees are pines.

In the Knox Jaycees Reserve, the understorey beneath the eucalypts is predominantly native. Decades of mowing has almost totally eliminated the shrub layer, but there remains approximately twenty indigenous species of ground flora, including such characteristic species of Valley Heathy Forest as Nodding Greenhood orchids (*Pterostylis nutans*) and Slender Speedwell (*Veronica gracilis*).

The un-treed part of the reserve, north and east of the public playground, supports some native ground flora (predominantly grasses); however the density and diversity of indigenous flora is low.

The kindergarten playground retains rather less indigenous understorey than the reserve, but a more extensive canopy of indigenous trees.

The native vegetation in the kindergarten playground and the reserve extends only slightly into the passage between Catesby Ct and Murene Ct, which is otherwise devoid of native vegetation.

Relationship to other land

This site is rather isolated from other bushland, but the author's observations of native birds including Grey Butcherbirds, Laughing Kookaburras and many Crimson Rosellas indicate that such birds visit the park as they move around the neighbourhood. The neighbourhood's scattered remnant eucalypts and planted street trees such as Red Ironbarks appear to be the reason why such an urbanised neighbourhood retains so many forest birds that are rare in suburbia generally. This supports the current coverage of the neighbourhood by Schedule 3 of the Vegetation Protection Overlay in the Knox Planning Scheme.

Bioregion: Gippsland Plain

Habitat types

Valley Heathy Forest (EVC 127, **Endangered**): Estimated to occupy 2,600 m², comprising 150 m² in fair ecological condition (rating C) and 2,450 m² in poor ecological condition (rating D).

Dominant canopy trees: *Eucalyptus cephalocarpa* dominates over *E. radiata*. There are also two *E. obliqua* and one *E. goniocalyx*.

Dominant lower trees: *Acacia melanoxylon* persists in the reserve but not in the western half of the site.

Shrubs: Reduced to three *Bursaria spinosa*.

Vines and Ferns: The light twiner, *Billardiera mutabilis*, is the only climbing species present.

Ground flora: Grassy and comparatively rich in herbs (considering the history of mowing). Dominated variously by *Themeda triandra*, *Microlaena stipoides*, *Rytidosperma racemosum* or exotic grass (particularly the weed, *Ehrharta erecta*, in parts of the kindergarten playground). *Poa morrisii* and *Solenogyne dominii*. Species that are abundant but not dominant in foliage cover include *Gahnia radula*, *Poranthera microphylla* and *Pterostylis nutans*. In addition, the presence of the following species provide a good cross-section of the ground flora expected in Valley Heathy Forest: *Dianella longifolia*, *D. admixta*, *Gonocarpus tetragynus*, *Lomandra filiformis* (two subspecies), *Platylobium formosum*, *Solenogyne dominii*, *S. gunnii*, *Veronica gracilis* and *Viola hederacea*.

Plant species

The following indigenous plant species were observed by Dr Lorimer on the site on 23/5/02. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox with 'E'=Endangered and 'V'=Vulnerable. Additional wild indigenous species would no doubt be found in other seasons.

Risk	Species name	Risk	Species name
V	<i>Acacia melanoxylon</i>	V	<i>Luzula meridionalis</i>
	<i>Acaena novae-zelandiae</i>		<i>Microlaena stipoides</i>
	<i>Billardiera mutabilis</i>	V	<i>Opercularia varia</i>
	<i>Bursaria spinosa</i>		<i>Oxalis exilis/perennans</i>
	<i>Carex breviculmis</i>	V	<i>Platylobium formosum</i>
	<i>Dianella admixta</i>		<i>Poa morrisii</i>
V	<i>Dianella longifolia</i> s.l.		<i>Poranthera microphylla</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Pterostylis nutans</i>
	<i>Eucalyptus goniocalyx</i>		<i>Rytidosperma racemosum</i>
V	<i>Eucalyptus obliqua</i>	V	<i>Solenogyne dominii</i>
E	<i>Eucalyptus radiata</i>	V	<i>Solenogyne gunnii</i>
	<i>Gahnia radula</i>		<i>Themeda triandra</i>
	<i>Gonocarpus tetragynus</i>	V	<i>Veronica gracilis</i>
	<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	E	<i>Viola hederacea</i>
	<i>Lomandra filiformis</i> subsp. <i>filiformis</i>		

Fauna of special significance

None observed.

Fauna habitat features

There are enough mature, remnant eucalypts to provide good basic habitat for forest birds such as the Grey Butcherbirds, Laughing Kookaburras and many Crimson Rosellas seen during the site inspection.

Significance ratings

Regionally Threatened Ecological Vegetation Class

Under the Department of Sustainability & Environment's criteria, this site contains a 'remnant patch' of an endangered EVC. According to 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), remnant patches of native vegetation belonging to an endangered EVC have a conservation significance rating of either High or Very High, depending on their ecological condition. In either case, any site containing a remnant patch of such vegetation is of **State** significance under the Department of Sustainability & Environment's standard criteria (criterion 3.2.3 of Amos 2004).

The author has misgivings about such a high rating when the ecological condition of the vegetation is so poor, but these misgivings are overridden by the importance of consistency with the standard criteria.

Locally Threatened Plant Species

Some of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Mowing over-frequently and in inappropriate areas in the reserve;
- Digging in the reserve, whose results were observed at the site inspection, but whose motivation is unknown;
- Invasion by the environmental weeds, Panic Veldt-grass (*Ehrharta erecta*), Monterey Pine (*Pinus radiata*) and Squirrel-tail Fescue (*Vulpia bromoides*) – all rated as Moderate seriousness;
- Loss or decline of plant species that are present in dangerously small numbers, due to inbreeding, poor reproductive success or vulnerability to localised chance events.

Management issues

Mowing should be reduced or stopped just to the west, south and east of the public playground in the reserve.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the endangered EVC with native understorey;
- The site is presently covered by Schedule 3 of the Vegetation Protection Overlay in the Knox Planning Scheme. This is partly on the basis that it is part of 'Composite Area F' of Water Ecoscience (1998), who did not detect any understorey in the neighbourhood;
- The northernmost lot is zoned Public Use Zone 6 (PUZ6, for the kindergarten) and the rest of the site is zoned Public Park and Recreation Zone (PPRZ).

Information sources used in this assessment

- A site survey undertaken during this study by Dr Lorimer for 1 hour on 23rd May 2002, using this study's standard procedures discussed in Section 2.4 of Volume 1. This included a description of the vegetation composition, compilation of a list of indigenous and introduced plant species for each half of the site, incidental fauna observations, and checks for fauna habitat, ecological threats and management issues;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 32. St Joseph's School, Boronia

The grounds of St Joseph's Primary School in Boronia Rd. Melway ref. 64 H9-10.

Site Significance Level: *State*

- Contains remnants of an endangered Ecological Vegetation Class (Valley Heathy Forest), partly with high quality indigenous ground layer vegetation (despite previous disturbances and relatively small extent);
- Has records of four plant species that are threatened in Knox, one of which is rare throughout Melbourne;
- Provides a habitat refuge for forest birds in an area otherwise substantially depleted of suitable habitat;
- Remnant vegetation and habitat within the school grounds provides an educational resource.



Scale 1:3,000

0 20 40 60 80 100m

Aerial photograph taken Feb. 2007

Boundaries

The site is the parts of the school property outlined in red above, measuring 1.60 ha. The remainder of the site is within the less significant Site 103, which is described at page 515.

Land use & tenure: Primary school, including a 'conservation area'.

Site description

The site is located on a gentle south-facing slope among lower hills in Boronia, at elevations of 103-117 m. The soil is shallow, light grey loam over clay subsoil, derived from decomposition of the underlying Lower Devonian sedimentary rocks of the Humevale formation.

The 'conservation area' within the southern section of the school grounds supports intact remnant forest with a fair to good cover of indigenous understorey vegetation. Some mowing activities are apparent in this area.

Other areas supporting remnant vegetation occur around the sporting field and car park in the western part of the school and adjacent to basketball courts in the southeastern corner. These areas have a fair cover of remnant trees but indigenous understorey vegetation is scarce. Some revegetation with indigenous plants has been undertaken around the western side of the sporting field, including the planting of Tree Everlasting, Prickly Tea-tree, Prickly Moses, Hedge Wattle and Golden Wattle. Weed infestations are a significant environmental problem around most of the sporting field.

Outside the site delineated here, the school grounds include scattered remnant trees (progeny of the pre-European vegetation) and planted trees from other parts of Australia. A substantial proportion of the planting appears to have occurred in the 1970s, including Southern Mahogany, Spotted Gum, Red Flowering Gum and Paperbarks. All the school's native trees, and particularly the remnant ones, help support native birds, insects, bats and tree frogs.

Relationship to other land

The site is relatively isolated from other areas of habitat with native understorey. Residential properties in the surrounding area (Site 103, p. 515) support scattered remnant indigenous trees and planted trees that are native to other parts of Australia. These trees undoubtedly encourage some movement of native birds between the school and Blind Creek, which is approximately 400 m south of the site. One would also expect similar movements of birds along the Boronia Rd roadside opposite the school (Site 90, page 456).

Bioregion: Gippsland Plain

Habitat type

Valley Heathy Forest (EVC 127, **regionally Endangered**), grading toward Swampy Woodland (which is also regionally endangered) in poorly drained areas on the western side of the sporting field.

Conservation Area: Total area 0.53 ha – 70% (0.37 ha) in good ecological condition (rating B) and 30% (0.16 ha) in fair ecological condition (rating C). 38 indigenous plant species were recorded on 11/9/02 and another 18 were recorded by Mr Andrew Paget in spring 1985.

Canopy trees: Dominated by *Eucalyptus goniocalyx* and *E. obliqua*, with some *E. cephalocarpa* and *E. radiata*. Intact cover of remnant trees up to 25m tall (mainly 50-80 years old).

Lower trees: Scattered specimens of *Acacia mearnsii*, *A. melanoxylon*, *A. pycnantha* and *Exocarpos cupressiformis*.

Shrubs: A few scattered shrubs, including some large specimens of *Bursaria spinosa* up to 6 m tall. The density of shrub layer vegetation has been reduced by previous clearing activities.

Vines: Some *Billardiera mutabilis*.

Ferns: Absent, except for some *Pteridium esculentum*.

Ground flora: A fair to good cover of indigenous ground layer vegetation dominated by a mix of indigenous herbs, sedges and grasses, including *Themeda triandra*, *Rytidosperma pallidum*, *Gahnia radula*, *Dianella admixta*, *Stackhousia monogyna*, *Platylobium formosum* and a range of other species. Includes a substantial population of *Pterostylis nutans* and scattered specimens of *Xanthorrhoea minor*. It is likely to support additional terrestrial orchids and lilies. Some mowing apparent, however infrequent.

Other Native Vegetation: Total area 1 ha, all of which is in poor ecological condition (rating D). 13 indigenous plant species were recorded.

Canopy trees: A fair cover of remnant trees up to 25m tall (mainly 50-80 years old), generally dominated by *Eucalyptus goniocalyx*. *E. ovata* dominates some poorly drained areas on the western side of the sporting field. Other remnant trees include *E. obliqua*, *E. cephalocarpa*, *E. radiata* and *E. melliodora*.

Lower trees: Scattered specimens of *Acacia mearnsii*, *A. melanoxylon* and *Exocarpos cupressiformis*.

Shrubs: Most remnant shrub layer vegetation has been cleared. A few remnant *Bursaria spinosa* shrubs occur around the base of trees. Indigenous shrubs have been planted in some locations.

Vines and ferns: Absent.

Ground flora: Restricted to a few *Gahnia radula* and *Lomandra longifolia* plants around the base of remnant trees. Areas along the western side of the sporting field are dominated by moderate to severe weed infestations. Other areas are mown or utilised for recreational activities.

Plant species

The following plant species were observed on 11th September 2002 except where otherwise noted. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Allittia cardiocarpa* is rare throughout the Melbourne region. Additional wild indigenous species would no doubt be found in other seasons.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia mearnsii</i>		<i>Acrotriche serrulata</i>
V	<i>Acacia melanoxylon</i>	C	<i>Allittia cardiocarpa</i> (1985)
E	<i>Acacia pycnantha</i>		<i>Arthropodium strictum</i> (1985)
	<i>Acaena novae-zelandiae</i>		<i>Austrostipa rudis</i>
V	<i>Acrotriche prostrata</i> (1985)		<i>Billardiera mutabilis</i>

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Bossiaea prostrata</i> (1985)		<i>Leptospermum continentale</i>
	<i>Burchardia umbellata</i> (1985)		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Bursaria spinosa</i>		<i>Lomandra longifolia</i>
E	<i>Daviesia latifolia</i> (1985)		<i>Microlaena stipoides</i>
	<i>Dianella admixta</i>	V	<i>Olearia lirata</i>
V	<i>Dianella longifolia</i> s.l.	V	<i>Opercularia ovata/varia</i> (1985)
	<i>Dichondra repens</i>		<i>Oxalis exilis/perennans</i>
V	<i>Dillwynia cinerascens</i>	V	<i>Pimelea humilis</i> (1985)
V	<i>Drosera whittakeri</i> (1985)	V	<i>Platylobium formosum</i>
V	<i>Epacris impressa</i>	V	<i>Platylobium obtusangulum</i> (1985)
V	<i>Eucalyptus cephalocarpa</i>		<i>Poa morrisii</i> (1985)
	<i>Eucalyptus goniocalyx</i>		<i>Poranthera microphylla</i>
V	<i>Eucalyptus melliodora</i>		<i>Pteridium esculentum</i>
V	<i>Eucalyptus obliqua</i>		<i>Pterostylis nutans</i>
V	<i>Eucalyptus ovata</i>		<i>Rytidosperma pallidum</i>
E	<i>Eucalyptus radiata</i>		<i>Schoenus apogon</i> (1985)
V	<i>Exocarpos cupressiformis</i>	E	<i>Stackhousia monogyna</i>
	<i>Gahnia radula</i>	C	<i>Thelymitra ixioioides</i> s.l.
	<i>Gonocarpus tetragynus</i>		<i>Themeda triandra</i>
	<i>Goodenia lanata</i>	E	<i>Viola hederacea</i>
V	<i>Helichrysum scorpioides</i>	E	<i>Wahlenbergia stricta</i>
E	<i>Hypericum gramineum</i> (1985)	E	<i>Wurmbea dioica</i> (1985)
E	<i>Hypoxis vaginata</i> (1985)	V	<i>Xanthorrhoea minor</i>
V	<i>Lagenophora gracilis/stipitata</i> (1985)		
Introduced Species			
	<i>Acacia longifolia</i> subsp. <i>longifolia</i>		<i>Ehrharta longiflora</i>
	<i>Agapanthus praecox</i>		<i>Foeniculum vulgare</i>
	<i>Allium triquetrum</i>		<i>Fraxinus angustifolia</i>
	<i>Anthoxanthum odoratum</i>		<i>Galium aparine</i>
	<i>Arctotheca calendula</i>		<i>Genista monspessulana</i>
	<i>Briza maxima</i>		<i>Hedera helix</i>
	<i>Conyza sumatrensis</i>		<i>Hypochoeris radicata</i>
	<i>Coprosma repens</i>		<i>Ipomoea indica</i>
	<i>Cotoneaster glaucophyllus</i>		<i>Pennisetum clandestinum</i>
	<i>Dactylis glomerata</i>		<i>Pinus radiata</i>
	<i>Delairea odorata</i>		<i>Pittosporum undulatum</i>
			<i>Plantago lanceolata</i>
			<i>Prunus cerasifera</i>
			<i>Raphanus raphanistrum</i>
			<i>Romulea rosea</i>
			<i>Rubus anglocandicans</i>
			<i>Sonchus oleraceus</i>
			<i>Taraxacum</i> sp.
			<i>Tradescantia fluminensis</i>
			<i>Watsonia meriana bulbifera</i>
			<i>Zantedeschia aethiopica</i>

Notes concerning some of the locally threatened plant species

Allittia cardiocarpa (Swamp Daisy). Recorded by Andrew Paget in 1985.

Hypoxis ?vaginata (Sheath Star). Recorded by Andrew Paget in 1985 and quite possibly still present.

Thelymitra ixioioides s.l. (Spotted Sun-orchid). A single plant is located towards the western end of the conservation area.

Wahlenbergia stricta (Tall Bluebell). A few plants are located within the conservation area.

Wurmbea dioica (Early Nancy). Recorded by Andrew Paget in 1985 and quite likely still present.

Fauna of special significance

None recorded during field surveys.

Fauna habitat features

The fair cover of remnant indigenous and planted native trees within the site provides habitat for forest birds in an area otherwise substantially depleted of suitable habitat. This includes providing good foraging habitat for parrots.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Regionally Endangered Ecological Vegetation Class

This site contains a 'remnant patch' of an endangered EVC. According to 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), vegetation belonging to an endangered EVC has a conservation significance

rating of either High or Very High, depending on its ecological condition. In either case, any site containing a remnant patch of such vegetation is of **State** significance under criterion 3.2.3 of Amos (2004).

Rare or Threatened Plants

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Potential loss of native vegetation if additional school facilities are established;
- Mowing and trampling of indigenous understorey vegetation within the conservation area;
- Invasion by environmental weeds, including infestations of Angled Onion (*Allium triquetrum*), Cleavers (*Galium aparine*) and Blackberry (*Rubus discolor*) that all rate as ‘serious’ by the criteria in Section 2.4.3 of Volume 1, along with a range of other woody weeds, bulbs and creepers;
- Loss or decline of plant species whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or elimination by incidents such as cubby house construction or digging by dogs;
- Reduced visitation of the site by small insect-eating birds due to its isolation from other areas with indigenous understorey, possibly leading to a worsening of plant pests and diseases.

Management issues

- Protect remnant vegetation in the establishment of any future facilities;
- Specific measures should be implemented to protect remnant vegetation within the conservation area, including restricting future mowing of indigenous ground layer vegetation, the maintenance of clearly defined walking trails and restriction of access as required;
- Incorporate remnant trees within indigenous revegetation areas wherever possible. There are good opportunities to enhance environmental values through the additional planting of indigenous vegetation within the school grounds;
- Selective control of the weeds mentioned above under the heading ‘Threats’. Intensive selective control of exotic grasses within the conservation area would be desirable to effectively rehabilitate ground layer vegetation, particularly of Sweet Vernal-grass, Large Quaking-grass, Cocksfoot and Kikuyu. The first two of these can be controlled very effectively with late-winter application of a grass-specific herbicide.

Administration matters

- This site is suited to inclusion under the proposed ESO2 overlay because it is of State significance and contains a viable remnant of an endangered EVC;
- It is zoned ‘Residential 1’ and is presently covered by Vegetation Protection Overlay 1 (based in part on the study by Water Ecoscience (1998), in which this is Site 38);
- Council may be able to assist or promote environmental education programs in the school that relate to the remnant vegetation.

Information sources used in this assessment

- A site survey undertaken during this study by Rik Brown on 11th September 2002, following this study’s standard procedures discussed in Section 2.4 of Volume 1. This included vegetation mapping, descriptions of the composition and condition of the vegetation in each area, compilation of two lists of indigenous and introduced plant species (one for the conservation area and one for the rest of the school), incidental fauna observations, and checks for fauna habitat, ecological threats, management issues and populations of scarce or threatened plant species;
- A plant list compiled by Mr Andrew Paget in 1985;
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment’s BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Acknowledgment

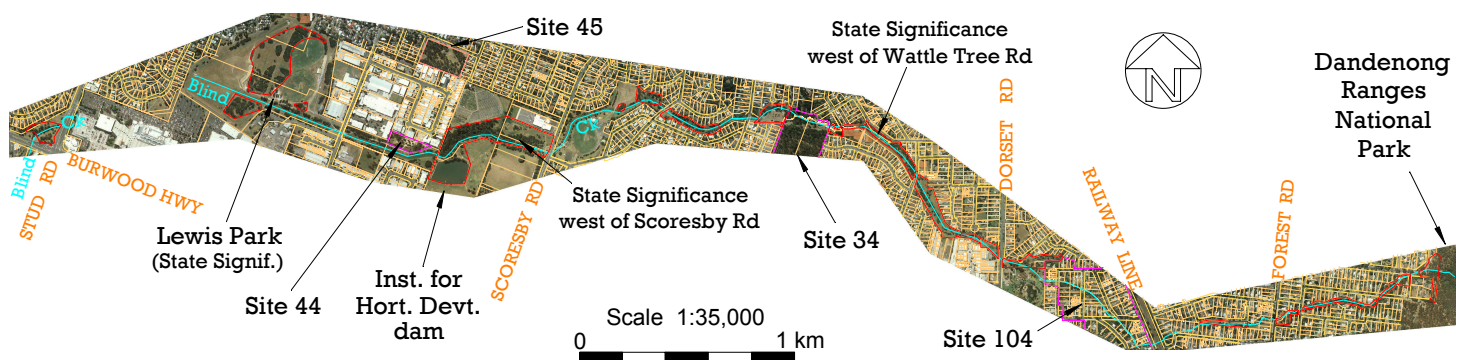
Thanks to the school for granting permission to inspect the land.

Site 33. Blind Creek Corridor

Disjoint patches or strips of habitat along one of Knox's three main streams. Melway map references 63 J11 to 74 F1.

Site Significance Level: *variously State and Local*

- All the native vegetation in this site belongs to Ecological Vegetation Classes that are regionally Endangered or Vulnerable;
- While most of the native vegetation is fragmented and has little understorey, there are some patches in fair ecological condition and a tiny fraction that is in good ecological condition;
- Blind Ck is a corridor for daily and seasonal movements of birds and insects, which may also transport pollen and plant propagules;
- The site includes a dam at the Knoxfield Institute of Horticultural Development that is visited by a wealth of waterbirds, including threatened species.



Boundaries

The 24-62 ha site comprises the sixteen separate strips and patches shown above, between the Dandenong Ranges National Park and Burwood Hwy.

Land use & tenure: Public land, part of the Knoxfield Institute for Horticultural Development and one private residential lot (Lot 7, LP7735, Cathay St, Ferntree Gully).

Site description

The segments of this site represent stretches of the waterway with native vegetation or open water, excluding sites described separately in their own right. Lewis Park and the segment immediately west of Scoresby Rd are of State significance and could reasonably be treated as separate sites, but all the segments are treated collectively here because they are unified by their collective role in forming a stream corridor for passage of fauna, pollen and plant propagules.

The channel of Blind Creek has been straightened or replaced by a barrel drain or underground pipe in parts of the site, such as through Lewis Park. Other reaches retain the natural channel.

The gradient of the stream is shallow downstream from the railway line crossing. The native vegetation along the natural route of the stream in this section is mainly Swampy Riparian Woodland flanked by Swampy Woodland. The exceptions are:

- A stretch of degraded Riparian Forest just upstream from Scoresby Rd;
- Some patches of Swamp Scrub in Lewis Park (probably regrowth from what was once Swampy Woodland); and
- A strip of Valley Heathy Forest flanking the Swampy Riparian Woodland on a hillside just downstream of Scoresby Rd.

Upstream from the railway line, the stream gradient becomes progressively steeper and the natural channel (where it has not been destroyed) has a progressively deeper channel with less alluvium. The steeper gradient is not compatible with the EVCs found further downstream and there is instead Valley Heathy Forest or Grassy Forest. The location of the transition between these two EVCs is not clearly distinguishable from the substantially modified native vegetation in that vicinity. The Valley Heathy Forest belongs to the Gippsland Plain bioregion and it is Endangered. The Grassy forest belongs to the Highlands Southern Fall bioregion, where it is regionally Vulnerable.

The site's ecological significance would be substantially greater if the native vegetation were not so fragmented or if more understorey was present. Knox City Council has been working to correct these limitations.

In addition to areas of native vegetation, the dam at the Knoxfield Institute of Horticultural Development is included in the site because of the important habitat that it represents for waterbirds moving along the corridor, including threatened species that are periodically observed there. The dam has fringing native vegetation and may have submerged aquatic vegetation, but the latter could not be investigated in this study.

More detailed descriptions of the segments of this site can be found in the 1997 report, '*Vegetation Survey of Linear Reserves – A Management Strategy for Riparian and Flood Plain Vegetation*', by Reid, Moss and Lorimer for Knox City Council.

Relationship to other land

One of the site's main ecological attributes is the role that it is believed to play in facilitating movement of fauna along the corridor, and the consequent transport of pollen and plant propagules. Such movements are corroborated by the regular observations along the corridor of nomadic or highly mobile waterbirds (e.g. egrets and ducks) and forest birds such as Eastern Rosellas.

The eastern end of the site abuts the Dandenong Ranges National Park, which represents a large reservoir of forest birds and insects that can move westward along the corridor. West of the site, there is a substantial gap before the next patch of habitat along Blind Ck, in Site 59.

Sites 34 (the Blind Ck Billabong site), 44 (Wadhurst Drive Park) and 45 (Roselyn Crescent Reserve) represent ecological stepping-stones along the Blind Creek habitat corridor. The lake at the Lakewood Nature Reserve (Site 43), just over 1km south of the corridor, probably acts as another stepping-stone for waterbirds. Treed residential neighbourhoods along the corridor probably also improve the corridor's ecological function.

Bioregion: Highlands Southern Fall upstream of Forest Rd, Ferntree Gully (approximately) and Gippsland Plain elsewhere.

Habitat types

Open Water (no EVC number or conservation status available): 1.45 ha at the Knoxfield Institute for Horticultural Development.

Riparian Forest (EVC 18, **regionally Vulnerable**) between Scoresby Rd and Site 34 (the Blind Ck Billabong): Estimated to occupy 6,450 m², comprising 500 m² in fair ecological condition (rating C) and 5,950 m² in poor ecological condition (rating D). 20 indigenous plant species recorded.

Swamp Scrub (EVC 53, **regionally Endangered**): The dominant vegetation type at Lewis Park, probably as a disclimax from prior Swampy Woodland vegetation that was cleared many years ago. Total area 24,400 m², comprising 22,900 m² in fair ecological condition (rating C) and 1,500 m² in poor ecological condition (rating D). 20 indigenous plant species recorded.

Swampy Riparian Woodland (EVC 83, **regionally Endangered**) along most of the creek downstream from the railway line: Estimated to occupy 30,800 m², comprising 18,400 m² in fair ecological condition (rating C) and 12,400 m² in poor ecological condition (rating D). 41 indigenous plant species recorded.

Valley Heathy Forest (EVC 127, **regionally Endangered**) next to the Knox Community Garden and Vineyard, as well as upstream from the railway line as far as Moore St: Estimated to occupy 12,600 m², comprising 100 m² in good ecological condition (rating B), 9,800 m² in fair ecological condition (rating C) and 2,700 m² in poor ecological condition (rating D). 39 indigenous plant species recorded collectively between this EVC and Grassy Forest.

Grassy Forest (EVC 128, **regionally Vulnerable**) upstream from Moore St (in the Highlands Southern Fall bioregion): Estimated to occupy 16,600 m², comprising 12,200 m² in fair ecological condition (rating C) and 4,400 m² in poor ecological condition (rating D).

Swampy Woodland (EVC 937, **regionally Endangered**) between Scoresby Rd and Burwood Hwy: Estimated to occupy 11,800 m², comprising 5,300 m² in good ecological condition (rating B), 4,700 m² in fair ecological condition (rating C) and 1,800 m² in poor ecological condition (rating D). 29 indigenous plant species were found.

Plant species

In the following plant list, the column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Acacia leprosa* (Dandenong Range variant) is rare nationally, *Austrostipa rudis* subsp. *australis* is rare in Victoria and species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species
	<i>Acacia dealbata</i>
V	<i>Acacia leprosa</i> (Dandenong Range variant)
V	<i>Acacia mearnsii</i> (wild & planted)
V	<i>Acacia melanoxylon</i> (wild & planted)
E	<i>Acacia stricta</i>
V	<i>Acacia verticillata</i> (wild & planted)
	<i>Acaena novae-zelandiae</i>
	<i>Alisma plantago-aquatica</i>
V	<i>Allocasuarina littoralis</i> (wild & planted)
V	<i>Alternanthera denticulata</i>
C	<i>Amyema pendula</i>
V	<i>Amyema quandang</i>
V	<i>Austrostipa rudis</i> subsp. <i>australis</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>
	<i>Billardiera mutabilis</i>
	<i>Bursaria spinosa</i>
	<i>Campylopus clavatus</i>
	<i>Campylopus introflexus</i>
	<i>Carex appressa</i>
	<i>Carex breviculmis</i>
	<i>Cassinia aculeata</i>
	<i>Cassinia arcuata</i>
E	<i>Cassythra melantha</i>
E	<i>Cassythra pubescens</i>
V	<i>Clematis aristata</i>
	<i>Clematis decipiens</i>
V	<i>Coprosma quadrifida</i>
E	<i>Cyathea australis</i>
	<i>Deyeuxia quadriseta</i>
	<i>Dichelachne rara</i>
	<i>Dianella admixta</i>
V	<i>Dianella longifolia</i> s.l.
V	<i>Dianella tasmanica</i>
V	<i>Dianella tasmanica</i>
	<i>Dichelachne rara</i>
V	<i>Dillwynia cinerascens</i>
	<i>Eleocharis sphacelata</i>
	<i>Elymus scaber</i>
V	<i>Epacris impressa</i>
	<i>Epilobium hirtigerum</i>
	<i>Eragrostis brownii</i>
V	<i>Eucalyptus cephalocarpa</i>
	<i>Eucalyptus goniocalyx</i>
E	<i>Eucalyptus macrorhyncha</i> (planted & ?wild)
V	<i>Eucalyptus melliodora</i>
V	<i>Eucalyptus obliqua</i>
V	<i>Eucalyptus ovata</i> (wild & planted)
E	<i>Eucalyptus radiata</i> (wild & planted)
E	<i>Eucalyptus viminalis</i> (wild & planted)
V	<i>Euchiton collinus</i>
V	<i>Exocarpos cupressiformis</i>
E	<i>Gahnia sieberiana</i>
C	<i>Geranium</i> sp. 5
	<i>Gonocarpus tetragynus</i>
	<i>Goodenia ovata</i> (wild & planted)
E	<i>Gynatrix pulchella</i>
V	<i>Hardenbergia violacea</i>
V	<i>Helichrysum luteoalbum</i>
V	<i>Hemarthria uncinata</i>
E	<i>Hypericum gramineum</i>

Risk	Indigenous Species
	<i>Hypnum cupressiforme</i>
C	<i>Hypolepis glandulifera</i>
V	<i>Isolepis inundata</i>
	<i>Juncus amabilis</i>
C	<i>Juncus ?australis</i>
	<i>Juncus bufonius</i>
	<i>Juncus gregiflorus</i>
	<i>Juncus pallidus</i>
E	<i>Juncus pauciflorus</i>
E	<i>Juncus procerus</i>
	<i>Juncus sarophorus</i>
E	<i>Juncus subsecundus</i>
	<i>Kunzea ericoides</i> spp. agg.
	<i>Lachnagrostis filiformis</i>
	<i>Lepidosperma ?elatius</i>
	<i>Lepidosperma gunnii</i>
V	<i>Lepidosperma laterale</i>
	<i>Leptospermum continentale</i>
E	<i>Leptospermum scoparium</i> (wild & planted)
E	<i>Lobelia anceps</i>
	<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
	<i>Lomandra longifolia</i>
V	<i>Lythrum hyssopifolia</i>
E	<i>Melaleuca ericifolia</i>
C	<i>Melaleuca parvistaminea</i> (planted)
E	<i>Meliccytus dentatus</i>
	<i>Microlaena stipoides</i>
	<i>Microtis parviflora</i>
C	<i>Microtis unifolia</i>
V	<i>Olearia lirata</i>
V	<i>Opercularia varia</i>
	<i>Oxalis exilis/perennans</i>
E	<i>Ozothamnus ferrugineus</i>
E	<i>Ozothamnus ferrugineus</i>
	<i>Pandorea pandorana</i>
	<i>Persicaria decipiens</i>
E	<i>Persicaria praetermissa</i>
C	<i>Persicaria subsessilis</i>
E	<i>Phragmites australis</i>
V	<i>Pimelea humilis</i>
	<i>Poa ensiformis</i>
E	<i>Poa labillardierei</i> var. <i>labillardierei</i>
	<i>Poa morrisii</i>
E	<i>Polyscias sambucifolia</i>
	<i>Poranthera microphylla</i>
V	<i>Potamogeton ochreatus</i>
E	<i>Prostanthera lasianthos</i>
	<i>Pteridium esculentum</i>
E	<i>Pteris tremula</i>
V	<i>Pultenaea gunnii</i>
E	<i>Rubus parvifolius</i>
E	<i>Rytidosperma caespitosum</i>
	<i>Rytidosperma geniculatum</i>
	<i>Rytidosperma laeve</i>
	<i>Rytidosperma linkii</i> var. <i>fulvum</i>
	<i>Rytidosperma penicillatum</i>
	<i>Rytidosperma racemosum</i>
E	<i>Rytidosperma semiannulare</i>
	<i>Rytidosperma setaceum</i>

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Schoenus apogon</i>	V	<i>Solanum laciniatum</i>
E	<i>Senecio campylocarpus</i>		<i>Tetrarrhena juncea</i>
	<i>Senecio glomeratus</i>	V	<i>Thelymitra peniculata</i>
	<i>Senecio hispidulus</i>		<i>Themeda triandra</i>
E	<i>Senecio minimus</i>		<i>Thuidiopsis furfurosa</i>
E	<i>Senecio prenanthoides</i>	E	<i>Typha orientalis</i>
	<i>Senecio quadridentatus</i>	V	<i>Veronica gracilis</i>
Introduced Species			
	<i>Acacia baileyana</i>		<i>Cynara cardunculus</i>
	<i>Acacia decurrens</i>		<i>Cynodon dactylon</i>
	<i>Acacia elata</i>		<i>Cyperus eragrostis</i>
	<i>Acacia floribunda</i>		<i>Dactylis glomerata</i>
	<i>Acacia longifolia</i> subsp. <i>longifolia</i>		<i>Delairea odorata</i>
	<i>Acacia prominens</i>		<i>Echinochloa crus-galli</i>
	<i>Acer negundo</i>		<i>Echium plantagineum</i>
	<i>Agapanthus praecox</i>		<i>Ehrharta erecta</i>
	<i>Agrostis capillaris</i>		<i>Ehrharta longiflora</i>
	<i>Aira</i> sp.		<i>Erigeron karvinskianus</i>
	<i>Allium triquetrum</i>		<i>Festuca arundinacea</i>
	<i>Anthoxanthum odoratum</i>		<i>Foeniculum vulgare</i>
	<i>Araujia sericifera</i>		<i>Fraxinus angustifolia</i>
	<i>Arundo donax</i>		<i>Fumaria bastardii</i>
	<i>Aster subulatus</i>		<i>Fumaria muralis</i> subsp. <i>muralis</i>
	<i>Atriplex prostrata</i>		<i>Galium aparine</i>
	<i>Billardiera heterophylla</i>		<i>Genista linifolia</i>
	<i>Briza maxima</i>		<i>Genista monspessulana</i>
	<i>Briza minor</i>		<i>Hedera helix</i>
	<i>Bromus catharticus</i>		<i>Helminthotheca echioides</i>
	<i>Bromus diandrus</i>		<i>Holcus lanatus</i>
	<i>Calystegia silvatica</i>		<i>Hypochoeris radicata</i>
	<i>Centaurium erythraea</i>		<i>Ipomoea indica</i>
	<i>Centaurium tenuiflorum</i>		<i>Juncus ?articulatus</i>
	<i>Chamaecytisus palmensis</i>		<i>Leontodon taraxacoides</i>
	<i>Chrysanthemoides monilifera monilifera</i>		<i>Ligustrum lucidum</i>
	<i>Cirsium vulgare</i>		<i>Lolium perenne</i>
	<i>Conyza sumatrensis</i>		<i>Lonicera japonica</i>
	<i>Coprosma repens</i>		<i>Lotus subbiflorus</i>
	<i>Cordyline australis</i>		<i>Malus pumila</i>
	<i>Cortaderia selloana</i>		<i>Modiola caroliniana</i>
	<i>Cotoneaster glaucophyllus</i>		<i>Oxalis incarnata</i>
	<i>Cotoneaster pannosus</i>		<i>Paraserianthes lophantha</i>
	<i>Crassula multicava</i>		<i>Paspalum dilatatum</i>
	<i>Crataegus monogyna</i>		<i>Paspalum distichum</i>
	<i>Crepis capillaris</i>		<i>Pennisetum clandestinum</i>
	<i>Crocsmia</i> × <i>crocsmiiflora</i>		<i>Phalaris aquatica</i>
			<i>Pinus radiata</i>
			<i>Pittosporum undulatum</i>
			<i>Plantago coronopus</i>
			<i>Plantago lanceolata</i>
			<i>Plantago major</i>
			<i>Poa annua</i>
			<i>Prunella vulgaris</i>
			<i>Psoralea pinnata</i>
			<i>Prunus cerasifera</i>
			<i>Ranunculus repens</i>
			<i>Raphanus raphanistrum</i>
			<i>Rumex crispus</i>
			<i>Romulea rosea</i>
			<i>Rosa rubiginosa</i>
			<i>Rubus anglocandicans</i>
			<i>Rumex conglomeratus</i>
			<i>Rumex crispus</i>
			<i>Salix</i> sp.
			<i>Solanum mauritianum</i>
			<i>Solanum nigrum</i>
			<i>Solanum pseudocapsicum</i>
			<i>Sonchus oleraceus</i>
			<i>Taraxacum officinale</i>
			<i>Tradescantia fluminensis</i>
			<i>Trifolium dubium</i>
			<i>Tragopogon porrifolius</i>
			<i>Tropaeolum majus</i>
			<i>Verbena bonariensis</i> s.l.
			<i>Vicia hirsuta</i>
			<i>Vicia sativa</i>
			<i>Vinca major</i>
			<i>Vulpia bromoides</i>
			<i>Vulpia myuros</i>
			<i>Watsonia meriana bulbifera</i>
			<i>Zantedeschia aethiopica</i>

Notes concerning some of the locally threatened plant species

Acacia leprosa (Cinnamon Wattle), Dandenong Range variant – up to about a dozen in the site's eastern extremity. One just west of Scoresby Rd has probably been planted there.

Austrostipa rudis subsp. *australis* – hundreds of plants at Lewis Park each side of the Blind Ck channel, west of the skate park.

Poa labillardierei (Common Tussock-grass) – 5 or 6 tussocks at Lewis Park.

Persicaria subsessilis (Hairy Knotweed) – a small amount in the creek next to the Knoxfield Institute for Horticultural Development.

Gynatrix pulchella (Hemp Bush) – two plants just downstream from Scoresby Rd.

Fauna of special significance

The following observations all appear in the Atlas of Victorian Wildlife.

Knoxfield Institute for Horticultural Development

Vulnerable in Victoria

Australasian Shoveller – observations from 1990 and 1991. Probably only occasional visitors.

Hardhead – multiple observations from 1988 to 1990. The birds move between the dam and Lakewood Nature Reserve (where Hardhead are resident) and may be more common at the dam than records suggest.

Musk Duck – recorded on the basis of a species list up to 1988. This species probably visits infrequently.

Great Egret – there is a 1999 record, but the site is probably visited periodically by Great Egret moving along the Blind Ck corridor.

Near Threatened in Victoria

Pied Cormorant – a 1988 observation.

Lewis Park

Vulnerable in Victoria

Powerful Owl – a record from 1998. The observation may be a vagrant. If not, the bird probably moves along the Blind Ck corridor.

Great Egret – multiple records up to at least 1999. Lewis Park would be only a small part of a Great Egret's range, but perhaps not insignificant in the context of such a bird's usage of habitat corridors.

Fauna habitat features

- There are some very large old trees, particularly Manna Gums (*Eucalyptus viminalis*) with tree hollows, providing what is now a highly depleted kind of habitat for arboreal fauna with specialised needs;
- Patches of scrub provide habitat for small insect-eating birds such as wrens;
- The dam at the Knoxfield Institute for Horticultural Development supports a wealth of waterbirds and acts as an important substitute for the natural wetlands that would once have occurred along Blind Ck;
- The dam and the waters of the creek provide habitat for aquatic invertebrates, including larvae of flying insects.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment'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 all the segments of this site. Criterion 1.2.6 might also be taken to accord Local significance to each segment because they fit the description, 'Important at local scale - Link between individual remnant habitat blocks or within subcatchment'.

Regionally Threatened Ecological Vegetation Class

According to 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), remnant patches of native vegetation belonging to an endangered EVC (including most of the vegetation in this site) have a conservation significance rating of either High or Very High, depending on their ecological condition. In either case, any site containing a remnant patch of such vegetation is of State significance under criterion 3.2.3.

There are three areas of native vegetation in the site that belong to an endangered EVC and clearly meet the definition of a 'remnant patch', thereby qualifying for **State** significance:

- Lewis Park;
- in the segment immediately west of Scoresby Rd; and
- in the segment between Site 34 and Wattle Tree Rd.

It also seems likely that native vegetation upstream from Little Opie St in Ferntree Gully qualifies as a remnant patch. The vegetation there is Grassy Forest (a regionally Vulnerable EVC) and is likely to have a habitat score (Vol.1, Section 2.4.4) of at least 0.3, which would give this segment **State** significance.

It is somewhat doubtful whether the threatened EVCs represented in the remaining segments of the Blind Ck corridor site described meet the definition for a 'remnant patch'.

Rare or Threatened Fauna

Criterion 3.1.2 confers at least **Local** significance on sites that provide habitat for species that are threatened in Victoria. This applies to Lewis Park and the dam at the Knoxfield Institute for Horticultural Development, on the basis of the observations of vulnerable species listed under the heading, 'Fauna of special significance' above. The significance does not rise above Local because neither of these sites would meet the requirement of being among 'the

minimum number of sites estimated to capture 75% of populations in the bioregion, or believed to be a viable population in its own right'.

Rare or Threatened Flora

Acacia leprosa (Dandenong Range variant) is listed as Rare in Victoria. It occurs upstream of Perra St, at the site's eastern extremity. The population is probably viable, taking into account that it is an extension of a large population in the adjoining Dandenong Ranges National Park. It follows that this area is of **State** significance under criterion 3.1.2.

The statewide-rare *Austrostipa rudis* subsp. *australis* has a population of hundreds in this site, thereby representing an important contribution to the taxon's conservation. This taxon is not endemic to Victoria (occurring also in Tasmania). These characteristics give the site **State** significance according to criterion 3.1.2.

Many of the other locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Invasion by the environmental weeds, particularly woody weeds (e.g. Sweet Pittosporum) and grass weeds (e.g. Cocksfoot and Kikuyu Grass). Blackberries would also be a serious problem if they were not subjected to repeated control;
- Loss or decline of plant species that are present in dangerously small numbers, due to inbreeding, poor reproductive success or vulnerability to localised chance events;
- Foxes, which kill wildlife and spread woody weeds and blackberries.

Management issues

- The site's ecological significance would be substantially greater if the native vegetation were not so fragmented or if more understorey was present. Knox City Council has been working to correct this.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the riparian habitat, the threatened EVCs and the other attributes discussed under the heading 'Significance ratings' above;
- Some segments of the site are presently covered by Schedules 1 or 3 of the Vegetation Protection Overlay in the Knox Planning Scheme. This includes the segments of State significance other than the one immediately downstream of Wattle Tree Rd.

Information sources used in this assessment

- The 1997 report, '*Vegetation Survey of Linear Reserves – A Management Strategy for Riparian and Flood Plain Vegetation*', by Reid, Moss and Lorimer for Knox City Council, along with the supporting field data. This included descriptions of vegetation composition, compilation of lists of indigenous and introduced plant species for each of fifteen parts of the site, incidental fauna observations, and checks for fauna habitat, ecological threats and management issues;
- A reinspection of parts of the site by Dr Lorimer on 12/4/02 to seek any changes from the data listed above and to fill any gaps in the pre-existing data;
- A major study by Dr Lorimer of the section of the corridor between Burwood Hwy and Scoresby Rd, titled '*Blind Creek and Lewis Parklands Ecological Assessment*'. Completed in September 2009, the study included approximately forty hours of fieldwork during October 2008 to March 2009 to thoroughly document the area's natural assets;
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 34. Blind Creek Billabong & Quarry, Ferntree Gully

A small strip of riparian vegetation with a shallow billabong, and adjoining vegetation beside a quarry. Melway ref. 64 H11.

Site Significance Level: State

- Contains vegetation belonging to four regionally Endangered vegetation types (Wetland, Swampy Riparian Woodland, Swampy Woodland and Valley Heathy Forest), some of which is in good ecological condition;
- The Swampy Woodland is particularly rich in plant species;
- Six plant species recorded from the site are Critically Endangered in Knox, and another eleven are either Endangered or Vulnerable in Knox;
- The bird fauna is rich for metropolitan Melbourne, and a statewide-vulnerable Grey Goshawk was observed.



Aerial photograph taken February 2007



Scale 1:4,000
0 20 40 60 80 100m

Boundaries

This 4.63 ha site is outlined in red and marked 'Site 34' on the aerial photograph on the previous page. The south-southwestern edge skirts the clay pit (as observed in June 2008) and partly follows the alignment of a series of survey pegs along the pit edge. The remaining boundaries coincide with property boundaries, except for straight lines that have been drawn across Blind Ck between corners of properties.

The site originally described in 2004 for the first edition of this report included an additional 0.65 ha of Valley Heathy Forest that has since been excavated, including all of the hatched area on the aerial photograph above.

Land use & tenure: Public reserve along the creek and a fenced bushland area within the fence around the quarry site. Council manages some of the fenced bushland and the remainder is the responsibility of the quarry owner.

Site description

This site includes some swampy vegetation along Blind Ck and some Valley Heathy Forest on a hillside inside the fence adjacent to a quarry, from which clay is periodically taken for brickmaking.

Elevations range from 89 m on the bank of the creek to 95 m in the southeastern corner. The slope is very shallow in the area labelled 'Swampy Woodland' on the aerial photograph (being a floodplain), and becomes progressively steeper to the south. Contours run generally east-west, the main exception being the billabong marked on the aerial photograph. There are also small depressions and shallow drainage excavations in the vicinity of the quarry pit.

The Swampy Woodland and Swampy Riparian Woodland are on alluvial soil (or probably colluvium near the southern edge) and the Valley Heathy Forest is on shallow, light grey loam. The subsoil is clay throughout, derived from decomposition of the underlying Lower Devonian sedimentary rocks of the Humevale formation.

The most significant vegetation is in three areas:

- The western third of the billabong;
- In a small patch beside the creek; and
- In the northwest corner of the fenced bushland.

The last of these areas retains large old trees and very rich understorey.

Other parts of the site have been ecologically degraded to varying degrees by weed invasion, past clearing, drainage works and dumping of overburden from the quarry. However, recent efforts by Knox City Council and the Friends of Blind Creek Billabong to rehabilitate the vegetation have been very successful and the ecological condition is steadily improving. There is extensive natural regeneration where slashing has ceased.

A more detailed (if dated) description of most of the site can be found in the 1997 report, '*A Management Plan for Blind Creek Billabong, Ferntree Gully*', prepared for Knox City Council by J.C. Reid, G.S. Lorimer and H. Moss.

Relationship to other land

The site is part of the Blind Creek habitat corridor, and is treated here separately from Site 33 only because its vegetation stands out for its breadth, ecological condition, abundance of uncommon species and separate management regime.

The treed residential neighbourhood to the north forms Site 103 (see the aerial photograph above) represents an extension of the site's habitat for some wildlife, such as rosellas and Tawny Frogmouths. Land south of Blind Ck provides much less ecological linkage except for the Norvel Road Reserves (Site 35).

Bioregion: Gippsland Plain

Habitat types

Perennial Stream (No EVC number), barrel-drained but with parts of the original watercourse retained.

Wetland (the billabong – EVC 74, **regionally Endangered**): Estimated in c. 2003 to cover 1,000 m², comprising 350 m² in good ecological condition (rating B), 350 m² in fair ecological condition (rating C) and 300 m² in poor ecological condition (rating D). However, intervening drought has badly reduced the ecological condition (hopefully a temporary situation). 9 indigenous plant species were recorded in 1997.

Trees, vines and ferns: Absent.

Shrubs: Some *Melaleuca ericifolia* extend into the billabong.

Aquatic and semi-aquatic flora: Dominated by *Carex appressa* and rushes. *Baumea rubiginosa* is a character species.

Swampy Riparian Woodland (EVC 83, **regionally Endangered**) tending toward Riparian Forest (EVC 18): Estimated to occupy 4,400 m², comprising 500 m² in good ecological condition (rating B), 1,500 m² in fair ecological condition (rating C) and 2,400 m² in poor ecological condition (rating D). These figures do not include recent revegetation.

Dominant canopy trees: *Eucalyptus ovata*, *E. obliqua*, *E. cephalocarpa*, *E. viminalis*, *E. melliodora*.

Dominant lower trees: *Acacia melanoxylon* and *Acacia mearnsii*.

Shrubs: The presence of *Bursaria spinosa* is typical of Swampy Riparian Woodland, whereas the presence of *Prostanthera lasianthos* reflects the tendency toward Riparian Forest (in combination with the *Eucalyptus viminalis* and *E. melliodora* at the edge of the site).

Ground flora: Includes species of wet soil such as *Lepidosperma elatior* as well as species of drier soil such as *L. gunnii*.

Swampy Woodland (EVC 937, regionally Endangered): Estimated to occupy 22,000 m², comprising 2,000 m² in good ecological condition (rating B), 19,500 m² in fair ecological condition (rating C) and 500 m² in poor ecological condition (rating D). 95 indigenous plant species were recorded by the author, plus three others recorded by Mr Andrew Paget in May 1985.

Dominant canopy trees: *Eucalyptus ovata* and *E. cephalocarpa* with rather less *E. obliqua*.

Dominant lower trees: *Acacia melanoxylon* and *Acacia mearnsii* with rather less *Exocarpos cupressiformis*.

Shrubs: Patchy, becoming quite dense in places (particularly due to *Bursaria spinosa* and *Leptospermum scoparium*).

Fairly rich in species. *Goodenia ovata*, *Ozothamnus ferrugineus*, *Prostanthera lasianthos* and *Pultenaea gunnii* are also abundant. *Coprosma quadrifida* and *Melaleuca ericifolia* are dense in small parts of the site.

Vines: *Billardiera mutabilis*, *Clematis aristata* and *Cassytha melantha* are present.

Creepers: Creepers are represented by no fewer than nine species, of which *Poa tenera* and *Centella cordifolia* are the most abundant. The ecological indicator species, *Gonocarpus micranthus*, *Goodenia elongata*, *Gratiola pubescens* and *Hemarthria uncinata* are all present.

Ferns: *Lindsaea linearis* is abundant and *Pteridium esculentum* rather less so. One *Cyathea australis* was found.

Ground flora: Moderately to very dense, dominated by *Gahnia radula*, *Microlaena stipoides* and *Rytidosperma* species.

Other abundant species are *Deyeuxia quadriseta*, *Eragrostis brownii*, *Gonocarpus tetragynus*, *Juncus planifolius*, *Schoenus apogon*, *Austrostipa rudis* and *Themeda triandra*. The ecological indicator species, *Baumea rubiginosa*, *Empodisma minus*, *Schoenus tesquorum*, *Triglochin striatum* and *Villarsia reniformis* are also present.

Valley Heathy Forest (EVC 127, regionally Endangered): Estimated to occupy 6,000 m², comprising 5,000 m² in fair ecological condition (rating C) and 1,000 m² in poor ecological condition (rating D). 59 indigenous plant species recorded by the author, plus one other recorded by Mr Andrew Paget in May 1985.

Canopy trees: Dominated by *Eucalyptus cephalocarpa* and *E. radiata*.

Lower trees: Scattered *Acacia melanoxylon*.

Shrubs: Low to moderate density, the most abundant species being *Acacia myrtifolia*, *A. stricta*, *Bursaria spinosa* and *Cassinia aculeata*. The locally rare species, *Viminaria juncea*, germinated at the edge of the quarry in c.1995 but was bulldozed in 1997 (along with the locally rare wildflower, *Wahlenbergia multicaulis*).

Vines: *Billardiera mutabilis* is fairly abundant.

Ferns: Small amounts of *Lindsaea linearis*.

Ground flora: Grassy but with the characteristic heathy elements of *Hibbertia riparia*, *Acrotriche serrulata*, *Epacris impressa*, *Dillwynia cinerascens*, *Lepidosperma gunnii*, *Platylobium obtusangulum* and *Xanthosia dissecta*.

Dominant graminoids include *Gahnia radula*, *Microlaena stipoides*, *Austrostipa rudis* and *Themeda triandra*. Other species that help to characterise the vegetation include substantial numbers of *Dianella longifolia* and *Gonocarpus tetragynus*, as well as small numbers of *Leptorhynchus tenuifolius*.

Plant species

The following plant species were observed in the years indicated. 1985 records are from Mr Andrew Paget and the remainder are from the author. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, the species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
	<i>Acacia dealbata</i>	1985		<i>Arthropodium strictum</i>	2001
V	<i>Acacia mearnsii</i>	2005		<i>Austrostipa pubinodis</i>	1997
V	<i>Acacia melanoxylon</i>	2005		<i>Austrostipa rudis</i> subsp. <i>rudis</i>	2009
E	<i>Acacia myrtifolia</i>	2001	C	<i>Baumea acuta</i>	1997
E	<i>Acacia stricta</i>	1997	C	<i>Baumea rubiginosa</i>	1997
V	<i>Acacia verticillata</i>	2005		<i>Billardiera mutabilis</i>	2005
	<i>Acaena novae-zelandiae</i>	2005		<i>Bossiaea prostrata</i>	2005
	<i>Acrotriche serrulata</i>	2005		<i>Burchardia umbellata</i>	2005
C	<i>Amyema pendula</i>	2001		<i>Bursaria spinosa</i>	2005

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
V	<i>Caesia parviflora</i>	1997	E	<i>Juncus procerus</i>	2005
	<i>Carex appressa</i>	1997		<i>Juncus sarophorus</i>	1997
	<i>Carex breviculmis</i>	2005	E	<i>Juncus subsecundus</i>	1997
	<i>Cassinia aculeata</i>	2005		<i>Kunzea ericoides</i> spp. agg.	2001
	<i>Cassinia arcuata</i>	2001		<i>Lachnagrostis filiformis</i>	2005
V	<i>Cassinia longifolia</i>	2005	E	<i>Lagenophora stipitata</i>	2001
E	<i>Cassytha melantha</i>	1997		<i>Lepidosperma elatius</i>	1997
E	<i>Cassytha pubescens</i>	1985		<i>Lepidosperma gunnii</i>	2005
E	<i>Centella cordifolia</i>	2001	V	<i>Leptorhynchus tenuifolius</i>	1997
C	<i>Centrolepis strigosa</i>	1997		<i>Leptospermum continentale</i>	2005
V	<i>Clematis aristata</i>	2001	E	<i>Leptospermum lanigerum</i>	1997
V	<i>Coprosma quadrifida</i>	2005	E	<i>Leptospermum scoparium</i>	1997
E	<i>Cyathea australis</i>	1997	V	<i>Lindsaea linearis</i>	2005
E	<i>Daviesia latifolia</i>	2001	E	<i>Lobelia anceps</i>	2005
	<i>Deyeuxia quadriseta</i>	2001		<i>Lomandra filiformis</i>	2005
	<i>Dianella admixta</i>	1985		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	1997
V	<i>Dianella longifolia</i> s.l.	2005		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>	1997
V	<i>Dianella tasmanica</i>	2005		<i>Lomandra longifolia</i>	2001
	<i>Dichondra repens</i>	2005	V	<i>Lythrum hyssopifolia</i>	2001
V	<i>Dillwynia cinerascens</i>	1997	E	<i>Melaleuca ericifolia</i>	2009
E	<i>Dipodium roseum</i>	1997		<i>Microlaena stipoides</i>	2005
C	<i>Diuris</i> sp.	2001		<i>Microtis parviflora</i>	2001
V	<i>Drosera peltata</i> subsp. <i>auriculata</i>	1997	C	<i>Muellerina eucalyptoides</i>	1997
V	<i>Drosera whittakeri</i>	2001	V	<i>Olearia lirata</i>	2001
V	<i>Empodisma minus</i>	2005	V	<i>Opercularia ovata</i>	2001
V	<i>Epacris impressa</i>	2005	V	<i>Opercularia varia</i>	2005
	<i>Eragrostis brownii</i>	2005		<i>Oxalis exilis/perennans</i>	2005
V	<i>Eucalyptus cephalocarpa</i>	2009	E	<i>Ozothamnus ferrugineus</i>	2005
V	<i>Eucalyptus melliodora</i>	1997	E	<i>Pentapogon quadrifidus</i>	1997
V	<i>Eucalyptus obliqua</i>	2005		<i>Persicaria decipiens</i>	1997
V	<i>Eucalyptus ovata</i>	2009	V	<i>Pimelea humilis</i>	2001
E	<i>Eucalyptus radiata</i>	2005	V	<i>Platylobium formosum</i>	1985
E	<i>Eucalyptus viminalis</i> ssp. <i>viminalis</i>	1997	V	<i>Platylobium obtusangulum</i>	2005
V	<i>Euchiton collinus</i>	2001	E	<i>Poa labillardierei</i> var. <i>labillardierei</i>	2005
E	<i>Euchiton involucratus</i>	1997		<i>Poa morrisii</i>	2005
V	<i>Exocarpos cupressiformis</i>	2005	E	<i>Poa tenera</i>	2005
	<i>Gahnia radula</i>	2005	E	<i>Polyscias sambucifolia</i>	2001
E	<i>Gahnia sieberiana</i>	1985		<i>Poranthera microphylla</i>	2005
C	<i>Gonocarpus micranthus</i>	1997	E	<i>Prostanthera lasianthos</i>	2005
	<i>Gonocarpus tetragynus</i>	2005		<i>Pteridium esculentum</i>	2001
C	<i>Goodenia elongata</i>	2001	V	<i>Pultenaea gunnii</i>	2005
E	<i>Goodenia humilis</i>	2005		<i>Rytidosperma laeve</i>	1997
	<i>Goodenia lanata</i>	1985		<i>Rytidosperma pallidum</i>	2005
	<i>Goodenia ovata</i>	2009		<i>Rytidosperma penicillatum</i>	1997
C	<i>Gratiola pubescens</i>	1997		<i>Rytidosperma racemosum</i>	2001
V	<i>Helichrysum luteoalbum</i>	2009	E	<i>Rytidosperma semiannulare</i>	1997
V	<i>Helichrysum scorpioides</i>	2001		<i>Rytidosperma setaceum</i>	2001
V	<i>Hemarthria uncinata</i>	1997		<i>Rytidosperma tenuius</i>	1997
E	<i>Hibbertia riparia</i>	2005		<i>Schoenus apogon</i>	2005
E	<i>Hypericum gramineum</i>	2005	C	<i>Schoenus lepidosperma</i>	2001
C	<i>Hypoxis hygrometrica</i>	1997	C	<i>Schoenus tesquorum</i>	1997
E	<i>Imperata cylindrica</i>	1997		<i>Senecio glomeratus</i>	2005
E	<i>Isolepis cernua</i> var. <i>platycarpa</i>	1997		<i>Senecio hispidulus</i>	2001
V	<i>Isolepis inundata</i>	2005	E	<i>Senecio minimus</i>	1997
E	<i>Isolepis marginata</i>	1985		<i>Senecio quadridentatus</i>	2001
	<i>Juncus amabilis</i>	2005	C	<i>Solanum aviculare</i>	2005
	<i>Juncus bufonius</i>	1997	V	<i>Solanum ?laciniatum</i>	1997
	<i>Juncus pallidus</i>	2005	E	<i>Stylidium armeria/graminifolium</i>	2001
E	<i>Juncus pauciflorus</i>	1997		<i>Tetrarrhena juncea</i>	1985
E	<i>Juncus planifolius</i>	1997	V	<i>Thelymitra</i> sp.	2001

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
	<i>Themeda triandra</i>	2005	C	<i>Viminaria juncea</i>	1997
	<i>Tricoryne elatior</i>	2001	E	<i>Viola hederacea</i>	2005
E	<i>Triglochin striata</i> (flat leaf variant)	2005	C	<i>Wahlenbergia multicaulis</i>	1997
E	<i>Typha domingensis</i>	2001	E	<i>Wurmbea dioica</i>	2001
V	<i>Veronica gracilis</i>	2001	V	<i>Xanthorrhoea minor</i>	1985
C	<i>Villarsia reniformis</i>	2005	E	<i>Xanthosia dissecta</i>	2005

Introduced Species

<i>Acacia elata</i>	<i>Cynodon dactylon</i>	<i>Parentucellia viscosa</i>
<i>Acacia floribunda</i>	<i>Cyperus eragrostis</i>	<i>Paspalum dilatatum</i>
<i>Agrostis capillaris</i>	<i>Dactylis glomerata</i>	<i>Pennisetum clandestinum</i>
<i>Agrostis capillaris</i>	<i>Danthonia procumbens</i>	<i>Phalaris aquatica</i>
<i>Aira caryophylla</i>	<i>Echinochloa crus-galli</i>	<i>Pinus radiata</i>
<i>Allium triquetrum</i>	<i>Ehrharta erecta</i>	<i>Pittosporum undulatum</i>
<i>Anagallis arvensis</i>	<i>Ehrharta longiflora</i>	<i>Plantago lanceolata</i>
<i>Anthoxanthum odoratum</i>	<i>Erica lusitanica</i>	<i>Plantago major</i>
<i>Arbutus unedo</i>	<i>Erodium moschatum</i>	<i>Poa annua</i>
<i>Arctotheca calendula</i>	<i>Freesia alba</i> × <i>leichtlinii</i>	<i>Prunella vulgaris</i>
<i>Asparagus asparagoides</i>	<i>Fumaria muralis</i>	<i>Prunus cerasifera</i>
<i>Asparagus scandens</i>	<i>Galium aparine</i>	<i>Raphanus raphanistrum</i>
<i>Aster subulatus</i>	<i>Gamochaeta purpurea</i>	<i>Romulea rosea</i>
<i>Bellis perennis</i>	<i>Genista monspessulana</i>	<i>Rubus anglocandicans</i>
<i>Briza maxima</i>	<i>Geranium dissectum</i>	<i>Rumex crispus</i>
<i>Briza minor</i>	<i>Gladiolus undulatus</i>	<i>Setaria parviflora</i>
<i>Bromus catharticus</i>	<i>Grevillea rosmarinifolia</i>	<i>Sisyrinchium iridifolium</i>
<i>Centaurium erythraea</i>	<i>Hedera helix</i>	<i>Solanum nigrum</i>
<i>Chrysanthemoides monilifera</i>	<i>Holcus lanatus</i>	<i>Sonchus oleraceus</i>
<i>Chrysanthemoides monilifera</i> ssp. <i>monilifera</i>	<i>Homalanthus populifolius</i>	<i>Taraxacum officinale</i> spp. agg.
<i>Cirsium vulgare</i>	<i>Hypochoeris radicata</i>	<i>Tradescantia fluminensis</i>
<i>Conyza bonariensis</i>	<i>Ilex aquifolium</i>	<i>Trifolium campestre</i>
<i>Coprosma repens</i>	<i>Juncus articulatus</i>	<i>Trifolium repens</i>
<i>Cordyline australis</i>	<i>Juncus tenuis</i>	<i>Ulex europaeus</i>
<i>Cortaderia selloana</i>	<i>Leontodon taraxacoides</i>	<i>Veronica arvensis</i>
<i>Cotoneaster glaucophyllus</i>	<i>Lonicera japonica</i>	<i>Vicia sativa</i>
<i>Cotoneaster pannosus</i>	<i>Lotus corniculatus</i>	<i>Watsonia meriana</i> var. <i>bul-</i>
<i>Cotoneaster simonsii</i>	<i>Lotus subbiflorus</i>	<i>billifera</i>
<i>Crepis capillaris</i>	<i>Medicago polymorpha</i>	<i>Zantedeschia aethiopica</i>
<i>Crocsmia</i> × <i>crocsmiiflora</i>	<i>Oxalis pes-caprae</i>	

Notes concerning some of the locally threatened plant species

Wahlenbergia multicaulis (Tadgell's Bluebell) – Found beside the quarry in 1997 and subsequently destroyed.

Viminaria juncea (Golden Spray) – Found beside the quarry in 1997 and subsequently destroyed.

Fauna of special significance

Grey Goshawk – listed as Vulnerable in Victoria. Seen incidentally during fieldwork. It is not known how frequently the bird visits the site but a much larger area is required to meet the needs of such a species over its lifecycle.

Fauna habitat features

- There are large eucalypts with hollows that provide suitable roosting or nesting sites for certain fauna;
- Some large Manna Gums (*Eucalyptus viminalis*) may provide nest sites for bird species that only breed in particularly tall trees;
- Patches of scrub provide habitat for small insect-eating birds such as wrens;
- Mistletoe was seen harbouring a colony of Imperial White Butterflies, which are reliant on mistletoes for larval food;
- The ground layer of dense grasses and sedges in much of the site is excellent habitat for butterflies and probably skippers that rely on such plants. A survey for skippers would be worthwhile.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment'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 this site.

Endangered Vegetation Types

All the EVCs present in the site are listed as regionally Endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that the site's vegetation is of at least High conservation significance. This, in turn, gives the site **State** significance under criterion 3.2.3.

Rare or Threatened flora

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

Criterion 3.1.2 confers at least **Local** significance on sites that provide habitat for species that are threatened in Victoria. This applies to the present site if it is deemed to provide habitat for the Grey Goshawk that was seen during fieldwork. One cannot be sure that the sighting was not just of a vagrant, but taking into account the nature of the vegetation and its known fauna, it is prudent to treat the site as habitat for the goshawk.

Threats

- Clay extraction and ancillary activities;
- Invasion by environmental weeds, particularly Boneseed (*Chrysanthemoides monilifera*), Japanese Honeysuckle (*Lonicera japonica*), Sweet Pittosporum (*Pittosporum undulatum*), Blackberry (*Rubus discolor*) and Bulbil Watsonia (*Watsonia meriana*);
- Slashing in inappropriate areas or at an inappropriate frequency or time of year, although this appears to have been corrected in recent years;
- Rubbish dumping by local people;
- Children cutting and damaging vegetation such as paperbarks;
- Foxes (observed), which eat wildlife and spread weeds.

Management issues

- Management of most of the public land in this site is discussed in the 1997 report, ‘*A Management Plan for Blind Creek Billabong, Ferntree Gully*’ by J.C. Reid, G.S. Lorimer and H. Moss for Knox City Council;
- Ongoing weed control is the main priority for vegetation management in this site.

Administration matters

- It would be desirable to have an expert on skippers (insects that are intermediate between butterflies and moths) survey the site in spring and summer, due to the distinct possibility that rare species are present;
- This site is highly worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its State significance, the endangered EVCs, the areas of native vegetation with all strata present, the large number of significant plant species, the richness of the site's native vegetation and the habitat that it provides for fauna;
- A strip along the creek is zoned Urban Floodway Zone (UFZ) and the rest of the site is zoned Special Use 2 (SUZ2);
- Most of the site is included under the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, but not a strip along the creek (which is more biologically significant than much of the rest of the site). This is a result of the cursory and factually inaccurate treatment of this area in the study by Water Ecoscience (1998, see their Sites 269 and 286).

Information sources used in this assessment

- The 1997 report, ‘*A Management Plan for Blind Creek Billabong, Ferntree Gully*’ by J.C. Reid, G.S. Lorimer and H. Moss for Knox City Council, along with the supporting field data, including six lists of indigenous and introduced plant species for various parts of the site, a quadrat in the Swampy Woodland, incidental fauna observations, and checks for fauna habitat, ecological threats and management issues;
- The 1997 report, ‘*Vegetation Survey of Linear Reserves – A Management Strategy for Riparian and Flood Plain Vegetation*’, by Reid, Moss and Lorimer for Knox City Council, along with the supporting field data. This included the same sorts of data as above (except for the absence of a quadrat) for parts of the site that were outside the area covered by the management plan just cited;
- Site inspections (without collecting species data) by Dr Lorimer in 2007 and on 7/6/08, including mapping of the interface between the clay pit and native vegetation;

- Data from three quadrats north of the former quarry fence (DSE numbers N13171-N13173) and five quadrats south of that fence (DSE numbers N13275-N13279), compiled by Mr Andrew Paget in May 1985;
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 35. Norvel Rd Reserves, Ferntree Gully

Two reserves located in Norvel Rd either side of Concord Place. Melway ref. 64 G12.

Site Significance Level: *State*

- Contains remnants of a regionally endangered Ecological Vegetation Class (Valley Heathy Forest) in fair to poor ecological condition due to previous clearing and mowing, but with good potential for rehabilitation;
- Provides good habitat for forest birds in an area substantially depleted of suitable habitat;
- Forms a component of a fragmented habitat link between Blind Creek and the Ferny Creek / Monbulk Creek valley.

Aerial photograph and plan: See page 179, which covers this site and Site 34.

Boundaries

The site boundaries coincide with the cadastral boundaries of two neighbouring reserves, as marked in red as Sites 35A and 35B on the aerial photograph. The former, termed the 'scout hall reserve' here, measures 4,765 m² and comprises two lots (Standard Parcel Identifiers RES\LP56995 and RES\LP134582). The larger 'Norvel Reserve' measures 8,501 m² and comprises five lots (Standard Parcel Identifier RES\LP62338 and Lots 13-16 of LP62338). There are no fences within the reserves to mark their constituent lots.

Land use & tenure: Council reserves zoned 'Public Park and Recreation Zone'. The northern reserve is a park with playground facilities, the scout hall for the 8th Knox troop and associated car parking area. Norvel Reserve is a park with no facilities.

Site description

The site is located on a broad, low ridgeline that extends 600 m to the northwest, where it meets Blind Ck. The slope is very shallow and the elevation is approximately 105 m. The soil is shallow, light grey loam over clay subsoil, derived from decomposition of the underlying Lower Devonian sedimentary rocks of the Humevale formation.

Much of the area of each reserve has a natural density of remnant trees. The scout hall reserve also has a fair cover of indigenous ground flora, but Norvel Reserve's indigenous ground flora is limited to patches of native grasses and single specimens of Pale Flax-lily (*Dianella longifolia*) and Small Grass-tree (*Xanthorrhoea minor*).

There is a single specimen of Manna Gum (*Eucalyptus viminalis*) around 50 years old in Norvel Reserve. It appears to be a disjunct ridgeline occurrence of this species, unlikely to have been planted. Two other Manna Gums are located within nearby residential properties at 1 Concord Pl and 35 Moira Ave, and many along the nearby Blind Ck.

Most understorey vegetation within both reserves has previously been cleared and regularly mown. Mowing activities appear to have been discontinued relatively recently in areas supporting remnant ground layer vegetation.

Relationship to other land

The site forms a component of a fragmented habitat link between Blind Creek and the Ferny Creek / Monbulk Creek valley, extending over hills through residential areas in Ferntree Gully.

Residential properties in the surrounding area support occasional remnant indigenous trees and planted trees that are native to other parts of Australia. These trees no doubt encourage some movement of hardier native birds between the reserves and Blind Creek, which is 320 m north of the site. The most significant and substantial patch of nearby habitat along Blind Ck is Site 34, just over 300 m away.

Bioregion: Gippsland Plain

Habitat type

Valley Heathy Forest (EVC 127, **regionally Endangered**) in both reserves.

The Scout Hall Reserve: Approx. 2,700m² of native vegetation, of which 30% (810 m²) is in fair ecological condition (rating C) and 70% (1,900 m²) is in poor ecological condition (rating D). 10 indigenous plant species were recorded.

Canopy trees: Dominated by *Eucalyptus cephalocarpa*, *E. goniocalyx* and *E. radiata*. Good cover of remnant trees up to 20 m tall (mainly 50-80 years old with a few older trees).

Lower trees and shrubs: Depleted by previous clearing.

Ground flora: A fair cover of indigenous grasses beneath remnant trees which have tolerated mowing, including *Microlaena stipoides*, *Rytidosperma* species, *Poa* species and *Themeda triandra*. Some *Dianella admixta* occurs around the base of remnant trees.

Norvel Reserve: Approx. 6,550m² of native vegetation, of which 5% (350 m²) is in fair ecological condition (rating C) and 95% (6,200 m²) is in poor ecological condition (rating D). 9 indigenous plant species recorded.

Canopy trees: A fair to good cover of remnant trees up to 25m tall (mainly 50-80 years old) dominated by *Eucalyptus obliqua* and *E. cephalocarpa*. A few large specimens of *E. obliqua* over 100 years old. Single *E. viminalis* tree adjacent to 1 Concord Pl.

Lower trees and shrubs: Depleted by previous clearing.

Ground flora: Patches of indigenous grasses beneath remnant trees which have tolerated mowing, including *Microlaena stipoides* and *Poa tenera*. Some *Gahnia radula*, *Dianella longifolia* and *Xanthorrhoea minor* occur around the base of remnant trees.

Plant species

The following indigenous plant species were observed by Mr Rik Brown on 20th May, 2002. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox with 'E'=Endangered and 'V'=Vulnerable. Others species would be detectable in spring or early summer.

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Dianella admixta</i>		<i>Gahnia radula</i>
V	<i>Dianella longifolia</i> s.l.		<i>Microlaena stipoides</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Poa morrisii</i>
	<i>Eucalyptus goniocalyx</i>	E	<i>Poa tenera</i>
V	<i>Eucalyptus obliqua</i>		<i>Rytidosperma penicillatum</i>
E	<i>Eucalyptus radiata</i>		<i>Themeda triandra</i>
E	<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>	V	<i>Xanthorrhoea minor</i>

Fauna of special significance

None recorded during field surveys.

Fauna habitat features

The relatively intact cover of remnant trees provides good habitat for forest birds in an area otherwise substantially depleted of suitable habitat, particularly larger Messmate trees within Norvel Reserve. Populations of parrots were apparent in the area during field surveys, including Crimson and Eastern Rosellas and Rainbow Lorikeets.

Significance ratings

Regionally Endangered Ecological Vegetation Class

Under the Department of Sustainability & Environment's criteria, this site contains a 'remnant patch' of an endangered EVC. According to 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), remnant patches of native vegetation belonging to an endangered EVC have a conservation significance rating of either High or Very High, depending on their ecological condition. In either case, any site containing a remnant patch of such vegetation is of **State** significance under the Department of Sustainability & Environment's standard criteria (Amos 2004 – criterion 3.2.3).

The author has misgivings about such a high rating when the ecological condition of the vegetation is so poor, but these misgivings are overridden by the importance of consistency with the standard criteria.

Locally Threatened Plant Species

Some of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Lack of recruitment of indigenous vegetation because of mowing;
- Loss or decline of plant species whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or elimination by incidents such as falling branches or digging by dogs;
- Reduced visitation of the site by small insect-eating birds due to its isolation from other areas with indigenous understorey, possibly leading to a worsening of plant pests and diseases;
- Soil compaction around the scout hall car parking area;

- Invasion of environmental weeds, specifically exotic grasses and herbs;
- Potential extension of buildings and other facilities around the scout hall.

Management issues

- Containment of vehicle access and car parking around the scout hall to prevent soil compaction and other damage to indigenous vegetation (including by installation of barriers where required);
- Incorporate remnant trees within indigenous revegetation areas to provide ongoing protection and opportunities for regeneration. There are good opportunities for community involvement in revegetation activities;
- Continue to avoid mowing of areas supporting remnant ground layer vegetation. Prospects for their future rehabilitation are good;
- Selective control of weeds, particularly exotic grasses and herbs in areas with remnant ground layer vegetation;
- Monitor the recovery of indigenous ground flora in areas where mowing has been discontinued.

Administration matters

- This site is suited to inclusion under the proposed ESO2 overlay because of its biological significance and because it contains a viable remnant of an endangered EVC;
- It is presently covered by Vegetation Protection Overlay 1. This is partly because of the study by Water Ecoscience (1998), in which this is Site 270;
- There should be liaison between Council and users of the reserve around the Scout Hall to ensure awareness of the environmental values of the land and requirements for their protection and rehabilitation.

Information sources used in this assessment

- For each of the two reserves, a site survey undertaken during this study by Rik Brown on 20th May 2002, following this study's standard procedures discussed in Section 2.4 of Volume 1. This included a description of the composition and condition of the vegetation, compilation of lists of indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats, management issues and populations of scarce or threatened plant species;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 36. Burke Road Reserve and Knox Reservoir, Ferntree Gully

Reserve in Burke Rd opposite Elmstead Ct and adjoining land around the Knox Reservoir water storage tank. Melway ref. 73 H1.

Site Significance Level: *State*

- Contains remnants of a regionally endangered Ecological Vegetation Class (Valley Heathy Forest) in fair to poor ecological condition due to previous clearing and mowing but with good potential for rehabilitation;
- Provides good habitat for forest birds, including the occurrence of large remnant Yellow Box trees;
- Forms a component of a fragmented habitat link between Blind Creek and the Ferny Creek / Monbulk Creek valley.



Aerial photograph taken April 2003



Scale 1:2,000
10 0 20 40 60 80 100m

Boundaries

The site comprises the whole of a single lot, Lot 6 LP6617, which includes the 'Burke Road Reserve' and adjoining fenced land to the north around the water storage tank known as the Knox Reservoir. The lot measures 1.98 ha.

Note: Permission was not obtained to enter the fence around the reservoir. Most vegetation was evident from around the boundaries, but some ground flora could well have been undetected.

Land use & tenure: Zoned 'Public Park and Recreation Zone'. There is a public park in the southern corner and the remainder of the property is a fenced enclosure with a South East Water storage tank (the 'Knox Reservoir') and associated facilities.

Site description

The site is on the upper slope of a broad, low ridge, which is oriented roughly northwest to southeast. The slope of the natural soil surface is shallow and faces west. The elevation is approximately 110-115 m. About one third of the site has been cleared and levelled, leaving an embankment rising from the eastern edge of the cleared area and water tank visible on the aerial photograph.

The soil is shallow, light grey loam over clay subsoil, derived from decomposition of the underlying Lower Devonian sedimentary rocks of the Humevale formation.

The density of remnant trees in two-thirds of the site is not much different from pre-European times. This includes a few large specimens of Yellow Box (*Eucalyptus melliodora*) likely to be over 100 years old. Indigenous understorey vegetation has been substantially depleted by previous clearing but persists in some areas. The highest quality remnant ground layer vegetation occurs in the northeastern corner of the public park and on an embankment along the southern boundary of the water tank enclosure.

Mowing activities appear to have relatively recently been discontinued in areas supporting remnant ground layer vegetation within the public park.

Relationship to other land

Residential properties and nature strips in the surrounding area contain scattered remnant indigenous and planted native trees. This includes a large remnant Yellow Box along the frontage of 60 Burke Rd, almost opposite the reserve.

The site forms a component of a fragmented habitat link between Blind Creek and the Ferny Creek / Monbulk Creek valley, extending through residential areas in Ferntree Gully.

Bioregion: Gippsland Plain

Habitat type

Valley Heathy Forest (EVC 127, **regionally Endangered**), approaching Valley Grassy Forest (EVC 47, regionally vulnerable). There is approximately 1.25 ha of native vegetation, of which it is estimated that 10% (1,200 m²) is in fair ecological condition (rating C) and 90% (1.13 ha) is in poor ecological condition (rating D).

Canopy trees: A fair cover of remnant *Eucalyptus melliodora* and *E. goniocalyx* trees up to 25m tall, with some *E. macrorhyncha* and *E. cephalocarpa*.

Lower trees: Several scattered specimens of *Exocarpos cupressiformis*.

Shrubs: Scattered *Bursaria spinosa* shrubs. Shrub layer vegetation has been substantially depleted by previous clearing.

Vines and ferns: Absent.

Ground flora: Substantially depleted by previous clearing but recovering in some unmown areas, including (*Austro-*) *Rytidosperma* spp., *Microlaena stipoides* and *Themeda triandra*. Additional indigenous ground layer species potentially occur within the least disturbed sections of the water tank enclosure.

Plant species

The following plant species were observed by Mr Rik Brown on 8th May 2002. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox with 'E'=Endangered and 'V'=Vulnerable. Additional species would no doubt be found in spring or early summer.

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Acacia dealbata</i>	V	<i>Exocarpos cupressiformis</i>
E	<i>Acacia stricta</i>		<i>Goodenia ovata</i>
	<i>Bursaria spinosa</i>		<i>Juncus</i> sp.
	<i>Cassinia arcuata</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Microlaena stipoides</i>
	<i>Eucalyptus goniocalyx</i>		<i>Rytidosperma penicillatum</i>
E	<i>Eucalyptus macrorhyncha</i>		<i>Rytidosperma</i> sp.
V	<i>Eucalyptus melliodora</i>		<i>Themeda triandra</i>
Introduced Species			
	<i>Acacia longifolia</i> subsp. <i>longifolia</i>		<i>Hakea salicifolia</i>
	<i>Coprosma repens</i>		<i>Hedera helix</i>
	<i>Cotoneaster glaucophyllus</i>		<i>Pinus radiata</i>
	<i>Genista monspessulana</i>		<i>Pittosporum undulatum</i>
			<i>Prunus cerasifera</i>
			<i>Rubus anglocandicans</i>

Fauna of special significance

None recorded during field surveys.

Fauna habitat features

The cover of remnant trees occurring within the site and scattered throughout the surrounding area provides good habitat for forest birds. The remnant Yellow Box trees are likely to provide an important nectar source for lorikeets and nomadic honeyeaters when in flower. A substantial population of Musk and Rainbow Lorikeets was apparent in the area during field surveys and are also likely to be attracted by nature strip plantings of Red Ironbark in the area.

Significance ratings

Regionally Endangered Ecological Vegetation Class

This site contains a 'remnant patch' of an endangered EVC. According to 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), vegetation belonging to an endangered EVC has a conservation significance rating of either High or Very High, depending on its ecological condition. In either case, any site containing a remnant patch of such vegetation is of **State** significance under the Department of Sustainability & Environment's standard criteria (Amos 2004 – criterion 3.2.3).

The author has misgivings about such a high rating when the ecological condition of the vegetation is so poor, but these misgivings are overridden by the importance of consistency with the standard criteria.

Regionally Threatened Plant Species

Some of the locally threatened plant species listed above have viable populations (in combination with surrounding vegetation), thereby meeting criterion 3.1.5 for a site of **Local** significance.

The large remnant Yellow Box (*Eucalyptus melliodora*) trees in the area are locally significant in view of their size and the habitat they provide for native birds, but this does not meet any criterion of Amos (2004).

Threats

- Invasion by environmental weeds, particularly woody weeds within the reservoir enclosure;
- Dieback disease of remnant trees;
- Loss or decline of plant species whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or elimination by incidents such as digging by dogs;
- Reduced visitation of the site by small insect-eating birds due to its isolation from other areas with indigenous understorey, possibly leading to a worsening of plant pests and diseases;
- Lack of recruitment of indigenous vegetation because of mowing and other physical disturbances;
- Clearing or damage to remnant vegetation associated with potential further development or construction works within the fenced reservoir enclosure.

Management issues

- Provide specific protection for remnant vegetation in any development or construction works;
- Incorporate remnant trees within indigenous revegetation areas wherever possible to provide ongoing protection and opportunities for regeneration;
- Continue to reduce mowing of areas supporting remnant ground layer vegetation, which appears to have been facilitating natural regeneration of indigenous flora within the public section of the site. Prospects for rehabilitation of these areas are good;
- Selective weed control, particularly of woody weeds;
- Monitor the recovery of indigenous ground layer vegetation in areas where mowing has been discontinued.

Administration matters

- This site is suited to inclusion under the proposed ESO2 overlay because of its biological significance and because it contains a viable remnant of an endangered EVC;
- It was not recognised as a site of significance in the study by Water Ecoscience (1998);
- It is not presently covered by any Vegetation Protection Overlay;
- There should be liaison between Council and South East Water Ltd to ensure awareness of the environmental values of the land and requirements for their protection and rehabilitation.

Information sources used in this assessment

- A site survey undertaken during this study by Rik Brown on 8/5/02, following this study's standard procedures discussed in Section 2.4 of Volume 1. This included a description of the composition and condition of the vegetation, compilation of lists of indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats, management issues and populations of scarce or threatened plant species;
- Aerial photography from February 2001 and April 2003;

- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 37. Pickett Reserve, Ferntree Gully

A recreation reserve located at the northwestern corner of Burwood Hwy and Commercial Rd. Melway ref. 73 J2-3.

Site Significance Level: *Local*

- Contains remnants of a regionally endangered Ecological Vegetation Class (Valley Heathy Forest) in fair to poor ecological condition due to previous clearing and mowing, but with good potential for rehabilitation;
- Provides good habitat for forest birds and possums in an area substantially depleted of suitable habitat.



Aerial photograph taken April 2003



Scale 1:2,000
10 0 20 40 60 80 100m

Boundaries

This 3.01 ha site is outlined in red above. It includes most of Pickett Reserve as well as a narrow triangle of road verge abutting the reserve's southern boundary, next to the Burwood Hwy traffic lights. The reserve occupies five lots, and one of these (Lot 13, LP32239) is not included in the site because it has no influence on the site's biological significance. The oval, buildings and some of the car parking areas are of no environmental significance but are included in the site because activities in these areas can affect the significant vegetation, and because of desirability of aligning site boundaries with cadastral boundaries. The triangular extension southwards from the reserve's cadastral boundary, near the traffic lights, is intended to include all the native vegetation between the reserve boundary and the footpath.

Land use & tenure: Council reserve mainly utilised for sporting activities, with some buildings and car parks. Most of the reserve is zoned 'Public Park and Recreation Zone'. The two smaller lots fronting Mossfield Av provide a car park for the adjoining gymnastics stadium, and are zoned 'Residential 1 Zone'. The narrow triangle at the southern tip of the site is zoned 'Road Zone Category 1' and it functions as part of the reserve.

Site description

The site is on the upper slope of a broad, low ridge, which is oriented roughly northwest to southeast. The natural surface of the ground has a slope that is shallow and faces generally southwest, and there has been a small degree of levelling for

the oval. The site's elevation range is approximately 110-115 m. The soil is shallow, light grey loam over clay subsoil, derived from decomposition of the underlying Lower Devonian sedimentary rocks of the Humevale formation.

The aerial photograph shows a fair cover of remnant trees around the fringe of the reserve. This includes several large indigenous trees likely to be over 100 years old. Understorey vegetation is mostly absent due to clearing and ongoing mowing activities, but some remnants persist in places. In particular, a fair cover of indigenous ground flora occurs towards the southwestern corner of the reserve. Mowing activities appear to have been discontinued in this area relatively recently. Ground flora elsewhere within the reserve is generally restricted to around the base of remnant trees.

Relationship to other land

Remnant vegetation within Pickett Reserve is rather isolated from other native vegetation. Some remnant trees occur in residential properties to the north and east.

Bioregion: Gippsland Plain

Habitat type

Valley Heathy Forest (EVC 127, **regionally Endangered**): Estimated to occupy 0.5 ha, comprising 5% (250 m²) in ecological condition C (fair) and 95% (0.5 ha) in ecological condition D (poor).

Canopy trees: A fair cover of remnant trees up to 25 m tall, including *Eucalyptus cephalocarpa*, *E. goniocalyx* and *E. radiata*. Several *E. melliodora* trees occur towards the northern end. Most remnant trees are 50-80 years old, with several older specimens. Moderate foliage dieback is apparent in some locations, mainly near car parking areas.

Lower trees: A few scattered specimens of *Acacia melanoxylon*, *A. mearnsii* and *Exocarpos cupressiformis*.

Shrubs: A few *Bursaria spinosa* and *Kunzea ericoides* shrubs around the base of remnant trees. Most shrub layer vegetation has been cleared.

Vines and ferns: Absent.

Ground flora: A fair cover of indigenous ground layer vegetation occurs in the southwestern section of the reserve, including *Microlaena stipoides*, *Gahnia radula* and *Rytidosperma pallidum*. Otherwise substantially depleted by clearing and mowing activities and restricted to a few plants around the base of remnant trees.

Plant species

The following indigenous plant species were observed by Mr Rik Brown on 24th May 2002. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox with 'E'=Endangered and 'V'=Vulnerable. Other species would no doubt be detectable in other seasons.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia mearnsii</i>	E	<i>Eucalyptus radiata</i>
V	<i>Acacia melanoxylon</i>	V	<i>Exocarpos cupressiformis</i>
	<i>Austrostipa rudis</i>		<i>Gahnia radula</i>
	<i>Bursaria spinosa</i>		<i>Kunzea ericoides</i> spp. agg.
	<i>Dichondra repens</i>		<i>Microlaena stipoides</i>
V	<i>Eucalyptus cephalocarpa</i>	V	<i>Plantago varia</i>
	<i>Eucalyptus goniocalyx</i>		<i>Rytidosperma pallidum</i>
V	<i>Eucalyptus melliodora</i>		

Fauna of special significance

None recorded during field surveys.

Fauna habitat features

The fair cover of remnant indigenous trees within the site provides moderately extensive habitat for forest birds and possums in an area otherwise substantially depleted of suitable habitat. This includes providing good foraging habitat for parrots. A Common Ringtail Possum drey and carcass (probable cat predation) was observed during inspection of the site.

Significance ratings

Regionally Endangered Ecological Vegetation Class

According to 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), remnant patches of native vegetation belonging to an endangered EVC (including Valley Heathy Forest) have a conservation significance rating of either High or Very High, depending on their ecological condition. In either case, any site containing a

remnant patch of such vegetation is of State significance under the Department of Sustainability & Environment's standard criteria (Amos 2004 – criterion 3.2.3).

A small part of the native vegetation at Pickett Reserve meets the Department of Sustainability & Environment's current definition of a remnant patch, but at the time Amos (2004) prepared the significance criteria, the unpublished convention was that native vegetation only qualified as a remnant patch if it occupied at least 2,500 m². Because this threshold is so much larger than the area of native vegetation at Pickett Reserve, the author has reduced the significance level of the site to **Local**.

Locally Threatened Plant Species

Some of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Dieback of remnant trees associated with altered drainage and soil compaction from vehicles;
- Loss or decline of plant species whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or elimination by incidents such as trampling or digging by dogs;
- Reduced visitation of the site by small insect-eating birds due to its isolation from other areas with indigenous understorey, possibly leading to a worsening of plant pests and diseases;
- Lack of recruitment of indigenous vegetation because of mowing;
- Potentially, removal of remnant vegetation to allow future expansion of recreational facilities;
- Invasion by environmental weeds, specifically exotic grasses and herbs and particularly Panic Veldt-grass (*Ehrharta erecta*).

Management issues

- Protect remnant vegetation in any future development;
- Containment of vehicle access and car parking within the northern section of the reserve to prevent soil compaction and other damage to indigenous vegetation (including by installation of barriers where required);
- Incorporate remnant trees within revegetation areas wherever possible to provide ongoing protection and opportunities for regeneration. There are substantial opportunities for the re-establishment of indigenous vegetation within the site compatible with recreational uses of the reserve;
- Continue to reduce mowing of areas supporting remnant ground layer vegetation, which appears to have been facilitating natural regeneration of indigenous flora in the southwestern corner. Prospects for rehabilitation of these areas are good;
- Selectively control exotic grasses and herbs in areas supporting indigenous ground flora;
- Monitor the recovery of indigenous ground layer vegetation in areas where mowing has been discontinued.

Administration matters

- This site is suited to inclusion under the proposed ESO2 overlay because it contains a viable (if degraded) remnant of an endangered EVC;
- Part of the site is presently covered by Vegetation Protection Overlay 1. This is partly because of the study by Water Ecoscience (1998), in which this is Site 42.

Information sources used in this assessment

- A site survey undertaken during this study by Rik Brown on 24/5/02, following this study's standard procedures discussed in Section 2.4 of Volume 1. This included a description of the composition and condition of the vegetation, compilation of lists of indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats, management issues and populations of scarce or threatened plant species;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 38. Clyde Reserve, Ferntree Gully

A small Council reserve extending between Clyde St and Hayward Rd. Melway ref. 73 F2-G2.

Site Significance Level: *State*

- Contains remnants of a regionally endangered Ecological Vegetation Class (Valley Heathy Forest) in fair to poor ecological condition due to previous clearing and mowing, but with good potential for rehabilitation;
- Provides good habitat for forest birds in conjunction with adjoining residential areas, including substantial populations of lorikeets;
- Forms a component of a fragmented habitat link between Blind Creek and the Ferny Creek - Monbulk Creek valley.



Boundaries

The site comprises the two lots that make up Clyde Reserve, as outlined in red above. The dashed line separates the two lots. The total area is 3,370 m². Note that the aerial photograph was taken from well to the north, so tree tops and roofs are displaced to the south of their actual locations relative to the map.

Land use & tenure: Council reserve without facilities, zoned 'Public Park and Recreation Zone'.

Site description

As shown on the aerial photograph, this small reserve is at the interface between commercial premises fronting Burwood Hwy and a residential neighbourhood to the south. It provides pedestrian passage between Clyde St, the bend in Hayward Rd and the northern end of Ferguson Ct.

The land is almost flat land and the elevation is 90 m. The slope is less than 3% for a radius of 1 km around the site. The soil is shallow, poorly draining, light grey loam over clay subsoil, derived from decomposition of the underlying Lower Devonian sedimentary rocks of the Humevale formation.

An intact cover of remnant trees extends throughout most of the reserve. Understorey vegetation is scarce due to past clearing and ongoing mowing activities, but some patches of indigenous ground flora persist. This includes a fair cover of indigenous grasses and some ground layer species that are characteristic species of the endangered Valley Heathy Forest, such as Pale Flax-lily (*Dianella longifolia*), Spreading Flax-lily (*Dianella admixta*) and a colony of approximately fifty Nodding Greenhood orchids (*Pterostylis nutans*). The highest quality ground layer vegetation occurs on the northern side of the reserve. Mowing activities appear to have been relatively recently discontinued in areas supporting remnant ground flora.

Relationship to other land

The reserve is at the northern edge of a residential neighbourhood whose properties and nature strips contain scattered remnant trees and trees from other parts of Australia. This neighbourhood is Site 105 (p. 520), which is recommended to be covered by a Vegetation Protection Overlay. Any native birds, insects, possums or other fauna that may use the reserve's habitat would also need additional habitat in Site 105 or further afield.

Native vegetation is very scarce in commercial premises along Burwood Hwy north of the reserve.

The site forms a component of a fragmented habitat link between Blind Creek and Ferny Creek - Monbulk Creek valley.

Bioregion: Gippsland Plain

Habitat type

Valley Heathy Forest (EVC 127, **regionally Endangered**): Estimated to occupy 0.3 ha, comprising 30% (0.09 ha²) in ecological condition C (fair) and 70% (0.21 ha) in ecological condition D (poor).

Canopy trees: Dominated by *Eucalyptus cephalocarpa* and *E. radiata*, with some *E. goniocalyx*. A good cover of remnant trees up to 20 m tall (mainly 50-80 years old).

Lower trees: A few scattered specimens of *Exocarpos cupressiformis* and *Acacia melanoxylon*.

Shrubs: Absent because of previous clearing.

Vines and ferns: *Billardiera mutabilis*, scarce.

Ground flora: A fair cover of indigenous grasses has recovered in unmown areas, including *Rytidosperma* spp., *Rytidosperma pallidum* and *Microlaena stipoides*. Other ground layer plants are mainly restricted to around the base of remnant trees, including some *Dianella longifolia* and *D. admixta*. There is a sizeable colony of *Pterostylis nutans*.

Plant species

The following indigenous plant species were observed by Mr Rik Brown on 8th May 2002. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox with 'E'=Endangered and 'V'=Vulnerable. Additional species would no doubt be detectable in other seasons.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia melanoxylon</i>		<i>Gahnia radula</i>
	<i>Billardiera mutabilis</i>	V	<i>Helichrysum scorpioides</i>
	<i>Dianella admixta</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
V	<i>Dianella longifolia</i> s.l.		<i>Microlaena stipoides</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Pterostylis nutans</i>
	<i>Eucalyptus goniocalyx</i>		<i>Rytidosperma pallidum</i>
E	<i>Eucalyptus radiata</i>		<i>Rytidosperma penicillatum</i>
V	<i>Exocarpos cupressiformis</i>		<i>Rytidosperma</i> sp.

Fauna of special significance

None recorded during field surveys.

Fauna habitat features

The relatively intact cover of remnant trees provides good habitat for forest birds in conjunction with remnant trees scattered within the adjoining residential neighbourhood. Substantial populations of Musk and Rainbow Lorikeets were apparent during field surveys.

Significance ratings

Regionally Endangered Ecological Vegetation Class

Under the Department of Sustainability & Environment's criteria, this site contains a 'remnant patch' of an endangered EVC. According to 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), remnant patches of native vegetation belonging to an endangered EVC have a conservation significance rating of either High or Very High, depending on their ecological condition. In either case, any site containing a remnant patch of such vegetation is of **State** significance under the Department of Sustainability & Environment's standard criteria (Amos 2004 – criterion 3.2.3).

The author has misgivings about such a high rating when the ecological condition of the vegetation is so poor, but these misgivings are overridden by the importance of consistency with the standard criteria.

Locally Threatened Plant Species

Some of the locally threatened plant species listed above have viable populations (in combination with surrounding vegetation), thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Lack of recruitment of indigenous vegetation because of mowing;
- Invasion by environmental weeds, particularly *Paspalum dilatatum*;
- Loss or decline of plant species whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or elimination by incidents such as cubby house construction or digging by dogs;

- Reduced visitation of the site by small insect-eating birds due to its isolation from other areas with indigenous understorey, possibly leading to a worsening of plant pests and diseases.

Management issues

- Incorporate remnant trees within indigenous revegetation areas to provide ongoing protection and opportunities for regeneration;
- Continue to reduce mowing of areas supporting remnant ground layer vegetation, which appears to have been successful in facilitating natural regeneration of indigenous flora. Prospects for rehabilitation of these areas are good;
- Control exotic grasses and herbs, particularly *Paspalum* in poorly drained areas.

Administration matters

- This site is suited to inclusion under the proposed ESO2 overlay because it contains a viable (if degraded) remnant of an endangered EVC;
- The site is presently covered by Vegetation Protection Overlay 1. This is partly because of the study by Water Ecoscience (1998), in which this is Site 292 (but which the authors apparently did not inspect).

Information sources used in this assessment

- A site survey undertaken during this study by Rik Brown on 8/5/02, following this study's standard procedures discussed in Section 2.4 of Volume 1. This included a description of the composition and condition of the vegetation, compilation of lists of indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats, management issues and populations of scarce or threatened plant species;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 39. Kent Park, Ferntree Gully

A small Council reserve with remnant large trees and ground flora. Melway ref. 73 E4.

Site Significance Level: *Regional*

- Contains some large old trees and very rudimentary understorey that are remnants of a regionally endangered Ecological Vegetation Class (Valley Heathy Forest);
- The ecological condition is poor due to previous clearing and mowing but there is good potential for restoration;
- The trees provide good habitat for forest birds in conjunction with adjoining residential areas, including substantial populations of lorikeets.



Aerial photograph taken April 2003



Scale 1:2,000
10 0 20 40 60 80 100m

Boundaries

The site boundaries coincide with the cadastral boundaries of the Council reserve. The area is 1.67 ha. There is a gradation from almost no biological significance in the northeastern corner to maximum significance in the southwestern corner.

Land use & tenure: Council reserve with playground facilities, zoned 'Public Park and Recreation Zone'.

Site description

The site is located on almost flat land at an elevation of 90 m, on the divide between the catchments of Ferny Ck and the minor drainage line that passes through Lakewood Nature Reserve. The slope is less than 3% for a radius of 1 km around the site. The soil is shallow, poorly draining, light grey loam over clay subsoil, derived from decomposition of the underlying Lower Devonian sedimentary rocks of the Humevale formation.

The ground is uneven in the west of the reserve, suggesting past excavation. Many trees and practically all indigenous shrubs must have been cleared from the reserve long ago.

Thirty-seven mature remnant eucalypts remain, some of them very large and over a century old. There are also some planted specimens of indigenous species in the northeast and several planted trees from elsewhere in Australia in the west (particularly Bracelet Honey-myrtle, *Melaleuca armillaris*).

The root systems of the large remnant trees are efficient at extracting nutrients and moisture from the soil around them, showing up as paler areas of grass visible on the aerial photograph. Introduced grasses dominate the greener areas but they do not thrive beneath the trees, allowing some of the hardier indigenous ground flora species to survive there.

Council recognised the persistence of the indigenous ground flora and reduced the amount of mowing in some areas over the past few years. Any changes that may have occurred due to the reduction in mowing could not be discerned in this study. At the time of the survey, in May 2002, there were still very few indigenous understorey plants other than grass species, and some of the area showed no signs of natural regeneration. The species other than grasses that had regenerated were *Oxalis perennans*, two plants of *Juncus subsecundus* and single specimens of *Lomandra filiformis*, *Bursaria spinosa*, *Senecio minimus* and *Solanum ?laciniatum*. More species may be detectable in spring (including a *Glycine* that has been reported), but it is clear that the understorey is quite rudimentary.

A fire might stimulate natural regeneration, but this would be hard to achieve. A more feasible alternative would be replanting with species that are indigenous to the site's original Valley Heathy Forest community. This is an excellent site for such revegetation because of its size and the base provided by the large remnant trees.

Relationship to other land

There are several small patches of remnant trees in the neighbourhood generally to the east, including Kent Park Primary School and nearby parks and roadsides (Site 105, p. 520), as well as Site 40 on Ferntree Gully Rd. These treed areas apparently serve as habitat for some native birds, as evidenced by the large numbers of parrots seen during the fieldwork for this study (Musk Lorikeets, Rainbow Lorikeets, rosellas). The large old trees in Kent Park no doubt play an important role in keeping the birds (and perhaps bats) in the area, particularly because of the hollows that can serve as sites for nesting and roosting. However, the treed areas in this neighbourhood have very few indigenous shrubs or wildflowers.

The closest remnant forest with more than minimal understorey is at Lakewood Nature Reserve (Site 43, 700 m west) and Egan-Lee Reserve (Site 41, 1.3 km west). These distances are quite large for transmission of pollen or seeds by insects or birds, so Kent Park's understorey plants are vulnerable to inbreeding.

Because of its large trees, Kent Park may function like a stepping-stone for movement of birds between Blind Creek and the Ferny Creek - Monbulk Creek valley, perhaps via Lakewood Nature Reserve. However this is rather speculative.

Bioregion: Gippsland Plain

Habitat type

Valley Heathy Forest (EVC 127, **regionally Endangered**): Estimated to occupy 0.55 ha, all of which is in ecological condition D (poor).

Canopy trees: Dominated by *Eucalyptus cephalocarpa*, *E. goniocalyx* and *E. radiata* to 25m tall, mostly 50-80 years old but with some much larger specimens.

Lower trees: There are two *Acacia melanoxylon* saplings that may have been planted.

Shrubs: Single specimens of *Bursaria spinosa*, *Senecio minimus* and *Solanum ?laciniatum*.

Vines and ferns: None.

Ground flora: A fair cover of indigenous grasses beneath remnant eucalypts, including three *Rytidosperma* species, *Microlaena stipoides* and *Poa morrisii*. There are also scattered *Oxalis perennans*, two *Juncus subsecundus* and a single specimen of *Lomandra filiformis*.

Plant species

The following plant species were observed by the author on 8th May 2002. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. Additional species would no doubt be detectable in other seasons.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia melanoxylon</i>		<i>Oxalis exilis/perennans</i>
	<i>Bursaria spinosa</i>		<i>Poa morrisii</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Rytidosperma geniculatum</i>
	<i>Eucalyptus goniocalyx</i>		<i>Rytidosperma penicillatum</i>
E	<i>Eucalyptus radiata</i>		<i>Rytidosperma racemosum</i>
C	<i>Eucalyptus rubida</i>		<i>Rytidosperma</i> sp.
E	<i>Juncus subsecundus</i>	E	<i>Senecio minimus</i>
	<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	V	<i>Solanum laciniatum</i>
	<i>Microlaena stipoides</i>		

A single *Eucalyptus rubida* (Candlebark) grows on the nature strip of Cambden Park Pde – perhaps planted, in which case it is not significant.

Fauna of special significance

None recorded during field surveys.

Fauna habitat features

The crowns and tree hollows of the large old trees appear to be well used by forest birds, and the hollows may be used by bats. Substantial populations of Musk and Rainbow Lorikeets were apparent during field surveys. Unmown native grasses may serve as habitat for native butterflies, particularly Common Browns.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Regionally Endangered Ecological Vegetation Class

According to 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), remnant patches of native vegetation belonging to an endangered EVC (including Valley Heathy Forest) have a conservation significance rating of either High or Very High, depending on their ecological condition. In either case, any site containing a remnant patch of such vegetation is of State significance under the Department of Sustainability & Environment's standard criteria (Amos 2004 – criterion 3.2.3).

The native vegetation at Kent Park meets the Department of Sustainability & Environment's current definition of a remnant patch, but at the time Amos (2004) prepared the significance criteria, the unpublished convention was that native vegetation only qualified as a remnant patch if it contained at least 2,500 m² with native understorey. Because this threshold is not met (or at best, scarcely met) at Kent Park, the author has reduced the significance level of the site to **Regional**.

Rare or Threatened Flora

Some of the locally threatened plant species listed above have viable populations (particularly the eucalypts), thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Invasion by environmental weeds, particularly introduced grasses, preventing re-establishment of native species;
- Loss or decline of plant species whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or elimination by incidents such as cubby house construction or digging by dogs;
- Reduced visitation of the site by small insect-eating birds due to its isolation from other areas with indigenous understorey, possibly leading to a worsening of plant pests and diseases.

Management issues

- The efficacy of the reduced mowing in recent years should be assessed to see if it is succeeding in allowing indigenous species to regenerate. If not, resume heavier mowing or revegetate;
- The site has good potential for restoration of Valley Heathy Forest vegetation by planting of suitable species, even if reduced mowing does not bring about much regeneration;
- Control of introduced grasses would be very important for the success of any restoration efforts.

Administration matters

- This site is suited to inclusion under the proposed ESO2 overlay because it contains a viable (if degraded) remnant of an endangered EVC, with good potential for restoration;
- The site is presently covered by Vegetation Protection Overlay 1. This is partly because of the study by Water Ecoscience (1998), in which this is Site 293 (but which the authors apparently did not inspect).

Information sources used in this assessment

- A site survey undertaken during this study by Dr Lorimer for 50 minutes on 8/5/02, following this study's standard procedures discussed in Section 2.4 of Volume 1. This included descriptions of the composition and condition of the vegetation, compilation of a list of indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats, management issues and populations of scarce or threatened plant species;
- A similar, independent survey by Rik Brown earlier the same day (duplicated for quality control purposes);
- Aerial photography from February 2001 and April 2003;

- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 40. Ferntree Gully Rd Verge, Ferntree Gully

Road verge near Scoresby Rd with remnant understorey and revegetation. Melway ref. 73 E5.

Site Significance Level: *Local*

- Remnants of a regionally endangered Ecological Vegetation Class (Valley Heathy Forest) in fair ecological condition.



Scale 1:2,000
10 0 20 40 60 80 100m

Aerial photograph taken
February 2007

Boundaries

This 0.25 ha site of three parts is outlined in red above. Kerbing or property boundaries define most of the site boundary. The narrow, magenta oblong along Scoresby Rd is part of Site 106 (page 523).

Land use & tenure: Private property (zoned 'Residential 1') used for horse grazing, and adjacent road verge.

Site description

The site is at elevations of 76-78 m on a shallow slope facing southeast, close to the floodplain (and one-time swamp) of Ferny Ck and Monbulk Ck. The slope is less than 3% for a radius of more than 1 km around the site. The soil is shallow, poorly draining, light grey loam over clay subsoil, derived from decomposition of the underlying Lower Devonian sedimentary rocks of the Humevale formation.

The site supports remnant trees and a moderate density of indigenous understorey vegetation, including a range of typical species of Valley Heathy Forest such as Sweet Bursaria (*Bursaria spinosa*), Prickly Currant-bush (*Coprosma quadrifida*), Grey Parrot-pea (*Dillwynia cinerascens*), Thatch Saw-sedge (*Gahnia radula*), Flax-lilies (*Dianella admixta*, *D. longifolia*) and Yellow Rush-lily (*Tricoryne elatior*).

At the time the first edition of this report was prepared in 2004, there was additional remnant vegetation where there is now a subdivision surrounding Watling Grove. To compensate for the loss of this vegetation, revegetation has been conducted within the site described here. The species planted are mostly indigenous.

Relationship to other land

Remnant trees are scattered within residential areas to the north. The treed verge of Scoresby Rd (Site 106, p. 523) provides continuity of treed habitat to the treed precinct of Site 107 in Knoxfield (p. 525) and from there to high quality habitat at Lakewood Nature Reserve (Site 43, p. 215) and neighbouring sites.

Knox Park is located on the opposite side of Ferntree Gully Rd. This potentially provides a link with the Ferny Creek - Monbulk Creek valley to the south, however suitable habitat is currently scarce within the reserve.

Bioregion: Gippsland Plain

Habitat type

Valley Heathy Forest (EVC 127, **regionally Endangered**): Estimated to occupy 0.24 ha, all in fair ecological condition (rating C).

Canopy trees: Dominated by *Eucalyptus goniocalyx*, with some *E. cephalocarpa* and *E. radiata*.

Lower trees: *Acacia melanoxylon*, *A. mearnsii* and *Exocarpos cupressiformis*.

Shrubs: *Bursaria spinosa*, *Coprosma quadrifida* and *Acacia paradoxa*. Indigenous shrub layer is depleted elsewhere.

Vines: *Billardiera mutabilis* were present in 2002 but could not be found in 2008. This species may regenerate.

Ferns: Absent.

Ground flora: A fair cover of indigenous ground flora, e.g. *Gahnia radula*, *Dillwynia cinerascens*, *Gahnia radula*, *Dianella admixta*, *D. longifolia*, *Tricoryne elatior* *Dianella admixta*, *Microlaena stipoides* and two subspecies of *Lomandra filiformis*. Includes several specimens of *Dianella longifolia*. Ground layer vegetation is depleted elsewhere because of previous clearing and ongoing grazing activities.

Plant species

The following plant species were observed by the author and Mr Rik Brown on their respective inspections of 24th May 2002 and 16 on 10th March 2008. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox with 'E'=Endangered and 'V'=Vulnerable. Additional species would no doubt be detectable in other seasons. Introduced plants that are not having significant environmental impact are not included.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia mearnsii</i>	E	<i>Eucalyptus radiata</i>
V	<i>Acacia melanoxylon</i>	V	<i>Exocarpos cupressiformis</i>
	<i>Acacia paradoxa</i>		<i>Gahnia radula</i>
	<i>Billardiera mutabilis</i>		<i>Leptospermum continentale</i>
	<i>Bursaria spinosa</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
V	<i>Coprosma quadrifida</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
	<i>Dianella admixta</i>		<i>Microlaena stipoides</i>
V	<i>Dianella longifolia</i> s.l.		<i>Poa morrisii</i>
	<i>Dichondra repens</i>	E	<i>Poa tenera</i>
V	<i>Dillwynia cinerascens</i>		<i>Poranthera microphylla</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Rytidosperma</i> sp.
	<i>Eucalyptus goniocalyx</i>		<i>Tricoryne elatior</i>
Introduced Species			
	<i>Coprosma repens</i>		<i>Pennisetum clandestinum</i>
	<i>Crataegus monogyna</i>		<i>Pittosporum undulatum</i>
			<i>Prunus cerasifera</i>
			<i>Rubus anglocandicans</i>

Fauna of special significance

None known. A locally rare Brown Goshawk was observed flying overhead during the 2002 inspection, but the site does not provide substantial habitat for this bird.

Significance ratings

Regionally Endangered Ecological Vegetation Class

According to 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), remnant patches of native vegetation belonging to an endangered EVC (including Valley Heathy Forest) have a conservation significance rating of either High or Very High, depending on their ecological condition. In either case, any site containing a remnant patch of such vegetation is of State significance under the Department of Sustainability & Environment's standard criteria (Amos 2004 – criterion 3.2.3).

The native vegetation in the present site meets the Department of Sustainability & Environment's current definition of a remnant patch, but at the time Amos (2004) prepared the significance criteria, the unpublished convention was that native vegetation only qualified as a remnant patch if it occupied at least 2,500 m². Because this threshold is so much larger than the area of native vegetation beside Ferntree Gully Rd, the author has reduced the significance level of the site to **Local**.

Locally Threatened Plant Species

Some of the locally threatened plant species listed above have viable populations (in combination with other plants in the neighbourhood), thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Some of the remaining indigenous plant species are represented by only one or two individuals, rendering them vulnerable to loss through inbreeding, poor reproductive success or misadventure;
- Reduced visitation of the site by small insect-eating birds due to its isolation from other areas with indigenous understorey, possibly leading to a worsening of plant pests and diseases.

Administration matters

- This site is suited to inclusion under the proposed ESO2 overlay because it contains a remnant of an endangered EVC, complete with native understorey.

Information sources used in this assessment

- A site survey undertaken during this study by Rik Brown on 24/5/02, following this study's standard procedures discussed in Section 2.4 of Volume 1. This included a description of the composition and condition of the vegetation, compilation of lists of indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats, management issues and populations of scarce or threatened plant species;
- A botanical survey of the site by Dr Lorimer on 10/3/08 to document and map the vegetation that remained following residential development on the majority of the native vegetation that was present in 2002;
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 41. 52 Kathryn Rd, Knoxfield

Private vacant block, partly with indigenous tree cover and periodically slashed understorey. Melway ref. 73 B5.

Site Significance Level: *State*

- Contains a remnant of a regionally endangered Ecological Vegetation Class (Valley Heathy Forest) in reasonable ecological condition, albeit with the shrub layer suppressed by slashing.



The red outline on the aerial photograph is the site boundary and the dashed white curve is the approximate boundary of the area with substantial native understorey (greater than about 25% cover, including immature trees).

Boundaries

The site is the whole of the lot known as 52 Kathryn Rd, Knoxfield. It measures 3,972 m².

Land use & tenure: Vacant private property, zoned 'Residential 1'.

Site description

The site is at elevations of approximately 85 m with a shallow, southwest-facing slope, on the low ridge between the valleys of Monbulk Ck and Riddells Drain (which flows through Lakewood Nature Reserve, Site 43). The soil is shallow, poorly draining, light grey loam over clay subsoil, derived from decomposition of the underlying Lower Devonian sedimentary rocks of the Humevale formation.

The front 25 m of the block and the northeastern corner have been thoroughly cleared and the only vestiges of native vegetation left there are scattered native grasses. The trees on the rest of the block are Mealy Stringybarks (*Eucalyptus cephalocarpa*) and smaller numbers of Narrow-leafed Peppermints (*Eucalyptus radiata*). They appear to be regrowth following clearing long ago. Some of the regrowth is many decades old and some is more recent. Periodic slashing has suppressed regeneration of shrubs, but small plants have coped fairly well and contain a good representation of the ground flora of Valley Heathy Forest, with abundant lilies and quite a few orchids.

The composition of the tree canopy and the abundance of Prickly Tea-tree (*Leptospermum continentale*, stunted by slashing) also indicate Valley Heathy Forest. The localised presence of the moisture-loving species, Centella (*Centella*

cordifolia) and Mat Grass (*Hemarthria uncinata*), outside the perimeter of the tree canopy indicates that the topsoil can get waterlogged during winter and spring in the absence of tree roots.

A fully developed eucalypt canopy extends onto adjoining land, making the overall size of the patch approximately 3,500 m².

There are mature plants of the serious weed, Gorse, near the northeastern corner of the property, spreading further into the block (where most seedlings are being periodically slashed). There is also an infestation of Sweet Pittosporum in the southeastern corner. Otherwise, the main weeds are introduced grasses.

Relationship to other land

As can be seen on the aerial photograph, the native tree canopy continues unbroken into the property to the south. The native understorey there is reduced to some immature trees and scattered, hardy grasses.

There are also remnant trees and mature, planted eucalypts from other parts of Australia scattered within the surrounding residential neighbourhood. These provide habitat for native insects and forest birds such as Kookaburras and Rosellas as they move between more substantial habitat areas such as Lakewood Nature Reserve (Site 43) and R.D. Egan-Lee Reserve (Site 42). The neighbourhood is covered by a Vegetation Protection Overlay, and forms Site 105 in this report (p. 520).

Bioregion: Gippsland Plain

Habitat type

Valley Heathy Forest (EVC 127, **regionally Endangered**): Estimated to occupy 0.25 ha, comprising 0.19 ha in ecological condition C (fair) and 0.06 ha in ecological condition D (poor). Some of the vegetation is intermediate between categories C and D.

Canopy trees: Dominated by *Eucalyptus cephalocarpa* with some *E. radiata*, of various ages but none very old.

Lower trees: *Acacia melanoxylon* is dense in the southeast, becoming very sparse in the west.

Shrubs: Shrubs have been decimated by periodic slashing, but there are many stunted specimens of the characteristic species, *Leptospermum continentale*, scattered throughout. Gorse is radiating from the northeast.

Vines: The light twiner, *Billardiera mutabilis* is scattered through the slashed ground flora.

Ferns: Absent.

Ground flora: Species sensitive to slashing have been depleted, but there are still many low-growing species. Lilies are abundant (*Arthropodium strictum*, *Burchardia umbellata*, *Dianella admixta*, *Tricoryne elatior*) and quite a few orchid plants were found (*Pterostylis nutans*, *Thelymitra ?pauciflora*), considering the vegetation's history and the time of year of the site inspection (May). The dominant indigenous ground flora species are *Themeda triandra*, *Poa morrisii*, *Microlaena stipoides*, *Rytidosperma* species and (to a lesser degree) *Gahnia radula* and *Lomandra filiformis*. The grass weeds, *Anthoxanthum odoratum* and *Agrostis capillaris*, are also among the dominant species. Other abundant species are *Bossiaea prostrata*, *Gonocarpus tetragynus*, *Poranthera microphylla* and *Opercularia ovata*. The following species are less abundant but characteristic of Valley Heathy Forest: *Acrotriche serrulata*, *Hardenbergia violacea* (one plant only), *Lepidosperma gunnii* and *Platylobium obtusangulum*.

Plant species

The following plant species were observed by the author on 23rd May 2004. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. Additional species would no doubt be detectable in other seasons.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia melanoxylon</i>		<i>Gahnia radula</i>
	<i>Acaena novae-zelandiae</i>		<i>Gonocarpus tetragynus</i>
	<i>Acrotriche serrulata</i>	V	<i>Hardenbergia violacea</i>
	<i>Arthropodium strictum</i>	V	<i>Hemarthria uncinata</i>
	<i>Austrostipa pubinodis</i>		<i>Lepidosperma gunnii</i>
	<i>Billardiera mutabilis</i>		<i>Leptospermum continentale</i>
	<i>Bossiaea prostrata</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Burchardia umbellata</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
E	<i>Centella cordifolia</i>		<i>Microlaena stipoides</i>
	<i>Dianella admixta</i>	V	<i>Opercularia ovata</i>
V	<i>Dillwynia cinerascens</i>	V	<i>Opercularia varia</i>
	<i>Eragrostis brownii</i>		<i>Oxalis exilis/perennans</i>
V	<i>Eucalyptus cephalocarpa</i>	V	<i>Platylobium obtusangulum</i>
E	<i>Eucalyptus radiata</i>		<i>Poa morrisii</i>

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Poranthera microphylla</i>		<i>Schoenus apogon</i>
	<i>Pterostylis nutans</i>	V	<i>Thelymitra ?peniculata</i>
	<i>Rytidosperma laeve</i>		<i>Themeda triandra</i>
	<i>Rytidosperma penicillatum</i>		<i>Tricoryne elatior</i>
	<i>Rytidosperma racemosum</i>	V	<i>Veronica gracilis</i>
Introduced Species			
	<i>Agrostis capillaris</i>		<i>Ehrharta erecta</i>
	<i>Anthoxanthum odoratum</i>		<i>Fraxinus angustifolia</i>
	<i>Arbutus unedo</i>		<i>Galium aparine</i>
	<i>Briza maxima</i>		<i>Hypochoeris radicata</i>
	<i>Conyza sumatrensis</i>		<i>Linum trigynum</i>
	<i>Cotoneaster glaucophyllus</i>		<i>Paspalum dilatatum</i>
	<i>Cotoneaster pannosus</i>		<i>Pittosporum undulatum</i>
			<i>Plantago lanceolata</i>
			<i>Prunus cerasifera</i>
			<i>Romulea rosea</i>
			<i>Rubus anglocandicans</i>
			<i>Ulex europaeus</i>
			<i>Vulpia bromoides</i>

Fauna habitat features

The cover of remnant trees within the site provides some habitat for forest and woodland birds in an area otherwise substantially depleted of suitable habitat. The ground flora no doubt provides habitat for some native insects. There are several Bull Ant nests, indicating higher ecological complexity than would be present in the absence of native understorey.

Significance ratings

Regionally Endangered Ecological Vegetation Class

Under the Department of Sustainability & Environment's criteria, this site contains a 'remnant patch' of an endangered EVC. According to 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), remnant patches of native vegetation belonging to an endangered EVC have a conservation significance rating of either High or Very High, depending on their ecological condition. In either case, any site containing a remnant patch of such vegetation is of **State** significance under the Department of Sustainability & Environment's standard criteria (Amos 2004 – criterion 3.2.3).

The author has misgivings about such a high rating for such a small site with poor long-term prospects of persistence, but these misgivings are overridden by the importance of consistency with the standard criteria.

Locally Threatened Plant Species

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Possible residential development;
- Slashing;
- Invasion by environmental weeds:
 - Serious: Brown-top Bent (*Agrostis capillaris*), Sweet Vernal-grass (*Anthoxanthum odoratum*), Gorse (*Ulex europaeus*);
 - Moderate: Large Quaking-grass (*Briza maxima*), cotoneasters (*Cotoneaster glaucophyllus* and *C. pannosus*), Panic Veldt-grass (*Ehrharta erecta*), Cleavers (*Galium aparine*), Cat's Ear (*Hypochoeris radicata*), French Flax (*Linum trigynum*), Paspalum (*Paspalum dilatatum*), Sweet Pittosporum (*Pittosporum undulatum*), Ribwort (*Plantago lanceolata*), Cherry Plum (*Prunus cerasifera*), Common Onion-grass (*Romulea rosea*), Blackberry (*Rubus discolor*), Squirrel-tail Fescue (*Vulpia bromoides*).

Note that Gorse and Blackberry are Regionally Controlled Weeds under the *Catchment and Land Protection Act 1994*.

- Loss or decline of plant species whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or elimination by incidents such as cubby house construction or digging by dogs.

Management issues

- The ecological condition of the native understorey vegetation could be improved significantly with relatively small effort, involving weed control and a changed slashing regimen;
- The main legal imperative for action is that Gorse is controlled under the *Catchment and Land Protection Act 1994*).

Administration matters

- This site is suited to inclusion under the proposed ESO2 overlay because it contains a remnant of an endangered EVC in reasonable condition;
- The site is presently covered by Vegetation Protection Overlay 3. This overlay is proposed in this study to be revised, but still cover this neighbourhood;
- The significance of the vegetation would not be maintained if the site were to be developed for residential use, as foreseen by the property's zoning. There could therefore be competition between different objectives of the Planning Scheme.

Information sources used in this assessment

- A site survey of 90 minutes undertaken during this study by Dr Lorimer on 23/5/04, following this study's standard procedures discussed in Section 2.4 of Volume 1. This included a description of the composition and condition of the vegetation, compilation of a list of indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats, management issues and populations of scarce or threatened plant species;
- A brief reinspection of the site from the footpath by Dr Lorimer on 10/3/08 to check that there had been no significant changes that would make the information above obsolete;
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Acknowledgment

Thank you to the landowner for permission to inspect the property.

Site 42. R.D. Egan-Lee Reserve, Knoxfield

A council reserve of 8.26 ha that includes 2½ ha of remnant forest. Melway ref. 73 A3.

Site Significance Level: *State*

- The native vegetation is the endangered Valley Heathy Forest, some of which is in good ecological condition;
- There are five plant species that are threatened with extinction in Knox and three others that are rare in Knox. Some of these species are present in dangerously small numbers;
- The ecological condition of native vegetation west of the playing fields has been improving steadily over recent years due to good management and the use of fire;
- The native vegetation east of the playing fields comprises not much more than a canopy of large old trees with hardy native grasses beneath, and this could serve as a basis for ecological restoration.



Aerial photograph taken April 2003



Scale 1:3,000

0 20 40 60 80 100m

Boundaries

This site is in two parts, outlined in red above and totalling 2.68 ha. The boundaries of the western section follow property boundaries except along the eastern side, where a segmented line has been drawn to encompass trees but avoid the playing fields. The boundaries of the eastern section follow property boundaries on the south and east, and the other sides are a simple geometric circumscription of the native vegetation (which includes revegetation that has been planted since the aerial photograph was taken). The hatched areas have negligible native vegetation and are not of biological significance.

Although it is desirable to align site boundaries with lot boundaries wherever practicable, in this case it was deemed important not to impose the controls of an Environmental Significance Overlay on playing fields and associated cleared areas that may well need to be further developed in future.

Trees lining the entrance to the reserve from Wallace Rd are not included in the site. They are nevertheless protected to some degree under the Knox Planning Scheme by Clause 52.17.

Land use & tenure: Council reserve, zoned 'Residential 1 Zone'.

Site description

The site is on a very shallow, north-facing slope, with elevations of approximately 80-85 m. The slope is generally less than 2% for a radius of more than 1 km around the site. The soil is shallow, silty, light grey loam over clay subsoil, derived from decomposition of the underlying Lower Devonian sedimentary rocks of the Humevale formation.

The aerial photograph shows that half of the reserve is occupied by playing fields, pavilions and associated car parks. Neither these areas, nor the open expanse to the east of the playing fields, are of any environmental significance and do not materially affect the remnant native vegetation on the rest of the reserve.

There are also mown, open areas within the native vegetation. These areas are included within the boundaries of the site because their management and administration affects the adjacent native vegetation.

Areas with little or no native vegetation are hatched on the aerial photograph above.

All the native vegetation has a history of slashing or mowing. The shrub layer and some of the trees have been cleared from the site long ago. However, some of the native understorey west of the playing fields has shown a remarkable resilience since Council ceased slashing it in 1996 (or thereabout). Seventy-seven indigenous plant species were recorded west of the playing fields in 2001, which is a very good tally for an area of its size in metropolitan Melbourne. Concerted management effort has suppressed the serious weeds while the native vegetation has regenerated. Part of the area was burned in 2002 to stimulate regeneration, and it is likely that the number of plant species present will continue to grow. The ecological condition of some of the area west of the playing fields is now rated B (good) on the A-D scale explained in Section 2.4.4 of Volume 1. This is particularly pleasing considering that the native vegetation belongs to the endangered Valley Heathy Forest. (The Department of Sustainability & Environment's present edition of the BioMap of extant EVCs shows Grassy Forest, contrary to this study and the BioMap of pre-1750 EVCs, and this seems to be an error.)

There are large pine trees within, and at the edge of, the native vegetation west of the playing fields. These can be recognised on the aerial photograph by their more intense green colour compared with the eucalypts.

Within the more easterly of the site's two polygons, the parts that appear on the 2003 aerial photograph to be open lawn have since been revegetated to provide a fairly rich reconstruction of Valley Heathy Forest. Prior to the revegetation, the native vegetation comprised not much more than a canopy of large old trees with hardy native grasses beneath.

Relationship to other land

The site is less than 300 m from Lakewood Nature Reserve (Site 43), which has a large area of forest habitat as well as a substantial lake. During fieldwork, the author saw Kookaburras, Rosellas, Musk Lorikeets, Rainbow Lorikeets and common urban birds moving between R.D. Egan-Lee Reserve and Lakewood Nature Reserve. It is likely that other fauna, such as insects and bats, also commute between the reserves.

There is almost no other native understorey for a radius of 900 m from these two reserves, and the nearest large areas of native vegetation are more than 3km away, along Dandenong Ck and in the Dandenong Ranges. These distances represent substantial disconnection of the reserves from other forest habitat, other than for mobile fauna such as large birds.

Bioregion: Gippsland Plain

Habitat type

Valley Heathy Forest (EVC 127, **regionally Endangered**)

West of the playing fields

There is approximately 1.6 ha of native vegetation, of which it is estimated that 0.16 ha is in good ecological condition (rating B), 0.42 ha is in fair ecological condition (rating C) and 1.0 ha is in poor ecological condition (rating D). 77 indigenous plant species were found (including one with two subspecies).

Canopy trees: Dominated by *Eucalyptus cephalocarpa* and *E. radiata* at a density that is approximately natural.

Lower trees: *Acacia melanoxylon* and *Exocarpos cupressiformis* dominate and there are some *Acacia mearnsii* and *Allocasuarina littoralis*.

Shrubs: Sparse due to a history of slashing until recent years. *Bursaria spinosa*, *Cassinia aculeata*, *Daviesia latifolia*, *Epacris impressa*, *Kunzea ericoides*, *Leptospermum continentale* and *Ozothamnus ferrugineus* are present.

Vines: *Billardiera mutabilis* is fairly abundant, *Hardenbergia violacea* is scattered and *Clematis microphylla* is represented by a single plant.

Ferns: Absent.

Ground flora: Densely grassy but also with scattered ericoid plants such as *Dillwynia cinerascens* and the characteristic species, *Hibbertia riparia*. The layer is dominated by *Poa morrisii*. *Austrostipa rudis* and *Lomandra filiformis* (both subspecies) are abundant, as is typical for Valley Heathy Forest. The grasses *Rytidosperma pallidum*, *Microlaena stipoides* and several species of *Rytidosperma* are also each abundant in some areas. The sedges *Gahnia radula* and *Lepidosperma gunnii* are present, the former being dense in patches. There are substantial populations of *Acaena echinata*, *Pterostylis nutans* and *Wurmbea dioica*, all of which are indicative of Valley Heathy Forest. The presence of *Austrofestuca hookeriana* and *Allittia cardiocarpa* near Allister Av indicates that the vegetation there is at the wetter end of the spectrum for Valley Heathy Forest.

East of the playing fields

There is approximately 0.55 ha of native vegetation with revegetated understorey, all in ecological condition C (fair). 17 wild indigenous plant species were found on 10th May 2002.

Canopy trees: Dominated by large *Eucalyptus cephalocarpa* and *E. radiata* at a density that is approximately natural. Hollows are present.

Lower trees: *Acacia melanoxylon* and *Exocarpos cupressiformis*.

Shrubs: Very sparse due to mowing, reduced to a few *Leptospermum continentale* and some *Melaleuca ericifolia*.

Vines: Absent.

Ferns: Absent.

Ground flora: Mown, dominated by *Microlaena stipoides* and with abundant *Lomandra filiformis*. There are also three species of *Rytidosperma* and two plants of the characteristic species, *Lepidosperma gunnii*. *Gonocarpus tetragynus* is present, but at low density due to mowing. The only other ground flora species is *Oxalis perennans s.l.*

Plant species

The following plant species were observed by the author during 2001-2. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, the two species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia mearnsii</i>	E	<i>Hibbertia riparia</i>
V	<i>Acacia melanoxylon</i> (wild & planted)	E	<i>Hypericum gramineum</i>
	<i>Acacia paradoxa</i>	E	<i>Hypoxis vaginata</i>
V	<i>Acaena echinata</i>		<i>Rytidosperma pallidum</i>
	<i>Acaena novae-zelandiae</i>		<i>Juncus bufonius</i>
	<i>Acrotriche serrulata</i>		<i>Kunzea ericoides</i> spp. agg.
C	<i>Allittia cardiocarpa</i>	V	<i>Lagenophora gracilis</i>
V	<i>Allocasuarina littoralis</i>		<i>Lepidosperma gunnii</i>
	<i>Arthropodium strictum</i>		<i>Leptospermum continentale</i>
C	<i>Austrofestuca hookeriana</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
	<i>Billardiera mutabilis</i>		<i>Lomandra longifolia</i>
	<i>Bossiaea prostrata</i>	V	<i>Luzula meridionalis</i>
	<i>Burchardia umbellata</i>	E	<i>Melaleuca ericifolia</i>
	<i>Bursaria spinosa</i>		<i>Microlaena stipoides</i>
V	<i>Caesia parviflora</i>	V	<i>Opercularia ovata</i>
	<i>Carex breviculmis</i>	V	<i>Opercularia varia</i>
	<i>Cassinia aculeata</i>		<i>Oxalis exilis/perennans</i>
	<i>Cassinia arcuata</i>	E	<i>Ozothamnus ferrugineus</i>
E	<i>Centella cordifolia</i>	V	<i>Platylobium obtusangulum</i>
NA	<i>Clematis decipiens</i>		<i>Poa morrisii</i>
V	<i>Coprosma quadrifida</i>		<i>Poranthera microphylla</i>
V	<i>Crassula decumbens</i>		<i>Pterostylis nutans</i>
E	<i>Daviesia latifolia</i>	E	<i>Ranunculus lappaceus</i>
	<i>Deyeuxia quadriseta</i>		<i>Rytidosperma linkii</i> var. <i>fulvum</i>
	<i>Dianella admixta</i>		<i>Rytidosperma penicillatum</i>
V	<i>Dianella longifolia</i> s.l.		<i>Rytidosperma racemosum</i>
	<i>Dichondra repens</i>		<i>Rytidosperma setaceum</i>
V	<i>Dillwynia cinerascens</i>		<i>Rytidosperma tenuius</i>
V	<i>Drosera peltata</i> subsp. <i>auriculata</i>		<i>Schoenus apogon</i>
V	<i>Drosera whittakeri</i>		<i>Senecio hispidulus</i>
V	<i>Epacris impressa</i>	V	<i>Solanum ?laciniatum</i>
V	<i>Eucalyptus cephalocarpa</i>	V	<i>Solenogyne dominii</i>
E	<i>Eucalyptus radiata</i>	E	<i>Stackhousia monogyna</i>
V	<i>Exocarpos cupressiformis</i>		<i>Themeda triandra</i>
	<i>Gahnia radula</i>		<i>Tricoryne elatior</i>
	<i>Gonocarpus tetragynus</i>	V	<i>Veronica gracilis</i>
	<i>Goodenia lanata</i>	E	<i>Viola hederacea</i>
V	<i>Hardenbergia violacea</i>	E	<i>Wurmbea dioica</i>
V	<i>Helichrysum scorpioides</i>	E	<i>Xanthosia dissecta</i>

Introduced Species

<i>Acacia floribunda</i>	<i>Ehrharta erecta</i>	<i>Pinus radiata</i>	<i>Soliva sessilis</i>
<i>Agrostis capillaris</i>	<i>Ehrharta longiflora</i>	<i>Pittosporum undulatum</i>	<i>Sparaxis</i> sp.
<i>Allium triquetrum</i>	<i>Freesia alba</i> × <i>leichtlinii</i>	<i>Plantago lanceolata</i>	<i>Stellaria media</i>
<i>Anthoxanthum odoratum</i>	<i>Genista monspessulana</i>	<i>Poa annua</i>	<i>Vulpia bromoides</i>
<i>Cerastium glomeratum</i> s.l.	<i>Hypochoeris radicata</i>	<i>Romulea rosea</i>	
<i>Dactylis glomerata</i>	<i>Oxalis pes-caprae</i>	<i>Rubus anglocandicans</i>	

Notes concerning some of the locally threatened plant species

Allittia cardiocarpa (Swamp Daisy). Six plants were seen near Allister Av.

Austrofestuca hookeriana (Hooker's Fescue). Three plants were seen near Allister Av.

Clematis microphylla (Small-leaved Clematis). A single plant, approximately 30 m north of Allister Av.

Crassula decumbens (Spreading Crassula). A viable population in the reserve's northwestern corner.

Hypoxis vaginata (Sheath Star). Six plants were seen west of the playing fields, and others could have been overlooked.

Luzula meridionalis (Common Woodrush). Found west of the playing fields.

Ranunculus lappaceus (Australian Buttercup). A single plant was found near the middle of the western boundary.

Wurmbea dioica (Common Early Nancy). At least dozens are present west of the playing fields, possibly many more.

There is also a large eucalypt east of the playing fields that appears to be a hybrid. This is of mild scientific significance.

Fauna of special significance

None recorded during site inspection. The birdlife observed incidentally during fieldwork was most typical of urban, treed neighbourhoods, except for Kookaburras, more than the usual numbers of Eastern Rosellas and large numbers of Musk Lorikeets.

Fauna habitat features

The cover of remnant trees and the presence of tree hollows suggests that native bats and birds such as parrots should find suitable habitat here, but this could not be confirmed by the incidental observation of fauna during the flora survey. There is also a modest number of logs and branches on the ground and a shrub layer that is dense enough in patches to provide sites for bird nests, several of which were seen.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Regionally Endangered Ecological Vegetation Class

The site contains remnant patches of a regionally endangered EVC. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that R.D. Egan-Lee Reserve's native vegetation is of at least High conservation significance. This, in turn, gives the site **State** significance under criterion 3.2.3 of Amos (2004).

Rare or Threatened Flora

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Dumping of garden waste (particularly from a house in Olney Ct) – medium-level threat;
- Invasion by Panic Veldt-grass (*Ehrharta erecta*) beneath Cherry Ballarts – medium-level threat;
- Invasion by Onion-grass (*Romulea rosea*) in the more open areas – low or medium-level threat;
- Eucalypt dieback disease – medium-level threat;
- Loss or decline of plant species that have such small populations that they are vulnerable to inbreeding, poor reproductive success or random events such as cubby house construction or digging by dogs. Affected species include only one each of *Cassinia aculeata* and *Clematis microphylla*;
- Reduced visitation of the site by small insect-eating birds due to habitat fragmentation, possibly leading to a worsening of plant pests and diseases;
- Trampling – medium-level threat;
- Vandalism (youths observed uprooting and breaking plants) – medium-level threat.

Management issues

- The program of management west of the playing fields has proved very effective and should continue. This includes use of fire in 2002 according to the guidance in 'Fire in Knox Bushland Reserves 2001' by Lorimer (2001);
- The area west of the playing fields has been in rapid change and its vegetation has not been intensively surveyed for several years. A spring survey would be desirable, with particular focus on the efficacy of the fire in 2002;
- Removal of pines would be desirable on ecological and aesthetic grounds, but the expense may not be justified;
- Mowing around some edges of the open areas within the bushland west of the playing fields could be progressively reduced where there are signs that indigenous flora might establish itself. This would need to be monitored and combined with weed control wherever weeds threaten to overtake regenerating native vegetation;
- Mowing could be reduced beneath the trees east of the playing fields to see how much natural regeneration of understorey occurs. The present frequency of mowing appears unnecessary. Herbicide should not be used around the bases of tree trunks;
- Depending on how seriously Council and the State government take the policy of achieving a Net Gain in the quality and extent of native vegetation, particularly for endangered EVCs, the treed area east of the playing fields could be a good candidate for restoration of Valley Heathy Forest, complete with ground flora.

Administration matters

- This site is suited to inclusion under the proposed ESO2 overlay because it is of State significance and contains a remnant of an endangered EVC, partly in good condition;
- The site is presently covered by Vegetation Protection Overlay 1, which also includes the trees along the driveway from Wallace Rd. This overlay was applied partly because of the study by Water Ecoscience (1998), in which this is Site 14;
- Trees along the driveway receive some protection under clause 52.17 of the Knox Planning Scheme;
- Future development of sports facilities should respect the adjacent native vegetation, including the trees just mentioned. Temporary fencing might be required if construction machinery or car parking are to be allowed anywhere near the native vegetation.

Information sources used in this assessment

- A site survey by Dr Lorimer of vegetation west of the playing fields, taking at least ten hours during September and October 2001. This followed nearly all of this study's standard procedures discussed in Section 2.4 of Volume 1 including descriptions of the vegetation composition, compilation of lists of indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats, management issues and populations of scarce or threatened plant species. This was conducted principally for the report, 'Fire in Knox Bushland Reserves 2001' by Lorimer (2001);
- A 55-minute site survey of the area east of the playing fields by Dr Lorimer on 10/5/02, using this study's standard procedures (similar to west of the playing fields);
- Brief re-visits of the area east of the playing fields in May 2004 and March 2008 to update the site description and ensure the information remains relevant;
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 43. Lakewood Nature Reserve, Knoxfield

Council reserve with bushland, a lake, a small dam, revegetation areas and open, grassed areas. Melway ref. 73 C2.

Site Significance Level: *State*

- One of the most important wildlife sites in Knox, because its artificial lake is frequented by many rare waterbirds;
- There are also many flora species that are threatened in Victoria, regionally or within Knox;
- The lake is fringed by the regionally endangered EVC, Aquatic Herbland, partly in good ecological condition;
- There are also forest remnants of the endangered Valley Heathy Forest and Swampy Woodland, partly in good ecological condition.



The site boundary is shown in red. Neighbouring sites are outlined and labelled in bright yellow. Areas of native vegetation are outlined in white, with dashed white lines demarcating different EVCs.

Boundaries

The site is the whole of the reserve, outlined in red on the aerial photograph above. It occupies 18.05 ha and nine lots, whose boundaries are drawn in pale orange on the aerial photograph.

Land use & tenure: Council park for the purposes of passive recreation, nature conservation, drainage and flood mitigation. The northern and southern 'wings' of the reserve and the area around the dam marked on the aerial photograph are zoned R1Z – Residential 1 Zone. A relatively small part of the site, southeast of the dam, is zoned PUZ6 – Public Use Zone Local Government. The remainder of the site – including all cleared areas and some of the natural forest, is zoned PUZ1 – Public Use Zone Service and Utility.

Site description

This site is at elevations of 70-81 m in a broad, very shallow valley facing westward, between the valleys of Blind Ck and Monbulk Ck.

The site has very shallow slopes ($\leq 5\%$), with two drainage lines that both flow into an artificial lake with an area of 3.3 ha and a depth of 2 m. The more substantial drainage line is called the Riddell Drain (marked on the aerial photograph). It flows westward into the lake's eastern end, and has been excavated to install a pipe and a channel that flows intermittently with stormwater from the residential area to the east.

The other drainage line is very shallow and indistinct. It passes through the northern extremity of the reserve, labelled 'Swampy Woodland' on the aerial photograph. Surface water in this drainage line has appeared only briefly in recent years, but the presence of dense, tall Swamp Paperbarks (*Melaleuca ericifolia*) indicates that surface water would have been quite common prior to urbanisation and drainage of the area to the north.

The aerial photograph shows a small dam on the minor drainage line just northeast of the lake, filled partly by stormwater from the nearby residential area.

The natural topsoil along the more major drainage line is alluvium washed down from higher up the catchment. The minor drainage line has shallower alluvium. There are also swamp deposits beneath the lake. The rest of the site has shallow, poorly draining, light grey loam over clay subsoil, derived from decomposition of the underlying Lower Devonian siltstones of the Humevale formation.

The lake was constructed in 1985, according to Melbourne Water. It is one of the most biologically significant features of the whole municipality. The abundant waterbirds that visit the lake have introduced numerous native wetland plants, including some that are quite rare. These plants have developed into the regionally endangered EVC, Aquatic Herbland, around the lake perimeter. The lake's water level rises and falls seasonally and from year to year, causing the width and composition of the fringing vegetation to vary. The aerial photograph above shows a time of low water, showing clear zonation into bands parallel with the water's edge, dominated variously by rushes, sedges, Water Couch (*Paspalum distichum*) and short-lived species such as Waterwort (*Elatine gratioloides*) and the rare mud-mat, *Glossostigma cleistanthum*.

The last of these species is testament to the remarkable ability of wetland plants to spread across the landscape with the aid of waterbirds: the nearest record of the species prior to this study is near the Murray River, 200 km away, according to Walsh and Entwisle (1999) and *Australia's Virtual Herbarium* on the internet. There are also other rare plants such as Pigweed (*Dysphania glomulifera*) and the wetland weed, *Bidens tripartita*, which is more than 100 km further west than any previously known occurrence in Australia.

The plants originally brought into the lake by waterbirds have, in turn, come to provide habitat for waterbirds and frogs. Threatened bird species, such as the resident Blue-billed Ducks and Hardheads, can be seen on and around the lake daily. The fact that dabbling species can be seen diving suggests that the lake bottom is probably at least partially vegetated and has some ecological function, but no vegetation could be found by wading in gumboots in the eastern (shallow) end of the lake.

A vegetated island can be seen on the aerial photograph, but it was not visited for this study. Its perimeter was observed being used for hunting by the uncommon Great Crested Grebe and threatened egrets, and beaches around it were seen being used by other uncommon birds such as Blue-billed Ducks and Black-fronted Dotterels.

The lake is an excellent example of how a wetland can be artificially created and acquire the species, diversity and ecological functions of a naturally created ecosystem. It well deserves a proper investigation of its aquatic and amphibious fauna. It is also an excellent resource for recreation, amenity and education (e.g. by the neighbouring Knox Park Primary School, Site 108).

The adjacent small dam provides similar habitat to the lake, but rare waterbirds are less likely to use it and it is periodically excavated to remove silt. In 1989, several of the plant species growing on its eastern bank were rare in the Melbourne area, e.g. *Mazus pumilio*. These had declined by 1999, apparently due mainly to machinery operating there to remove silt. The rare species are now no longer visible, being replaced by the bare ground that can be seen on the aerial photograph. There

is a slight chance that one or more of the rare species may reappear after the current drought, perhaps nearby, but mowing, heavy foot traffic and further de-silting works are likely to prevent or destroy any regeneration.

There is a large old Silver-leafed Stringybark (*Eucalyptus cephalocarpa*) north of the lake and a small area of remnant understorey around it. The tree is significant for its size and the likely habitat value of its hollows. It is circled in white on the aerial photograph. Its ecological function is being increasingly augmented by adjacent revegetation areas. There are many more revegetation plots on the southern side of the lake.

Open, grassed areas around the lake are fairly heavily grazed by waterbirds, mainly Purple Swamphens and Australian Wood Ducks. Masked Lapwings also frequently use the grassed areas.

During the fieldwork for this study, insectivorous bats were seen above the lake at dusk. They may be just as numerous above the forest, but less easily seen. They would be roosting during the daytime in hollows and fissures within the forest's trees.

The reserve's 5½ ha of forest are of comparable biological significance to the lake. The two EVCs that are present, Valley Heathy Forest and Swampy Woodland, are both regionally endangered, and they tend to intergrade into one another. The forest's ecological condition is quite variable, but there is some of each EVC in good ecological condition. The main causes for deterioration of the native vegetation have been the effects of clearing and drainage works, and consequential invasion by environmental weeds.

Eucalypt dieback is widespread, and has been severe in parts but is apparently not worsening. The canopy of tall Swamp Paperbarks (*Melaleuca ericifolia*) in the northwestern corner was reported by Jaremovic *et al.* (1989) to be dense in 1989, but has been observed steadily thinning as the trees senesce. Regeneration of paperbarks has probably been inhibited by the drier soil conditions that have resulted from drainage schemes in the residential area immediately uphill, but some regeneration occurred in 2003.

Weed infestations that were severe in many parts of the forest until recent years have been eradicated and there is extensive natural regeneration of indigenous flora, including species that are rare or threatened in the Melbourne area.

Ecological burning has been conducted in the reserve in recent years. This has regenerated some indigenous plant species as well as the serious weed, Gorse (*Ulex europaeus*). Knox City Council is keeping serious weeds such as Gorse under control.

A feature of particular interest is the unusually high abundance of Black Sheoak (*Allocasuarina littoralis*) in the forest, in both the Valley Heathy Forest and the Swampy Woodland. Such a large, secure, breeding population is unusual in the Melbourne area.

The reserve is fairly popular for passive recreation. It has a 'Friends' group and is used as an educational resource by the adjacent Knox Park Primary School. It has a path system with paving, boardwalks, a pier and signs about natural history, as well as informal paths that cause some damage to the vegetation. There are no buildings.

The reserve was part of the Scoresby Horticultural Research Station until the 1980s.

Relationship to other land

The site's canopy of Valley Heathy Forest continues into the adjoining Knox Park Primary School (Site 108), which has very scarce and patchy native understorey. There is a gap of less than 200 m from there to R.D. Egan-Lee Reserve (Site 41). Some birds and insects no doubt commute between these sites, but the incidental observations during the fieldwork for this study did not reveal such movements other than by common urban birds and Musk Lorikeets.

There is almost no other native understorey for a radius of 900 m from these three sites, and the nearest 'core' areas of native vegetation are more than 3 km away, along Dandenong Ck and in the Dandenong Ranges. These distances represent substantial disconnection of the reserves from other forest habitat, other than for mobile fauna such as waterbirds.

Many of the abundant waterbirds at the lake apparently move between there and the various other lakes on the floodplain of the Dandenong Creek system, including the Dept of Primary Industries' dam 1.2 km to the north-northeast, Caribbean Lake, Koolamarra Waters, the Waterford Valley lakes and Jells Park's lake. Some species of waterbirds move among these on a daily basis and others move seasonally.

Bioregion: Gippsland Plain

Habitat types

Open Water in the lake and small dam, with no vegetation detectable by wading in gumboots. The size of the area varies above and below 3.3 ha as the water level rises and falls from month to month and year to year. This habitat is critical for the many significant waterbirds that live in the reserve or visit it.

Aquatic Herbland (EVC 653, **regionally Endangered**) fringing the lake and small dam. Although the water bodies are artificially created, the fringing vegetation has colonised naturally. The area is typically 1.5 ha but varies as the water level rises and falls. The ecological condition also varies but can be reasonably characterised as roughly equally divided between all four ratings A to D (i.e. between excellent and poor). 47 indigenous plant species recorded.

Trees and vines: None.

Shrubs: There are a few *Goodenia ovata* and *Melaleuca ericifolia* on the southern fringe, and several seedlings of *Viminaria juncea* have been planted at the eastern end of the lake.

Ferns: Four patches of *Hypolepis rugosula* on the southern fringe.

Ground flora: Dominated by indigenous rushes, particularly *Juncus sarophorus* and *Juncus procerus*, with patches of various *Pericaria* species (particularly *P. decipiens*), *Carex appressa*, *Carex gaudichaudiana*, *Typha* species, *Triglochin striatum*, *Eleocharis acuta* and seasonally, many small, amphibious herbs such as *Elatine gratioloides*, *Glossostigma cleistanthum*, *Dysphania glomulifera*, *Isolepis* species and *Alternanthera denticulata*. There are also bands of the serious weed, *Paspalum distichum*. *Alisma plantago-aquatica* is abundant, as are *Helichrysum luteoalbum* and *Senecio campylocarpus*, in season.

Valley Heathy Forest (EVC 127, **regionally Endangered**): 2.8 ha in total, comprising approximately 0.8 ha in good ecological condition (rating B), 1.9 ha in fair ecological condition (rating C) and 0.1 ha in poor ecological condition (rating D). 65 indigenous plant species recorded.

Dominant canopy trees: *Eucalyptus cephalocarpa* with smaller numbers of *Eucalyptus radiata* and *Eucalyptus ovata*.

Dominant lower trees: *Acacia melanoxylon*, *Acacia mearnsii*, *Exocarpos cupressiformis* and *Allocasuarina littoralis* are fairly dense.

Shrubs: There is a shrub layer that is approximately 3 m tall, mostly dense and prickly at maturity but with open patches. It is dominated by *Bursaria spinosa*, accompanied variously by *Coprosma quadrifida*, *Leptospermum continentale*, *Leptospermum scoparium* or *Kunzea ericoides*. *Acacia paradoxa* and *Cassinia arcuata* are also locally abundant following fire or mild soil disturbance. There are also plenty of smaller shrubs, of which *Epacris impressa* is the main species emerging above the ground layer.

Vines: *Billardiera mutabilis* is fairly abundant but with small total cover. There is one dense patch of *Clematis aristata*.

Ferns: *Pteridium esculentum* is dense in patches.

Ground flora: Grassy but with scattered sub-shrubs including the characteristic species, *Hibbertia riparia*. There are patches dominated variously by *Microlaena stipoides*, *Gahnia radula*, *Poa morrisii*, *Austrostipa rudis* and several *Rytidosperma* species. Other abundant species are *Arthropodium strictum*, *Burchardia umbellata*, *Caesia parviflora*, *Dianella longifolia*, *Dillwynia cinerascens*, *Gonocarpus tetragynus*, *Goodenia lanata*, *Rytidosperma pallidum*, *Lepidosperma gunnii*, *Lomandra filiformis*, *Themeda triandra* and *Xanthorrhoea minor*. The characteristic species *Acrotliche serrulata*, *Bossiaea prostrata*, *Caesia parviflora*, *Dianella admixta*, *Pimelea humilis*, *Platylobium obtusangulum* and *Veronica gracilis* are present.

Swampy Woodland (EVC 937, **regionally Endangered**): 2.5 ha in total, estimated to comprise 0.15 ha in good ecological condition (rating B), 1.55 ha in fair ecological condition (rating C) and 0.8 ha in poor ecological condition (rating D). 68 indigenous plant species recorded.

Dominant canopy trees: *Eucalyptus ovata* to approx 20 m tall, with considerably fewer *Eucalyptus cephalocarpa* and occasional *Eucalyptus radiata*.

Dominant lower trees: Rather dense, comprising *Acacia melanoxylon*, *Acacia mearnsii*, *Exocarpos cupressiformis*, *Allocasuarina littoralis* and a tall patch of *Melaleuca ericifolia*.

Shrubs: There is a layer approximately 4 m tall, dominated by *Coprosma quadrifida* with smaller numbers of *Ozothamnus ferrugineus*, *Bursaria spinosa*, *Kunzea ericoides* and *Leptospermum scoparium*. There are also scattered lower shrubs, comprising *Acacia verticillata*, *Leptospermum continentale* and *Goodenia ovata*.

Vines: *Billardiera mutabilis* is fairly abundant.

Ferns: *Pteridium esculentum* is scattered and there is a dense, ferny patch that includes approximately 13 *Cyathea australis* and one plant each of *Polystichum proliferum* and *Adiantum aethiopicum*.

Ground flora: Dominated variously by *Lomandra longifolia*, *Gahnia radula*, *Gahnia sieberiana*, *Microlaena stipoides* and patches of *Pteridium esculentum*. Species that are abundant but not dominant include *Acaena novae-zelandiae*, *Burchardia umbellata*, *Dianella longifolia*, *Gonocarpus tetragynus*, *Poa morrisii* and *Austrostipa rudis*. The characteristic species, *Goodenia elongata*, *Hemarthria uncinata*, *Dianella tasmanica*, *Lobelia anceps* and *Poa tenera* are all present.

