Ref: 2504/01/RPP04

29 July 2021

Leanne Harris
Senior Case Manager
Planning Panels Secretariat
320 Pitt Street Sydney NSW 2000

By email: Leanne.harris@dpie.nsw.gov.au

RE: Kings Hill Concept Development Application for Residential Subdivision | PPS-2018HCC047

Dear Leanne,

On behalf of the Applicant, Kings Hill Development Pty Ltd No.1 and Kings Hill Development Pty Ltd No.2 (collectively referred to as KHD), this letter serves to respond to the items that remain as areas of contention between RPS and Umwelt following the Joint Expert Meeting of 16 June 2021 on ecology, and the items discussed at the Briefing with the Panel and Council on 17 June 2021, which together represent the KHD position with regards to the application.

Minutes agreed between RPS, Umwelt and ERM containing all ecological "Areas of Agreement and Areas of Contention" were issued to the Panel 15 July 2021 with a record of the discussion included from the 16 June 2021 meeting between the experts.

Joint Expert Meeting

Only one of the agreed areas of contention resulted in a "Proposed Future Action". The action was to:

> *"Conduct analysis that includes a comparison of the relevant Kings Hill floristic data against an adequate number of plots for those that are known to represent the EEC."*

In response, RPS carried out further collection of reference data over 12 and 13 July 2021 to compare against the data presented in the SIS and compliment the RPS classification of vegetation as type PCT 1590. RPS concludes in the (**attached**) Memo dated 27 July 2021:

> *"The comparative analysis of plot data obtained from the subject site (Cumberland Ecology and RPS plots) and reference plot data obtained from known mapped patches of LHSGIF EEC in/adjacent to Werakata National Park and Columbey National Park has clearly demonstrated that the vegetation mapped as PCT 1590 within the subject site is not the same as vegetation described as LHSGIF EEC in the final determination."*

The remaining areas of contention are adequately responded to by either:

- Previously issued CBP letter dated 1 June 2021 to the Panel and the related RPS Memo dated 1 June 2021 - Response to Errors in Umwelt Review of RPS Species Impact Statement, or
- Advice of Senior Counsel Tim Robertson dated 28 July 2021 (**attached**).

Confidence in the SIS and the additional information provided to the panel, including the relevant legal advices, is assured by the extensive involvement of specialist expertise that informed the assessment and

conclusions of the RPS SIS, including contributions by Dr Kara Youngentob and Dr Karen Ford (Koala Food Tree Nutrition (Australian National University)), Dr David Dique (Koala ((ERM)), Dr Frank Lemckert (Forrest Regeneration (Eco Logical)) and Dr Stephen Phillips (Koala (Biolink)). These individuals are published and internationally recognised industry experts in their relevant fields, with input and advice informing the recommendations of the SIS which exceed the environmental commitments of standard industry practice.

Panel Briefing

To assist the Panel and the Applicant, further legal advice was sought from Senior Counsel Tim Robertson (recognised in Planning and Environmental Law) to both outline the legal context of the application and its determination process along with procuring advice on the resultant ecological areas of contention as they relate to application in terms of statutory precedent, intent and/or interpretation..

That advice is attached dated 28 July 2021. Key guidance is summarised below:

a. The Panel has no power to decide whether concurrence is required: that is a function given exclusively to Council;
b. Even if Council decided that concurrence was required, the concurrence authority has no power to refuse concurrence because the DA did not propose offsetting any residual impacts on biodiversity, or to impose a condition on its concurrence to require offsetting for that purpose;
c. Neither the Threatened Species Guidelines nor the seven-part test is a focal point for consideration of biodiversity issues, where ever arising in the determination of the application;
d. Neither is exhaustive of the matters to be considered in determining those issues;
e. In deciding if the DA involves likely significant impacts on threatened species or their habitats, or in deciding to grant or refuse consent, the decision-maker must consider the mitigation measures including the proposal to enhance the carrying capacity of the conservation reserve for koala, phascogale and other species;
f. Offsets compensate for residual impacts of the project on biodiversity, mitigation measures reduce the likely impacts of the proposal: reserving part of the existing habitat and enhancing it's carrying capacity by ecological restoration is not an offset, in the context of this DA;
g. The threatened species guidelines cannot require decision-makers to ignore mitigation measures, if they have been incorporated in the DA. It is obligatory to consider the development proposal as a whole, including its proposals for ecological restoration and adaptive management;
h. Restoration of koala habitats by tree species selection is a critical path of the Government's Koala Strategy (2018), is recommended by DPIE's *Koala Habitat Revegetation Guidelines (2020),* and is supported by over 40 years scientific research into koala habitat preferences: to describe the SIS prescriptions as novel is to disregard evidence even if that is the correct question to ask, which it is not;
i. Umwelt has adopted a legally flawed approach to the threshold question of significant impact, and it has disregarded evidence that the threshold of significance has not been exceeded;
j. The SIS correctly determined and additional research has confirmed that the area to be cleared does not largely comprise an EEC.

Exhibition of the Voluntary Planning Agreement (VPA) between KHD and Port Stephens Council was also raised at the Panel Briefing. At the Council Ordinary Meeting of 27 July 2021, Council voted unanimously to endorse the Draft VPA and support exhibition of the Draft Agreement and Explanatory Note.

Position and Next Steps

Responding to and addressing the items raised by the Panel and Umwelt does not require an amendment to the Development Application as the proposed action and future management regime as presented in the DA and SIS is sound and does not require alteration.

The Applicant would like to reiterate the importance of the 'Local Solution' put forward in the application towards achieving a long term sustainable outcome for the local environment and community.

To this end, the Concept Development Application was originally lodged with Council in 2018 and was before the Panel as early as Sep 2019. Assessment by Council and now the Panel has been ongoing for almost three years with the following merits of the application continuing to be relevant and represented in the form of a 'Local Solution':

- Restoration and protection of the local varieties of species, habitats and ecosystems that are vital to the long term, sustainable health and wellbeing of the environment and the community, including the avoidance of 40ha of land zoned for Residential purposes;
- protection and promotion of cultural and educational values, particularly those values that are significant to the local aboriginal Land Council, encouraging the training, development and employment of both the aboriginal community and broader community in areas such as tourism, education, recreation and biodiversity land care activities,
- substantial financial investment in the Urban and Conservation Areas to stimulate local economy with resultant jobs, social and environmental opportunities, and
- delivering housing supply that has been planned since the 1980s, endorsed NSW State Planning in the Lower Hunter Regional Strategy as 1 of 4 priority urban release areas in 2007,and subsequently rezoned for urban and conservation purposes, representing some 40% of forecast housing to the LGA until 2036.

KHD wish to thank the Panel for their invitation to provide further information, and it is expected with the above and attached supplementary advice and analysis the Panel can move with confidence towards a timely determination of the application.

For the consideration of the Panel and Council.

Yours sincerely
APP CORPORATION PTY LIMITED

ADAM SMITH
Project Director

Attachments:

1. RPS EEC Memo dated 27 July 2021 (20 pages)
2. Kings Hill Concept DA – Memorandum of Advice – Senior Counsel Tim Robertson dated 28 July 2021 (36 pages)

MEMO

Date: 15 July 2021
To: Adam Smith
From: Mark Aitkens
Pages: 20 inc. this page
Regarding: PR130430 Kings Hill: EEC Classification

Unit 2A, 45 Fitzroy Street
Carrington NSW 2294
T +61 2 4940 4200

EEC Classification: Is PCT 1590 at Kings Hill part of the Lower Hunter Spotted Gum Ironbark Forest endangered ecological community listing – a phytosociological analysis using reference data

Introduction

The natural vegetation of Kings Hill within lands described as Lot 41 DP1037411 and Lot 4821 DP852073, 3221 Pacific Highway (hereafter referred to as the subject site) was classified using a phytosociological analysis and mapped (RPS 2020) and includes vegetation described as plant community type (PCT) 1590 Spotted Gum - Broad-leaved Mahogany - Red Ironbark shrubby open forest; otherwise known as map unit (MU) 16 Seaham Spotted Gum Ironbark Forest (NPWS 2003). PCT 1590 or MU 16 is on a spectrum of related spotted gum ironbark forest types that occur from the southern parts of the Sydney Basin near Nowra to the NSW North Coast.

RPS (2020) assessed this vegetation to determine if it forms part of the listed threatened ecological community (TEC) referred to as Lower Hunter Spotted Gum Ironbark Forest endangered ecological community (LHSGIF EEC). RPS concluded that PCT 1590 is not part of this TEC for reasons relating to floristic composition, edaphic and climatic reasons [see Section 6.1 of RPS (2020)].

