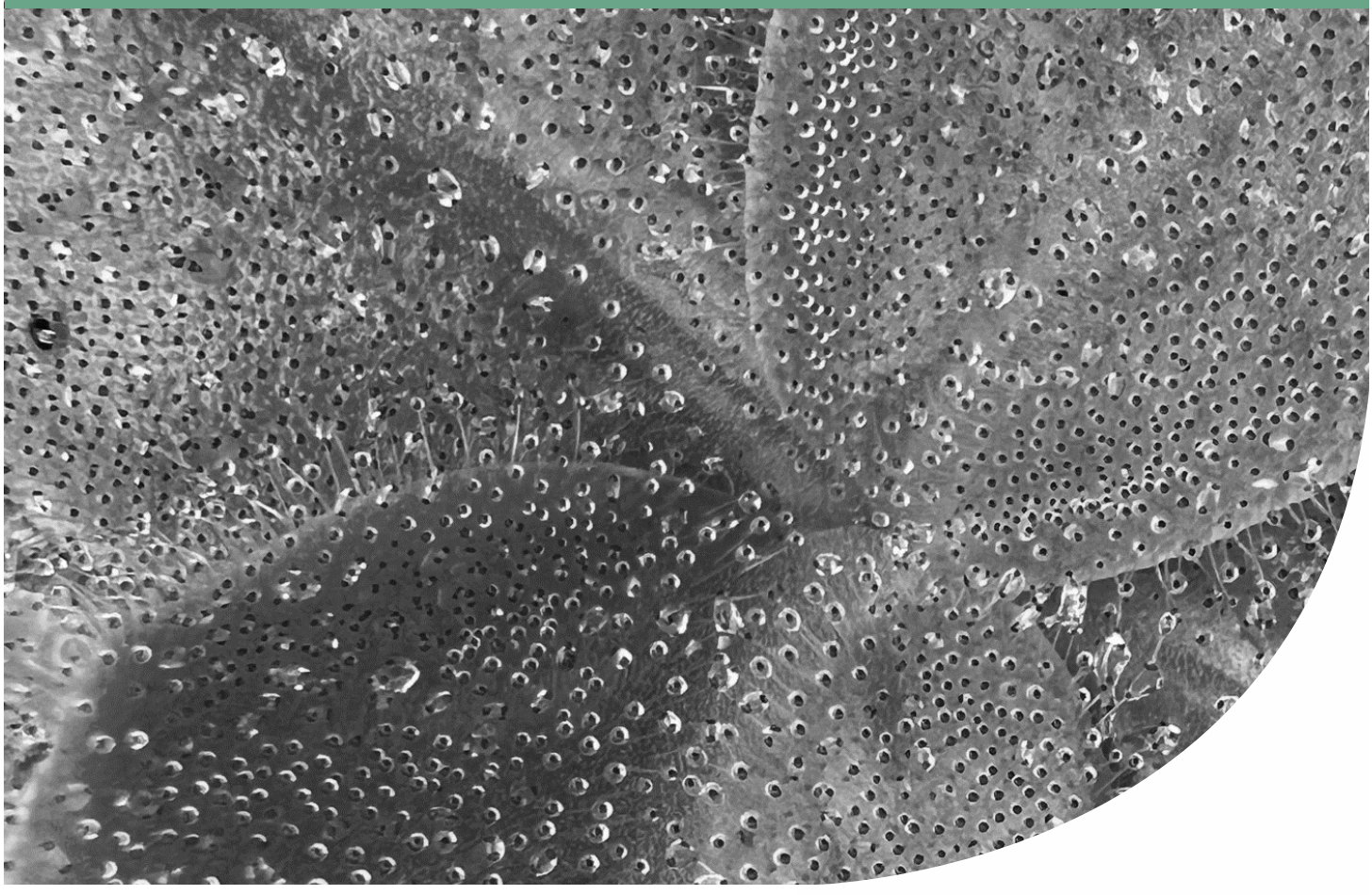
Detailed Flora and Vegetation Assessment

Lot 500 and Part Lot 501 Warton Road, Canning Vale

Project No: EP23-053(04)

Prepared for Department of Finance
October 2024



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Executive Summary

The Department of Finance engaged Emerge Associates to conduct a flora and vegetation assessment within lot 500 and part Lot 501 Warton Road in Canning Vale (the 'site').

The assessment included a desktop study of the environmental context of the site and the likelihood of occurrence of threatened and priority flora and ecological communities. Field surveys were conducted on several dates between July 2023 and May 2024 during which the composition and condition of vegetation was recorded. Flora and vegetation values were characterised to the standard required of a detailed survey with reference to EPA (2016b).

Outcomes of the assessment include the following:

- A total of 193 native and 59 non-native species were recorded within the site.
- One flora species listed as priority 2 in Western Australia, *Poranthera moorokatta,* was recorded. A total of 1,579 individuals were recorded and a total population of approximately 70,000 is estimated to occur in the site.
- No threatened flora species were recorded. Given that the survey effort was comprehensive and that the survey was undertaken at a suitable time of year no threatened flora are considered to occur in the site.
- Vegetation was classified into 13 vegetation units, of which 12 comprise native vegetation (63.65% of the site) and one comprises non-native vegetation (36.35%). The native vegetation occurs in 'excellent' to 'degraded' condition, with the condition of 3.90 ha of vegetation unable to be determined due to recent fire. The non-native vegetation was identified in 'completely degraded' condition.
- Two threatened ecological communities (TECs) and three priority ecological communities (PECs) were identified:
  - 'Banksia woodlands of the Swan Coastal Plain' TEC (38.62 ha)
  - 'Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain ecological community' TEC (4.69 ha)
  - '*Banksia ilicifolia* woodlands, southern Swan Coastal Plain ('floristic community type 22')' PEC (1.95 ha)
  - 'Banksia woodlands of the Swan Coastal Plain' PEC (38.62 ha)
  - 'Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain ecological community' PEC (4.69 ha).
- Vegetation within the site may provide habitat to a range of native fauna species, including threatened and priority species.

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Abbreviation Tables

Table A1: Abbreviations – Organisations

Organisations	
DBCA	Department of Biodiversity, Conservation and Attractions
DoW	Department of Water (now DWER)
DWER	Department of Water and Environmental Regulation
EPA	Environmental Protection Authority
WALGA	Western Australia Local Government Association

Table A2: Abbreviations – General terms

General terms	
A	Annual
CR	Critically endangered
EN	Endangered
FCT	Floristic community type
IBRA	Interim Biogeographic Regionalisation for Australia
NVIS	National Vegetation Information System (ESCAVI 2003)
P1	Priority 1
P2	Priority 2
P3	Priority 3
P4	Priority 4
P5	Priority 5
PEC	Priority ecological community
P	Perennial
PG	Perennial geophyte
T	Threatened
TEC	Threatened ecological community
VU	Vulnerable

Table A3: Abbreviations – Legislation

Legislation	
BAM Act	*Biosecurity and Agriculture Management Act 2007*
BC Act	*Biodiversity Conservation Act 2016*
CALM Act	*Conservation and Land Management Act 1985*
EP Act	*Environmental Protection Act 1986*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
SCRM Act	*Swan and Canning Rivers Management Act 2006*

Table A4: Abbreviations – Units of measurement

Units of measurement	
cm	Centimetre
ha	Hectare
km	Kilometre
m	Metre
m AHD	m in relation to the Australian height datum
mm	Millimetre

1 Introduction

1.1 Purpose

Emerge Associates (Emerge) were engaged by the Department of Finance to conduct a flora and vegetation assessment within Lot 500 and part Lot 501 Warton Road in Canning Vale as shown in **Figure 1** (referred to herein as the 'site').

Flora and vegetation assessments are required to characterise vegetation values and, in particular, confirm the presence or absence of values relevant to environmental approvals process, such as, 'native vegetation', 'threatened' flora, 'priority' flora, 'threatened ecological communities' (TECs), 'priority ecological communities' (PECs) and weeds.

1.2 Legislation and policy

'Native vegetation' is defined by the *Environmental Protection Act 1986* (EP Act) as indigenous aquatic or terrestrial flora. In the *Environmental Factor Guideline – Flora and Vegetation* the EPA further defines it as native vascular flora and defines vegetation as groupings of flora (EPA 2016a). Native vegetation is protected in Western Australia and can't be cleared without a permit or valid exemption. Biological diversity, habitat function, scarcity, association with wetlands and other ecosystem services influence the value placed on native vegetation (DWER 2018a). Planted flora and vegetation are generally not regarded as native vegetation unless required to be established under the EP Act or other written law or regulation.

Flora and ecological communities may be listed as threatened under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (DCCEEW 2021) and the State *Biodiversity Conservation Act 2016* (BC Act) (DBCA 2022c, 2023d). Threatened flora and TECs are classified as either 'critically endangered'(CR), 'endangered' (EN) and 'vulnerable' (VU) (DCCEEW 2021). Commonwealth and/or State ministerial approval is required to impact threatened flora or TECs.

Native flora and ecological communities that are not listed as threatened, but are otherwise considered rare or under threat, may be added to a Department of Biodiversity Conservation and Attractions (DBCA) priority list (DBCA 2022b, c). 'Priority flora' and PECs are classified as either 'priority 1' (P1), 'priority 2' (P2), 'priority 3' (P3) or 'priority 4' (P4). They do not have direct statutory protection. However, their priority classification is taken into account during State and Local government approval processes.

Flora that are regarded as having negative environmental or economic impacts are often referred to as weeds (DBCA 2023f). Particularly detrimental weed species may be listed as a 'declared pest' pursuant to the State *Biosecurity and Agriculture Management Act 2007* (BAM Act) or as a 'weed of national significance' (WoNS) (DAWE 2021). Management of weeds, declared pests and WoNS may be required during government approval processes.

Further information on legislation and policy relevant to flora and vegetation assessments is provided in **Appendix A**.

1.3 Scope of work

The Environmental Protection Authority (EPA) *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment* establishes standards for the assessment of flora and vegetation in Western Australia (EPA 2016b). The scope of work was to undertake a detailed survey with reference to EPA (2016b).

As part of this scope of work, the following tasks were undertaken:

- Desktop study to provide contextual information and determine the likelihood of occurrence of threatened and priority flora or ecological communities.
- Field surveys to record flora, vegetation units and vegetation condition.
- Analysis and mapping of contextual information, vegetation units, vegetation condition and threatened and priority flora or ecological communities (if present).
- Documentation of the desktop study, methods, results, discussion and conclusions.

2 Desktop Study

2.1 Site context

2.1.1 Location and extent

The site is located in the City of Gosnells in the Perth metropolitan area of Western Australia and extends over 80.93 hectares (ha) as shown in **Figure 1**. The site is bounded by Nicholson Road to the west, Melaleuca Women's Prison and Hakea Prison to the north-east and Warton Road to the south-east. The site includes the Banksia Hill Detention Centre buildings and infrastructure which was not included in the field surveys outlined in **Section 3.1**.

2.1.2 Climate

The Perth metropolitan region of Western Australia experiences a Mediterranean climate of hot dry summers and cool wet winters (BoM 2024). Recent rainfall at the closest weather station to the site has been generally consistent with long term averages (see **Plate 1**) (BoM 2024). Flora and vegetation surveys should be undertaken during the season that is most suitable for detection and identification of the range of flora likely to occur in the area (EPA 2016b). For the south-west botanical province in which the site lies, the primary survey time is spring (September to November) (EPA 2016b).

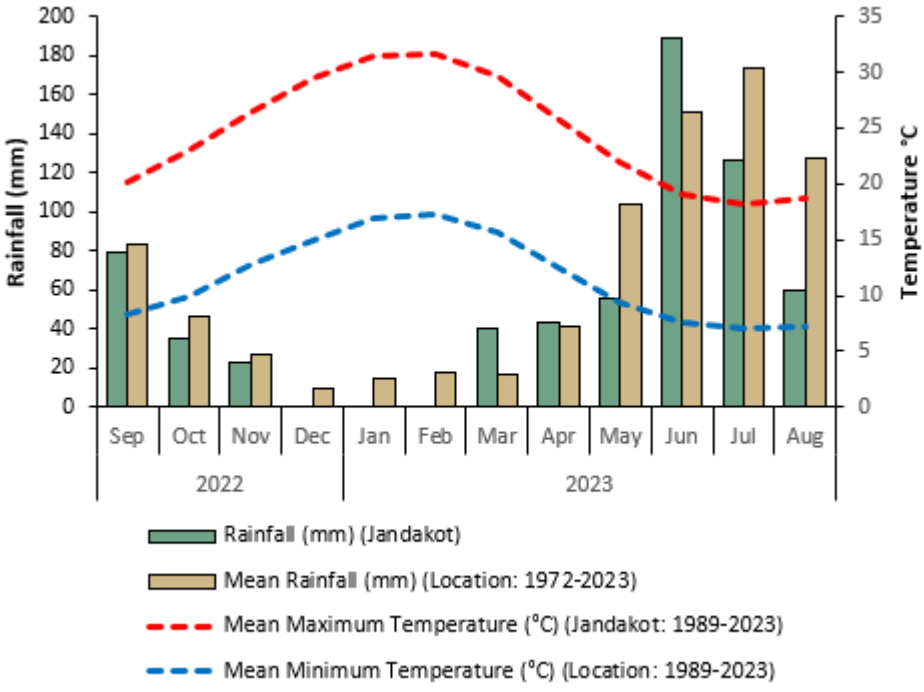

Plate 1: Recent rainfall and long-term mean temperature and rainfall at Jandakot weather station

2.1.3 Geomorphology and soils

The site occurs on the Swan Coastal Plain, which is the geomorphic unit that characterises much of the Perth metropolitan area. The Swan Coastal Plain is approximately 500 km long and 20 to 30 km wide and is roughly bounded by the Indian Ocean to the west and the Darling Scarp to the east. Broadly, the Swan Coastal Plain consists of two sedimentary belts of different origin: its eastern side comprises the Pinjarra Plain which formed from the deposition of alluvial material washed down from the Darling Scarp and its western side comprises three dune systems that run roughly parallel to the Indian Ocean coastline. These dune systems, referred to as Quindalup, Spearwood and Bassendean associations, represent a succession of coastal deposition and, as a result, they contain soils at different stages of leaching and formation (Kendrick *et al.* 1991).

Physiographic mapping places the site within the Bassendean dune association (Gozzard 2011). Examination of broad scale soil mapping places the site within the Southern River association which comprises sand plains with low dunes and intervening swamps, iron or humus podzols, peats and clays (Churchward and McArthur 1980).

Fine scale soil landscape mapping by DPIRD (2022) shows four units as occurring within the site, as described in **Table 1** and shown in **Figure 2**.

Table 1: Soil landscape mapping units within the site (DPIRD 2022)

Soil landscape unit	Location within site	Description
Bassendean B1 phase	Central and north-eastern portion	Extremely low to very low relief dunes, undulating sandplain and discrete sand rises with deep bleached grey sands sometimes with a pale yellow B horizon or a weak iron-organic hardpan at depths generally greater than 2 m.
Bassendean B2 phase	Eastern portion and western boundary	Flat to very gently undulating sandplain with well to moderately well drained deep bleached grey sands with a pale yellow B horizon or a weak iron-organic hardpan 1-2 m.
Bassendean B3 phase	Small intersection with site in southern portion	Closed depressions and poorly defined stream channels with moderately deep, poorly to very poorly drained bleached sands with an iron-organic pan, or clay subsoil. Surfaces are dark grey sand or sandy loam.
Bassendean B4 phase	South-western portion (associated with wetland features)	Broad poorly drained sandplain with deep grey siliceous sands or bleached sands, underlain at depths generally greater than 1.5 m by clay or less frequently a strong iron-organic hardpan.

The site is not known to contain any restricted landforms or unique geological features.

2.1.4 Topography

The elevation of the site ranges from 26 m in relation to the Australian height datum (mAHD) in the central portion to 45 mAHD in the northern portion (DoW 2008) (**Figure 2**).

2.1.5 Hydrology and wetlands

Wetlands are areas of seasonally, intermittently or permanently waterlogged land such as poorly drained soils, ponds, billabongs, lakes, swamps, tidal flats, estuaries, rivers and their tributaries (Wetlands Advisory Committee 1977). Wetlands can be recognised by the presence of vegetation

associated with waterlogging or the presence of hydric soils such as peat, peaty sand or carbonate mud (Hill *et al.* 1996).

Wetlands of national or international significance may be afforded special protection under Commonwealth or international agreements. Review of the *Ramsar List of Wetlands of International Importance* (DBCA 2017) and *A Directory of Important Wetlands in Australia – Western Australia* (DBCA 2018) indicates that no Ramsar or listed 'important wetlands' are located within or near the site.

The *Geomorphic Wetlands of the Swan Coastal Plain* dataset maps geomorphic wetland features and classifies them based on their landform shape and water permanence (DBCA 2023a). Each wetland feature is assigned to one of three management categories: 'conservation', 'resource enhancement' and 'multiple use'. A review of the *Geomorphic Wetlands, Swan Coastal Plain* dataset indicated that two multiple use wetland features (unique feature identifiers (UFI) 7069 and 7079), both identified as 'dampland' features, occur within the south-western portion of the site (DBCA 2023a). The location of the wetlands is shown in **Figure 3**.

The Department of Water and Environmental Regulation (DWER) hydrography linear dataset (DWER 2018b) records one 'area subject to inundation' within the western portion of the site, associated with UFI 7079.

2.1.6 Regional vegetation

Native vegetation is described and mapped at different scales to illustrate patterns in its distribution. At a continental scale the *Interim Biogeographic Regionalisation for Australia* (IBRA) divides Australia into floristic subregions (Environment Australia 2000).

The site is contained within the Swan Coastal Plain IBRA region and within the 'SWA02' or Perth subregion. The Perth subregion is characterised by mainly banksia low woodland on leached sands with melaleuca swamps where ill-drained; and woodland of *Eucalyptus gomphocephala* (tuart), *E. marginata* (jarrah) and *Corymbia calophylla* (marri) on less leached soils (Beard 1990). This subregion is recognised as a biodiversity hotspot and contains a wide variety of endemic flora and vegetation types.

Variations in native vegetation can be further classified based on regional vegetation mapping. Heddle *et al.* (1980) mapping shows the site as comprising the 'Southern River complex', which is described as vegetation ranging from *Corymbia calophylla – Eucalyptus marginata – Banksia* spp. with riparian vegetation of *Eucalyptus rudis* and *Melaleuca rhaphiophylla* along creek beds.

The Southern River complex was determined to have 18.43% of its pre-European extent remaining on the Swan Coastal Plain in 2018, with 1.37% protected for conservation purposes[1] (Government of Western Australia 2019).

[1]Defined as being listed in the DBCA-legislated lands and waters dataset as either Crown reserves or lands managed under Section 8A of the CALM Act that have an IUCN category of I – IV (Government of Western Australia 2019).

2.1.7 Threatened and priority flora

The Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) has compiled various datasets relating to 'matters of national environmental significance' (MNES) (DCCEEW 2023). The *Protected Matters Search Tool* provides general guidance on threatened flora listed under the EPBC Act that may occur within a location based on validated records and less reliable unvalidated habitat distribution modelling (DCCEEW 2023).

DBCA's *Threatened and Priority Flora Database* and *WA Herbarium Database* contain records of threatened and priority flora in Western Australia (DBCA 2023e). Searches of these databases provide point data for threatened and priority flora within a location, comprising validated and historical unvalidated records.

The *Protected Matters Search Tool* (DCCEEW 2023) and DBCA's threatened and priority flora databases (reference no. 12-0723FL) identified 29 threatened and 61 priority flora occurring or potentially occurring within a 10 km radius of the site (refer **Appendix B**).

2.1.8 TECs and PECs

The *Protected Matters Search Tool* provides general guidance on TECs listed as CR and EN under the EPBC Act that may occur within a location based on reliable records and less reliable habitat distribution modelling (DCCEEW 2023).

DBCA's *Threatened and Priority Ecological Community buffers and boundaries in WA* dataset contains validated records of TECs and PECs. Searches of this dataset provides buffered polygons of TEC and PEC records.

The *Protected Matters Search Tool* and DBCA's TEC and PEC database (reference no. 07-0723EC) identified 12 TECs and eight PECs occurring or potentially occurring within a 10 km radius of the site (refer **Appendix C**).

2.1.9 Historical land use

Review of historical images available from 1953 onwards shows that the majority of the site has supported native vegetation since that time (WALIA 2023). Clearing for the construction of residential properties in the north-western portion of the site occurred between 1979 and 1983, which included the clearing of vegetation to the south of the properties, which has since regrown. A fire occurred across the southern portion between 1994 and 1995, and the clearing for the construction of a shooting range within the central portion of the site occurred between 1995 and 2000.

The clearing of vegetation and construction of the Banksia Hill Detention Centre buildings and infrastructure occurred between 1995 and 2000. Informal tracks and firebreaks within the site have been cleared over several years, with an informal track within the southern portion that was previously cleared between 1987 and 1989 bituminised between 2008 and 2010. Aerial imagery within the site is obscured between 2003 and 2008. No changes in vegetation within the site are discernible during this period.

Vegetation within the northern, western and eastern portions of the site was burnt between 12 July and 31 August, as evidenced through site visits and a review of aerial imagery.

2.1.10 Bush Forever

The Government of Western Australia's *Bush Forever* policy is a strategic plan for conserving regionally significant bushland within the Swan Coastal Plain portion of the Perth Metropolitan Region. The objective of *Bush Forever* is to protect representations of all original ecological communities by targeting a minimum of 10% of each vegetation complex for protection (Government of WA 2000). *Bush Forever* sites are representative of regional ecosystems and habitat and have a key role in the conservation of Perth's biodiversity.

The majority of the site is located within Bush Forever Site 472 (Canning Vale Prison Bushland), which extends to the north-west and east. Bush Forever Site 472 is known to support *Caladenia huegelii* (listed as endangered under the EPBC Act and critically endangered under the BC Act).

Bush Forever Site 253 (Harrisdale Swamp and Adjacent Bushland, Forrestdale) is located adjacent to the south and east of the site, whilst Bush Forever Site 389 (Acourt Road Bushland, Banjup) is located to the west.

The locations of the Bush Forever sites in context of the site are shown in **Figure 3**.

2.1.11 DBCA managed or legislated land

DBCA has tenure of, or interests in, numerous areas of land across the state for a range of purposes. Tenure categories include national parks, nature reserves, conservation parks, marine parks, marine nature reserves, marine management areas, section 5(1)(g) reserves, state forest and timber reserves. These areas are mapped within the *Legislated Lands and Waters* (DBCA 2023b) and *Lands of Interest* (DBCA 2022a) datasets. The *Legislated Lands and Waters* (DBCA 2023b) dataset includes lands subject to the *Conservation and Land Management Act 1984* (CALM Act 1984), *Swan and Canning Rivers Management Act 2006* (SCRM Act) and lands identified under the *Land Administration Act 1997* (LA Act). The *Lands of Interest* (DBCA 2022a) dataset includes all other lands of which DBCA is recognised as the manager but is not vested under any act.

No DBCA managed lands occur within the site. Crown freehold land that is managed by DBCA under the CALM Act is located to the west and east of the site. The locations of the nearby DBCA managed lands are shown in **Figure 3**.

2.1.12 Ecological linkages

Ecological linkages are linear landscape elements that allow the movement of fauna, flora and genetic material between areas of habitat. This exchange of genetic material between vegetation improves the viability of this vegetation by allowing greater access to breeding partners and food sources, refuge from disturbances such as fire and maintenance of genetic diversity of Vegetation units and populations. Ecological linkages are ideally continuous or near-continuous as the more fractured a linkage is, the less ease flora and fauna have in moving within the corridor (Alan Tingay and Associates 1998).

The Perth Biodiversity Project, supported by the Western Australian Local Government Association (WALGA), identified and mapped regional ecological linkages within the Perth Metropolitan Region (WALGA and PBP 2004).

One ecological linkage (No. 48) is located within the northern and central portions of the site and extends to the east and west. Review of aerial imagery indicates that much of the vegetation within the site is connected to extensive areas of native vegetation within the local area. The location of the mapped ecological linkage is shown in **Figure 3**.

2.1.13 Previous surveys

No previous flora and vegetation surveys of the site are known to have been undertaken.

2.2 Likelihood of occurrence

The distribution and habitat preferences of the threatened and priority flora species and ecological communities listed in **Appendix B** and **Appendix C** was reviewed against site context information described in **Section 2.1**. Likelihood of occurrence of threatened and priority flora species and ecological communities within the site was classified as 'high', 'moderate', 'low' or 'negligible' as outlined in **Table 2**.

Table 2: Decision matrix for likelihood of occurrence of threatened and priority flora and ecological communities

		Distribution[1]	
		Reliable record within search area	No reliable record within search area
Habitat	Suitable	High	Negligible
	Potentially suitable	Moderate	
	Unsuitable	Low	

[1] Reliable record defined as validated, recent (within the last ~40 years) and spatially accurate (refer DBCA search meta data) in order to exclude unverified range or habitat projections.

2.2.1 Threatened and priority flora

One threatened and 11 priority flora were classified as having a 'high' or 'moderate' likelihood of occurrence within the site, as outlined in **Table 3**. The remaining threatened and priority flora were classified as having a 'low' or 'negligible' likelihood of occurrence within the site. The complete likelihood of occurrence assessment is provided as **Appendix B**.

Table 3: Threatened or priority flora species with a high or moderate likelihood occurrence in the site

Species	Status		Life strategy	Flowering period	Likelihood of occurrence
	WA	EPBC Act			
Caladenia huegelii	CR	EN	PG	Sep-early Nov	High
Calectasia grandiflora	P2	-	P	Jun-Nov	Moderate
Comesperma griffinii	P2	-	A/P	Oct	Moderate

Table 3: Threatened or priority flora species with a high or moderate likelihood occurrence in the site (continued)

Species	Status		Life strategy	Flowering period	Likelihood of occurrence
	WA	EPBC Act			
Johnsonia pubescens subsp. *cygnorum*	P2	-	P	Sep	Moderate
Poranthera moorokatta	P2	-	A	Sep-early Nov	Moderate
Thelymitra variegata	P2	-	PG	Jun-Sep	Moderate
Asteridea gracilis	P3	-	A	Sep-Dec	Moderate
Babingtonia urbana	P3	-	P	Jan-Mar	Moderate
Jacksonia gracillima	P3	-	P	Sep-Dec	Moderate
Phlebocarya pilosissima subsp. *pilosissima*	P3	-	P	Aug-Oct	Moderate
Jacksonia sericea	P4	-	P	Dec-Feb	Moderate
Thysanotus glaucus	P4	-	P	Oct-Mar	Moderate

CR=critically endangered, EN=endangered, P1-P4=Priority 1-Priority 4, A=annual, P=perennial, PG=perennial geophyte.

2.2.2 TECs and PECs

Four TECs and three PECs were classified as having a 'high' or 'moderate' likelihood of occurrence within the site, as detailed in **Table 4**. The remaining TECs and PECs were classified as having a 'low' or 'negligible' likelihood of occurrence within the site. The complete likelihood of occurrence assessment is provided as **Appendix C**.

Table 4: Threatened or priority ecological communities with a high or moderate likelihood of occurrence in the site

Community	Status		Likelihood of occurrence
	WA	EPBC Act	
Banksia attenuata and/or *Eucalyptus marginata* woodlands of the eastern side of the Swan Coastal Plain (floristic community type 20b as originally described in Gibson et al. 1994)	TEC (CR)	TEC (EN)	Moderate
Banksia ilicifolia woodlands, southern Swan Coastal Plain ('floristic community type 22')	PEC (P3)	TEC (EN)	Moderate
Banksia woodlands of the Swan Coastal Plain	PEC (P3)	TEC (EN)	High
Low lying *Banksia attenuata* woodlands or shrublands ('floristic community type 21c')	PEC (P3)	TEC (EN)	Moderate

3 Methods

3.1 Field survey

Botanists visited the site on the following dates to conduct the field survey:

- 12 July 2023
- 21 July 2023
- 12 September 2023
- 14 September 2023
- 15 September 2023
- 26 September 2023
- 28 September 2023
- 10 October 2023
- 17 November 2023
- 31 January 2024
- 27 March 2024
- 20 May 2024
- 25 May 2024.

The site was traversed on foot and the composition and condition of vegetation was recorded. Plant specimens were collected where the identity of flora required further confirmation. Photographic images and notes were recorded as required.

3.1.1 Targeted searches

Targeted searches were conducted for threatened and priority flora and ecological communities, with a particular focus on those with a high or moderate likelihood of occurrence (refer **Section 0**). Transects for flora were traversed approximately 2-10 m apart through areas of potentially suitable habitat, dependent on the target species and habitat suitability. Transects and records were marked using a hand-held GPS receiver (±5 m accuracy). Where possible, individual plants were recorded. Where population sizes were very large, sampling of a portion of the area of suitable habitat was undertaken and extrapolation was used to estimate the total number of individuals.

3.1.2 Sampling

Detailed sampling of the vegetation was undertaken using a combination of permanent 10 x 10 m quadrats and relevés. The quadrats were established using fence droppers bounded by measuring tape. The relevés were completed over an equivalent 10 x 10 m area without the use of physical markers and were included to provide a more rapid sample of patches of vegetation. The position[2] of each sample was recorded with a hand-held GPS receiver (±5 m accuracy).

The data recorded within each sample included:

- site details (site name, site number, observers, date, location)

[2] For quadrats the north-west corner was recorded.

- environmental information (slope, aspect, bare-ground, rock outcropping, soil type and colour, litter layer, topographical position, time since last fire event)
- biological information (species, plant specimens, vegetation structure, vegetation condition, 'foliage projective cover', and disturbance).

A total of 23 locations were sampled, comprised of 19 quadrats and four relevés, as shown in **Figure 4**.

3.1.3 Vegetation condition

The condition of the vegetation was assessed using the Keighery (1994) scale (**Table 5**). For vegetation in the site containing *Banksia* spp., the condition scale provided in the DoEE (2016) conservation advice for the 'banksia woodlands of the Swan Coastal Plain TEC' was applied in addition to the Keighery scale, as shown in **Table 5**.

Table 5: Vegetation condition scale applied during the field survey

Category	Definition (Keighery 1994)	Indicator (DoEE 2016)	
		Typical native vegetation composition^	Typical weed cover
Pristine	Pristine or nearly so, no obvious signs of disturbance.	Native plant species diversity fully retained or almost so	Zero or close to
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.	High native plant species diversity	Less than 10%
Very good	Vegetation structure altered obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.	Moderate native plant species diversity	5-20%
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.	Low native plant species diversity	5-50%
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.	Very low native plant species diversity	20-70%
Completely degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.	Very low to no native species diversity	Greater than 70%

^relative to the expected natural diversity for that vegetation.

3.2 Analysis and data preparation

3.2.1 Flora identification

Flora were identified through comparison with named material and through the use of taxonomic keys. Plant specimens collected during the field survey were dried, pressed and named in accordance with requirements of the Western Australian Herbarium (2024).

Flora was classified as native if indigenous to the IBRA region in which the site occurs. Non-native flora is denoted by '*' in text and raw data. The legal or policy status of flora was denoted using codes outlined in **Appendix A**.

3.2.2 Sampling adequacy

A species accumulation curve was plotted from sample data by generating a trendline (log) in Microsoft Excel. The trendline was forecast to locate the asymptote of the curve (the point at which the curve flattens), which provides an indication of amount of sampling that would be required before it can be assumed few species remain undetected.

Species richness was estimated in PRIMER v6 (Clarke and Gorley 2006). Jacknife1 and Chao2 non-parametric estimators are reported as these are known to perform well in comparison to simulated and real data sets and are also recommended for small sample sizes (Gotelli and Colwell 2011). Differences between recorded and estimated species richness was used to evaluate the adequacy of sampling effort.

3.2.3 Threatened and priority flora confirmation

Threatened and priority flora were confirmed as absent from the site where no significant limitation was identified that could have affected their detection (refer **Section 3.3**).

3.2.4 Vegetation unit identification and description

The vegetation units within the site were identified from the sample data collected during the field survey. The vegetation was described according to the dominant species present using the structural formation descriptions of the *National Vegetation Inventory System* (NVIS) (NVIS Technical Working Group 2017).

3.2.5 Floristic community type assignment

The identified vegetation units were compared to the regional 'floristic community type' (FCT) dataset *A floristic survey of the southern Swan Coastal Plain* (Gibson *et al.* 1994). Each sample was compared to Gibson *et al.* (1994) separately to limit the influence of spatial correlation when assigning an FCT. FCT analysis was not undertaken for samples located within disturbed vegetation with low native species diversity as the vegetation was considered unlikely to currently represent an FCT.

Sample data (presence/absence) was first reconciled with Gibson *et al.* (1994) by standardising the names of taxa with those used in the earlier study. This was necessary due to changes in nomenclature in the intervening period. Taxa that were only identified to genus level were excluded,

while some infra-species that have been identified since 1994 were reduced to species level. The combined dataset was then imported into the statistical analysis package PRIMER v6 (Clarke and Gorley 2006).

A resemblance matrix was generated using the Bray-Curtis distance measure which provided the percentage similarity between all pairs of samples. A cluster analysis was then performed using the resemblance matrix and hierarchical agglomerative clustering, to produce a dendrogram. Where a sample tended to cluster with a grouping of different FCTs, the resemblance matrix was examined. Ultimately a combination of cluster analysis, resemblance matrix and contextual information relating to the soils, landforms and known FCTs within the region was considered in the final determination of an FCT for vegetation within the site.

3.2.6 TEC and PEC confirmation

Vegetation units were assessed against TEC and PEC diagnostic characteristics and, if available, size and/or vegetation condition thresholds (DBCA 2023c). TECs and PECs were confirmed as absent from the site where no significant limitation was identified that could have affected their detection (refer **Section 3.3**).

3.2.7 Mapping

Environmental features, vegetation units, vegetation condition, threatened or priority flora or ecological communities were mapped on aerial photography using notes and data collected in the field.

3.3 Limitations

It is important to note constraints imposed on assessments and the degree to which these may have limited outcomes. An evaluation of the desktop study and methods applied in the current assessment against standard constraints outlined in the EPA document *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016b) is provided in **Table 6**.

Table 6: Evaluation of assessment against standard constraints outlined in EPA (2016b)

Constraint	Degree of limitation	Details
Availability of contextual information	No limitation	The broad scale contextual information described in **Section 2.1** is adequate to place the site and vegetation in context.
	No limitation	Regarding assignment of FCTs, the authoritative Gibson *et al.* (1994) dataset was derived from a necessarily limited sample of vegetation from largely publicly owned land which is now 30 years out of date. Consequently, it is unknown to what degree official FCTs are an appropriate reference for the biodiverse vegetation across the Swan Coastal Plain. However, in lieu of an alternative and as advised by DBCA, this dataset has been used for analysis. Gibson *et al.* (1994) collected data in the main flowering period (spring) and in many cases sampled plots multiple times to provide a complete species list. This detailed survey sampled the site twice during the main flowering period, which was considered sufficient sampling to compare data to the Gibson *et al* (1994) dataset.

Table 6: Evaluation of assessment against standard constraints outlined in EPA (2016b) (continued)

Constraint	Degree of limitation	Details
Experience level of personnel	No limitation	This flora and vegetation assessment was undertaken by qualified botanists with between two and 25 years of botanical experience in Western Australia. Technical review was undertaken by a senior environmental consultant with 13 years' experience in environmental science in Western Australia.
Suitability of timing	No limitation	In Mediterranean climates some flora spend part of their lifecycle as underground storage organs or seed to avoid excessive heat and drought over the summer period. These species, known as 'geophytes' or 'annuals', tend to re-emerge during winter and are often most visible during spring, which is the flowering period for the majority of plant species. Therefore, spring is the optimal time to complete flora and vegetation surveys in the south-west of WA. The survey was conducted over multiple days between September and November and thus within the main flowering season. Sufficient rainfall was recorded from June to August 2023 in the months preceding the site visits. Therefore, it is likely that many plant species would have been in flower and/or visible at the time of the survey. The survey timing was considered adequate to allow the detection of species for which seasonal timing is critical.
Temporal coverage	No limitation	Detailed flora and vegetation assessments can require multiple visits, at different times of year, and over a period of a number of years, to enable observation of all species present. The site was visited multiple times between September 2023 and May 2024. The reconnaissance survey undertaken in July 2023 provided an insight into the vegetation condition and composition outside of the main flowering period.
Spatial coverage and access	No limitation	Site coverage was comprehensive (track logged).
	No limitation	All parts of the site could be accessed as required. Access to the internal detention centre buildings was unavailable during the survey (shown in **Figure 4**). However, aerial imagery indicates this area supports hardstand and gardens which would not require survey and so this is not considered a limitation.
Sampling intensity	No limitation	A total of 252 flora species were recorded, of which 185 were recorded from 23 sample locations and 67 were recorded opportunistically. Minimum species richness within site is estimated at between 237 (Jacknife1) and 243 (Chao2) species (refer **Plate 2**). The number of species recorded in the site is greater than the two estimates which demonstrates that survey effort was adequate to prepare a near-comprehensive species inventory for the site.
Influence of disturbance	Limitation	Time since fire across the majority of the site is greater than five years as interpreted from aerial imagery and therefore short-lived species more common after fire may not have been visible.

Table 6: Evaluation of assessment against standard constraints outlined in EPA (2016b) (continued)

Constraint	Degree of limitation	Details
Influence of disturbance (cont.)	Limitation (cont.)	Where fire has recently occurred in the northern, western and eastern portions of the site, the vegetation units and condition could not be interpreted as the fires have occurred too close to the survey period. However, the fires occurred recently enough that short-lived species may have been present at the time of the survey within the burnt areas.
	No limitation	Historical ground disturbance was evident in parts of the site and some native vegetation in the site (within the eastern portion) is regrowth. The disturbance history of the site was considered when undertaking field sampling.
Adequacy of resources	No limitation	All resources required to perform the survey were available.

4 Results

4.1 Flora

4.1.1 Species inventory

A total of 252 species were recorded during the field survey. A summary of legal and policy status of flora records is provided in **Table 7**. A complete species list is provided in **Appendix D**.

Table 7: Summary of legal and policy status of taxa recorded in the site

Status	Unlisted	Threatened	Priority	Declared Pest	Planted	Total
Native	192	-	1	-	-	**193**
Non-native	50	-	-	1	8^	**59**
Total	242	-	1	1	8	**252**

^*Agonis flexuosa*, *Eucalyptus gomphocephala* and *Grevillea thelemanniana* occur on the Swan Coastal Plain, but are considered to be planted within the site (**Section 5.1.1**)

Sampling recorded 185 species from 23 samples. A further 67 species were recorded opportunistically across the site. A species accumulation curve derived from sample data is presented in **Plate 2**. Species richness was estimated to be between 237 (Jacknife1) and 243 (Chao2).