Plant species

The following plant species were observed in the years indicated. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Glossostigma cleistanthum*, *Senecio campylocarpus* and *Acacia leprosa* (Dandenong Range variant) are rare

nationally, *Lepidium pseudohyssopifolium* is listed as 'data deficient' in Victoria and species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species		Risk	Indigenous Species	
V	<i>Acacia leprosa</i> (Dandenong Range variant)	2009	V	<i>Epacris impressa</i>	2007
	<i>Acacia leprosa</i> × <i>paradoxa</i>	1989	V	<i>Epilobium billardierianum</i> ssp. <i>cinereum</i>	2007
V	<i>Acacia mearnsii</i>	2007		<i>Epilobium hirtigerum</i>	2007
V	<i>Acacia melanoxylon</i>	2007		<i>Epilobium ?pallidiflorum</i>	2009
E	<i>Acacia myrtifolia</i> (planted)	2007		<i>Eragrostis brownii</i>	2004
	<i>Acacia paradoxa</i> (wild and planted)	2007	V	<i>Eucalyptus cephalocarpa</i>	2007
V	<i>Acacia verticillata</i>	2007	V	<i>Eucalyptus cypellocarpa</i>	1989
	<i>Acaena novae-zelandiae</i>	2007	V	<i>Eucalyptus melliodora</i> (perhaps planted)	2009
	<i>Acrotriche serrulata</i>	2007	V	<i>Eucalyptus obliqua</i>	2007
V	<i>Adiantum aethiopicum</i>	2009	V	<i>Eucalyptus ovata</i>	2007
	<i>Alisma plantago-aquatica</i>	2007	E	<i>Eucalyptus radiata</i>	2007
V	<i>Allocasuarina littoralis</i>	2007	E	<i>Euchiton involucratus</i>	2007
V	<i>Alternanthera denticulata</i>	2007	E	<i>Euchiton sphaericus</i>	2009
	<i>Arthropodium strictum</i>	2007	V	<i>Exocarpos cupressiformis</i>	2009
	<i>Austrostipa pubinodis</i>	2007		<i>Gahnia radula</i>	2007
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	2007	E	<i>Gahnia sieberiana</i>	2009
C	<i>Baumea rubiginosa</i>	2007	E	<i>Glossostigma cleistanthum</i>	2009
	<i>Billardiera mutabilis</i>	2007		<i>Gonocarpus tetragynus</i>	2007
	<i>Bossiaea prostrata</i>	2004	C	<i>Goodenia elongata</i>	2007
	<i>Burchardia umbellata</i>	2007	E	<i>Goodenia humilis</i>	1999
	<i>Bursaria spinosa</i>	2009		<i>Goodenia lanata</i>	2007
V	<i>Caesia parviflora</i>	2007		<i>Goodenia ovata</i> (wild and planted)	2007
	<i>Campylopus clavatus</i>	2009	C	<i>Hakea nodosa</i> (planted)	2007
	<i>Campylopus introflexus</i>	2007	V	<i>Hardenbergia violacea</i>	2009
	<i>Carex appressa</i>	2007	V	<i>Helichrysum luteoalbum</i>	2007
	<i>Carex breviculmis</i>	2007	V	<i>Helichrysum scorpioides</i>	2007
E	<i>Carex gaudichaudiana</i> (wild & planted)	2007	V	<i>Hemarthria uncinata</i>	2007
	<i>Carex tereticaulis</i> (planted)	2007	E	<i>Hibbertia riparia</i>	2007
	<i>Carex inversa</i> (perhaps not indigenous)	1989	V	<i>Hovea heterophylla</i>	2004
	<i>Cassinia aculeata</i>	1999	V	<i>Hydrocotyle hirta</i>	2007
	<i>Cassinia arcuata</i>	2007	E	<i>Hydrocotyle laxiflora</i>	1999
V	<i>Cassinia longifolia</i>	2009	E	<i>Hypericum gramineum</i>	2004
V	<i>Cassinia longifolia</i>	2009		<i>Hypnum cupressiforme</i>	2009
E	<i>Centella cordifolia</i>	2007	C	<i>Hypolepis rugosula</i>	2007
	<i>Chiloscyphus ?semiteres</i>	2009	E	<i>Imperata cylindrica</i>	2007
V	<i>Clematis aristata</i>	2009	E	<i>Isolepis cernua</i> var. <i>platycarpa</i>	2002
	<i>Clematis decipiens</i>	2009	V	<i>Isolepis inundata</i>	2007
V	<i>Comesperma volubile</i>	2007		<i>Juncus amabilis</i>	2009
C	<i>Coprosma hirtella</i>	1989		<i>Juncus bufonius</i>	2007
V	<i>Coprosma quadrifida</i>	2009		<i>Juncus gregiflorus</i>	2007
V	<i>Cotula australis</i>	2009	C	<i>Juncus holoschoenus</i>	2004
V	<i>Crassula decumbens</i>	2009		<i>Juncus pallidus</i>	2007
E	<i>Crassula helmsii</i> (wild & planted)	2009	E	<i>Juncus planifolius</i>	1999
E	<i>Cyathea australis</i>	2009	E	<i>Juncus procerus</i>	2007
E	<i>Daviesia latifolia</i>	2009		<i>Juncus sarophorus</i>	2007
	<i>Deyeuxia quadriseta</i>	2004	E	<i>Juncus subsecundus</i> (planted)	2002
	<i>Dianella admixta</i>	2007	C	<i>Kennedia prostrata</i>	2002
V	<i>Dianella longifolia</i> s.l.	2007		<i>Kunzea ericoides</i> spp. agg.	2007
V	<i>Dianella tasmanica</i>	1989		<i>Lachnagrostis filiformis</i>	2007
	<i>Dichelachne rara</i>	2007	V	<i>Lagenophora gracilis</i>	2009
V	<i>Dillwynia cinerascens</i>	2007	E	<i>Lemna disperma</i>	1989
V	<i>Drosera whittakeri</i>	2009	C	<i>Lepidium pseudohyssopifolium</i>	2009
E	<i>Dysphania glomulifera</i>	2007		<i>Lepidosperma gunnii</i>	2007
E	<i>Elatine gratioloides</i>	2009	V	<i>Lepidosperma laterale</i>	2009
V	<i>Eleocharis acuta</i>	2009	V	<i>Leptorhynchus tenuifolius</i>	1999
	<i>Eleocharis sphacelata</i>	1989		<i>Leptospermum continentale</i>	2007
			E	<i>Leptospermum scoparium</i>	2007

Risk	Indigenous Species		Risk	Indigenous Species	
V	<i>Lindsaea linearis</i>	2009		<i>Ptychomnion aciculare</i>	2007
E	<i>Lobelia anceps</i>	2002		<i>Riccia crystallina</i>	2009
	<i>Lomandra filiformis</i>	1989		<i>Rosulabryum billarderi</i>	2009
	<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	2007		<i>Rytidosperma ?linkii</i> var. <i>fulvum</i>	2007
	<i>Lomandra filiformis</i> subsp. <i>filiformis</i>	2009		<i>Rytidosperma pallidum</i>	2007
	<i>Lomandra longifolia</i>	2007		<i>Rytidosperma penicillatum</i>	2002
	<i>Lunularia cruciata</i>	2009	E	<i>Rytidosperma semiannulare</i>	2002
V	<i>Lythrum hyssopifolia</i>	2007		<i>Rytidosperma setaceum</i>	1999
C	<i>Mazus pumilio</i> (destroyed in the 1990s)	1989		<i>Rytidosperma tenuius</i>	2007
E	<i>Melaleuca ericifolia</i>	2007		<i>Schoenus apogon</i>	2007
	<i>Microlaena stipoides</i>	2007	C	<i>Schoenus tesquorum</i>	1989
	<i>Microtis parviflora</i>	2009	E	<i>Senecio campylocarpus</i>	2009
V	<i>Opercularia ovata</i>	1989		<i>Senecio glomeratus</i>	2009
V	<i>Opercularia varia</i>	2007		<i>Senecio hispidulus</i>	2007
	<i>Oxalis exilis/perennans</i>	2007	E	<i>Senecio minimus</i>	2004
E	<i>Ozothamnus ferrugineus</i>	2007	E	<i>Senecio prenanthoides</i>	2007
	<i>Pandorea pandorana</i>	2009		<i>Senecio quadridentatus</i>	2004
	<i>Persicaria decipiens</i>	2007	C	<i>Solanum aviculare</i>	2007
E	<i>Persicaria hydropiper</i>	2007	V	<i>Solanum laciniatum</i>	2009
E	<i>Persicaria lapathifolia</i>	2004	V	<i>Thelymitra peniculata</i>	1989
E	<i>Persicaria praetermissa</i>	1989		<i>Themeda triandra</i>	2007
V	<i>Pimelea humilis</i>	2007		<i>Thuidiopsis furfurosa</i>	2009
V	<i>Platylobium obtusangulum</i>	2007		<i>Tricoryne elatior</i>	2007
	<i>Poa ensiformis</i>	2007	E	<i>Triglochin striata</i> (flat leaf variant)	2009
	<i>Poa morrisii</i>	2007	E	<i>Typha domingensis</i>	2007
E	<i>Poa tenera</i>	2004	E	<i>Typha orientalis</i>	2004
E	<i>Polyscias sambucifolia</i>	2009	V	<i>Veronica gracilis</i>	2009
E	<i>Polystichum proliferum</i>	2009	C	<i>Viminaria juncea</i> (planted)	2007
E	<i>Pomaderris aspera</i> (planted)	2007	E	<i>Viola hederacea</i>	2007
	<i>Poranthera microphylla</i>	2009	E	<i>Wahlenbergia gracilis</i>	2009
V	<i>Potamogeton ochreatus</i>	2007	V	<i>Xanthorrhoea minor</i>	2007
	<i>Pteridium esculentum</i>	2009	E	<i>Xanthosia dissecta</i>	2004

Introduced Species

<i>Acacia baileyana</i>	<i>Cordyline australis</i>	<i>Helminthotheca echioides</i>	<i>Plantago coronopus</i>
<i>Acacia longifolia</i> subsp. <i>longifolia</i>	<i>Cortaderia selloana</i>	<i>Holcus lanatus</i>	<i>Plantago lanceolata</i>
<i>Acetosella vulgaris</i>	<i>Cotoneaster glaucophyllus</i>	<i>Hypericum tetrapterum</i>	<i>Plantago major</i>
<i>Agrostis capillaris</i>	<i>Cotoneaster pannosus</i>	<i>Hypochoeris glabra</i>	<i>Poa annua</i>
<i>Allium triquetrum</i>	<i>Cotoneaster simonsii</i>	<i>Hypochoeris radicata</i>	<i>Polygonum aviculare</i> s.l.
<i>Anagallis arvensis</i>	<i>Cotula coronopifolia</i>	<i>Juncus articulatus</i>	<i>Prunella vulgaris</i>
<i>Anthoxanthum odoratum</i>	<i>Crassula multicava</i>	<i>Juncus bulbosus</i>	<i>Prunus cerasifera</i>
Apiaceae sp.	<i>Crataegus monogyna</i>	<i>Leontodon taraxacoides</i>	<i>Pyrus communis</i>
<i>Arbutus unedo</i>	<i>Crepis capillaris</i>	<i>Lepidium didymum</i>	<i>Ranunculus muricatus</i>
<i>Arctotheca calendula</i>	<i>Cynodon dactylon</i>	<i>Ligustrum lucidum</i>	<i>Ranunculus repens</i>
<i>Aster subulatus</i>	<i>Cyperus eragrostis</i>	<i>Ligustrum vulgare</i>	<i>Ranunculus sceleratus</i>
<i>Atriplex prostrata</i>	<i>Dactylis glomerata</i>	<i>Lolium perenne</i>	<i>Raphanus raphanistrum</i>
<i>Bidens tripartita</i>	<i>Danthonia procumbens</i>	<i>Lonicera japonica</i>	<i>Romulea rosea</i>
<i>Briza maxima</i>	<i>Daucus carota</i>	<i>Lotus corniculatus</i>	<i>Rubus anglocandicans</i>
<i>Bromus catharticus</i>	<i>Echinochloa crus-galli</i>	<i>Lotus subbiflorus</i>	<i>Rubus ulmifolius</i>
<i>Callitriche stagnalis</i>	<i>Ehrharta erecta</i>	<i>Lythrum junceum</i>	<i>Rumex conglomeratus</i>
<i>Cardamine ?hirsuta</i> s.l.	<i>Ehrharta longiflora</i>	<i>Malus pumila</i>	<i>Rumex crispus</i>
<i>Centaurium erythraea</i>	<i>Epilobium ciliatum</i>	<i>Medicago polymorpha</i>	<i>Salix cinerea</i>
<i>Cerastium glomeratum</i> s.l.	<i>Euphorbia peplus</i>	<i>Myoporum insulare</i>	<i>Senecio vulgaris</i>
<i>Chenopodium album</i>	<i>Festuca arundinacea</i>	<i>Oxalis pes-caprae</i>	<i>Setaria parviflora</i>
<i>Chrysanthemoides monilifera</i> subsp. <i>monilifera</i>	<i>Fraxinus angustifolia</i>	<i>Paspalum dilatatum</i>	<i>Sisyrinchium iridifolium</i>
<i>Cirsium vulgare</i>	<i>Fumaria bastardii</i>	<i>Paspalum distichum</i>	<i>Solanum americanum</i>
<i>Conyza sumatrensis</i>	<i>Galium aparine</i>	<i>Phalaris arundinacea</i>	<i>Solanum mauritianum</i>
<i>Coprosma repens</i>	<i>Genista monspessulana</i>	<i>Pinus radiata</i>	<i>Solanum nigrum</i>
	<i>Grevillea rosmarinifolia</i>	<i>Pittosporum undulatum</i>	<i>Sonchus asper</i>
	<i>Hedera helix</i>	<i>Plantago australis</i>	<i>Sonchus oleraceus</i>

<i>Spergularia rubra</i> s.l.	<i>Trifolium dubium</i>	<i>Typha latifolia</i>	<i>Vicia sativa</i>
<i>Stachys arvensis</i>	<i>Trifolium pratense</i>	<i>Ulex europaeus</i>	<i>Viola odorata</i>
<i>Stellaria media</i>	<i>Trifolium repens</i>	<i>Veronica ?persica</i>	<i>Vulpia bromoides</i>
<i>Taraxacum officinale</i>	<i>Trifolium subterraneum</i>	<i>Vicia ?hirsuta</i>	

Notes concerning some of the locally threatened plant species

- Acacia leprosa* (Cinnamon Wattle), Dandenong Range variant. One wild plant used to grow near where the Riddell Drain enters the reserve. It died out in c. 2005 but many plants have since regenerated and others have been planted nearby. Although listed as 'rare' in Victoria because of its limited geographic range, this taxon is fairly abundant in Knox, Maroondah and the Shire of Yarra Ranges.
- Acacia leprosa* × *paradoxa* (Cinnamon Wattle × Hedge Wattle hybrid). Last recorded in 1989.
- Carex gaudichaudiana* (Fen Sedge). Over 20 m² occurs in patches near the inlet to the lake; secure.
- Dysphania glomulifera* (Pigweed), growing as a diminutive form. Discovered in 2004 growing densely in a number of patches at the lake's edge, and seen in smaller numbers on each inspection since.
- Elatine gratioloides* (Waterwort). Seasonally abundant in the Aquatic Herbland.
- Epilobium ?pallidiflorum* (Showy Willow-herb). Hundreds of plants are scattered around the lake's edge.
- Euchiton sphaericus* (Annual Cudweed). Many plants germinated next to the small dam following de-silting in 2001, and others were seen by the lake in subsequent years.
- Gahnia sieberiana* (Red-fruit Saw-sedge). A secure and growing population of over 20 plants.
- Glossostigma cleistanthum* (a mud-mat). Seasonally abundant in mud at the lake's edge, mainly in the southeast. The nearest record of this species prior to this discovery in 2004 was on the Murray River, roughly 200 km away.
- Goodenia elongata* (Lanky Goodenia). One patch measuring 20 m² and growing; not otherwise threatened.
- Goodenia humilis* (Swamp Goodenia). A population beside the small dam was destroyed by de-silting work in 2001.
- Helichrysum luteoalbum* (Jersey Cudweed). Fairly abundant around the lake, at least in some years.
- Hydrocotyle laxiflora* (Stinking Pennywort). Recorded in 1989 and 1999. Current status not known.
- Hypolepis rugosula* (Ruddy Ground-fern). Approx. 4 m² in five patches on the lake's southern shore.
- Imperata cylindrica* (Blady Grass). Restricted to one large patch, not facing any known threat.
- Isolepis platycarpa* (a Club-rush). Grows around the small dam and probably the lake, at least in some years.
- Juncus holoschoenus* (Joint-leaf Rush). Several were scattered south of the inlet to the lake in 2004 but have not been seen since. They may well reappear but are threatened by drought.
- Kennedia prostrata* (Running Postman). A single plant germinated following fire in the southern forest area.
- Lemna disperma* (Common Duckweed). Last recorded in 1989 but likely to reappear from time to time.
- Mazus pumilio* (Swamp Mazus). Last recorded in 1989 around the small dam, since destroyed by de-silting work.
- Persicaria lapathifolia* (Pale Knotweed). Small numbers grow in the Aquatic Herbland.
- Polystichum proliferum* (Mother Shield-fern). One plant in the northern area of Swampy Woodland.
- Senecio campylocarpus* (Floodplain Groundsel). Abundant in mud at the lake's edge.
- Solanum aviculare* (Kangaroo Apple). Scattered in the northern forest area. The author could not confirm the identity of these *Solanums*, but *S. aviculare* was recorded by Jaremovic *et al.* (1989).
- Triglochin striatum* (Streaked Arrow-grass) - flat leafed variant. Abundant around the lake's southern and eastern shores.

Fauna of special significance

- Blue-billed Duck. Resident birds, breeding at the lake. This species is Endangered in Victoria and listed under the *Flora & Fauna Guarantee Act*.
- Hardhead. Apparently resident, but breeding not recorded. Vulnerable in Victoria.
- Musk Duck (visitor). Vulnerable in Victoria. A 1999 record appears in the Atlas of Victorian Wildlife.
- Magpie Goose (vagrant). Vulnerable in Victoria. A 1994 record appears in the Atlas of Victorian Wildlife.
- Great Crested Grebe. An occasional visitor.
- Pied Cormorant. Vagrant only.
- Great Egret. A fairly regular visitor. Vulnerable in Victoria and listed under the *Flora & Fauna Guarantee Act*.
- Cattle Egret
- Spotless Crake
- Latham's Snipe
- Black-fronted Dotterel
- Red-kneed Dotterel. A year-round resident.
- Australian Reed Warbler
- Little Grassbird

Fauna habitat features

As explained in the site description, the lake is one of the most biologically significant fauna habitats in Knox, and is augmented by the small dam.

The good cover of remnant trees within the forest provides good habitat for forest and woodland birds, but the area of tree canopy and the paucity of similar habitat in the neighbourhood must be limiting the fauna that can take advantage of the habitat. There are some large Swamp Gums and Mealy Stringybarks with hollows suitable for habitation by certain birds, bats or insects.

Some nest boxes have been installed but their usage is not known.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity and Viability

The site is a 'stepping stone' for movements of nomadic and migratory waterbirds, as evidenced by abundance of such species at the lake. It is not clear whether the site attracts birds moving along the Blind Creek corridor, the Corhanwarrabul/Monbulk Creek corridor, or both. Either way, the movement of so many significant species gives the site **Regional** significance under criterion 1.2.6 of Amos (2004).

Richness and Diversity

The tally of 137 indigenous plant species 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.

Regionally Threatened Ecological Vegetation Class

All the EVCs present at Lakewood Nature Reserve are listed as regionally Endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that Lakewood Nature Reserve's native vegetation is of at least High conservation significance. This, in turn, gives the site **State** significance under criterion 3.2.3.

Rare or Threatened Flora

The site has a large, viable population of the mud-mat, *Glossostigma cleistanthum*, which is listed as 'rare' in the Department of Sustainability & Environment's *Advisory List of Rare or Threatened Flora 2005*. This is of **State** significance under criterion 3.1.2 of the standard criteria. Prior to this study, the species had evidently never been recorded within 200 km, and never south of the Great Divide.

The substantial population of the regionally rare Pigweed (*Dysphania glomulifera*) is of **Regional** significance according to criterion 3.1.4.

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

The site has stable, breeding, resident populations of the statewide-vulnerable species, Hardhead, and the statewide-endangered Blue-billed Duck. It is also known to be visited by the statewide-vulnerable Great Egret. The last two of these species are listed under the *Flora and Fauna Guarantee Act 1988*. The evidently resident and viable populations of Blue-billed Duck and Hardhead fit criterion 3.1.2 for a site of **State** significance.

Of the remaining species listed above under the heading, 'Fauna of special significance', the less common ones are sufficiently rare and threatened locally that their presence confers at least **Local** significance upon the site under criterion 3.1.5. Criterion 3.1.4 may also confer Regional significance on some of the species.

Threats

- Invasion by environmental weeds:
 - Serious: Sweet Vernal-grass (*Anthoxanthum odoratum*), Panic Veldt-grass (*Ehrharta erecta*) around *Exocarpos* and *Allocasuarina* trees, Cleavers (*Galium aparine*), Water Couch (*Paspalum distichum*) around the edge of the lake;
 - Moderate: Brown-top Bent (*Agrostis capillaris*), Trifid Burr-marigold (*Bidens tripartita*) around the lake edge, Large Quaking-grass (*Briza maxima*), Water Starwort (*Callitriche stagnalis*), a cotoneaster (*Cotoneaster glaucophyllus*), Shade Crassula (*Crassula multicava* ssp. *multicava*), Drain Flat-sedge (*Cyperus eragrostis*), Cocksfoot (*Dactylis glomerata*), Desert Ash (*Fraxinus angustifolia*), Yorkshire Fog (*Holcus lanatus*), Cat's Ear (*Hypochoeris radicata*), Jointed Rush (*Juncus articulatus*), Hairy Hawkbit (*Leontodon taraxacoides*), Japanese Honeysuckle (*Lonicera japonica*), Sweet Pittosporum (*Pittosporum undulatum*), Ribwort (*Plantago lanceolata*), Creeping Buttercup (*Ranunculus repens*), Common Onion-grass (*Romulea rosea*), Blackberry (*Rubus discolor*), Glossy Nightshade (*Solanum americanum*), Tobacco-bush (*Solanum mauritianum*) on the island, Black Nightshade (*Solanum nigrum*), Gorse (*Ulex europaeus*).
- Tree dieback disease;
- Proliferation of informal paths in the northern forest area;

- Construction of cubby houses by children in the forest;
- Tree cutting by children;
- Loss or decline of plant species such as *Polystichum proliferum* and *Kennedia prostrata* whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or elimination by incidents such as being run over by a bike;
- Silt build-up in the lake, if it were to significantly reduce the water depth in the deepest parts;
- De-silting of the lake or small dam, if it were to be done without due care for the rare and threatened flora and fauna in and around the lake.

Management issues

- The forest area of this site is being very actively and competently managed, including the judicious use of fire;
- Council could consider preparing a vegetation management plan to provide the most efficient works program, although the absence of one has not prevented successful management so far;
- De-silting of the lake and small dam should be done with care to cause minimum damage to native vegetation and fauna habitat;
- It would be desirable to monitor the populations of the plant species listed above as rare or threatened in the Melbourne area or more widely;
- An effort has been commenced since the fieldwork for this study to eradicate the highly isolated outbreak of Trifid Burr-marigold (*Bidens tripartita*) around the lake. This will need monitoring and probably follow-up weed control each March, April and May until all signs of the weed have gone. The same approach seems to have succeeded in this reserve with Square-stemmed St John's Wort (*Hypericum tetrapterum*), also known as St Peter's Wort;
- The localised infestation of Tobacco-bush on the island should be eradicated fairly urgently.

Administration matters

- This site is suited to inclusion under the proposed ESO2 overlay because of its state significance and the presence of riparian and lake habitat that could be harmed by works in areas with no native vegetation;
- The existing Vegetation Protection Overlay VPO1 covers the forested parts of this site, and one isolated, large Mealy Stringybark (*Eucalyptus cephalocarpa*) north of the lake (although the location of the tree is wrongly mapped). This is partly on the basis of the study by Water Ecoscience (1998), in which the forest is Site 5 and the tree is Site 104. The Mealy Stringybark tree was wrongly identified as a Scentbark (*Eucalyptus ignorabilis*), which would be a remarkable occurrence. Site 5 extends into the adjacent Knox Park Primary School, which is treated separately in this report as 0;
- The lake and its surroundings deserve a serious investigation of the aquatic and amphibious fauna, if this is within the priorities of Council, the Department of Sustainability & Environment or naturalists. No works should be allowed to put the ecological function of these areas at risk without such an investigation;
- Melbourne Water should be made aware of the sensitivity and significance of the lake and its fringing vegetation, particularly in regard to any de-silting work that may be conducted in future.

Information sources used in this assessment

- Jaremovic R., McMahon A.R.G, Carr G.W. and McWha M. (1989). *Lakewood Estate Nature Reserve – Concept Development Plan Final Report*. A copy is held by Knox City Council. This includes a set of photographs, vegetation community descriptions, lists of flora and fauna species and data from sixteen quadrats;
- Vegetation monitoring data, as described in the reports, *'Monitoring of Bushland Reserves in Knox'* (Lorimer 1999) , *'Monitoring of Bushland Reserves in Knox – 2002 Review'* (Lorimer 2002) and *'Monitoring of Bushland Reserves in Knox – 2007 Review'* (Lorimer 2007a) for Knox City Council, comprising:
 - Updated data for three of the quadrats of Jaremovic *et al.*, compiled during February 1999 and again in March 2002, as well as data collected for two additional quadrats in both those months;
 - Lists of plant species (indigenous and introduced) observed in the reserve by Dr Lorimer in February 1999 and March 2002;
 - Maps and assessments of the population sizes and distributions of 21 scarce plant species in each of those years;
 - A list of fauna observed during the above botanical surveys; and
 - A series of nine photographs highlighting aspects of the reserve's vegetation, taken in 1999 and repeated in 2002;
- Site inspections totalling approximately seven hours by Dr Lorimer between 30/4/04 and 19/5/04 to fill any gaps in the pre-existing information compared with the standard survey data described in Section 2.4 of Volume 1;
- A thorough ecological investigation with approximately twenty hours of fieldwork by Dr Lorimer for *'2009 Bushland Management Plan for Lakewood Nature Reserve, Knoxfield'* for Knox City Council;
- Bird lists from U3A Knox Birdwatching Group, who visit the site from time to time;
- The Atlas of Victorian Wildlife;

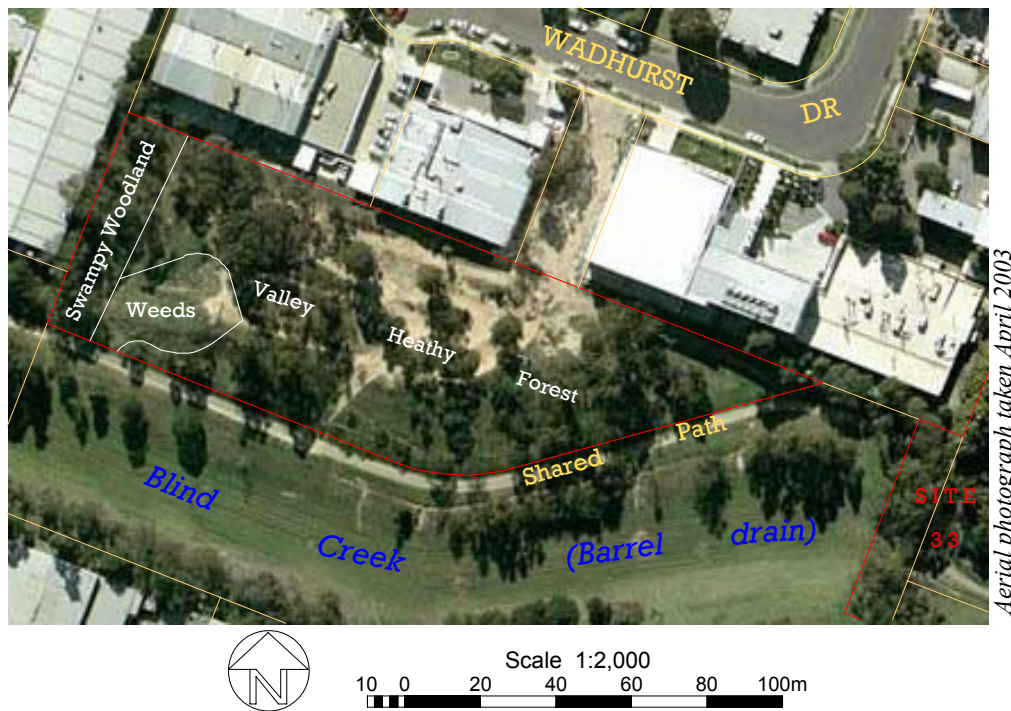
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 44. Wadhurst Drive Park, Boronia

Remnant ground flora and tree regrowth surrounding dumped soil and a BMX track. Melway ref. 64 C11 and D11.

Site Significance Level: *State*

- The site was once almost fully cleared and at least one third of it has been smothered with clay fill, but there are still fifty indigenous plant species present, distributed between two EVCs that are both regionally Endangered;
- Vegetation in the least-disturbed northeastern corner is in good ecological condition with rather rich ground flora.



Boundaries

The site is outlined in bold red above and is bordered by the shared path to the south and cadastral boundaries on the other sides. It measures 9,420 m². There are patches within this area that have no native vegetation, and these patches are included because they should be managed and administered as part of the whole site.

Land use & tenure: Council reserve used by BMX and motorbike riders, zoned 'Public Park and Recreation Zone'.

Site description

There is a fence around most of the site, with openings that provide access from Wadhurst Dr and from two points on the shared path. The site includes the narrow strip of ground flora between the shared path and the parallel fence, where species such as Slender Speedwell (*Veronica gracilis*) and *Thelymitra ?holmesii* occur within a layer dominated by native grasses.

The site is on a south-facing slope above Blind Ck between elevations of 75 m and 83 m. The natural soil surface slopes down toward the creek with a typical slope of 1:7 (14%), and there is also a shallow drainage line along the western boundary. Although the site is next to Blind Ck, it is well elevated above the creek and its vegetation is not riparian in character.

The lower slopes were excavated long ago for the shared path and barrel-draining of the original watercourse. At least one third of the site has been covered with local clay fill, which now provides an undulating surface on which the BMX track is formed. The track is visible as the bone-coloured areas on the aerial photograph.

The natural soil is shallow, poorly draining, light grey loam over clay subsoil, derived from decomposition of the underlying Lower Devonian sedimentary rocks of the Humevale formation.

Because of the history of excavation, most of the site's native vegetation is regrowth on a topography that is modified by various depths of clay fill. The main exception is in the northwestern corner and in a narrow band near the western boundary, where there are some large, old Swamp Gums (*Eucalyptus ovata*) and some rich ground flora and an apparently natural soil surface level. The native vegetation on the rest of the site is regrowth, and the original composition would have

been somewhat different from today. However, the regrowth is still identifiable as regrowth of Valley Heathy Forest, even though the diversity is reduced and the density of Yellow Box trees (*Eucalyptus melliodora*) is higher than would ever occur in a pristine state.

The Department of Sustainability & Environment's BioMap of pre-1750 EVCs concurs that there is Valley Heathy Forest on the site, but the BioMap of extant EVCs shows Valley Grassy Forest instead. The latter may be because of confusion about the high density of Yellow Box on the site, which might indeed suggest Valley Grassy Forest in more natural sites further to the north, but in the present case it is believed here to reflect the vegetation's chequered history. Valley Grassy Forest would be out of its normal ecological, topographic and geological context on this site.

Weeds are strongly concentrated on the south-facing slopes of clay fill. The area of the aerial photograph marked 'Weeds' is on the steep slope of a large mound of clay. It was burned by vandals in March 2004, a year since the previous fire, and robust grass weeds were seen regenerating in the following month. There was a fire in the east of the site in approximately 1996 and again in autumn 2003 and March 2004. The 1996 fire regenerated some indigenous plant species as well as some weeds and the outcome of the latter fire could not yet be discerned at the most recent inspection in April 2004. There is an outbreak of Bulbil *Watsonia* on the batter to the southeast of the area marked 'Weeds' on the aerial photograph.

Relationship to other land

The site is part of the quite fragmented corridor of native vegetation along Blind Creek, with one of the larger nodes of vegetation immediately to the east (see the aerial photograph and the description of Site 33 commencing on p. 173).

Roselyn Crescent Reserve (Site 45) lies 300 m to the north. The native birdlife in that reserve, and particularly the abundance of parrots, is no doubt considerably reliant on the presence of the Blind Ck corridor and, to a small extent, Wadhurst Drive Park.

Bioregion: Gippsland Plain

Habitat type

Valley Heathy Forest (EVC 127, regionally Endangered): 0.56 ha in total, comprising approximately 450 m² in good ecological condition (rating B), 4,500 m² in fair ecological condition (rating C) and 650 m² in poor ecological condition (rating D). 46 indigenous plant species recorded, of which all but four were seen on 12/4/04.

Dominant canopy trees: *Eucalyptus melliodora* with fewer *E. goniocalyx* and even fewer *E. radiata*, 12-15 m tall and yet to reach their full height.

Dominant lower trees: *Acacia melanoxylon*, *A. mearnsii* and *Exocarpos cupressiformis* are fairly dense.

Shrubs: There is a large shrub layer that is mostly approximately 2 m tall, which is dense in patches that are variously dominated by *Acacia stricta*, *Bursaria spinosa*, *Cassinia arcuata*, *Leptospermum continentale* or *Kunzea ericoides*. There are also the smaller shrubs *Epacris impressa* and *Dillwynia cinerascens* in substantial numbers.

Vines: One plant each of the parasites *Cassytha melantha* and *Cassytha pubescens*.

Ferns: None.

Ground flora: Densely grassy but with scattered sub-shrubs. Typically 20-30 cm deep with a foliage cover of approximately 80%. There are patches dominated variously by *Themeda triandra*, *Austrostipa rudis* and several *Rytidosperma* species. Other abundant species are *Lomandra filiformis*, *Bossiaea prostrata*, *Gonocarpus tetragynus*, *Goodenia ovata*, *Microlaena stipoides* and *Poa morrisii*. *Oxalis perennans s.l.* and *Dianella admixta* are characteristically present. *Gahnia radula* is absent.

Swampy Woodland (EVC 937, regionally Endangered): 0.13 ha in total, estimated to comprise 100 m² in fair ecological condition (rating C) and 0.12 ha in poor ecological condition (rating D). 13 indigenous plant species were seen on 12/4/04.

Dominant canopy trees: *Eucalyptus ovata*, rather dense in places, approximately 15 m tall and mostly fairly young (but with a few exceptions).

Dominant lower trees: *Acacia melanoxylon* is dense in places along the western fence.

Tall Shrubs: *Acacia paradoxa* and *Bursaria spinosa* are fairly sparse and may simply reflect the history of disturbance and the proximity to Valley Heathy Forest. There is also one plant of the characteristic species, *Ozothamnus ferrugineus*. All shrubs are approximately 4 m tall.

Lower Shrubs: A few *Goodenia ovata*, recently burned when inspected on 12/4/04.

Vines: No indigenous vines.

Ferns: None.

Ground flora: Grassy but not faithfully representing the natural composition. Dominated by *Austrostipa rudis* and the weeds *Dactylis glomerata* and *Agrostis capillaris*. *Microlaena stipoides* is also abundant, but not dominant. *Gonocarpus tetragynus* and *Veronica gracilis* are both present.

Plant species

The following plant species were observed by the author in 2008. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Austrostipa rudis* subsp. *australis* is listed by Walsh and Stajsic (2007) as rare throughout Victoria. There are approximately forty plants of that taxon close to the bend in the adjacent shared path.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia mearnsii</i>		<i>Gonocarpus tetragynus</i>
V	<i>Acacia melanoxylon</i>		<i>Goodenia ovata</i> (wild & planted)
	<i>Acacia paradoxa</i>	E	<i>Hypericum gramineum</i>
E	<i>Acacia stricta</i>		<i>Juncus amabilis</i>
V	<i>Acaena echinata</i>		<i>Juncus bufonius</i>
	<i>Acaena novae-zelandiae</i> (planted)		<i>Kunzea ericoides</i> spp. agg.
V	<i>Amyema quandang</i>		<i>Lepidosperma gunnii</i>
V	<i>Austrostipa rudis</i> subsp. <i>australis</i>	V	<i>Leptorhynchus tenuifolius</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>		<i>Leptospermum continentale</i>
	<i>Bossiaea prostrata</i>	E	<i>Leptospermum scoparium</i>
E	<i>Bulbine bulbosa</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i> (wild & planted)
	<i>Bursaria spinosa</i> (wild & planted)		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
	<i>Carex breviculmis</i>		<i>Lomandra longifolia</i> (wild & planted)
	<i>Cassinia arcuata</i>	E	<i>Melaleuca ericifolia</i>
E	<i>Cassytha melantha</i>		<i>Microlaena stipoides</i>
E	<i>Cassytha pubescens</i>	V	<i>Opercularia ovata</i>
C	<i>Chrysocephalum semipapposum</i> (planted)		<i>Oxalis exilis/perennans</i>
	<i>Clematis decipiens</i>	E	<i>Ozothamnus ferrugineus</i> (wild & planted)
C	<i>Craspedia variabilis</i> (planted)		<i>Poa ensiformis</i> (planted)
	<i>Daviesia latifolia</i> (planted)		<i>Poa morrisii</i>
	<i>Deyeuxia quadriseta</i>	C	<i>Pomaderris lanigera</i> (planted)
	<i>Dianella admixta</i>		<i>Poranthera microphylla</i>
	<i>Dichelachne rara</i>	E	<i>Rytidosperma caespitosum</i>
	<i>Dichondra repens</i> (planted)		<i>Rytidosperma laeve</i>
V	<i>Dillwynia cinerascens</i>		<i>Rytidosperma pallidum</i>
V	<i>Drosera peltata</i> subsp. <i>auriculata</i>		<i>Rytidosperma penicillatum</i>
	<i>Elymus scaber</i>		<i>Rytidosperma racemosum</i>
V	<i>Epacris impressa</i>		<i>Rytidosperma setaceum</i> (wild & planted)
	<i>Epilobium hirtigerum</i>		<i>Rytidosperma tenuius</i>
	<i>Eragrostis brownii</i>		<i>Schoenus apogon</i>
	<i>Eucalyptus goniocalyx</i>		<i>Senecio quadridentatus</i>
V	<i>Eucalyptus melliodora</i>	V	<i>Thelymitra peniculata</i>
V	<i>Eucalyptus ovata</i>		<i>Themeda triandra</i> (wild & planted)
E	<i>Eucalyptus radiata</i>	V	<i>Veronica gracilis</i>
V	<i>Exocarpos cupressiformis</i>		
	<i>Geranium</i> sp.		

Introduced Species

<i>Agrostis capillaris</i>	<i>Galium aparine</i>	<i>Phalaris aquatica</i>
<i>Aira</i> sp.	<i>Genista monspessulana</i>	<i>Pinus radiata</i>
<i>Allium triquetrum</i>	<i>Gladiolus undulatus</i>	<i>Plantago lanceolata</i>
<i>Anthoxanthum odoratum</i>	<i>Grevillea rosmarinifolia</i>	<i>Prunella vulgaris</i>
<i>Billardiera heterophylla</i>	<i>Hedera helix</i>	<i>Prunus cerasifera</i>
<i>Briza maxima</i>	<i>Holcus lanatus</i>	<i>Romulea rosea</i>
<i>Bromus catharticus</i>	<i>Hypochoeris radicata</i>	<i>Rubus anglocandicans</i>
<i>Bromus diandrus</i>	<i>Lolium perenne</i>	<i>Sonchus oleraceus</i>
<i>Centaurium erythraea</i>	<i>Malus pumila</i>	<i>Ulex europaeus</i>
<i>Cirsium vulgare</i>	<i>Mentha pulegium</i>	<i>Vicia hirsuta</i>
<i>Cynodon dactylon</i>	<i>Oxalis incarnata</i>	<i>Vicia sativa</i>
<i>Dactylis glomerata</i>	<i>Paspalum dilatatum</i>	<i>Watsonia meriana</i> var. <i>bulbillifera</i>
<i>Ehrharta erecta</i>	<i>Pennisetum clandestinum</i>	

Fauna of special significance

None recorded.

Fauna habitat features

The fair cover of remnant trees within the site provides some habitat for forest and woodland birds. The few large Swamp Gums may well have hollows suitable for nesting or roosting of certain birds or bats.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Regionally Endangered Ecological Vegetation Class

Under the Department of Sustainability & Environment's criteria, this site contains a 'remnant patch' of an endangered EVC. According to *'Victoria's Native Vegetation Management – A Framework for Action'* (NRE 2002a), remnant patches of native vegetation belonging to an endangered EVC have a conservation significance rating of either High or Very High, depending on their ecological condition. In either case, any site containing a remnant patch of such vegetation is of **State** significance under the Department of Sustainability & Environment's standard criteria (Amos 2004 – criterion 3.2.3).

The author has misgivings about such a high rating for such a small and heavy modified site, but these misgivings are overridden by the importance of consistency with the standard criteria.

Rare or Threatened Plant Species

The statewide-rare *Austrostipa rudis* subsp. *australis* has a population of approximately forty in this site, which represents a modest contribution to the taxon's conservation. This taxon is not endemic to Victoria (occurring also in Tasmania). These characteristics give the site **Regional** significance according to criterion 3.1.2.

Many of the other locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Invasion by environmental weeds:
 - Serious: Brown-top Bent (*Agrostis capillaris*), Cocksfoot (*Dactylis glomerata*), Montpellier Broom (*Genista monspessulana* – a small number of seedlings that could explode in numbers);
 - Moderate: Sweet Vernal-grass (*Anthoxanthum odoratum*), Large Quaking-grass (*Briza maxima*), Prairie Grass (*Bromus catharticus*), Centaury (*Centarurium erythraea*), Panic Veldt-grass (*Ehrharta erecta*), Cleavers (*Galium aparine*) along the western fence, Cat's Ear (*Hypochoeris radicata*), Paspalum (*Paspalum dilatatum*), Kikuyu Grass (*Pennisetum clandestinum*), Toowoomba Canary-grass (*Phalaris aquatica*), Monterey Pine (*Pinus radiata*), Ribwort (*Plantago lanceolata*), Cherry Plum (*Prunus cerasifera*), Onion Grass (*Romulea rosea*), Blackberry (*Rubus discolor*), W.A. Bluebell Creeper (*Sollya heterophylla*), Gorse (*Ulex europaeus*), Bulbil Watsonia (*Watsonia meriana*);
- Riding of bikes (particularly motorbikes) off the track;
- Loss or decline of plant species such as *Hypericum gramineum* and *Opercularia ovata* whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or elimination by incidents such as being run over by a bike;
- Tree cutting by children.

Management issues

- A young pine near the northern boundary should be removed soon to avoid the high cost of removing it at maturity;
- The rather intact area in the northwestern corner is well deserving of at least a few person-hours per year of expert bushland maintenance to keep it in good condition;
- The rest of the site deserves periodic rubbish removal and control of the weeds listed above, with particular attention to Blackberry, Gorse, Watsonia and the incipient outbreak of Montpellier Broom.

Administration matters

- Arrangements should be made to check the identity and conservation requirements of the sun-orchids that appear to be related to *Thelymitra holmesii*. An expert in sun-orchids would be required;
- This site is suited to inclusion under the proposed ESO2 overlay because it contains a remnant of an endangered EVC, some of it in good ecological condition;
- The site is not presently covered by any planning scheme overlay to protect its vegetation.

Information sources used in this assessment

- A site survey of just over one hour undertaken during this study by Dr Lorimer (24/5/02) using this study's standard procedures discussed in Section 2.4 of Volume 1. This included descriptions and mapping of the two vegetation types, compilation of lists of indigenous and introduced plant species within each vegetation type, incidental fauna observations, and checks for fauna habitat, ecological threats and management issues;
- Additional notes and a field map, collected similarly to the above by Ms Helen Moss on 11/4/97;
- Data from a quadrat (DSE number N04071) in the northwestern corner, surveyed by J.C. Reid on 12/6/97;
- Site description in '*Vegetation Survey of Linear Reserves – A Management Strategy for Riparian and Floodplain Vegetation*' by Reid *et al.* (1997);
- Verbal information from Knox City Council's Mr John Erwin about when fires occurred;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 45. Roselyn Crescent Reserve, Boronia

Council park with extensive cover of native vegetation. Melway ref. 64 D10.

Site Significance Level: *State*

- Despite clearing of part of the park and a history of slashing and drainage works in some other parts, a substantial part of the reserve supports rich native ground flora in two regionally Endangered EVCs (Valley Heathy Forest and Swampy Woodland);
- There are many species (notably orchids) that are threatened in Knox or the Melbourne area generally, and records from the 1980s of orchids that are threatened in the whole of Victoria.



Scale 1:2,000
10 0 20 40 60 80 100m

Boundaries

This site is as outlined in red above, comprising two lots. The total area is 2.52 ha.

Land use & tenure: Public park with playground facilities, bushland and paths.

Site description

This site lies on a shallow drainage line that flows southwest, at elevations of 85-90 m and with slopes of 2% to 4%. The Lower Devonian sedimentary bedrock is part of the Humevale formation, which decays to a heavy clay subsoil and shallow, poorly draining, light grey loam topsoil. This is shallowly covered with silt along the drainage line, where Swampy Woodland grows.

The park's vegetation varies from open lawn of introduced species through to rather natural forest. The aerial photograph shows a long slippery-dip on a large mound of soil in the largest treeless area of the park. The rest of the playground

facilities are just east of the mound, beneath some trees. This eastern corner has very little native understorey, which is also true of most of the smaller lot that provides pedestrian access between Roselyn Crescent and Wadhurst Drive.

The rest of the park retains native understorey whose ecological condition is patchy due to the history of slashing and pedestrian traffic. The more intact areas are rich in species, and particularly orchids, as is characteristic of Valley Heathy Forest. There are several records of orchid species that are very rare in Knox and the Melbourne area generally, as well as one listed nationally and one listed in Victoria.

Unfortunately, most of the populations of rare orchids were apparently destroyed in the late 1980s or early 1990s, according to orchid experts, Jeff and John Jeanes. Optimistically, one or more of these may reappear, perhaps after fire. The Knox Environment Society promoted an 'orchid regeneration project' to stem the losses in the reserve (discussed in a KES brochure from 1986), which resulted in a reduction in Council's mowing of the reserve and a subsequent partial recovery of the understorey.

The park's two vegetation types, Valley Heathy Forest and Swampy Woodland, are regionally Endangered. There is not a clear transition between them and the overstorey displays a different pattern than the ground flora. This might be due to the shallowness of the drainage line and the silt deposited in it, because plants of the ground flora are more likely to reflect topsoil conditions whereas larger plants are more affected by subsoil conditions.

Knox City Council has revegetated parts of the reserve with indigenous species.

Relationship to other land

300 m south of Roselyn Crescent Reserve is Site 44 (Wadhurst Drive Park), which is part of the Blind Creek habitat corridor (see also Site 33). The birdlife in Roselyn Crescent Reserve, and particularly the abundance of parrots, is likely to be considerably reliant on the presence of the Blind Ck corridor and, to a small extent, Wadhurst Drive Park.

Bioregion: Gippsland Plain

Habitat types

Valley Heathy Forest (EVC 127, regionally Endangered): Estimated to occupy 6,200 m², comprising 2,300 m² in good ecological condition (rating B), 1,900 m² in fair ecological condition (rating C) and 2,000 m² in poor ecological condition (rating D). 59 indigenous plant species recorded by the author, plus one other recorded by Mr Andrew Paget in May 1985. Approximately 61 indigenous plant species were recorded in this EVC by the author, but the number is uncertain due to the indistinct boundary between EVCs. Mr John Jeanes in 2001 reported another four orchid species as recent observations and five more as having been present in the 1980s but apparently since destroyed.

Canopy trees: Dominated by *Eucalyptus obliqua* and *E. cephalocarpa* with fewer *E. radiata* and very few *E. goniocalyx* and *E. macrorhyncha*.

Lower trees: Scattered *Acacia mearnsii*.

Shrubs: Scarce due to past slashing, but *Bursaria spinosa* and *Acacia verticillata* are conspicuous.

Vines: *Billardiera mutabilis* is fairly abundant.

Ferns: There are patches of *Pteridium esculentum*.

Ground flora: Densely grassy and dominated variously by *Themeda triandra*, *Poa tenera* or *Platylobium formosum*.

Swampy Woodland (EVC 937, regionally Endangered): Estimated to occupy 10,000 m² (excluding areas of trees over exotic lawn), comprising 2,500 m² in good ecological condition (rating B), 1,000 m² in fair ecological condition (rating C) and 6,500 m² in poor ecological condition (rating D). Approximately 65 indigenous plant species were recorded in this EVC by the author, but the number is uncertain due to the indistinct boundary between EVCs.

Dominant canopy trees: *Eucalyptus cephalocarpa* approx. 18m tall, along with *E. ovata* in damper areas.

Dominant lower trees: *Acacia melanoxylon* and *Acacia mearnsii* with rather less *Exocarpos cupressiformis*.

Shrubs: Reduced in density by past slashing. *Bursaria spinosa* and *Acacia verticillata* are most abundant. Other species include *Cassinia arcuata*, *Kunzea ericoides*, *Leptospermum scoparium* and *Pultenaea gunnii*. *Goodenia ovata* is absent, which is not a natural situation in such vegetation.

Vines: *Billardiera mutabilis* is fairly abundant.

Creepers: Creepers are represented by no fewer than seven species, including the ecological indicator species, *Goodenia elongata*.

Ferns: *Lindsaea linearis* was the only fern species found.

Ground flora: Patchy in density, composition and ecological condition due to past slashing and drainage works. The dominant species are not significantly different from the Valley Heathy Forest, but the non-dominant species include such ecological indicator species as *Allittia cardiocarpa*, *Diuris chryseopsis*, *Drosera peltata* subsp. *peltata*, *Goodenia elongata* and *Hypoxis vaginata*.

Plant species

The following plant species were observed by the author except for the asterisked orchid species, which were reported by Mr John Jeanes and are likely to have died out. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; 'V'=Vulnerable; and 'X'=extinct. In addition, *Pterostylis* × *ingens* is rare nationally and species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
E	<i>Acacia aculeatissima</i>	V	<i>Helichrysum scorpioides</i>
V	<i>Acacia mearnsii</i>	E	<i>Hibbertia riparia</i>
V	<i>Acacia melanoxylon</i>	E	<i>Hydrocotyle foveolata</i>
V	<i>Acacia verticillata</i>	E	<i>Hypericum gramineum</i>
	<i>Acaena novae-zelandiae</i>	E	<i>Hypoxis vaginata</i>
	<i>Acrotriche serrulata</i>		<i>Kunzea ericoides</i> spp. agg.
C	<i>Allittia cardiocarpa</i>		<i>Lachnagrostis filiformis</i>
C	<i>Amyema pendula</i>	V	<i>Lagenophora gracilis</i>
C	<i>Aphelia pumilio</i>		<i>Lepidosperma gunnii</i>
	<i>Arthropodium strictum</i>	V	<i>Leptorhynchus tenuifolius</i>
	<i>Austrostipa pubinodis</i>		<i>Leptospermum continentale</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	E	<i>Leptospermum scoparium</i>
	<i>Billardiera mutabilis</i>	V	<i>Lindsaea linearis</i>
	<i>Bossiaea prostrata</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Burchardia umbellata</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
	<i>Bursaria spinosa</i>		<i>Lomandra longifolia</i>
V	<i>Caesia parviflora</i>	V	<i>Luzula meridionalis</i>
X	<i>Caladenia clavigera</i>*		<i>Microlaena stipoides</i>
	<i>Carex breviculmis</i>		<i>Microtis parviflora</i>
	<i>Cassinia arcuata</i>	C	<i>Muellerina eucalyptoides</i>
V	<i>Cassinia longifolia</i>	V	<i>Opercularia ovata</i>
C	<i>Corunastylis despectans</i>*	V	<i>Opercularia varia</i>
V	<i>Cotula australis</i>		<i>Oxalis exilis/perennans</i>
C	<i>Craspedia variabilis</i>	V	<i>Pimelea humilis</i>
V	<i>Crassula decumbens</i>	V	<i>Platylobium formosum</i>
	<i>Deyeuxia quadriseta</i>		<i>Poa morrisii</i>
	<i>Dianella admixta</i>		<i>Poranthera microphylla</i>
	<i>Dichondra repens</i>		<i>Pteridium esculentum</i>
V	<i>Dillwynia cinerascens</i>	C	<i>Pterostylis curta</i>
E	<i>Dipodium roseum</i>		<i>Pterostylis nutans</i>
C	<i>Diuris chryseopsis</i>	C	<i>Pterostylis pedunculata</i> *
C	<i>Diuris orientis</i> *	X	<i>Pterostylis</i> × <i>ingens</i>*
V	<i>Drosera peltata</i> subsp. <i>auriculata</i>	V	<i>Pultenaea gunnii</i>
E	<i>Drosera peltata</i> subsp. <i>peltata</i>		<i>Rytidosperma pallidum</i>
V	<i>Drosera whittakeri</i>		<i>Rytidosperma</i> sp.
V	<i>Epacris impressa</i>		<i>Schoenus apogon</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Senecio quadridentatus</i>
	<i>Eucalyptus goniocalyx</i>	V	<i>Solenogyne dominii</i>
E	<i>Eucalyptus macrorhyncha</i>	V	<i>Thelymitra peniculata</i>
V	<i>Eucalyptus obliqua</i>		<i>Themeda triandra</i>
V	<i>Eucalyptus ovata</i>		<i>Tricoryne elatior</i>
E	<i>Eucalyptus radiata</i>	E	<i>Viola hederacea</i>
	<i>Gonocarpus tetragynus</i>	E	<i>Wahlenbergia gracilis</i>
C	<i>Goodenia elongata</i>	E	<i>Wurmbea dioica</i>
	<i>Goodenia lanata</i>	E	<i>Xanthosia dissecta</i>

Introduced Species

<i>Agrostis capillaris</i>	<i>Cordyline australis</i>	<i>Plantago lanceolata</i>
<i>Aira</i> sp.	<i>Cotoneaster glaucophyllus</i>	<i>Prunella vulgaris</i>
<i>Allium triquetrum</i>	<i>Ehrharta erecta</i>	<i>Prunus cerasifera</i>
<i>Anthoxanthum odoratum</i>	<i>Festuca arundinacea</i>	<i>Romulea rosea</i>
<i>Arctotheca calendula</i>	<i>Grevillea rosmarinifolia</i>	<i>Rubus anglocandicans</i>
<i>Briza maxima</i>	<i>Hedera helix</i>	<i>Taraxacum officinale</i> spp. agg.
<i>Centaureum erythraea</i>	<i>Hypochoeris radicata</i>	<i>Trifolium dubium</i>
<i>Cerastium glomeratum</i>	<i>Paspalum dilatatum</i>	<i>Vulpia bromoides</i>

Notes concerning some of the locally threatened plant species

Acacia aculeatissima (Thin-leaf Wattle). Very scarce, perhaps only one or two plants.

Allittia cardiocarpa (Swamp Daisy). Five flowered in 2009, but others could easily have escaped detection.

Aphelia pumilio (Dwarf Aphelia). Hundreds were observed in one small area in 2001, not since.

Caladenia clavigera (Plain-lip Spider-orchid). Last seen in the 1980s, before it was squashed beneath tractor wheels.

Corunastylis (= *Genoplesium*) *despectans* (Sharp Midge-orchid). Last seen in the mid 1980s, and suspected to be no longer present.

Cotula australis (Common Cotula). Many growing opportunistically in the Roselyn Crescent nature strip.

Craspedia variabilis (Variable Billy-buttons). Several regenerated after fire several years ago but only one was seen in 2009.

Crassula decumbens var. *decumbens* (Spreading Crassula). One patch found.

Diuris chryseopsis (Golden Moths). Thirteen were flowering in September 2001, none on 3/9/09.

Diuris corymbosa (Wallflower Orchid). Reported by Mr John Jeanes, who suspects this species is no longer in the reserve.

Drosera peltata ssp. *peltata* (Pale Sundew). Scattered in the Swampy Woodland.

Goodenia elongata (Lanky Goodenia). Only one found.

Hydrocotyle foveolata (Yellow Pennywort). Hundreds were observed in one small area

Hypoxis vaginata (Sheath Star). Seven individuals were found, and others could easily have escaped detection.

Luzula meridionalis (Common Woodrush). Several found.

Pterostylis × *ingens* (Sharp Greenhood). Last seen in the mid 1980s, and believed to be no longer present.

Pterostylis curta (Blunt Greenhood). Seen recently by Mr John Jeanes, number not stated.

Pterostylis pedunculata (Maroon-hood). Reported by Mr John Jeanes, who suspects this species is no longer in the reserve.

Fauna of special significance

None recorded.

Fauna habitat features

- There is a high density of hollows in the trees, many of them occupied by galahs, rosellas, possums or honey bees;
- There is a small number of logs on the ground;
- There is at least one nest box.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Endangered Vegetation Types

Both vegetation types present are listed as regionally Endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that Roselyn Crescent Reserve's native vegetation is of at least High conservation significance. This, in turn, gives the site **State** significance under criterion 3.2.3 of Amos (2004).

Locally Threatened Plant Species

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Invasion by Sweet Vernal-grass (*Anthoxanthum odoratum*) – medium-level threat;
- Critically small population sizes of some plant species, particularly in the cases of *Acacia aculeatissima*, *Allittia cardiocarpa*, *Craspedia variabilis*, *Eucalyptus macrorhyncha*, *Goodenia elongata* and *Pimelea humilis*;
- Fragmentation of habitat, leading to reduced visitation by small insect-eating birds and hence a risk of plant pests and diseases;
- Galahs that have completely ringbarked two trees and threaten some others;
- Dog faeces and scratching – medium-level threat;
- Trampling – medium-level threat.

Management issues

- Fire may regenerate one or more of the various rare orchid species that have disappeared from the reserve. Fire is discussed in the report, '*Fire in Knox Bushland Reserves 2001*' by Dr Lorimer for Knox City Council;

- Because of the reserve's importance for its endangered vegetation type and the richness of species (particularly orchids), it is important that the vegetation be managed as intensely as any other in Knox, including regular hand removal of weeds among the ground flora;
- The shrub layer should be enriched by planting some of the species that are uncharacteristically missing, such as *Acacia myrtifolia* and *Goodenia ovata*;
- Species whose population sizes are dangerously small should also be planted (see 'Threats' above);
- Tree hollows should be monitored in spring to detect nesting by undesirable species (e.g. Common Mynas) or discourage galahs from ringbarking trees.

Administration matters

- This site is highly worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its State significance, the endangered EVCs, the large number of significant plant species, the richness of the site's native vegetation and the habitat that it provides for fauna;
- The Planning Scheme zoning is Public Park and Recreation Zone (PPRZ);
- The park's larger lot is included under the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme.

Information sources used in this assessment

- A site survey by Dr Lorimer, mainly on 19/9/01 and 1/10/01, principally for the report, '*Fire in Knox Bushland Reserves 2001*' by Lorimer (2001). This followed nearly all of this study's standard procedures discussed in Section 2.4 of Volume 1 including mapping, descriptions of the vegetation composition, compilation of lists of indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats, management issues and populations of scarce or threatened plant species;
- A quadrat record (N04069) collected by Mr John Reid on 12/6/97;
- A letter about the park's orchid conservation from Mr John Jeanes to Knox City Council, dated 8/10/01;
- Discussions with orchid experts Messrs John and Jeff Jeanes in 2001 and 2004 respectively, about the history of orchids in the reserve;
- A brochure about the park by the Knox Environment Society dated 1986;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 46. Bayswater Park

Woodland sections of a recreation reserve beside Dandenong Creek. Melway ref. 64 F2.

Site Significance Level: *State*

- Three regionally Endangered vegetation types are represented: Wetland, Swamp Scrub and Swampy Woodland;
- One of the dominant species of the ground layer is the statewide-rare grass, *Austrostipa rudis* subsp. *australis*;
- Being on Dandenong Creek, the site is on a major corridor for daily and seasonal movements of birds and insects (particularly waterbirds, several species of which are threatened);
- The site was a floral wonderland until at least the 1930s, as indicated by a series of historical reports since 1906.



Scale 1:4,000
0 20 40 60 80 100m

Boundaries

This site is as outlined in red above, comprising two separate parts of the park that total 4.14 ha.

Land use & tenure: Public park with picnic facilities, bushland and paths.

Site description

This site lies on the floodplain of Dandenong Creek, at elevations of 93-97 m. It is flat except for two wetland depressions and two drains that have been excavated, as marked on the aerial photograph. The Lower Devonian sedimentary bedrock is part of the Humevale formation, which produces heavy clay subsoil. This is covered with silty clay alluvium of variable depth.

The contours of the wetland depressions have been modified by excavation, and part of the wetland next to the car park has been planted with indigenous species. However, both wetlands contain substantial amounts of naturally occurring wetland flora and fauna, so they should be regarded as significant natural features.

Swampy Woodland with a canopy of Swamp Gums (*Eucalyptus ovata*) is well developed where the alluvium is deepest and the soil most prone to waterlogging. In other patches, the vegetation approaches Valley Heathy Forest, as reflected by the presence of a Red Stringybark tree (*Eucalyptus macrorhyncha*).

The ground flora has a history of slashing for decades, which has been reduced in recent years to allow indigenous plants to regenerate. An ecological burn was conducted for the same purpose on 12th May 2002. There has also been extensive revegetation over at least two or three decades, initially using 'Australian native' species such as Red Ironbarks and Willow Hakeas, then with indigenous species.

The park's natural history through the first half of the twentieth century has fortunately been well documented contemporaneously in *Victorian Naturalist*, the journal of the Field Naturalists Club of Victoria. The proximity of the park to Bayswater Railway Station and the wonderful flora that once grew there attracted many field excursions to the park by the Club, and reports were documented in *Victorian Naturalist* for trips in 1906, 1909, 1916, 1918, 1929, 1931 and 1936. The descriptions indicate that what we now know as Bayswater Park had spectacular, rich native vegetation with numerous species that are now very threatened or extinct in the Melbourne area or the whole state.

Some of the rarer species mentioned were *Brachyscome decipiens*, *Caesia vittata*, *Caladenia cardiochila*, *Caladenia oenochila*, several *Diuris* species, *Euphrasia collina* (probably subsp. *trichocalycina*), *Hakea decurrens*, four *Hibbertia* species (perhaps not all properly identified), *Lobelia rhomboidea*, *Phylloglossum drummondii*, *Microseris scapigera*, *Microtis atrata*, *Prasophyllum frenchii*, *Sphaerolobium minus*, *Thelionema caespitosum*, *Thelymitra antennifera*, *Thelymitra aristata*, *Thelymitra carnea*, *Thelymitra flexuosa* and *Viminaria juncea*.

Some of these records may superficially seem far-fetched from a modern-day perspective, but even the most unexpected species were sometimes supported by herbarium specimens or were well known among reliable orchid enthusiasts to have been in the Bayswater-Heathmont area. On the other hand, some species reported have not been listed here because they appear to be certain misidentifications. Only those with very high credibility have been included in the inventory of plant species in Knox that appears in Appendix B of Volume 1.

The reports over the years in *Victorian Naturalist* also document the decline in this vegetation. Blackberries had become rampant by 1931, and in 1936, 'Reaching the Dandenong Creek we were disappointed to find that many of the Silver Wattles, which formerly lined its banks, had been destroyed...'

Today, the blackberries are under control, the creek has been replaced by a barrel drain and not a single Silver Wattle remains. The shrub layer has been decimated by decades of slashing and the ground flora appears to retain none of the vast number of orchids originally there, nor the rare plants.

Nevertheless, the native vegetation in the park is still a remnant of Endangered Ecological Vegetation Classes, and with vision and effort, some of its former glory can be regained.

The historical documentation in *Victorian Naturalist* gives the park a unique value in Knox as a reference site for the changes that have occurred to native vegetation, and how vegetation may be assisted to rehabilitate toward a known prior condition.

Relationship to other land

Being on Dandenong Creek, Bayswater Park is on a major corridor for daily and seasonal movements of birds and insects (particularly waterbirds, several species of which are threatened). This is discussed further in the section of this report for the corridor (Site 26).

It is also very close to the Belgrave Railway Line corridor (Site 88), which may further facilitate movements of fauna to and from the park.

There are several substantial bushland areas north of Dandenong Creek, in Heathmont, that are believed to serve as additional ecological stepping-stones for fauna that visit Bayswater Park. These sites are documented by Lorimer *et al.* (1997): '*Sites of Biological Significance in Maroondah*', Volume 2.

Bioregion: Gippsland Plain

Habitat types

Wetland (EVC 74, regionally Endangered): Two depressions, estimated to cover 1,200 m², all in fair ecological condition (rating C). 19 indigenous plant species recorded.

Trees, vines and ferns: Absent.

Shrubs: Some *Melaleuca ericifolia* extend into the wetlands.

Aquatic and semi-aquatic flora: Dominated in different areas by rushes (*Juncus* species), *Centella cordifolia*, *Eleocharis acuta* or *Glyceria australis*. *Alisma plantago-aquatica* is characteristically present.

Swamp Scrub (EVC 53, **regionally Endangered**): 300 m² in poor ecological condition (rating D). 7 indigenous plant species were found.

Dominant canopy trees: *Melaleuca ericifolia*. There are also overhanging *Eucalyptus ovata*, *Acacia mearnsii* and *Acacia melanoxylon*.

Shrubs, vines and ferns: No indigenous species.

Ground flora: *Carex appressa*, *Juncus gregiflorus* and *Lepidosperma ?elatius*.

Swampy Woodland (EVC 937, **regionally Endangered**): Estimated to occupy 21,000 m², comprising 50 m² in good ecological condition (rating B), 1,000 m² in fair ecological condition (rating C) and 20,000 m² in poor ecological condition (rating D). 55 indigenous plant species were recorded by the author.

Dominant canopy trees: *Eucalyptus ovata*.

Lower trees: *Acacia melanoxylon* dominates. *Acacia mearnsii* and *Exocarpos cupressiformis* are also present. The *Acacia dealbata* that used to be so abundant along the creek until the 1930s are absent.

Shrubs: The shrub layer is greatly depleted due to past slashing. *Bursaria spinosa*, *Cassinia aculeata*, *Coprosma quadrifida*, *Goodenia ovata* and *Ozothamnus ferrugineus* are present.

Vines: *Clematis aristata* and *Comesperma volubile* are present.

Ferns: No ferns were found. This is not a natural condition.

Ground flora: Densely grassy, dominated variously by *Microlaena stipoides*, *Austrostipa rudis*, *Themeda triandra* or *Poa morrisii* to very dense, dominated by *Gahnia radula*, *Microlaena stipoides* and *Rytidosperma* species (including the ecological indicator species, *Rytidosperma semiannulare*).

Plant species

The following plant species were observed by the author in 2001. Numerous others were reported in the *Victorian Naturalist* articles discussed under the heading 'Site description'. Some species not seen in the fieldwork for this study may have re-emerged since then in response to the ecological burn in 2002. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox with 'E'=Endangered and 'V'=Vulnerable. In addition, *Austrostipa rudis* subsp. *australis* is rare throughout Victoria.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia mearnsii</i>	E	<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>
V	<i>Acacia melanoxylon</i>	E	<i>Euchiton involucratus</i>
	<i>Acaena novae-zelandiae</i>	V	<i>Exocarpos cupressiformis</i>
	<i>Alisma plantago-aquatica</i>		<i>Gahnia radula</i>
	<i>Arthropodium strictum</i>	V	<i>Glyceria australis</i>
V	<i>Austrostipa rudis</i> subsp. <i>australis</i>		<i>Gonocarpus tetragynus</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>		<i>Goodenia ovata</i>
	<i>Burchardia umbellata</i>	E	<i>Hypericum gramineum</i>
	<i>Bursaria spinosa</i>	E	<i>Isolepis cernua</i> var. <i>platycarpa</i>
	<i>Carex appressa</i>	V	<i>Isolepis inundata</i>
	<i>Carex inversa</i>		<i>Juncus amabilis</i>
	<i>Cassinia arcuata</i>		<i>Juncus bufonius</i>
E	<i>Centella cordifolia</i>		<i>Juncus gregiflorus</i>
V	<i>Clematis aristata</i>		<i>Juncus sarophorus</i>
V	<i>Comesperma volubile</i>		<i>Lachnagrostis filiformis</i>
V	<i>Coprosma quadrifida</i>		<i>Lepidosperma ?elatius</i>
	<i>Deyeuxia quadriseta</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Dianella admixta</i>		<i>Lomandra longifolia</i>
V	<i>Dianella longifolia</i> s.l.	E	<i>Melaleuca ericifolia</i>
	<i>Dichondra repens</i>		<i>Microlaena stipoides</i>
V	<i>Drosera peltata</i> subsp. <i>auriculata</i>	V	<i>Opercularia ovata</i>
V	<i>Eleocharis acuta</i>		<i>Oxalis exilis/perennans</i>
	<i>Elymus scaber</i>	E	<i>Ozothamnus ferrugineus</i>
V	<i>Epilobium billardierianum</i> ssp. <i>cinereum</i>	E	<i>Pentapogon quadrifidus</i>
	<i>Eragrostis brownii</i>		<i>Persicaria decipiens</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Poa morrisii</i>
E	<i>Eucalyptus macrorhyncha</i>	E	<i>Poa tenera</i>
V	<i>Eucalyptus melliodora</i> (perhaps planted)	E	<i>Pomaderris aspera</i>
V	<i>Eucalyptus obliqua</i>		<i>Poranthera microphylla</i>
V	<i>Eucalyptus ovata</i>		<i>Rytidosperma geniculatum</i>
E	<i>Eucalyptus radiata</i>		<i>Rytidosperma laeve</i>

Risk Indigenous Species

Rytidosperma penicillatum
Rytidosperma racemosum
 E *Rytidosperma semiannulare*
Rytidosperma setaceum
Rytidosperma tenuius

Risk Indigenous Species

Schoenus apogon
Senecio quadridentatus
Themeda triandra
Tricoryne elatior
 V *Veronica gracilis*

Introduced Species

<i>Acacia longifolia</i> subsp. <i>longifolia</i>	<i>Dactylis glomerata</i>	<i>Paspalum dilatatum</i>
<i>Agrostis capillaris</i>	<i>Ehrharta erecta</i>	<i>Paspalum distichum</i>
<i>Aira</i> sp.	<i>Ehrharta longiflora</i>	<i>Phalaris aquatica</i>
<i>Anagallis arvensis</i>	<i>Erigeron karvinskianus</i>	<i>Pittosporum undulatum</i>
<i>Anthoxanthum odoratum</i>	<i>Galium aparine</i>	<i>Plantago lanceolata</i>
<i>Briza maxima</i>	<i>Genista monspessulana</i>	<i>Poa annua</i>
<i>Briza minor</i>	<i>Hedera helix</i>	<i>Prunus cerasifera</i>
<i>Bromus catharticus</i>	<i>Holcus lanatus</i>	<i>Ranunculus repens</i>
<i>Callitriche stagnalis</i>	<i>Hypochoeris radicata</i>	<i>Romulea rosea</i>
<i>Centaurium erythraea</i>	<i>Isolepis levynsiana</i>	<i>Rubus anglocandicans</i>
<i>Cerastium glomeratum</i> s.l.	<i>Juncus articulatus</i>	<i>Rumex crispus</i>
<i>Cirsium vulgare</i>	<i>Leontodon taraxacoides</i>	<i>Sonchus oleraceus</i>
<i>Conyza ?sumatrensis</i>	<i>Lolium perenne</i>	<i>Tradescantia fluminensis</i>
<i>Cotoneaster pannosus</i>	<i>Lonicera japonica</i>	<i>Trifolium dubium</i>
<i>Cynodon dactylon</i>	<i>Lotus subbiflorus</i>	<i>Vulpia bromoides</i>
<i>Cyperus eragrostis</i>	<i>Oxalis incarnata</i>	<i>Watsonia meriana</i> var. <i>bulbillifera</i>

Notes concerning some of the locally threatened plant species

Austrostipa rudis subsp. *australis* (a subspecies of Veined Spear-grass). Abundant; possibly Knox's largest population.
Rytidosperma geniculatum (Knead Wallaby-grass). A patch of ½ m² was found in the northeastern corner near the creek.
Glyceria australis (Australian Sweet-grass). A dominant species in the wetland.
Isolepis platycarpa (a Club-rush). Reasonable numbers were found in one of the wetlands.
Pentapogon quadrifidus (Five-awned Spear-grass). Only one plant found, but others are bound to appear from time to time.

Fauna of special significance

Peaceful Dove was recorded by the Knoxfield U3A birdwatching group in 1996. This is apparently the only record of the species in Knox. The species was listed as regionally rare and of restricted distribution in the Land Conservation Council's Melbourne Area District 2 Review in 1991.

The Dandenong Freshwater Amphipod was first discovered in or near Bayswater Park and this is the type locality (i.e. the location of the specimens from which the species was originally defined). However, any habitat for this rare invertebrate was destroyed when Dandenong Creek was replaced by a barrel drain.

Fauna habitat features

- Some of the mature eucalypts have hollows suitable for nesting or roosting by native birds, bats, possums or insects. However, some of them are occupied by feral bees or Common Mynas, to the exclusion of native fauna;
- The many planted eucalypts provide a diversity of blossom for the abundant lorikeets. In other respects, the birdlife is mediocre due to absence of a shrub layer.
- The wetlands are being used for breeding by large numbers of frogs.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity and Viability

Criterion 1.2.6 attributes **Local** significance to sites described as 'Important at local scale - Link between individual remnant habitat blocks or within subcatchment', which applies to this site. Criterion 1.1.1 attributes **Local** significance to 'All parts of riparian systems with riparian vegetation present', which might also be taken to apply to Bayswater Park, although the fact that the creek has been replaced by a barrel drain detracts substantially from this significance.

Endangered Vegetation Types

All vegetation types present are listed as regionally Endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that Bayswater Park's native vegetation is of at least High conservation significance. This, in turn, gives the site **State** significance under criterion 3.2.3.

Rare or Threatened Plants

The statewide-rare *Austrostipa rudis* subsp. *australis* is abundant and clearly a viable population, thereby representing an important contribution to the taxon's conservation. This taxon is not endemic to Victoria (occurring also in Tasmania). These characteristics give the site **State** significance according to criterion 3.1.2.

Many of the other locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Scientific and Educational Value

The series of reports about the site in *Victorian Naturalist* from 1906 to 1936, combined with more recent ecological surveys and efforts to rehabilitate the site's ecology, make Bayswater Park unique in Knox. This represents at least Local significance under criterion 5.1, and arguably Regional.

Threats

- Critically small population sizes of some plant species;
- Feral bees and introduced birds occupying tree hollows to the exclusion of native fauna;
- Invasion by environmental weeds (none presently very serious);
- Trampling.

Management issues

- Fire may regenerate one or more of the various rare orchid species that have disappeared from the reserve. Fire is discussed in the report, *'Fire in Knox Bushland Reserves 2001'* by Dr Lorimer for Knox City Council;
- The historical records from *Victorian Naturalist* provide good guidance about what plant species used to grow in the park and which ones would be desirable to re-establish (e.g. the original masses of *Patersonia occidentalis*, a very attractive wildflower);
- In particular, the shrub layer should be enriched by planting;
- Careful records of planting and rehabilitation works should be kept to maximise the benefit of the park's long historical records;
- Tree hollows should be monitored in spring to detect and evict nesting by undesirable species (e.g. Common Mynas).

Administration matters

- A post-fire botanical survey should be conducted to determine the effects of the ecological burn of 12/5/02;
- Visitors might appreciate a sign describing the historical Field Naturalists Club of Victoria visits and the floral wonders they encountered last century;
- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its State significance, the endangered EVCs, the significant plant species and the importance of the park's vegetation in an educational and historical context;
- The Planning Scheme zoning is Public Park and Recreation Zone (PPRZ);
- The site is included under the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, albeit with slightly different boundaries obtained from Site 32 of the report by Water Ecoscience (1998).

Information sources used in this assessment

- A site survey by Dr Lorimer, mainly on 21/11/01, principally for the report, *'Fire in Knox Bushland Reserves 2001'* by Lorimer (2001). This followed nearly all of this study's standard procedures discussed in Section 2.4 of Volume 1 including mapping, descriptions of the vegetation composition, compilation of lists of indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats, management issues and populations of scarce or threatened plant species;
- A similar survey by Dr Lorimer and J.C. Reid in March and April 1997 for the 1997 report, *'Vegetation Survey of Linear Reserves – A Management Strategy for Riparian and Flood Plain Vegetation'* by J.C. Reid, H. Moss and G.S. Lorimer for Knox City Council;
- Articles in *Victorian Naturalist* Volumes 23, 24, 26, 35, 46, 48 and 53 (from years 1906, 1907, 1909, 1918, 1929 and 1936 respectively) about field excursions to the site, as summarised in Andrew Paget's 1985 thesis for Bachelor of Applied Science (Landscape Architecture) at RMIT;
- A 1957 map of the area;

- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 47. J.W. Manson Reserve, Wantirna

Part of a public park that spans Dandenong Creek, including forest and a billabong. Melway ref. 63 J3.

Site Significance Level: *State*

- Two regionally threatened vegetation types are represented: Floodplain Wetland Complex and Riparian Forest;
- Locally rare flora and fauna are present, some species of which are abundant when the billabong contains water;
- Being on Dandenong Creek, the site is an ecological stepping-stone on a major corridor for daily and seasonal movements of birds and insects (particularly waterbirds, several species of which are threatened);



Aerial photograph taken April 2003

Boundaries

This site is as outlined in red above. The northern boundary follows the Dandenong Creek shared pathway. The boundary skirting the ovals is drawn to enclose all the native vegetation. The other edges are straight lines, mostly coinciding with cadastral boundaries. The area measures 4.75 ha.

Land use & tenure: Public park. The section east of the path marked above is owned by Maroondah City Council.

Site description

This site lies on the floodplain of Dandenong Creek, at elevations of 82-85 m. It is flat except for a billabong, as marked on the aerial photograph. The Upper Silurian sandstone bedrock is part of the Dargile formation, and it is covered with silty clay alluvium.

Until the drought of recent years, the site included one of the most ecologically intact and diverse wetlands in Knox, and some of the best Riparian Forest. The billabong has suffered very seriously from drought but may recover if more normal flooding returns. The site is still one of very few sites in Knox that are home to Sugar Gliders. The area west of the north-south pathway is more ecologically intact than to the east. When surveyed in 2002, the ecological condition ratings were A or B to the west and C to the east, on the scale of A to D.

Relationship to other land

The native vegetation on the opposite side of Dandenong Creek is similarly significant to the site described here. It is not treated in this report because it is in the municipality of Maroondah, where it is already recognised as a biologically significant site (see Lorimer *et al.* (1997): '*Sites of Biological Significance in Maroondah*', Volume 2, Site 79). Fauna such as Sugar Gliders probably rely on the native vegetation on both sides of the creek.

Being on Dandenong Creek, Manson Reserve is an ecological stepping-stone on a major corridor for daily and seasonal movements of birds and insects (particularly waterbirds, several species of which are threatened). This is discussed further in the section of this report for the corridor (Site 26), which includes the strip between the creek and the northern boundary of the Manson Reserve site.

Bioregion: Gippsland Plain

Habitat types

Riparian Forest (EVC 18, **Vulnerable in the Gippsland Plain bioregion):** Estimated to cover 3.9 ha, comprising 1.6 ha in good ecological condition (rating B) and 2.3 ha in fair ecological condition (rating C). 57 indigenous plant species were found by John Reid in June 1996 to January 1997. 5 others were credibly reported in quadrats by Andrew Paget in April-May 1985.

Dominant canopy trees: *Eucalyptus viminalis* with smaller numbers of *E. radiata*, *E. ovata* and *E. melliodora*.

Dominant lower trees: *Acacia dealbata*, *Acacia melanoxylon*, *Acacia mearnsii*, *Exocarpos cupressiformis*, *Pomaderris aspera* and *Melaleuca ericifolia*.

Shrubs: Fairly dense, comprising prickly shrubs (*Acacia verticillata*, *Bursaria spinosa* and *Coprosma quadrifida*) as well as many species with broader, softer leaves (e.g. *Goodenia ovata*, *Gynatrix pulchella*, *Olearia lirata*, *Ozothamnus ferrugineus* and *Prostanthera lasianthos*). *Cassinia aculeata*, *Cassinia arcuata* and the shrubby herb, *Senecio minimus*, are also present.

Vines: *Billardiera mutabilis* is present, as is a *Calystegia* that may be the indigenous *C. sepium* or (more likely) part of a hybrid complex between that species and the introduced *C. silvatica*.

Ferns: *Pteridium esculentum* is the only species present, and it is rather abundant.

Ground flora: The natural ground layer is tussocky due to species such as *Lepidosperma elatius*, *Austrostipa rudis*, *Poa ensiformis*, *Poa morrisii*, *Lomandra longifolia*, *Lomandra filiformis*, *Dianella longifolia* and *Dianella admixta*. The rhizomatous species *Dianella tasmanica* and *Phragmites australis* are also conspicuous, as are the small grasses, *Rytidosperma setaceum* and *Microlaena stipoides*. *Persicaria decipiens* and *Persicaria hydropiper* reflect the high level of soil moisture. Scattered plants of *Acaena novae-zelandiae* are the only creepers.

Floodplain Wetland Complex (EVC 172, **regionally Endangered)** in the billabong: Estimated to cover 2,600 m², comprising approximately equal proportions in excellent ecological condition (rating A) and good ecological condition (rating B). 27 indigenous plant species were found.

Trees, shrubs, vines and ferns: *Melaleuca ericifolia* encroaches into the edge of the billabong and there are other species of trees and shrubs that overhang to some degree.

Aquatic and semi-aquatic flora: Dominated by patches of *Alternanthera denticulata*, *Carex fascicularis*, *Glyceria australis*, *Persicaria decipiens*, *Persicaria praetermissa* and *Persicaria subsessilis*, as well as the introduced species *Paspalum distichum* and (in season) *Rorippa palustris*.

Plant species

In the following plant list, the column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, the species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Acacia dealbata</i>	C	<i>Juncus holoschoenus</i>
V	<i>Acacia mearnsii</i>		<i>Kunzea ericoides</i> spp. agg.
V	<i>Acacia melanoxylon</i>		<i>Lachnagrostis filiformis</i>
E	<i>Acacia stricta</i>		<i>Lepidosperma elatius</i>
V	<i>Acacia verticillata</i>	E	<i>Lobelia anceps</i>
	<i>Acaena novae-zelandiae</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Alisma plantago-aquatica</i>		<i>Lomandra longifolia</i>
V	<i>Alternanthera denticulata</i>	C	Lycopus australis
C	<i>Amyema pendula</i>	E	<i>Melaleuca ericifolia</i>
V	<i>Amyema quandang</i>		<i>Microlaena stipoides</i>
	<i>Austrostipa rudis</i>	C	<i>Muellerina eucalyptoides</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	V	<i>Olearia lirata</i>
	<i>Billardiera mutabilis</i>		<i>Oxalis exilis/perennans</i>
	<i>Bursaria spinosa</i>	E	<i>Ozothamnus ferrugineus</i>
C	<i>Calystegia ?sepium</i>		<i>Persicaria decipiens</i>
	<i>Carex appressa</i>	E	<i>Persicaria hydropiper</i>
E	Carex fascicularis	E	Persicaria praetermissa
	<i>Cassinia aculeata</i>	C	Persicaria subsessilis
	<i>Cassinia arcuata</i>	E	<i>Phragmites australis</i>
E	<i>Cassytha melantha</i>		<i>Poa ensiformis</i>
V	<i>Coprosma quadrifida</i>	E	<i>Poa labillardierei</i> var. <i>labillardierei</i>
E	<i>Crassula helmsii</i>		<i>Poa morrisii</i>
	<i>Deyeuxia quadriseta</i>	E	<i>Pomaderris aspera</i>
	<i>Dianella admixta</i>	C	Pomaderris racemosa
V	<i>Dianella longifolia</i> s.l.		<i>Poranthera microphylla</i>
V	<i>Dianella tasmanica</i>	E	<i>Prostanthera lasianthos</i>
V	<i>Eucalyptus melliodora</i>		<i>Pteridium esculentum</i>
V	<i>Eucalyptus ovata</i>	V	<i>Pultenaea gunnii</i>
E	<i>Eucalyptus radiata</i>		<i>Rytidosperma linkii</i> var. <i>fulvum</i>
E	<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>		<i>Rytidosperma pallidum</i>
E	<i>Euchiton involucratus</i>	E	<i>Rytidosperma semiannulare</i>
V	<i>Exocarpos cupressiformis</i>		<i>Rytidosperma setaceum</i>
	<i>Gahnia radula</i>		<i>Rytidosperma</i> sp.
V	<i>Glyceria australis</i>		<i>Schoenus apogon</i>
	<i>Gonocarpus tetragynus</i>		<i>Senecio hispidulus</i>
	<i>Goodenia ovata</i>	E	<i>Senecio minimus</i>
E	<i>Gynatrix pulchella</i>	C	<i>Solanum aviculare</i>
E	<i>Hypericum gramineum</i>	V	<i>Solanum laciniatum</i>
E	<i>Isolepis cernua</i> var. <i>cernua</i>	E	<i>Spyridium parvifolium</i>
V	<i>Isolepis inundata</i>		<i>Tricoryne elatior</i>
	<i>Juncus amabilis</i>	E	<i>Triglochin striata</i> (flat leaf variant)
	<i>Juncus bufonius</i>	V	Wolffia australiana
	<i>Juncus gregiflorus</i>		

Introduced Species

<i>Acacia longifolia</i> subsp. <i>longifolia</i>	<i>Ehrharta erecta</i>	<i>Plantago lanceolata</i>
<i>Agrostis capillaris</i>	<i>Fraxinus angustifolia</i>	<i>Prunus cerasifera</i>
<i>Anthoxanthum odoratum</i>	<i>Galium aparine</i>	<i>Ranunculus repens</i>
<i>Asparagus asparagoides</i>	<i>Hedera helix</i>	<i>Rorippa palustris</i>
<i>Atriplex prostrata</i>	<i>Holcus lanatus</i>	<i>Rubus anglocandicans</i>
<i>Briza minor</i>	<i>Hypochoeris radicata</i>	<i>Rumex conglomeratus</i>
<i>Centaurium erythraea</i>	<i>Lolium perenne</i>	<i>Rumex crispus</i>
<i>Chrysanthemoides monilifera</i>	<i>Lonicera japonica</i>	<i>Salix cinerea</i>
<i>Cirsium vulgare</i>	<i>Paraserianthes lophantha</i>	<i>Salix × rubens</i>
<i>Conyza</i> sp.	<i>Paspalum dilatatum</i>	<i>Solanum nigrum</i>
<i>Cotoneaster glaucophyllus</i>	<i>Paspalum distichum</i>	<i>Sonchus oleraceus</i>
<i>Cotoneaster pannosus</i>	<i>Pennisetum clandestinum</i>	<i>Taraxacum officinale</i> spp. agg.
<i>Cotula coronopifolia</i>	<i>Phalaris aquatica</i>	<i>Tradescantia fluminensis</i>
<i>Cynodon dactylon</i>	<i>Pinus radiata</i>	<i>Ulex europaeus</i>
<i>Cyperus eragrostis</i>	<i>Pittosporum undulatum</i>	<i>Watsonia meriana</i> var. <i>bulbillifera</i>

Notes concerning some of the locally threatened plant species

Calystegia sepium (Large Bindweed). Only significant if it can be shown not to be part of a hybrid complex with the weed, *C. silvatica*. This would require collection of a specimen with flowers and fruit, to be lodged and identified at the National Herbarium of Victoria.

Carex fascicularis (Tassel Sedge) A formerly dominant species in parts of the billabong.

Lycopus australis (Australian Gipsywort). Only two plants recorded, in the billabong.

Persicaria praetermissa (Spotted Knotweed). Apparently a substantial population.

Wolffia australiana (Tiny Duckweed). Seasonally abundant in the billabong.

Fauna of special significance

Vulnerable in Victoria

Royal Spoonbill, observed by Mr John Reid during a 1997 survey. Frequency of visitation unknown.

Rare or Threatened in Knox (but not all of Melbourne)

Sugar Glider, confirmed by spotlighting in 2003. Feeding scars have been seen on trees by Mr John Erwin of Knox City Council in 2004.

Fauna habitat features

- Some of the mature eucalypts have hollows suitable for nesting or roosting by native birds, bats, possums or insects;
- Some large Manna Gums (*Eucalyptus viminalis*) may provide nest sites for bird species that only breed in particularly tall trees;
- Silver Wattles (*Acacia dealbata*) provide a staple food source for the Sugar Gliders;
- Mistletoes are being used for food by Mistletoebirds and Imperial White Butterflies;
- The juxtaposition of the forest and the open pasture to the south makes good habitat for the Black-Shouldered Kites that live in this stretch of the valley;
- The billabong was observed to provide habitat for yabbies, frogs, insects and nesting waterbirds.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment'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 this site.

Criterion 1.2.6 accords **Local** significance to sites like Manson Reserve that fit the description, 'Important at local scale - Link between individual remnant habitat blocks or within subcatchment'.

Threatened Vegetation Types

Floodplain Wetland Complex is listed as regionally Endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that the reserve's native vegetation is necessarily of at least High conservation significance. This, in turn, gives the site **State** significance under criterion 3.2.3.

Riparian Forest is listed as regionally Vulnerable. The quality of 1.6 ha this vegetation at Manson Reserve is rating B, which is certain to put it in the category of at least 'High' conservation significance according to Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action*. This, in turn, gives the site **State** significance under criterion 3.2.3 of Amos (2004).

Rare or Threatened Plants

Some of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

Criterion 3.1.2 confers at least Local significance on sites that provide habitat for species that are threatened in Victoria, which includes Royal Spoonbill. Royal Spoonbills appear to be only occasional visitors to Manson Reserve, which gives the site **Local** significance.

Threats

- Invasion by environmental weeds. The most serious in the billabong are Water Couch (*Paspalum distichum*) and Creeping Buttercup (*Ranunculus repens*). The most serious in the forest are Boneseed (*Chrysanthemoides monilifera*), Bulbil Watsonia (*Watsonia meriana*) and (if not for periodic use of herbicide) Blackberry (*Rubus discolor*);

- Critically small population sizes of some plant species; e.g. only two *Lycopus australis* were found;
- Feral bees or introduced birds occupying tree hollows to the exclusion of native fauna.

Management issues

- Knox and Maroondah Councils cooperate to manage the vegetation of Manson Reserve on both sides of the creek;
- Weed control is the highest ecological priority for management of Manson Reserve;
- It would be desirable to plant *Lycopus australis*, *Gahnia sieberiana* and perhaps other species in the billabong to increase the dangerously small numbers present in this section of Dandenong Creek. Such plantings should be spread among Manson Reserve, the Scott Street wetlands and the University Road wetlands;
- Tree hollows should be monitored in spring to detect and evict nesting by undesirable species (e.g. Common Mynas).

Administration matters

- It would be desirable to have an expert on insects investigate whether the billabong or its margins support any rare invertebrates. Melbourne Water should take an interest in such an investigation;
- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its State significance, the threatened EVCs, the significant plant species, the habitat for native fauna and the riparian location;
- The Planning Scheme zoning is Public Conservation and Resource Zone (PCRZ);
- The site is included under the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, albeit with slightly different boundaries that were obtained from Site 82 of the report by Water Ecoscience (1998).

Information sources used in this assessment

- Site description and mapping in '*Vegetation Survey of Linear Reserves – A Management Strategy for Riparian and Floodplain Vegetation*' by Reid, Moss and Lorimer (1997), and the underlying field data. The field data included vegetation mapping, compilation of lists of indigenous and introduced plant species for three parts of the reserve, two quadrats, incidental fauna observations, and checks for fauna habitat, ecological threats, management issues and populations of scarce or threatened plant species;
- Data from eleven quadrats (DSE numbers N13223-N13233) compiled by Mr Andrew Paget in April 1985;
- The 2004 report, '*Bushland Management Plan for Scott Street Reserve, Heathmont, 2004*' by G.S. Lorimer for Maroondah City Council, plus the underlying field data and research. Scott Street Reserve is 300m from Manson Reserve and provides useful information about the natural vegetation and hydrology in this stretch of Dandenong Creek, and the potential for various weed species to become problems;
- Brief, informal visits to the site by the author;
- Various historical maps of the area, which show conflicting positions of Dandenong Creek;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 48. Healesville Freeway Reservation, Wantirna

A section of grazed VicRoads land on the proposed route of the Healesville Freeway, between Wantirna Rd and J.W. Manson Reserve. Melway ref. 63 G4-J4.

Site Significance Level: *State*

- Contains remnants of three regionally endangered Ecological Vegetation Classes, although only vestiges remain of one of these;
- Provides a habitat refuge for forest and woodland birds;
- Provides floodplain and wetland habitat for waterbirds and frogs, even on cleared land;
- Contributes to a wildlife corridor with other vegetation along the proposed route of the freeway, effectively augmenting the Dandenong Creek wildlife corridor;
- Grazing and uncontrolled weeds are degrading the significant vegetation.



Boundaries

The site is outlined in red above. The western boundary includes native vegetation on the nature strip of Wantirna Rd. The eastern boundary follows a fence beside the pathway south from J.W. Manson Reserve. The remainder of the site boundary follows property boundaries, except for an oblique section along the edge of the Swampy Woodland that is shown to the southeast of St Davids Drive. The total area is 5.50 ha.

Native vegetation is almost all within the three areas marked as Valley Heathy Forest, Swampy Woodland and Wetland. The areas without native vegetation are included within the site because they are used by waterbirds and frogs, they include a drainage line and because it is generally preferable to apply overlays to whole lots or parcels of land.

Note: Some sections of the site could not be inspected closely.

Land use & tenure: VicRoads land reserved for the Healesville Freeway, zoned 'Road Zone - Category 1' but presently used for agistment of horses.

Site description

There is a shallow drainage line flowing generally northeastward through the site, meeting the alluvial floodplain of Dandenong Creek near the northeast corner of the site, at an elevation of 85 m. The slope varies from extremely shallow in the northeast to an east-facing slope of 10% at the highest part of the site, beside Wantirna Rd, where the elevation is 105 m.

The soil on the slopes is light grey loam over clay subsoil, derived from Upper Silurian sediments of the Dargile Formation. There is alluvium on the flats and in the drainage line.

Native vegetation within the site falls into three sections, shown with white outlines on the aerial photograph above.

Between these sections, the photograph shows that much of the site is cleared, and there appear to be furrows consistent with a former orchard and market garden. These areas are used by waterbirds for foraging and the drainage line that passes through them is well populated with frogs.

Large Monterey Pines up to 40 m tall stand out on the aerial photograph as the more intense green trees with longer shadows. There are remnants of a pine windbreak along the northern boundary, which has produced subsequent generations of pines that have invaded the native vegetation.

The area of Valley Heathy Forest adjacent to the Wantirna Rd fence supports a relatively intact cover of remnant trees. Indigenous understorey vegetation appears not to have been previously cleared, but has recently been degraded by the grazing of horses throughout the area. There is a good cover of Sweet Bursaria in most of this area, along with some other indigenous shrubs and patches of remnant ground flora in areas less accessible to horses. Moderate to severe weed infestations occur in most of the area. The worst weeds are exotic creepers, Boneseed, Blackberry and a range of other woody weeds. Higher quality remnant ground layer vegetation occurs within the Wantirna Rd nature strip.

The area of Swampy Woodland at the southern end of St Davids Drive contains a stand of approximately thirty remnant Swamp Gums, including some larger trees likely to be over 100 years old. Indigenous understorey vegetation is scarce because of previous clearing and ongoing grazing.

The small seasonal wetland near J.W. Manson Reserve supports a fair cover of native Cumbungi, along with several indigenous rushes and semi-aquatic herbs. The size and location of the wetland are likely to have been modified by previous drainage works in the area.

Relationship to other land

The much larger area of native vegetation in the Bateman Street Bush (Site 49) is about 100 m away, on the other side of Wantirna Rd. It is also on the proposed freeway route. There is a line of trees on the far side of the Bateman Street Bush (Site 49) extending to Koomba Park on Dandenong Creek. Many birds and insects are likely to move between these sites, helping to spread pollen and seeds through the sites and beyond – e.g. to Manson Reserve (Site 47), which is on Dandenong Ck, 150 m north of the freeway reservation site.

These sites form a less fragmented corridor of treed vegetation between Koomba Park and Manson Reserve than along Dandenong Creek. It is therefore possible that some fauna migrating along the creek may detour through the freeway reservation rather than follow the creek via Winton Wetlands. In any case, the corridor through the freeway reservation site and the Bateman Street Bush is likely to serve an important role in the ecological functioning of the Dandenong Creek corridor.

There is also regenerating native vegetation on the batter of the cutting on the western side of Wantirna Rd. This is too small to warrant inclusion within one of the sites in this report, but it does have a small degree of biological significance because of its position on the habitat corridor along the proposed route of the Healesville Freeway.

There is little habitat in the surrounding residential and commercial areas, even allowing for mature planted eucalypts that are not locally indigenous.

Bioregion: Gippsland Plain

Habitat types

Valley Heathy Forest (EVC 127, regionally Endangered): 1.6 ha in total, of which approximately 0.65 ha is in fair ecological condition (rating C) and 0.95 ha is in poor ecological condition (rating D). 24 indigenous plant species were recorded on 15th May 2002.

Canopy trees: A fair cover of remnant *Eucalyptus cephalocarpa* and *E. radiata* trees up to 25 m tall.

Lower trees: Scattered specimens of *Acacia dealbata* and *Exocarpos cupressiformis*.

Shrubs: A good cover of *Bursaria spinosa* shrubs towards Wantirna Rd, with some *Acacia paradoxa*, *Coprosma quadrifida*, *Cassinia* spp. and *Kunzea ericoides*. Moderate infestations of woody weeds.

Vines: Some *Cassytha pubescens*. Extensive occurrence of introduced creepers.

Ferns: Absent.

Ground flora: *Lomandra longifolia*, *Viola hederacea*, *Dianella admixta* and the scattered occurrence of other indigenous grasses, sedges and ground layer herbs. Patches of indigenous ground layer vegetation are generally confined to the Wantirna Rd nature strip and in areas that are shrubby enough to discourage grazing. There may be

seasonal ground flora species in the least-disturbed areas, and these would not have been detected at the time of year of the site inspection.

Swampy Woodland (EVC 937, regionally Endangered): 2,200 m², all in poor ecological condition (rating D). 2 indigenous plant species were recorded on 15th May 2002.

Canopy trees: A stand of approximately thirty *Eucalyptus ovata* trees up to 30 m tall, with some *E. cephalocarpa*. Includes some older trees. Moderate foliage dieback is apparent and there is no regeneration.

Understorey vegetation: Grazed pasture.

Seasonal Wetland (part of EVC 74, regionally Endangered): 1,000 m², all in fair ecological condition (rating C). 6 indigenous plant species were recorded on 15th May 2002.

Trees, shrubs, vines and ferns: Absent.

Aquatic and semi-aquatic flora: Dominated by a fair cover of *Typha domingensis*. Scattered rushes and herbs, including *Juncus* spp., *Persicaria* spp. and *Alisma plantago-aquatica*. Substantially affected by grazing and the trampling of horses.

Plant species

The following plant species were observed by Mr Rik Brown on 15th May 2002. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox with 'E'=Endangered and 'V'=Vulnerable. Additional species would no doubt be detectable in other seasons.

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Acacia dealbata</i>	E	<i>Eucalyptus radiata</i>
V	<i>Acacia melanoxylon</i>	V	<i>Exocarpos cupressiformis</i>
	<i>Acacia paradoxa</i>		<i>Gahnia radula</i>
	<i>Alisma plantago-aquatica</i>	V	<i>Hydrocotyle hirta</i>
	<i>Bursaria spinosa</i>	E	<i>Imperata cylindrica</i>
	<i>Cassinia arcuata</i>	E	<i>Juncus procerus</i>
V	<i>Cassinia longifolia</i>		<i>Juncus</i> sp.
E	<i>Cassytha pubescens</i>		<i>Kunzea ericoides</i> spp. agg.
V	<i>Coprosma quadrifida</i>	E	<i>Lagenophora stipitata</i>
E	<i>Daviesia latifolia</i>		<i>Lomandra longifolia</i>
	<i>Dianella admixta</i>		<i>Microlaena stipoides</i>
	<i>Dichondra repens</i>		<i>Persicaria decipiens</i>
V	<i>Epacris impressa</i>	E	<i>Persicaria hydropiper</i>
V	<i>Eucalyptus cephalocarpa</i>	E	<i>Typha domingensis</i>
	<i>Eucalyptus goniocalyx</i>	E	<i>Viola hederacea</i>
V	<i>Eucalyptus ovata</i>		
Introduced Species			
	<i>Acacia baileyana</i>		<i>Genista monspessulana</i>
	<i>Agapanthus praecox</i>		<i>Hedera helix</i>
	<i>Allium triquetrum</i>		<i>Ligustrum vulgare</i>
	<i>Chrysanthemoides monilifera monilifera</i>		<i>Lonicera japonica</i>
	<i>Conyza sumatrensis</i>		<i>Pinus radiata</i>
	<i>Cotoneaster pannosus</i>		<i>Pittosporum undulatum</i>
	<i>Cytisus scoparius</i>		<i>Prunus cerasifera</i>
	<i>Delairea odorata</i>		<i>Prunus laurocerasus</i>
			<i>Ranunculus repens</i>
			<i>Rubus anglocandicans</i>
			<i>Rumex crispus</i>
			<i>Ulex europaeus</i>
			<i>Vinca major</i>
			<i>Viola odorata</i>
			<i>Watsonia meriana</i> var. <i>bulbillifera</i>

Notes concerning some of the locally threatened plant species

Imperata cylindrica (Blady Grass). A small patch grows in the Wantirna Rd nature strip.

Lagenophora stipitata (Common Lagenophora). There are patches within more intact ground layer vegetation near Wantirna Rd.

Fauna of special significance

None recorded during field surveys, but significant birds and frogs associated with the nearby Dandenong Creek and its floodplain are likely to be frequent visitors.

Fauna habitat features

Remnant trees and understorey vegetation within the site provide habitat for forest and woodland birds occurring in the area, including potential nesting sites for small birds within shrub layer vegetation. The site provides a habitat refuge for

birds in an area where other remnant vegetation is scarce. It would inevitably contribute to their daily and seasonal movements along the Dandenong Creek wildlife corridor, as discussed above.

A few of the older remnant Swamp Gums contain natural hollows suitable as shelter and breeding locations for birds, possums and bats.

Waterbirds forage in cleared areas adjacent to the drainage line, with the Straw-necked Ibis and White-faced Heron observed during field surveys. The drainage line and wetland area support substantial populations of frogs. Smaller birds of prey, particularly Black-shouldered Kites, are seen frequently along cleared parts of the freeway reservation.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity & Viability

The site is a component or ecological 'stepping stone' of a habitat corridor, as explained above under the heading, 'Relationship to other land'. The link that it provides is no doubt important for fauna movement at the local scale (or perhaps more widely). This represents **Local** significance under criterion 1.2.6.

Regionally Endangered Ecological Vegetation Classes

The Valley Heathy Forest represents a remnant patch of a regionally Endangered EVC. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that the site's native vegetation is of at least High conservation significance. This, in turn, gives the site **State** significance under criterion 3.2.3.

Locally Threatened Plant Species

Some of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Potential future freeway construction, which would inevitably destroy most of the site's environmental significance;
- Grazing horses, causing pugging, trampling, altered nutrient cycling, eating of indigenous plants, prevention of establishment of new generations of indigenous plants, and exacerbation of weed infestations due to selective feeding;
- Dieback of remnant trees, particularly as a result of the effects of grazing;
- Invasion by environmental weeds:
 - Very Serious: Ivy (*Hedera helix*) and Cape Ivy (*Delairea odorata*);
 - Serious: Boneseed (*Chrysanthemoides monilifera*), Sweet Pittosporum (*Pittosporum undulatum*) and Blackberry (*Rubus discolor*);
 - Moderate: Montpellier Broom (*Genista monspessulana*), Japanese Honeysuckle (*Lonicera japonica*), Monterey Pine (*Pinus radiata*), Creeping Buttercup (*Ranunculus repens*), Blue Periwinkle (*Vinca major*);
 - possibly grass weeds, whose effects could not be reliably determined due to the time of year of the inspection;
- Loss or decline of plant species that have such small populations that they are vulnerable to inbreeding, poor reproductive success or random events such as trampling.

Management issues

- VicRoads should cease agisting livestock in the Valley Heathy Forest or the wetland, to be consistent with the Victorian government's policy of placing maximum importance on conserving regionally endangered EVCs in its quest for increases in the quality and extent of native vegetation;
- The weeds listed above should be controlled. Note that some are listed as regionally controlled under the *Catchment and Land Protection Act 1994*.

Administration matters

- This site is suited to the proposed Environmental Significance Overlay (ESO2) because of its State significance and the presence of endangered EVCs;
- The western half of the site is presently covered by Vegetation Protection Overlay Schedule 1. The placing of the overlay was partly on the basis of the study by Water Ecoscience (1998), in which this is Site 69;
- Council might consider discussing with VicRoads the damaging impacts of horses and uncontrolled weeds on the site.

Information sources used in this assessment

- A site survey undertaken during this study by Rik Brown on 15/5/02, following this study's standard procedures discussed in Section 2.4 of Volume 1. This included descriptions of the composition and condition of the vegetation

types, compilation of lists of indigenous and introduced plant species for each type, incidental fauna observations, and checks for fauna habitat, ecological threats, management issues and populations of scarce or threatened plant species;

- Aerial photography from February 2001 and April 2003;
- Satellite images of the area;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 49. Bateman Street Bush, Wantirna

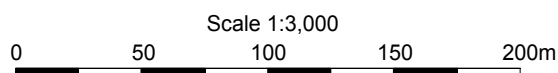
Bushland on the Healesville Freeway reservation, extending slightly onto adjoining properties. Melway ref. 63 F4.

Site Significance Level: *State*

- The site is one of the largest and richest areas of fairly intact Valley Heathy Forest in the Melbourne region. Valley Heathy Forest is an endangered vegetation type;
- The regionally endangered Swampy Woodland is also present, in smaller amounts;
- There are numerous plant species that are threatened at various scales from locally to state-wide;
- The Healesville Freeway is proposed to occupy most of the site when and if it is built.



Aerial photograph taken February 2007



Boundaries

This 12.68 ha site is as outlined in red above. The nature strips of Clarence Rd and Bateman St are included. The eastern boundary is made up of straight segments running due north-south and east-west (on the MGA grid) that skirt around the native vegetation, mostly following old fence lines. The rest of the site boundary follows property boundaries or short extensions thereof. The site boundary that was established by Water Ecoscience in 1998 and adopted for Schedule 1 of the Vegetation Protection Overlay in the Knox Planning Scheme has been altered here to more closely reflect the current area of native vegetation. Note that home units have recently been constructed on some of the previously defined area.

Land use & tenure: Mostly unused freeway reservation that is treated by members of the public as if it were parkland; Also private land in the southeastern corner.

Site description

This site lies on the upper, northwestern flank of a low ridge, at elevations of 91-112 m. The slope varies from 2% in the west to 15% in the east, facing directions between west and north.

A junction between two sedimentary rock formations runs through the site. The Middle Silurian siltstones of the Anderson Creek formation occur in the western third of the site and the Upper Silurian sandstones of the Dargile formation occupy the rest. The latter is more resistant to erosion, leaving it with steeper, higher ground than the western third of the site. The sudden change in permeability of soil as water moves down the slope is perhaps the reason for the seepage areas in the west. This effect is enhanced in the site's southwest by curvature of contour lines at the head of a drainage line, so that this corner has the highest concentration of swamp-loving plants such as rushes.

Most of the site supports the endangered Valley Heathy Forest. The seepage areas are closer to the regionally endangered Swampy Woodland. There is a very diffuse gradation between the two vegetation types, a very similar situation to the Blind Creek Billabong area in Site 34.

The Bateman Street Bush is one of the largest and richest areas of fairly intact Valley Heathy Forest in the Melbourne region. It epitomises the distinctive characteristics of that ecological vegetation class, including the rich ground flora with many orchids. It also supports nine indigenous species of wattle – a very high number for a Victorian forest.

The plants of the Swampy Woodland are not so well represented. Many of the characteristic species of Swampy Woodland have not been recorded since 1985, including Spreading Rope-rush (*Empodisma minus*), Lanky Goodenia (*Goodenia elongata*), Long Purple-flag (*Patersonia occidentalis*), Slender Bog-rush (*Schoenus lepidosperma*) and Tufted Blue-lily (*Thelionema caespitosum*). The decline in species in the Swampy Woodland can be attributed at least partly to clearing and heavy machinery traffic in and near the site's southwestern corner, associated with activities that were supposed to be confined to neighbouring properties.

VicRoads owns most of the site, having purchased it for the proposed Healesville Freeway. No time frame has been decided for this freeway. In the interim, VicRoads intends to maintain the site's conservation values and has had a management plan prepared to guide their actions (see 'Management issues' below).

The private land in the southeastern corner appears to be at risk of urban development, as has happened elsewhere along the site's southern boundary in recent years.

Relationship to other land

The Bateman Street Bush is an ecological stepping-stone for movement of birds and insects (and consequently pollen and seeds), particularly for movements along the Dandenong Creek Valley. There is a chain of such stepping-stones from Koomba Park (part of Site 58), through Winton Farm (Site 52), the Bateman Street Bush and Site 48 to Manson Reserve (Site 47), providing an alternative, less fragmented habitat corridor than the interconnected stretch of Dandenong Creek. This is quite noticeable on satellite imagery of the area.

The Bateman Street Bush is also a regional stronghold for Valley Heathy Forest and for many plant species that are rare in the Melbourne area. Until and unless the Healesville Freeway is constructed, the site could serve as a seed resource to allow enrichment and rehabilitation of other sites with Valley Heathy Forest. It also provides a benchmark for the structure and composition of Valley Heathy Forest, which can help guide management of other sites.

Bioregion: Gippsland Plain

Habitat types

Valley Heathy Forest (EVC 127, Endangered): Estimated to occupy 11.1 ha. Based on the management plan by Simon Cropper of Botanicus Australia Pty Ltd, this comprises 3.8 ha in high quality, 2.7 ha in medium quality, 2.7 ha in low quality and 1.9 ha in a degraded condition.

Canopy trees: Dominated by *Eucalyptus cephalocarpa* with various combinations of *E. radiata*, *E. goniocalyx*, *E. macrorhyncha* and *E. melliodora*.

Lower trees: Patches of *Allocasuarina littoralis* and scattered *Acacia melanoxylon* and *A. mearnsii*.

Shrubs: Patchy in density and sometimes very dense. The most abundant species are *Bursaria spinosa*, *Kunzea ericoides* and various wattles, including *Acacia myrtifolia*, *A. paradoxa*, *A. pycnantha* and *A. stricta*. *Spyridium parvifolium* is also fairly abundant.

Vines: *Billardiera mutabilis* and *Comesperma volubile* are fairly abundant. The parasitic climbers *Cassytha melantha* and *Cassytha pubescens* are also fairly abundant.

Ferns: *Lindsaea linearis* and *Pteridium esculentum* are abundant.

Ground flora: Very rich in species. The layer is grassy but with the characteristic heathy elements of *Hibbertia riparia*, *Acrotriche serrulata*, *Epacris impressa*, *Leucopogon virgatus*, *Dillwynia cinerascens*, *Lepidosperma gunnii*, *Platylobium obtusangulum* and *Xanthosia dissecta*. Dominant graminoids include *Poa morrisii*, *Rytidosperma pallidum*, *Austrostipa rudis*, *Microlaena stipoides* and *Gahnia radula*. Some of the other species that help to characterise the vegetation include substantial numbers of *Dianella longifolia* and *Gonocarpus tetragynus*, as well as small numbers of *Leptorhynchus tenuifolius* and *Veronica gracilis*. No fewer than 31 geophyte* species have been recorded, mostly orchids. Lilies are also particularly conspicuous.

Swampy Woodland (EVC 937, regionally Endangered): Estimated to occupy 9,500 m², in fair ecological condition (rating C).

Dominant canopy trees: *Eucalyptus cephalocarpa* and *E. radiata*, with a trace of *E. ovata*.

Dominant lower trees: *Acacia melanoxylon* and *Exocarpos cupressiformis*.

Shrubs: Very patchy, probably as a result of past clearing. *Coprosma quadrifida* is characteristically present.

Ground flora: Grassy. Species that help to characterise the vegetation include *Allittia cardiocarpa*, *Empodisma minus*, *Glyceria australis*, *Goodenia elongata*, *Lepidosperma filiforme*, *Patersonia occidentalis*, *Schoenus lepidosperma*, *Sphaerolobium minus*, *Thelionema caespitosum* and *Villarsia reniformis*, but most of these species have not been recorded since 1985.

Plant species

In the following plant list, the column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Austrostipa rudis* subsp. *australis* is rare throughout Victoria (Walsh & Stajsic 2007) and species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
E	<i>Acacia aculeatissima</i>		<i>Bursaria spinosa</i>
	<i>Acacia dealbata</i>	V	<i>Caesia parviflora</i>
V	<i>Acacia mearnsii</i>	C	<i>Caladenia carnea</i>
V	<i>Acacia melanoxylon</i>	C	<i>Caladenia catenata</i>
E	<i>Acacia myrtifolia</i>	C	<i>Calochilus paludosus</i>
	<i>Acacia paradoxa</i>	C	<i>Calochilus robertsonii</i>
E	<i>Acacia pycnantha</i>		<i>Campylopus introflexus</i>
E	<i>Acacia stricta</i>		<i>Carex breviculmis</i>
C	<i>Acacia ulicifolia</i>		<i>Cassinia aculeata</i>
V	<i>Acacia verticillata</i>		<i>Cassinia arcuata</i>
V	<i>Acaena echinata</i>	V	<i>Cassinia longifolia</i>
	<i>Acaena novae-zelandiae</i>	E	<i>Cassytha melantha</i>
	<i>Acrotriche serrulata</i>	E	<i>Cassytha pubescens</i>
V	<i>Adiantum aethiopicum</i>	E	<i>Centella cordifolia</i>
C	<i>Allittia cardiocarpa</i>	C	<i>Chamaescilla corymbosa</i>
V	<i>Allocasuarina littoralis</i>	V	<i>Chiloglottis valida</i>
C	<i>Amyema pendula</i>		<i>Chiloscyphus semiteres</i>
	<i>Arthropodium strictum</i>	V	<i>Comesperma volubile</i>
	<i>Austrostipa pubinodis</i>	V	<i>Coprosma quadrifida</i>
V	<i>Austrostipa rudis</i> subsp. <i>australis</i>	E	<i>Correa reflexa</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	C	<i>Corunastylis despectans</i>
	<i>Billardiera mutabilis</i>	V	<i>Crassula decumbens</i>
	<i>Bossiaea prostrata</i>	E	<i>Cryptostylis leptochila</i>
V	<i>Brunonia australis</i>	C	<i>Cryptostylis subulata</i>
	<i>Burchardia umbellata</i>	E	<i>Daviesia latifolia</i>

* A geophyte is a plant whose above-ground parts die during part of the year, then sprout again from an underground organ.

Risk	Indigenous Species	Risk	Indigenous Species
E	<i>Daviesia leptophylla</i>		<i>Lepidosperma gunnii</i>
	<i>Deyeuxia quadriseta</i>	V	<i>Lepidosperma laterale</i>
	<i>Dianella admixta</i>	C	<i>Lepidosperma tortuosum</i>
V	<i>Dianella longifolia</i> s.l.	V	<i>Leptorhynchus tenuifolius</i>
	<i>Dichelachne rara</i>		<i>Leptospermum continentale</i>
	<i>Dichondra repens</i>	C	<i>Leucopogon virgatus</i>
V	<i>Dillwynia cinerascens</i>	V	<i>Lindsaea linearis</i>
E	<i>Dipodium roseum</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
C	<i>Diuris orientis</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
V	<i>Drosera peltata</i> subsp. <i>auriculata</i>		<i>Lomandra longifolia</i>
E	<i>Drosera peltata</i> subsp. <i>peltata</i>	V	<i>Luzula meridionalis</i>
V	<i>Drosera whittakeri</i>	E	<i>Melaleuca ericifolia</i>
	<i>Elymus scaber</i>		<i>Microlaena stipoides</i>
V	<i>Empodisma minus</i>	C	<i>Microseris scapigera</i> spp. agg.
V	<i>Epacris impressa</i>		<i>Microtis parviflora</i>
	<i>Epilobium hirtigerum</i>	V	<i>Olearia lirata</i>
	<i>Eragrostis brownii</i>	E	<i>Olearia myrsinoides</i>
C	<i>Eriochilus cucullatus</i>	V	<i>Opercularia ovata</i>
V	<i>Eucalyptus cephalocarpa</i>	V	<i>Opercularia varia</i>
	<i>Eucalyptus goniocalyx</i>		<i>Oxalis exilis/perennans</i>
E	<i>Eucalyptus macrorhyncha</i>	E	<i>Ozothamnus ferrugineus</i>
V	<i>Eucalyptus melliodora</i>	C	<i>Ozothamnus obcordatus</i>
V	<i>Eucalyptus obliqua</i>		<i>Pandorea pandorana</i>
V	<i>Eucalyptus ovata</i>	C	<i>Patersonia occidentalis</i>
E	<i>Eucalyptus radiata</i>	E	<i>Pentapogon quadrifidus</i>
V	<i>Exocarpos cupressiformis</i>	V	<i>Pimelea humilis</i>
	<i>Gahnia radula</i>	V	<i>Plantago varia</i>
C	<i>Glossodia major</i>	V	<i>Platylobium obtusangulum</i>
V	<i>Glyceria australis</i>		<i>Poa morrisii</i>
V	<i>Glycine clandestina</i>	E	<i>Poa tenera</i>
	<i>Gonocarpus tetragynus</i>	C	<i>Pomaderris lanigera</i>
C	<i>Goodenia elongata</i>	C	<i>Pomaderris racemosa</i>
	<i>Goodenia lanata</i>		<i>Poranthera microphylla</i>
	<i>Goodenia ovata</i>	E	<i>Prostanthera lasianthos</i>
C	<i>Hakea nodosa</i>		<i>Pteridium esculentum</i>
V	<i>Hardenbergia violacea</i>	E	<i>Pterostylis melagramma</i>
V	<i>Helichrysum scorpioides</i>		<i>Pterostylis nutans</i>
E	<i>Hibbertia riparia</i>	C	<i>Pterostylis parviflora</i>
V	<i>Hovea heterophylla</i>	V	<i>Pultenaea gunnii</i>
C	<i>Hydrocotyle ?callicarpa</i>	C	<i>Rumex ?brownii</i>
E	<i>Hydrocotyle foveolata</i>		<i>Rytidosperma laeve</i>
E	<i>Hypericum gramineum</i>		<i>Rytidosperma linkii</i> var. <i>fulvum</i>
C	<i>Hypoxis hygrometrica</i>		<i>Rytidosperma pallidum</i>
E	<i>Hypoxis vaginata</i>		<i>Rytidosperma penicillatum</i>
E	<i>Imperata cylindrica</i>	V	<i>Rytidosperma pilosum</i>
E	<i>Indigofera australis</i>		<i>Rytidosperma racemosum</i>
E	<i>Isolepis cernua</i> var. <i>platycarpa</i>	E	<i>Rytidosperma semiannulare</i>
E	<i>Isolepis hookeriana</i>		<i>Rytidosperma setaceum</i>
	<i>Juncus bufonius</i>		<i>Rytidosperma tenuius</i>
	<i>Juncus pallidus</i>		<i>Schoenus apogon</i>
E	<i>Juncus planifolius</i>	C	<i>Schoenus lepidosperma</i>
	<i>Juncus sarophorus</i>		<i>Senecio glomeratus</i>
E	<i>Juncus subsecundus</i>		<i>Senecio hispidulus</i>
C	<i>Kennedia prostrata</i>	E	<i>Senecio prenanthoides</i>
	<i>Kunzea ericoides</i> spp. agg.		<i>Senecio quadridentatus</i>
	<i>Lachnagrostis filiformis</i>	V	<i>Solenogyne dominii</i>
V	<i>Lagenophora gracilis</i>	C	<i>Sphaerolobium minus</i>
E	<i>Lagenophora stipitata</i>	E	<i>Spyridium parvifolium</i>
	<i>Lepidosperma elatius</i>	E	<i>Stackhousia monogyna</i>
E	<i>Lepidosperma filiforme</i>	E	<i>Stylidium armeria/graminifolium</i>

Risk	Indigenous Species	Risk	Indigenous Species
C	<i>Tetraria capillaris</i>	V	<i>Veronica gracilis</i>
C	<i>Thelionema caespitosum</i>	C	<i>Villarsia reniformis</i>
C	<i>Thelymitra ixioides</i> s.l.	E	<i>Viola hederacea</i>
V	<i>Thelymitra peniculata</i>	C	<i>Wahlenbergia gymnoclada</i>
	<i>Themeda triandra</i>	E	<i>Wurmbea dioica</i>
V	<i>Thysanotus patersonii</i>	V	<i>Xanthorrhoea minor</i>
E	<i>Thysanotus tuberosus</i>	E	<i>Xanthosia dissecta</i>
	<i>Tricoryne elatior</i>		

Introduced Species

<i>Dodonaea viscosa</i>	<i>Coprosma repens</i>	<i>Oxalis pes-caprae</i>
<i>Acacia baileyana</i>	<i>Cotoneaster</i> sp.	<i>Oxalis purpurea</i>
<i>Acacia decurrens</i>	<i>Crassula multica</i>	<i>Pinus pinaster</i>
<i>Acacia elata</i>	<i>Crataegus monogyna</i>	<i>Pinus radiata</i>
<i>Acacia longifolia</i> subsp. <i>longifolia</i>	<i>Cytisus scoparius</i>	<i>Pittosporum undulatum</i>
<i>Acetosella vulgaris</i>	<i>Dactylis glomerata</i>	<i>Plantago lanceolata</i>
<i>Agrostis capillaris</i>	<i>Ehrharta erecta</i>	<i>Prunus cerasifera</i>
<i>Aira elegantissima</i>	<i>Galium aparine</i>	<i>Romulea rosea</i>
<i>Allium triquetrum</i>	<i>Genista monspessulana</i>	<i>Rubus anglocandicans</i>
<i>Anthoxanthum odoratum</i>	<i>Grevillea cultivars</i>	<i>Sonchus oleraceus</i>
<i>Aster subulatus</i>	<i>Holcus lanatus</i>	<i>Tradescantia fluminensis</i>
<i>Briza maxima</i>	<i>Hypochoeris radicata</i>	<i>Trifolium repens</i>
<i>Bromus diandrus</i>	<i>Isolepis levynsiana</i>	<i>Triticum aestivum</i>
<i>Centaureum erythraea</i>	<i>Juncus microcephalus</i>	<i>Ulex europaeus</i>
<i>Chrysanthemoides monilifera monilifera</i>	<i>Leontodon taraxacoides</i>	<i>Vicia sativa</i>
<i>Conyza</i> sp.	<i>Oxalis incarnata</i>	<i>Watsonia meriana</i> var. <i>bulbillifera</i>

Notes concerning some of the locally threatened plant species

Acacia aculeatissima (Thin-leaf Wattle). Many plants, widely scattered, were found by Lorimer in 1998.

Acacia ulicifolia (Juniper Wattle). Last recorded in 1985.

Austrostipa rudis subsp. *australis* (a subspecies of Veined Spear-grass). At least several plants found by Lorimer in spring 1998. A summer survey would probably detect more.

Allittia cardiocarpa (Swamp Daisy). Over one dozen were found by Lorimer in 1998.

Caladenia carnea (Pink Fingers). Scarce.

Caladenia catenata (White Caladenia). Two plants found by Lorimer in 1998.

Calochilus paludosus (Red Beard-orchid). Last recorded in or about 1985 by Mr Andrew Paget.

Calochilus robertsonii (Purplish Beard-orchid). At least nine plants were found by Lorimer in 1998.

Chamaescilla corymbosa (Blue Stars). Several plants were found by Lorimer in 1998.

Chiloglottis valida (Common Bird-orchid). Last recorded in 1990-1995 by Mr Darren Wallace.

Corunastylis (= *Genoplesium*) *despectans* (Sharp Midge-orchid). Recorded by orchid expert, Mr Jeff Jeanes, in the 1990s and in several quadrats by Mr Andrew Paget in 1985. There has been no recent autumn survey to detect this species, but the habitat does not appear to have deteriorated.

Crassula decumbens (Spreading Crassula). Found by Lorimer in 1998, growing in wheel ruts.

Cryptostylis leptochila (Small Tongue-orchid). Last recorded in or about 1985 by Mr Andrew Paget.

Cryptostylis subulata (Large Tongue-orchid). At least 15 plants were found by Lorimer in 1998.

Diuris corymbosa (Wallflower Orchid). Sixteen plants were found by Lorimer in 1998.

Drosera peltata ssp. *peltata* (Pale Sundew). Last recorded in or about 1985 by Mr Andrew Paget.

Empodisma minus (Spreading Rope-rush). Last recorded in or about 1985 by Mr Andrew Paget.

Eriochilus cucullatus (Parson's Bands). Last recorded in or about 1985 by Mr Andrew Paget.

Glossodia major (Wax-lip Orchid). Only one plant was found by Lorimer in 1998.

Goodenia elongata (Lanky Goodenia). Last recorded in or about 1985 by Mr Andrew Paget.

Hakea nodosa (Yellow Hakea). At least twelve plants were found by Lorimer in 1998.

Hydrocotyle ?callicarpa (Small Pennywort). Last recorded in or about 1985 by Mr Andrew Paget.

Hydrocotyle foveolata (Yellow Pennywort). Many plants, widely scattered, were found by Lorimer in 1998.

Hypoxis hygrometrica (Golden Weather-glass). Last recorded in or about 1985 by Mr Andrew Paget.

Hypoxis vaginata (Sheath Star). Only one plant found in 1998. Its former habitat has been extensively bulldozed.

Imperata cylindrica (Blady Grass). Last recorded in or about 1985 by Mr Andrew Paget.

Kennedia prostrata (Running Postman). Only a few were found by Lorimer in 1998, but fire should bring more.

Lagenophora stipitata (Common Lagenophora). Last recorded in or about 1985 by Mr Andrew Paget.

Lepidosperma filiforme (Common Rapier-sedge). Only a few plants were found by Lorimer in 1998.

Luzula meridionalis var. *flaccida* (Common Woodrush). Last recorded in or about 1985 by Mr Andrew Paget.
Microseris scapigera spp. agg. (Yam-daisy). Very few seen on 26/9/99.
Microtis ?unifolia (Common Onion-orchid). Only one plant found, and identity uncertain.
Microtis parviflora (Slender Onion-orchid). Last recorded in or about 1985 by Mr Andrew Paget.
Ozothamnus obcordatus (Grey Everlasting). Last recorded in 1985-1990 by Mr Andrew Paget.
Patersonia occidentalis (Long Purple-flag). Last recorded in or about 1985 by Mr Andrew Paget.
Pentapogon quadrifidus (Five-awned Spear-grass). Last recorded in or about 1985 by Mr Andrew Paget.
Pomaderris lanigera (Woolly Pomaderris). One colony of twelve plants was found by Lorimer in 1998.
Pomaderris racemosa (Cluster Pomaderris). Approximately 35 plants were found in two colonies by Lorimer in 1998.
Pterostylis longifolia (= *P. melagramma*) (Tall Greenhood). Numbers not recorded.
Pterostylis parviflora (Tiny Greenhood). Last recorded in or about 1985 by Mr Andrew Paget.
Rumex ?brownii (Slender Dock). Last recorded in or about 1985 by Mr Andrew Paget.
Schoenus lepidosperma (Slender Bog-rush). Last recorded in or about 1985 by Mr Andrew Paget.
Sphaerobolium ?minus (Globe-pea). Last recorded some time in 1990-1995 by Mr Darren Wallace.
Spyridium parvifolium (Australian Dusty Miller). Abundant.
Tetraria capillaris (Hair-sedge). Last recorded in or about 1985 by Mr Andrew Paget.
Thelionema caespitosum (Tufted Blue-lily). Last recorded in or about 1985 by Mr Andrew Paget.
Thelymitra ixioides var. *ixioides* (Dotted Sun-orchid). Last recorded in or about 1985 by Mr Andrew Paget.
Thysanotus tuberosus (Common Fringe-lily). Last recorded in or about 1985 by Mr Andrew Paget.
Villarsia reniformis (Running Marsh-flower). Last recorded in c.1992 by Mr Darren Wallace.
Viola ?sieberiana (Tiny Violet). Last recorded in or about 1985 by Mr Andrew Paget, somewhat dubiously.
Wahlenbergia gymnoclada (Naked Bluebell). An unusually large population was discovered by Lorimer in 1998.
Wurmbea dioica ssp. *dioica* (Common Early Nancy). Scattered, and apparently not abundant (Lorimer, 1998).

Fauna of special significance

Endangered Nationally

Regent Honeyeater – a single bird was observed in November 1993 by naturalist, Mr Greg Bain. This is part of a pattern of infrequent observations of this species between Wantirna and Bayswater, but bird observers who regularly go to the site suggest that frequent visitation by Regent Honeyeaters would not have escaped their attention.

Vulnerable in Victoria

Powerful Owl – a record from July 1999 appears in the Atlas of Victorian Wildlife. Occasional records of this species arise throughout the eastern suburbs, even in residential gardens, so the observation is not taken as highly significant.

Rare or Threatened in Knox (but not all of Melbourne)

Sugar Gliders, found by residents in April 2004 and taken to a wildlife shelter.

Fauna habitat features

- Some of the mature eucalypts have hollows suitable for nesting or roosting by native birds, bats, possums or insects;
- The high density and diversity of shrubs significantly improves the habitat for native insects and birds. The prickliness of many of the shrubs helps protect birds from cats at large;
- Swampy depressions probably allow Southern Brown Tree Frogs to breed.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity and Viability

Criterion 1.2.6 accords **Local** significance to any site like this that fits the description, 'Important at local scale - Link between individual remnant habitat blocks or within subcatchment'.

Richness and Diversity

Criterion 2.1.1 accords **Regional** significance to any site whose richness in native species puts them among the top 5% when compared with similar sites in the bioregion. This fits the Bateman Street Bush.

Endangered Vegetation Types

Both vegetation types present are listed as regionally Endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that the site's native vegetation is necessarily of at least High conservation significance. This, in turn, gives the site State significance under criterion 3.2.3.

Rare or Threatened Flora

Criterion 3.1.2 attributes **Regional** significance to any site with known habitat for a small population of a species that is listed as rare or threatened in Victoria. This applies to the Bateman Street Bush in the case of *Austrostipa rudis* subsp. *australis*. A summer survey may discover that the population of this taxon is larger than could be detected during past surveys, in which case the significance level could rise to State.

Many of the other locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

Sugar Gliders are threatened locally but not throughout the whole Gippsland Plain bioregion. The presence of at least one family found in the site in April 2004 gives the site **Local** significance on the same basis as the plants just discussed.

Criterion 3.1.2 confers at least Local significance on sites that provide habitat for species that are threatened in Victoria. The Regent Honeyeater is such a species, but the habitat in the Bateman Street Bush would represent only a tiny fraction of the habitat of any bird of this migratory or nomadic species. Taking into account the pattern of recurring observations of this species in the area of Wantirna to Bayswater, the habitat at Bateman Street Bush could be regarded as **Locally or Regionally** significant.

Similar considerations apply to the single observation of a Powerful Owl in the site, at a time of year when adult birds would be breeding. This only warrants Local significance.

Threats

- Invasion by environmental weeds, of which the following are rated Very Serious: Boneseed (*Chrysanthemoides monilifera*), Monterey Pine (*Pinus radiata*), Sweet Pittosporum (*Pittosporum undulatum*), Gorse (*Ulex europaeus*) and Bulbil Watsonia (*Watsonia meriana*). Blackberry (*Rubus discolor*) would also be very serious if not for periodic application of herbicide;
- Illegal incursions by vehicles and machinery, particularly motorbikes;
- Dumping of rubbish and garden waste by neighbours;
- Critically small population sizes of some plant species; e.g. only two *Lycopus australis* were found;
- Cats killing wildlife.

Management issues

- Management can be guided in general by the 2000 report, 'Flora and Fauna Survey and Management Plan for Bateman Street Bushland' by S. Cropper (Botanicus Australia Pty Ltd) for VicRoads;
- Weed control is the highest ecological priority for management of the Bateman Street Bush;
- Regeneration of the native vegetation requires ecological burning as hot as safety allows, one section of the site at a time and at intervals of several years. The suggestions for autumn burning in the management plan just cited should be treated with care, because if this were applied to an area with much Large Quaking-grass (*Briza maxima*) or Sweet Vernal-grass (*Anthoxanthum odoratum*), the result would probably be a serious worsening of these very serious weeds. Such areas should only be burned in November or early December when conditions allow a rather hot fire, or after grass-specific herbicide is applied during this period.

Administration matters

- It would be desirable to have a botanist check in autumn for the continued existence of the nationally listed orchid, *Corunastylis* (= *Genoplesium*) *despectans*. A summer inspection for *Austrostipa rudis* subsp. *australis* would also be desirable, but less important;
- This site is extremely worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its State significance, the endangered EVCs, the significant plant species, the habitat for native fauna and potential subdivision pressure;
- The Planning Scheme zoning is variously Residential 1 Zone (R1Z), Residential 2 Zone (R2Z) and Road Zone Category 1 (RDZ1);
- The site is included under the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, albeit with slightly different boundaries that were obtained from Site 6 of the report by Water Ecoscience (1998).

Information sources used in this assessment

- The report, '1998 Flora Survey of Bateman Street Bush, Wantirna' by G.S. Lorimer for Knox Environment Society, plus the underlying field data. The fieldwork took twelve hours during October and early November 1998. It included mapping, compilation of lists of indigenous and introduced plant species, and checks for ecological threats, management issues and populations of scarce or threatened plant species;

- Several other inspections of the site by the author during springtimes since the mid- to late-1980s;
- A re-inspection of the site by Dr Lorimer in December 2007 to ensure that the information presented here would remain relevant;
- A re-inspection of the southern boundary in May 2010 to determine adjustments to account for residential development on some of the land formerly included in the site;
- The 2000 report, '*Flora and Fauna Survey and Management Plan for Bateman Street Bushland*' by S. Cropper (Botanicus Australia Pty Ltd) for VicRoads;
- Data from thirty-six quadrats (DSE numbers N13101-N13137, except the missing quadrat N13113) compiled by Mr Andrew Paget in June and July 1985, although some species such as *Eucalyptus bridgesiana* are treated here as unreliable;
- A list of additional species seen by Mr Paget during 1985-1990 that were not found in his quadrats;
- Discussion with orchid expert, Mr Jeff Jeanes, in the late 1990s and 2003 about his personal observations of orchids;
- A written list and verbal description of personal observations of plants seen by reliable naturalist, Mr Darren Wallace, during 1990-1995;
- Discussion with biologist Mr Greg Bain, who observed the Regent Honeyeater at the Bateman Street Bush in 1993;
- Aerial photography from February 2001, April 2003, February 2007 and December 2009;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 50. Yarrabing Wetlands Reserve, Wantirna

A park beside Dandenong Creek with a wetland, impressive Manna Gums and mown lawn. Melway ref. 63 F3.

Site Significance Level: *Regional*

- The regionally Endangered vegetation type, Floodplain Wetland Complex, is present, as well as scattered trees that are remnants of two other threatened vegetation types (Riparian Forest and Swampy Woodland);
- Locally rare flora and fauna have been recorded at the site;
- Being on Dandenong Creek, the site is on a major corridor for daily and seasonal movements of birds and insects (particularly waterbirds).

Aerial photograph and plan: See page 262, which covers this site and Site 51.

Boundaries

This site is the whole of the Yarrabing Wetlands Reserve, as outlined in red and labelled 'Yarrabing Wetlands' on the aerial photograph on p. 262. The total area is 1.79 ha.

Land use & tenure: Public park and conservation area, managed by Knox City Council.

Site description

This site lies on the floodplain of Dandenong Creek, except for a narrow strip on the southern edge which is at the foot of the north-facing slope leading down to the floodplain. The elevation is 79 m on the floodplain, rising to almost 81 m on the southern boundary.

Two meanders of the natural course of Dandenong Creek flowed through the reserve before the creek was replaced by a straight channel in the 1960s. A depression was left where the more easterly meander had been, and this has been expanded into a larger wetland by excavation in recent years. This wetland is outlined in white on the aerial photograph.

The expanded wetland has been extensively revegetated with indigenous wetland species, as a result of Council's efforts to enhance the habitat. The First Friends of Dandenong Creek and Melbourne Water have assisted these efforts. Council has also erected signs to help the public understand the ecology of this floodplain area.

The wetland is usually occupied by waterbirds. Unfortunately, weeds are also thriving in some of the wetland, exacerbated by the prolonged drought of recent years.

The main features of biological significance in the site are the wetland and the healthy, large specimens of Manna Gum (*Eucalyptus viminalis*) that remain in the reserve (clearly visible on the aerial photograph). The Manna Gums mark the area originally covered by Riparian Forest. The native understorey there has been reduced to little more than a small paperbark thicket and scattered ground flora that tolerate the frequent mowing which extends through most of the reserve.

On the slope at the reserve's southern margin, there are two Mealy Stringybarks (*Eucalyptus cephalocarpa*) and a Swamp Gum (*Eucalyptus ovata*), the only remnants of what would once have been Swampy Woodland. They are now within a revegetation plot that extends along most of the reserve's southern boundary.

Relationship to other land

Yarrabing Wetlands is like the nearby Winton Wetlands in most respects, and is separated from it only by the EastLink road. It represents a small ecological stepping-stone on a major corridor for daily and seasonal movements of birds and insects (particularly waterbirds). However, the native habitat along the stretch of creek corridor between Yarrabing Wetlands and the eastern side of Wantirna Rd is greatly fragmented, being mostly reduced to scattered trees and young vegetation.

Bioregion: Gippsland Plain

Habitat types

Riparian Forest (EVC 18, **Vulnerable** in the Gippsland Plain bioregion), reduced to scattered trees over predominantly introduced grasses, regularly mown. 10 indigenous plant species recorded.

Dominant canopy trees: *Eucalyptus viminalis* with one *E. radiata* and one unidentified hybrid eucalypt.

Dominant lower trees: *Acacia dealbata* and *Melaleuca ericifolia*.

Shrubs: *Bursaria spinosa*, very scant.

Vines and Ferns: None found.

Ground flora: The hardy species, *Microlaena stipoides* and *Lythrum hyssopifolia* were the only native ground flora found.

Swampy Woodland (EVC 937, **Endangered** in the Gippsland Plain bioregion), reduced to one *Eucalyptus ovata* and two *Eucalyptus cephalocarpa*.

Floodplain Wetland Complex (EVC 172, **regionally Endangered**): Estimated as 1,200 m², approximately equally divided between ecological condition ratings C and D when inspected in 2002, but in a state of change due to expansion of the wetland and extensive revegetation. 12 naturally occurring indigenous plant species have been recorded.

Trees, shrubs, vines and ferns: None other than some overhanging branches of trees and shrubs.

Aquatic and semi-aquatic flora: The dominant indigenous species are *Juncus* species and *Persicaria* species. *Alisma plantago-aquatica* is also abundant in places, as are the wetland weeds, *Juncus articulatus*, *Paspalum distichum* and *Ranunculus repens*.

Plant species

The following plant species were observed by the author on 14th June 2002. Additional species would no doubt be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Persicaria praetermissa* is rare throughout the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Acacia dealbata</i>	V	<i>Isolepis inundata</i>
	<i>Alisma plantago-aquatica</i>		<i>Juncus amabilis</i>
V	<i>Alternanthera denticulata</i>		<i>Juncus gregiflorus</i>
C	<i>Amyema pendula</i>		<i>Juncus pallidus</i>
	<i>Bursaria spinosa</i>		<i>Juncus sarophorus</i>
E	<i>Centella cordifolia</i>		<i>Lachnagrostis filiformis</i>
E	<i>Crassula helmsii</i>	V	<i>Lythrum hyssopifolia</i>
V	<i>Eucalyptus cephalocarpa</i>	E	<i>Melaleuca ericifolia</i>
V	<i>Eucalyptus ovata</i>		<i>Microlaena stipoides</i>
E	<i>Eucalyptus radiata</i>	C	<i>Muellerina eucalyptoides</i>
	<i>Eucalyptus hybrid</i>		<i>Persicaria decipiens</i>
E	<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>	E	<i>Persicaria praetermissa</i>
Introduced Species			
	<i>Agrostis capillaris</i>		<i>Holcus lanatus</i>
	<i>Crataegus monogyna</i>		<i>Juncus articulatus</i>
	<i>Gladiolus undulatus</i>		<i>Paspalum distichum</i>
			<i>Ranunculus repens</i>
			<i>Romulea rosea</i>
			<i>Ulex europaeus</i>

Fauna of special significance

Rare in Knox

Yellow-Billed Spoonbill.

Fauna habitat features

- Some of the mature eucalypts have hollows suitable for nesting or roosting by native birds, bats, possums or insects;
- The large Manna Gums (*Eucalyptus viminalis*) may provide nest sites for bird species that only breed in particularly tall trees;
- The juxtaposition of the tall trees (including dead ones) and the open pasture makes good habitat for smaller birds of prey such as Black-Shouldered Kites;
- The wetland was observed to provide habitat for frogs, insects and foraging (but not nesting) waterbirds.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment'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 this site.

Criterion 1.2.6 accords **Local** significance to sites that fit the description 'Important at local scale - Link between individual remnant habitat blocks or within subcatchment'. This applies to Yarrabing Wetlands' role for waterbirds such as the Yellow Spoonbill observed there.

Threatened Vegetation Types

Floodplain Wetland Complex is an endangered EVC. According to 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), remnant patches of native vegetation belonging to an endangered EVC have a conservation significance rating of either High or Very High, depending on their ecological condition. In either case, any site containing a remnant patch of such vegetation is of State significance under criterion 3.2.3 of Amos (2004).

The wetland vegetation at Yarrabing Wetlands Reserve meets the Department of Sustainability & Environment's current definition of a remnant patch, but at the time Amos (2004) prepared the significance criteria, the unpublished convention was that native vegetation only qualified as a remnant patch if it occupied at least 2,500 m². Because this threshold is substantially larger than the area of native vegetation at Yarrabing Wetlands Reserve, the author has reduced the significance level of the site to **Regional**.

It is possible that the effects of drought will reduce the cover of indigenous wetlands plants to below the threshold required to qualify as a remnant patch, in which case the criterion 3.2.3 will no longer apply. However, the cover of indigenous plants may subsequently recover naturally when flooding recurs.

Locally Threatened Plant Species

Some of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Invasion by environmental weeds in the wetland. The most serious are Water Couch (*Paspalum distichum*), Jointed Rush (*Juncus articulatus*) and Creeping Buttercup (*Ranunculus repens*);
- Climate change and the effects of drought.

Management issues

- Weed control in the wetland is the highest ecological priority for management. Since Water Couch is very serious, it would be desirable to conduct a trial with a grass-specific herbicide that has been shown to have low aquatic toxicity, either at this site or another wetland in Knox (e.g. Lakewood Nature Reserve or Winton Wetlands). The WA Water and Rivers Commission has found Fusilade[®] to be suitable in such conditions (see their 'Water Notes' no. 22 of 2001, available from the www).

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its threatened EVCs, the significant plant species, the habitat for native fauna and the riparian location;
- The Planning Scheme zoning is Urban Floodway Zone (UFZ);
- The site is included under the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, as part of Site 82 of the report by Water Ecoscience (1998).

Information sources used in this assessment

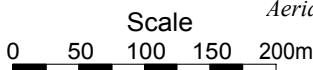
- Site description and mapping in 'Vegetation Survey of Linear Reserves – A Management Strategy for Riparian and Floodplain Vegetation' by Reid, Moss and Lorimer (1997), and the underlying field data. The field data included vegetation mapping, compilation of lists of indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats, management issues and populations of scarce or threatened plant species;
- A survey of the site by Dr Lorimer on 14/6/2002 to update the early survey, to fill gaps between the above data and the requirements of this study, and to advise Council on the content of interpretive signs that have since been erected there;
- Information about plantings obtained from Council and the website of the First Friends of Dandenong Creek;
- The 1998 'Scoresby Transport Corridor Environment Effects Statement', particularly Supplement Volume H: Flora and Fauna by Williams L.M., Yugovic J.V., McGuckin J., Humphrey P. and Larwill S. (1998);
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 51. Winton Wetlands, Wantirna

Publicly accessible wetland conservation park managed by Melbourne Water. Melway ref. 63 D3.

Site Significance Level: State

- Two regionally threatened vegetation types are represented: Floodplain Wetland Complex and Riparian Forest;
- Locally rare flora are present, and the rare waterbird, Latham’s Snipe, has been observed there;
- Being on Dandenong Creek, the site is on a major corridor for daily and seasonal movements of birds and insects (particularly waterbirds, several species of which are threatened).



Aerial photograph taken February 2007

Boundaries

This site is the elongated shape on the aerial photograph of the previous page, outlined in red and labelled ‘Winton Wetlands’. The boundary follows a fence. The total area is 5.72 ha.

Land use & tenure: Fenced (but publicly accessible) wetland conservation area, managed by Melbourne Water.

Site description

This site lies on the floodplain of Dandenong Creek, at elevations of 74-77 m. The natural course of the creek meandered partly through this area until it was replaced by a straight channel in the 1960s. There is now a chain of wetland depressions whose origins appear to be partly natural and partly the result of excavation. The largest, most northerly wetland is a section of the original creek channel.

There are a small number of mature remnant trees and extensive plantings of trees and shrubs between the wetlands. There are also some large dead trees, whose hollows are used as birds' nests. As a result of a long history of grazing, naturally occurring shrubs are few, and most of the ground flora comprises introduced pasture species.

Relationship to other land

Being on Dandenong Creek, Winton Wetlands is an ecological stepping-stone on a major corridor for daily and seasonal movements of birds and insects (particularly waterbirds, several species of which are threatened). This is discussed further in the section of this report for the corridor (Site 26), which includes the strip between the creek and the northern boundary of the Manson Reserve site.

The native habitat along the stretch of creek corridor between Winton Wetlands and the eastern side of Wantirna Rd is greatly fragmented, being mostly reduced to scattered trees and young revegetation. The situation downstream is better, with a large area of unfragmented forest habitat south of Boronia Rd and a substantial area of less intact bushland at Campbell's Croft Reserve, just southwest of Winton Wetlands.

The recent construction of the EastLink road may alter the hydrology or water quality of the wetlands.

Bioregion: Gippsland Plain

Habitat types

Riparian Forest (EVC 18, **Vulnerable** in the Gippsland Plain bioregion): Estimated as 1.6 ha, comprising 0.3 ha in fair ecological condition (rating C) and 1.3 ha in poor ecological condition (rating D). 20 indigenous plant species were found by Mr John Reid in January to February 1997.

Dominant canopy trees: *Eucalyptus viminalis* with smaller numbers of *E. cephalocarpa*, *E. obliqua*, *E. radiata* and *E. ovata*.

Dominant lower trees: *Acacia dealbata*, *Acacia melanoxylon*, *Acacia mearnsii* and *Exocarpos cupressiformis*.

Shrubs: Only the very hardy shrub, *Kunzea ericoides*, remains of the natural shrub layer, due to a history of grazing.

Vines: There is a *Calystegia* that may be the indigenous *C. sepium* or (more likely) part of a hybrid complex between that species and the introduced *C. silvatica*.

Ferns: None found.

Ground flora: Principally introduced pasture species, but there are patches of the weedy indigenous *Phragmites australis* and a few plants of *Persicaria hydropiper* and *Persicaria lapathifolia*, as well as patches of the indigenous grasses, *Rytidosperma setaceum*, *Eragrostis brownii*, *Austrostipa rudis* and *Themeda triandra*.

Floodplain Wetland Complex (EVC 172, **regionally Endangered**): Estimated as 9,500 m², in good ecological condition (rating B). 29 indigenous plant species were found by Mr John Reid in January to February 1997.

Trees, shrubs, vines and ferns: None other than some overhanging branches of trees and shrubs.

Aquatic and semi-aquatic flora: Deeper water is dominated by *Eleocharis sphacelata* and *Triglochin procerum*, as well as small floating plants in season. The dominant indigenous species in other areas are variously *Alternanthera denticulata*, *Juncus* species or *Persicaria* species. *Alisma plantago-aquatica* is also abundant in places. *Carex appressa* and *Glyceria australis* are present, as is usual in this EVC.

Plant species

The following plant species were observed in 1997. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. Additional species would no doubt be detectable in other seasons. In addition, the species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Acacia dealbata</i>		<i>Austrostipa rudis</i> subsp. <i>rudis</i>
V	<i>Acacia mearnsii</i>	E	<i>Azolla pinnata</i>
V	<i>Acacia melanoxylon</i>		<i>Bursaria spinosa</i>
	<i>Alisma plantago-aquatica</i>	C	<i>Calystegia ?sepium</i>
V	<i>Alternanthera denticulata</i>		<i>Carex appressa</i>
C	<i>Amyema pendula</i>	E	<i>Centella cordifolia</i>

Risk	Indigenous Species	Risk	Indigenous Species
C	<i>Centipeda elatinoidea</i>		<i>Juncus sarophorus</i>
E	<i>Crassula helmsii</i>		<i>Kunzea ericoides</i> spp. agg.
V	<i>Eleocharis acuta</i>		<i>Lachnagrostis filiformis</i>
	<i>Eleocharis sphacelata</i>	C	<i>Landoltia punctata</i>
	<i>Epilobium hirtigerum</i>	V	<i>Lythrum hyssopifolia</i>
	<i>Eragrostis brownii</i>		<i>Persicaria decipiens</i>
V	<i>Eucalyptus cephalocarpa</i>	E	<i>Persicaria hydropiper</i>
V	<i>Eucalyptus obliqua</i>	E	<i>Persicaria lapathifolia</i>
V	<i>Eucalyptus ovata</i>	E	<i>Persicaria praetermissa</i>
E	<i>Eucalyptus radiata</i>	E	<i>Phragmites australis</i>
E	<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>		<i>Ranunculus</i> sp.
E	<i>Euchiton involucratus</i>		<i>Rytidosperma setaceum</i>
V	<i>Exocarpos cupressiformis</i>	C	<i>Spiranthes australis</i>
C	<i>Gratiola pubescens</i>		<i>Themeda triandra</i>
	<i>Juncus amabilis</i>	C	<i>Triglochin procera</i>
	<i>Juncus gregiflorus</i>	E	<i>Triglochin striata</i> (flat leaf variant)
C	<i>Juncus holoschoenus</i>	C	<i>Viminaria juncea</i>
E	<i>Juncus procerus</i>		
Introduced Species			
	<i>Acacia retinodes</i> s.l.		<i>Foeniculum vulgare</i>
	<i>Agrostis capillaris</i>		<i>Helminthotheca echioides</i>
	<i>Anthoxanthum odoratum</i>		<i>Holcus lanatus</i>
	<i>Aster subulatus</i>		<i>Hypochoeris radicata</i>
	<i>Bromus catharticus</i>		<i>Juncus articulatus</i>
	<i>Calystegia ?silvatica</i>		<i>Myriophyllum aquaticum</i>
	<i>Dactylis glomerata</i>		<i>Paspalum dilatatum</i>
			<i>Paspalum distichum</i>
			<i>Plantago lanceolata</i>
			<i>Ranunculus repens</i>
			<i>Raphanus raphanistrum</i>
			<i>Rumex crispus</i>
			<i>Salix × rubens</i>
			<i>Ulex europaeus</i>

Fauna of special significance

Listed as 'Near Threatened' in Victoria

Latham's (or Japanese) Snipe. Observed by Mr John Reid on 30/6/96. Frequency of visitation unknown.

Uncommon in the Melbourne Area

Weasel Skink. Seen in c.1998, as reported in the Scoresby Transport Corridor Environment Effects Statement.

Rare or Threatened in Knox (but not all of Melbourne)

Yellow-Billed Spoonbill. Observed by Mr John Reid during a 1997 survey. Frequency of visitation unknown.

Fauna habitat features

- Some of the mature eucalypts have hollows suitable for nesting or roosting by native birds, bats, possums or insects;
- Some large Manna Gums (*Eucalyptus viminalis*) may provide nest sites for bird species that only breed in particularly tall trees;
- The juxtaposition of the tall trees (including dead ones) and the open pasture makes good habitat for smaller birds of prey such as Black-Shouldered Kites;
- The wetlands were observed to provide habitat for yabbies, frogs, insects and nesting waterbirds.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment'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 this site.

Criterion 1.2.6 accords **Local** significance to sites that fit the description, 'Important at local scale - Link between individual remnant habitat blocks or within subcatchment'. This applies to Winton Wetlands' role for waterbirds such as the Latham's Snipe observed there.

Threatened Vegetation Types

Floodplain Wetland Complex is listed as regionally Endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that the wetland vegetation is necessarily of at least High conservation significance. This, in turn, gives the site **State** significance under criterion 3.2.3 of Amos (2004).

Similarly, the presence of a remnant patch of Riparian Forest (which is listed as regionally Vulnerable) in fair ecological condition represents Regional significance under criterion 3.2.3.

Rare or Threatened Flora

Some of the locally threatened plant species listed above have viable populations (in combination with ecologically connected habitat), thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

Criterion 3.1.2 confers at least Local significance on sites that provide habitat for species that are on the Department of Sustainability & Environment's advisory list of threatened fauna in Victoria, which includes Latham's Snipe. Winton Wetlands does provide habitat that appears suitable for Latham's Snipe, one of which has been recorded at the site, but without further observations, the significance level is only **Local**.

Threats

- Invasion by environmental weeds. The most serious in the wetlands are Water Couch (*Paspalum distichum*), Jointed Rush (*Juncus articulatus*) and Creeping Buttercup (*Ranunculus repens*). *Paspalum dilatatum* and *Cynodon dactylon* are serious around the fringes of the wetlands and into their surroundings. Gorse (*Ulex europaeus*) and Blackberry (*Rubus discolor*) could readily become very serious if not for periodic application of herbicide;
- Climate change and the effects of drought;
- Potential alteration of hydrology or water quality as a result of the recent construction of the EastLink road.

Management issues

- Any works that may affect an old eucalypt in the site should be mindful that there is at least one listed Aboriginal scar tree (whose location must remain confidential);
- Weed control is the highest ecological priority for management. Since Water Couch is very serious, it would be desirable to conduct a trial with a grass-specific herbicide that has been shown to have low aquatic toxicity. The WA Water and Rivers Commission has found Fusilade[®] to be suitable in such conditions (see their 'Water Notes' no. 22 of 2001, available from the www).

Administration matters

- It would be desirable to have an expert on insects investigate whether the wetlands support any rare invertebrates;
- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its State significance, the threatened EVCs, the significant plant species, the habitat for native fauna and the riparian location;
- The Planning Scheme zoning is Public Conservation and Resource Zone (PCRZ);
- The site is included under the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, as part of Site 82 of the report by Water Ecoscience (1998).

Information sources used in this assessment

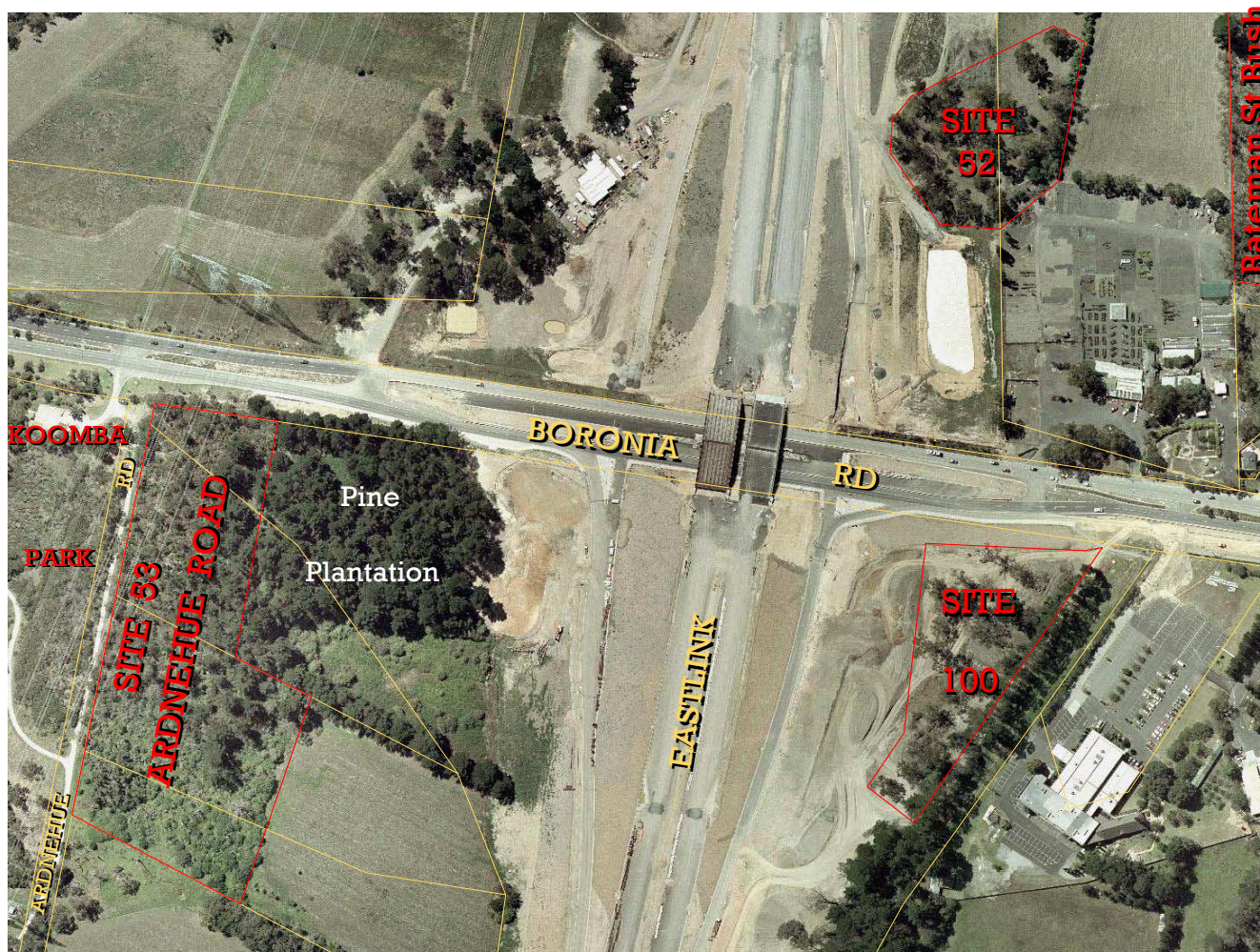
- Site description and mapping in '*Vegetation Survey of Linear Reserves – A Management Strategy for Riparian and Floodplain Vegetation*' by Reid, Moss and Lorimer (1997), and the underlying field data. The field data included vegetation mapping, compilation of lists of indigenous and introduced plant species for three parts of the reserve, incidental fauna observations, and checks for fauna habitat, ecological threats, management issues and populations of scarce or threatened plant species;
- Brief, informal visits to the site by the author over seven years;
- The 1998 '*Scoresby Transport Corridor Environment Effects Statement*', particularly Supplement Volume H: Flora and Fauna by Williams L.M., Yugovic J.V., McGuckin J., Humphrey P. and Larwill S. (1998);
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 53. Ardnehue Rd Land, Wantirna

Regenerating native vegetation on swampy public land, largely earmarked for possible future road construction. Melway ref. 63 D5.