A third party review challenged the RPS (2020) analysis and suggested further analysis using reference plot data obtained from known mapped patches of LHSGIF EEC for floristic comparison with PCT 1590 as described in RPS (2020). This memo provides a clear quantitative analysis of the vegetation classed as PCT 1590 at Kings Hill and comparison with reference plot data obtained from LHSGIF EEC. The similarity/ dissimilarity of LHSGIF EEC reference plot data with PCT 1590 plot data obtained from Kings Hill (RPS 2020) was determined by an appropriate phytosociological analysis [para 101 of Motorplex (Australia) Pty Limited v Port Stephens Council [2007] NSWLEC 74]. Results were compared against the final determination for LHSGIF EEC (NSW Threatened Species Scientific Committee 2019).

Summary of Findings

The analysis presented in this memo confirms that the mapped extent of PCT 1590 in the subject site is consistent with vegetation described as MU 65/ MU 16 (Seaham Spotted Gum Ironbark Forest), as mentioned in Part 4.6 of the final determination for LHSGIF EEC (NSW Threatened Species Scientific Committee 2019). The vegetation described as PCT 1590 at Kings Hill (RPS 2020) is compositionally dissimilar to LHSGIF EEC reference plots and differs to LHSGIF EEC vegetation in the same way as described in Part 4.6 of the final determination. Key quantitative disparities that support the conclusion that PCT 1590 at Kings Hill is not part of LHSGIF EEC, rather is part of MU 65 as mentioned in Part 4.6 of the final determination, are summarised below:

- Spotted Gum (*Corymbia maculata*) is a sole tree canopy dominant species in the PCT 1590 plot data at Kings Hill. Red Ironbark (*Eucalyptus fibrosa*) is one of a few associate species and never codominant. Compared to the LHSGIF EEC final determination, this is:
  - inconsistent with Part 4.3 of the final determination where LHSGIF EEC is characterised by the codominance of Spotted Gum and Red Ironbark; and

  - consistent with Part 4.6 of the final determination where MU 65 is characterised as dominated by Spotted Gum with Red Ironbark among several canopy associate species;

- Five of the tree canopy species that typically associate with the dominant Spotted Gum in MU 65 (Part 4.6) are present in PCT 1590 plots at Kings Hill. The final determination identifies these canopy associate species as not characteristic of LHSGIF EEC (Part 4.3). Consistent with the final determination, these canopy associate species were absent from LHSGIF EEC reference plot data;
- LHSGIF EEC reference plot data (n=6) cumulatively comprise 39 of the 44 characteristic species listed in Part 1.1 of the final determination. Conversely, there are 14 or 36% fewer characteristic species (i.e. 25 of the 44 species) in the RPS plot data obtained from PCT 1590 at Kings Hill (n=13 plots) despite there being seven more plots used in the comparison. The phytosociological analysis shows a statistically significant difference between LHSGIF EEC reference plot data and PCT 1590 plot data obtained at Kings Hill, demonstrating that PCT 1590 is not part of LHSGIF EEC;
- 25 species present in the RPS PCT 1590 plots obtained at Kings Hill and not listed in Part 1.1 of the final determination. As expected, these species were absent from the LHSGIF EEC reference plots;
- Six of the 21 shrub or groundcover species that are frequently observed in LHSGIF EEC (Part 4.3) and observed in the reference plot data were absent from RPS PCT 1590 plots obtained at Kings Hill;
- Eight species listed in Part 1.1 of the final determination were frequent in the LHSGIF EEC reference plots and uncommon to rare in the RPS PCT 1590 plots obtained at Kings Hill; and
- 15 of 17 species recorded more frequently in MU 65 and not in LHSGIF EEC (i.e. Part 4.6 of the final determination) were characteristic species in the RPS PCT 1590 plots obtained at Kings Hill.

Methods and analysis supporting this analysis are provided in the following sections.

Method

An analysis of full floristic plot data obtained from plots performed within the subject site and reference LHSGIF EEC sites was performed using relevant analytical techniques available in PRIMER version 6.1.13 with PERMANOVA version 1.0.3 (Plymouth Marine Laboratory, Plymouth, United Kingdom and see Clarke and Gorley 2006). The analytical workflow is outlined as follows.

- Resemblance analysis (calculating the similarity between plots): Each full floristic plot was compared with each other to quantitatively calculate their pairwise similarity. This was performed using the Bray-Curtis similarity measure (dummy variable added, value: 0.1) following a square-root transform of raw percent cover values recorded for each species (RPS data only).

  Output: a similarity matrix showing the result of plot pairwise comparisons. This analysis numerically compares all plots at Kings Hill with reference plots in LHSGIF EEC.

- CLUSTER analysis (grouping of plots with similar floristic composition): The output from the resemblance analysis (i.e. similarity matrix) was subject to a CLUSTER analysis for the purpose of grouping (classifying) full floristic plots into statistically significant clusters of similarity at the 5% significance level. A SIMPROF test of a priori unstructured plot data was performed to test for statistically significant evidence of genuine clusters in samples (i.e. are clusters of similarity significantly different to each other).

  Output: a classification tree (dendrogram) showing the similarity level between full floristic plots. This analysis graphically groups the similarity matrix results and provides statistical significance of these groups (i.e. are they statistically similar or dissimilar).

- Analysis of Similarities (ANOSIM) (testing the biological significance of clustered groups): A one-way ANOSIM was performed using a factor generated from the CLUSTER analysis (i.e. clusters of similarity) to calculate the sample statistic (Global R). The Global R value was reviewed to determine if the CLUSTER analysis was biologically meaningful (i.e. a Global R > 0.5 is considered significant and

biological meaningful). If significant, pairwise test results between CLUSTER generated groups were examined to further interrogate the results (i.e. p <0.05 or 5% significant a statistically significant difference between groups and therefore represent biologically important differences).

Output: a scatter plot (nMDS plot) graphically showing the relationship between all full floristic plots using the statistically significant groups determined in the CLUSTER analysis. Similarity contours are also shown to provide additional appreciation of similarity/ dissimilarity.

- SIMPER analysis (describing the floristic composition of clustered groups): SIMPROF generated clusters/ groups were analysed to describe vegetation classifications by CLUSTER groupings. Characteristic species were reported for each group and related to PCT descriptions to assign the best fit PCT. A priori, species with 'Diss/SD' >1.0 were identified as important contributors to CLUSTER group dissimilarity (Beck et al 2017).

  Output: floristic composition of each statistically significant CLUSTER group noting important metrics such as average abundance and percent contribution to the group cluster. This analysis tells us the species that characterise each group and their relative importance in that group assignment (i.e. fidelity).

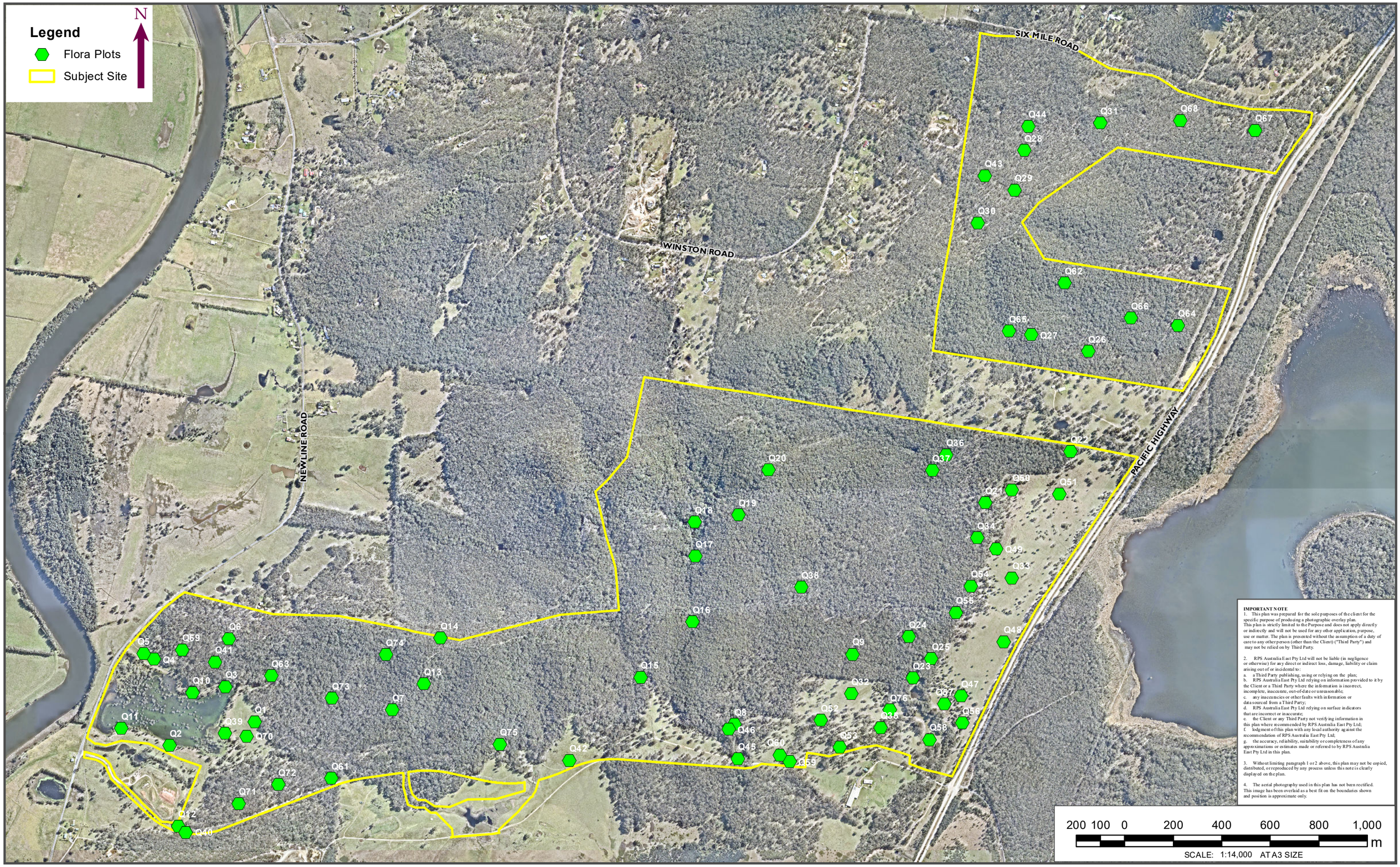
Data used in this analysis is as follows with treatments noted where performed as part of the analysis.

