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The native plant communities in Ryde Local Government Area, northern Sydney, New South Wales

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Abstract

This study describes the indigenous vegetation in suburban Ryde Local Government Area in northern Sydney, NSW, Australia, and identifies the likely past natural vegetation in now developed areas. Vegetation descriptions are based on the NSW *Plant Community Types* (PCTs) described by NSW Department of Climate Change, Energy, Environment, & Water in its 2025 Eastern NSW State Vegetation Mapping. 25 PCTs are described, with floristics and comments on habitats in the Ryde LGA. Significant variation was observed within 10 Ryde communities compared with the generic descriptions by DCCEEW. There are 8 plant communities listed under Federal and NSW state legislation as endangered or critically endangered, and another one is likely to be worthy of listing as an endangered ecological community.

Plant community descriptions for New South Wales vegetation since 2000 by the NSW Government have been based on whole-of-community data; these are generic and unable to provide details necessary for local area studies and management. There is therefore a need for local studies such as this to provide that detail. Local studies, using appropriate methodology can enhance broad scale mapping.

Keywords: Natural vegetation, Plant Community Types, PCTs, Urban bushland, Ryde flora, Historic impacts

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Introduction

The native flora of Ryde Local Government Area (hereafter 'Ryde') and other parts of northern Sydney has been of interest since colonial times (Kubiak 2005) as it was close to the main centre of population. However, surveys for vegetation and plant community types only began in the late 20th Century, initially with qualitative descriptions (e.g. Kartzoff 1969; Benson & Howell 1990, 1994), with quantitative assessments developed relatively recently (e.g. NPWS 2000). More comprehensive survey work by NSW Office of Environment & Heritage (OEH) (2013) followed, and has become an unofficial standard for the Sydney Metropolitan Area. Their mapping surveys were updated in 2016 by OEH, and by NSW Dept. Planning & Environment (DPE) from 2021, and NSW Department of Climate Change, Energy, Environment, & Water (DCCEEW 2023-2025). The latter works incorporated the Sydney Metropolitan Area into an eastern New South Wales, Australia study area. This has resulted in refining vegetation mapping in Ryde, as elsewhere, and providing a consistent context for understanding native plant communities in NSW.

Most of the natural plant communities in Ryde have been significantly modified by historical clearing and other ongoing impacts (Figure 1). Exotic species were introduced following European settlement, and many of these continue to invade bushland, changing its character significantly. By 2025, DCCEEW considered that c.10 % of Ryde LGA contained bushland, with most being on primarily sandstone-derived soils. Some relics survived as scattered remnant trees and tiny areas of understorey species, often within landscape plantings. Many of these have recently experienced significant losses of trees and other native vegetation owing to senescence, weed spread, and ongoing residential development, including legal and illegal removal of inconvenient large trees near homes.

Since the 1980s, attempts have been made to rehabilitate some of Ryde's bushland. Whilst this is producing good results in some sites, it has been compromised by a lack of resources, and poor management methods, including the application of data from broad-scale vegetation mapping for local sites.



Figure 1. Blue Gum High Forest at corner of Blaxland, Vimiera and Balaclava Roads, Eastwood, in 1912 (Photo: City of Ryde Library).

This paper documents the natural plant communities as they occurred in Ryde at the time of this report, and provides:

- baseline information for improved understanding and future management of bushland within Ryde,

- conclusions of the nature of the indigenous vegetation in now-cleared areas that now comprise c.90% of the LGA,
- ground truthing of DCCEEW (2025) mapping in the LGA, and
- comments on the role of local studies in vegetation mapping.

Methods

Descriptions of the native plant communities in Ryde are based on observations and surveys done by the author within the LGA, and adjoining locations where relevant. Where possible PCT names given by DCCEEW (2025) are used, however some PCTs varied significantly and their identity was unclear.

Where practical, plant community sampling was done using quadrat survey (Figures 2, 3), following random meander traversing to determine whether the quadrat was representative of the local vegetation, was in an area of minimal disturbance, and likely to produce useful results. Quadrats were 20 × 20 m (400 m² area) with 10 × 40 m quadrats used to exclude adjoining plant communities at some sites. Where the vegetation was too modified to provide a representative quadrat, a random meander transect was surveyed.

Data from unpublished species lists by Benson (1984), Benson & Keith (1984), Coveny (1984, 1978), Keith (1984), Kubiak (1989-1995) and Thomas (1984-2000) have been used to help determine which species are likely to occur naturally or are more recent, non-natural introductions in the site. It is known that some potentially local species have been planted in some locations following recent absence. In such sites an assessment was made of the probability that species originally occurred naturally. For example, *Eucalyptus saligna* has been planted along Burrows and Shrimptons Creeks but was considered a naturally occurring species owing to the suitable habitat and original connectivity with Blue Gum High Forest. Exotic and non-local Australian species are indicated, generally with an asterisk. Plant species nomenclature accords with PlantNet, the website of the Botanic Gardens of Sydney.

Habitat details including location, landscape element, soil and geology, slope and aspect, condition of vegetation, and other relevant details were recorded. Quadrat details (see Appendix 1) are available via the BioNet website.

The Plant Community Type was assigned using data provided in DCCEEW (2025) and the online Eastern NSW PCT identification tool (*Plot to PCT*). Some sites have not fallen into recognized PCTs and have been described independently and linked to the most similar PCT. The areas of the various plant communities accord with DCCEEW (2025) mapping, unless otherwise indicated.

Plant community structure is based on Specht (1970). This system was used, rather than more recent systems such as Walker & Hopkins (1990) as used in the DCCEEW mapping, because it was considered more appropriate for the often-broader range in height within most disturbed native plant communities in Ryde. The vegetation maps are provided courtesy of DEECCW (2025).

As the main emphasis of this report is to describe the natural plant communities, little mention is made of introduced species, despite their dominance in parts of many communities. Neither does this document set out to describe individual reserves in detail, as would be necessary for detailed planning for management.

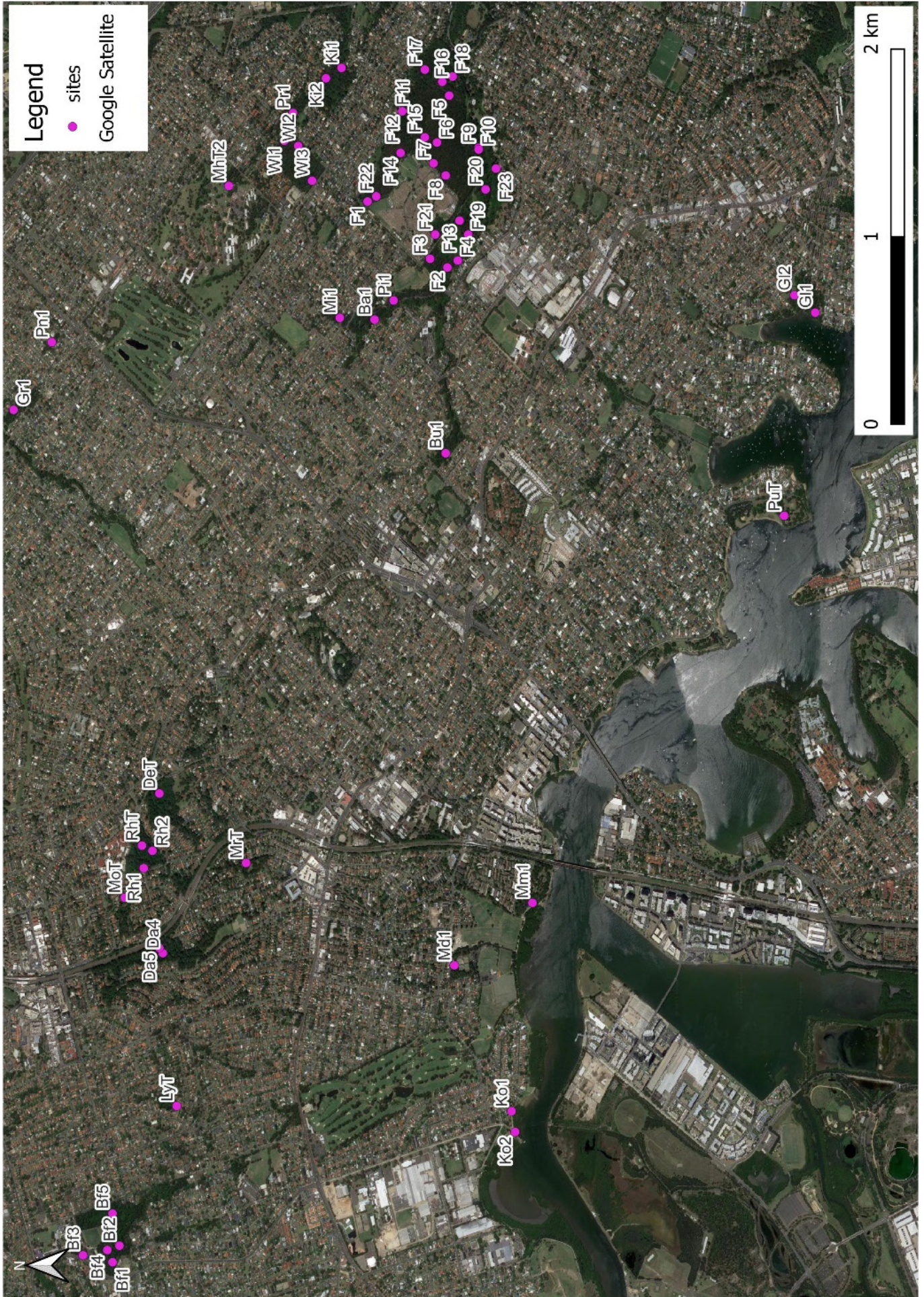


Figure 3. Locations of Ryde LGA survey sites – southern section of LGA.

Results

Study Area

Ryde, approximately 12 km north west of Sydney CBD, is bounded by Parramatta River to the south, Lane Cove River to the east and north, and Terrys Creek to Marsden Road in the west. It covers 4 065 ha. Clearing for agriculture starting from 1792, and much of the native vegetation was cleared in the 19th Century. Of prime importance to agriculture was the use of the relatively nutrient-rich clay soils, so native vegetation on clay and shale-sandstone transition soils was largely removed. Native vegetation on the lower-nutrient sandy soils was left relatively intact by agriculture but much was later cleared for residential development. In 2025, Ryde contained approximately 426 ha of bushland (Table 1), comprising c.200 ha of bushland in National Park Estate, c.201 ha in reserves managed by City of Ryde, and c.25 ha in other ownership. In total, mapped bushland now covers 10% of the LGA, and comprises 26 natural PCTs. Based on DCCEEW (2025) data, estimated areas of bushland cleared are: Clay soils – 97%; Transitional soils – 81%; Sandy soils – 53%.

Climate

Ryde's climate is warm-subtropical with relatively reliable and moderate rainfall. The mean summer maximum temperature at Macquarie Park is 27.7 degrees C, and the mean winter minimum temperature is 4.9 degrees. The average annual rainfall varies from 1002 mm at Meadowbank (BioNet data, 2.2026), 1054 mm at Ryde Hospital, to 1162 mm on the plateau at Macquarie Park.

Geology and Soils

Ashfield Shale of the Wianamatta group covers most of the LGA apart from near the boundaries where sandstone is exposed along the major river valleys of the Parramatta and Lane Cove Rivers, and lesser creeklines in the transition zones (eg. Burrows, Shrimptons and Terrys Creeks). Shale extends across the western boundary, into Parramatta LGA.

Hawkesbury Sandstone underlies the Wianamatta Shale and is exposed around the perimeter of Ryde, becoming more significant in the east and north of the municipality. It is deeply incised along the upper Lane Cove River.

Mittagong Formation comprises a group of thin bands of shale and sandstone that often occurs at the junction of Ashfield Shale and Hawkesbury Sandstone. Although unmapped in Ryde, small areas are indicated by Lucas Heights Soil Landscape (eSPADE 2019, Chapman & Murphy 1983) (Figure 4).

Alluvium has been deposited along the Parramatta River and the lower reaches of the Lane Cove River, including from more recent upstream erosion caused by development.

Clay soil covers c.80% of the LGA, varying in depth from more than three metres (eg. on the slopes below the plateau) to shallower on the Hornsby Plateau and towards sandstone margins (e.g. c.1-1.5 m at Greenwood Park, 600 mm at Marsfield Park and 300 mm at West Ryde Station). Clay enrichment of sandy soils occurs downslope of the clay-sandstone margins and in the vicinity of interbedded clay in sandstone areas, and affects most soils in Ryde. Sandy soils vary greatly in depth but generally tend to be shallow to skeletal. Sandy and clay alluvium has been deposited in fresh water and estuarine parts of Lane Cove River and along most of the estuarine Parramatta River (Dept. Min. Resources,

1983). Ryde contains six Soil Landscapes (Chapman & Murphy 1983) (Glenorie; West Pennant Hills; Lucas Heights; Gymea; Hawkesbury and Lane Cove Soil Landscapes-Figure 4).

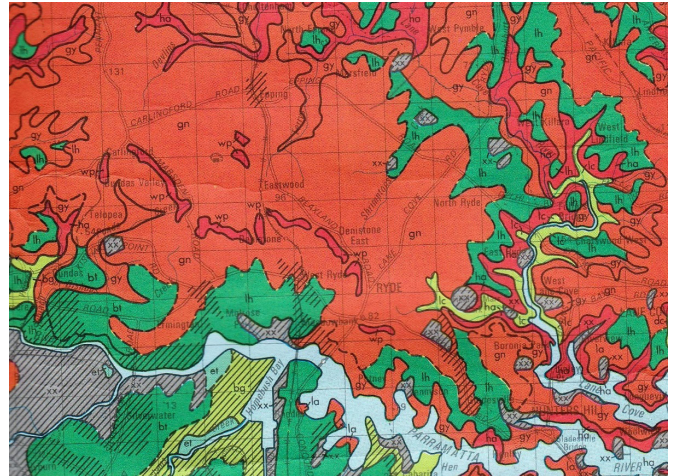


Figure 4. Soil Landscapes in Ryde LGA (Chapman & Murphy 1983).

Landscape Zones

Ryde is located at the southern end of the Hornsby Plateau. Most of the LGA is on the low plateau, with the northern, southern and eastern margins in the Parramatta and Lane Cove River valleys. Elevation ranges from near sea level at the Parramatta River to approximately 80 m at Marsfield. The main landscape elements are:

Parramatta River Corridor

The middle reach of the Parramatta River corridor, forms the southern boundary of the LGA. The western end of the corridor has low relief and predominantly clay soil from the Wharf Road boundary to Memorial Park, where sandstone is exposed and becomes more prominent progressively to the east. Slopes associated with sandstone along the river tend to be steeper owing to the resistance to weathering of sandstone compared with shale. Sandstone headlands become more common in the eastern section. The geology changes from Hawkesbury Sandstone at the shoreline, to Wianamatta Shale upslope. Shale-sandstone transition zones occur between the river and Victoria Road. Owing to the lower rainfall, and habitat variation, the vegetation in the river corridor comprises drier sclerophyll types that range from open or tall open forest on the slopes, to localized shrubland on sandstone outcrops. Most has now been cleared.

The western end of the corridor is directly connected to the extensive clay and transitional soils that continue west beyond Parramatta. This relatively dry zone of rich soils appears to have enabled the easterly spread of some plant communities and species more typical of the Cumberland Plain.

Estuarine communities occur along the Parramatta River which have varied since 1794 owing to alluvial deposition following catchment development, including foreshore "reclamation" works.

Hornsby Plateau southern slopes

A steep to very steep rise occurs above the slopes of the Parramatta River corridor to the Hornsby Plateau. This incline is

approximately 30 m in height and has deep Wianamatta Shale clay soils. Aspect generally ranges from southern (in Denistone/Eastwood and Putney areas) to western, especially at Top Ryde and Gladesville. Numerous small, intermittent creeks flow from the edge down to the Parramatta River along gullies, some of which are relatively deep and offer shelter from insolation and wind.

West of Top Ryde, the combination of deep clay soil, aspect, shelter, adequate rainfall and relatively rich soils has enabled the establishment of tall open forest, often with associated rainforest understories. Further east, mesic elements may have been uncommon, owing to shallower clay soils and interbedded sandstone.

Hornsby Plateau

The Hornsby Plateau is of low elevation in Ryde, c. 40 m asl, increasing northwards to about 80 m asl. The plateau mainly comprises clay soils grading into transitional soils near the edge of Lane Cove River valley. The vegetation has been largely cleared but was predominantly tall open forest. Open forest and woodlands occur on transitional soils on the northerly and easterly edges of the plateau.

Lane Cove River Valley

Lane Cove River cuts through the Ashfield Shale and Hawkesbury Sandstone to form a deep valley varying in depth from 40-70 m, and in width 200-400 m, between developed areas on each side. A second, smaller but significant valley has been created by Terrys Creek. Although the dominant geology in these gullies is Hawkesbury Sandstone, localized interbedded clay lenses and lateritic material occur, and the slopes contain sandy colluvium that has been enriched by clay soil from the ridges. Deep alluvium has been deposited along parts of Lane Cove River and Buffalo Creek.

This zone contains a wide variety of habitats (19 PCTs). These vary from tall open forest in local situations with better growing conditions, to woodland in drier habitat and/or shallower soils, with small areas of shrubland on skeletal soils on rocky benches. Rainforest occurs in the most sheltered, moist gully locations. Estuarine communities line the Lane Cove River, downstream from the weir near Fullers Bridge, but occurred a little further upstream previously.

Influence of fire

Prior to European settlement, Aboriginal land managers used fire (Gammage 2012; Steffensen 2020). Often this produced "park-like" settings of widely spaced trees with a grassy understorey (Hawkins, R. 1994), especially on better quality soils with forest and grassland (Gammage 2012). No areas in Ryde now show the influence of Aboriginal management, although a vestige of grassy understorey in Blue Gum High Forest at Ryde Hospital may have survived owing to subsequent compatible European land management.

Until c.1985 part of Darvall Park showed the results of occasional fire ignited by steam locomotives climbing Eastwood Bank where the Blue Gum High Forest understorey within c.20 m of the rail corridor included native grasses and forbs, but since 1985, lack of fire has enabled mesic species, mainly *Cissus antarctica*, to dominate the understorey.

Plant Communities

The 27 native Plant Community Types (PCTs) recorded in Ryde are described below with extant and pre-clearing areas (Table 1) and maps showing extant (Figure 5) and pre-settlement plant communities (Figure 38). The relationships of the Ryde plant communities based on the habitat differences that determine their floristics and structure are shown diagrammatically (Figure 6). Individual plant communities in Ryde represent a narrower subset of the total throughout their full natural range of distribution and may vary from the general descriptions in DCCEEW (2025) and OEH (2016).

Of prime importance has been the overarching influence of clay soil on almost every plant community in Ryde, and for this reason, some PCTs have not corresponded directly with what had been predicted in the earlier reports. For example, rockplate shrublands differ from the predicted Northern Sydney Rockplate Scrub (PCT 3808) and it is likely that the wetland communities have also been influenced this way. Much of the Sydney Sandstone Gully Forest (PCT 3595) previously mapped in OEH 2016 has, following extra field survey, been shown to be Sydney Coastal Enriched Sandstone Forest (PCT 3592). Similarly, the differences between most of the shale-sandstone transitional communities are minor and difficult to predict, and difficult because of human impacts over many years.