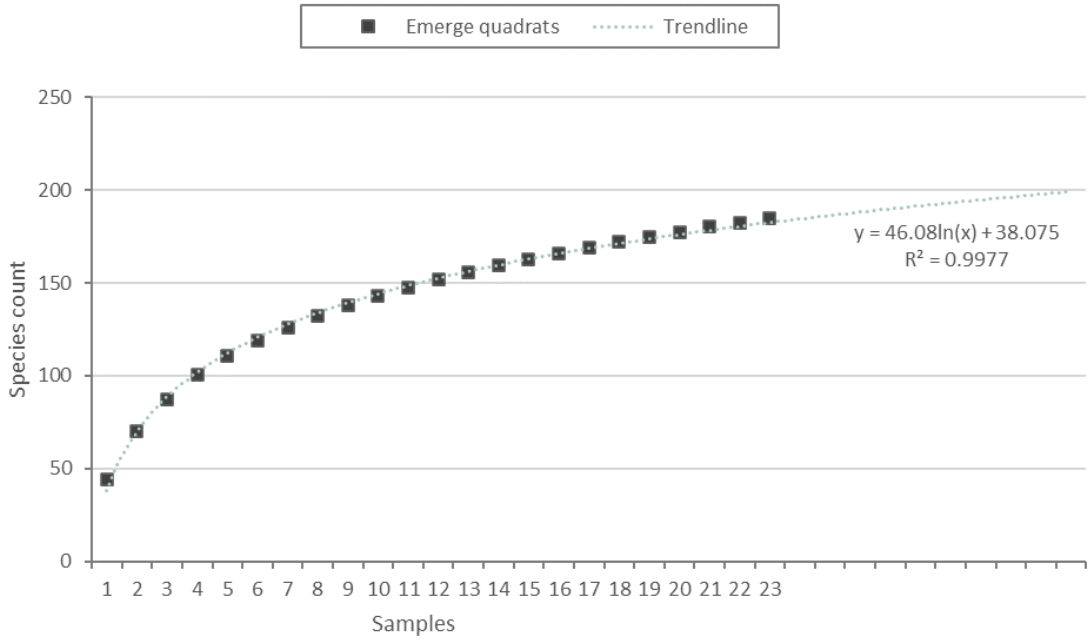

Plate 2: Species accumulation curve derived from sample data (y = 46.08ln(x) + 38.075, R² = 0.9977)

4.1.2 Threatened and priority flora

One priority flora species, *Poranthera moorokatta* (P2), was recorded across the site. A total of 1,579 individuals were recorded within the site and an additional ~70,000 individuals are estimated to occur based on sampling (as discussed in **Section 5.1.2**). The location of the individuals recorded in the site and area of suitable habitat for the estimated individuals is shown in **Figure 5** and a representative photo of the species is shown in **Plate 3.**

Plate 3: Poranthera moorokatta (P2)

4.1.3 Declared pests

One species listed as a declared pest pursuant to the BAM Act, **Opuntia ?stricta* (common prickly pear) was recorded within the western portion of the site, adjacent to residential properties. This species is also listed as a weed of national significance (WoNS).

4.2 Vegetation

4.2.1 Vegetation units

A total of 13 vegetation units were identified within the site. A description and the area of each vegetation unit is provided in **Table 8**. The location of each vegetation unit is shown in **Figure 5**. Raw sample data for sample location is provided in **Appendix E**.

Table 8: Description and extent of vegetation units within the site

Code	Description	Sample/s	Total area (ha)	Proportion of site (%)	Representative photograph
AcKg	Tall shrubland of *Adenanthos cygnorum* and *Kunzea glabrescens* over scattered *Jacksonia furcellata* over low shrubland of *Gompholobium tomentosum*, *Hemiandra pungens* and *Hibbertia subvaginata* over herbland of *Hyalosperma cotula* and **Gladiolus caryophyllaceous* over non-native grassland of **Briza maxima* and **Ehrharta calycina*.	R12	2.10	2.59	
BaBm	Recently burnt open woodland of *Banksia attenuata* and *Banksia menziesii* with isolated understorey of scattered shrubs, herbs and grasses including *Calytrix flavescens*, *Anigozanthos manglesii* and *Austrostipa compressa*.	-	3.90	4.82	

Table 8: Description and extent of vegetation units within the site (continued)

Code	Description	Sample/s	Total area (ha)	Proportion of site (%)	Representative photograph
BaBmAhCf	Open woodland of *Banksia attenuata* and *Banksia menziesii* over open to sparse shrubland of *Allocasuarina humilis*, *Bossiaea eriocarpa*, *Calytrix flavescens*, *Hibbertia hypericoides* and *Stirlingia latifolia* over sparse to open herbland of *Lyginia barbata*, *Poranthera moorokatta* (P2) and *Trachymene pilosa* over sparse grassland of *Amphipogon turbinatus* and *Austrostipa compressa*.	Q13, Q14, Q16	15.43	19.07	
BaBmBeSi	Open woodland of *Banksia attenuata*, *Banksia ilicifolia*, *Banksia menziesii* and *Nuytsia floribunda* over open shrubland of *Melaleuca thymoides* and *Xanthorrhoea preissii* over low shrubland of *Acacia pulchella* var. *glaberrima*, *Bossiaea eriocarpa*, *Gastrolobium capitatum* and *Scholtzia involucrata* over forbland of *Dasypogon bromeliifolius*, *Hensmania turbinata*, *Lomandra nigricans*, *Lomandra suaveolens* and *Patersonia occidentalis* over herbland of *Desmocladus flexuosus*.	Q4, Q5, R8, Q9, Q10, Q11, Q15, Q19	16.64	20.56	

Table 8: Description and extent of vegetation units within the site (continued)

Code	Description	Sample/s	Total area (ha)	Proportion of site (%)	Representative photograph
BaBmDbPc	Low open forest of *Banksia attenuata*, *Banksia ilicifolia* and *Banksia menziesii* over open shrubland of *Jacksonia furcellata*, *Kunzea glabrescens*, *Melaleuca thymoides* and *Xanthorrhoea preissii* over low shrubland of *Acacia pulchella* var. *glaberrima*, *Bossiaea eriocarpa*, *Hibbertia subvaginata* and *Styphelia conostephioides* over forbland of *Dasypogon bromeliifolius*, *Phlebocarya ciliata*, *Patersonia occidentalis*, *Lomandra nigricans* and *Lomandra preissii* over herbland of *Desmocladus flexuosus*.	Q3, Q6	3.54	4.37	
BaBmRiDf	Low open forest of *Banksia attenuata*, *Banksia ilicifolia* and *Banksia menziesii* over open shrubland of *Calytrix flavescens*, *Kunzea glabrescens* and *Regelia inops* over low shrubland of *Styphelia xerophylla* over forbland of *Dasypogon bromeliifolius* and *Lyginia barbata* over herbland of *Chamaescilla corymbosa* and *Desmocladus flexuosus*.	Q2	2.00	2.47	

Table 8: Description and extent of vegetation units within the site (continued)

Code	Description	Sample/s	Total area (ha)	Proportion of site (%)	Representative photograph
BiMpDb	Open woodland of *Banksia attenuata*, *Banksia ilicifolia* and *Melaleuca preissiana* over open shrubland of *Adenanthos cygnorum*, *Astartea scoparia*, *Kunzea glabrescens* and *Regelia inops* over low shrubland of *Adenanthos obovatus* over forbland of *Dasypogon bromeliifolius*, *Lyginia imberbis*, *Lomandra preissii* and *Phlebocarya ciliata*.	Q1	0.45	0.56	
CcEg	Open forest of *Corymbia calophylla* and *Eucalyptus gomphocephala* over *Allocasuarina fraseriana*, *Banksia attenuata* and *Banksia menziesii* over shrubland of *Adenanthos cygnorum* over low shrubland of *Hibbertia hypericoides*, *Stirlingia latifolia* and *Styphelia xerophylla*.	R7	1.67	2.06	

Table 8: Description and extent of vegetation units within the site (continued)

Code	Description	Sample/s	Total area (ha)	Proportion of site (%)	Representative photograph
CfRi	Scattered *Banksia littoralis* and *Melaleuca preissiana* trees over shrubland of *Adenanthos cygnorum*, *Calytrix fraseri* and *Regelia inops* over forbland of *Dasypogon bromeliifolius*, *Phlebocarya ciliata* and *Schoenus efoliatus* over herbland of *Stylidium araeophyllum* and *Stylidium repens*.	Q17	1.38	1.71	
MpAcRi	Open woodland of *Melaleuca preissiana* over shrubland of *Adenanthos cygnorum*, *Calytrix fraseri*, *Jacksonia furcellata* and *Regelia inops* over low shrubland of *Acacia pulchella* var. glaberrima over forbland of *Phlebocarya ciliata*.	Q18	3.73	4.61	

Table 8: Description and extent of vegetation units within the site (continued)

Code	Description	Sample/s	Total area (ha)	Proportion of site (%)	Representative photograph
MpLl	Woodland to open woodland of *Melaleuca preissiana* over sedgeland of *Lepidosperma longitudinale* over scattered grassy weeds and forbs.	Q21, Q23	0.19	0.23	
MSs	Woodland *Melaleuca preissiana* and *Melaleuca rhaphiophylla* over scattered shrubs of *Astartea scoparia* and *Kunzea glabrescens* over closed sedgleland of *Schoenus subfascicularis* over scattered herbs including *Lobelia anceps*.	Q22	0.48	0.60	

Table 8: Description and extent of vegetation units within the site (continued)

Code	Description	Sample/s	Total area (ha)	Proportion of site (%)	Representative photograph
Non-native	Heavily disturbed areas comprising non-native or planted vegetation with occasional scattered shrubs or forbs and bare ground.	-	29.42	36.35	

4.2.2 Vegetation condition

The extent of vegetation by condition category is detailed in **Table 9** and shown in **Figure 6.**

Vegetation unit **BaBm** was mapped as being in 'unknown' condition as it was burnt recently before the survey and so understorey vegetation was absent.

Table 9: Extent of vegetation condition categories within the site

Condition category (Keighery 1994)	Total area (ha)	Proportion of site (%)
Pristine	0	0
Excellent	18.30	22.61
Very good	5.36	6.6.62
Good	21.36	26.39
Degraded	2.59	3.20
Completely degraded	29.42	36.35
Unknown	3.90	4.82

4.2.3 Floristic community types

The following four floristic community types were determined to occur in the site:

- FCT 21c: Low lying *Banksia attenuata* woodlands or shrublands
- FCT 22: *Banksia ilicifolia* woodlands
- FCT 23a: Central *Banksia attenuata – Banksia menziesii* woodlands.
- FCT 4: *Melaleuca preissiana* damplands

The vegetation units that represent the FCTs are shown in **Table 10** and the relevant portions of the cluster dendograms are provided in **Appendix F**. R12, Q13, Q14, Q16 and R20 were too degraded and/or recently disturbed to assign an FCT.

Table 10: Vegetation unit FCT classification by sample

Vegetation unit	Sample unit	Most similar Gibson *et al.* (1994) sites^	Similarity (%)	Floristic community type (FCT)
BiMpDb	Q1	BANK-1 (FCT 22)	43	FCT 22: *Banksia ilicifolia* woodlands
CfRi	Q17	BANK-1 (FCT 22)	48	
BaBmRiDf	Q2	low07 (FCT 21c)	50	FCT 21c: Low lying *Banksia attenuata* woodlands or shrublands
MpAcRi	Q18	low07 (FCT 21c)	37	
BaBmDbPc	Q3	hurst03 (FCT 23a)	52	FCT 23a: Central *Banksia attenuata – B. menziesii* woodlands
	Q6	hurst03 (FCT 23a)	52	

Table 10: Vegetation unit FCT classification by sample (continued)

Vegetation unit	Sample unit	Most similar Gibson *et al.* (1994) sites^	Similarity (%)	Floristic community type (FCT)
BaBmBeSi	Q4	DEJONG-C (FCT 21c)	49	FCT 23a: Central *Banksia attenuata – B. menziesii* woodlands
		hurst03 (FCT 23a)	49	
	Q5	hurst03 (FCT 23a)	48	
	R7	hurst03 (FCT 23a)	42	
	R8	hurst03 (FCT 23a)	52	
	Q9	HARRY-4 (FCT 23a)	49	
	Q10	hurst03 (FCT 23a)	54	
	Q11	hurst03 (FCT 23a)	52	
	Q15	hurst03 (FCT 23a)	55	
	Q19^	MELA-6 (FCT 23b)	58	
		MELA-8 (FCT 23b)	55	
		CAPEL-2 (FCT 21b)	52	
		hurst03 (FCT 23a)	51	
MpLl	Q21	KOOLJ-1 (FCT 4)	26	FCT 4: *Melaleuca preissiana* damplands
		MELA-1 (FCT 4)	26	
	Q23	Multiple representing FCT 11 and one representing FCT 25	14	
MSs	Q22	MILT-5 (FCT 14)	26	
		MELA-1 (FCT 4)#	26	

^ *shows highest percent similarity to individual Gibson et al. (1994) samples rather than similarity to a cluster of samples.*
# *based on resemblance matrix rather than cluster analysis.*

4.2.4 Threatened and priority ecological communities

The following TECs and PECs were identified within the site:

- 'Banksia woodlands of the Swan Coastal Plain' TEC (herein referred to as the 'banksia woodlands TEC')
- 'Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain ecological community' TEC (herein referred to as the 'tuart woodlands TEC')
- '*Banksia ilicifolia* woodlands, southern Swan Coastal Plain ('floristic community type 22')' PEC
- 'Banksia woodlands of the Swan Coastal Plain' PEC.
- 'Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain ecological community' PEC.

The locations of the TECs and PECs within the site are shown in **Figure 7**.

The structure, composition and patch size of vegetation units **BaBmAhCf**, **BaBmBeSi**, **BaBmDbPc**, **BaBmRiDf** and **BiMpDb** and the eastern patch of **CcEg** indicates that they represent the Commonwealth listed banksia woodlands TEC, as outlined in **Table 11**.

Table 11: Criteria for determining presence of banksia woodlands of the Swan Coastal Plain TEC adapted from DoEE (2016)

Criteria	Requirements for meeting criteria	Site implications
1. Must meet key diagnostic characteristics	A variety of factors relating to: Location Soils Structure Composition	The site meets location and soils criteria. The **BaBmAhCf**, **BaBmBeSi**, **BaBmDbPc**, **BaBmRiDf** and **BiMpDb** vegetation includes the key diagnostic feature of a tree layer of *Banksia attenuata*, *Banksia menziesii* and/or *Banksia ilicifolia*. Within the **CcEg** vegetation, the *Banksia* species are located under an overstorey of *Corymbia calophylla* and *Eucalyptus gomphocephala* but still meets this crierion. The **BaBmAhCf**, **BaBmBeSi**, **BaBmDbPc**, **BaBmRiDf**, **BiMpDb** and **CcEg** vegetation within the site also meet structure and composition criterion. FCT 22 (**BiMpDb**) and FCT 23a (**BaBmAhCf**, **BaBmBeSi**, **BaBmDbPc**, **BaBmRiDf** and **BiMpDb**) are identified as two of the FCTs which represent the banksia woodland TEC. Whilst the **CfRi** vegetation unit aligned with FCT 22, it lacks the overstorey *Banksia* vegetation required to meet the key diagnostic criteria and is therefore not part of the TEC.
2. Must meet condition thresholds	A patch should at least meet the 'good' condition category (see **Table 5**)	The **BaBmAhCf**, **BaBmBeSi**, **BaBmDbPc**, **BaBmRiDf** and **BiMpDb** vegetation is present in 'excellent' to 'good' condition, and the **CcEg** vegetation is in 'very good' or 'good' condition which meets this criterion.
3. Must meet minimum patch size	Minimum size of patch: Pristine=no minimum size Excellent=0.5 ha Very Good=1 ha Good=2 ha	The conservation advice does not consider compound categories for the determination of the TEC. Accordingly, the lower condition category for each patch of vegetation was the category used for the assessment of the patch sizes. The patches of **BaBmAhCf** vegetation mapped in 'good' condition (15.25 ha), the **BaBmBeSi** vegetation in 'excellent' (12.07 ha) and 'very good' (3.19 ha) condition, the **BaBmDbPc** vegetation mapped in 'excellent' condition (3.30 ha) and the **BaBmRiDf** mapped in 'excellent' condition (2.00 ha) all meet the minimum patch size criterion. Therefore, these patches of vegetation form the banksia woodland TEC. The patches of **BaBmAhCf** vegetation mapped in 'very good' condition (0.18 ha), the **BaBmBeSi** vegetation mapped in 'good' (1.38 ha) condition, the **BaBmDbPc** vegetation mapped in 'very good' condition (0.24 ha), the **BiMpDb** vegetation mapped in 'excellent' condition (0.45 ha) and the **CcEg** vegetation mapped in 'very good' (0.43 ha) and 'good' condition (0.13 ha) do not independently meet the criterion for the minimum condition. However, given the proximity of these patches (< 30 m) to patches of vegetation discussed above as meeting the criterion, these patches are considered to form part of the same patch and represent the banksia woodland TEC.

Table 11: Criteria for determining presence of banksia woodlands of the Swan Coastal Plain TEC adapted from DoEE (2016) (continued)

Criteria	Requirements for meeting criteria	Site implications
4. Must incorporate surrounding context	Breaks (e.g. tracks) < 30 m do not separate vegetation into separate patches Buffer zones may apply (20-50 m recommended from patch edge) The site should be thoroughly sampled (2 surveys in same spring). Survey timing should be appropriate. Surrounding environment should be considered (e.g. connectivity, conservation values, fauna habitat).	Small scale tracks (<30 m wide) exist within the patch. Land surrounding the patch is a combination of native vegetation and buildings. This survey was conducted between September and November within the main flowering period. Intact vegetation is present to the west and south-east is mapped as banksia woodland TEC within the DBCA TEC and PEC database. This vegetation is separated by more than 30 m by Nicholson and Warton Roads respectively, and is therefore unlikely to form part of a broader patch of the TEC with the vegetation within the site.
Result	The site supports 38.62 ha of the banksia woodlands of the Swan Coastal Plain TEC.	

DBCA's *Priority Ecological Community* list indicates that the description, area and condition thresholds that apply to the banksia woodland TEC also apply to the 'banksia woodlands of the Swan Coastal Plain' PEC (DBCA 2020). Therefore, the site supports 38.62 ha of the banksia woodlands PEC.

The FCT, structure, composition and patch size of vegetation unit **CcEg** indicates that it represents the Commonwealth listed 'tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain' TEC, as outlined in **Table 12**.

Table 12: Assessment of site conditions against the tuart (Eucalyptus gomphocephala) woodlands and forests of the Swan Coastal Plain TEC criteria (adopted from (DoEE 2019))

Criteria	Requirements for meeting criteria	Site implications
1. Must meet key diagnostic characteristics	Located in appropriate bioregion and landform. At least 2 living established *E. gomphocephala* trees with DBH≥ 15cm present in canopy layer and with <60 m between the outer edges of canopies^ Vegetation structure is a woodland, forest, open forest, open woodland, or mallee (various forms).	Site is located in appropriate bioregion and landform. Two patches of **CcEg** occur and both patches each contain more than two living established *E. gomphocephala* trees with DBH≥ 15cm present in canopy layer and with <60 m between the outer edges of canopies Vegetation within the patches comprises a forest to open forest structure. Both patches meet this criterion.
2. Must meet size threshold	A patch must be larger than 0.5 ha#	The patches are >0.5 ha and so meet this criterion.
3. Must meet condition thresholds	Patches >5 ha: no condition threshold Patches ≥0.5 – <2 ha: 'very high' or 'high' condition† Patches ≥2 – ≤5 ha: 'very high', 'high' or 'moderate' condition†	The western patch is 1.90 ha and in 'high' condition as ≥60% of understorey vegetation is native and the patch is located less than 100 m from native vegetation. This patch meets this criterion.

Table 12: Assessment of site conditions against the tuart (Eucalyptus gomphocephala) woodlands and forests of the Swan Coastal Plain TEC criteria (adopted from (DoEE 2019)) (continued)

Criteria	Requirements for meeting criteria	Site implications
		The southern patch is 2.79 ha and ranges from 'high' to 'very high' condition as there are at least eight to 12 native understorey species and is located less than 100 m from native vegetation. This patch meets this criterion.
4. Must incorporate surrounding context	Breaks (e.g. tracks, cleared areas) < 30 m do not separate vegetation into separate patches. The site should be thoroughly sampled in the appropriate season. Survey timing should be appropriate. Surrounding environment should be considered (e.g. connectivity, conservation values, fauna habitat)	The survey timing was sufficient to determine that the patch represents the TEC, as it was undertaken between September and November within the main flowering period.
Result	The site supports 4.69 ha of the tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain TEC.	

^Includes dead trees. Where species of dead tree is unclear it is assumed to be *E. gomphocephala* if its canopy is within 60 m of an identified *E. gomphocephala tree*. #Note that a patch comprises a 30 m buffer around the canopy of each *E. gomphocephala* tree, may extend beyond a lot boundary and may include areas of bare ground, waterbodies and hardscape. †Using the condition scale provided in (DoEE 2019).

DBCA's *Priority Ecological Community* list indicates that the description, area and condition thresholds that apply to the tuart woodland TEC also apply to the State listed 'tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain' PEC (DBCA 2020). Therefore, the site supports 4.69 ha of this PEC.

FCT 22 is synonymous with the State-listed SCP22 '*Banksia ilicifolia* woodlands, southern Swan Coastal Plain' PEC. No conservation advice exists for the SCP22 PEC so it is unclear whether a condition threshold should be applied when identifying its presence. DBCA has historically applied 'good' condition as a threshold for the identification of conservation significant vegetation. The **BiMpDb** vegetation that aligns with FCT 22 occurs in 'excellent' condition and the **CfRi** vegetation that aligns with FCT 22 occurs in 'very good' condition and so both vegetation units represent the PEC. A total of 1.82 ha of this PEC occurs within the site as shown in **Figure 7**.

No other TECs or PECs occur within the site.

5 Discussion

5.1 Flora

5.1.1 Species inventory

The majority of the site supports relatively undisturbed banksia woodland vegetation, which is typically species rich and the site was traversed thoroughly across five months. A range of species visible during only part of the year were also recorded, including 22 Orchidaceae taxa and other perennial geophytes. Subsequently, 252 flora species were recorded which indicates that a near-comprehensive list was compiled.

Eucalyptus gomphocephala (tuart) trees were recorded within the western portion of the site. This species typically occurs on the western portion of the Swan Coastal Plain, predominantly within the Quindalup and Spearwood dune systems. Tuarts do also occur on Bassendean dunes and outlying populations of tuart trees are known to occur further east on the Swan Coastal Plain, near the Canning and Swan rivers (DoEE 2019). However, the trees within the site are not part of a mapped outlying population and the trunks of the trees within the site are not as large as would be expected if the population was remnant. In addition, a review of aerial imagery indicates that these trees did not appear to be present within the site prior to the construction of the Banksia Hill Detention Centre buildings and infrastructure. Therefore, the tuarts within the site are considered to be planted.

5.1.2 Threatened and priority flora

A relatively large population of the priority flora species, *Poranthera moorokatta* (P2), was detected within the site. Most individuals were recorded within the **BaBmAhCf** vegetation, which was burnt prior to the survey. The persistence of the species within the burnt area is interesting, given other populations have shown up to 80% reduction in recruitment following a fire (Barrett 2012). *P. moorokatta* was also recorded in other areas the site subject to disturbance, such as cleared tracks. Generally, the species also appeared to favour open disturbed areas of sand with low leaf litter cover.

Due to the small size of the plant and high density of *P. moorokatta* individuals within the **BaBmAhCf** vegetation, a portion of the vegetation was sampled and the total number of individuals was estimated. Sampling comprised traversing of transects 2 m wide and recording all *P. moorokatta* individuals observed. A total of 0.2 ha (2% of the total area of **BaBmAhCf** patch) was traversed and 1,504 individuals recorded. Assuming *P. moorokatta* occurs at a consistent density across the patch, approximately 70,000 additional individuals may occur. This provides a preliminary indication of species density.

Whilst the remainder of the site supports vegetation which is described as habitat for the species (*Banksia* woodland with grey and white sand (Barrett 2012)), it was not recorded during targeted surveys, and it is likely that the understorey vegetation is too dense and lacks open spaces favoured by the species. Scattered *P. moorokatta* individuals may occur within the site, but not at high densities like that recorded in the **BaBmAhCf** vegetation.

P. moorokatta is recently described and poorly known, with 15 records of the species currently documented (Barrett 2012; Western Australian Herbarium 2024). Barrett (2012) notes that, due to the species' small stature, it is unknown whether it is more widespread and simply overlooked, or range restricted. This is reflected in the Priority 2 designation, which indicates that the species is poorly known, and is collected from only a few populations. One confirmed record of *P. moorokatta* from Kings Park details that approximately 2,500 plants were recorded from a 800 m^2 sample, which equates to a density of 31,250 individuals/ha, indicating that the species can be locally common where it is occurs (Western Australian Herbarium 2024).

With regards to the other threatened or priority flora that had potential to occur (refer **Table 3**) but that were not recorded, the field surveys are considered to have been sufficient to detect them should they have been present. The absence of perennial species such as *Babingtonia urbana*, *Calectasia grandiflora*, *Comesperma rhadinocarpum*, *Jacksonia gracillima*, *Jacksonia sericea*, *Johnsonia pubescens* subsp. *cygnorum*, *Phlebocarya pilosissima* subsp. *pilosissima*, and *Thysanotus glaucus* was relatively easy to confirm. However, smaller annual or geophytic species including *Asteridea gracilis*, *Caladenia huegelii*, *Comesperma griffinii* and *Thelymitra variegata* could have been more difficult to detect. Areas of suitable habitat were searched on multiple occasions between July and November, which intersects each annual and geophytic species' flowering period. As none of the species were recorded, it is considered unlikely that they occur in the site

DBCA's *Threatened and Priority Flora Database* contains a 2004 record of *Caladenia huegelii* within the site. The record comprises eight individuals and lies within the **BiMpDb** vegetation unit. *C. huegelii* is a perennial geophyte that is only visible and identifiable during the flowering period of September to early November. Suitable habitat comprises well-drained, deep sandy soils in lush undergrowth within *Banksia* woodlands (DEC 2009). The *Draft survey guidelines for Australia's threatened orchids* (DoE 2013) recommends surveys occur during the flowering period of the orchid species, within optimal survey locations and with appropriate survey effort.

Targeted searches for *C. huegelii* were undertaken across the site including within the area surrounding the record and in accordance with DoE (2013). Surveys were undertaken across several days during the optimal survey period (12, 14, 26 and 28 September) and within suitable *Banksia* woodland habitat in the southern and south-eastern portion of the site (including the **BiMpDb** vegetation). Transects were walked between 5 – 10 m apart, in both north-south and east-west directions across the four survey dates, to ensure appropriate spatial coverage of the suitable habitat. No *C. huegelii* individuals were recorded during these surveys.

Two *Caladenia* species with a flowering time and appearance to *C. huegelii*, *C. arenicola* and *C. paludosa,* were both recorded within the site during the surveys. Both species were beginning to senesce by the final targeted survey. As no unidentified orchid leaves were found, and similar species were beginning to senesce by the end of September, it was determined that the targeted survey effort was sufficient and *C. huegelii* does not occur.

Grevillea thelemanniana was recorded from one location within the site, in the **BaBmBeSi** vegetation unit. Where this species occurs naturally, it is listed as threatened (critically endangered). In the current survey this species was recorded within areas fringing the **BaBmBeSi** vegetation unit, where vegetation was observed to be planted due to the presence of irrigation infrastructure and presence of non-native flora species. *G. thelemanniana* is commonly cultivated and propagated for use in

landscaping. Unless otherwise designated under law, the EP Act states that planted vegetation is not native vegetation and so the status of this record was accordingly designated as planted (Pl) rather than threatened.

5.2 Vegetation

5.2.1 Vegetation condition

The vegetation within the site that was mapped in 'excellent' condition clearly met the condition scale in **Section 3.2.4**, with low weed cover and disturbance and high native species diversity. Where smaller patches of vegetation were impacted by fragmentation, including higher weed cover and lower native species diversity, these were mapped in 'very good' or 'very – good' condition where weeds were more aggressive.

The **CfRi** and **MpLl** vegetation units were mapped in 'very good' condition as previous disturbance was evident, as well as current disturbance from rabbits and lower native species cover. The **MpAcRi** vegetation unit was mapped in 'good' condition as it contained lower native species diversity, particularly in the understorey. The **AcKg** vegetation unit showed obvious signs of previous clearing, high weed cover and low native species diversity and was mapped in 'degraded' condition.

The **CcEg** vegetation unit showed signs of disturbance, including the presence of sprinklers and mulch in some areas. The canopy within the **CcEg** vegetation unit is dominated by planted tuart trees but, where the native remnant understorey structure is largely intact and has low weed cover, the assignment of a 'very good' condition rating was deemed appropriate. Where **CcEg** vegetation within the southern portion of the site had an understorey that consisted mainly of planted *Labichea punctata* subsp. *punctata*, this vegetation was mapped in 'good' condition. Where understorey species cover and diversity was lower in the western portion of the site, this extent of the unit was mapped in 'degraded' condition.

Where vegetation within the site had been burnt within the last year, the **BaBmAhCf** vegetation unit was mapped in 'good' condition, as it has been burnt earlier than the **BaBm** vegetation and was displaying more advanced regrowth from the fire. The overall low weed cover indicates that this vegetation may be in better condition once vegetation has regrown and a 'good' condition is considered conservative. The **BaBm** vegetation unit within the eastern portion was mapped as being in 'unknown' condition as it was burnt recently before the survey and so understorey vegetation was absent. During the first survey on 12 September this vegetation was smoking, indicating that the fire had occurred very recently prior to the surveys commencing. Further survey of these vegetation units at a later stage would be required to assign the appropriate vegetation condition category.

5.2.2 Floristic community types

Assignment of the floristic community types was relatively straightforward, with samples recording high similarities to Gibson *et al*. (1994) sites.

Q1 and Q17 readily clustered with Gibson et al. (1994) sites representing FCT 22, which was expected due to the presence of B. ilicifolia and other flora species associated with low-lying areas. The two samples sites that clustered with FCT 21c were considered appropriate, given the low-lying nature of

the sample locations, with Q2 in particular in a transitional area between the FCT 22 vegetation and the drier FCT 23a vegetation.

The majority of samples assigned to FCT 23a clustered with Gibson et al. (1994) sample sites representing this FCT, and it is considered appropriates for this area. Some similarity to FCT 23b occurred. However, this is considered to be an erroneous alignment, as this community type occurs primarily on the northern Swan Coastal Plain, and is therefore not appropriate for the site. R7 clustered with FCT 24 'Northern Spearwood shrublands and woodlands', which is not considered appropriate given the sites location on the Bassendean dunes, and the individual resemblance to FCT 23a.

Samples for vegetation units **MpLl** and **MSs** showed clear but low similarity to the wetland-associated FCT 4 as shown in **Table 10**. The low similarity is potentially influenced by the survey timing of these patches of vegetation being outside of the primary survey season for the Swan Coastal Plain (spring). Nevertheless, the species composition, site location and landform indicate that FCT 4 would be an appropriate assignation for **MpLl** and **MSs**.

Q13, Q14 and Q16 were all too recently disturbed by fire, and whilst regrowth vegetation was present, it was less than a year old and not appropriate to undertake FCT analysis for these samples.

5.2.3 Threatened and priority ecological communities

The **BiMpDb** vegetation unit represents FCT 22 and the **BaBmDbPc** and **BaBmBeSi** vegetation units, as well as the patches of the **CcEg** vegetation that contain *Banksia* species, represents FCT 23a, both of which are components of the banksia woodland TEC/PEC. In addition, whilst the **BaBmAhCf** vegetation was unable to be assigned an FCT, the key diagnostic criteria were present, including an overstorey of *Banksia attenuata* and *B. menziesii* as well as low weed cover. Therefore, this vegetation was considered to form a part of the broader banksia woodland TEC patch. The **BaBm** vegetation within the eastern portion may potentially meet the diagnostic criteria to be considered the TEC, based on the presence of a *B. attenuata*/*B. menziesii* overstorey. However, at the time of the surveys the vegetation was yet to begin regenerating from the recent fire and so further survey would be required to appropriately characterise this vegetation.

Whilst the **CcEg** vegetation unit meets the key diagnostic criteria for the tuart woodland TEC outlined in the approved conservation advice (DoEE 2019), the tuart trees are assumed to be planted, and therefore not representative of a natural occurrence of the TEC. However, the conservation advice does not exclude areas of planted vegetation and therefore the vegetation within the site represents the TEC, albeit a modified version.

The DOEE (2018) indicative distribution map shows that the tuart woodlands TEC may occur within the site. However, in relation to known patches of the tuart woodlands TEC on the Swan Coastal Plain, the presence of the TEC in site would be a considerable eastern range extension. A review of DBCA's *Threatened and Priority Ecological Community buffers and boundaries in WA* dataset (reference no. 07-0723EC) indicates that the closest known occurrence of the tuart woodlands TEC is approximately 8 km to the south-west of the site. As a result, the TEC was not considered to have a 'high' or 'moderate' likelihood of occurrence (see **Section 2.2.2**).

Whilst tuart trees are native to the Swan Coastal Plain, they are mostly restricted to coastal areas, predominantly on the Spearwood dune system associated with calcareous soils. The site is located within the Bassendean dune system (see **Section 2.1.3**), and whilst records of the TEC have been recorded within this dune system, they are typically within protected swales, saline and freshwater wetlands, close to river banks and on limestone slopes (DoEE 2019), none of which are present in the site.

In addition, the conservation advice identifies Heddle *et al.* (1980) vegetation complexes that characteristically have structural formations comprising tuart. Within the Bassendean dunes, tuarts typically only occur in the Caladenia or Cannington complex, whilst the site is mapped as occurring in the Southern River complex. Given that the typical landforms of the tuart woodlands TEC outside on the Bassendean dune are not present within the site, and it is not located within a vegetation complex known to support typical tuart formation, the tuart vegetation within the site is considered to be a modified version of the TEC that is not representative of a natural occurrence.

The tuart trees are assumed to be planted, as a review of aerial imagery from 1953 onwards indicates that vegetation within the site appears to be contiguous with areas of banksia woodland to the north and east (WALIA 2024). The denser tuart canopy is visible in imagery between 1995 and 2000, associated with the construction of the Banksia Hill Detention Centre (WALIA 2024). Evidence of irrigation infrastructure (sprinklers) is still present within the understorey, and non-endemic planted species are common in the understorey, including *Labichea lanceolata* subsp. *lanceolata* and *Guichenotia macrantha*.

Whilst an assessment of vegetation within the site against the diagnostic criteria provided in the conservation advice resulted in the mapping of 4.69 ha of the tuart woodland TEC within the site, this vegetation is not determined to be a natural occurrence of the TEC. The location of the site on the central Swan Coastal Plain and the apparent planted nature of the vegetation indicates that whilst the vegetation meets the diagnostic criteria of the TEC, it is not representative of a natural occurrence of this TEC.

5.2.4 Regional and local significance

Flora and vegetation may be significant irrespective of protection under policy or legislation. The vegetation in the site may be significant as it may provide habitat to a range of native fauna species, including threatened species

6 Conclusions

Outcomes of the assessment include the following:

- A total of 193 native and 59 non-native species were recorded within the site.
- One flora species listed as priority 2 in Western Australia, *Poranthera moorokatta,* was recorded. A total of 1,579 individuals were recorded and a total population of approximately 70,000 is estimated to occur in the site.
- No threatened flora species were recorded. Given that the survey effort was comprehensive and that the survey was undertaken at a suitable time of year no threatened flora are considered to occur in the site.
- Vegetation was classified into 13 vegetation units, of which 12 comprise native vegetation (63.65% of the site) and one comprises non-native vegetation (36.35%). The native vegetation occurs in 'excellent' to 'degraded' condition, with the condition of 3.90 ha of vegetation unable to be determined due to recent fire. The non-native vegetation was identified in 'completely degraded' condition.
- Two threatened ecological communities (TECs) and three priority ecological communities (PECs) were identified:
  - 'Banksia woodlands of the Swan Coastal Plain' TEC (38.62 ha)
  - 'Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain ecological community' TEC (4.69 ha)
  - '*Banksia ilicifolia* woodlands, southern Swan Coastal Plain ('floristic community type 22')' PEC (1.95 ha)
  - 'Banksia woodlands of the Swan Coastal Plain' PEC (38.62 ha)
  - 'Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain ecological community' PEC (4.69 ha).
- Vegetation within the site may provide habitat to a range of native fauna species, including threatened and priority species.

7 References

7.1 General references

Alan Tingay and Associates 1998, *A Strategic Plan for Perth's Greenways - Final Report*. December 1998.

Barrett, R. L. 2012, *Poranthera moorokatta (Phyllanthaceae), a rare new species from Perth, Western Australia*, Nuytsia, 22(6): 399-407.

Buereau of Meterology (BoM) 2024, *Climate Data Online*, <http://www.bom.gov.au/climate/data/>.

Churchward, H. M. and McArthur, W. M. 1980, *'Landforms and Soils of the Darling System, Western Australia'*, in Department of Conservation and Environment (ed.), *Atlas of Natural Resources Darling System Western Australia*, Department of Conservation and Environment.

Clarke, K. R. and Gorley, R. N. 2006, *PRIMER v6: User Manual/Tutorial*, PRIMER-E, Plymouth.

Department of Agriculture, Water and the Environment (DAWE) 2021, *Weeds of National Significance (WoNS)*, Centre for Invasive Species Solutions (CISS), <https://weeds.org.au/weeds-profiles/>.

Department of Biodiversity, Conservation and Attractions (DBCA) 2017, *Ramsar Sites (DBCA-010)*.

Department of Biodiversity, Conservation and Attractions (DBCA) 2018, *Directory of Important Wetlands in Australia - Western Australia (DBCA-045)*.

Department of Biodiversity Conservation and Attractions (DBCA) 2020, *Priority Ecological Communities for Western Australia Version 30*.

Department of Biodiversity, Conservation and Attractions (DBCA) 2022a, *Lands of Interest (DBCA-012)*, <https://catalogue.data.wa.gov.au/dataset/dbca-lands-of-interest>.

Department of Biodiversity, Conservation and Attractions (DBCA) 2022b, *Priority Ecological Communities for Western Australian Version 34*.

Department of Biodiversity, Conservation and Attractions (DBCA) 2022c, *Threatened and Priority Flora List 6 October 2022*, Perth.

Department of Biodiversity, Conservation and Attractions (DBCA) 2023a, *Geomorphic Wetlands, Swan Coastal Plain (DBCA-019)*, Perth, WA.

Department of Biodiversity, Conservation and Attractions (DBCA) 2023b, *Legislated Lands and Waters (DBCA-011)*, Perth, WA, <https://catalogue.data.wa.gov.au/dataset/dbca-lands-of-interest>.

Department of Biodiversity, Conservation and Attractions (DBCA) 2023c, *Methods for survey and identification of Western Australian threatened ecological communities (draft)*, Perth, Western Australia.

Department of Biodiversity, Conservation and Attractions (DBCA) 2023d, *Threatened Ecological Community List 26 May 2023*, Perth, WA, <https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/wa-s-threatened-ecological-communities>.

Department of Biodiversity, Conservation and Attractions (DBCA) 2023e, *Threatened Species and Communities - Data Searches*, Perth, WA, <https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities>.