Data Source	Data form	Treatments
Cumberland ecology (2019): full floristic plot data obtained from BioBanking plot surveys reported in the Species Impact Statement (SIS) (Appendix F) Total: 65 Plots See Figure 1	Modified Braun Blanquet cover abundance scale from 0 to 6 as follows: 0 = absence 1 = <5% and rare (< 10 individuals) 2 <5% cover and common 3 <25% and >5% cover 4 <50% and >25% cover 5 <75% and >50% cover 6 >75% cover	• No data transformations • Use of dummy data in resemblance analysis (0.1)
RPS (2020): full floristic plot data obtained from BAM plot surveys reported in the SIS Total: 24 Plots See Plate 1 for photograph See Figure 2	Cover abundance scores as specified in BAM (2017) and BAM (2020)	• Square-root transform of percent cover score • Use of dummy data in resemblance analysis (0.1)
RPS (2021): full floristic 'reference' plot data obtained known mapped patches of LHSGIF EEC located within/ adjacent to Werakata National Park (n=3) and Columbey National Park (n=3) on 13/07/2021 Total: 6 Plots See Figure 3 for plot locations See Plate 2 for photograph See Attachment 1 for plot data	Cover abundance scores as specified in BAM (2017) and BAM (2020)	For analysis against RPS data: • Square-root transform of percent cover score • Use of dummy data in resemblance analysis (0.1) For analysis against Cumberland Ecology Dataset (compatibility) • Categorical transform of % cover score using Braun Banquet cover abundance scores

Square-root transforms were applied to the RPS dataset to down weight the effect of trees and shrubs with high percent cover values on the analysis. The Cumberland Ecology data was already transformed by use of the Modified Braun Blanquet cover abundance scale and did not require any further treatment. This data transformation is appropriate and commonly used in the evaluation of floristic composition (i.e. proportionally increases the weighting of smaller species such as forbs, grasses and herbs in the analysis).

Plate 1: Photograph typifying the character of PCT 1590 (MU 65) at Kings Hill (Plot 24)

Plate 2: Photograph typifying the character of LHSGIF EEC at Reference Plots (Plot 1)



TITLE : FIGURE 1: CUMBERLAND ECOLOGY PLOTS

LOCATION : KINGS HILL

DATUM:GDA 1994

PROJECTION: GDA 1994 MGA Zone 56

DATE : **14/07/2021**

PURPOSE: **ECOLOGY**

VERSION (PLAN BY): B A3 (mark.aitkens)

PATH: J:\JOBS\130k\130430 Raymond Terrace\10 - Drafting\Arcgis Map Documents\Eco\Report\3. SIS\20191030 SIS REVISED FINAL\130430 Figure 4.01 BAM survey locations within SS (RPS) B A3 20191205.mxd

CLIENT: **PM NO 1 PTY LIMITED**

JOB REF: **PR130430**

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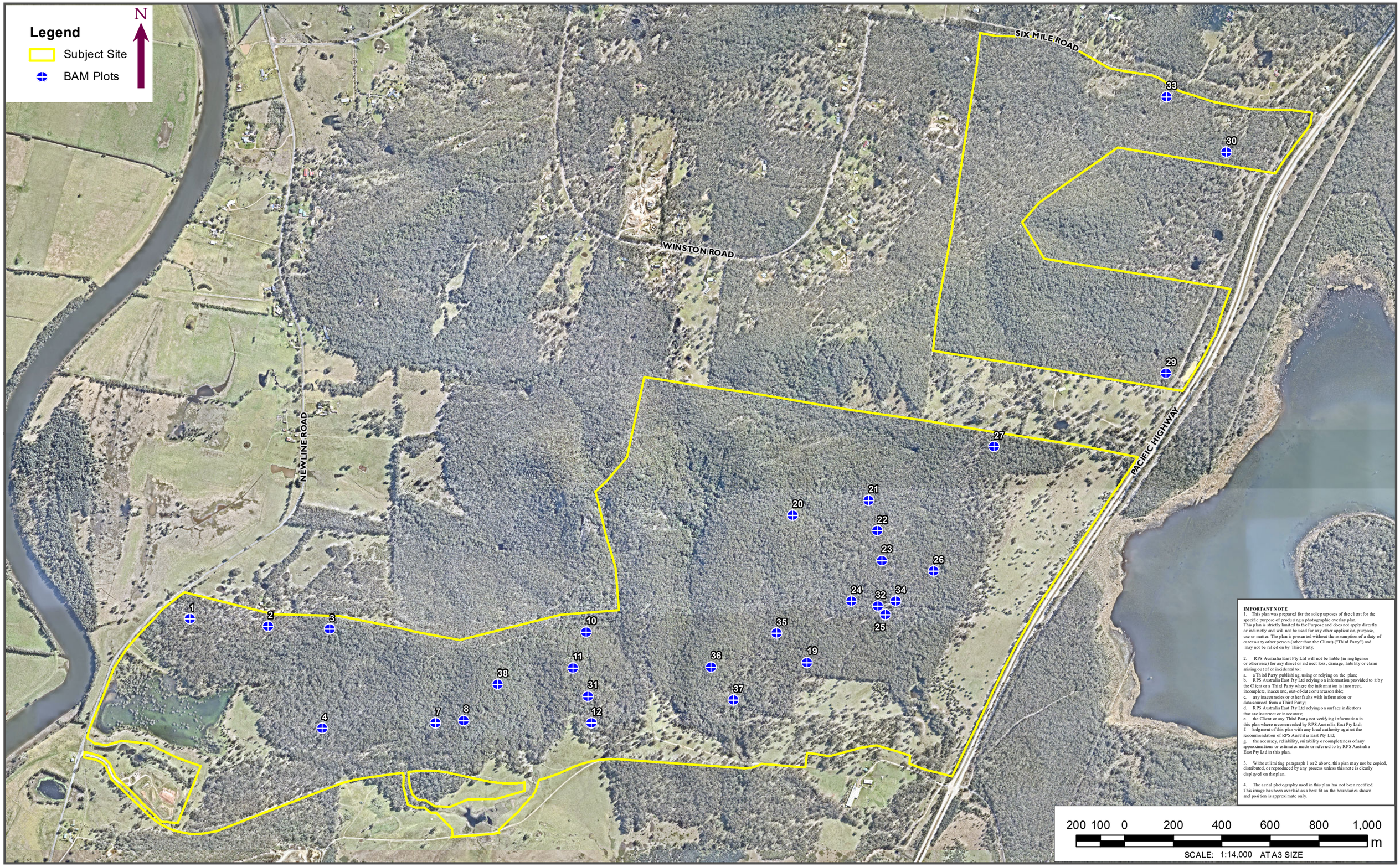
MAKING COMPLEX EASY



TITLE : FIGURE 2: RPS PLOTS

LOCATION : KINGS HILL

DATUM:GDA 1994

PROJECTION: GDA 1994 MGA Zone 56

DATE : **14/07/2021**

PURPOSE: **ECOLOGY**

VERSION (PLAN BY): B A3 (mark.aitkens)