1. **Plant Communities on Primarily Clay Soil or Alluvium**
 - 1.1. Western Sydney Complex Dry Rainforest (PCT 3082)
 - 1.2. Blue Gum High Forest (PCT 3136)
 - 1.3. Sydney Turpentine Ironbark Forest (PCT 3262)
 - 1.4. Cumberland Red Gum Riverflat Forest (PCT 4025)
2. **Plant Communities of Transitional Soil Zones**
 - 2.1. Sydney Enriched Sandstone Moist Forest (PCT 3176)
 - 2.2. Lower North Coastal Hills Red Gum Grassy Forest (PCT 3445)
 - 2.3. Sydney Coastal Sandstone Foreshores Forest (PCT 3594)
 - 2.4. Sydney Turpentine Ironbark Marginal Forest (PCT 3262) (variant included in 1.3 above)
 - 2.5. Sydney Coastal Shale Sandstone Forest (PCT 3259)
 - 2.6. Sydney Coastal Enriched Sandstone Forest (PCT 3592)
3. **Plant Communities on Primarily Sandstone-derived Soil**
 - 3.1. Coastal Sandstone Gallery Rainforest (PCT 3038)
 - 3.2. Hinterland Turpentine Apple Forest (PCT 3621)
 - 3.3. Sydney Coastal Sandstone Gully Forest (PCT 3595)
 - 3.4. Sydney Coastal Sandstone Exposed Sandstone Bloodwood Shrub Forest (PCT 3593)
 - 3.5. Northern Sydney Scribbly Gum Woodland (PCT 3586)
 - 3.6. Northern Sydney Heath-Mallee (PCT 3807 variant)
 - 3.7. Sandstone Rock Plate Shrubland (PCT 3810 variant)
 - 3.8. Sandstone Cliff Soak (PCT 3916)
 - 3.9. Sydney Coastal Sandstone Riparian Scrub (PCT 3086)
4. **Estuarine and Freshwater Wetland Plant Communities**
 - 4.1. Grey Mangrove River Mangrove Forest (PCT 4091)
 - 4.2. Saltmarsh – including Samphire Saltmarsh (PCT 4097) & Sea Couch Saltmarsh (PCT 4103)
 - 4.3. Estuarine Swamp Oak-Mangrove Forest (PCT 4027)

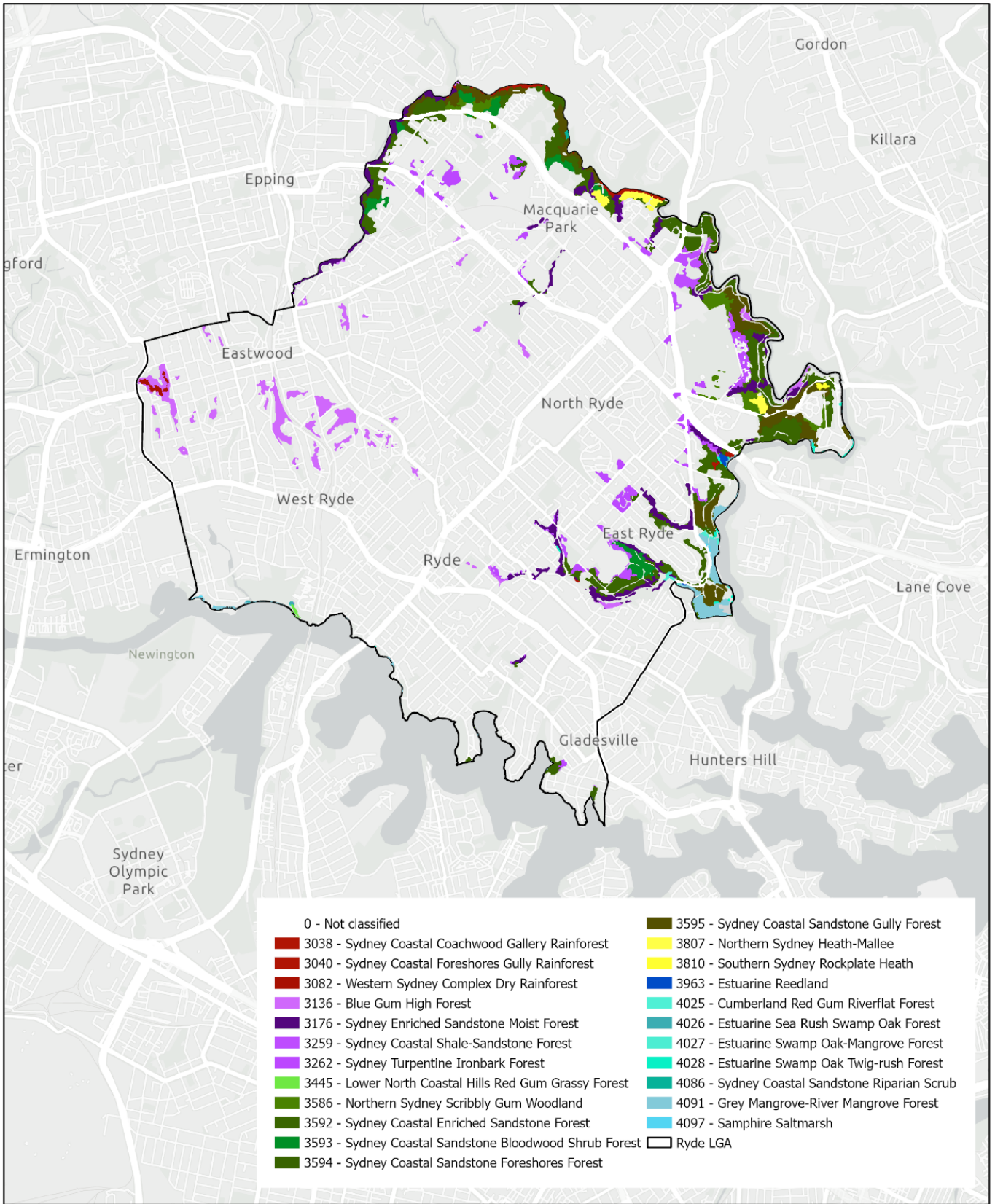
- 4.4. Estuarine Sea Rush Swamp Oak Forest (PCT 4026)
 4.5. Estuarine Swamp Oak Twig-rush Forest (PCT 4028)
 4.6. Estuarine Reedland (3963)

- 4.7. Creekflat Paperbark Forest (PCT 3972/4010/4057 variant)
 4.8. Cheese Tree Wet Forest (3040 variant)

Table 1. Ryde Plant Community Types (PCTs) showing Landscape zones and areas (ha) of pre-settlement and extant vegetation

(>5 ha rounded to nearest whole ha and < 5 ha rounded to two decimal places)

PCT	Community	Pre-clearing ha *	Extant ha 2025*	Landscape zone
3038	Sydney Coastal Coachwood Gallery Rainforest	9	6	Lane Cove River valley incl. tributaries
3040 variant	Cheese Tree Wet Forest	0.50	0.50	Lane Cove River valley, Parramatta River corridor
3082	Western Sydney Complex Dry Rainforest	6 Adjusted from 2.45	2.45	Hornsby Plateau southern slope
3136	Blue Gum High Forest	1552	50	Hornsby Plateau, Hornsby Plateau sthn slope, Lane Cove River valley
3176	Sydney Enriched Sandstone Moist Forest	178	53	Lane Cove River valley, incl. Hornsby Plateau margins
3259	Sydney Coastal Shale Sandstone Forest	85	25	Hornsby Plateau adjacent to Lane Cove River valley, Parramatta River corridor
3262	Sydney Turpentine Ironbark Forest	1266	30	Hornsby Plateau, Lane Cove River valley, Parramatta River corridor
3445	Lower North Coastal Hills Red Gum Grassy Forest	57	0.57	Parramatta River corridor
3586	Northern Sydney Scribbly Gum Woodland	92	18	Lane Cove River valley
3592	Sydney Coastal Enriched Sandstone Forest	437	125	Lane Cove River valley & adjacent Hornsby Plateau
3593	Sydney Coastal Sandstone Bloodwood Shrub Forest	58	20	Lane Cove River valley
3594	Sydney Coastal Sandstone Foreshores Forest	159	3.58	Parramatta River corridor, Lane Cove River valley
3595	Sydney Coastal Sandstone Gully Forest	69	57	Lane Cove River valley
3621	Hinterland Turpentine-Apple Forest	nil	Nil	Not mapped by DCCEEW but recorded in one quadrat in north Ryde and more extensively west of Terrys Ck
3807 variant	Northern Sydney Heath-Mallee	11	10	Lane Cove River valley
3810 variant	Sandstone Rockplate Shrubland	0.89	0.88	Lane Cove River Valley, Parramatta River corridor
3916	Sandstone Cliff Soak	0.03	Nil	Lane Cove River valley
3963	Coastal Estuarine Reedland	1.24	1.06	Lane Cove River valley
4010	Sydney Hinterland Creekflat Paperbark Scrub	1.48	Nil	Lane Cove River valley & adjacent Hornsby Plateau
4025	Cumberland Red Gum Riverflat Forest	19	0.04	Parramatta River corridor
4026	Estuarine Sea Rush-Swamp Oak Forest	8	0.43	Lane Cove River valley, Parramatta River corridor
4027	Estuarine Swamp Oak-Mangrove Forest	2.49	1.62	Lane Cove River valley
4028	Estuarine Swamp Oak Twig-rush Forest	6.2	2.05	Lane Cove River valley
4086	Sydney Coastal Sandstone Riparian Scrub	0.34	0.34	Lane Cove River valley
4091	Grey Mangrove-River Mangrove Forest		17	Parramatta River corridor, Lane Cove River valley
4097	Saltmarsh			Parramatta River corridor, Lane Cove River valley



Extant State Vegetation Type Map Ryde, 2026

0 0.5 1 1.5 2 Kilometers
Datum/Projection: GCS GDA 1994



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Figure 5. Extant native vegetation in Ryde LGA.

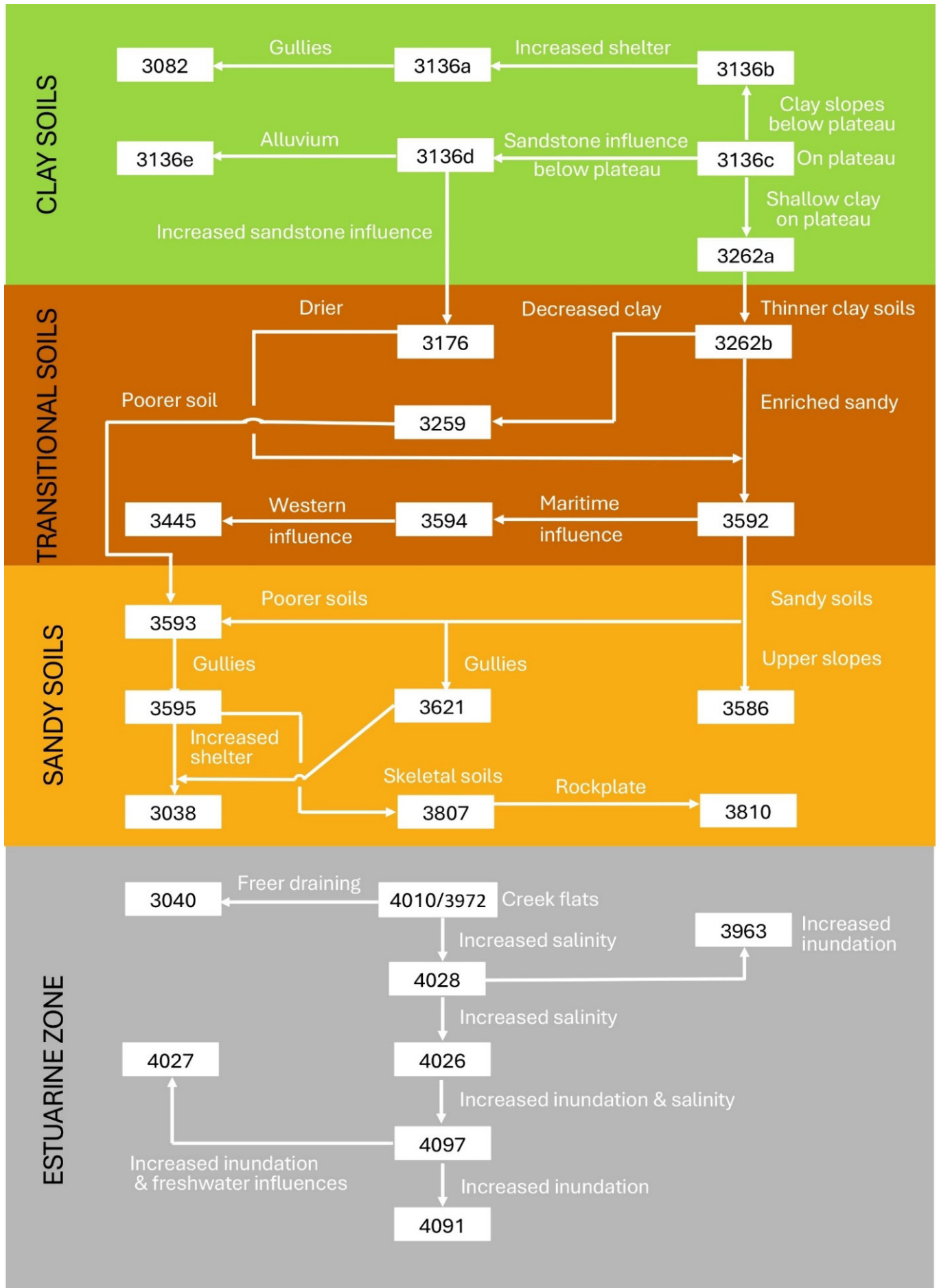


Figure 6. Relationships of Ryde LGA Plant Community Types (PCTs) and local plant community variants.

1 Vegetation on primarily shale-derived soils or alluvium

1.1 Western Sydney Complex Dry Rainforest - NSW PCT 3082 (Figure 7)

Rainforest is uncommon in Ryde and Western Sydney Complex Dry Rainforest is the only rainforest plant community that occurs on clay soil. However, similar rainforest understories, occur in sheltered locations in the adjoining and closely related Blue Gum High Forest (BGHF) on the plateau slopes (e.g. Darvall Pk). Habitat is the deep clay soil gullies below the southern edge of the Hornsby Plateau. The best example, covering approximately 2 ha, is in Brush Farm Park (Figure 7, Table 1). Minor remnants occur nearby.

Brush Farm Park was the site of an important farm between 1807-1831 before being used for various other purposes (City of Ryde website). A 1943 aerial photograph shows the vegetation as largely cleared. However, since then, massive regrowth has occurred with *Acmena smithii* (Lilly Pilly), *Pittosporum undulatum* (Sweet Pittosporum) and **Ligustrum* spp. (Privets) dominating much of lower the lower slopes of the reserve. **Ligustrum* spp. have now been largely removed and less common indigenous species including *Melicope micrococca* (Hairy Doughwood), *Ficus coronata* (Creek Sandpaper Fig), *Alectryon subcinereus* (Native Quince), *Cassine australe* (Red Olive-berry), *Guioa semiglaucua* and *Rhodamnia rubescens* (Brush Turpentine), also occur. *Backhousia myrtifolia* (Grey Myrtle) was present previously (C. Farmer pers. comm.), but its original extent and natural distribution is unclear. Similar habitat with *Backhousia* in many nearby gullies suggests it was probably common or dominant in most gullies below the plateau west of Top Ryde. Bases of *Livistona australis* (Cabbage Palm) were observed in the creek in the 1980s, and it has been planted in more recent years. This and other species including *Cryptocarya glaucescens* (Jackwood), *Synoum glandulosum* (Scentless Rosewood), *Guioa semiglaucua* and *Schizomeria ovata* (Crabapple) also occur in Lane Cove Valley and are likely to have been distributed between sites by bats.

Eucalypts form a sparse overstory. Some *Eucalyptus saligna* (Blue Gum), *Syncarpia glomulifera* (Turpentine) and *Eucalyptus paniculata* (Grey Ironbark) were estimated to be over 150 years old. Other species include: *Eucalyptus pilularis* (Blackbutt) and *Eucalyptus acmenoides* (White Mahogany). Numerous trees have been planted at Brush Farm Park during bushland rehabilitation work, since the mid-1980s including *Eucalyptus saligna*, *Backhousia myrtifolia* and some non-local species. Excessive numbers of *Ficus coronata* have been planted. It has proven very hardy and has enabled canopy and rainforest habitat to be reestablished relatively quickly. It is now being spread in the local area by bats.

The shrub stratum is generally sparse, especially where the rainforest canopy is dense. Species include: *Notelaea longifolia* (Native Olive), *Polyscias sambucifolia* (Elderberry Panax), *Pittosporum revolutum* (Yellow Pittosporum), *Clerodendrum tomentosum* (Hairy Clerodendrum), *Myrsine variabilis* (Variable Muttonwood), *Eupomatia laurina* (Bolwarra) and *Croton verreauxii* (Green Cascarilla).

The ground cover is dominated by ferns, especially *Adiantum hispidulum* (Rough Maidenhair), *Doodia aspera* (Rasp Fern) and *Adiantum aethiopicum* (Common Maidenhair). Other common herbs are *Pseuderanthemum variabile* (Pastel Flower), *Dichondra*

repens (Kidney Plant), with *Oplismenus* spp., and *Microlaena stipoides* (Weeping Meadow-grass) in gaps or at margins. **Tradescantia albiflora* dominates the ground cover in various locations and is an ongoing management problem. *Asplenium flabellifolium* (Necklace Fern) was previously common in the upper creek zone.

Vines are common, including robust, tall-growing species such as *Cissus antarctica* (Kangaroo Vine), *Pandorea pandorana* (Wonga Wonga Vine), *Celastrus subspicata* (Large Staff Climber) and *Gynochthodes jasminoides* (Jasmine Morinda). Slender vines are also common, especially *Eustrephus latifolius* (Wombat Berry), *Cayratia clematidea* (Slender Grape), *Smilax australis* (Prickly Supplejack), *Stephania japonica* (Tape Vine) and, at margins, *Glycine* spp. The regionally rare *Ripogonum album* also occurs in one location. Epiphytes were locally common in the eastern gully until about 1990. *Pyrrosia rupestris* (Rock Felt Fern) was especially common on a large old *Pittosporum undulatum* (estimated to be 15 m tall with a dbh of 900 mm) but it has since died, along with its epiphytes. *Platyserium bifurcatum* (Elkhorn) and *Asplenium australasicum* (Birds Nest Fern) are uncommon.

Table 2. Typical structure of Western Sydney Complex Dry Rainforest at Brush Farm Park

Strata	Height range (m)	Projective foliage cover %
Emergents	20-35	5
Canopy	10-15	50-80
Shrubs	1-4	0-5
Groundcover	0-1	5-60

Relationship to other Communities - Grades upslope into Blue Gum High Forest with rainforest understory, which, in drier and more fire prone locations grades into Blue Gum High Forest with a sclerophyllous understory, as occurs on the plateau edge just north of Lawson Street. Western Sydney Complex Dry Rainforest in Ryde is an isolated outlier of the community which mainly occurs in the Kurrajong area.

Representative example - Brush Farm Park

Likely Previous Distribution - Suitable habitat for this community occurs on deep soils in the multiple sheltered gullies on the slopes below the Hornsby Plateau, mainly between Brush Farm/Lambert Park and the deep gully below Pennant Avenue, Denistone.



Figure 7. Western Sydney Dry Rainforest at Brush Farm Park eastern gully (Site Bf5).

1.2 Blue Gum High Forest - NSW PCT 3136

Blue Gum High Forest (BGHF) is a tall open forest that in Ryde generally occurs on deep to very deep clay soils. Remnants of the community occur on the slopes and footslopes below the Hornsby Plateau, and scattered sites on the plateau. It is mostly restricted to West Pennant Hills and Glenorie Soil Landscapes however, a few small patches were recorded within the sandstone zone and on alluvium in Lane Cove River catchment. Relics comprising individual trees are scattered across its original range.

As this PCT mainly occurred on deep fertile soils and gentle to moderate slopes, most of the original forest was cleared for farming and development, leaving c.50 ha of disturbed remnants (Table 1). This represents 3.2% of the estimated 1552 ha of Ryde's original Blue Gum High Forest, of which less than 9 ha (0.6%) is currently viable, owing to severe weed invasion. Clearing has been the most extensive on the gentle terrain of the plateau.

Five variants of Blue Gum High Forest (BGHF) recorded in Ryde are described below.