Site Significance Level: *State*

- The site is part of the State-significant Dandenong Creek flora and fauna corridor, and it makes a considerable contribution to the richness of flora in the corridor;
- Several of the plant species present are regionally rare;
- Being on Dandenong Creek, the site is on a major corridor for daily and seasonal movements of birds and insects.



Aerial photograph taken February 2007



Scale

0 20 40 60 80 100m

Boundaries

The site comprises the area outlined in red and labelled 'Site 53 - Ardnehue Road' on the aerial photograph above. The western, northern and southern boundaries follow cadastral boundaries of three lots. Abutting to the west is the reservation for Ardnehue Rd, which is presently part of the Dandenong Creek trail. There is no distinct boundary between native vegetation in the site and the pine plantation to the east, so a boundary has been placed somewhat arbitrarily at 70 m from the Ardnehue Rd fence. From there, the boundary follows a cadastral boundary along the southern edge of the pine plantation for 50 m before heading to the site's southern corner. This corner is 110 m along a fence from the site's southwestern corner. The total area is 2.41 ha.

Land use & tenure: Of the four lots in the site, Knox City Council owns the largest one and VicRoads owns the others. The VicRoads properties are on alignments for proposed roads: a realignment of Boronia Rd and an interchange route between the Healesville Freeway and the EastLink road.

Site description

This site is on the alluvial floodplain of Dandenong Creek at an elevation of 75 m, 200 m east of the stream channel.

It contains some mature trees in the north, but most of the vegetation is young regrowth of Swampy Woodland and probably some Riparian Forest or Swampy Riparian Forest. The eucalypts are destined to ultimately dominate the vegetation (if they are not cut down or trimmed to protect electricity transmission lines), but at the moment they are not as dense as the shrub layer, which forms a dense scrub several metres tall over much of the site. The scrub is dominated by *Leptospermum scoparium* in the central and northern lots and by *Melaleuca ericifolia* in the southern lot (where there is also an open patch dominated by *Typha*).

The ground is swampy on the two more southerly lots, with channels and depressions that rarely dry out. The more northern property has older trees and the ground is somewhat drier.

On the Council's lot there is a rich diversity of ground flora despite the dense shade of the scrub, including many amphibious species (some of them rare) and a few species normally associated with drier soil (e.g. many *Pterostylis pedunculata*). Remarkably, *Gahnia radula* is absent, suggesting possible severe soil disturbance in the past. The richness of flora reduces progressively to the north and south of the Council lot.

The presence of scrub may suggest Swamp Scrub (EVC 53) except that this is likely to be only temporary. The vegetation is in a phase of rapid growth and development. The scrub can be expected to naturally decline over coming years, and the diversity and composition of ground flora will change as a result. As the eucalypts grow and drain the soil, species such as *Pterostylis* will benefit while water-lovers such as *Carex* and *Cyperus* will decline.

Pine trees have evidently been invading the site for many years, resulting in the indistinct transition between the native vegetation and the adjoining pine plantation. The effects are quite serious, and could destroy the native vegetation if not controlled regularly for as long as the pine plantation remains adjacent.

Also worthy of note is a dam 140 m southeast from the site, that was located at the southeastern tip of the Council property prior to construction of the EastLink road. Its embankment supported natural regrowth of *Acacia pycnantha*, *Gonocarpus tetragynus*, *Microlaena*, *Oxalis perennans* (s.l.), *Schoenus apogon* and *Senecio glomeratus*. This did not represent a natural vegetation community, and there was substantial growth of weeds such as Blackberry and Sweet Pittosporum. More importantly, the dam water and its margins supported amphibious and aquatic plants, including dominance by the locally endangered floating fern, *Azolla pinnata*. The dam was destroyed during EastLink construction, but a small amount of native vegetation may have survived.

Relationship to other land

The site is part of the Dandenong Ck flora and fauna corridor. Neighbouring areas of native vegetation are shown on the aerial photograph above.

Bioregion: Gippsland Plain

Habitat type

Regrowth of Swampy Woodland (EVC 937, **regionally Endangered**) and probably either Swampy Riparian Woodland (EVC 83 – **regionally Endangered**) or Riparian Forest (EVC 18 – **regionally Vulnerable**), covering approximately 2.3 ha in total, comprising 0.23 ha in good ecological condition (rating B) (on the Council property), 0.78 ha in fair ecological condition (rating C) and 1.3 ha in poor ecological condition (rating D). On 15/5/02, 28 indigenous plant species were found on the northern property, 47 on the Council property and 8 on the southern property.

Dominant canopy trees: In the southernmost lot, eucalypts are effectively absent and *Melaleuca ericifolia* forms the canopy. Further north, the dominant eucalypts are *Eucalyptus viminalis*, or *E. cephalocarpa* near Boronia Rd. *E. ovata* is uncharacteristically scarce. These species may be in quite different proportions from their original state, but they suggest the eventual condition will tend toward Riparian Forest over most of the land and Swampy Woodland close to Boronia Rd.

Dominant lower trees: *Acacia mearnsii* is rather dense and *A. melanoxylon* is less dense. *Leptospermum scoparium* could be regarded as a small tree that is forming a dense scrub over the Council lot and some of the lot to the north.

Shrubs: Mostly dense, dominated by *Coprosma quadrifida*, *Ozothamnus ferrugineus* and *Bursaria spinosa*. *Prostanthera lasianthos* is also present on the Council property and the one to the north, supporting the expectation that the vegetation is tending toward Riparian Forest rather than Swampy Woodland over most of the land.

Vines: Very scarce or absent.

Ferns: Scarce: There are single plants of *Hypolepis rugosula*, *Histiopteris incisa* and *Blechnum minus* on the Council property and *Lindsaea linearis* is scattered around the boundary between that lot and the one to the north. Ferns may well proliferate as the vegetation develops.

Ground flora: *Microlaena stipoides* and *Austrostipa rudis* dominate on the drier ground of the northernmost property, with abundant moss, *Acaena novae-zelandiae* and *Gonocarpus tetragynus*. These species are joined on the Council property by *Lomandra longifolia* and, in the wettest areas, water-loving sedges such as *Carex* and *Cyperus*. *Lobelia anceps* and *Centella cordifolia* are abundant on this property. Rushes become dominant among the ground flora (along with the weed, *Ranunculus repens*) on the southernmost lot, although *Typha* dominates a large patch. The combination of *Centella cordifolia*, *Gonocarpus micranthus*, *Goodenia humilis*, *Isotoma ?fluviatilis*, *Lindsaea linearis* and *Lobelia anceps* on the Council property are suggestive of Swampy Woodland, but they are intermixed with species such as *Cyperus lucidus*, *Eucalyptus viminalis* and *Prostanthera lasianthos* that are more indicative of Riparian Forest.

Plant species

The following plant species were observed by the author on 30th August 2002. Additional species would no doubt be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, the species with names in bold are rare throughout the Melbourne region. Of the species found, 47 were on the Council property, 28 to the north and 8 to the south.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia mearnsii</i>	C	?Isotoma fluviatilis
V	<i>Acacia melanoxylon</i>		<i>Juncus gregiflorus</i>
	<i>Acacia paradoxa</i>	C	<i>Juncus holoschoenus</i>
E	<i>Acacia pycnantha</i>		<i>Juncus pallidus</i>
	<i>Acaena novae-zelandiae</i>	E	<i>Juncus planifolius</i>
V	<i>Adiantum aethiopicum</i>	E	<i>Juncus procerus</i>
	<i>Alisma plantago-aquatica</i>		<i>Juncus sarophorus</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	E	<i>Leptospermum scoparium</i>
C	Baumea acuta	V	<i>Lindsaea linearis</i>
C	Blechnum minus	E	<i>Lobelia anceps</i>
	<i>Bursaria spinosa</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
E	Carex fascicularis		<i>Lomandra longifolia</i>
E	<i>Centella cordifolia</i>	E	<i>Melaleuca ericifolia</i>
V	<i>Coprosma quadrifida</i>		<i>Microlaena stipoides</i>
E	<i>Cyathea australis</i>		<i>Oxalis exilis/perennans</i>
V	<i>Dianella longifolia</i> s.l.	E	<i>Ozothamnus ferrugineus</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Persicaria decipiens</i>
E	<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>	E	<i>Poa tenera</i>
	<i>Eucalyptus</i> – two hybrids		<i>Prostanthera microphylla</i>
V	<i>Exocarpos cupressiformis</i>	E	<i>Prostanthera lasianthos</i>
C	<i>Gonocarpus micranthus</i>	C	<i>Pterostylis pedunculata</i>
	<i>Gonocarpus tetragynus</i>	E	<i>Rytidosperma semiannulare</i>
E	<i>Goodenia humilis</i>		<i>Schoenus apogon</i>
	<i>Goodenia ovata</i>	E	<i>Senecio minimus</i>
C	Histiopteris incisa	V	<i>Solanum laciniatum</i>
C	Hypericum japonicum	E	<i>Typha</i> sp.
C	Hypolepis rugosula	E	<i>Viola hederacea</i>
V	<i>Isolepis inundata</i>	E	<i>Xanthosia dissecta</i>

Introduced Species

<i>Acacia baileyana</i>	<i>Galium aparine</i>	<i>Pittosporum undulatum</i>
<i>Anthoxanthum odoratum</i>	<i>Genista monspessulana</i>	<i>Prunella vulgaris</i>
<i>Callitriche stagnalis</i>	<i>Gladiolus undulatus</i>	<i>Prunus cerasifera</i>
<i>Centaurium erythraea</i>	<i>Hedera helix</i>	<i>Ranunculus repens</i>
<i>Cirsium vulgare</i>	<i>Holcus lanatus</i>	<i>Rubus anglocandicans</i>
<i>Cotoneaster pannosus</i>	<i>Hypochoeris radicata</i>	<i>Salix</i> sp.
<i>Crataegus monogyna</i>	<i>Leontodon taraxacoides</i>	<i>Solanum americanum</i>
<i>Cyperus eragrostis</i>	<i>Lonicera japonica</i>	<i>Sonchus oleraceus</i>
<i>Ehrharta erecta</i>	<i>Oxalis incarnata</i>	<i>Ulex europaeus</i>
<i>Erica lusitanica</i>	<i>Pinus radiata</i>	<i>Watsonia meriana</i> var. <i>bulbillifera</i>

Notes concerning some of the locally threatened plant species

Baumea acuta (Pale Twig-rush). Abundant on the Council property.

Blechnum minus (Soft Water-fern). One individual seen on the Council property.

Carex fascicularis (Tassel Sedge). At least several on the Council property.
Cyperus ?lucidus (Leafy Flat-sedge). At least several plants.
Gonocarpus micranthus (Creeping Raspwort). Approximately ten scattered plants were found.
Goodenia humilis (Swamp Goodenia). One large colony was found.
Histiopteris incisa (Bat's Wing Fern). One patch was found.
Hypericum japonicum (Matted StJohn's Wort). Seen on the Council property, where numbers would vary seasonally.
Hypolepis rugosula (Ruddy Ground-fern). A single plant was found.
?Isotoma fluviatilis (Swamp Isotome). Scattered on the Council property.
Juncus holoschoenus (Joint-leaf Rush). Number of plants not recorded.
Pterostylis pedunculata (Maroon-hood). Rather abundant in the dense scrub.

Fauna habitat features

- Frogs breed in the near-permanent water;
- The scrub and other native vegetation were observed to be occupied by plenty of White-browed Scrubwrens and Superb Fairy-wrens;
- Many birds and insects would find abundant food when the paperbarks and tea-trees are in flower.

Significance ratings

This property is part of the Dandenong Creek flora and fauna corridor, which is of State significance. Of course, not every part of the corridor is as significant as every other part, so the following paragraphs describe the significant attributes of this particular site, as assessed against the Department of Sustainability & Environment's standard criteria (Amos 2004):

Ecological Integrity & Viability

The site adds to the Dandenong Creek corridor nearly 2½ ha of dense bushland of a kind that is scarce elsewhere in the corridor, thereby providing diversity of habitat. Its relationship to neighbouring bushland (see above) is also important as a 'stepping stone' for local fauna movements. It follows that the site is of **Local** significance under criterion 1.2.6 of Amos (2004).

Richness of Flora

57 indigenous plant species is a good tally for Knox, taking into account the size of the site, the type of vegetation and that the survey was conducted in winter. The DSE significance criteria provide no recognition for such an attribute.

Regionally Threatened Ecological Vegetation Class

The vegetation represents early developmental stages of a regionally endangered EVC (Swampy Woodland) and perhaps some Swampy Riparian Woodland or Riparian Forest (both of which are also regionally threatened). If one uses the formula in Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a), any occurrence of an endangered EVC is of at least High conservation significance. Taking into account the immature stage of the vegetation's development, the Ardnehue Rd site would be unlikely to reach the level of Very High conservation significance under the Framework, but a habitat score would have to be determined to confirm this with certainty.

Under criterion 3.2.3 of Amos (2004), the site is of **State** significance because it includes vegetation of High conservation significance on the basis of threatened EVCs.

Rare or Threatened Flora

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

This site was reported in the Scoresby Transport Corridor Environment Effects Statement to support Sugar Gliders. If the population remains and is viable, it would give the site Local significance under criterion 3.1.5.

Threats

- The electricity transmission lines above the site must be kept clear of risks from the vegetation. Depending on the care that is taken, the vegetation cutting may have a serious or mild impact on the vegetation.
- Environmental weed invasion has had a major impact on the site but a moderate amount of effort is being made to control this on the northern property and the Council land. The species that were recorded as 'Very Serious' during the field survey for this report were Hawthorn, Gorse, Blackberry, Japanese Honeysuckle and Creeping Buttercup. Six others were rated 'Serious': Cleavers, Wild Gladiolus, Water Couch, Sweet Pittosporum, Blue Periwinkle and Bulbil *Watsonia*.
- Some indigenous plant species (particularly ferns) have population sizes so small that they are vulnerable to inbreeding, poor reproductive success or elimination by incidents such as cubby house construction or digging by dogs;

- The two VicRoads properties are earmarked for possible road construction in the long term.

Management issues

- Transmission line clearance should be done in accordance with a management plan that gives full regard to the significance of the vegetation and minimises the harm to the vegetation's ecology;
- Vegetation that is to be retained during any road construction should be protected by careful planning and hard fencing;
- Any loss of vegetation due to transmission line clearance, road construction or other reasons should be compensated by offsets according to the Victorian Native Vegetation Framework (e.g. by strengthened weed control at the site);
- The site needs and well deserves a greater effort at weed control in order to avoid gradual ecological decline.

Administration matters

- As a site of considerable biological significance, this site meets the criteria for an Environmental Significance Overlay as given in the Biodiversity Practice Note for the Victoria Planning Provisions;
- Those responsible for managing vegetation beneath the electricity transmission lines should be approached regarding this report with a view toward addressing the management issues above.

Information sources used in this assessment

- Detailed vegetation data and mapping in accord with this study's standard approach described in Section 2.4 of Vol.1, including a list of indigenous and introduced plant species for each of the three properties, compiled by Dr Lorimer over approximately two hours on 30th August 2002. Herbarium voucher specimens were taken of *Baumea acuta* and *Hypolepis rugosula* and are being offered to the National Herbarium of Victoria;
- A fauna list for the whole site plus the adjoining Forest Lodge (see below), as observed incidentally during the vegetation survey;
- The 1998 '*Scoresby Transport Corridor Environment Effects Statement*', particularly Supplement Volume H: Flora and Fauna by Williams L.M., Yugovic J.V., McGuckin J., Humphrey P. and Larwill S. (1998);
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 54. Stringybark Reserve, Wantirna

Small Council bushland reserve in two sections separated by Petalnina Dr. Melway ref. 63 F7.

Site Significance Level: *State*

- The native vegetation is young regrowth of the endangered Valley Heathy Forest, partly in quite good condition;
- There are three plant species that are locally threatened, with small populations.



Aerial photograph taken April 2003



Scale 1:2,000
10 0 20 40 60 80 100m

Boundaries

This 4,962 m² site is in two parcels, as outlined in red above. The edges coincide with property boundaries. The magenta lines indicate the boundaries of parts of Site 91, for reference.

Land use & tenure: Council reserve, principally for conservation purposes. Both parts of the reserve are presently fenced, with locked gates.

Site description

Council obtained these two remnants of a formerly larger area of bushland as part of the subdivision of the adjoining residential estate, several years ago. Council is rehabilitating the native vegetation by intensive management. The reserve is not open to the public while this is occurring.

The bedrock is Upper Silurian sandstone of the Dargile formation, which has weathered to form clay subsoil and light grey loam topsoil. The Dargile formation forms a low ridge, and the reserve is situated on the northwestern side, 200 m from the ridge top. Elevations are approximately 107-113 m and the shallow slope (6% gradient) faces west.

The native vegetation is Valley Heathy Forest, which is endangered. Its ecological condition is quite variable due to localised damage during the area's residential development (vehicle tracks, dumped soil) and due to grazing and weed infestations prior to the subdivision. The section of the reserve that lies south of Petalnina Dr is much richer in species than to the north, which appears to have suffered substantial damage from past grazing.

The form of Valley Heathy Forest on this site is the same as at nearby W.G. Morris Reserve (Site 55) and different from the form dominated by Mealy Stringybark (*Eucalyptus cephalocarpa*) at the Bateman Street Bush (Site 49). The latter has greater soil moisture.

The intensive management of the vegetation in Stringybark Reserve is successfully fostering natural regeneration of many indigenous plants. The vegetation is far from maturity and more species are likely to appear in coming years. Some existing species, such as the disturbance-loving Running Postman (*Kennedia prostrata*), may dwindle or disappear as dominant plants suppress the more opportunistic species. To limit this effect, Council's bush crew has selectively cut some particularly dense stands of dominant indigenous plants.

Interestingly, some of the neighbouring vacant housing lots supported young regrowth of indigenous flora at the time of the site inspection for this report (17th June 2002). For example, 31 indigenous plant species were found at 15 Petalnina Dr, including the *Kennedia prostrata* and *Indigofera australis*. Probably no indigenous plant species will remain in the whole estate once all the properties have houses.

Relationship to other land

Stringybark Reserve is fairly isolated from other bushland. Birds and insects would generally be able to fly between Stringybark Reserve, Morris Reserve (Site 55, 350 m to the southeast) and Koomba Park (part of Site 58, 850 m west). Native vegetation along neighbouring parts of Mountain Hwy (part of Site 91) can be seen on the aerial photograph and may assist fauna movements to and from Stringybark Reserve. The great diversity of eucalypts may attract certain nectar-loving birds during flowering times, but overall, Stringybark Reserve's small size detracts substantially from its attractiveness to most birds, as indicated by the poor range of species observed during the fieldwork.

Bioregion: Gippsland Plain

Habitat types

Valley Heathy Forest (EVC 127, Endangered): 0.5 ha, estimated to comprise 925 m² in good ecological condition (rating B), 3,500 m² in fair ecological condition (rating C) and 575 m² in poor ecological condition (rating D).

Canopy trees: Dominated by *Eucalyptus melliodora*, *E. macrorhyncha*, *E. radiata*, *E. goniocalyx* and *E. obliqua*.

Lower trees: *Exocarpos cupressiformis*, *Acacia mearnsii*, *Acacia implexa* and *Acacia dealbata*.

Shrubs: The shrub layer is prickly and is dense in patches. The most abundant species are *Bursaria spinosa*, *Acacia paradoxa* and *Cassinia aculeata*. *Goodenia ovata* is dense in patches.

Vines: *Billardiera mutabilis* is abundant.

Ferns: Patches of *Pteridium esculentum* cover less than 10% south of Petalnina Dr, and ferns are absent to the north.

Ground flora: Characteristically rich in species, densely grassy and with scattered plants of rather infertile soils, such as *Hibbertia riparia* and *Platylobium obtusangulum*. The dominant species are variously *Poa morrisii*, *Microlaena stipoides*, *Austrostipa rudis*, *Themeda triandra*, *Rytidosperma* species or *Gahnia radula*. Other notable species include *Acacia aculeatissima*, *Bossiaea prostrata*, *Dillwynia cinerascens*, *Drosera whittakeri*, *Epacris impressa*, *Hardenbergia violacea*, *Rytidosperma pallidum*, *Kennedia prostrata*, *Lepidosperma gunnii*, *Lomandra filiformis*, *Lomandra longifolia*, *Viola hederacea*, *Xanthorrhoea minor* and many lily species.

Plant species

The following plant species were observed by the author on 14-17th June 2002. Additional species would no doubt be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable.

Risk Indigenous Species

E	<i>Acacia aculeatissima</i>
	<i>Acacia dealbata</i>
V	<i>Acacia implexa</i>
V	<i>Acacia mearnsii</i>
V	<i>Acacia melanoxylon</i>

Risk Indigenous Species

E	<i>Acacia myrtifolia</i>
	<i>Acacia paradoxa</i>
E	<i>Acacia pycnantha</i>
C	<i>Amyema ?pendula</i>
	<i>Arthropodium strictum</i>

Risk Indigenous Species

	<i>Austrostipa pubinodis</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>
	<i>Billardiera mutabilis</i>
	<i>Bossiaea prostrata</i>
	<i>Burchardia umbellata</i>
	<i>Bursaria spinosa</i>
V	<i>Caesia parviflora</i>
	<i>Carex breviculmis</i>
	<i>Cassinia aculeata</i>
	<i>Cassinia arcuata</i>
V	<i>Comesperma volubile</i>
E	<i>Correa reflexa</i>
	<i>Deyeuxia quadriseta</i>
	<i>Dianella admixta</i>
V	<i>Dillwynia cinerascens</i>
V	<i>Drosera peltata</i> subsp. <i>auriculata</i>
V	<i>Drosera whittakeri</i>
V	<i>Epacris impressa</i>
	<i>Eragrostis brownii</i>
	<i>Eucalyptus goniocalyx</i>
E	<i>Eucalyptus macrorhyncha</i>
V	<i>Eucalyptus melliodora</i>
V	<i>Eucalyptus obliqua</i>
E	<i>Eucalyptus radiata</i>
V	<i>Euchiton collinus</i>
V	<i>Exocarpos cupressiformis</i>
	<i>Gahnia radula</i>
	<i>Gonocarpus tetragynus</i>
	<i>Goodenia ovata</i>
V	<i>Hardenbergia violacea</i>
E	<i>Hibbertia riparia</i>
V	<i>Hovea heterophylla</i>
E	<i>Hypericum gramineum</i>

Risk Indigenous Species

E	<i>Indigofera australis</i>
	<i>Juncus pallidus</i>
C	<i>Kennedia prostrata</i>
	<i>Kunzea ericoides</i> spp. agg.
	<i>Lachnagrostis filiformis</i>
V	<i>Lagenophora ?gracilis</i>
	<i>Lepidosperma gunnii</i>
	<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Lomandra longifolia</i>
	<i>Microlaena stipoides</i>
	<i>Microtis parviflora</i>
C	<i>Muellerina eucalyptoides</i>
V	<i>Opercularia varia</i>
	<i>Oxalis exilis/perennans</i>
V	<i>Platylobium obtusangulum</i>
	<i>Poa morrisii</i>
	<i>Poranthera microphylla</i>
	<i>Pteridium esculentum</i>
	<i>Rytidosperma pallidum</i>
	<i>Rytidosperma penicillatum</i>
	<i>Rytidosperma racemosum</i>
	<i>Rytidosperma tenuius</i>
	<i>Schoenus apogon</i>
	<i>Senecio glomeratus</i>
	<i>Senecio hispidulus</i>
	<i>Senecio quadridentatus</i>
E	<i>Spyridium parvifolium</i>
E	<i>Stackhousia monogyna</i>
V	<i>Thelymitra</i> sp.
	<i>Themeda triandra</i>
E	<i>Viola hederacea</i>
V	<i>Xanthorrhoea minor</i>

Introduced Species

<i>Acacia baileyana</i>	<i>Cotoneaster pannosus</i>	<i>Lotus corniculatus</i>
<i>Agapanthus praecox</i>	<i>Cytisus scoparius</i>	<i>Oxalis incarnata</i>
<i>Agrostis capillaris</i>	<i>Dactylis glomerata</i>	<i>Oxalis ?purpurea</i>
<i>Anthoxanthum odoratum</i>	<i>Ehrharta erecta</i>	<i>Paspalum dilatatum</i>
<i>Briza maxima</i>	<i>Freesia alba</i> × <i>leichtlinii</i>	<i>Pennisetum clandestinum</i>
<i>Centaureum erythraea</i>	<i>Galium aparine</i>	<i>Pinus radiata</i>
<i>Chrysanthemoides monilifera</i> ssp. <i>monilifera</i>	<i>Holcus lanatus</i>	<i>Pittosporum undulatum</i>
<i>Cirsium vulgare</i>	<i>Hypochoeris radicata</i>	<i>Plantago lanceolata</i>
<i>Conyza sumatrensis</i>	<i>Linum trigynum</i>	<i>Rubus anglocandicans</i>

Notes concerning some of the locally threatened plant species

Acacia aculeatissima (Thin-leaf Wattle). Two patches were found, comprising a total of several individuals.

Correa reflexa (Common Correa). A solitary individual was found.

Kennedia prostrata (Running Postman). A solitary individual was found. Several more were found on a nearby vacant house lot.

Spyridium parvifolium (Australian Dusty Miller). A solitary individual was found.

Fauna of special significance

None found.

Fauna habitat features

- The high density and diversity of shrubs significantly improves the habitat for native insects and birds. The prickliness of many of the shrubs helps protect birds from cats at large. Birds' nests were found in *Acacia paradoxa*;
- There is some fallen timber, which is beneficial for the lizards seen during the site inspection (as well as invertebrate fauna);

- Despite the reserve's small size, it supports Southern Brown Tree Frogs (which presumably breed in water nearby).

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Endangered Vegetation Types

This site contains a remnant patch of a regionally endangered EVC (Valley Heathy Forest). It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that Stringybark Reserve's native vegetation is necessarily of at least High conservation significance. This, in turn, gives the site **State** significance under criterion 3.2.3 of Amos (2004).

Rare or Threatened Plants

Some of the locally threatened plant species listed above have viable populations (e.g. *Acacia aculeatissima*), thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Invasion by environmental weeds, of which *Oxalis incarnata* is rated Very Serious and the following are rated Serious: Brown-top Bent (*Agrostis capillaris*), Sweet Vernal-grass (*Anthoxanthum odoratum*), Large Quaking-grass (*Briza maxima*) and Sweet Pittosporum (*Pittosporum undulatum*). These are included in Council's weed control program for the reserve;
- Dumping of rubbish and garden waste by neighbours;
- Critically small population sizes of some plant species;
- Cats and foxes killing wildlife;
- Rabbit grazing (particularly if foxes are removed).

Management issues

- Weed control at the time of the site inspection (June 2002) was found to be quite effective;
- The plight of species that are present in critically small populations should be improved by planting more individuals after propagating them from seeds collected from nearby W.G. Morris Reserve. This includes *Acacia aculeatissima*, *Correa reflexa*, *Hovea linearis*, *Indigofera australis*, *Kennedia prostrata* and *Spyridium parvifolium*. All plantings should be documented in Council's files about the reserve.
- The dynamic, immature nature of the vegetation means that management practices needs more monitoring and review than most other bushland reserves in Knox. In particular, rabbit numbers may need to be controlled once foxes are removed, and care will need to be taken not to over-thin the dominant indigenous plants while trying to benefit indigenous opportunist species.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its State significance and the endangered EVC;
- The Planning Scheme zoning is Residential 1 Zone (R1Z);
- The site and the adjoining residential estate are included under the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, based on the description of Site 21 of the report by Water Ecoscience (1998). The site described here is much smaller than the area in the present overlay as a result of recent residential development in the estate.

Information sources used in this assessment

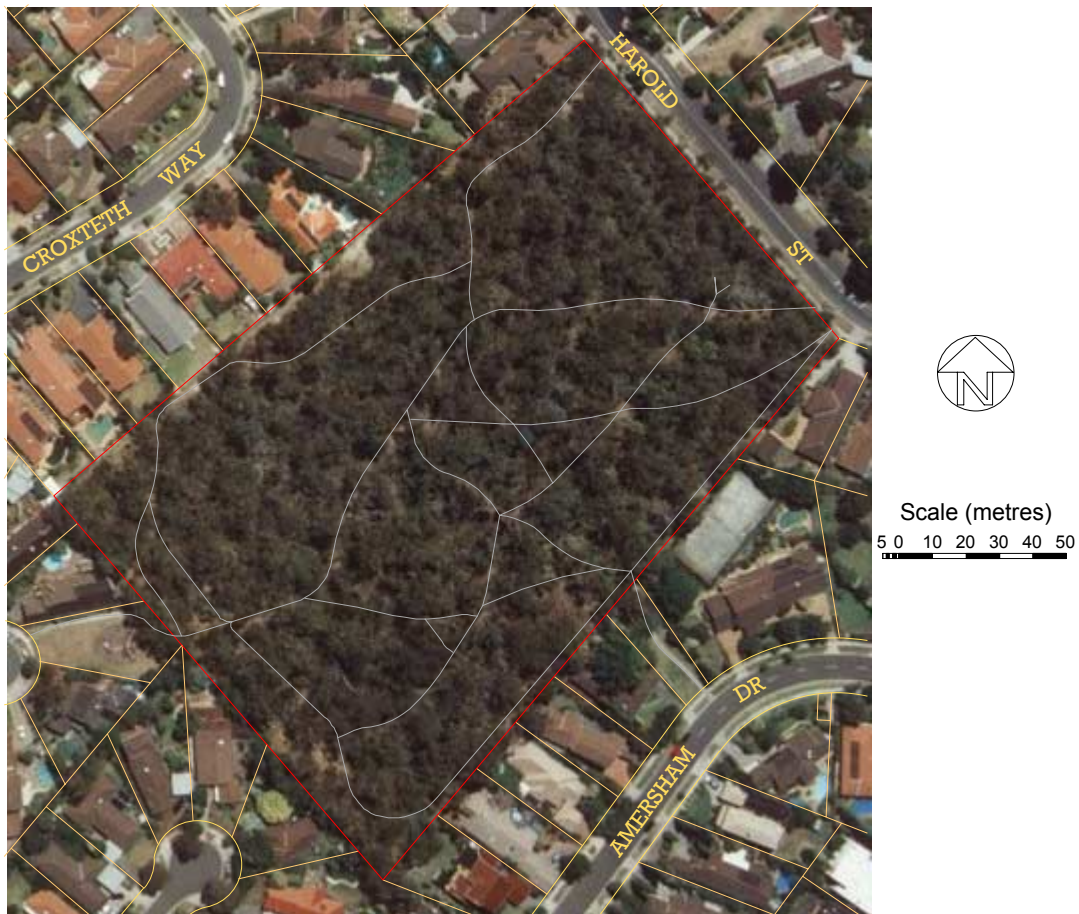
- A site survey totalling three hours and twenty minutes, undertaken on 14th and 17th June 2002 by Dr Lorimer using this study's standard procedures discussed in Section 2.4 of Volume 1. This included separate descriptions and mapping of the vegetation on each side of Petalnina Dr, compilation of lists of indigenous and introduced plant species on each side of Petalnina Dr, incidental fauna observations, and checks for fauna habitat, ecological threats and management issues;
- On-site discussions with Mr John Erwin (Knox City Council) about the reserve's management and recent history;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 55. W.G. Morris Reserve, Wantirna

2.8 ha Council bushland reserve. Melway ref. 63 G7.

Site Significance Level: *State*

- The site is covered with Valley Heathy Forest (an endangered Ecological Vegetation Community), and some of it is in excellent ecological condition;
- Over ninety indigenous flora species have been recorded;
- Ten of the plant species are threatened in Knox, and two of them are Critically Endangered in Knox.



Boundaries

This site coincides exactly with a single lot and is outlined in red above.

Land use & tenure: Owned by Knox City Council and managed as a bushland reserve for passive recreation.

Site description

This 2.8-hectare bushland reserve site lies on a gentle south-facing slope. Elevations vary from 107 m to 121 m approximately. The soil is light grey loam over clay subsoil, derived from Upper Silurian sedimentary deposits of the Dargile formation.

There is a rather dense network of paths through the reserve, shown on the aerial photograph with grey lines.

Apart from some firebreak strips, the whole reserve supports native vegetation of Valley Heathy Forest, which is an endangered Ecological Vegetation Class.

The density of large old trees is lower than would be expected in a pristine example of Valley Heathy Forest. Eucalypt dieback has seriously affected many mature eucalypts, but the consequent gaps that have formed in the canopy are starting to be filled by healthy, younger trees.

The understorey appears to show signs of clearing long ago. Weeds are also seriously affecting some parts of the reserve, no doubt exacerbated by the unnaturally high amount of sunlight beneath the dieback-affected tree canopy.

Despite these environmental pressures, the reserve retains a rich range of indigenous plant species, of which five are vulnerable to extinction from Knox, and a sixth (*Acacia genistifolia*), has only been recorded from one other site in Knox, very near the Dandenong Ranges National Park.

Council's recent management of the reserve's vegetation has included manual weeding, herbicide application, planting of tubestock and fire management. Council's revegetation work near Harold St, where eucalypt dieback has been most severe, has been very successful in suppressing weeds and forming a healthy, young canopy. A neighbour to the northwest on Harold St has also played a very useful role in controlling weeds in the northern corner of the reserve, which is in excellent ecological condition.

Parts of the reserve have been set alight by vandals in recent years. Such fires pose a risk to the community that is unacceptable and the risk is being addressed by Council. Controlled burning is planned for fire safety and proper ecological management of the reserve. Knox City Council performed a fire risk assessment in 2004 and has put in place a fire hazard management program.

Relationship to other land

The site is ecologically rather isolated from other native habitat. The closest area of any size is the Dandenong Valley Parklands approximately one kilometre away, with the small Stringybark Reserve midway between them. The more mobile bird and insect species can traverse such distances, but there would be very little infusion of seeds or pollen into the reserve from other areas. This leaves some of the less numerous plant species in the reserve vulnerable to inbreeding or disappearance due to chance events.

Bioregion: Gippsland Plain

Habitat type

Valley Heathy Forest (EVC 127, **regionally Endangered**): 2.8 ha of native vegetation, of which 1.57 ha is in ecological condition B (good), 0.99 ha is in ecological condition C (fair) and 0.26 ha is in ecological condition D (poor).

Dominant canopy trees: *Eucalyptus goniocalyx*, *E. macrorhyncha* and *E. obliqua*, with fewer *E. melliodora* and *E. radiata*.

The tree crowns overlap slightly where dieback has not thinned the canopy.

Dominant lower trees: *Exocarpos cupressiformis* and *Acacia implexa* are rather abundant, and *Allocasuarina littoralis* is characteristically present in considerable numbers at the southern corner of the reserve.

Shrubs: Mostly 2-3 m tall and rather dense, but thinner in areas of very mature vegetation or very young regrowth after fire.

Acacia paradoxa, *Cassinia aculeata* and *Cassinia longifolia* are dominant in the denser areas (along with *Ozothamnus ferrugineus* in some areas).

Vines: Only the light climbers, *Billardiera mutabilis*, *Comesperma volubile* and *Hardenbergia violacea*; not dense.

Ferns: *Pteridium esculentum* becomes locally dense after disturbance, and *Lindsaea linearis* is scarce.

Ground flora: Rather rich. Densely grassy but with characteristic heathy elements such as *Hibbertia riparia*. Overall, the dominant indigenous species are *Rytidosperma pallidum* and *Gahnia radula*. The weed *Ehrharta erecta* is dominant in some patches, where it represents very serious ecological degradation. *Lepidosperma gunnii*, *Lomandra filiformis* and *Poa morrisii* are also abundant. Characteristic species include *Acacia aculeatissima*, *Rytidosperma racemosum*, *R. tenuius*, *Dillwynia cinerascens*, *Drosera whittakeri*, *Epacris impressa*, *Gonocarpus tetragynus*, *Hibbertia riparia*, *Microlaena stipoides*, *Platylobium formosum*, *P. obtusangulum*, *Poa morrisii*, *Pterostylis nutans*, *Themeda triandra* and *Xanthorrhoea minor*.

Plant species

In the following plant list, the column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Austrostipa rudis* subsp. *australis* is rare throughout Victoria and species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
E	<i>Acacia aculeatissima</i>	E	<i>Acacia pycnantha</i>
	<i>Acacia dealbata</i>	E	<i>Acacia stricta</i>
C	<i>Acacia genistifolia</i>	V	<i>Acacia verticillata</i>
V	<i>Acacia implexa</i>		<i>Acaena novae-zelandiae</i> (wild & planted)
V	<i>Acacia mearnsii</i>		<i>Acrotriche serrulata</i>
V	<i>Acacia melanoxylon</i>	V	<i>Allocasuarina littoralis</i> (wild & ?planted)
E	<i>Acacia myrtifolia</i>	C	<i>Amyema pendula</i>
	<i>Acacia paradoxa</i>	V	<i>Amyema quandang</i>

Risk Indigenous Species

	<i>Arthropodium strictum</i>
	<i>Austrostipa pubinodis</i>
V	<i>Austrostipa rudis</i> subsp. <i>australis</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>
	<i>Billardiera mutabilis</i>
	<i>Bossiaea prostrata</i>
V	<i>Brunonia australis</i>
	<i>Burchardia umbellata</i>
	<i>Bursaria spinosa</i>
V	<i>Caesia parviflora</i>
	<i>Campylopus clavatus</i>
	<i>Campylopus introflexus</i>
	<i>Carex breviculmis</i>
	<i>Cassinia aculeata</i>
	<i>Cassinia arcuata</i>
V	<i>Cassinia longifolia</i>
C	<i>Cassinia trinerva</i>
C	<i>Chamaescilla corymbosa</i>
	<i>Chiloscyphus semiteres</i>
	<i>Clematis decipiens</i>
V	<i>Comesperma volubile</i>
V	<i>Coprosma quadrifida</i>
E	<i>Correa reflexa</i> var. <i>reflexa</i>
C	<i>Corybas</i> sp. (a questionable record)
V	<i>Cotula australis</i>
V	<i>Crassula decumbens</i>
C	<i>Cryptostylis subulata</i>
E	<i>Daviesia leptophylla</i>
	<i>Deyeuxia quadriseta</i>
	<i>Dianella admixta</i>
V	<i>Dianella longifolia</i> s.l. (wild & planted)
	<i>Dichelachne rara</i>
	<i>Dichondra repens</i>
V	<i>Dillwynia cinerascens</i>
E	<i>Dipodium roseum</i>
V	<i>Drosera peltata</i> subsp. <i>auriculata</i>
E	<i>Drosera peltata</i> subsp. <i>peltata</i>
V	<i>Drosera whittakeri</i>
V	<i>Epacris impressa</i>
V	<i>Eucalyptus cephalocarpa</i>
	<i>Eucalyptus goniocalyx</i>
E	<i>Eucalyptus macrorhyncha</i>
	<i>Eucalyptus macrorhyncha</i> × <i>obliqua</i>
V	<i>Eucalyptus melliodora</i>
V	<i>Eucalyptus obliqua</i>
E	<i>Eucalyptus radiata</i>
E	<i>Euchiton involucratus</i>
V	<i>Exocarpos cupressiformis</i>
	<i>Gahnia radula</i>
	<i>Gonocarpus tetragynus</i>
	<i>Goodenia ovata</i>
V	<i>Hardenbergia violacea</i>
V	<i>Helichrysum scorpioides</i>
E	<i>Hibbertia riparia</i>
V	<i>Hovea heterophylla</i>
V	<i>Hydrocotyle hirta</i>
E	<i>Hypericum gramineum</i>
	<i>Hypnum cupressiforme</i>
E	<i>Indigofera australis</i>
E	<i>Juncus planifolius</i>

Risk Indigenous Species

C	<i>Kennedia prostrata</i>
	<i>Kunzea ericoides</i> spp. agg.
	<i>Lachnagrostis filiformis</i>
V	<i>Lagenophora gracilis</i>
	<i>Lepidosperma elatius</i>
	<i>Lepidosperma gunnii</i>
	<i>Leptospermum continentale</i>
E	<i>Leptospermum scoparium</i>
V	<i>Lindsaea linearis</i>
	<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
	<i>Lomandra longifolia</i> (wild & planted)
E	<i>Melaleuca ericifolia</i>
	<i>Microlaena stipoides</i>
C	<i>Microtis unifolia</i>
C	<i>Muellerina eucalyptoides</i>
V	<i>Olearia lirata</i>
E	<i>Olearia myrsinoides</i>
V	<i>Opercularia varia</i>
E	<i>Ozothamnus ferrugineus</i>
	<i>Pandorea pandorana</i>
V	<i>Pimelea humilis</i> (wild & planted)
V	<i>Plantago varia</i>
V	<i>Platylobium formosum</i>
V	<i>Platylobium obtusangulum</i>
E	<i>Poa labillardierei</i> (planted)
	<i>Poa morrisii</i> (wild & planted)
	<i>Poranthera microphylla</i>
	<i>Pteridium esculentum</i>
E	<i>Pterostylis melagramma</i>
	<i>Pterostylis nutans</i>
C	<i>Pterostylis pedunculata</i>
	<i>Ptychomnion aciculare</i>
V	<i>Pultenaea gunnii</i>
	<i>Rytidosperma linkii</i> var. <i>fulvum</i>
	<i>Rytidosperma pallidum</i>
	<i>Rytidosperma penicillatum</i>
V	<i>Rytidosperma pilosum</i>
	<i>Rytidosperma racemosum</i>
E	<i>Rytidosperma semiannulare</i>
	<i>Rytidosperma setaceum</i>
	<i>Rytidosperma tenuius</i>
	<i>Schoenus apogon</i>
	<i>Senecio glomeratus</i>
	<i>Senecio hispidulus</i>
E	<i>Senecio minimus</i>
	<i>Senecio quadridentatus</i>
V	<i>Solanum ?laciniatum</i> (wild & planted)
E	<i>Stackhousia monogyna</i>
E	<i>Stylidium armeria/graminifolium</i>
V	<i>Thelymitra</i> sp.
	<i>Themeda triandra</i>
	<i>Thuidiopsis furfurosa</i>
V	<i>Thysanotus patersonii</i>
E	<i>Viola hederacea</i>
E	<i>Wahlenbergia gracilis</i> (planted)
E	<i>Wurmbea dioica</i>
V	<i>Xanthorrhoea minor</i>
E	<i>Xanthosia dissecta</i>

Introduced Species

<i>Acacia baileyana</i>	<i>Cotoneaster glaucophyllus</i>	<i>Plantago lanceolata</i>
<i>Acacia floribunda</i>	<i>Cotoneaster pannosus</i>	<i>Poa annua</i>
<i>Acacia iteaphylla</i>	<i>Dactylis glomerata</i>	<i>Polycarpon tetraphyllum</i>
<i>Acacia longifolia</i> subsp. <i>longifolia</i>	<i>Dipogon lignosus</i>	<i>Prunella vulgaris</i>
<i>Acer negundo</i>	<i>Ehrharta erecta</i>	<i>Prunus cerasifera</i>
<i>Agapanthus praecox</i>	<i>Ehrharta longiflora</i>	<i>Quercus robur</i>
<i>Agrostis capillaris</i>	<i>Eriobotrya japonica</i>	<i>Romulea rosea</i>
<i>Aira caryophylla</i>	<i>Euphorbia peplus</i>	<i>Rubus anglocandicans</i>
<i>Anagallis arvensis</i>	<i>Freesia alba</i> × <i>leichtlinii</i>	<i>Solanum nigrum</i>
<i>Anthoxanthum odoratum</i>	<i>Galium aparine</i>	<i>Soliva sessilis</i>
<i>Arbutus unedo</i>	<i>Gamochaeta purpurea</i>	<i>Sonchus oleraceus</i>
<i>Arctotheca calendula</i>	<i>Genista monspessulana</i>	<i>Sporobolus africanus</i>
<i>Asparagus scandens</i>	<i>Grevillea rosmarinifolia</i>	<i>Stellaria media</i>
<i>Avena barbata</i>	<i>Hakea salicifolia</i>	<i>Syzygium smithii</i>
<i>Billardiera heterophylla</i>	<i>Hedera helix</i>	<i>Taraxacum officinale</i> spp. agg.
<i>Briza maxima</i>	<i>Holcus lanatus</i>	<i>Tradescantia fluminensis</i>
<i>Briza minor</i>	<i>Hypochoeris radicata</i>	<i>Trifolium dubium</i>
<i>Bromus catharticus</i>	<i>Lactuca serriola</i>	<i>Trifolium repens</i>
<i>Cardamine hirsuta</i> s.l.	<i>Ligustrum lucidum</i>	<i>Ulex europaeus</i>
<i>Centaureum erythraea</i>	<i>Medicago polymorpha</i>	<i>Veronica persica</i>
<i>Cerastium glomeratum</i>	<i>Oxalis incarnata</i>	<i>Vicia sativa</i>
<i>Chlorophytum comosum</i>	<i>Pennisetum clandestinum</i>	<i>Vulpia bromoides</i>
<i>Conyza sumatrensis</i>	<i>Pinus radiata</i>	<i>Vulpia myuros</i> f. <i>myuros</i>
<i>Coprosma repens</i>	<i>Pittosporum tenuifolium</i>	<i>Zantedeschia aethiopica</i>
<i>Correa ?glabra</i>	<i>Pittosporum undulatum</i>	

Notes concerning some of the locally threatened plant species

- Acacia aculeatissima* (Thin-leaf Wattle). Nine plants were found.
- Acacia genistifolia* (Spreading Wattle). Eight appeared after a fire in c. 2000, of which two have since died.
- Austrostipa rudis* subsp. *australis* (a subspecies of Veined Spear-grass). At least eight plants; probably a viable population.
- Cassinia trinerva* (Three-nerved Cassinia). A small population, showing no signs of decline over 20 years.
- Chamaescilla corymbosa* (Blue Stars). Last recorded prior to 1984.
- Correa reflexa* var. *reflexa* (Common Correa). Fairly numerous and apparently secure.
- Cryptostylis subulata* (Large Tongue-orchid). Last recorded prior to 1984.
- Daviesia leptophylla* (Narrow-leaf Bitter-pea). Population details were not recorded.
- Eucalyptus obliqua* × *macrorhyncha* (An uncommon hybrid). Several specimens were found.
- Hypoxis vaginata* (Sheath Star). Last recorded prior to 1984.
- Kennedia prostrata* (Running Postman). Seven plants were recorded when most recently checked (2006).
- Pterostylis longifolia* (= *P. melagramma*) (Tall Greenhood). Moderate numbers.
- Pterostylis pedunculata* (Maroon-hood). Two healthy plants were found in 2006.
- Thysanotus ?patersonii* (Twining Fringe-lily). Last recorded prior to 1984.

Fauna habitat features

- There are large eucalypts (including dead ones) with hollows that would suit habitation by birds, bats, possums or insects;
- There are some logs on the ground, providing cover for ground-dwelling native fauna;
- The dense shrub layer suits many species of small birds (but the reserve's size and relative isolation from other habitat are not so suitable).

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Regionally Threatened Ecological Vegetation Class

Valley Heathy Forest listed as regionally Endangered. In addition, the habitat scores determined by the author for most of the reserve put the conservation significance of the vegetation in the Very High category under Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a). This, in turn, gives the site **State** significance under criterion 3.2.3 of Amos (2004).

Rare or Threatened Flora

Austrostipa rudis subsp. *australis* is listed as 'rare' in Victoria. The population in this site is small but quite likely viable, although its genetic stability relative to subspecies *rudis* (with which it is growing) is not known. The presence of such a subspecies represents **Regional** significance under criterion 3.1.2 of the standard criteria.

Many of the other locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Environmental weeds;
- Eucalypt dieback disease (which has been severe, but appears not to be preventing a new canopy of younger trees);
- Damage such as trampling from recreational activities;
- Loss or decline of plant species that are present in such small numbers that they are vulnerable to inbreeding, poor reproductive success or random events such as cubby house construction or digging by dogs;
- Fires lit by vandals at too high a frequency or at a time of year that favours weeds and suppresses indigenous plants;
- Deliberate cutting down of shrubs and trees;
- Predation of birds by cats.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its biological significance – particularly the presence of some Valley Heathy Forest in excellent ecological condition (discussed above);
- The site is included within Vegetation Protection Overlay VPO1 of the Knox Planning Scheme.

Information sources used in this assessment

- Vegetation monitoring data, as described in the reports, '*Monitoring of Bushland Reserves in Knox*' (Lorimer 1999), '*Monitoring of Bushland Reserves in Knox – 2002 Review*' (Lorimer 2002) and '*Monitoring of Bushland Reserves in Knox – 2007 Review*' (Lorimer 2007a) for Knox City Council, comprising:
 - Lists of plant species (indigenous and introduced) observed in the reserve by Dr Lorimer in 1999 and 2002;
 - Maps and assessments of the population sizes and distributions of ten scarce plant species in each of 1999 and 2002;
 - Data from a single quadrat, surveyed by the author in 1999, 2002 and 2006;
 - A list of fauna observed during the above botanical surveys; and
 - A series of seven photographs highlighting aspects of the reserve's vegetation, taken in 1999 and repeated in 2002;
- More detailed data, including habitat scores and fine-scale vegetation condition mapping, compiled for '*2007 Bushland Management Plan for W.G. Morris Reserve, Wantirna*' (Lorimer 2007b);
- Data from twenty-five quadrats, compiled by Mr Andrew Paget in March 1985;
- A list of plant species compiled by Mr Gary Cheers, as reported by Paget (1985);
- A slightly different list presented by Western (1985) that was stated to be also based on Mr Cheers's observations;
- Aerial photography from February 2001 and April 2003 and Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 56. Flamingo Reserve, Wantirna

Bushland section of a Council park. Melway ref. 63 F11.

Site Significance Level: *State*

- The native vegetation is regrowth of the endangered Valley Heathy Forest, partly in quite good condition;
- There are 108 indigenous plant species (a large number for an area this small);
- There are ten plant species that are locally threatened and at least one (*Acacia acinacea*) that is found nowhere else in Knox.



Scale 1:2,000
0 20 40 60 80 100m

Aerial photograph taken April 2003

Boundaries

This 1.827 ha site is outlined in red above, comprising the whole of a single lot.

Land use & tenure: Part of a Council reserve, managed for conservation of bushland and for public enjoyment.

Site description

This site lies halfway up the eastern flank of the low ridge between Dandenong Creek and Blind Creek. Elevations are 77-87 m and the shallow slope (6-7% gradient) has a variable aspect between west and south-southwest. The soil is shallow, poorly draining, light grey loam over clay subsoil, derived from decomposition of the underlying Lower Devonian sedimentary rocks of the Humevale formation.

The site's geology has been explored with bores, as evidenced by small mounds of extracted rock in the reserve and by a 1969 Geological Survey map showing a north-south line of bores through the reserve.

The geological exploration and associated use of heavy machinery may have involved clearing the site's vegetation, which would explain why there are no large trees left today. The regrowth is reaching maturity and much of it has a rich understorey in fairly good ecological condition. It belongs to the Ecological Vegetation Class, Valley Heathy Forest, which is endangered and characteristically rich in species. The prevalence of weeds has been declining in recent years (Lorimer 2007a).

The reserve is particularly notable for the number of plant species that are known at only one or two other sites in Knox.

Relationship to other land

Flamingo Reserve is fairly isolated from other bushland.

Birds and insects would generally be able to fly between Flamingo Reserve and the Timmothy Drive Bushland (0, 300 m south). Flamingo Reserve's small size probably detracts substantially from its attractiveness to most birds, as indicated by the poor range of species observed during the fieldwork, but the great diversity of eucalypts may attract certain nectar-loving birds during flowering times.

Bioregion: Gippsland Plain

Habitat types

Valley Heathy Forest (EVC 127, Endangered): 1.33 ha, estimated to comprise 0.02 ha in excellent ecological condition (rating A), 0.46 ha in good ecological condition (rating B), 0.64 ha in fair ecological condition (rating C) and 0.21 ha in poor ecological condition (rating D).

Canopy trees: Dominated by *Eucalyptus goniocalyx* and *E. macrorhyncha*, mixed with plenty of *E. melliodora*, moderate numbers of *E. radiata* and fewer *E. obliqua*. *E. cephalocarpa* is scarce.

Lower trees: Dominated by *Exocarpos cupressiformis*, *Acacia mearnsii*.

Shrubs: The shrub layer is prickly and is dense in patches. The most abundant species are *Bursaria spinosa* and *Kunzea ericoides*. *Leptospermum continentale* and *Leptospermum scoparium* are also present and may have been more abundant once.

Vines: *Billardiera mutabilis* is abundant. There is one individual of each of *Clematis microphylla* and *Pandorea pandorana*. The climbing parasite, *Cassytha pubescens*, is also present.

Ferns: Only represented by a solitary *Lindsaea linearis*. *Pteridium esculentum* is unexpectedly absent.

Ground flora: Densely grassy or sedgy and dominated by *Rytidosperma pallidum* in some areas and *Gahnia radula* in others (the latter particularly where there has been fire or obvious soil disturbance). Characteristically rich in species, including characteristic species such as *Hibbertia riparia* and *Platylobium obtusangulum*. Other species present that are typical of Valley Heathy Forest include *Poa morrisii*, *Microlaena stipoides*, *Austrostipa rudis*, *Themeda triandra*, *Rytidosperma* species *Acacia aculeatissima*, *Bossiaea prostrata*, *Dillwynia cinerascens*, *Drosera whittakeri*, *Epacris impressa*, *Hardenbergia violacea*, *Lomandra filiformis*, *Lomandra longifolia*, *Viola hederacea*, *Xanthorrhoea minor* and many lily species.

Plant species

In the following plant list, the column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, the species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
C	<i>Acacia acinacea</i> s.l.		<i>Austrostipa pubinodis</i>
E	<i>Acacia aculeatissima</i>		<i>Austrostipa rudis</i> subsp. <i>rudis</i>
V	<i>Acacia mearnsii</i>		<i>Billardiera mutabilis</i>
V	<i>Acacia melanoxylon</i>		<i>Bossiaea prostrata</i>
E	<i>Acacia myrtifolia</i>	V	<i>Brunonia australis</i>
	<i>Acacia paradoxa</i>		<i>Burchardia umbellata</i>
V	<i>Acaena echinata</i>		<i>Bursaria spinosa</i>
	<i>Acaena novae-zelandiae</i>	V	<i>Caesia parviflora</i>
	<i>Acrotriche serrulata</i>		<i>Campylopus</i> sp.
V	<i>Allocasuarina littoralis</i>		<i>Carex breviculmis</i>
C	<i>Amyema pendula</i>		<i>Cassinia aculeata</i>
C	<i>Arthropodium milleflorum</i> s.l.		<i>Cassinia arcuata</i>
	<i>Arthropodium strictum</i>	V	<i>Cassinia longifolia</i>

Risk	Indigenous Species
E	<i>Cassytha pubescens</i>
E	<i>Centella cordifolia</i>
C	<i>Chrysocephalum semipapposum</i>
NA	<i>Clematis decipiens</i>
V	<i>Coprosma quadrifida</i>
E	<i>Correa reflexa</i>
V	<i>Crassula decumbens</i>
E	<i>Daviesia leptophylla</i>
	<i>Deyeuxia quadriseta</i>
V	<i>Dianella longifolia</i> s.l. (planted)
	<i>Dianella admixta</i>
	<i>Dichelachne rara</i>
V	<i>Dillwynia cinerascens</i>
V	<i>Drosera peltata</i> subsp. <i>auriculata</i>
V	<i>Drosera whittakeri</i>
	<i>Elymus scaber</i>
V	<i>Epacris impressa</i>
	<i>Eragrostis brownii</i>
V	<i>Eucalyptus cephalocarpa</i>
	<i>Eucalyptus goniocalyx</i>
E	<i>Eucalyptus macrorhyncha</i>
V	<i>Eucalyptus melliodora</i>
V	<i>Eucalyptus obliqua</i>
E	<i>Eucalyptus radiata</i>
V	<i>Euchiton collinus</i>
V	<i>Exocarpos cupressiformis</i>
	<i>Gahnia radula</i>
V	<i>Geranium</i> sp. 2
	<i>Gonocarpus tetragynus</i>
	<i>Goodenia lanata</i>
	<i>Goodenia ovata</i>
V	<i>Hardenbergia violacea</i>
V	<i>Helichrysum scorpioides</i>
E	<i>Hibbertia riparia</i>
V	<i>Hovea heterophylla</i>
E	<i>Hydrocotyle foveolata</i>
E	<i>Hypericum gramineum</i>
E	<i>Indigofera australis</i>
E	<i>Isolepis marginata</i>
	<i>Kunzea ericoides</i> spp. agg.
	<i>Lachnagrostis filiformis</i>
V	<i>Lagenophora gracilis</i>
V	<i>Lepidosperma laterale</i>
V	<i>Leptorhynchus tenuifolius</i>
	<i>Leptospermum continentale</i>
E	<i>Leptospermum scoparium</i>
V	<i>Lindsaea linearis</i>

Risk	Indigenous Species
	<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
	<i>Lomandra longifolia</i> (wild & planted)
V	<i>Luzula meridionalis</i>
V	<i>Lythrum hyssopifolia</i>
	<i>Microlaena stipoides</i>
	<i>Microtis parviflora</i>
V	<i>Opercularia varia</i>
	<i>Oxalis exilis/perennans</i>
E	<i>Ozothamnus ferrugineus</i>
	<i>Pandorea pandorana</i>
V	<i>Pimelea humilis</i>
V	<i>Plantago varia</i>
V	<i>Platylobium formosum</i>
V	<i>Platylobium obtusangulum</i>
C	<i>Poa clelandii</i>
	<i>Poa ensiformis</i>
	<i>Poa morrisii</i>
E	<i>Poa tenera</i>
	<i>Poranthera microphylla</i>
	<i>Ptychomnion aciculare</i>
E	<i>Ranunculus lappaceus</i>
	<i>Rytidosperma laeve</i>
	<i>Rytidosperma pallidum</i>
	<i>Rytidosperma penicillatum</i>
V	<i>Rytidosperma pilosum</i>
	<i>Rytidosperma racemosum</i>
	<i>Rytidosperma setaceum</i>
	<i>Rytidosperma tenuius</i>
	<i>Schoenus apogon</i>
	<i>Senecio glomeratus</i>
	<i>Senecio hispidulus</i>
E	<i>Senecio minimus</i>
E	<i>Senecio ?prenanthoides</i>
	<i>Senecio quadridentatus</i>
V	<i>Solanum laciniatum</i>
E	<i>Spyridium parvifolium</i>
E	<i>Stackhousia monogyna</i>
V	<i>Thelymitra</i> sp.
	<i>Themeda triandra</i>
	<i>Thuidiopsis furfurosa</i>
V	<i>Veronica gracilis</i>
E	<i>Viola hederacea</i>
E	<i>Wahlenbergia gracilis</i>
E	<i>Wurmbea dioica</i>
V	<i>Xanthorrhoea minor</i>
E	<i>Xanthosia dissecta</i>

Introduced Species

<i>Acacia baileyana</i>	<i>Asparagus scandens</i>	<i>Crassula multicava</i>	<i>Holcus lanatus</i>
<i>Acacia floribunda</i>	<i>Billardiera heterophylla</i>	<i>Crataegus monogyna</i>	<i>Hypochoeris radicata</i>
<i>Acacia iteaphylla</i>	<i>Briza maxima</i>	<i>Crepis capillaris</i>	<i>Lobelia erinus</i>
<i>Acacia longifolia</i> subsp. <i>longifolia</i>	<i>Briza minor</i>	<i>Dactylis glomerata</i>	<i>Lonicera japonica</i>
<i>Agrostis capillaris</i>	<i>Centaureum erythraea</i>	<i>Ehrharta erecta</i>	<i>Medicago polymorpha</i>
<i>Aira caryophyllea</i>	<i>Chrysanthemoides monilifera</i>	<i>Ehrharta longiflora</i>	<i>Melaleuca armillaris</i>
<i>Aira elegantissima</i>	<i>Cirsium vulgare</i>	<i>Fumaria bastardii</i>	<i>Oxalis incarnata</i>
<i>Allium triquetrum</i>	<i>Conyza bonariensis</i>	<i>Galium aparine</i>	<i>Oxalis pes-caprae</i>
<i>Anagallis arvensis</i>	<i>Conyza ?sumatrensis</i>	<i>Genista monspessulana</i>	<i>Phytolacca octandra</i>
<i>Anthoxanthum odoratum</i>	<i>Coprosma repens</i>	<i>Grevillea lavandulacea</i>	<i>Pinus radiata</i>
	<i>Cotoneaster glaucophyllus</i>	<i>Hedera helix</i>	<i>Pittosporum undulatum</i>

<i>Plantago lanceolata</i>	<i>Romulea rosea</i>	<i>Sonchus oleraceus</i>	<i>Trifolium dubium</i>
<i>Poa annua</i>	<i>Rubus anglocandicans</i>	<i>Stellaria media</i>	<i>Ulex europaeus</i>
<i>Ranunculus muricatus</i>	<i>Solanum nigrum</i>	<i>Taraxacum officinale</i>	<i>Vulpia bromoides</i>

Notes concerning some of the locally threatened plant species

- Acacia acinacea* (Gold-dust Wattle). Unique in Knox. 20 plants were found, a viable population.
- Acacia aculeatissima* (Thin-leaf Wattle). Approximately eight plants were found.
- Arthropodium milleflorum* (Pale Vanilla-lily). Three plants were found in an area that is periodically mown.
- Clematis microphylla* (Small-leaved Clematis). A solitary plant was found.
- Correa reflexa* (Common Correa). Five plants were found.
- Crassula decumbens* var. *decumbens* (Spreading Crassula). Many were found in an area that is periodically mown.
- Hydrocotyle foveolata* (Yellow Pennywort). Several plants were found in an area that is periodically mown.
- Isolepis marginata* (Little Club-rush). A solitary plant was found in an area that is periodically mown.
- Luzula meridionalis* (Common Woodrush). Numbers were not recorded.
- Microtis parviflora* (Slender Onion-orchid). Numbers were not recorded.
- Poa clelandii* (Matted Tussock-grass). One small patch was found in 1999 (from which a herbarium specimen was taken), but this species could not be found again in 2001.
- Ranunculus lappaceus* (Australian Buttercup). A solitary plant was found.
- Spyridium parvifolium* (Australian Dusty Miller). A solitary plant was found.
- Wurmbea dioica* (Common Early Nancy). Four flowering plants were found in an area that is periodically mown (probably preventing this species from producing seed).

Fauna of special significance

No significant species were found, but some lizards, numerous skippers and a good diversity of native ants was noticed incidentally. (Skippers are insects intermediate between butterflies and moths.) Each of these groups of fauna deserve further investigation.

Fauna habitat features

- A substantial number of logs and branches on the ground which, combined with dense ground flora, provides good habitat for reptiles;
- The high density and diversity of shrubs significantly improves the habitat for native insects and birds. The prickliness of many of the shrubs helps protect birds from cats;
- The trees are quite young and provide few hollows usable for nests or roosting;
- The abundant saw-sedge and native grasses are supporting abundant skippers and probably butterflies.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Endangered Vegetation Types

Valley Heathy Forest is endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that Flamingo Reserve's native vegetation is necessarily of at least High conservation significance. This, in turn, gives the site **State** significance under criterion 3.2.3 of Amos (2004).

Rare or Threatened Plants

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Invasion by Veldt-grasses (*Ehrharta erecta* and *E. longiflora*) beneath Cherry Ballarts – medium-level threat;
- Invasion by Large Quaking-grass (*Briza maxima*) – medium-level threat;
- Dumping of soil and garden waste;
- Trampling by dogs and people – medium-level threat;
- Critically small population sizes of several plant species, including the rare *Arthropodium milleflorum*;
- Fragmentation of habitat, leading to reduced visitation by small insect-eating birds and hence a risk of worsening plant pests and diseases.

Management issues

- Note that five of the rare or threatened plant species were found only in periodically mown locations on the edge of the bushland. The only change that should occur to the mowing regimen is to avoid cutting the *Arthropodium milleflorum* during the period when it flowers and sets seed (typically November to December).
- The southern quarter of the reserve was burned on 14/12/99 for ecological reasons. More burns are planned;
- Weed control at the time of the most recent site inspection (February 2002) was found to be achieving a steady, slow reduction in the influence of weeds;
- The plight of species that are present in critically small populations should be improved by planting more individuals after propagating them from seeds collected from nearby (e.g. W.G. Morris Reserve). This includes *Acacia aculeatissima*, *Clematis microphylla*, *Hibbertia riparia*, *Indigofera australis*, *Lindsaea linearis*, *Spyridium parvifolium*, *Xanthosia dissecta* and *Xanthorrhoea minor*;
- Seeds of the *Acacia acinacea* (which is unique in Knox) should be collected and securely stored in case the living population dwindles or is destroyed;
- All propagations and plantings should be documented in Council's files about the reserve.
- Knox City Council's current management is subject to a regular monitoring program; see '*Monitoring of Bushland Reserves in Knox*' and '*Monitoring of Bushland Reserves in Knox – 2002 Review*', both by Dr Lorimer for Knox City Council.

Administration matters

- It would be desirable to have an expert on ants and skippers (insects that are intermediate between butterflies and moths) survey the site in spring and summer, due to the abundance of these insects and the possibility that rare species are present;
- A reptile survey would also be desirable, but probably less important than in the case of insects;
- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its State significance, the locally rare and threatened plants and the endangered EVC;
- The site and the adjoining tennis courts, lawn and kindergarten are included under the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, based on the description of Site 4 of the report by Water Ecoscience (1998). The site described here is limited to the lot with native vegetation;
- The Planning Scheme zoning is Public Park and Recreation Zone (PPRZ).

Information sources used in this assessment

- Vegetation monitoring data, as described in the reports, '*Monitoring of Bushland Reserves in Knox*' (Lorimer 1999), '*Monitoring of Bushland Reserves in Knox – 2002 Review*' (Lorimer 2002) and '*Monitoring of Bushland Reserves in Knox – 2007 Review*' (Lorimer 2007a) for Knox City Council, comprising:
 - Lists of plant species (indigenous and introduced) observed in the reserve by Dr Lorimer on 16/10/98, 17/2/99, 27/2/02 and June 2007;
 - Maps and assessments of the population sizes and distributions of ten scarce plant species on the above dates;
 - Data from two quadrats, both surveyed by the author on 17/2/99, 27/2/99 and 1/6/07;
 - A list of fauna observed during the above botanical surveys; and
 - Photographs of six scenes that highlight aspects of the reserve's vegetation, taken in 1999 and repeated in 2002;
- Site surveys by Dr Lorimer on 1/10/01 and 29/11/01 for the report, '*Fire in Knox Bushland Reserves 2001*' by Lorimer (2001). This included:
 - An update to the reserve's list of plant species;
 - Detailed mapping of rare species populations and the ecological condition of the vegetation;
 - A description of the vegetation's structural and floristic composition;
 - Incidental fauna observations;
 - Checks for fauna habitat, ecological threats and management issues; and
 - Development of a strategy for ecological burning of the reserve, in consultation with Council and the Scoresby Fire Brigade;
- Data from four quadrats (DSE numbers N13176-N13179) compiled by Mr Andrew Paget in July 1985;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 57. Wakley Reserve, Wantirna South

Small Council park with some patchy native vegetation. Melway ref. 63 E11.

Site Significance Level: *Local*

- The native vegetation belongs to the endangered Ecological Vegetation Class, Valley Heathy Forest, but it is in poor condition and covers only a tiny area;
- There is one plant of a plant species (*Acacia aculeatissima*) that is Vulnerable in Knox.



Scale 1:2,000

0 20 40 60 80 100m

Aerial photograph taken April 2003

Boundaries

The site occupies the whole of this 4,402 m² reserve, but the untreed western section is not of biological significance.

Land use & tenure: Council park, managed partly for conservation of the bushland section.

Site description

This site lies halfway up the eastern flank of the low ridge between Dandenong Creek and Blind Creek. Elevations are 79–81 m and the shallow slope (4% gradient) has a southeasterly aspect. The soil is shallow, poorly draining, light grey loam over clay subsoil, derived from decomposition of the underlying Lower Devonian sedimentary rocks of the Humevale formation.

The western third of the reserve has effectively no native vegetation, and nearly 2,000 m² in the west and south has practically no native understorey. The remainder of the reserve has patchy native vegetation, revegetation plots and a playground. The native understorey was evidently substantially damaged many years ago, and this was exacerbated in the past few years during residential development of the surroundings and development of the park (particularly the installation of the playground).

The highest quality native understorey is in the northeastern corner of the reserve. Past mowing has been too frequent for the welfare of the native vegetation, and probably at the wrong times of the year. The highest concentration of indigenous understorey plants is where they abut tree trunks, helping to escape mowing.

Relationship to other land

Birds and insects would generally be able to fly easily between this reserve and either the Timmothy Drive Bushland (0, 250 m southeast) or Flamingo Reserve (Site 56, 430 m northeast), but Wakley Crescent Reserve's small size and poor ecological condition greatly diminish its attractiveness to native fauna.

Bioregion: Gippsland Plain

Habitat types

Valley Heathy Forest (EVC 127, **Endangered**): Estimated as 1,200 m² (excluding trees with no native understorey beneath), comprising 20 m² in fair ecological condition (rating C) and the remainder in poor ecological condition (rating D).

Canopy trees: *Eucalyptus macrorhyncha* has the greatest cover. The next most abundant eucalypts are *E. cephalocarpa*, *E. goniocalyx* and *E. melliodora*. *E. ovata* and *E. obliqua* have the lowest coverage of the eucalypts. The canopy is typically 12 m tall.

Lower trees: *Acacia melanoxylon* and fewer *Acacia mearnsii*.

Shrubs: *Bursaria spinosa* is overwhelmingly dominant in the shrub layer, followed by *Cassinia aculeata*.

Vines: There are two or three of the scrambler, *Hardenbergia violacea*.

Ferns: None.

Ground flora: Weeds dominate. Of the indigenous species, the dominants are *Gahnia radula*, *Lomandra longifolia*, *Poa morrisii* and (seasonally) *Arthropodium strictum*. *Microlaena stipoides* and *Rytidosperma* species are also abundant. There are small numbers of the following species typically found in Valley Heathy Forest: *Cassinia aculeata*, *Dianella admixta*, *Dillwynia cinerascens* and *Lomandra filiformis* (both subspecies).

Plant species

The following plant species were observed by the author on 15/5/02 and 26/6/03. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox with 'E'=Endangered and 'V'=Vulnerable. Additional species would no doubt be detectable in other seasons.

Risk	Indigenous Species	Risk	Indigenous Species
E	<i>Acacia aculeatissima</i> (one plant only)	V	<i>Eucalyptus melliodora</i>
V	<i>Acacia mearnsii</i>	V	<i>Eucalyptus obliqua</i>
V	<i>Acacia melanoxylon</i>	V	<i>Eucalyptus ovata</i>
E	<i>Acacia pycnantha</i> (perhaps planted)		<i>Gahnia radula</i>
	<i>Arthropodium strictum</i>	V	<i>Hardenbergia violacea</i>
	<i>Bursaria spinosa</i>		<i>Kunzea ericoides</i> spp. agg.
	<i>Cassinia aculeata</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Cassinia arcuata</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
	<i>Dianella admixta</i>		<i>Lomandra longifolia</i>
V	<i>Dillwynia cinerascens</i>		<i>Microlaena stipoides</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Poa morrisii</i>
	<i>Eucalyptus goniocalyx</i>		<i>Rytidosperma ?linkii</i> var. <i>fulvum</i>
E	<i>Eucalyptus macrorhyncha</i>		<i>Rytidosperma racemosum</i>
Introduced Species			
	<i>Acacia podalyriifolia</i>		<i>Romulea rosea</i>
	<i>Briza maxima</i>		<i>Rubus anglocandicans</i>
	<i>Coprosma repens</i>		<i>Vicia</i> sp.
	<i>Cotoneaster glaucophyllus</i>		<i>Watsonia meriana</i> var. <i>bulbillifera</i>
	<i>Echium plantagineum</i>		
	<i>Ehrharta erecta</i>		
	<i>Galium aparine</i>		
	<i>Hakea salicifolia</i>		
	<i>Oxalis pes-caprae</i>		
	<i>Pinus radiata</i>		
	<i>Pittosporum undulatum</i>		
	<i>Plantago lanceolata</i>		

Fauna of special significance

None found.

Fauna habitat features

- Approximately five of the eucalypts are large enough and old enough to have hollows that could be inhabited by birds, bats, possums or insects;
- The prickly shrub layer provides protection for small native birds, and three nests were found among them.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Endangered Vegetation Types

Valley Heathy Forest is endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that Wakley Reserve's native vegetation is necessarily of at least High conservation significance. Criterion 3.2.3 of Amos (2004) assigns State significance to any site with a remnant patch of such vegetation.

The native vegetation at Wakley Reserve meets the Department of Sustainability & Environment's current definition of a remnant patch, but at the time Amos (2004) prepared the significance criteria, the unpublished convention was that

native vegetation only qualified as a remnant patch if it occupied at least 2,500 m². Because this threshold is so much larger than the area of native vegetation at Wakley Reserve, the author has reduced the significance level of the site to **Local**.

Rare or Threatened Plants

Some of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Excessive mowing;
- Invasion by environmental weeds, of which the following species are rated as ‘Serious’: Large Quaking-grass (*Briza maxima*), Panic Veldt-grass (*Ehrharta erecta*), Cleavers (*Galium aparine*), Soursob (*Oxalis pes-caprae*), Common Onion-grass (*Romulea rosea*), a vetch (*Vicia* species) and Bulbil Watsonia (*Watsonia meriana*);
- Eucalypt dieback, currently of moderate severity;
- Fragmentation of habitat, leading to reduced visitation by small insect-eating birds and hence a risk of worsening plant pests and diseases;
- Critically small population sizes of several plant species, including *Acacia aculeatissima*.

Management issues

- It would be possible to encourage some natural regeneration of the native understorey if mowing were to be conducted more sensitively and if several species of environmental weeds were to be controlled. Specialised techniques can be used for some of the weed species: The grass weeds could be controlled by spot-spraying with grass-specific herbicide, the Soursobs can be controlled by application of glyphosate at bulb exhaustion stage (typically in August) and the Watsonias can be controlled by wiping the foliage with herbicide during active growth. However, it should be recognised that Council may have insufficient resources to do all of these things as well as properly look after its other, more important bushland reserves;
- Any future revegetation should take care not to smother or otherwise destroy the remnant native understorey.
- The plight of the locally Vulnerable species, *Acacia aculeatissima*, should be improved by planting more individuals after propagating them from seeds collected from nearby (e.g. W.G. Morris Reserve and Flamingo Reserve);
- All propagations and plantings should be documented in Council’s files about the reserve.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the endangered EVC which is heavily fragmented and occurs predominantly in urban surroundings;
- The Planning Scheme zoning is Public Use Zone - Service and Utility (PUZ1);
- The site and adjoining parts of two properties to the south are included under the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, based on the description of Site 71 of the report by Water Ecoscience (1998). The site described here is limited to the reserve because there is no native vegetation on the adjoining properties.

Information sources used in this assessment

- A site survey by Rik Brown on 15th May 2002 using this study’s standard approach described in Section 2.4 of Vol.1. This included:
 - Compilation of lists of indigenous and introduced plant species;
 - A description of the vegetation’s structural and floristic composition;
 - Incidental fauna observations; and
 - Checks for fauna habitat, ecological threats and management issues;
- An independent repeat of the above inspection by Dr Lorimer on 26th June 2003, for quality assurance;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment’s BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 58. Dandenong Valley Parklands

A large area between Dandenong Ck and the EastLink road, containing parks, other public land and large private properties destined for public acquisition. Melway maps 62, 63, 71, 72 and 81.

Site Significance Level: **National** for the presence of Yarra Gums; otherwise **State**

- There are many plant species that are rare in Knox or in the whole Melbourne area, as well as many of the rare Yarra Gum (*Eucalyptus yarraensis*);
- Dandenong Ck, Blind Ck and Corhanwarrabul Ck are corridors for daily and seasonal movements of fauna;
- The streams and the many wetlands in the site are habitat for frogs, fish, other aquatic fauna and waterbirds, several species of which are threatened;
- Despite a long history of grazing and sometimes horticulture, the remnant forest and woodland vegetation is highly significant because almost all of it belongs to endangered EVCs;
- Parts of the site are being used for long-term research into management of degraded Valley Heathy Forest (an endangered EVC).

Note

The amount of fieldwork conducted during this study to assess the Dandenong Valley Parklands was substantially less intensive than for all other sites except Lysterfield Lake Park. This is because the conservation and management of the Parklands and Lysterfield Park are largely within the jurisdiction of the State government and its agencies (particularly Parks Victoria). Also, permission was not obtained from some of the private landowners within the Parklands to inspect their properties.

While the treatment below is believed to be adequate for the purposes of a municipal biodiversity study like this, more fieldwork may be required to meet more specific requirements such as park management. The site boundary might also be subject to refinement if additional fieldwork were to be done.

Boundaries

The site comprises the two polygons outlined in red on the aerial photograph on the next page, totalling 541 ha. One polygon covers Koomba Park (between Boronia Rd and Burwood Hwy) and the other covers all of the site south of Burwood Hwy. The magenta-outlined shapes are other sites from this report. Since the first edition of this report, the EastLink road has forced a reduction in site area, with boundary changes at George St and Wellington Rd.

The site includes roadside vegetation along High Street Rd, Ferntree Gully Rd and several minor roads.

The parts of Dandenong Valley Parklands on the western side of Dandenong Creek are not treated here because they are outside Knox.

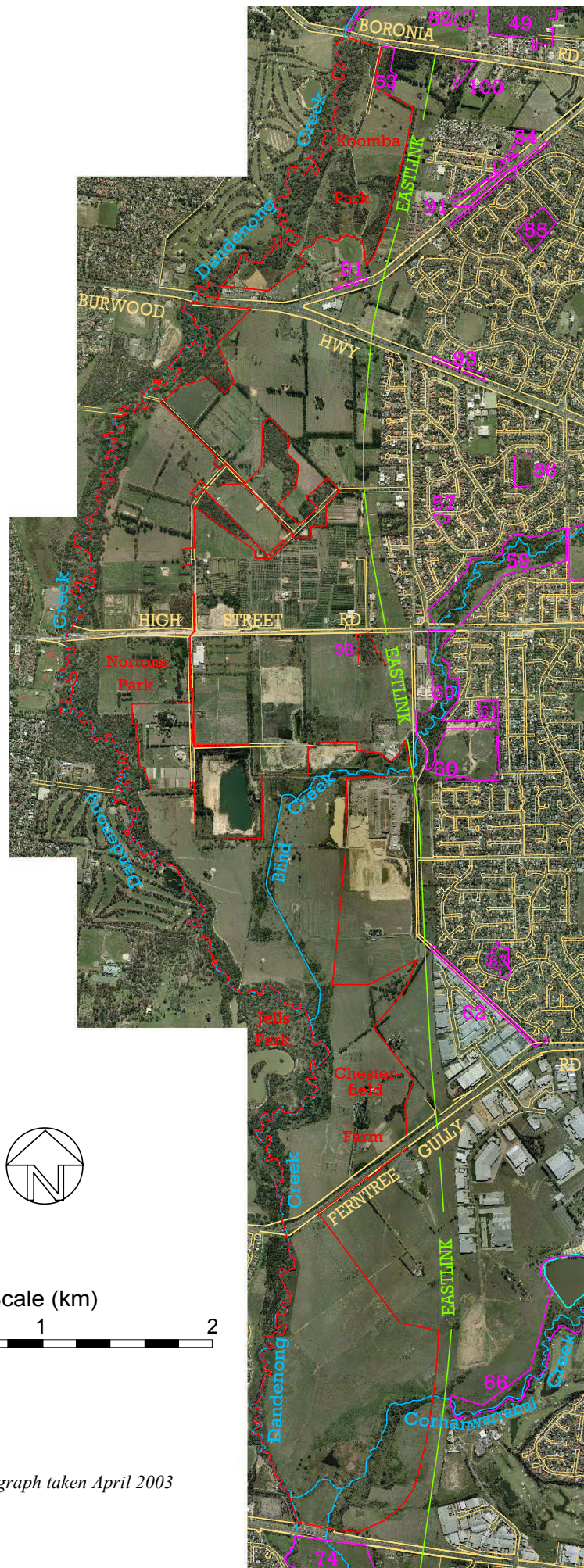
Land use & tenure: Includes parkland managed by Parks Victoria for recreation and conservation as well as proposed parkland that is presently used for farming. The farmland includes the tourist farm, Chesterfield Farm, as well as private land covered by a Public Acquisition Overlay in the Knox Planning Scheme. The site also includes roadside verges and a disused quarry pit.

Site description

Dandenong Valley Parklands has mostly had a long history of farming (mainly grazing), and the remainder has been used for roads or quarrying of clay. Despite this, the Parklands retain some very high conservation values. Even some of the pasture that is being grazed today includes the nationally rare Yarra Gum (*Eucalyptus yarraensis*) and wetlands with plants that are rare or threatened in the Melbourne area. These wetlands within the pasture provide habitat for fauna, including waterbirds that are threatened throughout Victoria.

The site assessed here includes most of the Parklands' areas of native vegetation in Knox, on both public and private land (the latter being intended for public acquisition), as well as the stream channels of Dandenong Ck, Blind Ck and Corhanwarrabul Ck. It also includes farmland within which wetlands or Yarra Gums are believed to occur, or whose location is important to the ecological function of the floodplain and the habitat corridor.

Within this site, Dandenong Creek and Corhanwarrabul Creek flow in their natural stream channels, although some of the flow is diverted by drains in the vicinity of the confluence of these creeks. Blind Creek's natural course has been replaced by a straightened channel through much of its passage through this site. Native fish have been recorded in all three creeks in the past five years. The Vulnerable fish species, Dwarf Galaxias, was present in the 1990s, but introduced fish and drainage works may have wiped out the species in this catchment in the last few years, according to fish expert, Mr John McGuckin of Streamline Research Pty Ltd.



Aerial photograph taken April 2003

A large part of the site is floodplain, with deep alluvium soil subject to periodic inundation. Much of the remaining native vegetation on the floodplain south of Burwood Highway is Floodplain Riparian Woodland, which is regionally Endangered. In other parts of the floodplain, there is a narrow band of Riparian Forest or Swampy Riparian Woodland beside the streams, flanked by Swampy Woodland. Wetlands are scattered widely across the floodplain and have predominantly native vegetation, even in the cases of disused clay pits and dams in grazed paddocks.

A few sections of the site, mainly in the vicinity of Bushy Park Lane, Axford Rd and the eastern edge of Nortons Park, extend into the more elevated ground east of the floodplain. These areas have pale loam topsoil and clay subsoil, derived from Upper Silurian and Lower Devonian sedimentary bedrock. The associated vegetation is the endangered Valley Heathy Forest.

All but one of the Ecological Vegetation Classes in the site are listed as Endangered, at the bioregional scale or greater. The exception is Riparian Forest, which is regionally Vulnerable. The area of each EVC, and the spectrum of ecological condition within each EVC, could not be determined without more detailed fieldwork.

The biological highlights of the site can be summarised as follows:

- The streams have no flow obstructions and largely retain their natural channels, providing habitat for native aquatic fauna;
- There are numerous wetlands with native vegetation, frequented by a wealth of frogs and waterbirds (some of which are rare or threatened, such as egrets), and evidently the smaller aquatic fauna that form the base of the aquatic food chain;
- Despite a long history of grazing and sometimes horticulture, the remnant forest and woodland vegetation almost all belongs to endangered EVCs and includes a large number of plant species;
- Some of the plant species are rare or threatened at various levels, including a significant proportion of the global population of the nationally rare Yarra Gum;
- The Parklands includes habitat corridors along Dandenong Ck, Blind Ck and (probably to a lesser extent) Corhanwarrabul Ck; and
- Parts of the Parklands (Capuchin Fathers' land, Noonan's and Robinsons) are being used by Parks Victoria for long-term research into management of degraded Valley Heathy Forest (an endangered EVC).

Relationship to other land

One of the site's main ecological attributes is its role as a habitat corridor linked to other habitat downstream along Dandenong Ck (e.g. Site 74) and upstream along all three streams (e.g. Sites 26, 51-53, 59-61 and 65-66). The aerial photograph helps to visualise some of these linkages. The ecological wellbeing of the Parklands significantly affects the other sites mentioned. Conversely, the ecological wellbeing of the other sites is likely to have a rather smaller effect on the Parklands.

While this report is confined to the Knox side of Dandenong Ck, there are similar connections on the other side of the creek and the site would be somewhat larger if ecological considerations were to prevail over the practicalities of the study area boundary.

The land use flanking the Parklands is so urbanised that it detracts from the Parklands' ecological function. On the other hand, some birds from the Parklands radiate to some degree into nearby residential neighbourhoods and parks, improving their aesthetics and the health of their trees.

Bioregion: Gippsland Plain

Habitat types

Stream Channel (No EVC number or conservation status available);

Wetland (EVC 74, **regionally Endangered**);

Floodplain Wetland Complex (EVC 172, **regionally Endangered**);

Floodplain Riparian Woodland (EVC 56, **regionally Endangered**);

Riparian Forest (EVC 18, **regionally Vulnerable**);

Swampy Riparian Woodland (EVC 83, **regionally Endangered**);

Swampy Woodland (EVC 937, **regionally Endangered**);

Valley Heathy Forest (EVC 127, **regionally Endangered**).

Plant species

In the following plant list, the column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Eucalyptus yarraensis* is rare nationally and species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
E	<i>Acacia aculeatissima</i>	V	<i>Dianella longifolia</i> s.l.
	<i>Acacia dealbata</i>		<i>Dichelachne rara</i>
C	<i>Acacia genistifolia</i>		<i>Dichondra repens</i>
V	<i>Acacia implexa</i>	V	<i>Dillwynia cinerascens</i>
V	<i>Acacia mearnsii</i>	C	<i>Diuris chryseopsis</i>
V	<i>Acacia melanoxylon</i>	V	<i>Drosera peltata</i> subsp. <i>auriculata</i>
E	<i>Acacia myrtifolia</i>	E	<i>Drosera peltata</i> subsp. <i>peltata</i>
	<i>Acacia paradoxa</i>	V	<i>Drosera whittakeri</i>
E	<i>Acacia pycnantha</i>	E	<i>Echinopogon ovatus</i>
V	<i>Acacia verticillata</i>	E	<i>Elatine gratioides</i>
V	<i>Acaena echinata/ovina</i>	V	<i>Eleocharis acuta</i>
	<i>Acaena novae-zelandiae</i>	C	<i>Eleocharis gracilis</i>
	<i>Acrotriche serrulata</i>		<i>Eleocharis sphacelata</i>
V	<i>Adiantum aethiopicum</i>		<i>Elymus scaber</i>
	<i>Alisma plantago-aquatica</i>	V	<i>Epacris impressa</i>
V	<i>Allocasuarina littoralis</i>	V	<i>Epilobium billardierianum</i> ssp. <i>cinereum</i>
V	<i>Alternanthera denticulata</i>		<i>Epilobium hirtigerum</i>
C	<i>Amyema pendula</i>		<i>Eragrostis brownii</i>
	<i>Arthropodium strictum</i>	V	<i>Eucalyptus cephalocarpa</i>
C	<i>Astroloma humifusum</i>		<i>Eucalyptus cephalocarpa</i> × <i>ovata</i>
	<i>Austrostipa pubinodis</i>		<i>Eucalyptus goniocalyx</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	E	<i>Eucalyptus macrorhyncha</i>
V	<i>Azolla filiculoides</i>	V	<i>Eucalyptus melliodora</i>
E	<i>Azolla pinnata</i>	V	<i>Eucalyptus obliqua</i>
	<i>Billardiera mutabilis</i>	V	<i>Eucalyptus ovata</i>
	<i>Bossiaea prostrata</i>	E	<i>Eucalyptus polyanthemos</i>
V	<i>Brunonia australis</i>	E	<i>Eucalyptus radiata</i>
E	<i>Bulbine bulbosa</i>	C	<i>Eucalyptus rubida</i>
	<i>Burchardia umbellata</i>	E	<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>
	<i>Bursaria spinosa</i>	C	<i>Eucalyptus yarraensis</i>
C	<i>Caesia calliantha</i>	E	<i>Euchiton involucratus</i>
V	<i>Caesia parviflora</i>	V	<i>Exocarpos cupressiformis</i>
C	<i>Caladenia dilatata</i> s.l.		<i>Gahnia radula</i>
	<i>Carex appressa</i>	V	<i>Geranium</i> sp. 2
	<i>Carex breviculmis</i>	V	<i>Glyceria australis</i>
E	<i>Carex fascicularis</i>	V	<i>Glycine clandestina</i>
E	<i>Carex gaudichaudiana</i>		<i>Gonocarpus tetragynus</i>
	<i>Carex inversa</i>	E	<i>Goodenia humilis</i>
	<i>Cassinia aculeata</i>		<i>Goodenia ovata</i>
	<i>Cassinia arcuata</i>	E	<i>Gynatrix pulchella</i>
E	<i>Cassytha melantha</i>	C	<i>Haloragis heterophylla</i>
E	<i>Cassytha pubescens</i>	V	<i>Hardenbergia violacea</i>
E	<i>Centella cordifolia</i>	V	<i>Helichrysum scorpioides</i>
C	<i>Centipeda elatinooides</i>	E	<i>Hibbertia riparia</i>
V	<i>Clematis aristata</i>	V	<i>Hovea heterophylla</i>
	<i>Clematis decipiens</i>	V+	<i>Hydrocotyle</i> sp.
V	<i>Comesperma volubile</i>	E	<i>Hypericum gramineum</i>
V	<i>Coprosma quadrifida</i>	C	<i>Hypoxis hygrometrica</i>
E	<i>Correa reflexa</i>	E	<i>Indigofera australis</i>
E	<i>Crassula helmsii</i>	E	<i>Isolepis hookeriana</i>
E	<i>Cyathea australis</i>	V	<i>Isolepis inundata</i>
E	<i>Daviesia latifolia</i>		<i>Juncus amabilis</i>
E	<i>Daviesia leptophylla</i>	C	<i>Juncus australis</i>
	<i>Deyeuxia quadriseta</i>		<i>Juncus bufonius</i>
	<i>Dianella admixta</i>		<i>Juncus gregiflorus</i>

Risk Indigenous Species

C	<i>Juncus holoschoenus</i>
	<i>Juncus pallidus</i>
E	<i>Juncus procerus</i>
	<i>Juncus sarophorus</i>
E	<i>Juncus subsecundus</i>
C	<i>Juncus vaginatus</i>
C	<i>Kennedia prostrata</i>
	<i>Kunzea ericoides</i> spp. agg.
	<i>Lachnagrostis filiformis</i>
V	<i>Lagenophora gracilis</i>
C	<i>Landoltia punctata</i>
E	<i>Lemna disperma</i>
	<i>Lepidosperma gunnii</i>
V	<i>Lepidosperma laterale</i>
	<i>Leptorhynchos squamatus</i>
V	<i>Leptorhynchos tenuifolius</i>
	<i>Leptospermum continentale</i>
E	<i>Leptospermum lanigerum</i>
E	<i>Leptospermum scoparium</i>
	<i>Leptospermum</i> sp.
C	<i>Leucopogon virgatus</i>
	<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
	<i>Lomandra longifolia</i>
C	<i>Lomandra multiflora</i> subsp. <i>multiflora</i>
V	<i>Luzula meridionalis</i>
C	<i>Lycopus australis</i>
V	<i>Lythrum hyssopifolia</i>
E	<i>Melaleuca ericifolia</i>
C	<i>Melaleuca parvistaminea</i>
E	<i>Melicytus dentatus</i>
	<i>Microlaena stipoides</i>
	<i>Microtis parviflora</i>
C	<i>Myriophyllum crispatum</i>
V	<i>Olearia lirata</i>
V	<i>Opercularia ovata</i>
V	<i>Opercularia varia</i>
C	<i>Ottelia ovalifolia</i>
	<i>Oxalis exilis/perennans</i>
E	<i>Ozothamnus ferrugineus</i>
	<i>Persicaria decipiens</i>
E	<i>Persicaria lapathifolia</i>
E	<i>Persicaria praetermissa</i>
E	<i>Phragmites australis</i>
V	<i>Pimelea humilis</i>
V	<i>Plantago varia</i>
V	<i>Platylobium obtusangulum</i>
	<i>Poa ensiformis</i>

Risk Indigenous Species

	<i>Poa morrisii</i>
E	<i>Poa tenera</i>
E	<i>Polystichum proliferum</i>
E	<i>Pomaderris aspera</i>
C	<i>Pomaderris racemosa</i>
	<i>Poranthera microphylla</i>
V	<i>Potamogeton crispus</i>
V	<i>Potamogeton ochreatus</i>
C	<i>Potamogeton tricarinatus</i> s.l.
E	<i>Prostanthera lasianthos</i>
	<i>Pteridium esculentum</i>
	<i>Pterostylis nutans</i>
C	<i>Ranunculus inundatus</i>
E	<i>Ranunculus lappaceus</i>
E	<i>Rubus parvifolius</i>
E	<i>Rytidosperma caespitosum</i>
	<i>Rytidosperma laeve</i>
	<i>Rytidosperma linkii</i> var. <i>fulvum</i>
	<i>Rytidosperma pallidum</i>
	<i>Rytidosperma penicillatum</i>
V	<i>Rytidosperma pilosum</i>
	<i>Rytidosperma racemosum</i>
	<i>Rytidosperma setaceum</i>
	<i>Rytidosperma tenuius</i>
	<i>Schoenus apogon</i>
	<i>Senecio glomeratus</i>
	<i>Senecio hispidulus</i>
E	<i>Senecio minimus</i>
E	<i>Senecio prenanthoides</i>
	<i>Senecio quadridentatus</i>
V	<i>Solanum laciniatum</i>
E	<i>Spyridium parvifolium</i>
E	<i>Stackhousia monogyna</i>
E	<i>Stylidium armeria/graminifolium</i>
E	<i>Tetrateca ciliata</i>
V	<i>Thelymitra peniculata</i>
	<i>Themeda triandra</i>
	<i>Tricoryne elatior</i>
C	<i>Triglochin procera</i>
E	<i>Typha domingensis</i>
E	<i>Typha orientalis</i>
V	<i>Veronica gracilis</i>
C	<i>Viminaria juncea</i>
E	<i>Viola hederacea</i>
V	<i>Wolffia australiana</i>
E	<i>Wurmbea dioica</i>
V	<i>Xanthorrhoea minor</i>

Introduced Species

<i>Acacia baileyana</i>	<i>Aira caryophyllea</i>	<i>Asparagus officinalis</i>	<i>Callitriche stagnalis</i>
<i>Acacia decurrens</i>	<i>Aira cupaniana</i>	<i>Aster subulatus</i>	<i>Calystegia silvatica</i>
<i>Acacia longifolia</i> subsp. <i>longifolia</i>	<i>Aira</i> sp.	<i>Atriplex prostrata</i>	<i>Centaurium erythraea</i>
<i>Acer negundo</i>	<i>Allium triquetrum</i>	<i>Avena</i> sp.	<i>Chenopodium album</i>
<i>Acetosella vulgaris</i>	<i>Alopecurus pratensis</i>	<i>Billardiera heterophylla</i>	<i>Chrysanthemoides monilifera</i> subsp. <i>monilifera</i>
<i>Agapanthus praecox</i>	<i>Anagallis arvensis</i>	<i>Briza maxima</i>	<i>Cirsium vulgare</i>
<i>Agave americana</i>	<i>Anagallis arvensis</i> var. <i>arvensis</i>	<i>Briza minor</i>	<i>Conium maculatum</i>
<i>Agrostis capillaris</i>	<i>Anagallis minima</i>	<i>Bromus catharticus</i>	<i>Conyza sumatrensis</i>
<i>Agrostis capillaris</i>	<i>Anthoxanthum odoratum</i>	<i>Bromus diandrus</i>	<i>Cortaderia selloana</i>
	<i>Arctotheca calendula</i>	<i>Bromus hordeaceus</i>	

<i>Cotoneaster glaucophyllus</i>	<i>Galium aparine</i>	<i>Mentha spicata</i>	<i>Rosa rubiginosa</i>
<i>Cotoneaster pannosus</i>	<i>Genista linifolia</i>	<i>Mentha × piperita</i>	<i>Rubus anglocandicans</i>
<i>Cotula coronopifolia</i>	<i>Genista monspessulana</i>	<i>Modiola caroliniana</i>	<i>Rumex conglomeratus</i>
<i>Crataegus monogyna</i>	<i>Gladiolus undulatus</i>	<i>Myosotis sylvatica</i>	<i>Rumex crispus</i>
<i>Crocsmia × crocosmiiflora</i>	<i>Grevillea robusta</i>	<i>Myriophyllum aquaticum</i>	<i>Salix babylonica</i> s.l.
<i>Cupressus</i> sp.	<i>Hedera helix</i>	<i>Oxalis ?incarnata</i>	<i>Salpichroa origanifolia</i>
<i>Cynara cardunculus</i>	<i>Helminthotheca echioides</i>	<i>Oxalis pes-caprae</i>	<i>Sedum</i> sp.
<i>Cynodon dactylon</i>	<i>Holcus lanatus</i>	<i>Paspalum dilatatum</i>	<i>Sisyrinchium iridifolium</i>
<i>Cyperus eragrostis</i>	<i>Hypericum tetrapterum</i>	<i>Paspalum distichum</i>	<i>Solanum nigrum</i>
<i>Dactylis glomerata</i>	<i>Hypochoeris radicata</i>	<i>Pennisetum clandestinum</i>	<i>Solanum pseudocapsicum</i>
<i>Daucus carota</i>	<i>Isolepis levynsiana</i>	<i>Phalaris aquatica</i>	<i>Sonchus asper</i> s.l.
<i>Delairea odorata</i>	<i>Jasminum</i> sp.	<i>Phalaris minor</i>	<i>Sonchus oleraceus</i>
<i>Dittrichia graveolens</i>	<i>Juncus articulatus</i>	<i>Pinus radiata</i>	<i>Sporobolus africanus</i>
<i>Echinochloa crus-galli</i>	<i>Juncus capitatus</i>	<i>Pittosporum undulatum</i>	<i>Taraxacum officinale</i>
<i>Egeria densa</i>	<i>Leontodon taraxacoides</i>	<i>Plantago coronopus</i>	<i>Tradescantia fluminensis</i>
<i>Ehrharta erecta</i>	<i>Ligustrum vulgare</i>	<i>Plantago lanceolata</i>	<i>Trifolium campestre</i>
<i>Ehrharta longiflora</i>	<i>Linum trigynum</i>	<i>Plantago major</i>	<i>Trifolium dubium</i>
<i>Epilobium ciliatum</i>	<i>Lolium perenne</i>	<i>Poa annua</i>	<i>Trifolium glomeratum</i>
<i>Erica lusitanica</i>	<i>Lonicera japonica</i>	<i>Polygonum aviculare</i> s.l.	<i>Trifolium repens</i>
<i>Euphorbia pepus</i>	<i>Lotus subbiflorus</i>	<i>Polygonum aviculare</i>	<i>Ulex europaeus</i>
<i>Festuca arundinacea</i>	<i>Lotus uliginosus</i>	<i>Populus</i> sp.	<i>Vicia hirsuta</i>
<i>Festuca rubra</i>	<i>Ludwigia</i> sp.	<i>Prunella vulgaris</i>	<i>Vicia sativa</i>
<i>Fraxinus angustifolia</i>	<i>Malus pumila</i>	<i>Prunus cerasifera</i>	<i>Vinca major</i>
<i>Freesia alba × leichtlinii</i>	<i>Malva parviflora</i>	<i>Ranunculus repens</i>	<i>Viola odorata</i>
<i>Fumaria capreolata</i>	<i>Medicago polymorpha</i>	<i>Raphanus raphanistrum</i>	<i>Vulpia bromoides</i>
<i>Fumaria officinalis</i> spp. agg.	<i>Melilotus indicus</i>	<i>Romulea rosea</i>	<i>Watsonia meriana</i>
<i>Galenia pubescens</i>	<i>Mentha pulegium</i>	<i>Rorippa palustris</i>	<i>Zantedeschia aethiopica</i>

Notes concerning some of the locally threatened plant species

- Acacia aculeatissima* (Thin-leaf Wattle). Only a few plants seen by the author, beside and near High Street Rd.
- Astroloma humifusum* (Cranberry Heath). Last recorded in 1989.
- Caesia calliantha* (Blue Grass-lily). Last recorded in 1989.
- Callistemon ?sieberi* (River Bottlebrush). Two plants discovered in 2004 near the Shepherd Rd footbridge.
- Carex fascicularis* (Tassel Sedge). A rather large population at several locations.
- Carex gaudichaudiana* (Fen Sedge). Last recorded in 1989.
- Centipeda elatinoides* (Elatine Sneezeweed). Last recorded in 1989.
- Clematis microphylla* (Small-leafed Clematis). Last recorded in 1989.
- Correa reflexa* (Common Correa). Last recorded in 1989.
- Crassula helmsii* (Swamp Crassula). Common in wetlands, particularly toward Wellington Rd.
- Daucus glochidiatus* (Austral Carrot). Last recorded in 1989.
- Daviesia leptophylla* (Narrow-leaf Bitter-pea). Last recorded in 1989.
- Drosera peltata* ssp. *peltata* (Pale Sundew). Localised in two patches of Valley Heathy Forest, but abundant there.
- Echinopogon ovatus* (Common Hedgehog-grass). Last recorded in 1989.
- Eleocharis gracilis* (Slender Spike-rush). Last recorded in 1989.
- Eucalyptus rubida* (Candlebark). Last recorded in 1989, but dubiously.
- Eucalyptus yarraensis* (Yarra Gum). Locally common, particularly in the triangle between Blind Ck, Dandenong Ck and High Street Rd.
- Glyceria australis* (Australian Sweet-grass). Surprisingly uncommon. Discovered in 2004 in small numbers.
- Goodenia humilis* (Swamp Goodenia). Last recorded in 1992.
- Gynatrix pulchella* (Hemp Bush). Scattered along Dandenong Ck.
- Haloragis heterophylla* (Varied Raspwort). Last recorded in 1989.
- Hypoxis hygrometrica* var. *hygrometrica* (Golden Weather-glass). Very scarce, found in Robinson's in 1998.
- Isolepis hookeriana* (Grassy Club-rush). Numbers uncertain due to the species' cryptic, ephemeral ecology.
- Juncus australis* (Austral Rush). Many discovered in 2004 near Wellington Rd.
- Juncus holoschoenus* (Joint-leaf Rush). Found in moderate numbers in a few wetlands.
- Kennedia prostrata* (Running Postman). Scarce and localised, but possibly present as soil-stored seed in more locations.
- Lemna disperma* (Common Duckweed). Fairly common in wetlands.
- Lomandra multiflora* ssp. *multiflora* (Many-flowered Mat-rush). Last recorded in 1989.
- Luzula meridionalis* (Common Woodrush). Last recorded in 1989.
- Lycopus australis* (Australian Gipsywort). Many found in the Shepherds Bush area.

Melaleuca parvistaminea (Rough-barked Honey-myrtle). Unique in Knox. Herbarium specimen collected by botanist Mr W.M. Molyneux in 1990 (specimen number MEL 2011925). This species is probably still present but hard to distinguish from the dominant *M. ericifolia* with which Mr Molyneux said it was growing.

Melicytus dentatus (Tree Violet). Localised to stream banks, but moderately common.

Microtis parviflora (Slender Onion-orchid). Few recorded, but possibly locally common in Valley Heathy Forest.

Myriophyllum crispatum (Upright Milfoil). Moderate numbers found in 2004 near Wellington Rd.

Ottelia ovalifolia (Swamp Lily). In several wetlands, mostly with more than just a few plants in each.

Persicaria lapathifolia (Pale Knotweed). Moderately common in and around wetlands and stream channels.

Persicaria praetermissa (Spotted Knotweed). Discovered during 2004 in two wetlands, abundant in one of them.

Potamogeton crispus (Curly Pondweed). Discovered in this study. Common in the creeks.

Ranunculus lappaceus (Australian Buttercup). Last recorded in 1989.

Rumex brownii (Slender Dock). Last recorded in 1989.

Spirodela punctata (Thin Duckweed). Discovered during 2004 in moderate numbers in a few wetlands.

Spyridium parvifolium (Australian Dusty Miller). Last recorded in 1989.

Viminaria juncea (Golden Spray). Last recorded in 1989.

Wolffia australiana (Tiny Duckweed). Discovered during 2004 in moderate numbers in a few wetlands.

Wurmbea dioica (Common Early Nancy). Scattered through patches of Valley Heathy Forest.

Fauna of special significance

The Atlas of Victorian Wildlife contains many unreliable records of birds in the Parklands, based on a 1994 list. The bird species in the list below are mostly from the report, '*Birds of the Dandenong Valley Parklands – An Annotated Checklist*' by careful observer, Mr Ren Millsom, who has surveyed birds in the valley for many years.

Nationally Endangered

Swift Parrot. Seen rarely to make brief stop-overs during autumn migration.

Nationally Vulnerable

Warty Bell Frog. Listed for the Parklands in 1988, but not detected during any of the searches that have been conducted within the Parklands (or anywhere else in the catchment) as part of the Melbourne Frog Census since its inception in 2001. Quite likely to be not extant.

Critically Endangered in Victoria

Intermediate Egret – Recorded only once by a skilled observer who can reliably distinguish this species, in c.1990 on the western side of Dandenong Ck (and hence not in Knox).

Endangered in Victoria

Blue-billed Duck – Rarely seen in the Parklands since 1993, prior to which it was more common.

Little Egret - A very rare visitor with no record in recent years.

Little Bittern – A single record from Geoff Deason in 1994 at Koomba Park.

Australasian Bittern - Only one report in recent years for the Parklands, but the species' secretiveness and the extensive suitable habitat in the Parklands mean there could well be reasonable numbers present.

Vulnerable in Victoria

Hardhead – This species was once more common and bred in the Parklands, but has shifted to nearby lakes (e.g. Sites 43,65 and 69) since carp began to cloud the water in the previously favoured site in the Parklands.

Musk Duck – No records since 1985.

Australasian Shoveller – An uncommon visitor, in pairs or small parties.

Great Egret – Commonly seen, mostly as solitary individuals, in certain wetlands or marshy areas, and less commonly at other swampy locations.

Nankeen Night Heron – There is a substantial population, probably increasing in numbers since 1992.

Royal Spoonbill - Seen in the shallow wetlands, either singularly or in small parties, and becoming more abundant over the years.

Baillon's Crake – An occasional summer visitor, usually in years of inland drought. There is a 1997 record from near Wellington Rd in the Atlas of Victorian Wildlife.

Powerful Owl – Apparently only vagrant.

Near Threatened in Victoria

Pied Cormorant – multiple records up to at least 1999, from various locations in the parklands, appear in the Atlas of Victorian Wildlife, but the occurrences seem to be vagrants.

Whiskered Tern – A very rare visitor to the Parklands, and not yet recorded on the Knox side of Dandenong Ck.

Latham's (or Japanese) Snipe - A common non-breeding visitor in spring and summer, in substantial numbers.

Glossy Grass Skink – A 1994 record appears in the Atlas of Victorian Wildlife.

Fauna habitat features

- There is aquatic habitat in the streams and wetlands, some with fringing native vegetation;
- Waterbirds forage and breed in the wetlands;
- Many large eucalypts have tree hollows that would make suitable locations for habitation by native birds, bats, possums and insects;
- Patches of scrub and revegetation plots provide habitat for small insect-eating birds such as wrens;
- Some areas have logs and fallen branches that may provide cover for native reptiles and invertebrates;
- Fragmentation of the Parklands' native vegetation is to some degree offset by the diversity of habitat (forest, woodland, grassland, wetland, stream), which is beneficial to some native fauna.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment'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 parts of this site.

Criterion 1.2.6 attributes **Regional** significance to any corridor that meets the description 'Important at regional scale (link within bioregion or catchment)'. This applies to the Dandenong Valley Parklands.

Regionally Threatened Ecological Vegetation Classes

According to the criteria of 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), areas of native vegetation belonging to an endangered EVC (like most of the remnant native vegetation in this site) have a conservation significance rating of High or Very High. In either case, the significance level of the site is **State** under criterion 3.2.3.

Rare or Threatened Flora

Eucalyptus yarraensis is endemic to Victoria and is on the Department of Sustainability & Environment's 'Advisory List of Rare or Threatened Plants in Victoria – 2005'. The author estimates that more than half of the global population of this species would be in sites with smaller populations than the Parklands. It follows from criterion 3.1.2 that the Parklands is of **National** significance for its population of *Eucalyptus yarraensis*.

Many of the other locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

Of the 'Fauna of special significance' above, the most significant populations are probably the Great Egret, Nankeen Night Heron and Royal Spoonbill, because they are Vulnerable species, regularly observed and making substantial use of the wetlands or wet pasture in the Parklands. The apparent population sizes of these species are in the range which qualifies for **Regional** significance under criterion 3.1.2. The substantial seasonal population of Latham's Snipe might also be argued to be of Regional significance, but only barely if at all.

The other 'Fauna of special significance' listed above, and several other species that are rare or threatened in the Melbourne region, give the site **Local** significance.

Scientific and educational value

The site is of **Regional** significance under criterion 5.1.1 because of its importance as a site for studying and monitoring the regenerative capacity of an endangered EVC (Valley Heathy Forest) and the ways that this may be encouraged, with application to other sites in the region.

Threats

- Invasion by environmental weeds is the main environmental threat, at least for the short to medium term;
- Tree dieback disease;
- Loss or decline of plant species whose populations are dangerously small, due to inbreeding, poor reproductive success or vulnerability to localised chance events;
- Foxes, which kill wildlife and spread woody weeds and blackberries;
- European Carp, which have already caused serious ecological damage in Jells Lake and could do likewise in other wetlands if they were to arrive there;
- Climate change. While this may affect all of Knox to one degree or another, the large floodplain in the Parklands is probably at greater risk than elsewhere.

Management issues

Management issues in the Parklands are outside the scope of this report.

Administration matters

- A targeted search for the Warty Bell Frog (or Growling Grass Frog) would be desirable;
- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the riparian habitat, the threatened EVCs and the other attributes discussed under the heading 'Significance ratings' above;
- Some segments of the site are presently covered by Schedule 1 of the Vegetation Protection Overlay in the Knox Planning Scheme, on the basis of their recognition by Water Ecoscience (1998) as their Sites 75-80.

Information sources used in this assessment

- The author's work in the Parklands for Parks Victoria since 1997, which led to the following reports for Parks Victoria (all authored by Dr Lorimer):
 - 'Dandenong Valley Parklands - Flora Survey Prior to Ecological Burns' (1997);
 - 'Dandenong Valley Parklands - Flora Recovery after Ecological Burns' (1999);
 - 'Plant Species List for Dandenong Valley Parklands' (2000);
 - 'Dandenong Valley Parklands - Second Baseline Flora Survey for Fire Research' (2000);
 - 'Dandenong Valley Parklands Ground Flora Survey, Revisited' (2000); and
 - 'Dandenong Valley Parklands - Flora Recovery after Ecological Burns and Other Treatments' (2001);
 as well as the scientific paper, '*Ecological burning trials in degraded open-forest remnants in Melbourne*', presented to the Ecological Society of Australia's annual conference in 2000.

The data generated from the above studies included updated plant lists for the Parklands as well as data from nine quadrats within Knox. To monitor the effects of fire and selective herbicide application, five of the quadrats have each been surveyed in three separate years (1997, 1998, 2000) and the other four quadrats were each surveyed in 1999 and 2000;
- References cited in the above documents, including plant species lists for the Parklands and '*Botanical Survey and Guidelines for the Management of Remnant Native Vegetation in the Dandenong Valley Metropolitan Park*' by R. Adams and D. Simmons for the MMBW in 1989;
- A vegetation map showing EVCs and vegetation quality, and seven lists of plant species (indigenous and introduced) for different sections of High Street Rd within the site, observed by Dr Lorimer on 11th-17th September 1997, as described in the report, '*A Survey and Management Plan for Significant Vegetation of Roadsides in Knox*' by G.S. Lorimer for Knox City Council (May 1998, 137 pp.);
- The equivalent of one full day of vegetation survey by Dr Lorimer, on foot and by bicycle, within the parklands from Wellington Rd to Burwood Hwy in January 2004, and close to Boronia Rd on 30/8/02. The purpose was to determine appropriate site boundaries, update old plant lists, check the EVCs that had been mapped by the Department of Sustainability & Environment (which are inaccurate), check for rare flora or fauna and provide a stronger basis for preparing the text above;
- A brief inspection of roadside vegetation along Ferntree Gully Rd in late 2003, seeking *Eucalyptus yarraensis* and *Melaleuca parvistaminea*;
- The 1998 '*Scoresby Transport Corridor Environment Effects Statement*', including Supplement Volume H: Flora and Fauna by Williams L.M., Yugovic J.V., McGuckin J., Humphrey P. and Larwill S. (1998), in which part of Koomba Park is labelled as 'Site 4';
- A report, '*Assessment of Native Vegetation on the Mitcham to Frankston Freeway Alignment in Knox*', by Dr Lorimer in July 2003 for Knox City Council;
- The report, '*Birds of the Dandenong Valley Parklands – An Annotated Checklist*' by careful observer, Mr Ren Millsom, who has surveyed birds in the valley for many years, plus updated verbal information from Mr Millsom.
- The Atlas of Victorian Wildlife (which contains many unreliable records for the Parklands, from a 1994 bird list);
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Acknowledgment

Thanks to Mr Ren Millsom for documentation and verbal information about bird observations in the Parklands.

Site 59. Timmothy Drive Bushland, Wantirna South

Vegetated corridor of Blind Creek upstream of High Street Rd, including some private land proposed for development. Melway ref. 63 G12.

Site Significance Level: *State*

- All the native vegetation belongs to one or another endangered Ecological Vegetation Class;
- Some of the vegetation is in quite good condition (albeit regrowth);
- Being on Blind Creek, the site is a substantial ecological stepping stone on a corridor for daily and seasonal movements of birds and insects;
- The waters of Blind Creek and adjacent wetlands supported the rare fish, Dwarf Galaxias, at least until 1998 (but probably rarely if ever since then).



Scale (metres)

0 100 200

*Aerial photograph taken
February 2007*

The red outlines above define the site boundary. The white outlines delimit different Ecological Vegetation Classes (EVCs), with ‘SS’ for Swamp Scrub, ‘SRW’ for Swampy Riparian Woodland, ‘SW’ for Swampy Woodland and ‘VHF’ for Valley Heathy Forest. The distinction between some of these EVCs is sometimes quite obscure due to modification from their natural state. Dark green patches without white outlines are mainly revegetation.

Boundaries

The site comprises the two segments outlined in red on the aerial photograph. The border follows property boundaries along the back fences of numerous residential lots, and also along Timmothy Drive and Jenola Pde. At the downstream (southwest) end of the site, the border follows the footpath of High Street Rd and an imaginary line from the Blind Ck bridge to a corner of the nearest residential lot to the north. At the upstream (eastern) end of the site, a somewhat arbitrary border has been drawn between the corners of two residential lots. Immediately east of the boundary segment along Jenola Pde, the boundary diverges around a new residential estate for which no cadastral boundaries could be obtained, but the intention is to follow the edge of the estate. The road reservation of Timmothy Drive is not included within the site. Note that the site includes a large proportion of open grass that is slashed regularly and supports scant indigenous flora. This is because: (a) management of the native vegetation has to be integrated with the open grassed areas; (b) the open areas provide potential for expanding the native vegetation; and (c) it is preferable for boundaries of sites and their planning overlays to coincide with cadastral boundaries where practical.

Land use & tenure: All the land downstream from Timmothy Drive is public reserve, either for drainage and related purposes or (beside High Street Rd) for a road reservation with a bridge. There is a mixture of public and private land upstream of Timmothy Drive. Some of the creek course is in private ownership.

Site description

This 25.2 ha site is an area of broad floodplain along Blind Creek, at elevations of 59-63 m. There are small strips along the northern boundary with grey loam topsoil and clay subsoil, derived from the underlying Lower Devonian siltstones of the Dargile Formation, but the rest of the site is covered with alluvium washed down by the creek.

The absence of large old trees indicates that practically the whole site has been previously cleared. However, the aerial photograph shows that there is a patchwork of native vegetation that has regrown since the clearing, along with substantial areas of revegetation. Some of the native vegetation is in surprisingly good condition and supports a large number of indigenous flora species – some of them rare or threatened in the Melbourne area.

The creek still takes its natural course, unlike the majority of Knox's creeks that have been converted to barrel drains. Some aquatic native vegetation persists as a result. However, native vegetation on the creek banks is mostly reduced to patches or small strips of regrowth scrub scattered along the top of the embankments.

Relationship to other land

The site is part of the Blind Creek habitat corridor, which continues on the other side of High Street Rd with the Cathies Lane Bushland (Site 60). The corridor is highly interrupted between the Timmothy Drive bushland and Lewis Park (part of Site 33), with a small amount of native vegetation at Collier Reserve and scattered small patches of native vegetation elsewhere.

Highly mobile birds, such as ibis and cockatoos, can be seen moving along the corridor notwithstanding its interruptions. Birds such as honeyeaters and whistlers, as well as insects, no doubt move between the Timmothy Drive Bushland, the Cathies Lane Bushland area (Site 60), the Coppelia St Bushland (Site 61), the Cathies Lane road reservation (Site 62), Redcourt Reserve (Site 63), and possibly the Dandenong Valley Parklands (Site 58). However, the newly constructed EastLink road may effectively sever the link to the Dandenong Valley Parklands.

Some insects and birds such as rosellas no doubt move between the Timmothy Drive Bushland and Flamingo Reserve (Site 56, which is 300 m away) and, to a lesser extent, the tiny patch of vegetation at Wakley Reserve (Site 57, 400 m away).

Blind Ck is above ground from this site to its confluence with Dandenong Ck, largely in its natural bed. It therefore allows migration of fish and other stream fauna. It is barrel-drained for a considerable distance upstream, which represents a major barrier for movement of stream fauna.

Bioregion: Gippsland Plain.

Habitat types

Perennial Stream (No EVC number). Flora includes *Triglochin procerum* and *Potamogeton ochreatus*.

Swamp Scrub (EVC 53, **regionally Endangered**): All or most of the Swamp Scrub is regrowth from former Swampy Riparian Woodland or Swampy Woodland. Total area 30.4 ha. Ecological condition is approximately 1-2% rating B (good), 70% rating C (fair) and the remainder rating D (poor). 35 indigenous plant species were found.

Dominant canopy trees: Dense *Melaleuca ericifolia* with occasional emergent *Eucalyptus ovata* and *Acacias*.

Shrubs: Sparse, including *Coprosma quadrifida*, *Ozothamnus ferrugineus*, *Acacia verticillata*, *Goodenia ovata* and *Senecio minimus*.

Vines: The indigenous *Cassytha pubescens* is sparse; the weed Japanese Honeysuckle is serious in places.

Ferns: none.

Ground flora: Sparse patches of *Juncus*, *Isolepis* and grasses. The character species *Triglochin striatum* and *Lobelia anceps* are present but very scarce.

Wetland (EVC 74, **regionally Endangered**): Mostly rushland dominated by *Juncus* species and weeds, and in fair ecological condition (rating C). 24 indigenous plant species were found.

Swampy Riparian Woodland (EVC 83, **regionally Endangered**): Total area 3.7 ha as shown above, but this may include some Swampy Woodland due to the confounding influences of past clearing. Ecological condition is approximately 40% rating B (good), 40% rating C (fair) and 20% rating D (poor). 44 indigenous plant species were found.

Dominant canopy trees: *Eucalyptus ovata* with fewer *E. radiata*, *E. viminalis* and *E. cephalocarpa*.

Dominant lower trees: *Acacia melanoxylon* (becoming a dense scrub in regrowth patches), with fewer *A. mearnsii* and *Exocarpos cupressiformis*.

Shrubs: *Melaleuca ericifolia* is dominant overall, but patchy. The other shrubs are *Bursaria spinosa*, *Coprosma quadrifida*, *Goodenia ovata*, *Gynatrix pulchella* and *Ozothamnus ferrugineus*.

Vines: Native vines are scarce, but the weed Japanese Honeysuckle is serious in places.

Ferns: none.

Ground flora: *Acæna novæ-zelandiæ*, *Alternanthera denticulata*, *Dianella admixta*, *Epacris impressa*, *Gonocarpus tetragynus*, *Juncus* species, *Lomandra longifolia*, *Microlaena stipoides*, *Phragmites australis*, *Austrostipa rudis*, *Themeda triandra*. *Gahnia radula* is scarce.

Valley Heathy Forest (EVC 127, regionally Endangered): 0.7 ha in total, comprising approximately 4,000 m² in good ecological condition (rating B), 2,000 m² in fair ecological condition (rating C) and 1,000 m² in poor ecological condition (rating D). 63 indigenous plant species were found.

Dominant canopy trees: *Eucalyptus cephalocarpa* with fewer *E. radiata* and scarce *E. melliodora*.

Dominant lower trees: *Exocarpos cupressiformis*, *Acacia melanoxylon* and *A. mearnsii*.

Shrubs: A mostly dense and prickly layer approximately 2-3 m deep, with *Bursaria spinosa*, *Acacia paradoxa*, *A. verticillata*, *Leptospermum continentale*, *L. scoparium*, *Cassinia arcuata*, *Spyridium parvifolium*, *Goodenia ovata*, *Epacris impressa*.

Vines: *Cassytha melantha* and *Cassytha pubescens* are both scattered. The light twiner *Billardiera mutabilis* is fairly abundant.

Ferns: None.

Ground flora: A layer typically 20-30 cm deep with a foliage cover of approximately 70%. Dominated by grasses (including *Austrostipa rudis*, *Themeda triandra*, *Rytidosperma pallidum*, *Poa morrisii*, *Microlaena stipoides*) with abundant *Xanthorrhoea minor*, *Lomandra filiformis* and *L. longifolia*. *Gahnia radula* was not found. Other character species are *Arthropodium strictum*, *Bossiaea prostrata*, *Burchardia umbellata*, *Caesia parviflora*, *Dianella admixta*, *Drosera whittakeri*, *Hibbertia riparia*, *Lepidosperma gunnii*, *L. laterale*, *Platylobium obtusangulum* and *Veronica gracilis*.

Swampy Woodland (EVC 937, regionally Endangered): Due to the effects of past clearing, it is very difficult to distinguish the interface between Swampy Woodland and Swampy Riparian Woodland. The map on p. 297 shows 800 m² of Swampy Woodland, and there is an adjacent mown area measuring 1,900 m² that best approximates regenerating Swampy Woodland. Approximately three-quarters of the total is in fair ecological condition (rating C) and the remainder is in poor ecological condition (rating D). 32 indigenous plant species were found.

Dominant canopy trees: *Eucalyptus ovata*, fairly sparse, with fewer *E. cephalocarpa*.

Dominant lower trees: *Acacia mearnsii* and *Melaleuca ericifolia*.

Shrubs: The main species are *Bursaria spinosa*, *Coprosma quadrifida*, *Goodenia ovata* and *Ozothamnus ferrugineus*.

Vines: Native vines are practically absent, but the weed Japanese Honeysuckle threatens to become dense.

Ferns: None.

Ground flora: *Eragrostis brownii*, *Gonocarpus tetragynus*, *Juncus* species, *Lepidosperma elatius*, *Lomandra longifolia*, *Lythrum hyssopifolia*, *Microlaena stipoides*, *Phragmites australis*, *Austrostipa rudis* and *Thelymitras*, with *Carex appressa* and *Persicaria decipiens* on wet ground (approaching wetland).

Plant species

125 indigenous plant species have been recorded either during this study, by Helen Moss in 1997 or Biosis Pty Ltd in 2002.

In the following plant list, the column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Acacia leprosa* (Dandenong Range variant) is rare nationally and species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia mearnsii</i>		<i>Austrostipa pubinodis</i>
V	<i>Acacia melanoxylon</i>		<i>Austrostipa rudis</i> subsp. <i>rudis</i>
	<i>Acacia paradoxa</i>		<i>Billardiera mutabilis</i>
V	<i>Acacia verticillata</i>		<i>Bossiaea prostrata</i>
	<i>Acaena novae-zelandiæ</i>		<i>Burchardia umbellata</i>
	<i>Acrotriche serrulata</i>		<i>Bursaria spinosa</i>
	<i>Alisma plantago-aquatica</i>	V	<i>Caesia parviflora</i>
V	<i>Allocasuarina littoralis</i>	C	<i>Calystegia sepium</i>
V	<i>Alternanthera denticulata</i>		<i>Carex appressa</i>
C	<i>Amyema pendula</i>	E	<i>Carex fascicularis</i>
	<i>Arthropodium strictum</i>		<i>Carex inversa</i>

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Cassinia arcuata</i>		<i>Leptospermum continentale</i>
V	<i>Cassinia longifolia</i>	E	<i>Leptospermum scoparium</i>
E	<i>Cassytha melantha</i>	E	<i>Lobelia anceps</i>
E	<i>Cassytha pubescens</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
E	<i>Centella cordifolia</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
V	<i>Coprosma quadrifida</i>		<i>Lomandra longifolia</i>
V	<i>Crassula decumbens</i>	V	<i>Lythrum hyssopifolia</i>
	<i>Deyeuxia quadriseta</i>	E	<i>Melaleuca ericifolia</i>
	<i>Dianella admixta</i>		<i>Microlaena stipoides</i>
V	<i>Dillwynia cinerascens</i>		<i>Microtis parviflora</i>
V	<i>Drosera peltata</i> subsp. <i>auriculata</i>	V	<i>Opercularia ovata</i>
E	<i>Drosera peltata</i> subsp. <i>peltata</i>	V	<i>Opercularia varia</i>
V	<i>Drosera whittakeri</i>		<i>Oxalis exilis/perennans</i>
V	<i>Eleocharis acuta</i>	E	<i>Ozothamnus ferrugineus</i>
V	<i>Epacris impressa</i>		<i>Persicaria decipiens</i>
V	<i>Epilobium billardierianum</i> ssp. <i>cinereum</i>	E	<i>Persicaria hydropiper</i>
	<i>Epilobium hirtigerum</i>	E	<i>Persicaria lapathifolia</i>
	<i>Eragrostis brownii</i>	E	<i>Phragmites australis</i>
V	<i>Eucalyptus cephalocarpa</i>	V	<i>Pimelea humilis</i>
	<i>Eucalyptus cephalocarpa</i> × <i>ovata</i>	V	<i>Platylobium formosum</i>
C	<i>Eucalyptus ?fulgens</i> (possibly a hybrid)	V	<i>Platylobium obtusangulum</i>
V	<i>Eucalyptus melliodora</i>		<i>Poa morrisii</i>
V	<i>Eucalyptus ovata</i>		<i>Poranthera microphylla</i>
E	<i>Eucalyptus radiata</i>	V	<i>Potamogeton ochreatus</i>
E	<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>		<i>Pteridium esculentum</i>
V	<i>Euchiton collinus</i>		<i>Rytidosperma pallidum</i>
V	<i>Exocarpos cupressiformis</i>		<i>Rytidosperma penicillatum</i>
	<i>Gahnia radula</i>		<i>Rytidosperma racemosum</i>
	<i>Gonocarpus tetragynus</i>	E	<i>Rytidosperma semiannulare</i>
E	<i>Goodenia humilis</i>		<i>Rytidosperma setaceum</i>
	<i>Goodenia ovata</i>		<i>Rytidosperma ?tenuius</i>
E	<i>Gynatrix pulchella</i>		<i>Schoenus apogon</i>
C	<i>Hakea nodosa</i>		<i>Senecio hispidulus</i>
E	<i>Hibbertia riparia</i>	E	<i>Senecio minimus</i>
E	<i>Hypericum gramineum</i>		<i>Senecio quadridentatus</i>
E	<i>Isolepis cernua</i> var. <i>cernua</i>	V	<i>Solanum laciniatum</i>
E	<i>Isolepis hookeriana</i>	C	<i>Sphaerolobium minus</i>
V	<i>Isolepis inundata</i>	E	<i>Spyridium parvifolium</i>
E	<i>Isolepis marginata</i>	E	<i>Stylidium armeria/graminifolium</i>
	<i>Juncus amabilis</i>	C	<i>Stylidium inundatum</i>
	<i>Juncus bufonius</i>	C	<i>Thelionema caespitosum</i>
	<i>Juncus gregiflorus</i>	V	<i>Thelymitra peniculata</i>
C	<i>Juncus holoschoenus</i>	C	<i>Thelymitra rubra</i>
	<i>Juncus pallidus</i>		<i>Themeda triandra</i>
E	<i>Juncus pauciflorus</i>		<i>Tricoryne elatior</i>
E	<i>Juncus planifolius</i>	C	<i>Triglochin procera</i>
E	<i>Juncus procerus</i>	E	<i>Triglochin striata</i> (flat leaf variant)
	<i>Juncus sarophorus</i>	E	<i>Typha orientalis</i>
V	<i>Lagenophora gracilis</i>	V	<i>Veronica gracilis</i>
E	<i>Lemna disperma</i>	C	<i>Villarsia reniformis</i>
	<i>Lepidosperma elatius</i>	E	<i>Viola hederacea</i>
E	<i>Lepidosperma filiforme</i>	V	<i>Xanthorrhoea minor</i>
	<i>Lepidosperma gunnii</i>	E	<i>Xanthosia dissecta</i>
V	<i>Lepidosperma laterale</i>		

Introduced Species

<i>Acacia longifolia</i> subsp. <i>longifolia</i>	<i>Cynodon dactylon</i>	<i>Pennisetum clandestinum</i>
<i>Acer negundo</i>	<i>Cyperus eragrostis</i>	<i>Phalaris aquatica</i>
<i>Acetosella vulgaris</i>	<i>Cytisus scoparius</i>	<i>Pinus radiata</i>
<i>Agrostis capillaris</i>	<i>Dactylis glomerata</i>	<i>Pittosporum undulatum</i>
<i>Agrostis capillaris</i>	<i>Daucus carota</i>	<i>Plantago lanceolata</i>
<i>Allium triquetrum</i>	<i>Delairea odorata</i>	<i>Plantago major</i>
<i>Alopecurus geniculatus</i>	<i>Ehrharta erecta</i>	<i>Poa trivialis</i>
<i>Anagallis arvensis</i>	<i>Ehrharta longiflora</i>	<i>Prunella vulgaris</i>
<i>Anthoxanthum odoratum</i>	<i>Erica lusitanica</i>	<i>Prunus cerasifera</i>
<i>Arctotheca calendula</i>	<i>Festuca arundinacea</i>	<i>Ranunculus repens</i>
<i>Aster subulatus</i>	<i>Foeniculum vulgare</i>	<i>Raphanus raphanistrum</i>
<i>Atriplex prostrata</i>	<i>Fraxinus angustifolia</i>	<i>Romulea rosea</i>
<i>Avena barbata</i>	<i>Fumaria bastardii</i>	<i>Rorippa palustris</i>
<i>Avena sterilis</i>	<i>Galium aparine</i>	<i>Rosa rubiginosa</i>
<i>Billardiera heterophylla</i>	<i>Genista monspessulana</i>	<i>Rubus anglocandicans</i>
<i>Briza minor</i>	<i>Geranium dissectum</i>	<i>Rumex crispus</i>
<i>Bromus catharticus</i>	<i>Helminthotheca echioides</i>	<i>Rumex pulcher</i>
<i>Bromus diandrus</i>	<i>Holcus lanatus</i>	<i>Salix cinerea</i>
<i>Callitriche stagnalis</i>	<i>Hypochoeris radicata</i>	<i>Senecio vulgaris</i>
<i>Calystegia silvatica</i>	<i>Juncus acuminatus</i>	<i>Solanum mauritanium</i>
<i>Cardamine flexuosa</i>	<i>Juncus articulatus</i>	<i>Solanum nigrum</i>
<i>Centaurium erythraea</i>	<i>Juncus microcephalus</i>	<i>Solanum pseudocapsicum</i>
<i>Cerastium glomeratum</i>	<i>Lactuca serriola</i>	<i>Sonchus asper</i>
<i>Cicendia quadrangularis</i>	<i>Leontodon taraxacoides</i>	<i>Sonchus oleraceus</i>
<i>Cirsium vulgare</i>	<i>Lolium perenne</i>	<i>Stellaria media</i>
<i>Conium maculatum</i>	<i>Lolium rigidum</i>	<i>Taraxacum officinale</i> spp. agg.
<i>Conyza sumatrensis</i>	<i>Lonicera japonica</i>	<i>Tradescantia fluminensis</i>
<i>Cordyline australis</i>	<i>Lotus subbiflorus</i>	<i>Trifolium repens</i>
<i>Cortaderia selloana</i>	<i>Medicago polymorpha</i>	<i>Ulex europaea</i>
<i>Cotula coronopifolia</i>	<i>Medicago sativa</i>	<i>Vicia sativa</i>
<i>Crataegus monogyna</i>	<i>Oxalis pes-caprae</i>	<i>Viola odorata</i>
<i>Crepis capillaris</i>	<i>Paspalum dilatatum</i>	<i>Vulpia bromoides</i>
<i>Crocsmia</i> × <i>crocsmiiflora</i>	<i>Paspalum distichum</i>	

Notes concerning some of the locally threatened plant species

- Carex fascicularis* (Tassel Sedge). 3 plants in a wetland immediately upstream of Timmothy Drive.
- Crassula decumbens* (Spreading Crassula). Several seen in 2003 on 91 Jenola Pde.
- Eucalyptus fulgens* (Green Scentbark). Recorded at 91 Jenola Pde by Biosis Pty Ltd in 2002, but this record is dubious.
- Goodenia humilis* (Swamp Goodenia). Recorded at 91 Jenola Pde by Biosis Pty Ltd in 2002.
- Gynatrix pulchella* (Hemp Bush). Probably only 1 or 2, recorded behind 94 Wakley Cres by H. Moss in 1997.
- Hakea nodosa* (Yellow Hakea). One plant found in 2003 on 91 Jenola Pde.
- Isolepis hookeriana* (Grassy Club-rush). Recorded at 91 Jenola Pde by Biosis Pty Ltd in 2002.
- Isolepis marginata* (Little Club-rush). Rather abundant and widespread on 91 Jenola Pde.
- Juncus holoschoenus* (Joint-leaf Rush). A single plant was found in 2003 on 91 Jenola Pde.
- Lemna disperma* (Common Duckweed). A population was recorded by Lorimer beside High Street Rd in 1997.
- Lepidosperma filiforme* (Common Rapier-sedge). Unknown numbers on 91 Jenola Pde, recorded in 1996 and 2002.
- Persicaria lapathifolia* (Pale Knotweed). Recorded 1997 by H. Moss in Swamp Scrub, both sides of Timmothy Dr.
- Sphaerolobium minus* (Globe-pea). Unknown numbers on 91 Jenola Pde, recorded by Biosis in 2002.
- Spyridium parvifolium* (Australian Dusty Miller). Approximately 12 plants were found on 91 Jenola Pde in 2003 and others recorded just downstream of Timmothy Drive by H. Moss in 1997.
- Thelionema caespitosum* (Tufted Blue-lily). Unknown numbers on 91 Jenola Pde, recorded by H. Moss in 1997.
- Triglochin striatum* (Streaked Arrow-grass). At least one patch seen in 2003 on 91 Jenola Pde.
- Villarsia reniformis* (Running Marsh-flower). One plant found in 2003 on 91 Jenola Pde.

Fauna of special significance

Although the species just listed are significant, none approaches the significance of the Dwarf Galaxias, a tiny native fish that is listed as Vulnerable under the federal *Environment Protection and Biodiversity Conservation Act 1999*. It generally favours off-stream wetlands with warm, still water and dense vegetation, but it moves into streams at times of flood and then migrates around catchments.

Fish expert, Mr John McGuckin, found Dwarf Galaxias in the dam just northeast of the corner of Timmothy Drive and Jenola Pde during a fish study in 1995, but failed to find them more recently after a period when the dam dried out completely. He has also looked in the wetland to the north-northeast of there, on the western edge of 91 Jenola Pde, but found none. He also says that Mr Peter Unmack found Dwarf Galaxias about 50 m upstream of the Timmothy Drive bridge in 1998.

More recent studies indicate that the Dwarf Galaxias population in the Dandenong Creek catchment has crashed. Populations of this species are prone to rise and fall naturally with droughts and floods, but introduced fish and drainage works may have wiped out the species in this catchment in the last few years, according to Mr McGuckin.

Dwarf Galaxias have been taken from the catchment and bred at LaTrobe University for re-introduction, which could conceivably occur in Blind Ck.

Fauna habitat features

- There is a substantial stretch of creek still flowing in its natural bed and unimpeded in its flow to Dandenong Ck and beyond;
- The site is an ecological stepping-stone on the Blind Creek habitat corridor;
- Collectively, the patches of native vegetation represent a substantial sized area of woodland, scrub and wetland, some of which is in good ecological condition;
- The wetlands are good habitat for frogs and some native invertebrates;
- The scrub provides good habitat for small insect-eating birds;
- There are some large, old trees with hollows, but they are rather low in density.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity and Viability

The site is a 'stepping stone' on the Blind Creek habitat corridor. This represents **Local** significance under criterion 1.2.6 of Amos (2004).

Regionally Threatened Ecological Vegetation Class

According to the criteria of '*Victoria's Native Vegetation Management – A Framework for Action*' (NRE 2002a), most of the site's native vegetation has a conservation significance rating of at least High, probably reaching Very High in the most intact section of Valley Heathy Forest on 91 Jenola Pde and perhaps in the Swampy Riparian Woodland just downstream from Timmothy Dr. This is due to the Endangered status of the EVCs present, which confers High status on poor to moderately intact examples (habitat score <0.4), and Very High conservation significance on the rest. Either category gives the site **State** significance under criterion 3.2.3 of Amos (2004).

Rare or Threatened Flora

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

The presence of known habitat for a species listed under the federal *Environment Protection and Biodiversity Conservation Act 1999* (i.e. Dwarf Galaxias) confers at least **State** significance on the site, according to Amos (2004). Taking into account the recent crash in the species' population in this catchment, the site does not meet the criteria for National significance.

Threats

- Urban residential development on some of the private land;
- Invasion by environmental weeds, as discussed by Reid, Moss and Lorimer (1997);
- Damage such as trampling from recreational activities, including trail bikes;
- Dumping of rubbish from adjoining residential properties, particularly building sites;
- Slashing or mowing at the wrong time, frequency or height;
- Reid *et al.* (1997) reported progressive encroachment of slashing on previously unslashed native vegetation, which would cause ecological deterioration if allowed to resume;
- Loss or decline of plant species that are present in dangerously small numbers (e.g. only one *Villarsia reniformis* was found), due to inbreeding, poor reproductive success or vulnerability to localised chance events.

Management issues

- Mowing or slashing of indigenous ground flora is not intrinsically bad, but the timing and frequency are important. In particular, no vehicles should be on native vegetation when the ground is wet enough to cause bogging or loss of traction;
- Trials by Parks Victoria (assessed by Dr Lorimer) in the nearby Dandenong Valley Parklands have shown the value of fire in recovering plant species that have suffered massive decline in Knox (e.g. *Kennedia prostrata*). This site should be considered as part of Knox City Council's overall program for ecological burning. The ecological importance of burning this site is only moderate, but the overall importance may be high if the Country Fire Authority regards the vegetation as a significant fire risk;
- Reid *et al.* (1997) discuss additional management issues.

Administration matters

- This site is very worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its biological significance, importance to a waterway, the presence of threatened EVCs that are predominantly on private land, and the potential for residential subdivision to adversely affect the natural assets (directly or indirectly);
- The granting of planning permits for subdivision or development on any native vegetation within the site would be severely restricted by the endangered status of the vegetation and the Victorian government's policy for native vegetation management (NRE 2002a; Victoria Planning Provisions).

Information sources used in this assessment

- For 91 Jenola Pde, detailed vegetation data and mapping in accord with this study's standard approach described in Section 2.4 of Vol.1, including a list of indigenous and introduced plant species within each of five separate areas of the property, compiled by Dr Lorimer over 4½ hours on 7th October 2003;
- Similar data, maps and associated documentation from H. Moss in March 1997 for the whole site, 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;
- Similar data, maps and associated documentation from G. Lorimer in September 1997 for the roadside of High Street Rd, as reported by Lorimer G.S. (1998), '*A Survey and Management Strategy for Significant Roadsides in Knox*', for Knox City Council;
- Incidental observations of birds and frogs while the above data was being gathered;
- An inspection by Dr Lorimer on 10/3/08 to update the above information where appropriate, with particular attention to recent residential development requiring amendment of the site boundary used in the first edition of this report;
- Information about Dwarf Galaxias verbally from fish expert, Mr John McGuckin (Streamline Research Pty Ltd), in October 2003;
- A list of plant species and a basic report on flora and fauna at 91 Jenola Pde (apparently wrongly identified in the report as 90 Jenola Pde), produced by Biosis Pty Ltd (their project no. 2375);
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Acknowledgment

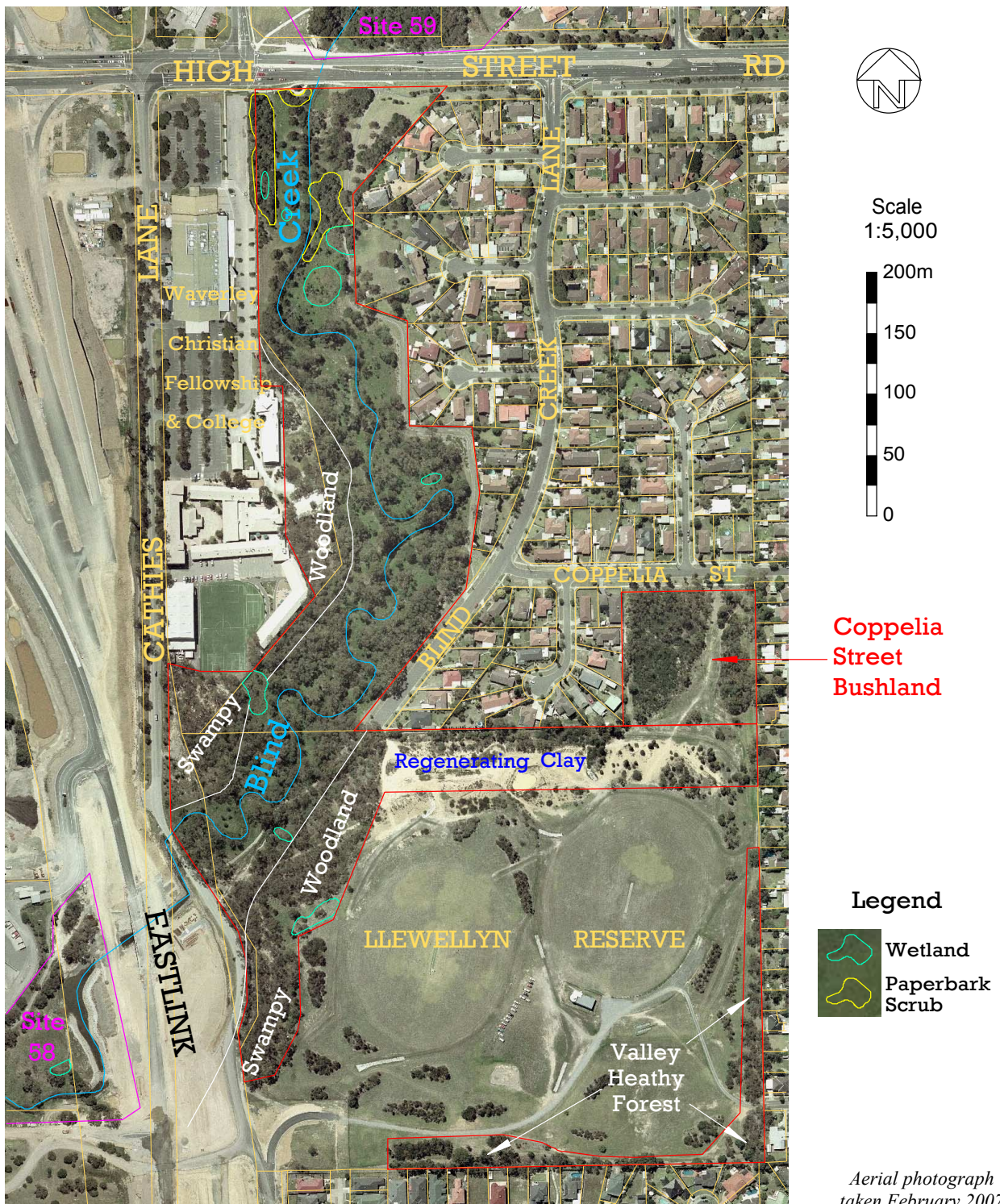
Thanks to fish expert, John McGuckin, for information concerning Dwarf Galaxias on the site.

Site 60. Cathies Lane Bushland & Llewellyn Reserve, Wantirna South

Parkland with native vegetation along Blind Ck and in the adjoining Llewellyn Reserve. Melway ref. 72 E3.

Site Significance Level: State

- Being on Blind Creek, the site is on a corridor for daily and seasonal movements of birds, insects and fish;
- Although the vegetation is mostly seriously degraded, some is in fair to good ecological condition and all of it belongs to various regionally endangered Ecological Vegetation Classes;
- Some of the plants (mainly in wetlands) are rare or threatened locally or throughout the Melbourne area.



Aerial photograph taken February 2007

Boundaries

The two parts that make up this 12.0 ha site are outlined in red on the aerial photograph on the previous page: a larger part along Blind Ck, and a narrow strip along the southern and eastern edges of Llewellyn Reserve. The square labelled as Coppelia Street Bushland and outlined in red is a separate site (Site 61).

Site boundaries have been aligned with property boundaries where feasible. In the southwest, the site abuts Cathies Lane. (In the first edition of this report, it extended to the other side of what is now the EastLink Rd.) Within Llewellyn Reserve, the boundary encompasses all the native vegetation, including largely bare slopes of clay along a 51 m-wide strip along the reserve's northern edge, where natural regeneration of indigenous plants (e.g. *Thelymitra pauciflora*) is occurring.

Land use & tenure: Mostly Council reserve, also part of the Waverley Christian Fellowship and College.

Site description

This site includes a band of vegetation along Blind Creek, as well as peripheral strips of Llewellyn Reserve that have native vegetation.

The strip to the north of the Llewellyn Reserve playing fields that appears on the aerial photograph to be mostly bare clay is a disturbed section of a former clay pit and municipal rubbish tip. It is included within the site because it has shown signs of natural regeneration of indigenous plants (e.g. *Thelymitra pauciflora*), which, as the Coppelia Street Bushland has shown, can develop into significant vegetation.

Blind Ck retains its natural course from 120 m south of High Street Rd to Cathies Lane. There are indigenous plants scattered all along the stream channel, including species that are permanently submerged (in whole or in part) or frequently immersed at times of high water. The other native vegetation in this site comprises the regionally Endangered EVCs, Swampy Riparian Woodland (EVC 83), Swampy Woodland (EVC 937), Valley Heathy Forest (EVC 127) and Wetland (EVC 74).

Swampy Riparian Woodland occurs in patches within a band along the creek. The approximate edges of this band are marked with white outlines on the aerial photograph on the previous page, with some imprecision due to sparseness of native vegetation. Swampy Woodland flanks the Swampy Riparian Woodland, giving way to Valley Heathy Forest at higher elevations along the southern and eastern edges of Llewellyn Reserve.

The elevations in the Valley Heathy Forest are approximately 65-77 m and the soil there is poorly draining, silty clay formed from decomposition of the underlying Devonian sedimentary bedrock. The other vegetation types all grow in alluvium along the creek, at elevations of 57-61 m.

In addition to the site's native vegetation, there are treeless areas covered with exotic grass that is invading the native vegetation. These areas can be seen from the aerial photograph. Where there is a canopy of indigenous trees, the density of trees is mostly less than natural, and the foliage in the eucalypt crowns is often thin due to dieback disease.

The understorey of the Swampy Riparian Woodland and Swamp Scrub has been decimated, mainly by the effects of creeping and climbing weeds that have smothered the native plants. Japanese Honeysuckle (*Lonicera japonica*) and Greater Bindweed (*Calystegia silvatica*) have climbed more than ten metres into the tree canopy, destroying a large proportion of the naturally dense Swamp Paperbarks (*Melaleuca ericifolia*) as well as smaller indigenous shrubs. Council has put a lot of effort into removing these vine weeds. The three remaining notable examples of dense stands of paperbarks are outlined in yellow on the aerial photograph, and could be regarded as the EVC, Swamp Scrub, but are treated here as disclimax regrowth of Swampy Riparian Woodland. The bindweed, as well as Creeping Buttercup (*Ranunculus repens*) and Wandering Jew (*Tradescantia albiflora*), form a dense carpet within most of the Swampy Riparian Woodland, allowing few indigenous plants to survive.

The areas of wetland and Swampy Woodland are less afflicted by weeds, with small proportions of each being in good ecological condition (rating B). The most ecologically intact area of Swampy Woodland retains predominantly native plants in all vegetation strata.

Despite the low density of mature trees and the incidence of dieback, a highlight of this site is the high diversity of native birds, including species that are uncommon in suburban Melbourne. This was concluded independently by the present author and by Biosis Pty Ltd. (Biosis Pty Ltd surveyed the site for the Environment Effects Statement for the Scoresby Transport Corridor in 1998). The location on the Blind Creek habitat corridor is the explanation for the diversity of birdlife. It is yet to be seen whether the new EastLink road will act as a barrier to wildlife movement.

Knox City Council has been responsible for extensive revegetation within the site, which is starting to mature and provide a substitute (however imperfect) for the past loss of naturally occurring trees and shrubs.

More details about the site can be obtained from 'A Management Plan for Cathies Lane Bushland, Wantirna South' by G.S. Lorimer (1997) for Knox City Council.

Relationship to other land

As noted above, the site's diverse birdlife can be attributed to movements along the Blind Ck habitat corridor. Insects, frogs and bats may also use the corridor. The ecological functioning of the habitat corridor relies on the native vegetation upstream and downstream of the site in question, particularly the Timmothy Drive Bushland (Site 59) upstream and through the Dandenong Valley Parklands (Site 58) downstream.

Fish in Blind Ck are similarly reliant on the condition of the stream and its fringing vegetation, upstream and downstream.

Exchange of pollen and seeds by birds and insects moving along the corridor have probably minimised inbreeding problems that affect more isolated patches of urban bushland. However, this may no longer apply if the new EastLink road acts as a barrier to pollinating fauna.

Bioregion: Gippsland Plain

Habitat types

Perennial Stream (No EVC number). 5 aquatic flora species found: *Juncus gregiflorus*, *Persicaria hydropiper*, *Potamogeton crispus*, *Potamogeton ochreatus* and *Triglochin procerum*.

Wetland (EVC 74, **regionally Endangered**) in eight patches: Estimated as 0.50 ha in total area, comprising 0.14 ha in good ecological condition (rating B), 0.34 ha in fair ecological condition (rating C) and 0.02 ha in poor ecological condition (rating D). 24 indigenous plant species have been recorded.

Trees, vines and ferns: Absent.

Shrubs: Sparse *Melaleuca ericifolia* extend into some of the wetlands.

Aquatic and semi-aquatic flora: The fully aquatic species, *Triglochin procerum* and *Potamogeton crispus*, are present in some of the wetlands, but most of the species are amphibious. Four species of *Juncus* and five species of *Persicaria* are prominent among the dominant species, sometimes accompanied by *Carex* species or *Eleocharis acuta*.

Swampy Riparian Woodland (EVC 83, **regionally Endangered**) in numerous patches: Estimated as 3.0 ha in total area, comprising 1.0 ha in fair ecological condition (rating C) and 2.0 ha in poor ecological condition (rating D). 32 indigenous plant species have been recorded.

Dominant canopy trees: *Eucalyptus ovata*.

Dominant lower trees: *Acacia melanoxylon*, *A. mearnsii* and *Melaleuca ericifolia*. The first of these has formed patches of scrub where it has regenerated naturally after soil disturbance.

Shrubs: *Bursaria spinosa*, *Coprosma quadrifida*, *Goodenia ovata*, *Gynatrix pulchella*, *Leptospermum scoparium* and *Ozothamnus ferrugineus*. There is a single plant of the ecological indicator, *Leptospermum lanigerum*.

Vines: The only native climber is the parasite, *Cassytha pubescens*, but introduced vines have been rampant and could reinfest the area.

Ferns: none.

Ground flora: The native ground flora is decimated, but retains *Acæna novæ-zelandiæ*, *Carex appressa*, *Gonocarpus tetragynus*, *Juncus* species, *Microlaena stipoides*, *Austrostipa rudis*, *Rytidosperma setaceum*, *Eragrostis brownii*, *Persicaria decipiens*, *Persicaria hydropiper* and *Persicaria lapathifolia*.

Swampy Woodland (EVC 937, **regionally Endangered**): Estimated as 2.6 ha in area, comprising 0.10 ha in good ecological condition (rating B), 1.2 ha in fair ecological condition (rating C) and 1.3 ha in poor ecological condition (rating D). Approximately 58 indigenous plant species have been recorded (the number uncertain due to difficulty discerning a boundary between Swampy Woodland and Valley Heathy Forest).

Dominant canopy trees: *Eucalyptus ovata* and *E. cephalocarpa*.

Dominant lower trees: *Acacia melanoxylon*, *A. mearnsii*, *Exocarpos cupressiformis* and *Melaleuca ericifolia*.

Shrubs: The main species are *Acacia verticillata*, *Bursaria spinosa*, *Cassinia arcuata*, *Goodenia ovata*, *Leptospermum scoparium* and *Ozothamnus ferrugineus*. In addition, *Solanum laciniatum*, *Spyridium parvifolium* and the ecological indicator species, *Hakea nodosa*, are present.

Vines: The light twiner, *Billardiera mutabilis*, is abundant and the climbing parasite, *Cassytha pubescens* is also present.

Ferns: *Pteridium esculentum* is scarce.

Ground flora: Densely grassy, with eleven species of native grass recorded as well as three types of *Lomandra* and substantial numbers of *Lepidosperma gunnii*. The most abundant grasses are *Microlaena stipoides*, *Eragrostis brownii*, *Austrostipa rudis* and *Themeda triandra*. There is also a scattering of four *Juncus* species. *Gahnia radula* is present but abnormally scarce. Non-grassy species are seriously depleted, and the most abundant one is *Gonocarpus tetragynus*. The ecological indicator species, *Centella cordifolia*, *Senecio minimus* and *Rytidosperma semiannulare*, are present.

Valley Heathy Forest (EVC 127, **regionally Endangered**): Estimated as 0.5 ha in area, comprising 0.2 ha in fair ecological condition (rating C) and 0.3 ha in poor ecological condition (rating D).

Canopy trees: Dominated by *Eucalyptus cephalocarpa* and fewer *E. obliqua*, *E. radiata* and *E. ovata*.

Lower trees: *Acacia melanoxydon*, *A. mearnsii*, *Exocarpos cupressiformis*.