PATH: J:\JOBS\130k\130430 Raymond Terrace\10 - Drafting\Arcgis Map Documents\Eco\Report\3. SIS\20191030 SIS REVISED FINAL\130430 Figure 4.01 BAM survey locations within SS (RPS) B A3 20191205.mxd

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Legend

- LHSGIF EEC Plots
- Subject Site
- State Conservation Reserves

N

5
4
6
2
3
1

IMPORTANT NOTE

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5 2.5 0 5 10 15 20 25 Kilometers

SCALE: 1:200,000 AT A3 SIZE

TITLE : FIGURE 3: LHSGIF EEC REFERENCE PLOTS

LOCATION : KINGS HILL

DATUM:GDA 1994

PROJECTION: GDA 1994 MGA Zone 56

DATE : **14/07/2021**

PURPOSE: **ECOLOGY**

VERSION (PLAN BY): B A3 (mark.aitkens)

PATH: J:\JOBS\130k\130430 Raymond Terrace\10 - Drafting\Arcgis Map Documents\Eco\Report\3. SIS\20191030 SIS REVISED FINAL\130430 Figure 4.01 BAM survey locations within SS (RPS) B A3 20191205.mxd

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MEMO

Date: 15 July 2021
Regarding: PR130430 Kings Hill: EEC Classification

Results

The results of the phytosociological analysis comparing the LHSGIF EEC 'reference plot' dataset and Cumberland Ecology (2019)/ RPS (2020) plot data are provided as follows.

Cumberland Ecology (2019) Dataset

The analysis of Cumberland Ecology plot data (n=65) obtained from the subject site and RPS reference LHSGIF EEC plot data (n=6) obtained from patches in/ adjacent Werakata National Park and Columbey National Park plots generated significantly different group clusters; a finding consistent with the analysis provided in Section 6.1 of RPS (2020). Plot data describing PCT 1590 and PCT 1584 in RPS (2020) clustered into two distinct groups as shown in **Figure 4** and reflect the two differing vegetation formations described (i.e. wet sclerophyll forest versus dry sclerophyll forest). Reference plot data collected from known mapped patches of LHSGIF formed a third distinct group separate from PCT 1590 and PCT 1584. Although related to PCT 1590 (i.e. a spotted gum ironbark forest community), the CLUSTER groupings clearly demonstrate a statistically significant separation of LHSGIF EEC plot data from PCT 1590 plots at the 5% level; a finding consistent with RPS (2020) that concluded PCT 1590 does not form part of LHSGIF EEC.

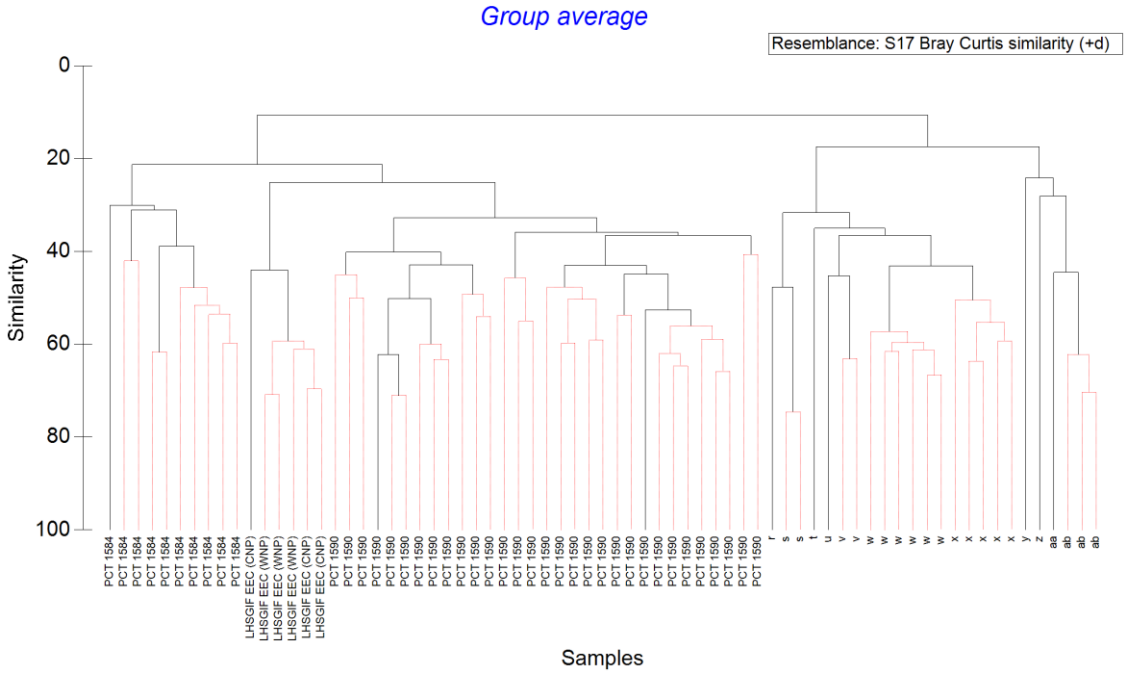

Figure 4: Dendrogram showing group classifications using Cumberland Ecology Plots (n=65) and LHSGIF EEC reference plots (n=6)

Group clusters are biologically meaningful (Global R = 0.82) and significantly different from each other at the 5% significance level. Pairwise tests are reported below (bold results for PCT 1590 and LHSGIF EEC plots).

Pairwise Group Comparisons	R Statistic	Significance Level %	Possible Permutations	Actual Permutations	Number >= Observed
LHSGIF EEC (WNP), LHSGIF EEC (CNP)	0.333	10	10	10	1
LHSGIF EEC (WNP), PCT 1590	**0.709**	**0.1**	5984	999	0
LHSGIF EEC (WNP), PCT 1584	1	0.3	286	286	1
LHSGIF EEC (CNP), PCT 1590	**0.713**	**0.2**	5984	999	1
LHSGIF EEC (CNP), PCT 1584	1	0.3	286	286	1
PCT 1590, PCT 1584	0.698	0.1	Very large	999	0

MEMO

Date: 15 July 2021
Regarding: PR130430 Kings Hill: EEC Classification

The non-significant pairwise comparison among LHSGIF EEC reference plots confirms that the utility (i.e. representativeness and suitability) of these plots in the analysis presented in this memo.

The nMDS plot graphically distinguishing between plot clusters is shown in **Figure 5**. The 40% similarity contour, as used by Bell (2009) to better distinguish between the closely related LHSGIF and Seaham Spotted Gum Ironbark Forest groups at Columbey National Park, shows clear group separation between PCT 1590 and LHSGIF EEC reference plots. The average dissimilarity between LHSGIF EEC and PCT 1590 is 74.89%.

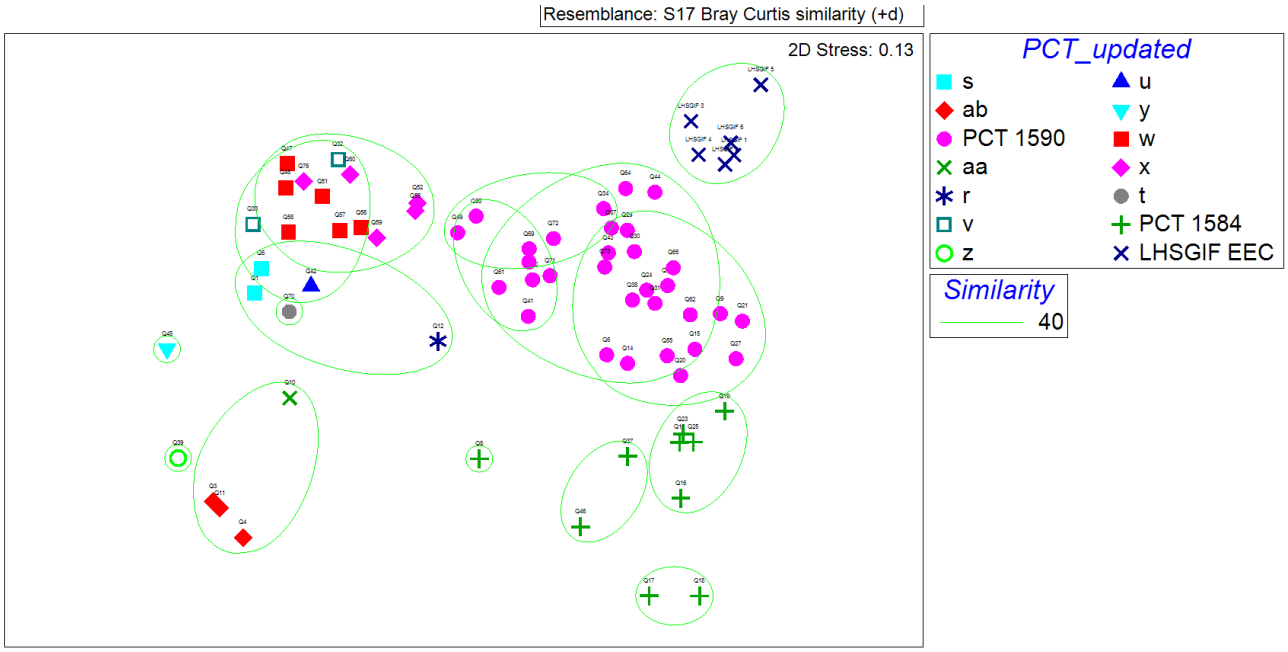

Figure 5: nMDS plot showing group classifications using Cumberland Ecology Plots (n=65) and LHSGIF EEC reference plots (n=6)

The SIMPER analysis provided in the table below confirms floristic compositional differences between LHSGIF EEC reference plots and PCT 1590 plots obtained from the subject site (list limited to informative species mentioned in Part 1.1 and Part 4.6 of the final determination for LHSGIF EEC).