1.2.1 Blue Gum High Forest with mesic understory (Figure 8)

This variant occurs in moist, sheltered gullies on the slopes below the Hornsby Plateau. *Eucalyptus saligna*, *Syncarpia glomulifera*, *Eucalyptus acmenoides*, *Eucalyptus pilularis*, and *Eucalyptus paniculata* are the canopy species. Below the canopy, more intact sections of this mesic community have a dense small tree stratum. In the Denistone area this is dominated by *Backhousia myrtifolia* and *Pittosporum undulatum*, with *Acmena smithii* being common near the creeks. Other small trees include: *Glochidion ferdinandi* (Cheese Tree), *Myrsine variabilis*, *Trema tomentosum* var. *aspera* (Poison Peach), *Cassine australe* and *Alectryon subcinereus*. *Tristaniopsis collina* (Hill Water Gum), was recorded in Darvall Park and adjacent to Symons Reserve. This species is rare on clay soils, being more usually found in seepage zones on sandstone hillsides (eg. Field of Mars). *Rhodamnia rubescens* previously occurred in numerous locations but is now almost locally extinct owing to Myrtle Rust Disease (*Puccinia psidii*). *Backhousia myrtifolia* often occurs in drier rainforest or margins that are impacted by fire, owing to its ability to coppice and better survive fire than more tender species (Floyd, 1990). It appears to have been dominant in most gullies before clearing significantly reduced its extent (C. Farmer, pers. comm). Vines are very common and comprise robust species, including *Cissus* spp., *Pandorea pandorana*, *Gynochthodes jasminoides*, *Parsonsia straminea* (Common Silkpod), *Celastrus subspicata*, and slender types, especially *Eustrephus latifolius*, *Stephania japonica*, *Cayratia clematidea* and *Smilax australis*.

Shrubs are naturally sparse except in gaps and margins where there is more sunlight. The more common species include: *Notelaea longifolia*, *Leucopogon juniperinus* (Prickly Beard-heath), *Polyscias sambucifolia*, *Clerodendrum tomentosum* and *Pittosporum revolutum*. One twin-stemmed *Notelaea longifolia* in Symons Reserve was estimated to be well over 150 years in age (height: c. 4 m; dbh: 140 & 120 mm). More tender mesic species are limited to *Pittosporum multiflorum*, *Cyathea australis* (Rough Treefern) and the probable garden escapee *Cyathea cooperi* (Straw Treefern). *Psychotria loniceroides* was recorded in Brush Farm Park (Kubiak, 2005) and Denistone Park (Indigenous Bush Regeneration Co., 1992) but this has not been confirmed and

would have required long-distance seed dispersal. There have been two recent examples of long-distance seed dispersal and establishment into this community at Ryde Hospital: *Dendrocnide excelsa* (Giant Stinging Tree) and *Polyscias murrayi* (Pencil Cedar). Both occurred during extended favourable rainy years (2023-2025).

Ferns typically dominate the ground cover, with *Doodia aspera* and *Adiantum* spp. being the most common. *Microlaena stipoides* (Weeping Meadow-grass) and *Oplismenus aemulus* are the main grasses in gaps and margins, with localized *Poa affinis*. Other common ground covers are: *Psuederantherum variabile*, *Plectranthus parviflorus* (Cockspur Flower), *Commelina cyanea* (Scurvy Weed), *Dianella caerulea* var. *producta* (Rough Flax Lily) and *Dichondra repens*. Locally rare mesic species include: *Gymnostachys anceps* (Settlers Flax) and *Blechnum cartilagineum* (Gristle Fern).



Figure 8. Mesic form of Blue Gum High Forest in Darvall Park, Denistone (Site Da4) with *Backhousia myrtifolia* understory.

1.2.2 Blue Gum High Forest with sclerophyllous and mesic understorey (Figure 9)

This variant occurs on open steep slopes to footslopes below the Hornsby Plateau. The canopy is generally dominated by *Eucalyptus saligna*, with a variable assortment of common associates, including: *Eucalyptus acmenoides*, *Syncarpia glomulifera*, *Eucalyptus paniculata* and *Eucalyptus pilularis*. *Angophora* spp. are absent from this variant. In some locations *Eucalyptus saligna* is now dominant owing to previous clearing and subsequent opportunistic regeneration.

Eucalyptus acmenoides occurs almost exclusively on the slopes, but is replaced by *Eucalyptus resinifera* in the Hornsby Plateau variant. Overlap of the two mahoganies was observed at the plateau edge (eg. Heath Street), at Forester Park and on the rolling hills between Grove and Threlfall Streets. The local distribution of *Eucalyptus acmenoides* suggests its preference for deeper, well-drained clay soils. This trend was also observed in nearby Epping (Chesterfield and Albuera Roads area in Parramatta LGA) where *Eucalyptus acmenoides* occurred on the rolling hills, and *Eucalyptus resinifera* was the more common mahogany in Somerville Park, Vimiera Reserve and Epping shopping centre on flatter and shallower clay soils. Colyer & James (2011) recorded *Eucalyptus acmenoides* in a "dry form" of BGHF and *Eucalyptus resinifera* in the "typical form" of BGHF in Ku-Ring-Gai LGA.

Small trees have been largely removed decades ago. Relic trees include *Pittosporum undulatum*, *Acacia parramattensis*,

Melaleuca styphelioides, and *Callistemon salignus* which have also been planted. Other species include *Clerodendrum tomentosum*, *Exocarpos cupressiformis* (Cherry Ballart), *Glochidion ferdinandi* and *Trema tomentosum*. On the footslopes of Darvall Park, *Backhousia myrtifolia* extends along the creek down to Park Avenue. *Seringia arborescens* was recorded in the railway corridor and Ryde Hospital bushland. Native shrub species are typically scattered and variable in density. Owing to clearing it is unclear what the "natural" density was. Species include: *Notelaea longifolia*, *Breynia oblongifolia*, *Denhamia silvestris*, *Ozothamnus diosmifolius*, *Leucopogon juniperinus* and *Pittosporum revolutum*. *Phyllanthus gastroemii*, *Pittosporum multiflorum* and *Hibbertia aspera* are rare.

The ground covers are diverse and varied, including mesic and drier forest species and localized grassy understorey. Ferns are generally scattered but included: *Pteridium esculentum*, *Doodia aspera*, *Adiantum hispidulum*, *Cheilanthes sieberi* (Rock Fern) and *Pteris tremula* (Tender Brake). *Pseuderanthemum variabile*, *Dichondra repens*, *Oxalis perennans* and *Wahlenbergia graciis* are the most common dicots. *Senecio linearifolius* is rare in Ryde being recorded in three locations (Denistone Park, Ryde Hospital and Symons Reserve), and appears to be dependent on periodic especially wet years to emerge from the soil seed bank. *Microlaena stipoides*, *Oplismenus aemulus*, *Entolasia* spp., *Dianella caerulea* var. *producta*, *Cyperus gracilis* and *Commelina cyanea* (Scurvy Weed) are the main monocots. One of only two records of *Anthosachne scabra* (Wheatgrass) in Ryde was made in an area of diverse grassy understorey in Ryde Hospital BGHF.

A few species indicate a connection with the drier Parramatta River corridor that provided a link for species more typical of the Cumberland Plain to spread eastwards. Some plants more typical of western Sydney include: *Fimbristylis dichotoma*, *Linum marginale*, *Zornia dyctiocarpa* (Coveny, 1984), *Brunoniella australis*, *Eragrostis leptostachya*, *Paspalidium distans*, *Senecio quadridentatus* and *Olearia viscidula*.

Vines are common, with large-growing and wiry types being present. *Eustrephus latifolius*, *Pandorea pandorana*, *Stephania japonica* var. *discolor*, *Glycine microphylla* and *Clematis glycinoides* were the mostly commonly recorded. *Cissus antarctica* and *Sarcopetalum harveyanum*, more typical of rainforest, were recorded in a few sites.



Figure 9. Blue Gum High Forest on slopes with sclerophyllous understorey at Darvall Park (near Site Da5). Low-branching mature canopy trees show open growing conditions caused by old clearing.

1.2.3 Blue Gum High Forest on the Hornsby Plateau (Figure 10)

Blue Gum High Forest on the Hornsby Plateau lacks the cooler southern aspect, deeper gullies and generally deeper soils of the slopes. Clearing of this variant has been more complete than on the slopes so many details of the original forest remain unclear. However, relics and photos (eg. Eastwood/6, City of Ryde) show this was a drier form of forest than on the slopes.

Eucalyptus saligna or *Eucalyptus pilularis* are the main canopy trees in remnants and as scattered individuals, both naturally-occurring and planted. Common associates in remnants are *Eucalyptus paniculata*, *Eucalyptus resinifera* and *Syncarpia glomulifera*. *Eucalyptus acmenoides* is rare and restricted to the plateau margins and northern rolling hills. *Angophora floribunda* (Rough-barked Apple) was mainly recorded in locally elevated sites on the plateau (eg. near Eastwood Station, Norma Street, Lovel Road and along upper Agincourt Road Marsfield) suggesting that it prefers slightly drier situations. *Angophora costata* (Smooth-barked Apple) was recorded in a couple of locations on the plateau, and has been frequently planted. Old trees at Pindari Park and near Denistone East Public School appear to be natural, but most others are likely to be planted. Colyer and James (2011) and the NSW Scientific Committee (1995) found that *Angophora costata* was atypical of Blue Gum High Forest on deeper clay soils, but was a component where sandstone influence existed. *Eucalyptus punctata* (Grey Gum) was recorded at the plateau edge near Ryde Hospital. Non-local canopy species including *Eucalyptus microcorys* (Tallowwood), *Eucalyptus grandis* and *Corymbia maculata* (Spotted Gum) have been planted in many reserves.

The understorey contains a diverse mixture of grasses, and herbs, with scattered small trees, shrubs and vines. Small tree species variably include *Acacia parramattensis* (Parramatta Wattle), *Acacia implexa* (Hickory Wattle), *Clerodendrum tomentosum*, *Trema tomentosum* and *Exocarpos cupressiformis*. Mesic small trees are generally limited to the ubiquitous *Pittosporum undulatum* plus *Glochidion ferdinandi* and *Elaeocarpus reticulatus*. It is unclear whether *Allocasuarina torulosa* (Forest Oak) was a common natural component originally but was recorded in Kent Rd Public School. A mature natural stand, associated with *Eucalyptus acmenoides*, was also observed in similar habitat on the upper slope in George Harley Park, 700 m north of Eastwood Park, in Parramatta LGA.

Shrubs are now rare most having been removed many decades ago. It is expected that common, hardy local species would have included *Leucopogon juniperinus*, *Notelaea longifolia*, *Ozothamnus diosmifolius* (White Dogwood), *Hibbertia aspera*, *Bursaria spinosa*, *Polyscias sambucifolia*, *Breynia oblongifolia* (Dwarfs Apples) and *Denhamia silvestris*. Inappropriate plantings of sandstone species were observed in many BGHF remnants on the plateau and elsewhere.

The main ground covers are *Microlaena stipoides*, *Oplismenus* spp., *Echinopogon* spp. (Hedgehog Grasses), *Imperata cylindrica* (Blady Grass), *Pseuderanthemum variabile*, *Lomandra longifolia*, *Geranium homeanum* and *Dianella caerulea* var. *producta*. Ferns appear to have been limited to scattered hardy species, or to sheltered, moist situations. Species include *Pteridium esculentum*, *Calochlaena dubia*, *Adiantum aethiopicum*, with *Doodia caudata* var. *caudata* (Small Rasp Fern) in riparian

zones, especially near sandstone outcrops (eg. Greenwood and Forrester Parks). Slender vines are common, including *Eustrephus latifolius*, *Glycine* spp., *Clematis* spp., *Cayratia clematidea* and *Tylophora barbata*. Mesic vine species are uncommon but include *Pandorea pandorana*, *Stephania japonica* and *Gynochthodes jasminoides*.



Figure 10. Blue Gum High Forest at Greenwood Park on the Hornsby Plateau (Site Gr1)

1.2.4 Blue Gum High Forest with sandstone elements (Figure 11)

This subcommunity was observed in various locations on shallow clay soil adjoining sandstone-derived soils: Fern Gully in Lane Cove NP; Forrester Park at Eastwood; Burrows Park, Top Ryde and Field of Mars Reserve near Monash Rd. These sites were adjacent to waterways: Lane Cove River, Terrys Ck and Buffalo Ck, respectively, where a band of deep clay soil was interbedded in sandstone strata. The lower end of the Fern Gully and Monash Rd patches also adjoined alluvium.

Eucalyptus saligna and *Eucalyptus pilularis* are the main canopy trees. *Syncarpia glomulifera* and *Eucalyptus resinifera* were recorded in or adjacent to the sites. *Eucalyptus paniculata* occurred in Fern Gully, Forrester Park and adjacent to the Field of Mars sites. One mature *Eucalyptus acmenoides* was recorded at Forrester Park close to the BGHF slopes variant. *Angophora costata* is present in small numbers at or adjacent to all these sites. **Eucalyptus botryoides* (Bangalay) in Monash Park appears to be a planted non-local species.

Small trees mainly comprise *Pittosporum undulatum*. Other species are scattered in small numbers, and include *Elaeocarpus reticulatus* and *Acacia irrorata* ssp. *irrorata* at Fern Gully and *Glochidion ferdinandi* at Burrows and Forrester Parks. *Tristaniopsis collina* occurred in Field of Mars. Species recorded in the riparian zone adjacent to the Lane Cove NP and Forrester Park sites were: *Ceratopetalum apetalum*, *Tristaniopsis laurina*, *Callicoma serrata* and *Backhousia myrtifolia*. Mature and juvenile specimens of the non-locally-native **Polyscias elegans* (Celerywood) were observed in Forrester Park. *Acmena smithii* was recorded in Burrows Park. Shrub cover is sparse in all sites and comprises generalist species *Polyscias sambucifolia*, *Homalanthus populifolius*, *Notelaea longifolia* and *Breynia oblongifolia*.

Grasses and ferns dominate the ground cover. *Microlaena stipoides*, *Imperata cylindrica*, *Entolasia* spp., *Commelina cyanea*, *Pseuderanthemum variabile*, *Geranium homeanum*,

Lomandra longifolia and *Lobelia purpurascens* were recorded at all sites. *Hydrocotyle sibthorpioides* is locally very common at Fern Gully, with *Oplismenus aemulus* at Forrester and Burrows Parks, and *Ottochloa gracillima* at Fern Gully. The latter species had not been recorded in Ryde previously and represents a significant disjunct extension of its range south of the Hunter Valley. *Pteridium esculentum*, *Calochlaena dubia* and *Hypolepis muelleri* (Harsh Ground Fern) are the main ferns, the latter occurring in seepage or riparian zones.



Figure 11. Blue Gum High Forest on interbedded clay in sandstone habitat in Lane Cove NP (Site L1).

1.2.5 Blue Gum High Forest on alluvium (Figure 12)

Large amounts of alluvium have been deposited along the lower Lane Cove River and its tributaries, much of this since European development but relic vegetation indicates some alluvium occurred earlier. Almost all this subcommunity was cleared many years ago so details of its original character are lacking. Application of the Plot to PCT tool concluded the remnant vegetation conformed to BGHF.

Four patches were recorded along the Lane Cove River and Buffalo Creek: Browns Waterhole; The main picnic area of Lane Cove NP; Fairyland; Lower Buffalo Creek (Field of Mars Res). These sites contain significant variability owing to differences in alluvium composition, saline influence and disturbance. The Field of Mars site is dominated by exotics with only one indigenous understorey species (*Dennstaedtia davallioides*). In three sites, *Eucalyptus saligna* was the dominant or only canopy tree. It is absent, possibly due to clearing, at Fairyland, despite the understorey being the most intact and typical of BGHF. Other canopy trees were mainly associated with adjacent sandy soils and include *Eucalyptus pilularis*, *Syncarpia glomulifera* and *Angophora costata*. *Casuarina glauca* occurs along the riparian margins downstream from the Lane Cove NP picnic area. Apart from *Pittosporum undulatum* recorded in all sites, small trees range from sandstone habitat species (eg. *Tristaniopsis laurina*, *Ceratopetalum apetalum*, *Stenocarpus salignus*, *Acacia irrorata* and *A. schinoides*) to generalist mesic species (*Glochidion ferdinandi*, *Ficus coronata*, *Backhousia myrtifolia* and *Elaeocarpus reticulatus*). *Doryphora sassafras* (Sassafras) was recorded at Browns Waterhole, presumably having colonized downstream from Browns Field, Sth Turramurra. Except *Lomatia myricoides* at Browns Waterhole and planted sandstone species, shrubs are typical of BGHF, including *Breynia oblongifolia*, *Leucopogon*

juniperinus, *Polyscias sambucifolius*, *Ozothamnus diosmifolius*, and *Notelaea longifolia*. Ground covers are also consistent with BGHF, and include: *Oplismenus* spp., *Microlaena stipoides*, *Sigesbeckia orientalis*, *Pteridium esculentum*, *Geranium homeanum* and *Commelina cyanea*.

Table 3. Typical structure of Blue Gum High Forest

Strata	Height range (m)	Projective foliage cover %
Canopy	25-35	40-50
Small trees	5-15	5-70
Shrubs	0.5-3	2-10
Groundcover	0-1	40-80

Relationship to other Communities - The mesic form of Blue Gum High Forest merges with Western Sydney Complex Dry Rainforest in more sheltered situations, and with the sclerophyllous form of BGHF in more exposed habitats. The natural boundary between these sub-communities is dynamic and relates to land management as much as ecology. In the absence of fire or clearing, mesic species (especially vines) have shown their ability to colonise upslope of gullies.

The plateau form of BGHF originally merged with Sydney Turpentine Ironbark Forest (STIF) where soil depth was a limiting factor for BGHF. However, there are no remaining intact examples of this transition, and original boundaries are often unclear because the ecotone has been completely cleared of forest. Relics and early photos suggest *Eucalyptus pilularis* dominated forest in ecotones (eg. along Epping Road). Relics of BGHF-STIF ecotones were observed in four locations

- Macquarie Hospital, where scattered *Eucalyptus saligna* and other canopy trees and a few native ground covers extended from the upper slope to the lower slope with STIF remnants.
- Burrows Park, where very shallow clay soil occurs on sandstone bedrock on the northern side of the gully, above deeper interbedded clay.
- Forrester Park, where there is a band of sandstone and associated species (including *Corymbia gummifera*) above BGHF with sandstone elements. BGHF previously occurred upslope of the band of STIF.
- Pioneer Park, where there BGHF appears to have occurred in the gully and STIF on the mid to upper slope, indicated by *Corymbia gummifera* (and other species recorded by Kubiak in July 1995). *Eucalyptus saligna* has been planted on the plateau but may not have occurred there originally. Remnant *Eucalyptus pilularis* forest occurs nearby.

BGHF grades into Sydney Coastal Enriched Sandstone Moist Forest in moist gullies where clay is replaced by enriched sandstone (e.g. Field of Mars and lower Burrows Park), or upslope into Sydney Coastal Enriched Sandstone Forest (e.g. Fern Gully and Field of Mars). On alluvium with increasing brackish water table BGHF grades into Swamp Oak twig-rush Forest (e.g. near Fullers Bridge and Field of Mars). Significant floristic differences were recorded in some BGHF in other LGAs (Colyer and James 2011; BioNet data), usually including high sandstone influences. Cumberland Plain species occur in some West Pennant Hills variants.

Representative examples - Mesic understory variant: Brush Farm Park, Darvall Pk, Ryde Hospital; Sclerophyllous & mesic understory variant: Darvall Pk, Ryde Hospital; Plateau variant: Brush Farm House; Sandstone influenced variant: Fern Gully in Lane Cove NP, Forrester Park Eastwood; Alluvial variant: Lane Cove NP (Fairyland patch).

Likely Previous distribution -BGHF appears to have occurred on most of the Glenorie Soil and West Pennant Hills Landscape zones in the LGA (Figure 4) south of Epping Rd.