Department of Biodiversity, Conservation and Attractions (DBCA) 2023f, *Weeds*, Perth, WA, <https://www.dbca.wa.gov.au/parks-and-wildlife-service/threat-management/plant-diseases/weeds#:~:text=Weeds%20are%20plants%20(not%20necessarily,detectable%20environmental%20or%20economic%20impacts>.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) 2021, *Threatened Ecological Communities*, <https://www.dcceew.gov.au/environment/biodiversity/threatened/communities>.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) 2023, *Protected Matters Search Tool*, <https://pmst.awe.gov.au/#/map>.

Department of Environment and Conservation (DEC) 2009, *Grand Spider Orchid (Caladenia huegelii) Recovery Plan*, Department of the Environment, Water, Heritage and the Arts, Canberra.

Department of Environment (DoE) 2013, *Draft Survey Guidelines for Australia's Threatened Orchids: Guidelines for Detecting Orchids listed as 'Threatened' under the Environment Protection and Biodiversity Conservation Act 1999*, Canberra.

Department of Environment and Energy (DoEE) 2016, *Approved Conservation Advice (incorporating listing advice) for the Banksia Woodlands of the Swan Coastal Plain ecological community*, Canberra.

Department of the Environment and Energy (DOEE) 2018, *Indicative 'tuart (Eucalyptus gomphocephala) woodlands and forests ecological community' distribution map*

Department of Environment and Energy (DoEE) 2019, *Approved Conservation Advice (incorporating listing advice) for the Tuart (Eucalyptus gomphocephala) woodlands and forests of the Swan Coastal Plain ecological community*, Canberra.

Department of Water (DoW) 2008, *LiDAR Elevation Dataset, Swan Coastal Plain*, Perth.

Department of Primary Industries and Regional Development (DPIRD) 2022, *Soil Landscape Mapping - Systems (DPIRD-064)*.

Department of Water and Environmental Regulation (DWER) 2018a, *A Guide to Preparing Revegetation Plans for Clearing Permits*

Department of Water and Environmental Regulation (DWER) 2018b, *Hydrography Linear (Heirarchy) (DWER-031)*, Perth.

Environment Australia 2000, *Revision of the Interim Biogeographic Regionalisation for Australia (IBRA) and Development of Version 5.1 - Summary Report*, Department of Environment and Heritage.

Environmental Protection Authority (EPA) 2016a, *Environmental Factor Guideline: Flora and Vegetation*, Perth.

Environmental Protection Authority (EPA) 2016b, *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment*, Perth.

Gibson, N., Keighery, B., Keighery, G., Burbidge, A. and Lyons, M. 1994, *A Floristic survey of the southern Swan Coastal Plain*, Department of Conservation and Land Management and the Conservation Council of Western Australia, Perth.

Gotelli, N. J. and Colwell, R. K. 2011, *Estimating species richness*, Oxford University Press, Oxford.

Government of WA 2000, *Bush Forever - Volume 1: Policies, principles and processes*, Perth.

Government of Western Australia 2019, *2018 South West Vegetation Complex Statistics. Current as of March 2019*, WA Department of Biodiversity, Conservation and Attractions, Perth.

Gozzard, J. 2011, *Sea to scarp - geology, landscape, and land use planning in the southern Swan Coastal Plain*, Geological Survey of Western Australia.

Heddle, E. M., Loneragan, O. W. and Havel, J. J. 1980, *'Vegetation Complexes of the Darling System Western Australia'*, in Department of Conservation and Environment (ed.), *Atlas of Natural Resources Darling System Western Australia*, Perth.

Hill, A. L., Semeniuk, C. A., Semeniuk, V. and Del Marco, A. 1996, *Wetlands of the Swan Coastal Plain: Volume 2A - Wetland Mapping, Classification and Evaluation*, Water and Rivers Commission and the Department of Environmental Protection, Perth.

Keighery, B. 1994, *Bushland Plant Survey: A guide to plant community survey for the community*, Wildflower Society of WA (Inc), Nedlands.

Kendrick, G. W., Wyrwoll, K. H. and Szabo, B. J. 1991, *Pliocene-Pleistocene coastal events and history along the western margin of Australia*, Quaternary Science Reviews, 10: 419-439.

NVIS Technical Working Group 2017, *Australian Vegetation Attribute Manual: National Vegetation Information System*, Department of the Environment and Energy, Canberra.

Western Australian Local Government Association and Perth Biodiversity Project (WALGA and PBP) 2004, *Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region*, Perth.

Western Australian Land Information Authority (WALIA) 2023, *Landgate Map Viewer Plus*.

Western Australian Herbarium 2024, *Florabase*, Department of Biodiveristy, Conservation and Attractions (DBCA), <https://florabase.dbca.wa.gov.au/>.

Wetlands Advisory Committee 1977, *The status of reserves in System Six*, Environmental Protection Authority, Perth.

7.2 Online references

The online resources that have been utilised in the preparation of this report are referenced in **Section 7.1**, with access date information provided in **Table R 1**.

Table R 1 Access dates for online references

Reference	Date accessed	Website or dataset name
BoM (2024)	26 February 2024	Climate Data Online
(DBCA 2023d)	17 July 2023	Threatened Ecological Communities
(DAWE 2021)	17 July 2023	Weeds of National Significance (WoNS)
DCCEEW (2023)	6 July 2023	Protected Matters Search Tool
WALIA (2023)	17 July 2023	Landgate Map Viewer
Western Australian Herbarium (2024)	17 February 2024	Florabase

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Figures

Figure 1: Site Location

Project:	Detailed Flora and Vegetation Assessment Lot 500 and Part Lot 501 Warton Road, Canning Vale
Client:	Department of Finance

Plan Number:
EP23-053(04)--F42

Drawn:	SCM
Date:	28/02/2024
Checked:	SCM
Approved:	RAW
Date:	29/02/2024

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Scale: 1:10,000@A4

GDA2020 MGA Zone 50

emerge ASSOCIATES

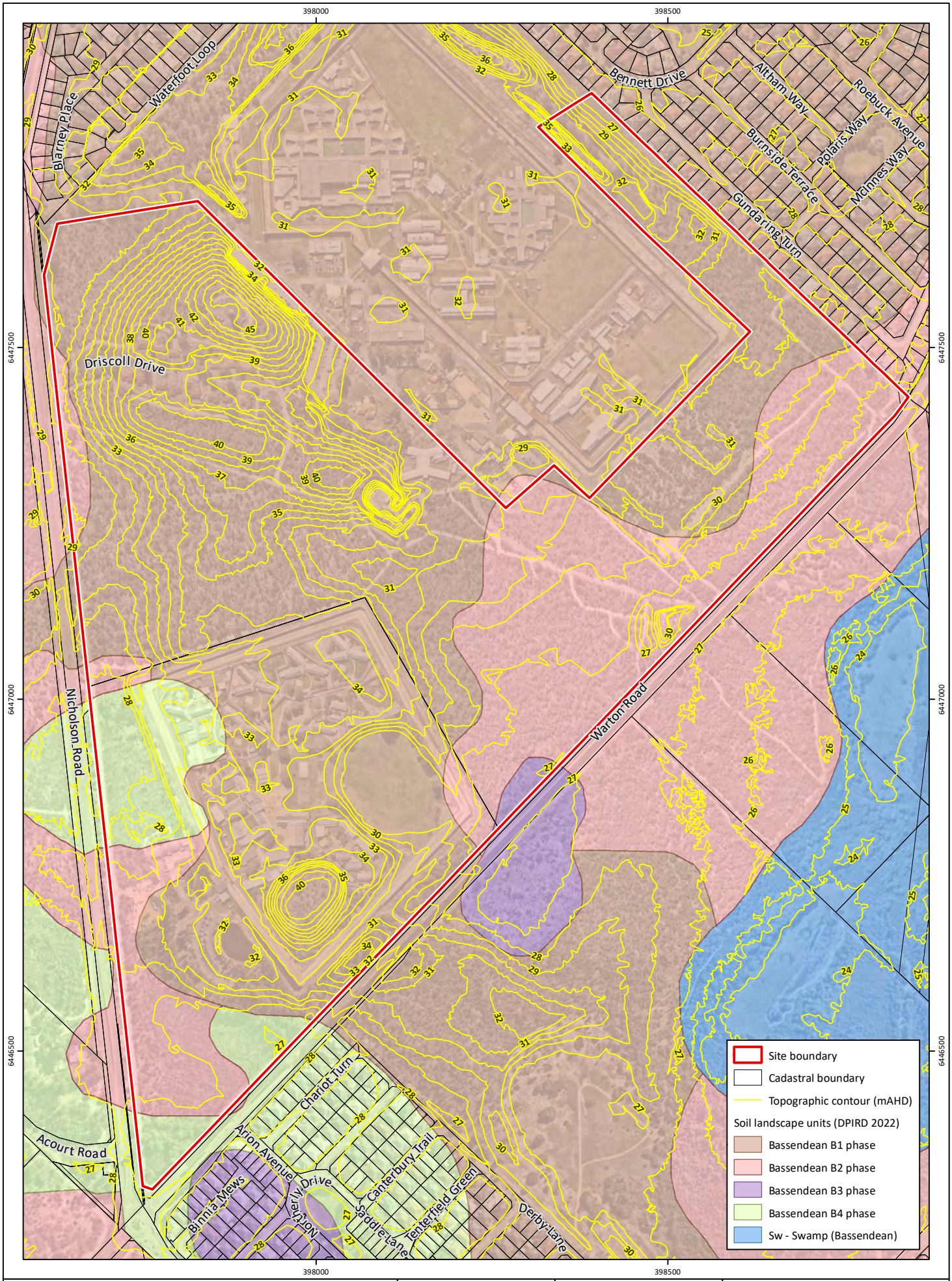

Figure 2: Soils and Topography

Project:	Detailed Flora and Vegetation Assessment Lot 500 and Part Lot 501 Warton Road, Canning Vale
Client:	Department of Finance

Plan Number:
EP23-053(04)--F43

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Checked:	SCM
Approved:	RAW
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GDA 2020 MGA Zone 50

emerge ASSOCIATES

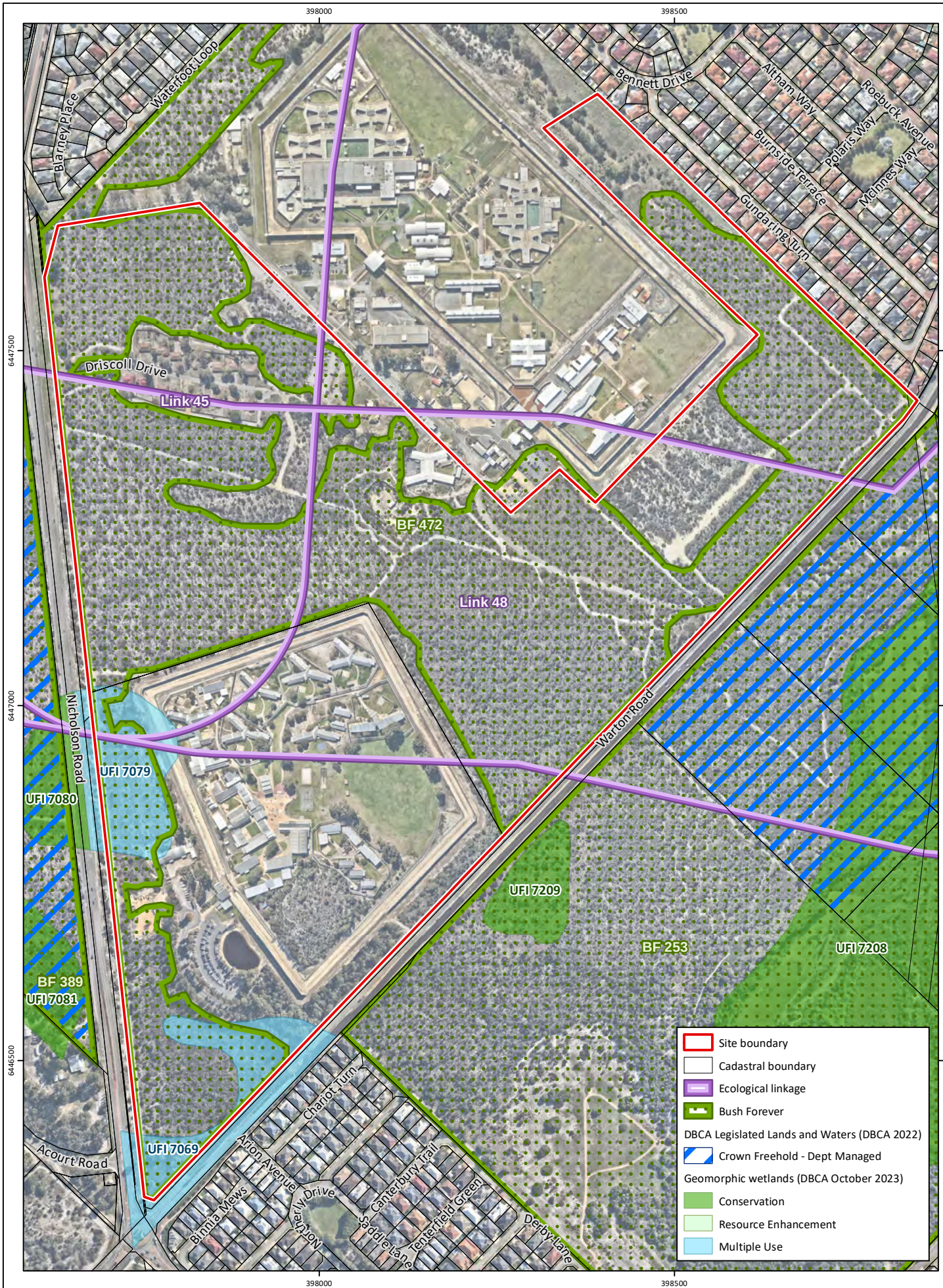

Figure 3: Environmental Features

Project:	Detailed Flora and Vegetation Assessment Lot 500 and Part Lot 501 Warton Road, Canning Vale
Client:	Department of Finance

Plan Number:
EP23-053(04)--F44

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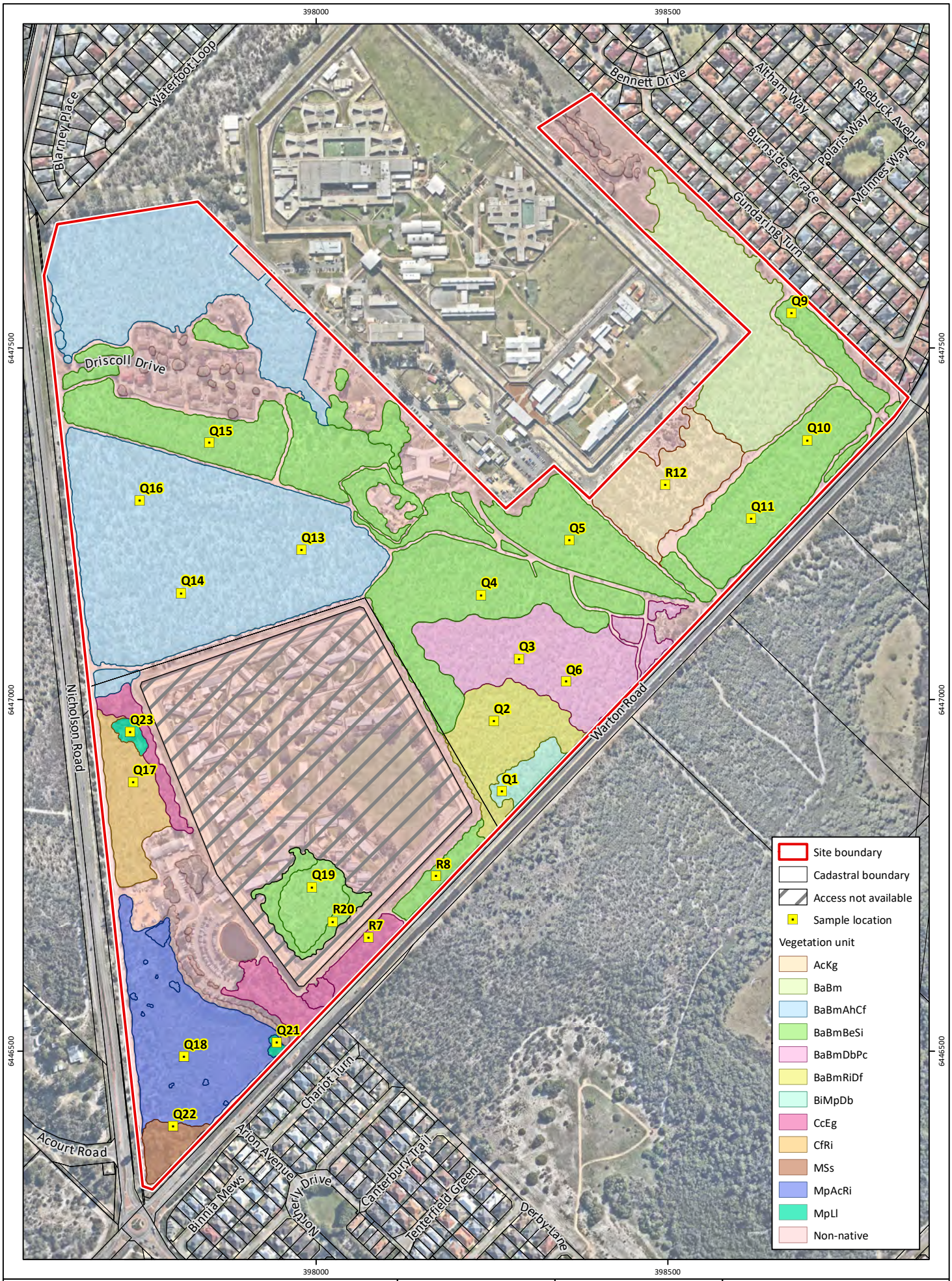

Figure 4: Vegetation Units

Project: Detailed Flora and Vegetation Assessment
Lot 500 and Part Lot 501 Warton Road, Canning Vale

Client: Department of Finance

Plan Number: EP23-053(04)--F45a

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GDA2020 MGA Zone 50

emerge ASSOCIATES

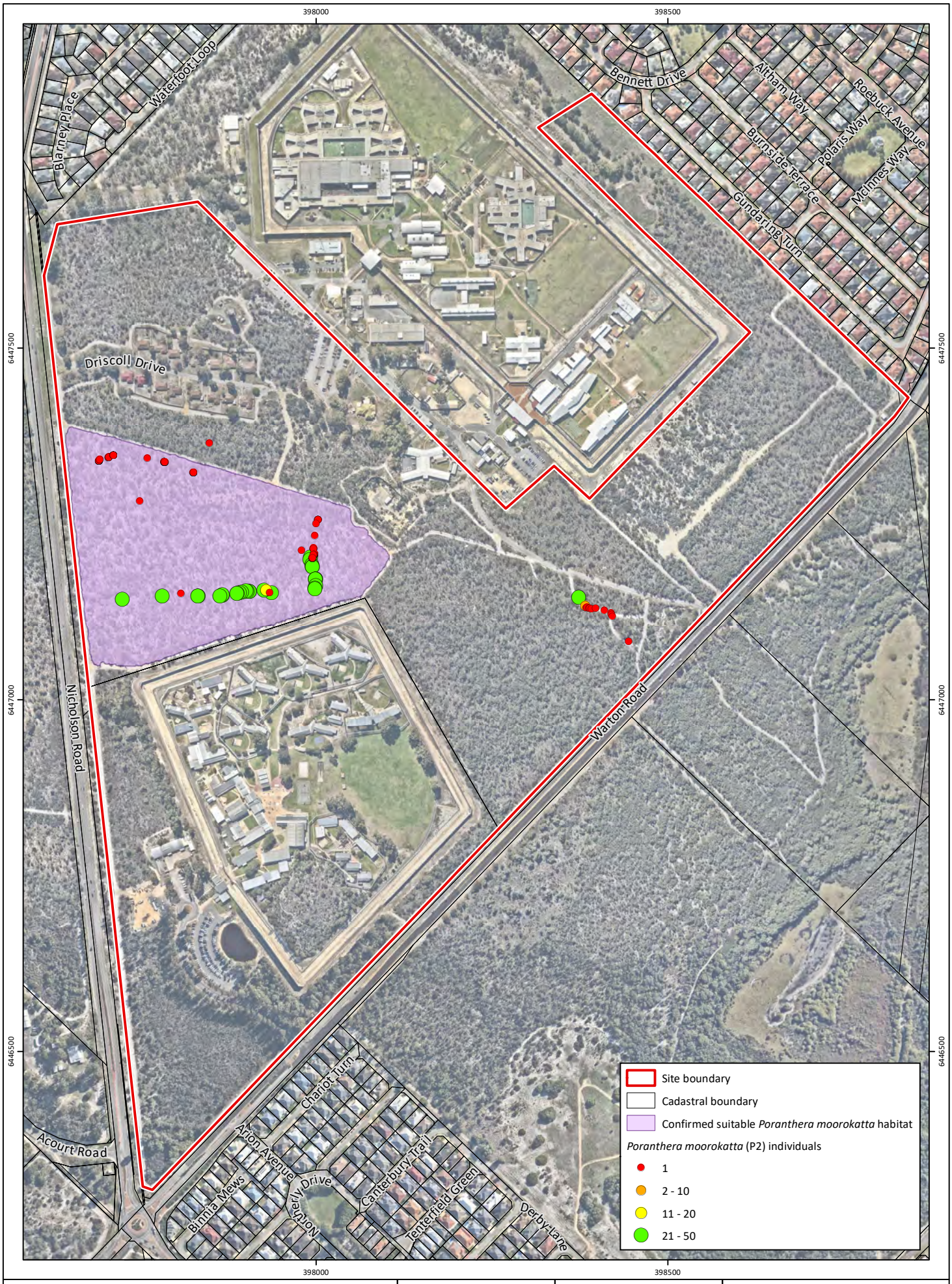

Figure 5: Priority Flora

Project:	Detailed Flora and Vegetation Assessment Lot 500 and Part Lot 501 Warton Road, Canning Vale
Client:	Department of Finance

Plan Number:
EP23-053(04)--F46a

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GDA2020 MGA Zone 50

emerge ASSOCIATES

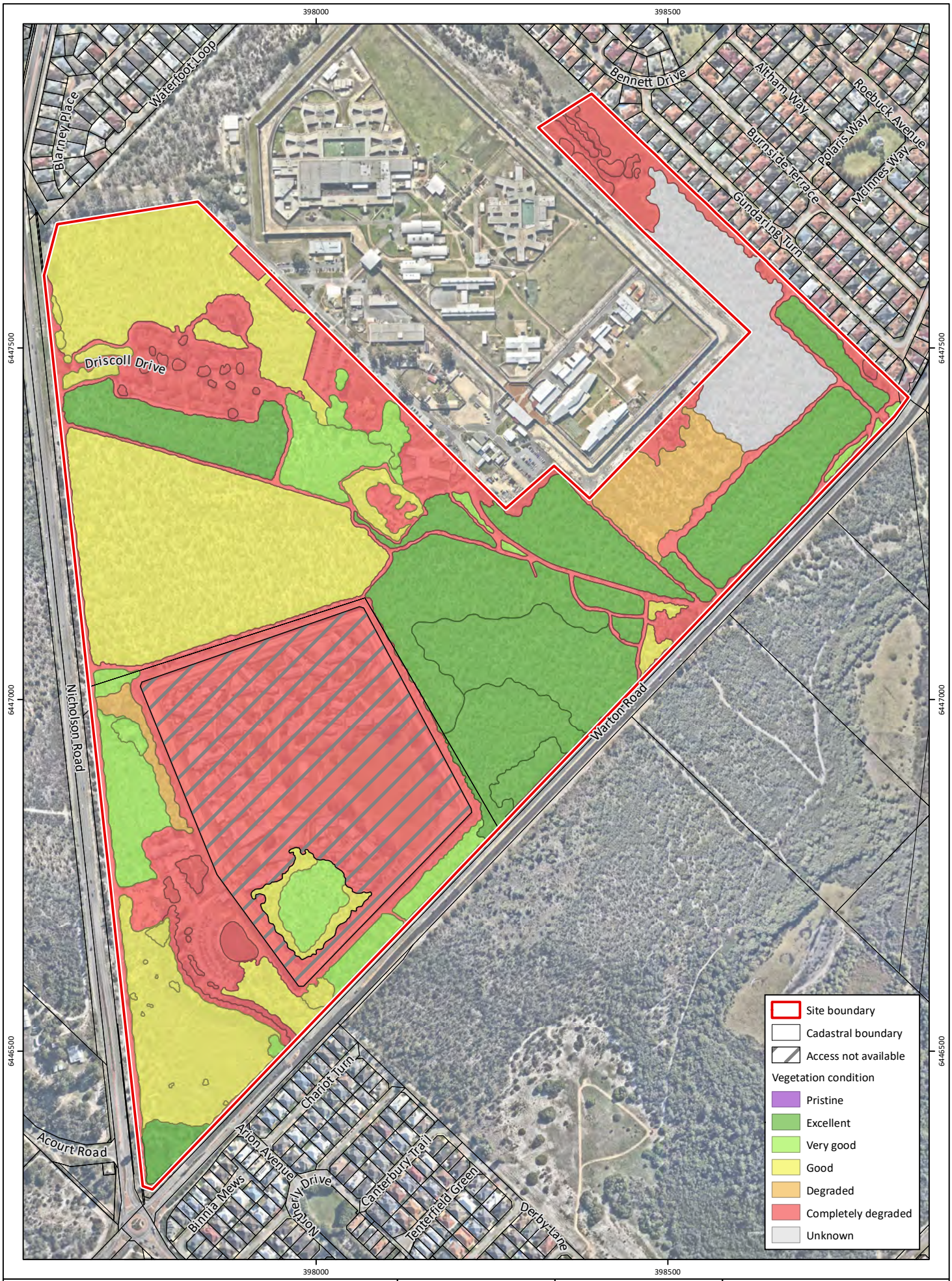

Figure 6: Vegetation Condition

Project:	Detailed Flora and Vegetation Assessment Lot 500 and Part Lot 501 Warton Road, Canning Vale
Client:	Department of Finance

Plan Number:
EP23-053(04)--F47a

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Approved:	RAW
Date:	11/10/2024

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Metres

Scale: 1:7,000@A4

GDA2020 MGA Zone 50

emerge ASSOCIATES

Figure 7: Threatened and Priority Ecological Communities

Project: Detailed Flora and Vegetation Assessment
Lot 500 and Part Lot 501 Warton Road, Canning Vale

Client: Department of Finance

Plan Number: EP23-053(04)--F48a

Drawn:	SCM
Date:	11/10/2024
Checked:	SCM
Approved:	RAW
Date:	11/10/2024

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Metres

Scale: 1:7,000@A4

GDA2020 MGA Zone 50

emerge ASSOCIATES

Appendix A

Additional Information

Conservation Significant Flora and Vegetation

Threatened and priority flora

Flora species considered rare or under threat warrant special protection under Commonwealth and/or State legislation. At the Commonwealth level, flora species can be listed as 'threatened' pursuant to Schedule 1 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

In Western Australia, plant taxa may be classed as 'threatened' under the *Biodiversity Conservation Act 2016* (BC Act) which is enforced by Department of Biodiversity Conservation and Attractions (DBCA). Threatened flora species are listed under sections 19(1) and 26(2) of the BC Act and published in the Biodiversity Conservation (Species) Order 2022. It is an offence to 'take' or disturb threatened flora without Ministerial approval. Section 5(1)1 of the Act defines to take as including "… to gather, pluck, cut, pull up, destroy, dig up, remove, harvest or damage flora by any means" or to cause or permit the same to be done.

Threatened flora are assigned categories under the EPBC Act and BC Act according to their conservation status, as outlined in **Table 1**.

Flora species that may be threatened or near threatened but lack sufficient information to be listed under the BC Act may be added to the DBCA's *Priority Flora List* (DBCA 2018b). Priority flora species are considered during State approval processes. Priority flora are assigned categories as listed in **Table 1**.

Table 1: Definitions of threatened and priority flora species pursuant to the EPBC Act and BC Act and on DBCA's Priority Flora List (DBCA 2023b)

Conservation code	Description
EX†	Threatened Flora – Presumed Extinct Taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such.
T^†	Threatened Flora – Extant Taxa which are declared to be likely to become extinct or is rare, or otherwise in need of special protection.
CR^	Threatened Flora – Critically Endangered Taxa which are considered to be facing an extremely high risk of extinction in the wild.
EN^	Threatened Flora – Endangered Taxa which are considered to be facing a very high risk of extinction in the wild.
VU^	Threatened Flora – Vulnerable Taxa which are considered to be facing a high risk of extinction in the wild.
P1	Priority One – Poorly Known Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat e.g. road verges, urban areas, farmland, active mineral leases etc., or the plants are under threat, e.g. from disease, grazing by feral animals etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
P2	Priority Two – Poorly Known Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but urgently need further survey.
P3	Priority Three – Poorly Known Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered), either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but needs further survey.
P4	Priority Four – Rare Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5-10 years.

^pursuant to the EPBC Act, †pursuant to the BC Act, on DBCA's *Priority Flora List*

Threatened and priority ecological communities

'Threatened ecological communities' (TECs) are ecological communities that are rare or under threat and therefore warrant special protection. Selected TECs are afforded statutory protection at a Commonwealth level under section 181 of the EPBC Act. TECs nominated for listing under the EPBC Act are considered by the Threatened Species Scientific Committee and a final decision is made by the Commonwealth Minister for the Environment. Once listed under the EPBC Act, communities are categorised as either 'critically endangered', 'endangered' or 'vulnerable' as defined in **Table 2**. Any action likely to have a significant impact on a community listed under the EPBC Act requires approval from the Minister for the Environment.

In Western Australia TECs are listed under sections 27(1), 31 and 33 of the BC Act. TECs are determined by the Western Australian Threatened Ecological Communities Scientific Advisory Committee (WATECSAC) and endorsed by the State Minister for the Environment. The WATECSAC is an independent group comprised of representatives from organisations including tertiary institutions, the Western Australian Museum and DBCA. The TECs listed under the BC Act are defined in Schedule 1 of the Biodiversity Conservation (Threatened Ecological Communities) Order 2023. State TECs are also acknowledged through other environmental approval processes such as 'environmental impact assessment' pursuant to Part IV of the *Environmental Protection Act 1986* (EP Act) and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*.

TECs are assigned to one of the categories outlined in **Table 2** according to their level of threat.

Table 2: Categories of threatened ecological communities (English and Blyth 1997; DEC 2009)

Conservation code	Description
PD	Presumably Totally Destroyed An ecological community that has been adequately searched for but for which no representative occurrences have been located.
CE	Critically Endangered An ecological community that has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future.
E	Endangered An ecological community that has been adequately surveyed and is not critically endangered but is facing a very high risk of total destruction in the near future.
V	Vulnerable An ecological community that has been adequately surveyed and is not critically endangered or endangered but is facing a high risk of total destruction or significant modification in the medium to long-term future.

An ecological community with insufficient information available to be considered a TEC or which are rare but not currently threatened may be listed as a 'priority ecological community' (PEC). PECs are categorised based on a variety of criteria, as described in **Table 3**. Listed PECs are published by DBCA (DBCA 2023a).

Table 3: Categories of priority ecological communities (DEC 2013)

Priority code	Description
P1	Priority One: Poorly known ecological communities Ecological communities that are known from very few occurrences with a very restricted distribution (generally ≤5 occurrences or a total area of ≤ 100ha). Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.
P2	Priority Two: Poorly known ecological communities Communities that are known from few occurrences with a restricted distribution (generally ≤10 occurrences or a total area of ≤200ha). At least some occurrences are not believed to be under immediate threat (within approximately 10 years) of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.
P3	Priority Three: Poorly known ecological communities (i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or: (ii) communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat (within approximately 10 years), or; (iii) communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, inappropriate fire regimes, clearing, hydrological change etc. Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.
P4	Priority Four: Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring. (i) Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These communities are usually represented on conservation lands. (ii) Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for a higher threat category. (iii) Ecological communities that have been removed from the list of threatened communities during the past five years.
P5	Priority Five: Conservation Dependent ecological communities Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

Reporting

Section 43 of the BC Act requires that an occurrence of a threatened species or threatened ecological community is reported to DBCA where the occurrence has been identified as part of field work completed:

- as part of an assessment under Part IV of the *Environmental Protection Act 1986*; or
- in relation to an application for a clearing permit under the *Environmental Protection Act 1986* section 51E(1)(d).

Penalties apply to individuals and organisations that fail to provide accurate reports of threatened species or communities.

The *Biodiversity Conservation Regulations 2018* (BC Regulations 2018) came into effect on January 1 2019. The BC Regulations include provisions for licencing, charges, penalties and other provisions associated with the BC Act.

Weeds

A number of legislative and policy documents exist in relation to weed management at state and national levels. The *Biosecurity and Agriculture Management Act 2007* (BAM Act) is the principle legislation guiding weed management in Western Australia and lists declared pest species. At a national level, the Australian government has compiled a list of 32 Weeds of National Significance (WoNS) (DoEE 2018), of which many are also listed under the BAM Act.

Declared Pests

Part 2.3.23 of the BAM Act requires a person must not; "*a) keep, breed or cultivate the declared pest; b) keep, breed or cultivate an animal, plant or other thing that is infected or infested with the declared pest; c) release into the environment the declared pest, or an animal, plant or other thing that is infected or infested with the declared pest; or d) intentionally infect or infest, or expose to infection or infestation, a plant, animal or other thing with a declared pest*".

Under the BAM Act, all declared pests are assigned a legal status, as described in **Table 7**. Species assigned to the 'declared pest, prohibited - s12' category are placed in one of three control categories, as described in **Table 8**.

The *Biosecurity and Agriculture Management Regulations 2013* specify keeping categories for species assigned to the 'declared pest - s22(2)' category, which relate to the purposes of which species can be kept, as well as the entities that can keep them. The categories are described in **Table 9**.

The Western Australian Organism List (WAOL) provides the status of organisms which have been categorised under the BAM Act (DPIRD 2020).

Table 4: Legal status of declared pest species listed under the BAM Act (DPIRD 2020)

Category	Description
Declared Pest Prohibited - s12	May only be imported and kept subject to permits. Permit conditions applicable to some species may only be appropriate or available to research organisations or similarly secure institutions.
Declared Pest s22(2)	Must satisfy any applicable import requirements when imported, and may be subject to an import permit if they are potential carriers of high-risk organisms. They may also be subject to control and keeping requirements once within Western Australia

Table 5: Control categories of declared pest species listed under the BAM Act (DPIRD 2020)

Category	Description
C1	Exclusion Not established in Western Australia and control measures are to be taken, including border checks, in order to prevent them entering and establishing in the State.
C2	Eradication Present in Western Australia in low enough numbers or in sufficiently limited areas that their eradication is still a possibility.
C3	Management Established in Western Australia but it is feasible, or desirable, to manage them in order to limit their damage. Control measures can prevent a C3 pest from increasing in population size or density or moving from an area in which it is established into an area which currently is free of that pest.

Table 6: Keeping categories of declared pest species listed under the BAM Act (DPIRD 2020)

Category	Description
Prohibited	Can only be kept under a permit for public display and education purposes, and/or genuine scientific research, by entities approved by the state authority.
Exempt	No permit or conditions are required for keeping.
Restricted	Organisms which, relative to other species, have a low risk of becoming a problem for the environment, primary industry or public safety and can be kept under a permit by private individuals.

Wetland Habitat

Geomorphic wetland types

On the Swan Coastal Plain DBCA (2017) have used the geomorphic wetland classification system developed by Semeniuk (1987) and Semeniuk and Semeniuk (1995) to classify wetlands based on the landform shape and water permanence (hydro-period) as outlined in **Table 10**.

Table 7: Geomorphic Wetlands of the Swan Coastal Plain classification categories (DBCA 2017)

Level of inundation	Geomorphology			
	Basin	Flat	Channel	Slope
Permanently inundated	Lake	-	River	-
Seasonally inundated	Sumpland	Floodplain	Creek	-
Seasonally waterlogged	Dampland	Palusplain	-	Paluslope

Wetland management categories

DBCA maintains the *Geomorphic Wetland of the Swan Coastal Plain* dataset (DBCA 2018a), which also categorises individual wetlands into specific management categories as described in **Table 11**.

Table 8: Geomorphic Wetlands of the Swan Coastal Plain classification categories (DBCA 2017)

Management category	Description of wetland	Management objectives
Conservation (CCW)	Support high levels of attributes	Preserve wetland attributes and functions through reservation in national parks, crown reserves and state owned land. Protection provided under environmental protection policies.
Resource enhancement (REW)	Partly modified but still supporting substantial functions and attributes	Restore wetland through maintenance and enhancement of wetland functions and attributes. Protection via crown reserves, state or local government owned land, environmental protection policies and sustainable management on private properties.
Multiple use (MUW)	Few wetland attributes but still provide important hydrological functions	Use, development and management considered in the context of water, town and environmental planning through land care.

The management categories of wetland features are determined based on hydrological, biological and human use features. The DBCA document *A methodology for the evaluation of specific wetland types on the Swan Coastal Plain, Western Australia* (DBCA 2017) details the methodology by which wetlands on the Swan Coastal Plain are assigned management categories based on a two tiered evaluation system, with preliminary and secondary evaluation stages. The preliminary evaluation aims to identify any features of conservation significance that would immediately place the wetland within the CCW management category. Examples of these significant features include presence on significant wetland lists, presence of TECs or PECs (Priority 1 and 2), presence of threatened flora and

over 90% of vegetation in good or better condition based on the Keighery (1994) scale. If such environmental values are identified the wetland would be categorised as CCW without further evaluation.

Should the preliminary evaluation indicate that no such features occur, the secondary evaluation and site assessment are then applied. In the secondary evaluation, an appropriate management category is determined through the assessment of a range of environmental attributes, functions and values.

Wetland reclassification

DBCA have a protocol for proposing changes to the wetland boundaries and management categories of the existing geomorphic wetland dataset (DEC 2007). The procedure involves a wetland desktop evaluation and site assessment which culminates in a recommended management category. Relevant information should be obtained in the optimal season for vegetation condition and water levels, which is usually spring (DEC 2007). In the case of larger wetlands that have undergone a degree of disturbance, a separate management category may be assigned to parts of the wetland in order to reflect the current values.

References

General references

Department of Biodiversity, Conservation and Attractions (DBCA) 2017, *A methodology for the evaluation of wetlands on the Swan Coastal Plain*, draft prepared by the Wetlands Section of the Department of Biodiversity, Conservation and Attractions and the Urban Water Branch of the Department of Water and Environmental Regulation, Perth.

Department of Biodiversity, Conservation and Attractions (DBCA) 2018a, *Geomorphic Wetlands, Swan Coastal Plain (DBCA-019)*.

Department of Biodiversity, Conservation and Attractions (DBCA) 2018b, *Threatened and Priority Flora List 16 January 2018*, Perth.

Department of Biodiversity, Conservation and Attractions (DBCA) 2023a, *Priority Ecological Communities for Western Australia Version 35*, Perth.

Department of Biodiversity, Conservation and Attractions (DBCA) 2023b, *Threatened and Priority Flora List July 2023* Perth.