Species in bold denote positive identifiers for MU 65 or PCT 1590 as mentioned in Part 4.6 of the final determination – species in red are listed in Part 1.1 of the final determination and are characteristic of LHSGIF EEC. Importantly, the relative average abundance of species identified in the final determination as characteristic of MU 65/ MU 16 (Seaham Spotted Gum Ironbark Forest) are prominent in the PCT 1590 cluster and rare to absence in the LHSGIF EEC plot cluster. Similarly, species characteristic of LHSGIF EEC are rare to absence in the PCT 1590 (MU 65/ MU 16) group cluster. Divisions between species important in identifying dissimilarity between PCT 1590 and LHSGIF are consistent with those listed in Part 4.6 of the final determination).

The disparity in average abundance between *Corymbia maculata* and *Eucalyptus fibrosa* is materially noteworthy. The similar average abundance exhibited by these two species in the LHSGIF EEC plots (i.e. 4.33 for *Eucalyptus fibrosa* and 3.67 for *Corymbia maculata*) is consistent with and confirms Part 4.3 of the final determination and its importance in identifying LHSGIF EEC, where it states (in part):

Lower Hunter Spotted Gum Ironbark Forest is usually dominated by Corymbia maculata (Spotted Gum) and Eucalyptus fibrosa (Broad-leaved Ironbark), with E. punctata (Grey Gum) occurring less frequently.

Conversely, the plots associated with the PCT 1590 group cluster clearly indicate a dominance of *Corymbia maculata* over *Eucalyptus fibrosa* (i.e. 3.1 for *Corymbia maculata* and 1.16 *Eucalyptus fibrosa*). With 65 plots used in the analysis it is considered that this result is informative and confirms the key differences between PCT 1590 at Kings Hill and LHSGIF EEC as described in the final determination.

Species	LHSGIF EEC Av.Abund	PCT 1590 Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
*Eucalyptus fibrosa**	4.33	1.16	1.71	2.04	2.29	2.29
Dichondra repens	0	**2.42**	1.2	2.17	1.6	3.89
Imperata cylindrica	1	**1.9**	0.96	1.12	1.29	12
Cymbopogon refractus	1	**2.71**	0.92	1.41	1.23	14.51
Leucopogon juniperinus	0.17	**2**	0.92	1.17	1.23	16.96
Eucalyptus acmenoides	0	**1.77**	0.86	0.84	1.15	19.26
Lissanthe strigosa	1.67	0	0.86	2.12	1.14	20.41
Phyllanthus hirtellus	1.83	0.19	0.84	2.73	1.13	21.54
Geitonoplesium cymosum	0	**1.68**	0.84	1.75	1.12	22.66
*Corymbia maculata**	3.67	3.1	0.82	1.1	1.1	23.76
Eustrephus latifolius	0.33	**1.77**	0.79	1.79	1.05	25.86
Eucalyptus siderophloia	0	**1.52**	0.75	0.92	1.01	26.87
Melaleuca nodosa	1.17	0.61	0.74	0.78	0.99	29.83
Pomax umbellata	1.5	0.06	0.73	1.82	0.98	31.79
Daviesia ulicifolia	1.67	0.74	0.72	1.4	0.96	33.73
Macrozamia flexuosa	1.5	0	0.7	0.62	0.94	36.55
Notelaea longifolia	0	**1.42**	0.68	1.2	0.91	38.39
Bursaria spinosa	1.33	0.52	0.65	1.21	0.87	41.05
Dianella revoluta	1.33	0.13	0.64	1.73	0.85	42.76
Opercularia diphylla	0.83	**1.71**	0.58	1.24	0.78	46.78
Breynia oblongifolia	0.5	**1.32**	0.5	1.21	0.67	56.16
Goodenia rotundifolia	1	0	0.47	0.99	0.63	57.45
Desmodium rhytidophyllum	0	**0.87**	0.43	0.88	0.57	60.49
Desmodium varians	0.33	**0.77**	0.42	0.9	0.57	62.19
Pultenaea spinosa	0.83	0	0.4	0.67	0.53	63.82
Acacia ulicifolia	0.17	**0.77**	0.37	0.83	0.5	65.34
Acacia parvipinnula	0.67	0	0.33	0.89	0.44	69.06
Pandorea pandorana	0	**0.55**	0.26	0.63	0.35	74.44
Dianella caerulea var. producta	0.17	**0.29**	0.22	0.6	0.29	77.58
Echinopogon ovatus	0	**0.35**	0.18	0.47	0.24	81.45
Dianella longifolia var. longifolia	0	**0.23**	0.12	0.53	0.16	88.34

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RPS (2020) Dataset

The analysis of RPS plot data (n=24) obtained from the subject site and RPS reference LHSGIF EEC plot data (n=6) obtained from patches in/ adjacent Werakata National Park and Columbey National Park plots generated significantly different CLUSTER groups; a finding consistent with the analysis provided in Section 6.1 of RPS (2020). Plot data describing PCT 1590 and PCT 1584 in RPS (2020) clustered into two distinct groups as shown in **Figure 6** and reflect the two differing vegetation formations described (i.e. wet sclerophyll forest versus dry sclerophyll forest). Reference plot data collected from known mapped patches of LHSGIF formed a third distinct group separate from PCT 1590 and PCT 1584. As for the analysis of the Cumberland Ecology data, this group separation is significant and is consistent with the RPS (2020) assessment concluding that PCT 1590 within the subject site is not part of LHSGIF EEC.

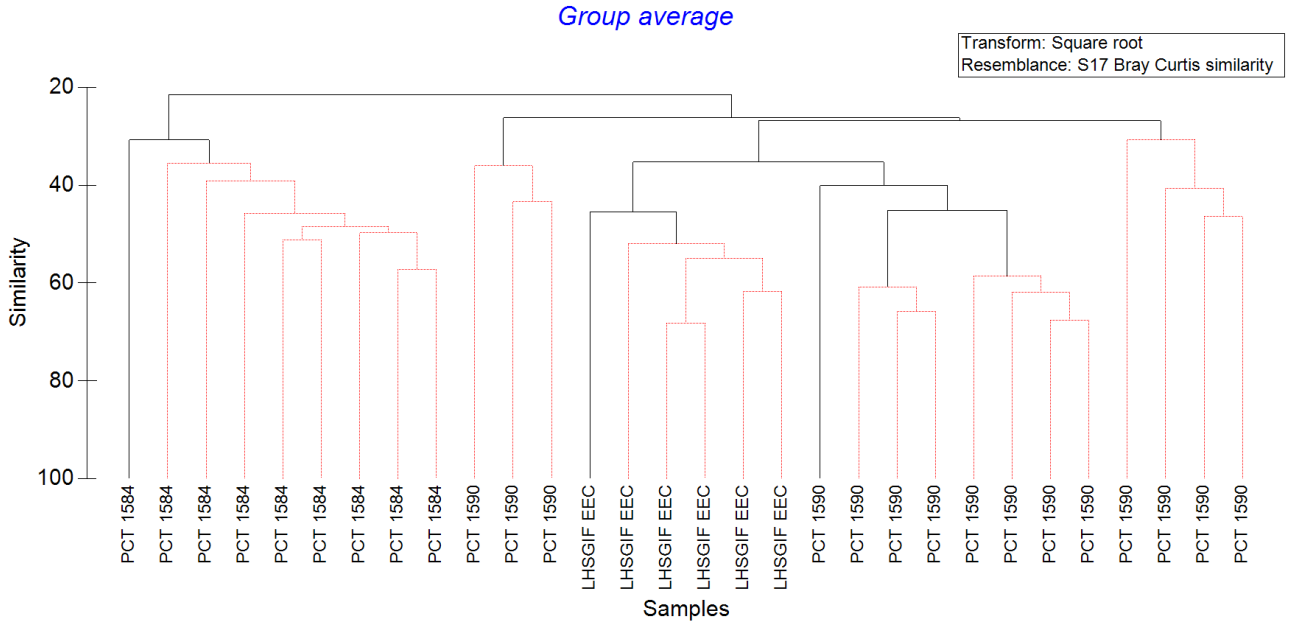

Figure 6: Dendrogram showing group classifications using RPS Plots (n=24) and LHSGIF EEC reference plots (n=6)

Group clusters are biologically meaningful (Global R = 0.59) and significantly different from each other at the 5% significance level as indicated in the pairwise tests reported below (see bold results for PCT 1590 and LHSGIF EEC plots).