Figure 12. Blue Gum High Forest on alluvium at Fairyland (Site L21). *Eucalyptus saligna* was absent, presumed to have been cleared for farming c.1915.

1.3 Sydney Turpentine Ironbark Forest - NSW PCT 3262

Sydney Turpentine Ironbark Forest (STIF) is an open to tall open forest that was located between Blue High Forest and the drier transition zone forests and woodlands. It has been largely cleared since 1792 (Table 1) but remnants occur on shallow clay and in the shale sandstone transition zone of the plateau. These are likely to have previously included localized patches of ironstone gravel (eg. near Epping Boys High School). The community is mainly restricted to Glenorie Soil Landscape, but the marginal variant also occurs on adjoining Lucas Heights Soil Landscape (eg. Yurrah Reserve, Tasman and Waterloo Parks).

There are two main variants of STIF in Ryde located on: shallow clay soils (<0.5 m deep) and very shallow to skeletal clay soils in transitional zones. In this paper, the latter variant includes some vegetation that was classified as Sydney Coastal Enriched Sandstone Forest by DPE (2025), but was interpreted by the "Plot to PCT Tool" during this survey as being STIF. These sites have been grouped into "Sydney Turpentine Ironbark Marginal Forest."

1.3.1 Sydney Turpentine Ironbark Forest on Shallow Clay Soils (Figures 13, 14)

Small remnants at Stewart Park, Marsden Park and Wallumatta Nature Reserve are the only relatively intact examples that remain, covering approximately 17 ha. They occur on clay soil that appears to be c.200-500 mm deep.

The canopy mainly comprises *Syncarpia glomulifera* and *Eucalyptus paniculata*, *Eucalyptus resinifera*, *Eucalyptus pilularis*, with *Eucalyptus globoidea* and *Angophora costata* occurring nearer the sandstone zone. Old *Eucalyptus fibrosa* (Broad-leaved Ironbark) were recorded in the northern road reserve section of

Stewart Park and the southern end of Wallumatta NR. Soil depth in these locations appears to be less than about 300 mm. This is a newly recorded species for Ryde and is an extension of its known eastern limit of distribution north of the Parramatta River. The nearest other occurrences are at Bicentennial Park in Silverwater and Parramatta Lake Reserve. It is unclear whether *Eucalyptus fibrosa* was originally more widespread on the higher ground between Stewart Park and Wallumatta NR as almost all bushland has been removed between the two reserves. This species commonly occurs on gravelly clay soils. Kubiak (1995) recorded four locally uncommon understory species that are sometimes associated with *Eucalyptus fibrosa* forest, on gravelly clay soils outside Epping Boys' High School, downslope of Stewart Park: *Lissanthe strigosa* (Peach Heath), *Pultenaea linophylla*, *Pultenaea scabra* var *biloba* and *Pultenaea villosa*. *Eucalyptus punctata* was recorded at Macquarie Hospital, Stewart Park and Wallumatta NR but is now uncommon and its natural distribution in Ryde is unclear. Two small stands of *Eucalyptus tereticornis* were recorded near Morrisons Road, Putney and appear to be naturally occurring in what is assumed to have been STIF.

The small tree stratum is sparse in this community, with *Allocasuarina torulosa* and *Acacia parramattensis* and the ubiquitous *Pittosporum undulatum* being recorded. *Allocasuarina littoralis* occurs nearest shale sandstone margins. Common shrub species now include: *Notelaea longifolia*, *Polyscias sambucifolia* (broad-leaved form), *Leucopogon juniperinus*, *Ozothmanus diosmifolius* and *Breynia oblongifolia*.

The lowest strata are variable, ranging from grassy (Stewart Park) to dense shrubby (Marsfield Park, Wallumatta NR). Prior to European settlement it is probable that fire would have been a controlling factor of understorey in STIF. Grassy understorey mainly comprises: *Microlaena stipoides*, *Entolasia* spp., *Aristida vagans*, *Imperata cylindrica* and *Austrostipa rudis* ssp *nervosa*. Other typical herbaceous species include: *Pseuderanthemum variabile*, *Lobelia purpurascens*, *Dichondra repens*, *Dianella caerulea* var *producta*, *Hydrocotyle sibthorpioides* and *Lomandra* spp. Apart from *Pandorea pandorana*, vines are limited to wiry species such as *Eustrephus latifolius*, *Billardiera scandens* and *Glycine* spp. *Tylophora barbata* is common at Stewart Park. One specimen, unusual in Sydney, is the broad-leaved form of *Geitonoplesium cymosum* (Scrambling Lily), recorded at Wallumatta NR.



Figure 13. Turpentine Ironbark Forest with grassy understorey at Stewart Park (Site St1), Marsfield on relatively deep clay soil.



Figure 14. Sydney Turpentine Ironbark Forest in Wallumatta Nature Reserve (Site WallNR03) on shallow clay soil near shale sandstone transition.

1.3.2 Sydney Turpentine Ironbark Marginal Forest (Figure 15)

Sydney Turpentine Ironbark Marginal Forest occurs on very shallow (less than c.200 mm deep) to skeletal clay soil in the shale sandstone transition zone. These occur north of Epping Road, and near parts of Vimiera and Pittwater Roads, extending south to Field of Mars. This community variant forms a mosaic with other transitional PCTs on Lucas Heights Soil Landscape. cursory observation of soil in the survey sites suggests that this community occurs on the shallow clay bands within this soil landscape type, with Sydney Coastal Shale Sandstone Forest or Sydney Coastal Enriched Sandstone Forest occurring on the adjacent sandstone bands. Most of the sites inspected were in good condition although early stages of weed invasion were evident. Similar forest in the M2 Motorway margin was generally poor in condition.

Syncarpia glomulifera, *Eucalyptus resinifera*, *Angophora costata*, *Eucalyptus pilularis* and *Eucalyptus globoidea*, are typical canopy trees in this community variant. *Eucalyptus paniculata* tends to be absent in this subcommunity, but was recorded in eastern Tasman Park (adjacent to Ta1) and Field of Mars (F3). *Eucalyptus racemosa* (Narrow-leaved Scribbly Gum) and *Corymbia gummifera* (Red Bloodwood) occur on enriched sandy soil.

The small tree stratum is typically sparse, with *Acacia parramattensis* and *Pittosporum undulatum* being the most common species. Other, less common species include: *Acacia implexa*, *Allocasuarina* spp. (She-oaks) and *Exocarpos cupressiforme* (Cherry Ballart). Shrubs are very common, especially *Polyscias sambucifolia*, *Dodonaea triquetra*, *Leucopogon juniperinus*, *Hibbertia aspera*, with *Breynia oblongifolia*, *Notelaea longifolia*, *Bursaria spinosa*, *Zieria smithii* and *Platylobium formosum* being variable.

The ground cover is largely grassy, with *Themeda australis* (Kangaroo Grass), *Entolasia stricta* (Wiry Panic), *Microlaena stipoides*, *Imperata cylindrica* (Blady Grass), *Dianella caerulea* var *producta*, *Aristida vagans* (Three-awned Grass) and *Pseuderanthemum variabile* being the main ground covers. Ferns are typically limited to scattered patches of *Pteridium esculentum*. Vines are uncommon and are limited to wiry species such as: *Hardenbergia violacea* (Purple Coral Pea), *Glycine* spp., *Casytha pubescens* and *Billardiera scandens* (Common Appleberry).

Table 4. Typical structure of Sydney Turpentine Ironbark Forest

Strata	Height range (m)	Projective foliage cover %
Canopy	15-30	30-50
Small trees	4-10	<5
Shrubs	0.5-1.5	5-30
Groundcover	0-0.5	40-70

Relationship to other Communities - Sydney Turpentine Ironbark Forest previously graded into Blue Gum High Forest where soil depth was adequate (e.g. Macquarie Hospital). On shale-sandstone transitional soils, it commonly grades into Coastal Enriched Sandstone Dry Forest (e.g. Field of Mars Reserve) or Coastal Shale Sandstone Forest (e.g. Tasman Park, Field of Mars Reserve and Wallumatta NR). The relationship between these three communities is often very close as shown by alternative conclusions made from quadrat analysis and air photo interpretation in the above sites and Myall Pk, Pryor Park and Yurrah Reserve.

Representative examples - Shallow soil variant remnant: Stewart Pk, Wallumatta NR and Marsfield Pk; Skeletal clay soil variant: Field of Mars Res, Yurrah Res, Macquarie University, Myall Pk, Tasman Pk, and at the junction of Epping Road and Herring Rd.

Previous Distribution - Originally formed a broken circle from Vimiera Rd, Eastwood north to, and then east and south along the upper edge of Lane Cove River Valley, and west from Gladesville along the mid-upper slopes above the Parramatta River, to Meadowbank (Figure 38). A monospecific stand of *Eucalyptus paniculata* with various indigenous ground cover species in Kissing Point Reserve, near the Parramatta River bank appears to be the result of regeneration on natural clay soil translocated from elsewhere.



Figure 15. Skeletal clay soil variant Sydney Turpentine Ironbark Forest at Tasman Park, North Ryde (Site Ta1).

1.4 Cumberland Red Gum Riverflat Forest - NSW PCT 4025 (Figure 16)

Cumberland Red Gum Riverflat Forest has been proposed (DPE 2021) to have occurred on creekflats in and near Meadowbank Park, based on suitable habitat, and adjoins the related Lower North Coastal Hills Red Gum Grassy Forest in Memorial and Meadowbank Parks. No remnants exist. Most of the area where

the community may have occurred has been altered with soil levels raised for playing fields and nearby golf course. A few tiny patches of what might be natural soil remain and contain scattered individual veterans of *Casuarina glauca*, and one *Eucalyptus tereticornis* near the kiosk (Figure 16). Both species also occur on low-lying ground near the canal and others have been planted around the playing fields. It is probable that Sea Rush Swamp Oak Forest originally occurred in slightly lower, saline areas nearest Parramatta River, as mapped by DCCEEW (2025).



Figure 16. Old *Eucalyptus tereticornis* and *Casuarina glauca* on flats in Meadowbank Park.

2 Vegetation in Shale Sandstone Transition Zones

2.1 Sydney Enriched Sandstone Moist Forest – NSW PCT 3176 (Figure 17)

Sydney Enriched Sandstone Moist Forest is a tall open forest that occurs in gullies near the junction of shale and sandstone geologies and is restricted to Lane Cove River catchment, occurring discontinuously along Terrys Creek, Lane Cove River to near Fullers Bridge, and downstream at Field of Mars. From here it extends up Buffalo and Strangers Creeks to above Quarry Rd. Much of this community is in poor condition because it occurs in riparian zones where the nutrient loading of the developed catchment is high, favoring exotic species, especially *Ligustrum* spp. In other locations the community has been extremely altered by previous clearing (eg. lower Burrows Park, Laurel Park, lower Aitchandar Reserve/Barton Park and Kittys Creek Reserve. However, parts of some sites are in currently excellent condition, although in the early stages of weed invasion (eg. Field of Mars Reserve, Yinnell Reserve and some sites in Lane Cove NP).

Eucalyptus pilularis, *Angophora costata* and *Syncarpia glomulifera* are the main canopy species. *Eucalyptus resinifera* or *Eucalyptus saligna* may be common locally. *Eucalyptus piperita* is generally uncommon. Old *Eucalyptus paniculata* were recorded in three locations in Lane Cove NP and Field of Mars but it is unclear whether they were planted. *Eucalyptus saligna* and **Eucalyptus grandis* have been planted in some locations where they are unnatural (eg. Pryor Pk), occasionally resulting in misinterpretation of the PCT from aerial photographs. *Elaeocarpus reticulatus*, *Pittosporum undulatum* and *Glochidion ferdinandi* are consistent small tree species, although variable in numbers and size. *Callicoma serrata*, *Ceratopetalum gummiferum*, *Allocasuarina torulosa* and *Tristaniopsis collina* are uncommon small trees. *Ceratopetalum apetalum* and *Schizomeria ovata* are rare.

The shrub stratum ranges from mainly sclerophyllous to locally mesic species. Hardy mesic species include: *Notelaea longifolia*, *Breynia oblongifolia*, *Polyscias sambucifolius* and *Myrsine variabilis*. Common sclerophyllous species include: *Dodonaea triquetra*, *Zieria smithii*, *Leucopogon juniperinus* and *Platylobium formosum*. *Xanthorrhoea arborea* is common in a few sites.

The ground cover is often locally ferny, with *Calochlaena dubia* and *Pteridium esculentum* being the main species. *Hypolepis muelleri* and *Blechnum cartilagineum* are uncommon. Other herbaceous species are common, especially monocots: *Lomandra longifolia*, *Dianella caerulea*, *Lepidosperma laterale* and *Entolasia* spp., *Poa affinis* and *Microlaena stipoides*. *Lobelia purpurascens* is the most frequently recorded forb. Vines are present in all sites inspected with most species being slender-growing (eg. *Smilax glycyphylla*, *Eustrephus latifolius*, *Tylophora barbata*, *Billardiera scandens*), except for *Pandorea pandorana* which was recorded in all quadrats.

Table 5. Typical structure of Sydney Enriched Sandstone Moist Forest

Stratum	Height range (m)	Projective foliage cover %
Canopy	20-30	30-40
Small tree stratum	3-15	5-30
Shrub stratum	0.5-2.5	5-60
Groundcover	0-0.5	10-70

Relationship to other Communities - Often occurs downstream of Blue Gum High Forest (e.g. lower Burrows/Laurel Park, Shrimptons Creek in ELS Hall Park), and downslope of shale-sandstone transitional vegetation, especially Coastal Enriched Sandstone Forest.

Representative examples - Lane Cove NP, Field of Mars Reserve, Yinnell Reserve

Likely Previous Distribution - The likely original extent of this community is unclear owing to major clearing. However, parts of most gullies into Lane Cove River appear to be suitable habitat (Figure 5). The community may have also occurred in gullies along the Parramatta River east of Charity Creek, Meadowbank.



Figure 17. Sydney Enriched Sandstone Moist Forest at Field of Mars (Site F9).

2.2 Lower North Coastal Hills Red Gum Grassy Forest - NSW PCT 3445 (Figure 18)

Red Gum Grassy Forest in Ryde is an open forest with a largely herbaceous understory confined to one 0.6 ha example on the lower to upper slope of Memorial Park. This vegetation was heavily modified by clearing at least 110 years ago, when the site was used as a picnic area adjacent to the old Meadowbank Baths, further impacted by being terraced about 70 years ago, and more recently by weed growth, resulting in lower species diversity than expected. The site occurs on Lucas Heights Soil Landscape (Chapman and Murphy 1983) at the northern margin of the Parramatta River. Soil at and near the site is shallow clayey material over Hawkesbury Sandstone, varying from dark to white clay, to clayey sand. Interbedded sandstone outcrops are common.

The forest canopy at Memorial Park mainly comprises *Eucalyptus tereticomis* (Forest Red Gum) and *Angophora floribunda*. Some veteran Red Gums are expected to be over 200 years of age (City of Ryde Library photographs -Meadowbank Park 1920 - 4, 12, 14) that show some of the same trees were veterans in 1920. Two old *Eucalyptus paniculata* were recorded east of the quadrat.

The small tree stratum is largely absent, with *Casuarina glauca* (Swamp Oak) being localized on one section of the lower slope. It is likely that *Casuarina glauca* originally lined Parramatta River here. A photo (Meadowbank Park/14) shows scattered *Casuarina glauca* along the lower half of the slope in 1920. At the time of the current survey *Acacia implexa* and shrub-sized *Glochidion ferdinandi* and *Pittosporum undulatum* are scattered widely. One naturally occurring *Ficus rubiginosa* (Rusty Fig) was observed, and others had been planted. Shrubs are uncommon apart from *Polyscias sambucifolia*, *Breynia oblongifolia*, *Myrsine variabilis*, *Clerodendrum tomentosum*, *Bursaria spinosa*, and *Leucopogon juniperinus* occur in small numbers. Many planted shrub species were not native to this site.

The ground cover is dominated by *Lomandra* spp., *Imperata cylindrica* and *Microlaena stipoides*. *Themeda triandra*, *Commelina cyanea*, *Cyperus gracilis*, *Oplismenus aemulus* and *Dianella caerulea* are common to scattered through the site. *Anthosachne scabra* (Wheat Grass) was recorded, being one

of only two locations in Ryde. Apart from *Cayratia clematidea*, which is very common throughout the patch, vines are rare. Other species include *Eustrephus latifolius* and *Glycine* spp.

Table 6. Typical structure of Lower North Coastal Hills Red Gum Grassy Forest

Stratum	Height range (m)	Projective foliage cover %
Canopy	20-25	40
Small tree stratum	4-10	<5
Shrub stratum	0.5-1.5	5
Groundcover	0-0.5	80

Relationship to other Communities - Related to Grassy Red Gum Forests of the north, central and south coasts as well as to Cumberland Red Gum Riverflat Forest. The Ryde site is likely to represent a link with Cumberland Plain communities that have been able to extend eastwards along the relatively dry Parramatta River corridor. In adjacent locations where sandstone influence is greatest (eg. near the railway corridor and upper parts of Meadowbank Park), *Eucalyptus pilularis* indicates a variant of Sydney Foreshores Sandstone Forest occurred previously, containing elements of Lower North Coastal Hills Red Gum Grassy Forest. This possibility is also supported by the presence of *Angophora floribunda* and *Eucalyptus tereticornis* in Sydney Foreshores Sandstone Forest discontinuously east of Memorial Pk (e.g. Glades Bay Pk). On the flat zone upslope of Memorial Park, the soil becomes shallower and, based on historic photographs taken along Bank St (Meadowbank 1920, 5) and the southern end of Ryde Pumping Station, the community was probably Sydney Coastal Shale Sandstone Transition Forest, dominated by *Eucalyptus racemosa* (Narrow-leaved Scribbly Gum).

Representative example - Memorial Park

Likely Previous Distribution - The natural extent and distribution of this PCT is unclear owing to the almost total clearing of forest along the Parramatta River from Parramatta to the eastern Ryde boundary. The presence of similar habitat and scattered individuals of *Eucalyptus tereticornis* and/or *Angophora floribunda* east and west of Memorial Park indicate this PCT occurred along the lower slopes above the Parramatta River, west from Shepherds Bay Park into Parramatta LGA (Figure 5).



Figure 18. Lower North Coastal Hills Red Gum Grassy Forest at Memorial Park, Meadowbank (Site Mm1).

2.3 Sydney Coastal Sandstone Foreshores Forest - NSW PCT 3594 (Figure 19)

This open to tall open forest appears to have been originally dominant along the Parramatta River east of about Meadowbank, but c.98% of the bushland has been cleared for residential development and views of the river, leaving tiny pockets of highly modified forest or individual trees. The community grows on the generally shallow sandy soil of the Gynea Soil Landscape. Clay enrichment from upslope has influenced the species present, favoring some species that are atypical of the general community. All the remnants of this community are in public reserves with plantings over many years for landscape enhancement and bushland rehabilitation including species that are clearly not locally indigenous and is especially unfortunate in a community that covers a tiny proportion of its original extent and is fragmented and highly modified.

The canopy in Ryde is typically dominated by *Eucalyptus pilularis*, instead of the more typical *Angophora costata* (DPE 2021) indicating clay enrichment. *Angophora costata* was recorded in one reserve. Other species occur sporadically and include: *Eucalyptus resinifera*, *Syncarpia glomulifera*, *Corymbia gummiifera* and *Eucalyptus racemosa*. *Ficus rubiginosa* (Rusty Fig) is a minor but consistent component, especially along the rockier sections of foreshore that may have pockets of calcium. It has also been planted for landscape purposes. Elements of Lower North Coastal Hills Red Gum Grassy Forest were recorded in a few reserves, including an old *Eucalyptus tereticornis* in Glades Bay Park and naturally occurring and planted specimens of *Angophora floribunda*.