Department of Environment and Conservation (DEC) 2007, *Protocol for proposing modifications to the Geomorphic Wetlands Swan Coastal Plain dataset*, Perth.

Department of Environment and Conservation (DEC) 2009, *Definitions, Categories and Criteria for Threatened and Priority Ecological Communities*, Perth.

Department of Conservation (DEC) 2013, *Definitions, Categories and Criteria for Threatened and Priority Ecological Communities*, Perth.

English, V. and Blyth, J. 1997, *Identifying and Conserving Threatened Ecological Communities in the South West Botanical Province*, ANCA National Reserves System Cooperative Program, Project Number N702, Perth.

Keighery, B. 1994, *Bushland Plant Survey: A guide to plant community survey for the community*, Wildflower Society of WA (Inc), Nedlands.

Semeniuk, C. A. 1987, *Wetlands of the Darling System - a geomorphic approach to habitat classification*, Journal of the Royal Society of Western Australia, 69: 95-112.

Semeniuk, C. A. and Semeniuk, V. 1995, *A Geomorphic Approach to Global Classification for Inland Wetlands*, Vegetatio, 118(1/2): 103-124.

Online references

Department of Environment and Energy (DoEE) 2018, Weeds of National Significance, <http://www.environment.gov.au/biodiversity/invasive/weeds/weeds/lists/wons.html>.

Department of Primary Industries and Regional Development (DPIRD) 2020, The Western Australian Organism List (WAOL), < https://www.agric.wa.gov.au/bam/western-australian-organism-list-waol>.

Appendix B

Conservation Significant Flora Species and Likelihood of Occurrence Assessment

Species name	Level of significance		Life strategy	Habitat	Flowering period	Likelihood of occurrence
	WA	EPBC Act				
Austrostipa jacobsiana	CR	CR	P	Grey sandy clay.	Nov-Jan	Low
Grevillea thelemanniana	CR	CR	P	Sand, sandy clay. Winter-wet low-lying flats.	May-Nov	Low
Synaphea sp. Fairbridge Farm (D. Papenfus 696)	CR	CR	P	Low woodland on grey, clayey sand with lateritic pebbles (Pinjarra Plain) near winter wet flats.	Sep-Nov	Negligible
Ptilotus pyramidatus	CR	CR	P	Seasonally inundated, flat floodplain on pale grey muddy sand.	Early Oct	Negligible
Synaphea sp. Serpentine (G.R. Brand 103)	CR	CR	P	Seasonally damp areas, loam - sand.	Sep-Oct	Negligible
Synaphea sp. Pinjarra Plain (A.S. George 17182)	EN	CR	P	White grey clayey sand on edges of seasonally inundated low lying areas.	Sep-Oct	Negligible
Caladenia huegelii	CR	EN	PG	Well-drained, deep sandy soils in lush undergrowth in a variety of moisture levels.	Sep-early Nov	High
Calytrix breviseta subsp. *breviseta*	CR	EN	P	Seasonally wet sandy-clay soil on swampy flats.	Oct-Nov	Negligible
Drakaea elastica	CR	EN	PG	Bare patches of sand within otherwise dense vegetation in low-lying areas alongside winter-wet swamps. Typically in banksia woodland or thickets of Kunzea glabrescens.	late Sep-Oct/Nov	Low
Eucalyptus x balanites	CR	EN	P	Light coloured sandy soils over laterite. Habitat consists of gently sloping heathlands; open mallee woodland over shrubland or heathland with emergent mallees.	Oct - Feb	Negligible
Austrostipa bronweniae	EN	EN	P	Grey-brown sandy loam soil in low lying winter wet areas.	Sep-Nov	Negligible
Darwinia apiculata	EN	EN	P	Open jarrah-marri woodland on shallow gravely soil over laterite, or open heathland over sandy loams with granite boulders.	Oct-Nov	Negligible
Diuris purdiei	EN	EN	PG	Sand to sandy clay soils in areas subject to winter inundation.	late Sep to mid-Oct	Low
Goodenia arthrotricha	EN	EN	P	Granite rocks, slopes.	Oct-Nov	Negligible
Grevillea curviloba subsp. *incurva*	EN	EN	P	Sand, sandy loam. Winter-wet heath.	Aug-Sep	Negligible

Species name	Level of significance		Life strategy	Habitat	Flowering period	Likelihood of occurrence
	WA	EPBC Act				
Lepidosperma rostratum	EN	EN	P	Peaty sand and clay amongst low heath, in winter-wet swamps.	May-Jun	Low
Macarthuria keigheryi	EN	EN	P	Low-lying winter-wet damp grey/white sands in open patches.	Sep-Dec or Feb-Mar	Negligible
Thelymitra stellata	EN	EN	PG	Sandy loam, clay or gravel over laterite or gravel.	Sep-Nov	Negligible
Andersonia gracilis	VU	EN	P	Seasonally damp, black sandy clay flats near or on the margins of swamps.	Sep-Nov	Negligible
Banksia mimica	VU	EN	P	Flat to gentle slopes in grey and white sand in open woodlands.	Dec-Jan	Negligible
Eremophila glabra subsp. *chlorella*	EN	-	P	Sandy clay. Winter-wet depressions.	Jul-Nov	Negligible
Drakaea micrantha	EN	VU	PG	Open sandy patches often adjacent to winter-wet swamps.	Sept- early Oct	Low
Acacia aphylla	VU	VU	P	Laterite and granite outcrops on hillsides.	Aug-Oct	Negligible
Anthocercis gracilis	VU	VU	P	Steep granite slopes along the Darling Scarp in shallow, humis-rich sandy or loamy soils.	Sep-Oct, Apr	Negligible
Conospermum undulatun	VU	VU	P	Sand and sandy clay soils, on flat or gently sloping sites between the Swan and Canning Rivers.	May-Oct	Negligible
Diuris drummondii	VU	VU	PG	In low-lying depressions in peaty and sandy clay swamps.	Nov-Jan	Negligible
Diuris micrantha	VU	VU	PG	Dark grey-black sandy clay-loam in winter wet depressions or swamps. Often in shallow standing water.	Aug/Sep-early Oct	Negligible
Eleocharis keigheryi	VU	VU	P	Clay or sandy loam in freshwater creeks and transient waterbodies such as seasonally wet clay pans.	Aug-Dec	Low
Morelotia australiensis	VU	VU	P	Sand over clay, winter wet depressions and drainage lines.	Nov-Dec	Low
Acacia lasiocarpa var. bracteolata long peduncle variant (G.J. Keighery 5026)	P1	-	P	Grey or black sand over clay. Swampy areas, winter wet lowlands.	May or Aug	Negligible
Bolboschoenus fluviatilis	P1	-	P	Floodplain with grey/brown wet sand.	Nov	Low

Species name	Level of significance		Life strategy	Habitat	Flowering period	Likelihood of occurrence
	WA	EPBC Act				
Calytrix simplex subsp. *simplex*	P1	-	P	Swamps to well drained lateritic gravel slopes and flats.	(Dec-) Jan	Low
Drosera patens	P1	-	P	Sandy soils on margins of winter-wet depressions, swamps and lakes.	Aug-Dec	Low
Hydrocotyle striata	P1	-	A	Sand and clay in springs and creeklines.	Nov	Low
Levenhookia preissii	P1	-	A	Grey or black, peaty sand. Swamps	Sep-Dec/Jan	Low
Ptilotus sericostachyus subsp. *roseus*	P1	-	P	Unknown. Seem to be associated with wetlands/rivers.	Sep-Dec	Low
Schoenus sp. Beaufort (G.J. Keighery 6291)	P1	-	A	Mud in winter-wet clay pans.	Sep-Oct	Low
Acacia benthamii	P2	-	P	Sand, typically on limestone breakaways	Aug-Sept	Low
Andersonia sp. Blepharifolia (F. & J. Hort 1919)	P2	-	P	Sandy clay with gravel.	Sep-Nov	Low
Calectasia grandiflora	P2	-	P	White, grey or yellow sand.	Jun-Nov	Moderate
Comesperma griffinii	P2	-	A/P	Yellow or grey sand on plains.	Oct	Moderate
Comesperma rhadinocarpum	P2	-	P	Sandy soils.	Oct-Nov	Negligible
Diuris brevis	P2	-	P	Black peaty soil.	Unknown	Low
Haloragis aculeolata	P2	-	P	Black sand or clay over limestone in winter-wet areas.	Sep or Dec	Low
Johnsonia pubescens subsp. *cygnorum*	P2	-	P	Grey white yellow sands on flats and seasonally wet areas.	Sep	Moderate
Poranthera moorokatta	P2	-	A	Sandy or clay soils. Dampland or low sandy dunes in banksia woodland.	Sep-early Nov	Moderate
Rytidosperma racemosum var. *racemosum*	P2	-	P	Brown loam with gravel, granite. Disturbed sites.	Sep-Jan	Low
Schoenus loliaceus	P2	-	A	Sandy soils in winter-wet depressions.	Aug-Nov	Low
Stenanthemum sublineare	P2	-	P	White sand on coastal plains.	Oct-Dec	Low
Thelymitra variegata	P2	-	P	Sandy clay, sand, laterite.	Jun-Sep	Moderate
Acacia horridula	P3	-	P	Gravelly soils over granite, sand, rocky hillsides.	May-Aug	Low
Angianthus micropodioides	P3	-	A	Saline sandy soils on edge of rivers, depressions and clay pans.	Nov-Dec or Jan-Feb	Low
Asteridea gracilis	P3	-	A	Sand, clay, gravelly soils.	Sep-Dec	Moderate

Species name	Level of significance		Life strategy	Habitat	Flowering period	Likelihood of occurrence
	WA	EPBC Act				
Babingtonia urbana	P3	-	P	Grey sand, lateritic gravel. Associated with wetlands.	Jan-Mar	Moderate
Beaufortia purpurea	P3	-	P	Lateritic or granitic soils on rocky slopes.	Oct-Feb	Negligible
Byblis gigantea	P3	-	P	Sandy-peat swamps. Seasonally wet areas.	Sep-Jan	Low
Carex tereticaulis	P3	-	P	Black peaty sand.	Sep-Oct	Low
Chamaescilla gibsonii	P3	-	PG	Clay to sandy clay in winter-wet flats, shallow water-filled claypans.	Sep-Oct	Low
Cyathochaeta teretifolia	P3	-	P	Grey sand, sandy clay in swamps and creek edges.	Oct-Jan	Negligible
Dampiera triloba	P3	-	P	Damp peat/loam soil.	Aug-Dec	Low
Eryngium pinnatifidum subsp. Palustre (G.J. Keighery 13459)	P3	-	P	Grey brown sand or clay in winter wet flats.	Sep-Nov	Low
Eryngium sp. Subdecumbens (G.J. Keighery 5390)	P3	-	A	Clay in seasonal wetlands.	Sep-Nov	Low
Halgania corymbosa	P3	-	P	Gravelly soils, soils over granite.	Aug-Nov	Negligible
Isotropis cuneifolia subsp. *glabra*	P3	-	P	Sand, clay loam in winter-wet flats.	Sep	Low
Jacksonia gracillima	P3	-	P	Sand, often adjacent to winter wet areas.	Sep-Dec	Moderate
Lasiopetalum glutinosum	P3	-	P	Brown clay loam on slopes.	Sep-Dec	Negligible
Meionectes tenuifolia	P3	-	P	Clay loam or grey sand in seasonally wet areas.	Oct-Dec	Low
Myriophyllum echinatum	P3	-	A	Clay in winter-wet flats.	Nov	Low
Phlebocarya pilosissima subsp. *pilosissima*	P3	-	P	White or grey sand, lateritic gravel.	Aug-Oct	Moderate
Schoenus benthamii	P3	-	P	White, grey sand, sandy clay in winter wet flats and swamps.	Oct-Nov	Low
Schoenus capillifolius	P3	-	A	Brown mud in claypans.	Oct-Nov	Low
Schoenus pennisetis	P3	-	A	Grey or peaty sand in swamps and winter-wet depressions.	Aug-Sep	Low
Stylidium aceratum	P3	-	A	Sandy soils in swamp heathland.	Oct-Nov	Low
Stylidium paludicola	P3	-	P	Peaty sand over clay. Winter wet habitats. Marri and Melaleuca woodland, Melaleuca shrubland.	Oct-Dec	Low
Styphelia filifolia	P3	-	P	Brown over pale yellow sand.	Feb-Apr	Low
Acacia oncinophylla subsp. *patulifolia*	P4	-	P	Granitic soils, occasionally on laterite.	Aug-Nov/Nov-Dec	Negligible

Species name	Level of significance		Life strategy	Habitat	Flowering period	Likelihood of occurrence
	WA	EPBC Act				
Aponogeton hexatepalus	P4	-	P	Mud. Freshwater: ponds, rivers, claypans.	Jul-Oct	Low
Cyanothamnus tenuis	P4	-	P	Laterite, stony soils, granite.	Aug-Nov	Low
Dodonaea hackettiana	P4	-	P	Sand, outcropping limestone.	Jul-Oct	Low
Drosera occidentalis	P4	-	P	Flat, brown/white/yellow moist sand/clay/peat, often near swamps.	Oct-Dec/Jan	Moderate
Hydrocotyle lemnoides	P4	-	A	Floating in swamps.	Aug-Oct	Low
Jacksonia sericea	P4	-	P	Calcareous and sandy soils on Swan Coastal Plain	Dec-Feb	Moderate
Kennedia beckxiana	P4	-	P	Sand or loam on granite hills and outcrops.	Sep-Dec	Low
Microtis quadrata	P4	-	PG	Sand, loam or peat in winter wet areas.	Oct-Dec	Low
Ornduffia submersa	P4	-	A	Sandy clay in inundated wetland/creek.	Aug-Nov	Low
Schoenus natans	P4	-	A	Aquatic, in winter-wet depressions.	Oct	Low
Stylidium longitubum	P4	-	A	Sandy clay, clay. Seasonal wetlands.	Oct-Dec	Low
Thysanotus glaucus	P4	-	P	White, grey or yellow sand, sandy gravel.	Oct-Mar	Moderate
Tripterococcus sp. Brachylobus (A.S. George 14234)	P4	-	P	Winter-wet areas on grey sand.	Oct-Feb	Low
Verticordia lindleyi subsp. *lindleyi*	P4	-	P	Sand and sandy clay in winter wet areas.	May or Nov-Jan	Low

Note: CR=critically endangered, EN=endangered, VU=vulnerable, P1=Priority 1, P2=Priority 2, P3=Priority 3, P4=Priority 4, P=perennial, PG=perennial geophyte, A=annual.

Appendix C

Conservation Significant Communities and Likelihood of Occurrence Assessment

Code	Community name	TEC/ PEC	Level of significance		Likelihood of occurrence
			State	EPBC Act	
Honeymyrtle shrubland	Honeymyrtle shrubland on limestone ridges of the Swan Coastal Plain Bioregion	TEC	CR	CR	Negligible
SCP07	Herb rich saline shrublands in clay pans (floristic community type 7 as originally described in Gibson et al. 1994)	TEC	EN	CR (Clay Pans of the Swan Coastal Plain)	Negligible
SCP08	Herb rich shrublands in clay pans (floristic community type 8 as originally described in Gibson et al. 1994)	TEC	EN		Negligible
SCP10a	Shrublands on dry clay flats (floristic community type 10a as originally described in Gibson et al. 1994)	TEC	EN		Negligible
SCP20b	Banksia attenuata and/or Eucalyptus marginata woodlands of the eastern side of the Swan Coastal Plain (floristic community type 20b as originally described in Gibson et al. 1994)	TEC	CR	EN	Moderate
SCP3a	Corymbia calophylla (Kingia australis) woodlands on heavy soils (floristic community type 3a as originally described in Gibson et al. 1994)	TEC	CR	EN	Negligible
Empodisma peatlands	Empodisma peatlands of southwestern Australia	TEC	-	EN	Negligible
Muchea limestone	Shrublands and woodlands on Muchea Limestone of the Swan Coastal Plain	TEC	EN	EN	Negligible
Claypans with shrubs over herbs	Claypans with mid dense shrublands of Melaleuca lateritia over herbs	TEC/ PEC	P1	CR	Negligible
Tuart woodlands	Tuart (Eucalyptus gomphocephala) woodlands and forests of the Swan Coastal Plain	TEC/ PEC	P3	CR	Negligible
SCP22	Banksia ilicifolia woodlands	TEC/ PEC	P3	EN	Moderate
Banksia WL SCP	Banksia Woodlands of the Swan Coastal Plain ecological community	TEC/ PEC	P3	EN	High
SCP21c	Low lying Banksia attenuata woodlands or shrublands	TEC/ PEC	P3	EN	Moderate
Coastal saltmarsh	Subtropical and Temperate Coastal Saltmarsh	TEC/ PEC	P3	VU	Negligible
Wooded waterbird wetlands	Wooded wetlands which support colonial waterbird nesting areas	PEC	P2	-	Negligible
SCP24	Northern Spearwood shrublands and woodlands	PEC	P3	-	Negligible

Note: TEC=threatened ecological community, PEC=priority ecological community, CR=critically endangered, EN=endangered, VU=vulnerable, P3=priority 3

Appendix D

Species List

Family	Status	Species
Aizoaceae		
	*	*Carpobrotus edulis*
Anarthriaceae		
		Lyginia barbata
		Lyginia imberbis
Apiaceae		
		Actinotus glomeratus
		Platysace filiformis
		Xanthosia huegelii
Araliaceae		
		Trachymene pilosa
Asparagaceae		
	*	*Agave* sp.
		Laxmannia ramosa
		Laxmannia squarrosa
		Lomandra ?caespitosa
		Lomandra ?suaveolens
		Lomandra caespitosa
		Lomandra hermaphrodita
		Lomandra nigricans
		Lomandra preissii
		Lomandra sericea
		Lomandra suaveolens
		Thysanotus manglesianus
		Thysanotus patersonii
		Thysanotus sp.
		Thysanotus sparteus
		Thysanotus triandrus
Asphodelaceae		
		Arnocrinum preissii
		Caesia occidentalis
Asteraceae		
	*	*Arctotheca calendula*
	*	*Asteraceae* sp.
	*	*Cotula turbinata*
		Hyalosperma cotula
	*	*Hypochaeris glabra*
	*	*Hypochaeris radicata*
	*	*Leontodon rhagadioloides*
		Podotheca gnaphalioides
		Quinetia urvillei
		Senecio ?pinnatifolius
		Siloxerus filifolius
	*	*Sonchus oleraceus*
	*	*Urospermum picroides*
	*	*Ursinia anthemoides*

Brassicaceae		
	*	*Raphanus raphanistrum*
Cactaceae		
	*,DP	*Opuntia ?stricta*
Campanulaceae		
		Lobelia alata
	*	*Wahlenbergia capensis*
		Wahlenbergia preissii
Caprifoliaceae		
	*	*Centranthus macrosiphon*
Casuarinaceae		
		Allocasuarina fraseriana
		Allocasuarina humilis
	*	*Casuarina cunninghamiana*
	Pl	*Casuarina* sp.
Centrolepidaceae		
		Centrolepis drummondiana
Colchicaceae		
		Burchardia congesta
Crassulaceae		
		Crassula colorata
	*	*Crassula glomerata*
Cupressaceae		
		Callitris ?pyramidalis
Cyperaceae		
		Chaetospora curvifolia
		Cyperaceae sp.
	*	*Ficinia marginata*
		Lepidosperma apricola
		Lepidosperma longitudinale
		Lepidosperma pubisquameum
		Machaerina juncea
		Schoenus efoliatus
		Schoenus sp.
		Schoenus subfascicularis
Dasypogonaceae		
		Calectasia narragara
		Dasypogon bromeliifolius
Dilleniaceae		
		Hibbertia huegelii
		Hibbertia hypericoides
		Hibbertia sp.
		Hibbertia subvaginata
		Hibbertia vaginata
Droseraceae		
		Drosera drummondii
		Drosera erythrorhiza
		Drosera micrantha

		Drosera pallida
		Drosera sp.
		Drosera zonaria
Elaeocarpaceae		
		Platytheca galioides
Ericaceae		
		Conostephium pendulum
		Leucopogon polymorphus
		Leucopogon squarrosus
		Lysinema pentapetalum
		Styphelia conostephioides
		Styphelia xerophylla
Euphorbiaceae		
	*	*Euphorbia terracina*
	*	*Ricinus communis*
Fabaceae		
		Acacia ?drewiana
		Acacia huegelii
	*	*Acacia iteaphylla*
	*	*Acacia longifolia*
		Acacia pulchella var. *glaberrima*
		Acacia saligna
		Acacia stenoptera
		Bossiaea eriocarpa
		Daviesia divaricata
		Daviesia physodes
		Daviesia triflora
		Euchilopsis linearis
		Gastrolobium capitatum
		Gompholobium tomentosum
		Hardenbergia comptoniana
		Hovea trisperma
		Isotropis cuneifolia
		Jacksonia furcellata
	*	*Lupinus cosentinii*
	*	*Medicago polymorpha*
		Pultenaea reticulata
	*	*Trifolium campestre*
	*	*Vicia sativa*
Geraniaceae		
	*	*Pelargonium capitatum*
Goodeniaceae		
		Dampiera linearis
		Lechenaultia floribunda
Haemodoraceae		
		Anigozanthos humilis
		Anigozanthos manglesii
		Conostylis aurea

		Conostylis juncea
		Conostylis setigera
		Haemodorum spicatum
		Phlebocarya ciliata
		Phlebocarya filifolia
Hemerocallidaceae		
		Chamaescilla corymbosa
		Corynotheca micrantha
		Corynotheca sp.
		Dianella revoluta
		Hensmania turbinata
		Tricoryne elatior
Iridaceae		
	*	*Ferraria crispa*
	*	*Freesia leichtlinii* subsp. *alba* × *leichtlinii* subsp. *leichtlinii*
	*	*Gladiolus caryophyllaceus*
	*	*Iridaceae* sp.
		Patersonia occidentalis
	*	*Watsonia meriana*
Lamiaceae		
		Hemiandra pungens
Lauraceae		
		Cassytha flava
		Cassytha sp.
Loganiaceae		
		Phyllangium paradoxum
Loranthaceae		
		Nuytsia floribunda
Macarthuriaceae		
		Macarthuria australis
Malvaceae		
	Pl	*Guichenotia macrantha*
Montiaceae		
		Calandrinia corrigioloides
Myrtaceae		
	Pl	*Agonis flexuosa*
		Astartea scoparia
		Beaufortia squarrosa
		Calothamnus sp. 1
		Calothamnus sp. 2
		Calytrix flavescens
		Calytrix fraseri
	*	*Chamelaucium uncinatum*
		Corymbia calophylla
		Eremaea asterocarpa
		Eremaea pauciflora
	Pl	*Eucalyptus camaldulensis*
	Pl	*Eucalyptus gomphocephala*

	Eucalyptus marginata
	Eucalyptus rudis
Pl	*Eucalyptus* sp.
	Eucalyptus todtiana
*	*Gaudium laevigatum*
	Hypocalymma angustifolium
	Kunzea glabrescens
	Leptospermopsis erubescens
	Melaleuca preissiana
	Melaleuca rhaphiophylla
	Melaleuca sp.
	Melaleuca teretifolia
	Melaleuca thymoides
	Melaleuca trichophylla
	Melaleuca ?seriata
	Myrtaceae sp.
	Pericalymma ellipticum
	Regelia inops
	Scholtzia involucrata
	Verticordia densiflora var. *densiflora*
	Verticordia drummondii
Onagraceae	
*	*Oenothera stricta*
Orchidaceae	
	Caladenia arenicola
	Caladenia discoidea
	Caladenia flava
	Caladenia latifolia
	Caladenia paludosa
	Caladenia sp.
*	*Disa bracteata*
	Diuris corymbosa
	Diuris magnifica
	Elythranthera brunonis
	Eriochilus sp.
	Leporella fimbriata
	Microtis media
	Prasophyllum parvifolium
	Pterostylis recurva
	Pterostylis sanguinea
	Pyrorchis nigricans
	Thelymitra campanulata
	Thelymitra crinita
	Thelymitra graminea
	Thelymitra macrophylla
	Thelymitra sp. (sterile)
Papaveraceae	
*	*Fumaria capreolata*

Phyllanthaceae		
		Poranthera microphylla
	P2	*Poranthera moorokatta*
Pinaceae		
	Pl	*Pinus pinaster*
Poaceae		
	*	*Aira cupaniana*
		Amphipogon turbinatus
	*	*Arundo donax*
		Austrostipa compressa
		Austrostipa elegantissima
		Austrostipa sp.
	*	*Avena barbata*
	*	*Briza maxima*
	*	*Briza minor*
	*	*Bromus diandrus*
	*	*Ehrharta calycina*
	*	*Ehrharta longiflora*
	*	*Eragrostis curvula*
	*	*Lagurus ovatus*
	*	*Poaceae* sp.
		Rytidosperma acerosum
		Rytidosperma occidentale
	*	*Vulpia myuros*
Polygalaceae		
		Comesperma calymega
		Comesperma confertum
Primulaceae		
	*	*Lysimachia arvensis*
Proteaceae		
		Adenanthos cygnorum
		Adenanthos obovatus
		Banksia attenuata
		Banksia ilicifolia
		Banksia littoralis
		Banksia menziesii
		Grevillea crithmifolia
	Pl	*Grevillea thelemanniana*
		Hakea varia
		Persoonia saccata
		Petrophile linearis
		Proteaceae sp.
		Stirlingia latifolia
Restionaceae		
		Desmocladus fasiculatus
		Desmocladus flexuosus
		Hypolaena exsulca

Rutaceae		
		Boronia crenulata
		Boronia dichotoma
		Cyanothamnus ramosus subsp. anethifolius
		Philotheca spicata
Scrophulariaceae		
	*	*Dischisma capitatum*
Stylidiaceae		
		Levenhookia stipitata
		Stylidium araeophyllum
		Stylidium hispidum
		Stylidium repens
		Stylidium schoenoides
		Stylidium sp.
Xanthorrhoeaceae		
		Xanthorrhoea brunonis
		Xanthorrhoea preissii
Zamiaceae		
		Macrozamia fraseri

*=non-native, Pl=planted, P2=priority 2

Appendix E

Sample Data

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q1

Project no.: EP23-053
Date: 12/07/2023 **Status** Permanent
Author: SCM,TDP Q1: Page 1 of 3

Quadrat and landform details

Sample type:	quadrat	Size:	10 m x 10 m
NW corner easting:	398264	NW corner northing:	6446870
Altitude (m):	29	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	damp	Landform:	flat
Time since fire:	> 5 yrs	Disturbance:	low - weeds
Soil type/texture	sand/loam with organic layer	Bare ground (%):	1
Rocks (%) and type:	No rocks	Soil colour:	grey/brown
Litter:	60% (leaves,branches,twigs)	Vegetation condition:	excellent-very good

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q1

Project no.: EP23-053
Date: 12/07/2023 **Status** Permanent
Author: SCM,TDP Q1: Page 2 of 3

Species Data

* denotes non-native species

Status	Confirmed name	Cover (%)
	Acacia pulchella var. glaberrima	opp
	Actinotus glomeratus	0.1
	Adenanthos cygnorum	opp
	Adenanthos obovatus	5
*	*Aira cupaniana*	0.5
	Allocasuarina fraseriana	0.1
	Amphipogon turbinatus	0.1
*	*Arctotheca calendula*	0.1
	Astartea scoparia	3
	Austrostipa compressa	opp
	Banksia attenuata	10
	Banksia ilicifolia	5
	Boronia dichotoma	0.5
*	*Briza maxima*	0.1
	Caladenia sp.	0.1
	Calytrix fraseri	opp
	Dampiera linearis	0.1
	Dasypogon bromeliifolius	50
	Drosera sp.	0.1
	Eriochilus sp.	0.1
	Euchilopsis linearis	1
*	*Gladiolus caryophyllaceus*	0.1
	Gompholobium tomentosum	0.1
	Hyalosperma cotula	0.1
	Hypocalymma angustifolium	0.1
*	*Hypochaeris glabra*	0.1
	Jacksonia furcellata	opp
	Kunzea glabrescens	0.1
	Lepidosperma pubisquameum	0.1
	Lomandra preissii	2
	Lomandra sericea	opp
	Lyginia imberbis	opp
	Melaleuca preissiana	25
	Nuytsia floribunda	0.1

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q1

Project no.: EP23-053
Date: 0/01/1900 **Status** Permanent
Author: SCM,TDP Q1: Page 3 of 3

	Patersonia occidentalis	opp
	Petrophile linearis	opp
	Philotheca spicata	0.1
	Phlebocarya ciliata	30
	Platytheca galioides	0.1
	Poranthera microphylla	0.5
	Prasophyllum parvifolium	0.1
	Pterostylis sanguinea	0.1
	Regelia inops	35
	Schoenus sp.	opp
	Senecio ?pinnatifolius	0.1
	Styphelia xerophylla	opp
	Trachymene pilosa	0.5
	Tricoryne elatior	0.1
*	*Ursinia anthemoides*	0.1
	Wahlenbergia preissii	0.1
	Xanthorrhoea preissii	5

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q2

Project no.: EP23-053
Date: 12/07/2023 **Status** Permanent
Author: SCM,TDP Q2: Page 1 of 3

Quadrat and landform details

Sample type:	quadrat	Size:	10 m x 10 m
NW corner easting:	398253	NW corner northing:	6446969
Altitude (m):	36	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	slightly damp	Landform:	flat
Time since fire:	> 5 yrs	Disturbance:	low - weeds
Soil type/texture	sand/sand	Bare ground (%):	3
Rocks (%) and type:	No rocks	Soil colour:	grey/grey
Litter:	30% (leaves,branches,twigs)	Vegetation condition:	excellent-very good

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q2

Project no.: EP23-053
Date: 12/07/2023 **Status** Permanent
Author: SCM,TDP

Species Data

* denotes non-native species

Status	Confirmed name	Cover (%)
	Acacia pulchella var. glaberrima	1
	Anigozanthos humilis	0.1
	Arnocrinum preissii	0.1
	Austrostipa compressa	0.1
	Banksia attenuata	70
	Banksia ilicifolia	opp
	Banksia menziesii	10
	Bossiaea eriocarpa	0.1
*	*Briza maxima*	0.1
	Burchardia congesta	0.1
	Caesia occidentalis	0.1
	Caladenia flava	0.1
	Caladenia sp.	0.1
	Calytrix fraseri	2
	Chamaescilla corymbosa	5
	Conostylis juncea	0.1
	Dasypogon bromeliifolius	1
	Desmocladus flexuosus	50
	Drosera erythrorhiza	opp
	Drosera sp.	0.1
*	*Ehrharta calycina*	0.1
	Eriochilus sp.	0.1
*	*Gladiolus caryophyllaceus*	0.1
	Gompholobium tomentosum	0.5
	Hibbertia subvaginata	0.1
	Hyalosperma cotula	0.1
*	*Hypochaeris glabra*	0.1
	Jacksonia furcellata	opp
	Kunzea glabrescens	5
	Lepidosperma pubisquameum	opp
	Lomandra ?suaveolens	0.1
	Lomandra nigricans	opp
	Lomandra sericea	0.1
	Lyginia barbata	1

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q2

Project no.: EP23-053
Date: 12/07/2023 **Status** Permanent
Author: SCM,TDP Q2: Page 3 of 3

	Macrozamia fraseri	0.1
	Melaleuca thymoides	opp
	Melaleuca trichophylla	opp
	Microtis media	opp
	Patersonia occidentalis	opp
*	*Pelargonium capitatum*	0.1
	Platysace filiformis	0.1
	Pterostylis sanguinea	opp
	Regelia inops	30
	Scholtzia involucrata	opp
	Styphelia conostephioides	0.5
	Styphelia xerophylla	2
	Thysanotus triandrus	opp
	Trachymene pilosa	0.1
*	*Ursinia anthemoides*	0.1
	Xanthorrhoea preissii	0.1

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q3

Project no.: EP23-053
Date: 12/07/2023 **Status** Permanent
Author: SCM,TDP Q3: Page 1 of 3

Quadrat and landform details

Sample type:	quadrat	Size:	10 m x 10 m
NW corner easting:	398289	NW corner northing:	6447058
Altitude (m):	36	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	slightly damp	Landform:	flat
Time since fire:	> 5 yrs	Disturbance:	low - weeds
Soil type/texture	sand/sand	Bare ground (%):	1
Rocks (%) and type:	No rocks	Soil colour:	grey/brown
Litter:	60% (leaves,branches,twigs)	Vegetation condition:	excellent-very good

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q3

Project no.: EP23-053
Date: 12/07/2023 **Status** Permanent
Author: SCM,TDP

Species Data

* denotes non-native species

Status	Confirmed name	Cover (%)
	Acacia pulchella var. glaberrima	1
	Allocasuarina fraseriana	0.5
	Banksia attenuata	60
	Banksia ilicifolia	3
	Banksia menziesii	10
	Bossiaea eriocarpa	0.1
*	*Briza maxima*	0.1
	Burchardia congesta	0.1
	Caladenia sp.	0.1
	Calytrix fraseri	0.5
	Cassytha sp.	2
	Chaetospora curvifolia	0.1
	Chamaescilla corymbosa	1
	Comesperma confertum	0.1
	Conostephium pendulum	0.1
	Conostylis juncea	opp
	Dampiera linearis	opp
	Dasypogon bromeliifolius	1
	Drosera erythrorhiza	opp
	Drosera sp.	0.1
	Eriochilus sp.	0.1
*	*Gladiolus caryophyllaceus*	0.1
	Hibbertia huegelii	0.5
	Hibbertia subvaginata	2
	Hovea trisperma	0.1
	Jacksonia furcellata	opp
	Kunzea glabrescens	1
	Lepidosperma pubisquameum	0.1
	Leporella fimbriata	0.1
	Leucopogon squarrosus	0.1
	Lomandra nigricans	0.1
	Lomandra preissii	2
	Lomandra sericea	1
	Lyginia barbata	0.5

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q3

Project no.: EP23-053
Date: 12/07/2023 **Status** Permanent
Author: SCM,TDP Q3: Page 3 of 3

Melaleuca thymoides	0.1
Microtis media	0.1
Patersonia occidentalis	opp
Petrophile linearis	opp
Philotheca spicata	0.1
Phlebocarya ciliata	2
Platysace filiformis	0.1
Scholtzia involucrata	0.1
Stylidium repens	opp
Styphelia conostephioides	0.5
Styphelia xerophylla	opp
Trachymene pilosa	0.1
Tricoryne elatior	opp
Xanthorrhoea preissii	5
Xanthosia huegelii	0.1

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q4

Project no.: EP23-053
Date: 12/07/2023 **Status** Permanent
Author: SCM,TDP Q4: Page 1 of 3

Quadrat and landform details

Sample type:	quadrat	Size:	10 m x 10 m
NW corner easting:	398235	NW corner northing:	6447149
Altitude (m):	34	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	slightly damp	Landform:	flat
Time since fire:	no evidence	Disturbance:	low - weeds
Soil type/texture	sand/sand	Bare ground (%):	5
Rocks (%) and type:	No rocks	Soil colour:	grey/white
Litter:	25% (leaves,twigs,logs)	Vegetation condition:	excellent-very good

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q4

Project no.: EP23-053
Date: 12/07/2023 **Status** Permanent
Author: SCM,TDP

Species Data

* denotes non-native species

Status	Confirmed name	Cover (%)
	Acacia pulchella var. glaberrima	0.5
	Amphipogon turbinatus	0.5
	Anigozanthos humilis	0.1
	Arnocrinum preissii	0.1
	Austrostipa compressa	0.1
	Banksia attenuata	25
	Banksia ilicifolia	opp
	Banksia menziesii	5
	Bossiaea eriocarpa	0.5
*	*Briza maxima*	0.1
	Burchardia congesta	0.1
	Caladenia sp.	0.1
	Calytrix flavescens	0.1
	Calytrix fraseri	0.5
	Cassytha sp.	10
	Comesperma confertum	0.1
	Conostylis aurea	0.1
	Conostylis setigera	0.1
	Dampiera linearis	0.1
	Dasypogon bromeliifolius	0.1
	Desmocladus flexuosus	0.1
	Drosera erythrorhiza	0.1
	Drosera sp.	0.1
	Eriochilus sp.	0.1
	Gastrolobium capitatum	0.1
*	*Gladiolus caryophyllaceus*	0.1
	Gompholobium tomentosum	0.1
	Hensmania turbinata	0.1
	Hibbertia subvaginata	1
	Hovea trisperma	opp
	Hyalosperma cotula	0.1
	Jacksonia furcellata	opp
	Lechenaultia floribunda	opp
	Lepidosperma pubisquameum	opp

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q4

Project no.: EP23-053
Date: 12/07/2023 **Status** Permanent
Author: SCM,TDP Q4: Page 3 of 3

	Leporella fimbriata	0.1
	Leucopogon squarrosus	opp
	Levenhookia stipitata	0.1
	Lomandra nigricans	opp
	Lomandra sericea	0.5
	Lomandra suaveolens	0.1
	Lyginia barbata	2
	Melaleuca thymoides	2
	Nuytsia floribunda	opp
	Patersonia occidentalis	0.5
	Petrophile linearis	0.1
	Philotheca spicata	opp
	Phyllangium paradoxum	0.1
	Poranthera microphylla	0.1
	Regelia inops	15
	Scholtzia involucrata	15
*	*Sonchus oleraceus*	opp
	Stirlingia latifolia	0.1
	Stylidium araeophyllum	0.1
	Stylidium repens	0.1
	Stylidium sp.	0.1
	Styphelia conostephioides	5
	Styphelia xerophylla	0.1
	Thelymitra sp. (sterile)	opp
	Thysanotus triandrus	opp
	Trachymene pilosa	0.1
*	*Ursinia anthemoides*	0.1
*	*Wahlenbergia capensis*	opp

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q5

Project no.: EP23-053
Date: 12/07/2023 **Status** Permanent
Author: SCM,TDP Q5: Page 1 of 3

Quadrat and landform details

Sample type:	quadrat	Size:	10 m x 10 m
NW corner easting:	398360	NW corner northing:	6447227
Altitude (m):	34	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	slightly damp	Landform:	flat
Time since fire:	no evidence	Disturbance:	low - weeds
Soil type/texture	sand/sand	Bare ground (%):	5
Rocks (%) and type:	No rocks	Soil colour:	grey/white
Litter:	25% (branches,twigs,leaves)	Vegetation condition:	excellent-very good

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q5

Project no.: EP23-053
Date: 12/07/2023 **Status** Permanent
Author: SCM,TDP Q5: Page 2 of 3