Pairwise Group Comparisons	R Statistic	Significance Level %	Possible Permutations	Actual Permutations	Number >= Observed
LHSGIF EEC, PCT 1590	**0.256**	**3.2**	5984	999	0
LHSGIF EEC (CNP), PCT 1584	0.966	0.1	286	999	31
PCT 1590, PCT 1584	0.611	0.1	Very large	999	0

The nMDS plot that graphically distinguishes between plot clusters is shown in **Figure 7**. The 40% similarity contour, as used by Bell (2009) to better distinguish between the closely related LHSGIF and Seaham Spotted Gum Ironbark Forest groups at Columbey National Park, shows clear group separation between PCT 1590 and LHSGIF EEC reference plots. The average dissimilarity between LHSGIF EEC and PCT 1590 is 69.79%.

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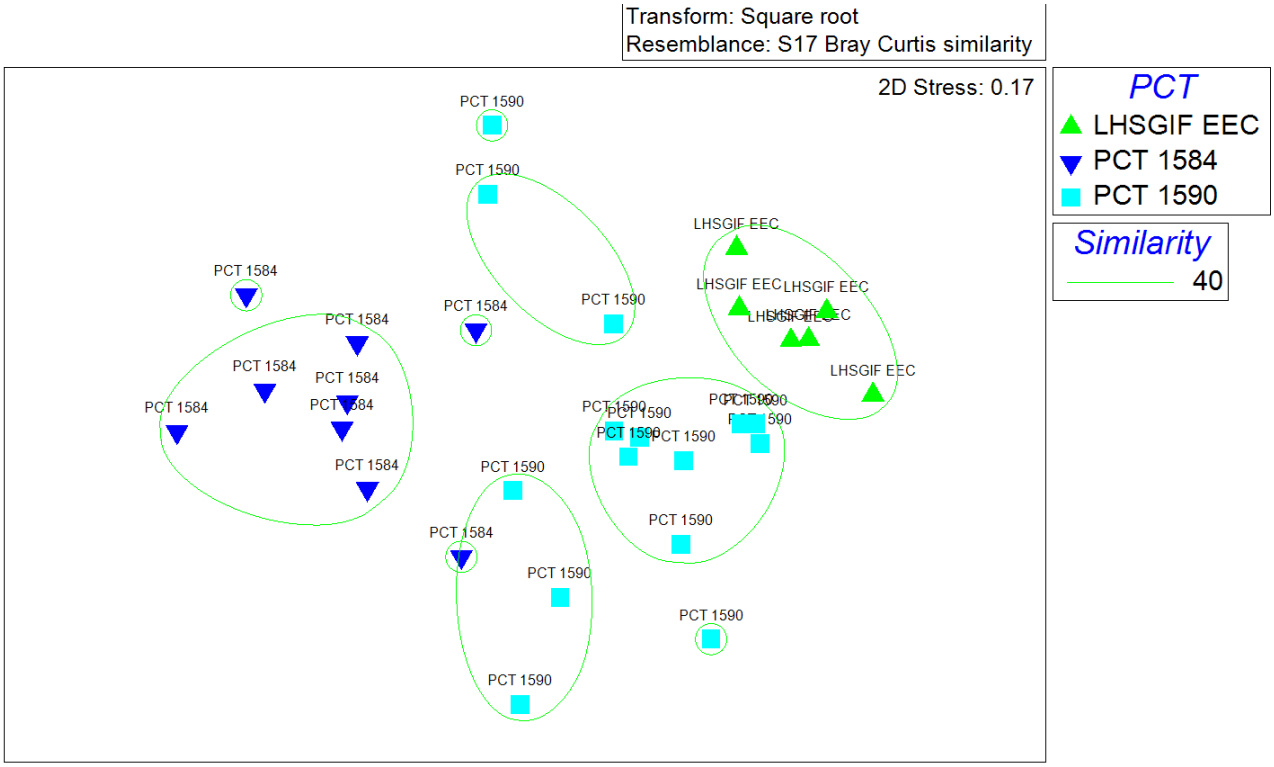

Figure 7: nMDS plot showing group classifications using RPS Plots (n=24) and LHSGIF EEC reference plots (n=6)

The SIMPER Analysis provided in the table below confirms the differences observed in floristic composition between LHSGIF EEC reference plots and plots located at Kings Hill used to describe PCT 1590 in the subject site (list limited to informative species mentioned in Part 1.1 and Part 4.6 of the final determination for LHSGIF EEC).

Species in bold denote positive identifiers for MU 65 or PCT 1590 as mentioned in Part 4.6 of the final determination. Species in red are listed in Part 1.1 of the final determination, with 16 of these species being in common with MU 65. Species not in bold are not characteristic of LHSGIF EEC. Importantly, differences exist in the relative average abundance of species identified in the final determination as characteristic of MU 65/ MU 16 (Seaham Spotted Gum Ironbark Forest) (Part 4.6), with these generally being prominent in the PCT 1590 cluster. Conversely, in many cases, these species are absent to uncommon in the LHSGIF EEC plot cluster.

The disparity in average abundance between *Corymbia maculata* and *Eucalyptus fibrosa* is materially noteworthy. The similar average abundance exhibited by these two species in the LHSGIF EEC plots (i.e. 4.25 for *Eucalyptus fibrosa* and 3.28 for *Corymbia maculata*) confirms the emphasis placed on these two species in Part 4.3 of the final determination where it states (in part):

Lower Hunter Spotted Gum Ironbark Forest is usually dominated by Corymbia maculata (Spotted Gum) and Eucalyptus fibrosa (Broad-leaved Ironbark), with E. punctata (Grey Gum) occurring less frequently.

Conversely, the plots obtained from the subject site used to define the PCT 1590 group cluster clearly indicate a dominance of *Corymbia maculata* over *Eucalyptus fibrosa* (i.e. 4.28 for *Corymbia maculata* and 1.67 *Eucalyptus fibrosa*). In this circumstance, *Eucalyptus fibrosa* is an associate canopy species, which is consistent with the reported prominence of this species in MU 65 (Part 4.6). With 24 plots used in the analysis it is considered that this result is representative and informative in confirming LHSGIF EEC not being present within the subject site.