Shrubs: Depleted by past clearing. Remaining species include *Bursaria spinosa*, *Cassinia arcuata*, *Epacris impressa* and *Platylobium obtusangulum*.

Vines: *Billardiera mutabilis*.

Ground flora: Grassy; depleted by mowing. The most abundant graminoids are *Microlaena stipoides*, *Austrostipa rudis*, *Rytidosperma setaceum*, *Themeda triandra* and *Lomandra filiformis*. Other species include *Acrotiche serrulata*, *Dianella admixta* and *Gonocarpus tetragynus*.

Plant species

The following plant species were observed by the author in 1997. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, the species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia mearnsii</i>		<i>Juncus sarophorus</i>
V	<i>Acacia melanoxydon</i>		<i>Kunzea ericoides</i> spp. agg.
V	<i>Acacia verticillata</i>		<i>Lachnagrostis filiformis</i>
	<i>Acaena novae-zelandiae</i>		<i>Lepidosperma gunnii</i>
	<i>Acrotiche serrulata</i>		<i>Leptospermum continentale</i>
	<i>Alisma plantago-aquatica</i>	E	<i>Leptospermum lanigerum</i>
V	<i>Alternanthera denticulata</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
C	<i>Amyema pendula</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
	<i>Austrostipa rudis</i>		<i>Lomandra longifolia</i>
	<i>Billardiera mutabilis</i>	E	<i>Melaleuca ericifolia</i>
	<i>Bursaria spinosa</i>		<i>Microlaena stipoides</i>
	<i>Carex appressa</i>	C	<i>Olearia ramulosa</i> (possibly planted)
	<i>Carex ?breviculmis</i>	E	<i>Ozothamnus ferrugineus</i>
E	<i>Carex fascicularis</i>		<i>Persicaria decipiens</i>
	<i>Cassinia arcuata</i>	E	<i>Persicaria hydropiper</i>
E	<i>Cassytha pubescens</i>	E	<i>Persicaria lapathifolia</i>
E	<i>Centella cordifolia</i>	E	<i>Persicaria praetermissa</i>
V	<i>Coprosma quadrifida</i>	C	<i>Persicaria subsessilis</i>
	<i>Deyeuxia quadriseta</i>	E	<i>Phragmites australis</i>
	<i>Dianella admixta</i>	V	<i>Platylobium obtusangulum</i>
V	<i>Eleocharis acuta</i>		<i>Poa morrisii</i>
V	<i>Epacris impressa</i>	V	<i>Potamogeton crispus</i>
	<i>Epilobium hirtigerum</i>	V	<i>Potamogeton ochreatus</i>
	<i>Eragrostis brownii</i>		<i>Pteridium esculentum</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Rytidosperma linkii</i> var. <i>fulvum</i>
V	<i>Eucalyptus obliqua</i>		<i>Rytidosperma penicillatum</i>
V	<i>Eucalyptus ovata</i>	E	<i>Rytidosperma semiannulare</i>
E	<i>Eucalyptus radiata</i>		<i>Rytidosperma setaceum</i>
V	<i>Exocarpos cupressiformis</i>		<i>Schoenus apogon</i>
	<i>Gahnia radula</i>		<i>Senecio hispidulus</i>
	<i>Gonocarpus tetragynus</i>	E	<i>Senecio minimus</i>
	<i>Goodenia ovata</i>		<i>Senecio quadridentatus</i>
E	<i>Gynatrix pulchella</i>	V	<i>Solanum laciniatum</i>
C	<i>Hakea nodosa</i>	E	<i>Spyridium parvifolium</i>
E	<i>Hypericum gramineum</i>		<i>Themeda triandra</i>
V	<i>Isolepis inundata</i>	C	<i>Triglochin procera</i>
	<i>Juncus amabilis</i>	E	<i>Triglochin striata</i> (flat leaf variant)
	<i>Juncus bufonius</i>	E	<i>Typha orientalis</i>
	<i>Juncus gregiflorus</i>	V	<i>Veronica gracilis</i>
	<i>Juncus pallidus</i>	V	<i>Xanthorrhoea minor</i>
E	<i>Juncus procerus</i>		

Introduced Species

<i>Acacia longifolia</i> subsp. <i>longifolia</i>	<i>Echinochloa crus-galli</i>	<i>Persicaria maculosa</i>
<i>Acer ?negundo</i>	<i>Ehrharta erecta</i>	<i>Phalaris aquatica</i>
<i>Agrostis capillaris</i>	<i>Erica lusitanica</i>	<i>Pinus radiata</i>
<i>Allium triquetrum</i>	<i>Foeniculum vulgare</i>	<i>Pittosporum undulatum</i>
<i>Anthoxanthum odoratum</i>	<i>Fraxinus angustifolia</i>	<i>Plantago lanceolata</i>
<i>Aster subulatus</i>	<i>Fumaria ?officinalis</i> spp. agg.	<i>Plantago major</i>
<i>Atriplex prostrata</i>	<i>Galium aparine</i>	<i>Prunella vulgaris</i>
<i>Billardiera heterophylla</i>	<i>Hedera helix</i>	<i>Prunus cerasifera</i>
<i>Bromus catharticus</i>	<i>Helminthotheca echioides</i>	<i>Psoralea pinnata</i>
<i>Bromus diandrus</i>	<i>Holcus lanatus</i>	<i>Ranunculus repens</i>
<i>Callitriche stagnalis</i>	<i>Hypochoeris radicata</i>	<i>Raphanus ?raphanistrum</i>
<i>Calystegia silvatica</i>	<i>Juncus articulatus</i>	<i>Rorippa palustris</i>
<i>Centaureum erythraea</i>	<i>Juncus microcephalus</i>	<i>Rosa rubiginosa</i>
<i>Cirsium vulgare</i>	<i>Leontodon taraxacoides</i>	<i>Rubus anglocandicans</i>
<i>Conyza ?sumatrensis</i>	<i>Linum trigynum</i>	<i>Rumex crispus</i>
<i>Cotoneaster glaucophyllus</i>	<i>Lolium perenne</i>	<i>Solanum nigrum</i>
<i>Cotula coronopifolia</i>	<i>Lonicera japonica</i>	<i>Solanum pseudocapsicum</i>
<i>Crataegus monogyna</i>	<i>Lotus subbiflorus</i>	<i>Sonchus oleraceus</i>
<i>Crocasmia × crocosmiflora</i>	<i>Malus pumila</i>	<i>Tradescantia fluminensis</i>
<i>Cynodon dactylon</i>	<i>Mentha spicata</i>	<i>Trifolium repens</i>
<i>Cyperus eragrostis</i>	<i>Modiola caroliniana</i>	<i>Ulex europaeus</i>
<i>Cytisus scoparius</i>	<i>Paspalum dilatatum</i>	<i>Vulpia bromoides</i>
<i>Dactylis glomerata</i>	<i>Paspalum distichum</i>	<i>Watsonia meriana</i>
<i>Daucus carota</i>	<i>Pennisetum clandestinum</i>	<i>Zantedeschia aethiopica</i>

Notes concerning some of the locally threatened plant species

- Carex fascicularis* (Tassel Sedge). Several plants were found.
- Carex ?gaudichaudiana* (Fen Sedge). One patch was found, perhaps a single plant.
- Gynatrix pulchella* (Hemp Bush). Two plants were found.
- Hakea nodosa* (Yellow Hakea). Three plants were found.
- Leptospermum lanigerum* (Woolly Tea-tree). A single plant was found.
- Persicaria lapathifolia* (Pale Knotweed). Found in wetland and on the stream bank, numbers not recorded.
- Persicaria praetermissa* (Spotted Knotweed). Many plants were found in two wetlands.
- Persicaria subsessilis* (Hairy Knotweed). Many plants were found in a single wetland.
- Potamogeton crispus* (Curly Pondweed). Many plants were found all along the creek.
- Spyridium parvifolium* (Australian Dusty Miller). A single plant was found, near Cathies Lane bridge.
- Triglochin striatum* (Streaked Arrow-grass). Found in two wetlands, number of individuals indeterminate.

Fauna of special significance

Nationally Vulnerable

The nationally vulnerable fish, Dwarf Galaxias, has been recorded 1 km upstream as well as downstream, and has undoubtedly passed through the site during the 1990s. It could conceivably appear in this site's wetlands or the stream, but fish experts such as Mr John McGuckin (of Streamline Research Pty Ltd) fear that the species may have become extinct in the Dandenong Creek catchment in recent years.

Uncommon in the Melbourne Region

Weasel Skink. Seen in c.1998, as reported in the Scoresby Transport Corridor Environment Effects Statement.

Striped Marsh Frog. As above.

Fauna habitat features

- The canopy of indigenous trees, fragmented though it is, was seen to support an unusually high density of native birds for suburbia, including such species as White-Browed Tree-Creeper;
- Some of the mature trees are old enough and large enough to have hollows that could be used by native fauna for nesting or roosting;
- A relatively high density and diversity of shrubs in Llewellyn Reserve near Cathies Lane significantly improves the habitat for native insects and birds, including White-Browed Scrubwrens. The prickliness of many of the shrubs helps protect birds from cats;
- The stream and wetlands are used extensively by frogs, ducks and some other waterbirds, and probably by aquatic invertebrates;

- Fish migrate up and down Blind Ck through this site;
- Fragmentation of the native vegetation is to some degree offset by the diversity of habitat (scrubby to open, aquatic to dry), which is beneficial to some native fauna.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment'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 parts of this site.

Endangered Vegetation Types

All the EVCs present are regionally Endangered. The significance of this might be discounted in the substantial areas of the site with little if any native understorey, but not in many of the wetlands, nor a substantial fraction of the Swampy Woodland. In these latter cases, it follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that the site's native vegetation is of at least High conservation significance because of the Endangered status of the EVCs. This, in turn, gives the site **State** significance under criterion 3.2.3.

Rare or Threatened Flora

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Invasion by environmental weeds, of which the greatest threats (when last inspected in 2000) were:
 - The grass weeds Sweet Vernal-grass (*Anthoxanthum odoratum*), Cocksfoot (*Dactylis glomerata*) and Yorkshire Fog (*Holcus lanatus*);
 - Possible reinfestation of the creepers and climbers, Blackberry (*Rubus discolor*), Greater Bindweed (*Calystegia silvatica*) and/or its hybrids, Japanese Honeysuckle (*Lonicera japonica*), Creeping Buttercup (*Ranunculus repens*) and Wandering Jew (*Tradescantia albiflora*) if not kept in check; and
 - Possible reinfestation of Gorse (*Ulex europaeus*) or English Broom (*Cytisus scoparius*) in Llewellyn Reserve, if not kept in check;
- Dieback disease;
- Critically small population sizes of several plant species;
- Garden waste dumping from neighbouring residences;
- Fragmentation of habitat caused by the EastLink road, leading to reduced visitation by small insect-eating birds and hence a risk of worsening plant pests and diseases.

Management issues

- Guidance for management of the reserve's habitat is discussed in detail in '*A Management Plan for Cathies Lane Bushland, Wantirna South*' by G.S. Lorimer (1997) for Knox City Council, although this is in need of updating;
- A new management plan is almost due. Conditions have changed due to EastLink and updates are necessary to bring classification of the vegetation types and the ecological condition of the vegetation into conformity with this *Sites of Biological Significance* report.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the matters considered under the heading, 'Significance ratings';
- The site is not included under the existing Vegetation Protection Overlay of the Knox Planning Scheme and was not recognised in the report by Water Ecoscience (1998).

Information sources used in this assessment

- Site surveys by Dr Lorimer and Mr John Reid on 25/3/97 and by Dr Lorimer on 23/4/97 and 25/4/97. These were for the two reports, '*A Management Plan for Cathies Lane Bushland, Wantirna South*' (Lorimer 1997) and '*Vegetation Survey of Linear Reserves – A Management Strategy for Riparian and Flood Plain Vegetation*' (Reid, Moss & Lorimer 1997) for Knox City Council. They included:
 - Compilation of lists of indigenous and introduced plants within each of sixteen parts of the site;
 - Detailed mapping and documentation of rare species populations and the ecological condition of the vegetation;

- A description of the vegetation's structural and floristic composition;
- Compilation of detailed data from a quadrat;
- Incidental fauna observations;
- Checks for fauna habitat, ecological threats and management issues; and
- Recommendations for the care and maintenance of the vegetation, including weed control;
- A re-inspection of the part of the site downstream from Cathies Lane, conducted by Dr Lorimer on 14/1/04 to update the above information and fill any gaps in the data;
- Another re-inspection by Dr Lorimer on 10/3/08 to update the above information in response to construction of the EastLink road;
- Information about Dwarf Galaxias verbally from fish expert, Mr John McGuckin (Streamline Research Pty Ltd), in October 2003;
- A report, '*Assessment of Native Vegetation on the Mitcham to Frankston Freeway Alignment in Knox*', by Dr Lorimer in July 2003 for Knox City Council;
- The 1998 '*Scoresby Transport Corridor Environment Effects Statement*', particularly Supplement Volume H: Flora and Fauna by Williams L.M., Yugovic J.V., McGuckin J., Humphrey P. and Larwill S. (1998), in which part of this site is labelled as 'Site 6';
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 61. Coppelia Street Bushland, Wantirna South

Public park (formerly a clay pit and rubbish tip) with regenerating native vegetation. Melway ref. 63 E2.

Site Significance Level: *State*

- A remarkable example of natural regeneration of the regionally endangered vegetation type, Swampy Woodland;
- Some of the vegetation is in good ecological condition despite having been once totally destroyed;
- Eight of the plant species are rare or threatened in Knox, and four of these are rare or threatened in the whole Melbourne area;
- The site is used for monitoring and studying the regenerative capacity of Swampy Woodland and how this may be used to help this vegetation type to recover from its endangered status in the bioregion.

Aerial photograph and plan: See page 304, which covers this site and Site 60.

Boundaries

This 1.21 ha site is the whole of a single lot, outlined in red and marked 'Coppelia Street Bushland' on the aerial photograph.

Land use & tenure: Council reserve, zoned Public Park and Recreation Zone.

Site description

This site is a remarkable example of natural regeneration of a regionally endangered vegetation type, complete with rare plants, following massive disturbance.

Approximately half the site was once part of a pit used for extraction of clay, and the remainder (strips along the northern and eastern edges) was completely cleared at that time. The strip along the eastern edge was covered with an elongated mound of overburden from the pit.

The clay pit was exhausted in 1974 and then used as a rubbish tip until the mid 1980s, when it was capped with clay. Native vegetation subsequently regenerated in the clay and around the rest of the site. The only native vegetation in the reserve that seems to predate the mid 1980s is on the mound, where there are some mature trees that would have been beneficial during the operation of the clay pit and tip, for visual screening and interception of dust.

The origin of the clay in which the natural regeneration has occurred is unknown, but for practical reasons, it would have been nearby (possibly stockpiled overburden from the same clay pit). The profusion of swamp-loving plants that germinated indicates that the clay came from somewhere that once had Swampy Woodland vegetation (a regionally endangered Ecological Vegetation Class). This description fits the pre-European vegetation of the Coppelia Street Bushland, as inferred from its location on a broad drainage line with alluvial soil and a slope of only 2%. The plant species present prior to the excavation of the clay pit would have been more or less the same as those present now.

No effort was made to encourage the natural regeneration until its significance was recognised around 1997. At that stage, there was a moderate cover of weeds, but these have since been progressively reduced. There was also a large number of plants whose species are rare or threatened in Knox or the whole Melbourne area; e.g. hundreds of Salmon Sun-orchids (*Thelymitra rubra*). Part of the area was regularly mown and part had developed into dense regrowth. The dense and open areas have important, complementary roles in conserving the native vegetation; e.g. the sun-orchids thrive in the open areas whereas the Leafless Globe-pea, *Sphaerolobium minus*, and the Horned Orchid *Orthoceras strictum* are in the dense vegetation. Therefore, current management aims to retain both open areas (partly with slashing) and areas where shrubs and trees are allowed to develop naturally.

The area of dense regrowth is now at an adolescent stage, with the eucalypts still small but reproductively mature, and the dense, prickly understorey in the unmown areas is starting to thin out (accelerated by drought in recent years).

The progress of development of the regrowth has been the subject of a monitoring program by Dr Lorimer for Knox City Council since October 1998. It serves as an important case study, showing how Swampy Woodland can regenerate under the right circumstances, even after it would have been deemed totally destroyed. This sort of information could be important for helping the regional representation of this vegetation type to recover from its present endangered condition. For example, the demonstration that the vegetation has a remarkable ability to regenerate from subsoil may provide a clue about how to facilitate regeneration without allowing weeds to take over.

Until the start of the current drought, the site's history as part of a rubbish tip was apparent from bubbling springs of tip leachate water and gas welling up at several locations, with the water flowing over the ground in shallow channels that have formed.

More details about the reserve can be obtained from 'A Management Plan for Coppelia Street Bushland, Wantirna South' by G.S. Lorimer (2001) for Knox City Council.

Relationship to other land

Land use to the north, west and east of the Coppelia Street Bushland is urban residential, with negligible indigenous vegetation. The eastern part of Llewellyn Reserve (part of Site 60) adjoins to the south, with its playing fields and narrow strips of degraded native vegetation. These areas have negligible impact on the conservation values of the Coppelia Street Bushland.

The Blind Creek habitat corridor lies 125 metres to the west, on the western edge of Llewellyn Reserve. The natural vegetation of this corridor is fairly badly degraded by weeds and loss of species, but it still provides enough cover and continuity to support movement of many bird species. The Coppelia Street bushland has lower weed coverage than the Blind Creek corridor and therefore, if it is allowed to develop as nature intended, it offers the potential to attract birds using the creek corridor. Many insects are also likely to move between the corridor and the Coppelia Street bushland.

Exchange of pollen and seeds by birds and insects should avoid most of the inbreeding problems that would otherwise occur in a bushland block as small as the Coppelia Street bushland.

However, the construction of the EastLink road through this part of the Blind Creek habitat corridor might significantly reduce the movement of birds and insects to the Coppelia Street Bushland, and thereby threaten the future of some of the indigenous plants.

Bioregion: Gippsland Plain

Habitat types

Swampy Woodland (EVC 937, **regionally Endangered**) in various stages of regrowth and subject to varying history. The total area of native understorey is estimated to be 0.88 ha, comprising 0.20 ha in good ecological condition (rating B), 0.51 ha in fair ecological condition (rating C) and 0.17 ha in poor ecological condition (rating D).

Dominant canopy trees: *Eucalyptus ovata* with fewer *Eucalyptus cephalocarpa*, *E. viminalis* and hybrids between all these. There are also some *Acacia dealbata* as tall as most of the eucalypts.

Dominant lower trees: *Acacia melanoxylon* and *Exocarpos cupressiformis*.

Shrubs: Variable in density from very dense to very sparse, depending on the history of regeneration and slashing. There is a tall shrub layer dominated by *Leptospermum scoparium* or *Melaleuca ericifolia* and a lower shrub layer dominated by *Goodenia ovata*.

Vines: The light twiner, *Billardiera mutabilis*, is moderately abundant.

Ferns: Absent.

Ground flora: Dominated by *Microlaena stipoides*, *Lomandra longifolia*, *Austrostipa rudis*, *Rytidosperma* species, *Lepidosperma gunnii* and *Schoenus apogon*, with patches of the open area heavily populated by *Thelymitra* species (mostly *T. pauciflora*).

Plant species

The following plant species were observed by the author in the years indicated. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable.

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
	<i>Acacia dealbata</i>	2007		<i>Bursaria spinosa</i>	2007
V	<i>Acacia mearnsii</i>	2007		<i>Campylopus</i> sp.	2007
V	<i>Acacia melanoxylon</i>	2007		<i>Carex breviculmis</i>	2007
	<i>Acacia paradoxa</i>	2007		<i>Cassinia arcuata</i>	2007
V	<i>Acacia verticillata</i>	2007	E	<i>Centella cordifolia</i>	2007
	<i>Acaena novae-zelandiae</i>	2007	V	<i>Coprosma quadrifida</i>	2007
	<i>Arthropodium strictum</i>	1999	V	<i>Cotula australis</i>	2007
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	2007	V	<i>Crassula decumbens</i>	2007
	<i>Billardiera mutabilis</i>	2007	E	<i>Daviesia latifolia</i>	1998
	<i>Bossicea prostrata</i>	2007		<i>Deyeuxia quadriseta</i>	1999
	<i>Burchardia umbellata</i>	2007		<i>Dianella admixta</i>	2007

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
V	<i>Drosera peltata</i> subsp. <i>auriculata</i>	1999	E	<i>Melaleuca ericifolia</i>	2007
V	<i>Epacris impressa</i>	2002		<i>Microlaena stipoides</i>	2007
	<i>Eragrostis brownii</i>	2007		<i>Microtis parviflora</i>	1999
V	<i>Eucalyptus cephalocarpa</i>	2007	C	<i>Olearia ramulosa</i> (perhaps planted)	2007
V	<i>Eucalyptus ovata</i>	2007	V	<i>Opercularia ovata</i>	2007
E	<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>	2007	V	<i>Opercularia varia</i>	2007
V	<i>Exocarpos cupressiformis</i>	2007	C	<i>Orthoceras strictum</i>	2004
	<i>Gahnia radula</i>	1999		<i>Oxalis exilis/perennans</i>	2007
	<i>Gonocarpus tetragynus</i>	2007	E	<i>Ozothamnus ferrugineus</i>	2007
E	<i>Goodenia humilis</i>	2007	C	<i>Patersonia occidentalis</i>	2007
	<i>Goodenia ovata</i>	2007	V	<i>Platylobium obtusangulum</i>	2007
V	<i>Hemarthria uncinata</i>	2007		<i>Poa morrisii</i>	2007
	<i>Juncus amabilis</i>	2007		<i>Poranthera microphylla</i>	2007
	<i>Juncus bufonius</i>	1999		<i>Rytidosperma laeve</i>	1999
	<i>Juncus gregiflorus</i>	2007		<i>Rytidosperma linkii</i> var. <i>fulvum</i>	2007
	<i>Juncus pallidus</i>	2007		<i>Rytidosperma racemosum</i>	2007
E	<i>Juncus procerus</i>	2007	E	<i>Rytidosperma semiannulare</i>	2007
	<i>Juncus sarophorus</i>	2007		<i>Rytidosperma setaceum</i>	2007
E	<i>Juncus subsecundus</i>	2007		<i>Schoenus apogon</i>	2007
	<i>Kunzea ericoides</i> spp. agg.	2007		<i>Senecio hispidulus</i>	2007
	<i>Lachnagrostis filiformis</i>	2007	E	<i>Senecio minimus</i>	2007
V	<i>Lagenophora gracilis</i>	2007	C	<i>Sphaerolobium minus</i>	2007
E	<i>Lepidosperma filiforme</i>	1999	V	<i>Thelymitra peniculata</i>	2007
	<i>Lepidosperma gunnii</i>	2007	C	<i>Thelymitra rubra</i>	1999
V	<i>Leptorhynchus tenuifolius</i>	2007		<i>Themeda triandra</i>	2007
E	<i>Leptospermum scoparium</i>	2007		<i>Thuidiopsis furfurosa</i>	2007
	<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	2007		<i>Tricoryne elatior</i>	2007
	<i>Lomandra longifolia</i>	2007	V	<i>Veronica gracilis</i>	2007
V	<i>Lythrum hyssopifolia</i>	1999	E	<i>Xanthosia dissecta</i>	2002

Introduced Species

<i>Acacia baileyana</i>	<i>Ehrharta erecta</i>	<i>Paspalum dilatatum</i>
<i>Acacia floribunda</i>	<i>Ehrharta longiflora</i>	<i>Pennisetum clandestinum</i>
<i>Acacia longifolia</i> subsp. <i>longifolia</i>	<i>Erica lusitanica</i>	<i>Pittosporum undulatum</i>
<i>Agrostis capillaris</i>	<i>Eucalyptus</i> sp.	<i>Plantago lanceolata</i>
<i>Aira</i> sp.	<i>Fumaria officinalis</i> spp. agg.	<i>Poa annua</i>
<i>Allium triquetrum</i>	<i>Galium aparine</i>	<i>Polygonum aviculare</i> s.l.
<i>Anagallis arvensis</i>	<i>Gladiolus undulatus</i>	<i>Prunella vulgaris</i>
<i>Anthoxanthum odoratum</i>	<i>Hakea salicifolia</i>	<i>Prunus cerasifera</i>
<i>Arctotheca calendula</i>	<i>Hedera helix</i>	<i>Romulea rosea</i>
<i>Aster subulatus</i>	<i>Holcus lanatus</i>	<i>Rosa rubiginosa</i>
<i>Briza maxima</i>	<i>Hypochoeris radicata</i>	<i>Rubus anglocandicans</i>
<i>Briza minor</i>	<i>Isolepis levynsiana</i>	<i>Setaria parviflora</i>
<i>Centaurium erythraea</i>	<i>Juncus articulatus</i>	<i>Sisyrinchium iridifolium</i>
<i>Cerastium glomeratum</i> s.l.	<i>Juncus microcephalus</i>	<i>Sonchus oleraceus</i>
<i>Cicendia filiformis</i>	<i>Leontodon taraxacoides</i>	<i>Taraxacum officinale</i> spp. agg.
<i>Cortaderia seloana</i>	<i>Ligustrum lucidum</i>	<i>Trifolium repens</i>
<i>Corymbia maculata</i>	<i>Lolium perenne</i>	<i>Vicia hirsuta</i>
<i>Cotoneaster glaucophyllus</i>	<i>Lonicera japonica</i>	<i>Vulpia bromoides</i>
<i>Cynodon dactylon</i>	<i>Oxalis pes-caprae</i>	<i>Watsonia meriana</i> var. <i>bulbillifera</i>

Notes concerning some of the locally threatened plant species

Goodenia humilis (Swamp Goodenia). Many large colonies, perhaps totalling >100 individuals.

Lepidosperma filiforme (Common Rapier-sedge). Small numbers were seen by the author in 1997 but they have not been found again.

Microtis parviflora (Slender Onion-orchid). Numbers not recorded.

Orthoceras strictum (Horned Orchid). A single specimen discovered in 2004.

Patersonia occidentalis (Long Purple-flag). Six plants were found.

Sphaerolobium minus (Globe-pea). Seventeen plants were found.

Thelymitra peniculata. Many dozens in some years, fewer in other years.

Thelymitra rubra (Salmon Sun-orchid). Approximately 100 plants were found in 2001; far fewer by 2007.

Fauna of special significance

None detected.

Fauna habitat features

- The high density and diversity of shrubs in the reserve significantly improves the habitat for native insects and birds. The prickliness of many of the shrubs helps protect birds from cats;
- Fragmentation of the site's native vegetation is to some degree offset by the diversity of habitat (dense to open, damp to dry), which is beneficial to some native fauna.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Endangered Vegetation Types

Swampy Woodland is regionally endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that the reserve's native vegetation is necessarily of at least High conservation significance. This, in turn, gives the site **State** significance under criterion 3.2.3 of Amos (2004).

Rare or Threatened Flora

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Scientific and Educational Value

The site is of **Regional** significance under criterion 5.1.1 because of its importance as a site for studying and monitoring the regenerative capacity of a regionally endangered EVC and the ways that this may be encouraged, with application to other sites in the region.

Threats

- Invasion by environmental weeds, of which the greatest threats (when last inspected in 2004) are:
 - Possible reinfestation of Blackberry (*Rubus discolor*), Japanese Honeysuckle (*Lonicera japonica*), Bulbil Watsonia (*Watsonia meriana*) and Spanish Heath (*Erica lusitanica*) if not kept in check;
 - The grass weeds Brown-top Bent (*Agrostis capillaris*), Paspalum (*Paspalum dilatatum*) and Couch (*Cynodon dactylon*), although these appear not to be expanding;
 - Cat's Ear (*Hypochoeris radicata*) and Ribwort (*Plantago lanceolata*) growing in the mown sections; and
 - Annual weeds growing on the elongated, north-south mound toward the site's eastern fence;
- In 1999, the worst weeds included (in addition to the ones above) Blackberry (*Rubus discolor*), Japanese Honeysuckle (*Lonicera japonica*), Bulbil Watsonia (*Watsonia meriana*) and Spanish Heath (*Erica lusitanica*), but Council has since brought these under control.
- Critically small population sizes of several plant species, including the rare Horned Orchid, *Orthoceras strictum*;
- Potential suppression or elimination (perhaps temporary) of some indigenous plant species by out-competition from the dense scrub-forming shrubs. If this becomes a problem by about 2010, regeneration may have to be stimulated by fire or other means;
- Damage to dense scrub vegetation by children and Marijuana growers creating small clearings;
- Garden waste dumping by neighbours (although this problem has abated since 1999, when it was serious);
- The effects of tip leachate percolating through and over the soil (although the effects so far seem minor);
- Fragmentation of habitat caused by the newly constructed EastLink road, leading to reduced visitation by small insect-eating birds and hence a risk of worsening plant pests and diseases.

Management issues

- Guidance for management of the reserve's habitat is discussed in detail in '*A Management Plan for Coppelia Street Bushland, Wantirna South*' by G.S. Lorimer (1999) for Knox City Council;
- Knox City Council's current management regimen is part of a regular monitoring program; see '*Monitoring of Bushland Reserves in Knox*' and '*Monitoring of Bushland Reserves in Knox - 2002 Review*', both by Dr Lorimer for Knox City Council;
- As noted under 'Threats' above, if too many plant species become threatened by out-competition from dense shrubs by about 2010, regeneration may have to be stimulated by fire or other means;

- The plight of some scarce plant species should be improved by planting more individuals after propagating them from seeds collected on-site and/or nearby. This applies to *Lepidosperma filiforme*, *Patersonia occidentalis* and *Veronica gracilis*;
- All propagations and plantings should be precisely documented in Council's files about the reserve. This is particularly important because of the site's role in long-term ecological monitoring and the study of how to help Swampy Woodland recover from its endangered condition in the bioregion.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the matters considered under the heading, 'Significance ratings';
- The site is not included under the existing Vegetation Protection Overlay of the Knox Planning Scheme and was not recognised in the report by Water Ecoscience (1998);
- The Planning Scheme zoning is Public Park and Recreation Zone (PPRZ).

Information sources used in this assessment

- The 1997 report, '*Vegetation Survey of Linear Reserves – A Management Strategy for Riparian and Flood Plain Vegetation*', by Reid, Moss and Lorimer for Knox City Council, along with the supporting field data. This included descriptions of vegetation composition, compilation of a list of indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats and management issues. The fieldwork was conducted by Dr Lorimer in March and April 1997 and data from the Coppelia Street Bushland were partly aggregated with data from Llewellyn Reserve;
- Site surveys by Dr Lorimer on 17/10/98, 24/10/98 and 25/6/99 for '*A Management Plan for Coppelia Street Bushland, Wantirna South*' and '*Monitoring of Bushland Reserves in Knox*', both for Knox City Council in 1999. This included:
 - Compilation of lists of indigenous and introduced plants within each of five parts of the reserve;
 - Detailed mapping and documentation of rare species populations and the ecological condition of the vegetation;
 - A description of the vegetation's structural and floristic composition;
 - Compilation of detailed data from a quadrat;
 - Incidental fauna observations;
 - Checks for fauna habitat, ecological threats and management issues;
 - Recommendations for the care and maintenance of the vegetation, including weed control; and
 - Taking six photographs of scenes that capture the main ecological features of the reserve and that will be useful for long-term monitoring of the reserve;
- Surveys of the site by Dr Lorimer in 2002 and 2007 for '*Monitoring of Bushland Reserves in Knox – 2002 Review*' (Lorimer 2002) and '*Monitoring of Bushland Reserves in Knox – 2007 Review*' (Lorimer 2007a) for Knox City Council;
- A brief visit to the reserve to inspect the newly-discovered *Orthoceras strictum* on 14/1/04;
- Brief visits by Dr Lorimer in November of several other years since 1998 to examine the sun-orchids;
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 62. Cathies Lane Reservation, Scoresby

A linear reserve that was once occupied by an extension of Cathies Lane. Centred on Melway ref. 72 E6.

Site Significance Level: *State*

- Contains some of the endangered Valley Heathy Forest and Swampy Woodland, in fair to poor ecological condition.



Aerial photograph taken February 2007

Boundaries

This site has been reduced in area from 9.18 ha to 1.9 ha due to construction of the EastLink road. The new boundary is shown in red on the aerial photograph above.

Land use & tenure: Linear Council park (formerly a road, since dug up) and tree reservation beside Ferntree Gully Rd.

Site description

Cathies Lane once ran along this reserve but has been closed and revegetated to provide a linear park along the interface between an industrial estate and a residential neighbourhood.

The site lies on the lower slopes of the valley of Blind Ck and Dandenong Ck. Elevations range between 53 m near Ferntree Gully Rd to approximately 70m at the northwest end. The slope of the terrain is mostly 5%.

The topsoil is nearly all shallow, poorly draining, light grey loam over clay subsoil, derived from decomposition of the underlying Lower Devonian sedimentary rocks of the Humevale formation. The exception is that there is a narrow band of alluvium along a drainage line that crosses the site close to Ferntree Gully Rd, at the southern end.

The endangered Ecological Vegetation Class, Valley Heathy Forest, occurs along most of the corridor. Swampy Woodland (a regionally endangered Ecological Vegetation Class) occurs on the alluvium as well as other locations where drainage is poor. In both cases, there is a fairly good cover of remnant trees and a fair cover of naturally occurring shrubs, with moderately large specimens of Yellow Box (*Eucalyptus melliodora*) and Sweet Bursaria (*Bursaria spinosa*). This explains why a good density and diversity of native birds was observed during the site surveys for this study. However, the native ground flora has been reduced to only a few scattered patches, in fair condition at best.

The remnant vegetation has been supplemented by revegetation, particularly towards Ferntree Gully Rd. This includes extensive planting of Golden Wattle (*Acacia pycnantha*) and Black Sheoak (*Allocasuarina littoralis*) approximately 15 years ago. The 'foot' of the site next to Ferntree Gully Rd contains a mature plantation of Australian native trees, providing greater security of food for native birds and insects at times when the remnant vegetation is least productive.

A highlight of the site prior to the construction of EastLink was the occurrence of the nationally rare Yarra Gum, *Eucalyptus yarraensis*. Supplement Volume H of the Environment Effects Statement for the Scoresby Transport Corridor (1998) concluded that there were seven clustered around the northwestern end of this site, but they have all been cleared during EastLink construction. The westernmost eucalypt in the site may be a hybrid containing Yarra Gum genes but appears to be predominantly Mealy Stringybark.

It is very unusual to find Yarra Gums extending so far from a floodplain or on a 5% slope, suggesting that the soil drains very poorly despite the slope.

Relationship to other land

Birds and insects are believed to fly between this site, Redcourt Reserve (Site 63) and Dandenong Valley Parklands (Site 58). It is not clear whether the recent construction of EastLink will disrupt such movements.

Bioregion: Gippsland Plain

Habitat types

Valley Heathy Forest (EVC 127, regionally **Endangered**): Estimated to cover 1.1 ha, comprising 0.3 ha in fair ecological condition (rating C) and 0.8 ha in poor ecological condition (rating D).

Canopy trees: Dominated by *Eucalyptus cephalocarpa*, *E. radiata* and *E. melliodora*, with some *E. goniocalyx* and *E. macrorhyncha*.

Lower trees: *Exocarpos cupressiformis*, *Acacia mearnsii*, *A. melanoxylon* and few *Allocasuarina littoralis*.

Shrubs: Dominated by *Bursaria spinosa* and *Cassinia arcuata*.

Vines: None remain.

Ground flora: Mostly dominated by pasture species and grass weeds. The remaining indigenous ground flora includes *Rytidosperma racemosum*, *Austrostipa rudis*, *Dianella admixta*, *Lomandra filiformis* and *Microlaena stipoides*.

Swampy Woodland (EVC 937, regionally **Endangered**): Estimated to cover 0.15 ha (but uncertain due to intergradation with Valley Heathy Forest), all in poor ecological condition (rating D). 8 indigenous plant species found in 2008.

Dominant canopy trees: Dominated by *Eucalyptus ovata*. *E. cephalocarpa* is also present.

Dominant lower trees: *Acacia melanoxylon* and *Exocarpos cupressiformis*.

Shrubs: Only scattered indigenous shrubs remain, mainly *Bursaria spinosa*. *Melaleuca ericifolia* and *Solanum laciniatum* are also present.

Vines: None remain.

Ground flora: Mostly dominated by pasture species and grass weeds, but the indigenous species, *Microlaena stipoides* and *Phragmites australis* persist.

Plant species

In the following plant list, the column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia mearnsii</i>	E	<i>Eucalyptus radiata</i>
V	<i>Acacia melanoxylon</i>	E	<i>Eucalyptus viminalis</i> (planted?)
E	<i>Acacia pycnantha</i>	C	<i>Eucalyptus yarraensis</i> (felled 2005)
V	<i>Allocasuarina littoralis</i>	V	<i>Exocarpos cupressiformis</i>
C	<i>Amyema pendula</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Austrostipa rudis</i>		<i>Lomandra longifolia</i>
	<i>Bursaria spinosa</i>	E	<i>Melaleuca ericifolia</i>
	<i>Cassinia arcuata</i>		<i>Microlaena stipoides</i>
	<i>Dianella admixta</i>	E	<i>Phragmites australis</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Poa morrisii</i>
	<i>Eucalyptus goniocalyx</i>		<i>Pteridium esculentum</i>
E	<i>Eucalyptus macrorhyncha</i>		<i>Rytidosperma racemosum</i>
V	<i>Eucalyptus melliodora</i>	V	<i>Solanum ?laciniatum</i>
V	<i>Eucalyptus ovata</i>		

Introduced Species

<i>Acacia elata</i>	<i>Fraxinus angustifolia</i>	<i>Phalaris aquatica</i>
<i>Agapanthus praecox</i>	<i>Fumaria</i> sp.	<i>Plantago lanceolata</i>
<i>Allium triquetrum</i>	<i>Galium aparine</i>	<i>Romulea rosea</i>
<i>Arctotheca calendula</i>	<i>Genista monspessulana</i>	<i>Rubus anglocandicans</i>
<i>Coprosma repens</i>	<i>Hedera helix</i>	<i>Stellaria media</i>
<i>Cotoneaster pannosus</i>	<i>Ligustrum lucidum</i>	<i>Tradescantia fluminensis</i>
<i>Cynodon dactylon</i>	<i>Oxalis articulata</i>	<i>Ulex europaeus</i>
<i>Dactylis glomerata</i>	<i>Oxalis pes-caprae</i>	<i>Watsonia meriana</i> var. <i>bulbillifera</i>
<i>Ehrharta erecta</i>	<i>Pennisetum clandestinum</i>	<i>Zantedeschia aethiopica</i>

Fauna of special significance

None detected.

Fauna habitat features

- The fair to good cover of indigenous trees and shrubs provides habitat for native birds, bats, possums or insects, including small forest birds such as thornbills and White-browed Scrubwrens. The prickliness of many of the shrubs helps protect birds from cats;
- Large Yellow Box trees (*Eucalyptus melliodora*) attract honeyeaters and lorikeets;

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity & Viability

A good diversity and density of native birds were observed during the site surveys, and the site appeared to serve as a habitat corridor for their movements through the local area. This represents **Local** significance under criterion 1.2.6 of the standard criteria, provided that the construction of EastLink has not seriously disrupted fauna movements through the area.

Endangered Vegetation Types

Under the Department of Sustainability & Environment's criteria, this site contains a 'remnant patch' of two endangered EVCs (notwithstanding that some of the Valley Heathy Forest is too fragmented to be deemed a remnant patch). According to 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), remnant patches of native vegetation belonging to an endangered EVC have a conservation significance rating of either High or Very High, depending on their ecological condition. In either case, any site containing a remnant patch of such vegetation is of **State** significance under criterion 3.2.3 of Amos (2004).

The author has misgivings about such a high rating for such a site, but these misgivings are overridden by the importance of consistency with the standard criteria.

Locally Threatened Plant Species

Some of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Fragmentation of habitat caused by the EastLink road, possibly leading to reduced visitation by small insect-eating birds and hence a risk of worsening plant pests and diseases;
- Invasion by environmental weeds, of which the following species are rated 'Serious': Angled Onion (*Allium triquetrum*), Panic Veldt-grass (*Ehrharta erecta*), Montpellier Broom (*Genista monspessulana*), Wood-sorrels (*Oxalis* species), Kikuyu Grass (*Pennisetum clandestinum*) and Blackberry (*Rubus discolor*);
- Loss or decline of plant species whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or misadventure;
- Rubbish dumping.

Management issues

- Revegetation has been successful in improving habitat connectivity and assisting natural regeneration, and this could be extended.

Administration matters

- This site is presently worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the matters considered under the heading, 'Significance ratings';
- Most of the site's native vegetation is included within the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, based on the description of Site 25 of the report by Water Ecoscience (1998).
- The Planning Scheme zoning is Public Park and Recreation Zone (PPRZ), except for the tree reservation on the verge of Ferntree Gully Rd.

Information sources used in this assessment

- Site surveys undertaken during this study by Mr Rik Brown on 20/5/02 (beside the constructed section of Cathies Lane) and 5/9/02 (between the dead end of Cathies Lane and Ferntree Gully Rd), using this study's standard procedures discussed in Section 2.4 of Volume 1. In each case, this included a description of the vegetation composition, compilation of a list of indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats and management issues;
- Re-inspections of the site by Dr Lorimer on 26th June 2003 and 5/6/08, to make sure that the information presented here would be current;
- A report, '*Assessment of Native Vegetation on the Mitcham to Frankston Freeway Alignment in Knox*', by Dr Lorimer in July 2003 for Knox City Council;
- The 1998 '*Scoresby Transport Corridor Environment Effects Statement*', particularly Supplement Volume H: Flora and Fauna by Williams L.M., Yugovic J.V., McGuckin J., Humphrey P. and Larwill S. (1998), in which part of this site is labelled as 'Site 6';
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 63. Redcourt Reserve, Scoresby

Small, Council bushland park. Melway ref. 72 F6.

Site Significance Level: *State*

- The native vegetation is of the endangered type, Valley Heathy Forest, partly in good ecological condition;
- There are five plant species that are locally threatened.



Aerial photograph taken April 2003

Boundaries

This 1.74 ha site is outlined in red above, being all parts of the reserve other than the fenced kindergarten area, the associated car park and the small lot that provides a walkway to Taunton Crescent.

Land use & tenure: Part of a Council reserve, managed for conservation of bushland and for public enjoyment.

Site description

This site lies on a gentle, south-facing slope in lightly undulating terrain, at an elevation of approximately 75 m. The soil is shallow, poorly draining, light grey loam over clay subsoil, derived from decomposition of the underlying Lower Devonian sedimentary rocks of the Humevale formation.

The site once had two intersecting roads through it, as evidenced by the 1969 Geological Survey map and vestiges that remain today. The road routes have been returned to soil, now covered with a mixture of introduced lawn species and hardy indigenous ground flora species.

Apart from the former roads, the quality of the native vegetation generally deteriorates from the centre of the reserve to the perimeter.

Relationship to other land

The Cathies Lane road reservation (Site 62) passes 150m to the southwest of Redcourt Reserve, and may serve to some small degree as a corridor for movement of birds and insects in the neighbourhood. Planted eucalypts in neighbourhood gardens are probably also part of the habitat for native fauna found in the reserve.

The nearest substantial area of bushland is one kilometre away at Jells Park, far enough away that most native birds and insects would not find it worthwhile to fly from there to the small patch of habitat at Redcourt Reserve.

This makes Redcourt Reserve quite ecologically isolated. In particular, there would be very little infusion of pollen or seeds of indigenous understorey plants, leaving the less abundant species vulnerable to inbreeding or misadventure.

Another consequence is that birds in the area are over-dominated by the aggressive species, Red Wattlebird and Noisy Miner. This situation often leads to eucalypt dieback due to suppression of small birds that would otherwise eat insect pests.

Bioregion: Gippsland Plain

Habitat types

Valley Heathy Forest (EVC 127, **Endangered):** Estimated to cover 1.3 ha, comprising 0.30 ha in good ecological condition (rating B), 0.32 ha in fair ecological condition (rating C) and 0.68 ha in poor ecological condition (rating D).

Canopy trees: Dominated by *Eucalyptus radiata* and *E. melliodora*, mixed with *E. goniocalyx* toward the north and *E. cephalocarpa* toward the south.

Lower trees: Dominated by *Exocarpos cupressiformis*; also with *Acacia mearnsii*, *A. melanoxylon* and *Allocasuarina littoralis*.

Shrubs: The shrub layer is prickly and is dense in patches, with thirteen species of widely varying stature and density. The most abundant species by far is *Bursaria spinosa*. *Leptospermum continentale* and *Leptospermum scoparium* are also present and may have been more abundant once.

Vines: The light twiner, *Billardiera mutabilis*, is abundant, but there are no other climbers.

Ferns: Only represented by *Lindsaea linearis*. *Pteridium esculentum* is unexpectedly absent.

Ground flora: Densely grassy and dominated by *Poa morrisii*. Lilies and geophytes (i.e. plants that die back to underground storage organs during the unfavourable season of the year) are particularly well represented.

Plant species

The following plant species were observed by the author on 10th September 2001. Additional species would no doubt be detectable in summer. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Allittia cardiocarpa* is rare throughout the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Acacia ?leprosa</i> × <i>paradoxa</i>	V	<i>Dianella longifolia</i> s.l.
V	<i>Acacia mearnsii</i>		<i>Dichondra repens</i>
V	<i>Acacia melanoxylon</i>	V	<i>Dillwynia cinerascens</i>
	<i>Acacia paradoxa</i>	V	<i>Drosera peltata</i> subsp. <i>auriculata</i>
V	<i>Acacia verticillata</i>	E	<i>Drosera peltata</i> subsp. <i>peltata</i>
	<i>Acrotriche serrulata</i>	V	<i>Drosera whittakeri</i>
C	<i>Allittia cardiocarpa</i>	V	<i>Epacris impressa</i>
V	<i>Allocasuarina littoralis</i>		<i>Eragrostis brownii</i>
C	<i>Amyema pendula</i>	V	<i>Eucalyptus cephalocarpa</i>
	<i>Arthropodium strictum</i>		<i>Eucalyptus goniocalyx</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	V	<i>Eucalyptus melliodora</i>
	<i>Billardiera mutabilis</i>	E	<i>Eucalyptus radiata</i>
	<i>Bossiaea prostrata</i>	V	<i>Exocarpos cupressiformis</i>
	<i>Burchardia umbellata</i>	C	<i>Gastrodia sesamoides</i>
	<i>Bursaria spinosa</i>		<i>Gonocarpus tetragynus</i>
	<i>Carex breviculmis</i>	E	<i>Hydrocotyle foveolata</i>
	<i>Cassinia aculeata</i>	E	<i>Hypericum gramineum</i>
	<i>Cassinia arcuata</i>	E	<i>Hypoxis vaginata</i>
V	<i>Coprosma quadrifida</i>		<i>Juncus gregiflorus</i>
E	<i>Daviesia latifolia</i>	E	<i>Juncus subsecundus</i>
	<i>Deyeuxia quadriseta</i>	V	<i>Lagenophora gracilis</i>
	<i>Dianella admixta</i>		<i>Lepidosperma gunnii</i>

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Leptorhynchos tenuifolius</i>		<i>Poranthera microphylla</i>
	<i>Leptospermum continentale</i>		<i>Rytidosperma laeve</i>
E	<i>Leptospermum scoparium</i>		<i>Rytidosperma pallidum</i>
V	<i>Lindsaea linearis</i>		<i>Rytidosperma penicillatum</i>
	<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	V	<i>Solanum ?laciniatum</i>
	<i>Lomandra filiformis</i> subsp. <i>filiformis</i>	V	<i>Solenogyne dominii</i>
	<i>Lomandra longifolia</i>	E	<i>Stackhousia monogyna</i>
V	<i>Luzula meridionalis</i>	V	<i>Thelymitra</i> sp.
	<i>Microlaena stipoides</i>		<i>Themeda triandra</i>
	<i>Microtis ?parviflora</i>		<i>Tricoryne elatior</i>
V	<i>Opercularia ovata</i>	V	<i>Veronica gracilis</i>
V	<i>Opercularia varia</i>	E	<i>Viola hederacea</i>
	<i>Oxalis exilis/perennans</i>	E	<i>Wahlenbergia gracilis</i>
C	<i>Patersonia occidentalis</i> (planted)	E	<i>Wurmbea dioica</i>
V	<i>Platylobium obtusangulum</i>	E	<i>Xanthosia dissecta</i>
	<i>Poa morrisii</i>		
Introduced Species			
	<i>Acacia floribunda</i>	<i>Centaurium erythraea</i>	<i>Oxalis incarnata</i>
	<i>Acacia longifolia</i> subsp. <i>longifolia</i>	<i>Cynodon dactylon</i>	<i>Plantago lanceolata</i>
	<i>Agrostis capillaris</i>	<i>Dactylis glomerata</i>	<i>Romulea rosea</i>
	<i>Allium triquetrum</i>	<i>Ehrharta erecta</i>	<i>Sonchus oleraceus</i>
	<i>Anthoxanthum odoratum</i>	<i>Ehrharta longiflora</i>	<i>Ulex europaeus</i>
	<i>Briza maxima</i>	<i>Galium aparine</i>	<i>Viola odorata</i>
	<i>Briza minor</i>	<i>Hypochoeris radicata</i>	<i>Vulpia bromoides</i>

Notes concerning some of the locally threatened plant species

Allittia cardiocarpa (Swamp Daisy). Two individuals were found.

Drosera peltata subsp. *peltata* (Pale Sundew). Approximately 100 were found.

Gastrodia sesamoides (Cinnamon Bells). Several stems were reported by Mr John Erwin of Knox City Council.

Hydrocotyle foveolata (Yellow Pennywort). Four were found, and numbers would vary greatly from year to year.

Hypoxis vaginata (Sheath Star). Six individuals were flowering among the *Drosera peltata* subsp. *peltata*.

Luzula meridionalis (Common Woodrush). Numbers not recorded.

Microtis ?parviflora (Slender Onion-orchid). Numbers not recorded.

Wurmbea dioica subsp. *dioica* (Common Early Nancy). 16 were seen flowering, and others are probably present.

Fauna of special significance

None detected.

Fauna habitat features

- A substantial number of logs and branches on the ground which, combined with dense shrubs and ground flora, provides good habitat for reptiles and invertebrates;
- The high density and diversity of shrubs significantly improves the habitat for native insects and birds. The prickliness of many of the shrubs helps protect birds from cats;
- Some of the larger eucalypts have hollows that may be usable for habitation by birds, bats, possums or insects;
- The dense ground flora may provide fodder for butterflies and their relatives;
- Fragmentation of the site's native vegetation is to some degree offset by the diversity of habitat (dense to open, damp to dry), which is beneficial to some native fauna.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Endangered Vegetation Types

Valley Heathy Forest is endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that Redcourt Reserve's native vegetation is necessarily of at least High conservation significance. This, in turn, gives the site **State** significance under criterion 3.2.3 of Amos (2004).

Rare or Threatened Flora

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Invasion by environmental weeds, particularly Veldt-grasses (*Ehrharta erecta* and *E. longiflora*) beneath Cherry Ballarts and Common Onion-grass (*Romulea rosea*) – medium-level threat;
- Critically small population sizes of several plant species, including the rare *Allittia cardiocarpa*;
- Possible future progression of moderately severe dieback disease that affects eucalypts and sheoaks. However, the symptoms appeared to be improving when the site was last inspected by the author in October 2001;
- Fragmentation of habitat, leading to reduced visitation by small insect-eating birds and hence a risk of worsening plant pests and diseases.

Management issues

- A strategy for burning parts of the reserve, initially as a trial, was developed by Dr Lorimer in consultation with Council and the Scoresby Fire Brigade, as described in the report, '*Fire in Knox Bushland Reserves 2001*';
- Grass weeds beneath Cherry Ballarts (*Exocarpos cupressiformis*) should be controlled using grass-specific herbicide;
- The plight of the locally Vulnerable species, *Allittia cardiocarpa*, should be improved by planting more individuals after propagating them from seeds collected elsewhere (e.g. Egan-Lee Reserve). Conversely, seed from Redcourt Reserve could be used to build up numbers of this species in the other reserves in Knox where it occurs;
- All propagations and plantings should be documented in Council's files about the reserve.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its State significance, the locally rare and threatened plants and the endangered EVC;
- The site and the adjoining kindergarten and car park are included under the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, based on the description of Site 16 of the report by Water Ecoscience (1998). The site described here differs in its exclusion of the kindergarten and car park so as not to needlessly encumber possible future developments at the kindergarten;
- The Planning Scheme zoning is mostly Public Park and Recreation Zone (PPRZ), but the car park and the area to its west are zoned Public Use Zone - Local Government (PUZ6).

Information sources used in this assessment

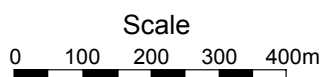
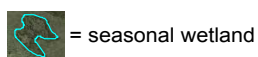
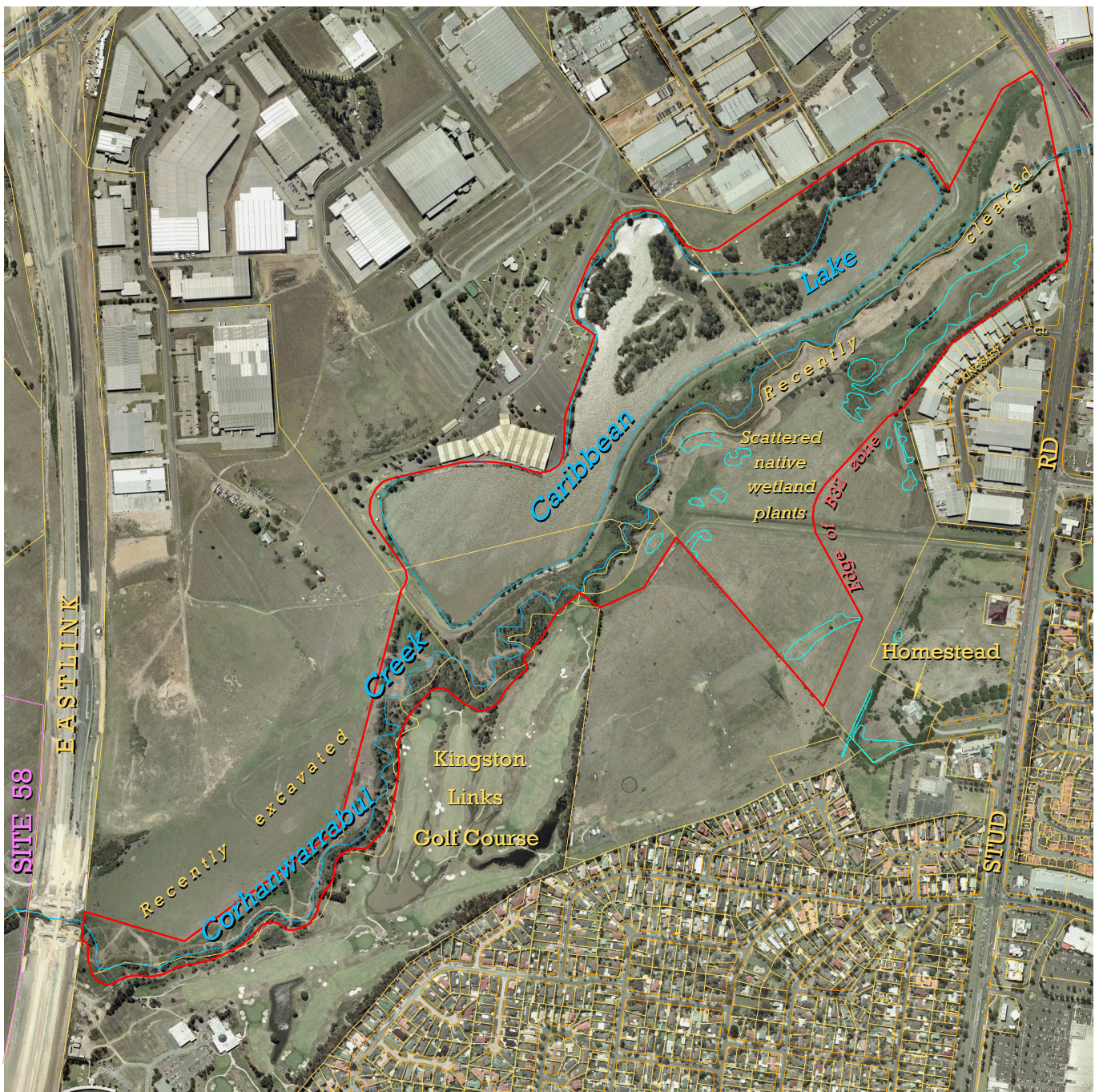
- Site surveys by Dr Lorimer on 10/9/01 and 3/10/01 for the report, '*Fire in Knox Bushland Reserves 2001*' by Lorimer (2001). This included:
 - Compilation of a list of indigenous and introduced plants;
 - Detailed mapping of rare species populations and the ecological condition of the vegetation;
 - A description of the vegetation's structural and floristic composition;
 - Incidental fauna observations;
 - Checks for fauna habitat, ecological threats and management issues; and
 - Development of a strategy for ecological burning of the reserve, in consultation with Council and the Scoresby Fire Brigade;
- A list of grasses seen incidentally by Dr Lorimer during a brief visit to the reserve on 2/3/00;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 65. Stamford Park, Rowville and Caribbean Lake

A section of Corhanwarrabul Creek and its floodplain immediately downstream of Stud Rd. Melway ref. 72 G10.

Site Significance Level: *State*

- Being on Corhanwarrabul Creek, the site is on a corridor for nomadic and migratory movements of birds, insects and fish;
- There are substantial areas of wetland and small areas of Floodplain Riparian Woodland, and both of these vegetation types are regionally endangered;
- Six species of plants are rare or threatened locally or throughout the Melbourne area;
- Seven species of wetland fauna recorded from the site are threatened throughout Victoria (and the whole nation, in the case of the fish, Dwarf Galaxias).



Aerial photograph taken
February 2007

Boundaries

The site is outlined in red above. None of the playable area of Kingston Links Golf Course is included within the site. Compared with the first edition of this report, the site has been reduced in area from 90.1 ha to 71.1 ha due to EastLink construction, the recent excavation of an adjoining section of floodplain (marked on the aerial photograph) and the initiation of industrial development in the new B3Z zone north of the Stamford Park homestead.

Note

Permission was not obtained to enter the Caribbean Gardens property to conduct a survey, so some features of this site may have escaped detection.

At the time this report is being prepared (late 2008), parts of the site generally in the vicinity to the Stamford Park homestead have been recently bulldozed. It is not clear how well the site's conservation values will recover.

Land use & tenure: Mixed public and private land. Parts of the site close to the Stamford Park homestead are the subject of a concept plan involving residential, industrial and recreational development and some artificial wetlands.

Site description

This 71.1 ha site is on the floodplain of Corhanwarrabul Ck at elevations of 45-57 m. The slope is very slight throughout, except for the bank of Corhanwarrabul Ck.

The creek retains its natural channel. It supports native fish and (until at least 1997) Platypus. The presence of these species means that their food sources (other aquatic fauna) must also be present.

The banks of Corhanwarrabul Ck retain vestiges of the original native vegetation. One feature that is rare in Knox is that Tree Violets (*Melicytus dentatus*) make up a substantial part of the shrub layer (or at least, they did until extensive clearing of riparian vegetation occurred recently, which may have removed a substantial number of Tree Violets). This clearing has exposed the channel and banks of the creek to sunlight, upsetting the stream ecology by increasing the fluctuations in water temperature, changing the nutrient input and removing cover for aquatic fauna.

The floodplain has natural depressions that form seasonal wetlands. Wetlands that the author has identified and surveyed are marked on the aerial photograph, and the most ecologically intact one is the largest. There are additional wetlands in the southwest that were investigated for the Environment Effects Statement for the Scoresby Transport Corridor (that has since become the EastLink road).

Wetlands are probably the most biologically important feature of the site and they are the only parts of the site with predominantly native vegetation. Wetlands are regarded as regionally endangered and they are critical for most of the fauna, including fish, frogs, snakes, yabbies and waterbirds in the site.

Among the fauna recorded in the wetlands of the site is the Dwarf Galaxias, a small native fish listed as vulnerable in Victoria. The record is from 1986, before this species suffered a drastic population crash in the catchment in the last decade, according to fish expert, Mr John McGuckin of Streamline Research Pty Ltd. It is quite possible that Dwarf Galaxias are no longer present in the Corhanwarrabul Ck catchment, but even if this is so, they may one day return, and this site could be important to their re-establishment because of the seasonal wetlands that are critical habitat.

As well as the natural wetlands, Caribbean Lake has been constructed on the north side of the creek. It is included within this site because it is frequented by a wealth of waterbirds, some of the more frequent ones being rare or threatened. Treed areas around the lake are also included in the site for the value that they may provide to birds, but this could not be checked because permission was not obtained to do so.

A large part of the site is pasture with a mixture of exotic pasture species and indigenous wetland species, plus thinly scattered remnant trees. A total of twenty indigenous plants species was found in the pasture. Areas near the creek that are no longer grazed and not periodically slashed tend to be densely covered with a deep, nearly impenetrable layer of very tall grass. The indigenous Common Reed (*Phragmites australis*) is the main grass in these areas, sometimes accompanied by the introduced Toowoomba Canary-grass (*Phalaris aquatica*) where grazing and slashing have ceased only recently.

More details about the part of the site upstream from the golf course can be obtained from '*Flora and Fauna Study of Stamford Park, Corhanwarrabul Creek, Rowville*' by G.S. Lorimer, M. Belvedere, D. Lockwood and M. Serena for Knox City Council (1998). Since 1998, some of the wetlands have been very dry due to severe, prolonged drought and they may have temporarily ceased to function as wetlands, but the 1998 report is still relevant to these areas because they are expected to return to their previous ecology when the drought eases.

Relationship to other land

This site is separated from the Dandenong Valley Parklands (Site 58) only by the EastLink corridor, and from the upstream parts of the Corhanwarrabul Creek catchment's habitat corridor (Site 66) only by Stud Rd. Aquatic fauna such as fish,

Platypus and invertebrates can move freely between these sites. The same is true of birds such as waterbirds and birds of prey that move seasonally or nomadically along the corridor. The movements of some birds may be disrupted by the presence of the EastLink road.

The industrial and residential estates that flank the corridor are not conducive to fauna movements laterally from the site. The Kingston Links Golf Course may provide some effective lateral expansion of habitat for waterbirds, but this was not investigated.

Bioregion: Gippsland Plain

Habitat types

Perennial Stream (No EVC number available).

Floodplain Wetland Complex (EVC 172, **regionally Endangered**) in thirteen patches: Estimated as 2.5 ha in total area, comprising 2.0 ha in fair ecological condition (rating C) and 0.5 ha in poor ecological condition (rating D). 16 indigenous plant species were recorded.

Trees, shrubs, vines and ferns: Absent.

Aquatic and semi-aquatic flora: Different wetlands are dominated by *Carex gaudichaudiana*, *Phragmites australis* or a mixture of *Juncus sarophorus* and *Carex appressa*.

Floodplain Riparian Woodland (EVC 56, **regionally Endangered**): Estimated as 0.5 ha in total area, comprising 0.4 ha in fair ecological condition (rating C) and 0.1 ha in poor ecological condition (rating D). 13 indigenous plant species have been recorded. Note that other reports often incorporate wetlands within this EVC because it is easier to do, but the extra effort has been put in here to separately identify and map the wetlands as Floodplain Wetland Complex.

Dominant canopy trees: *Eucalyptus ovata*.

Dominant lower trees: *Acacia melanoxylon*, *A. mearnsii* and *Melaleuca ericifolia*.

Shrubs: Mostly dense. *Meliccytus dentatus* is abundant (suggesting Floodplain Riparian Woodland rather than Swampy Riparian Woodland). *Gynatrix pulchella*, *Prostanthera lasianthos* and *Ozothamnus ferrugineus* are the other shrub species present.

Vines and ferns: None.

Ground flora: Heavily invaded by weeds. The dominant indigenous species is *Phragmites australis*. Other species are *Glyceria australis*, *Juncus gregiflorus*, *Juncus sarophorus* and *Persicaria decipiens*.

Plant species

The following plant species were observed in the years indicated. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, the species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species	Risk	Risk	Indigenous Species	Risk
V	<i>Acacia mearnsii</i>	1997		<i>Juncus sarophorus</i>	2007
V	<i>Acacia melanoxylon</i>	1997		<i>Kunzea ericoides</i> spp. agg.	2007
	<i>Acacia paradoxa</i>	1997		<i>Lachnagrostis filiformis</i>	2007
	<i>Alisma plantago-aquatica</i>	2005	V	<i>Lythrum hyssopifolia</i>	2005
V	<i>Alternanthera denticulata</i>	2007	E	<i>Melaleuca ericifolia</i>	1997
C	<i>Amphibromus nervosus</i>	1997	E	<i>Meliccytus dentatus</i>	1997
	<i>Carex appressa</i>	2007	E	<i>Ozothamnus ferrugineus</i>	1997
E	<i>Carex gaudichaudiana</i>	1997		<i>Persicaria decipiens</i>	2007
	<i>Carex inversa</i>	1997	C	<i>Persicaria subsessilis</i>	1997
	<i>Cassinia arcuata</i>	1997	E	<i>Phragmites australis</i>	1997
V	<i>Eleocharis acuta</i>	2005		<i>Portulaca oleracea</i>	2007
	<i>Eleocharis sphacelata</i>	2007	E	<i>Prostanthera lasianthos</i>	1997
	<i>Epilobium hirtigerum</i>	1997		<i>Rytidosperma setaceum</i>	1997
V	<i>Eucalyptus ovata</i>	1997		<i>Schoenus apogon</i>	1997
E	<i>Euchiton involucratus</i>	1997		<i>Senecio glomeratus</i>	2007
V	<i>Glyceria australis</i>	1997	E	<i>Senecio minimus</i>	2007
E	<i>Gynatrix pulchella</i>	1997		<i>Senecio quadridentatus</i>	1997
	<i>Juncus amabilis</i>	1997		<i>Senecio</i> sp.	2007
	<i>Juncus bufonius</i>	2005	C	<i>Solanum aviculare</i>	2007
	<i>Juncus gregiflorus</i>	1997	E	<i>Typha</i> sp.	1997
	<i>Juncus pallidus</i>	1997			

Introduced Species

<i>Acer negundo</i>	<i>Echium plantagineum</i>	<i>Phalaris aquatica</i>
<i>Agrostis capillaris</i>	<i>Galium aparine</i>	<i>Plantago coronopus</i>
<i>Allium triquetrum</i>	<i>Geranium dissectum</i>	<i>Plantago lanceolata</i>
<i>Alopecurus pratensis</i>	<i>Glyceria declinata</i>	<i>Polygonum aviculare</i> s.l.
<i>Anagallis arvensis</i>	<i>Helminthotheca echioides</i>	<i>Prunus</i> sp.
<i>Anthoxanthum odoratum</i>	<i>Holcus lanatus</i>	<i>Ranunculus repens</i>
<i>Arctotheca calendula</i>	<i>Hordeum hystrix</i>	<i>Raphanus raphanistrum</i>
<i>Aster subulatus</i>	<i>Hypericum tetrapterum</i>	<i>Rubus anglocandicans</i>
<i>Brassica fruticulosa</i>	<i>Hypochoeris radicata</i>	<i>Rumex conglomeratus</i>
<i>Bromus catharticus</i>	<i>Juncus articulatus</i>	<i>Rumex pulcher</i>
<i>Callitriche stagnalis</i>	<i>Leontodon taraxacoides</i>	<i>Salix</i> × <i>rubens</i>
<i>Chenopodium album</i>	<i>Lolium perenne</i>	<i>Solanum nigrum</i>
<i>Chenopodium murale</i>	<i>Lolium rigidum</i>	<i>Solanum pseudocapsicum</i>
<i>Cirsium vulgare</i>	<i>Lotus subbiflorus</i>	<i>Sonchus asper</i> s.l.
<i>Conyza sumatrensis</i>	<i>Lotus uliginosus</i>	<i>Stellaria media</i>
<i>Cotula coronopifolia</i>	<i>Malus pumila</i>	<i>Tradescantia fluminensis</i>
<i>Crataegus monogyna</i>	<i>Malva sylvestris</i>	<i>Trifolium repens</i>
<i>Cynodon dactylon</i>	<i>Paspalum dilatatum</i>	<i>Ulex europaeus</i>
<i>Cyperus eragrostis</i>	<i>Paspalum distichum</i>	<i>Verbena bonariensis</i> s.l.
<i>Dactylis glomerata</i>	<i>Pennisetum clandestinum</i>	<i>Vulpia bromoides</i>

Notes concerning some of the locally threatened plant species

Amphibromus nervosus (Veined Swamp Wallaby-grass). There are many individuals in the largest wetland.

Carex gaudichaudiana (Fen Sedge). Abundant.

Gynatrix pulchella (Hemp Bush). Two plants were found.

Melicytus dentatus (Tree Violet). Abundant along the northern creek bank in the vicinity of the northern tip of the golf course.

Pericaria subsessilis (Hairy Knotweed). Two plants were found and probably more were hidden in dense vegetation.

Fauna of special significance**Vulnerable Nationally**

Dwarf Galaxias. Found in a pond near the site's southwestern corner in December 1986.

Critically Endangered in Victoria

Intermediate Egret. Recorded by the Knox U3A Birdwatching Group at the Caribbean Lake on 8th March 2002.

Endangered in Victoria

Blue-billed Duck. Recorded repeatedly and recently in the Caribbean Lake.

Vulnerable in Victoria

Hardhead. Recorded by the Knox U3A Birdwatching Group at the Caribbean Lake on 24th November 2002.

Great Egret. Recorded by the Knox U3A Birdwatching Group at the Caribbean Lake on 6th February 1998.

Lower Risk (Near Threatened) in Victoria

Latham's Snipe. Observed in November 1997 for the report by Lorimer *et al.* (1998, see p. 329).

Nankeen Night Heron. Observed in November 1997 for the report by Lorimer *et al.* (1998, see p. 329).

Uncommon in the Melbourne Region

Great Crested Grebe. Observed in November 1997 for the report by Lorimer *et al.* (1998, see p. 329).

Darter. Observed in November 1997 for the report by Lorimer *et al.* (1998, see p. 329).

Little Grassbird. Observed in November 1997 for the report by Lorimer *et al.* (1998, see p. 329).

Australian Reed-Warbler. Observed in November 1997 for the report by Lorimer *et al.* (1998, see p. 329).

Platypus. Last seen in 1997 and not seen in more recent trap-and-release investigations.

Weasel Skink. Seen in c.1998, as reported in the Scoresby Transport Corridor Environment Effects Statement.

Fauna habitat features

- The stream is used by fish, ducks, Platypus, Water Rats and aquatic invertebrates (although Platypus have not been seen since 1997, despite two trapping campaigns since November 1999);
- The wetlands are used extensively by frogs, waterbirds, snakes, and probably by aquatic invertebrates;
- The wetlands were occupied (at least until 1986) by Dwarf Galaxias;
- Pasture areas support a high density of Lowland Copperhead snakes, probably because of all the frogs in the wetlands;
- Scattered trees (alive and dead) are used as hunting lookouts by birds of prey;

- Fragmentation of the native vegetation is to some degree offset by the diversity of habitat (scrubby to open, aquatic to dry), which is beneficial to some native fauna.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment'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 this site.

The site is also a component of the Corhanwarrabul Creek habitat corridor. The corridor is important at a Local scale. Criterion 1.2.6 takes this to confer **Local** significance to the site.

Endangered Vegetation Types

Both of the EVCs present are regionally Endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that the site's native vegetation is of at least High conservation significance because of the Endangered status of the EVCs. Criterion 3.2.3 assigns **State** significance to any site with a 'remnant patch' of such vegetation. Although much of the native vegetation has too little native understorey to qualify as a 'remnant patch', this cannot be said about many of the wetlands (other than perhaps during extreme drought), nor perhaps a substantial fraction of the Floodplain Riparian Woodland (although this may have changed with recent clearing).

Rare or Threatened Flora

Some of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

The nationally vulnerable Dwarf Galaxias was found in a pond in the site's southwest in 1986. More recent surveys suggest that the species has declined drastically in numbers in the catchment. It is not certain whether this species will recover from this decline, but it may conceivably do so after the current period of many years of drought.

Criterion 3.1 regards all known habitat of nationally listed threatened fauna such as Dwarf Galaxias as being of at least State significance. In this case, however, the significance is treated here as **Regional** in view of the population crash of Dwarf Galaxias and the real possibility that the fish will never again use the site for habitat.

The site also appears to be good habitat for at least some of the other species listed as 'Fauna of special significance' above. In particular, the state-endangered Blue-billed Duck is known to be there regularly, representing **State** significance under criterion 3.1.2. Observations of Hardhead and Great Egret (both listed as vulnerable in Victoria) suggest that the habitat which the site provides for these species is of **Regional** significance under criterion 3.1.2.

Threats

- Invasion by environmental weeds, of which the greatest threats are Drain Flat-sedge (*Cyperus eragrostis*), Cleavers (*Galium aparine*), Yorkshire Fog (*Holcus lanatus*), Square-stem St John's Wort (*Hypericum tetrapetrum*), Toowoomba Canary-grass (*Phalaris aquatica*), Creeping Buttercup (*Ranunculus repens*), Blackberry (*Rubus discolor*), White Crack Willow (*Salix × rubens*) and Wandering Jew (*Tradescantia albiflora*). There is also a risk of serious reinfestation of Gorse (*Ulex europaeus*) where it was dense prior to spraying in the last few years;
- Climate change and the effects of drought.
- Slashing of wetlands;
- Dieback disease;
- Rabbits;
- European Carp, which have already caused serious ecological damage in nearby Jells Lake and could do so in Caribbean Lake if they were to arrive there;
- The new EastLink road may create a barrier to faunal movements.

Management issues

- Wetlands should not be slashed except where essential. The slasher operator should be competent to distinguish patches dominated by *Carex* and/or *Juncus* in order to avoid them;
- Other guidance for management is provided in the report, '*Flora and Fauna Study of Stamford Park, Corhanwarrabul Creek, Rowville*' by G.S. Lorimer, M. Belvedere, D. Lockwood and M. Serena for Knox City Council (1998).

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the riparian location and the matters considered under the heading, 'Significance ratings';
- A small part of the site, just south of Caribbean Lake, is presently covered by Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, based on recognition of that area by Water Ecoscience (1998) as part of their Site 282;
- The Planning Scheme zoning is variously Public Park and Recreation Zone (PPRZ), Urban Floodway Zone (UFZ), Business 3 Zone (B3Z) and Special Use Zone 1 (SUZ1, for the golf course), with boundaries that do not always follow property boundaries.

Information sources used in this assessment

- A study of the parts of the site upstream of the golf course for the report, '*Flora and Fauna Study of Stamford Park, Corhanwarrabul Creek, Rowville*' by G.S. Lorimer, M. Belvedere, D. Lockwood and M. Serena for Knox City Council (1998). Several person-days were spent surveying the site, including:
 - Compilation of lists of indigenous and introduced plants within each of five vegetation types within the site;
 - Detailed mapping and documentation of rare species populations and the ecological condition of the vegetation;
 - A description of each vegetation type's structural and floristic composition;
 - Active fauna searches for birds, reptiles and frogs, including (in part) spotlighting and predator scat analysis;
 - Checks for fauna habitat, ecological threats and management issues; and
 - Recommendations for the preservation of the vegetation;
- Written reports of the Australian Platypus Conservancy about Platypus surveys conducted within the site almost annually from 1994 to 2001. Three Platypus and four fish species were found;
- Discussions in 1997 with stream experts, Mr Vin Pettigrove (Melbourne Water) and Mr Tarmo Raadik (Marine and Freshwater Resources Institute), about fish (and particularly Dwarf Galaxias) in Corhanwarrabul Creek;
- Additional discussions about Dwarf Galaxias in the catchment with Mr John McGuckin of Streamline Research Pty Ltd, in 2003;
- The draft Melbourne Water report, '*Waterway Assessment in the Dandenong Valley: The Health of Corhanwarrabul, Monbulk and Ferny Creeks*' by V. Pettigrove and R. Coleman (1997);
- The 1998 '*Scoresby Transport Corridor Environment Effects Statement*', including Supplement Volume H: Flora and Fauna by Williams L.M., Yugovic J.V., McGuckin J., Humphrey P. and Larwill S. (1998), in which the area of the proposed bridge over Corhanwarrabul Ck is labelled as 'Site 7';
- The 1996 report, '*Preliminary Flora and Fauna Assessment of the Proposed Water Ski Park, Stud Rd, Rowville*' by K.P. Lampman and A.R.G. McMahon for Maunsell Pty Ltd;
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 66. Corhanwarrabul Creek and its Tributaries

Floodplain and riparian habitat of the Corhanwarrabul Ck catchment, upstream of Stud Rd. Melway maps 72-74.

Site Significance Level: *State* except the northeasternmost polygon, which is *Local*

- The site is part of a corridor for daily and seasonal movements of fauna, including waterbirds, fish and Platypus;
- Native vegetation is fragmented and in poor ecological condition overall, but there is enough to indicate that it belongs to various regionally endangered Ecological Vegetation Classes;
- A strip of road verge along Karoo Rd has the only known remnant occurrence of River Red Gum within Knox;
- Waterbirds that are listed as threatened in Victoria are easily found at artificial wetlands within the site;
- Even golf courses and open, grassy expanses within the site are providing prey for birds such as Brown Goshawks.

Boundaries

The site comprises the eight polygons outlined in red on the aerial photograph on the next page, totalling 160.9 ha.

Much of the site has been delineated here to exclude shared paths running adjacent to the rear fences of private properties. Most of the remaining boundaries follow cadastral boundaries. However, the cadastre available from the state government at the time of writing (July 2008) does not match the limits of where buildings are being constructed in the Waterford Park retirement village, on the western side of Bunjil Way. The author's intention has been to skirt the fences of the new retirement properties. Some refinement of the boundary drawn here may be desirable when a reliable cadastre becomes available.

The narrow sections of the site along Monbulk Ck east of Blackwood Park Drive, in Ferntree Gully and Lysterfield, are defined by the presence of tree cover, in the absence of any nearby cadastral boundaries.

The site includes strips of road verge beside Stud Rd and Karoo Rd. The latter corresponds to a fenced reserve for Knox's only population of River Red Gum (*Eucalyptus camaldulensis*).

The magenta outlines on the aerial photograph are boundaries of other sites in this report, labelled with their site numbers.

Land use & tenure: Mostly Council land and the private Waterford Valley Golf Course. There are small sections of road verge as described above, and a strip of unused road reservation that intersects Napoleon Rd. The strips along Monbulk Ck upstream of Blackwood Park Drive are on private agricultural land.

Site description

Almost the whole site has alluvial soil. The exception is the short, east-west strip of road reservation intersecting Napoleon Rd, whose clay loam soil has formed from decomposition of the underlying Devonian hornfels.

The polygon on Ferny Ck upstream of Glenfern Rd is on the floodplain of Upper Ferntree Gully, at elevations of 90-95 m. This is the only section of stream within the site that has not been replaced by a straightened drain. It is also the only section with Manna Gum (*Eucalyptus viminalis*) or Yellow Box (*Eucalyptus melliodora*). Although the tree canopy is fragmented and there is little native understorey, this is the only representation of the EVC known as Riparian Forest in the whole site. Some of the Manna Gums are large, old and impressive.

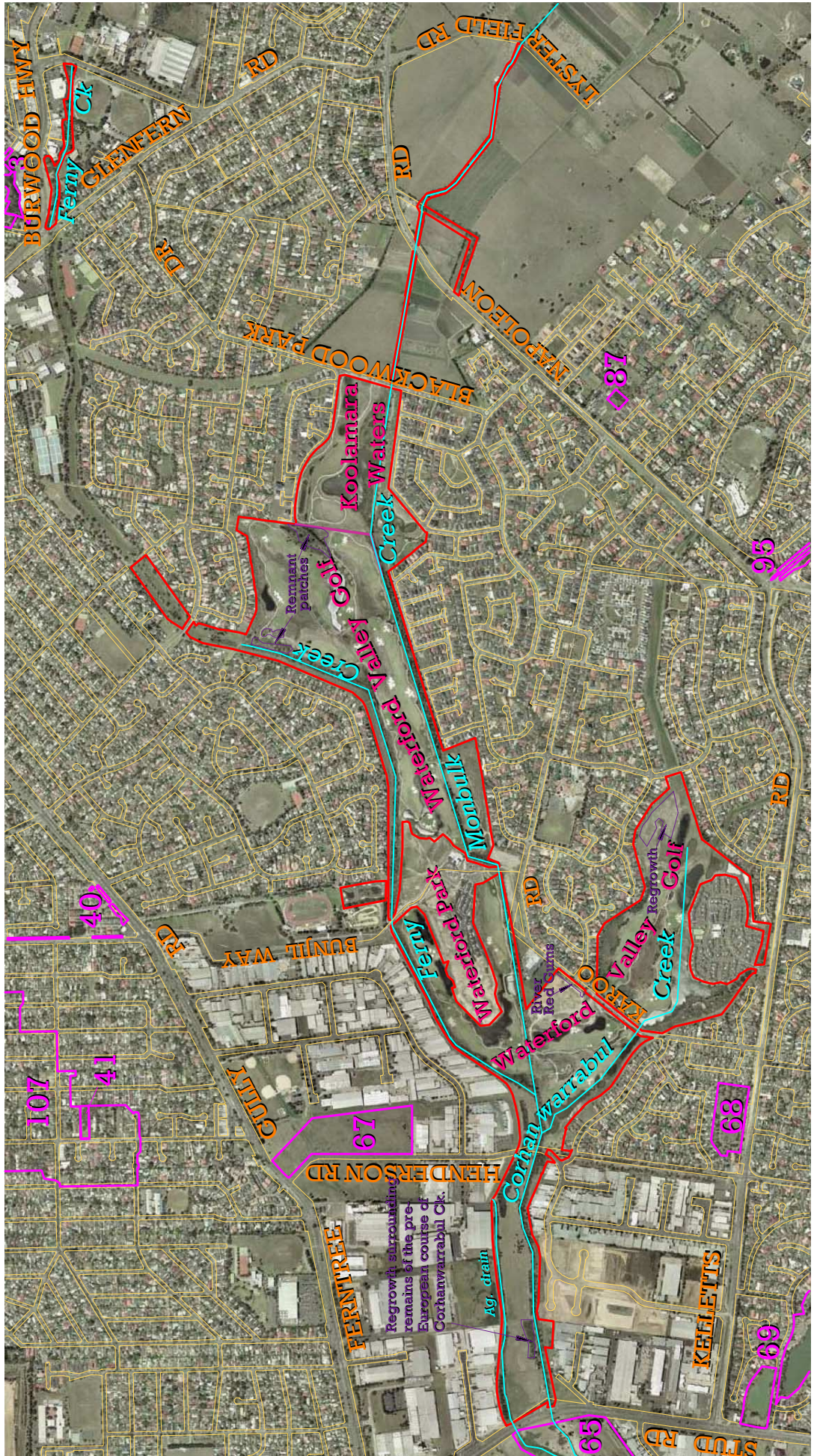
The rest of the site would have been part of a large swamp of more than 400 ha prior to settlement. The elevations vary from 56m to 90m and the average slope is 0.6%. The native vegetation of the swamp or floodplain probably had sparse trees and much of it would have been almost impenetrable due to boggy and dense scrub of paperbark and reeds. Streams would have meandered across the floodplain, leaving wetlands in their old courses. The nature of the topography and the presence of species such as River Red Gum (*Eucalyptus camaldulensis*), Muttonwood (*Rapanea howittiana*), Tree Violet (*Melicactus dentatus*), Hazel Pomaderris (*Pomaderris aspera*) and an abundance of Hemp Bush (*Gynatrix pulchella*) suggest that the pre-European vegetation belonged to the EVCs, Floodplain Riparian Woodland and Floodplain Wetland Complex, rather than the Swampy Woodland mapped by the Department of Sustainability & Environment. All of these EVCs are now regionally endangered, having been cleared for agriculture in most of their original range.

Early settlers converted the floodplain to farmland by decimating the dense vegetation and replacing the creeks with numerous straight drains. Native plants were mostly replaced by pasture, with willows and other woody weeds along the drainage channels. The limited regrowth of native flora was predominantly thickets of Blackwood (*Acacia melanoxylon*) or Swamp Paperbark (*Melaleuca ericifolia*), with scattered eucalypts and patches of Common Reed (*Phragmites australis*). There were also wetlands with predominantly indigenous plants when the site was surveyed in detail in 1997 for the report, 'Vegetation Survey of Linear Reserves – A Management Strategy for Riparian and Flood Plain Vegetation' by Reid, Moss and Lorimer for Knox City Council.

Site 66. Corhanwarrabul Creek and its Tributaries

outlined in red, with other sites marked in pink.

Aerial photograph taken February 2007.



Since late 2000, the Waterford Valley and Koolamara Waters developments have further changed the area's hydrology and habitat availability. Despite some destruction of habitat and rare plants in the process, there has been a net increase in habitat due to the creation of large areas of artificial wetlands and the planting of wetlands and along the waterways.

Wetlands constructed in autumn 2008 on the floodplain west of Henderson Rd do not appear on the aerial photograph above, which is from 2007.

When the site was inspected by the author in June 2008 to update this report, a high diversity of waterbirds was observed in the site's wetlands (even without a formal bird survey), including three listed threatened species. The wetland plantings had reproduced naturally and been augmented by indigenous plants that appeared to have been brought in by waterbirds. The birds of prey that had been noted hunting across the site in 1997 were still represented by Brown Goshawk and Black-shouldered Kite, now hunting in the golf course.

Along the creeks, weed control and planting since 2000 has been very successful despite prolonged drought conditions. There are more indigenous plants (particularly of the locally rare species) and far fewer weeds such as blackberries. The great majority of locally rare plants that were mapped in 1996-7 were found again in 2008 at their original locations, and those which could not be re-found were more than compensated by plantings and new discoveries of the same species. There were also some new discoveries of locally rare plants, including only the second record ever of *Melaleuca parvistaminea* in Knox (previously overlooked for *Melaleuca ericifolia*) beside Corhanwarrabul Ck near the Stud Rd bridge.

There is an interesting patch of regrowth along the remains of the winding, pre-European course of Corhanwarrabul Ck, 200-350 m east of Stud Rd. Although the original creek course is now disconnected from the flow except during floods, its banks are well populated with the locally rare Hemp Bush, *Gynatrix pulchella*, just as would have been the case prior to the arrival of Europeans. There is also a Hazel Pomaderris, *Pomaderris aspera*, which had become scarce along the site's waterways prior to recent plantings. These locally rare plants are embedded in a dense regrowth scrub dominated by the indigenous coloniser, Tree Everlasting (*Ozothamnus ferrugineus*). The weeds, Blackberry, Gorse and Toowoomba Canary-grass are also abundant.

Other notable patches of remnant vegetation within the site are located:

- On the south bank of Corhanwarrabul Ck, extending westward from the Henderson Rd bridge, where there is a mature stand of Swamp Gums and at least 13 of the locally rare *Gynatrix pulchella*;
- Each side of the 16th tee in the northeast of the Waterford Valley golf course, where there is a mature stand of Swamp Gums with sixteen indigenous understorey species, including the locally rare *Poa labillardierei*;
- North of the golf course's 12th green (near the western end of Koolamara Blvd), where there is a rich wetland adjoining a patch containing twelve indigenous plant species, including the regionally rare *Calystegia marginata* and *Carex fascicularis*;
- In a strip beside Karoo Rd containing the only remaining wild River Red Gums (*Eucalyptus camaldulensis*) in Knox, most of which are fenced for their protection;
- In the far southeast of the Waterford Valley golf course (behind houses fronting Kellbourne Drive), where recent scalping of the ground has initiated mass regeneration of indigenous plants. This patch was dominated in June 2008 by *Cassinia arcuata*, *Goodenia ovata* and *Rytidosperma setaceum*.

The ecological condition of the native vegetation in the site ranges between fair and poor (ratings C and D), and there would be very little in the 'fair' category if not for recent revegetation. Nevertheless, the vegetation still contains a high density of locally rare plants and represents extensive habitat for native fauna such as waterbirds, frogs, birds of prey and Platypus.

Relationship to other land

The site is part of a corridor for daily and seasonal movements of fauna, particularly waterbirds, fish and occasionally Platypus. Such movements are corroborated by the regular observations along the corridor of Platypus (in good years), fish (including Shortfin Eels) and nomadic or highly mobile waterbirds (e.g. egrets and ducks). Common forest birds such as Crimson Rosellas and Grey Fantails were observed moving along the corridor each day that the site was surveyed for this study. Many of the site's waterbirds, including vulnerable species such as Great Egret, are expected to move between this site and other habitat areas, both nearby (e.g. Lakewood Nature Reserve and Caribbean Lake) or as far away as Siberia.

There is a substantial gap in Ferny Creek's riparian vegetation between Glenfern Rd and Hancock Dr, Ferntree Gully. Knox City Council proposes to revegetate that gap, which is hoped to bring about a significant increase in the diversity of bird and insect species moving along the corridor.

Fish, and particularly eels, rely on movement between the site and reaches further upstream and downstream. Barrel-drains and retarding basins represent barriers to such movements for most fish species.

The aerial photograph on the previous page has been marked with pink outlines to show neighbouring sites.

Bioregion: Gippsland Plain

Habitat types

Stream (No EVC number or conservation status available). 13 indigenous plant species recorded.

Riparian Forest (EVC 18, **Vulnerable** in the Gippsland Plain bioregion): Approximately 1.0 ha in many fragments upstream of Glenfern Rd, all in poor ecological condition (rating D). 15 indigenous plant species were found, plus a record of the former existence of *Olearia argophylla* from Mr Darren Wallace.

Dominant canopy trees: *Eucalyptus viminalis* and *E. melliodora* with smaller numbers of *E. ovata* and *E. radiata*.

Dominant lower trees: *Acacia melanoxylon* and *A. mearnsii*, with fewer *Exocarpos cupressiformis*, *Melaleuca ericifolia* and three *Rapanea howittiana*.

Shrubs: *Coprosma quadrifida* and *Bursaria spinosa*.

Vines: *Cassytha melantha* is present but very scarce. The weeds *Hedera helix*, *Lonicera japonica* and *Rubus discolor* are also present.

Ferns: None.

Ground flora: The indigenous ground flora has been heavily replaced by weeds, reduced to some *Phragmites australis* and small numbers of *Lomandra longifolia* and *Juncus gregiflorus*.

Floodplain Riparian Woodland (EVC 56, **regionally Endangered**), possibly incorporating some vegetation that might be more associated with Swampy Woodland (which is also regionally Endangered): Estimated as 6.1 ha in fair ecological condition (rating C) and 8.8 ha in poor ecological condition (rating D). 67 indigenous plant species were recorded in 1997, 2002 or 2008.

Canopy trees: In the small remnants where eucalypts remain, they are *E. ovata* or (beside Karoo Rd) *E. camaldulensis*.

Lower trees: *Acacia melanoxylon* and *Melaleuca ericifolia* are abundant. *Pomaderris aspera* and *Acacia mearnsii* are less common. There is a single *Exocarpos cupressiformis* near the 16th tee of the golf course. *Rapanea howittiana* seedlings and saplings are scattered along the creek banks but it is unclear whether they are planted or wild.

Shrubs: Few of the shrubs in 2008 were wild, but among them are *Acacia verticillata*, *Cassinia arcuata*, *Coprosma quadrifida*, *Gynatrix pulchella*, *Goodenia ovata*, *Ozothamnus ferrugineus*, *Solanum ?laciniatum*, *Gynatrix pulchella*, *Goodenia ovata* and a solitary *Melicytus dentatus*.

Vines: Represented only by a single *Calystegia marginata* midway between the 12th and 14th greens of the golf course.

Ferns: There is a single, dense patch of *Pteridium esculentum* beside the drainage channel north of the 12 green.

Ground flora: *Phragmites australis* is common along much of the waterway banks. *Persicaria decipiens* and *Juncus* species are abundant beside the water of the creeks, with *P. subsessilis* and *Rytidosperma racemosum* scattered on the banks.

Floodplain Wetland Complex (EVC 172, **regionally Endangered**): If one includes the artificially created wetlands (which are mostly good replicas of natural wetlands), the total area is approximately 24 ha. The ecological condition of most of the areas of open water is hard to assess without investigating the bed, but it is estimated that 75% is in fair ecological condition (rating C) and 25% in poor ecological condition (rating D). 25 indigenous plant species were found in 2008.

Aquatic and semi-aquatic flora: Dominated variously by *Phragmites australis*, *Typha domingensis* or species of *Persicaria*, *Eleocharis* or *Juncus* (of which eight species are present).

Plant species

The following plant species were observed by the author, mainly in winter 2008. Additional species would no doubt be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, the species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Acacia dealbata</i> (wild & planted)	C	<i>Amyema pendula</i>
V	<i>Acacia mearnsii</i>	V	<i>Amyema quandang</i>
V	<i>Acacia melanoxylon</i> (wild & planted)		<i>Austrostipa rudis</i>
	<i>Acacia paradoxa</i> (wild & planted)	V	<i>Azolla filiculoides</i>
E	<i>Acacia stricta</i> (planted)		<i>Bursaria spinosa</i> (wild & planted)
V	<i>Acacia verticillata</i> (wild & planted)	E	<i>Calystegia marginata</i>
	<i>Acaena novae-zelandiae</i>		<i>Carex appressa</i>
	<i>Alisma plantago-aquatica</i>		<i>Carex breviculmis</i>
V	<i>Allocasuarina littoralis</i> (planted)	E	<i>Carex fascicularis</i>
V	<i>Alternanthera denticulata</i>	E	<i>Carex ?gaudichaudiana</i>

Risk Indigenous Species

	<i>Carex inversa</i>
	<i>Cassinia arcuata</i>
E	<i>Cassytha melanantha</i>
E	<i>Centella cordifolia</i>
V	<i>Coprosma quadrifida</i>
E	<i>Crassula helmsii</i>
V	<i>Eleocharis acuta</i>
	<i>Eleocharis sphacelata</i>
	<i>Epilobium hirtigerum</i>
C	<i>Eucalyptus camaldulensis</i>
V	<i>Eucalyptus cephalocarpa</i>
V	<i>Eucalyptus melliodora</i>
V	<i>Eucalyptus ovata</i> (wild & planted)
E	<i>Eucalyptus radiata</i>
E	<i>Eucalyptus viminalis</i> (wild & planted)
E	<i>Euchiton involucratus</i>
V	<i>Exocarpos cupressiformis</i>
	<i>Gahnia radula</i>
	<i>Geranium</i> sp.
	<i>Gonocarpus tetragynus</i>
	<i>Goodenia ovata</i>
	<i>Goodenia ovata</i> (wild & planted)
E	<i>Gynatrix pulchella</i> (wild & planted)
V	<i>Hemarthria uncinata</i>
E	<i>Indigofera australis</i> (planted)
V	<i>Isolepis inundata</i>
	<i>Juncus amabilis</i>
C	<i>Juncus australis</i>
	<i>Juncus gregiflorus</i>
C	<i>Juncus holoschoenus</i>
	<i>Juncus pallidus</i>
E	<i>Juncus pauciflorus</i>
E	<i>Juncus planifolius</i>
E	<i>Juncus procerus</i>
	<i>Juncus sarophorus</i>
E	<i>Juncus subsecundus</i>
C	<i>Juncus vaginatus</i>
	<i>Lachnagrostis filiformis</i>
E	<i>Lemna disperma</i>
	<i>Lepidosperma elatius</i>

Risk Indigenous Species

	<i>Leptospermum continentale</i>
E	<i>Leptospermum lanigerum</i> (planted)
E	<i>Leptospermum scoparium</i> (planted)
E	<i>Lobelia anceps</i>
	<i>Lomandra longifolia</i>
C	<i>Lycopus australis</i> (perhaps planted)
V	<i>Lythrum hyssopifolia</i>
E	<i>Melaleuca ericifolia</i> (wild & planted)
C	<i>Melaleuca parvistaminea</i>
E	<i>Melicytus dentatus</i> (wild & planted)
	<i>Microlaena stipoides</i>
	<i>Microtis parviflora</i>
C	<i>Myrsine howittiana</i>
V	<i>Olearia lirata</i> (planted)
E	<i>Ozothamnus ferrugineus</i> (wild & planted)
	<i>Persicaria decipiens</i>
E	<i>Persicaria hydropiper</i>
C	<i>Persicaria subsessilis</i>
E	<i>Phragmites australis</i>
E	<i>Poa labillardierei</i> var. <i>labillardierei</i>
E	<i>Pomaderris aspera</i> (wild & planted)
C	<i>Pomaderris racemosa</i> (planted)
V	<i>Potamogeton crispus</i>
V	<i>Potamogeton ochreatus</i>
	<i>Pteridium esculentum</i>
	<i>Rytidosperma racemosum</i>
E	<i>Rytidosperma semiannulare</i>
	<i>Rytidosperma setaceum</i>
	<i>Schoenus apogon</i>
	<i>Senecio glomeratus</i>
E	<i>Senecio minimus</i>
	<i>Senecio quadridentatus</i>
V	<i>Solanum laciniatum</i>
	<i>Themeda triandra</i>
E	<i>Triglochin striata</i> (flat leaf variant)
E	<i>Typha domingensis</i>
E	<i>Typha orientalis</i>
C	<i>Vallisneria americana</i> (planted)
C	<i>Viminaria juncea</i> (planted)

Introduced Species

<i>Acetosa sagittata</i>	<i>Foeniculum vulgare</i>	<i>Nasturtium officinale</i>	<i>Rosa rubiginosa</i>
<i>Agrostis capillaris</i>	<i>Fraxinus angustifolia</i>	<i>Oxalis pes-caprae</i>	<i>Rubus anglocandicans</i>
<i>Allium triquetrum</i>	<i>Fumaria</i> sp.	<i>Paraserianthes lophantha</i>	<i>Rumex conglomeratus</i>
<i>Anthoxanthum odoratum</i>	<i>Galium aparine</i>	<i>Paspalum dilatatum</i>	<i>Rumex crispus</i>
<i>Araujia sericifera</i>	<i>Genista linifolia</i>	<i>Paspalum distichum</i>	<i>Salix babylonica</i> s.l.
<i>Aster subulatus</i>	<i>Genista monspessulana</i>	<i>Pennisetum clandestinum</i>	<i>Salix × rubens</i>
<i>Atriplex prostrata</i>	<i>Hakea salicifolia</i>	<i>Persicaria maculosa</i>	<i>Solanum americanum</i>
<i>Bromus catharticus</i>	<i>Hedera helix</i>	<i>Phalaris aquatica</i>	<i>Solanum mauritianum</i>
<i>Callitriche stagnalis</i>	<i>Helminthotheca echioides</i>	<i>Pinus radiata</i>	<i>Solanum nigrum</i>
<i>Cirsium vulgare</i>	<i>Holcus lanatus</i>	<i>Plantago coronopus</i>	<i>Solanum pseudocapsicum</i>
<i>Cortaderia selloana</i>	<i>Hypericum tetrapterum</i>	<i>Plantago lanceolata</i>	<i>Sonchus asper</i>
<i>Cotoneaster pannosus</i>	<i>Hypochoeris radicata</i>	<i>Plantago major</i>	<i>Sonchus oleraceus</i>
<i>Crataegus monogyna</i>	<i>Juncus articulatus</i>	<i>Prunella vulgaris</i>	<i>Taraxacum officinale</i>
<i>Cynodon dactylon</i>	<i>Juncus microcephalus</i>	<i>Prunus cerasifera</i>	<i>Tradescantia fluminensis</i>
<i>Cyperus eragrostis</i>	<i>Leontodon taraxacoides</i>	<i>Pyracantha</i> sp.	<i>Trifolium repens</i>
<i>Dactylis glomerata</i>	<i>Lonicera japonica</i>	<i>Quercus robur</i>	<i>Ulex europaeus</i>
<i>Delairea odorata</i>	<i>Lotus uliginosus</i>	<i>Ranunculus repens</i>	<i>Verbena bonariensis</i> s.l.
<i>Echium plantagineum</i>	<i>Lythrum junceum</i>	<i>Raphanus raphanistrum</i>	<i>Zantedeschia aethiopica</i>
<i>Ehrharta erecta</i>	<i>Malus pumila</i>	<i>Romulea rosea</i>	

Notes concerning some of the locally threatened plant species

Eucalyptus camaldulensis (River Red Gum). The only specimens in Knox, four old trees and dozens of saplings beside Karoo Rd, mostly fenced for their protection.

Melaleuca parvistaminea (a paperbark). Found beside Corhanwarrabul Ck near the Stud Rd bridge, and possibly more widespread but overlooked through similarity to the abundant *M. ericifolia*.

Rapanea howittiana (Muttonwood). Found upstream of Glenfern Rd and scattered along Monbulk Ck and Ferny Ck, but only the first of these is certainly wild rather than planted.

Fauna of special significance

Endangered in Victoria

Blue-billed Duck. Observed in lakes at Waterford Valley Golf Course in 2008 (and known to be a regular feature of the similar lakes at Lakewood Nature Reserve and Caribbean Gardens, nearby).

Vulnerable in Victoria

Hardhead. Five observed in lakes at Waterford Valley Golf Course in 2008 (and known to be a regular feature of the similar lake at Lakewood Nature Reserve, nearby).

Great Egret. Observed in 2008 in the artificial wetland abutting the southeast of Knox Park and in the stormwater treatment system close to Cath Ct (off Karoo Rd). Likely to be present within the site frequently.

Royal Spoonbill. Recorded in the Atlas of Victorian Wildlife on the basis of a species list up to 1988. More potential habitat exists now than in the 1980s and both local species of spoonbill are likely to visit occasionally.

Uncommon in the Melbourne Region

White-necked Heron

Platypus. Found along Monbulk Ck in good years but may have retreated during the recent years of drought.

Fauna habitat features

- The stream provides habitat for Platypus, fish and their food sources;
- The large areas of wetland are used by frogs and a wealth of waterbirds (including threatened species);
- The corridors of riparian vegetation are
- There are some large eucalypts, particularly Manna Gums (*Eucalyptus viminalis*) with tree hollows that are undoubtedly nesting or roosting sites of birds, bats, possums or insects;
- Open spaces such as Waterford Valley Golf Course are used as hunting grounds by birds of prey such as Brown Goshawk, Nankeen Kestrel and Black-Shouldered Kite, particularly where there are scattered trees (even dead ones).

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment'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 native vegetation beside the site's watercourses.

The riparian vegetation was observed to be used by various common forest birds for nomadic movements. The extent of such usage suggests that it is important for bird movements at a Local scale. Criterion 1.2.6 takes such corridors to represent **Local** significance.

Regionally Threatened Ecological Vegetation Classes

The native vegetation in this site includes remnants and regrowth of regionally endangered EVCs. Some of it meets the Department of Sustainability & Environment's definition of a remnant patch, even though it differs substantially from the original EVCs. According to the criteria of 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), patches of native vegetation belonging to an endangered EVC have a conservation significance rating of High if they are in a substantially degraded state (as in the present site). Criterion 3.2.3 assigns **State** significance to any site that includes a 'remnant patch' of High conservation significance due to the presence of a threatened EVC. However, the site's northeastern polygon (on the western side of Glenfern Rd) does not qualify as a remnant patch because of its fragmented tree canopy and weedy understorey, so this polygon does not achieve State significance under criterion 3.2.3.

Rare or Threatened Flora

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

The site's ponds represent good habitat for the Blue-billed Duck, which was readily observed at the site and is a regular feature at the similar water bodies nearby at Lakewood Nature Reserve and Caribbean Gardens. This species is listed as endangered in Victoria and occurs in several states. The support that the site provides for such a species qualifies as **State** significance under criterion 3.1.2.

The site's water bodies were also observed to be supporting two waterbird species that are listed as vulnerable in Victoria; namely, Hardhead and Great Egret. Both species also occur interstate. This qualifies as **Regionally** significant under criterion 3.1.2 on the basis that the site is unlikely to represent an 'important site'.

Of the remaining species listed above under the heading, 'Fauna of special significance', the less common ones are sufficiently rare and threatened locally that their presence confers at least **Local** significance upon the site under criterion 3.1.5. Criterion 3.1.4 may also confer Regional significance on some of the species.

Threats

- Environmental weeds. Along the streams, the worst weeds are Angled Onion (*Allium triquetrum*), Couch (*Cynodon dactylon*), Drain Flat-sedge (*Cyperus eragrostis*), Panic Veldt-grass (*Ehrharta erecta*), Fumitory (*Fumaria* sp.), Cleavers (*Galium aparine*), Wood-sorrels (*Oxalis pes-caprae* and *Oxalis incarnata*), Kikuyu Grass (*Pennisetum clandestinum*), Toowoomba Canary-grass (*Phalaris aquatica*), Creeping Buttercup (*Ranunculus repens*), Watercress (*Rorippa nasturtium-aquaticum*) and Wandering Jew (*Tradescantia albiflora*). In the wetlands, the worst weeds are Couch, Drain Flat-sedge, Water Couch (*Paspalum distichum*) and Creeping Buttercup (*Ranunculus repens*). Brown-top Bent (*Agrostis capillaris*), Blackberry (*Rubus anglocandicans*) and Gorse (*Ulex europaeus*) are locally severe in patches of remnant vegetation on the plain. Only two or three plants each were found of the vine weeds, White Bladder-flower (*Araujia sericifera*) and Rambling Dock (*Acetosa sagittata*) – the first records in Knox – but these species have the potential to cause enormous environmental harm by smothering riparian shrubs, as they do in Floodplain Riparian Woodland along the Yarra River;
- Incremental removal of native vegetation on private land east of Napoleon Rd;
- Fertiliser leaching from the golf course's fairways and greens into wetlands and streams;
- Removal of old habitat trees (alive and dead), because such trees may be removed for the safety of golfers or the public;
- Loss or decline of plant species whose populations are dangerously small, due to inbreeding, poor reproductive success or vulnerability to localised chance events;
- European Carp, which have already caused serious ecological damage in nearby Jells Lake and could do so in this site if they were to arrive there;
- Foxes, which kill wildlife and spread woody weeds and blackberries.

Management issues

- Revegetation that has occurred along Ferny Ck and Monbulk Ck has established very well, but the task remains to plug the substantial gap in the corridor between Glenfern Rd and Hancock Dr, Ferntree Gully. Revegetation of this gap would complete a link from the Dandenong Ranges to the Dandenong Creek floodplain west of Stud Rd. This should bring about a significant increase in the diversity of bird and insect species moving along the corridor;
- Weed control should remain a high priority, including monitoring for outbreaks of White Bladder-flower (*Araujia sericifera*), Rambling Dock (*Acetosa sagittata*) and Square-stemmed St John's Wort (*Hypericum tetrapterum*);
- Care should be taken not to over-use fertiliser on the golf course;
- Some vegetation management guidelines have been provided to Knox City Council in periodic reports from the Australian Platypus Conservancy.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the riparian habitat, the potential for environmental damage from earthworks, the threatened EVCs and the other attributes discussed under the heading 'Significance ratings' above;
- It is proposed that ESO2 provide exemptions for normal, routine maintenance of the existing golf course, paths, roads and stormwater treatment wetlands;
- Some parts of the site are presently covered by Schedule 1 of the Vegetation Protection Overlay in the Knox Planning Scheme, on the basis of their recognition by Water Ecoscience (1998) as their Sites 89 and 285. The different boundaries used in this report reflect more detailed investigation and changed circumstances due to land development.

Information sources used in this assessment

- The 1997 report, 'Vegetation Survey of Linear Reserves – A Management Strategy for Riparian and Flood Plain Vegetation', by Reid, Moss and Lorimer for Knox City Council, along with the supporting field data. This included descriptions of vegetation composition, compilation of forty-four lists of indigenous and introduced plant species for

- different parts of the site, three quadrats (Department of Sustainability & Environment's numbers N04062, N04063 and N04067), incidental fauna observations, and checks for fauna habitat, ecological threats and management issues;
- Re-inspections of the site in and around the Waterford Valley development by Dr Lorimer during March 2001 to assist Knox City Council's environmental oversight of the development works;
 - A site survey of the Karoo Rd road verge undertaken during this study by Mr Rik Brown on 15/7/02, following this study's standard procedures discussed in Section 2.4 of Volume 1. This included descriptions of the composition and condition of the vegetation, compilation of lists of indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats, management issues and populations of scarce or threatened plant species;
 - A survey on foot and bicycle of all parts of the site west of Blackwood Park Drive and Glenfern Rd by Dr Lorimer on 16th and 18th June 2008 for a total of eleven hours, including:
 - Mapping of vegetation types, ecological condition, wildlife habitat features and locations of rare plants, rare bird sightings and serious weeds;
 - Compilation of lists of indigenous and introduced plant species for nine sections of the site, including estimates of the abundance of each species;
 - Checking the survival of rare plants that had been mapped in 1997;
 - Assessment of the severity of each weed species within each section;
 - Checking for ecological threats and management issues;
 - Observations of wildlife, with particular attention to waterbirds on the wetlands.
 - Written reports of the Australian Platypus Conservancy about Platypus surveys conducted within the site almost annually from 1994 to 2001. In the November 2000 survey, five Platypus, four fish species and at least one Water Rat were found;
 - Aerial photography from February 2001, April 2003 and February 2007;
 - Satellite imagery of the district;
 - The Department of Sustainability & Environment's BioMaps of the area;
 - Maps of geology and topography produced by agencies of the Victorian government.

Acknowledgment

Thanks to the management of the Waterford Valley golf course for permission to inspect the course.

Site 67. Henderson Road Wetlands, Knoxfield

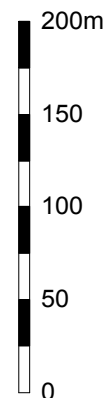
Vacant, cleared land that was formerly swamp, now with naturally regenerated wetlands. Melway ref 73 B7.

Site Significance Level: *Regional*

- Includes a substantial population of the plant, *Senecio campylocarpus*, which is rare throughout Victoria;
- Approximately 2.7 ha of wetlands were present in 2002, but drought has converted the wetlands into depressions within pasture and it is questionable whether recovery is possible. Wetland is a regionally endangered vegetation type;
- Uncommon birds used the wetlands when they were marshy;
- The site is zoned for industrial development.



Scale
1:4,000



*Aerial photograph
taken April 2003*

Boundaries

The site boundary is shown in red above and follows property boundaries. The aerial photograph is from 2003 and does not show the skate park constructed in 2007-8.

Land use & tenure: Vacant private land zoned for industrial development.

Site description

This 7.4 ha site is on the floodplain of Corhanwarrabul Ck at an elevation of 62 m, at the edge of what would have been a large swamp of more than 400 ha prior to settlement. The swamp contracted to scattered wetlands when the area was settled and numerous drains were dug to create farmland. A patchwork of these depressions remains on this site and were functional wetlands when surveyed for the first edition of this report. Since then, several years of drought have converted the wetlands into weedy depressions, and it is questionable whether the future climate will allow the wetlands to recover. However, a rare species (*Senecio campylocarpus*) persists in substantial numbers.

The largest wetland area in 2004 was on the site of the new skate park, marked on the aerial photograph by a blue, dashed outline. Smaller depressions, previously dominated by Common Reed (*Phragmites australis*), Fen Sedge (*Carex gaudichaudiana*) and Blackberry (*Rubus discolor*), occur on the vacant industrial lots fronting Henderson Rd, distinguished on the aerial photograph by the brownish patches sometimes with green centres. There are still some patches of Common Reed but when last checked in January 2009, Fen Sedge had died back so much that it could not be found.

Relationship to other land

This site is a component of the Corhanwarrabul Creek catchment's habitat corridor. However, factories have been built between the site and the rest of the corridor in recent years, thereby weakening the connection.

Bioregion: Gippsland Plain

Habitat types

Floodplain Wetland Complex (EVC 172, **regionally Endangered**).

Within the site: Estimated as 1.8 ha in numerous patches, all in poor ecological condition (rating D). 5 indigenous plant species were found in late 2008 or January 2009.

Trees, shrubs, vines and ferns: Almost absent. Confined to a few young *Acacia melanoxylon*.

Aquatic and semi-aquatic flora: Dominated by pasture species, *Phragmites australis*, *Carex gaudichaudiana* and *Rubus discolor*. There were over 100 plants of *Senecio campylocarpus* in 2008-9.

In the adjacent Skate Park (prior to construction): Estimated as 0.85 ha in area, all in fair ecological condition (rating C). 8 identified indigenous plant species plus an unknown number of unidentified indigenous *Juncus* species.

Trees, shrubs, vines and ferns: Absent.

Aquatic and semi-aquatic flora: Dominated variously by *Typha orientalis*, species of *Juncus* and *Persicaria*, and (seasonally) *Epilobium hirtigerum*.

Plant species

The following plant species were observed by the author, most recently in January 2009. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox with 'E'=Endangered and 'V'=Vulnerable. In addition, *Senecio campylocarpus* is rare in Victoria and *Carex gaudichaudiana* is rare in the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia melanoxylon</i>		<i>Persicaria decipiens</i>
E	<i>Carex ?gaudichaudiana</i>	E	<i>Phragmites australis</i>
	<i>Epilobium hirtigerum</i>	E	<i>Rubus parvifolius</i>
	<i>Juncus</i> sp.	E	<i>Senecio campylocarpus</i>
E	<i>Ozothamnus ferrugineus</i>	E	<i>Typha orientalis</i>
Introduced Species			
	<i>Cirsium vulgare</i>		<i>Paspalum dilatatum</i>
	<i>Fraxinus angustifolia</i>		<i>Ranunculus repens</i>
	<i>Galium aparine</i>		<i>Raphanus raphanistrum</i>
	<i>Geranium molle</i>		<i>Rubus anglocandicans</i>
	<i>Holcus lanatus</i>		<i>Rumex crispus</i>
			<i>Prunus cerasifera</i>
			<i>Vinca major</i>

Notes concerning some of the locally threatened plant species

Carex gaudichaudiana (Fen Sedge). Fairly abundant in 2006 but substantially reduced in numbers and stressed by drought when inspected in March and June 2008 and January 2009.

Senecio campylocarpus. One of only three known sites in Knox and very few in the Melbourne region. Approximately 100 plants were found in June 2008 in an area burned the previous summer, as well as scattered individuals outside the burned area. Expected to come up in abundance whenever the soil is disturbed lightly, as by fire.

Fauna of special significance

Lower Risk (Near Threatened) in Victoria

Latham's Snipe. Recorded by Mr Darren Wallace in the 1990s.

Regionally Uncommon

Cattle Egret. The site appears to be a congregating point for this species, listed as 'Uncommon' in the Melbourne region by the LCC (1991).

Locally Uncommon

Golden-Headed Cisticola. A population of approximately 100 individuals was observed foraging in patches of Common Reed in 2002. Smaller numbers were found in late 2008 and January 2009.

Fauna habitat features

- When wet, extensive seasonal wetlands and floodplain areas provide foraging habitat for waterbirds;
- Seasonal wetlands are likely to provide substantial habitat for frogs, snakes and invertebrates;
- Golden-Headed Cisticolas were observed in small numbers in 2008 after having been fairly abundant in 2002 on reeds and blackberry clumps that have since been decimated. Other small birds also used to use the reeds and blackberries for perching and foraging.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity and Viability

The site is a component of the Corhanwarrabul Creek habitat corridor. The corridor is important at a Local scale. Criterion 1.2.6 takes this to confer **Local** significance to the site.

Endangered Vegetation Types

The wetland EVC is regionally Endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) and criterion 3.2.3 of Amos (2004) that any site containing a remnant patch of wetland is of State significance. As at January 2009, the previous few years of drought have reduced the cover of indigenous flora so much that it does not qualify as a 'remnant patch'. This may, or may not, be a temporary situation. It is therefore not possible to assign a significance rating by this criterion until the site's future hydrology is established.

Rare or Threatened Flora

Senecio campylocarpus is listed as a rare species in Victoria. It also occurs interstate. The population is quite substantial and it would have the capacity to become quite large in response to suitable disturbance. However its security is poor and it probably does not fit the description of an 'important site' in the terms of criterion 3.1.2 of Amos (2004). It follows from that criterion that the population of *Senecio campylocarpus* gives the site **Regional** significance.

There is an extensive area of the locally threatened *Phragmites australis*, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

In its unknown state, the site provided good habitat for Latham's Snipe until recent years. Latham's Snipe is listed as 'Lower Risk, Near Threatened' in Victoria. This would represent Local significance under criterion 3.1.2 if the wetlands become functional again.

Threats

- Drought and climate change;
- Loss of seasonal wetland habitat through future industrial development of private land along Henderson Road;
- Inappropriate slashing of wetland vegetation;
- Invasion by environmental weeds, of which the greatest threats are Paspalum (*Paspalum dilatatum*), Toowoomba Canary-grass (*Phalaris aquatica*), Creeping Buttercup (*Ranunculus repens*), Blackberry (*Rubus discolor*) and Kikuyu (*Pennisetum clandestinum*).

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the potential for land development and the possibility that the wetlands may return to their former State significance;
- A northern part of the site is presently covered by Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, based on recognition of that area by Water Ecoscience (1998) as their Site 74;

- The Planning Scheme zoning is Industrial 1 Zone (IN1Z).

Information sources used in this assessment

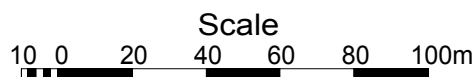
- A site survey on 24th May 2002 by Mr Rik Brown using this study's standard procedures discussed in Section 2.4 of Volume 1. Plant lists and vegetation descriptions were compiled separately for Gilbert Park and the adjacent private land. Other data gathered included incidental fauna observations and checks for fauna habitat, ecological threats and management issues;
- An inspection of by Dr Lorimer in May 2006 to check for ecological implications of the proposal for a skate park;
- Follow-up inspections by Dr Lorimer in March, June and December 2008 and January 2009 to check the impact of the newly constructed skate park and to see how the wetlands were coping with drought;
- Information, and particularly records of bird species from Mr Darren Wallace, listed by Water Ecoscience (1998) for their Site 74;
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 68. Hillside Park, Rowville

A park in Kelletts Rd near Taylors La, with remnant trees and revegetation. Melway ref 73 B11.

Site Significance Level: *Local (western section) and State (eastern section)*

- Contains a remnant of an endangered Ecological Vegetation Class (Valley Heathy Forest) whose understorey is presently rudimentary but whose ecological restoration is showing good potential;
- Provides good habitat for forest and woodland birds in an area substantially depleted of suitable habitat;
- Contains large remnant trees containing hollows suitable as shelter and breeding locations for hollow-dependent native fauna;
- Represents a habitat link along the habitat corridors of Corhanwarrabul Creek and Monbulk Creek.



Aerial photograph taken February 2007

Boundaries

The site is outlined in red above. It has been reduced in size since the first edition of this report due to clearing for Kelletts Rd to be widened. The northern, eastern and southern boundaries follow property boundaries (or extensions of them). The western boundary has been drawn to enclose planted trees that serve some habitat function, skirting kindergarten buildings and associated facilities.

The white line on the aerial photograph divides the site into an eastern section of 0.9 ha with a canopy of remnant trees and a western section of 2.0 ha whose significance derives only from one large old eucalypt and areas of revegetation.

Land use & tenure: Council park, zoned 'Public Park and Recreation Zone'.

Site description

The site is located on a minor knoll in very gently undulating terrain, at elevations between 70 m and 80 m. The slope is shallow and predominantly faces east toward the Corhanwarrabul Ck, approximately 300 m away.

The soil is shallow, poorly draining, light grey loam over clay subsoil, derived from decomposition of the underlying Lower Devonian sedimentary rocks of the Humevale formation.

Native vegetation in this neighbourhood was originally cleared long ago, probably for grazing. Tree cover was spared in places, including the eastern part of this park and along nearby Taylors Lane. More recently, urban development and road construction have made further, substantial reductions to the amount of remnant vegetation in the vicinity.

The eastern section of Hillside Park retains a good cover of remnant trees, including several large specimens likely to be 100-200 years old. The history of clearing, grazing and mowing in this area has left the indigenous understorey vegetation very depleted, but the grass contains some native grass species and some other remnant ground flora persists around the base of remnant trees. Moderate foliage dieback of remnant trees is apparent.

The section of the park west of the white line on the aerial photograph has previously been cleared of nearly all remnant vegetation, except for a large Mealy Stringybark tree (*Eucalyptus cephalocarpa*) along the Kelletts Rd frontage, as marked on the aerial photograph. This tree has a trunk diameter exceeding 1m and contains substantial natural hollows.

Indigenous revegetation areas have been established throughout the reserve within the last ten years, including extensive planting of shrub and ground layer species such as Sweet Bursaria, Hop Wattle, Spiny-headed Mat-rush, Common Tussock-grass and Kangaroo Grass. These include revegetation areas established around remnant trees in the eastern section of the reserve. The revegetation undertaken will undoubtedly contribute substantially to the cover of indigenous vegetation within the reserve over time.

A number of mature planted native trees occur within the reserve and adjoining residential properties, including Red Ironbark, Spotted Gum, Southern Blue Gum, Southern Mahogany, Sydney Blue Gum and Silky Oak. Most of these trees would have been planted around the time of establishment of the reserve and the residential development of the area, approximately thirty years ago.

The only built facilities within the reserve are paths and some playground equipment towards the northern side, as seen on the aerial photograph.

Relationship to other land

Planted native trees are scattered within residential properties in the surrounding area, however the reserve is only weakly connected to other areas of remnant vegetation. The main connection is a fair to good cover of remnant indigenous and planted native trees along the western side of Taylors Lane, providing a habitat link to Corhanwarrabul Creek (approximately 600 m to the north).

Eastern Rosellas, Spotted Pardalotes and abundant lorikeets were seen to move through Hillside Park during the site inspection. This indicates that the park represents an ecological stepping-stone as these birds move around the district. The birds may well also be nomadic along nearby Corhanwarrabul Creek and Monbulk Creek.

Bioregion: Gippsland Plain

Habitat type

Valley Heathy Forest (EVC 127, **regionally Endangered**).

Eastern section: 0.85 ha, all in poor ecological condition (rating D). 7 remnant indigenous plant species were recorded on 24th May, 2002.

Canopy trees: A good cover of remnant *Eucalyptus goniocalyx* and *E. cephalocarpa* trees up to 25m tall, mainly 80-100 years old but with several larger trees 100-200 years old. Moderate foliage dieback is apparent.

Lower trees and shrubs: Reduced by past clearing to a single small specimen of *Acacia mearnsii*. Indigenous shrubs have been included in recent revegetation activities.

Ground flora: Generally restricted to a few plants around the base of remnant trees because of previous clearing, grazing and mowing activities, including some *Microlaena stipoides*, *Poa morrisii* and *Lomandra filiformis*. Mowing of some areas has been discontinued in recent years. Recent revegetation activities have included the re-establishment of indigenous ground flora.

Western section: Naturally occurring vegetation is reduced to a single, large remnant specimen of *Eucalyptus cephalocarpa* (marked on the aerial photograph above) with a trunk diameter of approximately 1 m and moderate foliage dieback. All other remnant indigenous trees have previously been cleared west of the white line on the aerial photograph. There are scattered planted native trees and many areas of indigenous revegetation, amid mown introduced grass.

Plant species

The following plant species were observed by Mr Rik Brown on 24th May 2002. Additional species would no doubt be detectable in other seasons. A 'V' in the column headed 'Risk' indicates the species' risk of local extinction is Vulnerable.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia mearnsii</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Dichondra repens</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Microlaena stipoides</i>
	<i>Eucalyptus goniocalyx</i>		<i>Poa morrisii</i>

Introduced Species

<i>Acacia baileyana</i>	<i>Ligustrum vulgare</i>	<i>Prunus cerasifera</i>
<i>Arctotheca calendula</i>	<i>Pennisetum clandestinum</i>	<i>Rosa rubiginosa</i>
<i>Galium aparine</i>	<i>Pittosporum undulatum</i>	<i>Rubus anglocandicans</i>

Fauna of special significance

None recorded during field surveys, although significant birds associated with nearby creeks and their floodplains are likely to visit the reserve.

Fauna habitat features

Remnant trees within the site provide good habitat for forest and woodland birds in an area otherwise substantially depleted of suitable habitat. Substantial populations of lorikeets were apparent in the area during field surveys, along with smaller forest birds such as the Spotted Pardalote.

The large remnant trees within the site contain natural hollows suitable as shelter and breeding locations for birds, possums, bats or insects. Nesting activity by Galahs was apparent during field surveys. There are also nesting boxes.

Habitat values of the reserve are likely to increase over time with the further re-establishment of indigenous vegetation.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity & Viability

The site is a component or ecological 'stepping stone' of a habitat corridor, as explained above under the heading, 'Relationship to other land'. The link that it provides appears to be important for fauna movement at the local scale (or perhaps more widely). This represents **Local** significance under criterion 1.2.6 of Amos (2004).

Regionally Endangered Ecological Vegetation Class

Under the Department of Sustainability & Environment's criteria, the eastern section of this site contains a 'remnant patch' of an endangered EVC. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that Hillside Park's native vegetation is of at least High conservation significance. This, in turn, gives the site **State** significance under criterion 3.2.3.

Locally Threatened Plant Species

The two locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

The large remnant trees within the site are also locally significant because of their age and size, particularly the old specimen of Mealy (or Silver-leafed) Stringybark (*Eucalyptus cephalocarpa*) along the Kelletts Rd frontage, marked on the aerial photograph. However, this does not meet any of the significance criteria of Amos (2004).

Threats

- Lack of recruitment of indigenous vegetation because of mowing;
- Eucalypt dieback;
- Reduced visitation of the site by small insect-eating birds due to its degree of isolation from other areas with indigenous understorey, possibly leading to a worsening of plant pests and diseases;
- Loss or decline of plant species whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or elimination by incidents such as digging by dogs;
- Potentially, invasion of environmental weeds, but these are under control and none are rated in the categories of 'Very Serious' or 'Serious'.

Management issues

- Monitor the success and maintenance needs of revegetation areas, and when the time is right, augment them with additional revegetation to create greater continuity in the tree canopy and understorey;
- Keep suppressing weeds that emerge, particularly woody weeds such as Sweet Pittosporum.

Administration matters

- This site is suited to the proposed Environmental Significance Overlay (ESO2) because of the presence of an endangered EVC. The western section is included because of its high potential to assist the ecological function of the remnant vegetation in the east, give Council's efforts to revegetate the area;
- The eastern part of the site is presently covered by Vegetation Protection Overlay 1. The placing of the overlay was partly on the basis of the study by Water Ecoscience (1998), in which this is Site 45.

Information sources used in this assessment

- A site survey undertaken during this study by Rik Brown on 24/5/02, following this study's standard procedures discussed in Section 2.4 of Volume 1. This included a description of the composition and condition of the vegetation, compilation of lists of indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats, management issues and populations of scarce or threatened plant species;
- Description of the site by Water Ecoscience (1998), in which Hillside Park forms their Site 45;
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 69. Cogley, Sutton and Hill Lakes, Rowville

Three adjacent lakes in a parkland setting. Melway ref. 72 K11.

Site Significance Level: *Regional*

- Supports native wetland flora and a wealth of waterbirds, some of which are threatened in Victoria;
- Includes the plant species, *Potamogeton pectinatus* (Fennel Pondweed), which is unique in Knox and rare throughout Melbourne.



Scale 1:4,000
0 20 40 60 80 100m

Aerial photograph taken April 2003

Boundaries

The site is in two parts, each outlined in red above and totalling 9.55 ha. The boundaries follow property boundaries.

Land use & tenure: Lakes and fringing open space. The lakes were constructed for purposes of drainage, water quality and amenity. Some of the open space is public and some is fenced for access only by adjacent properties.

Site description

The site is on a minor tributary of Corhanwarrabul Ck at an elevation of 55 m. Probably all the natural vegetation was destroyed by farming and drainage works, culminating in the construction of the three lakes. There has been amenity planting around the lakes, particularly using non-indigenous 'Australian native' species, but the lakes themselves contain predominantly indigenous vegetation that must have been introduced by waterbirds (as often happens in such situations).

One of the plants that has established, the Fennel Pondweed (*Potamogeton pectinatus*), is unique in Knox and very rare in the entire Melbourne area. However, the site's most biologically significant feature is its wealth of birdlife, some of which is rare.

Relationship to other land

This site is a component of the Corhanwarrabul Creek catchment's habitat corridor, as evidenced by the frequent visits of waterbirds such as Darters, Hardhead and Australian Pelicans. The nearest other component of the corridor is Site 65, on the other side of Stud Rd.

Bioregion: Gippsland Plain

Habitat types

Wetland Complex (EVC 74, regionally Endangered): Estimated as 0.1 ha of vegetation in fair ecological condition (rating C) fringing the lake, plus an unknown extent of bottom-dwelling plants. 9 indigenous plant species were recorded in June 2002.

Trees, shrubs, vines and ferns: Effectively absent, but there are some *Melaleuca ericifolia* that were probably planted on the island in Sutton Lake.

Aquatic and semi-aquatic flora: The fringing vegetation is dominated variously by *Typha domingensis* or any of three species of *Juncus*. The bottom of Cogley Lake evidently has substantial cover of *Potamogeton pectinatus*, gathering from the amount of fragments found floating on the lake.

Plant species

The following plant species were observed by the author on 4th June 2002. Other species would be expected to appear in summer, or perhaps if the lake bottoms were inspected. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Alternanthera denticulata</i>	E	<i>Juncus subsecundus</i>
	<i>Epilobium hirtigerum</i>		<i>Lachnagrostis filiformis</i>
V	<i>Exocarpos cupressiformis</i>	E	<i>Melaleuca ericifolia</i> (?planted)
	<i>Juncus amabilis</i>	C	<i>Potamogeton pectinatus</i>
	<i>Juncus sarophorus</i>	E	<i>Typha domingensis</i>

Numerous fragments of *Potamogeton pectinatus* (Fennel Pondweed) were found floating on Cogley Lake, the only known occurrence in Knox. It is at risk of destruction when the lake is drained for silt removal.

Introduced Species

<i>Aster subulatus</i>	<i>Cortaderia selloana</i>	<i>Lonicera japonica</i>	<i>Rubus anglocandicans</i>
<i>Callitriche stagnalis</i>	<i>Cyperus eragrostis</i>	<i>Paspalum distichum</i>	

Fauna of special significance

With the exception of Hardhead, the following information about numbers and frequencies of birds come from a knowledgeable local resident whose birdwatching skills were verified by the author.

Vulnerable in Victoria

Hardhead. 2 birds were observed by the author.

Great Egret. One individual is present most of each year.

Lower Risk (Near Threatened) in Victoria

Pied Cormorant. Two or three Pied Cormorants visit the lakes.

Regionally Uncommon

Darter. One individual was seen by the author and said by the local resident to be an occasional visitor.

Locally Uncommon

Australian Pelican. Regular visitors in autumn and occasional in other seasons.

Black Swan. Very infrequent visitors.

Flatheaded Gudgeon. Fairly abundant, at least in Sutton Lake. Shown to the author by a biology student at the site.

Fauna habitat features

- The lakes are inhabited by fish (native and introduced) and invertebrates, and almost certainly frogs;
- The lakes and the fringing native vegetation and lawns are used by waterbirds for foraging;

- The fringing beds of Cumbungi (*Typha domingensis*) are used by waterbirds for nest sites;
- Frogs probably seek cover among the lakes' fringing native vegetation;
- Some birds use the island in Sutton Lake as a safe refuge.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity and Viability

The site is a component of the Corhanwarrabul Creek habitat corridor, which is important at a Local scale. This gives the site **Local** significance under criterion 1.2.6 of Amos (2004).

Rare or Threatened Flora

Some of the locally threatened plant species listed above, including *Potamogeton pectinatus*, have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

The author believes that the resident Great Egret is part of a wider ranging, viable population in the catchment. The same is likely to apply to the Hardhead. Both are listed as Vulnerable in Victoria. These conditions represent **Regional** significance under criterion 3.1.2. There might be a temptation to downgrade this rating due to the small population sizes, but this is compensated by the presence of other, less rare waterbirds and the likelihood that other threatened species have gone undetected.

Threats

- Removal of silt from the lake bottoms, which could also remove vegetation;
- Invasion by environmental weeds, of which the only serious threat is a small outbreak of Pampas Grass (*Cortaderia selloana*);
- European Carp, which have already caused serious ecological damage in nearby Jells Lake and could do so in this site if they were to arrive there.

Management issues

- The Pampas Grass should be removed;
- Management of silt in the lakes should be conducted with due consideration to the presence of the *Potamogeton pectinatus* and other possible significant flora growing in the silt. Removal of silt should be preceded by arrangements for botanical inspection of the bottom-dwelling flora and rescue any plants that need to be rescued, as discussed below;
- Removal of rushes around the lakes should be avoided as much as possible and only done in a season when waterbirds are not breeding.

Administration matters

- When any of the lakes are drained for maintenance, their bottom-dwelling flora should be inspected to determine the density of plants and the presence of previously undetected species;
- Melbourne Water should take note that if any *Potamogeton pectinatus* is found in silt that has to be removed from the lake, samples of this species should be collected and propagated for re-establishment after the work is complete;
- Ideally, there should be surveys of the site's fish and frogs. Frogs could be sought as part of the Melbourne Frog Census organised through Melbourne Water;
- Signs should be erected to draw visitors' attention to the biological significance of the site;
- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the potential for land development and the matters considered under the heading, 'Significance ratings';
- The site is not presently covered by the Vegetation Protection Overlay in the Knox Planning Scheme, having not previously been identified as a site of biological significance;
- The Planning Scheme zoning of the water bodies is Public Use Zone - Service & Utility (PUZ1) and the remainder of the site is zoned Public Park and Recreation Zone (PPRZ).

Information sources used in this assessment

- A site survey by Dr Lorimer taking one hour on 4th June 2002, comprising compilation of separate lists of indigenous and introduced plant species in and around each of the lakes, fauna observations, and checks for fauna habitat, ecological threats, management issues and populations of scarce or threatened plant species;
- On-site discussions with local residents, one of whom was surveying Sutton Lake's fish and another who provided a bird list for the lakes;

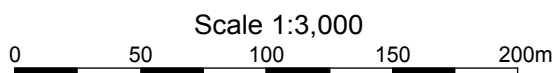
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 70. Rowville Primary & Secondary Schools

Areas of native vegetation in the grounds of two adjacent schools. Melway ref. 81 K2.

Site Significance Level: *State*

- The native vegetation belongs to the endangered Ecological Vegetation Class, Valley Heathy Forest, but it is in poor ecological condition.



Aerial photograph taken February 2007

Boundaries

The site of biological significance is in two polygons, marked on the aerial photograph on the previous page with red outlines and labelled 'Site 70'. Together, they total 0.94 ha. There are indigenous trees scattered around the buildings and just outside the northern boundary that add to the site's significance, but they do not warrant inclusion within the site boundary because they have hardly any understorey. Other sites at Delta Court Reserve and Brusco Close are also outlined in red on the aerial photograph.

Land use & tenure: Government primary and secondary schools on a shared lot.

Site description

These twin schools straddle a low knoll or short ridge, with a northeasterly slope of up to 4% in the site's north and a southwesterly slope of up to 8% in the south. The elevation is typically 80 m. The soil is shallow, poorly draining, light grey loam over clay subsoil, derived from decomposition of the underlying Lower Devonian sedimentary rocks of the Humevale formation.

The patches of vegetation with indigenous understorey are almost wholly within the site boundary displayed on the aerial photograph. There are also many remnant trees scattered among and around the school buildings, helping to attract native birds to the schools. Some of the trees contain hollows and some of the hollows are occupied by wildlife.

The ground flora left in the primary school grounds is very thin due to trampling and children's digging during play, but indigenous understorey trees and grasses are abundant. The secondary college grounds has suffered much less digging and trampling and hence there is a reasonable cover of hardy native grasses such as Weeping Grass (*Microlaena stipoides*) and Veined Spear-grass (*Austrostipa rudis*), as well as the indigenous Kidney Weed (*Dichondra repens*). However, part of the secondary college's indigenous vegetation is used as a dumping ground for a large pile of prunings and garden waste.

The ecological condition of most of the schools' indigenous vegetation had not deteriorated between 2002 and 2009, although some of it had been removed for new buildings. There are good prospects of significantly improving the ecological condition of the secondary college's patch by more sensitive mowing and ceasing the garden waste dumping.

Relationship to other land

The nearest areas of native habitat are Delta Court Reserve (Site 71), the Wellington Rd road verge (Site 96), the Rowville Electricity Terminal Station (Site 72) and the small remnant on Brusco Close (0). The native vegetation at Brusco Close is facing imminent replacement by houses. Most local native birds and flying insects would be able to fly easily between these five sites, but the more ecologically sensitive species would not find the school's habitat sufficiently attractive to cross the main roads and stark residential area between the sites.

Bioregion: Gippsland Plain

Habitat types

Valley Heathy Forest (EVC 127, **Endangered**): Estimated as 1.1 ha (excluding trees without native understorey), all in poor ecological condition (rating D).

Canopy trees: *Eucalyptus radiata* and *E. cephalocarpa*, the latter species dominant in the north and west and the former elsewhere.

Lower trees: Dominated by *Allocasuarina littoralis*, *Acacia mearnsii* and *Exocarpos cupressiformis*. There are very few *Acacia melanoxylon*.

Shrubs: Severely depleted by clearing, leaving *Acacia paradoxa* as the only shrub in substantial numbers. *Cassinia arcuata*, *Daviesia latifolia* and *Leptospermum continentale* are also present. *Bursaria spinosa* is uncharacteristically absent.

Vines: There were many of the light twiner, *Billardiera mutabilis*, in 2002 but few were visible in February 2009.

Ferns: There is a very small amount of *Pteridium esculentum*.

Ground flora: Dominated by *Microlaena stipoides*, *Austrostipa rudis* subsp. *rudis* and *Dichondra repens*. Other species include three *Rytidosperma* species, *Deyeuxia quadriseta*, *Gonocarpus tetragynus*, *Lepidosperma gunnii*, *Lomandra filiformis* (both subspecies), *L. longifolia*, *Poa morrisii*, *Austrostipa pubinodis* and *Themeda triandra*.

Plant species

In February 2009, during a record drought, the author found 14 indigenous plant species in the primary school and 24 in the secondary college. A few extra species were seen in May 2002. More species would be found in mid spring to early summer. In the following plant list, the column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable.

Risk	Indigenous Species
V	<i>Acacia mearnsii</i>
V	<i>Acacia melanoxydon</i> <i>Acacia paradoxa</i>
V	<i>Allocasuarina littoralis</i>
C	<i>Amyema pendula</i> <i>Austrostipa pubinodis</i> <i>Austrostipa rudis</i> subsp. <i>rudis</i> <i>Billardiera mutabilis</i> <i>Cassinia arcuata</i> <i>Chenopodium pumilio</i>
E	<i>Daviesia latifolia</i> <i>Deyeuxia quadriseta</i> <i>Dichondra repens</i>
V	<i>Epilobium billardierianum</i> ssp. <i>cinereum</i>
V	<i>Eucalyptus cephalocarpa</i> <i>Eucalyptus goniocalyx</i>
V	<i>Eucalyptus melliodora</i>
E	<i>Eucalyptus radiata</i>

Risk	Indigenous Species
V	<i>Exocarpos cupressiformis</i> <i>Gonocarpus tetragynus</i> <i>Kunzea ericoides</i> spp. agg. (perhaps planted) <i>Lachnagrostis filiformis</i> <i>Lepidosperma gunnii</i> <i>Leptospermum continentale</i> <i>Lomandra filiformis</i> subsp. <i>coriacea</i> <i>Lomandra filiformis</i> subsp. <i>filiformis</i> <i>Lomandra longifolia</i> <i>Microlaena stipoides</i> <i>Poa morrisii</i> <i>Pteridium esculentum</i> <i>Rytidosperma penicillatum</i> <i>Rytidosperma racemosum</i> <i>Rytidosperma setaceum</i> <i>Themeda triandra</i> <i>Tricoryne elatior</i>

Introduced Species

<i>Agapanthus praecox</i>	<i>Crataegus monogyna</i>	<i>Lolium perenne</i>	<i>Ulex europaeus</i>
<i>Agrostis capillaris</i>	<i>Cynodon dactylon</i>	<i>Paspalum dilatatum</i>	<i>Vulpia bromoides</i>
<i>Briza maxima</i>	<i>Ehrharta erecta</i>	<i>Pittosporum undulatum</i>	
<i>Bromus catharticus</i>	<i>Hypochoeris radicata</i>	<i>Plantago lanceolata</i>	

Fauna habitat features

- Some of the eucalypts in each school are large enough and old enough to have hollows that could provide nesting or roosting sites for birds, possums, bats or insects;
- The prickly shrub layer provides protection for small native birds, and three nests were found among them.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Endangered Vegetation Types

Valley Heathy Forest is endangered and each of the two areas that make up this site meet the Department of Sustainability & Environment's definition of a 'remnant patch'. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) and criterion 3.2.3 of Amos (2004) that the site is of **State** significance.

The author has misgivings about such a high rating when the ecological condition of the vegetation is so poor, but these misgivings are overridden by the importance of consistency with the standard criteria.

Locally Threatened Plant Species

Some of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Mowing at the secondary college that has been too low and too frequent, particularly during October to December;
- Dumping of green waste at the secondary college, including by neighbours. There is at least one very unhealthy *Allocasuarina* (beside the hockey/soccer pitch) whose base is affected by a neighbour's dumping;
- Trampling and digging by primary school children;
- Eucalypt dieback disease;
- Borers killing most *Acacia mearnsii*;
- Loss or decline of plant species whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or misadventure.

Management issues

- It would be easy to significantly improve the ecological condition of the secondary college's indigenous vegetation by increasing the height of mowing, reducing the frequency of mowing (particularly in October-December) and allowing some of the indigenous shrubs to escape mowing;
- Green waste should not be dumped on native ground flora or the root zones of indigenous trees;
- The schools' trees have been receiving good arboricultural treatment, although some are stressed from the current record drought.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because the vegetation belongs to an endangered EVC that is heavily fragmented and occurs predominantly in urban surroundings;
- Parts of the grounds of Rowville Primary School are included under the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, based on the description of Site 43 of the report by Water Ecoscience (1998). The site described here differs in that it includes the (ecologically superior) vegetation in the secondary college and takes into account changes over the past decade. Note that the proposed ESO is not intended to affect maintenance of buildings, pavement or other facilities;
- The Planning Scheme zoning is Public Use Zone - Education (PUZ2).

Information sources used in this assessment

- Site surveys by Dr Lorimer in the secondary college on 24th May 2002 and in the primary school on 4th June 2002. In each case, this included a brief description of the vegetation structure and floristic composition, compilation of plant lists, incidental fauna observations, and checks for fauna habitat, ecological threats and management issues;
- A survey by Dr Lorimer on 26th February 2009 to update the information gained in the earlier surveys;
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Acknowledgment

Thanks to the schools' administration for granting permission to inspect the grounds.

Site 71. Delta Court Reserve, Rowville

A tiny Council reserve with regrowth of native vegetation. Melway ref. 81 J3.

Site Significance Level: *State*

- The native vegetation belongs to the endangered Ecological Vegetation Class, Valley Heathy Forest. The number of species is unnaturally low but there are good prospects for improvement.

Aerial photograph: See page 350, which covers this site, Site 70 and 0.

Boundaries

The site is the whole of a single lot, marked and labelled on the aerial photograph on page 350.

Land use & tenure: Council bushland reserve.

Site description

This small reserve of 3,294 m² is at an elevation of just under 70 m on a south-facing slope of about 5% gradient. The soil is shallow, poorly draining, light grey loam over clay subsoil, derived from decomposition of the underlying Lower Devonian sedimentary rocks of the Humevale formation.

This site has been previously cleared, grazed and allowed to regenerate. This history has left it with a rather small number of indigenous plant species (thirty-five) but a high percentage cover of indigenous understorey. Council's bushland staff have vigorously controlled the Gorse that would otherwise have destroyed the site, and begun planting additional indigenous species to compensate for those that have been lost.

The more ecologically intact native vegetation is in the southern three-quarters of the site, west of the footpath.

Because of the predominance of indigenous plants and the small area involved, this site would be an excellent candidate for intensive restoration and enrichment through indigenous plantings to create a showcase of Rowville's seriously depleted native flora. The main impediment would be controlling Brown-top Bent (*Agrostis capillaris*, a grass weed) and Common Onion-grass (*Romulea rosea*, a weed in the Iris family).

Relationship to other land

The nearest areas of native habitat are Rowville Primary & Secondary Schools (Site 70), the Wellington Rd road verge (Site 96), the Rowville Electricity Terminal Station (Site 72) and the small remnant on Brusco Close (0). The last of these is facing imminent replacement by houses. Most local native birds and flying insects would be able to fly easily between these sites, but the more ecologically sensitive species would not find Delta Court Reserve's habitat sufficiently attractive to cross the main roads and stark residential area between the sites.

Bioregion: Gippsland Plain

Habitat types

Valley Heathy Forest (EVC 127, **Endangered**): Estimated as 2,700 m², comprising 1,700 m² in fair ecological condition (rating C) and 1,000 m² in poor ecological condition (rating D).

Canopy trees: *Eucalyptus radiata* with smaller numbers of *E. gonicalyx*, *E. cephalocarpa* and *E. melliodora*.

Lower trees: Moderately dense, comprising *Allocasuarina littoralis*, *Acacia mearnsii* and fewer *Exocarpos cupressiformis*.

Shrubs: Severely depleted by past clearing. Remaining species are *Acacia paradoxa*, *Bursaria spinosa*, *Leptospermum continentale* and a single *Pomaderris racemosa*.

Vines: There are reasonable numbers of the light twiner, *Billardiera mutabilis*.

Ferns: None.

Ground flora: Dominated by *Microlaena stipoides*, *Themeda triandra*, *Poa morrisii* and *Austrostipa rudis* subsp. *rudis*.

The following additional species are abundant: *Rytidosperma* species, *Gonocarpus tetragynus*, *Poranthera microphylla* and *Tricoryne elatior*. There are smaller numbers of the following species that are typical of Valley Heathy Forest: *Bossiaea prostrata*, *Burchardia umbellata*, *Deyeuxia quadriseta*, *Dichondra repens*, *Dillwynia cinerascens*, *Eragrostis brownii*, *Hypericum gramineum*, *Leptorhynchus tenuifolius*, *Lomandra filiformis* subsp. *coriacea*, *Opercularia varia*, *Oxalis perennans*, *Veronica gracilis* and *Viola hederacea*.

Plant species

The following plant species were observed by the author on 2nd May 2002. Additional species would no doubt be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Pomaderris racemosa* is rare throughout the Melbourne region. A single plant of that species was seen.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia mearnsii</i>		<i>Gonocarpus tetragynus</i>
	<i>Acacia paradoxa</i>	E	<i>Hypericum gramineum</i>
V	<i>Acacia verticillata</i>	V	<i>Leptorhynchos tenuifolius</i>
V	<i>Allocasuarina littoralis</i>		<i>Leptospermum continentale</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Billardiera mutabilis</i>		<i>Microlaena stipoides</i>
	<i>Bossiaea prostrata</i>	V	<i>Opercularia varia</i>
	<i>Burchardia umbellata</i>		<i>Oxalis exilis/perennans</i>
	<i>Bursaria spinosa</i>		<i>Poa morrisii</i>
	<i>Deyeuxia quadriseta</i>	C	<i>Pomaderris racemosa</i>
V	<i>Dianella longifolia</i> s.l.		<i>Poranthera microphylla</i>
	<i>Dichondra repens</i>		<i>Rytidosperma laeve</i>
V	<i>Dillwynia cinerascens</i>		<i>Rytidosperma penicillatum</i>
	<i>Eragrostis brownii</i>		<i>Rytidosperma setaceum</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Themeda triandra</i>
	<i>Eucalyptus goniocalyx</i>		<i>Tricoryne elatior</i>
V	<i>Eucalyptus melliodora</i>	V	<i>Veronica gracilis</i>
E	<i>Eucalyptus radiata</i>	E	<i>Viola hederacea</i>
V	<i>Exocarpos cupressiformis</i>		
Introduced Species			
	<i>Agrostis capillaris</i>		<i>Hypochoeris radicata</i>
	<i>Anthoxanthum odoratum</i>		<i>Paspalum dilatatum</i>
	<i>Dactylis glomerata</i>		<i>Plantago lanceolata</i>
	<i>Danthonia procumbens</i>		<i>Romulea rosea</i>
			<i>Rubus anglocandicans</i>
			<i>Ulex europaeus</i>

Fauna of special significance

None found.

Fauna habitat features

None found.

Significance ratings

Endangered Vegetation Types

Under the Department of Sustainability & Environment's criteria, this site contains a 'remnant patch' of an endangered EVC. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that Delta Court Reserve's vegetation is of at least High conservation significance. This, in turn, gives the site **State** significance under the Department of Sustainability & Environment's standard criteria (Amos 2004 – criterion 3.2.3).

Locally Threatened Plant Species

Some of the locally threatened plant species listed above have viable populations in combination with nearby native vegetation, thereby meeting criterion 3.1.5 of Amos (2004) for a site of **Local** significance.

Threats

- Invasion by environmental weeds, of which the following are the only ones rated 'Serious': Brown-top Bent (*Agrostis capillaris*, a grass weed) and Common Onion-grass (*Romulea rosea*, a weed in the Iris family);
- Loss or decline of plant species whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or misadventure.

Management issues

- A small trial burn would determine whether any plant species such as *Kennedia prostrata* are still present as soil-stored seed. Trials in the Dandenong Valley Parklands have shown Valley Heathy Forest to recover remarkably well from a very degraded state after fire;
- All plantings in the reserve should be carefully documented so that natural regeneration can be monitored without confusion from planted specimens;
- The solitary *Pomaderris racemosa* should be outbred by propagating it and others from the larger population at Starlight Reserve, then exchanging the propagated plants between the reserves.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the endangered EVC which is heavily fragmented and occurs predominantly in urban surroundings;
- The site is presently included under Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, based on the description of Site 10 of the report by Water Ecoscience (1998);
- The Planning Scheme zoning is Public Park and Recreation Zone (PPRZ).

Information sources used in this assessment

- A site survey by Dr Lorimer for one hour on 24th May 2002, following this study's standard procedures discussed in Section 2.4 of Volume 1. This included a description of the composition and condition of the vegetation, compilation of a list of indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats, management issues and populations of scarce or threatened plant species;
- A list of grasses seen incidentally by Dr Lorimer during a brief visit to the reserve on 2nd March 2000;
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 72. Rowville Electricity Terminal Station

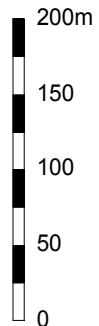
Sections of a major electricity infrastructure property that contain regrowth of native vegetation. Melway ref. 81 H4.

Site Significance Level: *State*

- Includes 8 ha of regionally endangered vegetation (Swampy Woodland and Valley Heathy Forest), in addition to 6 ha that is treeless and regularly slashed (beneath transmission lines) but which retains most of the species in the treed areas of Valley Heathy Forest;
- Fifteen indigenous plant species are rare or threatened in Knox, nine of which are rare or threatened in the whole Melbourne area. Some of these are abundant. One species (*Eryngium vesiculosum*) is unique in Knox.



Scale
1:5,000



*Aerial photograph
taken February 2007*

Boundaries

This site is outlined in red on the aerial photograph on the previous page. The boundaries almost wholly follow fences and the edges of roads and tracks. Note that the fence along Stud Rd (which is a site boundary) is well inside the property boundary. Since the first edition of this report, the site area has been reduced by 1.4 ha to account for construction of the southern switchyard in what was formerly Valley Heathy Forest.

Land use & tenure: Public land managed by SP AusNet, principally for provision of electricity services.

Site description

This 17.1 ha site includes:

- An east-west ridgetop, running through the excavations marked on the aerial photograph;
- The northern slopes of the ridge, down to a drain (formerly a creek) in the site's northeastern corner; and
- A small area of the ridge's southern flank.

The elevation range is from just under 50m to just over 70m and the gradient at mid-slope is approximately 8%.

The ridge has formed from the Humevale formation of Lower Devonian sedimentary rocks, which decomposes to form stony clay subsoil and shallow, poorly draining topsoil of light grey loam. At the foot of the ridge, within the area marked as Swampy Woodland on the aerial photograph, the soil is formed from silt washed down the hill and from further up the valley.

The dearth of large, old trees and the agricultural history of this district indicate that this site was once cleared and grazed. This ridge was also used as a military camp during the Second World War. The diversity of native vegetation has suffered from this history (particularly in the case of shrubs) and there is a legacy of weeds. However, there remains at least eighty-two indigenous plant species including some that are quite rare in the Melbourne area.

The aerial photograph is marked to show treed areas of the regionally endangered Swampy Woodland and the endangered Valley Heathy Forest. The majority of the site's rare plants are in the Swampy Woodland south of the drain. The trees of the Valley Heathy Forest have low stature for their age, indicating that the soil is rather infertile.

There is also a high percentage cover of low-growing indigenous plants (especially Kangaroo-grass, *Themeda triandra*) in the slashed strips beneath the high-voltage transmission lines, whose pylons can be seen on the photograph.

The excavations marked on the aerial photograph are on the ridge top but have the most consistently wet soil in the site. This has enabled wetland vegetation to establish in a part of the landscape where they could not occur in nature. The colonisation of the excavations by indigenous plants is remarkable, including at least fifteen species that have presumably arrived by wind or on the feathers or legs of waterbirds. Some of these species are rare or threatened, either in Knox or throughout the Melbourne area.

Relationship to other land

Many native birds, bats and insects would be likely to move between this site, Starlight Reserve (Site 73), the Waverley Golf Club (Site 77, with the pink outline in the southeast of the aerial photograph), the Dandenong Creek habitat corridor (e.g. Site 74 and Site 75) and the Lysterfield Hills.

Bioregion: Gippsland Plain

Habitat types

Wetland (EVC 74, listed as regionally Endangered, but in this case the depression is artificial), comprising the excavations on the ridge top. Estimated to occupy approximately 0.14 ha, all in fair ecological condition (rating C). 15 indigenous plant species were recorded.

Woody vegetation: None, although *Leptospermum continentale* grows on the edge.

Ferns: There is one patch of *Hypolepis glandulifera*.

Semi-aquatic flora: Dominated by *Centella cordifolia* and *Isolepis fluitans*. Other species include *Alisma plantago-aquatica*, *Eleocharis acuta*, *Isolepis fluviatilis*, five indigenous *Juncus* species, *Persicaria decipiens* and *Schoenus apogon*.

Swampy Woodland (EVC 937, **regionally Endangered**): Estimated as 2.4 ha in area, comprising 1.9 ha in fair ecological condition (rating C) and 0.5 ha in poor ecological condition (rating D). 43 indigenous plant species were recorded.

Dominant canopy trees: *Eucalyptus ovata* and far fewer *E. cephalocarpa*.

Dominant lower trees: *Acacia melanoxylon*.

Shrubs: Low in diversity and low to moderate in density, leaving clear visibility for typically 100 m. The species with substantial numbers are *Leptospermum continentale*, *Leptospermum scoparium* and *Ozothamnus ferrugineus*. The only other species is *Solanum laciniatum*.

Vines: Absent.

Ferns: Very scarce - a very small amount of *Pteridium esculentum*.

Ground flora: Densely grassy. The dominant grasses are *Microlaena stipoides* and the weed *Anthoxanthum odoratum*. Other species that are dominant in patches are *Juncus* species, *Schoenus tesquorum* or the weeds *Paspalum dilatatum*, *Rubus discolor* or *Watsonia meriana*. Other abundant species are *Lomandra longifolia* and *Austrostipa rudis* subsp. *rudis*. *Epilobium hirtigerum* is moderately common and serves as a good ecological indicator.

Valley Heathy Forest (EVC 127, Endangered): Estimated as 5.1 ha, all in fair ecological condition (rating C). 45 indigenous plant species were recorded.

Canopy trees: Dominated by *Eucalyptus radiata* on the upper slopes and *E. cephalocarpa* on the lower slopes, closer to the Swampy Woodland. *E. goniocalyx* is also present.

Lower trees: Mostly sparse. Dominated by *Acacia mearnsii* and *Acacia melanoxyton*. *Allocasuarina littoralis* and *Exocarpos cupressiformis* are also present.

Shrubs: Severely depleted by past clearing, leaving only sparse indigenous shrubs. The more abundant species are *Bursaria spinosa* and *Leptospermum continentale*. The only others are *Acacia paradoxa*, *Cassinia arcuata*, *Kunzea ericoides* and *Ozothamnus ferrugineus*.