Species Data

* denotes non-native species

Status	Confirmed name	Cover (%)
	Acacia pulchella var. glaberrima	0.5
	Acacia stenoptera	opp
	Amphipogon turbinatus	0.1
	Austrostipa compressa	0.1
	Banksia attenuata	20
	Banksia ilicifolia	opp
	Banksia menziesii	5
	Bossiaea eriocarpa	0.1
*	*Briza maxima*	0.1
	Burchardia congesta	0.1
	Caladenia sp.	0.1
	Calytrix flavescens	0.1
	Chaetospora curvifolia	opp
	Conostephium pendulum	0.5
	Conostylis setigera	0.1
	Dampiera linearis	0.1
	Dasypogon bromeliifolius	0.5
	Desmocladus flexuosus	0.1
	Drosera erythrorhiza	opp
	Drosera sp.	0.1
	Gastrolobium capitatum	opp
*	*Gladiolus caryophyllaceus*	0.1
	Hensmania turbinata	0.1
	Hibbertia huegelii	0.1
	Hibbertia sp.	0.1
	Hibbertia subvaginata	0.1
	Hyalosperma cotula	0.1
*	*Hypochaeris radicata*	0.1
	Kunzea glabrescens	5
	Laxmannia ramosa	0.1
	Lechenaultia floribunda	opp
	Lomandra nigricans	opp
	Lomandra suaveolens	0.1
	Lyginia barbata	1

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q5

Project no.: EP23-053
Date: 12/07/2023 **Status** Permanent
Author: SCM,TDP Q5: Page 3 of 3

	Melaleuca thymoides	0.1
	Melaleuca trichophylla	2
	Melaleuca ?seriata	0.5
	Myrtaceae sp.	0.1
	Nuytsia floribunda	3
	Patersonia occidentalis	0.1
	Petrophile linearis	0.1
	Philotheca spicata	0.5
	Phyllangium paradoxum	0.1
	Scholtzia involucrata	20
	Stylidium araeophyllum	opp
	Stylidium repens	0.1
	Styphelia conostephioides	2
	Styphelia xerophylla	0.5
	Thelymitra sp. (sterile)	0.1
	Thysanotus triandrus	0.5
*	*Urospermum picroides*	0.1
*	*Ursinia anthemoides*	0.1

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q6

Project no.: EP23-053
Date: 10/10/2023 **Status** Permanent
Author: SCM, Q6: Page 1 of 3

Quadrat and landform details

Sample type:	quadrat	Size:	10 m x 10 m
NW corner easting:	398356	NW corner northing:	6447026
Altitude (m):	22	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	slightly damp	Landform:	flat
Time since fire:	no evidence	Disturbance:	low - weeds
Soil type/texture	sand/ with organic layer	Bare ground (%):	1
Rocks (%) and type:	No rocks	Soil colour:	grey/brown
Litter:	60% (leaves,twigs,branches)	Vegetation condition:	excellent-very good

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q6

Project no.: EP23-053
Date: 10/10/2023 **Status** Permanent
Author: SCM, Q6: Page 2 of 3

Species Data

* denotes non-native species

Status	Confirmed name	Cover (%)
	Acacia pulchella var. glaberrima	2
	Austrostipa compressa	0.1
	Banksia attenuata	40
	Banksia ilicifolia	5
	Banksia menziesii	opp
	Bossiaea eriocarpa	2
*	*Briza maxima*	0.1
	Burchardia congesta	0.1
	Caladenia sp.	0.1
	Calytrix flavescens	0.1
	Chaetospora curvifolia	opp
	Chamaescilla corymbosa	1
	Conostephium pendulum	opp
	Conostylis juncea	0.1
	Dasypogon bromeliifolius	5
*	*Disa bracteata*	0.1
	Drosera erythrorhiza	0.1
	Drosera sp.	0.1
*	*Gladiolus caryophyllaceus*	0.1
	Gompholobium tomentosum	0.1
	Hensmania turbinata	0.1
	Hibbertia subvaginata	10
	Hovea trisperma	opp
	Jacksonia furcellata	2
	Kunzea glabrescens	5
	Lepidosperma pubisquameum	0.1
	Lomandra caespitosa	opp
	Lomandra nigricans	0.1
	Lomandra preissii	0.1
	Lomandra sericea	opp
	Lyginia barbata	5
	Melaleuca thymoides	1
	Microtis media	opp
	Patersonia occidentalis	1

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q6

Project no.: EP23-053
Date: 10/10/2023 **Status** Permanent
Author: SCM, Q6: Page 3 of 3

Petrophile linearis	opp
Phlebocarya ciliata	2
Platysace filiformis	2
Pterostylis sanguinea	opp
Regelia inops	5
Rytidosperma acerosum	opp
Scholtzia involucrata	20
Stylidium repens	1
Styphelia conostephioides	2
Styphelia xerophylla	opp
Thysanotus triandrus	opp
Trachymene pilosa	0.1
Xanthorrhoea preissii	25
Xanthosia huegelii	opp

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: R7

Project no.: EP23-053
Date: 12/07/2023 **Status** Non-permanent
Author: NAW, R7: Page 1 of 3

Quadrat and landform details

Sample type:	releve	Size:	0
NW corner easting:	398075	NW corner northing:	6446662
Altitude (m):	0	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	0	Landform:	0
Time since fire:	0	Disturbance:	-
Soil type/texture	/	Bare ground (%):	0
Rocks (%) and type:	No rocks	Soil colour:	/
Litter:	% (,,)	Vegetation condition:	-

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: R7

Project no.: EP23-053
Date: 12/07/2023 **Status** Permanent
Author: NAW, R7: Page 2 of 3

Species Data

* denotes non-native species

Status	Confirmed name	Cover (%)
*	*Acacia longifolia*	
	Acacia pulchella var. glaberrima	
	Adenanthos cygnorum	
*	*Aira cupaniana*	
	Allocasuarina fraseriana	
	Amphipogon turbinatus	
	Anigozanthos manglesii	
	Banksia attenuata	
	Banksia menziesii	
	Bossiaea eriocarpa	
*	*Briza maxima*	
	Burchardia congesta	
	Calothamnus sp. 1	
	Calytrix fraseri	
	Conostylis aurea	
	Conostylis juncea	
	Corymbia calophylla	
	Corynotheca sp.	
	Desmocladus flexuosus	
*	*Ehrharta calycina*	
	Eremaea pauciflora	
Pl	*Eucalyptus gomphocephala*	
	Eucalyptus todtiana	
	Gastrolobium capitatum	
*	*Gladiolus caryophyllaceus*	
	Gompholobium tomentosum	
Pl	*Guichenotia macrantha*	
	Hardenbergia comptoniana	
	Hemiandra pungens	
	Hensmania turbinata	
	Hibbertia hypericoides	
	Laxmannia squarrosa	
	Lechenaultia floribunda	
	Leucopogon polymorphus	

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: R7

Project no.: EP23-053
Date: 12/07/2023 **Status** Permanent
Author: NAW, R7: Page 3 of 3

Lyginia imberbis
Melaleuca sp.
Melaleuca trichophylla
Microtis media
Nuytsia floribunda
Patersonia occidentalis
Regelia inops
Scholtzia involucrata
Stirlingia latifolia
Styphelia conostephioides
Styphelia xerophylla
Trachymene pilosa
* *Ursinia anthemoides*

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: R8

Project no.: EP23-053
Date: 12/07/2023 **Status** Non-permanent
Author: NAW, R8: Page 1 of 3

Quadrat and landform details

Sample type:	releve	Size:	0
NW corner easting:	398170	NW corner northing:	6446749
Altitude (m):	0	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	0	Landform:	0
Time since fire:	0	Disturbance:	-
Soil type/texture	/	Bare ground (%):	0
Rocks (%) and type:	No rocks	Soil colour:	/
Litter:	% (,,)	Vegetation condition:	-

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: R8

Project no.: EP23-053
Date: 12/07/2023 **Status** Permanent
Author: NAW,

Species Data

* denotes non-native species

Status	Confirmed name	Cover (%)
	Acacia pulchella var. glaberrima	
	Adenanthos cygnorum	
	Adenanthos obovatus	
	Allocasuarina fraseriana	
	Austrostipa compressa	
	Banksia attenuata	
	Banksia ilicifolia	
	Banksia menziesii	
	Bossiaea eriocarpa	
*	*Briza maxima*	
	Burchardia congesta	
	Calytrix flavescens	
	Conostylis juncea	
	Dasypogon bromeliifolius	
	Desmocladus flexuosus	
	Drosera erythrorhiza	
*	*Ehrharta calycina*	
	Eucalyptus todtiana	
	Gastrolobium capitatum	
*	*Gladiolus caryophyllaceus*	
	Gompholobium tomentosum	
	Hibbertia subvaginata	
*	*Hypochaeris glabra*	
*	*Iridaceae sp.*	
	Jacksonia furcellata	
	Laxmannia ramosa	
	Lyginia barbata	
	Macrozamia fraseri	
	Microtis media	
	Patersonia occidentalis	
*	*Pelargonium capitatum*	
	Regelia inops	
	Scholtzia involucrata	
	Stylidium repens	

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: R8

Project no.: EP23-053
Date: 12/07/2023 **Status** Permanent
Author: NAW, R8: Page 3 of 3

Styphelia conostephioides
Styphelia xerophylla
Trachymene pilosa
* *Vulpia myuros*
Xanthosia huegelii

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q9

Project no.: EP23-053
Date: 14/09/2023 **Status** Permanent
Author: SCM, Q9: Page 1 of 3

Quadrat and landform details

Sample type:	quadrat	Size:	10 m x 10 m
NW corner easting:	398676	NW corner northing:	6447549
Altitude (m):	33	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	damp	Landform:	flat
Time since fire:	no evidence	Disturbance:	low - weeds
Soil type/texture	sand/	Bare ground (%):	1
Rocks (%) and type:	No rocks	Soil colour:	grey/white
Litter:	45% (leaves,logs,branches)	Vegetation condition:	excellent-very good

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q9

Project no.: EP23-053
Date: 14/09/2023 **Status** Permanent
Author: SCM, Q9: Page 2 of 3

Species Data

* denotes non-native species

Status	Confirmed name	Cover (%)
	Acacia huegelii	opp
	Acacia pulchella var. glaberrima	2
	Adenanthos cygnorum	opp
	Amphipogon turbinatus	1
	Anigozanthos manglesii	0.1
	Banksia attenuata	20
	Banksia ilicifolia	2
	Banksia menziesii	5
	Bossiaea eriocarpa	5
*	*Briza maxima*	0.1
	Burchardia congesta	0.5
	Caladenia flava	opp
	Calytrix flavescens	1
	Chaetospora curvifolia	0.1
	Comesperma confertum	0.1
	Dampiera linearis	0.1
	Dasypogon bromeliifolius	2
	Desmocladus flexuosus	2
*	*Disa bracteata*	0.1
	Diuris corymbosa	0.1
	Drosera erythrorhiza	0.1
	Drosera pallida	0.1
*	*Ehrharta calycina*	0.1
	Eriochilus sp.	0.1
*	*Gladiolus caryophyllaceus*	0.1
	Gompholobium tomentosum	0.1
	Hensmania turbinata	1
	Hibbertia subvaginata	2
	Hovea trisperma	0.1
*	*Hypochaeris glabra*	0.1
	Hypolaena exsulca	opp
	Lepidosperma pubisquameum	0.1
	Leucopogon squarrosus	opp
	Lomandra ?caespitosa	0.1

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q9

Project no.: EP23-053
Date: 14/09/2023 **Status** Permanent
Author: SCM, Q9: Page 3 of 3

	Lomandra sericea	0.1
	Lyginia barbata	0.1
	Melaleuca thymoides	0.1
	Melaleuca trichophylla	0.5
	Patersonia occidentalis	2
	Persoonia saccata	opp
	Petrophile linearis	0.1
	Philotheca spicata	0.1
	Phlebocarya ciliata	35
	Phlebocarya filifolia	2
	Prasophyllum parvifolium	0.1
	Pterostylis sanguinea	0.1
	Pyrorchis nigricans	opp
	Rytidosperma occidentale	opp
	Scholtzia involucrata	5
	Stirlingia latifolia	0.5
	Stylidium repens	1
	Styphelia conostephioides	5
	Thelymitra crinita	0.1
	Thelymitra graminea	0.1
	Thysanotus triandrus	0.1
	Trachymene pilosa	0.1
	Tricoryne elatior	0.5
*	*Ursinia anthemoides*	0.1

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q10

Project no.: EP23-053
Date: 14/09/2023 **Status** Permanent
Author: SCM, Q10: Page 1 of 3

Quadrat and landform details

Sample type:	quadrat	Size:	10 m x 10 m
NW corner easting:	398698	NW corner northing:	6447369
Altitude (m):	30	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	slightly damp	Landform:	flat
Time since fire:	no evidence	Disturbance:	low - weeds
Soil type/texture	sand/	Bare ground (%):	1
Rocks (%) and type:	No rocks	Soil colour:	grey/brown
Litter:	40% (leaves,branches,twigs)	Vegetation condition:	excellent-very good

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q10

Project no.: EP23-053
Date: 14/09/2023 **Status** Permanent
Author: SCM, Q10: Page 2 of 3

Species Data

* denotes non-native species

Status	Confirmed name	Cover (%)
	Acacia pulchella var. glaberrima	2
	Amphipogon turbinatus	0.1
	Anigozanthos humilis	opp
	Arnocrinum preissii	0.1
	Banksia attenuata	25
	Banksia ilicifolia	15
	Banksia menziesii	5
	Bossiaea eriocarpa	2
*	*Briza maxima*	0.1
	Burchardia congesta	0.1
	Caladenia flava	0.1
	Calytrix flavescens	15
	Chaetospora curvifolia	0.1
	Chamaescilla corymbosa	0.1
	Comesperma confertum	0.1
	Conostephium pendulum	0.5
	Conostylis juncea	0.5
	Dampiera linearis	0.1
	Dasypogon bromeliifolius	5
	Desmocladus flexuosus	2
	Diuris corymbosa	0.1
	Diuris magnifica	opp
	Drosera erythrorhiza	0.1
	Drosera pallida	0.1
*	*Ehrharta calycina*	0.1
	Eremaea pauciflora	15
	Gastrolobium capitatum	0.5
*	*Gladiolus caryophyllaceus*	0.1
	Gompholobium tomentosum	0.5
	Hensmania turbinata	5
	Hibbertia subvaginata	2
	Hovea trisperma	0.1
*	*Hypochaeris glabra*	0.1
	Hypolaena exsulca	opp

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q10

Project no.: EP23-053
Date: 14/09/2023 **Status** Permanent
Author: SCM, Q10: Page 3 of 3

Jacksonia furcellata	2
Lepidosperma pubisquameum	0.1
Leporella fimbriata	0.1
Leucopogon squarrosus	0.5
Lomandra ?caespitosa	1
Lomandra preissii	0.1
Lomandra sericea	0.5
Lyginia barbata	2
Lyginia imberbis	opp
Macrozamia fraseri	0.5
Melaleuca thymoides	2
Melaleuca trichophylla	0.5
Microtis media	0.1
Patersonia occidentalis	0.5
Persoonia saccata	1
Petrophile linearis	0.1
Philotheca spicata	2
Phlebocarya ciliata	1
Phlebocarya filifolia	2
Platysace filiformis	0.1
Pterostylis recurva	0.1
Scholtzia involucrata	opp
Stirlingia latifolia	2
Stylidium araeophyllum	opp
Stylidium repens	0.1
Styphelia conostephioides	2
Styphelia xerophylla	2
Thelymitra graminea	0.1
Thelymitra sp. (sterile)	0.1
Thysanotus manglesianus	0.1
Thysanotus triandrus	5
Ursinia anthemoides	opp

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q11

Project no.: EP23-053
Date: 14/09/2023 **Status** Permanent
Author: SCM, Q11: Page 1 of 3

Quadrat and landform details

Sample type:	quadrat	Size:	10 m x 10 m
NW corner easting:	398619	NW corner northing:	6447257
Altitude (m):	27	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	dry	Landform:	flat
Time since fire:	no evidence	Disturbance:	low - weeds
Soil type/texture	sand/	Bare ground (%):	2
Rocks (%) and type:	No rocks	Soil colour:	grey/brown
Litter:	40% (leaves,twigs,)	Vegetation condition:	excellent-very good

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q11

Project no.: EP23-053

Date: 14/09/2023 **Status** Permanent

Author: SCM, Q11: Page 2 of 3

Species Data

* denotes non-native species

Status	Confirmed name	Cover (%)
	Acacia pulchella var. glaberrima	2
	Acacia stenoptera	0.1
	Amphipogon turbinatus	opp
	Anigozanthos manglesii	0.1
	Banksia attenuata	20
	Banksia ilicifolia	opp
	Banksia menziesii	15
	Bossiaea eriocarpa	1
*	*Briza maxima*	0.5
	Burchardia congesta	0.1
	Caladenia flava	0.1
	Calytrix flavescens	2
	Chaetospora curvifolia	0.1
	Chamaescilla corymbosa	0.1
	Comesperma confertum	0.1
	Conostylis aurea	0.5
	Conostylis juncea	0.5
	Dampiera linearis	0.1
	Dasypogon bromeliifolius	1
	Desmocladus flexuosus	25
	Diuris corymbosa	0.1
	Diuris magnifica	opp
	Drosera pallida	0.1
*	*Ehrharta calycina*	0.1
*	*Gladiolus caryophyllaceus*	0.1
	Gompholobium tomentosum	0.5
	Hensmania turbinata	1
	Hibbertia subvaginata	2
	Hovea trisperma	0.1
*	*Hypochaeris glabra*	0.1
	Hypolaena exsulca	0.1
	Isotropis cuneifolia	0.1
	Kunzea glabrescens	5
	Laxmannia squarrosa	0.1

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q11

Project no.: EP23-053
Date: 14/09/2023 **Status** Permanent
Author: SCM, Q11: Page 3 of 3

	Lechenaultia floribunda	0.5
	Leucopogon squarrosus	1
	Lomandra caespitosa	2
	Lomandra preissii	0.1
	Lomandra sericea	0.5
	Lyginia barbata	1
	Macrozamia fraseri	opp
	Melaleuca thymoides	opp
	Patersonia occidentalis	5
	Philotheca spicata	1
	Phlebocarya ciliata	5
	Platysace filiformis	2
	Pterostylis sanguinea	0.1
	Scholtzia involucrata	2
	Stylidium repens	0.5
	Styphelia conostephioides	1
	Thelymitra graminea	0.1
	Thysanotus manglesianus	0.1
	Thysanotus triandrus	0.5
	Trachymene pilosa	0.1
*	*Ursinia anthemoides*	0.1

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: R12

Project no.: EP23-053
Date: 14/09/2023 **Status** Non-permanent
Author: SCM, R12: Page 1 of 2

Quadrat and landform details

Sample type:	releve	Size:	0
NW corner easting:	398496	NW corner northing:	6447305
Altitude (m):	29	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	dry	Landform:	flat
Time since fire:	no evidence	Disturbance:	high - historic clearing
Soil type/texture	sand/	Bare ground (%):	85
Rocks (%) and type:	No rocks	Soil colour:	grey/white
Litter:	1% (leaves,twigs,)	Vegetation condition:	degraded-completely degraded

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: R12

Project no.: EP23-053
Date: 14/09/2023 **Status** Permanent
Author: SCM, R12: Page 2 of 2

Species Data

* denotes non-native species

Status	Confirmed name	Cover (%)
	Acacia pulchella var. glaberrima	
	Adenanthos cygnorum	
	Anigozanthos manglesii	
	Banksia attenuata	
*	*Briza maxima*	
	Caladenia flava	
	Conostylis aurea	
	Crassula colorata	
	Dasypogon bromeliifolius	
*	*Ehrharta calycina*	
	Eremaea pauciflora	
	Gastrolobium capitatum	
*	*Gladiolus caryophyllaceus*	
	Gompholobium tomentosum	
	Hemiandra pungens	
	Hensmania turbinata	
	Hibbertia subvaginata	
	Hyalosperma cotula	
	Jacksonia furcellata	
	Kunzea glabrescens	
	Laxmannia squarrosa	
	Lechenaultia floribunda	
	Lomandra sericea	
	Lyginia barbata	
	Nuytsia floribunda	
	Patersonia occidentalis	
	Scholtzia involucrata	
	Stirlingia latifolia	
	Styphelia conostephioides	
*	*Ursinia anthemoides*	

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q13

Project no.: EP23-053
Date: 14/09/2023 **Status** Permanent
Author: SCM, Q13: Page 1 of 3

Quadrat and landform details

Sample type:	quadrat	Size:	10 m x 10 m
NW corner easting:	397980	NW corner northing:	6447213
Altitude (m):	35	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	slightly damp	Landform:	mid-slope
Time since fire:	<1 yr	Disturbance:	high - fire, weeds
Soil type/texture	sand/	Bare ground (%):	75
Rocks (%) and type:	No rocks	Soil colour:	grey/brown
Litter:	5% (branches,twigs,)	Vegetation condition:	N/A-

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q13

Project no.: EP23-053
Date: 14/09/2023 **Status** Permanent
Author: SCM, Q13: Page 2 of 3

Species Data

* denotes non-native species

Status	Confirmed name	Cover (%)
	Acacia pulchella var. glaberrima	0.1
	Allocasuarina humilis	5
	Amphipogon turbinatus	1
	Anigozanthos humilis	opp
	Anigozanthos manglesii	0.5
	Arnocrinum preissii	opp
	Austrostipa compressa	0.1
	Banksia attenuata	5
	Banksia ilicifolia	opp
	Banksia menziesii	0.5
	Bossiaea eriocarpa	1
	Burchardia congesta	0.1
	Caladenia flava	opp
	Calytrix flavescens	1
	Chaetospora curvifolia	0.1
	Conostephium pendulum	0.1
	Dampiera linearis	0.1
	Dasypogon bromeliifolius	0.1
	Daviesia triflora	0.5
	Desmocladus flexuosus	0.1
	Drosera drummondii	0.1
	Elythranthera brunonis	opp
*	*Gladiolus caryophyllaceus*	0.1
	Hensmania turbinata	0.1
	Hibbertia hypericoides	0.5
	Hibbertia subvaginata	0.1
	Hyalosperma cotula	0.1
*	*Hypochaeris glabra*	0.1
	Hypolaena exsulca	0.1
	Jacksonia furcellata	opp
	Lechenaultia floribunda	opp
	Lomandra hermaphrodita	0.1
	Lyginia barbata	0.1
	Melaleuca trichophylla	2

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q13

Project no.: EP23-053
Date: 14/09/2023 **Status** Permanent
Author: SCM, Q13: Page 3 of 3

	Patersonia occidentalis	1
*	*Pelargonium capitatum*	0.1
	Philotheca spicata	0.1
	Phlebocarya ciliata	opp
	Phlebocarya filifolia	0.1
P2	*Poranthera moorokatta*	0.1
	Senecio ?pinnatifolius	0.1
*	*Sonchus oleraceus*	0.1
	Stirlingia latifolia	2
	Thysanotus patersonii	0.1
	Thysanotus sp.	opp
	Trachymene pilosa	0.1
*	*Vulpia myuros*	opp

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q14

Project no.: EP23-053
Date: 14/09/2023 **Status** Permanent
Author: SCM, Q14: Page 1 of 3

Quadrat and landform details

Sample type:	quadrat	Size:	10 m x 10 m
NW corner easting:	397808	NW corner northing:	6447151
Altitude (m):	34	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	slightly damp	Landform:	upper slope
Time since fire:	<1 yr	Disturbance:	high - fire, weeds
Soil type/texture	sand/	Bare ground (%):	60
Rocks (%) and type:	No rocks	Soil colour:	grey/brown
Litter:	20% (leaves,branches,twigs)	Vegetation condition:	N/A-

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q14

Project no.: EP23-053
Date: 14/09/2023 **Status** Permanent
Author: SCM, Q14: Page 2 of 3

Species Data

* denotes non-native species

Status	Confirmed name	Cover (%)
	Adenanthos cygnorum	opp
	Allocasuarina fraseriana	0.5
	Allocasuarina humilis	2
	Amphipogon turbinatus	0.1
	Anigozanthos humilis	0.1
	Anigozanthos manglesii	0.5
	Austrostipa compressa	0.1
	Banksia attenuata	2
	Banksia menziesii	5
	Bossiaea eriocarpa	1
	Burchardia congesta	0.1
	Caladenia flava	opp
	Calytrix flavescens	1
	Conostephium pendulum	0.5
	Conostylis aurea	opp
	Dampiera linearis	opp
	Dasypogon bromeliifolius	0.1
	Daviesia triflora	opp
	Desmocladus flexuosus	0.5
	Drosera drummondii	opp
	Drosera erythrorhiza	0.1
*	*Ficinia marginata*	0.1
*	*Gladiolus caryophyllaceus*	0.1
	Hibbertia hypericoides	1
	Hyalosperma cotula	opp
*	*Hypochaeris glabra*	0.1
	Leucopogon polymorphus	opp
	Lomandra sericea	0.1
	Lyginia barbata	0.1
*	*Lysimachia arvensis*	0.1
	Melaleuca thymoides	1
	Nuytsia floribunda	2
	Petrophile linearis	0.1
	Philotheca spicata	opp

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q14

Project no.: EP23-053
Date: 14/09/2023 **Status** Permanent
Author: SCM, Q14: Page 3 of 3

	Phlebocarya filifolia	0.1
P2	*Poranthera moorokatta*	0.1
	Regelia inops	opp
*	*Sonchus oleraceus*	0.1
	Stirlingia latifolia	2
	Styphelia conostephioides	opp
	Thysanotus triandrus	0.1
	Trachymene pilosa	0.1

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q15

Project no.: EP23-053
Date: 15/09/2023 **Status** Permanent
Author: SCM, Q15: Page 1 of 3

Quadrat and landform details

Sample type:	quadrat	Size:	10 m x 10 m
NW corner easting:	397848	NW corner northing:	6447365
Altitude (m):	56	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	dry	Landform:	upper slope
Time since fire:	> 5 yrs	Disturbance:	low - weeds
Soil type/texture	sand/	Bare ground (%):	5
Rocks (%) and type:	No rocks	Soil colour:	grey/white
Litter:	30% (leaves,logs,branches)	Vegetation condition:	excellent-very good

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q15

Project no.: EP23-053
Date: 15/09/2023 **Status** Permanent
Author: SCM, Q15: Page 2 of 3

Species Data

* denotes non-native species

Status	Confirmed name	Cover (%)
	Acacia pulchella var. glaberrima	1
	Acacia stenoptera	1
	Allocasuarina fraseriana	5
	Allocasuarina humilis	5
	Amphipogon turbinatus	5
	Arnocrinum preissii	0.1
	Austrostipa compressa	0.1
	Banksia attenuata	20
	Banksia menziesii	opp
	Bossiaea eriocarpa	1
*	*Briza maxima*	0.1
	Burchardia congesta	0.1
	Caladenia flava	0.1
	Calytrix flavescens	0.5
	Calytrix fraseri	10
	Cassytha flava	0.1
	Chaetospora curvifolia	0.5
	Chamaescilla corymbosa	0.1
	Comesperma confertum	0.1
	Conostephium pendulum	0.5
	Conostylis aurea	0.5
	Conostylis juncea	0.1
	Corynotheca sp.	1
	Crassula colorata	0.1
	Cyanothamnus ramosus subsp. anethifolius	0.1
	Dasypogon bromeliifolius	0.5
	Desmocladus flexuosus	1
	Drosera pallida	0.1
*	*Ehrharta calycina*	0.1
	Eremaea pauciflora	10
	Eriochilus sp.	opp
	Eucalyptus todtiana	opp
	Gastrolobium capitatum	opp
*	*Gladiolus caryophyllaceus*	0.1

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q15

Project no.: EP23-053
Date: 15/09/2023 **Status** Permanent
Author: SCM, Q15: Page 3 of 3

	Gompholobium tomentosum	1
	Hensmania turbinata	0.1
	Hibbertia hypericoides	5
	Hibbertia subvaginata	0.5
	Hyalosperma cotula	0.1
*	*Hypochaeris glabra*	0.5
	Lechenaultia floribunda	opp
	Leporella fimbriata	opp
	Leucopogon squarrosus	opp
	Lomandra hermaphrodita	0.1
	Lomandra sericea	0.1
	Lyginia barbata	2
	Melaleuca thymoides	2
	Nuytsia floribunda	opp
	Patersonia occidentalis	1
*	*Pelargonium capitatum*	opp
	Petrophile linearis	0.1
	Philotheca spicata	opp
	Phlebocarya ciliata	2
	Phlebocarya filifolia	0.1
P2	*Poranthera moorokatta*	0.1
	Quinetia urvillei	0.1
	Scholtzia involucrata	1
	Siloxerus filifolius	0.1
	Stirlingia latifolia	0.1
	Stylidium repens	0.1
	Styphelia conostephioides	2
	Styphelia xerophylla	opp
	Thelymitra macrophylla	opp
	Thysanotus patersonii	0.1
	Thysanotus triandrus	0.1
	Trachymene pilosa	0.1
*	*Ursinia anthemoides*	0.1

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q16

Project no.: EP23-053
Date: 15/09/2023 **Status** Permanent
Author: SCM, Q16: Page 1 of 3

Quadrat and landform details

Sample type:	quadrat	Size:	10 m x 10 m
NW corner easting:	397749	NW corner northing:	6447283
Altitude (m):	40	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	dry	Landform:	lower slope
Time since fire:	<1 yr	Disturbance:	high - fire, weeds
Soil type/texture	sand/	Bare ground (%):	80
Rocks (%) and type:	No rocks	Soil colour:	grey/brown
Litter:	2% (branches,twigs,)	Vegetation condition:	N/A-

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q16

Project no.: EP23-053
Date: 15/09/2023 **Status** Permanent
Author: SCM, Q16: Page 2 of 3

Species Data

* denotes non-native species

Status	Confirmed name	Cover (%)
	Acacia pulchella var. glaberrima	0.1
	Allocasuarina fraseriana	opp
	Allocasuarina humilis	1
	Amphipogon turbinatus	0.5
	Anigozanthos manglesii	opp
	Austrostipa compressa	5
	Banksia attenuata	2
	Banksia menziesii	2
	Bossiaea eriocarpa	1
	Burchardia congesta	0.1
	Caladenia flava	0.1
	Calytrix flavescens	1
	Conostephium pendulum	opp
	Conostylis aurea	0.5
	Conostylis juncea	0.1
	Crassula colorata	opp
	Dampiera linearis	2
	Dasypogon bromeliifolius	1
	Desmocladus flexuosus	0.1
	Drosera pallida	0.1
*	*Ficinia marginata*	1
*	*Gladiolus caryophyllaceus*	0.1
	Hensmania turbinata	0.5
	Hibbertia hypericoides	2
	Hyalosperma cotula	0.1
*	*Hypochaeris glabra*	0.1
	Hypolaena exsulca	1
	Lechenaultia floribunda	0.1
	Lepidosperma pubisquameum	opp
	Lyginia barbata	1
	Macarthuria australis	opp
	Macrozamia fraseri	opp
	Melaleuca thymoides	1
	Nuytsia floribunda	opp

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q16

Project no.: EP23-053
Date: 15/09/2023 **Status** Permanent
Author: SCM, Q16: Page 3 of 3

	Petrophile linearis	0.1
	Phyllangium paradoxum	opp
P2	*Poranthera moorokatta*	0.1
	Senecio ?pinnatifolius	opp
*	*Sonchus oleraceus*	0.1
	Stirlingia latifolia	0.1
	Thysanotus patersonii	0.1
	Trachymene pilosa	0.1
*	*Ursinia anthemoides*	0.1

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q17

Project no.: EP23-053
Date: 15/09/2023 **Status** Permanent
Author: SCM, Q17: Page 1 of 3

Quadrat and landform details

Sample type:	quadrat	Size:	10 m x 10 m
NW corner easting:	397740	NW corner northing:	6446883
Altitude (m):	32	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	slightly damp	Landform:	flat
Time since fire:	no evidence	Disturbance:	low - weeds
Soil type/texture	sand/	Bare ground (%):	2
Rocks (%) and type:	No rocks	Soil colour:	grey/
Litter:	10% (branches,twigs,)	Vegetation condition:	very good-

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q17

Project no.: EP23-053
Date: 15/09/2023 **Status** Permanent
Author: SCM, Q17: Page 2 of 3

Species Data

* denotes non-native species

Status	Confirmed name	Cover (%)
*	*Acacia longifolia*	opp
	Acacia pulchella var. glaberrima	2
	Acacia stenoptera	0.1
	Adenanthos cygnorum	5
*	*Aira cupaniana*	0.1
	Amphipogon turbinatus	0.5
	Banksia littoralis	opp
	Boronia dichotoma	opp
	Caladenia flava	0.1
	Calytrix fraseri	15
	Comesperma calymega	opp
	Conostylis juncea	0.5
	Crassula colorata	0.1
	Cyanothamnus ramosus subsp. anethifolius	0.1
	Dampiera linearis	0.1
	Dasypogon bromeliifolius	2
	Daviesia physodes	opp
*	*Ehrharta calycina*	0.1
	Euchilopsis linearis	opp
*	*Ficinia marginata*	0.1
*	*Gladiolus caryophyllaceus*	0.1
	Gompholobium tomentosum	opp
	Hensmania turbinata	1
	Hibbertia subvaginata	0.5
	Hyalosperma cotula	opp
	Hypocalymma angustifolium	1
*	*Hypochaeris glabra*	0.1
	Hypolaena exsulca	0.1
	Jacksonia furcellata	2
	Kunzea glabrescens	opp
	Lechenaultia floribunda	opp
	Lyginia barbata	1
	Lyginia imberbis	0.1
	Melaleuca preissiana	opp

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q17

Project no.: EP23-053
Date: 15/09/2023 **Status** Permanent
Author: SCM, Q17: Page 3 of 3

	Pericalymma ellipticum	1
	Phlebocarya ciliata	60
	Regelia inops	15
	Schoenus efoliatus	2
	Stylidium araeophyllum	opp
	Stylidium repens	opp
	Thysanotus sparteus	0.1
	Trachymene pilosa	0.1
*	*Ursinia anthemoides*	0.1

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q18

Project no.: EP23-053
Date: 15/09/2023 **Status** Permanent
Author: SCM, Q18: Page 1 of 3

Quadrat and landform details

Sample type:	quadrat	Size:	10 m x 10 m
NW corner easting:	397812	NW corner northing:	6446492
Altitude (m):	33	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	slightly damp	Landform:	flat
Time since fire:	> 5 yrs	Disturbance:	low - weeds
Soil type/texture	sand/	Bare ground (%):	35
Rocks (%) and type:	No rocks	Soil colour:	grey/brown
Litter:	5% (branches,twigs,)	Vegetation condition:	very good-

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q18

Project no.: EP23-053
Date: 15/09/2023 **Status** Permanent
Author: SCM, Q18: Page 2 of 3

Species Data

* denotes non-native species

Status	Confirmed name	Cover (%)
	Acacia pulchella var. glaberrima	1
	Adenanthos cygnorum	10
*	*Aira cupaniana*	0.1
	Amphipogon turbinatus	opp
	Austrostipa sp.	0.1
	Bossiaea eriocarpa	opp
*	*Briza maxima*	opp
	Caladenia flava	0.1
	Calytrix fraseri	1
	Chaetospora curvifolia	0.1
	Crassula colorata	0.1
	Cyanothamnus ramosus subsp. anethifolius	opp
	Dasypogon bromeliifolius	opp
	Drosera sp.	0.1
*	*Ehrharta longiflora*	0.1
	Eucalyptus rudis	opp
*	*Ficinia marginata*	0.1
*	*Gladiolus caryophyllaceus*	0.1
	Gompholobium tomentosum	0.1
	Hensmania turbinata	0.1
	Hibbertia subvaginata	opp
	Hyalosperma cotula	0.1
*	*Hypochaeris glabra*	0.1
	Hypolaena exsulca	opp
	Jacksonia furcellata	1
	Lomandra preissii	0.1
	Lyginia imberbis	0.1
	Melaleuca preissiana	5
	Nuytsia floribunda	opp
*	*Pelargonium capitatum*	0.1
	Phlebocarya ciliata	2
	Poranthera microphylla	0.1
	Regelia inops	70
	Stylidium araeophyllum	opp

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q18

Project no.: EP23-053
Date: 15/09/2023 **Status** Permanent
Author: SCM, Q18: Page 3 of 3

	Thysanotus patersonii	0.1
	Thysanotus triandrus	opp
	Trachymene pilosa	0.1
*	*Ursinia anthemoides*	0.1
*	*Vulpia myuros*	opp

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q19

Project no.: EP23-053
Date: 10/10/2023
Author: SCM,ASF

Status Non-permanent

Quadrat and landform details

Sample type:	quadrat	Size:	10 m x 10 m
NW corner easting:	397994	NW corner northing:	6446733
Altitude (m):	43	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	slightly damp	Landform:	hilltop
Time since fire:	> 5 yrs	Disturbance:	moderate - weeds
Soil type/texture	sand/sand	Bare ground (%):	10
Rocks (%) and type:	No rocks	Soil colour:	white/grey
Litter:	40% (leaves,twigs,branches)	Vegetation condition:	very good-good

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q19

Project no.: EP23-053
Date: 10/10/2023 **Status** Permanent
Author: SCM,ASF

Species Data

* denotes non-native species

Status	Confirmed name	Cover (%)
	Acacia pulchella var. glaberrima	5
	Adenanthos cygnorum	5
*	*Aira cupaniana*	0.1
	Allocasuarina humilis	5
	Amphipogon turbinatus	1
	Arnocrinum preissii	opp
	Austrostipa compressa	0.1
	Banksia attenuata	20
	Banksia menziesii	2
	Bossiaea eriocarpa	0.5
	Burchardia congesta	0.1
	Calytrix flavescens	opp
	Calytrix fraseri	15
	Cassytha flava	0.1
	Conostephium pendulum	0.5
	Conostylis aurea	opp
	Conostylis juncea	opp
	Cyanothamnus ramosus subsp. anethifolius	0.1
	Eremaea pauciflora	2
	Gastrolobium capitatum	0.1
*	*Gladiolus caryophyllaceus*	0.1
	Gompholobium tomentosum	0.1
	Hemiandra pungens	opp
	Hensmania turbinata	0.1
	Hibbertia hypericoides	1
	Hibbertia subvaginata	1
*	*Hypochaeris glabra*	opp
	Laxmannia squarrosa	0.1
	Lechenaultia floribunda	5
	Leucopogon polymorphus	5
	Leucopogon squarrosus	0.5
	Levenhookia stipitata	0.1
	Lomandra caespitosa	0.1
	Lyginia barbata	0.5

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q19

Project no.: EP23-053
Date: 10/10/2023 **Status** Permanent
Author: SCM,ASF Q19: Page 3 of 3

	Lyginia imberbis	1
	Melaleuca thymoides	opp
	Nuytsia floribunda	1
	Patersonia occidentalis	opp
	Petrophile linearis	0.1
	Philotheca spicata	opp
	Phyllangium paradoxum	0.1
	Poranthera microphylla	opp
	Regelia inops	opp
	Scholtzia involucrata	10
	Stirlingia latifolia	0.5
	Stylidium araeophyllum	0.1
	Stylidium repens	0
	Styphelia conostephioides	10
	Styphelia xerophylla	5
	Trachymene pilosa	0.1
*	*Ursinia anthemoides*	0.1
	Xanthosia huegelii	0.1

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: R20

Project no.: EP23-053
Date: 10/10/2023 **Status** Non-permanent
Author: SCM,ASF R20: Page 1 of 2