Small trees are locally common, especially on lower slopes and include: *Glochidion ferdinandi*, *Mysrine variabilis*, *Pittosporum undulatum* and *Acacia implexa*. *Glochidion ferdinandi* also form thickets locally in sheltered moist situations, and showed a tendency to be invasive. *Banksia integrifolia* (Coast Banksia) is rare and appears to be naturally restricted to slopes nearest the river, although planted further upslope. *Allocasuarina littoralis* and *Elaeocarpus reticulatus* have been planted in a few locations and are likely to have occurred naturally. **Livistona australis* was planted in Glades Bay Park but is unlikely to have occurred naturally, especially on the dry midslope.

Owing to disturbances over many years, including the creation of extensive parkland lawns, the natural shrub stratum is generally restricted to a few scattered individuals. Natural species include *Breynia oblongifolia*, *Notelaea longifolia*, *Kunzea ambigua*, *Polyscias sambucifolia*, *Persoonia linearis*, *Leucopogon juniperinus*, and rarely, *Monotoca elliptica* and *Bursaria spinosa*. Species that have been planted but may have occurred naturally include *Dodonaea triquetra*, *Acacia longifolia*, *Acacia ulicifolia*, *Grevillea linearifolia* and *Zieria smithii*.

Natural ground covers tend to be restricted to locations that have been avoided for establishment of lawn or picnic facilities, or species that are sufficiently hardy to survive within the landscaped zones. Owing to mowing and nutrient enrichment from upslope in many areas, grasses tend to be dominant, and include *Imperata cylindrica*, *Microlaena stipoides*, *Entolasia* spp, *Themeda triandra*, *Oplismenus aemulus* and *Aristida vagans* (Three-awned Grass). *Lomandra longifolia* and *Dianella* spp. are common to scattered. Ferns are rare, such as *Pteridium esculentum* and *Calochlaena dubia*, with *Histiopteris incisa* (Bats Wing Fern) occasionally

surviving in rocky crevices. *Hypolepis muelleri* (Harsh Ground Fern) is locally common in some seepage zones. Dicots include: *Dichondra repens*, *Veronica plebeia* and *Wahlenbergia gracilis*. Vines are uncommon but include: *Pandorea pandorana*, *Cayratia clematidea*, *Smilax glyciophylla*, *Cassytha pubescens*, *Kennedia rubicunda* and *Glycine* spp.

Table 7. Typical structure of Sydney Coastal Sandstone Foreshores Forest

Strata	Height range (m)	Projective foliage cover %
Canopy	10-25	20-40
Small trees	4-10	2-10
Shrubs	0.7-3	5-40
Groundcover	0-0.9	5-40

Relationship to other Communities - Probably occupied the lower slope above the Parramatta River (Figure 38) and graded into Sydney Turpentine Ironbark Forest on Glenorie Soil Landscape upslope. Localised rockplates contain *Kunzea ambigua* thickets (eg. Glades Bay and Putney Pks). Estuarine communities adjoin along the edge of Parramatta River. Along Lane Cove River, it usually grades into Sydney Coastal Enriched Sandstone Forest.

Representative Examples - Glades Bay Pk, Putney Pk.

Likely Previous Distribution - Likely occurred from the eastern LGA boundary to Shepherds Bay. Further west it is likely to have been replaced by Lower North Coastal Hills Red Gum Grassy Forest. Sydney Foreshores Sandstone Forest forms a narrow discontinuous band along the Lane Cove River south of Magdala Rd.



Figure 19. Sydney Coastal Sandstone Foreshores Forest at Glades Bay Park (Site G1). *Eucalyptus pilularis* was the main canopy tree in Ryde instead of the more typical *Angophora costata*.

2.4 Sydney Turpentine Ironbark Marginal Forest - NSW PCT 3262

This community variant occurs in transition zones but is a component of Sydney Turpentine Ironbark Forest described

above (1.3.2). It has much in common with Sydney Coastal Enriched Sandstone Forest and Sydney Coastal Shale Sandstone Forest and their habitats, and especially in disturbed locations, may be difficult to separate.

2.5 Sydney Coastal Shale Sandstone Forest - NSW PCT 3259 (Figure 20)

Sydney Coastal Shale Sandstone Forest occurs as scattered patches on Lucas Heights Soil Landscape on gentle slopes near the edge of the Hornsby Plateau above the Lane Cove valley, from north of Epping Road, extending from above Terrys Creek in the west, to Field of Mars cemetery in eastern Ryde. Most remnants are in highly degraded and altered condition and include regrowth. However, some relatively large patches in good condition remain in Lane Cove NP, east of Lane Cove Road, and in the northwestern part of Macquarie University.

The community exhibits a variable composition and most is atypical of the community description of OEH (2016), generally containing *Corymbia gummifera*, *Eucalyptus resinifera* and *Eucalyptus racemosa*. *Angophora costata*, *Eucalyptus globoidea* and *Syncarpia glomulifera* were occasional components. *Eucalyptus pilularis* was recorded in only one patch, although is common in this PCT in other LGAs (OEH 2016). *Allocasuarina littoralis* was the only consistent small tree, apart from the ubiquitous *Pittosporum undulatum*. *Angophora bakeri* (Narrow-leaved Apple) was recorded in three sites. Common shrubs included: *Acacia longifolia*, *Polyscias sambucifolia*, *Lomatia silaifolia*, *Bossiaea obcordata*, *Persoonia levis*, *Hakea sericea* and *Leucopogon juniperinus*.

The ground cover was dominated by monocots. *Entolasia stricta*, *Microlaena stipoides*, *Dianella caerulea* var *producta* and *Lepidosperma laterale* were the main species, with *Lomandra longifolia*, *Austrostipa pubescens*, *Cyathochaeta diandra*, *Imperata cylindrica*, *Themeda triandra* and *Xanthorrhoea media* being less common. Vines were uncommon and limited to slender-growing species, such as *Billardiera scandens* *Cassytha* spp. and *Glycine clandestina*.

Table 8. Typical structure of Sydney Coastal Shale Sandstone Forest

Strata	Height range (m)	Projective foliage cover %
Canopy	10-20	30-40
Small trees	4-10	5-10
Shrubs	0.9-3	5-50
Groundcover	0-0.9	10-40

Relationship to other Communities - Sydney Coastal Shale Sandstone Forest is one of three main transition zone PCTs in Ryde. Sydney Coastal Enriched Sandstone Forest and Sydney Turpentine Ironbark Marginal Forest are very closely related and form a mosaic that varies within short distances according to available clay enrichment or soil depth. Analysis of the vegetation in some sites (eg. Mq1, Mq4, Ta1, Yu1, L46, L68, Wa1, Wa2) showed no significant differences between the above PCTs (DCCEE, 2025). Where clay soil depth increases the community grades into Sydney Turpentine Ironbark Marginal Forest. In areas of reduced clay enrichment, the community grades into Sydney Coastal Enriched Sandstone Forest, Sydney Coastal Sandstone Gully Forest or Sydney Coastal Exposed

Bloodwood Forest or Scribbly Gum Woodland where ironstone or exposure is often greater.

Representative example - Lane Cove NP, Macquarie University, Field of Mars Reserve, Tasman Park.

Likely Previous Distribution - The pre-clearing distribution of this community (Figure 38) is probably similar to the current extent although reduced in area by 30 % (Table 1).



Figure 20. Coastal Shale Sandstone Forest at Tasman Pk, Macquarie Park (Site Ta2). *Eucalyptus racemosa* is the dominant canopy tree.

2.6 Sydney Coastal Enriched Sandstone Forest - NSW PCT 3592 (Figures 21 and 22)

The largest PCT in Ryde’s shale-sandstone transition zone is Sydney Coastal Enriched Sandstone Forest, which covers 125 hectares, 28.6% of its pre-clearing area (DPE 2025). The Ryde community was recorded on Lucas Heights, Gynea and Hawkesbury Soil Landscapes, from Terrys Creek, and along Lane Cove valley from Browns Waterhole to Field of Mars Reserve. There is an unexpected narrow extension of the community south from Lane Cove valley, along Shrimptons Creek to ELS Hall Reserve (Site Eh).

Sandstone habitat in Ryde occurs adjacent to, or downslope of clay soil on the plateau. Clay soil extends downslope below the plateau in Parramatta River catchment, but in Lane Cove catchment is generally restricted to the plateau. However, colluvial clay has enriched the sandy soil and increased the ability of clay soil species to survive in otherwise poorer sandy soils. The community varies greatly, containing elements of, and intergrading with adjoining communities. Forest variants range from typical open forest with a range of sandstone and clay habitat species, to tall open forest dominated by *Eucalyptus pilularis* (ELS Hall Park, Field of Mars Res., Pidding Pk and four sites in Lane Cove NP). Variations of species in each stratum occur over short distances in response to often subtle differences in soil depth or colluvial enrichment. Most patches have mixed grassy and shrubby understories. Most of the community is in excellent condition.

Typical canopy species include *Angophora costata*, *Eucalyptus resinifera*, *Eucalyptus piperita*, and *Syncarpia glomulifera*. *Eucalyptus pilularis* is sometimes present, occasionally dominant. *Corymbia gummifera* is variable in distribution in this community

in Ryde, but common in Field of Mars Reserve. *Allocasuarina littoralis*, *Elaeocarpus reticulatus*, *Glochidion ferdinandi* and *Acacia parramattensis* are generally the most common small trees in a typically sparse stratum. *Pittosporum undulatum* is ubiquitous, probably due to the general lack of fire.

Shrubs form a typically dense and diverse cover and commonly include *Polyscias sambucifolius*, *Dodonaea triquetra*, *Acacia* spp., *Lomatia silaifolia* and *Notelaea longifolia*. *Banksia spinulosa*, *Lasiopetalum ferrugineum* and *Bossiaea obcordata* are less common.

The ground cover tends to have a higher proportion of monocot herbs than dicots. Typical species include *Dianella* spp., *Entolasia stricta*, *Austrostipa pubescens*, *Lomandra* spp., *Microlaena stipoides*, *Pteridium esculentum* and *Micrantheum ericoides*. *Aristida vagans* and *Echinopogon caespitosus* are uncommon but widespread. As is normal in relatively poor soil communities, vines comprise wiry species rather than robust types. These include *Smilax glycyphylla*, *Billardiera scandens* and *Cassytha pubescens*. *Pandorea pandorana* is sometimes present but is never of large size as it can be in wet sclerophyll forest or rainforest.

Table 9. Typical structure of Sydney Coastal Enriched Sandstone Forest

Strata	Height range (m)	Projective foliage cover %
Canopy	10-20	40
Small trees	4-10	5-10
Shrubs	1-3	10-50
Groundcover	0-1	5-40

Relationship to other Communities - Tends to occur on mid to upper slopes with clay enrichment. Where shallow clay soil is present, the community is likely to grade into Coastal Shale Sandstone Forest (eg. Field of Mars) or Sydney Turpentine Ironbark Forest (e.g. Wallumatta NR). In more exposed situations, Northern Sydney Scribbly Gum Woodland or Sydney Coastal Sandstone Bloodwood Shrub Forest may adjoin on upper slopes near the plateau edge. In areas of reduced or no enrichment, the vegetation grades into Coastal Sandstone Sheltered Peppermint-Apple Forest. The community sometimes grades into Coastal Enriched Sandstone Moist Forest in sheltered gullies (eg. Lane Cove NP).

The patch in ELS Hall Reserve occurs on the southern end of exposed sandstone substrate that is surrounded by shale-derived soil. Although the surrounding area has been cleared of native vegetation, the original community appears to have been Blue Gum High Forest to the south and west, Turpentine Ironbark Forest in the north-west, and Sydney Coastal Enriched Moist Forest along Shrimptons Ck.

Representative examples - Lane Cove NP, Banool Reserve, Brereton Park, ELS Hall Reserve, Field of Mars Reserve, Kobada Park, North Ryde RSL, Nundah Reserve, Pembroke Park, Pidding Park, Somerset Park

Likely Previous Distribution - This community is likely to have been common in all sandstone transition zones in Ryde (Figure 5).



Figure 21. Sydney Coastal Enriched Sandstone Forest at Field of Mars Res (Site F22). The main canopy species here are *Corymbia gummifera*, *Angophora costata* and *Eucalyptus racemosa*.



Figure 22. Blackbutt-dominated Sydney Coastal Enriched Sandstone Forest at ELS Hall Res (Site Eh).

3 Vegetation Found on Predominantly Sandstone-derived Soils

3.1 Sydney Coastal Coachwood Gallery Rainforest - NSW PCT 3038 (Figure 23)

This community is generally limited to moist, sheltered gully locations in the northern sections of Lane Cove River valley and Terrys Creek. A couple of tiny sites occurred on hillslopes with adequate shelter and reliable moisture. Small patches also occur on Buffalo Creek in Field of Mars Reserve and the small creek in Yinnell Reserve. The community is narrow, sometimes only a couple of rows of mesic trees along the riparian zone where sheltered from fire and insolation by rocky outcrops. It typically occurs on poor sandy soil (Hawkesbury or Gynea Soil Landscapes), though in Ryde these are often enriched from upslope clay soil or nutrient-rich creek flows, and sediment from the developed catchments.

Ceratopetalum apetalum (Coachwood) is the dominant native species in situations with deeper soil. *Tristaniopsis laurina* is more common where soils are shallow, especially near the water's edge. However, much of this community is dominated by **Ligustrum* spp. Other common associated species are

Callicoma serratifolia and *Pittosporum undulatum*. Uncommon tree species include: *Acmena smithii*, *Stenocarpus saligna* (Beefwood), *Ficus coronata*, *Schizomeria ovata* and *Acacia schinoides*. The community usually has a variable emergent stratum of *Syncarpia glomulifera*, *Angophora costata*, *Eucalyptus piperita* or *Eucalyptus pilularis*.

The shrub layer is usually sparse and mainly comprises regenerating tree species. *Austromyrtus tenuifolia* and *Lomatia myricoides*, are rare and generally restricted to the riparian edges. Further upslope and at margins, the understory quickly takes on the nature of the adjoining sclerophyll forest. In small pockets of this community, standard 20 × 20 m quadrats may give misleading information about the community for this reason.

The ground cover varies from ferny, to rocky with leaf litter and almost no vegetation. *Doodia caudatum* var *caudatum*, *Calochlaena dubia*, *Christella dentata* and *Pteridium esculentum* are typical but variable. *Pseuderanthemum variabile* is sometimes common. In many sites regenerating seedlings of *Ceratopetalum apetalum* and *Ligustrum* spp. form the main ground cover. Lithophytes were recorded in some sites, including *Asplenium australasicum* and rarely *Pyrrosia rupestris*. Vines are generally limited to slender species such as *Smilax glycyphylla* and *Eustrephus latifolius*. *Geitonoplesium cymosum* (Scrambling Lily) was recorded along Terrys Creek just south of Epping Road. Larger-growing species, *Gynochthodes jasminoides*, *Cissus hypoglauca* and *Pandorea pandorana*, are uncommon.

Portius Park contains a degraded variant that appears to be the result of historic habitat clearing. **Ligustrum* spp. are dominant and *Pittosporum undulatum* is very common. *Ceratopetalum apetalum*, *Callicoma serratifolia* and *Tristaniopsis laurina* are limited to a few individuals. Similar modified vegetation was observed above and below Yinnell Reserve, but included patches of intact rainforest.

Table 10. Typical structure of Coastal Sandstone Gallery Rainforest

Strata	Height range (m)	Projective foliage cover %
Emergents	20-30	1-20
Canopy	10-20	70-80
Small trees	4-10	2-10
Shrubs	0.5-1.5	2-10
Groundcover	0-0.5	2-40

Relationship to other Communities - Usually a distinct community owing to its specific habitat requirements. Rarely it grades into Sydney Coastal Enriched Sandstone Moist Forest. The upslope vegetation is commonly Sydney Coastal Enriched Sandstone Forest or Sydney Coastal Enriched Sandstone Moist Forest. Sydney Coastal Sandstone Gully Forest was recorded in a few locations. In more open, localized rocky sections of the riparian zone vegetation could change to Sandstone Cliff Soak (PCT 3916) or Sydney Sandstone Riparian Scrub (PCT 4086), though none was inspected in Ryde.

Representative examples - Lane Cove NP, Terrys Creek (eg. Pembroke Park), "The Cascades" on Buffalo Creek in Field of Mars Reserve.

Likely Previous Distribution - This community mainly occurs on relatively poor soils and limited in spread by its need for shelter and moisture. Its current extent has probably remained substantially unchanged since European settlement (Table 1). It is unclear how much of the now *Ligustrum*-dominated riparian understory along Lane Cove River and Terrys Creek comprised Coastal Gallery Rainforest.



Figure 23. Sydney Coastal Coachwood Gallery Rainforest in East Ryde near Epping Rd (Site L8).

3.2 Hinterland Turpentine-Apple Forest - NSW PCT 3621 (Figure 24)

Hinterland Turpentine Apple Gully Forest adjoins Ryde LGA discontinuously between Forsyth Pk and M2 Motorway on the Parramatta LGA side of Terrys Creek. However, a tiny unmapped patch of this community was observed in Ryde LGA east of Lane Cove Road, adjacent to the Lane Cove River. Further investigation may reveal other small areas of this PCT in Ryde LGA.

The patch recorded in Ryde contained *Eucalyptus piperita* and *Angophora costata* as the main canopy species. *Corymbia gummifera* was present in small proportions but *Syncarpia glomulifera* was absent. The small tree stratum mainly contained *Ceratopetalum gummiferum* and *Allocasuarina littoralis*. *Elaeocarpus reticulatus* and *Xylomelum pyriforme* were present in small numbers. Owing to proximity to Lane Cove River, a few shrub-sized mesic species occurred of *Stenocarpus salignus* and *Ceratopetalum apetalum*. *Acacia irrorata* was adjacent between this community and elements of Sydney Coastal Gallery Rainforest along the river. The shrub stratum was relatively open with *Lambertia formosa*, *Lasiopetalum ferrugineum*, *Leionema dentatum* being common. Others were *Xanthorrhoea arborea*, *Lomatia silaifolia* and *Pultenaea* spp.

The ground cover mainly comprised *Caustis flexuosa*, *Podocarpus spinulosus*, *Lomandra longifolia*, *Pteridium esculentum* and *Lepidosperma laterale*. Less common species included: *Tetrarrhena juncea*, *Calochlaena dubia*, *Dianella caerulea* var *producta* and *Brunoniella pumilio*. Vines were scattered through the site in low proportions: *Smilax glyciphylla*, *Pandorea pandorana*, *Billardiera scandens* and *Cassytha pubescens*. Mesic species, more typical of clay soils (*Gynochthodes jasminoides* and *Sarcopetalum harveyanum*) occurred below the survey quadrat.

Table 11. Structure of Hinterland Turpentine Apple Forest

Strata	Height range (m)	Projective foliage cover %
Canopy	10-25	40
Small trees	3-12	10
Shrubs	0..7-3	40
Groundcover	0-1	50

Relationship to other Communities - Closely-related to Sydney Coastal Enriched Sandstone Forest and Sydney Coastal Sandstone Gully Forest. The few sites observed adjoin Sydney Coastal Gallery Rainforest or elements of that PCT along the riparian margin.

Representative examples - Lane Cove NP, western side Terrys Ck (Parramatta LGA)

Likely Previous Distribution - This community is currently known from one site in Lane Cove NP. It is not known whether it occurred elsewhere in Ryde.



Figure 24. Hinterland Turpentine Apple Forest, Lane Cove NP (Site L70).

3.3 Sydney Coastal Sandstone Gully Forest - NSW PCT 3595 (Figure 25)

This community was previously included in the broad category of Sandstone Gully Forest (Benson & Howell 1994), subsequently separated into seven plant community types (OEH 2013). Of these, OEH mapped 127 ha of Sydney Coastal Sandstone Gully Forest in Ryde, the largest area of any extant plant community in the LGA. Increased survey effort resulted in 56% of this being reclassified, mostly as Sydney Coastal Enriched Sandstone Forest (eg. parts of Field of Mars Reserve, Magdala Park, Terrys Creek and Lane Cove NP). The area of Sydney Coastal Sandstone Gully Forest is unclear owing to its gradation into communities with enriched sandy soils, but is approximately 55 ha.