Vines: Uncharacteristically absent.

Ferns: There is a small amount of *Pteridium esculentum*.

Ground flora: Dominated by *Microlaena stipoides* and *Austrostipa rudis* subsp. *rudis*, also with patches of dense *Themeda triandra*. Other abundant species are *Arthropodium strictum*, *Rytidosperma* species and *Tricoryne elatior*. Less abundant species that are good ecological indicators include *Dianella longifolia*, *Dichondra repens*, *Gonocarpus tetragynus*, *Lepidosperma gunnii*, *Leptorhynchus tenuifolius*, *Lomandra filiformis* and *Veronica gracilis*.

Regularly slashed ground flora of Valley Heathy Forest beneath the transmission lines. Estimated as 6.2 ha, all in fair ecological condition (rating C). 35 indigenous plant species were recorded.

Shrubs: There are scattered, stunted specimens of *Acacia paradoxa*, *Bursaria spinosa*, *Cassinia arcuata*, *Leptospermum continentale*, *Kunzea ericoides* and *Ozothamnus ferrugineus*.

Vines: Absent.

Ferns: There is a small amount of *Pteridium esculentum*.

Ground flora: Dominated by *Themeda triandra*, *Microlaena stipoides* and *Austrostipa rudis* subsp. *rudis*. *Drosera peltata* subsp. *peltata* is abundant in places, despite being undetected in the rest of the site. Most of the ground flora species in the unslashed Valley Heathy Forest are also present in the slashed strip.

Plant species

The following plant species were observed in the years indicated, the 2002-3 entries being the author's. The reliability of some of the 1999 data is questionable. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, the species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
V	<i>Acacia mearnsii</i>	2002		<i>Carex appressa</i>	1999
V	<i>Acacia melanoxyton</i>	2002		<i>Carex breviculmis</i>	1999
	<i>Acacia paradoxa</i>	2002		<i>Carex inversa</i>	2002
V	<i>Acacia verticillata</i>	1999		<i>Cassinia arcuata</i>	2002
	<i>Acaena novae-zelandiae</i>	2002	E	<i>Centella cordifolia</i>	2002
	<i>Alisma plantago-aquatica</i>	2002		<i>Deyeuxia quadriseta</i>	2002
V	<i>Allocasuarina littoralis</i>	2002		<i>Dianella admixta</i>	2002
C	<i>Allocasuarina paludosa</i> (unconfirmed)	1999	V	<i>Dianella longifolia</i> s.l.	2002
C	<i>Amphibromus archeri</i>	2002		<i>Dichondra repens</i>	2002
	<i>Arthropodium strictum</i>	2002	E	<i>Drosera peltata</i> subsp. <i>peltata</i>	2002
C	<i>Asperula conferta</i>	1999	C	<i>Drosera pygmaea</i>	1999
C	<i>Austrofestuca hookeriana</i>	1999	V	<i>Eleocharis acuta</i>	2002
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	2002	C	<i>Eleocharis gracilis</i>	2002
C	<i>Baumea arthropophylla</i>	2002		<i>Epilobium hirtigerum</i>	2002
	<i>Burchardia umbellata</i>	2002	C	<i>Eryngium vesiculosum</i>	1999
	<i>Bursaria spinosa</i>	2002	V	<i>Eucalyptus cephalocarpa</i>	2002

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
	<i>Eucalyptus goniacalyx</i>	2002		<i>Lomandra longifolia</i>	2002
V	<i>Eucalyptus ovata</i>	2002	V	<i>Lythrum hyssopifolia</i>	2002
E	<i>Eucalyptus radiata</i>	2002	E	<i>Melaleuca ericifolia</i>	1999
C	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	1999		<i>Microlaena stipoides</i>	2002
E	<i>Euchiton sphaericus</i>	1999		<i>Microtis parviflora</i>	1999
V	<i>Exocarpos cupressiformis</i>	2002	V	<i>Opercularia varia</i>	2002
	<i>Gahnia radula</i>	1999	C	<i>Ottelia ovalifolia</i>	1999
	<i>Gonocarpus tetragynus</i>	2002		<i>Oxalis exilis/perennans</i>	2002
C	<i>Gratiola peruviana</i>	1999	E	<i>Ozothamnus ferrugineus</i>	2002
C	<i>Haloragis heterophylla</i>	2003		<i>Persicaria decipiens</i>	2002
V	<i>Helichrysum luteoalbum</i>	1999	V	<i>Plantago varia</i>	1999
V	<i>Hemarthria uncinata</i>	2002	E	<i>Poa labillardierei</i> var. <i>labillardierei</i>	1999
E	<i>Hydrocotyle laxiflora</i>	1999		<i>Poa morrisii</i>	1999
E	<i>Hypericum gramineum</i>	2002	E	<i>Poa tenera</i>	2002
C	<i>Hypolepis glandulifera</i>	2002		<i>Poranthera microphylla</i>	2002
E	<i>Hypoxis</i> sp.	1999		<i>Pteridium esculentum</i>	2002
E	<i>Imperata cylindrica</i>	1999	E	<i>Rubus parvifolius</i>	1999
C	<i>Isolepis fluitans</i>	2002		<i>Rytidosperma geniculatum</i>	2002
V	<i>Isolepis inundata</i>	1999		<i>Rytidosperma racemosum</i>	2002
C	<i>Isotoma fluviatilis</i>	2002	E	<i>Rytidosperma semiannulare</i>	2003
	<i>Juncus amabilis</i>	2002		<i>Rytidosperma setaceum</i>	2002
	<i>Juncus bufonius</i>	2002		<i>Rytidosperma tenuius</i>	2002
	<i>Juncus gregiflorus</i>	2002		<i>Schoenus apogon</i>	2002
	<i>Juncus pallidus</i>	2002	C	<i>Schoenus tesquorum</i>	2002
	<i>Juncus sarophorus</i>	2002	V	<i>Solanum laciniatum</i>	2002
	<i>Kunzea ericoides</i> spp. agg.	2002	V	<i>Solenogyne dominii</i>	1999
	<i>Lachnagrostis filiformis</i>	2002	V	<i>Thelymitra peniculata</i>	2002
	<i>Lepidosperma gunnii</i>	2002		<i>Themeda triandra</i>	2002
V	<i>Leptorhynchos tenuifolius</i>	2002		<i>Tricoryne elatior</i>	2002
	<i>Leptospermum continentale</i>	2002	V	<i>Veronica gracilis</i>	2002
E	<i>Leptospermum scoparium</i>	2002	E	<i>Viola hederacea</i>	1999
	<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	2002	E	<i>Wahlenbergia gracilis</i>	2002

Introduced Species

<i>Acacia longifolia</i> subsp. <i>longifolia</i>	<i>Dactylis glomerata</i>	<i>Phalaris minor</i>
<i>Agrostis capillaris</i>	<i>Ehrharta erecta</i>	<i>Pittosporum undulatum</i>
<i>Aira cupaniana</i>	<i>Ehrharta longiflora</i>	<i>Plantago lanceolata</i>
<i>Aira elegantissima</i>	<i>Galium aparine</i>	<i>Poa annua</i>
<i>Aira praecox</i>	<i>Gamochaeta purpurea</i>	<i>Prunella vulgaris</i>
<i>Allium triquetrum</i>	<i>Gladiolus undulatus</i>	<i>Ranunculus repens</i>
<i>Anagallis arvensis</i>	<i>Holcus lanatus</i>	<i>Romulea rosea</i>
<i>Anthoxanthum odoratum</i>	<i>Hypochoeris glabra</i>	<i>Rosa rubiginosa</i>
<i>Briza maxima</i>	<i>Hypochoeris radicata</i>	<i>Rubus anglocandicans</i>
<i>Bromus catharticus</i>	<i>Isolepis levynsiana</i>	<i>Rumex crispus</i>
<i>Centaureum erythraea</i>	<i>Juncus articulatus</i>	<i>Solanum nigrum</i>
<i>Cerastium glomeratum</i> s.l.	<i>Leontodon taraxacoides</i>	<i>Sonchus oleraceus</i>
<i>Cicendia filiformis</i>	<i>Lonicera japonica</i>	<i>Sporobolus africanus</i>
<i>Cirsium vulgare</i>	<i>Lotus subbiflorus</i>	<i>Stenotaphrum secundatum</i>
<i>Conyza bonariensis</i>	<i>Lythrum junceum</i>	<i>Taraxacum officinale</i> spp. agg.
<i>Coprosma repens</i>	<i>Melaleuca armillaris</i>	<i>Trifolium repens</i>
<i>Cortaderia selloana</i>	<i>Paspalum dilatatum</i>	<i>Ulex europaeus</i>
<i>Crataegus monogyna</i>	<i>Paspalum distichum</i>	<i>Vulpia bromoides</i>
<i>Cynodon dactylon</i>	<i>Pennisetum clandestinum</i>	<i>Watsonia meriana</i> var. <i>bulbillifera</i>
<i>Cyperus eragrostis</i>	<i>Phalaris aquatica</i>	

Notes concerning some of the locally threatened plant species

Amphibromus archeri (Pointed Swamp Wallaby-grass). A solitary plant was found in 2002, in the Swampy Woodland, roughly 30 m from the Stud Rd fence, opposite the Bergins Rd intersection.

Austrofestuca hookeriana (Hooker Fescue). Reported to have been recorded by botanist, Mr G.W. Carr, in 1999.

Baumea arthropphylla (Fine Twig-rush). Two patches were found in 2002.

Drosera peltata subsp. *peltata* (Pale Sundew). Abundant in the slashed strips beneath the transmission lines.
Eleocharis gracilis (Slender Spike-rush). At least two patches of >1 m² were found in 2002.
Eryngium vesiculosum (Prickfoot). Reported to have been recorded by botanist, Mr G.W. Carr, in 1999.
Haloragis heterophylla (Varied Raspwort). One extensive patch was found in 2003 next to the Stud Rd fence.
Hypolepis glandulifera (Downy Ground-fern). A solitary plant was found in the excavations in 2002.
Imperata cylindrica (Blady Grass). Reported by Jameson and Rishworth in a 2002 management strategy for the site.
Isolepis fluitans (Floating Club-rush). Abundant in the excavations and also present in the Swampy Woodland.
Isotoma fluviatilis subsp. *australis* (Swamp Isotome). 2 m² was found in the excavations in 2002.
Microtis parviflora (Slender Onion-orchid). Reported by Jameson and Rishworth in a 2002 management strategy for the site.
Ottelia ovalifolia (Swamp Lily). As above.
Rytidosperma geniculatum (Knead Wallaby-grass). Scattered patches were found on the ridge top in 2002.
Schoenus tesquorum (Soft Bog-rush). Over 1,000 plants, dominant in parts of the Swampy Woodland.

Fauna of special significance

None detected.

Fauna habitat features

- The grassy ground flora provide suitable habitat for butterfly caterpillars and other invertebrates;
- It is possible that butterflies congregate on the ridge top (which is what many butterflies do on hilltops);
- The trees feed birds, possums and insects, and the insects feed more birds and probably bats.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Endangered Vegetation Types

Valley Heathy Forest and Swampy Woodland are endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that native vegetation of these types is necessarily of at least High conservation significance. It follows from criterion 3.2.3 of Amos (2004) that the site is of **State** significance.

Rare or Threatened Plants

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Invasion by environmental weeds:
 - Very serious: Sweet Vernal-grass (*Anthoxanthum odoratum*), Gorse (*Ulex europaeus*), Bulbil Watsonia (*Watsonia meriana*);
 - Serious: Brown-top Bent (*Agrostis capillaris*), Large Quaking-grass (*Briza maxima*), Jointed Rush (*Juncus articulatus*), Water Couch (*Paspalum distichum*), Blackberry (*Rubus discolor*);
 - Moderate: Sallow Wattle (*Acacia longifolia*), Angled Onion (*Allium triquetrum*), Hawthorn (*Crataegus monogyna*), Cocksfoot (*Dactylis glomerata*), Panic Veldt-grass (*Ehrharta erecta*), Cleavers (*Galium aparine*), Wild Gladiolus (*Gladiolus undulatus*), Yorkshire Fog (*Holcus lanatus*), Cat's Ear (*Hypochoeris radicata*), Japanese Honeysuckle (*Lonicera japonica*), Paspalum (*Paspalum dilatatum*), Kikuyu Grass (*Pennisetum clandestinum*), Toowoomba Canary-grass (*Phalaris aquatica*), Sweet Pittosporum (*Pittosporum undulatum*), Ribwort (*Plantago lanceolata*), Creeping Buttercup (*Ranunculus repens*), Common Onion-grass (*Romulea rosea*), Squirrel-tail Fescue (*Vulpia bromoides*);
- Loss or decline of plant species whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or misadventure;
- Climate change and the effects of drought, particularly on wetland and Swampy Woodland vegetation.

Management issues

- This site's native vegetation is being professionally managed under contract to SP AusNet, guided by the 2002 report, *'Habitat and Pest Plant Management Strategy 2002-2007 – Rowville Terminal Station'* by G. Jameson and R. Rushworth;
- Slashing beneath the transmission lines is not compromising the conservation values of the affected vegetation;

- A small part of the rare wetland species that are presently confined to the ridgetop excavations should be propagated or transplanted to establish populations in the wettest parts of the Swampy Woodland, to provide greater security for the species.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the matters discussed under the heading, 'Significance ratings';
- Parts of the site are included under the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, based on the description of Site 29 of the report by Water Ecoscience (1998). The site described here is larger to encompass all the significant native vegetation, including areas that are periodically slashed;
- The Planning Scheme zoning is Special Use Zone 3 (SUZ3).

Information sources used in this assessment

- A site survey by Dr Lorimer for 3½ hours on 7th November 2002 using this study's standard approach described in Section 2.4 of Vol.1. This included:
 - Compilation of lists of indigenous and introduced plant species in each of four parts of the site;
 - Description of the structural and floristic composition of each type of native vegetation;
 - Incidental fauna observations; and
 - Checks for fauna habitat, ecological threats and management issues;
- A brief re-inspection of the Swampy Woodland by Dr Lorimer from the fenceline on 30th November 2003 to seek any cryptic species missed the previous year and check for additional Pointed Swamp Wallaby-grass (*Amphibromus archeri*);
- The 2002 report, '*Habitat and Pest Plant Management Strategy 2002-2007 – Rowville Terminal Station*' by G. Jameson and R. Rushworth for SPI PowerNet (noting that there are inaccuracies in the botanical content);
- Quadrat data from 1999 in the Department of Sustainability & Environment's '*Flora Information System*'.
- Verbal information about how the site's vegetation is managed, from Mr Malcolm Warren of SP AusNet;
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Acknowledgment

Thanks to SP AusNet for permission to survey the property, and to Mr Malcolm Warren of SP AusNet for his assistance and attendance during the site inspection.

Site 73. Starlight Reserve, Rowville

Council reserve with bushland, a playground and minor relics of the Second World War. Melway ref. 81 G5.

Site Significance Level: *State*

- Two endangered Ecological Vegetation Classes are present: Valley Heathy Forest and Swampy Woodland;
- Some of the vegetation is in good ecological condition;
- There is a solitary plant of a nationally endangered species, the Matted Flax-lily (*Dianella amoena*), although the identity has not been confirmed to scientific standards;
- There are eight other plant species that are threatened in Knox or in the whole Melbourne area;
- The reserve also has some historical significance as part of a Second World War camp.



Scale 1:2,000
0 20 40 60 80 100m

Boundaries

This 3.26 ha site is the whole of Starlight Reserve, as outlined in red above.

Land use & tenure: Council reserve for nature conservation, heritage conservation and public enjoyment, including a playground.

Site description

This site lies on the lower slope of a small hill, which drains toward Dandenong Creek 600 m to the southwest. The elevation range is 41-54 m and the slope is gentle (typically 6%), falling to the south but interrupted by an east-west drain.

The soil is shallow, poorly draining, light grey loam over clay subsoil, derived from decomposition of the underlying Lower Devonian sedimentary rocks of the Humevale formation.

The site was once part of a military camp that became a prisoner-of-war camp during the Second World War. This gives the site historical significance, highlighted on signs that have been erected in the reserve. The main uses of the land in those days appear to have been a latrine, an open sewer, a sewage treatment building and a vehicle track.

Given the reserve's history, it is surprising that it retains so much of biological significance.

The richest areas of indigenous plants are toward the northwest corner and just east of the playground. These two areas are quite different in character, the former being densely shrubby regrowth while the latter is open and grassy due to past mowing beneath old trees. Both areas belong to the endangered Ecological Vegetation Class, Valley Heathy Forest.

There is also a shallow drainage line with a band of the regionally endangered Ecological Vegetation Class, Swampy Woodland. This is marked on the aerial photograph on the previous page.

The other highlight of the reserve is a patch of *Dianella amoena* (Matted Flax-lily), which is listed as Endangered under the federal *Environment Protection and Biodiversity Conservation Act 1999* and is Critically Endangered in Knox. However, the identity has not been proved to scientific standards because no specimen can be taken from such a rare plant, and no expert on the genus *Dianella* has visited to confirm the identity.

More details about the reserve can be obtained from the 'Bushland Management Plan for Starlight Reserve, Rowville, 2001' by G.S. Lorimer (2001) for Knox City Council.

Relationship to other land

The immediate surroundings of Starlight Reserve are residential in character, with detached dwellings. Many of the residential lots in the neighbourhood retain one or more remnant eucalypts, but few retain any understorey. This means that possums and hardier native birds still find good habitat, but the range of wildlife species is low and imbalanced. For example, there are reasonable numbers of aggressive nectar-eating birds such as wattlebirds but few highly beneficial insect-eating birds.

The reserve lies approximately 200 metres from the public land corridor along Dandenong Creek, and 600 metres from the creek itself. The nearest part of the creek corridor contains the Tirhatuan Wetlands (Site 74), whose renowned waterbirds are unlikely to be attracted away from the water to Starlight Reserve. Forest birds also move along the creek's habitat corridor, and Starlight Reserve is visited daily by Eastern Rosellas that are nomadic along the valley. Birds such as these probably also use the woodland at the Rowville Electricity Terminal Station (Site 72), 200 m to the northeast.

The nearest large area of natural vegetation is 1½ km to the southeast, extending between Churchill National Park and the adjoining Dandenong Police Paddocks Reserve. Waverley Golf Club provides a partially treed link for much of the distance between Starlight Reserve and the Dandenong Police Paddocks, but the author has not observed wildlife movement along that alignment.

Because it appears that there may be little movement of birds or insects between Starlight Reserve and large areas of forest, there is probably little infusion of pollen and seeds of indigenous flora into Starlight Reserve and the less abundant plant species are therefore at risk of inbreeding and poor regenerative capacity.

Bioregion: Gippsland Plain

Habitat types

Valley Heathy Forest (EVC 127, Endangered): Estimated to cover 1.95 ha, comprising 0.11 ha in good ecological condition (rating B), 1.50 ha in fair ecological condition (rating C) and 0.34 ha in poor ecological condition (rating D). 80 indigenous plant species have been recorded.

Canopy trees: Dominated by *Eucalyptus cephalocarpa* with smaller numbers of *E. radiata* and *E. goniocalyx*.

Lower trees: Rather dense, dominated by *Acacia mearnsii*, *Exocarpos cupressiformis*, *Allocasuarina littoralis* and *A. melanoxylon*.

Shrubs: The shrub layer is prickly and is dense in patches (depending on the history of slashing), being predominantly regrowth of *Bursaria spinosa*, *Acacia paradoxa* and *Leptospermum continentale* and *Leptospermum scoparium*.

Vines: The light twiner, *Billardiera mutabilis*, is abundant, and *Pandorea pandorana* is scattered.

Ferns: Absent.

Ground flora: Densely grassy and dominated by *Microlaena stipoides* and *Austrostipa rudis*, with plenty of *Dichondra repens*. Lilies and geophytes (i.e. plants that die back to underground storage organs during the unfavourable season of the year) are particularly well represented, characteristically including large colonies of *Pterostylis nutans*.

Swampy Woodland (EVC 937, **regionally Vulnerable**): Estimated to cover 0.3 ha, comprising 0.17 ha in fair ecological condition (rating C) and 0.13 ha in poor ecological condition (rating D). 41 indigenous plant species have been recorded.

Dominant canopy trees: *Eucalyptus ovata*.

Dominant lower trees: *Acacia melanoxylon* and *Exocarpos cupressiformis*.

Shrubs: Rather sparse due to a long history of slashing. *Leptospermum scoparium* and *Pomaderris racemosa* are the only shrub species in reasonable numbers. *Melaleuca ericifolia* is very scarce but helps to confirm the diagnosis of Swampy Woodland.

Vines: The light twiner, *Billardiera mutabilis*, is present.

Ferns: Absent.

Ground flora: Moderately to very dense, dominated by *Microlaena stipoides* and *Lomandra longifolia*. Other species that are characteristic of Swampy Woodland are *Centella cordifolia*, *Drosera peltata* subsp. *peltata* and *Eragrostis brownii*.

Plant species

The following plant species were observed by the author in 2000. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Dianella amoena* is endangered nationally and *Diuris chryseopsis* and *Pomaderris racemosa* are rare in the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia mearnsii</i>	V	<i>Hardenbergia violacea</i>
V	<i>Acacia melanoxylon</i>	V	<i>Hemarthria uncinata</i>
	<i>Acacia paradoxa</i>	V	<i>Hydrocotyle hirta</i>
V	<i>Acacia verticillata</i>	E	<i>Hypericum gramineum</i>
V	<i>Acaena echinata</i>		<i>Juncus amabilis</i>
	<i>Acaena novae-zelandiae</i>		<i>Juncus gregiflorus</i>
V	<i>Allocasuarina littoralis</i>		<i>Juncus pallidus</i>
C	<i>Amyema pendula</i>		<i>Juncus sarophorus</i>
V	<i>Amyema quandang</i>	E	<i>Juncus subsecundus</i>
	<i>Arthropodium strictum</i>		<i>Kunzea ericoides</i> spp. agg.
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	V	<i>Lagenophora gracilis</i>
	<i>Billardiera mutabilis</i>	E	<i>Lagenophora stipitata</i>
	<i>Bossiaea prostrata</i>		<i>Lepidosperma gunnii</i>
	<i>Burchardia umbellata</i>	V	<i>Leptorhynchos tenuifolius</i>
	<i>Bursaria spinosa</i>		<i>Leptospermum continentale</i>
	<i>Carex breviculmis</i>	E	<i>Leptospermum scoparium</i>
	<i>Cassinia aculeata</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Cassinia arcuata</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
E	<i>Centella cordifolia</i>		<i>Lomandra longifolia</i>
E	<i>Cynoglossum suaveolens</i>	V	<i>Lythrum ?hyssopifolia</i>
E	<i>Daviesia latifolia</i>	E	<i>Melaleuca ericifolia</i>
	<i>Deyeuxia quadriseta</i>		<i>Microlaena stipoides</i>
	<i>Dianella admixta</i>	V	<i>Opercularia varia</i>
C	<i>Dianella amoena</i>		<i>Oxalis exilis/perennans</i>
V	<i>Dianella longifolia</i> s.l.	E	<i>Ozothamnus ferrugineus</i>
	<i>Dichondra repens</i>		<i>Pandorea pandorana</i>
C	<i>Diuris chryseopsis</i>		<i>Poa morrisii</i>
V	<i>Drosera peltata</i> subsp. <i>auriculata</i>	C	<i>Pomaderris racemosa</i>
E	<i>Drosera peltata</i> subsp. <i>peltata</i>		<i>Poranthera microphylla</i>
V	<i>Drosera whittakeri</i>		<i>Pterostylis nutans</i>
	<i>Eragrostis brownii</i>		<i>Rytidosperma geniculatum</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Rytidosperma laeve</i>
	<i>Eucalyptus goniocalyx</i>		<i>Rytidosperma linkii</i> var. <i>fulvum</i>
V	<i>Eucalyptus ovata</i>		<i>Rytidosperma pallidum</i>
E	<i>Eucalyptus radiata</i>		<i>Rytidosperma penicillatum</i>
C	<i>Eucalyptus rubida</i>	V	<i>Rytidosperma pilosum</i>
V	<i>Euchiton collinus</i>		<i>Rytidosperma setaceum</i>
V	<i>Exocarpos cupressiformis</i>		<i>Rytidosperma tenuius</i>
	<i>Gonocarpus tetragynus</i>		<i>Schoenus apogon</i>

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Senecio glomeratus</i>	V	<i>Veronica gracilis</i>
	<i>Senecio hispidulus</i>	E	<i>Veronica plebeia</i>
V	<i>Thelymitra ?peniculata</i>	E	<i>Viola hederacea</i>
	<i>Themeda triandra</i>	E	<i>Wahlenbergia gracilis</i>
	<i>Tricoryne elatior</i>	E	<i>Xanthosia dissecta</i>
Introduced Species			
	<i>Acacia longifolia</i> subsp. <i>longifolia</i>		<i>Dactylis glomerata</i>
	<i>Agrostis capillaris</i>		<i>Danthonia decumbens</i>
	<i>Allium triquetrum</i>		<i>Dodonaea viscosa</i>
	<i>Anthoxanthum odoratum</i>		<i>Ehrharta erecta</i>
	<i>Aster subulatus</i>		<i>Ehrharta longiflora</i>
	<i>Billardiera heterophylla</i>		<i>Freesia ?alba</i> × <i>leichtlinii</i>
	<i>Briza maxima</i>		<i>Galium aparine</i>
	<i>Centaurium erythraea</i>		<i>Gamochaeta purpurea</i>
	<i>Cerastium ?glomeratum</i> s.l.		<i>Hedera helix</i>
	<i>Conyza ?sumatrensis</i>		<i>Holcus lanatus</i>
	<i>Coprosma repens</i>		<i>Hypochoeris radicata</i>
	<i>Cotoneaster glaucophyllus</i>		<i>Leontodon taraxacoides</i>
	<i>Cotoneaster pannosus</i>		<i>Lotus subbiflorus</i>
	<i>Crassula multicava</i>		<i>Oxalis incarnata</i>
	<i>Crataegus monogyna</i>		<i>Oxalis pes-caprae</i>
	<i>Cynodon dactylon</i>		<i>Paspalum dilatatum</i>
	<i>Cyperus eragrostis</i>		<i>Pennisetum clandestinum</i>
			<i>Phalaris aquatica</i>
			<i>Pittosporum undulatum</i>
			<i>Plantago coronopus</i>
			<i>Plantago lanceolata</i>
			<i>Prunella vulgaris</i>
			<i>Prunus cerasifera</i>
			<i>Ranunculus muricatus</i>
			<i>Romulea rosea</i>
			<i>Rubus anglocandicans</i>
			<i>Solanum nigrum</i>
			<i>Sonchus oleraceus</i>
			<i>Taraxacum officinale</i> spp. agg.
			<i>Trifolium repens</i>
			<i>Ulex europaeus</i>
			<i>Viola odorata</i>

Notes concerning some of the locally threatened plant species

Cynoglossum suaveolens (Sweet Hound's-tongue). There is a patch measuring 1 m across, perhaps a single plant.

Dianella amoena (Matted Flax-lily). A single patch, in the Swampy Woodland.

Diuris chryseopsis (Golden Moths). One plant was reported by Mr John Erwin (of Knox City Council) to have flowered in September 2001.

Drosera peltata subsp. *peltata* (Pale Sundew). Hundreds of plants were found in the swale in the southeast.

Eucalyptus rubida (Candlebark). Two individuals were found.

Hydrocotyle ?foveolata (Yellow Pennywort). Several tens of plants found in 2000 near the eastern fence.

Lagenophora stipitata (Common Lagenophora). Numbers not recorded.

Pomaderris racemosa (Cluster Pomaderris). Six plants were found.

Veronica plebeia (Trailing Speedwell). Five separate patches were found. The number of individuals is unclear due to intertwining stems.

Fauna of special significance

None detected. The Atlas of Victoria Wildlife includes a 1988 record of five Little Egrets in or near Starlight Reserve, but this seems very likely to be more properly attributed to the nearby section of Dandenong Creek (allowing for inaccurate specification of coordinates).

Fauna habitat features

- Some of the larger eucalypts have hollows that may be usable for nests or roosting by birds, bats, possums or insects;
- There is a modest number of logs and branches on the ground which, combined with dense shrubs and ground flora, represent good habitat for reptiles and invertebrates;
- The high density and diversity of shrubs in the reserve's northwest significantly improves the habitat for native insects and birds. The prickliness of many of the shrubs helps protect birds from cats. However, a fox also inhabited the shrubby area when the reserve's management plan was being prepared in 2001;
- The dense ground flora may provide fodder for butterflies and their relatives;
- Fragmentation of the site's native vegetation is to some degree offset by the diversity of habitat (dense to open, damp to dry), which is beneficial to some native fauna.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Endangered Vegetation Types

Valley Heathy Forest and Swampy Woodland are endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that all of the reserve's native vegetation is necessarily of at least High conservation significance. This, in turn, gives the site **State** significance under criterion 3.2.3 of Amos (2004).

Rare or Threatened Plants

Criterion 3.1.1 confers at least **State** significance on a site with known habitat for a nationally threatened species such as *Dianella amoena*. The identity is yet to be confirmed to scientific standards, but it is very likely to be correct and the Precautionary Principle means that it should be treated essentially the same as if the identity is certain. (The Precautionary Principle is explained in the Glossary at the end of Volume 1.)

Many of the other locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Invasion by environmental weeds, of which Gorse (*Ulex europaeus*) is the most serious followed by Sweet Vernal-grass (*Anthoxanthum odoratum*), Ribwort (*Plantago lanceolata*) and Common Onion-grass (*Romulea rosea*). The other species rated as serious threats are Blackberry (*Rubus discolor*), Cat's-Ear (*Hypochoeris radicata*), Paspalum (*Paspalum dilatatum*), Veldt-grasses (*Ehrharta erecta* and *E. longiflora*) beneath Cherry Ballarts, and Drain Flat-sedge (*Cyperus eragrostis*) in a swale in the reserve's southeastern corner;
- Critically small population sizes of several plant species, including the nationally endangered *Dianella amoena*;
- Possible future progression of moderately severe eucalypt dieback disease in the reserve's northwestern corner;
- Fragmentation of habitat, leading to reduced visitation by small insect-eating birds and hence a risk of worsening plant pests and diseases.
- Predation by foxes;
- Trampling;
- Damage to vegetation by children, particularly cubby houses in the northwest of the reserve.

Management issues

- Guidance for management of the reserve's habitat is discussed in detail in the '*Bushland Management Plan for Starlight Reserve, Rowville, 2001*' by G.S. Lorimer (2001) for Knox City Council;
- A strategy for burning parts of the reserve, initially as a trial, was developed by Dr Lorimer in consultation with Council and the Rowville Fire Brigade, as described in the report, '*Fire in Knox Bushland Reserves 2001*';
- Grass weeds beneath Cherry Ballarts (*Exocarpos cupressiformis*) could be controlled using grass-specific herbicide;
- Council has approached the Department of Sustainability & Environment about conserving the nationally Endangered *Dianella amoena*, but further action is required. Firstly, the identity should ideally be confirmed by an expert on *Dianellas*, who would probably have to visit the site. Depending on permit requirements, seed should be collected and propagated. To avoid inbreeding, consideration should be given to propagating plants from one or more of the closest other populations of the species, for exchange between these sites. Great care would be needed to safeguard against possible introduction of plant disease when planting, so as not to risk infecting the existing plant;
- If possible, pollen from a *Diuris chryseopsis* plant at Roselyn Crescent Reserve (Site 45) should be used to manually pollinate the plant (or perhaps plants) of that species at Starlight Reserve, for outbreeding. This needs to be done by someone with experience in pollinating orchids, and during September. Pollen from a plant at Starlight Reserve could also be used to pollinate one or two plants at Roselyn Crescent Reserve, but this is less important;
- The plight of other scarce plant species should be improved by planting more individuals after propagating them from seeds collected nearby. This applies to *Acacia verticillata*, *Cynoglossum suaveolens*, *Rytidosperma geniculatum*, *Daviesia latifolia*, *Hardenbergia violacea* and *Xanthosia dissecta*;
- Seeds (or if necessary, cuttings) should be collected from as many as possible of the *Pomaderris racemosa* for propagation and planting at one or more similar sites, to provide security in case the ones at Starlight Reserve decline, die out or suffer misadventure.
- All propagations and plantings should be documented in Council's files about the reserve.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its State significance, the rare and threatened plants and the endangered EVCs;
- The Planning Scheme zoning is Public Park and Recreation Zone (PPRZ);
- The largest lot that makes up most of the reserve is included under the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, based on the description of Site 15 of the report by Water Ecoscience (1998).

Information sources used in this assessment

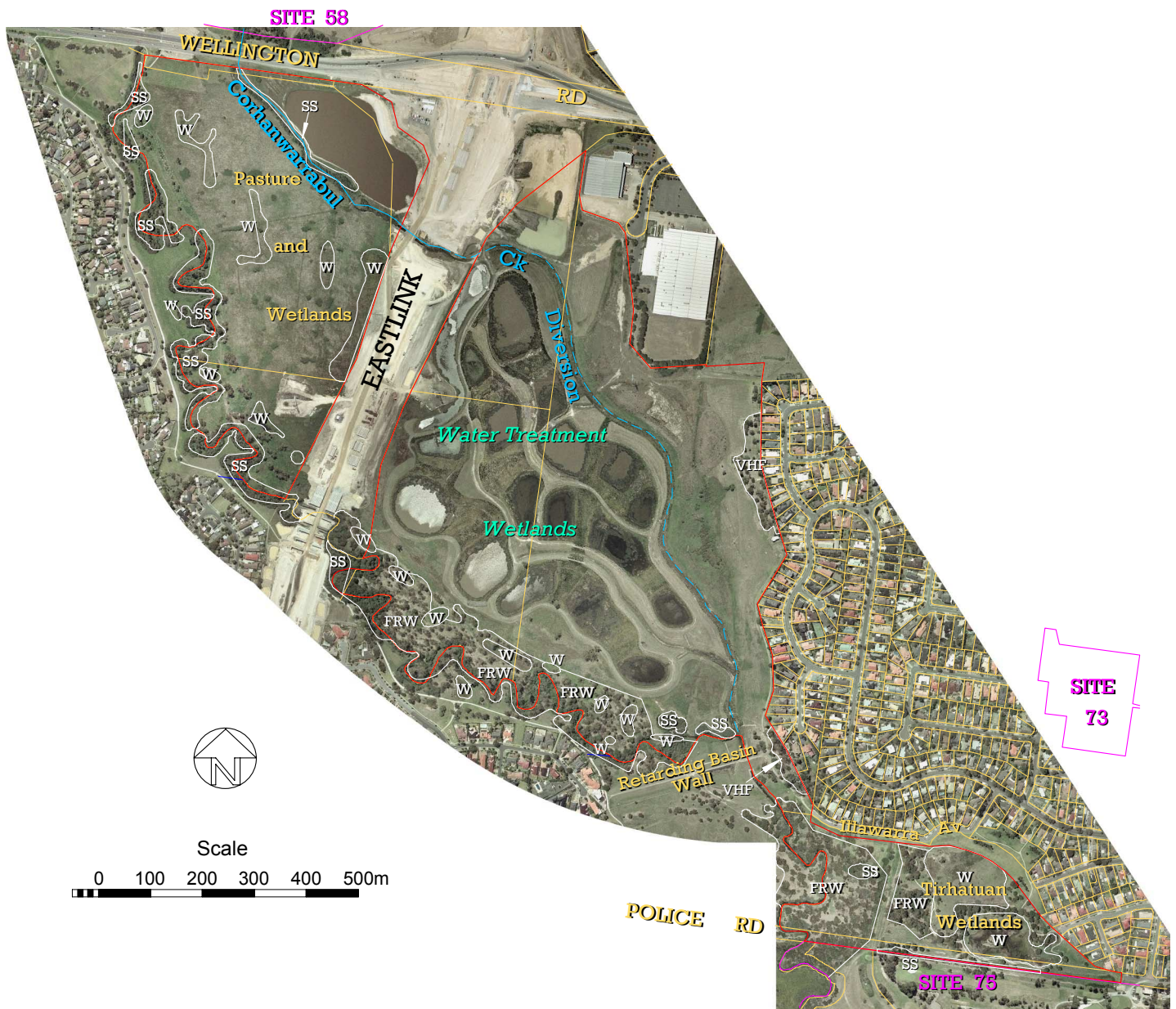
- 9½ hours of site survey by Dr Lorimer on 28/2/00, 2/3/00 and 26/6/00 for the '*Bushland Management Plan for Starlight Reserve, Rowville, 2001*' for Knox City Council. This included:
 - Compilation of lists of indigenous and introduced plants within each of five parts of the reserve;
 - Detailed mapping and documentation of rare species populations and the ecological condition of the vegetation;
 - A description of the vegetation's structural and floristic composition;
 - Incidental fauna observations;
 - Checks for fauna habitat, ecological threats and management issues; and
 - Taking photographs that capture the main ecological features of the reserve and that will be useful for long-term monitoring of the reserve;
- Re-inspection of the site by Dr Lorimer on 3/10/01 for the report, '*Fire in Knox Bushland Reserves 2001*' by Lorimer (2001). This included:
 - An update to the lists of indigenous and introduced plants; and
 - Development of a strategy for ecological burning of the reserve, in consultation with Council and the Rowville Fire Brigade;
- Aerial photography from 1968, 1972, 1982, 1992, 1996, February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 74. Police Road Retarding Basin and Tirhatuan Wetlands

A section of Dandenong Creek’s floodplain with a retarding basin and conservation wetlands. Centred on Melway ref. 81 E5.

Site Significance Level: State

- All the native vegetation belongs to Ecological Vegetation Classes that are regionally endangered;
- Nine species of plants are rare or threatened throughout the Melbourne area, and seven more are threatened in Knox;
- Being on Dandenong Creek, the site is on a major corridor for daily and seasonal movements of fish, birds, frogs and insects (particularly waterbirds, several species of which are threatened);
- The site is known to have supported the nationally vulnerable fish, Dwarf Galaxias, at least until 1985.



Markings in white indicate Ecological Vegetation Classes as follows: FRW=Floodplain Riparian Woodland; SS=Swamp Scrub; VHF=Valley Heathy Forest; and W=Floodplain Wetland Complex. The aerial photograph was taken in February 2007.

Boundaries

The site has one section each side of the EastLink road, each outlined in red on the aerial photograph above. The western boundary is Dandenong Creek, solely because that is the edge of Knox and hence the limit of this report. The rest of the

boundary mostly coincides with property boundaries, except where it skirts wetlands at the northern edge of Tirhatuan Wetlands Reserve and next to the northbound off-ramp of EastLink. Sections of neighbouring sites are outlined in magenta.

Compared with the first edition of this report, the total area has been reduced from 111.2 ha (in one polygon) to 100.7 ha due to construction of EastLink.

Note

Due to the effects of very serious drought over recent years, along with the newness of the water treatment wetlands marked on the aerial photograph and the construction of EastLink through the site, the information below may become out of date very quickly. The site's biologically significant features and significance rating should be reassessed as soon as the wetlands and associated fauna have a chance to settle into the new landscape, hopefully without the effects of drought.

Land use & tenure: Entirely public land, being floodplain required for drainage purposes. Part is used as pasture, part is used for water treatment wetlands, and Tirhatuan Wetlands is used as a conservation reserve.

Site description

The site is on the floodplain of Dandenong Ck, with a southward gradient of 0.3% and little variation in elevation either side of 40 m. Dandenong Ck meanders within its natural channel near the western edge of the floodplain, and a drain has been dug close to the eastern edge of the floodplain to divert the waters of Corhanwarrabul Ck during times of low flow. The natural course of Corhanwarrabul Ck meets Dandenong Ck just north of Wellington Rd.

In times of flood, the whole floodplain is inundated and the waters are held back by a retarding basin wall toward the southern end of the site (marked on the aerial photograph).

Upstream (north) of the retarding basin wall, Dandenong Ck is lined by a good cover of native vegetation, mostly fenced to exclude cattle from adjacent pasture. The naturally dominant Manna Gums (*Eucalyptus viminalis*) have been removed from part of this corridor, creating thickets of Swamp Paperbark (*Melaleuca ericifolia*). This represents a transition from the naturally occurring Floodplain Riparian Woodland to an artificial disclimax* of Swamp Scrub. Both of these vegetation types are listed as regionally endangered, although a disclimax community is not as ecologically significant as a naturally occurring one.

Some native trees have been planted along this corridor, including species such as River Red Gum (*Eucalyptus camaldulensis*) that do not occur naturally in this site.

The pasture areas in the north of the site have thinly scattered Swamp Gums (*Eucalyptus ovata*) that serve as perching sites for birds of prey, and possibly as roosting sites by native bats.

There are patches of seasonal wetlands within the pasture. There are also billabongs beside Dandenong Ck that extend into the pasture, but that are now mostly fenced to exclude cattle. The billabongs and seasonal wetlands have predominantly native vegetation (at least, when they have not dried out from drought), belonging to the regionally endangered Ecological Vegetation Class, Floodplain Wetland Complex.

A large system of artificial wetlands was excavated for water treatment in 2002, as marked on the aerial photograph. This has the potential to provide important breeding and foraging habitat for significant waterbirds. The excavations caused the destruction of some Swamp Scrub and wetland habitat, including locally rare plants and potential habitat for the nationally vulnerable fish, Dwarf Galaxias. However, the site has suffered major ecological upset before, when it was originally cleared and dissected with agricultural drains, which suggests that there are reasonable prospects for it to recover from the 2002 works.

On the downstream (southern) side of the retarding basin wall, Dandenong Ck flows through more Floodplain Riparian Woodland and past the Tirhatuan Wetlands Conservation Reserve. The reserve has two shallow floodplain depressions supporting high quality wetland vegetation.

Drains have been dug through the area, and these support native vegetation dominated by Swamp Paperbark. The drain along the site's southern boundary is also lined with many specimens of Woolly Tea-tree (*Leptospermum lanigerum*).

The slope behind houses near the Illawarra Avenue entrance to the Police Road Retarding Basin supports some remnant trees and understorey vegetation of the endangered Valley Heathy Forest.

Relationship to other land

This site is separated from the Dandenong Valley Parklands (Site 58) only by Wellington Rd. Downstream, there is a continuum of biologically significant sites including Tirhatuan Park, Tirhatuan Lakes Golf Course (Site 75) and the Dandenong Police Paddocks Reserve (Site 76). Aquatic fauna such as fish and invertebrates can move freely between these

* A disclimax is a stable ecological state that differs from the natural stable state due to disturbance, usually by humans.

sites. The same is true of birds such as waterbirds and birds of prey that move seasonally or nomadically along the corridor. The movements of some birds may be disrupted by the construction of EastLink.

The industrial and residential estates that flank the sites are not conducive to fauna movements laterally from the site, except perhaps that the more treed neighbourhood along Illawarra Av provides some additional habitat for less sensitive wildlife. However, birds such as Eastern Rosellas can be seen daily moving between the site and nearby Starlight Reserve (Site 73), whose location is marked on the aerial photograph.

Bioregion: Gippsland Plain

Habitat types

Perennial Stream (No EVC number available). Includes aquatic species such as *Potamogeton crispus*, *P. ochreatus* and *Triglochin procerum*.

Floodplain Wetland Complex (EVC 172, **regionally Endangered**) in numerous patches: Estimated as 7.0 ha in total area (excluding two small wetlands west of Dandenong Ck), comprising 3.2 ha in excellent ecological condition (rating A), 1.7 ha in good ecological condition (rating B) and 2.1 ha in fair ecological condition (rating C). 31 indigenous plant species were found.

Trees, shrubs, vines and ferns: Some *Melaleuca ericifolia* encroaches from the surrounding vegetation and some *Cassinia arcuata* has established at the edge of one wetland.

Aquatic and semi-aquatic flora: Different areas are dominated by *Eleocharis sphacelata*, *Eleocharis acuta*, *Phragmites australis*, or various species of *Typha*, *Juncus*, *Carex* or *Persicaria*. *Myriophyllum crispatum* and *Alisma plantago-aquatica* are also dense in some areas.

Swamp Scrub (EVC 53, **regionally Endangered** but in this case a disclimax community): Estimated as 5.3 ha in total area (including the western bank of Dandenong Ck), comprising 0.5 ha in good ecological condition (rating B), 4.3 ha in fair ecological condition (rating C) and 0.5 ha in poor ecological condition (rating D). 40 indigenous plant species were found.

Canopy: Dominated by *Melaleuca ericifolia* to 8 m tall. There are also emergent *Eucalyptus ovata* and *Acacia melanoxylon*, and some *Rapanea howittiana*.

Shrubs: Variable in density, comprising *Coprosma quadrifida*, *Leptospermum lanigerum*, *Ozothamnus ferrugineus* and small numbers of *Gynatrix pulchella*, *Melicytus dentatus*, *Pomaderris racemosa* and *Solanum laciniatum*.

Vines: Indigenous vines absent, but the weed Japanese Honeysuckle is a serious problem.

Ferns: Absent.

Ground flora: There are patches of *Phragmites australis* and other patches of low-growing wetland plants such as *Triglochin striatum* and species of *Juncus* and *Persicaria*.

Floodplain Riparian Woodland (EVC 56, **regionally Endangered**): Estimated as 10.5 ha in total area, comprising 0.8 ha in good ecological condition (rating B), 5.1 ha in fair ecological condition (rating C) and 4.6 ha in poor ecological condition (rating D). 38 indigenous plant species were found. Note that wetlands are often incorporated within this EVC for coarse-scale mapping, but are here segregated into Floodplain Wetland Complex.

Dominant canopy trees: *Eucalyptus viminalis* with smaller numbers of *E. ovata*. Some trees would be over 100 years old.

Dominant lower trees: *Melaleuca ericifolia* is abundant. *Rapanea howittiana* is less abundant, but still with substantial numbers. *Acacia melanoxylon* and *A. dealbata* are less numerous.

Shrubs: Dominated by *Melicytus dentatus*, *Bursaria spinosa* and *Coprosma quadrifida*. The ecological indicator species, *Gynatrix pulchella*, is present.

Vines: The parasitic twiner, *Cassytha melantha*, is present.

Ferns: Absent.

Ground flora: Heavily invaded by weeds. The dominant indigenous species are *Carex appressa*, *Poa ensiformis* and *Lomandra longifolia*.

Valley Heathy Forest (EVC 127, **Endangered**): Estimated to cover 0.3 ha, excluding areas with negligible native understorey. The more northerly of the two mapped patches is excluded from this total because it has negligible understorey. All in poor ecological condition (rating D). 13 indigenous plant species were found.

Canopy trees: Dominated by *Eucalyptus cephalocarpa* with smaller numbers of *E. radiata*.

Lower trees: A few *Acacia mearnsii*, *A. dealbata* and *Exocarpos cupressiformis*.

Shrubs: Small numbers of *Bursaria spinosa* and *Acacia paradoxa*.

Vines: The parasitic twiner, *Cassytha melantha*, is present.

Ferns: Absent.

Ground flora: Densely grassy and dominated by *Microlaena stipoides*. Also with plenty of *Dichondra repens*. The characteristic species, *Dianella longifolia*, is present but scarce.

Plant species

The following plant species were observed by Mr Rik Brown and the author in June 2002. Additional species would no doubt be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, the species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Acacia dealbata</i>		<i>Kunzea ericoides</i> spp. agg.
V	<i>Acacia mearnsii</i>	E	<i>Lemna disperma</i>
V	<i>Acacia melanoxylon</i>		<i>Leptospermum continentale</i>
	<i>Acacia paradoxa</i>	E	<i>Leptospermum lanigerum</i>
	<i>Acaena novae-zelandiae</i>	E	<i>Leptospermum scoparium</i>
	<i>Alisma plantago-aquatica</i>	E	<i>Lobelia anceps</i>
V	<i>Alternanthera denticulata</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Bursaria spinosa</i>		<i>Lomandra longifolia</i>
C	<i>Calystegia sepium</i>	C	<i>Lycopus australis</i>
	<i>Carex appressa</i>	E	<i>Melaleuca ericifolia</i>
E	<i>Carex fascicularis</i>	E	<i>Meliclytus dentatus</i>
E	<i>Carex gaudichaudiana</i>		<i>Microlaena stipoides</i>
	<i>Cassinia arcuata</i>	C	<i>Myriophyllum crispatum</i>
E	<i>Cassitya melantha</i>	C	<i>Myrsine howittiana</i>
E	<i>Centella cordifolia</i>	E	<i>Ozothamnus ferrugineus</i>
V	<i>Coprosma quadrifida</i>		<i>Persicaria decipiens</i>
E	<i>Crassula helmsii</i>	E	<i>Persicaria hydropiper</i>
V	<i>Dianella longifolia</i> s.l.	E	<i>Persicaria praetermissa</i>
	<i>Dichondra repens</i>	C	<i>Persicaria subsessilis</i>
V	<i>Eleocharis acuta</i>	E	<i>Phragmites australis</i>
	<i>Eleocharis sphacelata</i>		<i>Poa ensiformis</i>
	<i>Epilobium hirtigerum</i>		<i>Poa morrisii</i>
V	<i>Eucalyptus cephalocarpa</i>	E	<i>Poa tenera</i>
V	<i>Eucalyptus ovata</i>	C	<i>Pomaderris racemosa</i>
E	<i>Eucalyptus radiata</i>	V	<i>Potamogeton crispus</i>
E	<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>	V	<i>Potamogeton ochreatus</i>
V	<i>Exocarpos cupressiformis</i>	C	<i>Potamogeton tricarinatus</i> s.l.
	<i>Gahnia radula</i>	C	<i>Ranunculus inundatus</i>
C	<i>Geranium</i> sp. 5	E	<i>Rubus parvifolius</i>
	<i>Goodenia ovata</i>		<i>Rytidosperma penicillatum</i>
E	<i>Gynatrix pulchella</i>	E	<i>Senecio minimus</i>
V	<i>Hemarthria uncinata</i>	V	<i>Solanum laciniatum</i>
	<i>Juncus amabilis</i>	C	<i>Triglochin procera</i>
	<i>Juncus bufonius</i>	E	<i>Typha domingensis</i>
E	<i>Juncus procerus</i>	E	<i>Typha orientalis</i>
	<i>Juncus sarophorus</i>	E	<i>Veronica plebeia</i>
	<i>Juncus</i> sp.		

Introduced Species

<i>Acacia longifolia longifolia</i>	<i>Conyza sumatrensis</i>	<i>Galium aparine</i>	<i>Phalaris aquatica</i>
<i>Acanthus mollis</i>	<i>Cordyline australis</i>	<i>Genista monspessulana</i>	<i>Pittosporum undulatum</i>
<i>Agapanthus praecox</i>	<i>Crataegus monogyna</i>	<i>Hedera helix</i>	<i>Plantago lanceolata</i>
<i>Allium triquetrum</i>	<i>Cynodon dactylon</i>	<i>Helminthotheca echioides</i>	<i>Plantago major</i>
<i>Arctotheca calendula</i>	<i>Cyperus eragrostis</i>	<i>Hypochoeris radicata</i>	<i>Prunella vulgaris</i>
<i>Aster subulatus</i>	<i>Dactylis glomerata</i>	<i>Juncus articulatus</i>	<i>Prunus persica</i>
<i>Bellis perennis</i>	<i>Daucus carota</i>	<i>Lonicera japonica</i>	<i>Ranunculus repens</i>
<i>Briza maxima</i>	<i>Delairea odorata</i>	<i>Oxalis corniculata</i>	<i>Raphanus raphanistrum</i>
<i>Bromus catharticus</i>	<i>Euphorbia pepus</i>	<i>Oxalis purpurea</i>	<i>Romulea rosea</i>
<i>Centaureum tenuiflorum</i>	<i>Festuca arundinacea</i>	<i>Paspalum dilatatum</i>	<i>Rosa rubiginosa</i>
<i>Cirsium vulgare</i>	<i>Foeniculum vulgare</i>	<i>Paspalum distichum</i>	<i>Rubus anglocandicans</i>
<i>Conium maculatum</i>	<i>Fraxinus angustifolia</i>	<i>Pennisetum clandestinum</i>	<i>Rumex crispus</i>

<i>Salix babylonica</i> s.l.	<i>Solanum nigrum</i>	<i>Tradescantia fluminensis</i>	<i>Vicia sativa</i>
<i>Salix fragilis</i>	<i>Solanum pseudocapsicum</i>	<i>Trifolium dubium</i>	<i>Viola odorata</i>
<i>Salix</i> × <i>rubens</i>	<i>Sonchus asper</i> s.l.	<i>Trifolium repens</i>	<i>Watsonia meriana</i>
<i>Solanum mauritanium</i>	<i>Sonchus oleraceus</i>	<i>Ulex europaeus</i>	<i>Zantedeschia aethiopica</i>

Notes concerning some of the locally threatened plant species

- Calystegia sepium* (Large Bindweed). Scattered along Dandenong Creek. Only significant if it can be shown not to be the weed, *Calystegia silvatica*, or a hybrid between the two (which is the usual case in the Melbourne area);
- Carex fascicularis* (Tassel Sedge). Scattered around wetlands in the retarding basin and Tirhatuan Wetlands.
- Carex gaudichaudiana* (Fen Sedge). There were hundreds or thousands of square metres of this species prior to the construction of the water treatment wetland, and it is likely that at least some were unaffected.
- Crassula helmsii* (Swamp Crassula). Scattered around wetlands near Dandenong Creek in the retarding basin.
- Gynatrix pulchella* (Hemp Bush). A few found along Dandenong Ck, one beside Corhanwarrabul Ck and one near Tirhatuan Wetlands.
- Lemna disperma* (Common Duckweed). Fairly abundant in the waterways when inspected in 2002.
- Leptospermum lanigerum* (Woolly Tea-tree). Substantial numbers along a drainage channel along the site's southern boundary.
- Lycopus australis* (Australian Gipsywort). At least one was destroyed by construction of the water treatment wetlands. None were seen elsewhere in the site.
- Melicytus dentatus* (Tree Violet). Abundant along Dandenong Ck, and a single specimen was found beside Corhanwarrabul Ck in June 2002.
- Myriophyllum crispatum* (Upright Milfoil). Abundant in wetlands within the retarding basin and at Tirhatuan Wetlands.
- Pericaria praetermissa* (Spotted Knotweed). Thousands of square metres dominated by this species were destroyed during wetland destruction in 2002, but it is still widespread in other parts of the retarding basin.
- Pericaria subsessilis* (Hairy Knotweed). At least a few dozens were destroyed by construction of the water treatment wetlands. None were seen elsewhere in the site.
- Pomaderris racemosa* (Cluster Pomaderris). Several were found along Dandenong Ck south of the retarding basin, and beside the drain along the site's southern boundary.
- Potamogeton crispus* (Curly Pondweed). Scattered along Corhanwarrabul Ck and common in Dandenong Ck.
- Potamogeton tricarinatus* (Floating Pondweed). Some patches were found in the Tirhatuan Wetlands (perhaps planted).
- Ranunculus inundatus* (River Buttercup). Several patches were found in the Tirhatuan Wetlands (perhaps planted).
- Rapanea howittiana* (Muttonwood). A few hundred plants were found along Dandenong Ck, including a large number of mature trees. This is the only stronghold of the species in Knox or the southeastern suburbs.
- Veronica plebeia* (Trailing Speedwell). Scattered beside Dandenong Ck south of the retarding basin.

Fauna of special significance

Vulnerable Nationally

- Dwarf Galaxias. 20 were found at the Police Rd bridge on 15/10/85 and others were found close to that location on 12/11/85. Some were also found in a pond just outside the site on Corhanwarrabul Ck in December 1986. The population in this catchment has crashed since those recordings.

Vulnerable in Victoria

- Australasian Shoveller. Multiple records from 1999 appear in the Atlas of Victorian Wildlife.
- Great Egret. Frequently seen (including in this study), mostly as solitary individuals.
- Royal Spoonbill. One was seen at Tirhatuan Wetlands and there are multiple, recent records in the Atlas of Victorian Wildlife.
- Baillon's Crane. A 1999 record appears in the Atlas of Victorian Wildlife.

Near Threatened in Victoria

- Pied Cormorant. 1999 records from the retarding basin and the wetlands appear in the Atlas of Victorian Wildlife.
- Latham's (or Japanese) Snipe. Seen in c.1998, as reported in the Environment Effects Statement for the Scoresby Transport Corridor.
- Nankeen Night Heron. Records from 1999 appear in the Atlas of Victorian Wildlife, and the Environment Effects Statement for the Scoresby Transport Corridor indicates that they could be affected by the construction of the EastLink bridge across Dandenong Ck.

Rare in the Melbourne Area

- Buff-banded Rail. One bird was flushed from a wetland in the retarding basin.
- Pouched Lamprey. Caught and released near Police Rd in 1985, but unlikely to be extant.

Uncommon in the Melbourne Area

- Whistling Kite. One bird was seen flying over the floodplain.
- Australian Hobby. One bird was observed close to Dandenong Ck, south of the retarding basin.

Musk Lorikeet. A flock was seen in eucalypts.

Fauna habitat features

- The stream is used by ducks, fish and aquatic invertebrates, and probably Water Rats;
- The wetlands are used extensively by frogs, waterbirds, aquatic invertebrates (including many yabbies) and probably snakes;
- The wetlands were occupied (at least until 1985) by Dwarf Galaxias;
- Trees and shrubs provide some habitat for native birds, bats, possums and insects. In particular, the trees downstream of the retarding basin appear to provide a major roosting location for waterbirds (including ibis) and some trees contain stick nests likely to be made by birds of prey;
- Fragmentation of the native vegetation is to some degree offset by the diversity of habitat (scrubby to open, aquatic to dry), which is beneficial to some native fauna.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment'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 this site.

The site is also a component of the Dandenong Creek habitat corridor. The corridor is important at a Regional scale. It follows from criterion 1.2.6 that the site is of **Regional** significance.

Endangered Vegetation Types

All of the EVCs present are regionally Endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that the site's native vegetation is of at least High conservation significance. This, in turn, gives the site **State** significance under criterion 3.2.3 of Amos (2004).

Rare or Threatened Flora

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

The nationally vulnerable Dwarf Galaxias was found in a pond in the site's south in 1985. More recent surveys suggest that the species has declined drastically in numbers in the catchment. It is not certain whether this species will recover from this decline, but it may conceivably do so after the current period of many years of drought.

Criterion 3.1 regards all known habitat of nationally listed threatened fauna such as Dwarf Galaxias as being of at least State significance. In this case, however, the significance is treated here as **Regional** in view of the time since the last observation of Dwarf Galaxias and the real possibility that the fish will never again use the site for habitat.

The Great Egret and Royal Spoonbill are listed as threatened in Victoria and this site has a substantial area of suitable habitat for them. The frequency of recorded observations in this site and elsewhere on the floodplain suggest that these birds are part of a wider ranging, viable population. These conditions represent **Regional** significance under criterion 3.1.2.

Threats

- Invasion by environmental weeds, of which the ones rated 'Very Serious' or 'Serious' are:
 - Very Serious: Drain Flat-sedge (*Cyperus eragrostis*), Creeping Buttercup (*Ranunculus repens*), Blackberry (*Rubus discolor*), Madeira Winter-cherry (*Solanum pseudocapsicum*), Wandering Jew (*Tradescantia albiflora*), Gorse (*Ulex europaeus*);
 - Serious: Angled Onion (*Allium triquetrum*), Hawthorn (*Crataegus monogyna*), Jointed Rush (*Juncus articulatus*), Japanese Honeysuckle (*Lonicera japonica*), Paspalum (*Paspalum dilatatum*), Kikuyu (*Pennisetum clandestinum*), Toowoomba Canary-grass (*Phalaris aquatica*), Curled Dock (*Rumex crispus*), White Crack Willow (*Salix × rubens*), Bulbil Watsonia (*Watsonia meriana* var. *bulbillifera*);
- Disturbance to wildlife and their habitat by recreational uses of the land and dogs;
- Slashing of some areas, which is preventing regeneration of indigenous trees and shrubs;
- Grazing, causing degradation of wetland habitat, damage to remnant trees and suppression of natural regeneration of flora;

- Fragmentation of habitat connectivity associated with depletion of indigenous trees along some sections of the creek, particularly close to Wellington Road;
- Dumping of garden waste along Dandenong Ck, resulting in the introduction and spread of weeds (mainly on the western side, not in Knox);
- European Carp, which have already caused serious ecological damage in nearby Jells Lake and could do so in this site if they were to arrive there;

Management issues

- Removal of silt from the water treatment wetlands should not occur during breeding seasons for waterbirds, and only after referral to the Federal Minister for Environment (see 'Administration matters' below). A botanist should check for rare plants that may need to be avoided or transplanted;
- A management plan for the Police Road Retarding Basin and adjoining Tirhatuan Wetlands Conservation Reserve has been in preparation concurrently with this Sites of Biological Significance study;
- Continuation of recent weed control work should be a high priority;
- More wetlands within the pasture should be fenced to exclude cattle;
- Slashing should be reduced or cease in areas with native understorey in the southern part of the site;
- Revegetation should be used to fill gaps in the corridor of vegetation along Dandenong Ck, particularly near Wellington Rd;
- Populations of waterbirds, frogs and fish should be monitored as the new water treatment wetlands become vegetated;
- Signs might help to discourage rubbish dumping, mainly on the western side of Dandenong Ck (not in Knox).

Administration matters

- Because the site is known to have supported the nationally listed Dwarf Galaxias until at least the mid 1980s, any proposed works in future should be referred to the Federal Minister for Environment under the *Environment Protection and Biodiversity Conservation Act 1999*. This includes road construction, removal of silt from wetlands or any other actions that might conceivably affect Dwarf Galaxias;
- Dogs should be banned from the site because of the importance of its wildlife;
- Recreational facilities should not be constructed near the areas of native vegetation or wetlands, except perhaps for environmentally benign facilities such as a bird hide;
- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the riparian location and the matters considered under the heading, 'Significance ratings';
- Strips of riparian vegetation within this site are presently covered by Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, based on their recognition by Water Ecoscience (1998) as their Sites 81 and 278;
- The Planning Scheme zoning of the EastLink corridor is Road Zone Category 1 (RDZ1). The unused reservation for Police Rd, and an embankment below the back fences of houses overlooking the retarding basin wall, are zoned Residential 1 Zone (R1Z). A section of land from near the retarding basin wall to the site's southwestern corner is zoned Public Use Zone - Other Public Use (PUZ7). The rest of the site is zoned Public Use Zone - Service and Utility (PUZ1).

Information sources used in this assessment

- An initial survey of the Corhanwarrabul Ck diversion and retarding basin sections of the site for the present study by Dr Lorimer on 13th January 2002, discovering bulldozers moving into areas of Swamp Scrub and seasonal wetlands. The work included:
 - Compilation of lists of indigenous and introduced plants within each of four vegetation types in the vicinity of the new water treatment wetlands;
 - Mapping and documentation of rare species populations in that area;
 - Checks for fauna habitat (including Dwarf Galaxias), ecological threats and management issues;
- Site surveys undertaken during this study by Mr Rik Brown on 5/6/02, 10/6/02 and 15/7/02, following this project's standard procedures discussed in Section 2.4 of Volume 1. This included:
 - Compilation of lists of indigenous and introduced plants within each of ten sections the site;
 - A description of each vegetation type's structural and floristic composition;
 - Mapping and documentation of rare species populations and the ecological condition of the vegetation;
 - Incidental fauna observations;
 - Checks for fauna habitat, ecological threats and management issues;
- Discussions in 2003 about Dwarf Galaxias in the catchment with Mr John McGuckin of Streamline Research Pty Ltd;
- A report, '*Assessment of Native Vegetation on the Mitcham to Frankston Freeway Alignment in Knox*', by Dr Lorimer in July 2003 for Knox City Council;

- The report, '*Indigenous Reserve Corridors Conservation & Management Plan*' by Quin, D.G., Carr, G.W., Flann, C.M. and Silveira, C.E. (2000) for City of Monash, noting that the vegetation classification is inaccurate and fauna records are not all of scientific reliability;
- A 1938 specimen of *Pomaderris racemosa* collected by T.S. Hart, now kept at the National Herbarium of Victoria (specimen MEL 55583);
- The Atlas of Victorian Wildlife;
- Aerial photography from February 2001, April 2003 and February 2008;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 75. Tirhatuan Lakes Golf Course, Rowville

A public golf course and adjoining stream corridor, wedged between Dandenong Creek and Stud Rd. Melway ref. 81 G7-9.

Site Significance Level: *State*

- Contains remnants of the regionally endangered Ecological Vegetation Classes, Floodplain Riparian Woodland and Floodplain Wetland, although the former has been badly degraded by past clearing and grazing;
- Native vegetation and wetlands within the site provide relatively extensive habitat for a range of birds, possums, frogs, freshwater fish and other aquatic fauna associated with the Dandenong Creek and its floodplain, including significant waterbirds and fish;
- The nationally vulnerable fish, Dwarf Galaxias, was recorded in or near the site's northwestern corner in 1989, and could conceivably appear within the site again;
- The site contains four known plant species that are threatened in Knox, including a substantial population of Cluster Pomaderris (*Pomaderris racemosa*);
- It is a component of the Dandenong Creek wildlife corridor, contributing to the daily and seasonal movements of birds and other native fauna along the corridor.



Scale 1:8,000
0 50 100 150 200m

Aerial photograph taken April 2003

Boundaries

The site is outlined in red and labelled 'Site 75' on the aerial photograph, which also includes Site 76 and the southern edge of Site 74. It includes the whole golf course and extends to the centre of Dandenong Creek, which is also the border with the City of Greater Dandenong.

The site's biologically significant attributes are mostly within a narrow corridor along Dandenong Creek and in floodplain depressions, artificial wetlands and drainage lines scattered within the golf course (outlined in blue on the aerial photograph).

Land use & tenure: Public land owned by Melbourne Water, zoned PUZ7 ('Public Use Zone - Other Public Use'), with a public golf course and a floodway beside Dandenong Creek. Flood management is an important function of the land.

Site description

This 52 ha site is located on the Dandenong Creek floodplain west of the Lysterfield Hills. There is other public land on the other side of the creek (Tirhatuan Park), upstream (Tirhatuan Wetlands - Site 74) and downstream (Dandenong Police Paddocks - Site 76). The Dandenong Creek trail follows the opposite bank, which is in the City of Greater Dandenong.

Most of the site is an alluvial floodplain at an elevation of approximately 35 m, with very shallow slope. The exception is a slope in the northeastern corner, with a 10% gradient and a maximum elevation of approximately 49 m near the Police Rd - Stud Rd intersection. The golf course buildings are located on the slope.

The site's bedrock is Lower Devonian sedimentary rock of the Humevale formation, and it is exposed in places in the creek channel. It has decomposed to silty grey loam with clay subsoil on the slope in the site's northeast, and on the floodplain it has been covered with alluvium washed down by the creek.

The aerial photograph above shows a narrow corridor of vegetation along Dandenong Creek, flanked by a parallel, mown floodway on the northeastern side (the left bank). The golf course itself lies between the floodway, Stud Rd and Police Rd.

The corridor of vegetation between Dandenong Creek and the floodway supports a fair cover of indigenous vegetation regrowth, although the overstorey has been reduced to only a few scattered remnant trees because of past clearing and grazing. It has important identifying features of the regionally endangered Floodplain Riparian Woodland, particularly the presence of character species such as *Callistemon sieberi* and *Meliccytus dentatus*, reinforced by the abundance of the highly indicative *Rapanea howittiana* just upstream (Site 74) where the forest has not been so emaciated. (Current BioMaps from the Department of Sustainability & Environment indicate Swampy Riparian Woodland, but the information that they are based on probably overlooked the above features.)

A fair cover of indigenous lower trees and shrubs is present along the creek. Patches of indigenous ground flora persist in the least disturbed areas supporting remnant shrub layer vegetation. Regeneration is being substantially suppressed by mowing or slashing adjacent to the creek and moderate rabbit infestations. Moderate to severe weed infestations are apparent along the creek, particularly of Bulbil *Watsonia* (*Watsonia meriana*). Some areas have relatively recently been planted with indigenous plants following bank stabilisation works along the creek.

The natural soil surface has been modified for the floodway and the golf course, including profiling of fairways and greens and the creation of water traps. This, and the change of vegetation cover, have altered the drainage characteristics of the site. The very elongated shape outlined in blue on the aerial photograph is now a linear wetland that appears to derive from a natural drainage line shown on old maps. The other blue outlines are also wetlands, some of which appear to originate from natural floodplain depressions, and some of which are entirely artificial. The largest water body, near the southeastern corner of the site, is a storage dam.

Indigenous wetland vegetation occurs within floodplain depressions and along drainage lines adjacent to Dandenong Creek and also within wetlands scattered throughout the golf course (outlined in blue on the aerial photograph). This includes patches of Tall Spike-rush (*Eleocharis sphacelata*) and Cumbungi (*Typha domingensis* and *Typha orientalis*), with regenerating Common Reed (*Phragmites australis*) in some mown areas. Some patches of indigenous sedges, rushes and semi-aquatic herbs occur in the least disturbed wetland areas adjacent to the creek.

Other sections of the golf course have been planted with a range of 'Australian natives' mainly 20-30 years old, including Southern Mahogany, Southern Blue Gum, Large-fruited Yellow Gum, Bracelet Honey-myrtle, Sheoaks and Heath Banksia.

Relationship to other land

The site is part of the Dandenong Creek habitat corridor.

Substantial remnant vegetation and wetland habitat occurs within the Tirhatuan Wetlands Conservation Reserve and Police Road Retarding Basin (Site 74, managed by Melbourne Water) and the Dandenong Police Paddocks Reserve (Site 76, managed by Parks Victoria). There are also ponds in Tirhatuan Park on the opposite side of Dandenong Ck, providing additional wetland habitat. All of these areas are strongly ecologically linked to each other and to the creek itself, with fauna no doubt moving freely throughout.

Bioregion: Gippsland Plain

Habitat types

Floodplain Riparian Woodland (EVC 56, **regionally Endangered**) in the narrow band along the creek. There is approximately 3.5 ha on the northeastern side of the creek, all in poor ecological condition (rating D). 21 indigenous plant species were found on 15th July 2002.

Canopy trees: A few scattered *Eucalyptus viminalis* and *E. ovata* trees. Most overstorey trees have been cleared.

Lower trees: Scattered specimens of *Acacia mearnsii* and *A. dealbata*. Mostly in poor condition due to insect attack.

Shrubs: A fair cover of shrubs, including *Melaleuca ericifolia*, *Melicytus dentatus*, *Ozothamnus ferrugineus*, *Coprosma quadrifida* and *Goodenia ovata*, with some *Pomaderris racemosa* and a single *Callistemon sieberi*. There are moderate infestations of woody weeds.

Vines and ferns: Absent.

Ground flora: Limited to a few patches of *Poa labillardierei* in shrubby areas. Mostly very scarce due to past clearing and grazing. There are severe infestations of Bulbil *Watsonia (Watsonia meriana)* and a range of other ground layer weeds.

Semi-aquatic plants: Patches of *Phragmites australis* occur along the creek margins.

Floodplain Wetland Complex (EVC 172, **regionally Endangered**), including both natural and artificial depressions and drainage lines, indicated with blue outlines on the aerial photograph. The total area is 1.2 ha, of which approximately 0.1 ha is in good ecological condition (rating B), 0.5 ha is in fair ecological condition (rating C) and 0.6 ha is in poor ecological condition (rating D). 11 indigenous plant species were found on 15th July 2002.

Trees, shrubs, vines and ferns: Absent from the wetlands, but there are a few remnant *Acacia melanoxylon* and *A. dealbata* trees at the edges of constructed wetlands, along with planted native trees and shrubs.

Aquatic and semi-aquatic flora: Dominated by patches of *Phragmites australis*, *Typha* spp. and *Eleocharis sphacelata*. Some semi-aquatic herbs occur in natural wetland depressions near the creek, including *Carex appressa*, *Juncus* spp., *Persicaria decipiens* and *Alisma plantago-aquatica* (additional species potentially occur in these areas).

Plant species

The following plant species were observed by the author on 15th July 2002. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. Additional species would no doubt be detectable in other seasons. In addition, *Pomaderris racemosa* is rare throughout the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Acacia dealbata</i>		<i>Goodenia ovata</i>
V	<i>Acacia mearnsii</i>		<i>Juncus pallidus</i>
V	<i>Acacia melanoxylon</i>		<i>Juncus</i> sp.
	<i>Acaena novae-zelandiae</i>	E	<i>Melaleuca ericifolia</i>
	<i>Alisma plantago-aquatica</i>	E	<i>Melicytus dentatus</i>
	<i>Bursaria spinosa</i>	E	<i>Ozothamnus ferrugineus</i>
C	<i>Callistemon sieberi</i>		<i>Persicaria decipiens</i>
	<i>Carex appressa</i>	E	<i>Phragmites australis</i>
	<i>Cassinia arcuata</i>	E	<i>Poa labillardierei</i> var. <i>labillardierei</i>
V	<i>Coprosma quadrifida</i>	C	<i>Pomaderris racemosa</i>
	<i>Eleocharis sphacelata</i>		<i>Senecio quadridentatus</i>
	<i>Eucalyptus goniocalyx</i>	V	<i>Solanum laciniatum</i>
V	<i>Eucalyptus ovata</i>	E	<i>Typha domingensis</i>
E	<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>	E	<i>Typha orientalis</i>
V	<i>Exocarpos cupressiformis</i>		
Introduced Species			
	<i>Acacia baileyana</i>		<i>Genista linifolia</i>
	<i>Allium triquetrum</i>		<i>Paspalum dilatatum</i>
	<i>Chrysanthemoides monilifera monilifera</i>		<i>Phalaris aquatica</i>
	<i>Cirsium vulgare</i>		<i>Romulea rosea</i>
	<i>Cortaderia selloana</i>		<i>Rubus anglocandicans</i>
	<i>Cotoneaster glaucophyllus</i>		<i>Rumex crispus</i>
	<i>Crataegus monogyna</i>		<i>Salix × rubens</i>
	<i>Cyperus eragrostis</i>		<i>Solanum mauritianum</i>
			<i>Solanum nigrum</i>
			<i>Solanum pseudocapsicum</i>
			<i>Tradescantia fluminensis</i>
			<i>Ulex europaeus</i>
			<i>Vinca major</i>
			<i>Watsonia meriana</i> var. <i>bulbillifera</i>

Notes concerning some of the locally threatened plant species

Callistemon sieberi (River Bottlebrush). A single shrub along Dandenong Creek.

Melicytus dentatus (Tree Violet). A number of shrubs scattered along Dandenong Creek.

Poa labillardierei (Common Tussock-grass). Small patches in the least disturbed locations along Dandenong Creek.

Pomaderris racemosa (Cluster Pomaderris). Approximately 20 shrubs scattered along Dandenong Creek (mainly towards the upstream end).

Fauna of special significance

Vulnerable Nationally

Dwarf Galaxias (*Galaxiella pusilla*). Found in a pond near the site's northwestern corner in 1989, and in the same vicinity in 1985 and 1986. Not seen in recent years despite searches. See the Atlas of Victorian Wildlife and also Koehn *et al.* (1986)*.

Vulnerable in Victoria

Hardhead (*Aythya australis*). Two birds were observed on the water storage dam during the site inspection.

Uncommon in the Melbourne area (although recently becoming common in park-like areas)

Crested Pigeon (*Ocyphaps lophotes*). 17 birds were observed foraging on the golf course by Dr Lorimer on 8/5/04.

Uncommon in Knox

Red-rumped Parrot (*Psephotus haematonotus*). 35 birds observed with the Crested Pigeons just mentioned.

Other significant waterbirds associated with the Dandenong Creek floodplain are likely to be frequent visitors. Significant frogs, freshwater fish and other aquatic fauna also potentially occur within the creek and wetland areas.

Fauna habitat features

The fair to good cover of shrub layer vegetation along Dandenong Creek provides habitat for small native birds, possums and insects. A substantial population of Red-browed Finches was observed along the creek during field surveys. Woody weeds contribute to this habitat to some degree. Some Common Ringtail Possum dreys are located in Hawthorn shrubs.

Shallow floodplain depressions and constructed wetlands scattered throughout the golf course provide relatively extensive foraging habitat and potential nesting sites for ducks, swamphens and other waterbirds. They are also likely to provide habitat for frogs, freshwater fish and other aquatic fauna.

Planted native trees throughout the golf course provide habitat for honeyeaters, lorikeets and other forest and woodland birds. Habitat values are likely to increase over time as the trees mature.

Native vegetation and floodplain/wetland habitat within the site would inevitably contribute to the daily and seasonal movements of native fauna along the Dandenong Creek habitat corridor, particularly of waterbirds.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity & Viability

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

The site provides a substantial amount of habitat for native wildlife associated with the Dandenong Creek and its floodplain (including vulnerable species in Victoria and Australia) and forms a component of the Dandenong Creek habitat corridor. This corridor is important on a scale larger than just local and smaller than state-wide. This represents **Regional** significance under criterion 1.2.6.

Regionally Threatened Ecological Vegetation Class

This site contains a remnant patch of a regionally endangered EVC. According to the criteria of 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), remnant patches of an endangered EVC have a conservation significance rating of High. This, in turn, gives the site **State** significance under criterion 3.2.3 of Amos (2004).

Rare or Threatened Flora

The site contains sixteen species of plants that are threatened in Knox, including a substantial population of Cluster Pomaderris (*Pomaderris racemosa*). This gives the site **Local** significance under criterion 3.1.5.

* Koehn, J.D. (1986) 'Dandenong Creek: Fishes, their Habitats and Management Recommendations'. Arthur Rylah Institute for Environmental Research Technical Report Series No. 51. Department of Conservation, Forests and Lands, Victoria.

Rare or Threatened Fauna

The nationally vulnerable Dwarf Galaxias was found in a pond next to the golf course in 1989 and at other locations in the immediate vicinity in 1985 and 1986. More recent surveys suggest that the species has declined drastically in numbers in the catchment. It is not certain whether this species will recover from this decline, but it may conceivably do so after the current period of many years of drought.

Criterion 3.1 regards all known habitat of nationally listed threatened fauna such as Dwarf Galaxias as being of at least State significance. In this case, however, the significance is treated here as **Regional** in view of the population crash of Dwarf Galaxias and the real possibility that the fish will never again use the site for habitat.

The site is also known to be current habitat for Hardhead, a species which is listed by the Department of Sustainability & Environment as vulnerable. However, it would add little to the state's total habitat of this species. Criterion 3.1.2 recognises such sites as **Regionally** significant.

Waterway Protection

All riparian vegetation has a Very High hazard rating for waterway protection according to Appendix 1 of Victoria's Native Vegetation Framework (NRE 2002a). This is separate from conservation significance, and indicates the level of importance that should be placed on protecting, restoring and revegetating riparian vegetation such as in the present site.

Threats

- Climate change and drought, particularly affecting wetland vegetation;
- Fragmentation of habitat associated with the depletion of indigenous trees along the creek;
- Consequently, reduced visitation of the site by small insect-eating birds, possibly leading to a worsening of plant pests and diseases;
- Intensive mowing activities within the golf course preventing the natural regeneration of indigenous vegetation;
- Invasion by environmental weeds along the creek and around wetland areas. Mowing activities are particularly contributing to the spread of Bulbil *Watsonia*;
- Loss or decline of plant species whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or elimination by incidents such as trampling or flood damage. The single *Callistemon sieberi* is the most important example;
- Potential nutrient overload in the wetlands due to the application of fertilisers and other chemicals on the golf course;
- Disturbances to wetland habitat by golfers and maintenance work.

Management issues

- The significance of the habitat corridor along Dandenong Creek warrants extensive revegetation along the creek to enhance habitat connectivity;
- Mowing should be discontinued in areas supporting remnant indigenous vegetation, particularly wetland vegetation along drainage lines adjacent to the creek;
- Indigenous revegetation areas should be established around wetlands and at strategic locations within the golf course to enhance habitat values and minimise disturbances to wildlife;
- Specifically utilise indigenous plants in plantings undertaken throughout the golf course. There are substantial opportunities for the future re-establishment of indigenous vegetation to enhance habitat values compatible with recreational uses of the golf course;
- Weed control should be improved, particularly of 'very serious' infestations of Bulbil *Watsonia* (*Watsonia meriana*) and 'serious' infestations of Gorse (*Ulex europaeus*), along with a range of other woody weeds, creepers and exotic grasses. Removal of woody weeds along Dandenong Creek should be integrated with indigenous revegetation activities to minimise the loss of habitat for birds and possums;
- Implement specific measures to minimise the use of fertilisers and other chemicals in proximity of wetland areas;
- The issues above could be well addressed in a management plan, which could draw on the '*Environmental Strategy for Australian Golf Courses*' (Australian Golf Union, 1998).

Administration matters

- This site is suited to the proposed Environmental Significance Overlay (ESO2) because of its State significance. Note that the overlay is proposed to exempt maintenance of the golf course and associated assets;
- This site is not covered by any of Knox Planning Scheme's existing Vegetation Protection Overlays, and it was not recognised as significant by Water Ecoscience (1998);
- There may be benefit in Council having discussions with the golf course management and Melbourne Water regarding protection and rehabilitation of indigenous vegetation and habitat values.

Information sources used in this assessment

- A site survey undertaken during this study by Rik Brown (15/7/02), including compilation of lists of indigenous and introduced plant species, incidental fauna observations and vegetation mapping/descriptions according to the procedures discussed in Section 2.4 of Volume 1;
- The Atlas of Victorian Wildlife;
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 76. Dandenong Police Paddocks Reserve, Rowville

A part of the small section of the Dandenong Police Paddocks Reserve that lies within Knox, north of Dandenong Creek and east of Stud Rd. Melway ref. 81 G9-H9.

Site Significance Level: *State*

- Contains remnants of a regionally endangered Ecological Vegetation Class (Swamp Scrub) which are significant despite previous clearing and grazing activities;
- The Dandenong Creek and adjoining floodplain areas provide relatively extensive habitat for a range of birds, possums, frogs and other aquatic fauna (including significant waterbirds);
- Contains a population of Upright Milfoil *Myriophyllum crispatum* that is rare in the Melbourne area, and five other known plant species that are rare or threatened in Knox;
- Forms a component of the Dandenong Creek habitat corridor, contributing to the daily and seasonal movements of birds and other native fauna;
- Forms a component of a habitat link between the Dandenong Creek corridor and Lysterfield Hills.

Aerial photograph and plan: See page 377, which covers this site and Site 75.

Boundaries

The Dandenong Police Paddocks Reserve is located on the eastern side of Stud Rd north of the Dandenong Creek crossing. Because this is a municipal study, only the section of the reserve located within the City of Knox, close to Stud Rd and Rowville Reserve, has been examined. Most of the Police Paddocks Reserve is located within the City of Casey.

The site boundary is shown in red on the aerial photograph on p. 377, marked as 'Site 76'. The western boundary is the edge of the road reservation for Stud Rd. The southern boundary is Dandenong Creek, with the City of Greater Dandenong on the other side. Northward from the creek, the eastern boundary follows the municipal boundary until it intercepts the fence of the tennis courts at Rowville Reserve. The rest of the boundary follows the fence of Rowville Reserve.

Areas of predominantly native vegetation within the site are outlined in white. The rest of the site is pasture with scattered native plants, including some locally rare ones.

Land use & tenure: Reserve managed by Parks Victoria with paddocks used for grazing; zoned PCRZ – Public Conservation and Resource Zone.

Site description

The site is along Dandenong Creek and the adjoining floodplain at the foot of the Lysterfield Hills. It measures 15.5 ha. The elevation is 30 m where the creek exits the site (in the southeastern corner) and rises to approximately 37 m in the north. Apart from the creek channel and the drains, the site is almost flat. The soil is alluvium washed down by the creek.

The area has a long history of grazing, and was almost totally cleared long ago. Old maps show a natural drainage line to the north of Dandenong Creek, but now there are just constructed drains.

The two marked drains on the aerial photograph are fringed by occasional Swamp Gum (*Eucalyptus ovata*) and Blackwood (*Acacia melanoxylon*) trees, and there are patches of indigenous reeds and other wetland vegetation in the drains where grazing has been less intensive. There are even some plants of Upright Millfoil (*Myriophyllum crispatum*), which is rare throughout the Melbourne area and found in Knox at only three other sites (all along Dandenong Ck).

There are moderate weed infestations in the pasture, particularly of Gorse (*Ulex europaeus*).

The rushland areas at the northern tip of the site (marked on the aerial photograph) are dominated by indigenous species of rushes (which are unpalatable to the grazing cattle), interspersed with a mixture of introduced pasture species (weeds and fodder) and native wetland species such as Fen Sedge (*Carex gaudichaudiana*) and knotweeds (*Persicaria* species). There are more plants of Upright Millfoil (*Myriophyllum crispatum*) in the rushland, trampled by cattle.

The riparian vegetation on the northern bank of Dandenong Creek, extending as far north as the nearest white line on the aerial photograph, supports a fair to good cover of remnant Swamp Paperbarks (*Melaleuca ericifolia*). Past clearing has reduced the overstorey to a few specimens of Manna Gum (*Eucalyptus viminalis*) and Swamp Gum (*Eucalyptus ovata*). The pre-European vegetation would have been Floodplain Riparian Woodland or perhaps Swampy Riparian Woodland, but the loss of so many eucalypts and the regrowth of paperbarks have made the vegetation a reasonable fit for Swamp Scrub. Remnant and regenerating wattles and other indigenous shrubs are scattered within the area. They include a few large specimens of Sweet Bursaria (*Bursaria spinosa*) up to 8 m tall. Some patches of indigenous grasses persist in the least disturbed areas. Indigenous reeds, rushes and other semi-aquatic plants occur along drainage lines within the riparian zone, and a small dam is dominated by Common Spike-rush (*Eleocharis acuta*).

Most of the banks of Dandenong Creek have previously been grazed but the area is now fenced to exclude access by livestock. Ongoing disturbances along the creek are now mainly associated with riding of trail bikes and horses within the fenced area. Some bank stabilisation works have been undertaken along the creek.

The areas marked 'Reveg.' on the aerial photograph are indigenous revegetation areas up to approximately 7 years old.

There are no existing recreational facilities within the Knox section of the Dandenong Police Paddocks Reserve. The Dandenong Creek Trail is on the opposite side of the creek, in the City of Greater Dandenong.

Relationship to other land

The site is a component of the Dandenong Creek wildlife corridor. In addition to the obvious linkage of the stream itself, daily and seasonal migrations of birds (particularly waterbirds) can be readily observed along the corridor. Frogs and insects no doubt also move along the corridor.

The most direct connections are with neighbouring areas of habitat in the rest of the Dandenong Police Paddocks Reserve, the other side of the creek, Tirhatuan Park and the Tirhatuan Lakes Public Golf Course (Site 75).

The Dandenong Police Paddocks Reserve and Churchill National Park to its east also provide habitat linkage between the Dandenong Creek corridor and the Lysterfield Hills, across to Lysterfield Park and the Dandenong Ranges via Belgrave South.

Bioregion: Gippsland Plain

Habitat type

Floodplain Riparian Woodland (EVC 56, regionally Endangered): Approximately 0.97 ha, of which it is estimated that 0.3 ha is in fair ecological condition (rating C) and 0.67 ha is in poor ecological condition (rating D). 25 indigenous plant species were recorded on 15th July 2002.

Canopy trees: A few remnant *Eucalyptus viminalis* and *E. ovata* trees remain, but most overstorey trees have been cleared.

Lower trees: Scattered specimens of *Acacia mearnsii* and *A. dealbata*, with some *A. melanoxylon* and *Exocarpos cupressiformis*.

Shrubs: A fair to good cover of *Melaleuca ericifolia* and other scattered indigenous shrubs, including *Leptospermum lanigerum*, *L. scoparium*, *Melicactus dentatus*, *Coprosma quadrifida* and some large specimens of *Bursaria spinosa*. Fair levels of natural regeneration have appeared since this area was fenced several years ago.

Vines and ferns: Absent.

Ground flora: Patches of indigenous grasses where least disturbed, including *Poa labillardierei* and *Microlaena stipoides*. Otherwise dominated by exotic pasture grasses, particularly Paspalum, Kikuyu and Toowoomba Canary-grass.

Wetland (EVC 74, regionally Endangered), comprising a dam and natural depressions close to Dandenong Ck and the areas marked on the aerial photograph of p. 377 as rushland and drains. The part of the rushland area that is on the Knox side of the municipal boundary occupies 0.45 ha and is in fair ecological condition (rating C), with 11 indigenous plant species recorded on 8th May 2004. The other wetland areas occupy approximately 0.2 ha and are all in poor ecological condition (rating D), with 8 indigenous plant species recorded on 15th July 2002. Larger numbers of species would be detected in midsummer.

Woody vegetation: None within the wetland vegetation. Immediately to the northwest of the more southerly drain there are a few scattered *Eucalyptus ovata* trees, and the rest of the drains are lined by scattered *Acacia melanoxylon* and *Bursaria spinosa*.

Aquatic and semi-aquatic flora: The rushland is dominated by *Juncus sarophorus*. Other wetland areas are variously dominated by *Phragmites australis*, *Eleocharis acuta*, *Typha domingensis* or *Juncus sarophorus*. There are various non-dominant *Juncus* species, as well as *Persicaria decipiens*, *Schoenus apogon* and localised populations of *Lemna disperma* and *Myriophyllum crispatum*.

Plant species

The following list of plant species were compiled by Mr Rik Brown on 15th July 2002 and the author on 8th May 2004. Additional species would no doubt be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Carex gaudichaudiana* and *Myriophyllum crispatum* are rare throughout the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Acacia dealbata</i>		<i>Juncus bufonius</i>
V	<i>Acacia mearnsii</i>		<i>Juncus pallidus</i>
V	<i>Acacia melanoxylon</i>		<i>Juncus sarophorus</i>
	<i>Acaena novae-zelandiae</i>		<i>Juncus sp.</i>
C	<i>Amyema pendula</i>	E	<i>Lemna disperma</i>
V	<i>Amyema quandang</i>	E	<i>Leptospermum lanigerum</i>
	<i>Bursaria spinosa</i>	E	<i>Leptospermum scoparium</i>
	<i>Carex appressa</i>	V	<i>Lythrum hyssopifolia</i>
E	<i>Carex gaudichaudiana</i>	E	<i>Melaleuca ericifolia</i>
	<i>Cassinia arcuata</i>	E	<i>Melicytus dentatus</i>
V	<i>Coprosma quadrifida</i>		<i>Microlaena stipoides</i>
V	<i>Eleocharis acuta</i>	C	<i>Myriophyllum crispatum</i>
	<i>Epilobium hirtigerum</i>	E	<i>Ozothamnus ferrugineus</i>
V	<i>Eucalyptus ovata</i>		<i>Persicaria decipiens</i>
E	<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>	E	<i>Phragmites australis</i>
V	<i>Exocarpos cupressiformis</i>	E	<i>Poa labillardierei</i> var. <i>labillardierei</i>
	<i>Goodenia ovata</i>		<i>Schoenus apogon</i>
E	<i>Gynatrix pulchella</i>	V	<i>Solanum laciniatum</i>
V	<i>Hemarthria uncinata</i>	E	<i>Typha domingensis</i>
	<i>Juncus amabilis</i>		
Introduced Species			
	<i>Acacia longifolia</i> subsp. <i>longifolia</i>		<i>Pittosporum undulatum</i>
	<i>Agrostis capillaris</i>		<i>Plantago coronopus</i>
	<i>Anthoxanthum odoratum</i>		<i>Plantago lanceolata</i>
	<i>Chrysanthemoides monilifera monilifera</i>		<i>Prunella vulgaris</i>
	<i>Cirsium vulgare</i>		<i>Rubus anglocandicans</i>
	<i>Cortaderia seloana</i>		<i>Rumex crispus</i>
	<i>Crataegus monogyna</i>		<i>Ulex europaeus</i>
	<i>Cynodon dactylon</i>		<i>Watsonia meriana bulbifera</i>
	<i>Cyperus eragrostis</i>		
	<i>Hakea salicifolia</i>		
	<i>Holcus lanatus</i>		
	<i>Hypochoeris radicata</i>		
	<i>Juncus articulatus</i>		
	<i>Leontodon taraxacoides</i>		
	<i>Lythrum junceum</i>		
	<i>Paspalum dilatatum</i>		
	<i>Pennisetum clandestinum</i>		
	<i>Phalaris aquatica</i>		

Notes concerning some of the locally threatened plant species

Carex gaudichaudiana (Fen Sedge). Fairly abundant, particularly in the rushland.

Gynatrix pulchella (Hemp Bush). A few shrubs were found, scattered along a drainage line adjacent to Dandenong Ck.

Lemna disperma (Common Duckweed). Patches occur in a drainage line within the pasture.

Leptospermum lanigerum (Woolly Tea-tree). Several shrubs were found, scattered along Dandenong Ck.

Melicytus dentatus (Tree Violet). A few shrubs scattered were found along a drainage line adjacent to Dandenong Ck.

Myriophyllum crispatum (Upright Milfoil). Patches occur along a drainage line and within the pasture and rushland.

Poa labillardierei (Common Tussock-grass). A few small patches were found along Dandenong Creek.

The large remnant Sweet Bursaria (*Bursaria spinosa*) shrubs along Dandenong Creek are locally significant because they are exceptionally large.

Milky Beauty-heads (*Calocephalus lacteus*) occurs within a few tens of metres (at most) east of the municipal boundary, and also at the foot of the slope slightly further east. There is no record of this species anywhere in Knox, but it may have been overlooked within this site.

Fauna of special significance

Vulnerable in Victoria

Great Egret (*Ardea alba*). A single bird was observed foraging along Dandenong Creek during the site inspection on 15th July 2002. This species has been reported here previously, and the creek and adjoining floodplains provide substantial habitat for it.

Other significant waterbirds associated with the Dandenong Creek floodplain are likely to be frequent visitors. Significant frogs, freshwater fish and other aquatic fauna also potentially occur within the creek and wetland areas.

Some significant forest birds occurring within the Dandenong Ranges National Park are likely to visit the site via the Lysterfield Hills.

Fauna habitat features

The fair to good cover of shrub layer vegetation within the fenced frontage along Dandenong Creek provides habitat for native birds and possums. This includes a range of smaller birds, such as the Golden Whistler, Grey Fantail, Striated Thornbill, Superb Fairy-wren and White-plumed Honeyeater recorded during field surveys. Common Ringtail Possum dreys were also apparent in shrubs along the creek. Infestations of Gorse and other woody weeds in the area contribute to habitat for small birds and possums to some degree.

The Dandenong Creek and adjoining floodplain provide relatively extensive foraging habitat for waterbirds and breeding locations for frogs and other aquatic fauna. There are many yabby holes, which are sometimes said to be drought refuges for the vulnerable Dwarf Galaxias in this vicinity. Foraging activities by birds of prey also occur on the floodplain, including a Nankeen Kestrel observed during a site inspection for this study.

The indigenous vegetation and floodplain/wetland habitat within the site would inevitably contribute to the daily and seasonal movements of native fauna along the Dandenong Creek wildlife corridor.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity & Viability

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

The site provides a substantial amount of habitat for native wildlife associated with the Dandenong Creek and its floodplain and forms a component of the Dandenong Creek habitat corridor. This corridor is important on a scale larger than just local and smaller than state-wide. This represents **Regional** significance under criterion 1.2.6.

Regionally Threatened Ecological Vegetation Class

This site contains remnant patches of regionally endangered EVCs. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that the native vegetation of these patches is of at least High conservation significance. This, in turn, gives the site **State** significance under criterion 3.2.3 of Amos (2004).

Rare or Threatened Flora

At least some of the locally threatened species listed under the heading 'Plants of special significance' have viable populations within the site. This gives the site **Local** significance under criterion 3.1.5.

Rare or Threatened Fauna

The Great Egret seen on the site in this study is listed as vulnerable in Victoria and has substantial habitat within the site. According to criterion 3.1.2 of the standard criteria of Amos (2004), a site with known habitat for a listed threatened species is of at least Local significance, and the significance level depends on how many sites support larger populations.

For the purposes of assessing population sizes of the Great Egret in this context, one should consider a 'site' that encompasses far more than just the small part of the Dandenong Creek floodplain within this part of the Dandenong Police Paddocks Reserve. Depending on how large a 'site' one chooses, it could be taken to be of **Local** or **Regional** significance under the standard criteria. The latter is deemed more reasonable here.

Waterway Protection

All riparian vegetation has a Very High hazard rating for waterway protection according to Appendix 1 of Victoria's Native Vegetation Framework (NRE 2002a). This is separate from conservation significance, and indicates the level of importance that should be placed on protecting, restoring and revegetating riparian vegetation such as in the present site.

Threats

- Climate change and drought, particularly affecting wetland vegetation;
- Fragmentation of habitat associated with the depletion of indigenous trees along the creek;
- Consequently, reduced visitation of the site by small insect-eating birds, possibly leading to a worsening of plant pests and diseases;
- Loss of indigenous vegetation and degradation of wetland habitat due to grazing on the floodplain;
- Invasion by environmental weeds:
 - Serious: Brown-top Bent (*Agrostis capillaris*), Cat's Ear (*Hypochoeris radicata*), Hairy Hawkbit (*Leontodon taraxacoides*), Bird's-foot Trefoil (*Lotus ?corniculatus*), Gorse (*Ulex europaeus*), Paspalum (*Paspalum dilatatum*);

- Moderate: Sweet Vernal-grass (*Anthoxanthum odoratum*), Spear Thistle (*Cirsium vulgare*), Hawthorn (*Crataegus monogyna*), Couch (*Cynodon dactylon*), Drain Flat-sedge (*Cyperus eragrostis*), Yorkshire Fog (*Holcus lanatus*), Jointed Rush (*Juncus articulatus*), Mediterranean Loosestrife (*Lythrum junceum*), Kikuyu Grass (*Pennisetum clandestinum*), Ribwort (*Plantago lanceolata*), Buck's-horn Plantain (*Plantago coronopus*), Toowoomba Canary-grass (*Phalaris aquatica*), Blackberry (*Rubus discolor*), Curled Dock (*Rumex crispus*);
- Loss or decline of plant species whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or elimination by incidents such as being eaten or trodden on by cattle;
- Disturbance to remnant vegetation and habitat along Dandenong Creek by recreational uses (particularly riding of trail bikes and horses).

Management issues

- Extend revegetation areas along the creek with indigenous plants on an ongoing basis to increase habitat connectivity;
- Install stock-proof fencing to protect remnant vegetation along drainage lines and floodplain wetlands within paddock areas;
- Control the weeds listed under the heading 'Threats' above. Removal of woody weeds should be integrated with indigenous revegetation activities to minimise the loss of habitat for birds and possums;
- Signs and other measures are required to prevent inappropriate recreational activities within the reserve along the creek.

Administration matters

- This site is suited to the proposed Environmental Significance Overlay (ESO2) because of its State significance;
- Most of the native vegetation in this site is presently covered by Vegetation Protection Overlay 1. This is partly because of the study by Water Ecoscience (1998), in which this is Site 94 (under the erroneous title of Rowville Reserve).

Information sources used in this assessment

- A site survey undertaken during this study by Rik Brown (15/7/02), including compilation of lists of indigenous and introduced plant species, incidental fauna observations and vegetation mapping/descriptions according to the procedures discussed in Section 2.4 of Volume 1;
- An additional inspection by Dr Lorimer during 45 minutes on 8/5/04, to do the same things as above, but for the rushlands south of the Rowville Reserve tennis courts (not inspected by Mr Brown);
- Verbal information from respected naturalist, Mr Darren Wallace, about *Calocephalus lacteus* and any other rare or threatened species that may occur within the site;
- The Atlas of Victorian Wildlife;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

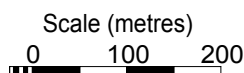
Site 77. Waverley Golf Club, Rowville

The 50 ha golf course contains patches of remnant vegetation in some of the roughs, interlinked by corridors of remnant trees and planted 'native' trees with no understorey. The abutting road reservations also have native vegetation. Five dams provide complementary habitat. There is a residential subdivision proposal for the golf course and a road construction proposal for the extension of Police Rd.

Melway ref. 81 J6.

Site Significance Level: *State*

- The remnant vegetation belongs to two regionally endangered Ecological Vegetation Classes;
- There is rich wildlife, including the nationally protected Grey-headed Flying-fox and several species rare in Knox;
- Ninety-five indigenous plant species were found overall, a good number for such vegetation by Knox standards;
- These plants include several species or subspecies that are threatened in Knox or the Melbourne region generally;
- An arborist has identified fourteen large remnant eucalypts as significant to the site, with dimensions to 20 m high and 22 m spread;
- The site augments habitat corridors along the Lysterfield Hills and (to a lesser extent) the Dandenong Creek valley, which explains the rich wildlife.



Aerial photograph taken April 2003

Boundaries

The site comprises the golf course and adjacent road verges along Bergins Rd, Churchill Park Drive and the extension of Police Rd, as outlined in red on the above aerial photograph (taken in April 2003). This includes remnant vegetation on the roadside abutting the Rowville East Electricity Terminal Station. The site's southern boundary follows the municipal

boundary. The features that make the site a significant one are the hatched areas (which have remnant trees and understorey), coupled with the wildlife habitat provided by the dams, remnant trees and smaller plants scattered around the golf course.

Land status: The golf course is zoned 'Special Use (Golf Course)'. The rest of the site comprises road reservations. There is a proposal to extend Police Rd to Churchill Park Drive.

Note

Permission was not obtained to enter the golf course, so the inspection was done from the fence and aerial photographs. Heavy reliance has been placed on consultants' reports written for the golf club in its consideration of residential development of the site.

Site description

The site has a general, gentle slope to the southwest, with elevations varying from just under 50 m to just over 70 m (Australian Height Datum). This is interrupted by a minor drainage line flowing in the same direction, with the large dam on it just north of the Rowville East Electricity Terminal Station. The soils of the western and central parts of the site are derived from weathering of the Lower Devonian 'Humevale' siltstone deposits, except for some alluvium in the minor drainage line. The southeastern end of the site is within the metamorphic zone between the Humevale formation and the Upper Devonian 'Lysterfield' granodiorite.

The 50 ha golf course contains patches of remnant vegetation in some of the roughs, interlinked by corridors of remnant trees and planted 'native' trees with no understorey. The road verges around the site support remnant tree cover, and the Police Rd extension has native understorey as well. All the remnant native vegetation belongs to endangered Ecological Vegetation Classes, mainly Valley Heathy Forest.

Waters (2002), an arborist, examined over 2,200 trees on the golf course (not the roadsides). Of these, over 550 are remnant indigenous trees and most of the remainder are planted specimens from other parts of Australia. Waters mentions fourteen large remnant eucalypts as being particularly significant, with dimensions to 20 m high and 22 m diameter. Such large trees are very likely to have some hollows used by wildlife, although few were detected.

Nearly all the understorey has been cleared at least once. In some areas, dense stands of Burgan (*Kunzea ericoides*) have regrown, and in other areas (particularly near the maintenance shed), many indigenous grasses and other ground flora persist.

The hatched areas on the aerial photograph above show the largest areas that contain native vegetation with continuous tree cover and some understorey. There are other indigenous plants scattered around the roughs and the fringes of dams.

The tree cover generally, both indigenous and otherwise, provides significant habitat for birds. The dams and areas with understorey provide habitat for other species of birds, including waterfowl and scrub birds like White-browed Scrubwrens.

The forty-five native bird species that were recorded by Timewell and Costello on one September day at the site, plus two additional species observed by the present author in November, indicate quite rich bird life. This, along with records of the locally rare Eastern Grey Kangaroo, Sugar Glider and Verraux's Tree Frog, no doubt reflect the presence of the trees, understorey and dams, and the proximity of the site to other land with very high habitat value.

There is a residential subdivision proposal for the golf course and a road construction proposal for the extension of Police Rd.

Electricity transmission lines pass over the site, supported by large pylons within the site (just visible on the aerial photograph above). This may explain why aerial photography in February 2007 shows that most woody plants had been removed beneath the transmission lines within the patch of vegetation visible southeast of the green dam on the 2003 aerial photograph above.

Relationship to other land

The site is contiguous with the Dandenong Police Paddocks reserve, and across the road from Churchill National Park and native vegetation that extends from there to Lysterfield Lake Park and into the Dandenong Ranges. The Rowville Electricity Terminal Station (Site 72) provides further habitat just over the other side of Stud Rd. There is only a short gap between the native vegetation canopy of these sites and that of the Dandenong Creek riparian habitat corridor. The site is therefore on the edge of a major habitat corridor between the Dandenong Ck and the southern Dandenong Ranges.

Bioregion: Gippsland Plain.

Habitat types derived from brief inspection and referral to Waters (2002) and Timewell & Costello (2002)

Wetland (EVC 74): 18,500 m² of water surface in five dams partly fringed with indigenous vegetation, apparently in ecological condition D (poor), based on the comments of Timewell and Costello (2002).

Swampy Woodland (EVC 937, **regionally Endangered**): roughly 0.5 ha, nearly all badly degraded (ecological condition rating D) and largely represented by weedy regrowth scrub around the dam north of the Rowville East Electricity Terminal Station.

Dominant canopy trees: *Eucalyptus ovata* and *Acacia mearnsii*.

Dominant lower trees: *Acacia melanoxylon*.

Shrubs: Very depleted by past clearing and infested with dense Gorse (*Ulex europaeus*), but the characteristic species *Ozothamnus ferrugineus* and *Melaleuca ericifolia* are present.

Vines: None seen.

Ferns: None seen.

Ground flora: Hard to detect from the fence line, but the indigenous ground flora is apparently reduced to very hardy species such as *Microlaena stipoides*.

Valley Heathy Forest (EVC 127, **regionally Endangered**): roughly 5 ha, of which it is estimated that 80% is in fair ecological condition (rating C) and 20% is in poor ecological condition (rating D). 55 indigenous plant species were recorded on the Police Rd extension by the author on 28/11/02.

Dominant canopy trees: *Eucalyptus cephalocarpa* (over 260 trees), *E. radiata* (over 200 trees), *E. goniocalyx* (at least 66 trees) and smaller numbers of *E. macrorhyncha* and *E. melliodora*.

Dominant lower trees: *Acacia mearnsii*, *A. implexa* and *Exocarpos cupressiformis*, with some *Acacia melanoxylon* and *Allocasuarina littoralis*.

Shrubs: Severely depleted in the golf course except for *Kunzea ericoides* regrowth in patches. Other species that remain dominant in more intact patches (particularly the Police Rd extension) are *Acacia paradoxa* and *Leptospermum scoparium*.

Vines: The light twiners *Billardiera mutabilis* and *Comesperma volubile* are fairly common in the more intact areas.

Ferns: The only ferns detected are thinly scattered patches of bracken.

Ground flora: Densely grassy with *Austrostipa rudis*, *Microlaena stipoides* and *Rytidosperma setaceum* dominant. *Lomandra filiformis coriacea* and *Lomandra longifolia* are both abundant, but not dominant.

Plant species

The following plant list comprises mostly records from Timewell and Costello (2002), minus a few dubious records. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Austrostipa rudis* subsp. *australis* is rare in Victoria and *Wahlenbergia multicaulis* is rare in the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia implexa</i>		<i>Cassinia arcuata</i>
V	<i>Acacia mearnsii</i>	V	<i>Cassinia longifolia</i>
V	<i>Acacia melanoxylon</i>	E	<i>Centella cordifolia</i>
	<i>Acacia paradoxa</i>	V	<i>Comesperma volubile</i>
	<i>Acaena novae-zelandiae</i>	V	<i>Coprosma quadrifida</i>
	<i>Acrotriche serrulata</i>	E	<i>Crassula helmsii</i>
V	<i>Allocasuarina littoralis</i>		<i>Deyeuxia quadriseta</i>
C	<i>Amyema pendula</i>		<i>Dianella admixta</i>
V	<i>Amyema quandang</i>	V	<i>Dianella longifolia</i> s.l.
	<i>Arthropodium strictum</i>		<i>Dichelachne ?rara</i>
	<i>Austrostipa pubinodis</i>		<i>Dichondra repens</i>
V	<i>Austrostipa rudis</i> subsp. <i>australis</i>	V	<i>Dillwynia cinerascens</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	E	<i>Drosera peltata</i> subsp. <i>peltata</i>
	<i>Billardiera mutabilis</i>	V	<i>Drosera whittakeri</i>
	<i>Bossiaea prostrata</i>		<i>Eleocharis sphacelata</i>
	<i>Bursaria spinosa</i>	V	<i>Epilobium billardierianum</i> subsp. <i>cinereum</i>
V	<i>Caesia parviflora</i>		<i>Eragrostis brownii</i>
	<i>Carex inversa</i>	V	<i>Eucalyptus cephalocarpa</i>
	<i>Cassinia aculeata</i>		

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Eucalyptus goniocalyx</i>	V	<i>Opercularia varia</i>
E	<i>Eucalyptus macrorhyncha</i>		<i>Oxalis exilis/perennans</i>
V	<i>Eucalyptus melliodora</i>	E	<i>Ozothamnus ferrugineus</i>
V	<i>Eucalyptus ovata</i>	V	<i>Platylobium obtusangulum</i>
E	<i>Eucalyptus radiata</i>		<i>Poa morrisii</i>
V	<i>Euchiton collinus</i>		<i>Poa ?sieberiana</i> var. <i>sieberiana</i>
V	<i>Exocarpos cupressiformis</i>		<i>Poranthera microphylla</i>
	<i>Gahnia radula</i>		<i>Pteridium esculentum</i>
V	<i>Geranium</i> sp. 2		<i>Pterostylis nutans</i>
	<i>Gonocarpus tetragynus</i>		<i>Rytidosperma geniculatum</i>
E	<i>Goodenia humilis</i>		<i>Rytidosperma pallidum</i>
E	<i>Hypericum gramineum</i>		<i>Rytidosperma penicillatum</i>
	<i>Juncus amabilis</i>	V	<i>Rytidosperma pilosum</i>
	<i>Juncus gregiflorus</i>		<i>Rytidosperma racemosum</i>
	<i>Juncus pallidus</i>		<i>Rytidosperma setaceum</i>
E	<i>Juncus procerus</i>		<i>Rytidosperma tenuius</i>
	<i>Juncus sarophorus</i>		<i>Schoenus apogon</i>
E	<i>Juncus subsecundus</i>		<i>Senecio glomeratus</i>
	<i>Kunzea ericoides</i> spp. agg.	E	<i>Senecio minimus</i>
	<i>Lachnagrostis filiformis</i>		<i>Senecio quadridentatus</i>
	<i>Lepidosperma gunnii</i>	V	<i>Solenogyne dominii</i>
V	<i>Lepidosperma laterale</i>		<i>Themeda triandra</i>
V	<i>Leptorhynchus tenuifolius</i>	V	<i>Thysanotus patersonii</i>
E	<i>Leptospermum scoparium</i>		<i>Tricoryne elatior</i>
	<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	E	<i>Typha</i> sp.
	<i>Lomandra longifolia</i>	V	<i>Veronica gracilis</i>
V	<i>Lythrum hyssopifolia</i>	E	<i>Viola hederacea</i>
	<i>Microlaena stipoides</i>	C	<i>Wahlenbergia multicaulis</i>
V	<i>Opercularia ovata</i>		
Introduced Species			
	<i>Acacia longifolia</i> subsp. <i>longifolia</i>		<i>Dactylis glomerata</i>
	<i>Agrostis capillaris</i>		<i>Ehrharta erecta</i>
	<i>Anthoxanthum odoratum</i>		<i>Erica lusitanica</i>
	<i>Briza maxima</i>		<i>Holcus lanatus</i>
	<i>Centaureum erythraea</i>		<i>Leontodon taraxacoides</i>
	<i>Chrysanthemoides monilifera monilifera</i>		<i>Melaleuca armillaris</i>
	<i>Cirsium vulgare</i>		<i>Oxalis corniculata</i>
	<i>Cynodon dactylon</i>		<i>Paspalum dilatatum</i>
			<i>Pennisetum clandestinum</i>
			<i>Phalaris aquatica</i>
			<i>Pittosporum undulatum</i>
			<i>Plantago lanceolata</i>
			<i>Rubus anglocandicans</i>
			<i>Solanum nigrum</i>
			<i>Ulex europaeus</i>

Notes concerning some of the locally threatened plant species

Austrostipa rudis subsp. *australis* (a subspecies of Veined Spear-grass) – a large population along the Police Rd extension, the biggest in Knox. This population was discovered by Dr Lorimer. All other species below were listed by Timewell and Costello (2002) without further information.

Crassula helmsii (Swamp Crassula)

Drosera peltata subsp. *peltata* (Pale Sundew)

Geranium sp. 2 (Variable Cranesbill)

Goodenia humilis (Swamp Goodenia)

Poa ?sieberiana var. *sieberiana* (Grey Tussock-grass) – somewhat dubious, given the habitat

Rytidosperma geniculatum (Knead Wallaby-grass)

Thysanotus patersonii (Twining Fringe-lily)

Wahlenbergia multicaulis (Tadgell's Bluebell)

Fauna of special significance

The following species were observed by Timewell and Costello (2002):

Nationally Vulnerable

Grey-headed Flying-fox – listed under federal legislation, but the observation at the Waverley Golf Club is possibly no more significant than the nightly visits of this species to gardens all around Melbourne.

Rare in Knox

Sugar Glider
 Eastern Grey Kangaroo
 Brush Bronzewing
 Verraux's Tree Frog

Note that Timewell and Costello (2002, p. 14) expect that the golf course provides habitat for wallabies, echidnas and antechinus. These animals are all significant in Knox.

The reliable naturalist, Mr Darren Wallace, reports that Grey-crowned Babblers were once seen on this site, but there is no significant chance that this will be repeated in the foreseeable future.

Fauna habitat features

- Large remnant eucalypts that probably have hollows used by wildlife;
- Indigenous understorey that supports small birds and possums (including Sugar Gliders);
- Dense patches of Burgan (*Kunzea ericoides*) that are favoured by wrens;
- Dams for waterfowl.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity and Viability

The site is part of a habitat corridor connecting the southern Dandenong Ranges with the Rowville Electricity Terminal Station and (with a small gap) the Dandenong Creek riparian habitat corridor. The corridor is taken here to be locally important. This represents **Local** significance under criterion 1.2.6 of Amos (2004).

Regionally Threatened Ecological Vegetation Class

This site contains at least one remnant patch of a regionally endangered EVC (Valley Heathy Forest). It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that the native vegetation of such a patch is of at least High conservation significance. This, in turn, gives the site **State** significance under criterion 3.2.3 of Amos (2004).

Rare or Threatened Flora

Austrostipa rudis subsp. *australis* is listed as 'rare' in Victoria. Its population in this site is perhaps the largest one known to the author in Victoria, and it appears quite viable (although its genetic stability relative to subspecies *rudis* (with which it is growing) is not known). The presence of such a large population of a statewide-rare subspecies represents **State** significance under criterion 3.1.2 of the standard criteria.

At least some of the other locally threatened plant species listed above, such as eucalypts and *Exocarpos*, have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

It is not clear from the report by Timewell and Costello (2002) whether the observation of a Grey-headed Flying-fox fits the description of an 'opportunistic record of an individual in transit' that is used in the standard criteria. If so, the observation confers no significance on the site; otherwise, it gives the site State significance.

The remaining species listed above under the heading, 'Fauna of special significance', are sufficiently rare and threatened locally that their presence confers at least **Local** significance upon the site as a whole under criterion 3.1.5.

Threats

- Proposed residential development for the part of the site north of the electricity transmission lines;
- Proposed development of a new golf course generally beneath the transmission lines;
- Proposed road construction along the extension of Police Rd
- Eucalypt dieback;
- Invasion by environmental weeds, particularly grass weeds and gorse;
- Loss or decline of plant species whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or elimination by incidents such as cubby house construction or digging by dogs.

Management issues

The site's vegetation appears to be mostly in a stable state, based on the report of Timewell and Costello (2002) and external observations by the present author. The only significant change in management that appears warranted is better control of weeds below the largest dam and lower parts of the Police Rd periphery (where adjoining highly significant

habitat is being affected). Management will have to be reviewed in the event that residential development and a smaller golf course are constructed, as mentioned above.

Planning issues

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its biological significance (known and potential) and the possibility of future subdivision. Note that the overlay is proposed to exempt maintenance of the golf course and associated assets;
- The golf course is within a Special Use Zone and parts of it are covered by Vegetation Protection Overlay VPO1 of the Knox Planning Scheme. It is outside the Urban Growth Boundary;
- There is a residential subdivision proposal for the golf course and a road construction proposal for the extension of Police Rd;
- The Victorian government's policy for native vegetation management (NRE 2002a; Victoria Planning Provisions) places great importance on retaining all remnants of regionally endangered EVCs. This will considerably restrain residential development or road construction within the site. All of the site's native vegetation that has a habitat score of 0-4 or above falls into a category for which permitted removal can only occur under exceptional circumstances of state significance. All the site's remaining native vegetation would have to be retained to the maximum possible extent.

Information sources used in this assessment

- An arborist's assessment of over 2,200 trees on the golf course north of the transmission lines, including species, size, health, structural soundness and retention value: see Waters G. (2002). "*Arboricultural Assessment and Report for Waverley Golf Club – 'Bergins Green'*". Report on behalf of Treelogic (4/21 Eugene Tce, Ringwood) for the golf club, dated September 2002. 62 pp.;
- A single list of indigenous and introduced plant species on the golf course (not the roadsides), compiled during August and September 2002, corrected and augmented by the present author: see Timewell C. and Costello C. (2002). "*Ecological Assessment of the Proposed Bergins Green Development, Rowville, Victoria*". Report on behalf of Biosis Research, 322 Bay St, Port Melbourne for Waverley Golf Club, dated September 2002;
- Additional lists of flora for the golf course, the neighbouring Police Rd extension, the 'Syrena' Polish House (Swampy Woodland and Valley Heathy Forest separately) and the Stud Rd nursery abutting the course's largest dam, compiled by Dr Lorimer on 28th November 2002;
- Incidental bird observations by Dr Lorimer on the same day;
- Aerial photography from February 2001, April 2003 and February 2007 ;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 78. Bergins Rd Extension, Rowville

A 1.8 ha area with a drainage reserve, agistment area and roadside, each with native vegetation. Melway ref. 82 A7.

Site Significance Level: *Regional*

- The remnant vegetation belongs to two regionally endangered Ecological Vegetation Classes: Valley Heathy Forest and Swampy Woodland;
- Much of the site was subject to drainage works and mulching in 2004, which replaced substantial areas of native ground flora with mulch and newly planted tubestock.



Aerial photograph taken February 2007

Boundaries

This 1.84 ha site is outlined in red and labelled 'Site 78' on the aerial photograph. The southern edge follows the fence of Churchill National Park. The other boundaries mainly follow fences and the edges of the adjoining roads, diverting around the more intensely developed part of the kennels.

Land use: A substantial part of the site is occupied by treed parts of Diamond's Kennels. Other parts are used as road verge and for drainage and stormwater treatment. The stormwater treatment wetlands are on the road reservation for an extension of Police Rd.

Site description

This site lies at the foot of the Lysterfield Hills at elevations of approximately 60 m, with a gentle southwesterly slope. Prior to settlement, it would have been poorly drained but without an obvious watercourse. Now, a drain with a series of

stormwater treatment wetlands has been excavated (marked on the aerial photograph) to cope with the increased runoff and pollution created by urban development uphill.

The bedrock is the same as the Lysterfield Hills: hornfels created by metamorphosis of Lower Devonian sedimentary rock. In part of the site, along and adjacent to the Bergins Rd roadside, the soil is poorly drained clay loam formed from decomposition of the hornfels. The author believes that the soil in the rest of the site is silt that has washed from uphill, even though geological survey maps do not show the hill's colluvium extending that far south.

In the absence of silt, the native vegetation would be expected to be Valley Heathy Forest, and this is what one finds along most of the Bergins Rd edge of the site. A notable feature of this strip is the very large Lightwoods (*Acacia implexa*). Elsewhere, the vegetation is Swampy Woodland dominated by Swamp Gums (*Eucalyptus ovata*), corroborating the interpretation that much of the site's topsoil is silt washed from further uphill.

In the 2002 site inspection, the highest density of rare plant species was observed in the site's southwestern corner. Several such species regenerated following scalping of topsoil by machinery in c. 2000. These species flourish on exposed ground and are suppressed when covered by mulch or other, more competitive vegetation. In 2004, that location was covered with mulch, leaving no chance for the rare species to survive or regenerate.

When inspected in 2008, most of the plant species recorded from the site in 2002 were still present, but not the four significant ones (*Gratiola pubescens*, *Hypolepis rugosula*, *Drosera peltata* subsp. *peltata* and *Juncus holoschoenus*). All these species were destroyed by the stormwater project in 2004 and it seems highly likely that they will not reappear naturally. The revegetation that occurred in association with the stormwater project includes a mixture of indigenous species (some of them locally rare) and species from elsewhere in the Melbourne region. Overall, the stormwater works have had a bad effect on locally threatened plants but have reduced the average density of weeds and probably improved the habitat for fauna (particularly frogs).

Diamond's Kennels occupies a substantial part of the site and has little native vegetation other than mature trees, concentrated in the northwest.

Relationship to other land

Many native birds, bats, frogs and insects would be likely to move between this site, Churchill National Park, the Waverley Golf Club (Site 77), the Dandenong Creek habitat corridor (e.g. Site 75) and the Lysterfield Hills. The continuity of the tree canopy across all of these sites encourages such movements.

Bioregion: Gippsland Plain

Habitat types

Wetland (EVC 74, listed as regionally Endangered but in this case the wetlands are artificial): Estimated to contain 500 m² of vegetation (most of it planted) in fair ecological condition (rating C).

Trees, vines and ferns: Absent.

Shrubs: A small number of *Senecio minimus* have volunteered around the edges of the wetlands.

Aquatic and semi-aquatic flora: Dominated variously by *Typha domingensis*, *Persicaria decipiens*, *Eleocharis acuta*, *Eleocharis sphacelata*, *Juncus amabilis* or *Juncus sarophorus*. It is difficult to tell how much of this has been planted, but the mixture closely matches the non-planted wetland vegetation in a dam 300 m to the east.

Swampy Woodland (EVC 937, **regionally Endangered**): Estimated as 0.7 ha in area, comprising 0.2 ha in fair ecological condition (rating C) and 0.5 ha in poor ecological condition (rating D). 44 indigenous plant species were recorded in 2002, dropping to 30 in June 2008 (with an expectation of partial recovery).

Dominant canopy trees: *Eucalyptus ovata* is strongly dominant.

Dominant lower trees: *Acacia mearnsii* and *A. melanoxylon*.

Shrubs: The naturally occurring species are low in diversity and density due to clearing. The most abundant of these are *Kunzea ericoides*, *Leptospermum scoparium*, *Ozothamnus ferrugineus* and *Senecio minimus*.

Vines: Absent.

Ferns: There is a patch of *Pteridium esculentum* in the southwest. *Hypolepis rugosula* was destroyed in 2004.

Ground flora: Among the non-planted species, the dominant ground flora species are *Gahnia radula*, various *Juncus* species (particularly *J. amabilis*). Other characteristic species include *Carex appressa* and abundant *Epilobium hirtigerum*. Characteristic species that were destroyed in 2004 include *Centella cordifolia*, *Gratiola pubescens* and *Isolepis inundata*.

Valley Heathy Forest (EVC 127, **Endangered**) beside Bergins Rd: Estimated as 0.08 ha, all in poor ecological condition (rating D). 14 indigenous plant species were recorded, most or all of which were still present in June 2008.

Canopy trees: Dominated by *Eucalyptus radiata*, also with *E. cephalocarpa* and outliers of *E. ovata*.

Lower trees: *Acacia mearnsii*, *Allocasuarina littoralis*, *Exocarpos cupressiformis* and *Acacia implexa* to 10 m tall.

Shrubs: Very scant, but *Kunzea ericoides* is present (and formerly *Acacia paradoxa*).

Vines and ferns: Absent.

Ground flora: Predominantly introduced grass.

Plant species

The following plant species were observed by the author in the years indicated. Additional species would be detectable in seasons other than winter. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, the species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
V	<i>Acacia implexa</i>	2008	E	<i>Indigofera australis</i> (planted)	2008
V	<i>Acacia mearnsii</i>	2008	V	<i>Isolepis inundata</i>	2002
V	<i>Acacia melanoxylon</i>	2008		<i>Juncus amabilis</i>	2008
	<i>Acacia paradoxa</i>	2008		<i>Juncus bufonius</i>	2002
	<i>Acaena novae-zelandiae</i>	2008		<i>Juncus gregiflorus</i>	2002
V	<i>Allocasuarina littoralis</i>	2008	C	<i>Juncus holoschoenus</i>	2002
C	<i>Amyema pendula</i>	2008		<i>Juncus pallidus</i>	2008
	<i>Bursaria spinosa</i> (planted)	2008	E	<i>Juncus planifolius</i>	2002
	<i>Carex appressa</i> (wild and planted)	2002		<i>Juncus sarophorus</i>	2008
E	<i>Carex fascicularis</i> (planted)	2008	E	<i>Juncus subsecundus</i>	2002
	<i>Cassinia arcuata</i>	2008		<i>Kunzea ericoides</i> spp. agg.	2008
E	<i>Centella cordifolia</i>	2002		<i>Lachnagrostis filiformis</i>	2008
V	<i>Coprosma quadrifida</i> (planted)	2008	E	<i>Leptospermum scoparium</i>	2008
E	<i>Crassula helmsii</i> (planted)	2008		<i>Lomandra longifolia</i>	2002
V	<i>Dianella longifolia</i> s.l.	2002	V	<i>Lythrum hyssopifolia</i>	2008
	<i>Dichondra repens</i>	2008	E	<i>Melaleuca ericifolia</i> (planted)	2008
E	<i>Drosera peltata</i> subsp. <i>peltata</i>	2002	E	<i>Melicytus dentatus</i> (planted)	2008
V	<i>Eleocharis acuta</i>	2008		<i>Microlaena stipoides</i>	2008
	<i>Eleocharis sphacelata</i>	2008	C	<i>Muellerina eucalyptoides</i>	2002
V	<i>Epilobium billardierianum</i> ssp. <i>cinereum</i>	2008	E	<i>Ozothamnus ferrugineus</i>	2008
	<i>Epilobium hirtigerum</i>	2002		<i>Persicaria decipiens</i> (perhaps planted)	2008
V	<i>Eucalyptus cephalocarpa</i>	2008	E	<i>Poa labillardierei</i> (planted)	2008
V	<i>Eucalyptus ovata</i>	2008		<i>Poa morrisii</i>	2002
E	<i>Eucalyptus radiata</i>	2002	C	<i>Pomaderris racemosa</i> (planted)	2008
V	<i>Euchiton collinus</i>	2002		<i>Poranthera microphylla</i>	2002
V	<i>Exocarpos cupressiformis</i>	2002		<i>Pteridium esculentum</i>	2008
	<i>Gahnia radula</i>	2008		<i>Schoenus apogon</i>	2002
E	<i>Gahnia sieberiana</i> (planted)	2008	E	<i>Senecio minimus</i>	2008
E	<i>Geranium gardneri</i>	2008		<i>Senecio quadridentatus</i>	2008
	<i>Goodenia ovata</i> (wild & planted)	2008		<i>Themeda triandra</i> (planted)	2008
C	<i>Gratiola pubescens</i>	2002	C	<i>Triglochin procera</i> (planted)	2008
E	<i>Hypericum gramineum</i>	2002	E	<i>Triglochin striata</i> (planted)	2008
C	<i>Hypolepis rugosula</i>	2002	E	<i>Typha domingensis</i>	2008

Introduced Species

<i>Agrostis capillaris</i>	<i>Ehrharta erecta</i>	<i>Phytolacca octandra</i>
<i>Allium triquetrum</i>	<i>Fumaria officinalis</i> spp. agg.	<i>Ranunculus repens</i>
<i>Aster subulatus</i>	<i>Galium aparine</i>	<i>Rubus anglocandicans</i>
<i>Chrysanthemoides monilifera monilifera</i>	<i>Holcus lanatus</i>	<i>Rumex crispus</i>
<i>Cirsium vulgare</i>	<i>Juncus articulatus</i>	<i>Ulex europaeus</i>
<i>Conium maculatum</i>	<i>Oxalis incarnata</i>	<i>Watsonia meriana bulbifera</i>
<i>Conyza sumatrensis</i>	<i>Paspalum dilatatum</i>	<i>Zantedeschia aethiopica</i>
<i>Cyperus eragrostis</i>	<i>Paspalum distichum</i>	
<i>Dactylis glomerata</i>	<i>Pennisetum clandestinum</i>	

Notes concerning some of the locally threatened plant species

Drosera peltata subsp. *peltata* (Pale Sundew). A single plant was found beneath the transmission lines in July 2002, destroyed in 2004.

Gratiola pubescens (Glandular Brooklime). One group of ten plants was found beneath the transmission lines in July 2002, destroyed in 2004 by installation of stormwater treatment ponds.

Hypolepis rugosula (Ruddy Ground-fern). Several were growing in the eastern corner of the site in July 2002, but have not recovered from being buried in mulch in 2004.

Juncus holoschoenus (Joint-leaf Rush). At least two plants were in the drainage line opposite Wallingford Place in July 2002, destroyed in 2004.

Fauna of special significance

Eastern Grey Kangaroos frequent the site, as with all other bushland and open space in the vicinity.

Fauna habitat features

There are some old eucalypts with hollows that would suit roosting or nesting sites of native birds, bats, possums or insects.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity and Viability

Criterion 1.1.2 awards **Regional** significance to the largest blocks of contiguous native vegetation in regions where habitat is extensively cleared and fragmented. This applies to the large tract of native vegetation made up from Site 78, Churchill National Park and adjoining bushland; However the peripheral character of Site 78 in this context means that the site represents only a tiny contribution to the regional significance.

As explained under the heading 'Relationship to other land' on the previous page, this site's landscape context makes it part of a corridor for wildlife movement around the local area. This qualifies for **Local** significance under criterion 1.2.6.

Endangered Vegetation Types

Valley Heathy Forest and Swampy Woodland are endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that native vegetation of these types is necessarily of at least High conservation significance. Any 'remnant patch' of such vegetation gives a site State significance under criterion 3.2.3 of Amos (2004).

The native vegetation on a small part of the site meets the Department of Sustainability & Environment's definition of a remnant patch. Because this area is so small, the author deems the significance level of the site to be reduced to **Regional**.

Locally Threatened Flora

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Invasion by environmental weeds. The main weeds are as follows:
 - Serious: Angled Onion (*Allium triquetrum*), Panic Veldt-grass (*Ehrharta erecta*), Jointed Rush (*Juncus articulatus*), Pale Wood-sorrel (*Oxalis incarnata*), Creeping Buttercup (*Ranunculus repens*);
 - Moderate: Brown-top Bent (*Agrostis capillaris*), Spear Thistle (*Cirsium vulgare*), Drain Flat-sedge (*Cyperus eragrostis*), Cocksfoot (*Dactylis glomerata*), Fumitory (*Fumaria* sp.), Cleavers (*Galium aparine*), Hemlock (*Conium maculatum*), Paspalum (*Paspalum dilatatum*), Red-ink Weed (*Phytolacca octandra*), Blackberry (*Rubus discolor*), Bulbil Watsonia (*Watsonia meriana*), Arum Lily (*Zantedeschia aethiopica*);
- Rabbit grazing.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the matters discussed under the heading, 'Significance ratings' and the possibility of future development. Part of the justification is related to the following statement from the Department of Planning and Community Development's Biodiversity Practice Note: *'The ESO contains additional controls over the construction of buildings, works, fence construction and subdivision. The VPO should be used in preference to the ESO only where impacts on biodiversity caused by the clearing of vegetation are the sole concern'*;
- This site and some neighbouring land are presently covered by the Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, based on the description of Site 35 of the report by Water Ecoscience (1998);

- The site is outside the Urban Growth Boundary;
- The Planning Scheme zoning is Green Wedge Zone Schedule 2 (GWZ2). The associated minimum subdivision area of 4 ha means the site presently has no subdivision potential without a planning scheme amendment.

Information sources used in this assessment

- Site surveys by Dr Lorimer on 15th April and 31st July 2002 and on 5th June 2008 using this study's standard approach described in Section 2.4 of Vol.1. This included:
 - Compilation of lists of indigenous and introduced plant species in each of four parts of the site;
 - Description of the structural and floristic composition of each type of native vegetation;
 - Incidental fauna observations; and
 - Checks for fauna habitat, ecological threats and management issues;
- Brief observations of the site on 25th July 2004, when the native understorey had been removed and replaced by mulch and newly planted tubestock;
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 79. Whitecliffe Reserve, Rowville

Small Council reserve with areas of native vegetation. Melway ref. 82 A7.

Site Significance Level: *Regional*

- The native vegetation is of the endangered type, Valley Heathy Forest;
- There are good prospects of regenerating the native vegetation from soil-stored seed, improving the ecological condition from its present state of unnaturally few species.

Aerial photograph and plan: See page 394, which covers this site, Site 78 and part of the Waverley Golf Club (Site 77).

Boundaries

The site is the whole reserve, as outlined in red on the aerial photograph.

Land use & tenure: Council reserve, managed for conservation of bushland and for public enjoyment.

Site description

This 4,872 m² reserve lies on a gentle, west-facing slope at the foot of the Lysterfield Hills, at an elevation of approximately 65 m. According to geological survey maps, the bedrock is Lysterfield Hills hornfels, covered in the northern half of the reserve by the edge of a deposit of colluvium, or soil that has washed or slipped from uphill.

The topsoil is poorly drained, rather infertile clay loam.

The indigenous vegetation community is typical of Valley Heathy Forest in the Rowville-Scoresby area, showing no influence of the hornfels or the colluvium deposit.

As can be seen on the aerial photograph, more than half of the reserve has been cleared of trees and shrubs. A substantial proportion of the trees that are present are Bracelet Honey-myrtles (*Melaleuca armillaris*) that have been planted (probably for a windbreak) and become a weed. The site appears to have been grazed for many years.

Despite the clearing, grazing and associated weed invasions, there has been good regeneration of understorey where the ground has been scraped during the construction of the surrounding residential estate in recent years. Species that germinated in the scalped ground included (among others) *Bossiaea prostrata*, *Dianella longifolia*, *Drosera peltata* subsp. *peltata*, *Gonocarpus tetragynus*, *Lomandra filiformis* and *Poranthera microphylla*. This indicates a good bank of indigenous plant seeds in the soil, but the seeds are not germinating on most of the reserve because of an unnaturally dense cover of the indigenous Weeping Grass (*Microlaena stipoides*). There are good prospects of regeneration if the ground flora were to be burned.

Relationship to other land

The reserve is only 115 m from more extensive native vegetation at the Waverley Golf Course (Site 77), 140 m from Site 78, 300 m from Churchill National Park and 500 m from the Lysterfield Hills (including Site 80 and Site 81). Although the site's area is very small and it provides little habitat, some birds, bats and insects would be expected to occasionally stop at the reserve as they move around the neighbourhood. Pollen and seeds carried by these animals should help protect the plants in the reserve from inbreeding.

The surrounding residential estate is unfit for native flora and fauna.

Bioregion: Gippsland Plain

Habitat type

Valley Heathy Forest (EVC 127, *Endangered*): Estimated to cover 0.28 ha, comprising 0.25 ha in fair ecological condition (rating C) and 0.03 ha in poor ecological condition (rating D).

Canopy trees: Dominated by *Eucalyptus cephalocarpa* and *E. radiata*, both typically 12 m tall.

Lower trees: Dominated by *Acacia mearnsii*, with a single *Exocarpos cupressiformis*.

Shrubs: The shrub layer has been decimated by past clearing and grazing. The dominant shrub species is *Acacia paradoxa*. Other species are *Cassinia arcuata* and *Ozothamnus ferrugineus*.

Vines: Absent. *Billardiera mutabilis* would probably germinate after a fire in the reserve.

Ferns: Absent.

Ground flora: Densely grassy (95% cover) and dominated by *Microlaena stipoides*. *Austrostipa rudis* and *Dichondra repens* are also dense in patches. Species that are abundant but not dominant in cover are *Gonocarpus tetragynus*, *Hypericum gramineum*, *Oxalis perennans*, *Poa morrisii* and *Themeda triandra*. Less abundant species that are good ecological indicators are *Bossiaea prostrata*, *Dianella longifolia*, *Drosera peltata peltata*, *Tricoryne elatior*, *Veronica gracilis* and *Xanthosia dissecta*.

Plant species

The following plant species were observed by the author in July 2002. Additional species would no doubt be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox with 'E'=Endangered and 'V'=Vulnerable.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia mearnsii</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Acacia paradoxa</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>		<i>Microlaena stipoides</i>
	<i>Bossiaea prostrata</i>	V	<i>Opercularia ovata</i>
	<i>Cassinia arcuata</i>		<i>Oxalis exilis/perennans</i>
V	<i>Dianella longifolia</i> s.l.	E	<i>Ozothamnus ferrugineus</i>
	<i>Dichondra repens</i>		<i>Poa morrisii</i>
E	<i>Drosera peltata</i> subsp. <i>peltata</i> (×3)		<i>Poranthera microphylla</i>
	<i>Eragrostis brownii</i>		<i>Rytidosperma racemosum</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Schoenus apogon</i>
E	<i>Eucalyptus radiata</i>		<i>Senecio quadridentatus</i>
V	<i>Euchiton collinus</i>		<i>Themeda triandra</i>
V	<i>Exocarpos cupressiformis</i>		<i>Tricoryne elatior</i>
	<i>Gonocarpus tetragynus</i>	V	<i>Veronica gracilis</i>
E	<i>Hypericum gramineum</i>	E	<i>Xanthosia dissecta</i>
Introduced Species			
	<i>Agrostis capillaris</i>		<i>Ehrharta longiflora</i>
	<i>Arctotheca calendula</i>		<i>Galium aparine</i>
	<i>Centaurium erythraea</i>		<i>Holcus lanatus</i>
	<i>Conyza sumatrensis</i>		<i>Hypochoeris radicata</i>
	<i>Dactylis glomerata</i>		<i>Melaleuca armillaris</i>
	<i>Ehrharta erecta</i>		<i>Modiola caroliniana</i>
			<i>Paspalum dilatatum</i>
			<i>Plantago lanceolata</i>
			<i>Romulea rosea</i>
			<i>Sporobolus africanus</i>
			<i>Ulex europaeus</i>

Fauna of special significance

None detected.

Fauna habitat features

The reserve provides the most basic habitat attributes of grassy woodland vegetation, but its value for habitat is diminished by the small size, the small number of mature trees and the small number of plant species that are present in substantial numbers.

Significance rating

Endangered Vegetation Type

Valley Heathy Forest is endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that the native vegetation at Whitecliffe Reserve is necessarily of at least High conservation significance. Any site that contains a 'remnant patch' of such vegetation is of State significance under the Department of Sustainability & Environment's standard criteria (Amos 2004 – criterion 3.2.3).

However, at the time Amos (2004) prepared the significance criteria, the unpublished convention was that native vegetation only qualified as a remnant patch if at least 2,500 m² contained native understorey. Because this does not apply to Whitecliffe Reserve, the author has reduced the significance level of the site to **Regional**.

Locally Threatened Plant Species

Some of the locally threatened plant species listed above have viable populations (in combination with neighbouring vegetation), thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Invasion by environmental weeds, although none are rated 'Very serious' and only two (Cat's Ear *Hypochoeris radicata* and Bracelet Honey-myrtle *Melaleuca armillaris*) are rated 'Serious';
- Loss or decline of plant species that have such small populations that they are vulnerable to inbreeding, poor reproductive success or random events such as trampling;
- Fragmentation of habitat, leading to reduced visitation by small insect-eating birds and hence a risk of worsening plant pests and diseases.

Management issues

This reserve should be a high priority for ecological burning, which should be made as hot as safety allows. Burning could occur whenever weather and fuel conditions suit. Mowing in advance would help to increase the amount of dry fuel available to burn. Post-fire regeneration of plant species should be monitored by a botanist, and is expected to be good.

Administration matters

- The Planning Scheme zoning is Residential 1 Zone (R1Z) and the site is inside the Urban Growth Boundary;
- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the endangered EVC and its associated State significance;
- Most of the reserve is included under the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, based on the description of Site 277 of the report by Water Ecoscience (1998). The majority of Site 277 in that report is now covered with houses and streets. Note that Water Ecoscience apparently confused the weed *Melaleuca armillaris* with the locally indigenous species *M. ericifolia*, and so their site boundary may have been influenced by the extent of the weed rather than native vegetation.

Information sources used in this assessment

- A site survey by Dr Lorimer for approximately one hour on 31/7/02 using this study's standard approach described in Section 2.4 of Vol.1. This included:
 - Compilation of lists of indigenous and introduced plant species in the reserve;
 - Description of the structural and floristic composition of each type of native vegetation;
 - Incidental fauna observations (but only common urban birds were detected); and
 - Checks for fauna habitat, ecological threats and management issues;
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 80. Heany Park, Rowville

Council property with native vegetation, a reservoir and a Scout and Guide camp. Melway ref. 82 C6.

Site Significance Level: *State*

- Contains possibly the highest quality native vegetation for kilometres around;
- The vegetation with the best ecological condition is the very rare type, Lysterfield Grassy Dry Forest;
- The other vegetation types present belong to threatened Ecological Vegetation Classes;
- There are nine plant species that are threatened in Knox;
- The park is habitat for several rare fauna species.



Scale 1:3,000
0 50 100m

Aerial photograph taken April 2003

Boundaries

The site is the whole reserve, as outlined in red on the aerial photograph.

Land use & tenure: Council property closed to the general public, managed for conservation of bushland and for the benefit of Scouts and Guides, to whom the park is leased for a scout hall, camping and related activities.

Site description

This 9.48 ha site lies on the northwest-facing slopes of the Lysterfield Hills, with elevations varying from 84 m at the entrance gate on Golding Av to 164 m at the southeastern corner. The slope is typically 30% at locations above the 105 m contour and 10% below that level. A reservoir has been constructed at the break of slope by digging out earth and using it to form the downhill side of the reservoir.

The bedrock is Lysterfield Hills hornfels. On the steeper, upper slope, this has decomposed at the surface to form a shallow, stony, rather infertile clay loam that does not drain well and dries very hard. Some of this appears to have slipped or washed downhill to form the lower, shallower slope, judging from the abrupt change of slope and the particular plant species present.

The vegetation of the steeper, upper slopes is a grassy woodland only 10 m tall, sharing characteristics of Grassy Dry Forest and the form of Grassy Forest that is associated with the Gippsland Plain bioregion. This is the rare community described for the first time in Appendix A of Volume 1 under the name, 'Lysterfield Grassy Dry Forest'. It is unique among all the sites visited for this study, but it was seen to extend into adjacent properties where permission was not granted to inspect further. This vegetation type is in predominantly good ecological condition (possibly the best for several kilometres around) and has resisted serious weed invasion because of the very harsh growing conditions of the soil, slope and aspect. Wildflowers abound, particularly lilies.

The native vegetation in the southwest of the park is typical of Valley Heathy Forest (an endangered EVC), grading into Valley Grassy Forest (regionally vulnerable) in the north. The latter is characterised by a nearly pure stand of Yellow Box (*Eucalyptus melliodora*) with a few Candlebarks (*Eucalyptus rubida*) and Narrow-leaved Peppermints (*Eucalyptus radiata*), but the understorey has been greatly modified by the reservoir's construction and the site's history as a Scout and Guide camp. No clear disjunction between these two EVCs could be discerned in the brief site inspection for this report.

Scout and Guide activities have been concentrated on the lower, shallower slopes where the Valley Heathy Forest and Valley Grassy Forest occur. Trampling, clearing, excavations and buildings have degraded the vegetation in these areas, and the aerial photograph shows the lower density of trees that has resulted.

Despite the reservoir being an artificial water body, it has become colonised by predominantly native vegetation (as has happened at many sites in this report). It provides habitat for aquatic and semi-aquatic plants, frogs, waterbirds and aquatic invertebrates. Five Blue-billed Ducks (a vulnerable species) were seen on the reservoir when the park's fauna was surveyed in 2001.

The distinctive, more intense green tree crowns visible on the aerial photograph are pines, which are a significant environmental weed in the site, particularly near the reservoir.

Relationship to other land

The park is effectively part of a larger site of biological significance in combination with the Dandenong Police Paddocks Reserve, the Lysterfield Hills (Site 81), Churchill National Park, Lysterfield Park (Site 82) and bushland to the northeast of Lysterfield Park. Many species of fauna undoubtedly move between these sites, sometimes carrying pollen or seeds to link the plant populations across the area. Heany Park is treated as a separate site of significance for this report because of its land tenure, land use and the outstanding quality of its Grassy Dry Forest.

The residential estate to the north and west of the park is unfit for native flora and fauna.

Bioregion: The Valley Heathy Forest is in the Gippsland Plain bioregion and the other vegetation types are in the Highlands Southern Fall bioregion.

Habitat types

Lysterfield Grassy Dry Forest (part of EVC 22, whose regional conservation status is listed as 'Least Concern', but this rare variant is soon to be given an official rating of its own in the forthcoming regional Native Vegetation Plan): Estimated to cover 2.2 ha, all in good ecological condition (rating B).

Canopy trees: Dominated by *Eucalyptus radiata* (10 m tall), with occasional *E. melliodora*.

Lower trees: Dominated by *Acacia mearnsii* and *Allocasuarina littoralis* (both typically 7 m tall), and far fewer *Exocarpos cupressiformis*.

Shrubs: Very sparse (perhaps naturally) except for patches of regrowth of *Acacia paradoxa*.

Vines: *Comesperma volubile* is abundant.

Ferns: Absent.

Ground flora: Grassy and apparently naturally sparse (c.50% cover), with fairly low diversity (perhaps suppressed by grazing). Dominated by *Rytidosperma pallidum*, *Microlaena stipoides* and *Lomandra filiformis* subsp. *coriacea*. The following other species are also abundant: *Arthropodium strictum*, *Lepidosperma laterale*, *Austrostipa pubinodis* and *Lagenifera gracilis*. *Bossiaea prostrata* is moderately common.

Valley Heathy Forest (EVC 127, Endangered): Estimated to cover 3.5 ha, comprising 0.8 ha in good ecological condition (rating B), 1.4 ha in fair ecological condition (rating C) and 1.3 ha in poor ecological condition (rating D).

Canopy trees: Dominated by *Eucalyptus cephalocarpa* (typically 17 m tall), with far fewer *E. melliodora* (typically 20 m tall).

Lower trees: Dominated by *Acacia melanoxylon* and *Exocarpos cupressiformis*.

Shrubs: The shrub layer has been decimated and is sparse except for patches of regrowth. The dominant shrub species is *Acacia paradoxa*.

Vines: Absent. *Billardiera mutabilis* would probably germinate after a fire.

Ferns: Absent.

Ground flora: Densely grassy (95% cover) and dominated by *Microlaena stipoides*. The following other grasses are also dense in patches: *Themeda triandra*, *Austrostipa rudis*, *Austrostipa pubinodis* and *Austrostipa mollis*. Species that are abundant but not dominant in cover are *Arthropodium strictum*, *Hibbertia riparia* (a characteristic species) and *Oxalis perennans*.

Valley Grassy Forest (EVC 47, regionally Vulnerable): The boundary between this EVC and Valley Heathy Forest could not be clearly distinguished due to modification of the natural vegetation composition. Estimated to cover 1 ha, all in poor ecological condition (rating D).

Dominant canopy trees: Strongly dominated by *Eucalyptus melliodora*, with small numbers of *E. radiata* and *E. rubida*.

Dominant lower trees: *Acacia mearnsii*, *Exocarpos cupressiformis*, *Acacia implexa* and *Allocasuarina littoralis*.

Shrubs: *Acacia paradoxa* is dense in patches.

Ground flora: Sparse due to camp activities.

Wetland (EVC 74, listed as regionally Endangered but in this case it is artificial): Estimated to contain 0.32 ha of fringing vegetation in fair ecological condition (rating C) with 8 indigenous plant species, and 0.46 ha of open water with unknown bottom-dwelling flora.

Trees, vines and ferns: Absent.

Shrubs: A small amount of *Melaleuca ericifolia* encroaches into the wetland area.

Aquatic and semi-aquatic flora: Dominated variously by *Typha domingensis*, *Persicaria decipiens*, *Eleocharis acuta*, *Eleocharis sphacelata*, *Juncus amabilis* or *Juncus sarophorus*. The usual wetland weed, *Juncus articulatus*, is a moderate problem.

Plant species

The following plant species were observed by the author in April to June 2009 except where otherwise noted. Additional species would probably be found at other times of year. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, the species with names in bold are rare in the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia implexa</i>		<i>Austrostipa pubinodis</i>
V	<i>Acacia mearnsii</i>		<i>Austrostipa rudis</i> subsp. <i>rudis</i>
V	<i>Acacia leprosa</i> (Dandenong Range variant) - planted		<i>Billardiera mutabilis</i>
V	<i>Acacia melanoxylon</i>		<i>Bossiaea prostrata</i>
	<i>Acacia paradoxa</i>		<i>Burchardia umbellata</i>
E	<i>Acacia pycnantha</i> - planted		<i>Bursaria spinosa</i>
E	<i>Acacia stricta</i>		<i>Campylopus clavatus</i>
	<i>Acaena novae-zelandiae</i>		<i>Carex appressa</i>
	<i>Acrotriche serrulata</i>		<i>Carex breviculmis</i>
V	<i>Allocasuarina littoralis</i> (wild & planted)		<i>Cassinia aculeata</i>
C	<i>Amyema pendula</i>		<i>Cassinia arcuata</i>
C	<i>Arthropodium milleflorum</i> (Biosis, 2001)	V	<i>Cassinia longifolia</i>
	<i>Arthropodium strictum</i>	E	<i>Centella cordifolia</i>
V	<i>Austrostipa mollis</i>	C	<i>Chamaescilla corymbosa</i>
			<i>Clematis decipiens</i>

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Comesperma volubile</i>	E	<i>Lemna disperma</i>
V	<i>Cotula australis</i>		<i>Lepidosperma gunnii</i>
V	<i>Crassula decumbens</i>	V	<i>Lepidosperma laterale</i>
E	<i>Cynoglossum suaveolens</i>		<i>Leptospermum continentale</i>
	<i>Deyeuxia quadriseta</i>	E	<i>Leptospermum scoparium</i>
	<i>Dianella admixta</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
V	<i>Dianella longifolia</i> s.l. (wild & planted)		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
	<i>Dichelachne rara</i>		<i>Lomandra longifolia</i> (wild & planted)
	<i>Dichondra repens</i>	E	<i>Melaleuca ericifolia</i>
	<i>Diuris</i> sp. (D. Wallace, 1980s?)	C	<i>Melaleuca squarrosa</i> (planted)
V	<i>Drosera whittakeri</i>		<i>Microlaena stipoides</i>
V	<i>Eleocharis acuta</i>	C	<i>Myrsine howittiana</i> (planted)
	<i>Eleocharis sphacelata</i>	V	<i>Opercularia ovata</i>
	<i>Elymus scaber</i>	V	<i>Opercularia varia</i>
	<i>Epilobium hirtigerum</i>		<i>Oxalis exilis/perennans</i>
V	<i>Eucalyptus cephalocarpa</i>	E	<i>Ozothamnus ferrugineus</i> (wild & planted)
	<i>Eucalyptus cephalocarpa</i> hybrid		<i>Pandorea pandorana</i> (Biosis, 2001)
E	<i>Eucalyptus macrorhyncha</i> (planted)		<i>Persicaria decipiens</i>
V	<i>Eucalyptus melliodora</i>	C	<i>Persicaria prostrata</i>
V	<i>Eucalyptus ovata</i>	E	<i>Pimelea curviflora</i> (D. Wallace, 2001)
E	<i>Eucalyptus radiata</i>	V	<i>Pimelea humilis</i>
C	<i>Eucalyptus rubida</i> (only planted specimens remain since c. 2005)		<i>Poa morrisii</i>
E	<i>Eucalyptus viminalis</i> (planted)		<i>Poranthera microphylla</i>
V	<i>Euchiton collinus</i>		<i>Pterostylis nutans</i>
E	<i>Euchiton involucratus</i>		<i>Rytidosperma geniculatum</i>
V	<i>Exocarpos cupressiformis</i>		<i>Rytidosperma linkii</i> var. <i>fulvum</i>
	<i>Funaria hygrometrica</i>		<i>Rytidosperma pallidum</i>
	<i>Gahnia radula</i>		<i>Rytidosperma racemosum</i>
	<i>Gonocarpus tetragynus</i>		<i>Rytidosperma setaceum</i>
	<i>Goodenia ovata</i> (wild & planted)		<i>Rytidosperma tenuius</i>
C	<i>Goodia lotifolia</i> (planted)	E	<i>Schoenus apogon</i>
X	<i>Hakea decurrens</i> (planted)		<i>Senecio campylocarpus</i>
C	<i>Hakea nodosa</i> (planted)		<i>Senecio glomeratus</i>
V	<i>Helichrysum luteoalbum</i>	E	<i>Senecio minimus</i>
E	<i>Hibbertia riparia</i>	E	<i>Senecio prenanthoides</i>
E	<i>Hydrocotyle foveolata</i>		<i>Senecio quadridentatus</i>
E	<i>Hypericum gramineum</i>	V	<i>Solanum laciniatum</i>
	<i>Hypnum cupressiforme</i>	V	<i>Solenogyne dominii</i>
E	<i>Hypoxis vaginata</i> (Lorimer, 2005)		<i>Themeda triandra</i>
V	<i>Isolepis inundata</i>		<i>Thuidiopsis furfurosa</i>
	<i>Juncus amabilis</i>	V	<i>Thysanotus patersonii</i>
	<i>Juncus bufonius</i>		<i>Tricoryne elatior</i>
C	<i>Juncus holoschoenus</i>	E	<i>Typha orientalis</i>
	<i>Juncus pallidus</i>	C	<i>Vallisneria americana</i>
E	<i>Juncus planifolius</i>	V	<i>Veronica gracilis</i>
E	<i>Juncus procerus</i>	E	<i>Veronica plebeia</i>
	<i>Juncus sarophorus</i>	C	<i>Viminaria juncea</i> (planted)
E	<i>Juncus subsecundus</i>	E	<i>Viola hederacea</i>
	<i>Kunzea ericoides</i> spp. agg. (wild & planted)	E	<i>Wahlenbergia gracilis</i>
	<i>Lachnagrostis filiformis</i>	V	<i>Wolffia australiana</i>
V	<i>Lagenophora gracilis</i>	E	<i>Wurmbea dioica</i>
		V	<i>Xanthorrhoea minor</i> (wild & planted)

Introduced Species

<i>Acacia floribunda</i>	<i>Asparagus asparagoides</i>	<i>Cirsium vulgare</i>	<i>Fumaria</i> sp.
<i>Agrostis capillaris</i>	<i>Aster subulatus</i>	<i>Conyza sumatrensis</i>	<i>Hakea salicifolia</i>
<i>Anagallis arvensis</i>	<i>Briza maxima</i>	<i>Cynodon dactylon</i>	<i>Holcus lanatus</i>
<i>Anthoxanthum odoratum</i>	<i>Centaurium erythraea</i>	<i>Cyperus eragrostis</i>	<i>Hypochoeris radicata</i>
<i>Araujia sericifera</i>	<i>Chrysanthemoides monilifera</i>	<i>Dactylis glomerata</i>	<i>Juncus articulatus</i>
<i>Arctotheca calendula</i>	subsp. <i>monilifera</i>	<i>Ehrharta erecta</i>	<i>Leontodon taraxacoides</i>

<i>Nassella trichotoma</i>	<i>Pinus radiata</i>	<i>Rubus anglocandicans</i>	<i>Vicia</i> sp.
<i>Oxalis ?incarnata</i>	<i>Pittosporum undulatum</i>	<i>Solanum americanum</i>	<i>Vulpia bromoides</i>
<i>Oxalis pes-caprae</i>	<i>Plantago lanceolata</i>	<i>Solanum nigrum</i>	<i>Zantedeschia aethiopica</i>
<i>Paspalum dilatatum</i>	<i>Pseudoscleropodium purum</i>	<i>Sonchus oleraceus</i>	
<i>Paspalum distichum</i>	<i>Romulea rosea</i>	<i>Sporobolus africanus</i>	
<i>Pennisetum clandestinum</i>	<i>Rosa rubiginosa</i>	<i>Ulex europaeus</i>	

Notes concerning some of the locally threatened plant species

Arthropodium milleflorum (Pale Vanilla-lily). Very few individuals were reported by Yugovic and Timewell (2001) in the Valley Heathy Forest.