Quadrat and landform details

Sample type:	releve	Size:	10 m x 10 m
NW corner easting:	398024	NW corner northing:	6446684
Altitude (m):	33	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	0	Landform:	0
Time since fire:	0	Disturbance:	-
Soil type/texture	/	Bare ground (%):	0
Rocks (%) and type:	No rocks	Soil colour:	/
Litter:	2% (branches,twigs,)	Vegetation condition:	-

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: R20

Project no.: EP23-053
Date: 10/10/2023 **Status** Permanent
Author: SCM,ASF

Species Data

* denotes non-native species

Status	Confirmed name	Cover (%)
	Acacia saligna	
	Amphipogon turbinatus	
	Banksia menziesii	
	Bossiaea eriocarpa	
	Callitris ?pyramidalis	
	Calothamnus sp. 1	
	Conostylis aurea	
	Corymbia calophylla	
	Desmocladus flexuosus	
*	*Ehrharta calycina*	
Pl	*Eucalyptus gomphocephala*	
	Gastrolobium capitatum	
*	*Gladiolus caryophyllaceus*	
	Gompholobium tomentosum	
	Hemiandra pungens	
	Hibbertia subvaginata	
	Jacksonia furcellata	
	Lechenaultia floribunda	
	Leucopogon polymorphus	
	Nuytsia floribunda	
	Scholtzia involucrata	
	Stylidium araeophyllum	
	Styphelia conostephioides	
	Styphelia xerophylla	
	Trachymene pilosa	
*	*Ursinia anthemoides*	

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q21

Project no.: EP23-053
Date: 20/05/2024 **Status** Permanent
Author: RAW,TAA Q21: Page 1 of 2

Quadrat and landform details

Sample type:	quadrat	Size:	10 m x 10 m
NW corner easting:	0	NW corner northing:	0
Altitude (m):	30	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	dry	Landform:	depression
Time since fire:	no evidence	Disturbance:	low -
Soil type/texture	sand/	Bare ground (%):	2
Rocks (%) and type:	No rocks	Soil colour:	grey/
Litter:	2% (branches,twigs,)	Vegetation condition:	very good-

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q21

Project no.: EP23-053
Date: 20/05/2024 **Status** Permanent
Author: RAW,TAA Q21: Page 2 of 2

Species Data

* denotes non-native species

Status	Confirmed name	Cover (%)
	Acacia pulchella var. glaberrima	<1
	Acacia saligna	5
	Adenanthos cygnorum	<1
	Astartea scoparia	<1
*	*Avena barbata*	<1
	Banksia littoralis	opp
*	*Briza maxima*	<1
	Calytrix flavescens	<1
*	*Casuarina cunninghamiana*	<1
*	*Ehrharta calycina*	<1
*	*Eragrostis curvula*	<1
	Gompholobium tomentosum	<1
	Hypocalymma angustifolium	5
	Lepidosperma longitudinale	50
	Leptospermopsis erubescens	<1
	Lyginia imberbis	<1
	Melaleuca preissiana	20
*	*Pelargonium capitatum*	<1
*	*Poaceae sp.*	<1
	Regelia inops	opp
*	*Ursinia anthemoides*	<1

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q22

Project no.: EP23-053
Date: 20/05/2024 **Status** Permanent
Author: RAW,TAA Q22: Page 1 of 2

Quadrat and landform details

Sample type:	quadrat	Size:	10 m x 10 m
NW corner easting:	0	NW corner northing:	0
Altitude (m):	28	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	dry	Landform:	depression
Time since fire:	no evidence	Disturbance:	low -
Soil type/texture	sand/	Bare ground (%):	0
Rocks (%) and type:	No rocks	Soil colour:	grey/
Litter:	2% (branches,twigs,)	Vegetation condition:	excellent-

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q22

Project no.: EP23-053
Date: 20/05/2024 **Status** Permanent
Author: RAW,TAA Q22: Page 2 of 2

Species Data

* denotes non-native species

Status	Confirmed name	Cover (%)
	Acacia pulchella var. glaberrima	<1
	Acacia stenoptera	opp (distant)
	Amphipogon turbinatus	<1
	Astartea scoparia	1
	Banksia littoralis	15
	Cassytha flava	<1
	Corynotheca micrantha	opp (distant)
	Cyperaceae sp.	<1
	Dianella revoluta	<1
*	*Ehrharta calycina*	<1
	Hypocalymma angustifolium	opp (distant)
	Hypolaena exsulca	<1
	Kunzea glabrescens	5
	Laxmannia squarrosa	opp (distant)
	Lepidosperma longitudinale	5
	Lobelia alata	<1
	Melaleuca preissiana	5
	Melaleuca rhaphiophylla	opp
	Melaleuca teretifolia	<1
	Patersonia occidentalis	opp
	Schoenus subfascicularis	80

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q23

Project no.: EP23-053
Date: 20/05/2024 **Status** Permanent
Author: RAW,TAA Q23: Page 1 of 2

Quadrat and landform details

Sample type:	quadrat	Size:	10 m x 10 m
NW corner easting:	0	NW corner northing:	0
Altitude (m):	33	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	dry	Landform:	flat
Time since fire:	> 5 yrs	Disturbance:	moderate -
Soil type/texture	sand/	Bare ground (%):	5
Rocks (%) and type:	No rocks	Soil colour:	grey/
Litter:	2% (branches,twigs,)	Vegetation condition:	good-

Vegetation Sample Data

Lot 500 and Part 501 Warton Road, Canning Vale

Sample Name: Q23

Project no.: EP23-053
Date: 20/05/2024 **Status** Permanent
Author: RAW,TAA Q23: Page 2 of 2

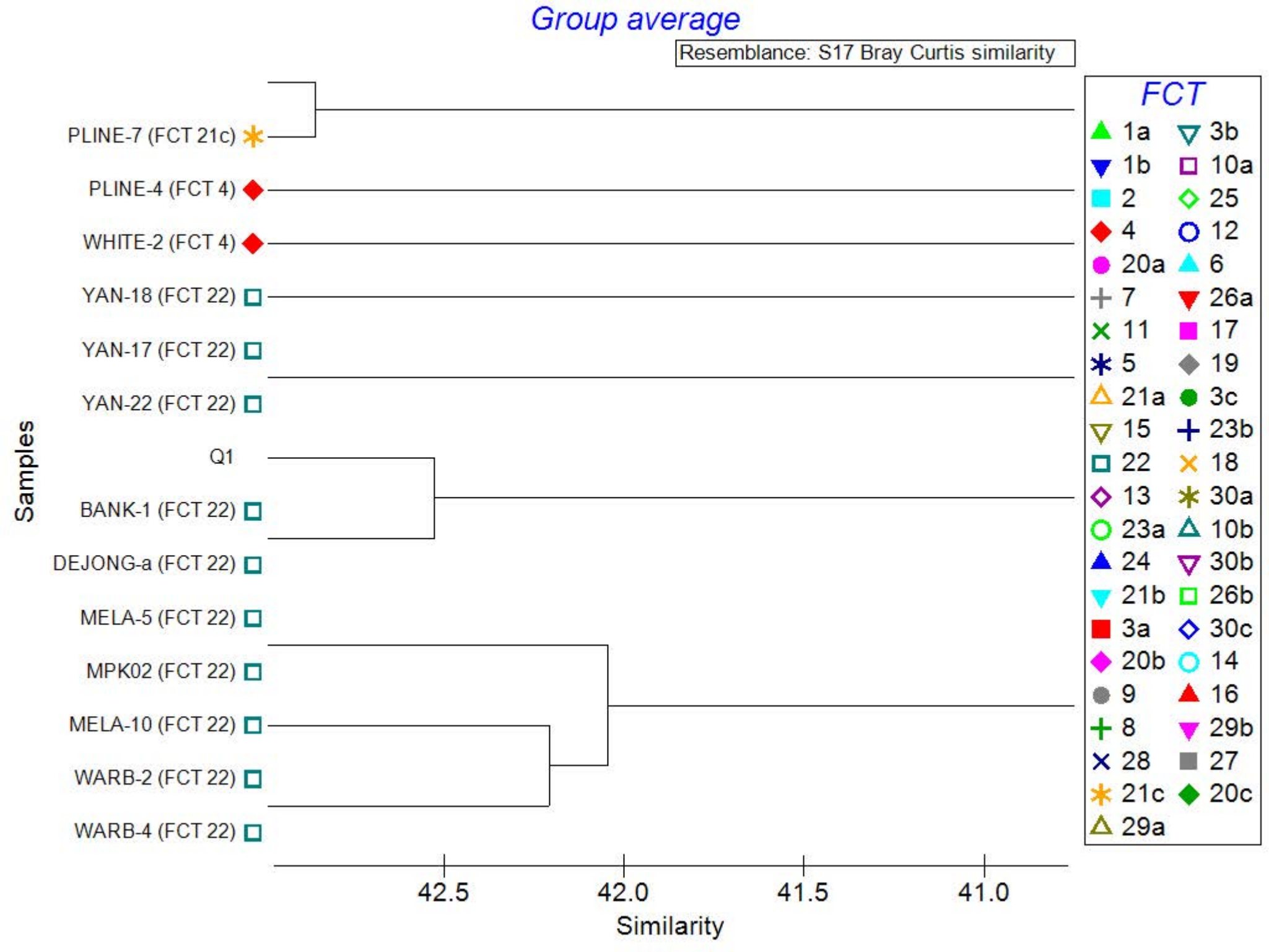
Species Data

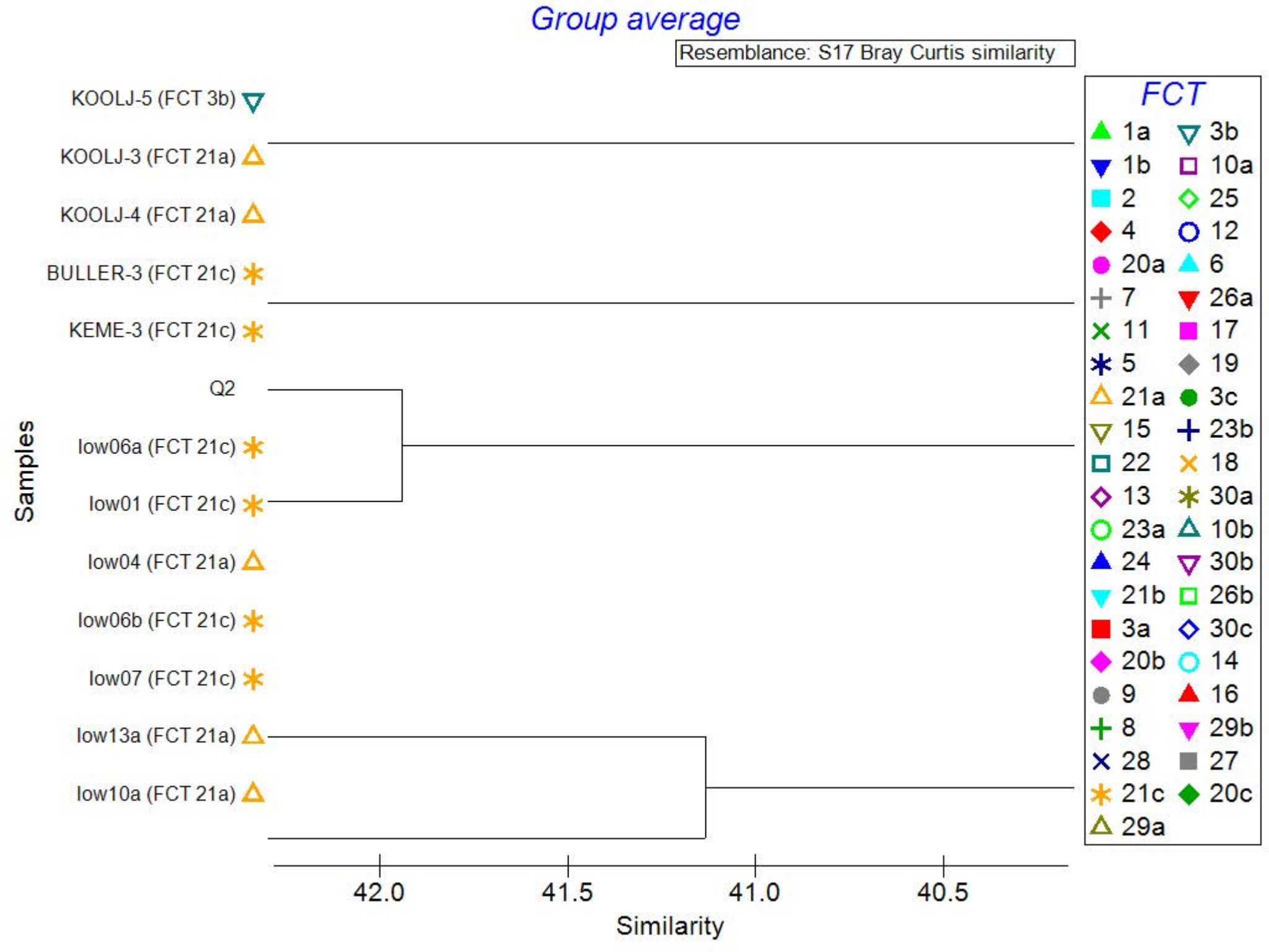
* denotes non-native species

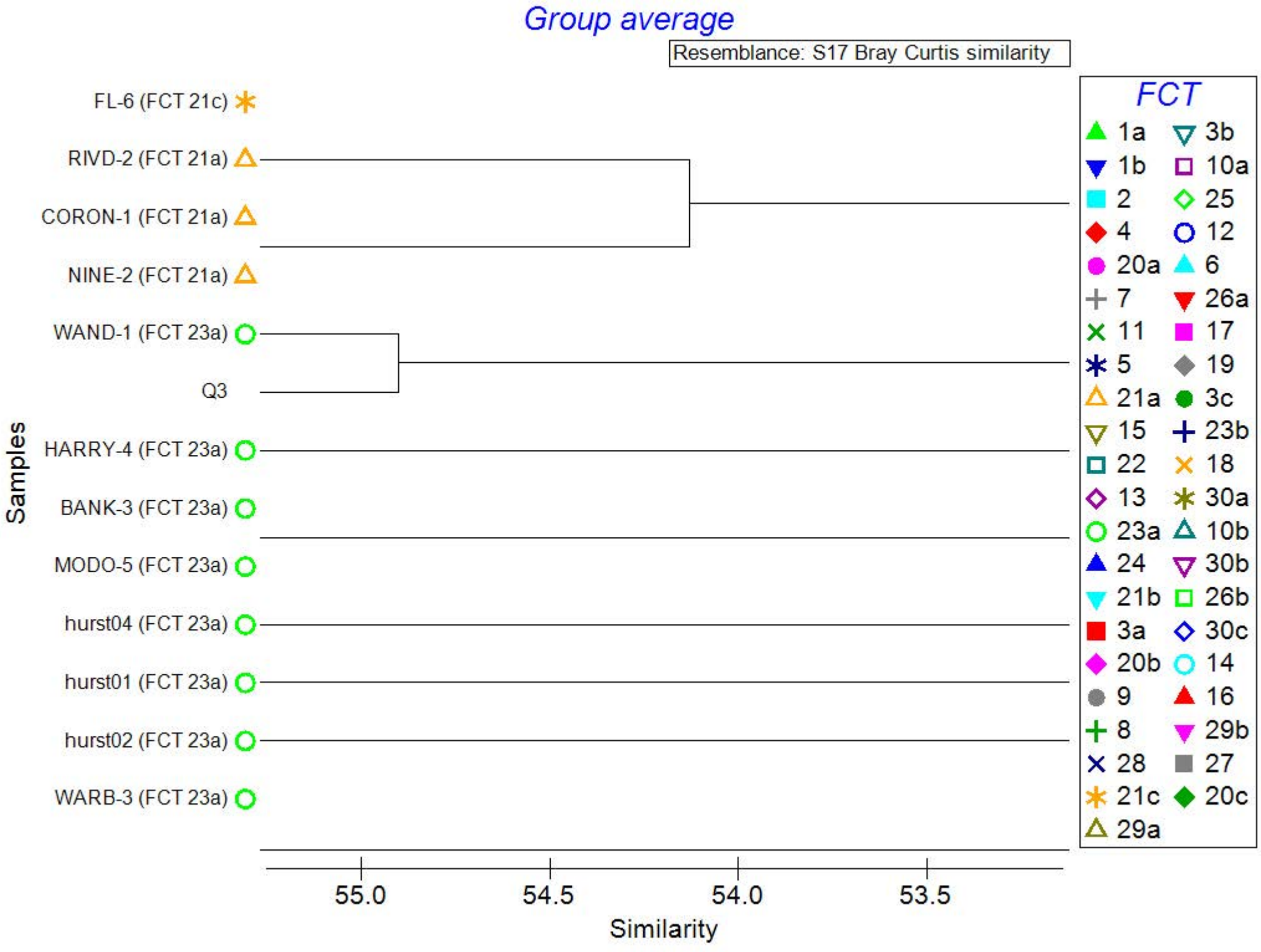
Status	Confirmed name	Cover (%)
	Adenanthos cygnorum	5
	Austrostipa elegantissima	1
*	*Briza maxima*	<1
	Calytrix flavescens	<1
*	*Ehrharta calycina*	1
	Gompholobium tomentosum	<1
	Hibbertia subvaginata	opp
	Kunzea glabrescens	2
	Lepidosperma longitudinale	30
	Lyginia imberbis	2
	Melaleuca preissiana	40
	Thysanotus sparteus	<1

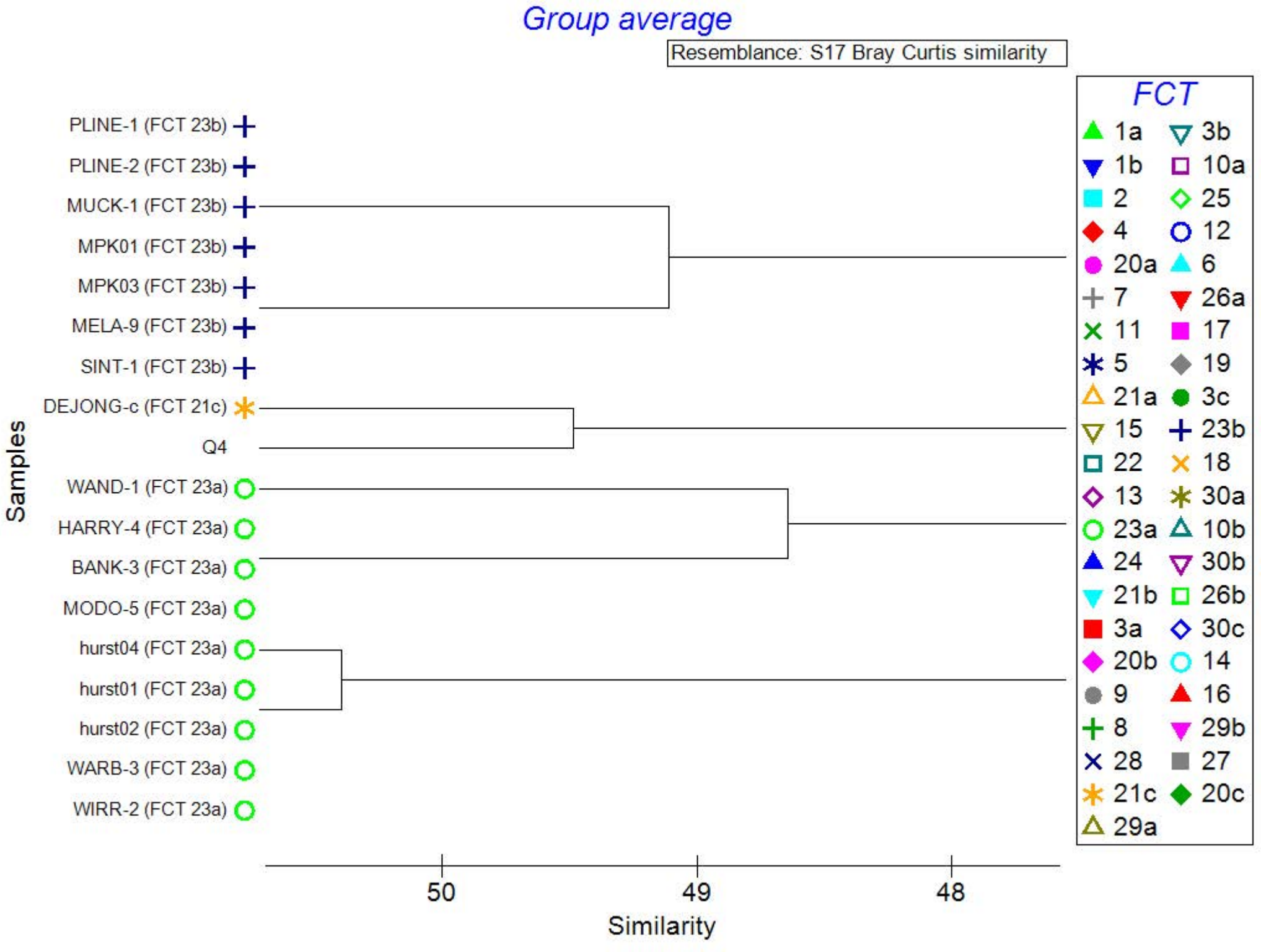
Appendix F

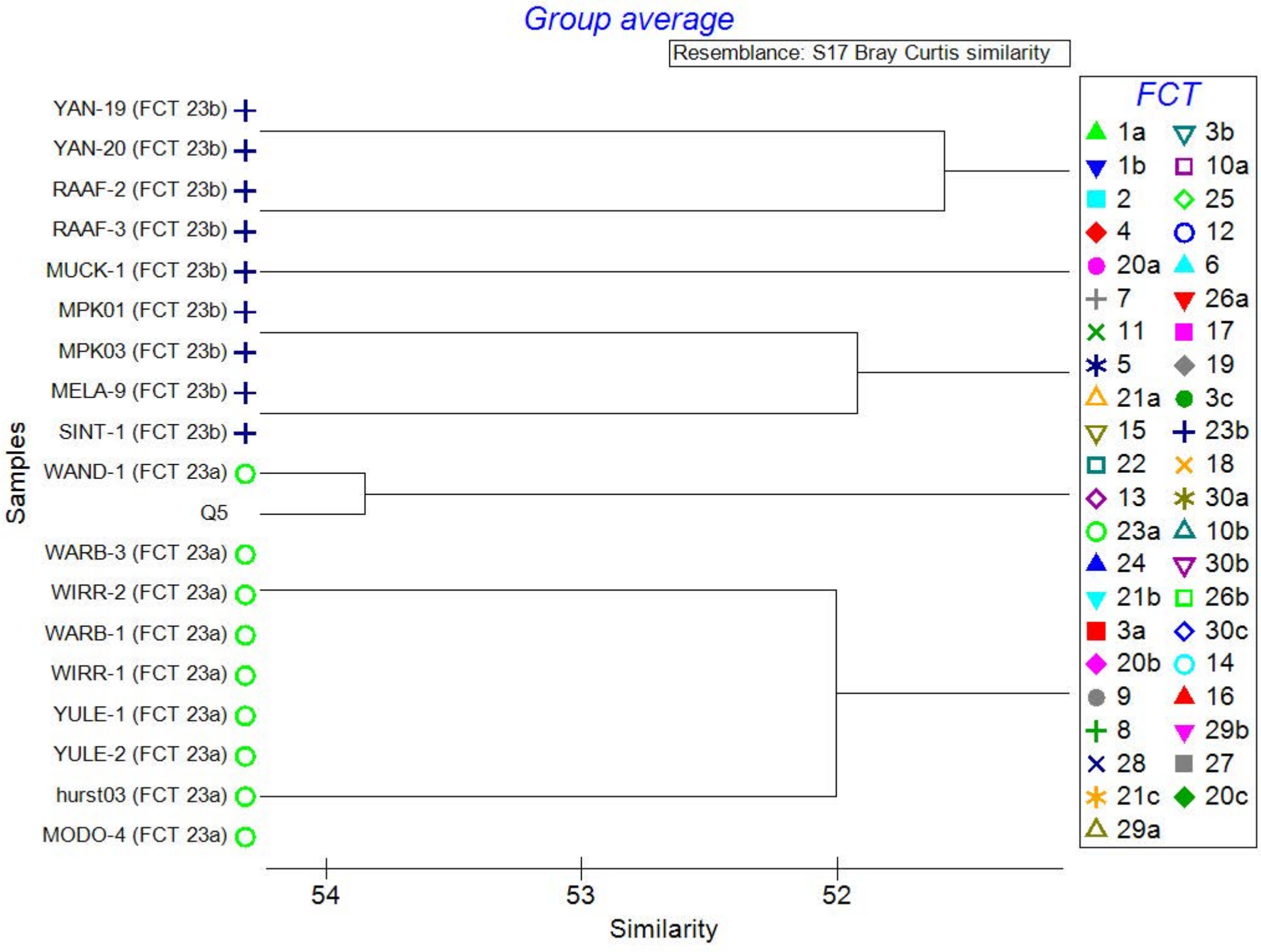
Cluster Dendograms

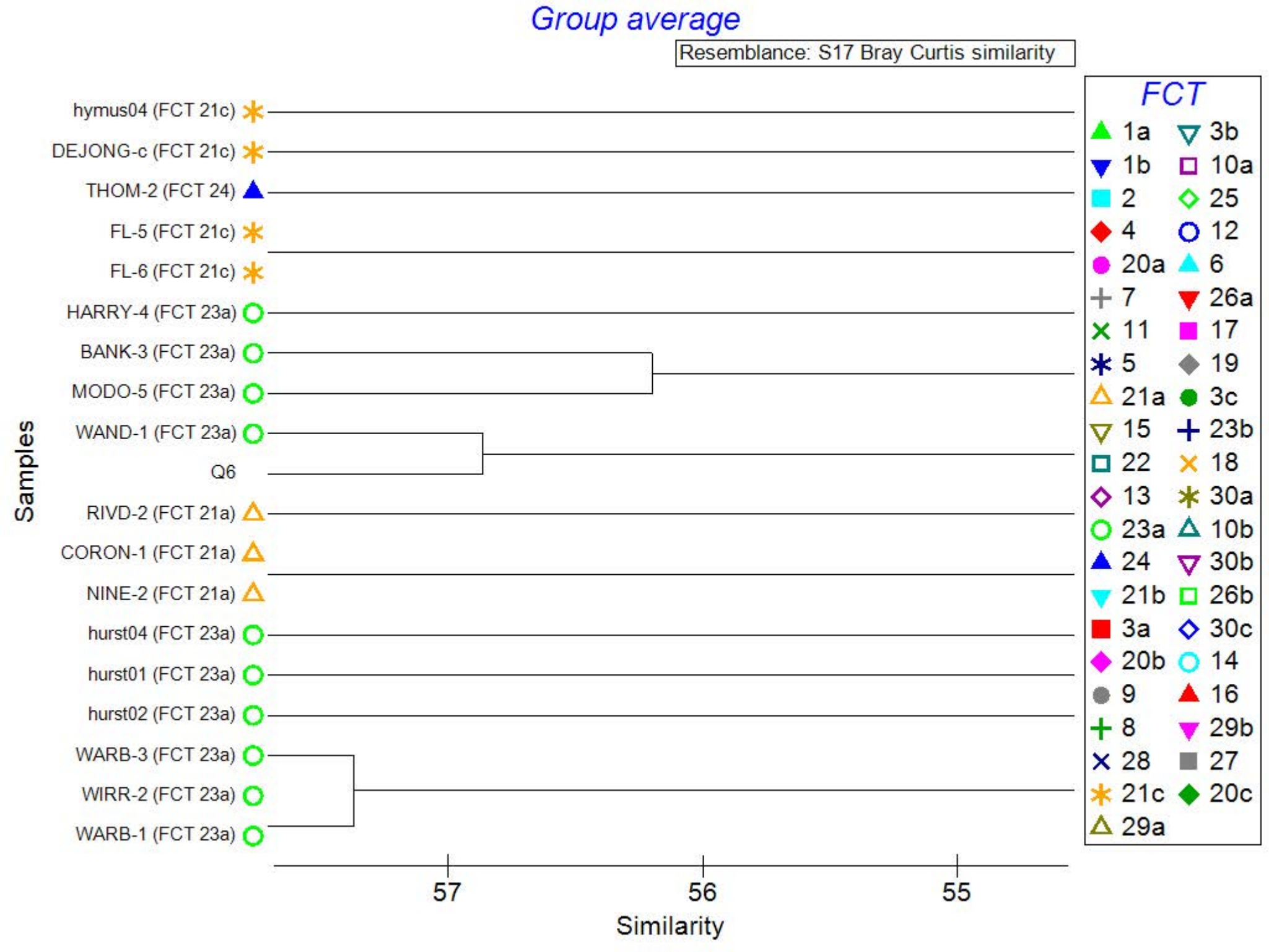

Group average
Resemblance: S17 Bray Curtis similarity
PLINE-7 (FCT 21c)
PLINE-4 (FCT 4)
WHITE-2 (FCT 4)
YAN-18 (FCT 22)
YAN-17 (FCT 22)
YAN-22 (FCT 22)
Q1
BANK-1 (FCT 22)
DEJONG-a (FCT 22)
MELA-5 (FCT 22)
MPK02 (FCT 22)
MELA-10 (FCT 22)
WARB-2 (FCT 22)
WARB-4 (FCT 22)
Samples
42.5
42.0
41.5
41.0
Similarity
FCT
1a
1b
2
4
20a
7
11
5
21a
15
22
13
23a
24
21b
3a
20b
9
8
28
21c
29a
3b
10a
25
12
6
26a
17
19
3c
23b
18
30a
10b
30b
26b
30c
14
16
29b
27
20c

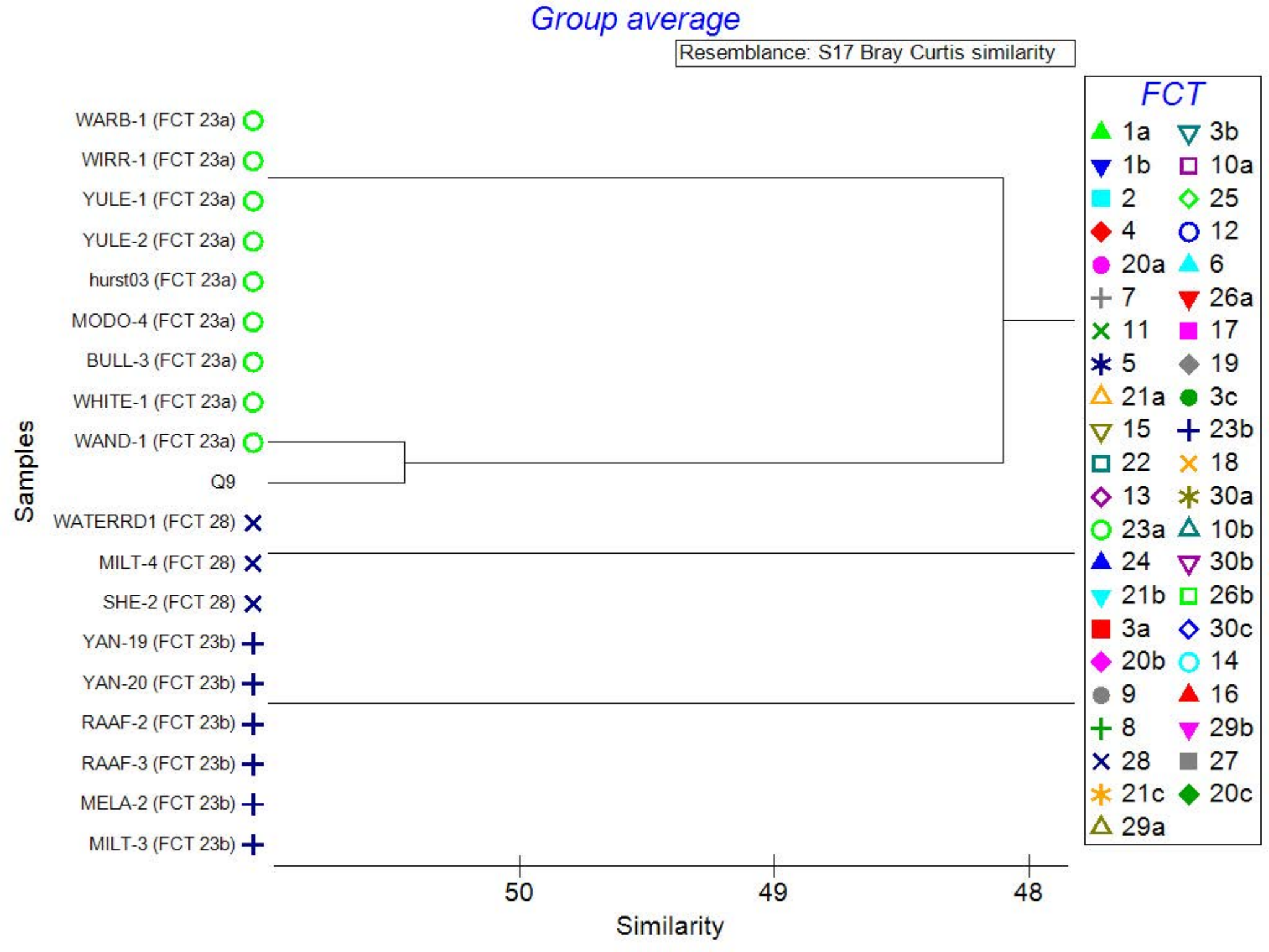

Group average
Resemblance: S17 Bray Curtis similarity
KOOLJ-5 (FCT 3b)
KOOLJ-3 (FCT 21a)
KOOLJ-4 (FCT 21a)
BULLER-3 (FCT 21c)
KEME-3 (FCT 21c)
Q2
low06a (FCT 21c)
low01 (FCT 21c)
low04 (FCT 21a)
low06b (FCT 21c)
low07 (FCT 21c)
low13a (FCT 21a)
low10a (FCT 21a)
Samples
42.0
41.5
41.0
40.5
Similarity
FCT
1a
3b
1b
10a
2
25
4
12
20a
6
7
26a
11
17
5
19
21a
3c
15
23b
22
18
13
30a
23a
10b
24
30b
21b
26b
3a
30c
20b
14
9
16
8
29b
28
27
21c
20c
29a

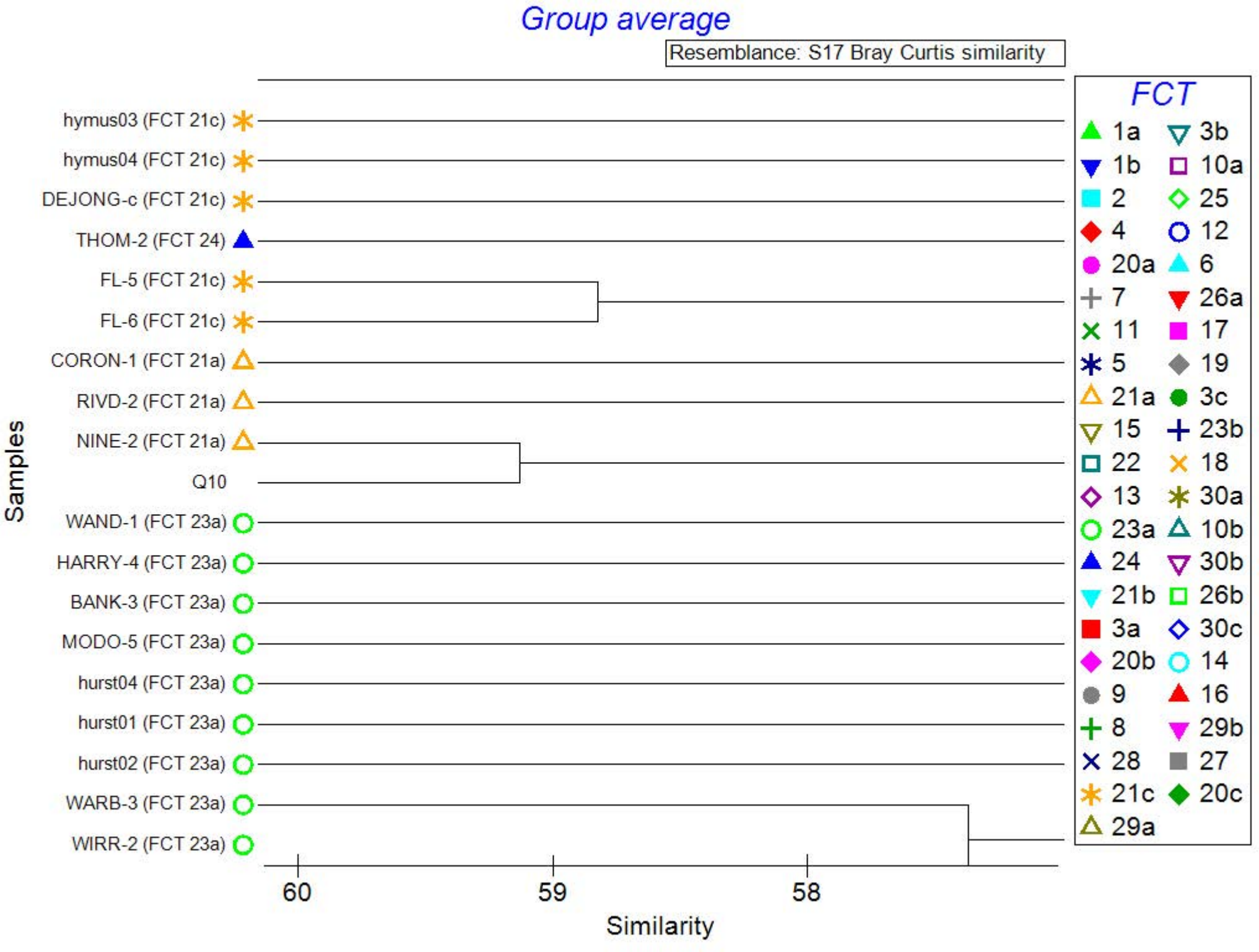

Group average
Resemblance: S17 Bray Curtis similarity
FL-6 (FCT 21c)
RIVD-2 (FCT 21a)
CORON-1 (FCT 21a)
NINE-2 (FCT 21a)
WAND-1 (FCT 23a)
Q3
HARRY-4 (FCT 23a)
BANK-3 (FCT 23a)
MODO-5 (FCT 23a)
hurst04 (FCT 23a)
hurst01 (FCT 23a)
hurst02 (FCT 23a)
WARB-3 (FCT 23a)
Samples
55.0
54.5
54.0
53.5
Similarity
FCT
1a
3b
1b
10a
2
25
4
12
20a
6
7
26a
11
17
5
19
21a
3c
15
23b
22
18
13
30a
23a
10b
24
30b
21b
26b
3a
30c
20b
14
9
16
8
29b
28
27
21c
20c
29a