Sydney Coastal Sandstone Gully Forest generally occurs on low nutrient rocky soils on the lower to mid slopes of sandstone gullies, where there is adequate shelter and moisture. Typically, these sites are on Hawkesbury Soil Landscape and are relatively distant from enrichment from interbedded material or shale caps on the plateau. Such sites were historically considered of little use for farming, and remained largely uncleared and in good condition.

Eucalyptus piperita is typically dominant, with *Angophora costata* and *Corymbia gummifera* as subsidiary canopy species. *Eucalyptus resinifera* and *Eucalyptus pilularis* are uncommon, and usually indicate some nutrient enrichment. The small tree stratum often contains *Allocasuarina littoralis*, *Ceratopetalum gummiferum* and *Banksia serrata*.

The shrub stratum is usually dense, containing a rich diversity of species, including: *Leptospermum* spp., *Dodonaea triquetra*, *Woolfsia pungens*, *Lomatia silaifolia*, *Persoonia* spp., *Banksia* spp., *Dillwynia retorta*, *Acacia* spp., and *Petrophile pulchella*.

The ground cover frequently is also diverse, although in areas that are overgrown and shaded because of prolonged times between fires, species diversity may be low until restored by fire. Ground covers include sedges (eg. *Caustis flexuosa*, *Leprodia scariosa*, *Lepidosperma* spp.), *Entolasia stricta*, and *Xanthosia* spp. Ferns may be locally common, especially *Pteridium esculentum* and *Lindsaea* spp. Vines form a minor component of the vegetation, but include wiry species such as *Smilax glycyphylla*, *Cassytha* spp., and *Billardiera scandens*.

Table 12. Typical structure of Sydney Coastal Sandstone Gully Forest

Strata	Height range (m)	Projective foliage cover %
Canopy	15-25	30-40
Small trees	4-10	2-20
Shrubs	0.5-2.5	5-40
Groundcover	0-0.5	5-30

Relationship to other Communities - Frequently has transitional vegetation upslope. Sydney Coastal Enriched Sandstone Forest is the most common, rarely Coastal Shale Sandstone Forest. Downslope, Coastal Sandstone Gallery Rainforest commonly occurs. Sydney Coastal Enriched Sandstone Moist Forest can occur where influenced by alluvium along the river bank. On one local midslope patch with skeletal soil, the upslope community was an atypical variant of Northern Sydney Heath-Mallee (PCT 3807), dominated by *Eucalyptus piperita*.

Representative examples - Lane Cove NP, Banool Reserve, Kobada Park, Lucknow Park, Magdala Park, Pembroke Park, Quebec Reserve



Figure 25. Sydney Coastal Sandstone Gully Forest north of M2 Motorway in Lane Cove NP (Site L54).

Likely Previous Distribution - It is likely the distribution of this community in Ryde has changed little since 1792. Mapping indicates that over 80% of the original community remains (Figure 1).

3.4 Sydney Coastal Sandstone Bloodwood Shrub Forest - NSW PCT 3593 (Figure 26)

This plant community mainly occurs on poor sandy soils on exposed mid to upper slopes in Lane Cove Valley between its confluence with Terrys Creek and Field of Mars Reserve. The community has been recorded on Lucas Heights, Gymea and Hawkesbury Soil Landscapes in Ryde. Ironstone is frequently a feature of the local geology of sites in Ryde and elsewhere (DPE, 2021). A total of 20 ha of this community has been mapped. Most is in excellent condition.

This community is closely related to Sydney Coastal Sandstone Gully Forest, Sydney Coastal Shale Sandstone Forest, Sydney Coastal Enriched Sandstone Forest and Northern Sydney Scribbly Gum Woodland, and can be difficult to separate without quadrat analysis. Correspondingly, the canopy can vary greatly and be dominated by one or various species that have previously been considered typical of these communities. In Ryde, much of the community is atypical, having *Eucalyptus piperita* as the common canopy tree.

Canopy species in Ryde include: *Corymbia gummifera*, *Eucalyptus piperita*, *Angophora costata*, *Eucalyptus haemastoma*, *Eucalyptus racemosa*, *Eucalyptus resinifera* and *Eucalyptus sparsifolia*. Plot to PCT analysis indicates that the community may contain monospecific canopies of *Eucalyptus piperita* or *Eucalyptus haemastoma*, however the patches often intergrade with related PCTs or may be assigned because of localized soil enrichment. The small tree stratum is typically sparse, with *Allocasuarina littoralis* being the main species. *Angophora hispida* and *Banksia serrata* often occur in small numbers.

The shrub layer is diverse, the most recorded being *Banksia spinulosa*, *Bossiaea obcordata*, *Lambertia formosa*, *Leptospermum trinervium* and *Micrantheum ericoides*. *Leucopogon setiger* was recorded in one site. Ground covers mainly comprise monocot species, especially *Entolasia stricta*, *Lepidosperma laterale*, *Xanthorrhoea media* and *Anisopogon avenaceus*. *Actinotus minor* was the most common dicot. Ferns were uncommon, with *Lindsaea* spp. and occasional *Pteridium esculentum* being recorded. Wiry vines are uncommon but include *Cassytha* spp. and *Billardiera scandens*.

Table 13. Typical structure of Sydney Coastal Sandstone Bloodwood Shrubby Forest

Strata	Height range (m)	Projective foliage cover %
Canopy	15-20	10-30
Small trees	4-8	2-20
Shrubs	0.5-2.5	5-40
Groundcover	0-0.5	5-30

Relationship to other Communities - Most of this PCT in Ryde was previously considered to be PCTs 3595 and 3586 (OEH, 2016) but recent quadrat analysis showed many sites had a closer affinity with PCT 3593. As nutrient enrichment increases, this PCT grades into Sydney Coastal Enriched Sandstone Forest.

Where clay soil occurs Sydney Coastal Shale Sandstone Forest may result. In more exposed sites, the community grades into Northern Sydney Scribbly Gum Woodland. In more sheltered sandy soils, this PCT can grade into Sydney Coastal Sandstone Gully Forest.

Representative examples - Lane Cove NP, Field of Mars Reserve

Likely Previous Distribution - An estimated 65% of this community has been cleared, mainly to allow for development near the plateau margins, especially in north Ryde.



Figure 26. Sydney Coastal Sandstone Bloodwood Shrub Forest in Lane Cove NP near Vimiera Rd, North Ryde (Site L10), atypically dominated by *Eucalyptus piperita* on a rocky slope.

3.5 Northern Sydney Scribbly Gum Woodland - NSW PCT 3586 (Figure 27)

Northern Sydney Scribbly Gum Woodland occurs on ridges and upper slopes with shallow to skeletal sandy soils on Gynea Soil Landscape. As these were unsuitable for farming pursuits, much of the original small area of this community has survived. Much has been cleared for residential use and the M2 motorway. Approximately 18 ha remain in north Ryde, mostly in Lane Cove NP, between Vimiera and Delhi Roads.

Eucalyptus haemastoma is the dominant canopy species. *Corymbia gummifera* and *Eucalyptus racemosa* are uncommon, however *Eucalyptus racemosa* dominated the patch north-east of the Northern Suburbs Cemetery (L63). Flora on the ridge above the site indicated the presence of skeletal residual clay. Small trees generally comprised scattered *Angophora hispida*, *Allocasuarina littoralis* and *Banksia serrata*. The shrub stratum was typically diverse and ranged from open to locally dense. *Leptospermum trinervium*, *Lambertia formosa*, *Micrantheum ericoides* and *Hakea sericea* were the main species. Less common species included: *Dillwynia retorta*, *Pultenaea elliptica*, *Epacris pulchella* and *Hibbertia empetrifolia*.

The ground cover varied greatly but tended to have dense sedges where high levels of seepage occurred. Typical monocots were: *Cyathochaeta diandra*, *Lepyrodia scariosa*, *Entolasia stricta*, *Patersonia sericea*, *Xanthorrhoea media* and *Lepidosperma laterale*. Dicots formed a minor component of the ground cover with *Actinotus minor*, *Dampiera stricta* and *Xanthosia tridentata* being frequent. Ferns were usually uncommon, *Lindsaea linearis* was the most common and *Lindsaea microphylla* being rare. Vines were present in very small numbers and were limited to wiry species such as *Billardiera scandens* and *Cassytha* spp.

A localized variant of this community was one small patch in Lane Cove NP (L5, west of Fielder Park) on skeletal soils and sandstone outcrops, and similar in structure to Northern Sydney Heath-Mallee (PCT 3807). *Eucalyptus haemastoma* was uncommon and stunted in size. *Angophora hispida* and *Banksia serrata* comprised most of the low open canopy. Shrubs formed a scattered stratum and the ground cover was sparse to largely absent. *Leptospermum trinervium*, *Phyllota phyllicoides* and *Pultenaea elliptica* were the most common shrubs. *Lepidosperma filiforme* and *Cyathochaeta diandra* were the more common ground covers.

Table 14. Typical structure of Northern Sydney Scribbly Gum Woodland

Strata	Height range (m)	Projective foliage cover %
Canopy	8-15	10-30
Small trees	4-8	0-5
Shrubs	0.7-3	10-60
Groundcover	0-0.7	5-50

Relationship to other Communities - Closely related to Sydney Coastal Sandstone Bloodwood Shrub Forest (PCT 3593) but the habitat differences between these communities are unclear, although PCT 3593 frequently has significant ironstone influence. Where clay influence increases the community can grade into Coastal Shale Sandstone Forest on crests, or Sydney Coastal Enriched Sandstone Forest on upper slopes. In a few locations the community grades into Sydney Coastal Sandstone Gully Forest.

Representative examples - Lane Cove NP, Christie Park, Fielder Park

Likely Previous Distribution - Habitat suitable for this community occurs in the vicinity of the M2 Motorway where the community has been cleared for roads and residential development on the edges of the plateau (Figure 5).



Figure 27. Northern Scribbly Gum Woodland in Lane Cove NP (Site L61.)

3.6 Northern Sydney Heath-Mallee - NSW PCT 3807 variant (Figure 28)

Northern Sydney Heath-Mallee has been mapped in Lane Cove NP but is intermediate between the typical community and Sydney Sandstone Gully Forest, and the Plot to PCT identification

tool interpreted the vegetation as the latter. However, the structure is typical of heath-mallee. The community occurs in an area of rainfall that is less than the median for Northern Sydney Heath-Mallee (1145 mm cf. 1250 mm) and it is possible that at least some of this vegetation is a result disturbance rather than being natural. The site contains Hawkesbury Sandstone as bedrock and outcrops, the sandy soil is skeletal to locally absent, and most flat surfaces are covered with plant litter. Part of the community has been impacted by local areas of exotic lawn grasses and planted eucalypts (eg. *Eucalyptus grandis* and *Eucalyptus tereticornis*). *Allocasuarina littoralis* has been mass-planted in at least one area, but appears natural elsewhere. Bush rock has been extracted from another local area. The bushland has also been subjected to wildfires, as in many parts of Lane Cove NP.

Trees are limited to dwarf forms, with *Eucalyptus piperita* comprising a scattered low open woodland canopy. Smaller trees are common including: *Allocasuarina littoralis*, *Angophora hispida*, *Banksia serrata* and less frequently, *Angophora bakeri* (Narrow-leaved Apple). The community has a diverse and rich shrub stratum, with *Acacia terminalis*, *Banksia ericifolia*, *Darwinia fascicularis*, *Grevillea buxifolia*, *Leptospermum squarrosum*, *Leucopogon ericoides*, and *Petrophile pulchella* being typical. The few shrub species recorded are largely restricted to it (eg. *Baeckea diosmifolia*, *Darwinia fascicularis*, *Philotheca salsolifolia* and *Styphelia* spp.).

The ground cover is generally very sparse. Ferns and vines are rare or locally absent. Herbs mainly comprise graminoids, especially *Entolasia stricta* and *Dianella caerulea*, although others include: *Lepyrodia scariosa*, *Cyathochaeta diandra*, *Schoenus imberbis* and *Caustis* spp. *Xanthosia tridentata* is the most frequent dicot. Less common are *Actinotus helianthi* and *Dampiera stricta*. Vines are limited to a couple of hardy wiry species, such as *Cassytha* spp. and *Billardiera scandens*.

Table 15. Typical structure of Northern Sydney Heath-Mallee

Strata	Height range (m)	Projective foliage cover %
Canopy	5-8	10-30
Small trees	Absent	
Shrubs	0.7-3	20-60
Groundcover	0-0.7	5-50

Relationship to other Communities - Grades into PCT 3595 or 3593 as soils deepen. Where soil depth decreases or is absent, elements of Sandstone Rock Plate Shrubland (*Kunzea ambigua* shrubland) were observed.

Representative examples - Lane Cove NP

Likely Previous Distribution - This community is mapped in three sites in Ryde LGA, although a few other locations have localized tiny patches of vegetation with similar structure. It is unclear whether this PCT occurs naturally in Ryde or is modified Sydney Sandstone Gully Forest.



Figure 28. Heath-Mallee in Lane Cove NP at Macquarie Park (Site L59). The mallee in the left of the photo is *Eucalyptus piperita*.

3.7 Sandstone Rock Plate Shrubland (Figure 29)

Sandstone rockplate shrubland is confined to crests or benches of slopes where sandstone has a skeletal but newly developing soil layer, with bare sandstone separating clumps of vegetation. All examples of this community group in Ryde are atypical of the broader community owing to clay enrichment of the sandy soil, as indicated by species such as *Eucalyptus resinifera*, *Leucopogon juniperinus*, *Microlaena stipoides*, *Oplismenus aemulus* and *Paspalidium distans*. The sites generally conformed to the adjacent PCT apart from obvious structural difference. Patches are individually tiny, the largest being the site near Northern Suburbs Crematorium in Lane Cove NP and another in Glades Bay Park. This community covered less than one hectare in Ryde, with individual sites <500 sqm.

One patch of Sandstone Rock Plate Shrubland has been mapped (DCCEEW 2025) as Southern Sydney Rock plate Heath (PCT 3810) (Site L6), however Plot to PCT did not match any related community in the Sydney Basin Bioregion. Much of this site is bare sandstone and receives seepage from upslope. Skeletal soil is 20-70 mm deep. Small potholes occur in numerous locations. Some temporarily contain water, providing habitat for small native fauna however, others have been filled with plant litter that has formed the base for colonization by mosses, lichens and subsequent soil development. *Kunzea ambigua* forms a dense canopy in areas of skeletal soil, with *Callistemon linearis*, *Platysace lanceolata* and *Micromyrtus ciliata* being relatively uncommon. Trees are limited to the edges of the adjacent open forest: *Eucalyptus haemastoma*, *Eucalyptus resinifera* and *Angophora costata*. The ground cover mainly comprises *Entolasia stricta*, *Lepidosperma laterale* and *Paspalidium distans*. *Eragrostis brownii*, *Gonocarpus teucroides*, *Laxmannia gracilis* and *Drosera peltata* were also recorded. Ferns are uncommon, being restricted to *Cheilanthes sieberi* and *Pteridium esculentum*. Wiry vines are rare, only *Kennedia rubicunda* (Dusky Coral Pea).

Other examples of Sandstone Rock Plate Shrubland were recorded in four other sites in Ryde: Sugarloaf and adjacent to Boobajool Res, in Lane Cove NP; Glades Bay; and disturbed elements of the community on the edge of the Parramatta River in Putney Park. In all sites, trees are generally absent or stunted. The canopy is dominated by shrubs, especially *Kunzea ambigua* (Tick Bush). The understory comprises hardy graminoids and

low shrubs. Relatively deep clay soil occurs above the Glades Bay site, resulting in a largely grassy ground cover.

Table 16. Typical structure of Sandstone Rock Plate Shrubland

Strata	Height range (m)	Projective foliage cover %
Trees	Absent	
Tall shrubs	2-5	20-80
Low shrubs	0.5-1.5	2-10
Groundcover	0-0.5	5-30

Relationship to other Communities - Sandstone Rock Plate Shrubland occurs in a distinct habitat of bare rock and skeletal soil. Where soil depth increases, the community in Ryde grades into the adjacent forms of sandstone forest.

Representative examples - Lane Cove National Park, Field of Mars, Glades Bay Reserve

Likely Previous Distribution of Sandstone Rock Plate Shrubland - Suitable habitat for this plant community has always been extremely limited. Other areas may have occurred in parts of the northern Marsfield area, now occupied by home units.



Figure 29. Sandstone Rock Plate Shrubland (Site L6).

4 Estuarine & Freshwater Wetland Plant Communities

4.1 Grey Mangrove-River Mangrove Forest - NSW PCT 4091 (Figure 30)

Patches of mangroves sporadically line the Paramatta River and lower Lane Cove River in Ryde, covering a total of 18 ha. Mangroves tend to be absent where sandstone extends down to the waterline. In a few places, especially along the Lane Cove River, they form extensive, dense visual barriers that give an impression of remoteness from the city. In some locations, mangroves appear as colonizing seedlings or scattered saplings. Along the Parramatta River, Grey Mangrove-River Mangrove Forest comprises monospecific stands of *Avicenna marina* (Grey Mangrove) with a low canopy and generally lacks any understory apart from regenerating juveniles.

Aegiceras corniculata (River Mangrove) is an understory tree or shrub that appears to favour locations where there is freshwater influence that dilutes the natural salinity level locally (OEH 2013). Although such situations occur along the Parramatta River,

Aegiceras was recorded in only one patch at Koonadan Reserve, however it is common along the Lane Cove River from Buffalo Creek to Fullers Bridge.

Herbaceous species can occur in gaps and edges on the landward margin or localized rises, where higher levels of sunlight can reach the ground and the tidal effect is less. Marginal species may be limited to one or two species but can include: *Suada australis*, *Tetragonia tetragonioides* (Warrigal Greens), *Juncus kraussii*, *Sarcochornia quinqueflora* (Samphire) *Sporobolus virginicus* (Sea Couch) and various weeds. In numerous locations, especially along the Parramatta River, sea walls or artificially raised soil levels restrict the landward development of estuarine vegetation. These are likely to have an increasing impact as sea and river level rises occur in response to global warming.

Table 17. Typical structure of Grey Mangrove River Mangrove Forest

Strata	Height range (m)	Projective foliage cover %
Canopy	5-10	30-80
Small Trees	<1-3	0-10
Shrubs		Absent
Groundcover	<1, seedlings	0-5

Relationship to other Communities - The upper margin may adjoin Estuarine Saltmarsh, or Estuarine Sea Rush-Swamp Oak Forest. Estuarine Swamp Oak-Mangrove Forest adjoined this community in Kittys and Buffalo Creeks on alluvial flats with a fresh water stream. Moist sites on Lane Cove River that have lower salinity can contain Swamp Oak Twig-rush Forest. In many suitable locations, adjoining plant communities have been cleared for parkland or residential development and views across the Parramatta River.

Representative examples - Lane Cove River: Lane Cove NP south from the weir near Fullers Bridge, Field of Mars; Parramatta River: Anderson Park, Bill Mitchell Park, Field of Mars Reserve, Glades Bay Park, Helene Park, Kissing Point Park, Koonadan Reserve, Looking Glass Bay Park, Meadowbank Park, Melrose Park, Ryde Wharf Reserve.



Figure 30. Estuarine Mangrove Forest at confluence of Lane Cove River and Kittys Ck (Site L16). Grey Mangrove canopy with River Mangrove understory.

Likely Previous Distribution - Likely to have occurred in most of the relatively large existing patches (Figure 3), though some are recent or currently colonizing where the community appears to have been absent previously. The original extent of mangrove forest is unknown; it is possible it has increased with catchment development causing soil erosion, and subsequent deposition along the Parramatta and Lane Cove Rivers.