Austrostipa mollis (a Spear-grass). Moderate numbers were observed in the author's July survey, and others would have been overlooked because of the season. It is also present on adjoining properties.

Chamaescilla corymbosa (Blue Stars). Respected local naturalist, Mr Darren Wallace, reports the presence of very small numbers of this species. The author saw some in 2009 approximately 100 m to the east.

Diuris, species indeterminate. Seen by Mr Wallace many years ago and perhaps now lost from the park.

Eucalyptus rubida (Candlebark). The very few wild trees seen by Dr Lorimer just below the reservoir until c. 2003 have replacements have been planted.

Pimelea curviflora (Curved Rice-flower). Mr Darren Wallace reports that there have been hundreds of plants on the slope above the reservoir, but they were not detectable during winter 2009 (perhaps due to drought).

Rytidosperma geniculatum (Knead Wallaby-grass). Modest numbers seen by Dr Lorimer. Also present in the adjoining Hanson Quarry land and apparently secure.

Veronica plebeia (Trailing Speedwell). Small numbers were found by Dr Lorimer in the Grassy Dry Forest.

Fauna of special significance

Endangered in Victoria

Blue-billed Duck. Five were seen on the dam on 20th June 2001, as reported by J. Yugovic and C. Timewell in the 2001 report, 'Draft Flora and Fauna Assessment of Heany Park, Rowville, Victoria' for Knox City Council.

Uncommon in the Melbourne region

Eastern Grey Kangaroo. Residents of the park and adjoining land, now abundant but hardly known in the area until recent years. Up to sixteen at a time have been observed in the park by Mr John Erwin (Knox City Council) in 2004.

Wedge-tailed Eagle. Mr Erwin observed two birds in 2003. Pairs are seen regularly in southern Knox.

Painted Button-quail. Seen by Mr Darren Wallace after a fire, in c.1992.

Spotted Brown Butterfly. The Lysterfield Hills is a stronghold of this localised species and Heany Park represents suitable habitat, but the author has no knowledge of sightings within the park.

Uncommon in Knox

Short-beaked Echidna. Four individuals were seen by Mr Erwin in 2003, and other reports suggest that they are frequently present.

Sugar Glider. Seen by Mr Wallace some years ago.

Fauna habitat features

- The tree canopy and scattered shrubs provide habitat for insects, bats, possums and a wide variety of forest birds. However, on the lower slopes, this value is diminished by aggressive Bell Miners and Noisy Miners that displace smaller birds;
- There are many mature trees, dead and alive, that have hollows suitable for nesting or other occupation by native birds, bats, possums or insects;
- The abundant large wattles provide sap to feed Sugar Gliders;
- The reservoir and its fringing wetland vegetation provide habitat for waterbirds, frogs and aquatic invertebrates;
- The reservoir provides drinking water for other native fauna such as kangaroos and wallabies;
- The grassy ground flora is likely to provide fodder for butterfly caterpillars and other invertebrates;
- Fallen timber on the upper slopes provides the sort of cover required by many reptiles and invertebrates;
- Piles of corrugated iron and building waste may provide cover for reptiles and invertebrates around the camp.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity and Viability

This site and the adjacent Site 81 represent a link in a large habitat corridor extending from Dandenong Ck in the Dandenong Police Paddocks Reserve to Birdsland Reserve in Belgrave Heights, and beyond. Criterion 1.2.6 attributes

Regional significance to any corridor that meets the description ‘Important at regional scale (link within bioregion or catchment)’, which is a reasonable description of the corridor of interest here.

Regionally Threatened Vegetation Types

Valley Heathy Forest is endangered. It follows from Appendix 3 of *Victoria’s Native Vegetation Management - a Framework for Action* (NRE 2002a) that Heany Park’s native vegetation is necessarily of at least High conservation significance. This, in turn, gives the park **State** significance under criterion 3.2.3 of Amos (2004).

The regionally vulnerable Valley Grassy Forest is in poor ecological condition and represents **Regional** significance under criterion 3.2.3.

The conservation status of Lysterfield Grassy Dry Forest is Vulnerable or (more likely) Endangered according to the criteria of NRE (2002a). The ecologically healthy patch at Heany Park gives the park **State** significance under criterion 3.2.4 of Amos (2004).

The significance of the reservoir’s wetland vegetation is not amenable to consideration under the guidelines of Amos (2004) because the reservoir is an artificial feature.

Rare or Threatened Flora

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

Apart from Blue-billed Ducks, the species listed as ‘Fauna of special significance’ above are rare or threatened locally or in the Melbourne area, but not throughout the whole of the relevant bioregion. This represents **Local** significance on the same basis as the rare flora just discussed.

The reservoir is good habitat for visits of Blue-billed Ducks, five of which were seen there. These birds are likely to be part of the wider-ranging, viable population seen in nearby lakes such as Caribbean Lake and Lakewood Nature Reserve. Heany Park could not support a viable population in its own right. This gives the site **Regional** significance under criterion 3.1.2.

The Powerful Owl is a vulnerable species in Victoria. It is known to frequent the adjoining Hanson Quarry, and Heany Park provides suitable habitat. However, no evidence has been found that the site has, or is likely to have, a viable population of Powerful Owls in its own right. This represents **Regional** significance under criterion 3.1.2.

Threats

- Invasion by environmental weeds, as follows;
 - Serious: Boneseed (*Chrysanthemoides monilifera* ssp. *monilifera*), Panic Veldt-grass (*Ehrharta erecta*), Sweet Pittosporum (*Pittosporum undulatum*), Gorse (*Ulex europaeus*);
 - Moderate: Sweet Vernal-grass (*Anthoxanthum odoratum*), Large Quaking-grass (*Briza maxima*), Drain Flat-sedge (*Cyperus eragrostis*), Cat’s Ear (*Hypochoeris radicata*), Jointed Rush (*Juncus articulatus*), Kikuyu (*Pennisetum clandestinum*), Monterey Pine (*Pinus radiata*), Blackberry (*Rubus discolor*), Indian Rat-tail Grass (*Sporobolus africanus*);
- Eucalypt dieback, which is presently severe in places on the lower slopes, and includes substantial psyllid attack;
- Trampling;
- Removal of fallen timber for firewood at the campsites;
- Casual cutting of live plants;
- Rabbit grazing;
- Loss or decline of plant species that have such small populations that they are vulnerable to inbreeding, poor reproductive success or random events such as trampling.

Management issues

- Knox City Council intends to have a management plan prepared for this site. Management recommendations beyond the ones below should preferably have the benefit of a site survey in October to December;
- Weed control has been effective in recent years and should be kept up;
- Fire would be likely to regenerate many indigenous plant species on the lower slopes.

Administration matters

- The Planning Scheme zoning is Public Park and Recreation Zone (R1Z) and the site is outside the Urban Growth Boundary;
- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the endangered EVCs and the matters discussed under the heading, ‘Significance ratings’;

- Heany Park is included under the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, based on the description of Site 56 of the report by Water Ecoscience (1998). Note that Water Ecoscience did not visit the site.

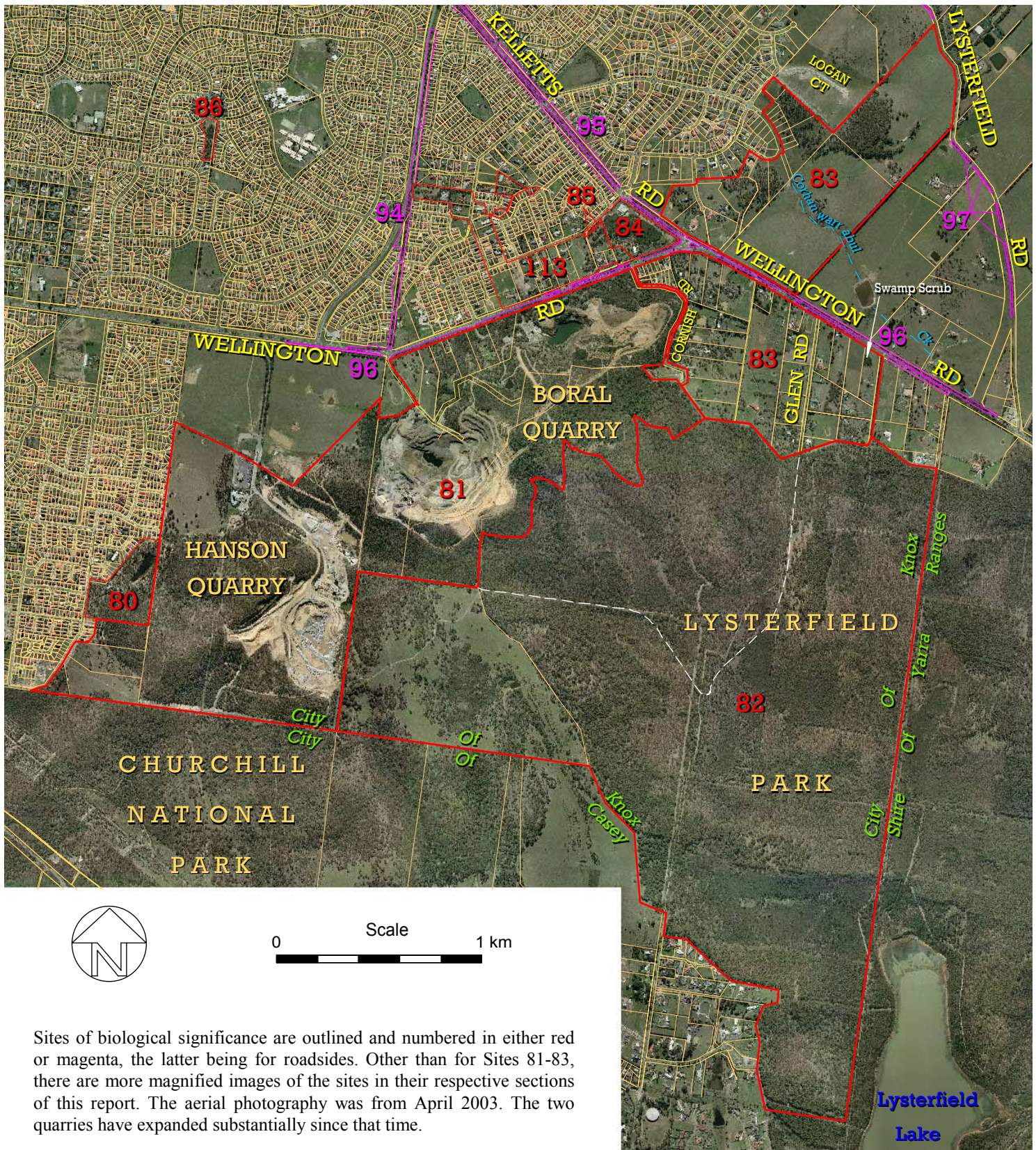
Information sources used in this assessment

- Yugovic J. and Timewell C.A. (2001). *'Draft Flora and Fauna Assessment of Heany Park, Rowville, Victoria'*, a draft report prepared for Knox City Council;
- A document from Mr Yugovic titled 'Changes to Heany Park Report', providing corrections and updates to the report just cited;
- A site survey by Dr Lorimer for 50 minutes on 24/4/03 to fill gaps between the above documents and this study's standards described in Section 2.4 of Vol.1. This included:
 - Compilation of lists of indigenous and introduced plant species in each of four sections of the park;
 - Description of the structural and floristic composition of each type of native vegetation;
 - Mapping of the ecological condition of the vegetation; and
 - Checks for ecological threats and management issues;
- A brief inspection of the site in January 2008, which confirmed that there had been no significant changes to the site's natural assets described above;
- Verbal reports of flora and fauna from respected local naturalist, Mr Darren Wallace, and Council land manager, Mr John Erwin;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Acknowledgments

Thanks to Messrs Darren Wallace and John Erwin for records of flora and fauna sightings cited above, and Mr Jeff Yugovic for providing an update to his draft flora and fauna assessment report of 2001.

Aerial Photograph and Plan of Sites in the Lysterfield Hills



Sites of biological significance are outlined and numbered in either red or magenta, the latter being for roadsides. Other than for Sites 81-83, there are more magnified images of the sites in their respective sections of this report. The aerial photography was from April 2003. The two quarries have expanded substantially since that time.

Site 81. Lysterfield Hills

The ridge top and slopes of the Lysterfield Hills, excluding land within parks. Centred on Melway ref. 82 F6.

Site Significance Level: *State*

- Much of the vegetation present belongs to threatened Ecological Vegetation Classes;
- A large number of indigenous plant species (152) has been recorded from the half of the site for which data are available, and more would undoubtedly be found in a thorough survey;
- Even though data is available from only part of the site, no fewer than eighteen of the indigenous plant species that have been recorded are critically endangered in Knox, along with twenty other plant species that are threatened in Knox at levels lower than 'critically endangered';
- The site is known habitat for several rare fauna species, including Powerful Owl and Speckled Warbler;
- The site's ecological values are threatened by quarry expansions.

Note

Permission was not obtained to enter the quarry land that makes up the majority of this site, nor one of the private lots. For these properties, the inspection was done from the fence and aerial photographs. This may have caused some biologically significant attributes to be overlooked. The Precautionary Principle (see the Glossary at the end of Volume 1) should be applied when considering protection of this site in the absence of full scientific certainty about its attributes.

Aerial photograph and plan: See page 409.

Boundaries

The site boundary is outlined in red and marked '81' on the aerial photograph. It includes the western road verge of Cornish Rd, but not the verge of Wellington Rd (which is part of Site 96).

Land use & tenure: The site includes the Boral Lysterfield Quarry, the Hanson Quarry (formerly owner by Pioneer), one ownerless 'old title' lot in the site's extreme southwest, and three private grazing lots between the ownerless lot and Heany Park (Site 80).

Site description

This 286 ha site straddles the Lysterfield Hills ridge, which is oriented southwest to northeast. Elevations vary from approximately 80 m in the southwestern corner to 240 m on the ridge. The upper slopes have a gradient up to 40% and the lower slopes (below the 120m contour) have much more gentle gradients because rock and earth has slipped from uphill and deposited there (called colluvium). Two commercial hard rock quarries extract hornfels from the site, with pits on each side of the ridge.

On the upper slopes, the hornfels has decomposed at the surface to form a shallow, stony, rather infertile clay loam that does not drain well and dries very hard. The lower slope, where rock and earth have been deposited from uphill, has soil that is deeper than the upper slopes, but still rather infertile.

There is a marked difference in the natural vegetation between the side of the ridge that faces northwest and the side that faces southeast. On the northwestern side, above the level where colluvium has deposited, the native vegetation is believed to grade between Grassy Forest and the rare community described for the first time in Appendix A of Volume 1 under the name, 'Lysterfield Grassy Dry Forest'. This vegetation type was confirmed in the vicinity of Heany Park and Cornish Rd at each end of the site, but permission was not obtained to inspect the whole of the expected area of this vegetation type.

The native vegetation on the lower northwestern slopes, in the colluvium, is predominantly Valley Grassy Forest (a regionally vulnerable EVC), as judged from Wellington Rd and Heany Park. This gives way to Valley Heathy Forest (an endangered EVC) in the southwestern corner of the site, but the pre-European line of disjunction between these two EVCs now lies within native pasture and cannot be seen.

The southeastern side of the ridge has a quite different pattern of vegetation. The present author was not authorised to go there, but according to unconfirmed mapping by others and discussions with people who have been there, the vegetation is dominated by the form of Grassy Forest that is associated with the Gippsland Plain bioregion, interrupted by gully headwaters with Herb-rich Foothill Forest and small patches of Damp Forest. A 1998 report by Mueck and Timewell about the Hanson Quarry site states that Creepline Herb-rich Woodland is present, but the report provides little evidence for this and it was written before the limits of that EVC were well understood. A site survey would be required to check whether the 1998 report is consistent with current conventions.

Quarrying and associated activities have removed a substantial proportion of the site's native vegetation, as can be seen (in part) on the aerial photograph. Some of the quarry excavations have been planted with Australian native trees and shrubs. Weeds and rabbits have been a serious problem on the quarry land, and the quarry companies are trying to reduce the weeds. Quarrying has been rapidly extended into areas of native vegetation since 2004.

There is a small, treed lot without an owner in the site's southwestern corner. It supports Valley Heathy Forest with 45 indigenous plant species and a dam with 21 indigenous species of wetland plants. Three of the eucalypts are *Eucalyptus viminalis* subsp. *pyroriana* (or possibly hybrids between this species and *Eucalyptus cephalocarpa*), which had never been recorded in Knox prior to the study reported here.

This treed lot and the three private lots between it and Heany Park have been long grazed by stock but retain predominantly indigenous ground flora, including substantial populations of some species that are threatened in Knox. Their conservation significance far exceeds expectations of grazing land in this part of Victoria.

Although the information about these private lots is incomplete, it appears that the ecological condition of native vegetation there is mostly good (rating B) or fair (rating C). The ridge top and southeastern slopes appear to be in better condition on average than the northwestern slopes, but this was not able to be investigated in this study. A 1998 report by Mueck and Timewell on the Hanson Quarry site indicates that some vegetation is in good condition (probably rating B) with a large number of indigenous plant species, many of which are unique or critically endangered in Knox; however, at least some of this vegetation has been cleared in the last few years.

Relationship to other land

The site is effectively part of a larger area of biological significance in combination with the Dandenong Police Paddocks Reserve, Heany Park (Site 80), Churchill National Park, Lysterfield Park (Site 82) and bushland to the northeast of Lysterfield Park. Many species of fauna undoubtedly move between these sites and some will rely on doing so in order to have enough habitat. Some fauna carry pollen or seeds, thereby linking plant populations across the area.

Bioregion: The Valley Heathy Forest and farm dam on the lower slopes in the west are in the Gippsland Plain bioregion and the other vegetation types are in the Highlands Southern Fall bioregion.

Habitat types

Lysterfield Grassy Dry Forest (intermediate between EVC 22 and EVC 128. The conservation status of this rare type is vulnerable or endangered): Estimated to cover 48 ha. The ecological condition is unclear, but a rough estimate is 20% in good condition (rating B) and 40% in each of ratings C and D (fair and poor).

Canopy trees: Dominated by *Eucalyptus radiata* (typically 10 m tall) and *E. goniocalyx*.

Lower trees: Dominated by *Acacia mearnsii*, *Acacia implexa*, *Allocasuarina littoralis* and *Exocarpos cupressiformis*.

Shrubs: Indigenous shrubs are sparse except for patches of regrowth of *Acacia paradoxa* or *Kunzea ericoides*. Other species include *Cassinia aculeata*, *Cassinia longifolia* and *Leptospermum continentale*. The weeds, *Chrysanthemoides monilifera monilifera* and *Pittosporum undulatum* are dense in much of the area seen by the author.

Vines: *Comesperma volubile* is abundant.

Ferns: Absent.

Ground flora: Grassy and apparently naturally sparse, with fairly low diversity. Dominated by *Rytidosperma pallidum*, *Microlaena stipoides* and *Lomandra filiformis* subsp. *coriacea*.

Valley Grassy Forest (EVC 47, **regionally Vulnerable**): Estimated to cover 12 ha. The ecological condition is unclear, but a rough estimate is equal proportions in each of ratings C and D (fair and poor).

Canopy trees: Dominated by Yellow Box (*Eucalyptus melliodora*), Narrow-leaved Peppermint (*Eucalyptus radiata*) and Bundy (*Eucalyptus goniocalyx*) with a few Candlebarks (*Eucalyptus rubida*).

Lower trees: *Allocasuarina littoralis*, *Exocarpos cupressiformis*, *Acacia mearnsii*, *Acacia implexa* and *Acacia melanoxylon*.

Shrubs: The natural shrub layer has been mostly replaced by weeds, particularly *Pittosporum undulatum*.

Ground flora: Densely grassy with abundant *Rytidosperma* species.

Valley Heathy Forest (EVC 127, **Endangered**): Estimated to cover 1 ha, comprising 0.1 ha in fair ecological condition (rating C) and 0.9 ha in poor ecological condition (rating D).

Canopy trees: Dominated by *Eucalyptus cephalocarpa*, with fewer *E. radiata* and *E. goniocalyx*.

Lower trees: Dominated by *Allocasuarina littoralis*, *Acacia melanoxylon*, *Acacia mearnsii*, *Acacia implexa* and *Exocarpos cupressiformis*.

Shrubs: Includes *Acacia paradoxa*, *Bursaria spinosa*, *Cassinia arcuata*, *Kunzea ericoides* and *Leptospermum continentale*.

Ferns: None seen.

Ground flora: Densely grassy and dominated by *Microlaena stipoides*. Grasses in the genera *Rytidosperma*, *Austrostipa* and *Themeda* are also abundant. *Lomandra filiformis* subsp. *coriacea* is also abundant. The characteristic species, *Drosera whittakeri* and *Hibbertia riparia*, are present, as are *Dianella admixta* and *Oxalis perennans* (both typically present in Valley Heathy Forest).

Herb-rich Foothill Forest (EVC 23, conservation status rated 'Least Concern' in the bioregion): Vegetation mapping from the Department of Sustainability & Environment depicts this EVC in the headwaters of gullies on the southeastern side of the ridge. Eyewitness descriptions of these areas and the report by Mueck and Timewell (1998) tend to confirm this. The extent and condition of the vegetation is not known.

Damp Forest (EVC 29, conservation status listed as of 'Least Concern' in the bioregion): Depicted on some departmental vegetation maps as being present at the headwaters of gullies on the southeastern slopes. Eyewitness accounts tend to support this. The extent and condition of the vegetation is not known.

Grassy Forest (EVC 128, **regionally Vulnerable**). Depicted on departmental vegetation maps, on southeast-facing slopes between the gullies. The extent and condition of the vegetation is not known.

Swampy Woodland (EVC 937, **regionally Vulnerable**) or **Creekline Herb-rich Woodland** (EVC 164, **regionally Endangered**). Departmental vegetation maps are inconsistent in their depiction of these EVCs, but plant species recorded by Mueck and Timewell (1998), such as *Eucalyptus ovata* and *Gratiola peruviana*, confirm that at least one of these EVCs is present.

Wetland (EVC 74, listed as regionally Endangered but in this case the wetlands are artificial):

A farm dam of 1,600 m² in the southwest corner of the site, estimated to contain:

- 1,200 m² of fringing and emergent vegetation, in good ecological condition (rating B) with 14 indigenous plant species;
- 400 m² of open water with unknown bottom-dwelling flora.

Trees, shrubs, vines and ferns: Absent.

Aquatic and semi-aquatic flora: Dominated by *Juncus sarophorus* in shallower water and *Eleocharis sphacelata* in deeper water. There are dense patches of *Carex fascicularis* and an indeterminate species of *Typha*. Other abundant species include *Centella cordifolia*, *Epilobium hirtigerum*, *Persicaria decipiens* and *Senecio minimus*. The tiny floating species, *Lemna disperma* and *Wolffia australiana* are both present in large numbers but small total area. The usual wetland weed, *Juncus articulatus*, is absent.

A dam at the Boral Quarry appears to have fringing wetland vegetation (judging from aerial photography) of indeterminate composition or extent. Its open water, and that of two other dams at the quarry, may provide low-grade habitat for common aquatic fauna and waterbirds.

Plant species

The following plant species were recorded by various observers in the years indicated. Records from 2007-9 are the author's. Additional species would no doubt be detectable if the whole area were to be surveyed. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Austrostipa rudis* subsp. *australis* is rare in Victoria and species with names in bold are rare in the Melbourne region.

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
	<i>Acacia dealbata</i>	2004		<i>Arthropodium strictum</i>	2009
V	<i>Acacia implexa</i>	2007	C	<i>Asperula conferta</i>	2004
V	<i>Acacia mearnsii</i>	2009	C	<i>Asplenium flabellifolium</i>	1998
V	<i>Acacia melanoxylon</i>	2007		<i>Atrichum androgynum</i>	2004
	<i>Acacia paradoxa</i>	2009	V	<i>Austrostipa mollis</i>	2007
E	<i>Acacia stricta</i>	1998		<i>Austrostipa pubinodis</i>	2009
C	<i>Acacia verniciflua</i>	2004	V	<i>Austrostipa rudis</i> subsp. <i>australis</i>	2009
V	<i>Acacia verticillata</i>	2004		<i>Austrostipa rudis</i> subsp. <i>rudis</i>	2009
	<i>Acaena novae-zelandiae</i>	2004	V	<i>Azolla filiculoides</i>	2004
	<i>Achrophyllum dentatum</i>	2004	E	<i>Banksia marginata</i>	2004
	<i>Acrotriche serrulata</i>	2007		<i>Billardiera mutabilis</i>	2009
V	<i>Adiantum aethiopicum</i>	2004	E	<i>Blechnum cartilagineum</i>	2004
V	<i>Allocasuarina littoralis</i>	2007		<i>Bossiaea prostrata</i>	2009
C	<i>Amyema pendula</i>	2009		<i>Breutelia affinis</i>	2004
C	<i>Arthropodium milleflorum</i> s.l.	2004		<i>Burchardia umbellata</i>	2007

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
	<i>Bursaria spinosa</i>	2009	V	<i>Euchiton collinus</i>	2004
V	<i>Caesia parviflora</i>	2004	E	<i>Euchiton involucratus</i>	2007
C	<i>Callitriche muelleri</i>	1998	V	<i>Exocarpos cupressiformis</i>	2007
V	<i>Calochlaena dubia</i>	2004		<i>Fissidens asplenioides</i>	2004
	<i>Campylopus clavatus</i>	2009		<i>Funaria hygrometrica</i>	2004
	<i>Campylopus introflexus</i>	2004		<i>Gahnia radula</i>	2007
	<i>Carex appressa</i>	2004	E	<i>Gahnia sieberiana</i>	2004
	<i>Carex breviculmis</i>	2003	C?	<i>Galium australe</i>	2004
E	<i>Carex fascicularis</i>	2007	E	<i>Galium gaudichaudii</i>	1998
	<i>Cassinia aculeata</i>	2007	E	<i>Galium propinquum</i>	1998
	<i>Cassinia arcuata</i>	2004		<i>Galium</i> sp.	2004
V	<i>Cassinia longifolia</i>	2007	E	<i>Geranium gardneri</i>	1998
E	<i>Cassytha melantha</i>	2004	V	<i>Geranium potentilloides</i>	2004
E	<i>Centella cordifolia</i>	2007	V	<i>Geranium</i> sp. 2	1998
C	<i>Centrolepis strigosa</i>	1998	V	<i>Glycine clandestina</i>	2004
C	<i>Chamaescilla corymbosa</i>	2009	E	<i>Glycine microphylla</i>	2004
C	<i>Cheilanthes austrotenuifolia</i>	1998	E	<i>Gonocarpus humilis</i>	1998
V	<i>Chiloglottis valida</i>	2004		<i>Gonocarpus tetragynus</i>	2009
V	<i>Clematis aristata</i>	2004		<i>Goodenia lanata</i>	2004
	<i>Clematis decipiens</i>	2004		<i>Goodenia ovata</i>	2004
V	<i>Comesperma volubile</i>	2007	C	<i>Goodia lotifolia</i>	2004
V	<i>Coprosma quadrifida</i>	2004	C	<i>Gratiola peruviana</i>	2004
V	<i>Cotula australis</i>	1998	V	<i>Hardenbergia violacea</i>	2004
V	<i>Crassula decumbens</i>	2009	V	<i>Helichrysum scorpioides</i>	2004
V	<i>Crassula sieberiana</i> s.l.	1998		<i>Heteroscyphus fissistipus</i>	2004
E	<i>Cyathea australis</i>	2004	E	<i>Hibbertia riparia</i>	2007
C	<i>Cymbonotus preissianus</i>	2004	C	<i>Histiopteris incisa</i>	1994
E	<i>Cynoglossum suaveolens</i>	2009	V	<i>Hovea heterophylla</i>	1998
C	<i>Cyperus lucidus</i>	1998	C	<i>Hydrocotyle callicarpa</i>	2004
E	<i>Desmodium gunnii</i>	2004	E	<i>Hydrocotyle foveolata</i>	2009
	<i>Deyeuxia quadriseta</i>	2009	V	<i>Hydrocotyle hirta</i>	2004
	<i>Dianella admixta</i>	2007	E	<i>Hydrocotyle laxiflora</i>	1998
V	<i>Dianella longifolia</i> s.l.	2004	C	<i>Hydrocotyle tripartita</i>	1998
	<i>Dichelachne rara</i>	2007	E	<i>Hypericum gramineum</i>	2009
C	<i>Dichelachne sieberiana</i>	1998		<i>Hypnodendron vitiense</i> subsp. <i>australe</i>	2004
	<i>Dichondra repens</i>	2009		<i>Hypnum cupressiforme</i>	2009
E	<i>Dipodium roseum</i>	1985	C	<i>Hypoxis hygrometrica</i>	2007
C	<i>Diuris sulphurea</i>	2004	E	<i>Imperata cylindrica</i>	1998
V	<i>Drosera peltata</i> subsp. <i>auriculata</i>	2007	E	<i>Isolepis cernua</i> var. <i>cernua</i>	1998
E	<i>Drosera peltata</i> subsp. <i>peltata</i>	1998	E	<i>Isolepis hookeriana</i>	1998
V	<i>Drosera whittakeri</i>	2009	V	<i>Isolepis inundata</i>	2007
E	<i>Echinopogon ovatus</i>	2004	V	<i>Isolepis</i> sp.	2007
	<i>Einadia nutans</i> – a recent immigrant	2009		<i>Juncus amabilis</i>	2007
	<i>Eleocharis sphacelata</i>	2007		<i>Juncus gregiflorus</i>	2004
	<i>Elymus scaber</i>	2007		<i>Juncus pallidus</i>	2007
V	<i>Epacris impressa</i>	2004	E	<i>Juncus planifolius</i>	2007
V	<i>Epilobium billardierianum</i> subsp. <i>cinereum</i>	2004		<i>Juncus sarophorus</i>	2007
	<i>Epilobium hirtigerum</i>	2004		<i>Juncus</i> sp.	2004
	<i>Eragrostis brownii</i>	1998	E	<i>Juncus subsecundus</i>	2007
V	<i>Eucalyptus cephalocarpa</i>	2009		<i>Kunzea ericoides</i> spp. agg.	2004
V	<i>Eucalyptus cypellocarpa</i>	2004	V	<i>Lachnagrostis filiformis</i>	2007
	<i>Eucalyptus goniocalyx</i>	2007	E	<i>Lagenophora gracilis</i>	2009
V	<i>Eucalyptus melliodora</i>	2009	E	<i>Lagenophora stipitata</i>	2004
V	<i>Eucalyptus obliqua</i>	2004		<i>Lemna disperma</i>	2007
V	<i>Eucalyptus ovata</i>	2004		<i>Lepidosperma elatius</i>	1998
E	<i>Eucalyptus radiata</i>	2009		<i>Lepidosperma gunnii</i>	2009
C	<i>Eucalyptus rubida</i>	1994	V	<i>Lepidosperma laterale</i>	2009
C	<i>Eucalyptus viminalis</i> subsp. <i>pryoriana</i>	2009	E	<i>Leptospermum continentale</i>	2007
E	<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>	2004	E	<i>Leptospermum scoparium</i>	2007
			V	<i>Lindsaea linearis</i>	2004

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
E	<i>Lobelia anceps</i>	2007		<i>Rosulabryum billarderi</i>	2004
	<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	2009	E	<i>Rubus parvifolius</i>	2004
	<i>Lomandra filiformis</i> subsp. <i>filiformis</i>	2009	E	<i>Rytidosperma caespitosum</i>	2007
	<i>Lomandra longifolia</i>	2007		<i>Rytidosperma geniculatum</i>	2009
V	<i>Luzula meridionalis</i>	1998		<i>Rytidosperma laeve</i>	2007
C	<i>Lyperanthus suaveolens</i>	1998		<i>Rytidosperma linkii</i> var. <i>fulvum</i>	2007
V	<i>Lythrum hyssopifolia</i>	2007		<i>Rytidosperma pallidum</i>	2007
	<i>Marchantia</i> sp.	2004		<i>Rytidosperma penicillatum</i>	2007
E	<i>Melaleuca ericifolia</i>	2004	V	<i>Rytidosperma pilosum</i>	2007
	<i>Microlaena stipoides</i>	2009		<i>Rytidosperma racemosum</i>	2009
C	<i>Microtis unifolia</i>	2004	E	<i>Rytidosperma semiannulare</i>	1998
C	<i>Muellerina eucalyptoides</i>	2003		<i>Rytidosperma setaceum</i>	2009
C	<i>Neopaxia australasica</i>	1998		<i>Rytidosperma tenuius</i>	2009
E	<i>Olearia argophylla</i>	2004		<i>Schoenus apogon</i>	2007
V	<i>Olearia lirata</i>	2004		<i>Senecio glomeratus</i>	2007
V	<i>Opercularia ovata</i>	2009		<i>Senecio hispidulus</i>	2007
V	<i>Opercularia varia</i>	2007	C	<i>Senecio linearifolius</i>	2004
	<i>Oxalis exilis/perennans</i>	2009	E	<i>Senecio minimus</i>	2007
E	<i>Ozothamnus ferrugineus</i>	2004	E	<i>Senecio prenanthoides</i>	2004
	<i>Pandorea pandorana</i>	2004		<i>Senecio quadridentatus</i>	2009
C	<i>Pelargonium australe</i>	1998	C	<i>Solanum aviculare</i>	2004
C	<i>Pelargonium inodorum</i>	2004	V	<i>Solanum laciniatum</i>	2007
E	<i>Pentapogon quadrifidus</i>	2007	C	<i>Solanum prinophyllum</i>	2004
	<i>Persicaria decipiens</i>	2007	C	<i>Stellaria pungens</i>	2004
E	<i>Pimelea curviflora</i>	2008	E	<i>Stylidium armeria/graminifolium</i>	2004
V	<i>Pimelea humilis</i>	2009	C	<i>Thelymitra ixioides</i> s.l.	2004
C	<i>Poa clelandii</i>	2004	V	<i>Thelymitra peniculata</i>	2004
	<i>Poa ensiformis</i>	2004		<i>Themeda triandra</i>	2009
E	<i>Poa labillardierei</i> var. <i>labillardierei</i>	2007		<i>Thuidiopsis furfurosa</i>	2009
	<i>Poa morrisii</i>	2009	V	<i>Thysanotus patersonii</i>	2004
	<i>Poa sieberiana</i> (needs confirmation)	2004		<i>Tricoryne elatior</i>	2009
E	<i>Poa tenera</i>	2004		<i>Triquetrella papillata</i>	2004
E	<i>Polyscias sambucifolia</i>	2004	E	<i>Typha domingensis</i>	2007
E	<i>Polystichum proliferum</i>	2004	E	<i>Veronica calycina</i>	2004
	<i>Polytrichum juniperinum</i>	2004	E	<i>Veronica plebeia</i>	2004
	<i>Poranthera microphylla</i>	2007	E	<i>Viola hederacea</i>	2007
	<i>Pteridium esculentum</i>	2004	C	<i>Wahlenbergia gracilentia</i>	2004
E	<i>Pterostylis melagramma</i>	2004	E	<i>Wahlenbergia gracilis</i>	2007
C	<i>Pterostylis pedunculata</i>	1998	E	<i>Wahlenbergia</i> sp.	2004
	<i>Ptychomnion aciculare</i>	2004	E	<i>Wahlenbergia stricta</i>	2004
V	<i>Pultenaea gunnii</i>	2004		<i>Wijkia extenuata</i>	2004
	<i>Racopilum cuspidigerum</i>	2004	V	<i>Wolffia australiana</i>	2007
C	<i>Ranunculus amphitrichus</i>	1998	E	<i>Wurmbea dioica</i>	2009
E	<i>Ranunculus lappaceus</i>	2004	V	<i>Xanthorrhoea minor</i>	1998
C	<i>Ranunculus pumilio</i> var. <i>pumilio</i>	1998			

Introduced Species

<i>Acacia baileyana</i>	<i>Aster subulatus</i>	<i>Conyza sumatrensis</i>	<i>Galium aparine</i>
<i>Acacia floribunda</i>	<i>Billardiera heterophylla</i>	<i>Cortaderia selloana</i>	<i>Galium murale</i>
<i>Acacia longifolia longifolia</i>	<i>Briza maxima</i>	<i>Cotoneaster</i> sp.	<i>Gamochaeta purpurea</i>
<i>Agapanthus praecox</i>	<i>Bromus hordeaceus</i>	<i>Crataegus monogyna</i>	<i>Genista linifolia</i>
<i>Agrostis capillaris</i>	<i>Callitriche stagnalis</i>	<i>Cynodon dactylon</i>	<i>Genista monspessulana</i>
<i>Aira caryophyllea</i>	<i>Centaureum erythraea</i>	<i>Cyperus eragrostis</i>	<i>Helminthotheca echioides</i>
<i>Aira cupaniana</i>	<i>Centaureum tenuiflorum</i>	<i>Cytisus scoparius</i>	<i>Holcus lanatus</i>
<i>Aira elegantissima</i>	<i>Cerastium glomeratum</i>	<i>Dactylis glomerata</i>	<i>Hypochoeris radicata</i>
<i>Allium triquetrum</i>	<i>Chamaecytisus palmensis</i>	<i>Dipogon lignosus</i>	<i>Juncus articulatus</i>
<i>Anagallis arvensis</i>	<i>Chrysanthemoides monilifera</i>	<i>Ehrharta erecta</i>	<i>Juncus capitatus</i>
<i>Anthoxanthum odoratum</i>	<i>Cicendia filiformis</i>	<i>Ehrharta longiflora</i>	<i>Juncus microcephalus</i>
<i>Arctotheca calendula</i>	<i>Cirsium vulgare</i>	<i>Eriobotrya japonica</i>	<i>Leontodon taraxacoides</i>
<i>Asparagus asparagoides</i>	<i>Conyza bonariensis</i>	<i>Eucalyptus cladocalyx</i>	<i>Lolium perenne</i>

<i>Lonicera japonica</i>	<i>Pittosporum undulatum</i>	<i>Sisyrinchium iridifolium</i>	<i>Ulex europaeus</i>
<i>Lotus corniculatus</i>	<i>Plantago lanceolata</i>	<i>Solanum americanum</i>	<i>Veronica arvensis</i>
<i>Lotus subbiflorus</i>	<i>Poa annua</i>	<i>Solanum nigrum</i>	<i>Vicia sativa</i> subsp. <i>nigra</i>
<i>Malus pumila</i>	<i>Polypogon monspeliensis</i>	<i>Sonchus asper</i>	<i>Vinca major</i>
<i>Moenchia erecta</i>	<i>Prunella vulgaris</i>	<i>Sonchus oleraceus</i>	<i>Vulpia bromoides</i>
<i>Oxalis pes-caprae</i>	<i>Ranunculus repens</i>	<i>Sporobolus africanus</i>	<i>Vulpia myuros</i>
<i>Pennisetum clandestinum</i>	<i>Romulea rosea</i>	<i>Stellaria media</i>	<i>Watsonia meriana</i> var.
<i>Phalaris aquatica</i>	<i>Rosa rubiginosa</i>	<i>Stenotaphrum secundatum</i>	<i>bulbillifera</i>
<i>Phytolacca octandra</i>	<i>Rubus anglocandicans</i>	<i>Trifolium glomeratum</i>	<i>Zantedeschia aethiopica</i>
<i>Pinus radiata</i>	<i>Rumex pulcher</i>	<i>Trifolium subterraneum</i>	

Notes concerning some of the locally threatened plant species

Austrostipa mollis (a Spear-grass). Moderately common in the site's west, and perhaps elsewhere.

Callitriche muelleri (Round Water Starwort). Recorded by Mueck and Timewell (1998), the only record in Knox.

Carex fascicularis (Tassel Sedge). 4 m² was found at the dam in the site's southwestern corner.

Clematis microphylla (Small-leaved Clematis). Found beside Cornish Rd in 2003, where scarce.

Cyperus lucidus (Leafy Flat-sedge). Regarded here as a possible misidentification by Mueck & Timewell (1998).

Eucalyptus viminalis subsp. *pryoriana*. Found in the site's southwestern corner in 2004 (albeit with flowers predominantly in sevens, suggesting possible interbreeding with *E. cephalocarpa*). The *Eucalyptus viminalis* reported by Mueck and Timewell is likely to be the same subspecies. The only other records in Knox are nearby in Lysterfield Park.

Glycine tabacina/microphylla (a Glycine). Mueck & Timewell's (1998) identification of *Glycine tabacina* is treated here as a probable misidentification of *G. microphylla*, which is common in the adjacent Lysterfield Park. There is no reliable record of *G. tabacina* in the Melbourne region south of the Yarra River.

Gratiola peruviana (Austral Brooklime). Recorded by Mueck and Timewell (1998).

Lemna disperma (Common Duckweed). Large numbers were found in the dam in the site's southwestern corner.

Neopaxia australasica (White Purslane). Recorded by Mueck and Timewell (1998), the only record in Knox.

Pelargonium australe (Austral Stork's-bill). Recorded by Mueck and Timewell (1998), the only record in Knox.

Pimelea curviflora (Curved Rice-flower). Present in unknown numbers on private grazing land in the site's west.

Poa labillardierei (Common Tussock-grass). Found by the author beside Cornish Rd in 2003, in the site's southwest in 2007, and by Mueck & Timewell at the Hanson Quarry in 1998.

Ranunculus amphitrichus (Small River Buttercup). Recorded by Mueck and Timewell (1998), the only record in Knox.

Ranunculus pumilio (Fan-leaf Buttercup). Recorded by Mueck and Timewell (1998), the only record in Knox.

Rytidosperma geniculatum (Knead Wallaby-grass). Moderately common in the site's southwest, and perhaps elsewhere.

Wahlenbergia gracilentia (Annual Bluebell). Recorded by Mueck and Timewell (1998), the only record in Knox.

Wolffia australiana (Tiny Duckweed). Large numbers were found by the author in 2004 in the dam in the site's southwestern corner.

Fauna of special significance

Vulnerable in Victoria

Powerful Owl. Reported repeatedly from the area.

Speckled Warbler. Reported repeatedly from the area, including in the 1998 study by Mueck and Timewell.

Uncommon in the Melbourne region

Australian King-parrot. Reported by neighbours to be not uncommon in the area.

Eastern Grey Kangaroo. Abundant, but hardly known in the area until recent years.

Weasel Skink. Seen during the 1998 study by Mueck and Timewell.

Spotted Brown Butterfly. The Lysterfield Hills are one of the strongholds of this generally localised species.

Uncommon in Knox

Shining Bronze-Cuckoo.

Yellow-faced Honeyeater. } Seen during the 1998 study by Mueck and Timewell.

Eastern Whipbird.

Short-beaked Echidna. Apparently fairly common in the area, and seen by the author beside Cornish Rd during fieldwork.

Black Wallaby. Reported by both Mr John Erwin (Knox City Council) and in the 1998 report by Mueck and Timewell.

Peregrine Falcon. A pair is resident and has been observed to nest on quarry cliffs.

Fauna habitat features

- Quarry cliffs serve as nest sites for Peregrine Falcons;
- The combination of treed areas and open grassland is ideal for the large kangaroo population;
- The tree canopy and shrubs provide habitat for insects, bats, possums and a wide variety of forest birds;

- There are mature trees with hollows suitable for nesting or other occupation by native birds, bats, possums or insects;
- Fallen timber provides the sort of cover required by many reptiles and invertebrates;
- The abundant large wattles provide sap to feed Sugar Gliders, which have been seen in the adjacent Heany Park and probably occur within this site;
- The grassy ground flora provides fodder for butterfly caterpillars and other invertebrates, including Spotted Brown butterflies;
- It is likely that butterflies congregate on the ridgetop (which is what many butterflies do on hilltops);
- The farm dam in the site's southwest, along with its fringing wetland vegetation, provide habitat for waterbirds, frogs and aquatic invertebrates, and drinking water for other native fauna such as kangaroos and wallabies. It is not clear whether dams on the Boral quarry site have any habitat value.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity and Viability

This site is a part of a large habitat corridor extending from Dandenong Ck in the Dandenong Police Paddocks Reserve to Birdsland Reserve in Belgrave Heights, and beyond. Criterion 1.2.6 attributes **Regional** significance to any corridor that meets the description 'Important at regional scale (link within bioregion or catchment)', which is a reasonable description of the corridor of interest here. Criterion 1.1.2 also awards Local significance to 'areas of 100 ha or more of contiguous native vegetation in a heavily fragmented landscape', which applies to the Lysterfield Hills.

Regionally Threatened Ecological Vegetation Classes

Valley Heathy Forest is endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that the native vegetation of this EVC in the site's southwest is necessarily of at least High conservation significance. This, in turn, gives the site **State** significance under criterion 3.2.3 of Amos (2004).

Most of the rest of the native vegetation within the site is in sufficiently good ecological condition to also achieve **State** significance under criterion 3.2.3. Some of the land occupied by vulnerable EVCs may only achieve Regional significance due to low habitat scores.

The significance of the site's wetland vegetation is not amenable to consideration under the guidelines of Amos (2004) because the water bodies are artificial features.

Rare or Threatened Flora

Criterion 3.1.2 attributes **Regional** significance to any site with known habitat for a small population of a species that is listed as rare or threatened in Victoria. This applies in the case of this site's known population of *Austrostipa rudis* subsp. *australis*. A summer survey may discover that the population of this taxon is larger than could be detected during past surveys, in which case the significance level could rise to State.

Some of the locally threatened plant species listed above are known to have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

Apart from the Powerful Owl and Speckled Warbler, the species listed as 'Fauna of special significance' above are rare or threatened locally or in the Melbourne area, but not throughout the whole of the relevant bioregion. This represents **Local** significance on the same basis as the rare flora just discussed.

The Powerful Owl is a vulnerable species in Victoria. It is known to frequent and roost in the Lysterfield Hills and there is evidently good quality habitat for it there. The population in the area is a small fraction of the bioregional total, but would be viable as part of the wider ranging population around the Dandenong Ranges. This represents **Regional** significance under criterion 3.1.2.

The Speckled Warbler population is of **Regional** significance on the same basis as the Powerful Owl.

Threats

- Quarry expansions;
- Invasion by environmental weeds, of which Boneseed (*Chrysanthemoides monilifera* ssp. *monilifera*), Sweet Pittosporum (*Pittosporum undulatum*) and Gorse (*Ulex europaeus*) are very serious in parts of the site that could be inspected in this study;
- Eucalypt dieback, which is severe in places and includes substantial psyllid attack;
- Grazing by stock in the site's southwestern corner;
- Cattle hoofs trampling mud at the farm dam in the site's southwestern corner, destroying wetland vegetation including rare plants;

- Rabbit grazing;
- Loss or decline of plant species that have such small populations that they are vulnerable to inbreeding, poor reproductive success or random events such as trampling.

Management issues

- The ecological condition of vegetation on the public land in the site's southwestern corner could recover well if relieved from grazing;
- Weed control has been effective in recent years and should be kept up;
- Further management advice cannot be provided without the benefit of access to the quarry sites.

Administration matters

- A Reservoir Crescent property without a land title became the subject of ESO1 in February 2009. It is recommended that the proposed ESO2 should not include that property because the existing schedule ESO1 is adequate;
- The Planning Scheme zoning is mostly Special Use Zone 2 (SUZ2). The exceptions are 7.4 ha contiguous with Summit Rd and approximately 14.0 ha fronting Reservoir Crescent. Of these 7.4 ha, 6.8 ha is zoned Green Wedge Zone Schedule 2 (GWZ2) and 0.6 ha beside Reservoir Crescent is zoned Residential 1 Zone (R1Z);
- Parts of the Hanson Quarry site outside the current approved extraction area are covered by Public Acquisition Overlay Schedule 2 (PAO2);
- The site is outside the Urban Growth Boundary;
- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the endangered EVCs, the matters discussed under the heading 'Significance ratings', and the likelihood of biodiversity significance in parts of the site that could not be inspected or otherwise assessed;
- Part of the site is included under the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, based on the description of Sites 57 and 58 of the report by Water Ecoscience (1998). The boundary shown on p. 409 includes a larger area of native vegetation, as well as the quarry pits.

Information sources used in this assessment

- Mueck S.G. and Timewell C.A. (1998). *Ecological Assessment of Native Vegetation Adjacent to a Proposed Extension of the Lysterfield Quarry*, a draft report prepared for Pioneer Concrete (Vic) Pty Ltd;
- A site survey by Dr Lorimer for 3 hours 50 minutes on 25/7/04 within the most southwesterly lot in the site, including:
 - Compilation of lists of indigenous and introduced plant species in each of two vegetation types;
 - Description of the structural and floristic composition of each type of native vegetation;
 - Mapping and documentation of rare species populations and the ecological condition of the vegetation;
 - Incidental fauna observations;
 - Checks for fauna habitat, ecological threats and management issues;
- Similar information collected by Dr Lorimer on 25/4/03 along Cornish Rd (the site's northeastern edge), looking into the Boral Quarry land;
- Similar information collected by Dr Lorimer on 25/11/97 along Wellington Rd (the site's northern edge), looking into the Boral Quarry land, in preparation for the report, *A Survey and Management Plan for Significant Vegetation of Roadsides in Knox* by G.S. Lorimer for Knox City Council (May 1998, 137 pp.);
- Similar information collected by Dr Lorimer on 10/12/07 at Lot A Reservoir Crescent;
- A follow-up survey of the ownerless lot in the site's southwest by Dr Lorimer on 9/12/07 to provide up-to-date information that was presented at a planning panel hearing on 31/1/08;
- A walk by Dr Lorimer with parties to the abovementioned planning panel on 31/1/08 across the three most southwesterly lots within the site;
- The investigation of the pre-settlement distribution of 'Lysterfield Grassy Dry Forest' described in Appendix A of Volume 1;
- The Atlas of Victorian Wildlife;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Acknowledgment

Thanks to Mr Michael Dileo, the owner of Lot A Reservoir Crescent (Standard Parcel Identifier A\PS428532), for providing access to his property.

Site 82. Lysterfield Park

Part of a public park with eucalypt plantations and areas of native vegetation. Melway maps 82 and 83.

Site Significance Level: *State*

- Some of the native vegetation present belongs to regionally threatened Ecological Vegetation Classes;
- Four plant species recorded from the park are listed as rare or threatened in Victoria, and at least some of these may be within the part of the park that lies within Knox;
- Due to incomplete botanical surveying, there is a strong possibility that further rare or threatened plant species are present;
- The site is known habitat for Powerful Owl and Speckled Warbler, which are both threatened in Victoria;
- Other rare or threatened fauna that have been recorded within the park may occur in the part that lies inside Knox.

Note

The amount of fieldwork conducted during this study to assess Lysterfield Park was substantially less intensive than for all other sites proposed for overlays. This is because:

- The conservation and management of the park is within the jurisdiction of the State government and Parks Victoria;
- The park spans three municipalities and less than half of it is within Knox; and
- There is no apparent benefit from assessing or considering only the Knox part of the park in isolation from the whole park, or in isolation from the contiguous Churchill National Park (City of Casey), Dandenong Police Paddocks Reserve (City of Casey) and 'ZA Land' (north of Wellington Rd, in the Shire of Yarra Ranges).

While the treatment below is believed to be adequate for the purposes of a municipal biodiversity study like this, it is not intended to support management or administration of the park by Parks Victoria.

Aerial photograph and plan: See page 409.

Boundaries

The site boundary is outlined in red and marked '82' on the aerial photograph. It follows the park boundary and the municipal boundary, the latter solely because this study is confined to the municipality of Knox.

Land use & tenure: Public park.

Site description

Lysterfield Park, also known as Lysterfield Lake Park, is part of a larger, contiguous area of public park extending from the Dandenong Police Paddocks Reserve in Dandenong North to Birdsland Reserve in Belgrave Heights. Most parts of this public land have previously been privately owned, then bought back by government at various times. They are now nearly all managed by Parks Victoria.

The part of Lysterfield Park that lies within Knox includes most of the southeastern slopes of the Lysterfield Hills, extending into a natural basin immediately upstream of Lysterfield Lake. There are moderate undulations, frequent granitic boulders and sandy to gravelly soil of low fertility, providing generally poor growing conditions for plants. Elevations vary from approximately 70m near Lysterfield Lake in the southeast to 220 m in the Lysterfield Hills.

Most of the land was largely cleared and grazed until it was reserved to provide a water catchment for the Mornington Peninsula, which it did from 1936 to 1975. The catchment was fenced to exclude cattle and the pasture was replaced by eucalypt plantations to protect the catchment.

The part of the site lying northwest of the dashed white curve on the aerial photograph (p. 409) has not been planted, according to vegetation mapping by botanist, Mr Damien Cook. However, a brief inspection during this study detected no old-growth trees and a dearth of understorey species, suggesting past clearing and a history of grazing long ago.

The site's westernmost lot (see p. 409) is outside the catchment of Lysterfield Lake. It was reserved only in recent years and is still largely pasture.

Some of the eucalypt plantations seem to be mixed with naturally occurring flora. Confusion between natural, semi-natural and artificial vegetation is probably why there is a great deal of discordance between at least four attempts to map the site's vegetation, namely:

- The Department of Sustainability & Environment's BioMap of 'extant EVCs' from c.2001;

- The department's BioMap of 'pre-1750 EVCs' from c.2001;
- Vegetation maps of Lysterfield Park prepared for Parks Victoria by botanist, Mr Damien Cook, in 1994; and
- A National Parks Service vegetation map prepared from a vegetation survey by P.G. Smith in 1978 with updating by P. Debicki in 1986.

All of these maps have inaccuracies. The habitat types listed below for the site are the author's best estimate of the site's EVCs based on incomplete data.

The native vegetation inspected by the author is in fair ecological condition (rating C), but it is not possible to extrapolate to the whole park.

Numerous species of flora and fauna that are threatened at local, regional or state level have been recorded in Lysterfield Park, but in most cases the author cannot tell whether they occur specifically within the part of the park that lies within Knox. Even though the author only spent one hour in the park, he found plant species not previously recorded anywhere in the park. It appears that the park's flora is not well known, with the prospect that a thorough investigation would detect even more significant plant species.

Relationship to other land

Lysterfield Park is effectively part of a larger site of biological significance in combination with the Dandenong Police Paddocks Reserve, Heany Park (Site 80), Churchill National Park, the Lysterfield Hills (Site 81) and bushland to the northeast of Lysterfield Park. Many species of fauna undoubtedly move between these sites and some will rely on doing so in order to have enough habitat. Some fauna carry pollen or seeds, thereby linking plant populations across the area.

Bioregion: Highlands Southern Fall

Habitat types

Herb-rich Foothill Forest (EVC 23, conservation status rated 'Least Concern' in the bioregion)

Damp Forest (EVC 29, conservation status listed as of 'Least Concern' in the bioregion)

Swamp Scrub (EVC 53, **regionally Endangered**)

Grassy Forest (EVC 128, **regionally Vulnerable**) – the kind that is associated with the Gippsland Plain, not the Highlands Southern Fall.

Swampy Woodland (EVC 937, **regionally Vulnerable**)

Wetland (EVC 74, listed as regionally Endangered but in this case it is an artificial farm dam)

Plant species

The following plant species were recorded by various observers in the years indicated. Additional species would no doubt be detectable if the park were to be systematically surveyed, which was outside this project's scope. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, the species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
V	<i>Acacia mearnsii</i>	2004	V	<i>Crassula sieberiana</i> s.l.	2003
V	<i>Acacia melanoxydon</i>	1986	E	<i>Desmodium gunnii</i>	1985
	<i>Acacia paradoxa</i>	2004		<i>Deyeuxia quadriseta</i>	2004
C	<i>Acacia verniciflua</i>	2004	V	<i>Dianella longifolia</i> s.l.	2003
V	<i>Acacia verticillata</i>	1985	V	<i>Dianella tasmanica</i>	2004
V	<i>Acaena echinata</i>	2003		<i>Dichondra repens</i>	2004
	<i>Acaena novae-zelandiae</i>	1986	V	<i>Drosera peltata</i> subsp. <i>auriculata</i>	2003
V	<i>Adiantum aethiopicum</i>	1985	E	<i>Drosera peltata</i> subsp. <i>peltata</i>	2003
C	<i>Asperula conferta</i>	2004	E	<i>Echinopogon ovatus</i>	2004
	<i>Billardiera mutabilis</i>	2004	V	<i>Epacris impressa</i>	1985
	<i>Bossiaea prostrata</i>	1985		<i>Epilobium</i> sp.	1985
	<i>Bursaria spinosa</i>	2003	V	<i>Eucalyptus cypellocarpa</i>	2004
	<i>Cassinia aculeata</i>	2004		<i>Eucalyptus goniocalyx</i>	2003
	<i>Cassinia arcuata</i>	2004	V	<i>Eucalyptus obliqua</i>	2004
E	<i>Centella cordifolia</i>	1985	V	<i>Eucalyptus ovata</i>	2004
V	<i>Clematis aristata</i>	2004	E	<i>Eucalyptus radiata</i>	2004
V	<i>Coprosma quadrifida</i>	2004	E	<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>	1985

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
V	<i>Euchiton collinus</i>	2004		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	2003
V	<i>Exocarpos cupressiformis</i>	2003		<i>Lomandra longifolia</i>	1986
	<i>Funaria hygrometrica</i>	2004	E	<i>Melaleuca ericifolia</i>	1986
	<i>Gahnia radula</i>	2003		<i>Microlaena stipoides</i>	2004
E	<i>Gahnia sieberiana</i>	2004	E	<i>Olearia argophylla</i>	2004
DD	<i>Galium australe</i>	2004	V	<i>Opercularia varia</i>	1985
E	<i>Galium propinquum</i>	1985		<i>Oxalis exilis/perennans</i>	2004
E	<i>Geranium gardneri</i>	2003	E	<i>Ozothamnus ferrugineus</i>	2004
V	<i>Geranium potentilloides</i>	2004	C	<i>Pelargonium inodorum</i>	2003
V	<i>Geranium</i> sp. 2	2003		<i>Poa ensiformis</i>	2004
V	<i>Glycine clandestina</i>	2004	E	<i>Poa labillardierei</i> var. <i>labillardierei</i>	2004
E	<i>Glycine microphylla</i>	2003		<i>Poa morrisii</i>	2004
	<i>Gonocarpus tetragynus</i>	1985	E	<i>Poa tenera</i>	2004
C	<i>Gratiola peruviana</i>	2004		<i>Pteridium esculentum</i>	2004
V	<i>Hydrocotyle hirta</i>	2004	C	<i>Pterostylis pedunculata</i>	1985
E	<i>Hypericum gramineum</i>	1986	E	<i>Rubus parvifolius</i>	2003
E	<i>Imperata cylindrica</i>	2003	C	<i>Rumex brownii</i>	2003
E	<i>Indigofera australis</i>	2003		<i>Schoenus apogon</i>	2004
	<i>Juncus bufonius</i>	1986		<i>Senecio hispidulus</i>	2004
	<i>Juncus gregiflorus</i>	2004	C	<i>Senecio linearifolius</i>	2004
C	<i>Juncus holoschoenus</i>	1986	E	<i>Senecio minimus</i>	2004
	<i>Juncus pallidus</i>	2004		<i>Senecio quadridentatus</i>	2004
E	<i>Juncus planifolius</i>	1986	C	<i>Sigesbeckia orientalis</i>	2003
	<i>Kunzea ericoides</i> spp. agg.	2003	C	<i>Solanum aviculare</i>	2004
V	<i>Lagenophora</i> sp.	1985	C	<i>Stellaria pungens</i>	2004
	<i>Lepidosperma elatius</i>	1985		<i>Themeda triandra</i>	1985
V	<i>Lepidosperma laterale</i>	2004		<i>Tricoryne elatior</i>	1986
	<i>Lepidosperma longitudinale</i>	2004	E	<i>Triglochin striata</i> (flat leaf variant)	1986
	<i>Lepidosperma</i> sp.	1985	E	<i>Veronica plebeia</i>	2004
	<i>Leptospermum continentale</i>	1986	E	<i>Viola hederacea</i>	2004
E	<i>Leptospermum scoparium</i>	2004	E	<i>Wahlenbergia gracilis</i>	2004

Introduced Species

<i>Anagallis arvensis</i>	<i>Galium aparine</i>	<i>Pittosporum undulatum</i>
<i>Anthoxanthum odoratum</i>	<i>Helminthotheca echiodes</i>	<i>Plantago lanceolata</i>
<i>Briza minor</i>	<i>Holcus lanatus</i>	<i>Prunella vulgaris</i>
<i>Chrysanthemoides monilifera</i>	<i>Hypochoeris radicata</i>	<i>Rosa rubiginosa</i>
<i>Cirsium vulgare</i>	<i>Isolepis levynsiana</i>	<i>Rubus anglocandicans</i>
<i>Conyza sumatrensis</i>	<i>Leontodon taraxacoides</i>	<i>Solanum nigrum</i>
<i>Cortaderia seloana</i>	<i>Lotus subbiflorus</i>	<i>Trifolium repens</i>
<i>Cynodon dactylon</i>	<i>Paspalum dilatatum</i>	<i>Vicia</i> sp.

The author's notes concerning some of the locally threatened plant species

Crassula sieberiana/tetramera (Sieber Crassula). Reasonable numbers of were found in an area recently burned.

Geranium gardneri (Rough Cranesbill). Reasonable numbers of immature plants were found in an area recently burned.

Geranium sp. 2 (Variable Cranesbill). Small numbers were found

Glycine microphylla (Small-leaf Glycine). Reasonable numbers of immature plants were found in an area recently burned.

Imperata cylindrica (Blady Grass). Small numbers were found.

Pelargonium inodorum (Kopata). Reasonable numbers were found in an area recently burned.

Rumex brownii (Slender Dock). Several plants were seen.

Sigesbeckia orientalis (Indian Weed). Only one or two plants were found, in a recently burned area.

Veronica plebeia (Trailing Speedwell). Small numbers were found.

Fauna of special significance

The following species are only a small fraction of the total for the park, being just those which the author is confident about occurring within the Knox part of the park.

Vulnerable in Victoria

Powerful Owl. Reported repeatedly from the area.

Speckled Warbler. Reported repeatedly from the area, including in the 1998 study by Mueck and Timewell on the abutting Hanson Quarry.

Uncommon in the Melbourne region

Australian King-parrot. Reported by neighbours to be not uncommon in the area.

Eastern Grey Kangaroo. Resident and becoming increasingly abundant.

Spotted Brown Butterfly. The Lysterfield Hills area is one of the strongholds of this generally localised species.

Fauna habitat features

This list is likely to be incomplete:

- The tree canopy provides habitat for insects, bats, possums and forest birds;
- Fallen timber provides the sort of cover required by many reptiles and invertebrates;
- The grassy ground flora provides fodder for butterfly caterpillars and other invertebrates, including Spotted Brown butterflies;
- It is likely that butterflies congregate on the hilltops in the site (which is what many butterflies do on hilltops);
- Swampy vegetation probably provides habitat for frogs and aquatic invertebrates.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity and Viability

Lysterfield Park meets criterion 1.1.2 for **Local** significance because it contains '100 ha or more of contiguous native vegetation in a heavily fragmented landscape'.

This park is also a substantial part of a large habitat corridor extending from Dandenong Ck in the Dandenong Police Paddocks Reserve to Birdsland Reserve in Belgrave Heights, and beyond. Criterion 1.2.6 attributes **Regional** significance to any corridor that meets the description 'Important at regional scale (link within bioregion or catchment)', which is a reasonable description of the corridor of interest here.

Regionally Threatened Ecological Vegetation Classes

Swamp Scrub is regionally Endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that native vegetation of this EVC is of at least High conservation significance, and this translates to a site of **State** significance under criterion 3.2.3. Quadrat data from Mr Andrew Paget tends to confirm the presence of Swamp Scrub in the Knox part of the park.

The regionally vulnerable EVCs, Grassy Forest and Swampy Woodland, would also give the site State significance if it were determined that at least part of them have a habitat score of 0.3 or above (i.e. not severely degraded). This seems quite likely. Note that the current (2004) 'EVC benchmarks' for Grassy forest in the Gippsland Plain and the Highlands Southern Fall bioregions are for quite different communities, and the former is the one applicable to Lysterfield Park despite the park being generally mapped as part of the other bioregion.

Rare or Threatened Flora

Some of the locally threatened plant species listed above are known to have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Some other plant species recorded for the park are significant at higher levels. The most important is *Amphibromus fluitans*, which is listed as vulnerable under the federal *Environment Protection and Biodiversity Conservation Act 1999*. Under criterion 3.1.1, the presence of this species gives the park **State or National** significance, depending on whether the population within the park is estimated to represent at least 1% of the national population. However, this semi-aquatic species is most likely at Lysterfield Lake and may not extend far enough from the normal water level to extend into Knox.

In the case of plant species in the park that are listed as rare or threatened in Victoria, the author does not know whether they have been seen in the Knox part of the park or elsewhere. The species involved are *Caladenia aurantiaca*, *Helichrysum* sp. aff. *rutidolepis* (Lowland Swamps), *Pomaderris oraria* and *Pterostylis* × *ingens*. Any of these could give the park significance at the Local to National level, depending on the size and viability of the populations.

Rare or Threatened Fauna

The Powerful Owl is a vulnerable species in Victoria. It is known to frequent and roost in the Lysterfield Hills and there is evidently good quality habitat for it there. The population in the area is a small fraction of the bioregional total, but would be viable as part of the wider ranging population around the Dandenong Ranges. This represents **Regional** significance under criterion 3.1.2.

The Speckled Warbler population is of **Regional** significance on the same basis as the Powerful Owl.

The other species listed as 'Fauna of special significance' above are rare or threatened locally or in the Melbourne area, but not throughout the whole of the relevant bioregion. This represents **Local** significance.

The Southern Brown Bandicoot and the Warty Bell Frog (or Growling Grass Frog) are resident at Lysterfield Lake (unless they have recently died out). These species are listed under the federal *Environment Protection and Biodiversity Conservation Act 1999*. Their presence gives the park at least **State** significance under criterion 3.1.1. The part of the park within Knox would be of the same significance if either species is determined to be present there.

Threats and Management issues

Refer to the Churchill National Park and Lysterfield Park Management Plan, August 1998.

Administration matters

- The Planning Scheme zoning of the most westerly lot is Public Park and Recreation Zone (PPRZ) and the rest of the site is zoned Public Use Zone - Service and Utility (PUZ1);
- The site is outside the Urban Growth Boundary;
- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the endangered EVCs, the matters discussed under the heading 'Significance ratings', and the likelihood of biodiversity significance in parts of the site that have not been adequately studied;
- The site is not affected by a Vegetation Protection Overlay to the Knox Planning Scheme and was not identified as a site of significance by Water Ecoscience (1998).

Information sources used in this assessment

- Parks Victoria's 'Park Notes', the 1998 management plan, fauna lists and several vegetation maps for the park;
- Cook D. (1994). *'Vegetation Community Survey for Lysterfield Lake Park, Churchill National Park, ZA Land and Link Land'*, a report and associated maps for the Department of Conservation and Natural Resources;
- A site survey by Dr Lorimer for one hour on 7th August 2003 (following a fire the previous summer) within a 40m-wide strip around the park perimeter, from Glen Rd to the edge of the Boral Quarry land. This included :
 - Compilation of a list of indigenous and introduced plant species;
 - Description of the structural and floristic composition of the native vegetation;
 - Documentation of rare species populations and the ecological condition of the vegetation;
 - Incidental fauna observations;
 - Checks for fauna habitat, ecological threats and management issues;
- A plant list and data from nine quadrats (DSE numbers N13242-N13250) compiled by Mr Andrew Paget in April and May 1985;
- Field data from celebrated naturalist, the late Mr Cliff Beaglehole, from his visit to the park on 18/11/82 with L.K.M Elmore;
- A specimen of the nationally vulnerable River Swamp Wallaby-grass (*Amphibromus fluitans*) collected by Mr Beaglehole in the park on 18/11/82 and kept at the National Herbarium of Victoria (specimen number MEL 119352);
- The Atlas of Victorian Wildlife;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Acknowledgment

Thanks to Parks Victoria, and particularly Mr Michael Van de Vreede, for providing documentation about the park.

Site 83. Lysterfield Valley

Residential and grazing land between Lysterfield Park and Lysterfield Rd, with patches of forest. Melway ref. 83 B3.

Site Significance Level: *Regional or potentially State* (see 'Significance ratings' below)

- There are remnants of threatened Ecological Vegetation Classes in poor ecological condition;
- Even though only part of the site could be visited, six plant species that are threatened in Knox were found, including two fern species that are extremely rare in the Melbourne region;
- Eastern Grey Kangaroos regularly appear in the site;
- The site's ecological values are threatened by urban expansion.

Note

Permission was not obtained to enter most of the properties within this site. Instead, these properties were inspected from publicly accessible land, aided by aerial photographs. This may have caused some biologically significant attributes to be overlooked. The Precautionary Principle (see the Glossary at the end of Volume 1) should be applied when considering protection of this site in the absence of full scientific certainty about its attributes.

Aerial photograph and plan: See page 409.

Boundaries

This 145.0 ha site is in two parts, one each side of Wellington Rd. The boundary of each part is outlined in red and marked '83' on the aerial photograph on p. 409. The site boundaries coincide with property boundaries, except where they cross streets.

Land use & tenure: Private property and reserves ('Lysterfield Reserve' and water supply reserves) leased for grazing.

Site description

This site is at the head of the Corhanwarrabul Creek valley, with elevations ranging from approximately 86 m at Sherwood Way to just over 200 m near the dead end of Cornish Rd on the Lysterfield Hills ridge. The highest areas, on the southern and southwestern fringe, have steep slopes facing northeast. The gradient tapers rapidly toward Corhanwarrabul Ck, which has a shallow gradient toward the northwest. The creek does not flow perennially due to dams that intercept it. There is a timbered knoll within the site between the creek and Lysterfield Rd, reaching an elevation of just over 150 m.

The site has complex geology. It is at the intersection of the Lysterfield Granodiorite formation, the Kalorama Rhyodacite formation and an unnamed hornfels formation where Devonian sediments have been metamorphosed by volcanic flows of the other two formations. There is also alluvium along the Corhanwarrabul Ck valley and two tributary gullies, and colluvial deposits where hornfels has slipped down hills. There is extensive outcropping of granodiorite rocks and boulders toward Lysterfield Park.

The aerial photograph (p. 409) shows that the land use is mostly untreed or sparsely treed pasture, with some denser treed areas north of Wellington Rd. Every part of the site has been grazed for many decades. The northwestern part of the site is undergoing residential development, and the downstream section of Corhanwarrabul Ck has been replaced by a pipe covered with earth, since the aerial photograph was taken in April 2003.

Grazing has destroyed most of the native understorey in the site. However some native plants persist, including two fern species (*Cheilanthes sieberi* and *Pleurosorus rutifolius*) that had not been recorded at any site closer than the Yarra River prior to this study. Even the open pasture is of some environmental significance because it is regularly grazed by Eastern Grey Kangaroos (listed by the Land Conservation Council (1991) as 'Uncommon' in the Melbourne Region) and some of it forms the headwaters of Corhanwarrabul Ck.

A large part of the site's native vegetation could be classified as scattered trees with negligible native understorey. The less degraded areas on the upper slopes near Lysterfield Park belong to the Gippsland Plain form of the Grassy Forest EVC. Drainage lines and the floor of the Corhanwarrabul Ck valley support Swampy Woodland. Some of the Swampy Woodland has been reduced to rush-dominated wetland by the removal of trees, and there is a patch of Swamp Scrub near the corner of Wellington Rd and Brae Rd (marked on the aerial photograph). Between the Grassy Forest and the Swampy Woodland, there are overstorey remnants of Valley Grassy Forest near Cornish Rd and Valley Heathy Forest further to the east.

The unusual, complex geology north of Wellington Rd, combined with the history of grazing and clearing, cause difficulty in assigning EVCs to vegetation within the patches of trees there. The two patches of trees within the site between Kelletts Rd and Corhanwarrabul Ck are nearly pure stands of Narrow-leafed Peppermint (*Eucalyptus radiata*) with densely grassy

ground flora, fitting the Grassy Forest EVC much better than the Valley Heathy Forest shown on the Department of Sustainability & Environment's map of extant EVCs. Similarly, the stand of Messmate Stringybark (*Eucalyptus obliqua*) and occasional Narrow-leaved Peppermints just south of Logan Ct is a better fit to Grassy Forest than the Valley Grassy Forest depicted on the department's maps.

Relationship to other land

The site is effectively an ecological buffer or fringe to a larger site of biological significance that includes the Dandenong Police Paddocks Reserve, Heany Park (Site 80), Churchill National Park, Lysterfield Park (Site 82) and bushland to the northeast of Lysterfield Park. The Eastern Grey Kangaroos and birdlife found within the Lysterfield Valley site undoubtedly rely on the larger site of significance for much of their habitat needs.

Bioregion: Gippsland Plain north of Wellington Rd (and slightly to the south), and Highlands Southern Fall elsewhere.

Habitat types

Full details about the structure and composition of each EVC are not given below because of variability across the site, the dearth of understorey and lack of permission to enter most of the private property.

Swamp Scrub (EVC 53, regionally **Endangered**): 0.19 ha, all in poor ecological condition (rating D).

Grassy Forest (EVC 128, **Endangered** in the Gippsland Plain bioregion and **Vulnerable** in the Highlands Southern Fall bioregion). Although Grassy Forest is in both bioregions of this site, it all belongs to the kind that is associated with the Gippsland Plain, not the Highlands Southern Fall. The area with native understorey is estimated as 13 ha, practically all in poor ecological condition (rating D). 57 indigenous plant species were found.

Swampy Woodland (EVC 937, regionally **Endangered** in the Gippsland Plain bioregion): The area with understorey is estimated to occupy 0.5 ha (but uncertain due to lack of permission to inspect some areas). All is in poor ecological condition (rating D).

Valley Grassy Forest (EVC 47, regionally **Vulnerable**): Mostly with negligible native understorey, but one patch at the intersection of Wellington Rd and Kelletts Rd is estimated to contain 0.3 ha with understorey, of which 0.08 ha is in good ecological condition (rating B), 0.15 ha is in fair ecological condition (rating C) and 0.07 is in poor ecological condition (rating D). Other areas may have escaped detection.

Valley Heathy Forest (EVC 127, regionally **Endangered**): There are patches of tree canopy from this EVC, but little native understorey could be seen in the absence of permission to inspect the private properties where these patches occur.

Wetland (EVC 74, listed as regionally Endangered but the occurrences in this site are not natural). There is a total of approximately 1.1 ha of farm dams with an indeterminate area of fringing vegetation, and roughly 0.5 ha of rushland that has replaced the natural Swampy Woodland due to clearing and grazing.

Plant species

The following plant species were recorded by various observers in the years indicated. Records dated 2002-2005 are the author's. Additional species would no doubt be detectable if the whole of the area were to be surveyed. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, the species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
V	<i>Acacia mearnsii</i>	2002	E	<i>Carex gaudichaudiana</i>	2002
V	<i>Acacia melanoxylon</i>	2005		<i>Cassinia aculeata</i>	2005
E	<i>Acacia stricta</i>	1997	C	<i>Cheilanthes sieberi</i> subsp. <i>sieberi</i>	2002
V	<i>Acacia verticillata</i>	2002	V	<i>Clematis aristata</i>	1996
V	<i>Acaena echinata</i>	2002	V	<i>Crassula sieberiana</i> s.l.	2002
	<i>Acaena novae-zelandiae</i>	2002		<i>Dianella admixta</i>	2002
V	<i>Allocasuarina littoralis</i>	2002		<i>Dichondra repens</i>	2005
C	<i>Amyema pendula</i>	2002		<i>Elymus scaber</i>	1997
V	<i>Amyema quandang</i>	1997	V	<i>Epacris impressa</i>	2002
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	2002		<i>Epilobium hirtigerum</i>	2002
	<i>Billardiera mutabilis</i>	2002		<i>Eragrostis brownii</i>	2002
	<i>Bossiaea prostrata</i>	2002	V	<i>Eucalyptus cephalocarpa</i>	2005
	<i>Bursaria spinosa</i>	2002		<i>Eucalyptus goniocalyx</i>	2005
	<i>Carex appressa</i>	2002	V	<i>Eucalyptus obliqua</i>	2002
	<i>Carex breviculmis</i>	1996	V	<i>Eucalyptus ovata</i>	2002

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
E	<i>Eucalyptus radiata</i>	2005		<i>Oxalis exilis/perennans</i>	2005
V	<i>Euchiton collinus</i>	2002	E	<i>Ozothamnus ferrugineus</i>	2002
V	<i>Exocarpos cupressiformis</i>	2005		<i>Pandorea pandorana</i>	2002
	<i>Gahnia radula</i>	2002		<i>Persicaria decipiens</i>	2002
V	<i>Geranium</i> sp. 2	2002	E	<i>Phragmites australis</i>	2002
	<i>Gonocarpus tetragynus</i>	2002	V	<i>Platylobium formosum</i>	1996
	<i>Goodenia lanata</i>	2002	C	<i>Pleurosorus rutifolius</i>	2002
C	<i>Gratiola peruviana</i>	1996		<i>Poa morrisii</i>	2002
V	<i>Hemarthria uncinata</i>	2002	E	<i>Pomaderris aspera</i>	1996
E	<i>Hypericum gramineum</i>	2002		<i>Poranthera microphylla</i>	1996
V	<i>Isolepis</i> sp.	1996		<i>Pteridium esculentum</i>	2002
	<i>Juncus amabilis</i>	2002	E	<i>Rubus parvifolius</i>	1996
	<i>Juncus bufonius</i>	2002	C	<i>Rumex brownii</i>	2005
	<i>Juncus gregiflorus</i>	2002		<i>Rytidosperma laeve</i>	1997
	<i>Juncus pallidus</i>	2002		<i>Rytidosperma linkii</i> var. <i>fulvum</i>	2002
E	<i>Juncus procerus</i>	2002		<i>Rytidosperma penicillatum</i>	2002
	<i>Juncus sarophorus</i>	2002		<i>Rytidosperma racemosum</i>	2002
E	<i>Juncus subsecundus</i>	2002	E	<i>Rytidosperma semiannulare</i>	1997
	<i>Kunzea ericoides</i> spp. agg.	2002		<i>Rytidosperma setaceum</i>	1997
E	<i>Lagenophora stipitata</i>	1996		<i>Rytidosperma tenuius</i>	1997
	<i>Leptospermum continentale</i>	2002		<i>Schoenus apogon</i>	2002
E	<i>Leptospermum scoparium</i>	2002		<i>Senecio quadridentatus</i>	2002
	<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	2002	V	<i>Solanum laciniatum</i>	1997
	<i>Lomandra filiformis</i> subsp. <i>filiformis</i>	1997	V	<i>Solenogyne dominii</i>	2002
	<i>Lomandra longifolia</i>	2002		<i>Themeda triandra</i>	2002
V	<i>Lythrum hyssopifolia</i>	2002		<i>Tricoryne elatior</i>	2002
E	<i>Melaleuca ericifolia</i>	2002	V	<i>Veronica gracilis</i>	2002
	<i>Microlaena stipoides</i>	2005	E	<i>Veronica plebeia</i>	1996
V	<i>Opercularia varia</i>	2002	E	<i>Viola hederacea</i>	2002

Introduced Species

<i>Agrostis capillaris</i>	<i>Gamochaeta purpurea</i>	<i>Pinus radiata</i>
<i>Allium triquetrum</i>	<i>Genista monspessulana</i>	<i>Pittosporum undulatum</i>
<i>Anthoxanthum odoratum</i>	<i>Glyceria declinata</i>	<i>Plantago coronopus</i>
<i>Arctotheca calendula</i>	<i>Hedera helix</i>	<i>Plantago lanceolata</i>
<i>Briza maxima</i>	<i>Helminthotheca echioides</i>	<i>Poa annua</i>
<i>Bromus diandrus</i>	<i>Holcus lanatus</i>	<i>Prunella vulgaris</i>
<i>Bromus hordeaceus</i>	<i>Hordeum leporinum</i>	<i>Prunus cerasifera</i>
<i>Callitriche stagnalis</i>	<i>Hypochoeris radicata</i>	<i>Raphanus raphanistrum</i>
<i>Centaureum erythraea</i>	<i>Juncus articulatus</i>	<i>Romulea rosea</i>
<i>Cerastium glomeratum</i> s.l.	<i>Leontodon taraxacoides</i>	<i>Rosa rubiginosa</i>
<i>Chrysanthemoides monilifera</i>	<i>Lolium perenne</i>	<i>Rubus anglocandicans</i>
<i>Cirsium vulgare</i>	<i>Lonicera japonica</i>	<i>Rumex conglomeratus</i>
<i>Cortaderia seloana</i>	<i>Lotus subbiflorus</i>	<i>Rumex crispus</i>
<i>Crataegus monogyna</i>	<i>Lythrum junceum</i>	<i>Solanum nigrum</i>
<i>Cynodon dactylon</i>	<i>Medicago polymorpha</i>	<i>Sonchus asper</i>
<i>Cynosurus echinatus</i>	<i>Modiola caroliniana</i>	<i>Sonchus oleraceus</i>
<i>Cyperus eragrostis</i>	<i>Oxalis pes-caprae</i>	<i>Stellaria media</i>
<i>Dactylis glomerata</i>	<i>Paspalum dilatatum</i>	<i>Trifolium repens</i>
<i>Echium plantagineum</i>	<i>Paspalum distichum</i>	<i>Trifolium striatum</i>
<i>Ehrharta erecta</i>	<i>Pennisetum clandestinum</i>	<i>Trifolium subterraneum</i>
<i>Euphorbia peplus</i>	<i>Phalaris aquatica</i>	<i>Ulex europaeus</i>
<i>Galium aparine</i>	<i>Phytolacca octandra</i>	

The author's notes concerning some of the locally threatened plant species

Carex gaudichaudiana (Fen Sedge). Found in June 2002 on Corhanwarrabul Ck near Sherwood Way, and possibly since destroyed when the creek was filled in and replaced by a pipe in that vicinity.

Cheilanthes sieberi subsp. *sieberi* (Narrow Rock Fern). Three plants were found among rocks in pasture near the southern end of Glen Rd.

Crassula sieberiana (Sieber Crassula). Substantial numbers were found among granodiorite rocks in pasture near the southern end of Glen Rd. Likely to occur around other outcropping rocks.

Geranium sp. 2 (Variable Cranesbill). Found in pasture near the end of Glen Rd, numbers not recorded.

Pleurosorus rutifolius (Blanket Fern). A patch of plants measuring 500 mm × 50 mm was found in a crevice between rocks in pasture near the southern end of Glen Rd.

Rumex brownii (Slender Dock). Several were found in pasture near the southern end of Glen Rd.

Fauna of special significance

Vulnerable in Victoria and listed under the *Flora and Fauna Guarantee Act 1988*

Great Egret. The Atlas of Victorian Wildlife includes a record of the species along Corhanwarrabul Ck within the site during 2000.

Uncommon in the Melbourne Region

Australian King-Parrot

Uncommon in Knox

Red-browed Finch

Black Wallaby

Fauna habitat features

- The tree canopy provides habitat for insects, bats, possums and forest birds;
- There are some very large, old trees with hollows that would suit native birds, bats, possums and insects;
- Corhanwarrabul Ck and swampy vegetation provide habitat for frogs and aquatic invertebrates;
- The mixture of open pasture and stands of trees suits Eastern Grey Kangaroos and is regularly used by them.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Regionally Threatened Ecological Vegetation Classes

Swamp Scrub is regionally endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that the swamp scrub in this site is necessarily of at least High conservation significance. Any site that contains a 'remnant patch' of such vegetation is of State significance under the criterion 3.2.3 of Amos (2004).

However, at the time Amos (2004) prepared the significance criteria, the unpublished convention was that native vegetation only qualified as a remnant patch if it covered at least 2,500 m². Because the area is only 1,900 m² in the present case, the author has reduced the significance level of the site to **Regional**.

The site's Swampy Woodland is also regionally endangered, and if a single area measuring at least 2,500 m² of it has a non-trivial density of native understorey, it would qualify as a 'remnant patch' and give the site State significance. It is unclear whether this applies because permission was not obtained to inspect most of the site's Swampy Woodland.

Rare or Threatened Flora

Blanket Fern (*Pleurosorus rutifolius*) is rare in the Highlands Southern Fall bioregion, according to an intensive review of the conservation status of flora in the Port Phillip and Westernport Catchment region by botanist, Mr Dale Tonkinson. The occurrence near Glen Rd is a remarkable outlier occurrence and is of **Regional** significance.

The author has confirmed that some of the other locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

Wetlands in Corhanwarrabul Ck valley provide suitable foraging habitat for the listed vulnerable species, Great Egret, and it is not surprising that one was reported there in 2000. However, the site would be a minor and fairly dispensable part of that bird's large habitat. This represents **Local** significance under criterion 3.1.2.

The other species listed as 'Fauna of special significance' above are rare or threatened locally or in the Melbourne area, but not throughout the whole of the relevant bioregion. This represents **Local** significance on the same basis as for locally rare or threatened flora.

Land protection hazard

Land along the Corhanwarrabul Ck valley, on both sides of Wellington Rd, is moderately to highly susceptible to waterlogging. The land use there also affects protection of the waterway. These features give the site a land protection hazard rating of High to Very High according to Victoria's Native Vegetation Management Framework (NRE 2002a).

Threats

- Subdivision;
- Invasion by environmental weeds, as follows;
 - Serious: Brown-top Bent (*Agrostis capillaris*), Sweet Vernal-grass (*Anthoxanthum odoratum*), Couch (*Cynodon dactylon*), Panic Veldt-grass (*Ehrharta erecta*), Cat's Ear (*Hypochoeris radicata*), Water Couch (*Paspalum distichum*);
 - Moderate: Angled Onion (*Allium triquetrum*), Hawthorn (*Crataegus monogyna*), Yorkshire Fog (*Holcus lanatus*), Paspalum (*Paspalum dilatatum*), Toowoomba Canary-grass (*Phalaris aquatica*), Red-ink Weed (*Phytolacca octandra*), Sweet Pittosporum (*Pittosporum undulatum*), Blackberry (*Rubus discolor*), Gorse (*Ulex europaeus*), Boneseed (*Chrysanthemoides monilifera* ssp. *monilifera*), Pampas Grass (*Cortaderia selloana*), Montpellier Broom (*Genista monspessulana*);
- Grazing by stock;
- Cattle hoofs disturbing mud and trampling plants in areas of rushland and Swamp Scrub;
- Rabbit grazing;
- Loss or decline of plant species that have such small populations that they are vulnerable to inbreeding, poor reproductive success or random events such as trampling. This is particularly important for the two rare fern species.

Management issues

- If further subdivision is to occur along Corhanwarrabul Ck, the creek and its native riparian vegetation (particularly rushland) should not be destroyed;
- It would be highly desirable for the two rare fern species to be propagated from spores collected from the site, so that the propagated plants can be established in Lysterfield Park where they might thrive, away from grazing by stock.

Administration matters

- Any planning scheme applications to remove or destroy native vegetation from the patches north of Wellington Rd should be checked to ensure that the associated habitat hectare determination(s) are done using the most appropriate EVC benchmark (which is probably the one for the Gippsland Plain version of Grassy Forest). The benchmark for Grassy Forest in the Highlands Southern Fall bioregional is not presently valid for the type of Grassy Forest present south of Wellington Rd (as at August 2004);
- The Planning Scheme zoning of Lysterfield Park is Public Park and Recreation Zone (PPRZ). Other land south of Wellington Rd is zoned Green Wedge Zone Schedule 2 (GWZ2). The land north of Wellington Rd is variously zoned Green Wedge Zone Schedule 1 (GWZ1), Residential Conservation Zone Schedule 2 (RCZ2) or Public Use Zone - Service and Utility (PUZ1);
- The site is outside the Urban Growth Boundary;
- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the endangered EVCs, the matters discussed under the heading 'Significance ratings', and the potential for subdivision;
- Part of the site is included under the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, based on the description and mapping of Sites 49 and 53 of the report by Water Ecoscience (1998). The boundary shown on p. 409 does not include all of Water Ecoscience's Sites 49 and 53 because clause 52-17 of the Planning Scheme is deemed adequate for the excluded parts. The site boundary used here has been aligned with property boundaries, unlike the boundaries mapped by Water Ecoscience.

Information sources used in this assessment

- Surveys of various parts of the site by Dr Lorimer on 18/6/02, 11/10/02, 29/10/02, 25/4/03 and 7/8/03 for a total of approximately eight hours, following this study's standard procedures discussed in Section 2.4 of Volume 1. This included:
 - Compilation of lists of indigenous and introduced plant species;
 - Description of the structural and floristic composition of the native vegetation;
 - Documentation of rare species populations and the ecological condition of the vegetation;
 - Incidental fauna observations;
 - Checks for fauna habitat, ecological threats and management issues;
- A brief visit by Dr Lorimer during winter 2004 to determine to what degree the site of significance had reduced in area as a result of ongoing residential development since the 2003 survey;
- Verbal records of wildlife observations by Mrs Jo Hauler of 25 Glen Rd, Lysterfield over many years;
- The Atlas of Victorian Wildlife;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;

- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Acknowledgment

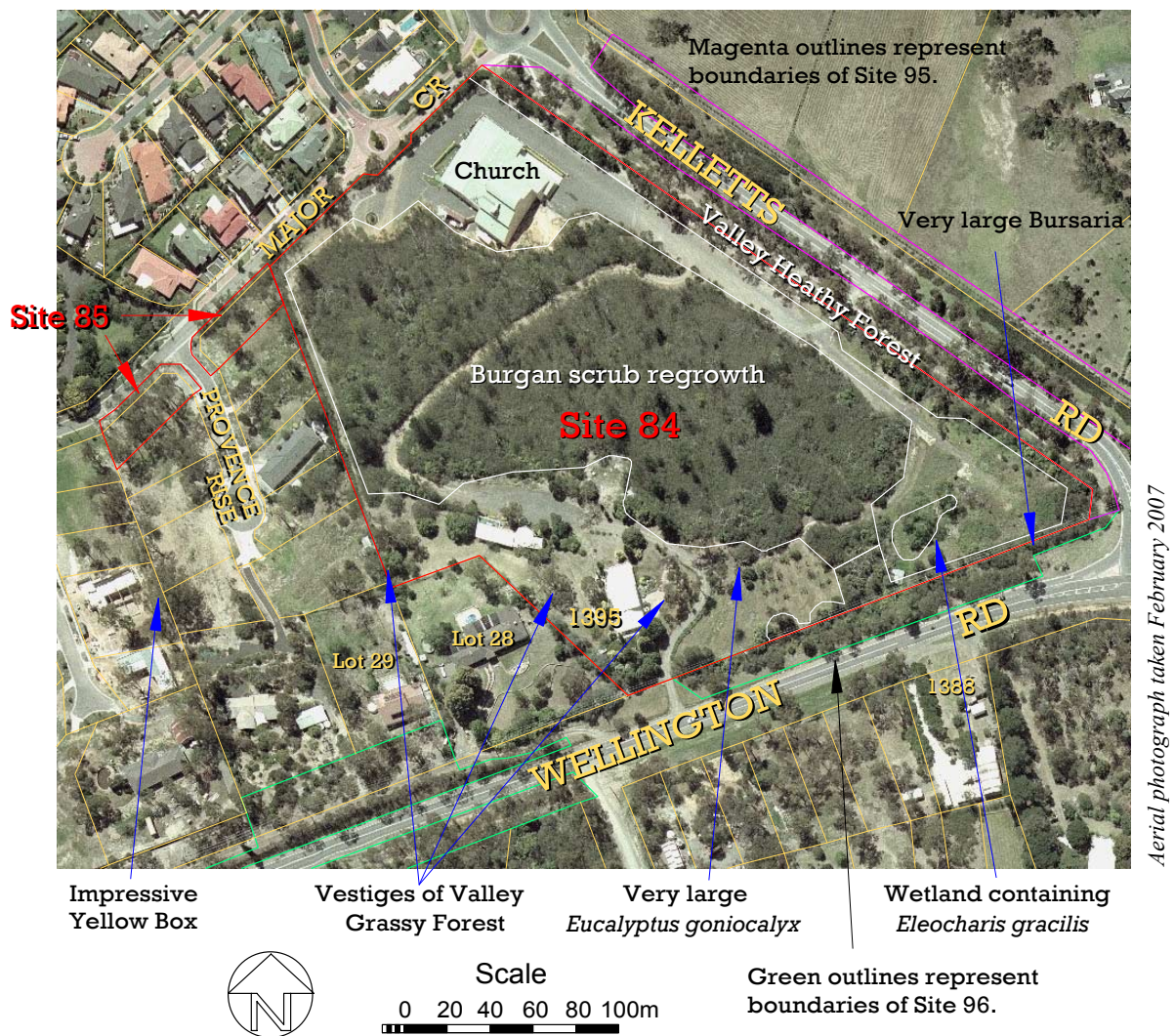
Thanks to Mr and Mrs Hauler of 25 Glen Rd for permission to inspect their property, and for information about observations of local wildlife over many years.

Site 84. Fruitful Vine Melbourne Church, Lysterfield

A 5.9 ha private lot used for worship, related purposes and a house, with approximately ½ ha of mature remnant trees and understorey and 3 ha of regrowth. Melway ref. 82 K2.

Site Significance Level: State

- The Ecological Vegetation Classes present are regionally Endangered or Vulnerable;
- There is an extremely large Sweet Bursaria (*Bursaria spinosa*) overhanging the boundary, 30 cm trunk diameter and approximately 10 m from base to tip – perhaps the largest of the species in existence;
- There are some large trees of *Eucalyptus goniocalyx*, up to 0.92 m diameter at breast height;
- There is a patch of the uncommon wetland plant, Slender Spike-rush (*Eleocharis gracilis*), measuring 15-25 m²;
- The vegetation has moderately high diversity and is ecologically stable or improving.



Boundaries

The site is the property on the western corner of Wellington Rd and Kelletts Rd, shown above with a red boundary and the label 'Fruitful Vine Church'. It includes all vegetation growing in or over the property. The adjoining property outlined in red, labelled 'Lot 2', is Site 85.

Land use & tenure: A single, 5.9 ha private lot used partly for worship and related purposes, and also with a house and 3½ ha of native vegetation.

Site description

Kelletts Rd perimeter

There is a strip of Valley Heathy Forest along the Kelletts Rd perimeter with mature remnant eucalypts and partly natural understorey of Valley Heathy Forest, contiguous with the roadside verge (Site 95). Twenty-seven indigenous plant species were found, including one plant of the locally uncommon Creeping Mistletoe (*Muellerina eucalyptoides*). Eucalypt dieback is serious toward the Wellington Rd intersection, and the rest of the strip has been moderately degraded by clearing, excavation and consequent weed invasion. The weeds, Bridal Creeper (*Asparagus asparagoides*), Boneseed (*Chrysanthemoides monilifera monilifera*) and Panic Veldt-grass (*Ehrharta erecta*) are serious but fairly localised. The additional weeds, Brown-top Bent (*Agrostis capillaris*), Sweet Vernal-grass (*Anthoxanthum odoratum*) and the blackberry *Rubus discolor* could also become serious in future, depending on how the vegetation is managed.

Wellington Rd perimeter

The perimeter along Wellington Rd has only patches of indigenous vegetation and little understorey except for the ubiquitous Thatch Saw-sedge (*Gahnia radula*). However there is one Sweet Bursaria (*Bursaria spinosa*), marked on the plan above, which far exceeds the accepted maximum size of this species. It is rooted in the roadside reservation and it leans very low over the fence into the site in question here. Its trunk diameter is 30 cm and it measures approximately 10 m from base to tip, making it one of the largest and oldest specimens of this common species anywhere (comparable with the trio beside the Belgrave Railway line, opposite 73 Power St, Bayswater). The standard text *Flora of Melbourne* indicates a maximum height of 6 m for this species, and *Flora of Victoria* indicates approximately 8 m. This specimen demonstrates the capacity of the species to form a substantial tree on those rare occasions when it is allowed to reach maturity.

Seasonal Wetland

The aerial photograph above shows a wetland in which there is a large and thriving population of the regionally-rare grass-like species, Slender Spike-rush or *Eleocharis gracilis*. There are patches and tussocks of the plant among weeds beneath willows and in adjacent boggy lawn, the foliage covering an aggregate of between 15 and 25 m². (The uncertainty in the area is due to difficulty in detecting the species within lawn.) This species is also present in smaller amounts in the adjacent roadside verge, as well as in substantial quantities in Lysterfield Park (Site 82) and at the Rowville Electricity Terminal Station (Site 72). *Flora of Melbourne* records only three or four other occurrences in the Melbourne region.

Valley Grassy Forest

Within 50 m of the house and retreat in the south or southwest of the site, there are some mature remnant eucalypts with mown understorey, vestiges of Valley Grassy Forest. Some of the trees are quite large. The biggest is a Bundy (*Eucalyptus goniocalyx*) with a diameter of 0.92 m measured at breast height, which is exceptional for Knox. It is marked on the plan above.

Beneath this tree and surrounding ones, the ground layer comprises overwhelmingly indigenous species (but few of them). There are several square metres of Slender Speedwell (*Veronica gracilis*), which is a characteristic species of Valley Grassy Forest.

Regrowth

The Valley Grassy Forest appears to have once extended over much of the property, but has been largely cleared and allowed to regenerate in recent years. The resulting scrub of Burgan (*Kunzea ericoides*) covers more than half the site, probably extending over some of the area that was once Valley Heathy Forest. Within this scrub, one can see on the aerial photograph scattered dark blobs measuring several metres across, which are trees that were left when the surrounding vegetation was cleared. They comprise Monterey Pine (*Pinus radiata*), Yellow Box (*Eucalyptus melliodora*), Narrow-leaved Peppermint (*E. radiata*) and Bundy. The surrounding Burgan allows only about 20% of sunlight to penetrate beneath, so the ground layer contains plenty of moss and lichen but only sparse cover of higher plants, except at the edges and where tracks allow sunlight in. Despite the dense shade, 47 indigenous plant species were recorded altogether in the scrub, including at least dozens of Creeping Bossiaea (*Bossiaea prostrata*) and over 100 plants of the uncommon Slender Sword-sedge, *Lepidosperma gunnii* – probably one of the largest populations in the region. Unfortunately, there were also enough Sweet Pittosporum (*Pittosporum undulatum*) to present a serious risk to the vegetation's natural ecology, and there are potentially serious threats from the weeds Sallow Wattle (*Acacia longifolia*), Sweet Vernal-grass (*Anthoxanthum odoratum*), Bridal Creeper (*Asparagus asparagoides*), Monterey Pine and blackberry.

Relationship to other land

This site is at the junction of two habitat corridors (Kelletts Rd and Wellington Rd – Sites 95 and 96 respectively) and there is an almost continuous tree canopy to the large expanse of native vegetation on the Lysterfield Hills, including Churchill National Park and Lysterfield Lake Park. There are also large patches of remnant eucalypts on the other side of Kelletts Rd, being progressively diminished by residential development.

Bioregion: Highlands Southern Fall (on the rather diffuse boundary with the Gippsland Plain bioregion).

Habitat types

Seasonal wetland (part of EVC 74, which is **regionally Endangered**): 500 m², all in ecological condition D (poor). 5 indigenous plant species, with a canopy of willows (*Salix ?fragilis*) above and dominated at ground level by *Eleocharis gracilis*, *Carex appressa* and the weeds *Allium triquetrum* and *Holcus lanatus*.

Burgan scrub regrowth of Valley Grassy Forest (EVC 47, see below) and probably some Valley Heathy Forest (EVC 127, **regionally Endangered**): Total area 30,000 m². Ecological condition approximating to rating C (fair) but difficult to ascribe due to the changeable nature of the regrowth; 47 indigenous plant species found.

Emergent tall trees: *Eucalyptus melliodora*, *E. goniocalyx*, *E. radiata* and *Pinus radiata*;

Emergent lower trees: *Acacia pycnantha*, *Exocarpos cupressiformis* and occasional *Allocasuarina littoralis*;

Shrubs: *Kunzea ericoides* 80% cover.

Ground flora: Moss and lichen dense; higher plants sparse except near edges and tracks. *Lepidosperma gunnii* and patches of *Gahnia radula* dominate the vascular ground-flora. *Bossiaea prostrata* is also abundant.

Valley Grassy Forest (EVC 47, **regionally Vulnerable**): 1,500 m², all in poor ecological condition (rating D). 16 indigenous plant species found.

Dominant canopy trees: *Eucalyptus goniocalyx* with fewer *E. melliodora* and *E. radiata*;

Dominant lower trees: *Acacia mearnsii*, *A. melanoxylon*, *Exocarpos cupressiformis*;

Shrubs: scant.

Ground flora: Mown, grassy; *Rytidosperma racemosum* and *Dichondra repens* are both abundant, also a large patch of the characteristic species, *Veronica gracilis*.

Valley Heathy Forest (EVC 127, **regionally Endangered**): 4,000 m², 50% in fair ecological condition (rating C) and 50% in poor ecological condition (rating D). 27 indigenous plant species found, the dominant ones as follows:

Canopy trees: *Eucalyptus goniocalyx*, *E. cephalocarpa*, *E. melliodora*;

Lower trees: *Allocasuarina littoralis*, *Acacia melanoxylon*, *Exocarpos cupressiformis*;

Shrubs: *Kunzea ericoides*, *Acacia pycnantha*.

Ground flora: *Gahnia radula* dominant, with rather fewer *Austrostipa rudis*.

Plant species

The following plant species were observed by the author on 23rd May 2002. Additional species would no doubt be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Eleocharis gracilis* is rare in the Melbourne area.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia implexa</i>	V	<i>Drosera whittakeri</i>
V	<i>Acacia mearnsii</i>	C	<i>Eleocharis gracilis</i>
V	<i>Acacia melanoxylon</i>	V	<i>Epacris impressa</i>
E	<i>Acacia pycnantha</i>	V	<i>Epilobium billardierianum</i> ssp. <i>cinereum</i>
	<i>Acaena novae-zelandiae</i>	V	<i>Eucalyptus cephalocarpa</i>
	<i>Acrotriche serrulata</i>		<i>Eucalyptus goniocalyx</i>
V	<i>Allocasuarina littoralis</i>	V	<i>Eucalyptus melliodora</i>
C	<i>Amyema pendula</i>	E	<i>Eucalyptus radiata</i>
	<i>Arthropodium strictum</i>	V	<i>Exocarpos cupressiformis</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>		<i>Gahnia radula</i>
	<i>Billardiera mutabilis</i>		<i>Gonocarpus tetragynus</i>
	<i>Bossiaea prostrata</i>	E	<i>Hibbertia riparia</i>
	<i>Carex appressa</i>	E	<i>Hypericum gramineum</i>
	<i>Carex breviculmis</i>		<i>Juncus sarophorus</i>
	<i>Carex inversa</i>		<i>Kunzea ericoides</i> spp. agg.
	<i>Cassinia arcuata</i>		<i>Lachnagrostis filiformis</i>
V	<i>Cassinia longifolia</i>		<i>Lepidosperma gunnii</i>
	<i>Deyeuxia quadriseta</i>	V	<i>Lepidosperma laterale</i>
	<i>Dianella admixta</i>		<i>Leptospermum continentale</i>
V	<i>Dianella longifolia</i> s.l.	E	<i>Leptospermum scoparium</i>
	<i>Dichondra repens</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
V	<i>Dillwynia cinerascens</i>		<i>Microlaena stipoides</i>

Risk	Indigenous Species	Risk	Indigenous Species
C	<i>Muellerina eucalyptoides</i>		<i>Rytidosperma racemosum</i>
V	<i>Opercularia ovata</i>		<i>Rytidosperma setaceum</i>
V	<i>Opercularia varia</i>		<i>Rytidosperma tenuius</i>
E	<i>Ozothamnus ferrugineus</i>		<i>Schoenus apogon</i>
	<i>Poa morrisii</i>		<i>Senecio quadridentatus</i>
	<i>Poranthera microphylla</i>	E	<i>Stackhousia monogyna</i>
	<i>Rytidosperma linkii</i> var. <i>fulvum</i>		<i>Themeda triandra</i>
	<i>Rytidosperma pallidum</i>	V	<i>Veronica gracilis</i>
Introduced Species			
	<i>Acacia longifolia</i> subsp. <i>longifolia</i>	<i>Asparagus asparagoides</i>	<i>Pinus radiata</i>
	<i>Agrostis capillaris</i>	<i>Chrysanthemoides monilifera monilifera</i>	<i>Pittosporum undulatum</i>
	<i>Allium triquetrum</i>	<i>Ehrharta erecta</i>	<i>Rubus anglocandicans</i>
	<i>Anthoxanthum odoratum</i>	<i>Holcus lanatus</i>	<i>Ulex europaeus</i>

Notes concerning significant plants

Eleocharis gracilis (Slender Spike-rush) is represented by 15-25 m² foliage cover, amid weedy vegetation.

One *Bursaria spinosa* (Sweet Bursaria) has an exceptionally large trunk diameter of 30 cm and measures 10 m from base to tip.

Fauna habitat features

A small number of mature eucalypts have hollows that may provide habitat for the more common species of possums and bats. The bird life was rather limited on the day this site was inspected, although a Goshawk was seen, probably investigating smaller birds.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity and Viability

The site meets the standard criteria for **Local** significance as a part of the much larger contiguous area of bushland extending over the Lysterfield Hills and along Kelletts Rd (criterion 1.2.6), with potential to develop into more significant vegetation (criterion 1.3.2).

Regionally Threatened Ecological Vegetation Classes

Valley Heathy Forest and wetlands are listed by the Department of Sustainability & Environment as Endangered. According to Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a), any occurrence of an Endangered community is of High or Very High conservation significance. This gives the Fruitful Vine Melbourne Church property **State** significance under criterion 3.2.3 of Amos (2004).

Valley Grassy Forest is listed by the Department of Sustainability & Environment as regionally Vulnerable. According to Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a), any occurrence of a regionally Vulnerable community is of at least Medium conservation significance. This would translate to at least **Regional** significance under criterion 3.2.3.

Note that the site is at the edge of the geographic range of both Valley Grassy Forest and Valley Heathy Forest.

Richness of Flora

The number of recorded indigenous species is a moderately high number for such a site in Knox. This stands out at the local scale, but it would have to stand out at the regional scale to qualify for recognition under the standard criteria.

Rare or Threatened Plants

The site is of some significance for the presence of the huge *Bursaria spinosa* and the large *Eucalyptus goniocalyx* trees, which stand out within the bioregion. Nevil Amos (pers. comm.) has stated that it was unintentional that the latest version of the significance criteria (Amos 2004) omitted the criterion that, in previous versions, recognised 'plants of exceptional size or age'. If not for this oversight, the plants in question would qualify as Regionally significant. The trunk of the largest *Eucalyptus goniocalyx* measures 0.92 m diameter at breast height.

Most of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- **Site development:** The biological significance of this site could be adversely affected by removal of, or damage to, any native vegetation on the property. This includes (but is not limited to) trees in the vicinity of the buildings and understorey beside the vehicle tracks and parking areas. The orchard, tracks, parking areas and the stockpiles of clay in the eastern corner are of no significance in themselves but developments there could affect significant vegetation through root severance, changed drainage, promotion of weeds or similar indirect effects;
- Invasion by environmental weeds as described above;
- Eucalypt dieback in the eastern corner;
- The *Eleocharis gracilis* is threatened by weed invasion and possible renewed excavation for drainage;
- Burgan has become over-dominant and is suppressing the growth and reproduction of other flora;
- Some species are present in dangerously small numbers (*Acrotriche serrulata*, *Cassinia longifolia*, *Muellerina eucalyptoides*, *Ozothamnus ferrugineus*, *Stackhousia monogyna*), making them vulnerable to inbreeding, poor reproductive success or elimination by incidents such as cubby house construction or digging by dogs;
- The huge *Bursaria spinosa* in the eastern corner is leaning over the fence and may become uprooted or be unwittingly cut down.

Management issues

Burgan is an indigenous species but it commonly gets out of control in regrowth, such as on this site. If it were thinned, it should be possible for the ground layer to flourish and become rather dense with wildflowers. This may require suppression of weeds such as Sweet Pittosporum (*Pittosporum undulatum*), which could also thrive if the Burgan were to be thinned.

Because of the rarity of *Eleocharis gracilis* and the insecure habitat at this site, it would be very desirable for seed and cutting material to be collected, propagated and established at more secure wetlands nearby.

Administration matters

- This site is suited to an Environmental Significance Overlay because of its State significance and the presence of regionally endangered EVCs;
- It is recommended that consideration of any development proposal on the site should take into account a survey of birds and reptiles, preferably conducted over at least two days in late spring. The vegetation may well be important as habitat for significant fauna not noticed during the present study.
- Any biological survey data submitted in support of a development or subdivision proposal should be no older than one year or so, because the regrowth which covers over half the site has the potential to change in character.
- Removal of pines and other environmental weed species would help to improve the ecological quality of the vegetation and hence support the state government policy of 'Net Gain'.
- The vegetation and the habitat that it forms should be considered not just in its present state but also for its potential. The regrowth, in particular, is returning to Valley Grassy Forest, which is localised and generally in poor ecological condition in Knox (see Volume 1) as well as being listed as regionally Vulnerable by the Department of Sustainability & Environment.

Information sources used in this assessment

- Detailed vegetation data and mapping in accord with this study's standard approach described in Section 2.4 of Vol.1, including lists of indigenous and introduced plant species within each of four different parts of the site, compiled by Dr Lorimer during this study on 23/5/02;
- A list of fauna observed incidentally on the same day;
- A list of species from the Department of Sustainability & Environment's Flora Information System database (Water Ecoscience 1998, Appendix 4);
- Data concerning presence of tree hollows, collected by Michael Harper on 27/6/02;
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Acknowledgment

Thanks to the Lysterfield Christian Fellowship for granting permission to inspect the land.

Site 85. Provence Rise Reserve, Rowville

Narrow roadside verge and a small council reserve in two parts retaining surprisingly rich remnant ground flora.

Melway ref. 82 J2.

Site Significance Level: *State*

- The vegetation type is the regionally vulnerable Valley Grassy Forest with rich ground flora (although scant shrubs);
- There are at least twenty plants of Forest Buttercup *Ranunculus lappaceus*, one of the largest populations in Knox;
- Sixty-one indigenous plant species were found overall, a good number for such vegetation.

Boundaries

The site comprises two council reserve lots (one each side of Provence Rise) and the abutting road verges. The total area is 0.21 ha. See the map on p. 429, which covers this site and the Fruitful Vine Melbourne Church (Site 84).

Land use & tenure: Council reserves and road reservation.

Site description

The two lots in this site were reserved as a result of the first edition of this report when the property of which they were part was subdivided. The new reserves contain most of the original lot's natural assets other than individual trees (which are protected under a planning permit condition). The reserves are being intensively managed as compensation for the loss of other, less significant, vegetation due to the subdivision.

The reserves were, until the recent subdivision, periodically grazed by a goat. Small wildflowers that are characteristic of the local Valley Heathy Forest in its natural state persisted surprisingly well, including *Arthropodium strictum*, *Bossiaea prostrata*, *Drosera whittakeri*, *Helichrysum scorpioides*, *Tricoryne elatior*, *Veronica plebeia*, *Viola hederacea* and at least twenty of the locally-vulnerable *Ranunculus lappaceus*. The ground flora are dominated by indigenous plants, particularly *Microlaena stipoides*. Shrubs, however, have been decimated. The road verge has been recently planted with indigenous species to complement the reserves, including shrubs.

Relationship to other land

This site shows the richness of ground flora that could result on the adjoining Fruitful Vine Melbourne Church property if Burgan were to be suppressed there. These two properties are well connected to other habitat, as discussed under the heading of the Fruitful Vine Melbourne Church.

Bioregion: Highlands Southern Fall (on the rather diffuse boundary with the Gippsland Plain bioregion).

Habitat types

Valley Grassy Forest (EVC 47, **regionally Vulnerable**) dominated by Bundy: 0.21 ha in area, of which 1,500 m² is in good ecological condition (rating B) and 5,500 m² is in poor ecological condition (rating D). 42 indigenous plant species found in winter, and ten or more others likely to be found in other seasons.

Dominant canopy trees: *Eucalyptus goniocalyx* with fewer *E. radiata*, *E. macrorhyncha*, *E. melliodora* and *E. cephalocarpa*;

Dominant lower trees: *Acacia melanoxylon*, *Exocarpos cupressiformis*, *A. mearnsii* and a patch of *A. implexa*;

Shrubs: Decimated except for *Kunzea ericoides* regrowth in patches.

Ground flora: Densely grassy with *Themeda triandra* dominant and abundant *Poa morrisii*, *Austrostipa rudis* and *Microlaena stipoides*.

Plant species

The following plant species were observed by the author in February 2005. Additional species might well be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia implexa</i>		<i>Acrotriche serrulata</i>
V	<i>Acacia mearnsii</i>		<i>Arthropodium strictum</i>
V	<i>Acacia melanoxylon</i>		<i>Austrostipa pubinodis</i>
E	<i>Acacia pycnantha</i>		<i>Austrostipa rudis</i> subsp. <i>rudis</i>

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Billardiera mutabilis</i>		<i>Lepidosperma gunnii</i>
	<i>Bossiaea prostrata</i>		<i>Leptospermum continentale</i>
	<i>Bursaria spinosa</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Carex breviculmis</i>	V	<i>Lythrum hyssopifolia</i>
E	<i>Centella cordifolia</i>		<i>Microlaena stipoides</i>
	<i>Dianella admixta</i>		<i>Microtis parviflora</i>
V	<i>Dianella longifolia</i> s.l.	V	<i>Opercularia varia</i>
	<i>Dichondra repens</i>		<i>Oxalis exilis/perennans</i>
V	<i>Drosera peltata</i> subsp. <i>auriculata</i>	V	<i>Pimelea humilis</i>
V	<i>Drosera whittakeri</i>		<i>Poa morrisii</i>
	<i>Eragrostis brownii</i>		<i>Poranthera microphylla</i>
V	<i>Eucalyptus cephalocarpa</i>	E	<i>Ranunculus lappaceus</i>
	<i>Eucalyptus goniocalyx</i>		<i>Rytidosperma geniculatum</i>
E	<i>Eucalyptus macrorhyncha</i>		<i>Rytidosperma laeve</i>
V	<i>Eucalyptus melliodora</i>		<i>Rytidosperma linkii</i> var. <i>fulvum</i>
E	<i>Eucalyptus radiata</i>		<i>Rytidosperma penicillatum</i>
V	<i>Euchiton collinus</i>		<i>Rytidosperma racemosum</i>
V	<i>Exocarpos cupressiformis</i>		<i>Rytidosperma setaceum</i>
	<i>Gahnia radula</i>		<i>Rytidosperma tenuius</i>
	<i>Gonocarpus tetragynus</i>	E	<i>Senecio minimus</i>
V	<i>Helichrysum scorpioides</i>		<i>Senecio quadridentatus</i>
E	<i>Hypericum gramineum</i>		<i>Themeda triandra</i>
C	<i>Hypoxis hygrometrica</i>		<i>Tricoryne elatior</i>
	<i>Juncus pallidus</i>	V	<i>Veronica gracilis</i>
	<i>Juncus sarophorus</i>	E	<i>Veronica plebeia</i>
E	<i>Juncus subsecundus</i>	E	<i>Viola hederacea</i>
	<i>Kunzea ericoides</i> spp. agg.		

Introduced Species

<i>Acacia baileyana</i>	<i>Ehrharta erecta</i>	<i>Pittosporum undulatum</i>
<i>Acacia ?floribunda</i>	<i>Genista linifolia</i>	<i>Plantago lanceolata</i>
<i>Acacia longifolia</i> subsp. <i>longifolia</i>	<i>Genista monspessulana</i>	<i>Prunella vulgaris</i>
<i>Agapanthus praecox</i>	<i>Holcus lanatus</i>	<i>Romulea rosea</i>
<i>Agrostis capillaris</i>	<i>Hypochoeris radicata</i>	<i>Rubus anglocandicans</i>
<i>Aira elegantissima</i>	<i>Juncus articulatus</i>	<i>Sonchus oleraceus</i>
<i>Anthoxanthum odoratum</i>	<i>Lonicera japonica</i>	<i>Taraxacum officinale</i> spp. agg.
<i>Briza maxima</i>	<i>Lotus subbiflorus</i>	<i>Trifolium</i> sp.
<i>Centaurium erythraea</i>	<i>Paspalum dilatatum</i>	<i>Vinca major</i>
<i>Chrysanthemoides monilifera monilifera</i>	<i>Pennisetum clandestinum</i>	<i>Vulpia bromoides</i>
<i>Cirsium vulgare</i>	<i>Phalaris aquatica</i>	
<i>Conyza sumatrensis</i>	<i>Pinus radiata</i>	

Notes concerning some of the locally threatened plant species

Ranunculus lappaceus (Forest Buttercup). Twenty individuals seen west of Provence Rise.

Veronica plebeia (Trailing Speedwell). A patch with a diameter of ½ m in the northeastern corner of the site.

Fauna habitat features

The large eucalypts are frequented by native birds.

Significance ratings

The road verge and the adjacent strip outlined in white on the map (p. 163) are of Regional significance whereas the rest of the site is of Local significance. The reasons are as follows:

Richness of Flora

Approximately 40 indigenous plant species were recorded in the site. To have so many species within 0.2 ha stands out on the local scale, but it would have to stand out at the regional scale to qualify for recognition under the standard criteria of Amos (2004).

Regionally Threatened Ecological Vegetation Class

Valley Grassy Forest is listed by the Department of Sustainability & Environment as Vulnerable in the Highlands Southern Fall bioregion. The example in the present site is in reasonable ecological condition and would undoubtedly qualify for at least 'High' conservation significance under Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a). This gives the site **State** significance under criterion 3.2.3 of Amos (2004).

Rare or Threatened Flora

Most of the locally threatened plant species listed above have viable populations (in combination with neighbouring vegetation), thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Potential site development;
- Invasion by environmental weeds, including:
 - Serious: Sallow Wattle (*Acacia longifolia* var. *longifolia*) and over-vigorous regrowth of Burgan;
 - Potentially or moderately serious: Brown-top Bent (*Agrostis capillaris*), Sweet Vernal-grass (*Anthoxanthum odoratum*), Boneseed (*Chrysanthemoides monilifera*), Panic Veldt-grass (*Ehrharta erecta*), Flax-leafed Broom (*Genista linifolia*), Cat's Ear (*Hypochoeris radicata*), Kikuyu (*Pennisetum clandestinum*) and Sweet Pittosporum (*Pittosporum undulatum*);
- Eucalypt dieback;
- Reduced visitation of the site by small insect-eating birds due to its isolation from other areas with indigenous understorey, possibly leading to a worsening of plant pests and diseases;
- Loss or decline of plant species whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or elimination by incidents such as a falling branch. *Acacia pycnantha* and *Veronica gracilis* are present only as one plant each.

Management issues

Goat grazing has allowed the existing flora to persist for years. If it were to be removed or changed to a less compatible management approach, weeds could proliferate and indigenous flora decline seriously. On the other hand, the indigenous flora could benefit if grazing were shifted away from the most significant vegetation during the months of September to December.

From an ecological perspective, the optimum management regimen for the rich ground flora would probably be infrequent slashing.

The landowner has been suppressing Burgan regrowth, particularly below the house, and this is beneficial to the site's ecology.

Tree health and vegetation ecology generally would benefit from removal of Sallow Wattles, and to a lesser extent Sweet Pittosporums, Flax-leafed Broom and Boneseed as well.

Some of the remnant eucalypts, particularly *E. goniocalyx*, are in such bad health that they are likely to need removal before long.

Administration matters

If the site is considered for subdivision, the strip bordered in white on the map (p. 163) contains by far the most ecologically valuable vegetation to protect. One option may be to reserve it, thereby effectively widening the road reservation. Conservation of any of the significant ground flora is very unlikely if it falls into private lots under a subdivision of the site.

To minimise ecological impact, access to new lots would probably be best done by widening the existing driveway, either eastward, westward or both.

A small subdivision might be able to align boundaries so that houses can be positioned in existing expanses that have no healthy trees or native understorey. Care should nevertheless be exercised to avoid harming trees by root severance associated with excavation, trenching, driveways etc.

Information sources used in this assessment

- Detailed vegetation data and mapping in accord with this study's standard approach described in Section 2.4 of Vol.1, including a list of indigenous and introduced plant species, compiled by Dr Lorimer during this study on 5/6/02;
- Observations of Wood Duck and *Crinia signifera* noted incidentally on the same day. See also fauna lists gathered during this project at neighbouring sites;

- Additional intensive botanical survey for 13 hours by Dr Lorimer and Matthew Dell in March 2005 to guide the design of the Provence Rise subdivision and the associated land management plan;
- Two brief re-inspections of the site by Dr Lorimer following subdivision, including March 2008;
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Acknowledgment

Thanks to the prior landowner, Mr Stamatopoulos, for granting permission to inspect his land in 2002 and for information about the property.

Site 86. Pine Hill Reserve, Rowville

Part of a Council park with good remnant overstorey and some areas of indigenous ground flora. Melway ref. 82 E1.

Site Significance Level: *State*

- Contains a remnant of the regionally endangered Ecological Vegetation Class, Valley Heathy Forest, in fair to poor ecological condition;
- Provides good habitat for forest birds, including substantial populations of lorikeets;
- Is one of only six sites in Knox known to support the plant species, Trailing Speedwell (*Veronica plebeia*);
- May act as a stepping-stone for movement of fauna between Monbulk Creek and the Lysterfield Hills.



Scale 1:2,000
10 0 20 40 60 80 100m

Aerial photograph taken February 2001

Boundaries

The site is the part of Pine Hill Reserve north of the kindergarten, as indicated by the red outline on the aerial photograph. The southern boundary is a line drawn between corners of two adjoining residential properties and the other boundaries coincide with the reserve's cadastral boundaries. There are small numbers of indigenous plants in the rest of the reserve, but not enough to warrant recognition as part of a site of biological significance.

Land use & tenure: Council park, zoned PPRZ – Public Park and Recreation Zone.

Site description

This 1.12 ha site is located on gently undulating terrain, at an elevation of just over 80 m with very little slope. It lies on the Humevale geological formation of Lower Devonian sedimentary origin, and the soil is shallow, poorly draining, light grey loam over clay subsoil.

It supports a relatively intact cover of remnant overstorey and lower trees. They include a few large eucalypts and specimens of Cherry Ballart (*Exocarpos cupressiformis*) likely to be over 100 years old. Some planting of indigenous trees

has been undertaken where remnant vegetation is depleted. Indigenous shrubs and ground flora have been greatly reduced from their natural coverage due to clearing long ago and ongoing mowing. However, a fair cover of ground layer vegetation dominated by indigenous grasses has persisted and regenerated in the least disturbed areas beneath the remnant trees. Mowing has relatively recently been discontinued in these areas. Other indigenous ground layer plants are mainly confined to around the bases of remnant tree trunks.

The part of the reserve south of the kindergarten, and out of the site recognised here, is maintained as mown open space with scattered planted trees, both 'Australian native' and exotic. The trees include several large Bracelet Honey-myrtles (*Melaleuca armillaris*) and a row of Monterey Pines (*Pinus radiata*) planted in the vicinity of the kindergarten. Remnant indigenous overstorey and understorey vegetation is very scarce in this area.

Relationship to other land

Planted native trees are scattered within residential properties and along nature strips in the surrounding area, however Pine Hill Reserve is relatively isolated from other areas of remnant vegetation.

The site, in conjunction with other small reserves in the area, may function like a 'stepping-stone' for native birds and insects moving between Monbulk Creek to the north (within Site 66) and the Lysterfield Hills to the south (Site 81). This is supported to some degree by the observation of Musk Lorikeets, Rainbow Lorikeets and Eastern Rosellas moving through the reserve during the site inspection. Further work would be needed to properly understand the reserve's functions for fauna movements, particularly since the roadside of Napoleon Rd (Site 94) appears superficially to provide a more substantial habitat link between Monbulk Creek and the Lysterfield Hills.

Bioregion: Gippsland Plain

Habitat type

Valley Heathy Forest (EVC 127, regionally **Endangered**): Total area 0.88 ha, of which approximately 0.35 ha is in fair condition (rating C) and 0.53 ha is in poor condition (rating D).

Canopy trees: A good cover of *Eucalyptus radiata* and *E. cephalocarpa* trees up to 20 m tall (mainly 50-80 years old). A few larger trees over 100 years old.

Lower trees: Scattered specimens of *Exocarpos cupressiformis*, *Acacia mearnsii* and *Allocasuarina littoralis*. Includes a few old *E. cupressiformis* trees.

Shrubs: Most shrub layer vegetation has been cleared, except for a few *Acacia paradoxa*.

Vines and ferns: Absent.

Ground flora: A fair cover of indigenous grasses has recovered in unmown areas, including *Austrostipa rudis*, *Microlaena stipoides* and *Rytidosperma* species, along with some *Dichondra repens*. Two small patches of *Dianella longifolia* are located towards the northern end (possibly planted). Other ground layer plants are mainly restricted to around the base of remnant tree trunks, including clumps of *Lomandra filiformis*.

Plant species

The following plant species were observed by Mr Rik Brown on 3rd June 2002. Additional species would no doubt be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia mearnsii</i>	E	<i>Eucalyptus radiata</i>
	<i>Acacia paradoxa</i>	V	<i>Exocarpos cupressiformis</i>
V	<i>Allocasuarina littoralis</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
C	<i>Amyema pendula</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
	<i>Austrostipa rudis</i>		<i>Microlaena stipoides</i>
V	<i>Dianella longifolia</i> s.l.	E	<i>Poa tenera</i>
	<i>Dichondra repens</i>		<i>Rytidosperma</i> sp.
V	<i>Eucalyptus cephalocarpa</i>	E	<i>Veronica plebeia</i> (1 small patch)
Introduced Species			
	<i>Acacia longifolia</i> subsp. <i>longifolia</i>		<i>Arctotheca calendula</i>
	<i>Anthoxanthum odoratum</i>		<i>Paspalum dilatatum</i>
			<i>Romulea rosea</i>
			<i>Ulex europaeus</i>

Fauna of special significance

None recorded during field surveys.

Fauna habitat features

The relatively intact cover of remnant trees within the site provides good habitat for forest birds in an area otherwise substantially depleted of suitable habitat. A substantial population of lorikeets was apparent in the area during field surveys.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity and Viability

As noted above under the heading, 'Relationship to other land', this site might function like a stepping-stone for native birds and insects moving between Monbulk Creek and the Lysterfield Hills. Such movements would be only locally important. This represents **Local** significance under criterion 1.2.6.

Regionally Endangered Ecological Vegetation Class

Pine Hill Reserve contains a remnant patch of a regionally endangered EVC (Valley Heathy Forest). It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that the reserve's native vegetation is necessarily of at least High conservation significance. This, in turn, gives the site **State** significance under criterion 3.2.3 of Amos (2004).

The author has misgivings about such a high rating when the ecological condition of the vegetation is so poor, but these misgivings are overridden by the importance of consistency with the standard criteria.

Locally Threatened Plants

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

The large specimens of Cherry Ballart *Exocarpos cupressiformis* within the northern section of the reserve are locally significant in view of their size.

Threats

- Lack of recruitment of indigenous vegetation because of mowing;
- Loss or decline of plant species whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or elimination by incidents such as digging by dogs;
- Reduced visitation of the site by small insect-eating birds due to its isolation from other areas with indigenous understorey, possibly leading to a worsening of plant pests and diseases;
- Competition of indigenous ground flora with exotic grasses and herbs, particularly Sweet Vernal-grass (*Anthoxanthum odoratum*), Paspalum (*Paspalum dilatatum*) and Onion-grass (*Romulea rosea*) – all rated as 'Moderate' threats.

Management issues

- There are good prospects for partial recovery of remnant indigenous ground flora in response to the recent cessation of mowing, and this should be monitored;
- This recovery would be enhanced by extension of indigenous revegetation beneath the remnant trees, and possibly spot spraying of Paspalum and use of grass-selective herbicide on Sweet Vernal-grass in August-September.

Administration matters

- This site is suited to the proposed Environmental Significance Overlay (ESO2) because of the presence of an endangered EVC;
- This site and the adjoining kindergarten are presently covered by Vegetation Protection Overlay 1. This is partly because of the study by Water Ecoscience (1998), in which this is Site 276. No justification could be found in this study for keeping the kindergarten under any such overlay.

Information sources used in this assessment

- A survey undertaken during this study by Rik Brown on 3/6/02, including compilation of lists of indigenous and introduced plant species, incidental fauna observations and vegetation mapping/descriptions according to the procedures discussed in Section 2.4 of Volume 1;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 87. Napoleon Rd Bushland, Ferntree Gully

Land at the rear of properties in Napoleon Rd. Melway ref. 73 J10.

Site Significance Level: *Local*

- Contains a remnant of a regionally endangered Ecological Vegetation Class (Swampy Woodland) in fair to poor ecological condition;
- Provides habitat for forest and woodland birds in an area otherwise substantially depleted of suitable habitat;
- Includes large old trees with hollows suitable for hollow-dependent native fauna.



Aerial photograph taken April 2003



Scale 1:2,000
10 0 20 40 60 80 100m

Boundaries

This site is outlined in red on the aerial photograph. The boundaries other than the northwestern one coincide with cadastral boundaries of 149 and 151 Napoleon Rd. The northwestern edge is drawn parallel to the southeastern boundary and 50 m from it. The site boundary does not fully follow cadastral boundaries in this case because it seems possible to develop the rest of the lots without unreasonably affecting the significant vegetation.

Land use & tenure: Private residential properties zoned R1Z – Residential 1.

Site description

This 0.29 ha site is located near the base of a northern spur of the Lysterfield Hills formed by metamorphic rock at the interface between the Lower Devonian sediments to the west and the Upper Devonian volcanics of the Dandenong Ranges to the east. The western edge of the metamorphic zone runs north-south through the site. The slope is very shallow, facing southwest, with a shallow drainage line through it. The elevation is 84-86 m.

The site supports a good cover of remnant trees, including a number of moderately large specimens containing natural hollows. Indigenous understorey vegetation has been degraded through past clearing and other disturbances (likely grazing and mowing), although patches of remnant and regenerating shrubs and ground flora species persist in some locations.

Relationship to other land

The site is rather isolated from other areas of remnant vegetation. Indigenous vegetation is generally depleted within the surrounding residential areas which have relatively recently been established, except for a few remnant trees within properties on the northern and western sides. The nearest areas with more than just scattered trees are 800 m north and northeast on Monbulk Ck (Site 66) and 900 m southwest to the Kelletts Rd roadside corridor (Site 95). This site is now too small to serve as much of a 'stepping-stone' for movements of fauna between larger areas of habitat.

Bioregion: Gippsland Plain

Habitat type

Swampy Woodland (EVC 937, regionally Endangered): Total area 0.24 ha, of which approximately 0.01 ha is in fair condition (rating C) and 0.23 ha is in poor condition (rating D).

Canopy trees: Dominated by *Eucalyptus ovata*, with some *E. cephalocarpa* and *E. radiata*. There is a good cover of older remnant trees up to 25 m tall (mainly 80-100 years old). No regeneration is apparent.

Lower trees: Scattered specimens of *Acacia melanoxylon*, with some *Exocarpos cupressiformis* and *Melaleuca ericifolia*.

Shrubs: Shrub layer vegetation has previously been extensively cleared. Some *Ozothamnus ferrugineus* and a few other indigenous shrubs have regenerated. Otherwise dominated by woody weeds, particularly Sweet Pittosporum.

Vines and ferns: Absent.

Ground flora: Patches of indigenous sedges and grasses persist in the least disturbed areas, including *Gahnia radula* and *Microlaena stipoides*.

Plant species

The following plant species were observed by Mr Rik Brown on 3rd June 2002. Additional species would no doubt be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox with 'E'=Endangered and 'V'=Vulnerable.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia melanoxylon</i>		<i>Gahnia radula</i>
V	<i>Coprosma quadrifida</i>		<i>Lomandra longifolia</i>
V	<i>Dianella longifolia</i> s.l.	E	<i>Melaleuca ericifolia</i>
	<i>Eucalyptus goniocalyx</i>		<i>Microlaena stipoides</i>
V	<i>Eucalyptus ovata</i>	E	<i>Ozothamnus ferrugineus</i>
E	<i>Eucalyptus radiata</i>		<i>Rytidosperma penicillatum</i>
V	<i>Exocarpos cupressiformis</i>		
Introduced Species			
	<i>Acacia longifolia</i> subsp. <i>longifolia</i>		<i>Lonicera japonica</i>
	<i>Asparagus asparagoides</i>		<i>Paspalum dilatatum</i>
	<i>Cirsium vulgare</i>		<i>Pittosporum undulatum</i>
	<i>Cotoneaster glaucophyllus</i>		<i>Rubus anglocandicans</i>
	<i>Crataegus monogyna</i>		
	<i>Dactylis glomerata</i>		
	<i>Foeniculum vulgare</i>		
	<i>Hedera helix</i>		

Fauna of special significance

The least common fauna that was observed during the site inspection was a Yellow-tailed Black-cockatoo. The site provides very little habitat for this species, which is historically uncommon in the area but becoming much more frequent in recent years.

Fauna habitat features

The good cover of remnant trees within the site provides a habitat refuge for forest and woodland birds in an area otherwise substantially depleted of suitable habitat. The larger Swamp Gums occurring within the site contain natural hollows

suitable as shelter and breeding locations for possums, bats and birds. Nesting activity by Sulphur-crested Cockatoos was observed during the site inspection. Stick nests were also apparent in some trees, potentially utilised by raptors or ravens.

Significance ratings

Regionally Endangered Ecological Vegetation Class

Swampy Woodland is regionally endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that the site's native vegetation is necessarily of at least High conservation significance. Criterion 3.2.3 of Amos (2004) assigns State significance to any site with a remnant patch of such vegetation.

The native vegetation at the Napoleon Rd site meets the Department of Sustainability & Environment's current definition of a remnant patch, but at the time Amos (2004) prepared the significance criteria, the unpublished convention was that native vegetation only qualified as a remnant patch if it occupied at least 2,500 m². Because this threshold is not met in the current instance, and because there is so little understorey, the author has reduced the significance level of the site to **Local**.

Locally Threatened Plant Species

Some of the locally threatened plant species listed appear to have viable populations (except for the risk that the site may be cleared for residential development), thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Loss of remnant vegetation associated with potential residential development, including mowing;
- Invasion by environmental weeds:
 - Serious: Cocksfoot (*Dactylis glomerata*), Sweet Pittosporum (*Pittosporum undulatum*);
 - Moderate: Bridal Creeper (*Asparagus asparagoides*), Fennel (*Foeniculum vulgare*), Japanese Honeysuckle (*Lonicera japonica*), Paspalum (*Paspalum dilatatum*), Blackberry (*Rubus discolor*);
- Dieback of remnant trees associated with altered drainage, likely to be exacerbated by excavation works and the establishment of buildings and hard surfaces;
- Reduced visitation of the site by small insect-eating birds due to its isolation from other areas with indigenous understorey, possibly leading to a worsening of plant pests and diseases.
- Loss or decline of plant species whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or elimination by random incidents such as digging by dogs;

Management issues

- The remnant vegetation could be restored to good ecological condition with appropriate expertise and very modest effort, but the usual outcome on residential lots is deterioration due to lack of understanding or commitment;
- The main priority for management is removal of the weeds listed under the heading 'Threats'.

Administration matters

- This site is suited to the proposed Environmental Significance Overlay (ESO2) because of the presence of an endangered EVC;
- This site corresponds to Site 36 of Water Ecoscience (1998), but is much smaller in extent due to clearing of native vegetation since 1998;
- The whole of Water Ecoscience's site is presently covered by Vegetation Protection Overlay 1.

Information sources used in this assessment

- A site survey undertaken during this study by Rik Brown on 3rd June 2002, following this study's standard procedures discussed in Section 2.4 of Volume 1. This included a description of the composition and condition of the vegetation, compilation of lists of indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats, management issues and populations of scarce or threatened plant species;
- Viewing of the site by Dr Lorimer from Napoleon Rd during the period in which the Rathgar Rd properties were being cleared, and again on 10/3/08;
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area (although this site is not on the map of extant EVCs);
- Maps of geology and topography produced by agencies of the Victorian government.

Site 98. Treed Paddock, High Street Rd, Wantirna Sth

Parts of what was a treed paddock until it became dissected by EastLink and a new alignment of George St.
Melway ref. 72 D1

Site Significance Level: *State*

- Much of the paddock has a full canopy of remnant trees that represent a small patch of the endangered EVC, Valley Heathy Forest;
- There is reasonable habitat for native birds;
- There are plant species that are rare locally or, in one case, throughout Victoria;
- There is good potential for ecological improvement by burning.



Aerial photograph taken February 2007



Scale 1:2,500
10 0 20 40 60 80 100m

Boundaries

This 1.80 ha site comprises the patches of trees and revegetated road verges outlined in red on the aerial photograph. There are no property boundaries to define the site but fence lines and the tops of batters have been used where reasonable to do so. The excluded strip along George St extends between the road's gutters.

Land use & tenure: Public land, zoned 'Public Park and Recreation' southwest of George St and 'Road Zone 1' (major road) in the rest of the site. George St and the EastLink Trail pass through the site.

Site description

This site has had to be redefined since the first edition of this report (in which it was Site 99) because construction of the EastLink road has substantially transformed what was, at that time, a single, treed paddock. The paddock had been extensively grazed for many years, leaving predominantly introduced ground flora and hardly any shrubs. There has been some clearing of the dominant trees, but most of the site retains a fairly natural density of eucalypts and tall wattles that are remnants of the original Valley Heathy Forest vegetation. Given the poor condition of the ground flora, it is surprising to

find that in 2008 the site retained a viable population of the statewide-rare grass, *Austrostipa rudis* subsp. *australis* and individual specimens of the locally threatened species, Thin-leaf Wattle (*Acacia aculeatissima*) and Tree Everlasting (*Meliccytus dentatus*). The presence of these species and the sensitive wildflowers Grey Parrot-pea (*Dillwynia cinerascens*) and Purple Coral-pea (*Hardenbergia violacea*) suggest that the soil probably retains a seed-bank of additional indigenous plant species that could be regenerated by fire (as has been done nearby in Dandenong Valley Parklands – Lorimer 2001b).

Some of the eucalypts appear to be hybrids. One of them near to the southern boundary may have genes of the nationally rare Yarra Gum (*Eucalyptus yarraensis*). Yarra Gums and their hybrids are present in substantial numbers along the Blind Ck corridor, to within about 400 m of this site.

The natural assets just described were overlooked in the Environmental Effects Statement for the Scoresby Transport Corridor (which included what is now the EastLink road).

Relationship to other land

Birds that use this site as part of their habitat are believed to access it via the Blind Ck habitat corridor, which is just east of Cathies Lane and also passes 500 m to the south (along the Knox Trail). However, patterns of bird movements may have changed now that EastLink has opened.

Bioregion: Gippsland Plain

Habitat type

Valley Heathy Forest (EVC 127, Endangered): The areas with a full tree canopy are estimated to measure 0.55 ha northeast of George St and 0.45 ha southwest of George St. Of these, approximately 0.1 ha is in fair ecological condition (rating C) and the remainder is in poor ecological condition (rating D).

Canopy trees: Dominated by *Eucalyptus goniocalyx* and *Acacia mearnsii*. Also present are *E. cephalocarpa* and *E. ovata*.

Lower trees: *Acacia mearnsii* and fewer *A. melanoxylon*.

Shrubs: Severely depleted by past clearing, grazing and slashing. *Bursaria spinosa* and *Cassinia arcuata* are present, plus a solitary, unexpected, *Meliccytus dentatus*.

Vines: No true vines seen, but the scrambler, *Hardenbergia violacea*, was found.

Ground flora: Predominantly pasture species and weeds except for regenerating patches dominated by *Rytidosperma linkii* var. *fulvum*, *Microlaena stipoides* and *Austrostipa rudis*. There are also many of the opportunistic indigenous species, *Senecio hispidulus* and *Senecio quadridentatus*.

Plant species

The following plant species were observed by the author on 10th March 2002. Additional species would no doubt be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox with 'E'=Endangered and 'V'=Vulnerable. In addition, *Austrostipa rudis* subsp. *australis* is rare in Victoria.

Risk	Indigenous Species	Risk	Indigenous Species
E	<i>Acacia aculeatissima</i>		<i>Juncus gregiflorus</i>
V	<i>Acacia mearnsii</i>	E	<i>Juncus subsecundus</i>
V	<i>Acacia melanoxylon</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Acaena novae-zelandiae</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
V	<i>Austrostipa rudis</i> subsp. <i>australis</i>		<i>Lomandra longifolia</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	E	<i>Meliccytus dentatus</i>
	<i>Bursaria spinosa</i>		<i>Microlaena stipoides</i>
	<i>Campylopus introflexus</i>		<i>Rytidosperma linkii</i> var. <i>fulvum</i>
	<i>Cassinia arcuata</i>		<i>Rytidosperma penicillatum</i>
V	<i>Dillwynia cinerascens</i>		<i>Rytidosperma racemosum</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Rytidosperma tenuius</i>
	<i>Eucalyptus goniocalyx</i>		<i>Senecio glomeratus</i>
V	<i>Eucalyptus ovata</i>		<i>Senecio hispidulus</i>
E	<i>Eucalyptus radiata</i>		<i>Senecio quadridentatus</i>
	<i>Eucalyptus hybrid</i>	V	<i>Veronica gracilis</i>
V	<i>Hardenbergia violacea</i>		

Introduced Species

<i>Agrostis capillaris</i>	<i>Genista linifolia</i>	<i>Prunus cerasifera</i>
<i>Anthoxanthum odoratum</i>	<i>Hedera helix</i>	<i>Rhaphiolepis ?indica</i>
<i>Avena</i> sp.	<i>Holcus lanatus</i>	<i>Romulea rosea</i>
<i>Briza maxima</i>	<i>Hypochoeris radicata</i>	<i>Rosa rubiginosa</i>
<i>Bromus diandrus</i>	<i>Malus pumila</i>	<i>Rubus anglocandicans</i>
<i>Cirsium vulgare</i>	<i>Paspalum dilatatum</i>	<i>Sonchus oleraceus</i>
<i>Cynodon dactylon</i>	<i>Pinus radiata</i>	<i>Ulex europaeus</i>
<i>Dactylis glomerata</i>	<i>Pittosporum undulatum</i>	
<i>Ehrharta erecta</i>	<i>Plantago lanceolata</i>	

Notes concerning some of the locally threatened plant species

Austrostipa rudis subsp. *australis* (a subspecies of Veined Spear-grass). Moderate numbers near High Street Rd, and possibly more widespread but unable to be confirmed due to seasonal factors.

Acacia aculeatissima (Thin-leaf Wattle). Only one plant found. Others may regenerate with fire.

Meliccytus dentatus (Tree Violet). Only one plant found, an interesting occurrence for this part of Victoria because of its abnormally large distance from a stream.

The hybrid eucalypt that may involve parentage of *Eucalyptus yarraensis* would be of some significance if that parentage were to be confirmed. *Eucalyptus yarraensis* is nationally rare, but the significance of a hybrid is substantially lower.

Fauna habitat features

The tree canopy provides habitat for native forest birds, as identified in the EES for the Scoresby Transport Corridor.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity and Viability

The EES for the Scoresby Transport identified that this site was used by native forest birds in their movements around the landscape. Criterion 1.3 of Amos (2004) assigns **Local** significance to a 'Site (or one of a group of such sites) to form a strategic corridor of local importance and scale', which is believed to apply in this case. If this becomes an important matter, the continued role of the site for faunal movements should be checked by a specialist ecologist following commissioning of the EastLink road.

Regionally Threatened Ecological Vegetation Class

The EVC represented within the site is endangered and the vegetation meets the Department of Sustainability & Environment's definition of a 'remnant patch'. According to the criteria of 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), even the most degraded remnant patches of native vegetation belonging to an endangered EVC have a conservation significance rating of High or Very High. It follows that the site is of **State** significance under criterion 3.2.3 of Amos (2004).

Rare or Threatened Plants

The statewide-rare *Austrostipa rudis* subsp. *australis* has a viable population at this site but its size may be moderate or large. This taxon is not endemic to Victoria (occurring also in Tasmania). It follows from criterion 3.1.2 that the site is of **State** significance if the population is large enough to be regarded as 'an important site' for the taxon, or **Regionally** significant otherwise. A survey in late November or early December would be required to resolve this.

Some of the other locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Isolation of habitat by the newly constructed EastLink road, leading to reduced visitation by small insect-eating birds and hence a risk of worsening plant pests and diseases;
- Eucalypt dieback disease;
- Invasion by environmental weeds, of which the only ones rated as Serious are Gorse (*Ulex europaeus*) and the grass weeds, Brown-top Bent (*Agrostis capillaris*), Sweet Vernal-grass (*Anthoxanthum odoratum*) and Cocksfoot (*Dactylis glomerata*);
- Critically small population sizes of some plant species.

Administration matters

- This site is worthy of inclusion within the proposed ESO2 because it is a site of State significance for the reasons discussed above;
- The site is not included under the existing Vegetation Protection Overlay of the Knox Planning Scheme and was not recognised in the report by Water Ecoscience (1998);
- Experience nearby in Dandenong Valley Parklands suggests that there is good potential for additional indigenous species to regenerate if the site were to be burned. Burning should be conducted in spring, ideally November.

Information sources used in this assessment

- A botanical survey by Dr Lorimer on 22/1/04 according to the standard procedures described in Section 2.4 of Volume 1, including:
 - Compilation of a list of indigenous and introduced plants;
 - A description of the vegetation's structural and floristic composition;
 - Incidental fauna observations; and
 - Checks for fauna habitat, ecological threats and management issues;
- Similar data gathered by Dr Lorimer on 10/3/08 following completion of works for George St and EastLink, including compilation of species lists for each side of George St;
- Similar data gathered from the road verge and adjacent parts of the paddock by Dr Lorimer on 11/9/97 for the report, *'A Survey and Management Plan for Significant Vegetation of Roadsides in Knox'* by G.S. Lorimer for Knox City Council (May 1998, 137 pp.);
- A report, *'Assessment of Native Vegetation on the Mitcham to Frankston Freeway Alignment in Knox'*, by Dr Lorimer in July 2003 for Knox City Council;
- The 1998 *'Scoresby Transport Corridor Environment Effects Statement'*, particularly Supplement Volume H: Flora and Fauna by Williams L.M., Yugovic J.V., McGuckin J., Humphrey P. and Larwill S. (1998), in which part of this site is labelled as 'Site 5';
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Road and Rail Corridors Recommended for ESO2

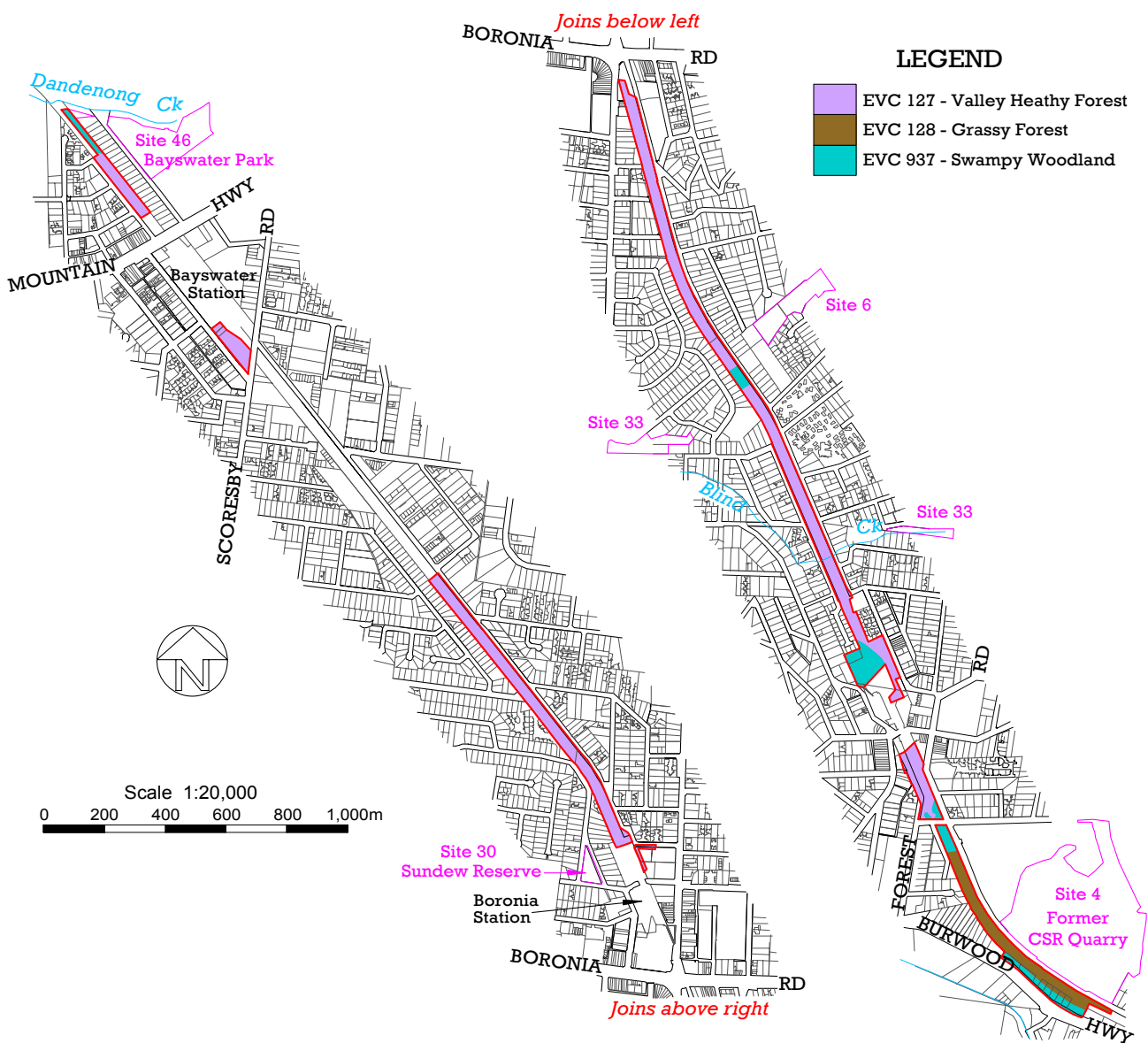
Sites 88-97 on the coming pages contain road and rail reserves. Note that some sections of road reservation are included within sites in other sections, e.g. verges of roads passing through the Dandenong Valley Parklands.

Site 88. Belgrave Railway Line Corridor

5.1 lineal kilometres of rail reserve and associated railway property, from Dandenong Creek almost to the Upper Ferntree Gully Station. Melway maps 64, 65 and 74.

Site Significance Level: State

- Most of the native vegetation belongs to the endangered EVC, Valley Heathy Forest (mauve on the map below) and the remainder belongs to regionally threatened EVCs (Swampy Woodland and Grassy Forest);
- The ecological condition of the native vegetation is highly variable, between good and poor;
- The site supports a large number of indigenous plant species (130);
- Fourteen plant species are threatened in Knox or the Melbourne area generally. Some of these are present in large numbers and some in critically small numbers, even single plants.



Boundaries

The site is in seven segments, defined by the areas on the map with red outlines and colour shading. Where the rail reserve's native vegetation extends into abutting road verges, the road verges are included (e.g. along Burwood Hwy and Underwood Rd).

Land use & tenure: Rail reservation, abutting road verges, and five vacant residential lots totalling 4,016 m² between the railway line and Burwood Hwy (opposite Acacia Rd).

Site Description

This site comprises strips of native vegetation along the Belgrave Railway Line from the Dandenong Ck bridge in Bayswater to just west of the Upper Ferntree Gully Railway Station. The total area is 24.7 ha, of which a large proportion is railway tracks and ballast, of no environmental significance.

The level of biological significance of the native vegetation within this site is higher than native vegetation further east along the railway line, which falls within Site 99 (the Dandenong Ranges Buffer site). Site 99 is proposed to be given a lower level of protection under the Planning Scheme than is proposed for the site considered here.

Most segments of the Belgrave Railway Line Corridor have a fragmented indigenous tree canopy, some indigenous lower trees such as Blackwood and Cherry Ballart, some indigenous shrubs and patchy indigenous ground flora. The density of weeds is highly variable, from low to very high, and the ecological condition of the native vegetation varies from good (rating B) to poor (rating D). Three regionally threatened Ecological Vegetation Classes are represented: Swampy Woodland in low-lying areas, Grassy Forest adjacent to the former CSR Ferntree Gully quarry, and Valley Heathy Forest elsewhere.

There is a tendency for the more intact vegetation to be where the tracks are below the natural ground level, within cuttings. Conversely, the Swampy Woodland occupies the lower-lying areas where the tracks are raised on fill placed on top of the natural soil, and the only patch that is not in poor ecological condition is the patch next to Burwood Hwy, remote from the tracks and associated embankment.

A highlight of this site is that there are several plant species that are rare or threatened in Knox generally but are surviving quite well in the railway reservation. Examples include Matted Bush-pea (*Pultenaea pedunculata*) and Clustered Everlasting (*Chrysocephalum semipapposum*). There are also other species, such as Hop Bitter-pea (*Daviesia latifolia*), that have larger, more stable populations along the railway line than elsewhere in Knox. The phenomenon of a railway corridor serving as a stronghold for certain plant species was also observed on the Lilydale line and the Belgrave line in Maroondah (Lorimer *et al.* 1997).

Relationship to other land

There are several other sites in proximity to the railway corridor, as seen on the map. There is undoubtedly some movement of birds and insects between the railway corridor and these other sites, but it seems unlikely that such movements have much ecological importance.

Trees in residential gardens neighbouring the corridor are probably at least as important. They are expected to encourage birds and insects to move along the corridor, sometimes making up for gaps in the native vegetation within the site itself.

Bioregion: The Grassy Forest lies within the Highlands Southern Fall bioregion. The remainder of the site lies in the Gippsland Plain bioregion.

Habitat types

Valley Heathy Forest (EVC 127, regionally Endangered): Estimated to occupy 4.9 ha in total, comprising 0.08 ha in good ecological condition (rating B), 0.49 ha in fair ecological condition (rating C) and 4.33 ha in poor ecological condition (rating D). 111 indigenous plant species were found.

Canopy trees: Several eucalypts co-dominate, but the particular combination of species varies. *Eucalyptus cephalocarpa* is present throughout and is typically the dominant species. *E. obliqua* is next most common, followed by *E. radiata*, *E. goniocalyx* and *E. macrorhyncha*. *E. melliodora* is very scarce and localised.

Lower trees: Fairly dense, dominated by *A. melanoxylon*, often sharing dominance with *Exocarpos cupressiformis*.

Shrubs: Rich in species, considering the treatment that railway vegetation receives. The most common species is *Bursaria spinosa*, which is typically dominant. *Acacia myrtifolia*, *Daviesia latifolia* and *Leptospermum continentale* are the next most common species. *Viminaria juncea* is notably present in two locations, reflecting the poor drainage properties of the soil.

Vines: *Billardiera mutabilis* is present but sparse.

Ferns: Patches of *Pteridium esculentum* are common.

Ground flora: Dense with grasses or *Gahnia radula*. Rich in indigenous species (under the circumstances), including thirty-one species of graminoids, twenty-one forbs, seven shrublets, eleven creepers and four scramblers. The dominant indigenous grasses are *Themeda triandra*, *Austrostipa rudis* and *Poa morrisii*. *Rytidosperma racemosum* is often dominant in mown areas. Other species that are abundant in numbers but not dominant in coverage include *Lomandra filiformis*, *Carex breviculmis*, *Dianella admixta*, *Dillwynia cinerascens*, *Gonocarpus tetragynus*, *Opercularia varia*, *Platylobium formosum* and *Senecio quadridentatus*. The characteristic species *Dianella longifolia*, *Hibbertia riparia*,

Olearia myrsinoides, *Opercularia ovata*, *Platylobium obtusangulum*, *Tricoryne elatior* and *Xanthorrhoea minor* are present but more localised than the other species just listed.

Grassy Forest (EVC 128, regionally Vulnerable): Not distinguishable from Valley Heathy Forest except for the soil type and landscape context. Estimated to occupy 0.94 ha in total, comprising 0.02 ha in fair ecological condition (rating C) and 0.92 ha in poor ecological condition (rating D). 50 indigenous plant species were found.

Canopy trees: Dominated by *Eucalyptus goniocalyx*, *E. macrorhyncha* and *E. obliqua*, with some *E. radiata* and very few *E. cephalocarpa* and *E. melliodora*.