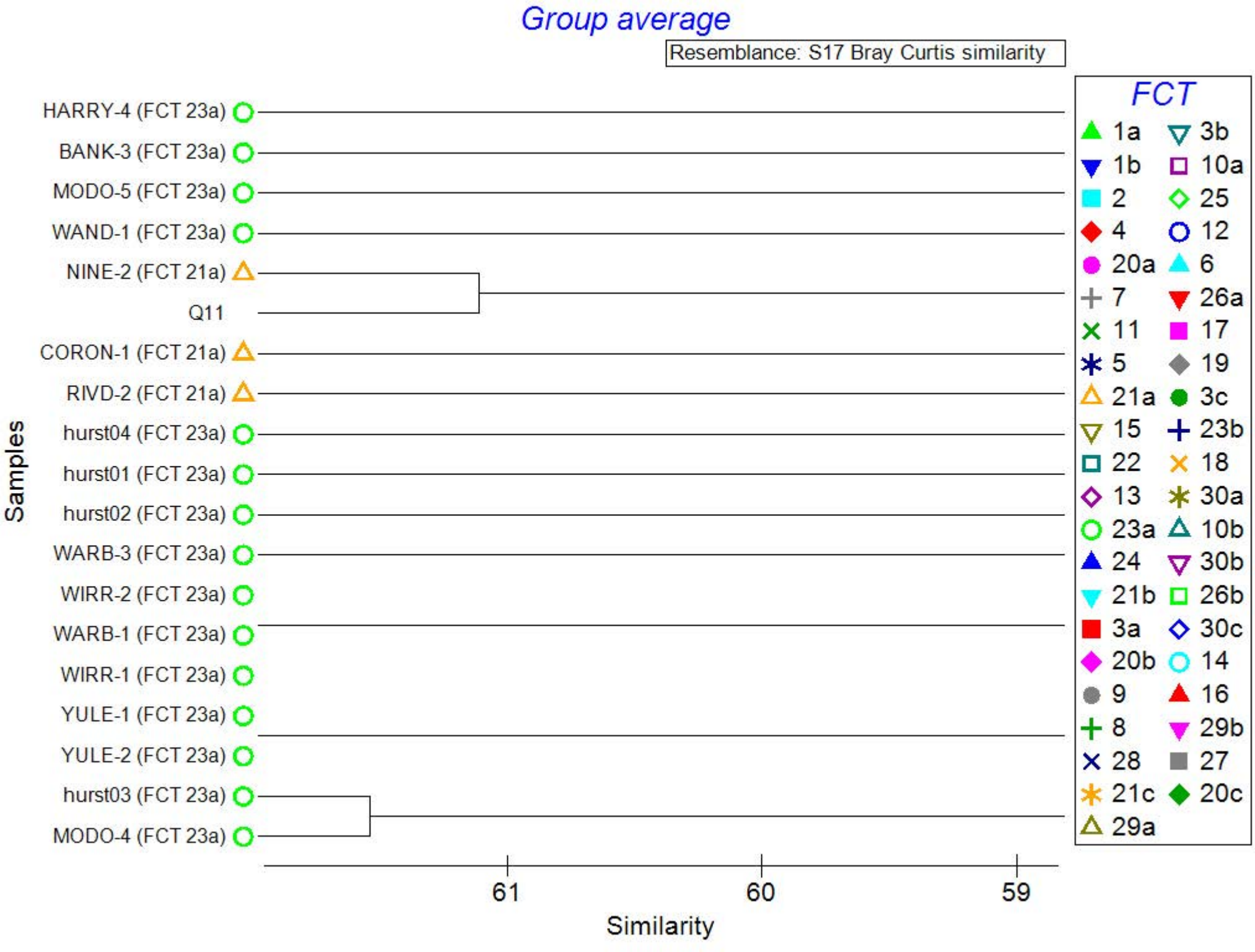

Group average
Resemblance: S17 Bray Curtis similarity
PLINE-1 (FCT 23b)
PLINE-2 (FCT 23b)
MUCK-1 (FCT 23b)
MPK01 (FCT 23b)
MPK03 (FCT 23b)
MELA-9 (FCT 23b)
SINT-1 (FCT 23b)
DEJONG-c (FCT 21c)
Q4
WAND-1 (FCT 23a)
HARRY-4 (FCT 23a)
BANK-3 (FCT 23a)
MODO-5 (FCT 23a)
hurst04 (FCT 23a)
hurst01 (FCT 23a)
hurst02 (FCT 23a)
WARB-3 (FCT 23a)
WIRR-2 (FCT 23a)
Samples
50
49
48
Similarity
FCT
1a
3b
1b
10a
2
25
4
12
20a
6
7
26a
11
17
5
19
21a
3c
15
23b
22
18
13
30a
23a
10b
24
30b
21b
26b
3a
30c
20b
14
9
16
8
29b
28
27
21c
20c
29a

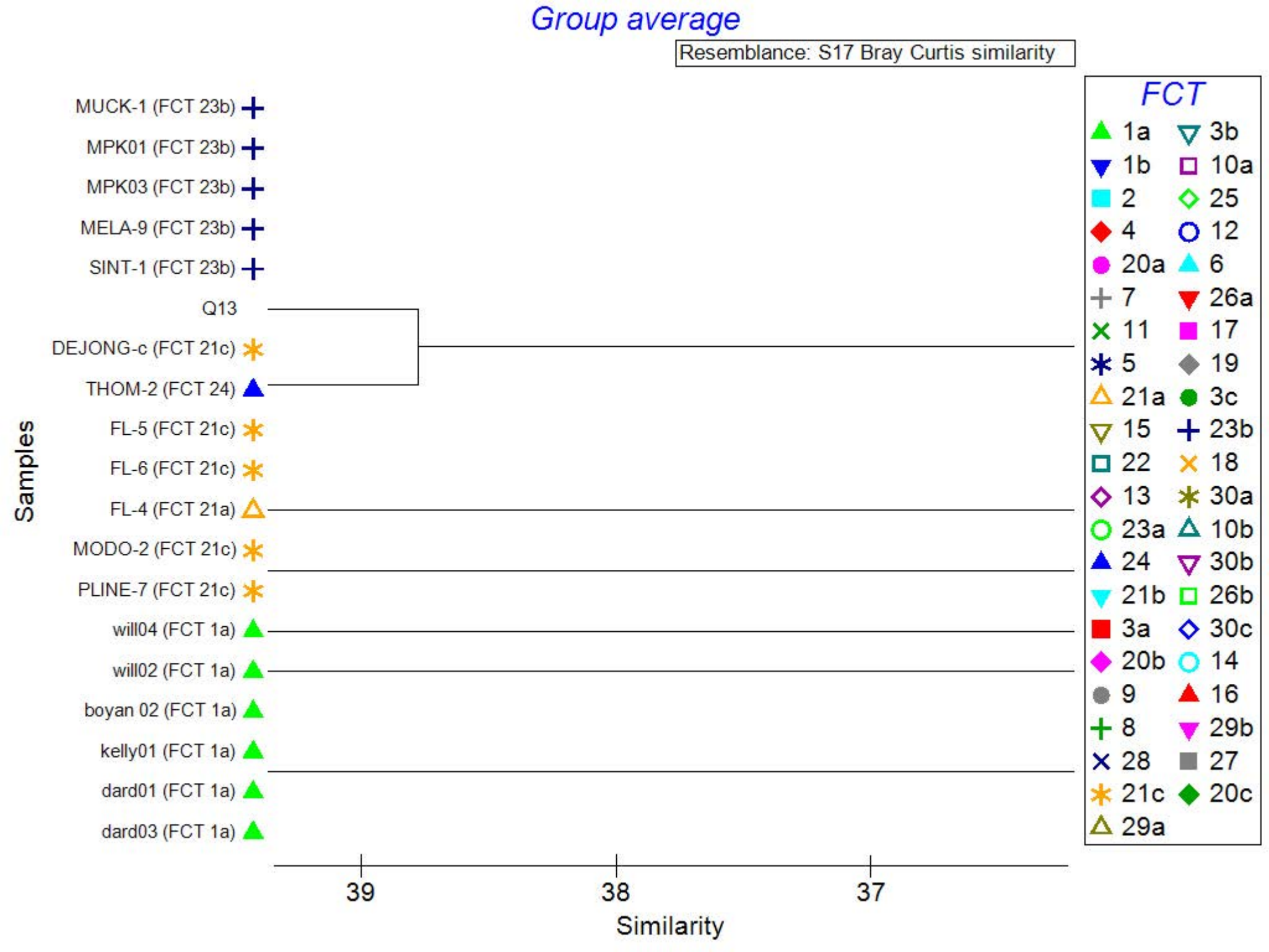

Group average
Resemblance: S17 Bray Curtis similarity
YAN-19 (FCT 23b)
YAN-20 (FCT 23b)
RAAF-2 (FCT 23b)
RAAF-3 (FCT 23b)
MUCK-1 (FCT 23b)
MPK01 (FCT 23b)
MPK03 (FCT 23b)
MELA-9 (FCT 23b)
SINT-1 (FCT 23b)
WAND-1 (FCT 23a)
Q5
WARB-3 (FCT 23a)
WIRR-2 (FCT 23a)
WARB-1 (FCT 23a)
WIRR-1 (FCT 23a)
YULE-1 (FCT 23a)
YULE-2 (FCT 23a)
hurst03 (FCT 23a)
MODO-4 (FCT 23a)
Samples
54
53
52
Similarity
FCT
1a
3b
1b
10a
2
25
4
12
20a
6
7
26a
11
17
5
19
21a
3c
15
23b
22
18
13
30a
23a
10b
24
30b
21b
26b
3a
30c
20b
14
9
16
8
29b
28
27
21c
20c
29a

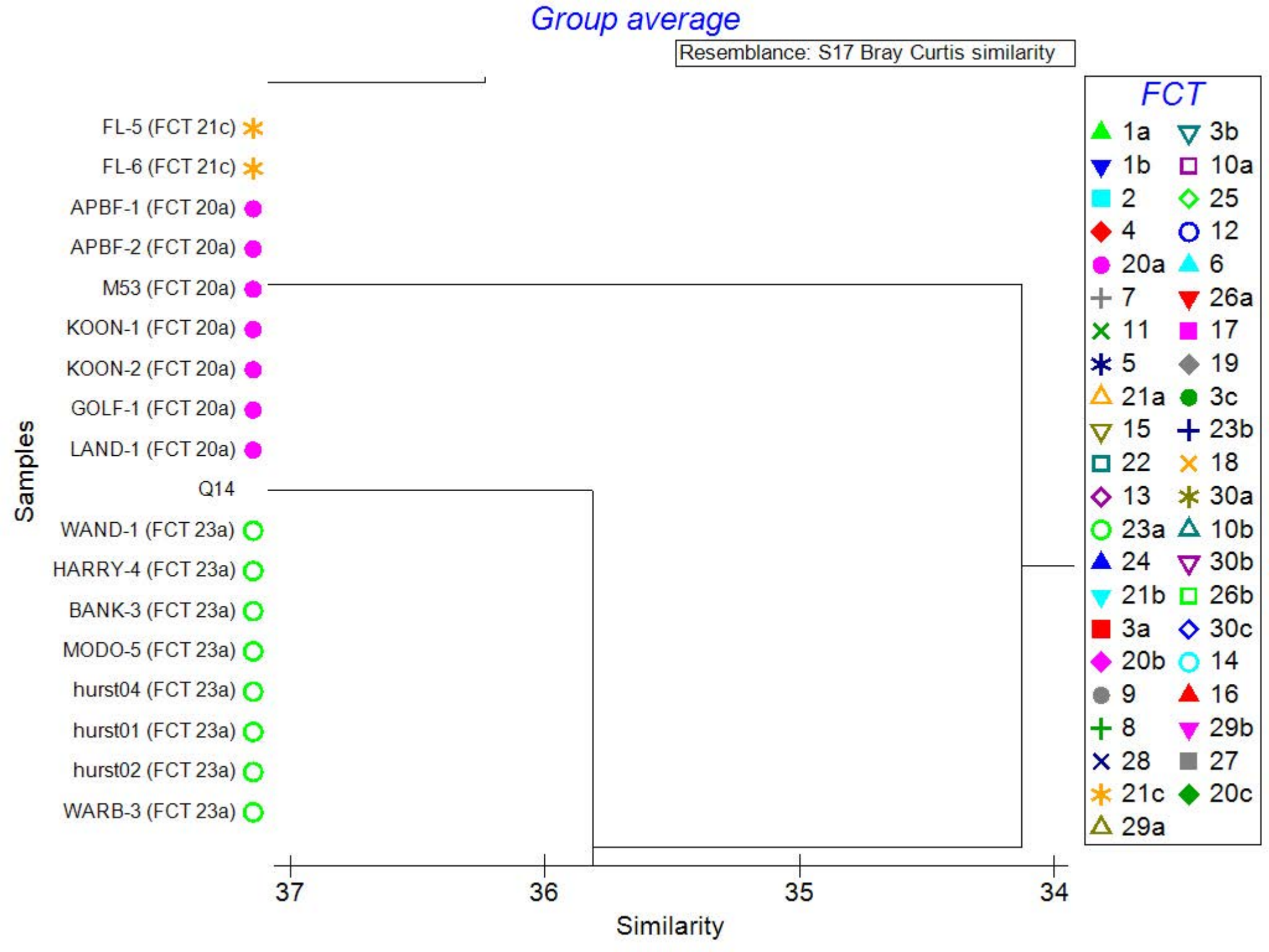

Group average
Resemblance: S17 Bray Curtis similarity
hymus04 (FCT 21c)
DEJONG-c (FCT 21c)
THOM-2 (FCT 24)
FL-5 (FCT 21c)
FL-6 (FCT 21c)
HARRY-4 (FCT 23a)
BANK-3 (FCT 23a)
MODO-5 (FCT 23a)
WAND-1 (FCT 23a)
Q6
RIVD-2 (FCT 21a)
CORON-1 (FCT 21a)
NINE-2 (FCT 21a)
hurst04 (FCT 23a)
hurst01 (FCT 23a)
hurst02 (FCT 23a)
WARB-3 (FCT 23a)
WIRR-2 (FCT 23a)
WARB-1 (FCT 23a)
Samples
57
56
55
Similarity
FCT
1a
3b
1b
10a
2
25
4
12
20a
6
7
26a
11
17
5
19
21a
3c
15
23b
22
18
13
30a
23a
10b
24
30b
21b
26b
3a
30c
20b
14
9
16
8
29b
28
27
21c
20c
29a

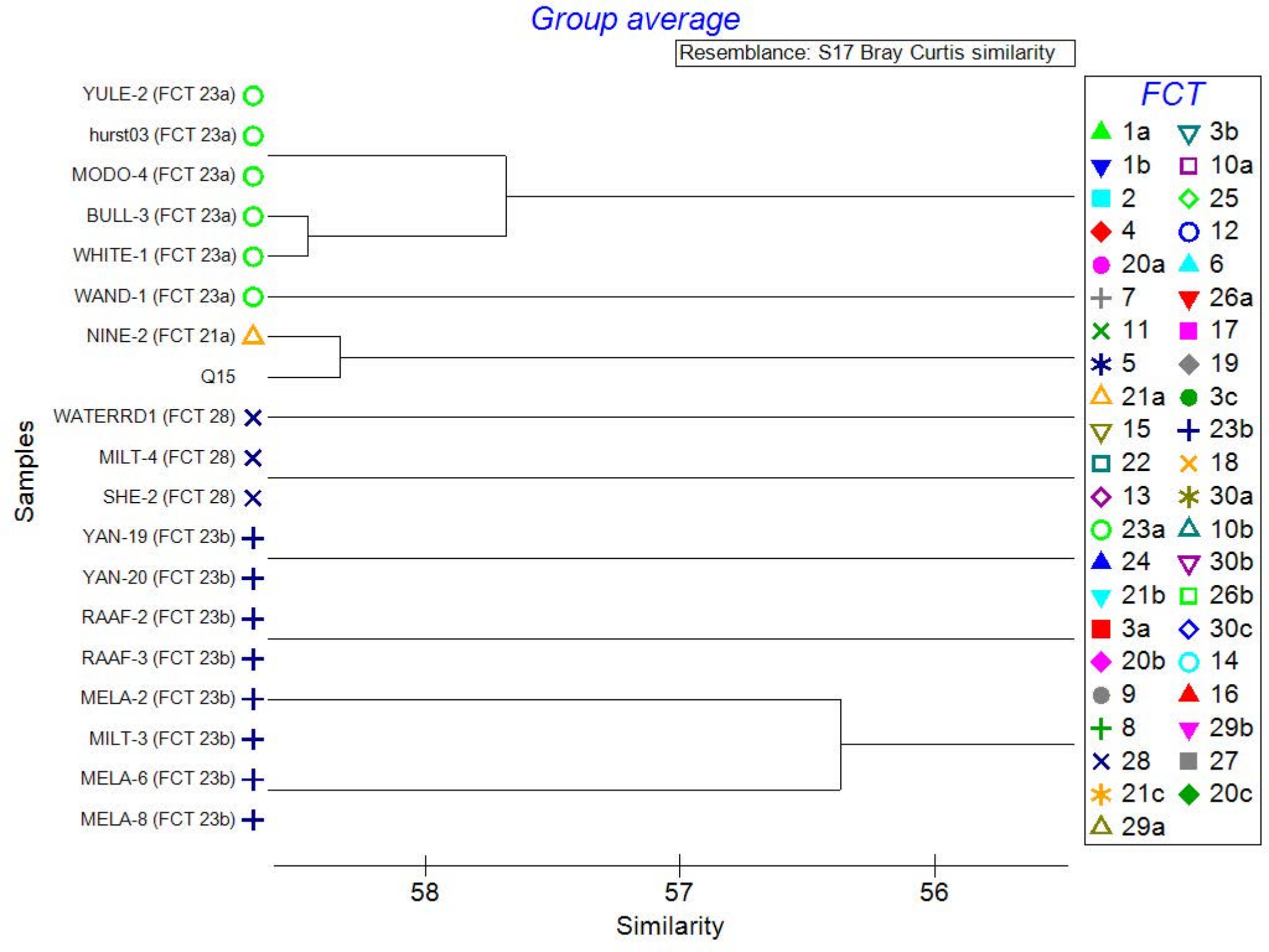

Group average
Resemblance: S17 Bray Curtis similarity
WARB-1 (FCT 23a)
WIRR-1 (FCT 23a)
YULE-1 (FCT 23a)
YULE-2 (FCT 23a)
hurst03 (FCT 23a)
MODO-4 (FCT 23a)
BULL-3 (FCT 23a)
WHITE-1 (FCT 23a)
WAND-1 (FCT 23a)
Q9
WATERRD1 (FCT 28)
MILT-4 (FCT 28)
SHE-2 (FCT 28)
YAN-19 (FCT 23b)
YAN-20 (FCT 23b)
RAAF-2 (FCT 23b)
RAAF-3 (FCT 23b)
MELA-2 (FCT 23b)
MILT-3 (FCT 23b)
Samples
50
49
48
Similarity
FCT
1a
3b
1b
10a
2
25
4
12
20a
6
7
26a
11
17
5
19
21a
3c
15
23b
22
18
13
30a
23a
10b
24
30b
21b
26b
3a
30c
20b
14
9
16
8
29b
28
27
21c
20c
29a

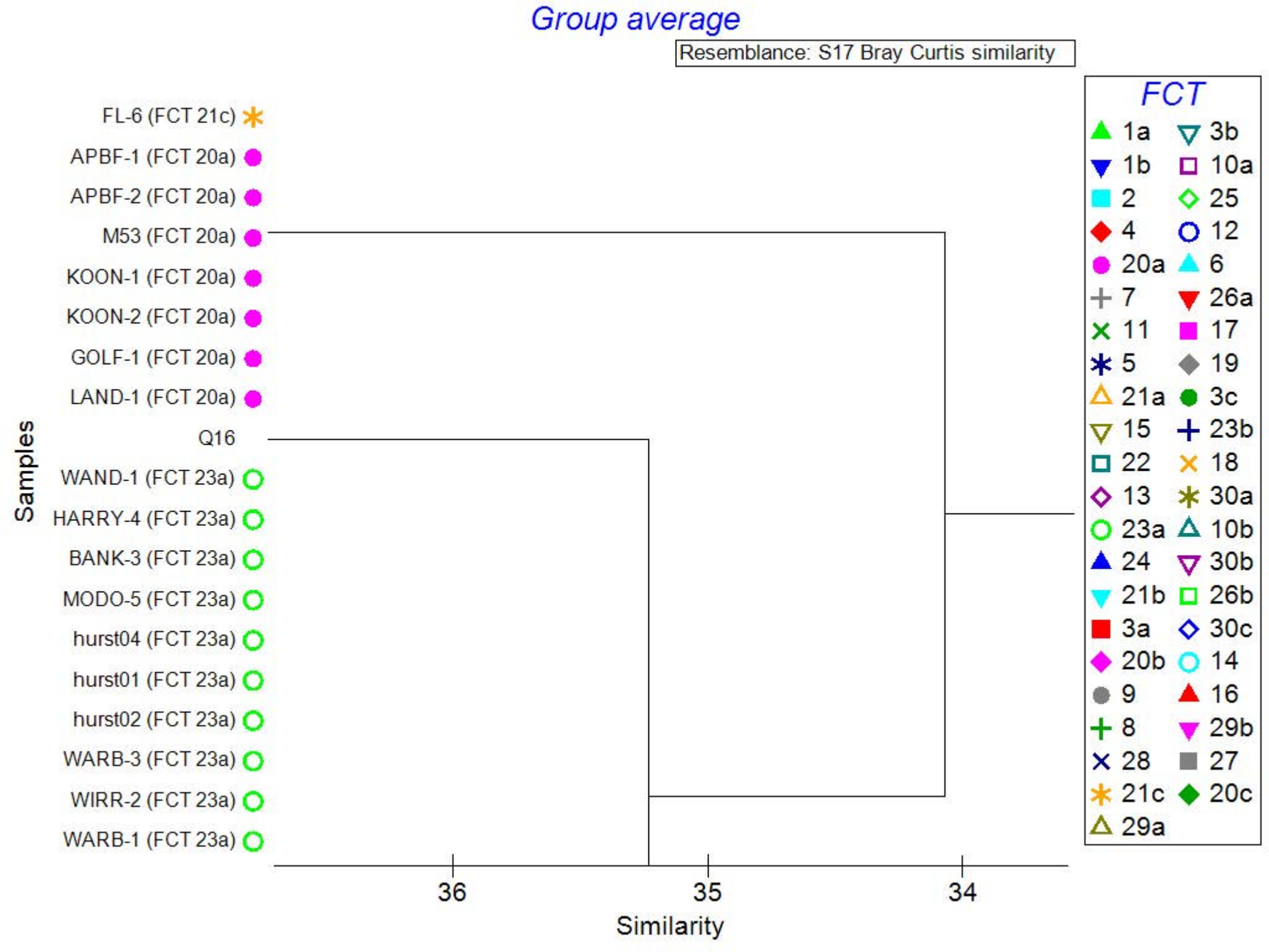

Group average
Resemblance: S17 Bray Curtis similarity
hymus03 (FCT 21c)
hymus04 (FCT 21c)
DEJONG-c (FCT 21c)
THOM-2 (FCT 24)
FL-5 (FCT 21c)
FL-6 (FCT 21c)
CORON-1 (FCT 21a)
RIVD-2 (FCT 21a)
NINE-2 (FCT 21a)
Q10
WAND-1 (FCT 23a)
HARRY-4 (FCT 23a)
BANK-3 (FCT 23a)
MODO-5 (FCT 23a)
hurst04 (FCT 23a)
hurst01 (FCT 23a)
hurst02 (FCT 23a)
WARB-3 (FCT 23a)
WIRR-2 (FCT 23a)
Samples
60
59
58
Similarity
FCT
1a
3b
1b
10a
2
25
4
12
20a
6
7
26a
11
17
5
19
21a
3c
15
23b
22
18
13
30a
23a
10b
24
30b
21b
26b
3a
30c
20b
14
9
16
8
29b
28
27
21c
20c
29a

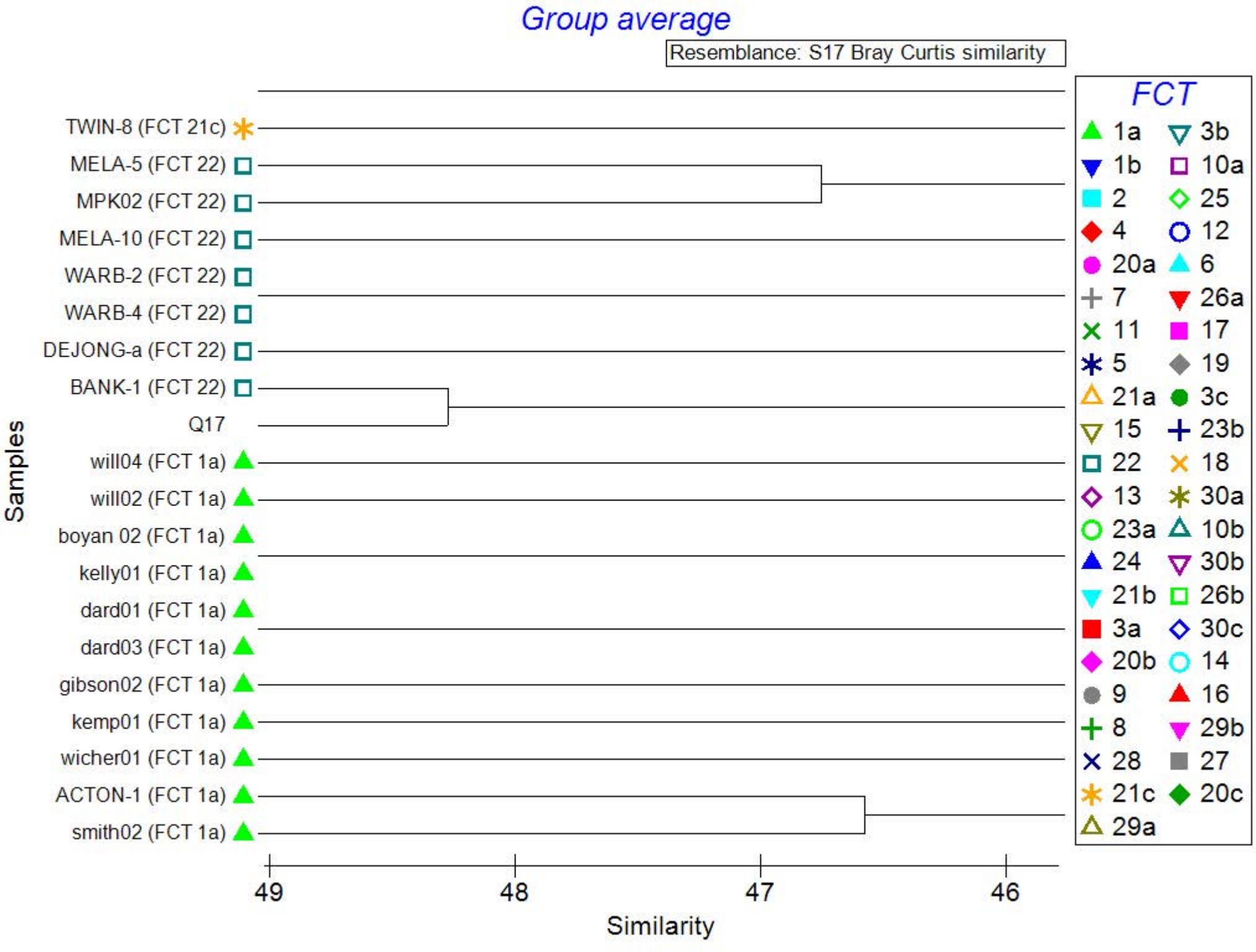

Group average
Resemblance: S17 Bray Curtis similarity
HARRY-4 (FCT 23a)
BANK-3 (FCT 23a)
MODO-5 (FCT 23a)
WAND-1 (FCT 23a)
NINE-2 (FCT 21a)
Q11
CORON-1 (FCT 21a)
RIVD-2 (FCT 21a)
hurst04 (FCT 23a)
hurst01 (FCT 23a)
hurst02 (FCT 23a)
WARB-3 (FCT 23a)
WIRR-2 (FCT 23a)
WARB-1 (FCT 23a)
WIRR-1 (FCT 23a)
YULE-1 (FCT 23a)
YULE-2 (FCT 23a)
hurst03 (FCT 23a)
MODO-4 (FCT 23a)
Samples
61
60
59
Similarity
FCT
1a
3b
1b
10a
2
25
4
12
20a
6
7
26a
11
17
5
19
21a
3c
15
23b
22
18
13
30a
23a
10b
24
30b
21b
26b
3a
30c
20b
14
9
16
8
29b
28
27
21c
20c
29a

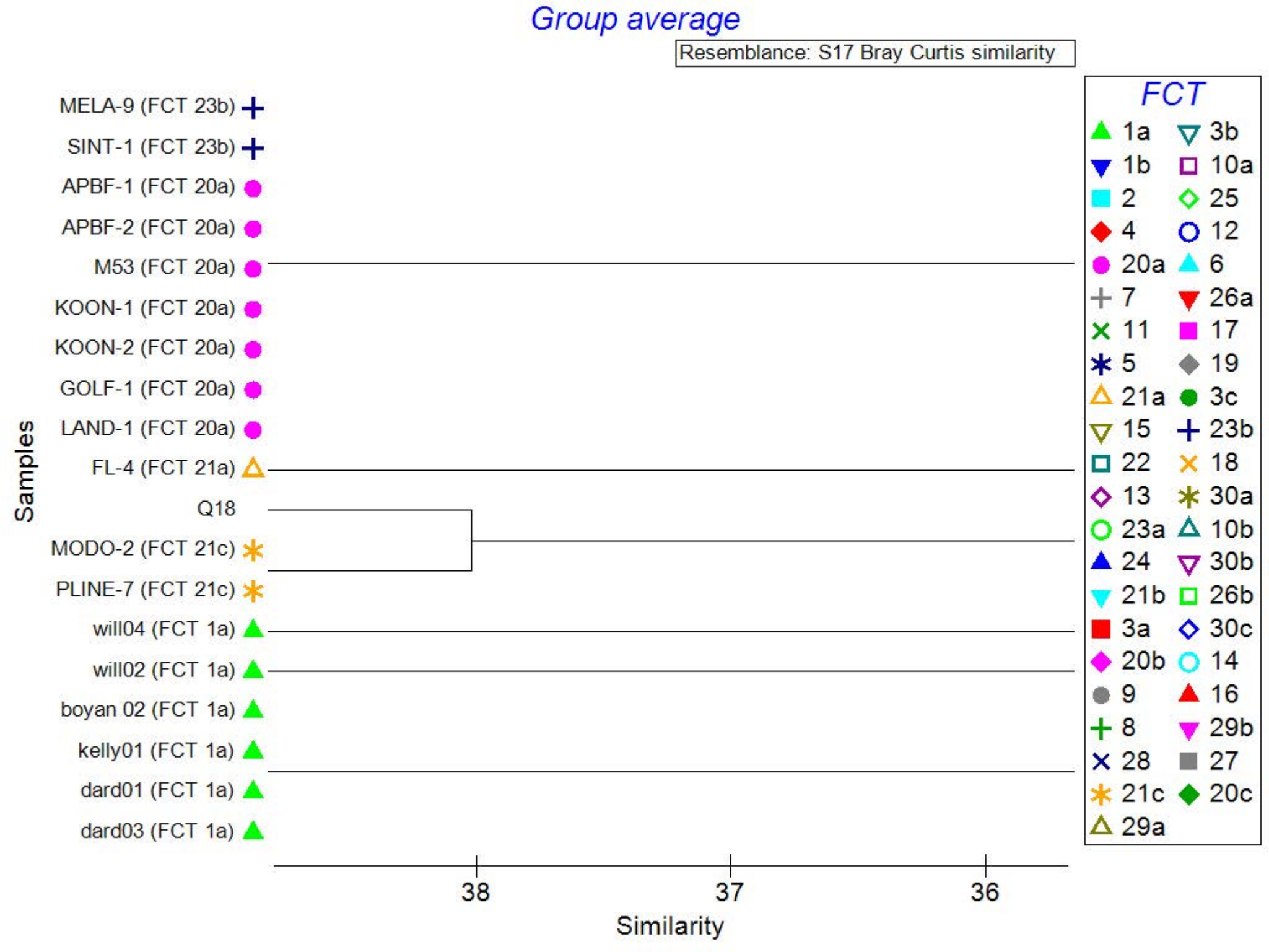

Group average
Resemblance: S17 Bray Curtis similarity
MUCK-1 (FCT 23b)
MPK01 (FCT 23b)
MPK03 (FCT 23b)
MELA-9 (FCT 23b)
SINT-1 (FCT 23b)
Q13
DEJONG-c (FCT 21c)
THOM-2 (FCT 24)
FL-5 (FCT 21c)
FL-6 (FCT 21c)
FL-4 (FCT 21a)
MODO-2 (FCT 21c)
PLINE-7 (FCT 21c)
will04 (FCT 1a)
will02 (FCT 1a)
boyan 02 (FCT 1a)
kelly01 (FCT 1a)
dard01 (FCT 1a)
dard03 (FCT 1a)
Samples
39
38
37
Similarity
FCT
1a
3b
1b
10a
2
25
4
12
20a
6
7
26a
11
17
5
19
21a
3c
15
23b
22
18
13
30a
23a
10b
24
30b
21b
26b
3a
30c
20b
14
9
16
8
29b
28
27
21c
20c
29a

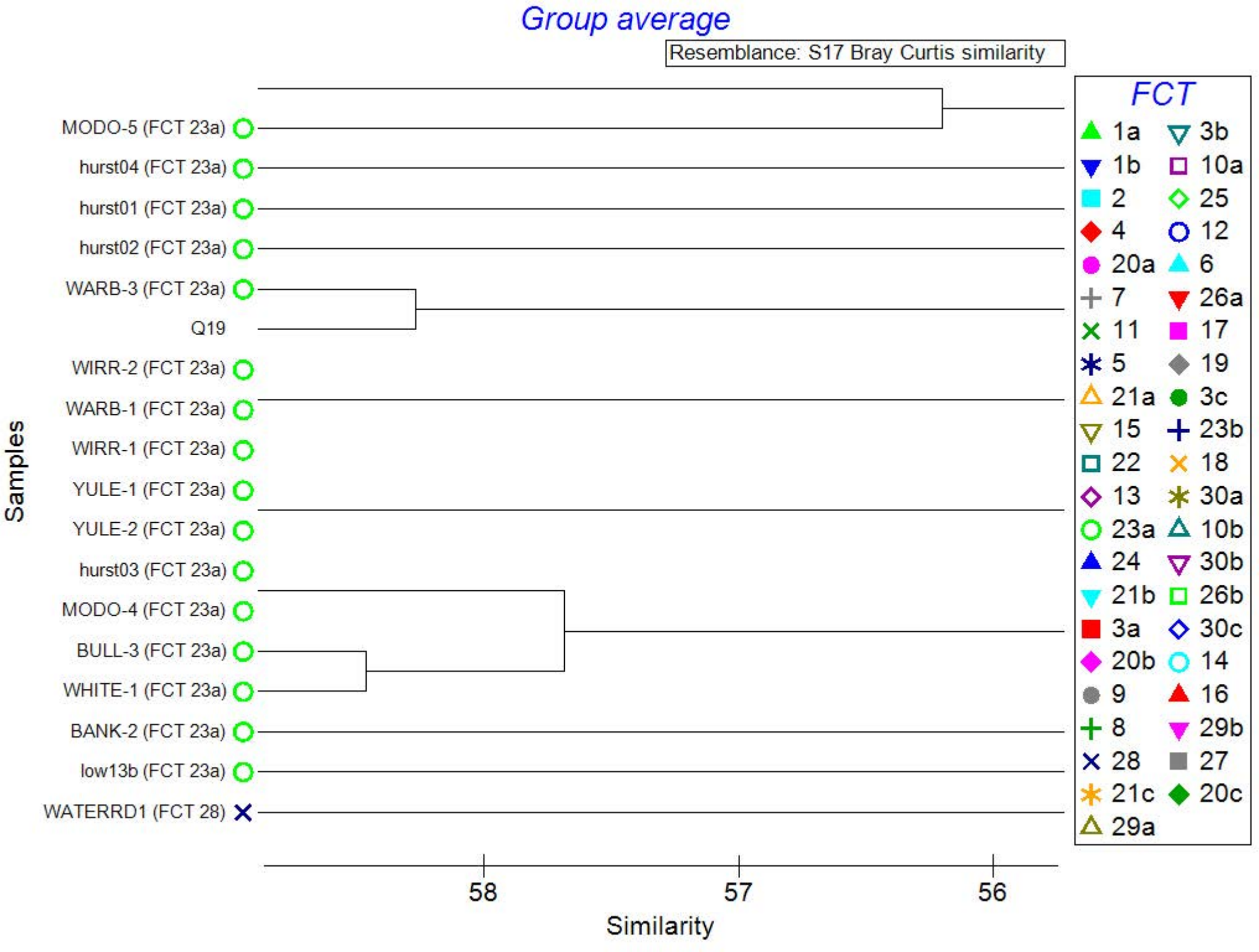

Group average
Resemblance: S17 Bray Curtis similarity
FL-5 (FCT 21c)
FL-6 (FCT 21c)
APBF-1 (FCT 20a)
APBF-2 (FCT 20a)
M53 (FCT 20a)
KOON-1 (FCT 20a)
KOON-2 (FCT 20a)
GOLF-1 (FCT 20a)
LAND-1 (FCT 20a)
Q14
WAND-1 (FCT 23a)
HARRY-4 (FCT 23a)
BANK-3 (FCT 23a)
MODO-5 (FCT 23a)
hurst04 (FCT 23a)
hurst01 (FCT 23a)
hurst02 (FCT 23a)
WARB-3 (FCT 23a)
Samples
37
36
35
34
Similarity
FCT
1a
3b
1b
10a
2
25
4
12
20a
6
7
26a
11
17
5
19
21a
3c
15
23b
22
18
13
30a
23a
10b
24
30b
21b
26b
3a
30c
20b
14
9
16
8
29b
28
27
21c
20c
29a