4.2 Saltmarsh including Samphire Saltmarsh (NSW PCT 4097; *Sporobolus virginicus* Saltmarsh (NSW PCT 4103) & *Juncus kraussii* Rushland (Figure 31)

Saltmarsh is an herbaceous plant community that occupies numerous tiny areas along the Parramatta and lower Lane Cove Rivers. Combined, these cover approximately one ha. They generally comprise narrow patches of a couple of metres in width and occur in the upper tidal zone where the community is inundated for less duration than Estuarine Mangrove Forest but more than the lower margins of Estuarine Sea Rush Swamp Oak Forest.

Few species can tolerate the difficult growing conditions of high salinity and periodic inundation, so the species diversity is low, often comprising only one or two species. Typical species may be: *Sarcochornia quinqueflora*, *Samolus repens*, *Sporobolus virginicus*, *Suada australis* and *Juncus kraussii*. These can occur as monocultures, mosaics or mixtures depending on local conditions.

It is often possible to separate saltmarsh into two communities: *Sarcochornia* herbland (PCT 4097) and *Sporobolus virginicus* grassland (PCT 4103). However, individual saltmarsh patches in Ryde are small and do not show sufficient extent or separation of these species to be considered different communities for general mapping purposes. A good example of a mosaic is near the mouth of Kittys Creek, where the saltmarsh patch (L34) comprises patches of *Sarcochornia quinqueflora*, *Sporobolus virginicus*, *Juncus kraussii*, *Phragmites australis*, *Baumea juncea* and scattered *Melaleuca ericifolia*. *Sarcochornia* occurs at the lower edge that receives greatest inundation. *Juncus*, *Suada*, *Samolus* and *Sporobolus* occupy the mid zone, and *Phragmites* and *Melaleuca* occupy the upper zone where salinity and inundation are lowest.

Mangroves, mainly *Avicenna marina*, seedlings have colonized and converted some areas that were previously saltmarsh into mangrove low closed forest. The saltmarsh patches at Field of Mars and Memorial Park are currently threatened this way and this will be increased more widely by future sea level rise.

Table 18. Typical structure of Saltmarsh

Strata	Height range (m)	Projective foliage cover %
Canopy	Absent	
Small trees	Absent	
Shrubs	Absent	
Groundcover	0-0.5	10-70

Relationship to other Communities - Occupies habitat that is restricted to a narrowly defined flooding regime. In adjoining locations with increased flooding, Estuarine Mangrove Forest replaces saltmarsh. Where saltwater inundation is rare or

restricted to groundwater, Estuarine Sea Rush Swamp Oak Forest may occur.

Representative examples - Lane Cove NP, Field of Mars Reserve, Glades Bay Park, Koonadan Reserve, Meadowbank Park.

Likely Previous Distribution in Ryde - Original saltmarsh habitat has been heavily modified and reduced by upslope impacts. It is unknown how much of the potential habitat zone contained Saltmarsh, however it is expected that it has been significantly reduced from its pre-European extent.



Figure 31. *Samolus* and Samphire Saltmarsh at Melrose Park (Site Ko1). Grey Mangrove River Mangrove Forest beyond. *Casuarina glauca* is behind on the upper margin that probably originally contained Estuarine Sea Rush-Swamp Oak Forest.

4.3 Estuarine Swamp Oak-Mangrove Forest -NSW PCT 4027 (Figure 32)

Although Swamp Oak and Grey Mangrove communities are common along the Parramatta and Lane Cove Rivers, combinations are rare in Ryde. Typically, the transition that separates these communities is a small but distinct increase of level that places Swamp Oak forest (PCTs 4026 & 4028) just above the zone of regular tidal effect and saltwater influence. However, a combination of gentle estuarine slope, and entry of a freshwater creek can provide conditions suitable for an overlap of the mangrove and Swamp Oak communities.

Estuarine Swamp Oak-Mangrove Forest was observed near the mouth of Kittys Creek and lower Buffalo Creek in Field of Mars Reserve. The Kittys Creek site was situated on sandy alluvium near the upper tidal limit for mangroves. Freshwater flowed through the site from Kittys Creek. Here, an area of less than one hectare formed an ecotone between Grey Mangrove-River Mangrove Forest, along the river, and *Casuarina glauca* forest that extends up Kittys Creek beyond Pittwater Road. The area comprised a continuous gentle slope from river level to above the tidal zone allowing overlap of both communities. *Casuarina glauca* and *Avicenna marina* formed the canopy. There was no understory apart from scattered exotics, however the ground cover was relatively diverse, mainly *Samolus repens*, *Atriplex australasica*, *Commelina cyanea* and **Ehrharta erecta* (Veldt Grass), **Erythrina crista-gali* and other weeds.

A second small site occurred in the lower section of Field of Mars on estuarine flats of Buffalo Creek. It is unclear how much of this is natural as rubbish was dumped here in the 1950-60s when

the site was used as a garbage tip (Shearer & Jenkins, 1979). An old photo shows the area had previously been cleared of most of its natural vegetation, and verbal records state that the creek channel was wider and much deeper in this locale – to the extent that sharks had been recorded. At the time of this survey, the site contained a mixture of *Avicenna marina* and *Casuarina glauca*, with scattered *Melaleuca linariifolia* (Snow-in-summer) at the upper margins. *Samolus repens* was the dominant ground cover.

Table 19. Typical structure of Estuarine Swamp Oak-Mangrove Forest (open forest)

Strata	Height range (m)	Projective foliage cover %
Canopy	10-20	40
Small trees	4-10	0-5
Shrubs	0.9-3	0-10
Groundcover	0-0.9	0-30

Relationship to other Communities - Ecotonal between Mangrove forest, Swamp Oak forest and saltmarsh. Grades into Mangrove Forest on the saltwater side and into Estuarine Sea Rush- Swamp Oak Forest on slightly higher terrain at Kittys Creek. It adjoins the unrelated Sydney Sandstone Gully Forest further upslope beyond estuarine habitat.

Representative examples - Lane Cove NP, Field of Mars Reserve

Likely Previous Distribution - Limited to two sites and unlikely to have been widespread previously.



Figure 32. Estuarine Swamp Oak Mangrove Forest at Kittys Ck, East Ryde (Site L17).

4.4 Estuarine Sea Rush-Swamp Oak Forest - NSW PCT 4026 (Figure 33)

Estuarine Sea Rush-Swamp Oak Forest occurs in low-lying locations that have a strong saline influence but no tidal inundation. Most of this community has been cleared.

The canopy of this community is typically monospecific *Casuarina glauca*. Eucalypts occur infrequently as emergents, or *Acacia* spp., *Pittosporum undulatum* or *Glochidion ferdinandi* sometimes share the canopy or sparse small tree stratum. Native shrubs are uncommon but can include; *Notelaea longifolia* and *Breynia oblongifolia*.

The ground cover can vary from *Casuarina* needle litter to variably dense. *Ehrhart erecta* (Veldt Grass) is dominant, although

indigenous species can include: *Tetragonia tetragonioides*, *Atriplex australasica*, *Juncus kraussii* or *Samolus repens*.

Table 20. Typical structure of Estuarine Sea-rush Swamp Oak Forest (open forest)

Strata	Height range (m)	Projective foliage cover %
Emergents	15-25	0-5
Canopy	10-15	30-60
Shrubs	0.9-3	0-5
Groundcover	0-0.9	0-20

Relationship to other Communities - Adjoins Estuarine Grey Mangrove River Mangrove Forest at Kittys Creek and Settlers Pk. Elements of saltmarsh occur between the two communities. Appears to have adjoined various unrelated PCTs upslope, including Sydney Foreshores Sandstone Forest and Sydney Sandstone Gully Forest. This community is replaced by Estuarine Swamp Oak Twig-Rush Forest along much of the Lane Cove River where the habitat has poorer drainage and reduced salinity. Both these communities were combined in previous mapping (DPE 2021, OEH 2016).

Representative examples - Parramatta River: narrow bands and scattered individuals, intermittently between Koonadan Reserve and Meadowbank Park, Kissing Point Park, Glades Bay (west), Settlers Park; Lane Cove River: tiny patches discontinuously along the lower section from Parramatta River (in Hunters Hill LGA) to Kittys Creek.

Likely Previous Distribution - Potentially this community could have lined low-lying sections of the Parramatta River and lower Lane Cove River, adjoining mangrove forest, apart from locations of sandstone outcrops and bedrock. Most suitable areas along the Parramatta River have since been developed or "reclaimed." including parts of Meadowbank Park and Shepherds Bay.



Figure 33. Sea Rush-Swamp Oak Forest at confluence of Lane Cove River and Kittys Ck, East Ryde (Site L18).

4.5 Estuarine Swamp Oak Twig-rush Forest -NSW PCT 4028 (Figure 34)

Estuarine Swamp Oak Twig-rush Forest was recorded in five locations along the Lane Cove River, often adjoining *Phragmites australis* (Common Reed) Reedland. Conditions here are less saline than on the river banks, which is the main condition

separating this community from Sea Rush Swamp Oak Forest. The habitat is slightly more elevated and less inundated than reedland habitat. The sites in Ryde were: Greens Flat south of Fullers Bridge; Relics in *Casuarina Flat* and *Wirrong Flat* near River Road, West Chatswood; Small areas near Magdala Road; "Fairyland" flats and the lower reaches of Buffalo Creek in Field of Mars Reserve.

Casuarina glauca is the constant feature of this community, although often forming localised clumps of trees rather than extensive stands. Individuals of *Eucalyptus saligna* occurred rarely. The understory can vary from almost monospecific reedland (near Magdala and Epping Roads) to more diverse herbaceous with scattered understory trees and shrubs (in part of *Fairyland* flats). Early in the 20th Century the *Fairyland* site was almost completely cleared and used for farming, before being grassed and developed for picnics and dancing. Since c. 1930 the vegetation has regrown to what may approximate its original type, if not condition. Weeds are common, especially *Senna pendula*, *Ligustrum* spp., *Ehrharta erecta*, *Tradescantia albiflora* and exotic Asteraceae. *Hypolepis muelleri* is the main ground cover in much of the regenerated community. *Pteridium esculentum*, *Phragmites australis*, *Gahnia sieberiana*, *Baumea juncea* and *Hydrocotyle* spp. are common. Indigenous shrubs are limited to individuals of *Acacia longifolia*, *Polyscias sambucifolia*, *Ozothamnus diosmifolius* and *Pittosporum undulatum*. Small trees are uncommon but include: *Glochidion ferdinandi* and *Acacia irrorata* var. *irrorata*. Vines are slender species: *Stephania japonica*, *Clematis aristata* and **Passiflora suberosa*.



Figure 34. Estuarine Swamp Oak Twig-rush Forest at *Fairyland* (Site L26). Understory of *Hypolepis muelleri* and *Phragmites australis*.

Table 21. Typical structure of Estuarine Swamp Oak Twig-rush Forest

Strata	Height range (m)	Projective foliage cover %
Canopy	10-20	30-40
Small trees	4-8	0-10
Shrubs	0.9-3	5-10
Groundcover	0-0.9	5-40

Relationship to other Communities - Adjoins *Phragmites* Reedland with routine inundation and can grade into Estuarine Grey Mangrove River Mangrove Forest (including associated elements of Sea Rush-Swamp Oak Forest) at the river edge. Adjoins Sydney Sandstone Gully Forest further upslope beyond estuarine habitat. At *Fairyland* flat there is a naturally slightly raised zone between the Estuarine Swamp Oak Twig-rush Forest and mangroves that contains regrowth forest of Blue Gum High Forest (see Section 3.1.2.5).

Representative examples - Lane Cove NP, Field of Mars Reserve

Likely Previous Distribution in Ryde - Limited to a few sites along Lane Cove River, but likely to have been more widespread previously, including upstream of the weir above Fullers Bridge and downstream in *Casuarina Flat* and *Wirong Flat*.

4.6 Estuarine Reedland – NSW PCT 3963 (Figure 35)

Estuarine Reedland is a plant community that occurs in localised patches along creeks that flow into Lane Cove River (south from Chatswood West), where there is adequate soil moisture or inundation. In Ryde it covers a total of approximately 2 ha. No significant areas of this community were recorded along the Parramatta River, where individual occurrences were limited to < 100 sqm. The community is usually dominated by *Phragmites australis* (Common Reed), however other species can include: *Juncus kraussii*, *Samolus repens* or *Typha orientalis* (Cumbungi).

The largest two occurrences, are in Lane Cove NP, on the Lane Cove River between Magdala Street and Epping Road, and in *Fairyland*, East Ryde. These are monocultures of *Phragmites australis*, apart from a few other species at the landward margin, such as *Casuarina glauca* and *Gahnia* spp. A third, smaller occurrence is located in the lower reaches of Buffalo Creek in Field of Mars Reserve, upstream of Swamp Oak Twig-Rush Forest and downstream of a small patch of Creekflat Paperbark Scrub. This patch has been modified by previous clearing and placement of rubbish and fill at the eastern margins. In addition to *Phragmites*, **Tradescantia albiflora* is co-dominant. Groups of *Casuarina glauca* occur at the saline end of the community and *Hypolepis muelleri* and other freshwater species become more common as salinity decreases at the upstream margins of the creek (eg. Site F10).

Table 22. Typical structure of Estuarine Reedland

Strata	Height range (m)	Projective foliage cover %
Tree Canopy	Absent	
Small tree	Absent	
Shrubs	Absent	
Groundcover	1.5-2	50-90

Relationship to other Communities - Can transition into Estuarine Saltmarsh in shallow, more saline situations (e.g. small area near Kittys Ck mouth). On the landward side Coastal Estuarine Reedland may grade into PCT 4028 or be replaced on well-drained slopes by woodland such as Sydney Coastal Enriched Sandstone Forest.

Representative examples - Lane Cove NP, Field of Mars Reserve

Likely Previous Distribution - The potential habitat for this community is very limited in extent and is probably similar in size to the area occupied before European colonisation.



Figure 35. Estuarine Reedland near Magdala Road, East Ryde (Site L35). Margin of woodland species and *Casuarina glauca* in foreground.

Related freshwater wetlands

A tiny area of *Phragmites australis* reedland previously occurred in the old creekline in Miriam Park, until it was removed during stormwater flow improvements in c.1990. Many years previously Eastwood Lake contained a perimeter of freshwater wetland species, until drained after 1912 (Northern District Times, 21/8/1996). It is probable that other freshwater wetlands occurred in Ryde (eg. at West Ryde where the shopping centre is now located). A small area of degraded freshwater wetland occurs in Darvall Park, above and below Burnett Pathway, although it is unclear whether this is a natural occurrence. The last four sites differ from the Lane Cove River sites in occurring on clay soil, and surrounded by Blue Gum High Forest. Based on the small number of records, this fresh water community differed from Estuarine Reedland in containing a higher diversity of species, including: *Phragmites australis*, *Typha orientalis*, *Lobelia alata*, *Lythrum hyssopifolia*, and additional *Cyperus* spp. and *Juncus* spp.

4.7 Creekflat Paperbark Swamp Forest - composite PCT 3972/4010/4057 (Figure 36)

Creekflat Paperbark Scrub is a plant community that grows on low-lying alluvial flats of Lane Cove River. Four sites that nominally fit this PCT, were found on Lane Cove River (F10, F18, L20, L27). However, none was identified as PCT 4010 by Plot to PCT analysis. One highly disturbed site on Buffalo Ck (F10) was identified as PCT 3972. All were outside the accepted assignment limit and all were considered related to 4057 despite the absence of *Eucalyptus robusta* in Ryde, and other characteristic species.

Only two relatively intact examples of this community are known in Ryde – located on the western side of Lane Cove River on the river flat below the area previously known as “Fairyland” (L20 and L27 – Figure 36). Combined, they cover approximately one ha and are located between the river or creek edge and sandstone forest upslope. Small freshwater streams enter the sites from the upslope forest. The vegetation in the sites is in largely natural condition, although regrown following major

clearing many decades ago. *Melaleuca linariifolia* and *Casuarina glauca* are the main trees, which form an open canopy. Emergent eucalypts occurred in some sites but are more properly considered to belong to adjacent forest communities. There is virtually no middle stratum. In the *Fairyland* sites the ground cover comprises a mosaic of sedges and prostrate herbs. The main sedges are: *Baumea juncea*, *Isolepis inundata*, *Gahnia* spp. and *Cyperus* spp. Other ground covers are *Centella asiatica*, *Viola hederacea* (Native Violet) (River Rd site) and *Hydrocotyle verticillata*. The last-named species is significant owing to its rarity in Sydney and has not been recorded in Ryde previously.

Relic sites that were in very poor condition were observed along lower Buffalo Creek in Field of Mars near the Monash Road entrance (including Site F10), and north of Magdala Road on a small creekflat between the eucalypt forest and estuarine reedland. These occurred on sandy alluvium and largely comprised a canopy of *Melaleuca linariifolia* with an understory of **Ligustrum sinense* and **Tradescantia albiflora*. The Field of Mars sites had scattered emergents of *Eucalyptus saligna* that had established from the adjacent Enriched Sandstone Moist Forest and Blue Gum alluvial Forest. Understory plants included some relic native species including: *Phragmites australis*, *Hypolepis muelleri*, *Persicaria* spp., *Ranunculus inundatus* and *Entolasia marginata*.

Relics of related creekflat plant communities were observed on the edge of the Hornsby Plateau, where clay soil gave way to sandy soil along some creeklines. A stand of veteran *Melaleuca linariifolia* was observed in the riparian zone of Coxs Park, Macquarie Park. One specimen had a diameter (dbh) of approx. 0.6 m. The habitat in this small park has been heavily altered because of the adjacent M2 Motorway construction, subsequent armoring of the creekbanks and planting of native species. Planting has included **Casuarina glauca* which is unlikely to have occurred naturally. However, the approximately 12 mature to senescing *Melaleuca linariifolia* indicate the original presence of a variant of creekflat forest. The soil is sandy with sandstone outcrops. *Eucalyptus resinifera* is common, suggesting the adjoining plant community was Sydney Coastal Enriched Sandstone Forest. Mature, although younger, *Melaleuca linariifolia* were observed along corresponding parts of some small creekflats in Macquarie University and may be indicators of similar forest there previously.

Table 23. Typical structure of Creekflat Paperbark Swamp Forest

Strata	Height range (m)	Projective foliage cover %
Emergents	20-30	1-5
Tree Canopy	5-12	20-70
Shrubs	0.7-2	1-2
Groundcover	0-0.7	5-20

Relationship to other Communities - The community in Ryde occupies locations between upslope enriched sandstone forests and estuarine fringe communities. The latter varied greatly at each site but include reedland, Estuarine Swamp Oak Twig-rush Forest or Grey Mangrove River Mangrove Forest. The community in Buffalo Creek appears to have graded into Blue Gum alluvial forest where the alluvium is more elevated and better-drained. One Fairyland site also adjoined Blue Gum alluvial forest.

Representative examples - Lane Cove National Park, Field of Mars Reserve.

Likely Previous Distribution of Creekflat Paperbark Forest -

This community is currently restricted to sites along the Lane Cove River. It is unknown if the community previously occurred along the Parramatta River because most areas of potential habitat have been altered by earthworks, and/or cleared of natural vegetation. It is likely that this community was more extensive in Field of Mars Reserve prior to dredging for boat access and later infill by use as a rubbish tip in the 1950-60s. Based on relic vegetation, a closely related community appears to have occurred on some flats above the plateau edge.



Figure 36. Creekflat Paperbark Swamp Forest in Fairyland, Chatswood West (Site L27).

4.8 Cheese Tree Wet Forest - NSW PCT 3040 (variant of Sydney Coastal Foreshores Gully Rainforest) (Figure 37)

Two small patches of closed forest dominated by *Glochidion ferdinandi* were observed in Lane Cove NP near Magdala Road and the lower section of Glades Bay Reserve. The Magdala Road patch was the larger and was largely free of introduced species. Plot to PCT analysis of the Magdala Rd site identified it as a variant of Sydney Coastal Foreshores Gully Rainforest (PCT 3040) but, being located on a river flat, adjoining estuarine communities, it is atypical.