Lower trees: *Acacia melanoxylon* and *Exocarpos cupressiformis* are rather abundant.

Shrubs: *Bursaria spinosa*, *Cassinia aculeata* and *Acacia stricta* are most common. *Goodenia ovata* is thinly scattered.

Vines: Sparse, including *Cassytha melantha* and very scarce *Clematis aristata*.

Ferns: There are sparsely distributed patches of *Pteridium esculentum*.

Ground flora: The dominant indigenous species in most of the site are *Themeda triandra*. *Gahnia radula* is dense in patches and *Rytidosperma racemosum* dominates mown areas. Other species that are abundant in numbers but not dominant in coverage include *Poa morrisii*, *Gonocarpus tetragynus* and *Lomandra filiformis* subsp. *coriacea*. At the highest part of the rail cutting below the quarry, there are also rather abundant *Pimelea curviflora* and *Chrysocephalum semipapposum*.

Swampy Woodland (EVC 937, regionally Endangered): Estimated to occupy 1.5 ha in total, comprising 0.9 ha in fair ecological condition (rating C) and 0.6 ha in poor ecological condition (rating D). 46 indigenous plant species were found.

Dominant canopy trees: *Eucalyptus ovata*, combined with *E. obliqua* in the area adjoining Burwood Hwy (due to the proximity of Grassy Forest and Herb-rich Foothill Forest).

Dominant lower trees: *Acacia melanoxylon* and *Melaleuca ericifolia*.

Dominant Shrubs: *Coprosma quadrifida*, *Ozothamnus ferrugineus* and *Goodenia ovata*.

Vines: *Pandorea pandorana* is the only vine species present.

Ferns: *Pteridium esculentum* is moderately common. *Adiantum aethiopicum* and *Cyathea australis* are fairly scarce.

Ground flora and small shrubs: The indigenous ground flora have been decimated by grass weeds and the effects of road runoff. *Gahnia radula*, *Microlaena stipoides* and *Juncus* species are the most consistently present remnants of the original ground flora, and there are occasional individuals of characteristic species such as *Senecio minimus* and *Epilobium hirtigerum*.

Plant species

The following plant species were observed by the author on the dates indicated. Additional species would no doubt be detectable in a more thorough survey. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Acacia leprosa* (Dandenong Range variant) is rare nationally and species with names in bold are rare throughout the Melbourne region.

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
	<i>Acacia dealbata</i>	2002		<i>Carex breviculmis</i>	2002
V	<i>Acacia leprosa</i> (Dandenong Range variant)	2002		<i>Cassinia aculeata</i>	2002
V	<i>Acacia mearnsii</i>	2002		<i>Cassinia arcuata</i>	2002
V	<i>Acacia melanoxylon</i>	2004	E	<i>Cassytha melantha</i>	2002
E	<i>Acacia myrtifolia</i>	2002	E	<i>Centella cordifolia</i>	2002
E	<i>Acacia pycnantha</i>	2002	C	<i>Chrysocephalum semipapposum</i>	2002
E	<i>Acacia stricta</i>	2002	V	<i>Clematis aristata</i>	2002
V	<i>Acaena echinata</i>	2004	V	<i>Coprosma quadrifida</i>	2002
	<i>Acaena novae-zelandiae</i>	2002	E	<i>Cyathea australis</i>	2002
V	<i>Acrotriche prostrata</i>	2002	E	<i>Daviesia latifolia</i>	2004
	<i>Acrotriche serrulata</i>	2002	E	<i>Daviesia leptophylla</i>	2002
V	<i>Adiantum aethiopicum</i>	2002		<i>Deyeuxia quadriseta</i>	2002
V	<i>Allocasuarina littoralis</i>	2002		<i>Dianella admixta</i>	2004
V	<i>Amyema quandang</i>	2002	V	<i>Dianella longifolia</i> s.l.	2002
	<i>Austrostipa pubinodis</i>	2002		<i>Dichondra repens</i>	2002
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	2004	V	<i>Dillwynia cinerascens</i>	2002
	<i>Billardiera mutabilis</i>	2002	V	<i>Drosera peltata</i> subsp. <i>auriculata</i>	2002
	<i>Bossiaea prostrata</i>	2002	V	<i>Drosera whittakeri</i>	2002
V	<i>Brunonia australis</i>	2002		<i>Elymus scaber</i>	2002
	<i>Bursaria spinosa</i>	2004	V	<i>Epacris impressa</i>	2004
V	<i>Caesia parviflora</i>	2002	V	<i>Epilobium billardierianum</i> ssp. <i>cinereum</i>	2002

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
	<i>Epilobium hirtigerum</i>	2002	V	<i>Opercularia ovata</i>	2002
	<i>Eragrostis brownii</i>	2002	V	<i>Opercularia varia</i>	2004
V	<i>Eucalyptus cephalocarpa</i>	2004		<i>Oxalis exilis/perennans</i>	2002
	<i>Eucalyptus goniocalyx</i>	2002	E	<i>Ozothamnus ferrugineus</i>	2002
E	<i>Eucalyptus macrorhyncha</i>	2002		<i>Pandorea pandorana</i>	2002
V	<i>Eucalyptus melliodora</i>	2002	C	<i>Persoonia juniperina</i>	2002
V	<i>Eucalyptus obliqua</i>	2004	E	<i>Phragmites australis</i>	2002
V	<i>Eucalyptus ovata</i>	2004	E	<i>Pimelea curviflora</i>	2002
E	<i>Eucalyptus radiata</i>	2004	V	<i>Pimelea humilis</i>	2002
E	<i>Euchiton involucratus</i>	2002	V	<i>Plantago varia</i>	2002
V	<i>Exocarpos cupressiformis</i>	2004	V	<i>Platylobium formosum</i>	2002
	<i>Gahnia radula</i>	2004	V	<i>Platylobium obtusangulum</i>	2004
C	<i>Geranium</i> sp. 5	2002	E	<i>Poa labillardierei</i> var. <i>labillardierei</i>	2002
	<i>Gonocarpus tetragynus</i>	2004		<i>Poa morrisii</i>	2004
	<i>Goodenia ovata</i>	2002	E	<i>Poa tenera</i>	1997
V	<i>Hardenbergia violacea</i>	2002		<i>Poranthera microphylla</i>	2002
V	<i>Helichrysum luteoalbum</i>	2002		<i>Pteridium esculentum</i>	2004
V	<i>Helichrysum scorpioides</i>	2002	V	<i>Pultenaea gunnii</i>	2002
V	<i>Hemarthria uncinata</i>	2002	C	<i>Pultenaea pedunculata</i>	2002
E	<i>Hibbertia riparia</i>	2002	E	<i>Rubus parvifolius</i>	2002
V	<i>Hovea heterophylla</i>	2002		<i>Rytidosperma linkii</i> var. <i>fulvum</i>	2004
E	<i>Hypericum gramineum</i>	2002		<i>Rytidosperma pallidum</i>	2002
E	<i>Imperata cylindrica</i>	2004		<i>Rytidosperma penicillatum</i>	2002
	<i>Juncus amabilis</i>	2002	V	<i>Rytidosperma pilosum</i>	2002
	<i>Juncus gregiflorus</i>	2002		<i>Rytidosperma racemosum</i>	2004
	<i>Juncus pallidus</i>	2002	E	<i>Rytidosperma semiannulare</i>	2002
	<i>Juncus sarophorus</i>	2002		<i>Rytidosperma setaceum</i>	2004
	<i>Kunzea ericoides</i> spp. agg.	2002		<i>Rytidosperma tenuius</i>	2002
	<i>Lachnagrostis filiformis</i>	2002		<i>Schoenus apogon</i>	2004
	<i>Lepidosperma elatius</i>	1997		<i>Senecio glomeratus</i>	1997
	<i>Lepidosperma gunnii</i>	2002		<i>Senecio hispidulus</i>	2002
V	<i>Lepidosperma laterale</i>	2002	E	<i>Senecio minimus</i>	2002
V	<i>Leptorhynchos tenuifolius</i>	2002		<i>Senecio quadridentatus</i>	2004
	<i>Leptospermum continentale</i>	2002	E	<i>Stylidium armeria/graminifolium</i>	2002
E	<i>Leptospermum scoparium</i>	2002		<i>Tetrarrhena juncea</i>	2002
	<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	2004	V+	<i>Thelymitra</i> sp.	2002
	<i>Lomandra filiformis</i> subsp. <i>filiformis</i>	2002		<i>Themeda triandra</i>	2004
	<i>Lomandra longifolia</i>	2004		<i>Tricoryne elatior</i>	2004
C	<i>Lomandra multiflora</i>	2002	C	<i>Viminaria juncea</i>	2002
V	<i>Lythrum hyssopifolia</i>	2002	E	<i>Viola hederacea</i>	2002
E	<i>Melaleuca ericifolia</i>	2002	C	<i>Wahlenbergia multicaulis</i>	2002
	<i>Microlaena stipoides</i>	2004	E	<i>Wahlenbergia stricta</i>	2002
C	<i>Muellerina eucalyptoides</i>	2002	V	<i>Xanthorrhoea minor</i>	2002
E	<i>Olearia myrsinoides</i>	2002			

Introduced Species

<i>Acacia baileyana</i>	<i>Coprosma repens</i>	<i>Genista monspessulana</i>	<i>Pittosporum undulatum</i>
<i>Acacia decurrens</i>	<i>Cortaderia selloana</i>	<i>Gladiolus undulatus</i>	<i>Plantago lanceolata</i>
<i>Acacia longifolia longifolia</i>	<i>Cotoneaster glaucophyllus</i>	<i>Grevillea hybrids</i>	<i>Prunus cerasifera</i>
<i>Agapanthus praecox</i>	<i>Cotoneaster pannosus</i>	<i>Hedera helix</i>	<i>Romulea rosea</i>
<i>Agrostis capillaris</i>	<i>Crataegus monogyna</i>	<i>Holcus lanatus</i>	<i>Rubus anglocandicans</i>
<i>Allium triquetrum</i>	<i>Crocospia</i> × <i>crocospiaiflora</i>	<i>Hypochoeris radicata</i>	<i>Salix</i> ? × <i>reichardtii</i>
<i>Anthoxanthum odoratum</i>	<i>Cytisus scoparius</i>	<i>Linum trigynum</i>	<i>Sporobolus africanus</i>
<i>Asparagus asparagoides</i>	<i>Dactylis glomerata</i>	<i>Lonicera japonica</i>	<i>Tradescantia fluminensis</i>
<i>Asparagus scandens</i>	<i>Delairea odorata</i>	<i>Nephrolepis cordifolia</i>	<i>Trifolium repens</i>
<i>Briza maxima</i>	<i>Ehrharta erecta</i>	<i>Oxalis incarnata</i>	<i>Ulex europaeus</i>
<i>Centaurium erythraea</i>	<i>Erica lusitanica</i>	<i>Oxalis pes-caprae</i>	<i>Verbena bonariensis</i> s.l.
<i>Chamaecytisus palmensis</i>	<i>Foeniculum vulgare</i>	<i>Oxalis purpurea</i>	<i>Vicia sativa</i>
<i>Chrysanthemoides monilifera</i>	<i>Fraxinus angustifolia</i>	<i>Pennisetum clandestinum</i>	<i>Watsonia meriana</i>
<i>Cirsium vulgare</i>	<i>Galium aparine</i>	<i>Pinus radiata</i>	<i>Zantedeschia aethiopica</i>

Notes concerning some of the locally threatened plant species

- Acacia leprosa* (Cinnamon Wattle), Dandenong Range variant. A solitary plant was found opposite 75 Underwood Rd, Boronia.
- Chrysocephalum semipapposum* (Clustered Everlasting). 25 were found on the railway cutting below Quarry Rd, Ferntree Gully.
- Daviesia leptophylla* (Narrow-leaf Bitter-pea). Found between Alpine St, Ferntree Gully and the pedestrian crossing to the southeast, numbers not recorded.
- Geranium* ?sp. 2 (Variable Cranesbill). At least several were found southeast of the Forest Rd bridge, numbers not recorded.
- Geranium* sp. 5 (Naked Cranesbill). A very small amount was found not far from Daffodil Rd, Boronia.
- Imperata cylindrica* (Blady Grass). Four patches were found between Boronia Rd and Ferntree Gully Station and one northwest of Mountain Hwy (northeast side of the tracks).
- Linum marginale* (Native Flax). A small population was found in the bushland between Burwood Hwy and the railway line in Upper Ferntree Gully.
- Lomandra multiflora* (Many-flowered Mat-rush). A solitary individual was found near Bowen St, Ferntree Gully.
- Persoonia juniperina* (Prickly Geebung). A single plant was found on the railway cutting opposite 65 Underwood Rd, Boronia.
- Pimelea curviflora* (Curved Rice-flower). More than thirty individuals were found in the railway reservation opposite the former CSR quarry. They are being overrun by the weeds, *Watsonia meriana*, *Genista monspessulana*, *Ehrharta erecta* and *Oxalis incarnata*. Note that the first two of these are declared noxious weeds.
- Poa labillardierei* (Common Tussock-grass). There are at least several on the cutting just north of Boronia Station on the western side of the tracks.
- Pseudognaphalium luteoalbum* (Jersey cudweed). One seen just northwest of Boronia Station. Likely to appear and disappear from time to time at many locations in the site.
- Pultenaea pedunculata* (Matted Bush-pea). Patches of 5 m² and 7 m² were found on the railway embankment between Lording St and Doysal Av, and approximately sixty patches between Alpine St and the Forest Rd bridge.
- Viminaria juncea* (Golden Spray). Several germinated near Boronia Rd in soil disturbed by the construction of the railway underpass. There is also one at Ferntree Gully Station on the northeastern side of the tracks.
- Wahlenbergia multicaulis* (Tadgell's Bluebell). A solitary individual was found where Iris Cr, Boronia, abuts the railway reserve.
- Wahlenbergia stricta* (Tall Bluebell). Many were found on the railway cutting below Quarry Rd, Ferntree Gully.

Fauna of special significance

None detected.

Fauna habitat features

- Many trees have hollows that may provide nesting sites for native bats, birds or possums;
- The densely grassy ground layer is bound to provide food for larvae of various butterflies (particularly in the Valley Grassy Forest);
- Dense patches of shrubs provide protection for small native birds.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Regionally Threatened Ecological Vegetation Classes

According to the criteria of 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), any example of a regionally endangered EVC (including the Valley Heathy Forest and Swampy Woodland along the railway line) has a conservation significance rating of at least 'High'. It follows from criterion 3.2.3 of Amos (2004) that the site's patches of these EVCs are of **State** significance. On a similar basis, remnants of the regionally vulnerable EVC, Grassy Forest, are of **Regional** significance.

Rare or Threatened Flora

The single specimen of *Acacia leprosa* that occurs within this site is of a form that is listed as rare (but not threatened) in Victoria. It is clearly not a viable population in its own right, but it could easily share pollen with the larger numbers of the species in nearby Vaughan Road Reserve (Site 6) and Koolunga Native Reserve (Site 5). This is of **State** significance under criterion 3.1.2.

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Plants of Exceptional Size

The three *Bursaria spinosa* trees measuring 8 m, 10 m and 11 m tall and with trunk diameters up to 30 cm, situated opposite 73 Power St, Bayswater, are of exceptional age and size when considered on a bioregional scale. Nevil Amos (pers. comm.) has stated that it was unintentional that the latest version of the significance criteria (Amos 2004) omitted the criterion that, in previous versions, recognised 'plants of exceptional size or age'. If not for this oversight, the *Bursaria spinosa* plants in question would qualify as Regionally significant.

Threats

- Invasion by environmental weeds. The worst species are as follows:
 - Very serious: Boneseed (*Chrysanthemoides monilifera* ssp. *monilifera*), Panic Veldt-grass (*Ehrharta erecta*), Montpellier Broom (*Genista monspessulana*), Japanese Honeysuckle (*Lonicera japonica*), Pale Wood-sorrel (*Oxalis incarnata*), Kikuyu (*Pennisetum clandestinum*), Sweet Pittosporum (*Pittosporum undulatum*), Blackberry (*Rubus discolor*), Bulbil Watsonia (*Watsonia meriana* var. *bulbillifera*);
 - Serious: Brown-top Bent (*Agrostis capillaris*), Angled Onion (*Allium triquetrum*), Sweet Vernal-grass (*Anthoxanthum odoratum*), Bridal Creeper (*Asparagus asparagoides*), Cotoneaster (*Cotoneaster glaucophyllus* forma *serotinus*), Hawthorn (*Crataegus monogyna*), English Broom (*Cytisus scoparius*), Cocksfoot (*Dactylis glomerata*), Spanish Heath (*Erica lusitanica*), Ivy (*Hedera helix*), Cat's Ear (*Hypochoeris radicata*), French Flax (*Linum trigynum*), Soursob (*Oxalis pes-caprae*), Monterey Pine (*Pinus radiata*), Pussy Willow (*Salix ? × reichardtii*), Wandering Jew (*Tradescantia albiflora*);
- Dumping of garden waste, which is spreading weeds;
- Herbicides applied to indigenous plants, usually as collateral damage while targeting weeds;
- Loss or decline of plant species whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or elimination by incidents such as track works, disease or slasher damage. This particularly applies to *Wahlenbergia multicaulis*, *Lomandra multiflora* and *Persoonia juniperina*.

Management issues

- Mowing of the fairly intact area of native vegetation south of the Ferntree Gully service station (near Alpine St) should be reduced in area and frequency, and it should not occur during September to December;
- Propagating material should be collected from plant species with critically small numbers. Plants propagated from this material should be planted in nearby, secure locations, and ideally at more secure locations within the site. Some seed should be kept in a seed bank in case the existing populations are destroyed.

Administration matters

- This site is suited to an Environmental Significance Overlay because of its biological significance documented above, particularly because the vegetation belongs to threatened Ecological Vegetation Classes. Such an overlay should exempt works (including vegetation removal) to the minimum extent needed for maintenance of railway assets;
- A little over half of this site is covered by Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, with boundaries derived from Sites 33, 40 and 61 of Water Ecoscience (1998). The site described and mapped here should replace the Water Ecoscience sites because of the more detailed, recent and accurate treatment. Note that Water Ecoscience did not visit their site 61 at all and only listed some of the dominant indigenous plant species in Sites 33 and 40;
- The planning scheme zoning is predominantly Public Use Zone - Transport (PUZ4). Abutting road verges are in various zones according to the adjacent land use, and the five small lots fronting Burwood Hwy are zoned Residential 1 Zone (R1Z);
- Some signs could be erected along the shared path to draw attention to some of the more significant sections of vegetation, such as just north of Ferntree Gully Station.

Information sources used in this assessment

- Surveys of all of the site except Bayswater Railway Station by Dr Lorimer on 20/8/02, 22/8/02 and 27-28/8/02 for a total of approximately thirteen hours, following this study's standard procedures discussed in Section 2.4 of Volume 1. This included:
 - Compilation of sixteen lists of indigenous and introduced plant species for different vegetation types and sections of the site;
 - Description of the structural and floristic composition of the native vegetation;
 - Documentation and mapping of rare species populations and the ecological condition of the vegetation;
 - Incidental fauna observations;
 - Checks for fauna habitat, ecological threats and management issues;
- An equivalent survey of Bayswater Railway Station by Mr Rik Brown on 20/5/02;

- A site survey of the strip of vegetation between Burwood Hwy and the railway line by Dr Lorimer on 22nd December 1997 for the report, '*A Survey and Management Plan for Significant Vegetation of Roadsides in Knox*' by G.S. Lorimer for Knox City Council (May 1998, 137 pp.). This included a list of plant species (indigenous and introduced), incidental fauna records and a vegetation map showing EVCs and vegetation quality;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 90. Boronia Rd Roadside, Boronia

Three sections of road verge, of lengths 350 m, 230 m and 800 m. Melway ref. 64 D8 to J9.

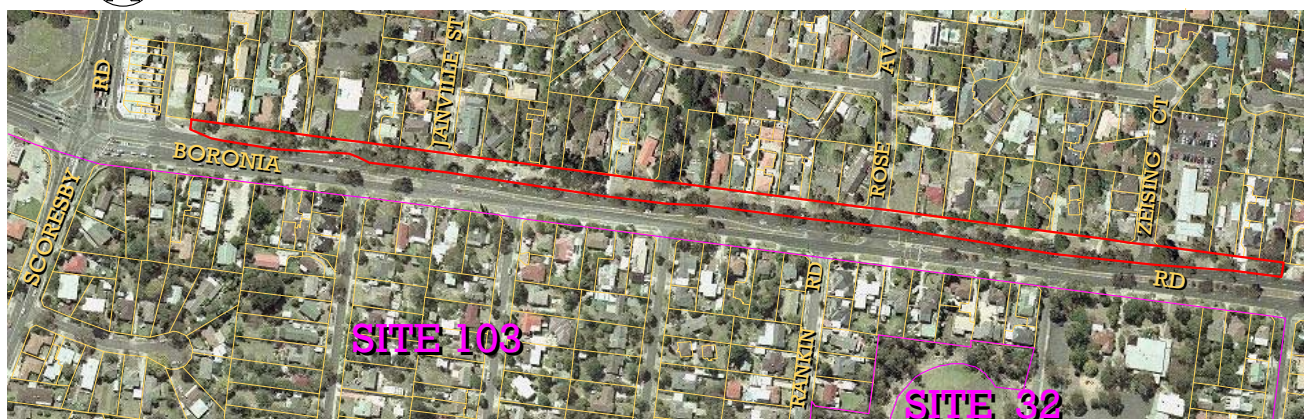
Site Significance Level: *State* west of Edinburgh Rd and *Local* east of Edinburgh Rd.

- The native vegetation belongs to the endangered EVC, Valley Heathy Forest;
- Small parts of the site are in good ecological condition.



0 100 200 300 400m

Aerial photographs taken February 2007



Aerial photographs

The two aerial photographs overlap slightly, with the intersection of Boronia Rd and Scoresby Rd seen in the southeast corner of the upper photograph and the northwest corner of the lower photograph. Site 90's three sections are outlined in red and neighbouring sites are outlined and labelled in magenta. Site 32 (St Joseph's College) is embedded within Site 103.

Boundaries

The two sections on the upper aerial photograph extend between the gutter of Boronia Rd and the edge of the adjacent service roads (but not enclosing the part of the gutter that is subject to periodic grading). The section on the lower aerial photograph extends between the property boundary and the kerb of Boronia Rd. The section west of Edinburgh Rd measures 0.49 ha, the section just east of Edinburgh Rd measures 0.17 ha and the section east of Scoresby Rd measures 1.09 ha.

Land use & tenure: Verges of a secondary road.

Site description

This site is situated in undulating terrain, at elevations from 90m in the west to 126 m in the east. There is a low ridge just east of Edinburgh Rd. The natural slope is typically 8%, but all three sections of the site include sections with very steep road cuttings. The soil is shallow, poorly draining, pale loam over clay subsoil, derived from decomposition of the underlying Lower Devonian sedimentary rocks of the Humevale formation.

Knox City Council has designated the section of the site west of Edinburgh Rd as Significant Roadside KN3. There are remnant indigenous trees scattered along Boronia Rd from Sasses Av to the Boronia shopping centre, but this site encompasses the sections with native understorey and better habitat for a wider range of species.

Three sections of the site can be identified with noticeably different topography, vegetation composition and ecological condition:

- West of Dinsdale Rd: the lowest section with the shallowest slope, and with a tree canopy dominated by Mealy Stringybark (*Eucalyptus cephalocarpa*) and Narrow-leafed Peppermint (*Eucalyptus radiata*). There is a central strip typically 5m wide that is in fair ecological condition (rating C) and the rest is almost all in poor ecological condition;
- Between Dinsdale Rd and Edinburgh Rd: a rise with a steep, vegetated cutting and native vegetation above it, dominated by Bundy (*Eucalyptus goniocalyx*) and mostly in good ecological condition (rating B);
- Between Edinburgh Rd and Scoresby Rd: elevated well above the road surface with a high cutting, its vegetation dominated by Bundy and Red Stringybark (*Eucalyptus macrorhyncha*), all in poor ecological condition (rating D) due to damaging practices such as dumping of garden waste and planting of environmental weeds;
- East of Scoresby Rd, where the undulations are more gentle and the native vegetation has mostly a long history of mowing, leaving a good cover of remnant eucalypts but patchy understorey. The vegetation's ecological condition in this stretch is poor (rating D) other than on the nature strips of 209, 219, 247 and 249 Boronia Rd, where there are patches in fair ecological condition (condition C). (209 Boronia Rd is the Uniting Church.) The patch outside 247 & 249 Boronia Rd includes the locally threatened plant species, *Acacia aculeatissima*.

Relationship to other land

As seen on the aerial photographs above, parts of this site are separated from Site 32 and Site 103 only by the width of Boronia Rd. Many birds and insects are likely to cross between these sites, representing a strong ecological connection. An example would be the Crimson Rosellas found nesting near the pedestrian crossing at Dinsdale Rd. These, and some other birds and insects, probably also include the Blind Creek corridor (Site 33) in their home ranges.

Bioregion: Gippsland Plain

Habitat types

Valley Heathy Forest (EVC 127, **Endangered):** The section west of Edinburgh Rd is estimated to have 0.35 ha of native understorey, comprising 0.015 ha in good ecological condition (rating B), 0.17 ha in fair ecological condition (rating C) and 0.165 ha in poor ecological condition (rating D). The section between Edinburgh Rd and Scoresby Rd is estimated to have 0.11 ha of native understorey, all in poor ecological condition (rating D). The section further to the east is estimated to have 0.59 ha of native understorey, comprising 0.04 ha in fair ecological condition (rating C) and 0.55 ha in poor ecological condition (rating D).

Canopy trees: Dominated by *Eucalyptus cephalocarpa* and *E. radiata* west of Dinsdale Rd, *E. goniocalyx* between there and Edinburgh Rd, a mixture of *E. goniocalyx* and *E. macrorhyncha* east of Edinburgh Rd, and *E. obliqua* east of Scoresby Rd.

Lower trees: Dominated by *Acacia mearnsii* and *Acacia melanoxylon*, with scarce *Exocarpos cupressiformis*.

Shrubs: Dominated by abundant *Bursaria spinosa*. *Goodenia ovata* is the next most abundant species. Other species include *Ozothamnus ferrugineus*, *Cassinia aculeata*, *Olearia lirata*, *Leptospermum continentale*, *Daviesia latifolia*, *Daviesia leptophylla*, *Dillwynia cinerascens* and *Epacris impressa*.

Vines: The light twiner, *Billardiera mutabilis*, is abundant.

Ferns: None.

Ground flora: Densely grassy, dominated variously by *Microlaena stipoides*, *Austrostipa rudis*, *Poa morrisii*, *Rytidosperma racemosum* or *Gahnia radula*. There are also substantial patches dominated by *Rytidosperma pallidum* or *Platylobium formosum* or *Dianella admixta*. Other species that are abundant in numbers but not dominant in foliage cover include *Arthropodium strictum*, *Gonocarpus tetragynus*, *Leptorhynchus tenuifolius*, *Lomandra filiformis* and *Poranthera microphylla*. *Acacia aculeatissima*, *Goodenia lanata*, *Platylobium formosum* and *Xanthorrhoea minor* are very scarce but good ecological indicators.

Plant species

The following plant species were observed by the author on 15/8/02 and/or 27/3/08, as indicated in the 'Year' column. Additional species would probably be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox with 'E'=Endangered and 'V'=Vulnerable.

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
E	<i>Acacia aculeatissima</i>	2008		<i>Goodenia lanata</i>	2008
V	<i>Acacia implexa</i>	2002		<i>Goodenia ovata</i>	2008
V	<i>Acacia mearnsii</i>	2008	V	<i>Hardenbergia violacea</i>	2002
V	<i>Acacia melanoxylon</i> (wild & planted)	2008		<i>Juncus pallidus</i>	2002
E	<i>Acacia pycnantha</i>	2008		<i>Lachnagrostis filiformis</i>	2002
	<i>Acrotriche serrulata</i>	2002	V	<i>Leptorhynchos tenuifolius</i>	2002
V	<i>Allocasuarina littoralis</i> (planted)	2002		<i>Leptospermum continentale</i>	2002
	<i>Arthropodium strictum</i>	2002		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	2008
	<i>Austrostipa pubinodis</i>	2002		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>	2008
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	2002		<i>Lomandra longifolia</i>	2008
	<i>Billardiera mutabilis</i>	2002	V	<i>Lythrum hyssopifolia</i>	2002
	<i>Bossiaea prostrata</i>	2002		<i>Microlaena stipoides</i>	2008
	<i>Bursaria spinosa</i>	2008	V	<i>Olearia lirata</i>	2002
	<i>Carex breviculmis</i>	2008	V	<i>Opercularia varia</i>	2002
	<i>Cassinia aculeata</i>	2002		<i>Oxalis exilis/perennans</i>	2002
V	<i>Comesperma volubile</i>	2002	E	<i>Ozothamnus ferrugineus</i>	2002
E	<i>Daviesia latifolia</i>	2002	V	<i>Platylobium formosum</i>	2008
E	<i>Daviesia leptophylla</i>	2002		<i>Poa morrisii</i>	2008
	<i>Dianella admixta</i>	2008		<i>Poranthera microphylla</i>	2002
V	<i>Dillwynia cinerascens</i>	2002		<i>Rytidosperma pallidum</i>	2002
V	<i>Epacris impressa</i>	2002		<i>Rytidosperma racemosum</i>	2008
	<i>Epilobium ?hirtigerum</i>	2002		<i>Rytidosperma setaceum</i>	2008
V	<i>Eucalyptus cephalocarpa</i>	2008		<i>Rytidosperma tenuius</i>	2008
	<i>Eucalyptus goniocalyx</i>	2008		<i>Schoenus apogon</i>	2002
E	<i>Eucalyptus macrorhyncha</i>	2008		<i>Senecio hispidulus</i>	2008
V	<i>Eucalyptus obliqua</i>	2008		<i>Senecio quadridentatus</i>	2008
V	<i>Eucalyptus ovata</i>	2008		<i>Themeda triandra</i>	2002
E	<i>Eucalyptus radiata</i>	2008	V	<i>Veronica gracilis</i>	2002
V	<i>Exocarpos cupressiformis</i>	2008	E	<i>Viola hederacea</i>	2002
	<i>Gahnia radula</i>	2008	V	<i>Xanthorrhoea minor</i>	2008
	<i>Gonocarpus tetragynus</i>	2008			

Introduced Species

<i>Agapanthus praecox</i>	<i>Dactylis glomerata</i>	<i>Paspalum dilatatum</i>
<i>Agrostis capillaris</i>	<i>Ehrharta erecta</i>	<i>Plantago lanceolata</i>
<i>Anthoxanthum odoratum</i>	<i>Hypochoeris radicata</i>	<i>Romulea rosea</i>
<i>Briza maxima</i>	<i>Linum trigynum</i>	<i>Sporobolus africanus</i>
<i>Centaurium erythraea</i>	<i>Oxalis pes-caprae</i>	

Notes concerning two of the locally threatened plant species

Acacia aculeatissima (Thin-leaf Wattle). Three plants: One beside the kerb, 5 m west of the pedestrian crossing near Dinsdale Rd and two on the nature strip of 249 Boronia Rd.

Daviesia leptophylla (Narrow-leaf Bitter-pea). A single plant was found east of Edinburgh Rd.

Fauna of special significance

None detected.

Fauna habitat features

- Some trees have hollows that would suit habitation by native birds, bats, possums or insects. Crimson Rosellas were observed emerging from one hollow near the pedestrian crossing close to Dinsdale Rd;
- The grassy ground flora probably provides food for butterfly caterpillars, but mowing would destroy a substantial proportion of these.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity and Viability

Taking into account the discussion under the heading 'Relationship to other land' above, this site (or at least, those parts east of Edinburgh Rd) represents an ecological 'stepping stone'. Criterion 1.2.6 (Amos 2004) attributes **Local** significance to stepping-stones like this which can be described as 'Important at local scale - Link between individual remnant habitat blocks or within subcatchment'.

Endangered Ecological Vegetation Class

Valley Heathy Forest is endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that the site's native vegetation is necessarily of at least High conservation significance. Criterion 3.2.3 of Amos (2004) assigns **State** significance to any site containing a 'remnant patch' of vegetation that is of at least High conservation significance due to the presence of a threatened EVC. The only part of the site that clearly qualified as a remnant patch (and hence of State significance) when surveyed was the segment west of Edinburgh Rd. The rest of the site is so interrupted by driveways and small patches of non-native vegetation that it is questionable whether any of it can be deemed a remnant patch, although ecological restoration could change this situation.

Rare or Threatened Flora

Some of the locally threatened plant species listed above have viable populations (in combination with nearby native vegetation), thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Invasion by environmental weeds, of which the following are the worst:
 - Very serious: Brown-top Bent (*Agrostis capillaris*), Large Quaking-grass (*Briza maxima*), Cocksfoot (*Dactylis glomerata*), Panic Veldt-grass (*Ehrharta erecta*), Cat's Ear (*Hypochoeris radicata*), Ribwort (*Plantago lanceolata*) and Common Onion-grass (*Romulea rosea*);
 - Serious: Sweet Vernal-grass (*Anthoxanthum odoratum*), Centaury (*Centaureum erythraea*), Soursob (*Oxalis pes-caprae*), Paspalum (*Paspalum dilatatum*) and Indian Rat's-tail Grass (*Sporobolus indicus* var. *capensis*);
- Overly frequent mowing of native ground flora and seedlings;
- Dumping of garden waste;
- Digging and planting of environmental weeds by neighbours, particularly between Edinburgh Rd and Scoresby Rd;
- Tree removal for safety, between Edinburgh Rd and Scoresby Rd;
- Loss or decline of plant species whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or elimination by incidents such as disease or mower damage.

Management issues

- Frequent mowing of exotic grass and weeds is desirable, but should not encroach into areas with substantial native ground flora. A skilled mower operator may be required to recognise the appropriate limits;
- Large Quaking-grass (*Briza maxima*) in the area west of Dinsdale Rd should be sprayed in late July or early August with the minimum recommended dose of a grass-specific herbicide such as Fusilade[®];
- *Epacris impressa* is in decline, with several seen dead west of Edinburgh Rd and only two left alive. This could be due to drought or an early sign of *Phytophthora cinnamomi* root rot. The segment west of Edinburgh Rd should be monitored for other signs of damage, such as tree dieback;
- *Epacris impressa* and other species that are present in dangerously small numbers should be helped by planting additional specimens.

Administration matters

- The Planning Scheme zoning is Road Zone Category 1 (RDZ1);
- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the endangered EVC;
- This site is not covered by any of the existing Vegetation Protection Overlay Schedules of the Knox Planning Scheme.

Information sources used in this assessment

- Site surveys by Dr Lorimer on 15/8/02 (west of Scoresby Rd) and 27/3/08 (east of Scoresby Rd) following this study's standard procedures discussed in Section 2.4 of Volume 1. This included:

- Compilation of lists of indigenous and introduced plants for each of six parts of the site;
 - A description of the vegetation's structural and floristic composition;
 - Determination of the vegetation's ecological condition in each part of the site;
 - Documentation of rare species populations;
 - Incidental observations of fauna; and
 - Checks for fauna habitat, ecological threats and management issues.
- Aerial photography from February 2001, April 2003 and February 2007;
 - Satellite imagery of the district;
 - The Department of Sustainability & Environment's BioMaps of the area;
 - Maps of geology and topography produced by agencies of the Victorian government.

Site 91. Mountain Hwy Roadside, Wantirna

A total of one kilometre of road verge (summed over both sides of the road), in four segments. Melway ref. 63 F7.

Site Significance Level: *State*

- A linear oasis of native vegetation in a neighbourhood where native vegetation is scarce;
- Contains remnants and regrowth of the endangered Ecological Vegetation Class, Valley Heathy Forest;
- The vegetation's ecological condition is stable or improving and has moderate diversity, but some species have too few individuals for long-term viability in the absence of intervention.

Aerial Photographs – see next page

The upper photograph on the next page is of an area that is separated from the lower one by 300 m. The red lines on the photographs are outlines of the four segments of road verge that make up this site and the magenta lines are outlines of neighbouring sites treated elsewhere in this report.

Boundaries

This site has four sections, outlined in red on the aerial photographs and totalling 2.32 ha. Except for the westernmost segment, the edges closest to the road surface are either title boundaries or the road gutter (but not enclosing any part of a gutter that is subject to periodic grading). The boundary includes a rectangle measuring 18 m × 8 m within a vacant lot (187 Harold St, Wantirna) on the southern corner of Mountain Hwy and Harold St, containing mature indigenous trees (*Eucalyptus radiata*, *Eucalyptus goniocalyx* and *Acacia melanoxylon*).

Land use & tenure: Verges of a primary road.

Site description

This site is situated on the western flank of the low ridge created by the Dargile geological formation of Upper Silurian sedimentary rock. The site's southeastern extremity, near Burwood Hwy, is at the foot of the ridge with an elevation of approximately 73 m, and Mountain Hwy rises gradually to an elevation of 122 m at the site's northeastern end, near the top of the ridge. The natural slope is typically 4% to 5% and the road is mostly at or slightly below the natural ground level.

The soil is poorly draining, pale loam over clay subsoil. The topsoil is mostly shallow, but the presence of an area dominated by Yellow Box (*Eucalyptus melliodora*) suggests that the topsoil there may be moderately deep.

Knox City Council has signposted two sections of the northwestern side of the road as Significant Roadsides because of their native vegetation. Until the 1990s, this stretch of Mountain Hwy had some of the highest quality roadside vegetation in Knox, with a spectacle of wildflowers in spring. Widening of Mountain Hwy damaged much of the vegetation badly, partly due to necessary removal and mostly due to lack of care. Much of the ground flora left today has regenerated after being flattened or destroyed during or soon after the road widening.

Destruction of the native vegetation continues. In 2003, a section of the highest quality native vegetation remaining at that time was destroyed outside the new medium-density residential development at 105 Mountain Hwy, on the northern roadside immediately east of the EastLink Rd. This section was therefore omitted from the site circumscribed here. Another substantial part of this strip was cleared in 2005-6 for the EastLink road.

The native vegetation all belongs to the endangered Ecological Vegetation Class (EVC), Valley Heathy Forest (except a tiny patch of another endangered EVC, Swampy Woodland, abutting the Koomba Park tennis courts).

The vegetation is mostly in fair ecological condition (rating C). A fifty-metre-long strip southwest from Harold St is dominated by Yellow Box (*Eucalyptus melliodora*), suggesting a tendency toward Valley Grassy Forest. The remainder is dominated either by Mealy Stringybark (*Eucalyptus cephalocarpa*) or by a mixture of Red Stringybark (*Eucalyptus macrorhyncha*), Bundy (*Eucalyptus goniocalyx*) and Narrow-leafed Peppermint.

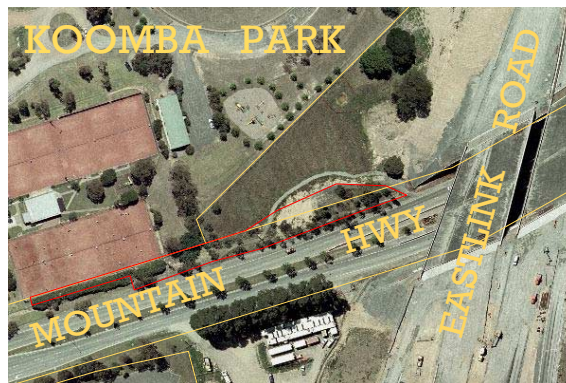
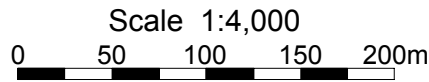
Relationship to other land

The native vegetation in this site near Petalnina Drive and Harold St augments the native habitat in Stringybark Reserve (Site 54). Flying fauna would also be able to cross to the larger and more intact habitat at W.G. Morris Reserve (Site 55), 260 m away. It seems unlikely that the site functions as a habitat corridor.

Bioregion: Gippsland Plain



Site 91 (outlined in red).
 Aerial photographs taken April 2003
 (above) and February 2007 (below).



Habitat types

Valley Heathy Forest (EVC 127, Endangered): The segment on the northwestern side near the EastLink road is estimated to contain 0.22 ha of native vegetation, comprising 0.20 ha in fair ecological condition (rating C) and 0.02 ha in poor ecological condition (rating D). The remainder of the site is estimated to contain 1.4 ha of native vegetation with native understorey, comprising 0.3 ha in fair ecological condition (rating C) and 1.1 ha in poor ecological condition (rating D).

Canopy trees: Dominated by *Eucalyptus cephalocarpa* and *E. radiata* in the segments on the lower aerial photograph of the previous page; dominated by *E. melliodora* in a fifty-metre-long strip southwest from Harold St; and dominated elsewhere by a mixture of *E. goniocalyx*, *E. macrorhyncha* and *E. radiata*.

Lower trees: Dominated by *Acacia melanoxylon*, combined with *Exocarpos cupressiformis* in less degraded areas.

Shrubs: Dominated by *Bursaria spinosa* and *Acacia paradoxa*, their density varying according to the history of clearing and regrowth, and becoming very dense near Stringybark Reserve. The other shrubs are *Cassinia arcuata*, *Coprosma quadrifida*, *Daviesia latifolia*, *Goodenia ovata* and *Leptospermum continentale*.

Vines: The light twiner, *Billardiera mutabilis*, is present but scarce.

Ferns: *Pteridium esculentum* is dense in patches.

Ground flora: Dominated variously by *Gahnia radula*, *Themeda triandra*, *Microlaena stipoides*, *Austrostipa rudis* or *Rytidosperma racemosum*. There are also substantial patches dominated by *Platylobium formosum* or *Dianella admixta*. *Rytidosperma pallidum* and *Poa morrisii* are present in less degraded areas. Other species that are abundant in numbers but not dominant in foliage cover include *Arthropodium strictum*, *Rytidosperma linkii* var. *fulva*, *Gonocarpus tetragynus*, *Hibbertia riparia*, *Lomandra filiformis*, *Lomandra longifolia* and *Schoenus apogon*. The characteristic species, *Platylobium obtusangulum* and *Tricoryne elatior*, are present but not abundant. *Platylobium formosum* was also present near Burwood Hwy in 2002 but not found in 2008.

Plant species

The following plant species were observed by the author on 13/9/02 and/or 7/3/08, as indicated in the 'Year' column. Additional species would probably be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Eucalyptus yarraensis* is rare nationally.

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
V	<i>Acacia mearnsii</i>	2002		<i>Lachnagrostis filiformis</i>	2008
V	<i>Acacia melanoxylon</i>	2008		<i>Lepidosperma gunnii</i>	2008
	<i>Acacia paradoxa</i>	2008	V	<i>Leptorhynchus tenuifolius</i>	2002
	<i>Acaena novae-zelandiae</i>	2002		<i>Leptospermum continentale</i>	2002
	<i>Acrotriche serrulata</i>	2002	E	<i>Leptospermum scoparium</i>	2002
V	<i>Allocasuarina littoralis</i> (wild & planted)	2008	E	<i>Linum marginale</i>	2008
C	<i>Amyema pendula</i>	2002		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	2008
	<i>Arthropodium strictum</i>	2008		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>	2008
	<i>Austrostipa pubinodis</i>	2002		<i>Lomandra longifolia</i>	2002
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	2008	E	<i>Melaleuca ericifolia</i>	2008
	<i>Billardiera mutabilis</i>	2002		<i>Microlaena stipoides</i>	2008
	<i>Bursaria spinosa</i>	2002		<i>Microtis ?parviflora</i>	2002
	<i>Carex ?breviculmis</i>	2002	C	<i>Muellerina eucalyptoides</i>	2002
	<i>Cassinia arcuata</i>	2008	C	<i>Olearia ramulosa</i> (planted)	2002
V	<i>Cassinia longifolia</i>	2008	V	<i>Opercularia ovata</i>	2008
	<i>Clematis decipiens</i> (planted)	2008	V	<i>Opercularia varia</i>	2002
V	<i>Coprosma quadrifida</i>	2008		<i>Oxalis exilis/perennans</i>	2002
E	<i>Daviesia latifolia</i>	2008	E	<i>Ozothamnus ferrugineus</i>	2002
	<i>Dianella admixta</i>	2008	V	<i>Pimelea humilis</i>	2008
V	<i>Dillwynia cinerascens</i>	2002	V	<i>Platylobium formosum</i>	2002
V	<i>Epacris impressa</i>	2002	V	<i>Platylobium obtusangulum</i>	2008
	<i>Epilobium ?hirtigerum</i>	2002		<i>Poa morrisii</i>	2002
V	<i>Eucalyptus cephalocarpa</i>	2008		<i>Poranthera microphylla</i>	2002
	<i>Eucalyptus goniocalyx</i>	2002		<i>Pteridium esculentum</i>	2008
E	<i>Eucalyptus macrorhyncha</i>	2008		<i>Rytidosperma linkii</i> var. <i>fulvum</i>	2008
V	<i>Eucalyptus melliodora</i>	2002		<i>Rytidosperma pallidum</i>	2002
V	<i>Eucalyptus obliqua</i>	2008		<i>Rytidosperma penicillatum</i>	2002
V	<i>Eucalyptus ovata</i>	2002	V	<i>Rytidosperma pilosum</i>	2002
E	<i>Eucalyptus radiata</i>	2008		<i>Rytidosperma racemosum</i>	2008
C	<i>Eucalyptus yarraensis</i> (destroyed 2007)	2003		<i>Rytidosperma setaceum</i>	2008
V	<i>Exocarpos cupressiformis</i>	2008		<i>Rytidosperma tenuius</i>	2002
	<i>Gahnia radula</i>	2008		<i>Schoenus apogon</i>	2002
	<i>Gonocarpus tetragynus</i>	2002		<i>Senecio glomeratus</i>	2002
	<i>Goodenia ovata</i>	2008		<i>Senecio quadridentatus</i>	2008
V	<i>Hemarthria uncinata</i>	2002	V	<i>Thelymitra ?peniculata</i>	2002
E	<i>Hibbertia riparia</i>	2002		<i>Themeda triandra</i>	2002
	<i>Juncus pallidus</i>	2002		<i>Tricoryne elatior</i>	2002
E	<i>Juncus subsecundus</i>	2008	V	<i>Veronica gracilis</i>	2008
	<i>Kunzea ericoides</i> spp. agg.	2008			

Introduced Species

<i>Acacia baileyana</i>	<i>Ehrharta erecta</i>	<i>Pittosporum undulatum</i>
<i>Agrostis capillaris</i>	<i>Ehrharta longiflora</i>	<i>Plantago lanceolata</i>
<i>Allium triquetrum</i>	<i>Erica lusitanica</i>	<i>Prunus cerasifera</i>
<i>Anthoxanthum odoratum</i>	<i>Galium aparine</i>	<i>Quercus robur</i>
<i>Briza maxima</i>	<i>Gladiolus undulatus</i>	<i>Romulea rosea</i>
<i>Bromus catharticus</i>	<i>Holcus lanatus</i>	<i>Rubus anglocandicans</i>
<i>Centaureum erythraea</i>	<i>Hypochoeris radicata</i>	<i>Sporobolus africanus</i>
<i>Cirsium vulgare</i>	<i>Linum trigynum</i>	<i>Trifolium dubium</i>
<i>Cotoneaster glaucophyllus</i>	<i>Oxalis incarnata</i>	<i>Ulex europaeus</i>
<i>Cotoneaster pannosus</i>	<i>Oxalis pes-caprae</i>	<i>Vicia sativa</i>
<i>Crassula multicava</i>	<i>Paspalum dilatatum</i>	<i>Vulpia bromoides</i>
<i>Cytisus scoparius</i>	<i>Pennisetum clandestinum</i>	<i>Watsonia meriana</i> var. <i>bulbillifera</i>
<i>Dactylis glomerata</i>	<i>Pinus radiata</i>	

Notes concerning two of the locally threatened plant species

Clematis microphylla (Small-leaved Clematis). One apparently wild plant was found for the first time in 2008 near the southwest corner of the Koomba Park tennis courts. It is probably progeny of individuals planted near Harold St.

Eucalyptus yarraensis (Yarra Gum). One mature tree grew near Burwood Hwy until it was felled in 2007, perhaps for road widening.

Linum marginale (Native Flax). Several were found near the Minkell Ct walkway and several more near the Koomba Park tennis courts.

Microtis ?parviflora (Slender Onion-orchid). Found northwest of Minkell Ct, numbers not recorded.

Fauna of special significance

Uncommon in the Melbourne Region

Cattle Egret. The author sees flocks regularly in grass on properties adjoining the roadside but not on the road verge itself.

Uncommon in Knox

Imperial White Butterfly. A large colony was found in 2002 on Creeping Mistletoes (*Muellerina eucalyptoides*) on the southeastern road verge, subsequently cleared for the EastLink road. This butterfly species has become uncommon in Knox, probably because of the dearth of the necessary host mistletoes.

Fauna habitat features

- Some large trees have hollows that would suit habitation by native birds, bats, possums or insects;
- Yellow Box trees are known to be good seasonal producers of nectar for birds and insects, so the ones near Harold St may be valuable in that capacity;
- The prickly shrub layer in parts of the site, particularly near Stringybark Reserve, could provide protection for small native birds.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Endangered Ecological Vegetation Class

Valley Heathy Forest is endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that the site's native vegetation is necessarily of at least High conservation significance. This, in turn, gives the site **State** significance under criterion 3.2.3 of Amos (2004).

Rare or Threatened Flora

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Invasion by environmental weeds:
 - Serious: Sweet Vernal-grass (*Anthoxanthum odoratum*), Large Quaking-grass (*Briza maxima*), English Broom (*Cytisus scoparius*), Cocksfoot (*Dactylis glomerata*), Spanish Heath (*Erica lusitanica*), Pale Wood-sorrel (*Oxalis incarnata*), Soursob (*Oxalis pes-caprae*), Kikuyu (*Pennisetum clandestinum*), Ribwort (*Plantago lanceolata*), Common Onion-grass (*Romulea rosea*), Squirrel-tail Fescue (*Vulpia bromoides*), Bulbil Watsonia (*Watsonia meriana* var. *bulbillifera*);

- Moderate: Brown-top Bent (*Agrostis capillaris*), Angled Onion (*Allium triquetrum*), Prairie Grass (*Bromus catharticus*), Cotoneaster (*Cotoneaster glaucophyllus forma serotinus*), Panic Veldt-grass (*Ehrharta erecta*), Annual Veldt-grass (*Ehrharta longiflora*), Cleavers (*Galium aparine*), Wild Gladiolus (*Gladiolus undulatus*), Yorkshire Fog (*Holcus lanatus*), Cat's Ear (*Hypochoeris radicata*), Paspalum (*Paspalum dilatatum*), Monterey Pine (*Pinus radiata*), Sweet Pittosporum (*Pittosporum undulatum*), Blackberry (*Rubus discolor*), Indian Rat-tail Grass (*Sporobolus indicus* var. *capensis*), Gorse (*Ulex europaeus*), a vetch (*Vicia ?hirsuta*), Common Vetch (*Vicia sativa*);
- Overly frequent mowing of native ground flora and seedlings;
- Loss or decline of plant species whose populations are so small and isolated that they are vulnerable to inbreeding, poor reproductive success or elimination by incidents such as disease or mower damage. Examples include *Acrotriche serrulata*, *Amyema pendulum*, *Dillwynia cinerascens*, *Leptorhynchos tenuifolius*, *Muellerina eucalyptoides* and *Veronica gracilis*, each of which was found to have only one or two individuals.

Management issues

- It would be ecologically desirable to remove the small number of photinias that are intermingled with Swamp Paperbarks outside the Koomba Park tennis courts. The paperbarks would soon provide similar visual screening to the photinias;
- Frequent mowing of exotic grass and weeds is desirable, but should not encroach into areas with substantial native ground flora. A skilled mower operator may be required to recognise the appropriate limits;
- The conservation significance of the site could be enhanced by planting of some of the species whose numbers are dangerously small (as listed above). The signposted 'Significant Roadside KN20' would be an appropriate area for planting.

Administration matters

- The Planning Scheme zoning of the road reservation is Road Zone Category 1 (RDZ1), but note that this is flanked by tree reserves that are zoned either Residential 1 Zone (R1Z, on the northwestern side of the road) or Public Park and Recreation Zone (PPRZ, on the opposite side). 187 Harold St, which is a vacant block partly within the site, is zoned R1Z;
- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the endangered EVC and the rare species present;
- This site is not covered by any of the existing Vegetation Protection Overlay Schedules of the Knox Planning Scheme.

Information sources used in this assessment

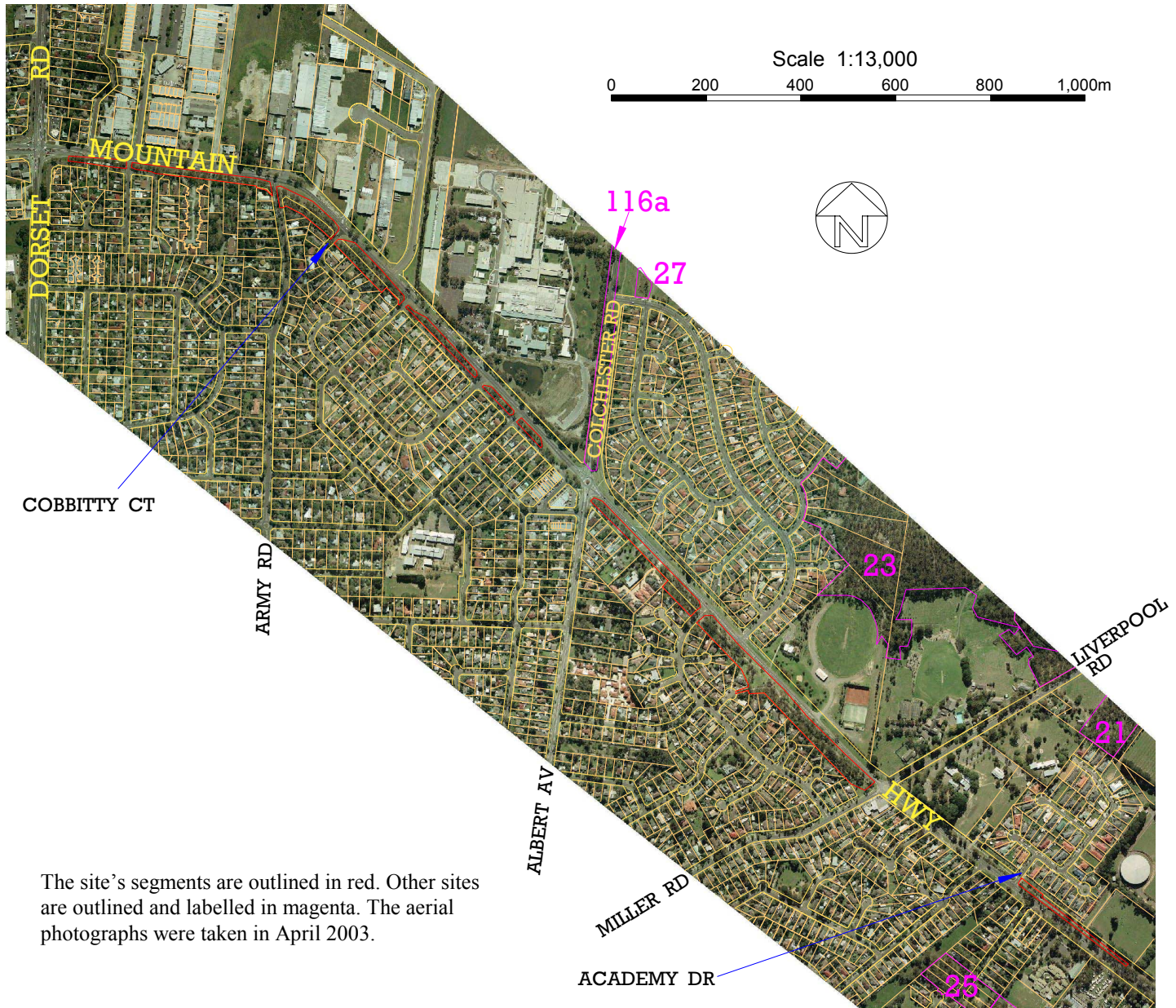
- Site surveys by Dr Lorimer for three hours on 13/9/02 and one hour on 7/3/08 following this study's standard procedures discussed in Section 2.4 of Volume 1. This included:
 - Compilation of lists of indigenous and introduced plants for each of five parts of the site;
 - A description of the vegetation's structural and floristic composition within each of the parts;
 - Documentation of the vegetation's ecological condition;
 - Documentation of rare species populations;
 - Incidental observations of fauna; and
 - Checks for fauna habitat, ecological threats and management issues.
- The 1998 'Scoresby Transport Corridor Environment Effects Statement', particularly the indicative road design;
- A report, 'Assessment of Native Vegetation on the Mitcham to Frankston Freeway Alignment in Knox', by Dr Lorimer in July 2003 for Knox City Council;
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 92. Mountain Hwy Roadside, Boronia to The Basin

A total of 2.23 kilometres of road reserve, in ten segments. Melway map 65.

Site Significance Level: *State*

- The native vegetation all belongs to the endangered Ecological Vegetation Class, Valley Heathy Forest;
- Over ninety indigenous plant species are present, which is rich by Knox standards;
- Ecologically stable or improving vegetation with moderate diversity, except for some species that may have too few individuals for long-term viability in the absence of intervention.



The site's segments are outlined in red. Other sites are outlined and labelled in magenta. The aerial photographs were taken in April 2003.

Boundaries

This site has ten sections totalling 4.82 ha. The edges closest to the road surface of Mountain Hwy are in the road gutter (but not enclosing any part of a gutter that is subject to periodic grading).

Land use & tenure: Verges of a secondary road.

Site description

This site skirts the southern edge of Dandenong Creek valley, rising into the foothills of the Dandenong Ranges at its southeastern end. Elevations vary from 118m at the edge of the Dandenong Ck floodplain near Cobbitty Ct to 171 m at the site's southeastern end.

The site traverses three Devonian geological formations, comprising hornfels in the west, rhyolite in the middle and rhyodacite in the east. Despite the variable geological origins, the subsoil is clay throughout and the topsoil is poorly draining clay loam except for some shallow alluvium near Cobbitty Ct.

All the native vegetation belongs to the endangered Ecological Vegetation Class, Valley Heathy Forest, with tendencies toward Swampy Woodland near Cobbitty Ct, Lowland Forest just west of Miller Rd and Grassy Forest at the southeastern end.

Knox City Council has designated a section of the site at Academy Drive in The Basin as Significant Roadside KN1, and a section between Army Rd and Cobbitty Ct in Boronia as Significant Roadside KN2. The former was partly destroyed in c.1999 by construction of Academy Drive and associated housing. Both these sections contain small patches in good ecological condition (rating B). The ecological condition in the parts of the site outside the designated significant roadsides is predominantly poor (rating D), except for a tiny patch in good condition and some scattered small patches in fair condition (rating C).

Relationship to other land

The other side of Mountain Hwy, and all land for more than one kilometre to the south, are within the Dandenong Ranges buffer (Site 99) that is proposed to be covered by a new Schedule 2 to the Environmental Significance Overlay. That is because of the extensive movement of native birds and insects through this area, even relatively ecologically sensitive species such as the Australian King-Parrot. These fauna transport pollen and seeds, helping plants to avoid becoming inbred.

Other, more localised sites from elsewhere in this report are outlined and labelled in magenta on the aerial photograph. The ecological links between them are likely to be weak.

It seems unlikely that this Mountain Highway site functions as a habitat corridor.

Bioregion: Gippsland Plain

Habitat types

Valley Heathy Forest (EVC 127, Endangered): Estimated to contain 4.0 ha of native vegetation, comprising 0.08 ha in good ecological condition (rating B, mainly near Army Rd), 0.65 ha in fair ecological condition (rating C) and 3.3 ha in poor ecological condition (rating D).

Canopy trees: Dominated by a mixture of four or more eucalypt species, the staple ones being *Eucalyptus cephalocarpa*, *E. radiata* and *E. obliqua*. The additional species, *E. goniocalyx* and *E. macrorhyncha*, are present in drier areas.

Lower trees: Dominated by *Acacia melanoxylon* and *Exocarpos cupressiformis*.

Shrubs: Dense where not thinned by humans. Seventeen shrub species were found, the most abundant and widespread being *Bursaria spinosa*. Other species that are present and typically found in Valley Heathy Forest include *Acacia paradoxa*, *Cassinia aculeata*, *Daviesia latifolia*, *Goodenia ovata*, *Kunzea ericoides* and *Leptospermum continentale*.

Vines: The light twiner, *Billardiera mutabilis*, is abundant in much of the site.

Ferns: *Pteridium esculentum* is common in the site and dense in patches.

Ground flora: Densely grassy and with small shrubs where not destroyed by mowing. Mown areas are dominated by various *Rytidosperma* species (particularly *R. racemosum*). Less modified areas are dominated variously by *Themeda triandra*, *Rytidosperma pallidum*, *Microlaena stipoides*, *Austrostipa rudis*, *Lomandra longifolia* or *Gahnia radula*. There are also substantial patches dominated by *Dianella admixta*. Other species that are abundant in numbers but not dominant in foliage cover include *Arthropodium strictum*, *Lomandra filiformis*, *Platylobium formosum*, *Tricoryne elatior* and *Xanthorrhoea minor*. The characteristic species, *Hibbertia riparia* and *Platylobium obtusangulum*, are present but not abundant.

Plant species

The following plant species were observed by the author on 10/9/97 and/or 16/4/03, or by Mr Damien Cook on 19/11/92-6/12/92, as indicated in the 'Year' column. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Eucalyptus yarraensis* is rare nationally. In addition, *Thelymitra media* and the *Caladenia* rare throughout the Melbourne area.

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
C	<i>Acacia acinacea</i> s.l.	1992	E	<i>Hibbertia riparia</i>	2003
	<i>Acacia dealbata</i>	2003	V	<i>Hovea heterophylla</i>	2003
V	<i>Acacia mearnsii</i>	2003	E	<i>Hypericum gramineum</i>	2003
V	<i>Acacia melanoxylon</i>	2003		<i>Juncus sarophorus</i>	1997
E	<i>Acacia myrtifolia</i>	2003	E	<i>Juncus subsecundus</i>	2003
	<i>Acacia paradoxa</i>	2003	C	<i>Kennedia prostrata</i>	1992
E	<i>Acacia pycnantha</i>	2003		<i>Kunzea ericoides</i> spp. agg.	2003
E	<i>Acacia stricta</i>	2003	C	<i>Lachnagrostis aemula</i> s.l.	1992
V	<i>Acaena echinata</i>	2003		<i>Lachnagrostis filiformis</i>	2003
	<i>Acaena novae-zelandiae</i>	1997	V	<i>Lepidosperma laterale</i>	2003
V	<i>Acrotriche prostrata</i>	2003		<i>Leptospermum continentale</i>	2003
	<i>Acrotriche serrulata</i>	2003	E	<i>Linum marginale</i>	1992
C	<i>Amyema pendula</i>	2003		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	2003
	<i>Arthropodium strictum</i>	2003		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>	2003
	<i>Austrostipa pubinodis</i>	2003		<i>Lomandra longifolia</i>	2003
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	2003	V	<i>Luzula meridionalis</i>	1992
E	<i>Banksia marginata</i>	2003	V	<i>Lythrum hyssopifolia</i>	1992
	<i>Billardiera mutabilis</i>	2003	E	<i>Melaleuca ericifolia</i>	2003
V	<i>Brunonia australis</i>	2003		<i>Microlaena stipoides</i>	2003
	<i>Bursaria spinosa</i>	2003		<i>Microtis parviflora/unifolia</i>	1992
V	<i>Caesia parviflora</i>	1992	C	<i>Muellerina eucalyptoides</i>	2003
C	<i>Caladenia</i> sp. (spider-orchid group)	1992	E	<i>Olearia myrsinoides</i>	1992
	<i>Carex breviculmis</i>	2003	V	<i>Opercularia varia</i>	1992
	<i>Carex inversa</i>	1992		<i>Oxalis exilis/perennans</i>	2003
	<i>Cassinia aculeata</i>	2003	E	<i>Ozothamnus ferrugineus</i>	2003
	<i>Cassinia arcuata</i>	2003		<i>Pandorea pandorana</i>	2003
C	<i>Chamaescilla corymbosa</i>	1992	E	<i>Pentapogon quadrifidus</i>	1992
V	<i>Clematis aristata</i>	2003	V	<i>Pimelea humilis</i>	2003
E	<i>Correa reflexa</i>	2003	V	<i>Plantago varia</i>	2003
E	<i>Cynoglossum suaveolens</i>	2003	V	<i>Platylobium formosum</i>	2003
E	<i>Daviesia latifolia</i>	2003	V	<i>Platylobium obtusangulum</i>	2003
E	<i>Daviesia leptophylla</i>	1997		<i>Poa ensiformis</i>	2003
	<i>Deyeuxia quadriseta</i>	2003		<i>Poa morrisii</i>	2003
	<i>Dianella admixta</i>	2003		<i>Poranthera microphylla</i>	1992
V	<i>Dianella tasmanica</i>	2003		<i>Pteridium esculentum</i>	2003
	<i>Dichondra repens</i>	2003		<i>Pterostylis nutans</i>	2003
V	<i>Dillwynia cinerascens</i>	2003	V	<i>Pultenaea gunnii</i>	2003
V	<i>Drosera peltata</i> subsp. <i>auriculata</i>	1992		<i>Rytidosperma laeve</i>	1992
	<i>Elymus scaber</i>	2003		<i>Rytidosperma linkii</i> var. <i>fulvum</i>	2003
V	<i>Epacris impressa</i>	1997		<i>Rytidosperma pallidum</i>	2003
	<i>Eragrostis brownii</i>	1997		<i>Rytidosperma penicillatum</i>	2003
V	<i>Eucalyptus cephalocarpa</i>	2003		<i>Rytidosperma racemosum</i>	2003
	<i>Eucalyptus goniocalyx</i>	2003		<i>Rytidosperma setaceum</i>	2003
E	<i>Eucalyptus macrorhyncha</i>	2003		<i>Rytidosperma tenuius</i>	2003
V	<i>Eucalyptus obliqua</i>	2003		<i>Schoenus apogon</i>	1992
	<i>Eucalyptus ovata</i> hybrid	2003		<i>Senecio hispidulus</i>	2003
E	<i>Eucalyptus radiata</i>	2003		<i>Senecio quadridentatus</i>	2003
V	<i>Euchiton collinus</i>	1992	V	<i>Solenogyne dominii</i>	2003
V	<i>Exocarpos cupressiformis</i>	2003	E	<i>Stackhousia monogyna</i>	2003
E	<i>Exocarpos strictus</i>	2003	E	<i>Stylidium armeria/graminifolium</i>	1992
	<i>Gahnia radula</i>	2003		<i>Tetrarrhena juncea</i>	2003
V	<i>Glycine clandestina</i>	2003	C	<i>Thelymitra media</i> s.l.	1992
	<i>Gonocarpus tetragynus</i>	2003		<i>Themeda triandra</i>	2003
	<i>Goodenia lanata</i>	2003	V	<i>Thysanotus patersonii</i>	1992
	<i>Goodenia ovata</i>	1997		<i>Tricoryne elatior</i>	2003
C	<i>Hakea ulicina</i>	2003	E	<i>Viola hederacea</i>	1992
V	<i>Hardenbergia violacea</i>	2003	V	<i>Xanthorrhoea minor</i>	2003
V	<i>Helichrysum scorpioides</i>	2003	E	<i>Xanthosia dissecta</i>	1992
V	<i>Hemarthria uncinata</i>	1992			

Introduced Species

<i>Acacia longifolia</i> subsp. <i>longifolia</i>	<i>Delairea odorata</i>	<i>Paspalum dilatatum</i>
<i>Agapanthus praecox</i>	<i>Ehrharta erecta</i>	<i>Pennisetum clandestinum</i>
<i>Agrostis capillaris</i>	<i>Galium aparine</i>	<i>Pinus radiata</i>
<i>Aira caryophylla</i>	<i>Gamochaeta purpurea</i>	<i>Pittosporum undulatum</i>
<i>Allium triquetrum</i>	<i>Genista monspessulana</i>	<i>Plantago lanceolata</i>
<i>Anagallis arvensis</i>	<i>Grevillea rosmarinifolia</i>	<i>Prunella vulgaris</i>
<i>Anthoxanthum odoratum</i>	<i>Hedera helix</i>	<i>Prunus</i> sp.
<i>Arctotheca calendula</i>	<i>Holcus lanatus</i>	<i>Quercus robur</i>
<i>Asparagus asparagoides</i>	<i>Hypochoeris radicata</i>	<i>Romulea rosea</i>
<i>Asparagus scandens</i>	Iridaceae sp.	<i>Rubus anglocandicans</i>
<i>Billardiera heterophylla</i>	<i>Isolepis levynsiana</i>	<i>Sisyrinchium iridifolium</i>
<i>Briza maxima</i>	<i>Juncus microcephalus</i>	<i>Sporobolus africanus</i>
<i>Centaurium erythraea</i>	<i>Leontodon taraxacoides</i>	<i>Taraxacum officinale</i> spp. agg.
<i>Cerastium glomeratum</i>	<i>Lolium perenne</i>	<i>Tradescantia fluminensis</i>
<i>Cotoneaster glaucophyllus</i>	<i>Lonicera japonica</i>	<i>Trifolium repens</i>
<i>Cotoneaster pannosus</i>	<i>Lotus subbiflorus</i>	<i>Vicia</i> sp.
<i>Crataegus monogyna</i>	<i>Malus pumila</i>	<i>Vinca major</i>
<i>Crocsmia</i> × <i>crocsmiiflora</i>	<i>Medicago polymorpha</i>	<i>Viola odorata</i>
<i>Cynodon dactylon</i>	<i>Melaleuca armillaris</i>	
<i>Dactylis glomerata</i>	<i>Oxalis purpurea</i>	

Notes concerning some of the locally threatened plant species

A spider-orchid (*Arachnorchis/Caladenia*) was recorded by Mr Damien Cook on 24/11/92 just southeast of Army Rd. If correct, it is likely to be referable to *Caladenia oenochila*, being the most common spider-orchid in the local area. This species is listed as vulnerable in Victoria. However, the date of the recording is not within the season when spider-orchids would be flowering or in seed, suggesting that Mr Cook may have relied on someone else's observation. The record is therefore treated here as highly worthy of further investigation, but not a good guide to the likelihood of the current existence of a spider-orchid within the site.

Acacia acinacea (Gold-dust Wattle). Last recorded in 1992 and evidently no longer present.

Banksia marginata (Silver Banksia). One individual was found opposite Kalman Dr, Boronia.

Correa reflexa (Common Correa). One was found northwest of Army Rd and another between Army Rd and Cobbitty Ct.

Cynoglossum suaveolens (Sweet Hound's-tongue). Three individuals were found just northwest of Dorrigo Dr.

Daviesia leptophylla (Narrow-leaf Bitter-pea). Found just southeast of Academy Dr, The Basin. Numbers not recorded.

Hakea ulicina (Furze Hakea). There is one individual (or a close pair) at the edge of the road outside 992 Mountain Hwy, Boronia (380 m east of Dorset Rd).

Kennedia prostrata (Running Postman). Recorded in 1992 as being scarce.

Microtis parviflora/unifolia (an Onion-orchid). Recorded in 1992 as being numerous. Probably undetected in 2002 due to seasonal factors.

Pentapogon quadrifidus (Five-awned Spear-grass). Recorded in 1992 as fairly plentiful.

Thelymitra media (Tall Sun-orchid). Recorded in 1992 as being scarce.

Thysanotus patersonii (Twining Fringe-lily). Recorded in 1992 as being scarce.

Fauna of special significance

None detected

Fauna habitat features

- Some large trees have hollows that would suit habitation by native birds, bats, possums or insects;
- The prickly shrub layer in parts of the site, particularly just northwest of Dorrigo Drive, could provide protection for small native birds. Even the very serious environmental weed, Hawthorn, may have some habitat value in this respect. Removal of Hawthorn should therefore be done progressively, accompanied by planting of prickly indigenous species as replacements.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Endangered Ecological Vegetation Class

Valley Heathy Forest is endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that the site's native vegetation is necessarily of at least High conservation significance. This, in turn, gives the site **State** significance under criterion 3.2.3 of Amos (2004).

It should be recognised that some of the site is of lower significance when taken in isolation.

Locally Threatened Plant Species

Many of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Richness of Species

Over ninety indigenous plant species are present, which is rich by Knox standards and represents a good cross-section of the species that inhabit Valley Heathy Forest. However, this level of richness is not recognised as significant under the standard criteria.

Threats

- Invasion by environmental weeds:
 - Very serious: Japanese Honeysuckle (*Lonicera japonica*) – concentrated strongly near Miller Rd;
 - Serious: Bridal Creeper (*Asparagus asparagoides*), Asparagus Fern (*Asparagus scandens*), Large Quaking-grass (*Briza maxima*), Cotoneaster (*Cotoneaster glaucophyllus forma serotinus*), Cotoneaster (*Cotoneaster pannosus*), Hawthorn (*Crataegus monogyna*), Panic Veldt-grass (*Ehrharta erecta*), Ivy (*Hedera helix*), Cat's Ear (*Hypochoeris radicata*), an Irid (possibly *Montbretia* or *Watsonia*), a wood-sorrel (*Oxalis ?incarnata*), Kikuyu (*Pennisetum clandestinum*) and Sweet Pittosporum (*Pittosporum undulatum*);
- Overly frequent mowing of native ground flora and seedlings;
- Slasher damage to trees and shrubs between Miller Rd and Albert Av;
- Loss or decline of plant species whose populations are so small and isolated that they are vulnerable to inbreeding, poor reproductive success or elimination by incidents such as disease or mower damage. This applies to *Acacia myrtifolia*, *Acaena echinata*, *Correa reflexa*, *Cynoglossum suaveolens*, *Daviesia leptophylla*, *Hakea ulicina*, *Hardenbergia violacea*, *Hovea linearis*, *Muellerina eucalyptoides*, *Plantago varia*, *Platylobium obtusangulum*, *Pultenaea gunnii* and *Stackhousia monogyna*.

Management issues

- Large Quaking-grass (*Briza maxima*) in the area between Army Rd and Cobbitty Ct should be sprayed in late July or early August with the minimum recommended dose of a grass-specific herbicide such as Fusilade®;
- Frequent mowing of exotic grass and weeds is desirable, but slashing has been extending into native ground flora of good to fair ecological condition in the patch to the northwest of Dorrigo Drive. This should be amended. A skilled mower operator may be required to recognise the appropriate limits;
- Greater care should be exercised by tractor operators slashing grass, to avoid a continuation of the damage that has been done to trees and shrubs between Miller Rd and Albert Av;
- Even the very serious environmental weed, Hawthorn, may have some habitat value near Dorrigo Drive as protection and nest sites for small native birds. Hawthorn should be removed from this area, but progressively, accompanied by planting of prickly indigenous species as replacements;
- The conservation significance of the site could be enhanced by planting of some of the species whose numbers are dangerously small (as listed above). The verges signposted as KN1 and KN2 would be the best areas for planting.

Administration matters

- It would be highly desirable to seek the spider-orchid that was recorded near Army Rd in 1992. If it exists, it is likely to be a statewide-vulnerable species;
- The Planning Scheme zoning of the road reservation is Road Zone Category 1 (RDZ1), but note that this is flanked by tree reserves that are variously zoned Public Park and Recreation Zone (PPRZ) or Residential 1 Zone (R1Z);
- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the endangered EVC and the rare species present. The boundary defined here takes in all the significant native vegetation apart from scattered trees. The remainder of the road reservation is proposed to be covered by the new Environmental Significance Overlay Schedule 2. Routine roadwork and utility maintenance is exempt under both of these proposed schedules;
- It is recommended to remove the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme, which covers the full width of the Mountain Hwy road reservation from Forest Rd (southeast of the site described here) almost to Cobbitty Ct. This is evidently partly because of the description of the report by Water Ecoscience (1998), in

which a longer stretch of road reservation comprised their Site 84. However, the overlay does not extend further northwest than Kalman Dr, thereby omitting the most significant vegetation in the whole site.

Information sources used in this assessment

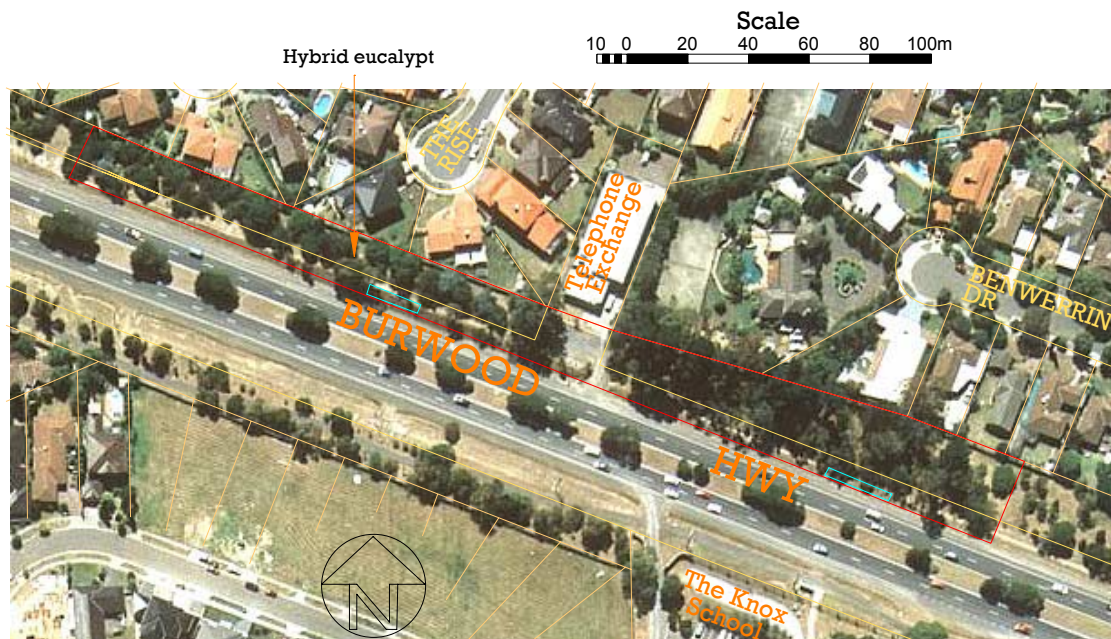
- Site surveys by Dr Lorimer totalling just over 4½ hours on 16/4/03 and 23/4/03 following this study's standard procedures discussed in Section 2.4 of Volume 1. This included:
 - Compilation of lists of indigenous and introduced plants for each of six parts of the site;
 - A description of the vegetation's structural and floristic composition within each of the parts;
 - Documentation of the vegetation's ecological condition;
 - Documentation of rare species populations; and
 - Checks for fauna habitat, ecological threats and management issues.
- A similar site survey of Mountain Hwy southeast of Liverpool Rd by Dr Lorimer on 10/9/97 for the report, '*A Survey and Management Plan for Significant Vegetation of Roadsides in Knox*' by G.S. Lorimer for Knox City Council (May 1998, 137 pp.);
- Plant records presented by Water Ecoscience (1998);
- Data from a 300 m² quadrat (number N01901 in the Victorian Flora Information System), gathered by Mr Damien Cook on 19/11/92, as described by Mark Allaway and Associates in '*Indigenous Vegetation survey to Major Road Reserves – Phase 2 – A Management Strategy for Remnant Roadside Vegetation*' for City of Knox (1993). Some of the records are treated here as of questionable accuracy, and the duplication of some species in the species list suggests that the preparation of the list was imperfect. The inclusion of a spider-orchid also raises the question of whether Mr Cook may have used records from someone else, because spider-orchids would not normally be identifiable in late November;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 93. Burwood Hwy Roadside, Wantirna

320 lineal metres of road reserve, each side of the Wantirna Telephone Exchange. Melway ref. 63 E9

Site Significance Level: *State*

- Contains remnants and regrowth of the endangered Ecological Vegetation Class, Valley Heathy Forest;
- A linear oasis of native vegetation in a heavily urbanised neighbourhood;
- Uncommonly large populations of the shrub, Hop Bitter-pea (*Daviesia latifolia*), by Knox standards;
- Ecologically stable or improving vegetation with moderate diversity, except for some species that may have too few individuals for long-term viability in the absence of intervention.



Boundaries

The site is defined by the red outline on the plan above. Its width extends from the gutter of Burwood Hwy to the northern boundary of the tree reserve. Its western end is a signpost indicating this as Significant Roadside KN9. The eastern end is as shown. The total area is 0.70 ha.

Land use & tenure: Road reservation and Council tree reserve.

Site Description

The most significant vegetation west of the telephone exchange's driveway is between the footpath above the cutting, extending down the batter to almost one metre above the road gutter. This is regrowth following creation of the cutting many years ago, fostered in recent years by relief from slashing (except just above the gutter).

Between this strip and the fences of adjoining residences, there are scarce remnant eucalypts and scattered regenerating wattles, interspersed with much larger numbers of nonindigenous wattles, grevilleas, hakeas and other large shrubs. Beneath all these is a ground layer comprising mostly indigenous wallaby-grasses and spear-grass, except for a weedy strip within a metre or so of the residences' fences (due largely to dumping of garden waste).

Some of the nonindigenous shrubs are naturalising and Council staff have therefore targeted them for removal.

East of the telephone exchange's driveway, the vegetation has been strongly influenced by many mature pines (some of which have just been removed). The significance of the vegetation tends to decrease northwards from the informal footpath next to the gutter.

The vegetation west of the telephone exchange is at the drier extreme of Valley Heathy Forest, reflected by the presence of *Eucalyptus macrorhyncha* and densely grassy ground flora. The vegetation toward the eastern end tends toward the opposite extreme of Valley Heathy Forest, with several *Eucalyptus cephalocarpa* and an increasing density of *Gahnia radula*.

Council has been actively controlling weeds in this site and it is quite possible that more indigenous plant species may appear. However, many species are present in numbers so low as to create concerns about their long-term viability. Examples are *Billardiera mutabilis*, *Bursaria spinosa*, *Hardenbergia violacea*, *Leptospermum continentale* and *Solanum ?laciniatum*, all with one plant each, and *Eucalyptus melliodora* and *Exocarpos cupressiformis* with two plants each.

Relationship to other land

This site is rather isolated from other native vegetation. Plantings of Australian natives and some indigenous species beside Burwood Hwy toward Stud Rd will, at maturity, provide a narrow and probably weak connection to the Blind Creek corridor. There is negligible habitat for native flora or fauna between the site and the Dandenong Creek corridor 1 km away.

Bioregion: Gippsland Plain

Habitat types

Valley Heathy Forest (EVC 127, **regionally Endangered**). Total vegetated area approx. 6,600 m², comprising:

125 m² in good ecological condition (rating B, shown as the two blue rectangles on the plan above);

3,000 m² in fair ecological condition (rating C); and

3,500 m² in poor ecological condition (rating D, some reduced to native grasses beneath planted Australian natives).

Dominant canopy trees: *Eucalyptus obliqua*, *E. macrorhyncha*, *E. goniocalyx*, *E. radiata*.

Dominant lower trees: *Acacia implexa*.

Shrubs: Very sparse, *Daviesia latifolia* prominent.

Ground flora: Fairly rich and densely grassy with ferns limited to a few patches of bracken and maidenhair. Dominated variously by *Rytidosperma* species (particularly *R. linkii* var. *fulva*), *Poa morrisii*, *Austrostipa rudis*, *Gahnia radula* or large patches of *Dianella admixta*. Also abundant are *Lomandra filiformis* subsp. *filiformis*, *Gonocarpus tetragynus*.

Plant species

The following plant species were observed by the author on 19/3/02 or by Mr Damien Cook on 6/12/92, as indicated in the 'Year' column. Additional species would probably be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox with 'E'=Endangered and 'V'=Vulnerable.

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
V	<i>Acacia implexa</i>	2002	E	<i>Euchiton involucratus</i>	1992
V	<i>Acacia mearnsii</i>	2002	V	<i>Exocarpos cupressiformis</i>	2002
	<i>Acacia paradoxa</i>	2002		<i>Gahnia radula</i>	2002
	<i>Acrotriche serrulata</i>	2002		<i>Gonocarpus tetragynus</i>	2002
	<i>Arthropodium strictum</i>	2002	V	<i>Hardenbergia violacea</i>	2002
	<i>Austrostipa pubinodis</i>	2002	E	<i>Hibbertia riparia</i>	2002
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	2002	V	<i>Hovea heterophylla</i>	2002
	<i>Billardiera mutabilis</i>	2002	E	<i>Hypericum gramineum</i>	1992
	<i>Bossicea prostrata</i>	2002		<i>Lachnagrostis filiformis</i>	2002
	<i>Bursaria spinosa</i>	2002		<i>Lepidosperma gunnii</i>	2002
	<i>Carex breviculmis</i>	1992		<i>Leptospermum continentale</i>	2002
	<i>Cassinia arcuata</i>	2002	E	<i>Linum marginale</i>	1992
V	<i>Coprosma quadrifida</i>	2002		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	2002
E	<i>Daviesia latifolia</i>	2002		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>	2002
	<i>Deyeuxia quadriseta</i>	2002		<i>Lomandra longifolia</i>	2002
	<i>Dianella admixta</i>	2002	V	<i>Luzula meridionalis</i>	1992
	<i>Dichelachne rara</i>	1992		<i>Microlaena stipoides</i>	2002
V	<i>Dillwynia cinerascens</i>	2002		<i>Microtis parviflora</i>	1992
V	<i>Drosera peltata</i> subsp. <i>auriculata</i>	1992	V	<i>Opercularia varia</i>	1992
	<i>Elymus scaber</i>	2002		<i>Oxalis exilis/perennans</i>	1992
V	<i>Epacris impressa</i>	1992	V	<i>Pimelea humilis</i>	2002
	<i>Eragrostis brownii</i>	2002		<i>Poa morrisii</i>	2002
V	<i>Eucalyptus cephalocarpa</i>	2002		<i>Poranthera microphylla</i>	1992
	<i>Eucalyptus goniocalyx</i>	2002		<i>Pteridium esculentum</i>	2002
E	<i>Eucalyptus macrorhyncha</i>	2002		<i>Rytidosperma linkii</i> var. <i>fulvum</i>	2002
V	<i>Eucalyptus melliodora</i>	2002		<i>Rytidosperma pallidum</i>	2002
V	<i>Eucalyptus obliqua</i>	2002		<i>Rytidosperma penicillatum</i>	2002
E	<i>Eucalyptus radiata</i>	2002		<i>Rytidosperma racemosum</i>	2002

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
	<i>Rytidosperma setaceum</i>	2002	V	<i>Thelymitra peniculata</i>	2002
	<i>Rytidosperma tenuius</i>	2002		<i>Themeda triandra</i>	2002
	<i>Schoenus apogon</i>	2002	E	<i>Viola hederacea</i>	1992
V	<i>Solanum laciniatum</i>	2002			
Introduced Species					
	<i>Acacia baileyana</i>	<i>Dactylis glomerata</i>		<i>Pinus radiata</i>	
	<i>Acacia longifolia</i> subsp. <i>longifolia</i>	<i>Ehrharta erecta</i>		<i>Pittosporum undulatum</i>	
	<i>Agrostis capillaris</i>	<i>Grevillea</i> cultivar or hybrid		<i>Plantago lanceolata</i>	
	<i>Aira caryophyllea</i>	<i>Holcus lanatus</i>		<i>Romulea rosea</i>	
	<i>Anthoxanthum odoratum</i>	<i>Hypochoeris radicata</i>		<i>Rubus anglocandicans</i>	
	<i>Briza maxima</i>	<i>Linum trigynum</i>		<i>Trifolium repens</i>	
	<i>Briza minor</i>	<i>Medicago polymorpha</i>		<i>Ulex europaeus</i>	
	<i>Centaurium erythraea</i>	<i>Oxalis incarnata</i>		<i>Vulpia bromoides</i>	
	<i>Cotoneaster pannosus</i>	<i>Paspalum dilatatum</i>			

Notes concerning some of the locally threatened plant species

Acacia implexa (Lightwood). Significant for the large size of the population, by Knox standards.

Daviesia latifolia (Hop Bitter-pea). Well over a dozen individuals, a large population by Knox standards.

Eucalyptus macrorhyncha × *obliqua* (hybrid eucalypt). One multi-trunked tree; a botanical oddity.

Fauna habitat features

The grassy ground layer is probably supporting butterfly larvae. (Adult Common Brown butterflies were seen.)

There are a small number of large trees that may provide habitat for the more common species of possums and bats.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Richness of Flora

49 indigenous species is a high tally in this highly urbanised area, even though many species are present in very small numbers. The total of six eucalypt species plus one hybrid is also rare in a site of this size. However, these types of attributes are not recognised by the standard criteria of Amos (2004).

Regionally Threatened Ecological Vegetation Class

Valley Heathy Forest is endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that the site's native vegetation is necessarily of at least High conservation significance. This, in turn, gives the site **State** significance under criterion 3.2.3 of Amos (2004).

Rare or Threatened Flora

A few of the locally threatened plant species listed above have viable populations (e.g. *Austrostipa pubinodis*), thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Loss or decline of plant species whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or elimination by incidents such as cubby house construction or digging by dogs;
- Reduced visitation of the site by small insect-eating birds due to its isolation from other areas with indigenous understorey, possibly leading to a worsening of plant pests and diseases;
- Invasion by environmental weeds, particularly Panic Veldt-grass (*Ehrharta erecta*), Pale Wood-sorrel (*Oxalis incarnata*) and pines (all rated 'serious') as well as the potentially serious Cotoneasters, nonindigenous wattles and Gorse (*Ulex europaeus*).

Management issues

- The pines are a negative influence but very expensive to remove (and becoming increasingly so as they grow);
- Recent and ongoing removal of pines, nonindigenous wattles and Panic Veldt-grass should allow expansion and better development of the indigenous vegetation. Gorse and grass weeds (particularly Sweet Vernal-grass) should be monitored on the cutting embankment;
- Pale Wood-sorrel could be controlled by appropriate herbicide application in July-August.

Administration matters

This site is suited to the proposed Schedule 1 to the Environmental Significance Overlay because of its biological significance documented above. It is recommended that this replace the existing coverage of part of the site by Schedule 1 of the Vegetation Protection Overlay.

Information sources used in this assessment

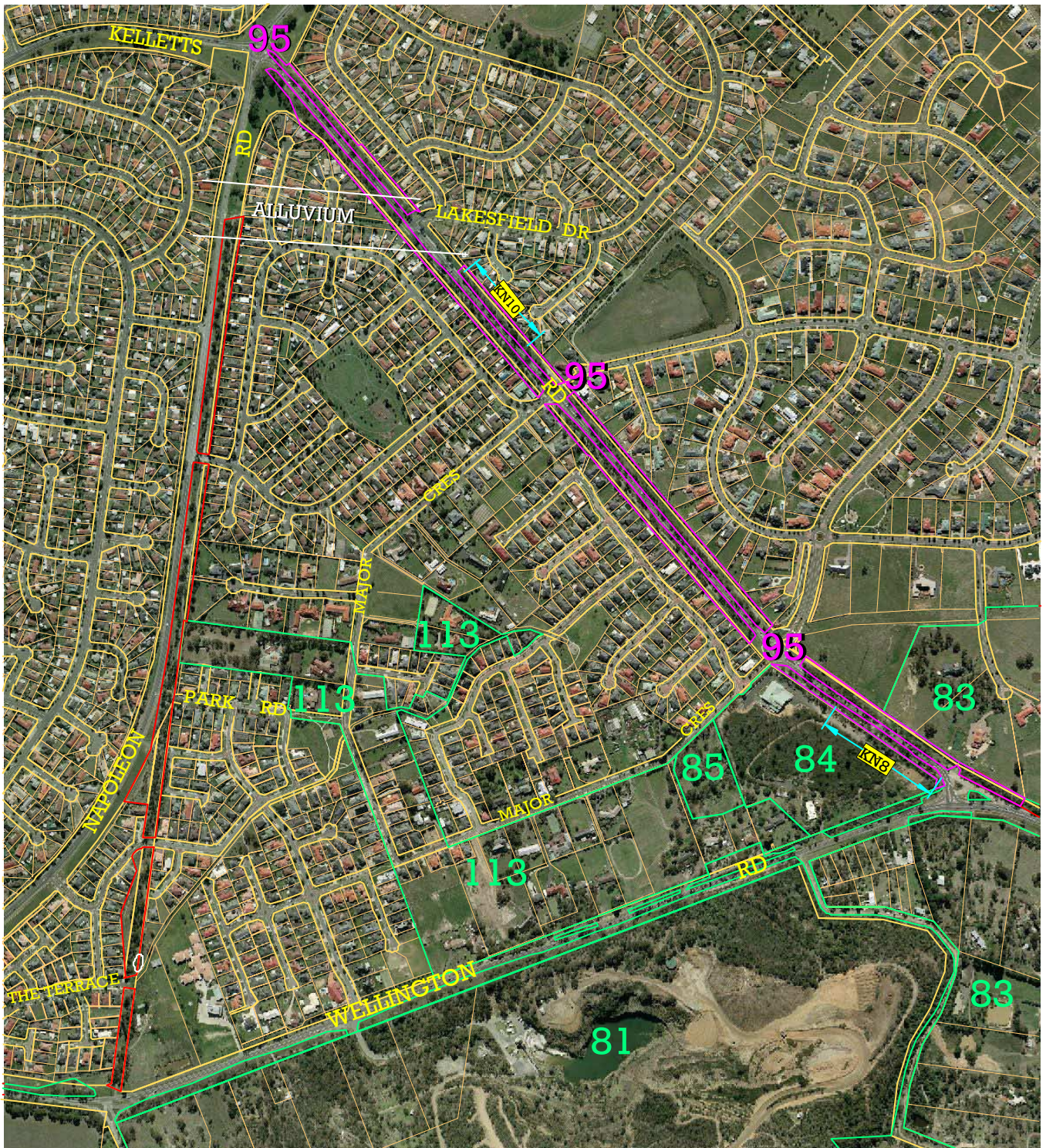
- A site survey undertaken during this study by Dr Lorimer on 19/3/02, following this study's standard procedures discussed in Section 2.4 of Volume 1. This included vegetation mapping, a description of the composition and condition of the vegetation, compilation of four lists of indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats, management issues and populations of scarce or threatened plant species;
- Data from a 150 m² quadrat (numbers N0190600 in the Victorian Flora Information System), gathered by Mr Damien Cook on 6/12/92, as described by Mark Allaway and Associates in '*Indigenous Vegetation survey to Major Road Reserves – Phase 2 – A Management Strategy for Remnant Roadside Vegetation*' for City of Knox (1993).;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 94. Napoleon Rd Roadside, Rowville

Road verge and unused road reservation totalling 1.5 lineal kilometres. Melway maps 73 and 82.

Site Significance Level: *State*

- Nearly all the native vegetation belongs to the endangered Ecological Vegetation Class, Valley Heathy Forest;
- The site is a linear oasis of native vegetation in a heavily urbanised neighbourhood;
- The vegetation is ecologically stable or improving in condition through Council action, but some species still have too few individuals for long-term viability in the absence of intervention.



Scale 1:10,000
 0 100 200 300 400m

KN8 and KN10 refer to signposted 'Significant Roadside' in Site 95.
 The aerial photograph was taken in April 2003.

Boundaries

The four sections of this site are outlined in red on the aerial photograph, totalling 3.81 ha. Other sites are outlined in magenta or green; Magenta outlines represent the Kelletts Rd site (Site 95, p. 481). The alluvial corridor of Corhanwarrabul Ck (now piped) is between the two white lines west of Lakesfield Drive. Where the edge of the Napoleon Rd site follows the road's gutter, it is not intended to enclose any part of the gutter that is subject to periodic grading. However, great care should be taken when grading not to damage the plant that appears to be a specimen of the nationally rare Matted Flax-lily (*Dianella amoena*), which abuts the gutter.

Land use & tenure: Road verge and unused road reservation.

Site description

This linear site extends from the lower slope of the Lysterfield Hills in the south, almost to Corhanwarrabul Ck at the northern tip. It follows the original alignment intended for Napoleon Rd, but the present route of Napoleon Rd diverges to the west, south of Park Rd. The state of the vegetation south of Park Rd indicates that this segment of the site was previously used as a road or track with pasture beside it. Today, that segment functions as a linear park, as well as providing driveway access to an adjoining farmlet.

The southern end of the site, near Wellington Rd, has an elevation of approximately 115 m and a north-facing slope of 10% grade. It lies on soil that has slipped or washed downhill from the Lysterfield Hills (called colluvium), providing the deep soil required by the Yellow Box trees (*Eucalyptus melliodora*) that are abundant there. The pre-European vegetation would probably have been Valley Grassy Forest, but there is negligible native understorey left to confirm this.

Within approximately 100m north of Wellington Rd, the depth of the colluvium becomes shallow and the native vegetation becomes identifiably Valley Heathy Forest, which is endangered nationally. The transition to Valley Heathy Forest represents the transition from the Highlands Southern Fall bioregion to the Gippsland Plain bioregion.

From that transition northward, the slope becomes shallow and faces northwest. The lowest point is at the northern end of the site, just south of the Corhanwarrabul Ck drain, at an elevation of 70 m. Valley Heathy Forest extends north to within approximately 60m of the site's northern end, where there are vestiges of Swampy Riparian Complex growing in shallow alluvium.

A minor drainage line crosses the site where it passes The Terrace. There is a small rushland there (i.e. a wetland dominated by rushes) outlined in white on the aerial photograph.

Overall, the site has a good canopy of eucalypts (particularly Mealy Stringybark, *Eucalyptus cephalocarpa*) and numerous small trees such as Blackwood (*Acacia melanoxylon*) and Cherry Ballart (*Exocarpos cupressiformis*). There are also areas of dense regrowth of Sweet Bursaria (*Bursaria spinosa*) and Hedge Wattle (*Acacia paradoxa*). The site's native ground flora is mostly sparse and the ecological condition of the vegetation is poor (rating D) throughout. Only forty naturally occurring indigenous plant species were recorded.

Knox City Council is capitalising on the good tree canopy and patches of dense shrubs by progressively planting indigenous ground flora and additional shrubs, while keeping weeds under control. These activities have been concentrated in the vicinity of Park Rd.

Surprisingly, despite the serious degradation of the ground flora, there remains a flax-lily plant that appears to be *Dianella amoena*, which is listed as nationally endangered under the *Environment Protection and Biodiversity Conservation Act 1999*. The identity is yet to be confirmed. It is so close to the road that a grader has exposed its roots. The small number of sites in the world where *Dianella amoena* still occurs are mostly degraded and typically contain only one or very few individuals, as in this case.

Relationship to other land

Some species of birds and insects are likely to move between this site, Kelletts Rd (Site 95) and the more expansive habitat in the Lysterfield Hills (Sites 81 and 82). Some of these fauna would carry pollen, which would reduce the risk of inbreeding of some plants within the site.

Bioregion: Gippsland Plain except for the southernmost 100 m (approximately), which is in the Highlands Southern Fall bioregion.

Habitat types

Valley Grassy Forest (EVC 47, **regionally Vulnerable**): Only a tiny, vestigial patch at the site's southern extremity.

Wetland (EVC 74, **regionally Endangered**): 350 m² in area (half inside and half outside the site – see the white ellipse near The Terrace on the aerial photograph). The ecological condition is poor (rating D). 4 indigenous plant species were found.

Trees, vines, shrubs and ferns: Absent.

Semi-aquatic flora: Densely covered by a mixture of *Juncus amabilis*, *J. gregiflorus*, *J. sarophorus* and smaller numbers of *J. pallidus*. No other indigenous species were found.

Valley Heathy Forest (EVC 127, **Endangered):** Estimated to occupy 1.4 ha with native understorey, all in poor ecological condition (rating D). 38 indigenous plant species were found.

Canopy trees: Dominated by *Eucalyptus cephalocarpa*, *E. radiata* and *E. obliqua*, with small numbers of *E. goniocalyx*.

Lower trees: Dominated by *Acacia melanoxylon* and *Exocarpos cupressiformis*.

Shrubs: Sparse due to past clearing in some of the site, but dense in areas of regrowth that are dominated by *Bursaria spinosa* and *Acacia paradoxa*. Other species are very scarce.

Vines: There are small numbers of the light twiner, *Billardiera mutabilis*.

Ferns: None found.

Ground flora: Weeds, and particularly Panic Veldt-grass (*Ehrharta erecta*) dominate the ground flora of much of the site. Areas that retain a substantial amount of indigenous ground flora are dominated variously by *Gahnia radula*, *Microlaena stipoides*, *Austrostipa rudis* or *Poa morrisii*. There are also substantial amounts of *Rytidosperma racemosum*.

Swampy Riparian Complex (EVC 126, **regionally Endangered):** Within the corridor between the two white lines to the left of Lakesfield Dr on the aerial photograph. Estimated as 0.06 ha of canopy (but with scant native understorey), all in very poor ecological condition (rating D). 3 indigenous plant species were found.

Canopy trees: A pure stand of *Eucalyptus ovata*.

Lower trees: *Acacia melanoxylon*.

Shrubs, vines and ferns: None.

Ground flora: Overwhelmingly weeds, mown regularly. The only indigenous ground flora species found was the hardy grass, *Microlaena stipoides*.

Plant species

The following plant species were observed by the author on 5th June 2002. Additional species would no doubt be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Dianella amoena* is endangered nationally and *Pultenaea pedunculata* is rare throughout the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia implexa</i>		<i>Goodenia ovata</i>
V	<i>Acacia mearnsii</i>		<i>Juncus amabilis</i>
V	<i>Acacia melanoxylon</i>		<i>Juncus gregiflorus</i>
	<i>Acacia paradoxa</i>		<i>Juncus pallidus</i>
V	<i>Acacia verticillata</i> (wild & planted)		<i>Juncus sarophorus</i>
	<i>Acaena novae-zelandiae</i>	E	<i>Juncus subsecundus</i>
V	<i>Allocasuarina littoralis</i> (wild & planted)		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
C	<i>Amyema pendula</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>		<i>Lomandra longifolia</i> (wild & planted)
	<i>Billardiera mutabilis</i>	E	<i>Melaleuca ericifolia</i>
	<i>Bursaria spinosa</i>		<i>Microlaena stipoides</i>
C	<i>Chrysocephalum semipapposum</i> (planted)		<i>Oxalis exilis/perennans</i>
	<i>Dianella admixta</i>	E	<i>Poa labillardierei</i> (planted)
C	<i>Dianella ?amoena</i>		<i>Poa morrisii</i>
V	<i>Dianella longifolia</i> s.l. (wild & planted)		<i>Poranthera microphylla</i>
V	<i>Eucalyptus cephalocarpa</i>	C	<i>Pultenaea pedunculata</i>
	<i>Eucalyptus goniocalyx</i>		<i>Rytidosperma racemosum</i>
V	<i>Eucalyptus melliodora</i> (wild & planted)	E	<i>Rytidosperma semiannulare</i>
V	<i>Eucalyptus ovata</i>		<i>Rytidosperma setaceum</i> (planted)
E	<i>Eucalyptus radiata</i>		<i>Senecio quadridentatus</i>
V	<i>Exocarpos cupressiformis</i>	V	<i>Solanum laciniatum</i> (planted)
	<i>Gahnia radula</i>		<i>Themeda triandra</i>
	<i>Gonocarpus tetragynus</i>		

Introduced Species

<i>Agrostis capillaris</i>	<i>Cynodon dactylon</i>	<i>Paspalum dilatatum</i>
<i>Allium triquetrum</i>	<i>Cyperus eragrostis</i>	<i>Pennisetum clandestinum</i>
<i>Anthoxanthum odoratum</i>	<i>Dactylis glomerata</i>	<i>Phalaris aquatica</i>
<i>Arctotheca calendula</i>	<i>Ehrharta erecta</i>	<i>Ranunculus repens</i>
<i>Asparagus asparagoides</i>	<i>Galium aparine</i>	<i>Romulea rosea</i>
<i>Aster subulatus</i>	<i>Genista monspessulana</i>	<i>Rubus anglocandicans</i>
<i>Bromus catharticus</i>	<i>Hedera helix</i>	<i>Sporobolus africanus</i>
<i>Chrysanthemoides monilifera monilifera</i>	<i>Helminthotheca echioides</i>	<i>Ulex europaeus</i>
<i>Cirsium vulgare</i>	<i>Holcus lanatus</i>	<i>Zantedeschia aethiopica</i>
<i>Crataegus monogyna</i>	<i>Hypochoeris radicata</i>	

Notes concerning two of the locally threatened plant species

Dianella amoena (Matted Flax-lily). A solitary specimen was found by the road edge just outside the southwest corner of an area protected by bollards, slightly north of Bark Av. It had been slashed and it was sprouting where its rhizomes had been severed by a grader blade.

Pultenaea pedunculata (Matted Bush-pea). One patch measuring approximately 1 m² is protected by bollards just north of Bark Av. Another patch died in (or about) 2000.

Fauna of special significance

Uncommon in the Melbourne region

Musk Lorikeet. A flock was seen during the site survey.

Uncommon in Knox

Imperial White Butterfly. A colony was found on a Drooping Mistletoe (*Amyema pendulum*). This butterfly species has become uncommon in Knox, probably because of the dearth of the necessary host mistletoes.

Fauna habitat features

- The larger Swamp Gums and Bundies have hollows that would suit habitation by native birds, bats, possums or insects. This is probably also true of some Mealy Stringybarks, but no hollows were seen;
- The prickly shrub layer in parts of the site, particularly just northwest of Dorrigo Drive, could provide protection for small native birds. Even the very serious environmental weed, Hawthorn, may have some habitat value in this respect. Removal of Hawthorn should therefore be done progressively, accompanied by planting of prickly indigenous species as replacements.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Endangered Ecological Vegetation Class

Valley Heathy Forest is nationally endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that the site's native vegetation is necessarily of at least High conservation significance. This, in turn, gives the site **State** significance under criterion 3.2.3 of Amos (2004).

Rare or Threatened Flora

Until a positive identification can be obtained for the plant believed to be *Dianella amoena*, it should be treated as if the identification is correct. Criterion 3.1.1 recognises any habitat for such a nationally listed threatened species as being of **State** significance if the number of individuals is less than 1% of the global population (as in this case). One might normally downgrade this rating for a single, highly isolated individual plant, but it should not happen in this case because the total global population of the species comprises mostly isolated individuals and tiny groups.

Some of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- The *Dianella amoena* is at risk from damage by graders or slashers and will need continuing protection;
- Invasion by environmental weeds, of which the only ones rated Serious are Panic Veldt-grass (*Ehrharta erecta*) and Creeping Buttercup (*Ranunculus repens*);
- Loss or decline of plant species whose populations are so small and isolated that they are vulnerable to inbreeding, poor reproductive success or elimination by incidents such as disease or mower damage. This applies to *Acaena novae-zelandiae*, *Dianella amoena*, *Dianella admixta* and *Pultenaea pedunculata*.

Management issues

- Positive identification and protection of the nationally listed *Dianella amoena* plant is a matter of **national importance**. The plant's wellbeing should be checked regularly (e.g. monthly) so that immediate action can be taken in the event of damage. If the identity is confirmed, the plant must form part of the national recovery plan for the species, which is being prepared by the Federal Department of Environment and Heritage. The plant should be checked in summer for seed (which would be self-pollinated), and any seed should be collected and kept for use as part of the recovery plan;
- Approximately two plants of *Pultenaea pedunculata* propagated from the Ferntree Gully population (in Site 88) should be planted near the one in this site, to facilitate outbreeding and increase the numbers.

Administration matters

- Arrangements should be made for a botanist to confirm the identity of the plant believed to be *Dianella amoena*, to be done in late spring (e.g. November);
- The Planning Scheme zoning south of Park Rd is Residential 1 Zone (R1Z). The rest is zoned Road Zone Category 1 (RDZ1) except for two narrow strips of tree reserves that are zoned Public Park and Recreation Zone (PPRZ);
- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the endangered Valley Heathy Forest and the rare species present;
- The southern half of the site is covered by the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme. The northern half appears to have been omitted by mistake, since the northern end of the overlay area coincides with the edge of a planning scheme map.

Information sources used in this assessment

- A site survey by Dr Lorimer taking 2½ hours on 5/6/02 following this study's standard procedures discussed in Section 2.4 of Volume 1. This included:
 - Compilation of lists of indigenous and introduced plants for each of five parts of the site;
 - A description of the vegetation's structural and floristic composition within each of the parts;
 - Documentation of the vegetation's ecological condition;
 - Documentation of rare species populations;
 - Incidental observations of fauna; and
 - Checks for fauna habitat, ecological threats and management issues.
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 95. Kelletts Rd Roadside east of Napoleon Rd

A total of 2.6 kilometres of road verge (summed over both sides of the road), in seven segments. Melway maps 73 and 82.

Site Significance Level: *State*

- The native vegetation all belongs to endangered Ecological Vegetation Classes, mainly Valley Heathy Forest;
- The site is a linear oasis of native vegetation in an increasingly urbanised neighbourhood;
- The vegetation is ecologically stable or improving in condition through Council action, but some species still have too few individuals for long-term viability in the absence of intervention.

Aerial photograph and plan: See page 476.

Boundaries

The seven sections of this site are outlined in magenta on the aerial photograph on p. 476, totalling 5.75 ha (reduced from 5.90 ha since the first edition, due to clearing for roadwork at the northwestern end in 2007). Where the edges of the site follow Kelletts Rd's gutter, it is not intended to enclose any part of the gutter that is subject to periodic grading.

Major roadwork around the intersection of Kelletts Rd and Napoleon Rd were completed shortly before this report was finalised. It included substantial vegetation removal and possible damage to some retained trees, not visible on any aerial photograph that was available. The site boundary in that vicinity may not precisely circumscribe the surviving vegetation.

Land use & tenure: Verge of a secondary road.

Site description

This linear site extends from Wellington Rd on the lower slope of the Lysterfield Hills (elevation 123 m), to Napoleon Rd at an elevation of 76 m. The site's lowest elevation is 73 m at the Lakesfield Drive intersection, which was once a crossing over Corhanwarrabul Ck (now replaced by a pipe). The slope faces north-northwest and the gradient increases steadily from Lakesfield Drive to Wellington Rd.

There is a deposit of alluvial soil along the natural course of Corhanwarrabul Ck (within the white lines marked on the aerial photograph on p. 476). The soil elsewhere is a pale, poorly draining clay loam, with clay subsoil. The underlying bedrock is Lower Devonian siltstone of the Humevale formation, but this has been buried in the southeastern half of the site by earth that has slipped or washed downhill from the Lysterfield Hills.

The alluvium near Lakesfield Drive supports vestiges of Swampy Riparian Complex, badly degraded by the earthworks that replaced Corhanwarrabul Ck with a pipe. Native vegetation in the rest of the site belongs to the endangered Ecological Vegetation Class called Valley Heathy Forest. However, the vegetation abutting the Fruitful Vine Melbourne Church property (Site 84) is close to the interface (or 'ecotone') with Valley Grassy Forest.

Overall, there is a nearly continuous canopy of indigenous trees except near intersections. Native understorey, and particularly shrubs, had been heavily suppressed by regular roadside slashing for many years until the mid-1990s. Since then, some areas have been relieved from slashing and native understorey has recovered. Roughly half of the native vegetation in the site has a substantial cover of native understorey, some of it in good ecological condition (rating B). Knox City Council has signposted two strips with moderately rich native understorey as Significant Roadsides KN8 and KN10 (as marked on the aerial photograph). There is similarly rich native understorey directly opposite the strip designated as KN10.

Relationship to other land

Some species of birds and insects are likely to move between this site, Napoleon Rd (Site 94) and the more expansive habitat in the Lysterfield Hills (Sites 81 and 82) and the Lysterfield Valley (Site 83). Some of these fauna would carry pollen, which would reduce the risk of inbreeding of some plants within the site.

Bioregion: Gippsland Plain

Habitat types

Valley Heathy Forest (EVC 127, **Endangered**): Estimated as 2.67 ha, comprising 0.12 ha in good ecological condition (rating B), 0.97 ha in fair ecological condition (rating C) and 1.58 ha in poor ecological condition (rating D). 82 indigenous plant species were found.

Canopy trees: Dominated by *Eucalyptus cephalocarpa*, *E. goniocalyx* and *E. radiata*. There are also some *E. melliodora* around the Fruitful Vine Melbourne Church, near the ecotone with Valley Grassy Forest.

Lower trees: Dominated by *Acacia melanoxylon* and slightly fewer *Exocarpos cupressiformis*.

Shrubs: Depleted in density and richness by past clearing and slashing. The most abundant and widespread species within the site are *Bursaria spinosa* and *Leptospermum continentale*. The other characteristic species of Valley Heathy Forest, *Acacia paradoxa*, *Cassinia arcuata* and *Daviesia latifolia* are also present.

Vines: The light twiner, *Billardiera mutabilis*, is fairly abundant.

Ferns: *Pteridium esculentum* is the only species, confined to one small area.

Ground flora: Densely grassy, and rich in forbs where least degraded. Areas that retain a substantial amount of indigenous ground flora are dominated variously by *Gahnia radula*, *Austrostipa rudis*, *Rytidosperma racemosum*, *Microlaena stipoides* or *Poa morrisii*. Lilies are particularly abundant.

Swampy Riparian Complex (EVC 126, regionally Endangered): Estimated as 0.06 ha, all in poor ecological condition (rating D). Seven indigenous plant species were found.

Canopy trees: A near-pure stand of *Eucalyptus ovata*, with *E. cephalocarpa* on the ecotone with Valley Heathy Forest.

Lower trees: *Acacia melanoxylon*.

Shrubs: *Melaleuca ericifolia* persists, but other shrubs have been destroyed by clearing.

Vines and ferns: None.

Ground flora: Weedy, but in part, dominated by the indigenous *Phragmites australis*. The only other indigenous ground flora observed were *Juncus sarophorus* and *Lomandra longifolia*.

Plant species

The following plant species were observed by the author on 27/11/97 and/or Mr Damien Cook on 30/11/92, as indicated in the 'Year' column. Additional species would probably be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Acacia leprosa* (Dandenong Range variant) is rare nationally

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
V	<i>Acacia implexa</i>	1992		<i>Elymus scaber</i>	1997
V	<i>Acacia leprosa</i> (Dandenong Range variant) (perhaps questionable)	1992		<i>Epilobium hirtigerum</i>	1997
V	<i>Acacia mearnsii</i>	1997	V	<i>Eucalyptus cephalocarpa</i>	1997
V	<i>Acacia melanoxylon</i>	1997		<i>Eucalyptus goniocalyx</i>	1997
E	<i>Acacia myrtifolia</i>	1992	V	<i>Eucalyptus melliodora</i>	1997
	<i>Acacia paradoxa</i>	1997	V	<i>Eucalyptus ovata</i>	1997
E	<i>Acacia pycnantha</i>	1997	E	<i>Eucalyptus radiata</i>	1997
V	<i>Acaena echinata</i>	1997	V	<i>Euchiton collinus</i>	1992
	<i>Acrotriche serrulata</i>	1992	V	<i>Exocarpos cupressiformis</i>	1997
V	<i>Allocasuarina littoralis</i>	1997		<i>Gahnia radula</i>	1997
C	<i>Amyema pendula</i>	1997		<i>Gonocarpus tetragynus</i>	1997
V	<i>Amyema quandang</i>	1997		<i>Goodenia ovata</i>	1997
	<i>Arthropodium strictum</i>	1997	E	<i>Hibbertia riparia</i>	1992
	<i>Austrostipa pubinodis</i>	1997	E	<i>Hypericum gramineum</i>	1992
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	1997	C	<i>Hypoxis hygrometrica</i>	1992
	<i>Billardiera mutabilis</i>	1997	E	<i>Isolepis cernua</i> var. <i>platycarpa</i>	1992
	<i>Bossiaea prostrata</i>	1997		<i>Juncus bufonius</i>	1992
	<i>Burchardia umbellata</i>	1992		<i>Juncus sarophorus</i>	1997
	<i>Bursaria spinosa</i>	1997	C	<i>Kennedia prostrata</i>	1997
V	<i>Caesia parviflora</i>	1992		<i>Kunzea ericoides</i> spp. agg.	1997
	<i>Carex breviculmis</i>	1992		<i>Lachnagrostis filiformis</i>	1997
	<i>Cassinia arcuata</i>	1997	V	<i>Lepidosperma gunnii</i>	1997
E	<i>Daviesia latifolia</i>	1997		<i>Lepidosperma laterale</i>	1992
	<i>Deyeuxia quadriseta</i>	1992		<i>Leptospermum continentale</i>	1997
	<i>Dianella admixta</i>	1997		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	1997
V	<i>Dianella longifolia</i> s.l.	1997		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>	1997
	<i>Dichelachne rara</i>	1992		<i>Lomandra longifolia</i>	1997
	<i>Dichondra repens</i>	1997	V	<i>Luzula meridionalis</i>	1992
V	<i>Dillwynia cinerascens</i>	1992	E	<i>Melaleuca ericifolia</i>	1997
V	<i>Drosera whittakeri</i>	1992		<i>Microlaena stipoides</i>	1997
V	<i>Eleocharis acuta</i>	1997		<i>Microtis parviflora</i>	1992
			C	<i>Microtis unifolia</i>	1992

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
V	<i>Opercularia ovata</i>	1992		<i>Rytidosperma penicillatum</i>	1997
V	<i>Opercularia varia</i>	1992	V	<i>Rytidosperma pilosum</i>	1997
	<i>Oxalis exilis/perennans</i>	1997		<i>Rytidosperma racemosum</i>	1997
E	<i>Ozothamnus ferrugineus</i>	1997		<i>Rytidosperma setaceum</i>	1997
E	<i>Phragmites australis</i>	1997		<i>Rytidosperma tenuius</i>	1997
	<i>Poa morrisii</i>	1997		<i>Schoenus apogon</i>	1997
	<i>Poranthera microphylla</i>	1997		<i>Senecio hispidulus</i>	1997
	<i>Pteridium esculentum</i>	1997		<i>Senecio quadridentatus</i>	1997
	<i>Pterostylis nutans</i>	1992		<i>Themeda triandra</i>	1997
	<i>Rytidosperma geniculatum</i>	1997	V	<i>Thysanotus patersonii</i>	1997
	<i>Rytidosperma laeve</i>	1997		<i>Tricoryne elatior</i>	1997
	<i>Rytidosperma linkii</i> var. <i>fulvum</i>	1997	E	<i>Viola hederacea</i>	1992
	<i>Rytidosperma pallidum</i>	1992	E	<i>Wurmbea dioica</i>	1992

Introduced Species

<i>Acacia floribunda</i>	<i>Chrysanthemoides monilifera monilifera</i>	<i>Medicago polymorpha</i>
<i>Acacia longifolia</i> subsp. <i>longifolia</i>	<i>Cirsium vulgare</i>	<i>Pinus radiata</i>
<i>Agrostis capillaris</i>	<i>Dactylis glomerata</i>	<i>Pittosporum undulatum</i>
<i>Aira caryophylla</i>	<i>Ehrharta erecta</i>	<i>Plantago lanceolata</i>
<i>Allium triquetrum</i>	<i>Festuca rubra</i>	<i>Romulea rosea</i>
<i>Anthoxanthum odoratum</i>	<i>Holcus lanatus</i>	<i>Rubus anglocandicans</i>
<i>Asparagus asparagoides</i>	<i>Hypochoeris radicata</i>	<i>Sisyrinchium iridifolium</i>
<i>Briza maxima</i>	<i>Isolepis levynsiana</i>	<i>Sonchus oleraceus</i>
<i>Briza minor</i>	<i>Leontodon taraxacoides</i>	<i>Sporobolus africanus</i>
<i>Centaurium erythraea</i>	<i>Lolium perenne</i>	<i>Trifolium repens</i>
<i>Cerastium glomeratum</i>	<i>Lotus</i> sp.	<i>Vulpia bromoides</i>

Notes concerning some of the locally threatened plant species

Acacia leprosa (Cinnamon Wattle), Dandenong Range variant. Not present in the most recent survey (1997) but recorded in substantial numbers within the signposted 'Significant Roadside KN10' by Mr Damien Cook in 1992. However, he also stated 'Shrubs – Absent', which is contradictory unless the plants were only seedlings. The habitat is also abnormal for this species and the location is several kilometres outside the range of all other records of this species. In combination, these considerations suggest that the record may have been either a misidentification or the result of planting.

Hypoxis hygrometrica (Golden Weather-glass). Recorded in substantial numbers within the signposted 'Significant Roadside KN8' by Mr Damien Cook in 1992. Not detected in the more recent survey (27/11/97), perhaps because the species is extremely hard to detect when it is not flowering.

Isolepis cernua var. *platycarpa* (a Club-rush). Recorded in 1992 and not in 1997, probably due to seasonal factors.

Kennedia prostrata (Running Postman). One plant was found by the author in 1997 within the signposted 'Significant Roadside KN10'.

Microtis ?parviflora (Slender Onion-orchid). Recorded in 1992 and not in 1997, probably due to seasonal factors.

Rytidosperma ?caespitosum (Common Wallaby-grass). This is the taxon which combines some characteristics of *R. caespitosum* and some of *R. setaceum*, found in moderate numbers around Melbourne's eastern suburbs and perhaps best represented at Wattle Park. Very few plants were found by the author in the signposted 'Significant Roadside KN10' on 27/11/97.

Rytidosperma geniculatum (Knead Wallaby-grass). There are small numbers in at least two places. At least one of the populations appears viable.

Thysanotus patersonii (Twining Fringe-lily). Found in very small numbers (perhaps only one plant) within the signposted 'Significant Roadside KN8'.

Wurmbea dioica (Common Early Nancy). Recorded in 1992 and not in 1997, probably due to seasonal factors.

Fauna of special significance

None found, but the Superb Fairy-Wrens and Black-faced Cuckoo-Shrike that were seen indicate that the site supports species other than just hardy urban wildlife.

Fauna habitat features

Some of the larger eucalypts have hollows that would suit habitation by native birds, bats, possums or insects.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Endangered Ecological Vegetation Class

Valley Heathy Forest is endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that the site's native vegetation is necessarily of at least High conservation significance. This, in turn, gives the site **State** significance under criterion 3.2.3 of Amos (2004).

Rare or Threatened Flora

The 1992 record of *Acacia leprosa* is regarded as open to question and, being not present in the most recent survey, it is not indicative of the site's current ecological values. It is therefore not regarded as significant.

Many of the other locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Invasion by environmental weeds, of which the main ones are grass weeds, particularly Sweet Vernal-grass (*Anthoxanthum odoratum*) and Panic Veldt-grass (*Ehrharta erecta*);
- Eucalypt dieback disease, particularly near Wellington Rd, associated in part with Bell Miners;
- Loss or decline of plant species whose populations are so small and isolated that they are vulnerable to inbreeding, poor reproductive success or elimination by incidents such as disease or mower damage.

Administration matters

- The Planning Scheme zoning of the road reservation is Road Zone Category 2 (RDZ2). The narrow strips between the road reservation and the adjacent residential fences are zoned Residential 1 Zone (R1Z);
- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of the endangered Valley Heathy Forest and the rare species present;
- Most of the site is covered by the existing Vegetation Protection Overlay Schedule 1 of the Knox Planning Scheme. It appears that the area covered by the overlay was intended to match the area mapped by Water Ecoscience (1998) as their Site 86, but part of the polygon that appears on the Planning Scheme maps has been displaced into adjacent pasture and residential development. There is also an erroneous mapping discontinuity at the join between VPO1 maps 6 and 7 in the Planning Scheme.

Information sources used in this assessment

- Vegetation mapping showing vegetation communities and vegetation quality, and six lists of plant species (indigenous and introduced), observed by Dr Lorimer on 27th November 1997, as described in the report, '*A Survey and Management Plan for Significant Vegetation of Roadsides in Knox*' by G.S. Lorimer for Knox City Council (May 1998, 137 pp.);
- A brief inspection of the whole roadside by Dr Lorimer on 10/3/08 to update any obsolete information from the first edition of this report, with particular attention to roadwork at the intersection of Kelletts Rd and Napoleon Rd;
- Data from two 150 m² quadrats (numbers N01904 and N01905 in the Victorian Flora Information System), gathered by Mr Damien Cook on 24/11/92 and 30/11/92, as described by Mark Allaway and Associates in '*Indigenous Vegetation survey to Major Road Reserves – Phase 2 – A Management Strategy for Remnant Roadside Vegetation*' for City of Knox (1993). The *Microtis unifolia* records are treated here as possible misidentifications of the more common *M. parviflora*, and the duplication of some species in the list for quadrat N01905 (and other lists in the same report) suggests that the preparation of species lists was imperfect;
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 96. Wellington Rd Roadside, Rowville & Lysterfield

8.4 hectares of road reserve in seventeen segments. Melway maps 81-83.

Site Significance Level: *State* in parts; other parts Regional or Local

- Some segments of the site are contiguous with larger sites (particularly the Lysterfield Hills) and are hence effectively part of a larger area of State significance;
- The site contains remnants and regrowth of the threatened EVCs, Valley Heathy Forest, Valley Grassy Forest and Swampy Woodland, a small part of which is in good ecological condition;
- There are small or modest populations of six plant species that are threatened in Knox (or in one case, throughout metropolitan Melbourne).

Aerial Photographs – see next page

The photographs on the next page were taken in April 2003. The second and third photographs adjoin each other (approximately) and are at the same scale. The first photograph is shown at a different scale from the other two and it depicts an area that lies 1.7 km further to the west, near Stud Rd. The red lines on the photographs are outlines of the various segments of road verge that make up this site. The magenta lines are outlines of neighbouring sites treated elsewhere in this report; and white lines are boundaries between areas of different Ecological Vegetation Classes (with their titles written in white text).

Boundaries

The site is in seventeen segments, defined by the red outlines on the three aerial photographs. The gutter of Wellington Rd forms one edge of each segment, and most segments extend to the fences of adjoining properties.

Land use & tenure: Road reservation.

Site Description

This site comprises the larger strips of native vegetation along Wellington Rd. Most segments have both native overstorey and understorey, but some patches are missing one or the other. There are other, smaller patches of native vegetation scattered along the roadside that are not deemed suitable for including within a Site of Biological Significance. All native vegetation west of Kelletts Rd was surveyed, mapped, analysed and documented by Lorimer (1998). The remaining vegetation was surveyed by Dr Lorimer in October 2002 and April 2003.

The width of the segments is typically 12 metres and the total area is 8.4 ha. Adjacent land use varies from urban residential at the western end to grazing and quarrying. There is little correlation between the native vegetation's ecological condition and the adjacent land use, probably because most of the degradation occurred when the whole area had similar, rural land use.

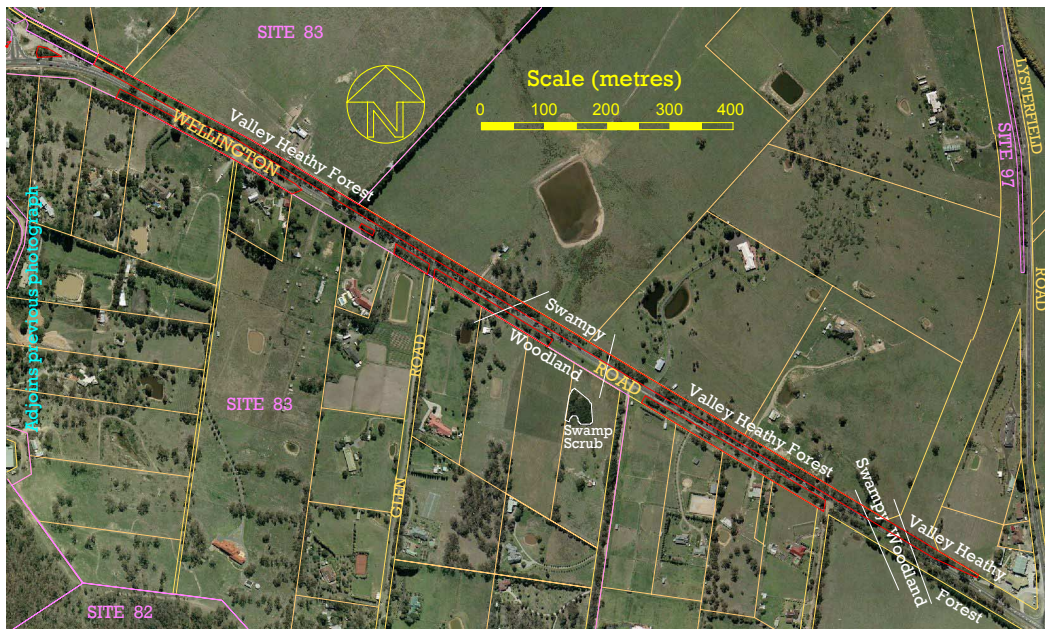
There is a tendency for the more intact vegetation to be where the road is below-grade, so that runoff from the road does not enter the vegetation.

The most intact part of the site is the western half of the segment on the first of the three aerial photographs. It is in good ecological condition (rating B). There is a small area in similar condition at the intersection of Kelletts Rd. Eastward from there, the condition rapidly deteriorates to rating D (poor) all the way to Lysterfield Rd. The areas west of Kelletts Rd on the second aerial photograph are divided roughly equally between condition ratings C (fair) and D.

Some of the site is signposted as significant roadside vegetation, with slashing to be conducted less frequently and with more ecological sensitivity than would otherwise be the case. The most significant of these is 'Significant Roadside KN5', the westernmost (and most intact) part of this site.

The segments just west of Kelletts Rd no doubt assist the movement of native birds and insects between the large area of native tree canopy to the south and the twin Sites 83 and 84 on the other side of the road. Other segments of the roadside do not represent a habitat corridor because they do not join larger areas of natural tree canopy or other habitat.

The Ecological Vegetation Classes present are predominantly Valley Heathy Forest and Valley Grassy Forest, with three smaller stretches of Swampy Woodland. The former pair of EVCs are hard to distinguish, partly because of the degree of human modification of the vegetation, and partly because soil conditions and climate apparently cause a tendency for these EVCs to merge into each other in this area. This is further complicated by the likely presence of an interface, or 'ecotone', between Valley Grassy Forest and Lysterfield Grassy Dry Forest running along the southern roadside at or near the cutting west of Kelletts Rd. *Eucalyptus cephalocarpa* is a good indicator of the Valley Heathy Forest.



Aerial photographs taken April 2003.

Relationship to other land

The segment of this site in the uppermost aerial photograph, west of Taylors Lane, is 400m from the substantial area of native vegetation at the Rowville Electricity Terminal Station (Site 72). There are smaller, less diverse patches of native vegetation at Delta Court Reserve (Site 71, 200m northwest) and Rowville Secondary School (Site 70, 250m north). This represents a high level of fragmentation and isolation of habitat, with greatly impeded migration of wildlife, pollen and seeds between the sites.

The segments of the site that appear in the central aerial photograph can be regarded as an extension of the Lysterfield Hills site (Site 81). It is likely that there is a high degree of movement of fauna, pollen and seed between the roadside vegetation and the large contiguous area of native vegetation across the Lysterfield Hills, into Lysterfield Park (Site 82) and beyond.

The roadside east of Kelletts Rd can be regarded as an extension to the abutting Site 83, with its rural landscape of lightly treed grazing country.

Bioregion: On the middle aerial photograph, the area between the two white, oblique lines across the road (with Valley Grassy Forest) lies within the Highlands Southern Fall bioregion. The remainder of the site lies in the Gippsland Plain bioregion.

Habitat types

Valley Grassy Forest (EVC 47, regionally Vulnerable): 3.0 ha in total, of which approximately 0.05 ha is in good ecological condition (rating B) and the remainder is approximately equally divided between ecological condition ratings C (fair) and D (poor). 64 indigenous plant species were found.

Canopy trees: Dominated by *Eucalyptus melliodora* (except near Allamanda Blvd), *E. radiata* and *E. goniocalyx*. *E. cephalocarpa* is absent, as opposed to its dominance in the adjoining Valley Heathy Forest. The presence of *E. rubida* on adjoining private land near Cornish Rd helps to confirm the identification of Valley Grassy Forest.

Lower trees: Rich and rather abundant, comprising *Acacia implexa*, *A. mearnsii*, *A. melanoxylon*, *A. pycnantha*, *Allocasuarina littoralis* and *Exocarpos cupressiformis*. The weeds *Pittosporum undulatum*, *Chrysanthemoides monilifera* and *Genista* species are dense in patches near the Boral quarry.

Shrubs: *Kunzea ericoides* is dense in patches. *Acacia paradoxa*, *Bursaria spinosa* and *Cassinias* are sparser. *Goodenia ovata* is thinly scattered. *Hibbertia riparia* is present in proximity to Valley Heathy Forest. *Platylobium obtusangulum* and *Leptospermum continentale* are conspicuously absent.

Ferns: None.

Ground flora: Densely grassy with few small shrubs. The dominant indigenous species in most of the site are *Themeda triandra* and *Rytidosperma* species. *Poa morrisii* and *Austrostipa pubinodis* are abundant but not dominant, whereas *Austrostipa rudis* and *Microlaena stipoides* (species more associated with Valley Heathy Forest) are much less abundant. There are some patches of *Gahnia radula*. *Lomandra longifolia* and *Lomandra filiformis* subsp. *coriacea* are both present. *Xanthorrhoea minor* and *Tricoryne elatior* are scarce. The locally rare species *Dichelachne crinita* is very scarce, but its presence helps to confirm the identification of Valley Grassy Forest.

Valley Heathy Forest (EVC 127, regionally Endangered): 5.1 ha in total, of which approximately 0.4 ha is in good ecological condition (rating B), 0.3 ha is in fair ecological condition (rating C) and 4.4 ha is in poor ecological condition (rating D). 69 indigenous plant species were found (one of them with two distinct subspecies).

Dominant canopy trees: *Eucalyptus cephalocarpa*, *E. radiata* and *E. goniocalyx*.

Dominant lower trees: *Acacia mearnsii*, *A. melanoxylon*, *Allocasuarina littoralis* and *Exocarpos cupressiformis*.

Shrubs: Apparently thinned below the natural density, except for regrowth patches of *Acacia paradoxa*, *Bursaria spinosa* and *Kunzea ericoides*. *Leptospermum continentale*, *Daviesia latifolia* and *Platylobium obtusangulum* are notably present.

Ferns: None.

Ground flora: Dense with grasses or *Gahnia radula*. The dominant indigenous grasses are *Microlaena stipoides*, various *Rytidosperma* species, *Poa morrisii*, *Austrostipa pubinodis* and *Austrostipa rudis*. *Dianella longifolia*, *Dianella admixta*, *Lomandra longifolia*, *Lomandra filiformis* and *Xanthorrhoea minor* are all abundant in the more intact areas. The characteristic species *Tricoryne elatior* is present but scarce.

Swampy Woodland (EVC 937, regionally Endangered): 0.3-0.4 ha in two sections, all in poor ecological condition (rating D). 22 indigenous plant species were found.

Dominant canopy trees: *Eucalyptus ovata* and fewer *E. cephalocarpa*, fairly sparse.

Dominant lower trees: *Acacia melanoxylon* and *Melaleuca ericifolia*.

Shrubs: Effectively eliminated by clearing, slashing and competition from weeds.

Vines: None.

Ferns: None.

Ground flora and small shrubs: The indigenous ground flora have been decimated by grass weeds and the effects of road runoff. *Gahnia radula*, *Microlaena stipoides* and *Juncus* species are the most consistently present remnants of the original ground flora, and there are occasional individuals of characteristic species such as *Senecio minimus* and *Epilobium hirtigerum*.

Plant species

The following plant species were observed by the author on 25/11/97, 11/10/02 and/or 25/4/03, as indicated in the 'Year' column. Additional species would probably be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Eleocharis gracilis* is rare in the Melbourne area.

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
	<i>Acacia dealbata</i>	1997		<i>Juncus bufonius</i>	2002
V	<i>Acacia implexa</i>	1997		<i>Juncus gregiflorus</i>	2002
V	<i>Acacia mearnsii</i>	2003		<i>Juncus pallidus</i>	2002
V	<i>Acacia melanoxylon</i>	2003		<i>Juncus sarophorus</i>	2002
	<i>Acacia paradoxa</i>	2002	E	<i>Juncus subsecundus</i>	2003
E	<i>Acacia pycnantha</i>	1997		<i>Kunzea ericoides</i> spp. agg.	2003
E	<i>Acacia stricta</i>	1997		<i>Lachnagrostis filiformis</i>	1997
V	<i>Acaena echinata</i>	2003		<i>Lepidosperma gunnii</i>	1997
	<i>Acrotriche serrulata</i>	2003	V	<i>Lepidosperma laterale</i>	1997
V	<i>Allocasuarina littoralis</i>	2003		<i>Leptospermum continentale</i>	2002
C	<i>Amyema pendula</i>	2002		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	2003
V	<i>Amyema quandang</i>	1997		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>	2002
	<i>Arthropodium strictum</i>	2002		<i>Lomandra longifolia</i>	2003
	<i>Austrostipa pubinodis</i>	2003	V	<i>Lythrum hyssopifolia</i>	1997
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	2003	E	<i>Melaleuca ericifolia</i>	2002
	<i>Billardiera mutabilis</i>	2002		<i>Microlaena stipoides</i>	2003
	<i>Bossiaea prostrata</i>	2002	C	<i>Muellerina eucalyptoides</i>	2002
	<i>Bursaria spinosa</i>	2003		<i>Oxalis exilis/perennans</i>	2003
	<i>Carex breviculmis</i>	2003	E	<i>Ozothamnus ferrugineus</i>	2002
	<i>Cassinia aculeata</i>	2003	E	<i>Pimelea curviflora</i>	1997
	<i>Cassinia arcuata</i>	1997	V	<i>Pimelea humilis</i>	1997
V	<i>Cassinia longifolia</i>	1997	V	<i>Platylobium obtusangulum</i>	1997
	<i>Clematis decipiens</i>	2003		<i>Poa morrisii</i>	2003
E	<i>Daviesia latifolia</i>	2002	E	<i>Poa tenera</i>	2002
	<i>Dianella admixta</i>	2003		<i>Poranthera microphylla</i>	2002
V	<i>Dianella longifolia</i> s.l.	2003	E	<i>Rubus parvifolius</i>	2003
C	<i>Dichelachne crinita</i>	1997	E	<i>Rytidosperma caespitosum</i>	1997
	<i>Dichelachne rara</i>	1997		<i>Rytidosperma geniculatum</i>	1997
	<i>Dichondra repens</i>	2003		<i>Rytidosperma laeve</i>	1997
V	<i>Dillwynia cinerascens</i>	2003		<i>Rytidosperma linkii</i> var. <i>fulvum</i>	2003
C	<i>Eleocharis gracilis</i>	2003		<i>Rytidosperma pallidum</i>	2003
	<i>Elymus scaber</i>	2002		<i>Rytidosperma penicillatum</i>	1997
	<i>Epilobium hirtigerum</i>	2002		<i>Rytidosperma racemosum</i>	2003
V	<i>Eucalyptus cephalocarpa</i>	2003		<i>Rytidosperma setaceum</i>	2003
	<i>Eucalyptus goniocalyx</i>	2003		<i>Rytidosperma tenuius</i>	1997
V	<i>Eucalyptus melliodora</i>	2002		<i>Schoenus apogon</i>	2002
V	<i>Eucalyptus obliqua</i>	2003	E	<i>Senecio minimus</i>	2002
V	<i>Eucalyptus ovata</i>	2003		<i>Senecio quadridentatus</i>	2003
E	<i>Eucalyptus radiata</i>	2003	V	<i>Thelymitra peniculata</i>	1997
V	<i>Exocarpos cupressiformis</i>	2003		<i>Themeda triandra</i>	2003
	<i>Gahnia radula</i>	2003		<i>Tricoryne elatior</i>	2003
	<i>Gonocarpus tetragynus</i>	2003	V	<i>Veronica gracilis</i>	1997
	<i>Goodenia ovata</i>	1997	E	<i>Wahlenbergia gracilis</i>	1997
E	<i>Hibbertia riparia</i>	1997	V	<i>Xanthorrhoea minor</i>	2003

Introduced Species

<i>Acacia longifolia longifolia</i>	<i>Bromus diandrus</i>	<i>Dactylis glomerata</i>	<i>Genista linifolia</i>
<i>Agapanthus praecox</i>	<i>Centaureum erythraea</i>	<i>Ehrharta erecta</i>	<i>Genista monspessulana</i>
<i>Agrostis capillaris</i>	<i>Chrysanthemoides monilifera</i>	<i>Ehrharta longiflora</i>	<i>Glyceria declinata</i>
<i>Allium triquetrum</i>	subsp. <i>monilifera</i>	<i>Foeniculum vulgare</i>	<i>Hedera helix</i>
<i>Anthoxanthum odoratum</i>	<i>Cirsium vulgare</i>	<i>Fraxinus angustifolia</i>	<i>Holcus lanatus</i>
<i>Asparagus asparagoides</i>	<i>Crataegus monogyna</i>	<i>Freesia alba</i> × <i>leichtlinii</i>	<i>Hypochoeris radicata</i>
<i>Avena ?barbata</i>	<i>Cynodon dactylon</i>	<i>Fumaria</i> sp.	<i>Lolium perenne</i>
<i>Briza maxima</i>	<i>Cytisus scoparius</i>	<i>Galium aparine</i>	<i>Lonicera japonica</i>

<i>Myoporum insulare</i>	<i>Prunella vulgaris</i>	<i>Solanum nigrum</i>	<i>Vicia ?hirsuta</i>
<i>Oxalis incarnata</i>	<i>Prunus cerasifera</i>	<i>Sonchus oleraceus</i>	<i>Vicia sativa</i>
<i>Paspalum dilatatum</i>	<i>Rosa rubiginosa</i>	<i>Sporobolus africanus</i>	<i>Vulpia bromoides</i>
<i>Plantago lanceolata</i>	<i>Rubus anglocandicans</i>	<i>Ulex europaeus</i>	<i>Watsonia meriana</i>

Notes concerning some of the locally threatened plant species

Dichelachne crinita (Long-hair Plume-grass). One plant found on the south side near Kelletts Rd; others probably overlooked due to the season in which the inspection occurred.

Eleocharis gracilis (Slender Spike-rush). A small patch next to Site 84, where it is abundant. Presence confirmed 2003.

Pimelea curviflora (Curved Rice-flower). One colony, probably comprising several plants, outside the Boral quarry.

Rytidosperma caespitosum (Common Wallaby-grass). As above, and also scattered in the vicinity of Summit Rd.

Rytidosperma geniculatum (Knead Wallaby-grass). Many plants between Summit Rd and Cornish Rd.

Fauna of special significance

Rare or Threatened in Knox (but not all of Melbourne)

Sugar Glider. Found in a tree hollow between Tirhatuan Drive and Taylors Lane in 2004.

Fauna habitat features

- Many trees have hollows that may provide nesting sites for native bats, birds or possums;
- The densely grassy ground layer is bound to provide food for larvae of various butterflies (particularly in the Valley Grassy Forest);
- Dense patches of shrubs provide protection for small native birds.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Regionally Threatened Ecological Vegetation Classes

Valley Heathy Forest and Swampy Woodland are both listed by the Department of Sustainability & Environment as regionally Endangered, and Valley Grassy Forest is listed as regionally Vulnerable. Any vegetation belonging to an Endangered EVC is of at least High conservation significance according to Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a). The same is also true of moderately intact vegetation of any Vulnerable EVC. Criterion 3.2.3 awards State significance to any site that includes a 'remnant patch' of any such vegetation.

The vegetation between Tirhatuan Drive and Taylors Lane clearly qualifies as a remnant patch and hence achieves a State significance rating. Segments of the site that abut the larger sites 81, 83 and 84 are given the same significance as the abutting sites. The remaining segments are classified as **Local** significance (the lowest rank) because they are more ecologically isolated and unlikely to qualify as remnant patches in the sense intended by Amos (2004).

Rare or Threatened Flora

Eleocharis gracilis is quite uncommon in the Melbourne area. A large and demonstrably stable population extends into this site from the Fruitful Vine Melbourne Church property (Site 84), where most of the population is located. It makes the roadside **Locally** significant under criterion 3.1.5 of Amos (2004) – as do the other listed locally threatened species that have viable populations.

Threats

- Loss or decline of plant species whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or elimination by incidents such as digging by dogs. This particularly applies to *Dichelachne crinita*, *Pimelea curviflora* and *Clematis microphylla*;
- Invasion by environmental weeds, particularly grasses. The worst species are as follows:
 - Very serious: Sweet Vernal-grass (*Anthoxanthum odoratum*);
 - Serious: Large Quaking-grass (*Briza maxima*), Cocksfoot (*Dactylis glomerata*), Panic Veldt-grass (*Ehrharta erecta*), Sweet Pittosporum (*Pittosporum undulatum*), Boneseed (*Chrysanthemoides monilifera*), Brooms (*Genista linifolia* and *G. monspessulana*), Sweet Briar (*Rosa rubiginosa*) and Bridal Creeper (*Asparagus asparagoides*);
- Reduced visitation of the roadside vegetation by small insect-eating birds due to its isolation from other areas with indigenous understorey, possibly leading to a worsening of plant pests and diseases.

Management issues

- The most intact segments of this site, near Tirhatuan Drive and Kelletts Rd, are signposted as sites of significance, not to be slashed except by special arrangement with Council. The vegetation near Tirhatuan Drive is being very well managed for its conservation significance.
- Outside the Boral quarry, there are serious outbreaks of weeds that are 'controlled' under the *Catchment Protection and Land Management Act 1994*, such as Boneseed and Brooms. Sweet Pittosporums are also a serious problem there. These should be brought under effective control in a program that spans the roadside and the quarry land.
- Any revegetation or use of herbicide in this site, and particularly in the Valley Grassy Forest, should only be done by someone with a good eye for small significant plants such as the *Pimelea curviflora* and *Eleocharis gracilis*.

Administration matters

- This site is suited to an Environmental Significance Overlay because of its biological significance documented above, particularly because the vegetation belongs to threatened Ecological Vegetation Classes.
- The sections between Cornish Rd and the unused road reservation for Lysterfield Rd are covered by the Significant Landscape Overlay Schedule 2 under the Knox Planning Scheme. The absence from the overlay of the section to the east of there appears to be an oversight, since the planning map does not even recognise it as being within Knox.
- Sites 67, 86 and 273 of Water Ecoscience (1998) overlap to some degree with the site described here and they are included in Schedule 1 of the Vegetation Protection Overlay (VPO1) in the Knox Planning Scheme. The site described and mapped here should replace the Water Ecoscience sites because of the more detailed, recent and accurate treatment.

Information sources used in this assessment

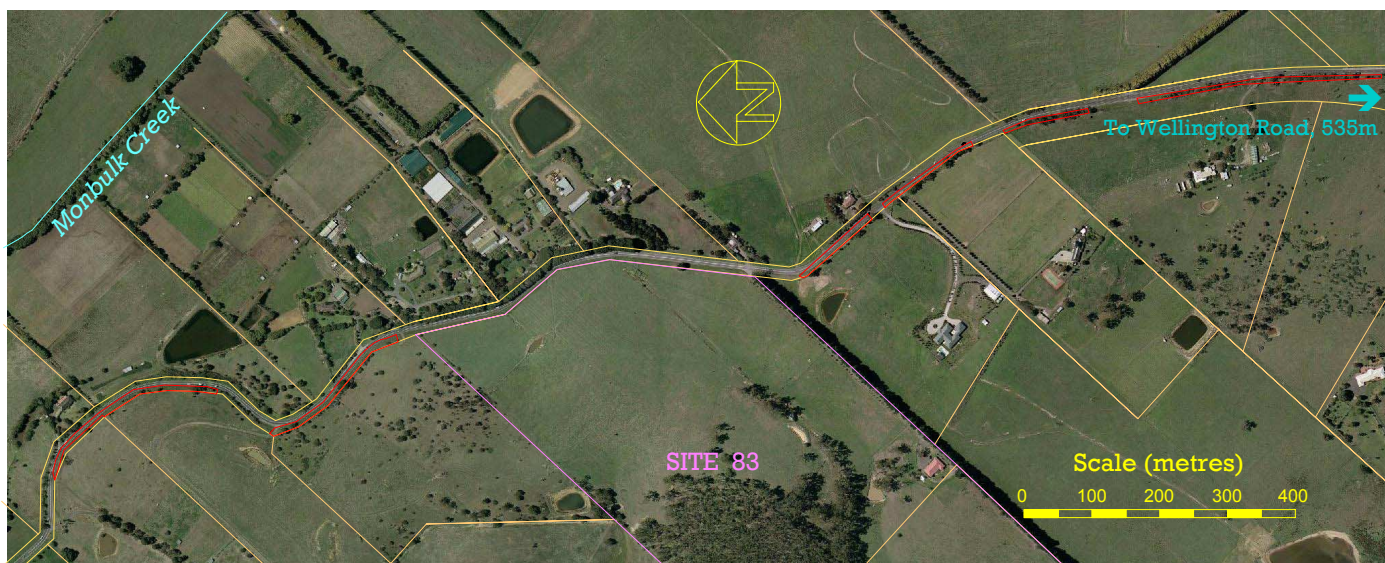
- Vegetation mapping showing vegetation communities and vegetation quality, and twelve lists of plant species (indigenous and introduced) for all native vegetation west of Kelletts Rd, observed by Dr Lorimer on 25th November 1997, as described in the report, '*A Survey and Management Plan for Significant Vegetation of Roadsides in Knox*' by G.S. Lorimer for Knox City Council (May 1998, 137 pp.);
- Vegetation data collected east of Kelletts Rd in October 2002 and on 25/4/03 by Lorimer according to the standard procedures described in Section 2.4 of Volume 1, including six lists of indigenous and introduced plant species for different segments of the site;
- Lists of fauna observed incidentally during the above studies;
- Revisitation of the area around the Boral Quarry in 2003 to further clarify the EVC identification;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 97. Lysterfield Rd Roadside, Lysterfield

A total of 1,300 lineal metres of road verge on one side of the road, in six sections. Melway maps 74 and 83.

Site Significance Level: *Regional*

- A linear oasis of native vegetation in an agricultural landscape;
- Contains remnants of the Endangered EVC, Valley Heathy Forest (and probably also remnants of the Vulnerable EVC, Valley Grassy Forest), but only in fair to poor ecological condition;
- Supports a single individual of the locally rare Scrub Sheoak, *Allocasuarina paludosa*;
- Ecologically stable vegetation with rather modest diversity.



Aerial photograph taken April 2003.

Boundaries

The site is in six segments, defined by the red outlines on the aerial photograph above (taken in April 2003). Its width extends from the gutter of Lysterfield Rd to the property fences. The ends of the six segments are as drawn, and in most cases do not have any landmarks to define them other than a transition from principally introduced vegetation to principally native vegetation. The total area is 0.97 ha. The boundary of Site 83 (p. 422) is shown in pink for reference.

Land use & tenure: Road reservation.

Site Description

This site comprises six sections of road verge with indigenous ground flora, much of it with remnant trees and some of it with indigenous shrubs. The width of the verge is typically 4-5 metres and the total length of all segments is 1,300 metres. There is pasture on the other side of the fences, uphill from the roadside. There is only one short strip of native vegetation on the eastern side of the road, which is in the Shire of Yarra Ranges.

Much of the site is signposted as significant roadside vegetation (labelled KN16, KN17 and KN18), with slashing to be conducted less frequently and with more ecological sensitivity than would otherwise be the case.

The roadside does not represent an important habitat corridor because of the fragmentation of the native vegetation and the size of the separation from the nearest large area of natural tree canopy (Lysterfield Park – Site 82).

Pasture grasses and weeds of pasture have extensively invaded the native vegetation, displacing many of the indigenous plant species that would once have occurred in the site. Some of the large, old trees present have died in recent years from unknown causes. The vegetation's ecological condition varies between ratings D (poor) and C (fair) on the scale explained in Section 2.4.4 of Volume 1.

The road winds along the side of a moderately steep slope, with the floodplain of Monbulk Ck roughly 200 m to the northeast. Close to the centrepiece of the site, there is a geological transition between Kalorama rhyodacite to the north and the less fertile Lysterfield granodiorite to the south.

The patches of vegetation on the granodiorite show strong characteristics of Valley Heathy Forest, particularly the overstorey composition and the presence of characteristic species such as *Dianella longifolia*. On the rhyodacite, the

vegetation type is harder to discern because there are few eucalypts or shrubs remaining and the ground flora composition has been greatly influenced by a history of slashing. There is some indication of a tendency toward Valley Grassy Forest in the northernmost section (e.g. an increase in *Elymus scaber*), consistent with the Department of Sustainability & Environment's BioMaps of pre-European EVCs in this area.

The presence of a solitary plant of the locally rare *Allocasuarina paludosa* (Scrub Sheoak) in the southernmost section indicates rather low fertility in that part of the site. This species has a local stronghold at Baluk Willam Flora Reserve, 3 km to the east, in rather heathier vegetation (particularly Damp Heathy Woodland).

Relationship to other land

The vegetation remnants in this site are so small that most of the flora and fauna must rely on nearby native vegetation for their long-term survival. With the exception of some insects, wildlife would have to move between the site and other vegetation to provide enough habitat and avoid inbreeding. Some plants would also be at risk from inbreeding or complete disappearance if not for infusion of pollen or seeds from other remnants, often carried by fauna. The rather weak ecological connections between this site and other native vegetation are therefore important for the site's long-term viability.

There is a short strip of native roadside vegetation on the eastern side of the road (in the Shire of Yarra Ranges) and there are scattered trees (mostly young) in some of the adjoining pasture. There is a larger area of tree cover 250 m away in Site 83 (seen partly on the aerial photograph above) and much larger areas slightly further away in the Lysterfield Hills (Site 81) and Lysterfield Park (Site 82). There is also substantial habitat in Upwey, just over 1 km to the northeast. Fauna may move through the Lysterfield Rd site *en route* between these sites, but no observations have been made to verify this.

Bioregion: Gippsland Plain, arguably extending into the Highlands Southern Fall bioregion at the southern end.

Habitat types

Valley Heathy Forest (EVC 127, **regionally Endangered**), tending toward Valley Grassy Forest (EVC 47, **regionally Vulnerable**) north of the centrepoint of the site. Total vegetated area approx. 6,000 m², of which approximately equal amounts are in ecological condition rating C (fair) and D (poor).

Dominant canopy trees: *Eucalyptus radiata* in the southern third, *E. cephalocarpa* and *E. goniocalyx* in the central third, and reduced in the northern third to one *E. radiata* and a dead *E. obliqua*.

Dominant lower trees: *Acacia melanoxylon* is dominant overall. *A. implexa* and *A. mearnsii* are also present in the south, and *Melaleuca ericifolia* is rather abundant in the central third. *Exocarpos cupressiformis* is scattered throughout.

Shrubs: *Kunzea ericoides* and fewer *Leptospermum continentale*.

Ground flora: Densely grassy with few small shrubs and with ferns limited to a few patches of bracken. The dominant indigenous species in most of the site is *Themeda triandra*, joined by *Gahnia radula* in the southern third. Various *Rytidosperma* species are collectively abundant. *Veronica gracilis*, *Lomandra longifolia* and *Dianella longifolia* are abundant in the northern third of the site. The characteristic species *Xanthorrhoea minor* is scattered sparsely along the road verge, and *Tricoryne elatior* is present but scarce.