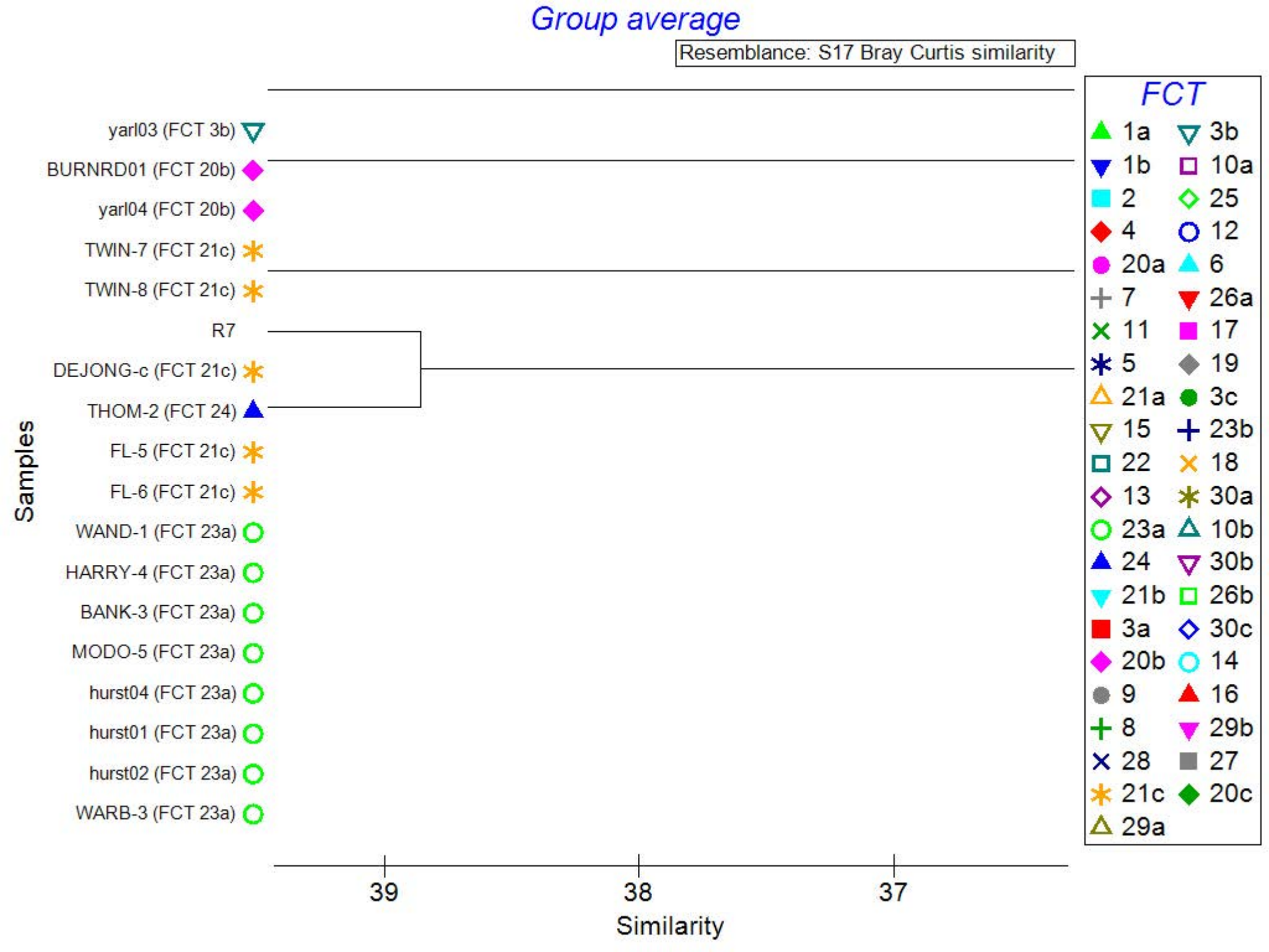

Group average
Resemblance: S17 Bray Curtis similarity
YULE-2 (FCT 23a)
hurst03 (FCT 23a)
MODO-4 (FCT 23a)
BULL-3 (FCT 23a)
WHITE-1 (FCT 23a)
WAND-1 (FCT 23a)
NINE-2 (FCT 21a)
Q15
WATERRD1 (FCT 28)
MILT-4 (FCT 28)
SHE-2 (FCT 28)
YAN-19 (FCT 23b)
YAN-20 (FCT 23b)
RAAF-2 (FCT 23b)
RAAF-3 (FCT 23b)
MELA-2 (FCT 23b)
MILT-3 (FCT 23b)
MELA-6 (FCT 23b)
MELA-8 (FCT 23b)
Samples
58
57
56
Similarity
FCT
1a
3b
1b
10a
2
25
4
12
20a
6
7
26a
11
17
5
19
21a
3c
15
23b
22
18
13
30a
23a
10b
24
30b
21b
26b
3a
30c
20b
14
9
16
8
29b
28
27
21c
20c
29a

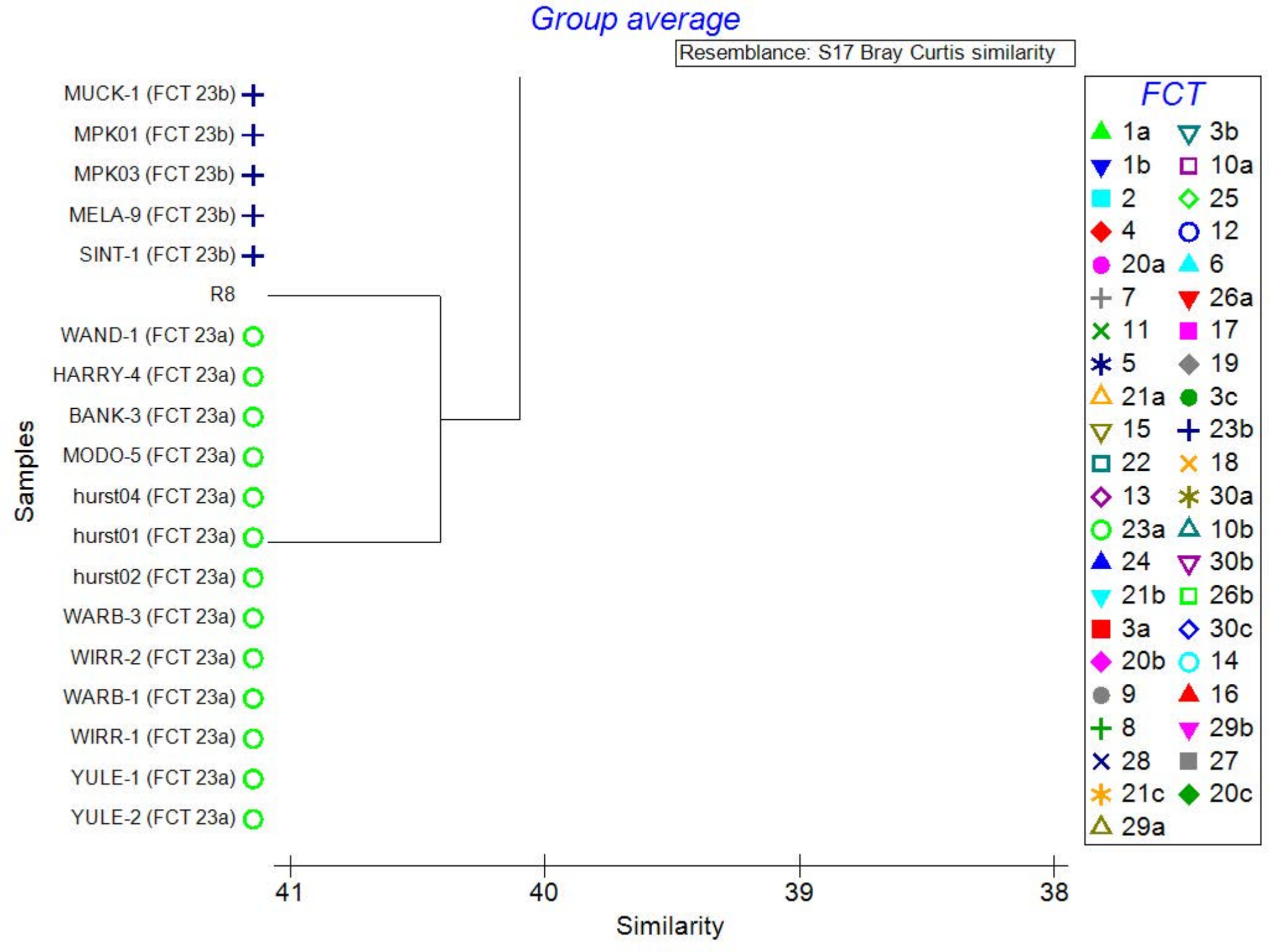

Group average
Resemblance: S17 Bray Curtis similarity
FCT
1a
3b
1b
10a
2
25
4
12
20a
6
7
26a
11
17
5
19
21a
3c
15
23b
22
18
13
30a
23a
10b
24
30b
21b
26b
3a
30c
20b
14
9
16
8
29b
28
27
21c
20c
29a
FL-6 (FCT 21c)
APBF-1 (FCT 20a)
APBF-2 (FCT 20a)
M53 (FCT 20a)
KOON-1 (FCT 20a)
KOON-2 (FCT 20a)
GOLF-1 (FCT 20a)
LAND-1 (FCT 20a)
Q16
WAND-1 (FCT 23a)
HARRY-4 (FCT 23a)
BANK-3 (FCT 23a)
MODO-5 (FCT 23a)
hurst04 (FCT 23a)
hurst01 (FCT 23a)
hurst02 (FCT 23a)
WARB-3 (FCT 23a)
WIRR-2 (FCT 23a)
WARB-1 (FCT 23a)
Samples
36
35
34
Similarity

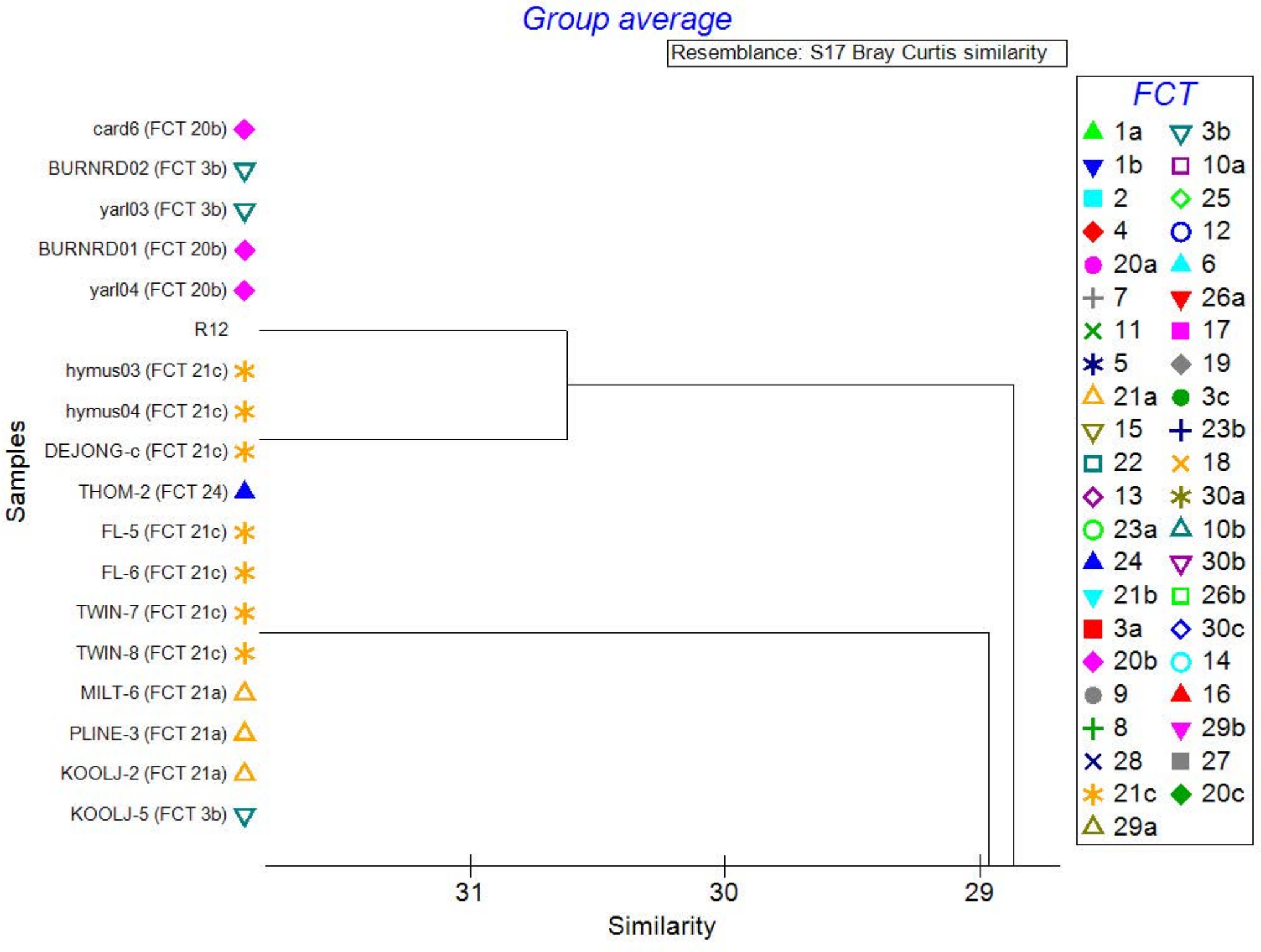

Group average
Resemblance: S17 Bray Curtis similarity
TWIN-8 (FCT 21c)
MELA-5 (FCT 22)
MPK02 (FCT 22)
MELA-10 (FCT 22)
WARB-2 (FCT 22)
WARB-4 (FCT 22)
DEJONG-a (FCT 22)
BANK-1 (FCT 22)
Q17
will04 (FCT 1a)
will02 (FCT 1a)
boyan 02 (FCT 1a)
kelly01 (FCT 1a)
dard01 (FCT 1a)
dard03 (FCT 1a)
gibson02 (FCT 1a)
kemp01 (FCT 1a)
wicher01 (FCT 1a)
ACTON-1 (FCT 1a)
smith02 (FCT 1a)
Samples
49
48
47
46
Similarity
FCT
1a
3b
1b
10a
2
25
4
12
20a
6
7
26a
11
17
5
19
21a
3c
15
23b
22
18
13
30a
23a
10b
24
30b
21b
26b
3a
30c
20b
14
9
16
8
29b
28
27
21c
20c
29a

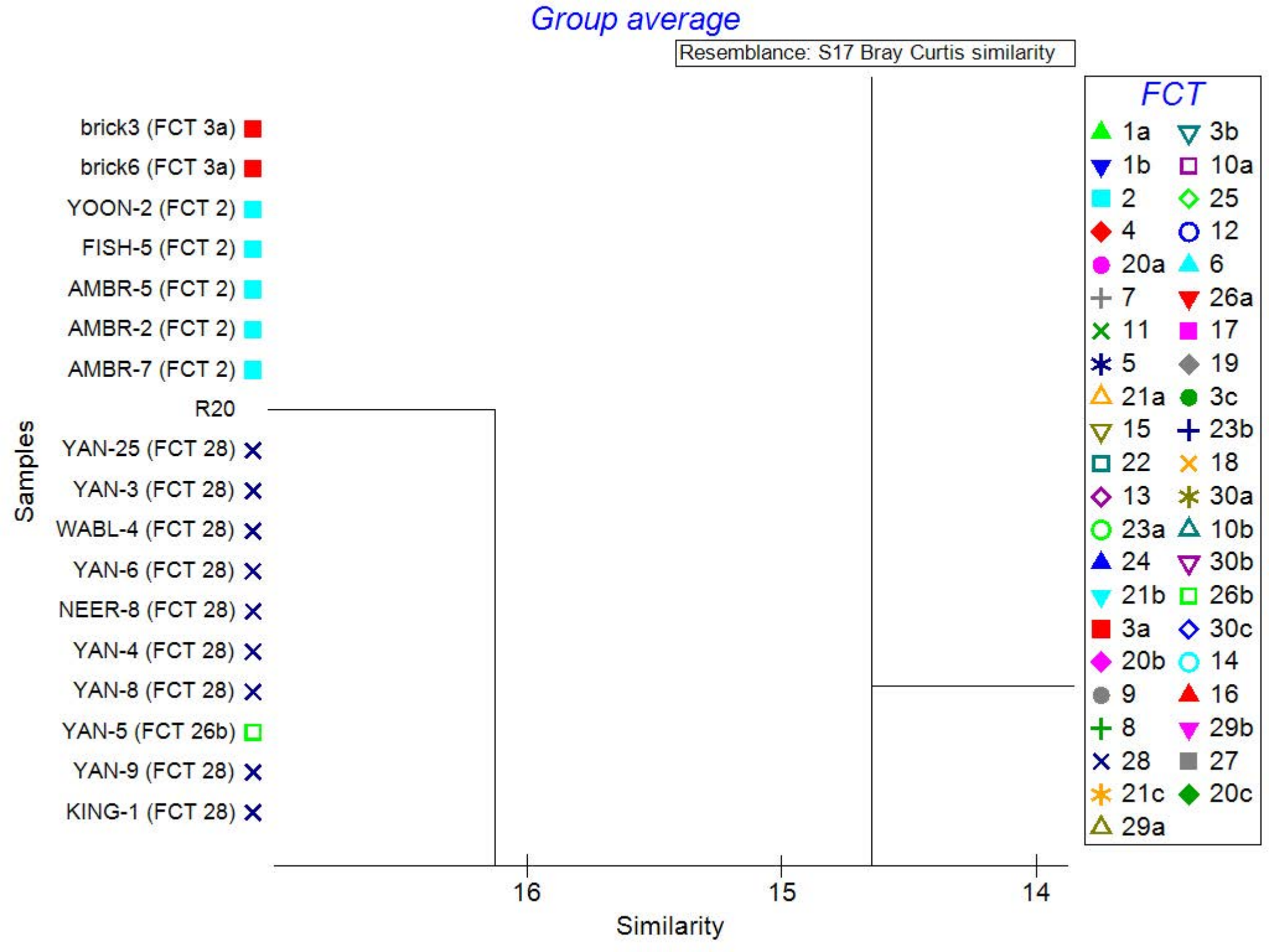

Group average
Resemblance: S17 Bray Curtis similarity
MELA-9 (FCT 23b)
SINT-1 (FCT 23b)
APBF-1 (FCT 20a)
APBF-2 (FCT 20a)
M53 (FCT 20a)
KOON-1 (FCT 20a)
KOON-2 (FCT 20a)
GOLF-1 (FCT 20a)
LAND-1 (FCT 20a)
FL-4 (FCT 21a)
Q18
MODO-2 (FCT 21c)
PLINE-7 (FCT 21c)
will04 (FCT 1a)
will02 (FCT 1a)
boyan 02 (FCT 1a)
kelly01 (FCT 1a)
dard01 (FCT 1a)
dard03 (FCT 1a)
Samples
38
37
36
Similarity
FCT
1a
3b
1b
10a
2
25
4
12
20a
6
7
26a
11
17
5
19
21a
3c
15
23b
22
18
13
30a
23a
10b
24
30b
21b
26b
3a
30c
20b
14
9
16
8
29b
28
27
21c
20c
29a

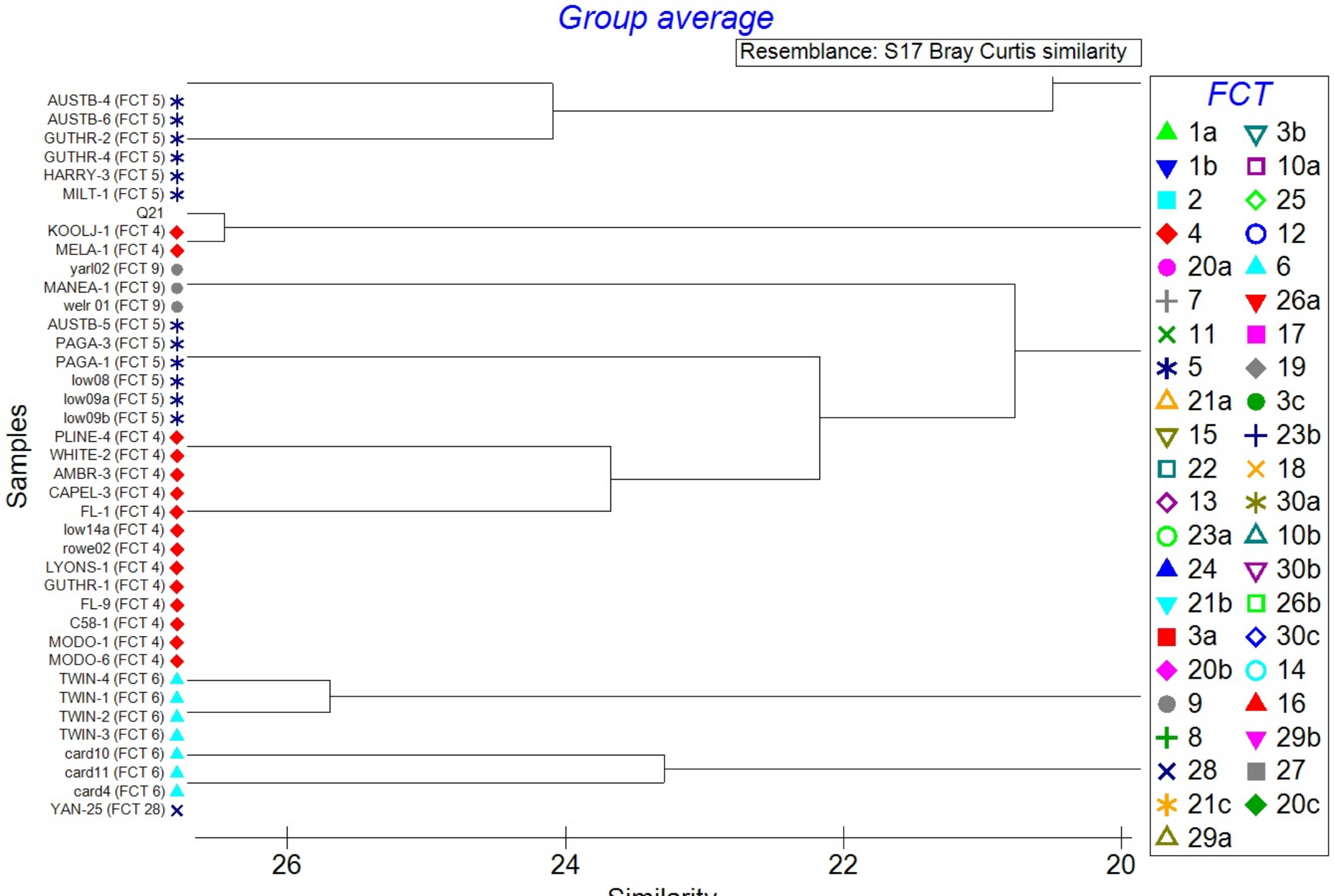

Group average
Resemblance: S17 Bray Curtis similarity
MODO-5 (FCT 23a)
hurst04 (FCT 23a)
hurst01 (FCT 23a)
hurst02 (FCT 23a)
WARB-3 (FCT 23a)
Q19
WIRR-2 (FCT 23a)
WARB-1 (FCT 23a)
WIRR-1 (FCT 23a)
YULE-1 (FCT 23a)
YULE-2 (FCT 23a)
hurst03 (FCT 23a)
MODO-4 (FCT 23a)
BULL-3 (FCT 23a)
WHITE-1 (FCT 23a)
BANK-2 (FCT 23a)
low13b (FCT 23a)
WATERRD1 (FCT 28)
Samples
58
57
56
Similarity
FCT
1a
3b
1b
10a
2
25
4
12
20a
6
7
26a
11
17
5
19
21a
3c
15
23b
22
18
13
30a
23a
10b
24
30b
21b
26b
3a
30c
20b
14
9
16
8
29b
28
27
21c
20c
29a

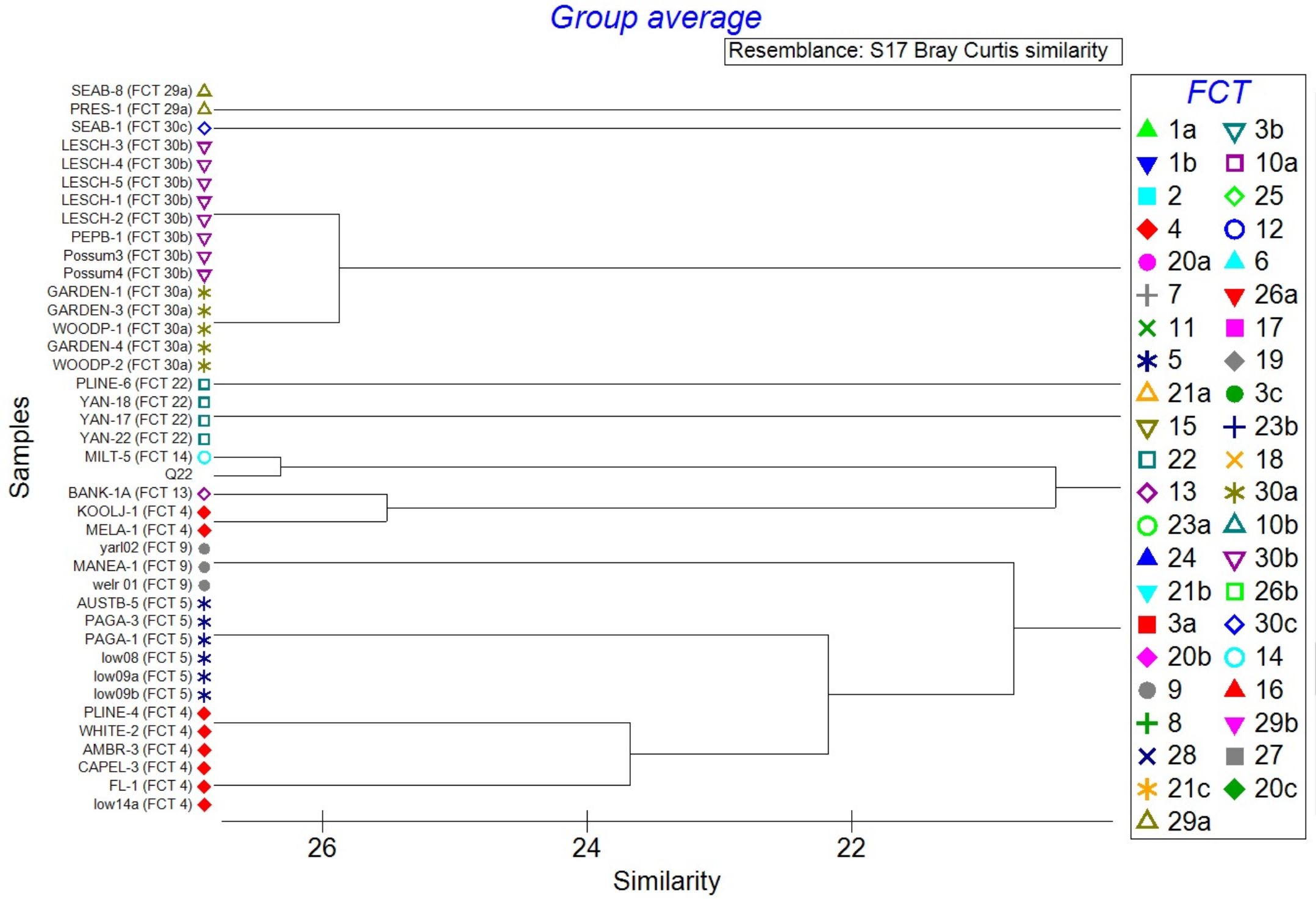

Group average
Resemblance: S17 Bray Curtis similarity
yarl03 (FCT 3b)
BURNRD01 (FCT 20b)
yarl04 (FCT 20b)
TWIN-7 (FCT 21c)
TWIN-8 (FCT 21c)
R7
DEJONG-c (FCT 21c)
THOM-2 (FCT 24)
FL-5 (FCT 21c)
FL-6 (FCT 21c)
WAND-1 (FCT 23a)
HARRY-4 (FCT 23a)
BANK-3 (FCT 23a)
MODO-5 (FCT 23a)
hurst04 (FCT 23a)
hurst01 (FCT 23a)
hurst02 (FCT 23a)
WARB-3 (FCT 23a)
Samples
39
38
37
Similarity
FCT
1a
3b
1b
10a
2
25
4
12
20a
6
7
26a
11
17
5
19
21a
3c
15
23b
22
18
13
30a
23a
10b
24
30b
21b
26b
3a
30c
20b
14
9
16
8
29b
28
27
21c
20c
29a

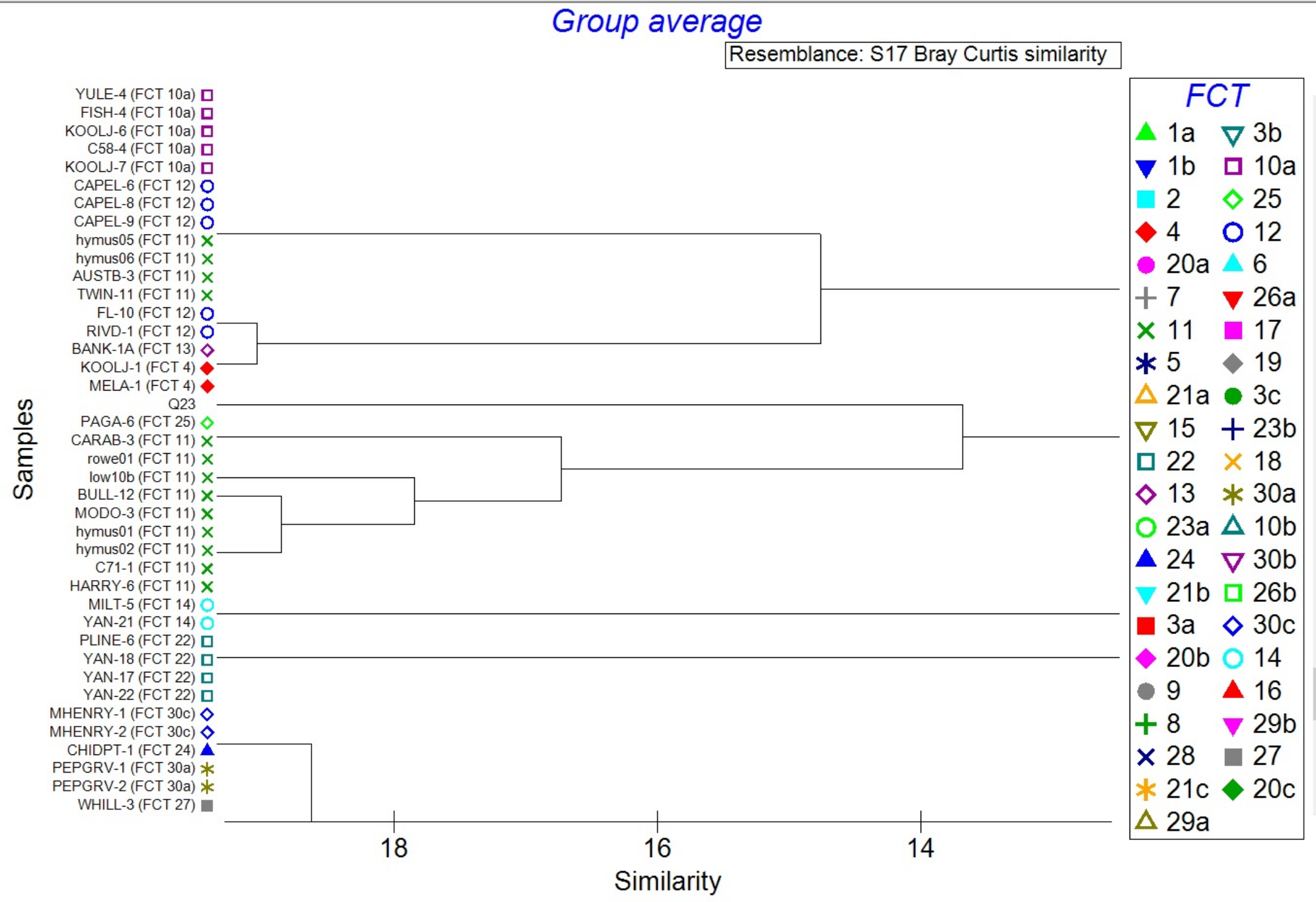

Group average
Resemblance: S17 Bray Curtis similarity
MUCK-1 (FCT 23b)
MPK01 (FCT 23b)
MPK03 (FCT 23b)
MELA-9 (FCT 23b)
SINT-1 (FCT 23b)
R8
WAND-1 (FCT 23a)
HARRY-4 (FCT 23a)
BANK-3 (FCT 23a)
MODO-5 (FCT 23a)
hurst04 (FCT 23a)
hurst01 (FCT 23a)
hurst02 (FCT 23a)
WARB-3 (FCT 23a)
WIRR-2 (FCT 23a)
WARB-1 (FCT 23a)
WIRR-1 (FCT 23a)
YULE-1 (FCT 23a)
YULE-2 (FCT 23a)
Samples
41
40
39
38
Similarity
FCT
1a
3b
1b
10a
2
25
4
12
20a
6
7
26a
11
17
5
19
21a
3c
15
23b
22
18
13
30a
23a
10b
24
30b
21b
26b
3a
30c
20b
14
9
16
8
29b
28
27
21c
20c
29a


Group average
Resemblance: S17 Bray Curtis similarity
card6 (FCT 20b)
BURNRD02 (FCT 3b)
yarl03 (FCT 3b)
BURNRD01 (FCT 20b)
yarl04 (FCT 20b)
R12
hymus03 (FCT 21c)
hymus04 (FCT 21c)
DEJONG-c (FCT 21c)
THOM-2 (FCT 24)
FL-5 (FCT 21c)
FL-6 (FCT 21c)
TWIN-7 (FCT 21c)
TWIN-8 (FCT 21c)
MILT-6 (FCT 21a)
PLINE-3 (FCT 21a)
KOOLJ-2 (FCT 21a)
KOOLJ-5 (FCT 3b)
Samples
31
30
29
Similarity
FCT
1a
3b
1b
10a
2
25
4
12
20a
6
7
26a
11
17
5
19
21a
3c
15
23b
22
18
13
30a
23a
10b
24
30b
21b
26b
3a
30c
20b
14
9
16
8
29b
28
27
21c
20c
29a


Group average
Resemblance: S17 Bray Curtis similarity
brick3 (FCT 3a)
brick6 (FCT 3a)
YOON-2 (FCT 2)
FISH-5 (FCT 2)
AMBR-5 (FCT 2)
AMBR-2 (FCT 2)
AMBR-7 (FCT 2)
R20
YAN-25 (FCT 28)
YAN-3 (FCT 28)
WABL-4 (FCT 28)
YAN-6 (FCT 28)
NEER-8 (FCT 28)
YAN-4 (FCT 28)
YAN-8 (FCT 28)
YAN-5 (FCT 26b)
YAN-9 (FCT 28)
KING-1 (FCT 28)
Samples
16
15
14
Similarity
FCT
1a
3b
1b
10a
2
25
4
12
20a
6
7
26a
11
17
5
19
21a
3c
15
23b
22
18
13
30a
23a
10b
24
30b
21b
26b
3a
30c
20b
14
9
16
8
29b
28
27
21c
20c
29a


Group average
Resemblance: S17 Bray Curtis similarity
AUSTB-4 (FCT 5)
AUSTB-6 (FCT 5)
GUTHR-2 (FCT 5)
GUTHR-4 (FCT 5)
HARRY-3 (FCT 5)
MILT-1 (FCT 5)
Q21
KOOLJ-1 (FCT 4)
MELA-1 (FCT 4)
yarl02 (FCT 9)
MANEA-1 (FCT 9)
welr 01 (FCT 9)
AUSTB-5 (FCT 5)
PAGA-3 (FCT 5)
PAGA-1 (FCT 5)
low08 (FCT 5)
low09a (FCT 5)
low09b (FCT 5)
PLINE-4 (FCT 4)
WHITE-2 (FCT 4)
AMBR-3 (FCT 4)
CAPEL-3 (FCT 4)
FL-1 (FCT 4)
low14a (FCT 4)
rowe02 (FCT 4)
LYONS-1 (FCT 4)
GUTHR-1 (FCT 4)
FL-9 (FCT 4)
C58-1 (FCT 4)
MODO-1 (FCT 4)
MODO-6 (FCT 4)
TWIN-4 (FCT 6)
TWIN-1 (FCT 6)
TWIN-2 (FCT 6)
TWIN-3 (FCT 6)
card10 (FCT 6)
card11 (FCT 6)
card4 (FCT 6)
YAN-25 (FCT 28)
Samples
26
24
22
20
Similarity
FCT
1a
3b
1b
10a
2
25
4
12
20a
6
7
26a
11
17
5
19
21a
3c
15
23b
22
18
13
30a
23a
10b
24
30b
21b
26b
3a
30c
20b
14
9
16
8
29b
28
27
21c
20c
29a


Group average
Resemblance: S17 Bray Curtis similarity
SEAB-8 (FCT 29a)
PRES-1 (FCT 29a)
SEAB-1 (FCT 30c)
LESCH-3 (FCT 30b)
LESCH-4 (FCT 30b)
LESCH-5 (FCT 30b)
LESCH-1 (FCT 30b)
LESCH-2 (FCT 30b)
PEPB-1 (FCT 30b)
Possum3 (FCT 30b)
Possum4 (FCT 30b)
GARDEN-1 (FCT 30a)
GARDEN-3 (FCT 30a)
WOODP-1 (FCT 30a)
GARDEN-4 (FCT 30a)
WOODP-2 (FCT 30a)
PLINE-6 (FCT 22)
YAN-18 (FCT 22)
YAN-17 (FCT 22)
YAN-22 (FCT 22)
MILT-5 (FCT 14)
Q22
BANK-1A (FCT 13)
KOOLJ-1 (FCT 4)
MELA-1 (FCT 4)
yarl02 (FCT 9)
MANEA-1 (FCT 9)
welr 01 (FCT 9)
AUSTB-5 (FCT 5)
PAGA-3 (FCT 5)
PAGA-1 (FCT 5)
low08 (FCT 5)
low09a (FCT 5)
low09b (FCT 5)
PLINE-4 (FCT 4)
WHITE-2 (FCT 4)
AMBR-3 (FCT 4)
CAPEL-3 (FCT 4)
FL-1 (FCT 4)
low14a (FCT 4)
Samples
26
24
22
Similarity
FCT
1a
3b
1b
10a
2
25
4
12
20a
6
7
26a
11
17
5
19
21a
3c
15
23b
22
18
13
30a
23a
10b
24
30b
21b
26b
3a
30c
20b
14
9
16
8
29b
28
27
21c
20c
29a


Group average
Resemblance: S17 Bray Curtis similarity
YULE-4 (FCT 10a)
FISH-4 (FCT 10a)
KOOLJ-6 (FCT 10a)
C58-4 (FCT 10a)
KOOLJ-7 (FCT 10a)
CAPEL-6 (FCT 12)
CAPEL-8 (FCT 12)
CAPEL-9 (FCT 12)
hymus05 (FCT 11)
hymus06 (FCT 11)
AUSTB-3 (FCT 11)
TWIN-11 (FCT 11)
FL-10 (FCT 12)
RIVD-1 (FCT 12)
BANK-1A (FCT 13)
KOOLJ-1 (FCT 4)
MELA-1 (FCT 4)
Q23
PAGA-6 (FCT 25)
CARAB-3 (FCT 11)
rowe01 (FCT 11)
low10b (FCT 11)
BULL-12 (FCT 11)
MODO-3 (FCT 11)
hymus01 (FCT 11)
hymus02 (FCT 11)
C71-1 (FCT 11)
HARRY-6 (FCT 11)
MILT-5 (FCT 14)
YAN-21 (FCT 14)
PLINE-6 (FCT 22)
YAN-18 (FCT 22)
YAN-17 (FCT 22)
YAN-22 (FCT 22)
MHENRY-1 (FCT 30c)
MHENRY-2 (FCT 30c)
CHIDPT-1 (FCT 24)
PEPGRV-1 (FCT 30a)
PEPGRV-2 (FCT 30a)
WHILL-3 (FCT 27)
Samples
18
16
14
Similarity
FCT
1a
3b
1b
10a
2
25
4
12
20a
6
7
26a
11
17
5
19
21a
3c
15
23b
22
18
13
30a
23a
10b
24
30b
21b
26b
3a
30c
20b
14
9
16
8
29b
28
27
21c
20c
29a