Glochidion ferdinandi was dominant, *Pittosporum undulatum* was fairly common. *Eucalyptus resinifera* was the emergent and *Casuarina glauca* occurred as a fringe between this community and Estuarine Phragmites Reedland. *Melaleuca linariifolia* occurred north of the patch in creekflat paperbark forest. The sparse shrub stratum comprised native and exotic species, native species being *Notelaea longifolia*, *Dodonaea triquetra* and juvenile *Livistona australis* and *Casuarina glauca*. *Livistona* was possibly planted as part of bushland rehabilitation work. Native ground covers included *Gahnia sieberiana*, *Calochlaena dubia*, *Oplismenus imbecillis*, *Microlaena stipoides*, *Entolasia marginata* and *Hydrocotyle sibthorpioides*. *Calochlaena dubia* occurred at the drier upslope margin. Vines were a minor part of the community with *Gynochthodes jasminoides*, *Eustrephus latifolius* and *Kennedia rubicunda*.

The second, tiny patch, at Glades Bay Reserve was adjacent to the Parramatta River on a small creekflat adjacent to Parramatta

River. *Glochidion ferdinandi* dominated the gully above Morrisons Bay in Mallee Reserve, however it is unclear if this was a natural relic or opportunistic colonization following clearing.

Table 24. Typical structure of Cheese Tree Wet Forest

Strata	Height range (m)	Projective foliage cover %
Emergents	15-25	1-5
Canopy	5-12	20-70
Shrubs	0.7-2	1-2
Groundcover	0-0.7	5-20

Relationship to other Communities - Occupies moist locations between upslope enriched sandstone forests and estuarine communities.

Representative examples - Lane Cove National Park near Magdala Rd, Glades Bay Reserve.

Likely Previous Distribution - Currently restricted to two sites and not known if it previously occurred elsewhere in the LGA.



Figure 37. Cheese Tree Wet Forest near Magdala Road, East Ryde, (Site L12). Located on upper river bank between reedland and sandstone woodland.

Discussion and Conclusions

What was learnt?

Detailed quantitative and qualitative data was acquired across Ryde LGA, providing a detailed description of the local vegetation. Some local descriptions were significantly different to generic descriptions given in the Eastern NSW Vegetation Mapping (DCCEE 2025) owing to specific local habitat features. Much of the mapped native vegetation on clay soil, or adjacent to developed areas, was found to be in very poor condition and threatened with local extinction as functioning ecosystems.

New species and new populations of locally rare species (based on Kubiak 2005) were recorded: *Anthosachne scabra*, *Cymbidium suave*, *Dendrocnide excelsa*, *Einadia trigonos*, *Eragrostis leptostachya*, *Eucalyptus fibrosa*, *Hydrocotyle verticillata*, *Leonema dentatum*, *Ottochloa gracillima*, *Paspalidium distans*, *Polyscias murrayi*, *Senecio linearifolius*, *Seringia arborescens*. One plant species and two plant communities were considered rare and worthy of assessment as being declared "threatened" under the Biodiversity Conservation Act, 2016. These were:

Western Sydney Complex Dry Rainforest and (south of the Hunter River) Lower North Coastal Hills Red Gum Grassy Forest and the vine *Celastrus subspicata*.

Accuracy of State Government mapping in Ryde

Data from the original survey (Thomas 2023) was used by DCCEEW in the 2024 mapping update. The survey ground-truthed earlier broad-scale mapping in Ryde (DPE 2021) finding it largely accurate, but with some significant differences including:

- The unexpected extent of influence of clay enrichment on many PCTs. This required reassessment of community boundaries in sandstone habitats, and the areas they covered.
- Small patches of new PCTs were discovered or confirmed. Some of these did not strictly conform to existing PCT descriptions. Examples were: 3807, 3810, 4010 (Table 2). Three others (3082, 3445 and 4025) were disjunct occurrences.
- Aerial photographic interpretation sometimes misidentified small areas where non-local tree species had been planted or where vegetation structure had been severely altered due to infrastructure construction.
- Quadrats in sandstone habitat sometimes revealed tiny areas of PCTs that were too small to be feasible to map, indicating the need for careful interpretation and location of survey sites that are truly representative of the survey area.
- One proposed community (Illawarra North-Pittwater Bangalay Moist Forest PCT 3155) was found to be invalid when the vegetation was identified as a variant of Blue Gum High Forest.
- Three PCTs (3136, 3262 & 3592) were found to have distinctive variants that occurred in predictable microhabitats, but were not recognised the DCCEEW or other mapping descriptions.
- Investigation of old cleared areas confirmed anticipated pre-clearing vegetation, but significantly revised areas and boundaries.

The NSW State Government revises and updates the Eastern NSW Vegetation map each year. Comments on map accuracy are therefore transitory as errors and information gaps are likely to be addressed in the subsequent update. An example of this process in Ryde is the original conclusion that there was no Blue Gum High Forest (NPWS 2000). This was updated in OEH 2013 to include BGHF and revised in the most recent mapping to show BGHF once covered 1552 ha (DCCEEW 2025), 40% of the LGA.

139 quadrats were surveyed for this report and each assessed using the Eastern NSW Plot to PCT Assignment Tool. These were compared to the PCT descriptions in BioNet data. The assignment tool uses quadrat data to identify PCTs that most closely match the baseline data. These are arranged in decreasing alignment with BioNet PCT descriptions. Interpretation accuracy depends on bushland quality, survey methodology and the existing baseline data. Using the Plot to PCT tool in the 2023 Ryde survey showed:

- 74 % of Match 1 assignments accurately identified the PCT
- 10 % of PCTs aligned with Match 2 assignments
- 7 % of PCTs were not predicted in the first five match options
- Numerous suggested matches were questioned.

Assessment of the 2025 survey showed:

- 80 % of all Match 1 assignments accurately identified the PCT
- 88 % of Match 1-3 assignments were accurate allowing for sites that failed the environmental threshold test
- 5 % of PCTs were not predicted in the first five options
- 7 % of PCTs all matches were questioned.

The basic reasons for questioned and non-assigned PCTs were:

- Different interpretations of the vegetation based on specific vegetation features. These mainly comprised: Scribbly Gum Woodland (PCT 3586)/Sydney Coastal Bloodwood Shrub Forest (PCT 3593); wetland communities of *Casuarina glauca* and *Melaleuca linariifolia* mixes (PCTs 3962/4010/4028); rockplate vegetation (PCTs related to 3810 and adjacent vegetation). Some assigned PCTs were "placeholders"
- Significantly modified relic vegetation but were considered worthy of survey
- Significant structural and habitat differences (e.g. The PCT 3807 assignment was based on structure although Plot to PCT assigned PCT 3595 based on floristics).

Need for Local studies

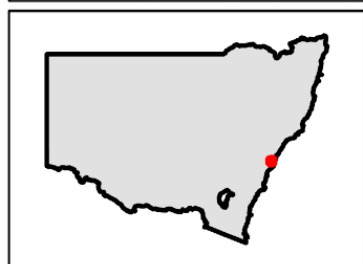
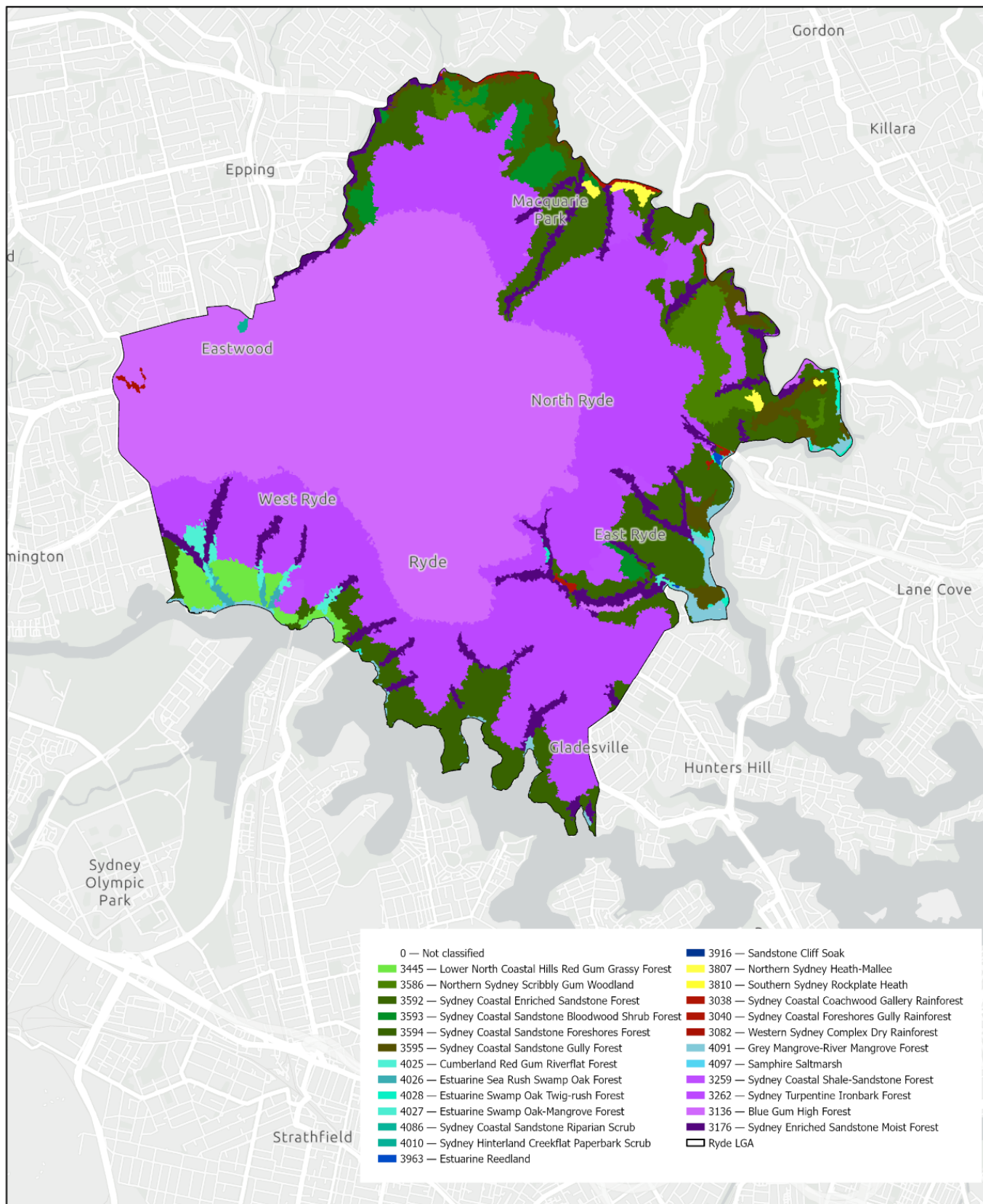
The above findings show that local studies that are detailed and compatible with the broad-scale State vegetation mapping program, can provide additional benefits to users at local, State and Federal levels regarding extant and pre-clearing native vegetation. Local studies can include information about local vegetation variants, locally extinct species and other historical data that add to better understanding of the plant communities.

Broad-scale mapping provides an excellent tool for identification of PCTs, but there are unlikely to be the resources required to identify and describe fine details of habitat and PCT variation that are necessary for understanding local biodiversity, and provide data for best management practice of local bushland.

It is important to rehabilitate what is left

The bushland in Ryde has been reduced to about 10% of its pre-settlement extent (Table 1) and much of this is in poor condition, especially in small, or fragmented remnants. Some previously extensive plant communities are now less than one hectare in area (PCTs 3445, 4025, 4026). One is less than 3.5 ha (PCT 3594), and viable areas of PCT 3136 are probably less than 10 ha, despite 2025 mapping showing 50 ha. PCTs that occurred naturally as small areas (3082, 3040, 3972, "4010", 4027, 4097) are also threatened with local extinction. Without adequate and appropriate management, many remnants will continue to degrade, making them practically unrestorable in the future.

The permanent loss of these historical landscape elements, plant communities and habitats would be significant at local, state, national or international levels. Nine of these communities in Ryde are listed as endangered or critically endangered (PCTs 3136, 3262, 3963, 3972, 4025, 4026, 4027, 4028, 4097). Although similar examples of these occur in other parts of Sydney, this and other local studies have shown that there is often significant natural variation within the same plant community. It is therefore important that where possible, this diversity be maintained or restored and managed permanently across the full range of the distribution of each plant community.



1750 State Vegetation Type Map - Ryde

0 0.5 1 1.5 2 km
Datum/Projection: GCS GDA 1994



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Figure 38. Likely extent of pre-settlement plant communities in Ryde LGA.

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References

- Benson, D.H. (1984) *Vegetation of Macquarie Hospital Bushland, Twin and Cressy Roads, East Ryde*. Unpublished report, Royal Botanic Gardens Sydney.
- Benson, D. & Howell, J. (1990) *Taken for Granted – The Bushland of Sydney and its Suburbs*. Royal Botanic Gardens, Sydney.
- Benson, D. & Howell, J. (1994) The natural vegetation of the Sydney 1:100 000 map sheet *Cunninghamia* 3: 677-787.
- Benson, D.H. & Keith, D.A. (1984) Unpublished floristic list for Brush Farm Park (11/4/1984). Royal Botanic Gardens, Sydney.
- BioNet Atlas plot export. Accessed 15/2/2026
- BioNet. Quantitative export data. Accessed 10/2/2026.
- Broadbent, J. & Buchanan, R. (1984) *Native Vegetation of Brush Farm Park, Eastwood*.
- City of Ryde. Historic photograph collection (held at Top Ryde Library).
- Colyer, P. & James, T. (2011) *Mapping & Assessment of Key Vegetation Communities across the Ku-ring-gai Local Government Area. Vol 2: Vegetation Communities*. Report to Ku-ring-gai Council.
- Coveny, R. (1978) Unpublished species list for Brush Farm Park. Royal Botanic Gardens, Sydney.
- Coveny, R. (1982). Unpublished species list for Darvall Park prepared for Friends of Darvall Park. Royal Botanic Gardens, Sydney.
- Department of Lands (NSW) (2002) *Parramatta River 9130-3N 1:25000 contour map*. NSW Department of Lands.
- Department of Climate Change Energy Environment and Water (NSW) (2025) *NSW State Vegetation Type Map, Version C2.0M2.2 DCCEEW (NSW) December 2025*.
- Department of Planning and Environment (NSW) (2021) *Eastern NSW PCT Classification. V1.1.0*
- Department of Planning and Environment (NSW) (2023) *State Vegetation Type Map, Version C2:M2 2023*.
- eSpade website of NSW Department of Planning, Industry & Environment (2019). *Soil Landscapes*. Accessed November, 2019.
- Floyd, A.G. (1990) *Australian Rainforests in New South Wales*. Surrey Beatty & Sons, Rickard Rd, Chipping Norton, NSW.
- Gammage, B. (2012) *The Biggest Estate on Earth – How Aborigines made Australia*. Allen & Unwin, Sydney.
- Hawkins, R. (1994) *The Convict Timbergetters of Pennant Hills*. Hornsby Shire Historical Society, Hornsby.
- Kartsoff, M. (1969) *Nature and a City*. Edwards & Shaw Pty. Ltd, Sydney.
- Keith, D.A. (1984) Unpublished species list for Macquarie Hospital bushland (5/6/1984). Royal Botanic Gardens, Sydney.
- Kubiak, P.J. (2005) *Native Plants of the Ryde District – The Conservation Significance of Ryde’s Bushland Plants*. Unpublished report for City of Ryde October 2005.
- Kubiak, P.J. (1989-1995) Unpublished plant species lists of various reserves in Ryde.
- NSW NPWS (2000) *The Native Vegetation of the Cumberland Plain, Western Sydney – Technical Report*, NSW National Parks & Wildlife Service, Hurstville.
- NSW Scientific Committee (1995) *Final Determination for Blue Gum High Forest*. Government Gazette.
- OEH (2013) *The Native Vegetation of the Sydney Metropolitan Area. Version 2*. NSW Office of Environment & Heritage, Sydney.
- OEH (2016) *The Native Vegetation of the Sydney Metropolitan Area – Version 3*. NSW Office of Environment & Heritage, Sydney.
- PlantNet NSW floraOnline [URL](#)
- Ryde City Council (1996) *Plan of Management – Natural Areas*. Unpublished report, Ryde City Council.
- Shearer, W.G. & Jenkins, B.W. (1979) *Resource Book for Field Studies in the Ryde District*. System Press Pty Ltd.
- Specht, R. L. (1970) *Vegetation*. In Leeper, G.W. (ed) *Australian Environment*. 4th edn. Melbourne University Press, Melbourne.
- Steffensen, V. (2020) *Fire Country*. Hardie Grant Travel, Melbourne.
- Thomas, D. (2023) *The native plant communities of Ryde*. Unpublished document.
- Thomas, D. (1984-2020) Unpublished plant species lists of various reserves in Ryde.
- Walker, J. & Hopkins, M.S. (1990) *Vegetation*. In McDonald et. al. *Australian Soil and Land Survey. Fieldbook*. Inkata Press, Melbourne & Sydney.
- Wallace, R. (1987) *100 Years of the Field of Mars Reserve, 1887-1987*. Ryde Hunters Hill Flora and Fauna Preservation Society.

Appendix 1. Survey data used in Thomas, Plant Communities of Ryde LGA 2026.

Quadrat	BioNet quadrat No.	Report site number
Lower Barton Reserve	Bart01	Ba1
Brush Farm House	BFP03	Bf3
Brush Farm Park	BFP01, 02, 04	Bf1, Bf2, Bf4
Burrows Park	BurPark01	Bu1
Darvall Park	DarvPark04,05	Da4, Da5
Epping Road, below Herring Rd	Ivan01, 02	Ep1, Ep2
Field of Mars Reserve	FoM01-23	F1-F23
Glades Bay Park	GladBayPark01, 02	Gl1, Gl2
Greenwood Park	GrePark01	Gr1
Koonadan Reserve	Koo01	Ko1
Lane Cove National Park	LaneCoveNP01-70 excl: 19, 35, 39-42, 58	L1-L70 excl: 19,35,39-42,58
Macquarie University	MacUni01-05	Mq1-Mq5
Magdala Park	Magd01	Mg1
Marsden Park	MarsPark01, 02	Ma1, Ma2
Meadowbank Park	MeadPark01	Me1
Memorial Park	Mem01	Mm1
Minga Reserve	Ming01	Mi1
Myall Park	BlenPark01	My1
Pidding Park	PiddPark01	Pi1
Pryor Park	PryoPark01	Pr1
Ryde Hospital	RydeHosp01, 02	Rh1, Rh2
Stewart Park	StewPark01, 02	St1, St2
Tasman Reserve	TasmPark01, 02	Ta1, Ta2
Terrys Creek	Ter01-04	Te1-4,
Wallumatta Nature Reserve	WallNR01-03	Wl1-Wl3
Waterloo Park	WatePark01	Wt1
Yinnell Reserve	Yinn01	Yi1
Yurrah Reserve	Yurr01	Yu1

Quadrats submitted but not shown in Atlas

Brush Farm Park, Eastwood	BFP05	Bf5
ELS Hall Park, Ryde	ElsHallPk01	Ha1
Forrester Park, Eastwood	ForrPk01	Fo1
Kittys Ck Reserve, East Ryde	Kittys01, 02	Ki1, Ki2
Koonadan Res	Koo02	Ko2
North Ryde RSL, North Ryde	NRydeRSL01	Rs1
Terrys Ck, Marsfield	Ter07	Te7
Yinnell Reserve, East Ryde	Yinn01	Yi1
Yurrah Reserve, Macquarie Park	Yurr01	Yu1

Transects shown in Figs 2 & 3

Denistone Park		DeT
Browns Waterhole, Lane Cove NP		L42T
Lynn Park		LyT
Macquarie Hospital		MhT
Moore Park		MoT
Miriam Park		MrT
Pindari Park		Pn1
Putney Park		PuT
Ryde Hospital		RhT