Plant species

The following plant species were observed by the author on 23rd January 2004. Additional species would no doubt be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Allocasuarina paludosa* is rare throughout the Melbourne region.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia implexa</i>		<i>Epilobium hirtigerum</i>
V	<i>Acacia mearnsii</i>	V	<i>Eucalyptus cephalocarpa</i>
V	<i>Acacia melanoxylon</i>		<i>Eucalyptus goniocalyx</i>
	<i>Acacia paradoxa</i>	V	<i>Eucalyptus obliqua</i>
	<i>Acrotriche serrulata</i>	V	<i>Eucalyptus ovata</i>
V	<i>Allocasuarina littoralis</i>	E	<i>Eucalyptus radiata</i>
C	<i>Allocasuarina paludosa</i>	V	<i>Exocarpos cupressiformis</i>
C	<i>Amyema pendula</i>		<i>Gahnia radula</i>
V	<i>Amyema quandang</i>	E	<i>Imperata cylindrica</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>		<i>Kunzea ericoides</i> spp. agg.
	<i>Bossiaea prostrata</i>		<i>Leptospermum continentale</i>
	<i>Dianella admixta</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
V	<i>Dianella longifolia</i> s.l.		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
	<i>Elymus scaber</i>		<i>Lomandra longifolia</i>

Risk	Indigenous Species	Risk	Indigenous Species
E	<i>Melaleuca ericifolia</i>		<i>Rytidosperma tenuius</i>
	<i>Microlaena stipoides</i>		<i>Themeda triandra</i>
	<i>Pteridium esculentum</i>		<i>Tricoryne elatior</i>
	<i>Rytidosperma penicillatum</i>	V	<i>Veronica gracilis</i>
	<i>Rytidosperma racemosum</i>	V	<i>Xanthorrhoea minor</i>
	<i>Rytidosperma setaceum</i>		
Introduced Species			
	<i>Acacia baileyana</i>	<i>Cirsium vulgare</i>	<i>Linum trigynum</i>
	<i>Agrostis capillaris</i>	<i>Crataegus monogyna</i>	<i>Lythrum junceum</i>
	<i>Anthoxanthum odoratum</i>	<i>Dactylis glomerata</i>	<i>Paspalum dilatatum</i>
	<i>Brassica</i> sp.	<i>Ehrharta erecta</i>	<i>Phalaris aquatica</i>
	<i>Briza maxima</i>	<i>Ehrharta longiflora</i>	<i>Plantago lanceolata</i>
	<i>Bromus catharticus</i>	<i>Festuca arundinacea</i>	<i>Rubus anglocandicans</i>
	<i>Bromus diandrus</i>	<i>Holcus lanatus</i>	<i>Sporobolus africanus</i>
	<i>Chrysanthemoides monilifera monilifera</i>	<i>Hypochoeris radicata</i>	

Notes concerning some of the locally threatened plant species

Allocasuarina paludosa (Scrub Sheoak). A single plant was found in the southernmost third of the site.

Imperata cylindrica (Blady Grass). Two patches were found in the northernmost third of the site.

Fauna habitat features

The grassy ground layer is probably supporting butterfly larvae and small lizards.

Significance ratings

Regionally Threatened Ecological Vegetation Class

Valley Heathy Forest is listed by the Department of Sustainability & Environment as regionally Endangered. Even allowing for the poor ecological condition of the Lysterfield Rd verge, it rates High conservation significance according to Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) because the EVC is endangered.

Criterion 3.2.3 of the Department of Sustainability & Environment's standard criteria for significance assessment (Amos 2004) awards State significance to any site that includes a 'remnant patch' of any such vegetation. It is questionable that any of the vegetation beside Lysterfield Rd qualifies as a 'remnant patch' in the sense intended by Amos, because in 2004, there was an unpublished convention of a minimum area of 2,500 m². Because of this, the author has downgraded the significance level to **Regional**.

Locally Threatened Plant Species

Some of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Loss or decline of plant species whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or elimination by random incidents. This applies particularly to *Allocasuarina paludosa* and *Eucalyptus obliqua*;
- Invasion by environmental weeds, which are overwhelmingly grasses. The worst species are as follows:
 - Very serious: Sweet Vernal-grass (*Anthoxanthum odoratum*) and Toowoomba Canary-grass (*Phalaris aquatica*);
 - Serious and widespread in the site: Large Quaking-grass (*Briza maxima*), Cocksfoot (*Dactylis glomerata*) and Panic Veldt-grass (*Ehrharta erecta*);
 - Serious in no more than one third of the site: Annual Veldt-grass (*Ehrharta longiflora*) and Ribwort (*Plantago lanceolata*);
- Reduced visitation of the site by small insect-eating birds due to its isolation from other areas with indigenous understorey, possibly leading to a worsening of plant pests and diseases.

Management issues

Much of this site is signposted as a site of significance, not to be slashed except by special arrangement with Council. It is important that this level of oversight and control be continued, otherwise the adverse effects of indiscriminate slashing would represent a serious additional threat to the site's ecological values.

On the other hand, carefully timed and sensitively executed slashing of the site would cause no harm. Fire hazard reduction may be directed largely or wholly to the abutting private properties. Any slashing that does need to occur on the roadside should be done in the months of October or November. In no circumstances should it occur in autumn, which would cause massive proliferation of weeds.

Administration matters

- This site is suited to an Environmental Significance Overlay because of its biological significance documented above, particularly because the vegetation belongs to threatened Ecological Vegetation Classes.
- Site 284 of Water Ecoscience (1998) and parts of their Site 272 are within the site described here. Schedule 1 of the Vegetation Protection Overlay (VPO1) in the Knox Planning Scheme covers part of Water Ecoscience's Site 272, but most of it has little or no native vegetation. There is only a small overlap between the areas mapped here and VPO1.
- The site is covered by Significant Landscape Overlay Schedule 2 under the Knox Planning Scheme.
- VicRoads has plans to upgrade Lysterfield Rd, and the findings above should be used to help guide the upgrade design.

Information sources used in this assessment

- Three lists of indigenous and introduced plant species for different parts of the site, compiled during this study on 23/1/04, along with mapping of vegetation types and quality in accordance with the standard procedures described in Section 2.4 of Volume 1;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Area Recommended for ESO3

The following area is proposed to be covered by the suggested Environmental Significance Overlay Schedule 3 discussed in Section 5.5 of Volume 1.

Site 99. Dandenong Ranges Buffer

The treed, mainly residential area at the foot of the Dandenong Ranges. Melway maps 65 and 74.

Site Significance Level: *Local*

- There are large numbers of mature, indigenous eucalypts, forming a canopy that is somewhat fragmented but which supports rich bird life, including regionally uncommon species such as Australian King-Parrots in abundance;
- There are many small populations of locally threatened plant species, particularly on roadsides.

Map – see next page

Boundaries

The 998 ha site is the green area on the map and does not include the other coloured and numbered sites shown within its outline. The outline follows property boundaries and the municipal boundary, except where it crosses roads.

Land use & tenure: Mainly residential land and parks.

Site Description

This site abuts the Dandenong Ranges National Park and many other identified sites of biological significance, and it has more than a dozen other sites of biological significance embedded within it. It also has a higher density of large trees than the rest of Knox, including remnant indigenous trees. These characteristics result in extensive dispersal of native birds, insects, pollen and seeds through the area. This dispersal is important for the landscape-scale maintenance of biodiversity in the area, e.g. by:

- Facilitating exchange of species and genetic material of native flora and fauna, particularly between the more isolated sites of biological significance covered by Schedule 1 of the Environmental Significance Overlay, thereby ameliorating the risks of inbreeding, decline in biodiversity and consequent vulnerability to other causes of ecological degradation;
- Allowing fauna to migrate around the landscape to fulfil their various habitat needs, such as for dispersal of young animals ejected from parental ranges, or in search of seasonal food sources in different parts of the landscape;
- To facilitate re-establishment of populations of species at sites from which they have disappeared, e.g. the successful reintroduction program for the Sword-grass Brown Butterfly in Boronia, run by the Knox Environment Society and Knox City Council.

The tree canopy and shrubs that occur along the many creeks and drainage lines that flow through the area are important for maintaining the aquatic ecosystems and water quality.

The presence of the vegetation and the associated wildlife (particularly birds) adds greatly to the amenity and character of the area.

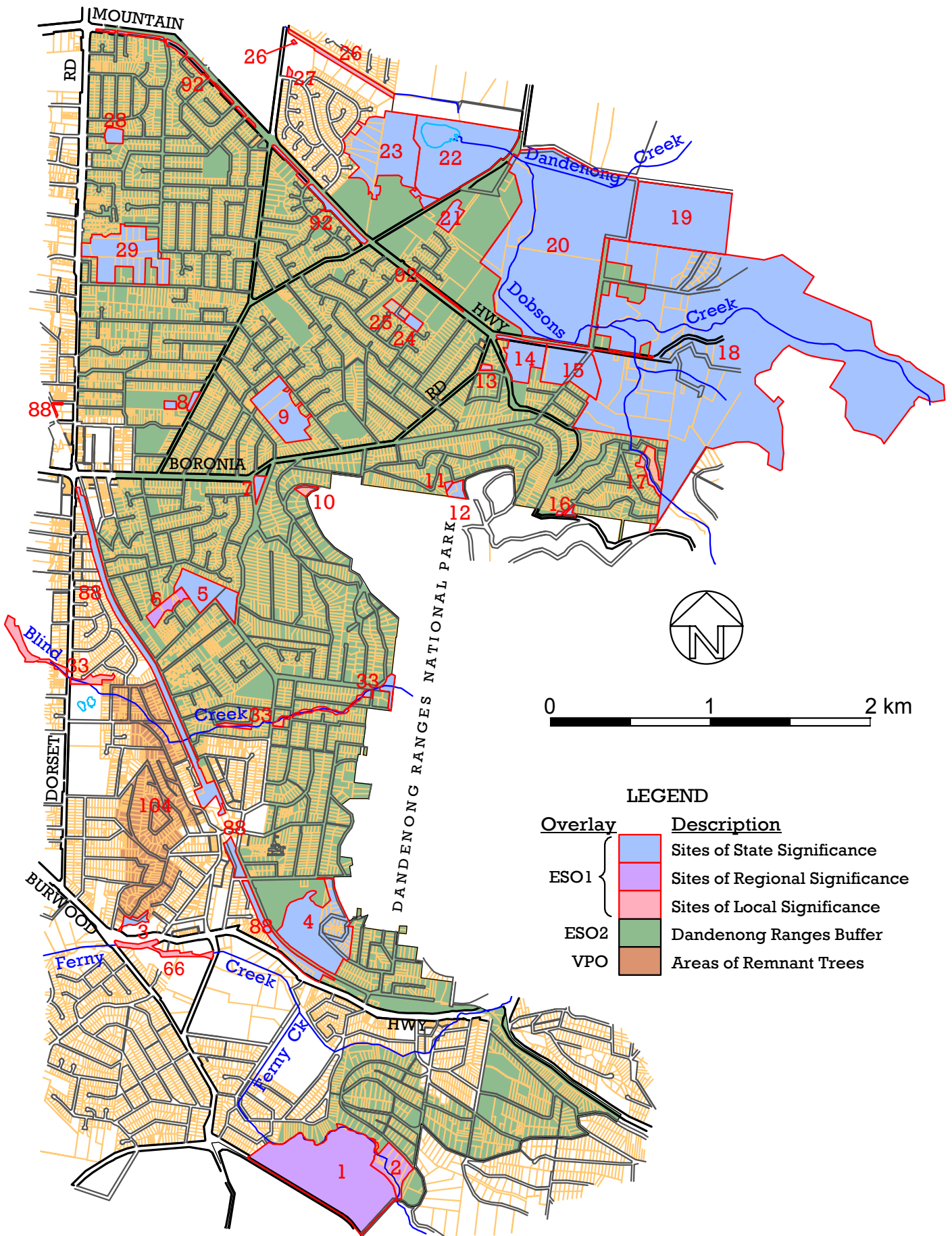
In these ways, this site plays an important role as an ecological buffer zone and for providing ecosystem services, even though it is not of great biological significance when one views a small part of it in isolation from the whole.

The area has scattered patches of native understorey vegetation, particularly on roadsides. Most of the remnant native vegetation belongs to, or is derived from, Ecological Vegetation Classes (EVCs) that are regionally Endangered or Vulnerable. There are localised, mostly very small populations of numerous plant species that are rare or threatened in Knox or the Melbourne area generally, including six species that are Critically Endangered in Knox. There are also significant fauna species such as Powerful Owl and abundant Australian King-Parrot.

The area is overwhelmingly residential and there may be undetected significant habitat or species among the many hundreds of properties.

However, many properties have few if any features of biological significance other than as a buffer for more significant vegetation, as described above. These properties are included within the site to:

- Provide a consistent, basic level of protection for the ecological buffering that the area provides; and
- Provide control over development or vegetation removal that may impair this buffering function, even when these activities occur on land that has no environmental significance when considered in isolation from the surroundings.



Map showing Site 99 – the Dandenong Ranges Buffer – in green, and other numbered sites in colours according to their conservation significance.

Relationship to other land

As seen from the map, this site has many other, more significant sites embedded within it. It also borders the Dandenong Ranges National Park and the Glenfern Valley Bushlands. Native wildlife (particularly birds, bats, insects and frogs) must move through this site to get from one of the embedded sites to another, or between them and the national park or the Glenfern Valley Bushlands. Such movements through the site allow dispersal of fauna and pollen between all these sites. For example, young Powerful Owls that were bred in the national park are sometimes observed in Koolunga Native Reserve (Site 5) and are likely to hunt in treed areas anywhere within the Dandenong Ranges Buffer. Similarly, the regionally uncommon Australian King-Parrot is abundant around The Basin, even at the shopping centre, because the treed landscape entices them out of their core habitat in the Dandenong Ranges National Park.

Without such a treed landscape, the more ecologically sensitive wildlife would cease to move through the area. As a result, pollen would not be as well dispersed, leading to plant inbreeding, reproductive failure and steady loss of native vegetation and habitat, even in the core areas such as Koolunga Native Reserve. The rich birdlife enjoyed by residents would be reduced to just hardy urban birds such as Common Mynas, Spotted Turtle-Doves, Little Ravens and Red Wattlebirds.

Bioregion: Gippsland Plain and Highlands Southern Fall, as mapped at the start of Section 3 of Volume 1.

Habitat types

The following is a list of the Ecological Vegetation Classes represented in the site, but some of them may be only represented by vestiges of the pre-European vegetation (typically just remnant trees and hardy ground flora in parks and residential gardens). For this reason, and because most private properties could not be inspected, no figures are quoted for the number of plant species in each EVC, nor the size of area within each EVC and in each ecological condition rating.

Riparian Forest (EVC 18, **Vulnerable** in the Gippsland Plain bioregion) along Ferny Ck in Upper Ferntree Gully, identifiable by the canopy of Manna Gums (*Eucalyptus viminalis*).

Grassy Dry Forest (EVC 22, conservation status rated 'Least Concern' in the Highlands Southern Fall bioregion) in the most elevated parts of The Basin, Boronia and Ferntree Gully.

Herb-rich Foothill Forest (EVC 23, conservation status rated 'Least Concern' in the Highlands Southern Fall bioregion) in the Claremont Av estate of The Basin and on the slopes of Upper Ferntree Gully that face approximately southward.

Swampy Riparian Woodland (EVC 83, **regionally Endangered**) along Upwey Ck and Ferny Ck.

Valley Heathy Forest (EVC 127, **regionally Endangered**) on the undulating terrain to the west of the Dandenong Ranges geological formation, including most of Boronia.

Grassy Forest (EVC 128, **regionally Vulnerable**) along the mid-slope of the western face of the Dandenong Ranges and on slopes and hills in Upper Ferntree Gully that do not support Herb-rich Foothill Forest.

Swampy Woodland (EVC 937, **regionally Endangered**) on alluvial deposits across the site, usually identifiable by pure stands of *Eucalyptus ovata*.

Plant species

The following plant species were observed by the author in the years indicated, except that the two 1985 records belong to Mr A. Paget. Because only part of the site could be inspected, the following list should not be treated as comprehensive. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable. In addition, *Acacia leprosa* (Dandenong Range variant) is rare nationally and the species with names in bold are rare in the Melbourne region.

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
	<i>Acacia dealbata</i>	2003		<i>Acrotriche serrulata</i>	1997
V	<i>Acacia implexa</i>	1997	V	<i>Adiantum aethiopicum</i>	1997
V	<i>Acacia leprosa</i> (Dandenong Range variant)	1997	C	<i>Amyema pendula</i>	1997
V	<i>Acacia melanoxydon</i>	2003	C	<i>Arthropodium milleflorum</i> s.l.	1997
E	<i>Acacia mucronata</i>	1997		<i>Arthropodium strictum</i>	1997
E	<i>Acacia myrtifolia</i>	2002	C	<i>Asperula conferta</i>	1997
E	<i>Acacia pycnantha</i>	2002		<i>Austrostipa pubinodis</i>	1997
E	<i>Acacia stricta</i>	2003		<i>Austrostipa rudis</i>	2002
V	<i>Acacia verticillata</i>	2003		<i>Austrostipa rudis</i> subsp. <i>rudis</i>	2003
V	<i>Acaena echinata</i>	1997	C	<i>Bedfordia arborescens</i>	1997
	<i>Acaena novae-zelandiae</i>	2003		<i>Billardiera mutabilis</i>	1997
V	<i>Acrotriche prostrata</i>	2002	E	<i>Blechnum cartilagineum</i>	1997
				<i>Bossiaea prostrata</i>	1997

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
V	<i>Brunonia australis</i>	1997	E	<i>Indigofera australis</i>	1997
E	<i>Bulbine bulbosa</i>	1997		<i>Juncus amabilis</i>	1997
	<i>Burchardia umbellata</i>	1997		<i>Juncus gregiflorus</i>	1997
	<i>Bursaria spinosa</i>	2003		<i>Juncus pallidus</i>	1997
V	<i>Caesia parviflora</i>	1997	E	<i>Juncus planifolius</i>	1997
V	<i>Calochlaena dubia</i>	2003		<i>Juncus sarophorus</i>	1997
	<i>Carex breviculmis</i>	1997	E	<i>Juncus subsecundus</i>	1997
	<i>Cassinia aculeata</i>	1997	C	<i>Juncus vaginatus</i>	1997
	<i>Cassinia arcuata</i>	1997		<i>Kunzea ericoides</i> spp. agg.	2003
V	<i>Cassinia longifolia</i>	1997	C	<i>Lachnagrostis aemula</i> s.l.	1997
E	<i>Cassytha melantha</i>	1997		<i>Lachnagrostis filiformis</i>	1997
E	<i>Cassytha pubescens</i>	1997		<i>Lepidosperma elatius</i>	1997
E	<i>Centella cordifolia</i>	1997	V	<i>Lepidosperma laterale</i>	1997
C	<i>Cheilanthes austrotenuifolia</i>	1997		<i>Leptospermum continentale</i>	2002
V	<i>Chiloglottis valida</i>	1997	E	<i>Linum marginale</i>	1997
V	<i>Clematis aristata</i>	1997		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	2002
V	<i>Coprosma quadrifida</i>	2003		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>	2002
E	<i>Correa reflexa</i>	1997		<i>Lomandra longifolia</i>	2002
E	<i>Cyathea australis</i>	1997	V	<i>Lythrum hyssopifolia</i>	1997
E	<i>Cynoglossum suaveolens</i>	1997	E	<i>Melaleuca ericifolia</i>	1997
E	<i>Daviesia leptophylla</i>	1997		<i>Microlaena stipoides</i>	2003
E	<i>Desmodium gunnii</i>	1997	C	<i>Muellerina eucalyptoides</i>	1997
	<i>Deyeuxia quadriseta</i>	1997	E	<i>Olearia argophylla</i>	1997
	<i>Dianella admixta</i>	2002	V	<i>Olearia lirata</i>	1997
V	<i>Dianella longifolia</i> s.l.	2003	E	<i>Olearia myrsinoides</i>	2002
V	<i>Dianella tasmanica</i>	2003	V	<i>Opercularia varia</i>	1997
C	<i>Dichelachne crinita</i>	1997		<i>Oxalis exilis/perennans</i>	1997
	<i>Dichelachne rara</i>	1997	E	<i>Ozothamnus ferrugineus</i>	2003
	<i>Dichondra repens</i>	2002		<i>Pandorea pandorana</i>	2003
V	<i>Dillwynia cinerascens</i>	1997	E	<i>Phragmites australis</i>	2002
E	<i>Dipodium roseum</i>	1997	C	<i>Pimelea axiflora</i>	1997
V	<i>Drosera peltata</i> subsp. <i>auriculata</i>	1997	E	<i>Pimelea curviflora</i>	1997
	<i>Elymus scaber</i>	1997	V	<i>Pimelea humilis</i>	1997
V	<i>Epacris impressa</i>	1997	V	<i>Plantago varia</i>	1997
V	<i>Epilobium billardierianum</i> ssp. <i>cinereum</i>	2003	V	<i>Platylobium formosum</i>	1997
	<i>Epilobium hirtigerum</i>	1997	V	<i>Platylobium obtusangulum</i>	2002
V	<i>Eucalyptus cephalocarpa</i>	2002		<i>Poa ensiformis</i>	2003
V	<i>Eucalyptus cypellocarpa</i>	2003		<i>Poa morrisii</i>	1997
	<i>Eucalyptus goniocalyx</i>	2003	E	<i>Poa tenera</i>	1997
E	<i>Eucalyptus macrorhyncha</i>	1997	E	<i>Polyscias sambucifolia</i>	1997
V	<i>Eucalyptus melliodora</i>	1997	E	<i>Polystichum proliferum</i>	1997
V	<i>Eucalyptus obliqua</i>	2003	E	<i>Pomaderris aspera</i>	1997
V	<i>Eucalyptus ovata</i>	2003		<i>Poranthera microphylla</i>	1997
E	<i>Eucalyptus radiata</i>	2003	E	<i>Prostanthera lasianthos</i>	1997
E	<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>	2003		<i>Pteridium esculentum</i>	2003
V	<i>Euchiton collinus</i>	1997	E	<i>Pterostylis melagramma</i>	1985
E	<i>Euchiton involucratus</i>	1997	V	<i>Pultenaea gunnii</i>	1997
V	<i>Exocarpos cupressiformis</i>	2003	C	<i>Pultenaea scabra</i>	1997
E	<i>Exocarpos strictus</i>	1997	E	<i>Rubus parvifolius</i>	2003
	<i>Gahnia radula</i>	2002	V	<i>Rytidosperma erianthum</i>	1997
V	<i>Geranium potentilloides</i>	2003		<i>Rytidosperma laeve</i>	1997
V	<i>Glycine clandestina</i>	1997		<i>Rytidosperma linkii</i> var. <i>fulvum</i>	1997
	<i>Gonocarpus tetragynus</i>	1997		<i>Rytidosperma pallidum</i>	1997
	<i>Goodenia lanata</i>	1997		<i>Rytidosperma penicillatum</i>	2002
	<i>Goodenia ovata</i>	2003	V	<i>Rytidosperma pilosum</i>	1997
C	<i>Hakea ulicina</i>	1997		<i>Rytidosperma racemosum</i>	1997
V	<i>Hardenbergia violacea</i>	1997	E	<i>Rytidosperma semiannularis</i>	1997
V	<i>Helichrysum scorpioides</i>	1997		<i>Rytidosperma setaceum</i>	1997
E	<i>Hibbertia riparia</i>	1997		<i>Rytidosperma tenuius</i>	1997
E	<i>Hypericum gramineum</i>	1997	C	<i>Senecio bathurstianus</i>	1997

Risk	Indigenous Species	Year	Risk	Indigenous Species	Year
	<i>Senecio glomeratus</i>	1997	V	<i>Thelymitra ?peniculata</i>	1997
	<i>Senecio hispidulus</i>	2003		<i>Themeda triandra</i>	2003
E	<i>Senecio prenanthoides</i>	1997	E	<i>Thysanotus tuberosus</i>	1997
	<i>Senecio quadridentatus</i>	2003	E	<i>Viola hederacea</i>	1997
E	<i>Spyridium parvifolium</i>	1997	E	<i>Wahlenbergia gracilis</i>	1997
C	<i>Stellaria pungens</i>	1997	E	<i>Wahlenbergia stricta</i>	1997
E	<i>Stylidium armeria/graminifolium</i>	1997	V	<i>Xanthorrhoea minor</i>	1997
	<i>Tetrarrhena juncea</i>	1997	E	<i>Xanthosia dissecta</i>	1985
E	<i>Tetradlea ciliata</i>	1997			

Introduced Species

<i>Acacia decurrens</i>	<i>Cyperus eragrostis</i>	<i>Paraserianthes lophantha</i>
<i>Acacia longifolia</i> subsp. <i>longifolia</i>	<i>Cytisus scoparius</i>	<i>Paspalum dilatatum</i>
<i>Acer pseudoplatanus</i>	<i>Dactylis glomerata</i>	<i>Passiflora tarminiana</i>
<i>Agapanthus praecox</i>	<i>Delairea odorata</i>	<i>Pennisetum clandestinum</i>
<i>Agrostis capillaris</i>	<i>Dipogon lignosus</i>	<i>Phalaris aquatica</i>
<i>Allium triquetrum</i>	<i>Ehrharta erecta</i>	<i>Pinus radiata</i>
<i>Anthoxanthum odoratum</i>	<i>Ehrharta longiflora</i>	<i>Pittosporum undulatum</i>
<i>Arctotheca calendula</i>	<i>Erica lusitanica</i>	<i>Plantago lanceolata</i>
<i>Arrhenatherum elatius</i>	<i>Fraxinus angustifolia</i>	<i>Polygala myrtifolia</i>
<i>Avena barbata</i>	<i>Freesia alba</i> × <i>leichtlinii</i>	<i>Prunus cerasifera</i>
<i>Bellis perennis</i>	<i>Galium aparine</i>	<i>Ranunculus repens</i>
<i>Briza maxima</i>	<i>Genista linifolia</i>	<i>Romulea rosea</i>
<i>Bromus catharticus</i>	<i>Genista monspessulana</i>	<i>Rubus anglocandicans</i>
<i>Buddleja davidii</i>	<i>Hakea salicifolia</i>	<i>Salix</i> sp.
<i>Chamaecytisus palmensis</i>	<i>Hedera helix</i>	<i>Solanum nigrum</i>
<i>Chrysanthemoides monilifera monilifera</i>	<i>Holcus lanatus</i>	<i>Sonchus oleraceus</i>
<i>Cirsium vulgare</i>	<i>Hypericum tetrapterum</i>	<i>Taraxacum officinale</i> spp. agg.
<i>Conyza ?sumatrensis</i>	<i>Hypochoeris radicata</i>	<i>Tradescantia fluminensis</i>
<i>Coprosma robusta</i>	<i>Ilex aquifolium</i>	<i>Ulex europaeus</i>
<i>Cortaderia selloana</i>	<i>Jasminum</i> sp.	<i>Verbena bonariensis</i> s.l.
<i>Cotoneaster glaucophyllus</i>	<i>Juncus articulatus</i>	<i>Vicia disperma</i>
<i>Cotoneaster pannosus</i>	<i>Lilium formosanum</i>	<i>Vicia ?hirsuta</i>
<i>Cotoneaster simonsii</i>	<i>Linum trigynum</i>	<i>Vicia sativa</i>
<i>Crataegus monogyna</i>	<i>Lolium perenne</i>	<i>Vinca major</i>
<i>Crepis capillaris</i>	<i>Lonicera japonica</i>	<i>Vulpia bromoides</i>
<i>Crococsmia</i> × <i>crococsmiiflora</i>	<i>Oxalis incarnata</i>	<i>Watsonia borbonica</i>
<i>Cynodon dactylon</i>	<i>Oxalis purpurea</i>	<i>Watsonia meriana bulbifera</i>

Notes concerning some of the locally threatened plant species

- Acacia leprosa* (Cinnamon Wattle), Dandenong Range variant. Present in moderate numbers (probably a few dozen) near the boundary with the Dandenong Ranges National Park.
- Acacia mucronata* (Narrow-leaf Wattle). A copse grows beside Arbor Av, Ferntree Gully, next to the national park.
- Agrostis aemula* (Purplish Blown Grass). Found sporadically, likely to appear in various locations from time to time.
- Arthropodium milleflorum* (Pale Vanilla-lily). Very small numbers found near Government Rd in The Basin and near Walbundry Av and Barclay Av in Ferntree Gully.
- Asperula conferta* (Common Woodruff). Found beside Bayview Cr, The Basin, at its eastern end. Numbers not recorded.
- Bedfordia arborescens* (Blanket-leaf). Only found near the national park boundary below Government Rd in The Basin, in small numbers.
- Blechnum cartilagineum* (Gristle Fern). Found on the east-facing slope near Government Rd, The Basin.
- Bulbine bulbosa* (Yellow Bulbine-lily). Several plants were found beside Walbundry Av in Ferntree Gully.
- Cheilanthes austrotenuifolia* (Green Rock Fern). One patch was found beside Hansen Rd in Boronia.
- Chiloglottis valida* (Common Bird-orchid). Found beside Inverness Av, The Basin. Numbers not recorded.
- Correa reflexa* (Common Correa). Found beside View Rd, The Basin. Numbers not recorded.
- Cynoglossum suaveolens* (Sweet Hound's-tongue). Found beside Barclay Av, Upper Ferntree Gully. Numbers not recorded.
- Daviesia leptophylla* (Narrow-leaf Bitter-pea). Small numbers were found on Chandlers Hill and the west face of the Dandenong Ranges.

- Desmodium gunnii* (Southern Tick-trefoil). Found beside Bayview Cr, The Basin, at its eastern end. Numbers not recorded.
- Hakea ulicina* (Furze Hakea). Found beside Inverness Av, The Basin. Numbers not recorded.
- Juncus vaginatus* (Clustered Rush). One plant found beside Government Rd, The Basin and another at the intersection of Heath Av and Arbor Av in Ferntree Gully (the latter at risk from road grading).
- Linum marginale* (Native Flax). Small populations found beside Mountain Hwy and Mercia Av in The Basin and beside Burwood Hwy in Upper Ferntree Gully.
- Olearia argophylla* (Musk Daisy-bush). Very small numbers found beside Toorak Av and Claremont Av in The Basin.
- Pimelea axiflora* (Bootlace Bush). Found in small numbers on the east-facing slope near Government Rd, The Basin, and near Arbor Av in Ferntree Gully.
- Pimelea curviflora* (Curved Rice-flower). Found in small numbers beside Hansen Rd, Boronia and beside Birdwood Av and Walbundry Av in Ferntree Gully.
- Poa ?sieberiana* (Grey Tussock-grass). Found beside Birdwood Av, Ferntree Gully (numbers of plants not recorded), but they could be just aberrant specimens of *Poa morrisii*.
- Polystichum proliferum* (Mother Shield-fern). Found beside Arbor Av, Ferntree Gully. Numbers of plants were not recorded, but were very small and possibly just one.
- Pterostylis longifolia* (= *P. melagramma*) (Tall Greenhood). Recorded by Mr Andrew Paget on the north side of Lucas Ct, Boronia in 1985. Probably more widespread but overlooked due to its cryptic nature.
- Pultenaea scabra* (Rough Bush-pea). Scattered on the northeastern slopes of Chandlers Hill in The Basin.
- Rytidosperma erianthum* (Hill Wallaby-grass). A small but probably viable population was found on the northern nature strip of Olivebank Rd, Ferntree Gully.
- Senecio hispidulus* var. *dissectus* (Rough Fireweed). One plant found beside Mercia Av, The Basin, and another found nearby, beside Old Forest Rd.
- Spyridium parvifolium* (Australian Dusty Miller). Scattered in small numbers around The Basin.
- Stellaria pungens* (Prickly Starwort). One plant was found beside Arbor Av, Ferntree Gully.
- Tetralochea ciliata* (Pink-bells). Found beside Arbor Av, Ferntree Gully. Numbers of plants were not recorded, but were very small and possibly just one.
- Thysanotus tuberosus* (Common Fringe-lily). Found beside Hansen Rd, Boronia. Numbers not recorded.
- Wahlenbergia stricta* (Tall Bluebell). Scattered on the west face of the Dandenong Ranges close to the national park.

Fauna of special significance

The following list is probably very incomplete because various significant species would be expected near the Dandenong Ranges National Park but no serious investigation has been done.

Vulnerable in Victoria and listed under the *Flora and Fauna Guarantee Act*

Powerful Owl. Commonly observed in the site.

Uncommon in the Melbourne region

Australian King-Parrot. Abundant around The Basin.

Uncommon in Knox

Koala. Occasionally seen in Upper Ferntree Gully and likely to move through properties near the national park.

Fauna habitat features

- The tree canopy, fragmented though it is, supports good native birdlife including uncommon species such as abundant Australian King-Parrots;
- Many trees have hollows suitable for habitation by native birds, bats or insects;
- Residential gardens often support large populations of Common Ringtail Possums, which represent prey for Powerful Owls;
- Areas with dense shrubs (particularly prickly, indigenous species) provide protection and nest sites for small native birds such as wrens.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity and Viability

The role that this site plays in linking other sites of greater biological importance fits the description of an ecological linkage that is 'Important at Local Scale - Link between individual remnant habitat blocks', which criterion 1.2.6 of Amos (2004) recognises to be of **Local** conservation significance.

Regionally Threatened Ecological Vegetation Class

The EVCs represented within the site are predominantly regionally threatened, but no examples were found that would qualify as 'remnant patches' in the sense intended by criterion 3.2.3 of Amos (2004). As a result, no significance can be formally assigned to recognise the threatened EVCs. Any areas which may be discovered in the future to qualify as remnant patches would be of Regional or State significance and should be placed under ESO2 rather than ESO3.

Rare or Threatened Flora

The Dandenong Range variant of *Acacia leprosa* is listed as 'rare' in Victoria. The population in this site is so small and fragmented that it does not make a significant contribution to the total population of the taxon, and its viability relies on proximity to other sites (particularly the Dandenong Ranges National Park). It follows that the site is of **Local** significance under criterion 3.1.2 of Amos (2004).

Many of the other locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Rare or Threatened Fauna

The abundance of Australian King-Parrots is of **Local** significance under criterion 3.1.5, on the same basis as just discussed for flora.

The Powerful Owl is a vulnerable species in Victoria and individuals of the species periodically move through the site and probably prey on possums there. However, the site does not seem to represent habitat for the species in the sense intended in criterion 3.1.2, so no formal significance rating is given here.

Threats

- Prevention of establishment of young indigenous shrubs and trees due to suburban gardening and mowing;
- Loss or decline of plant species whose populations are so small that they are vulnerable to inbreeding, poor reproductive success or elimination by misadventure;
- Invasion by environmental weeds;
- Killing of mature remnant trees by root severance or soil compaction in residential gardens and on road verges;
- Eucalypt dieback disease in some areas.

Management issues

- Landowners and occupiers can help maintain the site's important ecological function by protecting trees (particularly indigenous ones) from root damage or soil compaction, and allowing some young trees to establish and ultimately replace the current generation;
- People who are prepared to improve the site's ecological function should consider planting some prickly indigenous shrubs, such as Manuka (*Leptospermum scoparium*), Prickly Moses (*Acacia verticillata*) or Sweet Bursaria (*Bursaria spinosa*) to encourage small insect-eating birds, which will in turn help to control insect pests;
- Sweet Pittosporum (*Pittosporum undulatum*) is probably the most serious weed in the site, and is widely tolerated or encouraged in residential gardens. Females should be removed whenever possible, and males should preferably be removed if they are beneath eucalypts, which they debilitate. Females can be recognised by the presence of fruit between about November and April.

Administration matters

- This site is suited to an Environmental Significance Overlay for the reasons discussed under the heading, 'Significance ratings', and because of land development potential in some areas. The boundary around the Boronia activity centre takes into account Council's 'Boronia Structure Plan' and its implementation through planning scheme amendment C062, which was with a review panel at the time of writing;
- The whole site is presently covered by Schedules 1 or 3 of the Vegetation Protection Overlay (VPO1) in the Knox Planning Scheme. Some of the area covered by these schedules is not regarded here as being in need of such protection, and some of it (Site 104, west of the railway line) is recommended to be covered by a revised VPO schedule;
- The more elevated parts of the site are covered by Significant Landscape Overlay Schedule 2 under the Knox Planning Scheme.

Information sources used in this assessment

- Ecological surveys by Dr Lorimer during 1997-2003 in various areas scattered across the site. These were prepared partly for this study (using the standard survey procedures discussed in Section 2.4 of Volume 1) and partly for the report, 'A Survey and Management Plan for Significant Vegetation of Roadsides in Knox' by G.S. Lorimer for Knox City Council (May 1998, 137 pp.). The sites surveyed were Chandler Park, Batterham Park, the railway corridor through Upper Ferntree Gully and numerous roadsides and front yards. The data gathered included:

- Compilation of lists of indigenous and introduced plants for each of fifty-nine parts of the site;
 - Mapping of vegetation communities, ecological condition and uncommon plant species;
 - Descriptions of the vegetation's structural and floristic composition;
 - Incidental observations of fauna; and
 - Checks for fauna habitat, ecological threats and management issues.
- Equivalent surveys of the Upwey Ck corridor, Talaskia Reserve and Boronia Rd road verge by Mr Rik Brown as part of the present study;
 - Twelve quadrat records from what are now properties on the north side of Lucas Close, Boronia prior to the site's development, all recorded by Andrew Paget in his 1985 unpublished RMIT thesis for B.App.Sci.;
 - General visual inspection of the area's vegetation by the author over many hours while inspecting sites from this report that are embedded within the present one, as well as while driving around the area for the specific purpose of inspecting vegetation, detecting sites and determining site boundaries;
 - A 'windscreen survey' and aerial photography analysis by Dr Lorimer in May 2010 to adjust the boundary around the Boronia activity centre in response to recent land development and planning scheme amendment C062, which implements the Boronia Structure Plan;
 - Aerial photography from February 2001, April 2003, February 2007 and December 2009;
 - Satellite imagery of the district;
 - The Department of Sustainability & Environment's BioMaps of the area;
 - Maps of geology and topography produced by agencies of the Victorian government.

Areas Recommended for VPO

Sites 52 and 100-114 below are proposed to be covered by the suggested Vegetation Protection Overlay (VPO) Schedule discussed in Section 5.5 of Volume 1. Parcels of land measuring at least 0.4 ha are also subject to Clause 52.17, which provides basic protection for the full range of native vegetation other than Bracken.

It should be kept in mind that this report only deals with the biological significance of vegetation. Areas not recommended here for inclusion under the VPO schedule proposed in Volume 1 may nevertheless be worthy of including under a VPO schedule for other reasons, such as beauty, interest or history.

Site 52. Winton Farm, Boronia Rd, Wantirna

Remnant Mealy Stringybarks (some large) on the former Winton Farm property. Melway ref. 63 E4.

Site Significance Level: *Local*

- Vestiges of a regionally endangered plant community;
- Provides an ecological stepping-stone for daily and seasonal east-west movements of birds and insects.

Boundaries

The site comprises the area outlined in red and labelled 'Site 52' north of Boronia Rd on the aerial photograph on page 266. The boundary has been drawn to circumscribe the main area of remnant trees.

Land use & tenure: Disused grazing land now forming part of the verge of the EastLink road.

Site description

In 2004 when the first edition of this report was prepared, a 7.89 ha site was included within Winton Farm to circumscribe a seasonal wetland and an arc of remnant trees surrounded by pasture. Construction of the EastLink road has decimated the site, leaving only a fraction of the previous number of trees and a handful of individual indigenous wetland plants. The site described here is therefore much smaller (0.87 ha) and its significance has fallen from State to Local.

The soil is shallow, poorly draining, light grey loam over clay subsoil. The bedrock is Middle Silurian siltstone of the Anderson Creek formation.

The only native understorey found in 2008 comprised some Blackwoods and three Sweet Bursarias.

Relationship to other land

Neighbouring areas of native vegetation are shown on the aerial photograph on page 266. The site is probably used by some birds as a corridor between Dandenong Creek (500m away) and the Bateman St Bush (Site 49). Until the construction of EastLink, the site was part of the Dandenong Creek flora and fauna corridor, and facilitated fairly liberal movement of frogs and birds, but it is not clear what the result of the new EastLink road will be. Without this patch of trees, there would be a substantially larger gap in the Dandenong Creek corridor, at a location where it can be ill afforded.

Bioregion: Gippsland Plain

Habitat type

Valley Heathy Forest (EVC 127, **regionally Endangered**): 0.85 ha, present only as scattered trees with foliage density slightly lower than the Department of Sustainability & Environment's benchmark.

Dominant canopy trees: *Eucalyptus cephalocarpa* and one *E. ovata*, with crowns overlapping slightly in the most dense areas.

Dominant lower trees: A few *Acacia melanoxylon*.

Shrubs: Three *Bursaria spinosa*.

Vines: None.

Ferns: None.

Ground flora: Pasture weeds.

Plant species

The following plant species were observed by the author on 7th March 2008. Additional species would no doubt be detectable in other seasons.

Acacia mearnsii
Acacia melanoxylon
Bursaria spinosa
Eucalyptus cephalocarpa
Eucalyptus ovata

Fauna habitat features

Some of the large eucalypts probably have hollows suitable for habitation by the same fauna.

Significance ratings

Ecological Integrity and Viability

Criterion 1.3 of Amos (2004) assigns **Local** significance to a 'Site (or one of a group of such sites) to form a strategic corridor of local importance and scale', which is believed to apply in this case. If this becomes an important matter, the continued role of the site for faunal movements along the Dandenong Creek corridor should be checked by a specialist ecologist following commissioning of the EastLink road.

Locally Threatened Plant Species

Eucalyptus cephalocarpa is locally vulnerable and the dominant species in this site. Because there is a viable population, criterion 3.1.5 is met for a site of **Local** significance.

Threats

- Some trees are suffering dieback that threatens to kill them.

Administration matters

- This site is worthy of inclusion within the proposed Vegetation Protection Overlay Schedule (Volume 1, Section 5.5) because:
 - It contains (in the words of the VPP Practice Note on Biodiversity) 'scattered living food trees with an exotic understorey'; and
 - It is a site of Local biological significance because of the likely importance of the trees in providing an ecological stepping-stone along the Dandenong Creek corridor.

Information sources used in this assessment

- A site survey undertaken during this study by Rik Brown on 15th May 2002, following this study's standard procedures discussed in Section 2.4 of Volume 1. This included vegetation mapping, descriptions of the composition and condition of the vegetation types, compilation of two lists of indigenous and introduced plant species (one for the wetland and one for the treed area), incidental fauna observations, and checks for fauna habitat, ecological threats, management issues and populations of scarce or threatened plant species;
- An inspection by Dr Lorimer on 7/3/08 to determine what conservation values remain following construction of the EastLink road (which was almost complete in this vicinity);
- A report, 'Assessment of Native Vegetation on the Mitcham to Frankston Freeway Alignment in Knox', by Dr Lorimer in July 2003 for Knox City Council;
- The 1998 'Scoresby Transport Corridor Environment Effects Statement', particularly Supplement Volume H: Flora and Fauna by Williams L.M., Yugovic J.V., McGuckin J., Humphrey P. and Larwill S. (1998);
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 100. Forest Lodge, Boronia Rd, Wantirna

A patch of remnant eucalypts (some of them large) with some prospects of native understorey recovering from recent clearing and scarification during construction of the EastLink road. Melway ref. 63 E5.

Site Significance Level: *Local*

- Retains a canopy of trees from the endangered Valley Heathy Forest, but with very little native understorey.

Aerial photograph and plan: See page 266, which covers this site, Site 52 and Site 53.

Boundaries

The site is as outlined in red on the aerial photograph, labelled 'Site 100'. Clearing associated with the EastLink project in 2005-8 forced a major contraction of the site originally described in the first edition of this report, to 0.95 ha.

Land use & tenure: VicRoads land beside the nearly-completed EastLink road.

Site description

This site retains large remnant eucalypts. Only approximately 50 m² of native understorey remains since most of the site was scarified and sowed with exotic grass in 2007. There is some regeneration of indigenous understorey plants among the very sparse ground flora (as at March 2008) and it is possible that more will emerge with the coming of good rains. The original vegetation belonged to the endangered ecological vegetation class, Valley Heathy Forest.

Relationship to other land

This site may still serve as an ecological stepping-stone between Koomba Park and Manson Reserve. Refer to the discussion about the Bateman Street Bush (Site 49, p. 251) for more detail.

Bioregion: Gippsland Plain

Habitat types

Valley Heathy Forest (EVC 127, **Endangered**), reduced to remnant eucalypts with only a tiny patch of native understorey.

Dominant canopy trees: *Eucalyptus cephalocarpa* and *E. melliodora*, with smaller numbers of *E. macrorhyncha* and *E. radiata*.

Dominant lower trees: A few sapling *Acacia dealbata* were cleared in 2006-7. A solitary *Acacia mearnsii* remains.

Shrubs: Small numbers of *Acacia paradoxa* and *Solanum laciniatum*.

Vines and Ferns: None found.

Ground flora: A small patch of c. 50 m² contains *Microlaena stipoides*, *Rytidosperma racemosum*, *Rytidosperma setaceum*, *Austrostipa rudis*, *Lomandra filiformis* subsp. *coriacea* and *Themeda triandra*. *Dianella admixta* was recently cleared but may re-sprout.

Plant species

The following plant species were observed by the author on 7th March 2008. Additional species would no doubt be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox with 'E'=Endangered and 'V'=Vulnerable.

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Acacia paradoxa</i>	E	<i>Eucalyptus radiata</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Chenopodium pumilio</i> (a recent immigrant to Knox)		<i>Microlaena stipoides</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Rytidosperma racemosum</i>
E	<i>Eucalyptus macrorhyncha</i>		<i>Rytidosperma setaceum</i>
V	<i>Eucalyptus melliodora</i>	V	<i>Solanum laciniatum</i>
			<i>Themeda triandra</i>

Fauna of special significance

Uncommon in the Melbourne Region

Weasel Skink. Seen in c.1998, as reported in the Scoresby Transport Corridor Environment Effects Statement, but unlikely to have survived the EastLink construction.

The Environment Effects Statement for the Scoresby Freeway (now EastLink) also reported that Sugar Gliders were seen in the immediate vicinity.

Fauna habitat features

- Some of the mature eucalypts have hollows suitable for nesting or roosting by native birds, bats, possums or insects.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity and Viability

Criterion 1.3 assigns **Local** significance to a 'Site (or one of a group of such sites) to form a strategic corridor of local importance and scale', which is believed to apply in this case. If this becomes an important matter, the continued role of the site for faunal movements along the Dandenong Creek corridor should be checked by a specialist ecologist following commissioning of the EastLink road.

Regionally Threatened Ecological Vegetation Class

Valley Heathy Forest is listed by the Department of Sustainability & Environment as regionally Endangered. However, the representation in the Forest Lodge site does not have sufficient canopy cover or understorey to qualify as a 'remnant patch' under criterion 3.2.3, and therefore its status as an example of an endangered EVC is not formally significant.

Locally Threatened Plant Species

The site's eucalypts are locally threatened and have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Continuation of recent efforts to convert the native understorey to exotic grass;
- Severance of tree roots by the recent scarification of the soil, leading to tree death or debility.

Administration matters

- This site is worthy of inclusion within the proposed Vegetation Protection Overlay Schedule (Volume 1, Section 5.5) because:
 - It contains (in the words of the VPP Practice Note on Biodiversity) 'scattered living food trees with an exotic understorey' (albeit with potential for understorey regeneration); and
 - It is a site of Local biological significance because of the likely importance of the trees in providing an ecological stepping-stone along the Dandenong Creek corridor.
- The site is protected under the existing Schedule 2 of the Vegetation Protection Overlay in the Knox Planning Scheme, due to the presence of planted trees from outside Australia that were recognised as significant by Water Ecoscience (1998, their Site 133). The basis for that overlay schedule has gone due to clearing;
- The land is zoned Road Zone Category 1 (RDZ1).

Information sources used in this assessment

- Site surveys undertaken during this study by Dr Lorimer on 30th August 2002 and Mr Rik Brown on 15th May 2002, using this study's standard procedures discussed in Section 2.4 of Volume 1. This included a description of the vegetation composition, compilation of a list of indigenous and introduced plant species, incidental fauna observations, and checks for fauna habitat, ecological threats and management issues;
- A site inspection, including compilation of a plant list, for approximately 20 minutes by Dr Lorimer on 7/3/08 to reassess the site since EastLink construction;
- A report, 'Assessment of Native Vegetation on the Mitcham to Frankston Freeway Alignment in Knox', by Dr Lorimer in July 2003 for Knox City Council;
- The 1998 'Scoresby Transport Corridor Environment Effects Statement', particularly Supplement Volume H: Flora and Fauna by Williams L.M., Yugovic J.V., McGuckin J., Humphrey P. and Larwill S. (1998);
- Aerial photography from February 2001, April 2003 and February 2007;
- Satellite imagery of the district;

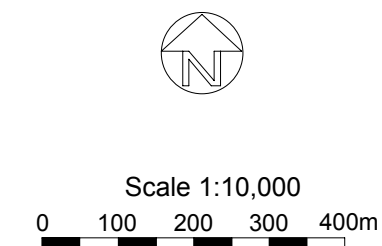
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 101. Stud Rd Roadside, Wantirna

A total of 1.54 kilometres of road reserve, in four sections. Melway maps 63 and 64

Site Significance Level: *Local*

- Contains a large number of trees that provide rudimentary habitat for native birds and insects. Some trees are remnant eucalypts and wattles, and others are planted 'Australian natives'.



Aerial photograph taken April 2003.

Boundaries

The four segments that make up this site are outlined in red on the aerial photograph. The boundaries align with title boundaries, except for two short, straight lines that delimit the site's northern and southern extent. The total area is 3.24 ha.

Land use & tenure: Roadside tree reserve.

Site description

This site provides an almost continuous canopy of trees that provide rudimentary habitat for native birds and insects. The trees that make up the canopy are a mixture of remnant eucalypts (six species), remnant wattle trees (Blackwood and Lightwood) and many planted 'Australian natives' such as Red Ironbark, Lemon-scented Gum, River Red Gum, Southern Blue Gum, Southern Mahogany, Casuarinas and Melaleucas.

The remnant trees indicate that the original Ecological Vegetation Classes were Swampy Woodland in low-lying patches and Valley Heathy Forest in the remainder. However, the native shrubs and ground flora are reduced to small numbers of plants around the bases of some of the remnant trees.

Relationship to other land

Birds and insects that use this site as part of their habitat probably access it via the surrounding residential neighbourhoods. Trees in these neighbourhoods help to maintain birds in the area, including along the Stud Rd roadside. Conversely, the trees along Stud Rd help to keep birds around the surrounding neighbourhoods.

Bioregion: Gippsland Plain

Habitat types

The original EVCs of the site have been reduced to scattered trees and a very small number of understorey plants. These EVCs are:

Valley Heathy Forest (EVC 127, **Endangered**) dominated by *Eucalyptus melliodora*, *E. macrorhyncha* and *E. radiata*.

Swampy Woodland (EVC 937, **regionally Endangered**) dominated by *Eucalyptus ovata*.

A total 12 indigenous plant species were recorded by Mr Rik Brown on 15th May 2002. This total included no indigenous grasses (because of mowing and seasonal factors), but there would undoubtedly be at least two indigenous grass species, possibly several.

Plant species

The following indigenous plant species were observed by Mr Rik Brown on 15th May 2002. Additional species would probably be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox with 'E'=Endangered and 'V'=Vulnerable.

<u>Risk</u>	<u>Indigenous Species</u>	<u>Risk</u>	<u>Indigenous Species</u>
V	<i>Acacia implexa</i>	E	<i>Eucalyptus macrorhyncha</i>
V	<i>Acacia melanoxylon</i>	V	<i>Eucalyptus melliodora</i>
	<i>Bursaria spinosa</i>	V	<i>Eucalyptus obliqua</i>
V	<i>Coprosma quadrifida</i>	V	<i>Eucalyptus ovata</i>
	<i>Dianella admixta</i>	E	<i>Eucalyptus radiata</i>
V	<i>Eucalyptus cephalocarpa</i>	V	<i>Exocarpos cupressiformis</i>

Fauna of special significance

Uncommon in the Melbourne region

Musk Lorikeet. Observed in abundance, feeding on eucalypt flowers.

Fauna habitat features

- Remnant and planted native trees provide foraging habitat for native birds;
- Large numbers of planted Red Ironbark trees (*Eucalyptus sideroxylon*) attract substantial numbers of lorikeets when in flower.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity and Viability

The use of the site by nomadic native forest birds, particularly Musk Lorikeets, makes the site an ecological 'stepping stone'. Criterion 1.2.6 attributes **Local** significance to ecological stepping stones like this which can be described as 'Important at local scale - Link between individual remnant habitat blocks or within subcatchment'.

Locally Threatened Flora

Some of the locally threatened plant species listed above have viable populations, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Two large remnant Yellow Box trees (*Eucalyptus melliodora*) opposite Studfield Shopping Centre and two large remnant Swamp Gums (*Eucalyptus ovata*) opposite 167 and 287 Stud Road are excellent specimens of their species. However, the standard criteria of Amos (2004) do not recognise such features.

Locally Rare Fauna

Musk Lorikeets were listed by the Land Conservation Council (1991) as 'uncommon' in the Melbourne region. They are not rare within the whole of the Gippsland Plain bioregion. Their abundance within the site represents **Local** significance under criterion 3.1.5.

Threats

- Potential damage to remnant vegetation during maintenance of roads or utility services;
- Eucalypt dieback disease due to altered drainage and low incidence of insect-eating birds;
- Lack of recruitment of indigenous vegetation because of mowing and physical disturbances
- Critically small population sizes of some indigenous plant species.

Management issues

The habitat value of the site and the health of the trees could be enhanced by planting additional indigenous trees and understorey species (e.g. Sweet Bursaria, *Bursaria spinosa*) that suit insect-eating birds.

Administration matters

- This site is worthy of inclusion within the proposed Vegetation Protection Overlay Schedule (Volume 1, Section 5.5) because:
 - It contains (in the words of the VPP Practice Note on Biodiversity) 'scattered living food trees with an exotic understorey';
 - It is a site of Local biological significance; and
 - Many of the trees are not native to Victoria and hence are not protected by Clause 52.17 of the Knox Planning Scheme;
- Most of the site is covered by the existing Schedule 1 to the Vegetation Protection Overlay of the Knox Planning Scheme, based on the description by Water Ecoscience (1998) of their Site 39. However, the southern end of the site was inadvertently omitted from one of Water Ecoscience's map sheets, and hence off the Planning Scheme's overlay map;
- The Planning Scheme zoning is Public Park and Recreation Zone (PPRZ).

Information sources used in this assessment

- A botanical survey by Mr Rik Brown on 15/5/02 according to the standard procedures described in Section 2.4 of Volume 1, including:
 - Compilation of a list of indigenous and introduced plants;
 - A description of the vegetation's structural and floristic composition;
 - Incidental fauna observations; and
 - Checks for fauna habitat, ecological threats and management issues;
- A visual inspection of the site by Dr Lorimer in a moving vehicle in 2004;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Site 102. Ash Grove Precinct, Bayswater

A small residential neighbourhood with remnant eucalypts. Melway ref. 64 E5.

Site Significance Level: *Local*

- Contains remnant Yellow Box trees and mistletoes that provide habitat for native birds and insects.



Scale 1:2,000
10 0 20 40 60 80 100m

Aerial photograph taken
February 2007.

Boundaries

This 1.53 ha site is outlined in red on the aerial photograph above. The boundaries align with title boundaries except for road crossings, which are extensions of title boundaries. The extension across Elm St is to enclose a Yellow Box tree on the eastern nature strip.

Land use & tenure: Freehold residential land and residential street.

Site description

This residential neighbourhood retains some excellent specimens of Yellow Box (*Eucalyptus melliodora*) that are remnants of the original native vegetation, which was the endangered type, Valley Heathy Forest. Yellow Box trees are prolific producers of nectar and these trees are likely to be a good seasonal food source for native insects and birds (including the regionally uncommon Musk Lorikeet).

One of the Yellow Box trees, at the front of 12 Ash Grove, supports no fewer than six indigenous mistletoes – one *Amyema pendulum* and five *Muellerina eucalyptoides* – with no obvious signs of debilitation. Mistletoes are substantially depleted in numbers in Knox. Their fruits are staple food for the native Mistletoebird (now uncommon around Bayswater), and the

leaves are the only food source that can be used by caterpillars of certain butterfly species, particularly the Imperial White that occurs around Bayswater.

The habitat value of the remnant eucalypts is slightly enhanced by the presence of other large trees within the site. The Vegetation Protection Overlay recommended for this site affects large trees whether they are indigenous or not.

Relationship to other land

A stand of remnant Mealy Stringybark (*Eucalyptus cephalocarpa*) trees in the grounds of Bayswater Primary School can be seen on the aerial photograph. These trees augment the habitat within the site described here. They are not recommended for inclusion within the site because they already receive adequate protection under Clause 52.17 of the Knox Planning Scheme.

Other properties in the neighbourhood provide no significant habitat and are not of biological significance. This includes properties presently covered under Schedule 3 of the Vegetation Protection Overlay in the Knox Planning Scheme.

Bioregion: Gippsland Plain

Habitat type

Scattered trees, mistletoes and some native grass are all that is left of the original EVC of the site:

Valley Heathy Forest (EVC 127, **Endangered**) dominated by *Eucalyptus melliodora*.

Plant species

The following plant species were observed by Mr Rik Brown in 2002 and/or Dr Graeme Lorimer in 2003. Additional species might be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of local extinction as follows: 'C'=Critically endangered'; 'E'=Endangered; and 'V'=Vulnerable.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia melanoxylon</i>	V	<i>Exocarpos cupressiformis</i>
C	<i>Amyema pendula</i>		<i>Gahnia radula</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
V	<i>Eucalyptus melliodora</i>	C	<i>Muellerina eucalyptoides</i>
E	<i>Eucalyptus radiata</i>		

Fauna of special significance

None detected, but the author visited the site for less than one hour.

Fauna habitat features

- Yellow Box trees are renowned nectar producers and the ones in this site would provide seasonal food for native birds and insects;
- The mistletoes on the Yellow Box at 12 Ash Grove provide essential habitat for Mistletoebirds and Imperial White butterflies, in a suburb where such habitat is very rare. The fact that the mistletoes exist is evidence of past visitation by Mistletoebirds, which are the principal means by which mistletoes are spread.

Significance ratings

Ecological Integrity and Viability

The habitat value of trees in the site for use by native birds and insects, including Mistletoebirds, Musk Lorikeets and Imperial White butterflies, makes the site an ecological 'stepping stone'. Criterion 1.2.6 (Amos 2004) attributes **Local** significance to stepping-stones like this which can be described as 'Important at local scale - Link between individual remnant habitat blocks or within subcatchment'.

Locally Threatened Flora

The locally threatened eucalypt species listed above appear to have viable populations in the school grounds, thereby meeting criterion 3.1.5 for a site of **Local** significance.

The remnant Yellow Box (*Eucalyptus melliodora*) at 12 Ash Grove is a good specimen of its species and supports no fewer than six indigenous mistletoes – one *Amyema pendulum* and five *Muellerina eucalyptoides* – with no obvious signs of debilitation. However, this does not qualify for recognition under the criteria of Amos (2004).

Threats

- Residential development, as has recently occurred at 16 Ash Grove (on the northern corner of Birch St).

Management issues

The habitat value of the site could be enhanced by planting additional indigenous trees and understorey species (e.g. Sweet Bursaria, *Bursaria spinosa*) that suit insect-eating birds.

Administration matters

- This site is worthy of inclusion within the proposed Vegetation Protection Overlay Schedule (Volume 1, Section 5.5) because:
 - It contains (in the words of the VPP Practice Note on Biodiversity) ‘scattered living food trees with an exotic understorey’;
 - It is a site of Local biological significance; and
 - The properties involved are too small to be affected by Clause 52.17 of the Knox Planning Scheme, which might otherwise provide the indigenous trees with some protection;
- The site and surrounding neighbourhood are covered by the existing Schedule 3 to the Vegetation Protection Overlay of the Knox Planning Scheme, and parts of three properties are also covered by Schedule 1 (namely, 11 & 12 Ash Grove and 42 Elm St). It is recommended to remove these overlays and replace them with the new Schedule proposed in Section 5.5 of Volume 1;
- The Planning Scheme zoning is Residential 1 Zone (R1Z).

Information sources used in this assessment

- Inspections of the neighbourhood by Dr Lorimer in 2003 and on 20/8/08, including mapping the remnant trees and mistletoes; and
- Aerial photography from February 2001, April 2003 and February 2007.

Site 103. Blind Creek Valley, Boronia

A treed residential area, predominantly on the northern side of the Blind Ck valley. Melway map 64 (southern half).

Site Significance Level: *Local*

- There is a substantial number of mature trees, including remnant eucalypts, that provide rudimentary habitat for native birds, bats, possums, frogs and insects;
- The tree canopy helps to provide some degree of habitat connection between several more substantial sites of biological significance.

Map – see next page

Boundaries

This 108.3 ha site is outlined in red on the aerial photograph on the next page. It does not include the three segments of Site 33 (the Blind Ck Corridor) that lie within it, nor the part of St Joseph's School that forms Site 32. Most of the boundary aligns with property boundaries. The main exceptions are that the eastern edge runs down Woodvale Rd and a short section of Springfield Rd, and the border through Fairpark Reserve follows the Blind Ck shared path. If desired, Scoresby Rd could be omitted from the site for the purpose of the Vegetation Protection Overlay.

Land use & tenure: Freehold residential land, park and roads.

Site description

This residential neighbourhood retains a substantial number of mature remnant eucalypts and mature planted trees, including eucalypts from other parts of Australia. They provide a tree canopy that, despite its fragmentation, provides basic habitat needs for native birds, bats, possums, frogs and insects. Substantial numbers of native forest birds, such as Crimson Rosellas and Eastern Rosellas, frequent the area, which can be attributed to the site's trees and the presence of more substantial areas of habitat in the sites that are numbered and outlined in pink on the aerial photograph.

Indigenous understorey within the site is scarce other than for hardy grasses. A modest number of indigenous understorey species occur in patches on the northern verge of Boronia Rd.

Relationship to other land

Many native birds move through this area. A good example is the Crimson Rosellas nesting in Site 90 on the Boronia Rd roadside, which would have to fly through the site to find enough food for themselves and their young. Eastern Rosellas and Galahs that are common in Roselyn Crescent Reserve (Site 45, abutting to the west) can often be seen flying from or into the Blind Ck Valley site. It seems that most of the native fauna in the various sites seen on the aerial photograph would need to move between the sites to fulfil all their habitat needs.

Significance ratings

Ecological Integrity and Viability

The habitat value of trees in the site for use by native fauna makes the site an ecological 'stepping stone' of **Local** significance under the Department of Sustainability & Environment's criteria (Amos 2004 – criterion 1.2.6).

Locally Threatened Plant Species

The site contains some locally threatened plant species that have viable populations in combination with neighbouring native vegetation. Eucalypts are the most conspicuous examples. Such occurrences meet criterion 3.1.5 for a site of **Local** significance.

Threats

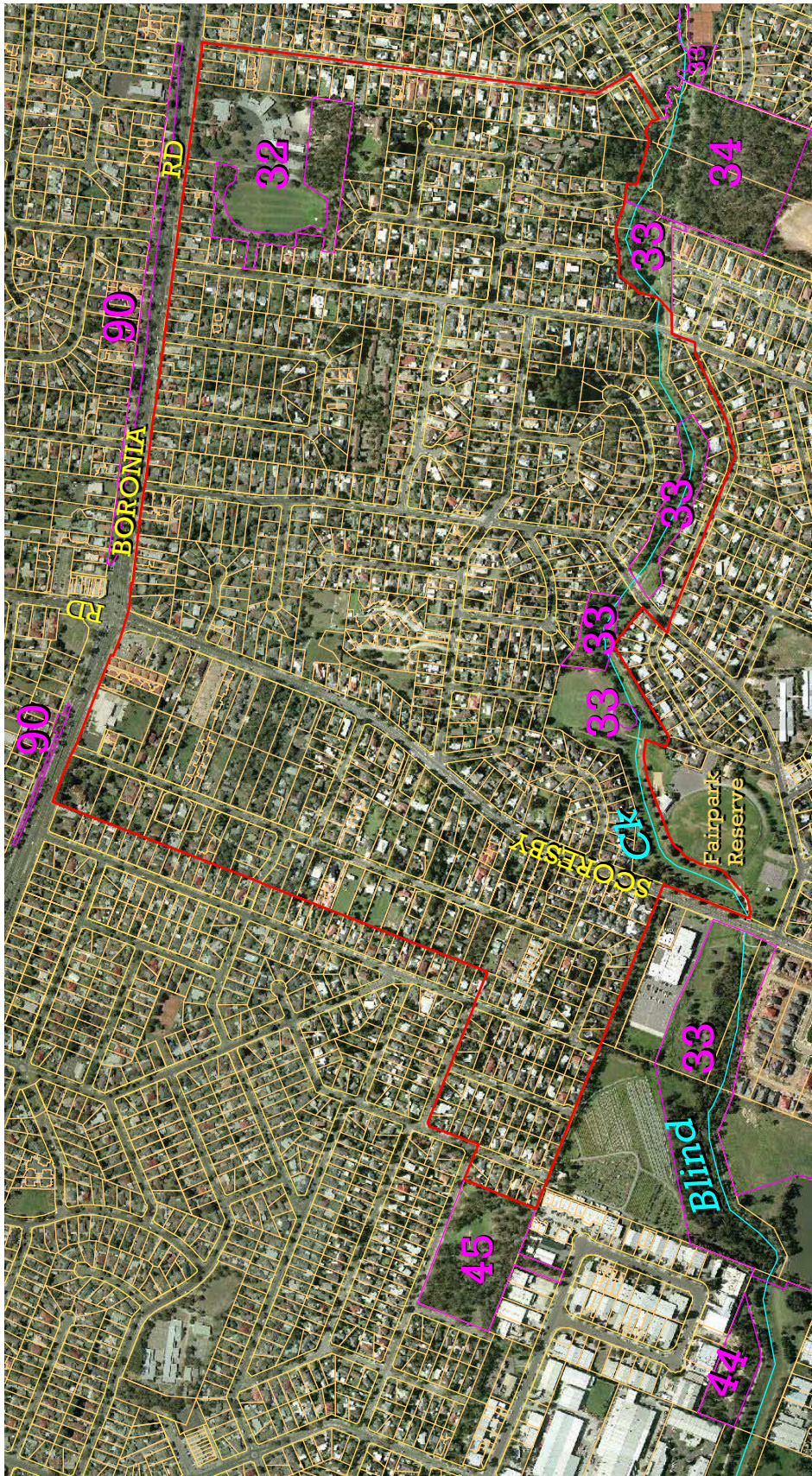
- Residential subdivision and development.

Management issues

The habitat value of the site could be enhanced by planting additional indigenous trees and understorey species (e.g. Sweet Bursaria, *Bursaria spinosa*) that suit insect-eating birds.

Administration matters

- This site is worthy of inclusion within the proposed Vegetation Protection Overlay Schedule (Volume 1, Section 5.5) because:
 - It contains (in the words of the VPP Practice Note on Biodiversity) 'scattered living food trees with an exotic understorey';



The Blind Creek Valley site is outlined in red, and other sites are outlined and numbered in pink. The aerial photograph was taken in April 2003.

- It is a site of Local biological significance;
- Most of the properties involved are too small to be affected by Clause 52.17 of the Knox Planning Scheme, which might otherwise provide some of the trees with some protection; and
- Some of the habitat trees are not native to Victoria and are therefore not protected by Clause 52.17.
- This site largely overlaps with an area covered by the existing Schedule 3 to the Vegetation Protection Overlay of the Knox Planning Scheme. The area described here extends further west to abut Roselyn Crescent Reserve (Site 45) because of observations of birds moving through that neighbourhood (and the likelihood that other native fauna also move through). Many properties around the edge of the area under the existing overlay are omitted from the site described here because they have no trees that are either biologically significant or likely to become so within the foreseeable future.

Information sources used in this assessment

- An inspection of the area by Dr Lorimer in 2003 for the specific purpose of finding sites of biological significance and determining the distribution of trees that represent reasonable habitat for native fauna;
- General visual inspection of the area's vegetation by the author and Mr Rik Brown during 2003-8 while surveying other sites in this report, such as St Joseph's School (Site 32), the Blind Creek Corridor (Site 33), the Blind Creek Billabong (Site 34) and Roselyn Crescent Reserve (Site 45);
- Aerial photography from February 2001, April 2003 and February 2007; and
- Satellite imagery of the district.

Site 104. Ferntree Gully Ridge

A treed residential area on a prominent ridge. Melway ref. 74 B3

Site Significance Level: *Local*

- There is a substantial number of mature trees, including remnant eucalypts, that provide rudimentary habitat for native birds, bats, possums, frogs and insects;
- The tree canopy helps to provide some degree of habitat connection between several more substantial sites of biological significance.

Map – See page 497.

Boundaries

This 47.4 ha site is shaded tan on the map on p. 497. It does not include Site 3 (End of The Avenue, Ferntree Gully) that lies at its southern tip. The boundary aligns with property boundaries except where it crosses roads.

Land use & tenure: Freehold residential land and associated streets.

Site description

This site includes a prominent, 1.1-kilometre long ridge and the Blind Ck valley, the latter being at the site's northern end. The southern end skirts Site 3, 130m from Ferny Ck.

The ridge is formed from a band of hornfels, created where Lower Devonian siltstones became covered by the Dandenong Ranges volcanic flows during the Upper Devonian Period. The subsoil is clay and the topsoil is a shallow clay loam.

Francis Crescent (just southwest of Blind Ck) follows the foot of the ridge. To its north and east, the topsoil is alluvium that has washed down Blind Ck and some of its tributaries.

The site stands out on a satellite photograph as more heavily vegetated than its surroundings. This is because many properties have large trees. A significant proportion of the trees are remnant eucalypts. On the ridge, the dominant remnant eucalypt is Bundy (*Eucalyptus goniocalyx*) – an excellent species for fauna habitat. There are also many trees that are native to other parts of Australia, which generally have greater habitat value than trees from other continents.

The tree canopy appears to provide basic habitat needs for native birds, bats, possums, frogs and insects.

Relationship to other land

The site provides a treed link between the Blind Creek habitat corridor (Site 33) and the Ferny Creek habitat corridor (part of Site 66). It may serve as a corridor for fauna movements between the two creeks, but there is no observational data to test that hypothesis.

It is also apparent from the map on p. 497 that the site abuts the Dandenong Ranges Buffer area (Site 99) and is close to several other sites of biological significance, particularly the railway corridor (Site 88), Koolunga Native Reserve (Site 5) and the Vaughan Road bushland (Site 6). The Dandenong Ranges National Park is 900 m away.

The author observed substantial numbers of parrots on the Ferntree Gully ridge, beyond what could be supported by the ridge on its own. This indicates that the parrots move through the area and rely on other areas to fulfil some of their habitat requirements. In this sense at least, the site functions as either a habitat corridor or an ecological 'stepping stone'.

Significance ratings

Ecological Integrity and Viability

The value of the site as a corridor or ecological 'stepping stone' fits the description 'Important at local scale - Link between individual remnant habitat blocks or within subcatchment', to which criterion 1.2.6 of Amos (2004) attributes **Local** significance.

Locally Threatened Plant Species

The site contains some locally threatened plant species that have viable populations in combination with neighbouring native vegetation. Eucalypts are the most conspicuous examples. Such occurrences meet criterion 3.1.5 for a site of **Local** significance.

Threats

- Loss of canopy trees due to residential subdivision and development;

- Eucalypt dieback disease.

Management issues

The habitat value of the site could be enhanced by planting additional indigenous trees and understorey species (e.g. Sweet Bursaria, *Bursaria spinosa*) that suit insect-eating birds. This applies particularly to properties that have little existing cover of native or indigenous trees.

Administration matters

- This site is worthy of inclusion within the proposed Vegetation Protection Overlay Schedule (Volume 1, Section 5.5) because:
 - It contains (in the words of the VPP Practice Note on Biodiversity) ‘scattered living food trees with an exotic understorey’;
 - It is a site of Local biological significance;
 - Most of the properties involved are too small to be affected by Clause 52.17 of the Knox Planning Scheme, which might otherwise provide some of the trees with some protection; and
 - Some of the habitat trees are not native to Victoria and are therefore not protected by Clause 52.17;
- This site lies within a much larger area covered by the existing Schedule 3 to the Vegetation Protection Overlay of the Knox Planning Scheme. The author believes that the overlay area can be contracted to the site described here because the land that has been omitted here has no biological significance and is unlikely to acquire any in the foreseeable future.

Information sources used in this assessment

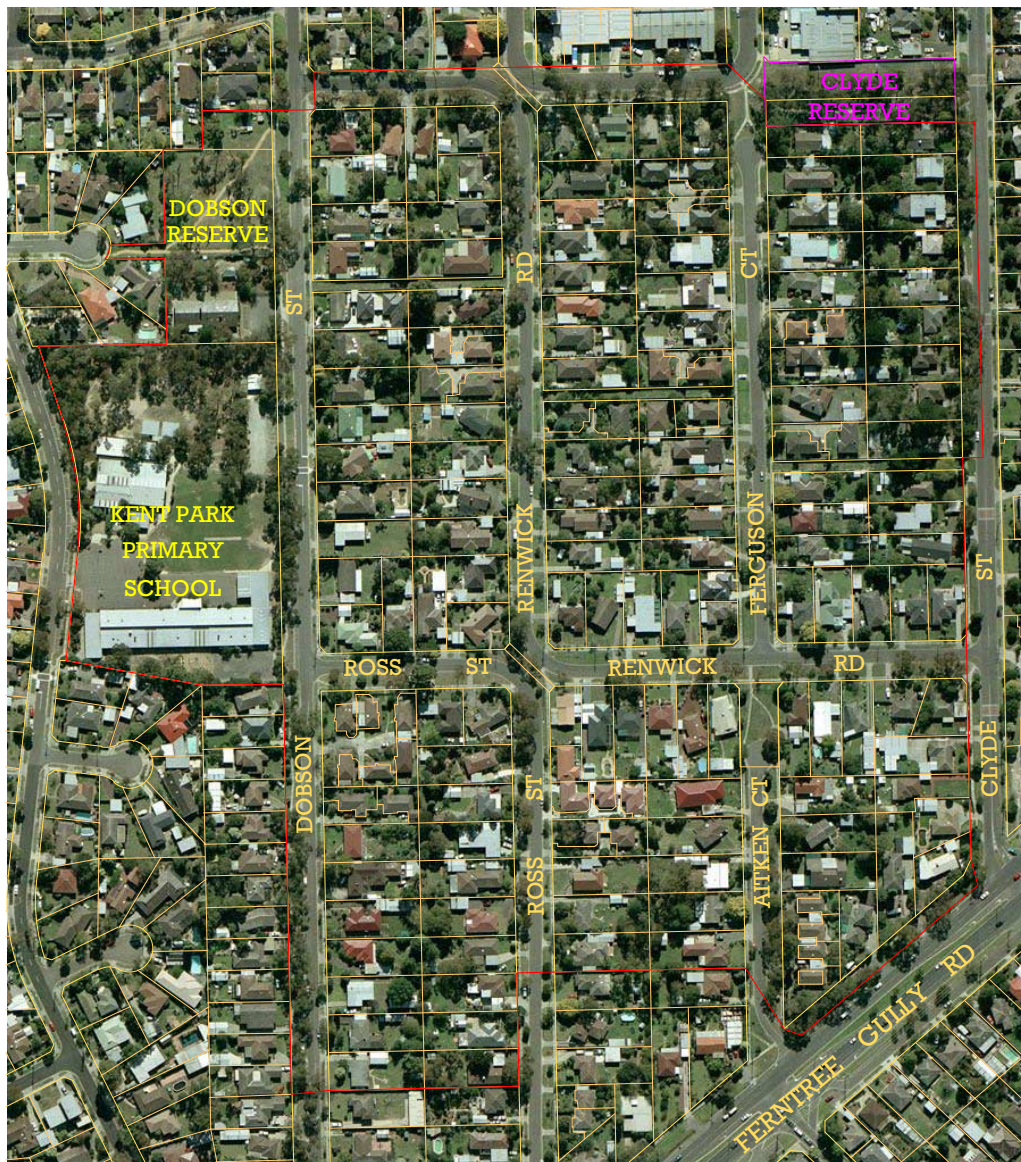
- An inspection of the area by Dr Lorimer in 2003 for the specific purpose of finding sites of biological significance and determining the distribution of trees that represent reasonable habitat for native fauna;
- General observations by Dr Lorimer while surveying the end of The Avenue (Site 3), the Blind Creek Corridor (Site 33) and the railway corridor (Site 88);
- Aerial photography from February 2001, April 2003 and February 2007; and
- Satellite imagery of the district.

Site 105. Dobson Street Treed Precinct, Ferntree Gully

A treed residential area, centred on Melway ref. 73 F3.

Site Significance Level: *Local*

- There are substantial numbers of mature trees, including remnant eucalypts, that provide rudimentary habitat for native birds, bats, possums, frogs and insects;
- Parrots are particularly abundant (at least seasonally), including the regionally uncommon Musk Lorikeet.



Aerial photograph taken April 2003.

Boundaries

A suggested boundary for this site is shown in red on the aerial photograph. The edges follow property boundaries, except for road crossings and a segment that runs down the middle of Clyde St. The precise location of the southern boundary between Dobson St and Aitken Ct is rather arbitrary. The outlined area measures 20.6 ha.

Land use & tenure: Freehold residential land, primary school, kindergarten, Council park and associated streets.

Site description

This treed neighbourhood retains a substantial number of remnant trees on nature strips, in Dobson Reserve, in the grounds of Kent Park Primary School and in a small number of private gardens. The indigenous species detected are listed below,

the column headed 'Risk' indicating the indigenous species' risk of extinction in Knox with 'E'=Endangered and 'V'=Vulnerable.

Risk	Species name	Risk	Species name
V	<i>Acacia melanoxylon</i>	V	<i>Eucalyptus obliqua</i>
	<i>Bursaria spinosa</i>	V	<i>Eucalyptus ovata</i>
V	<i>Coprosma quadrifida</i>	E	<i>Eucalyptus radiata</i>
	<i>Dianella admixta</i>		<i>Gahnia radula</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
	<i>Eucalyptus goniocalyx</i>	E	<i>Melaleuca ericifolia</i>

The site once supported two Ecological Vegetation Classes that have become regionally endangered: Swampy Woodland (characterised by the Swamp Gums and Swamp Paperbarks) and Valley Heathy Forest. Both are now reduced to vestiges with almost no native understorey.

The remnant trees, combined with mature planted trees (particularly species from other parts of Australia), provide basic habitat needs for native forest birds, bats, possums, frogs and insects. During fieldwork, large numbers of parrots were observed in the trees, including the regionally uncommon species, Musk Lorikeet.

The Kent Park Primary School community has improved the area's habitat by planting many Australian native trees and shrubs in the northern school grounds, as well as smaller numbers of trees in the southern school grounds.

Many private properties within the site are of no biological significance. They would be unaffected by the schedule for the Vegetation Protection Overlay that is proposed for this site (Section 5.5 in Volume 1).

Relationship to other land

On its own, the site could not fulfil all of the habitat needs of the number of parrots that were observed there. The parrots appear to roam daily between this area, Kent Park (Site 39) and habitat west of Scoresby Rd (e.g. Lakewood Nature Reserve (Site 43) or the Knoxfield treed precinct (Site 107)). They are also likely to travel further afield seasonally to take advantage of seasonal food sources, but this was not investigated in this study.

Native insects are likely to exhibit similar behaviour, but were not investigated.

Bioregion: Gippsland Plain

Habitat types

The original EVCs of the site have been reduced to scattered trees and a very small number of understorey plants. These EVCs are:

Valley Heathy Forest (EVC 127, **Endangered**) dominated by *Eucalyptus obliqua*, *E. radiata*, *E. goniocalyx* and *E. cephalocarpa*;

Swampy Woodland (EVC 937, **regionally Endangered**) dominated by *Eucalyptus ovata*.

A total of 12 indigenous plant species were recorded by Mr Rik Brown on 8th May 2002. This total included no indigenous grasses (because of mowing and seasonal factors), but there would undoubtedly be at least two indigenous grass species.

Plants of special significance

The remnant Mealy (or Silver-leafed) Stringybark (*Eucalyptus cephalocarpa*) at the front of 68 Dobson Street is an extremely large specimen of the species for the Melbourne region. It has a trunk diameter of one metre.

Fauna of special significance

Uncommon in the Melbourne region

Musk Lorikeet. Observed in abundance, feeding on eucalypt flowers.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity and Viability

The use of the site by native forest birds, particularly Musk Lorikeets, makes the site an ecological 'stepping stone' of **Local** significance. Criterion 1.2.6 attributes Local significance to sites that it describes as 'Important at local scale - Link between individual remnant habitat blocks or within subcatchment'.

Locally Threatened Flora

At least some of the locally threatened eucalypts and wattle listed above have viable populations (in combination with neighbouring native vegetation), thereby meeting criterion 3.1.5 for a site of **Local** significance.

Locally Rare Fauna

Musk Lorikeets were listed by the Land Conservation Council (1991) as 'uncommon' in the Melbourne region. They are not rare within the whole of the Gippsland Plain bioregion. Their abundance within the site represents **Local** significance under criterion 3.1.5.

Threats

- Potential damage to remnant vegetation during maintenance of roads or utility services;
- Eucalypt dieback disease due to altered drainage and low incidence of insect-eating birds;
- Lack of recruitment of indigenous vegetation because of mowing and physical disturbances;
- Critically small population sizes of some indigenous plant species.

Management issues

The habitat value of the site and the health of the trees could be enhanced by planting additional indigenous trees and understorey species that suit insect-eating birds. Hedge Wattle (*Acacia paradoxa*) and Sweet Bursaria (*Bursaria spinosa*) are examples of suitable shrubs.

Administration matters

- This site is worthy of inclusion within the proposed Vegetation Protection Overlay Schedule (Volume 1, Section 5.5) because:
 - It contains (in the words of the VPP Practice Note on Biodiversity) 'scattered living food trees with an exotic understorey';
 - It is a site of Local biological significance;
 - Most of the properties involved are too small to be affected by Clause 52.17 of the Knox Planning Scheme, which might otherwise provide some of the trees with some protection; and
 - Some of the habitat trees are not native to Victoria and are therefore not protected by Clause 52.17;
- Parts of the site are covered by the existing Schedule 1 to the Vegetation Protection Overlay of the Knox Planning Scheme. This resulted from the study by Water Ecoscience (1998), in which the overlay areas were Sites 289-292 and 294. The site shown on the aerial photograph above is proposed as a better alternative. It includes less nature strip and more private properties, but most of the private properties do not have trees large enough to be affected by the proposed VPO schedule. Note that the part of Kent Park Primary School covered by the existing overlay is not the part of the school grounds that has significant vegetation, presumably due to a mapping error.

Information sources used in this assessment

- Surveys of Clyde St, Dobson St, Dobson Reserve and Kent Park Primary School by Mr Rik Brown on 8th May 2002, following the standard procedures described in Section 2.4 of Volume 1, including (for each of these four areas):
 - Compilation of a list of indigenous and introduced plants;
 - A description of the vegetation's structural and floristic composition;
 - Incidental fauna observations; and
 - Checks for fauna habitat, ecological threats and management issues;
- An inspection of the area by Dr Lorimer in 2003 for the specific purpose of determining the distribution of trees that represent reasonable habitat for native fauna; and
- Aerial photography from February 2001 and April 2003.

Site 106. Scoresby Rd Verge, South of Burwood Hwy

A treed road verge, centred on Melway ref. 73 D3.

Site Significance Level: *Local*

- There are substantial numbers of mature trees, including remnant eucalypts, that provide rudimentary habitat for native birds, bats, possums, frogs and insects.

Aerial photograph and map: See page 525.

Boundaries

The site comprises the six strips along Scoresby Rd that are outlined in magenta on the aerial photograph on page 525. Five of the strips are individual lots, even though they are effectively road verges and might appear to be part of the road reservation. The southernmost strip occupies the full width of a similar lot, but only part of its length. The total area is 0.707 ha.

Land use & tenure: Road verge.

Site description

This roadside retains a substantial number of mature remnant eucalypts, interspersed with other Australian native trees and trees from other parts of the world. They provide rudimentary habitat needs for native birds, bats, possums, and insects.

There is hardly any native understorey left within the site. The main exception is a patch of eight remnant Swamp Paperbarks (*Melaleuca ericifolia*), 7 m tall, adjacent to a bus stop near Cambden Park Parade.

Apart from the habitat value, the trees provide an attractive streetscape and shade for walkers along the footpath.

Relationship to other land

The trees in this site effectively represent an enlargement to the other areas of habitat that are outlined in magenta or red on the aerial photograph on page 525.

It appears that birds such as Musk Lorikeets move between treed neighbourhoods to the east (Site 105) and west (Site 107). They are likely to detour on some occasions along the verge of Scoresby Rd, but evidence for this was not sought.

Bioregion: Gippsland Plain

Habitat types

Scattered remnant trees and very scarce, hardy understorey plants are all that is left of the original EVCs of the site:

Valley Heathy Forest (EVC 127, **Endangered**) dominated by *Eucalyptus cephalocarpa* and *E. radiata*, with some *Exocarpos cupressiformis* beneath.

Swampy Woodland (EVC 937, **regionally Endangered**) dominated by *Eucalyptus ovata*.

Plant species

The indigenous species detected are listed below, the column headed 'Risk' indicating the indigenous species' risk of extinction in Knox with 'E'=Endangered and 'V'=Vulnerable.

Risk	Species name	Risk	Species name
V	<i>Acacia melanoxylon</i>		<i>Kunzea ericoides</i> spp. agg.
C	<i>Amyema pendula</i>		<i>Leptospermum continentale</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
V	<i>Eucalyptus ovata</i>	E	<i>Melaleuca ericifolia</i>
E	<i>Eucalyptus radiata</i>		<i>Microlaena stipoides</i>
	<i>Gahnia radula</i>		

Significance ratings

Ecological Integrity and Viability

For the reasons discussed above, the trees in the site function as a habitat link. This link affects fauna only in the local area. Criterion 1.2.6 of Amos (2004) attributes **Local** significance to habitat links that it describes as 'Important at Local Scale - Link between individual remnant habitat blocks or within subcatchment'.

Locally Threatened Plant Species

At least some of the locally threatened eucalypts and wattle listed above have viable populations (in combination with neighbouring native vegetation), thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Tree removal or severance of tree roots during maintenance of roads or utility services;
- Eucalypt dieback disease.

Administration matters

- The planning scheme zoning is Residential 1 Zone (R1Z);
- This site is worthy of inclusion within the proposed Vegetation Protection Overlay Schedule (Volume 1, Section 5.5) because:
 - It contains (in the words of the VPP Practice Note on Biodiversity) ‘scattered living food trees with an exotic understorey’;
 - It is a site of Local biological significance; and
 - The lots involved are too small to be affected by Clause 52.17 of the Knox Planning Scheme, which might otherwise protect the more significant trees;
- Because the site comprises five small lots rather than being part of the road reservation, its native vegetation escapes the protection that Clause 52.17 of the Planning Scheme would otherwise provide (according to Knox City Council planners). If Clause 52.17 were to apply, the site would not be recommended for coverage by the Vegetation Protection Overlay. The Church of Christ land (431 Scoresby Rd) that abuts the northern tip of the site is covered by Clause 52.17 and hence it is not recommended for the overlay;
- This site almost matches an area covered by the existing Schedule 1 to the Vegetation Protection Overlay of the Knox Planning Scheme, which is identical to the area described by Water Ecoscience (1989) as their Site 68. Schedule 1 is intended for areas with native understorey, which does not apply along Scoresby Rd. The schedule to the Vegetation Protection Overlay that is discussed in Section 5.5 of Volume 1 is a more appropriate alternative.

Information sources used in this assessment

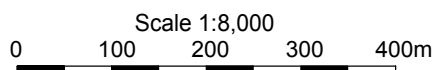
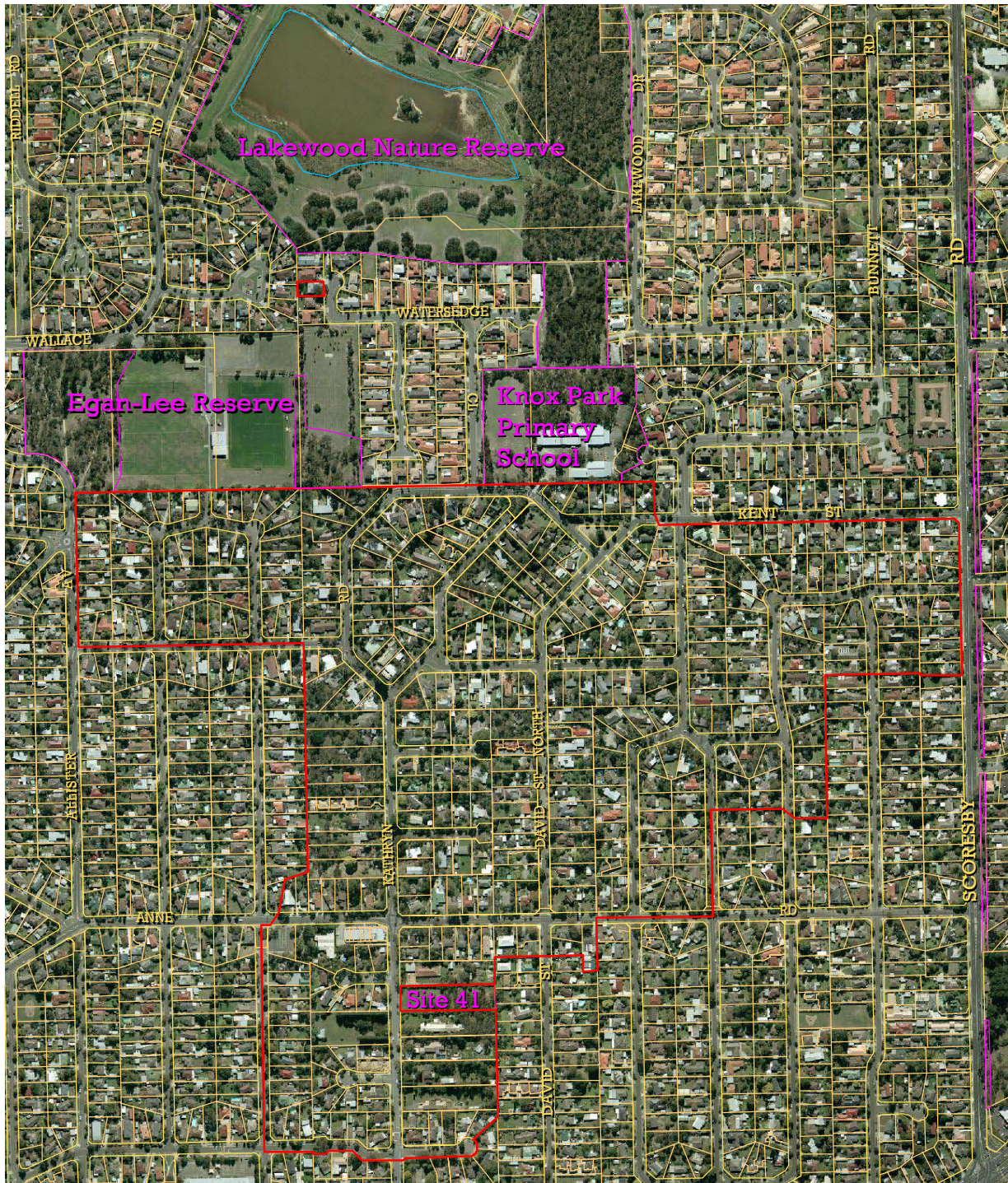
- Inspections of the area by Dr Lorimer in April and May 2004 for the purpose of finding sites of biological significance and determining the distribution of trees that represent reasonable habitat for native fauna;
- A basic check for changed conditions in 2008 as Dr Lorimer drove down Scoresby Rd; and
- Aerial photography from February 2001 and April 2003.

Site 107. Knoxfield Treed Precinct

A treed residential area, centred on Melway ref. 73 C4.

Site Significance Level: *Local*

- There are substantial numbers of mature trees, including remnant eucalypts, that provide rudimentary habitat for native birds, bats, possums, frogs and insects;
- The site provides habitat linkage between sites with higher quality vegetation.



*Aerial photograph taken
April 2003*

Boundaries

The site comprises a main section and a single lot (43 Watersedge Close) with an important habitat tree, as outlined in red on the aerial photograph. The site boundaries follow property boundaries, except for road crossings and segments that run down the middle of four streets. The precise location of the zigzags along the site's southeast is somewhat arbitrary. The main area of the site measures 52.88 ha and 43 Watersedge Close measures 0.063 ha.

Land use & tenure: Freehold residential land, shops and kindergarten.

Site description

The residential neighbourhood in the main section of this site retains a substantial number of mature remnant eucalypts, particularly Mealy Stringybark (*Eucalyptus cephalocarpa* – an excellent species for fauna habitat), Narrow-leaved Peppermint (*Eucalyptus radiata*) and Messmate Stringybark (*Eucalyptus obliqua*). They occur mostly in residential gardens and are distributed very patchily through the site.

The combination of species of eucalypts found in the site indicate that the whole area once supported the Ecological Vegetation Class, Valley Heathy Forest, which is now endangered. However, there is almost no native understorey left within the site. Indications of the original understorey composition can be obtained from the adjoining sites of biological significance that are outlined and labelled in pink on the aerial photograph on the previous page.

The tree canopy, despite its fragmentation, provides basic habitat needs for native birds, bats, possums, frogs and insects. This augments the higher quality habitat in the adjacent sites of biological significance. Consequently, the area has substantially more native forest birds, such as Crimson Rosellas and Eastern Rosellas, than most of Knox. There are also birds that are uncommon in suburbia, such as Laughing Kookaburras.

The isolated lot, 43 Watersedge Close, is included in the site because it has a large habitat tree that is believed to fulfil a function as a 'stepping-stone' for birds or insects.

Many private properties in the site are of no biological significance. They would be unaffected by the schedule for the Vegetation Protection Overlay that is proposed for this site (Section 5.5 in Volume 1).

Relationship to other land

The boundary of the site has been specifically devised to encourage retention of trees that are located between the sites of biological significance shown in pink on the aerial photograph.

As can be seen on the aerial photograph, there is presently a marked dearth of habitat directly between R.D. Egan-Lee Reserve (Site 42) and Lakewood Nature Reserve (Site 43), two sites of State conservation significance. The isolated lot outlined in red on the aerial photograph (43 Watersedge Close) has a large habitat tree, and it lies midway between the two reserves, so it can be seen as an important stepping-stone for wildlife.

The alternative route for wildlife moving between the two reserves is via Kent Park Primary School and the site under discussion here. The author's observations of bird species and bird movements in the area suggests that this alternative is well used by birds.

It also appears that birds such as Musk Lorikeets move between this precinct and the Dobson Street treed precinct (Site 105), probably detouring on some occasions along the treed eastern verge of Scoresby Rd (Site 106).

Bioregion: Gippsland Plain

Habitat type

The patchy cover of remnant trees (mainly eucalypts and Blackwoods) and a very low density of native understorey plants are all that is left of the original EVC of the site:

Valley Heathy Forest (EVC 127, Endangered) dominated by *Eucalyptus cephalocarpa*, *E. radiata* and *E. obliqua*.

Fauna of special significance

No species of special significance were detected, but the author visited the site for less than one hour.

Significance ratings

Ecological Integrity and Viability

For the reasons discussed above, the trees in the site function as a habitat link. This link affects fauna only in the local area. Criterion 1.2.6 of Amos (2004) attributes **Local** significance to sites that it describes as 'Important at Local Scale - Link between individual remnant habitat blocks or within subcatchment'.

Locally Threatened Plant Species

The site's eucalypts belong to locally threatened species and they have viable populations in combination with neighbouring native vegetation. Such occurrences meet criterion 3.1.5 for a site of **Local** significance.

Threats

- Residential subdivision and development;
- Eucalypt dieback disease.

Management issues

The habitat value of the site could be enhanced by planting additional indigenous trees and understorey species (e.g. Sweet Bursaria or Hedge Wattle) that suit insect-eating birds. This applies particularly to properties that have little existing cover of native or indigenous trees.

Administration matters

- This site is worthy of inclusion within the proposed Vegetation Protection Overlay Schedule (Volume 1, Section 5.5) because:
 - It contains (in the words of the VPP Practice Note on Biodiversity) ‘scattered living food trees with an exotic understorey’;
 - It is a site of Local biological significance;
 - The properties involved are too small to be affected by Clause 52.17 of the Knox Planning Scheme, which might otherwise provide some of the trees with some protection; and
 - Some of the habitat trees are not native to Victoria and are therefore not protected by Clause 52.17.
- This site overlaps with an area covered by the existing Schedule 3 to the Vegetation Protection Overlay of the Knox Planning Scheme. The area described here does not extend as far south because of the absence of biological significance in that area, but it is larger overall than the existing overlay area so that habitat linkages between sites can be better protected.

Information sources used in this assessment

- Inspections of the area by Dr Lorimer in April and May 2004 for the specific purpose of finding sites of biological significance and determining the distribution of trees that represent reasonable habitat for native fauna;
- General visual inspection of the area’s vegetation by the author while surveying the other sites outlined in pink on the aerial photograph on p. 523, up to March 2008;
- Aerial photography from February 2001 and April 2003; and
- Satellite imagery of the district.

Site 108. Knox Park Primary School

Primary school with heavily treed grounds. Melway ref. 73 C3

Site Significance Level: *State*

- The native vegetation, and particularly the mature remnant trees, provide an effective extension of the State-significance habitat of the abutting Lakewood Nature Reserve;
- Fauna appear to move through the school on their way between Lakewood Nature Reserve and other areas of habitat.

Aerial photograph and map: See page 525 for an image at 1:8,000 scale and page 215 for an image at 1:4,000 scale.

Boundaries

The site is the whole school property, comprising five lots (one of which is a short, narrow walkway). The area is 2.93 ha. Only the parts of the school grounds outlined in white on page 215 are of biological significance.

Land use & tenure: Primary school.

Site description

This site is at an elevation of typically 85 m on a north-facing slope with a very shallow gradient of 3%. The topsoil is shallow, poorly draining, light grey loam over clay subsoil, derived from decomposition of the underlying Lower Devonian sedimentary rocks of the Humevale formation.

The main area of biological significance is the treed school grounds between the school buildings and Lakewood Nature Reserve (Site 43). The trees in this area are predominantly remnant Mealy Stringybarks (*Eucalyptus cephalocarpa*), many of them quite large and with hollows used by birds (and probably also bats). The shrub layer has been mostly cleared, but there is a patch of dense Sweet Bursarias (*Bursaria spinosa*) and a few other shrubs, just northwest of the school buildings. The lawn beneath the trees is in very patchy condition. Some patches are dominated by indigenous species of grasses and mat-rushes, but are not densely grassy due to mowing and trampling. Other patches are either rather bare or are dominated by introduced plants.

In the southern half of the school property, the areas outlined in white on the aerial photograph have native vegetation in similar condition to north of the buildings but smaller in extent and with little if any ground flora (native or otherwise).

Trees and shrubs that are visible on the aerial photographs but not in the white-outlined areas are native Australian plants, which provide additional habitat.

One of the most important biological attributes of the site is that it abuts Lakewood Nature Reserve (a site of State significance) and augments the reserve's habitat. The school community is to be congratulated for not only maintaining that habitat in the school grounds, but also helping look after the reserve through participation in the 'Friends of Lakewood Nature Reserve' (supported by Knox City Council). These activities are related to the school's participation in the 'Schools for a Sustainable Future' program.

Relationship to other land

As noted above, the school grounds provide an effective extension of the state-significance habitat of the abutting Lakewood Nature Reserve, which the school helps to look after and uses as an educational resource. Native birds were observed moving between the school grounds, the reserve and the treed neighbourhood to the south, and probably also moving to and from R.D. Egan-Lee Reserve (Site 42). Native insects are likely to exhibit similar behaviour, but were not investigated.

Bioregion: Gippsland Plain

Habitat type

Valley Heathy Forest (EVC 127, **regionally Endangered**): Estimated to occupy 0.73 ha, all in poor ecological condition (rating D).

Dominant canopy trees: *Eucalyptus cephalocarpa* with far fewer *Eucalyptus radiata* and *Eucalyptus obliqua*. The trunk diameters are mostly 30-50 cm.

Dominant lower trees: Several *Allocasuarina littoralis*, one *Acacia melanoxylon* and one *Exocarpos cupressiformis*.

Shrubs: *Bursaria spinosa* is dense northwest of the buildings. *Coprosma quadrifida* is scattered to the east and southeast of the buildings. There is one each of *Acacia paradoxa* and *Leptospermum continentale*.

Vines: None found.

Ferns: None found.

Ground flora: Native ground flora is patchy and limited to hardy native grasses and mat-rushes, competing for dominance with the weeds, *Agrostis capillaris*, *Ehrharta erecta*, *Hypochoeris radicata* and *Plantago lanceolata*. The dominant indigenous species is *Rytidosperma racemosum* and there are also large numbers of *Lomandra filiformis* subsp. *coriacea*. The other indigenous species are *Gahnia radula*, *Hemarthria uncinata*, *Lomandra filiformis* subsp. *filiformis*, *Microlaena stipoides*, *Poa morrisii*, *Austrostipa rudis* and *Themeda triandra*.

Plant species

The following plant species were observed by the author on 30th April 2004. Additional species would no doubt be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox with 'E'=Endangered and 'V'=Vulnerable.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia melanoxylon</i>	V	<i>Exocarpos cupressiformis</i>
	<i>Acacia paradoxa</i>		<i>Gahnia radula</i>
E	<i>Acacia pycnantha</i> (possibly planted)	V	<i>Hemarthria uncinata</i>
V	<i>Allocasuarina littoralis</i>		<i>Leptospermum continentale</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Bursaria spinosa</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
V	<i>Coprosma quadrifida</i>		<i>Microlaena stipoides</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Rytidosperma racemosum</i>
V	<i>Eucalyptus obliqua</i>		<i>Themeda triandra</i>
E	<i>Eucalyptus radiata</i>		

Fauna habitat features

- The remnant trees, combined with mature planted trees, provide basic habitat needs for native forest birds, bats, possums, frogs and insects. There are many large Mealy Stringybarks with hollows, at least some of which are used by native birds, and some are likely to be inhabited by bats. Mealy Stringybarks make good habitat trees because they produce plenty of carbohydrates and form hollows and crevices more readily than most eucalypts;
- Flowers on the dense patch of Sweet Bursarias are likely to be extensively visited by adult butterflies in summer. Lakewood Nature Reserve provides excellent habitat for caterpillars of butterfly species that rely on grasses and sedges for larval food, and the adults may move into the school in search of nectar.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity and Viability

The value of the school's native vegetation as habitat for fauna moving through the area makes the school an ecological link or 'stepping stone'. Criterion 1.2.6 attributes **Local** significance to sites that it describes as 'Important at Local scale - Link between individual remnant habitat blocks'.

Endangered Ecological Vegetation Class

Under the Department of Sustainability & Environment's criteria, the school grounds contain a 'remnant patch' of a regionally endangered EVC (Valley Heathy Forest). It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that the patch is necessarily of at least High conservation significance. Criterion 3.2.3 of Amos (2004) attributes **State** significance to such a site.

The author has misgivings about such a high rating when the ecological condition of the vegetation is so poor, but these misgivings are overridden by the importance of consistency with the standard criteria.

Locally Threatened Plant Species

At least some of the locally threatened plant species listed above have viable populations (in combination with neighbouring native vegetation), thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Lack of recruitment of indigenous vegetation because of mowing and trampling, although the vegetation appears to be in a stable state under the current use of the school grounds;
- Potential future need for more school buildings, which might involve removal of native vegetation.

Management issues

If desired, the balance of ground flora between introduced and native species could be improved by more selective timing of mowing and localised use of selective herbicides. This would require expert advice.

Administration matters

- The site is large enough for the native vegetation to receive some protection by Clause 52.17 of the Knox Planning Scheme. However, that clause exempts vegetation removal for construction of buildings, which appears to be the most serious threat to the native vegetation in the school grounds. For this reason, and because Clause 52.17 does not affect plant species originating from outside Victoria, the vegetation needs to be recognised in an overlay to the planning scheme;
- This site would qualify on biological grounds for inclusion under the proposed Schedule 1 of the Environmental Significance Overlay. However, the vegetation that needs to be specifically recognised and protected in the Knox Planning Scheme is principally the trees, and protection of the trees would also provide incidental protection to the understorey. This view takes into account the potential uses of the land and the level of impact that those potential uses would have. The proposed schedule to the Vegetation Protection Overlay (Volume 1, Section 5.5) is deemed an adequate alternative to the Environmental Significance Overlay;
- The forested northern part of the school grounds are covered by the existing Schedule 1 to the Vegetation Protection Overlay of the Knox Planning Scheme. This resulted from the study by Water Ecoscience (1998), which mistook this area to be part of Lakewood Nature Reserve (their Site 5). The existing Schedule 1 is recommended to be removed.

Information sources used in this assessment

- A botanical survey by Dr Lorimer for 45 minutes on 30th April 2004, following the standard procedures described in Section 2.4 of Volume 1, including:
 - Compilation of a list of indigenous and introduced plants;
 - A description of the vegetation's structural and floristic composition;
 - Incidental fauna observations; and
 - Checks for fauna habitat, ecological threats and management issues;
- The Department of Sustainability & Environment's BioMaps of the area;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- Maps of geology and topography produced by agencies of the Victorian government.

Acknowledgment

Thanks to the school administration for permission to inspect the grounds.

Site 109. Fairhills High School, Knoxfield

Part of the grounds of a high school with remnant tree cover. Melway ref. 64 D12.

Site Significance Level: *Below the Rating Threshold*

- Contains remnant eucalypts, wattles and mat-rushes that represent basic habitat for native birds, bats, possums, frogs and insects.



Aerial photograph taken April 2003.

Boundaries

The site is the part of the school grounds that is outlined in red above. The area is 0.97 ha.

Land use & tenure: High school grounds.

Site description

The treed, northwestern corner of the school grounds is on a drainage line and is prone to waterlogging. It would once have supported the regionally endangered Swampy Woodland, as evidenced by the dominance of Swamp Gums (*Eucalyptus ovata*) and the presence of Swamp Paperbark (*Melaleuca ericifolia*). One of the Swamp Gums is very large and represents good habitat for a variety of native birds, possums, bats and insects. The remaining trees in this area are reproductively mature and represent reasonable habitat for native birds and insects, but they are not large, with trunk diameters less than about 30 cm. The shrub layer is very sparse due to past clearing, and the Swamp Paperbarks are the only indigenous species left. There are substantial numbers of Spiny-headed Mat-rush (*Lomandra longifolia*), but the only other ground flora are mown grass, weeds and amenity plantings.

The line of trees to the north of the playing field are vestiges of the endangered Valley Heathy Forest. As in the Swampy Woodland, the trees represent reasonable habitat, but the shrub layer has been decimated to a single species (Hedge Wattle, *Acacia paradoxa*). There are also hardy native grasses beneath the trees.

Relationship to other land

The school is less than seventy metres southeast from the large dam at the Knoxfield Institute for Horticultural Development, which is part of the Blind Ck habitat corridor (Site 33). The forest habitat along the corridor is 100m further away. Some birds and bats no doubt cross this distance to make use of the school's forest, but the school could not be regarded as an ecological 'stepping-stone' or link in a corridor.

Bioregion: Gippsland Plain

Habitat types

The original EVCs of the site have been reduced to scattered trees and a very small number of understorey plants. These EVCs are:

Valley Heathy Forest (EVC 127, **regionally Endangered**). 9 indigenous plant species were found.

Dominant canopy trees: *Eucalyptus cephalocarpa* and *Eucalyptus radiata*.

Dominant lower trees: *Acacia mearnsii*.

Shrubs: *Acacia paradoxa*.

Vines: None.

Ferns: None.

Ground flora: *Rytidosperma racemosum* and *Microlaena stipoides* are fairly abundant in the mown lawn. There are also small numbers of *Themeda triandra*.

Swampy Woodland (EVC 937, **regionally Endangered**). 8 indigenous plant species were found.

Dominant canopy trees: *Eucalyptus ovata*, *E. cephalocarpa* and *E. radiata*.

Dominant lower trees: *Acacia melanoxylon* and *Acacia mearnsii*.

Shrubs: Decimated by past clearing, now reduced to a few *Melaleuca ericifolia*.

Vines: None.

Ferns: None.

Ground flora and small shrubs: The only remaining indigenous ground flora is a substantial number of *Lomandra longifolia*.

Plant species

The following plant species were observed by the author. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox with 'E'=Endangered and 'V'=Vulnerable.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia mearnsii</i>		<i>Lomandra longifolia</i>
V	<i>Acacia melanoxylon</i>	E	<i>Melaleuca ericifolia</i>
	<i>Acacia paradoxa</i>		<i>Microlaena stipoides</i>
	<i>Bursaria spinosa</i>		<i>Rytidosperma penicillatum</i>
	<i>Einadia nutans</i> (a recent immigrant to Knox)		<i>Rytidosperma racemosum</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Rytidosperma setaceum</i>
E	<i>Eucalyptus macrorhyncha</i>		<i>Themeda triandra</i>
V	<i>Eucalyptus melliodora</i>	V	<i>Allocasuarina littoralis</i>
V	<i>Eucalyptus ovata</i>	V	<i>Dianella longifolia</i> s.l.
E	<i>Eucalyptus radiata</i>	E	<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>
	<i>Kunzea ericoides</i> spp. agg. (possibly planted)		

Introduced Species

<i>Agrostis capillaris</i>	<i>Fraxinus angustifolia</i>	<i>Plantago lanceolata</i>
<i>Anthoxanthum odoratum</i>	<i>Genista monspessulana</i>	<i>Prunus cerasifera</i>
<i>Arctotheca calendula</i>	<i>Grevillea rosmarinifolia</i> hybrid	<i>Rubus anglocandicans</i>
<i>Bromus catharticus</i>	<i>Hakea salicifolia</i>	<i>Tradescantia fluminensis</i>
<i>Cynodon dactylon</i>	<i>Hedera helix</i>	<i>Ulex europaeus</i>
<i>Dactylis glomerata</i>	<i>Hypochoeris radicata</i>	<i>Vulpia bromoides</i>
<i>Ehrharta erecta</i>	<i>Paspalum dilatatum</i>	

Flora and fauna of special significance

None detected, but if there are any significant fauna species, they would probably have escaped detection due to the brevity of the author's time at the school (20 minutes).

Fauna habitat features

- The remnant trees, combined with mature planted trees, represent basic habitat for native forest birds, bats, possums, frogs and insects. The particularly large Swamp Gum has hollows that are likely to be inhabited by birds or bats;
- The abundance of Spiny-headed Mat-rushes (*Lomandra longifolia*) represent good habitat for certain species of skipper butterfly whose caterpillars rely on that species for food.

Significance rating

Threatened Ecological Vegetation Classes

Both of the original Ecological Vegetation Classes on the site are now endangered. However, they have been reduced to such skeletal form in the school grounds that the vestiges do not qualify as 'remnant patches' of those EVCs under the Department of Sustainability & Environment's significance criterion 3.2.3 (Amos 2004).

Locally Threatened Plant Species

Some of the site's locally threatened species of eucalypt and wattle have viable populations, thereby meeting criterion 3.1.5 of Amos (2004) for a site of **Local** significance.

Threats

- Lack of recruitment of indigenous vegetation because of mowing and trampling, although the vegetation appears to be in a stable state under the current use of the school grounds;
- Potential future need for more school buildings, which might involve removal of native vegetation.

Management issues

Planting indigenous shrubs could enhance the site's habitat value. If properly positioned, these shrubs need not interfere with mowing.

Administration matters

- The site is large enough for the native vegetation to receive some protection by Clause 52.17 of the Knox Planning Scheme. However, that clause exempts vegetation removal for construction of buildings, which appears to be the most serious threat to the native vegetation in the school grounds. For this reason, effective protection of the vegetation requires use of an overlay to the planning scheme, and the proposed schedule to the Vegetation Protection Overlay (Volume 1, Section 5.5) would be appropriate;
- The area labelled on the aerial photograph as Swampy Woodland is covered by the existing Schedule 1 to the Vegetation Protection Overlay of the Knox Planning Scheme. This resulted from the description of the area by Water Ecoscience (1998) as their Site 51. It is recommended that the existing Schedule 1 be removed and that this site be covered instead by the schedule proposed in Volume 1 of this report.

Information sources used in this assessment

- A botanical survey by Dr Lorimer for 20 minutes on 12th April 2004, following the standard procedures described in Section 2.4 of Volume 1, including:
 - Compilation of a list of indigenous and introduced plants;
 - A description of the vegetation's structural and floristic composition;
 - Incidental fauna observations; and
 - Checks for fauna habitat, ecological threats and management issues;
- Aerial photography from February 2001, April 2003 and February 2007.

Site 110. Knox Gardens Primary School, Wantirna South

Part of the school grounds adjacent to Fewster Drive, with remnant tree cover. Melway ref. 72 H3.

Site Significance Level: *Below the Rating Threshold*

- Contains remnant eucalypts and Blackwoods that represent basic habitat for native birds, possums and insects.



Scale 1:2,000
10 0 20 40 60 80 100m

Aerial photograph taken April 2003.

Boundaries

The site is the part of the school grounds that is outlined in red above. The edge follows property boundaries except for a small segment at the western end of the northern edge, which is a continuation of a property boundary. The area is 1.02 ha.

Land use & tenure: Primary school grounds.

Site description

The part of the school grounds within this site contains a substantial number of mature remnant trees, as can be seen on the aerial photograph. The trees are of three species, all of them locally vulnerable:

- Mealy Stringybark (*Eucalyptus cephalocarpa*), the dominant species;
- Yellow Box (*Eucalyptus melliodora*), several trees; and
- Blackwood (*Acacia melanoxylon*), very scarce.

The ages of the eucalypts are estimated to be between fifty and eighty years.

There is no native understorey (except perhaps mown native grass, which could not be detected during the site inspection for this study).

Relationship to other land

The habitat value of the site is augmented by mature Australian native trees planted in other parts of the school grounds. The school is quite ecologically isolated from other native vegetation.

Bioregion: Gippsland Plain

Habitat types

The remnant eucalypts and the site's physical properties (soil, drainage etc.) indicate that the original EVC of the site was Valley Heathy Forest (EVC 127), which is regionally and endangered. However, the absence of understorey and the sparse tree canopy mean that the vegetation is not deemed a 'remnant patch' in the terms intended by the Department of Sustainability & Environment's standard criteria.

Flora and fauna of special significance

None detected.

Fauna habitat features

The remnant trees, combined with mature planted trees, represent basic habitat for native birds, possums, insects and perhaps bats.

Significance rating

Threatened Ecological Vegetation Class

The original Ecological Vegetation Class of the site is now endangered. However, it has been reduced to such skeletal form in the school grounds that the vestiges do not qualify as a 'remnant patch' of the EVC under the Department of Sustainability & Environment's significance criterion 3.2.3 (Amos 2004).

Locally Threatened Plant Species

The locally vulnerable *Eucalyptus cephalocarpa* appears to have a viable population in combination with nearby native vegetation, thereby meeting criterion 3.1.5 of Amos (2004) for a site of **Local** significance.

Threats

- Lack of recruitment of indigenous vegetation because of mowing and trampling, although the vegetation appears to be in a stable state under the current use of the school grounds;
- Potential future need for more school buildings, which might involve removal of native vegetation.

Management issues

Planting indigenous shrubs could enhance the site's habitat value and provide some protection against tree dieback disease.

Administration matters

- The property is large enough for the native vegetation to receive some protection by Clause 52.17 of the Knox Planning Scheme. However, that clause exempts vegetation removal for construction of buildings, which appears to be the most serious threat to the native vegetation in the school grounds. For this reason, effective protection of the vegetation requires use of an overlay to the planning scheme, and the proposed schedule to the Vegetation Protection Overlay (Volume 1, Section 5.5) would be appropriate;
- Most of the trees in this site are covered by the existing Schedule 1 to the Vegetation Protection Overlay of the Knox Planning Scheme. This resulted from the description of the area by Water Ecoscience (1998) as their Site 24. It is recommended that the existing Schedule 1 be removed and that this site be covered instead by the schedule proposed in Volume 1 of this report.

Information sources used in this assessment

- A botanical survey by Mr Rik Brown on 20th March 2002, following the standard procedures described in Section 2.4 of Volume 1, including:
 - Compilation of a list of indigenous and introduced plants;
 - A description of the vegetation's structural and floristic composition;
 - Incidental fauna observations; and
 - Checks for fauna habitat, ecological threats and management issues;
- Aerial photography from February 2001, April 2003 and February 2007.

Site 112. Starlight Treed Precinct, Rowville

A treed residential area west of Stud Rd and a group of largely undeveloped properties over 2 ha east of Stud Rd. Centred on Melway ref. 81 G6.

Site Significance Level: **State** at the rear of 1331 Stud Rd, **Local** elsewhere

- There are substantial numbers of mature trees, particularly remnant eucalypts, that provide rudimentary habitat for native birds, bats, possums, frogs and insects;
- There is a patch of the regionally endangered Swampy Woodland at 1331 Stud Rd, but badly degraded;
- The site provides habitat linkage between sites with higher quality vegetation.



Scale 1:10,000
0 100 200 300 400m

The site's two sections are outlined in red and other sites are outlined and numbered in magenta. The aerial photograph was taken in April 2003.

Boundaries

The site comprises the two areas outlined in red on the aerial photograph, excluding Starlight Reserve (which is labelled as site 73). The boundary edges follow property boundaries except where they cross streets. The total area is 92.52 ha.

Land use & tenure

- West of Stud Rd: Freehold residential land, park and streets;
- East of Stud Rd (which is outside the Urban Growth Boundary): Meeting place, gardening supplier, electricity sub-station and farmlets.

Site description

The residential neighbourhood on the western side of Scoresby Rd contains a substantial number of mature remnant eucalypts and mature planted eucalypts from other parts of Australia. They provide a tree canopy that, despite its fragmentation, provides basic habitat needs for native birds, bats, possums, frogs and insects. Substantial numbers of native forest birds, such as Crimson Rosellas and Eastern Rosellas, frequent the area, which can be attributed to the site's trees and the presence of more substantial areas of habitat in the sites that are numbered and outlined in magenta on the aerial photograph.

Many of the properties west of Stud Rd are of no biological significance. They would be unaffected by the schedule for the Vegetation Protection Overlay that is proposed for this site (Section 5.5 in Volume 1).

The section of the site east of Stud Rd has lots exceeding 2 ha. There are remnant eucalypts and wattles, some of which are large, old trees, but they are very patchy in distribution. There is also native understorey beneath remnant trees in an area of 4,750 m² at the eastern end of 1331 Stud Rd (clearly visible on the aerial photograph). However, the understorey is being badly degraded by declared noxious weeds (Blackberry and Gorse). The vegetation belongs to the regionally endangered vegetation type, Swampy Woodland.

Planting of trees in the untreed areas east of Stud Rd has the potential to substantially improve habitat links through southern Rowville, because of the strategic location for fauna movements.

Relationship to other land

The aerial photograph on the previous page shows how this site is interposed between several other sites, which have more significant habitat. The Starlight treed precinct represents a habitat link for faunal movements between these other sites.

Starlight Reserve (Site 73) is embedded within the precinct and undoubtedly attracts some native birds, insects and perhaps other fauna through the site. The tree cover within the precinct generally is believed to help facilitate such movements.

Without such movements, the habitat at the Rowville Electricity Terminal Station (Site 72) would be much more ecologically isolated and hence of less value to fauna and more at risk of inbreeding and tree dieback.

Bioregion: Gippsland Plain

Habitat types

Valley Heathy Forest (EVC 127, **regionally Endangered**). Reduced to scattered trees (dominated by *Eucalyptus cephalocarpa*, *Eucalyptus radiata* and *Eucalyptus goniocalyx*) and localised occurrence of a few hardy understorey species. Eleven indigenous plant species were found.

Swampy Woodland (EVC 937, **regionally Endangered**), dominated by *Eucalyptus ovata* and *Melaleuca ericifolia*. Only scattered trees remain of most of the Swampy Woodland. The exception is 4,750 m² at the eastern end of 1331 Stud Rd, where there is native understorey that is infested with Blackberry and Gorse. Twelve indigenous plant species were found.

Plant species

The following indigenous plant species were observed by the author on 28th November 2002. Additional species would no doubt be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia mearnsii</i>	E	<i>Melaleuca ericifolia</i>
	<i>Acacia paradoxa</i>		<i>Microlaena stipoides</i>
C	<i>Amyema pendula</i>	E	<i>Ozothamnus ferrugineus</i>
	<i>Dichondra repens</i>	V	<i>Rytidosperma erianthum</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Rytidosperma laeve</i>
	<i>Eucalyptus goniocalyx</i>		<i>Rytidosperma penicillatum</i>
V	<i>Eucalyptus ovata</i>	V	<i>Rytidosperma pilosum</i>
E	<i>Eucalyptus radiata</i>		<i>Rytidosperma racemosum</i>
V	<i>Exocarpos cupressiformis</i>		<i>Themeda triandra</i>

Rytidosperma erianthum (Hill Wallaby-grass) is the dominant ground flora species on the ridge and upper slope of the 'Syrena' Polish House property on the east side of Stud Rd. There is only one other known locality in Knox with this species.

Fauna of special significance

None detected, but if there are any significant fauna species, they would probably have escaped detection due to the brevity of the author's time within the site.

Fauna habitat features

- The remnant tree cover, combined with mature planted trees, represent basic habitat for native forest birds, bats, possums, frogs and insects. Some of the large trees have hollows that are likely to be inhabited by birds or bats.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity and Viability

As discussed above, the site is an important ecological link for local-scale movements of native fauna. Criterion 1.2.6 attributes **Local** significance to sites like this that meet the description, 'Important at local scale - Link between individual remnant habitat blocks'.

Regionally Threatened Vegetation Types

Swampy Woodland is regionally endangered. It follows from Appendix 3 of *Victoria's Native Vegetation Management - a Framework for Action* (NRE 2002a) that the Swampy Woodland vegetation with understorey at the eastern end of 1331 Stud Rd is necessarily of at least High conservation significance. It follows that this part of the site is of **State** significance under criterion 3.2.3 of Amos (2004).

The remaining native vegetation in the site fits the description of 'scattered trees' in Victoria's Native Vegetation Framework, and is therefore not regarded as a representation of any EVC for the purposes of the standard criteria.

Rare or Threatened Flora

Rytidosperma erianthum is endangered in Knox, but not throughout the whole of the relevant bioregion. The abundance of *Rytidosperma erianthum* at the 'Syrena' Polish House is of **Local** significance under criterion 3.1.5.

The site's locally threatened eucalypts and *Acacia mearnsii* also appear to have viable populations in combination with neighbouring native vegetation, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Invasion of the site's only substantial area of native understorey (1331 Stud Rd) by Blackberry and Gorse, which are both rated as very serious infestations;
- Residential development.

Management issues

- The declared noxious weeds, Blackberry and Gorse, should be controlled on 1331 Stud Rd as a matter of high priority, and the landowner should be advised of this. Note that care will have to be taken not to damage the intermingled native vegetation, which is of a regionally endangered type and is protected under Clause 52.17 of the Knox Planning Scheme;
- The habitat value of the area west of Stud Rd could be enhanced by planting additional indigenous trees and understorey species (e.g. Sweet Bursaria, *Bursaria spinosa*) that suit insect-eating birds;
- The section of the site east of Stud Rd is strategically positioned for fauna movements but is mostly devoid of trees. Planting of trees in the untreed areas has the potential to substantially improve habitat links through southern Rowville.

Administration matters

- The area west of Stud Rd is inside the Urban Growth Boundary and the eastern side of Stud Rd is not;
- The planning scheme zoning east of Stud Rd is Green Wedge Zone - Schedule 2 (GWZ2). The zoning west of Stud Rd is Residential 1 Zone (R1Z) except for two tiny areas zoned Public Park and Recreation Zone (PPRZ). One of these two tiny areas is part of Huntingdale Ct, which is paved and certainly not a park or recreational area;
- Clause 52.17 of the planning scheme provides some protection to native vegetation (including understorey) east of Stud Rd because the lots exceed 0.4 ha, but it does not protect against building construction (which is exempted);
- This site is worthy of inclusion within the proposed schedule to the Vegetation Protection Overlay (Volume 1, Section 5.5) because:
 - It is a site of Local biological significance (or regional to state significance, in the case of 1331 Stud Rd);

- Most of it contains (in the words of the VPP Practice Note on Biodiversity) ‘scattered living food trees with an exotic understorey’;
- Some of the habitat trees are not native to Victoria and are therefore not protected by Clause 52.17.
- This site overlaps with an area covered by the existing Schedule 3 to the Vegetation Protection Overlay of the Knox Planning Scheme. The area described here does not extend as far west, thereby omitting properties which do not have biologically significant trees (and are unlikely to have any for the foreseeable future). The section east of Stud Rd has been added because it contains some significant vegetation and is strategically positioned for movement of native birds, bats and insects through the district.

Information sources used in this assessment

- An inspection of the area by Dr Lorimer in 2002-3 for the specific purpose of finding sites of biological significance and determining the distribution of trees that represent reasonable habitat for native fauna;
- A botanical survey of the ‘Syrena’ Polish House property on the east side of Stud Rd by Dr Lorimer on 28/11/02, following the standard procedures described in Section 2.4 of Volume 1, including:
 - Compilation of lists of indigenous and introduced plants in each of two parts of the property and on the adjoining properties seen through the fence;
 - Mapping of vegetation communities;
 - A description of the vegetation’s structural and floristic composition and ecological condition;
 - Incidental fauna observations; and
 - Checks for fauna habitat, ecological threats and management issues;
- General visual inspection of the area’s vegetation by the author while surveying the other sites shown on the aerial photograph on p. 536;
- Aerial photography from February 2001, April 2003 and February 2007; and
- Satellite imagery of the district.

Acknowledgment

Thanks to the administrators of the ‘Syrena’ Polish House for permission to inspect their property.

Site 113. Major Crescent Precinct, Rowville

A residential area where larger lots with native vegetation are being progressively subdivided and developed. Melway ref. 82 H2.

Site Significance Level: *Below the Rating Threshold*

- There are modest numbers of mature trees, particularly remnant eucalypts, that provide rudimentary habitat for native birds, insects and probably bats;
- The site provides rudimentary habitat linkage between sites with higher quality vegetation.

Aerial photograph and map: See page 476, on which the site is labelled '113'.

Boundaries

The site is outlined and numbered in green on the aerial photograph on page 476. The boundary edges follow property boundaries except where they cross streets or the pipe track. The total area is 19.88 ha.

Land use & tenure: Freehold residential land, Council parks, pipe track and streets.

Site description

This site is at the foot of the Lysterfield hills. It was formerly grazing land and has been rapidly urbanised, particularly since about 1999.

The establishment of grazing in the area led to the removal of most of the original eucalypts. Residential development is leading to loss of more trees. However, the aerial photograph on page 476 shows the characteristic olive-green colour of surviving eucalypts, scattered patchily across this site. Some of these trees have mistletoes, which represent habitat for Mistletoebirds and Imperial White butterflies. There are also small numbers of remnant sub-canopy trees (Blackwood *Acacia melanoxylon*, Black Sheoak *Allocasuarina littoralis* and Cherry Ballart *Exocarpos cupressiformis*).

Grazing destroyed nearly all the native shrubs, other than the very hardy species, Burgan (*Kunzea ericoides*). It was somewhat less severe on the native ground flora, of which small patches are found scattered on roadsides and on private properties. These patches are being progressively replaced by gardens and mown nature strips as the residential density increases.

The pipe track has extremely scarce native understorey, belonging to only two particularly hardy species of grass that can be found in suburban lawns. The pipe track retains some mature trees, but not enough to represent a corridor.

Despite the patchy and declining condition of the site's native vegetation, its tree canopy provides basic habitat needs for native birds, insects and probably bats.

Many of the properties in the site are of no biological significance. They would be unaffected by the schedule for the Vegetation Protection Overlay that is proposed for this site (Section 5.5 in Volume 1).

Relationship to other land

As seen on the aerial photograph on page 476, the native vegetation in this site provides a rather fragmented link between the abutting sites of the Lysterfield Hills (Site 81) and Napoleon Rd (Site 94). No observational evidence was sought to determine whether native fauna commute along this link.

Bioregion: Gippsland Plain

Habitat types

The original EVCs of the site have been almost entirely reduced to scattered trees. These EVCs are:

Valley Grassy Forest (EVC 47, **regionally Vulnerable**) on the steeper slope near Wellington Rd, dominated by *Eucalyptus radiata*, *Eucalyptus melliodora* and *Eucalyptus goniocalyx*.

Valley Heathy Forest (EVC 127, **regionally Endangered**) on most of the site, dominated by *Eucalyptus cephalocarpa* and *Eucalyptus radiata*, with patchy cover of native grasses and very localised occurrence of the characteristic species, *Dianella admixta* and *Xanthorrhoea minor*.

Swampy Woodland (EVC 937, **regionally Endangered**), recognisable only by the dominance of *Eucalyptus ovata*, the minor presence of *Melaleuca ericifolia* and the poorly drained location (along the pipe track).

Plant species

The following indigenous plant species were observed by the author on 18th June 2002. Additional species would no doubt be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox as follows: 'C'=Critically Endangered; 'E'=Endangered; and 'V'=Vulnerable.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia melanoxylon</i>		<i>Gahnia radula</i>
V	<i>Allocasuarina littoralis</i>		<i>Kunzea ericoides</i> spp. agg.
C	<i>Amyema pendula</i>	V	<i>Lepidosperma laterale</i>
	<i>Dianella admixta</i>		<i>Microlaena stipoides</i>
	<i>Dichondra repens</i>	C	<i>Muellerina eucalyptoides</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Oxalis exilis/perennans</i>
	<i>Eucalyptus goniocalyx</i>		<i>Poa morrisii</i>
V	<i>Eucalyptus melliodora</i>		<i>Rytidosperma geniculatum</i>
V	<i>Eucalyptus ovata</i>		<i>Rytidosperma racemosum</i>
E	<i>Eucalyptus radiata</i>		<i>Themeda triandra</i>
V	<i>Exocarpos cupressiformis</i>	V	<i>Xanthorrhoea minor</i>

Fauna of special significance

None detected, but if there are any significant fauna species, they would probably have escaped detection due to the brevity of the author's time within the site.

Fauna habitat features

The remnant tree cover, combined with mature planted trees, represent basic habitat for native birds, insects and possibly bats. Some of the large trees have hollows that are likely to be inhabited by birds or bats.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity and Viability

The site's tree canopy is quite possibly too fragmented to provide an ecological link for local-scale movements of native fauna, and so no significance rating is assigned here to the site as a corridor.

Regionally Threatened Vegetation Types

The site's original EVCs are all regionally threatened, but they have been reduced to such skeletal form within the site that the vestiges do not qualify as 'remnant patches' of those EVCs for the purposes of applying the Department of Sustainability & Environment's significance criterion 3.2.3 (Amos 2004).

Rare or Threatened Flora

The locally threatened species of eucalypt listed above have viable populations in combination with neighbouring native vegetation, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Residential development;
- Planting of species such as cypresses that make conditions inhospitable for remnant plants;
- Severance of tree roots by new driveways.

Management issues

- The habitat value of the area could be enhanced by planting additional indigenous trees and understorey species (e.g. Sweet Bursaria, *Bursaria spinosa*) that suit insect-eating birds.

Administration matters

- The site is inside the Urban Growth Boundary and the planning scheme zoning is Residential 1 Zone (R1Z);
- Clause 52.17 of the planning scheme provides some protection to native vegetation (including understorey) on lots of 0.4 ha or more, but it does not protect against building construction (which is exempted);
- This site is appropriate for inclusion under the proposed schedule to the Vegetation Protection Overlay (Volume 1, Section 5.5) because it contains (in the words of the VPP Practice Note on Biodiversity) 'scattered living food trees with an exotic understorey', and its habitat value is being lost due to land development;

- This site overlaps with, but differs substantially from, an area covered by the existing Schedule 1 to the Vegetation Protection Overlay of the Knox Planning Scheme.

Information sources used in this assessment

- A botanical survey of the area, conducted by Dr Lorimer from publicly accessible land on 5th and 19th June 2002, using the standard procedures described in Section 2.4 of Volume 1. This included:
 - Compilation of lists of indigenous and introduced plants in each of nine parts of the site;
 - A description of the vegetation's structural and floristic composition and ecological condition;
 - Incidental fauna observations; and
 - Checks for fauna habitat, ecological threats and management issues; and
- Aerial photography from February 2001 and April 2003.

Site 114. Clarence Rd Treed Paddock, Wantirna

A treed paddock at the western end of Clarence Rd, grazed by horses and reserved for possible future use in an interchange between the EastLink road and the Healesville Fwy. Melway ref. 63 F3.

Site Significance Level: *Regional*

- A good stand of large remnant eucalypts, providing habitat for native birds, possums, insects and probably bats.

Aerial photograph and plan: See page 262.

Boundaries

The site is outlined and numbered in red on the aerial photograph on page 262. It measures 0.626 ha.

Land use & tenure: Publicly owned land, leased for grazing.

Site description

A little more than half of this paddock has a canopy of large, naturally occurring Mealy Stringybarks (*Eucalyptus cephalocarpa*), with trunk diameters up to one metre (typically 60 cm). This species is good for wildlife habitat, being a high producer of carbohydrates and often with hollows (as in this case). The density of the tree canopy is at natural levels over a substantial part of the site. The original native understorey has been almost entirely replaced by weeds due to the effects of many years of grazing.

Relationship to other land

The site represents a small augmentation of fauna habitat in the neighbouring Bateman Street Bush (Site 49).

Bioregion: Gippsland Plain

Habitat type

The original EVC of the site has been almost entirely reduced to scattered trees. It is:

Valley Heathy Forest (EVC 127, **regionally Endangered**), dominated by a pure stand of *Eucalyptus cephalocarpa*, with sparse cover of native grasses and very localised occurrence of the characteristic species, *Bursaria spinosa*.

Plant species

The following plant species were observed by the author on 20th May 2002. Additional species might be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox with 'C'=Critically Endangered and 'V'=Vulnerable.

Risk	Indigenous Species	Risk	Indigenous Species
	<i>Acacia dealbata</i>	V	<i>Eucalyptus cephalocarpa</i>
C	<i>Amyema pendula</i>		<i>Gahnia radula</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>		<i>Juncus amabilis</i>
	<i>Bursaria spinosa</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
V	<i>Epilobium billardierianum</i> subsp. <i>cinereum</i>		<i>Microlaena stipoides</i>
	<i>Epilobium hirtigerum</i>		

Flora and fauna of special significance

None detected, but if there are any significant fauna species, they would probably have escaped detection due to the brevity of the inspections of the site (a total of less than one hour).

Fauna habitat features

The large Mealy Stringybarks are good habitat trees for native birds, possums, insects and probably bats.

Significance rating

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Ecological Integrity and Viability

The site's tree canopy represents a small ecological link for local-scale movements of native fauna. Criterion 1.2.6 assigns **Local** significance to habitat links like this that can be described as 'Important at local Scale – Link between individual remnant habitat blocks or within subcatchment'.

Regionally Threatened Vegetation Types

The site's original EVC is endangered. The density of the tree canopy is at 'benchmark' level (30%) over approximately 3,000 m², which meets the Department of Sustainability & Environment's criteria for a remnant patch. It follows that the site is of State significance, according to a literal interpretation of criterion 3.2.3 of Amos (2004). However, Amos (2004) did not expect that vegetation with so little native understorey would be regarded as a 'remnant patch' for these purposes, because the '*Operational Guidelines*' to which he referred specified a minimum of 10% native understorey cover. Consequently, the author has reduced the significance level to **Regional**.

Locally Threatened Plant Species

Eucalyptus cephalocarpa is locally threatened and the site has a viable population of this species, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Invasion by environmental weeds, of which Blackberry (*Rubus discolor*) is rated Very Serious and the following are rated Serious: Brown-top Bent (*Agrostis capillaris*), Hawthorn (*Crataegus monogyna*) and Panic Veldt-grass (*Ehrharta erecta*);
- Grazing;
- Potentially, eucalypt dieback disease as an indirect consequence of weed invasion and grazing;
- Road construction, in the event that a decision is taken to build the Healesville Fwy.

Management issues

- The declared noxious weeds on the site should be controlled, and the land manager should be informed of this.

Administration matters

- This site is worthy of inclusion within the proposed Vegetation Protection Overlay Schedule (Volume 1, Section 5.5) because:
 - It contains (in the words of the VPP Practice Note on Biodiversity) 'scattered living food trees with an exotic understorey'; and
 - It is a site of Local biological significance because of the likely importance of the trees in providing an ecological stepping-stone along the Dandenong Creek corridor.
- The planning scheme zoning is Road Zone Category 1 (RDZ1);
- This site closely corresponds to an area covered by the existing Schedule 1 to the Vegetation Protection Overlay of the Knox Planning Scheme.

Information sources used in this assessment

- Botanical surveys of the area by Dr Lorimer on 14/6/02 and by Mr Rik Brown on 20/5/02, using the standard procedures described in Section 2.4 of Volume 1. This included:
 - Compilation of lists of indigenous and introduced plants;
 - A description of the vegetation's structural and floristic composition and ecological condition;
 - Incidental fauna observations; and
 - Checks for fauna habitat, ecological threats and management issues;
- Aerial photography from February 2001, April 2003 and February 2007; and
- The Department of Sustainability & Environment's BioMaps of the area.

Sites Not Recommended for Overlays

Sites 115 to 118 are areas whose native vegetation needs no overlay to protect its biological significance, being automatically and adequately protected by the statewide 'native vegetation retention' provisions of Clause 52.17 of the Victoria Planning Provisions.

It should be kept in mind that this report only deals with the biological significance of vegetation. Areas not recommended here for inclusion under an overlay may nevertheless be worthy of inclusion under a Vegetation Protection Overlay schedule for reasons other than biological significance, such as beauty, interest or history.

Site 111. Brusco Close, Rowville

A small area of fairly recently subdivided residential lots. Melway ref. 81 J2

Site Significance Level: *Local*

- Despite past selective clearing, grazing and slashing, the vegetation retains vestiges of the endangered Ecological Vegetation Class, Valley Heathy Forest;
- As a result of tree removal and the associated movement of heavy machinery over the site in early 2010, the site lost a substantial part of its habitat value for native birds, insects and bats, hence its deletion from the sites recommended for planning protection.

Boundaries

The site comprises the four lots outlined in red on page 350, being 2, 5, 6 and 7 Brusco Cl. The total area is 0.29 ha (reduced from 0.54 ha in the first edition of this report, due to residential development).

Land use & tenure: Vacant residential lots.

Site description

This area has only recently been subdivided and its native vegetation is being progressively lost as houses are constructed and the land is cleared.

Most of the tree canopy visible on the aerial photograph on page 350 was removed in 2010. The number of shrubs is also unnaturally low due to past grazing and more recent occasional slashing. The ground flora is in fair ecological condition, being predominantly native cover over a large proportion of 5-7 Brusco Cl. The native vegetation on 2 Brusco Cl is confined to a western strip that abuts plantings along the Stud Rd verge and includes single specimens of *Eucalyptus cephalocarpa*, *Allocasuarina littoralis* and *Exocarpos cupressiformis*.

At the time of the 2002 survey for the first edition of this report, the richest area of native flora was around the cluster of trees on 11 Selwood Ct, where slashing had been less severe. This area has since succumbed to residential development.

The thirty indigenous plant species that were found in the site are highly characteristic of the endangered Valley Heathy Forest.

Relationship to other land

The site is less than 60 m from habitat at Rowville Primary and Secondary Schools (Site 70), which is in turn only 22 m from Delta Ct Reserve (Site 71) and 240 m from native habitat beside Wellington Rd (Site 96). Prior to the clearing of early 2010, these sites formed a cluster that attracted native birds (and probably bats) that radiated from nearby larger areas of habitat such as the Rowville Electricity Terminal Station (Site 72) and the Lysterfield Hills (Site 81).

Bioregion: Gippsland Plain

Habitat types

Valley Heathy Forest (EVC 127, **regionally Endangered**). Estimated in 2010 as 900 m², comprising 600 m² in fair ecological condition (rating C) and 300 m² in poor ecological condition (rating D).

Dominant canopy trees: Formerly *Eucalyptus radiata* with considerably fewer *Eucalyptus cephalocarpa*, but since the 2010 clearing, reduced to one mature *Eucalyptus cephalocarpa* and a few seedlings.

Dominant lower trees: Formerly dominated by *Acacia mearnsii* and *Exocarpos cupressiformis*, but since the 2010 clearing, there are just single plants of *Exocarpos cupressiformis*, *Allocasuarina littoralis* and *Acacia melanoxylon*.

Shrubs: Several *Acacia paradoxa*, *Leptospermum continentale* and one *Daviesia latifolia* were present until 2010.

Vines: None.

Ferns: None.

Ground flora: Since the 2010 clearing, the areas of native vegetation retain dense native grasses. The most abundant species are *Microlaena stipoides*, *Rytidosperma* species, *Lomandra filiformis* subsp. *coriacea*, *Themeda triandra* and *Dichondra repens*. While not observed during a quick inspection in May 2010, it is likely that the site retains its *Arthropodium strictum*, *Gonocarpus tetragynus*, *Lepidosperma gunnii* and *Viola hederacea*.

Plant species

The following indigenous plant species were observed by the author between 4th June 2002 and May 2010. Underlining indicates species observed in a superficial inspection in May 2010, following extensive tree removal. Additional species would no doubt be detectable in other seasons. The column headed 'Risk' indicates the indigenous species' risk of extinction in Knox with 'E'=Endangered and 'V'=Vulnerable.

Risk	Indigenous Species	Risk	Indigenous Species
V	<i>Acacia mearnsii</i>	E	<i>Hypericum gramineum</i>
V	<i>Acacia melanoxydon</i>		<i>Lepidosperma gunnii</i>
	<i>Acacia paradoxa</i>		<i>Leptospermum continentale</i>
V	<i>Allocasuarina littoralis</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
	<i>Arthropodium strictum</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>		<i>Microlaena stipoides</i>
	<i>Billardiera mutabilis</i>		<i>Oxalis exilis/perennans</i>
E	<i>Daviesia latifolia</i>		<i>Poa morrisii</i>
	<i>Dichondra repens</i>		<i>Poranthera microphylla</i>
	<i>Eragrostis brownii</i>		<i>Rytidosperma laeve</i>
V	<i>Eucalyptus cephalocarpa</i>		<i>Rytidosperma penicillatum</i>
V	<i>Eucalyptus ovata</i>		<i>Rytidosperma racemosum</i>
E	<i>Eucalyptus radiata</i>		<i>Rytidosperma setaceum</i>
	<i>Eucalyptus</i> hybrid		<i>Rytidosperma tenuius</i>
V	<i>Exocarpos cupressiformis</i>		<i>Themeda triandra</i>
	<i>Gonocarpus tetragynus</i>	V	<i>Veronica gracilis</i>
V	<i>Hardenbergia violacea</i>	E	<i>Viola hederacea</i>
V	<i>Hemarthria uncinata</i>		

Flora and fauna of special significance

None detected.

Fauna habitat features

The remnant trees represent basic habitat for native birds, possums, insects and perhaps bats.

Significance rating

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Locally Threatened Plant Species

Apart from the likelihood of residential development, the surviving locally threatened species listed above would have viable populations in combination with nearby native vegetation, thereby meeting criterion 3.1.5 for a site of **Local** significance.

Threats

- Residential development.

Management issues

The owners of the properties may be able to ameliorate the loss of native vegetation by inviting a group such as the Knox Environment Society to salvage plants prior to house construction, and by planting some indigenous shrubs in their gardens.

Administration matters

- The planning scheme zoning is Residential 1 Zone (R1Z);
- This site is not covered by any existing Vegetation Protection Overlay in the Knox Planning Scheme;
- This site would qualify on biological grounds for protection under the planning scheme but imminent residential development would make this futile. A better option would be to arrange rescue of some of the plants that will inevitably be lost during development, as discussed above.

Information sources used in this assessment

- A botanical survey by Dr Lorimer for 35 minutes on 4th June 2002, following the standard procedures described in Section 2.4 of Volume 1, including:
 - Compilation of two lists of indigenous and introduced plants (one for Brusco Close and one for Selwood Ct);

- A description of the vegetation's structural and floristic composition in each of these two areas;
- Incidental fauna observations; and
- Checks for fauna habitat, ecological threats and management issues;
- A follow-up survey by Dr Lorimer for thirty minutes on 10/3/08 to check what natural assets remained;
- A superficial inspection by Dr Lorimer for ten minutes on 24/5/10 in the wake of extensive clearing;
- The Department of Sustainability & Environment's BioMaps of the area; and
- Aerial photography from February 2001, April 2003, February 2007 and December 2009.

Site 115. Lysterfield Rural Properties

Farms and farmlets with scattered remnant trees and other habitat. Centred on Melway ref. 83 C2.

Site Significance Level: *Local*

- Contains scattered indigenous trees and other rudimentary habitat for indigenous fauna.

Aerial photograph and plan: See page 409, on which the boundaries of this site are not marked (so as not to create confusion with sites of greater habitat value).

Boundaries

The site includes all private properties on the aerial photograph on page 409 that are not included in Site 83 and abut:

- Lysterfield Rd;
- Wellington Rd east of Kelletts Rd;
- Brae Rd; or
- Powells Rd.

Land use & tenure: Freehold farms and farmlets.

Site description

The land in this site is grazing country abutting more biologically significant sites. Its habitat comprises:

- Scattered remnant eucalypts, Blackwoods and small numbers of other trees;
- The headwaters of Corhanwarrabul Ck, with wetland visited by waterbirds;
- Farm dams that are also visited by waterbirds; and
- Pasture grazed by kangaroos.

All the site's native vegetation is covered by Clause 52.17 of the Knox Planning Scheme. The farm dams and pasture need no specific recognition or protection in the planning scheme.

Relationship to other land

The habitat in this site represents a small augmentation to the habitat in the adjacent sites marked on page 409.

Bioregion: Gippsland Plain

Habitat type

There is too little coverage of native vegetation within the site to regard it as a representation of an EVC. The original EVCs were:

- Valley Heathy Forest (EVC 127, **regionally Endangered**); and
- Swampy Woodland (EVC 937, **regionally Endangered**).

Flora and fauna of special significance

Uncommon in the Melbourne Region

Eastern Grey Kangaroo. This species is seen frequently in the area.

Significance rating

Locally Threatened Plant Species

The site supports viable populations of locally threatened eucalypt species such as *Eucalyptus cephalocarpa*, thereby meeting criterion 3.1.5 of Amos (2004) for a site of **Local** significance. Some other locally threatened species probably also qualify.

Threats and management issues

None identified.

Administration matters

- The area is outside the Urban Growth Boundary;

- The planning scheme zoning is Green Wedge Zone – Schedule 1 north of Wellington Rd and Green Wedge Zone – Schedule 2 (GWZ2) south of Wellington Rd;
- Some of the more densely treed parts of the area are covered by the existing Schedule 1 to the Vegetation Protection Overlay of the Knox Planning Scheme.

Information sources used in this assessment

- Inspection of the area by Dr Lorimer in 2002-2004 in search of sites of biological significance and while surveying the adjoining sites of biological significance
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district; and
- The Department of Sustainability & Environment's BioMaps of the area.

Site 116. Road Verges

This section refers to native vegetation on road verges that are not included in sites described earlier in this report.

Site Significance Level: *Local*

Isolated remnant trees, or small groups of them, are not uncommon on road verges in Knox that are not parts of formally recognised sites of biological significance. On rare occasions, the trees are accompanied by small patches of native understorey. These occurrences of native vegetation often provide fauna habitat or landscape value, but they are too isolated or too sparse to warrant the application of an overlay in the Knox Planning Scheme.

Under the town planning system, road reservations are regarded as subject to the baseline 'native vegetation retention' provisions of Clause 52.17 of the Victoria Planning Provisions. Council, road workers, service utility companies and owners of land abutting roadsides with native vegetation should be mindful that roadside native vegetation is protected under Clause 52.17, even in the absence of a planning overlay. Private land owners often ignore this or are ignorant of it.

The exemption that Clause 52.17 provides for clearing of vegetation within ten metres of a building or for construction of a building usually does not apply on roadsides. This places less need on the use of overlays for roadsides compared with other land. Consequently, some roadsides in Knox that are not proposed for overlays have vegetation even though their vegetation is more significant than some of the sites that are recommended for overlays. The most important examples of this that were detected in this study are as follows:

Site 116a. Colchester Rd Roadside, Boronia

Aerial photographs: pp. 141 and 466 (the latter at higher resolution, but not covering the whole site).

The full length of Colchester Rd in Knox is a site of **Local** biological significance because:

- There are large specimens of *Eucalyptus ovata* and *E. cephalocarpa*, both with trunk diameters to 0.86 m;
- There is a strip of the regionally endangered EVC, Swampy Woodland, in fair to poor ecological condition (ratings C and D), with twenty-six indigenous plant species;
- There is one patch of Blady Grass (*Imperata cylindrica*), which is rare (but not threatened) in Knox; and
- The vegetation represents a habitat link between the Dandenong Creek Corridor (Site 26) and the treed area along and south of Mountain Hwy (Sites 92 and 98).

Site 116b. Taylors Lane Roadside, Rowville

The western road verge, north of Kelletts Rd, is a site of **Local** biological significance:

- There is a fair to good cover of remnant trees, including five eucalypt species, and patches of native understorey (mostly a few shrubs and native grasses). These are vestiges of the endangered EVC, Valley Heathy Forest (ecological condition rating D), with sixteen indigenous plant species;
- Australian native trees and shrubs have been planted extensively within the tree reserve beside the remnant trees. They include Red Ironbark, wattles and hakeas;
- The vegetation represents a habitat link between Hillside Park (Site 68) and Corhanwarrabul Creek (Site 66).

Site 116c. Forest Rd Roadside, Ferntree Gully

The eastern road verge from 122 Forest Rd to 160 Forest Rd is a site of **Local** biological significance:

- There is a good cover of remnant trees in several strips, each typically 50 m long, comprising five eucalypt species, three wattle species and two individual *Exocarpos cupressiformis* trees. The ground flora is dominated by native grasses over much of the area but aside from grasses, mowing has allowed only a handful of individual plants of indigenous shrub or ground flora species to persist. The vegetation belongs to the endangered EVC, Valley Heathy Forest (ecological condition rating D), with twenty-one indigenous plant species;
- Indigenous trees and shrubs were planted by Council in patches during the late 2000s to improve the habitat quality and compensate for the loss of species that has resulted from the history of mowing.

Site 117. Schools

This section refers to native vegetation in schools that are not recognised as sites, or parts of sites, described earlier in this report.

Site Significance Level: *Local*

Many school grounds in Knox have remnant trees, which provide shade and can add to the attractiveness of what might otherwise be a rather stark landscape. Sometimes there are also patches of native understorey, or areas of hardy native grasses such as Weeping Grass or Clustered Wallaby-grass.

The more biologically important vegetation in school grounds is covered earlier in this report. Other native vegetation in schools seen during this study is too isolated or too sparse to warrant the application of an overlay in the Knox Planning Scheme. The school properties are larger than 0.4 ha and so they are subject to the baseline 'native vegetation retention' provisions of Clause 52.17 of the Victoria Planning Provisions. While small-scale vegetation removal at schools is generally done with planning approval, this does not always apply because planning schemes are not binding on land development carried out on behalf of the Minister for Education due to an Order-in-Council under Section 16 of the *Planning and Environment Act 1987* (Victorian Govt Gazette, 10th February 1988, p. 266).

Construction of buildings is a possible cause for future loss of native vegetation in these schools, particularly with a large provision of federal funds for school improvements in 2010. A state-wide amendment to clause 52.17 in 2008 introduced a level of planning control over native vegetation removal for building construction. Hopefully, school construction projects would only remove native vegetation if there were no practicable alternative.

The most important example of a school with native vegetation is Mountain Gate Primary School. It has an area of approximately 0.25 ha with a fair to good cover of remnant trees, and with native understorey restricted to a few Sweet Bursaria shrubs and ground layer plants around the base of remnant trees. This area is at the southwestern end of the school grounds adjacent to Ashton Road, where it seems unlikely that new school buildings would be placed because of remoteness from the existing school buildings.

A major feature of conservation significance in these schools is their eucalypts and large wattles. All indigenous eucalypt species in Knox, as well as *Acacia mearnsii* and *Acacia melanoxylon*, meet the international criteria for locally threatened species (Volume 1) and any viable population is of 'Local' conservation significance according to the criteria of the Department of Sustainability & Environment (Amos 2004). These species are common in school grounds.

Site 118. Parks and Reserves

This section refers to native vegetation in parks and reserves that are not recognised as sites, or parts of sites, described earlier in this report.

Site Significance Level: *Local*

As in the case of school grounds, some parks and reserves in Knox have remnant trees and sometimes patches of native understorey, or areas of hardy native grasses such as Weeping Grass or Clustered Wallaby-grass. The remnant eucalypts and large wattles that are common in these parks and reserves give the sites at least Local conservation significance on the same criteria as just discussed for schools.

The more biologically important parks and reserves are covered earlier in this report. The native vegetation in other parks and reserves seen during this study is too isolated or too sparse to warrant the application of an overlay in the Knox Planning Scheme. The four subsections below summarise the most noteworthy examples of native vegetation in this category. In all cases, the properties are larger than 0.4 ha and so they are subject to the baseline 'native vegetation retention' provisions of Clause 52.17 of the Victoria Planning Provisions.

Site 118a. Birchfield Reserve, Wantirna

Melway ref. 63 H9.

Native vegetation in this reserve is mainly represented by a fair cover of remnant trees towards the northern end of the reserve, including several mature specimens of Yellow Box (*Eucalyptus melliodora*). Native understorey is mainly restricted to a few shrubs and ground layer plants around the base of remnant trees. The habitat provided by the native vegetation is augmented by planted Australian native trees along the western boundary of the reserve, including Sydney Blue Gum, Lemon-scented Gum and Bracelet Honey-myrtle.

A flock of Musk Lorikeets was observed feeding on eucalypt flowers. They are likely to be regular seasonal visitors. Although regarded as regionally rare until the 1990s, Musk Lorikeets have become increasingly common.

Threats

- Invasion by Sweet Pittosporum;
- The effects of many Monterey Pines, up to 30 m tall, along the eastern side of the reserve;
- Dieback of remnant trees associated with altered drainage and ecological isolation;
- Lack of recruitment of indigenous vegetation because of mowing.

Site 118b. Michelle Drive Reserve, Scoresby

Melway ref. 72 H5.

This reserve is located between 42 and 52 Michelle Dr. It was created in 2003 from subdivision of the Catholic seminary that was on the site. Within an area of 2,400 m², there are approximately twenty eucalypts (mainly Mealy Stringybarks, *Eucalyptus cephalocarpa*), one Blackwood (*Acacia melanoxylon*) and a single Burgan shrub (*Kunzea ericoides*). There is effectively no indigenous ground flora.

Site 118c. Peregrine Reserve, Rowville

Melway ref. 82 D2.

The native vegetation within this reserve was mostly cleared or destroyed during its period as part of a grazing property. It would have belonged to the Swampy Woodland EVC, which is now regionally endangered. Today, the reserve's remnant vegetation comprises a small number of Swamp Gums (*Eucalyptus ovata*), very few Narrow-leafed Peppermints (*Eucalyptus radiata*) and a single Black Wattle (*Acacia mearnsii*). The eucalypts are estimated to be mostly 80-100 years old, with some exceeding 100 years. Such old Swamp Gums generally make excellent habitat trees because of their tendency to develop hollows and fissures that may be inhabited by native birds, bats, possums or insects.

Knox City Council has planted many indigenous trees since about 1998, including Swamp Gum, Bundy (*Eucalyptus goniocalyx*), Mealy Stringybark (*Eucalyptus cephalocarpa*), Yellow Box (*Eucalyptus melliodora*), Blackwood (*Acacia*

melanoxylon) and Black Sheoak (*Allocasuarina littoralis*). Council has also revegetated the centre of the reserve with indigenous understorey plants, including Sweet Bursaria (*Bursaria spinosa*), Prickly Moses (*Acacia verticillata*), Burgan (*Kunzea ericoides*), Hedge Wattle (*Acacia paradoxa*), Prickly Tea-tree (*Leptospermum continentale*), Spiny-headed Mat-rush (*Lomandra longifolia*), a tussock-grass (*Poa* species) and Pale Flax-lily (*Dianella longifolia*).

The value of the site for habitat is likely to increase substantially as the revegetation matures, considering the wealth of native fauna within the Lysterfield Hills area (Site 81), less than one kilometre away.

Site 118d. Teofilo Drive Reserve, Lysterfield

Melway ref. 82 G2, between Teofilo Dr and Sunrise Ct.

This 0.2 ha park has:

- One dozen mature, remnant Mealy Stringybarks (*Eucalyptus cephalocarpa*), some of which are very large;
- Some young wattles that have probably been planted; and
- A single remnant Spiny-headed Mat-rush plant (*Lomandra longifolia*).

The main significance of this vegetation is that some of the trees are very large and represent good habitat for native birds, possums, insects and perhaps bats.

Knox City Council has planted some indigenous species to augment the remnant habitat. This should encourage increasing numbers of native fauna to the park, mostly from the extensive habitat in the Lysterfield Hills (Site 81), which is only several hundred metres away.