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Species	Common in MU 65 (Somerville 2009)	LHSGIF EEC Av.Abund	PCT 1590 Av.Abund	Av.Diss	Diss/SD	Contrib %	Cum.%
Eucalyptus fibrosa	YES	4.25	1.67	3.86	1.59	5.53	5.53
Entolasia stricta	YES	1.98	1.3	2.72	1.51	3.89	9.42
Corymbia maculata	YES	3.28	4.28	2.45	1.41	3.51	12.93
Melaleuca nodosa		0.94	1.26	2.44	0.94	3.5	16.43
Eucalyptus acmenoides		**0**	**1.58**	**2.26**	**0.8**	**3.24**	**19.66**
Melaleuca stypheloides		0.17	1.31	2.06	0.69	2.96	22.62
Eucalyptus umbra	**YES**	**0.24**	**1.28**	**1.94**	**0.73**	**2.78**	**25.4**
Imperata cylindrica	**YES**	**0.41**	**1.22**	**1.75**	**0.73**	**2.5**	**27.9**
Eucalyptus punctata		0.24	1.05	1.57	0.83	2.24	30.15
Panicum simile	YES	1.11	0.06	1.54	1.65	2.2	32.35
Themeda triandra	YES	0.93	0.58	1.36	0.95	1.95	34.3
Daviesia ulicifolia	YES	1.04	0.23	1.34	1.11	1.92	36.21
Bursaria spinosa	YES	0.94	0	1.29	0.83	1.84	38.06
Eucalyptus moluccana		**0.24**	**0.73**	**1.19**	**0.81**	**1.7**	**39.76**
Angophora costata		0	0.74	1.11	0.64	1.59	41.35
Eucalyptus siderophloia	**YES**	**0**	**0.76**	**1.09**	**0.48**	**1.56**	**42.9**
Microlaena stipoides	YES	0.61	0.63	0.9	0.68	1.29	44.2
Pultenaea spinosa	YES	0.61	0	0.82	0.63	1.18	45.37
Glycine tabacina		0.52	0.17	0.81	0.96	1.17	46.54
Lobelia purpurascens	YES	0.88	0.62	0.81	1.01	1.16	47.7
Lomandra longifolia		0.54	0.33	0.8	0.88	1.14	48.84
Callistemon linearis		0.34	0.3	0.76	0.97	1.08	49.93
Acacia elongata		0.53	0	0.75	0.44	1.08	51.01
Poa labillardierei		0.22	0.39	0.7	0.8	1	52.01
Phyllanthus hirtellus		0.47	0	0.69	3.73	0.98	52.99
Persoonia linearis		0.49	0.1	0.68	1.39	0.97	53.96
Lissanthe strigosa		0.45	0	0.67	2.04	0.96	54.93
Entolasia marginata		0	0.45	0.66	1.08	0.94	55.87
Aristida ramosa		0.44	0.02	0.65	0.97	0.93	56.8
*Lantana camara**		0	0.44	0.65	0.81	0.93	57.73
Dichondra repens	**YES**	**0**	**0.42**	**0.61**	**1**	**0.87**	**58.6**
Lagenophora gracilis		0.4	0	0.59	5.08	0.85	59.45
Poa seiberiana		0	0.4	0.59	0.74	0.85	60.3
Aristida vagans	YES	0.32	0.47	0.58	1.45	0.83	61.13
Acianthus fornicatus		0.42	0.05	0.58	1.5	0.82	61.95
Pomax umbellata		0.37	0.02	0.52	1.59	0.75	62.7
Echinopogon caespitosus		0.18	0.36	0.51	0.74	0.73	63.43
Geitonoplesium cymosum	**YES**	**0**	**0.35**	**0.51**	**1.48**	**0.73**	**64.16**
Lepidosperma laterale	YES	0.53	0.19	0.49	1.58	0.7	64.86
Eucalyptus paniculata		0.37	0	0.48	0.44	0.69	65.55
Rytidosperma pallidum		0.29	0.03	0.46	0.58	0.66	66.21

Species	Common in MU 65 (Somerville 2009)	LHSGIF EEC Av.Abund	PCT 1590 Av.Abund	Av.Diss	Diss/SD	Contrib %	Cum.%
Dianella revoluta		0.3	0.02	0.43	1.76	0.61	66.83
Hibbertia aspera		0.26	0.13	0.43	1.61	0.61	67.44
Eucalyptus tereticornis		0	0.3	0.41	0.27	0.59	68.03
Hibbertia obtusifolia		0.11	0.26	0.41	0.56	0.59	68.62
Dichelachne micrantha		0.2	0.24	0.41	0.91	0.58	69.2
Melicytus dentatus		0	0.26	0.4	0.27	0.57	69.77
Desmodium rhytidophyllum	**YES**	**0**	**0.28**	**0.4**	**0.9**	**0.57**	**70.34**
Vernonia cinerea	YES	0.29	0.02	0.39	1.91	0.56	70.9
Acacia parvipinnula		0.27	0	0.37	0.8	0.53	71.44
Pultenaea villosa		0.23	0	0.35	1.35	0.5	71.94
Dianella caerulea var. producta	**YES**	**0.05**	**0.26**	**0.34**	**1.36**	**0.49**	**72.43**
Goodenia rotundifolia		0.25	0	0.34	0.93	0.49	72.91
Brunoniella australis		0.26	0.11	0.34	1.63	0.48	73.4
Goodenia heterophylla		**0.22**	**0.04**	**0.34**	**0.89**	**0.48**	**73.88**
Macrozamia flexuosa		0.22	0	0.34	0.86	0.48	74.36
Denhamia silvestris		0.23	0	0.34	1.32	0.48	74.84
Cymbopogon refractus	**YES**	**0.21**	**0.21**	**0.33**	**1.12**	**0.47**	**75.31**
Eucalyptus globoidea		0	0.23	0.32	0.39	0.46	75.77
Acacia falcata		0.21	0	0.32	1.4	0.45	76.22
Leucopogon juniperinus	**YES**	**0.05**	**0.2**	**0.32**	**0.61**	**0.45**	**76.67**
Pterostylis erecta		0.21	0	0.31	1.39	0.44	77.12
Billardiera scandens	YES	0.16	0.2	0.31	0.93	0.44	77.56
Dianella caerulea var. caerulea	**YES**	**0.22**	**0**	**0.31**	**0.89**	**0.44**	**78**
Oplismenus aemulus		0	0.2	0.29	0.69	0.42	78.42
Desmodium varians	**YES**	**0.05**	**0.19**	**0.28**	**0.79**	**0.41**	**78.82**
Glycine clandestina	YES	0.26	0.27	0.27	0.89	0.38	79.21
Lomandra filiformis		0.31	0.29	0.27	1.07	0.38	79.59
Callistemon linearifolius		0.17	0	0.26	0.44	0.38	79.97
Eragrostis brownii	YES	0.18	0	0.26	0.95	0.37	80.34
Cheilanthes sieberi	YES	0.35	0.3	0.26	1.04	0.37	80.71
Rytidosperma racemosum var. racemosum		0.05	0.14	0.25	0.42	0.36	81.07
Lomandra glauca		0.17	0	0.25	0.61	0.36	81.44
Rytidosperma longifolium		0.18	0	0.25	0.98	0.36	81.8
Exocarpos cupressiformis		0.17	0	0.25	0.44	0.36	82.16
Breynia oblongifolia	**YES**	**0.16**	**0.14**	**0.25**	**1.02**	**0.36**	**82.52**
Opercularia diphylla		0.16	0.25	0.25	1.03	0.36	82.88
Arthropodium sp. B		0.11	0.11	0.25	0.71	0.36	83.23
Lomandra multiflora	YES	0.34	0.27	0.25	1.25	0.35	83.58
Cassytha glabella		0.16	0	0.24	0.99	0.34	83.93

Species	Common in MU 65 (Somerville 2009)	LHSGIF EEC Av.Abund	PCT 1590 Av.Abund	Av.Diss	Diss/SD	Contrib %	Cum.%
Hardenbergia violacea	YES	0.36	0.24	0.22	1.03	0.32	84.24
Amyema sp.		0	0.15	0.22	0.54	0.32	84.56
Eustrephus latifolius	**YES**	**0.11**	**0.09**	**0.22**	**0.79**	**0.31**	**84.87**
Oxalis perrenans		0.11	0.13	0.22	0.93	0.31	85.18
Commelina cyanea		0	0.15	0.21	0.27	0.3	85.48
Goodenia bellidifolia		0	0.14	0.2	0.79	0.29	85.77
Lomandra confertifolia		0	0.15	0.2	0.68	0.29	86.06
Polymeria calycina		0	0.15	0.2	0.4	0.29	86.35
Solanum prinophyllum		0.11	0.08	0.19	0.85	0.27	86.62
Notelaea longifolia	**YES**	**0**	**0.13**	**0.18**	**0.55**	**0.26**	**86.88**
Acrotriche divaricata		0	0.11	0.17	0.69	0.25	87.13
Digitaria parviflora		0.12	0	0.17	0.44	0.25	87.38
Drosera peltata		0.11	0	0.16	0.7	0.23	87.61
*Plantago lanceolata**		0	0.12	0.16	0.27	0.23	87.84
Pimelea linifolia		0.11	0	0.16	0.7	0.23	88.07
Rytidosperma tenuius		0.11	0	0.16	0.7	0.23	88.29
Hibbertia pedunculata		0.11	0	0.15	0.7	0.22	88.51
Ozothamnus diosmifolius		0.11	0	0.15	0.7	0.22	88.73
Euchiton spp.		0.11	0	0.15	0.7	0.21	88.94
Pseuderanthemum variabile	**YES**	**0**	**0.1**	**0.14**	**0.57**	**0.2**	**89.14**
Acacia ulicifolia	**YES**	**0.05**	**0.05**	**0.14**	**0.5**	**0.2**	**89.34**
Pterostylis sp.		0.05	0.05	0.14	0.58	0.19	89.54
Eucalyptus crebra		0	0.09	0.13	0.27	0.19	89.73
Brachyscome microcarpa		0	0.08	0.13	0.6	0.19	89.92
Lagenophora stipitata		0	0.09	0.13	0.59	0.19	90.1

With reference to Part 1.1, Part 4.3 and Part 4.6 of the final determination, key summary statistics extracted from the analysis that support similarities between MU 65 and PCT 1590 at Kings Hill and dissimilarity with LHSGIF EEC are listed below:

- Spotted Gum (*Corymbia maculata*) is a sole tree canopy dominant species in the PCT 1590 plot data at Kings Hill. Red Ironbark (*Eucalyptus fibrosa*) is one of a few associate species and never codominant. Compared to the LHSGIF EEC final determination, this is:
  - inconsistent with Part 4.3 of the final determination where LHSGIF EEC is characterised by the codominance of Spotted Gum and Red Ironbark; and
  - consistent with Part 4.6 of the final determination where MU 65 is characterised as dominated by Spotted Gum with Red Ironbark among several canopy associate species;
- Five of the tree canopy species that typically associate with the dominant Spotted Gum in MU 65 (Part 4.6) are present in PCT 1590 plots at Kings Hill. The final determination identifies these canopy associate species as not characteristic of LHSGIF EEC (Part 4.3). Consistent with the final determination, these canopy associate species were absent from LHSGIF EEC reference plot data;
- LHSGIF EEC reference plot data (n=6) cumulatively comprise 39 of the 44 characteristic species listed in Part 1.1 of the final determination. Conversely, there are 14 or 36% fewer characteristic species (i.e. 25 of the 44 species) in the RPS plot data obtained from PCT 1590 at Kings Hill (n=13 plots) despite there being seven more plots used in the comparison. The phytosociological analysis shows a

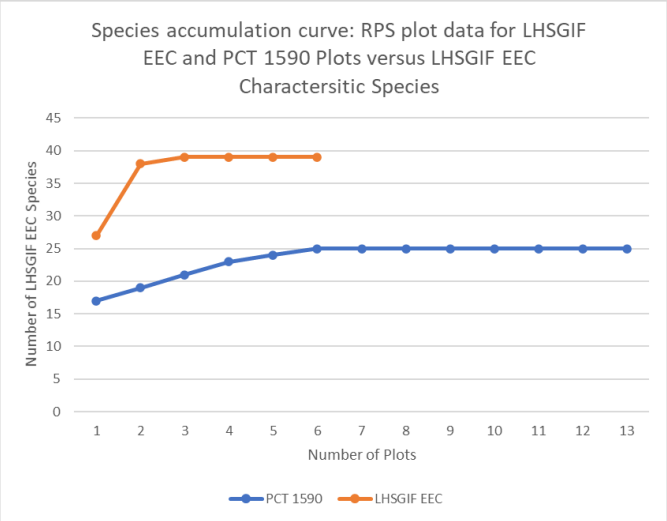
statistically significant difference between LHSGIF EEC reference plot data and PCT 1590 plot data obtained at Kings Hill, demonstrating that PCT 1590 is not part of LHSGIF EEC;

- 25 species present in the RPS PCT 1590 plots obtained at Kings Hill and not listed in Part 1.1 of the final determination. As expected, these species were absent from the LHSGIF EEC reference plots;
- Six of the 21 shrub or groundcover species that are frequently observed in LHSGIF EEC (Part 4.3) and observed in the reference plot data were absent from RPS PCT 1590 plots obtained at Kings Hill;
- Eight species listed in Part 1.1 of the final determination were frequent in the LHSGIF EEC reference plots and uncommon to rare in the RPS PCT 1590 plots obtained at Kings Hill; and
- 15 of 17 species recorded more frequently in MU 65 and not in LHSGIF EEC (i.e. Part 4.6 of the final determination) were characteristic species in the RPS PCT 1590 plots obtained at Kings Hill.

While more detailed these findings are consistent with the analysis presented in RPS (2020).

Species Accumulation Curve

Another way of comparing plot data against the final determination for LHSGIF EEC is to examine the species accumulation of the 44 listed LHSGIF EEC characteristic species in Part 1.1 of the final determination. The following graph shows the accumulation rate of newly observed LHSGIF EEC characteristic species by flora plot.



As expected, this chart demonstrates a rapid accumulation of LHSGIF EEC characteristic species in the LHSGIF EEC reference plots (orange line) and rapidly tapers as it reaches the maximum possible count (i.e. 44). Conversely, the accumulation rate of LHSGIF EEC characteristic species in PCT 1590 plots (i.e. blue line) starts lower, is slower and asymptotes well short of the maximum possible count (i.e. 25 accumulated species). There are 14 or 36% fewer LHSGIF EEC characteristic species in the PCT 1590 plots obtained from Kings Hill despite there being seven more plots used in the analysis. As demonstrated in the phytosociological analysis, these species accumulation differences are indicative of two full floristic datasets obtained from two different vegetation types (i.e. MU 65 or PCT 1590 at Kings Hill versus LHSGIF EEC).

Conclusion

The comparative analysis of plot data obtained from the subject site (Cumberland Ecology and RPS plots) and reference plot data obtained from known mapped patches of LHSGIF EEC in/ adjacent to Werakata National Park and Columbey National Park has clearly demonstrated that the vegetation mapped as PCT 1590 within the subject site is NOT the same as vegetation described as LHSGIF EEC in the final determination. Using the floristic composition data extracted from the full floristic plots, the phytosociological

analysis has clearly separated plots located within the subject site and identified as PCT 1590 from reference plots that describe known patches of LHSGIF EEC.

The compositional analysis (SIMPER analysis results) for these groups clearly identifies the species responsible for these statistically significant differences. The analysis evidently confirms the differences between MU 65/ MU 16 (Seaham Spotted Gum Ironbark Forest) and LHSGIF EEC as detailed in Part 4.6 of the final determination. The mapped extent of PCT 1590 in the subject site is consistent with vegetation described as MU 65/ MU 16 (Seaham Spotted Gum Ironbark Forest) and is not compositionally similar to that described as LHSGIF EEC vegetation as described in the final determination.

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Date: 15 July 2021
Regarding: PR130430 Kings Hill: EEC Classification

Attachment 1: LHSGIF Reference Plot Data

Species	LHSGIF 1		LHSGIF 2		LHSGIF 3		LHSGIF 4		LHSGIF 5		LHSGIF 6	
	C	A	C	A	C	A	C	A	C	A	C	A
Acacia elongata			10	50								
Acacia falcata			0.1	1	0.1	10	0.1	1	0.1	1		
Acacia floribunda							0.1	1				
Acacia parvipinnula	1	10			0.1	1					0.1	2
Acacia ulicifolia									0.1	2		
Acianthus fornicatus	0.1	30			0.1	20	0.5	200	0.5	200	0.2	100
Aristida ramosa			0.4	40			1	50			1	80
Aristida vagans	1	50			0.2	100			0.2	40		
Arthropodium spp.					0.1	20					0.1	2
Billardiera scandens			0.1	2					0.1	3	0.1	2
Brachyscome multifida							0.2	10				
Breynia oblongifolia	0.1	2	0.1	2			0.1	2				
Brunonellia australis	0.1	10	0.1	20	0.1	25	0.1	10			0.1	4
Bursaria spinosa subsp. spinosa	12	40			1	20	0.2	10			0.5	5
Callistemon linearifolius									1	5		
Callistemon linearis			1	20	0.1	5			0.5	5		
Cassytha glabella			0.1	5	0.1	10			0.1	2		
Cheilanthes sieberi	0.2	30	0.2	50	0.2	50	0.1	20			0.2	30
Chiloglottis anaticeps											0.1	10
Choretrum spp.			0.1	1								
Chrysocephalum semipapposum					0.1	20						
Clematis glycinoides	0.1	2										
Conyza spp.	0.1	5										
Corymbia maculata	15	14	10	10	10	20	6	6	10	10	15	20
Cymbopogon refractus	0.1	2	0.1	10			0.1	10			0.1	5
Daviesia ulicifolia	1	10	5	30	5	50			0.1	3	0.2	3
Denhamia silvestris	0.1	2	0.1	20	0.1	25	0.2	20				
Desmodium varians							0.1	10				
Dianella caerulea var. caerulea	0.5	50	0.1	10	0.1	25						
Dianella caerulea var. producta											0.1	3
Dianella revoluta			0.3	50	0.1	20	0.1	10	0.1	5	0.1	5
Dichelachne micrantha	0.2	20	0.1	5	0.2	100	0.2	30				
Digitaria parviflora											0.5	50
Dillwynia floribunda									0.1	1		
Drosera peltata					0.1	5			0.1	5		
Echinopogon caespitosus	0.1	10					0.1	10			0.2	20
Entolasia stricta	2	200	1	80	2	200	7	100	5	200	10	200

MEMO

Date: 15 July 2021
Regarding: PR130430 Kings Hill: EEC Classification

Species	LHSGIF 1		LHSGIF 2		LHSGIF 3		LHSGIF 4		LHSGIF 5		LHSGIF 6	
	C	A	C	A	C	A	C	A	C	A	C	A
Eragrostis brownii	0.1	5			0.1	25	0.2	30				
Eucalyptus fibrosa	20	15	20	20	20	25	30	30	10	8	12	15
Eucalyptus moluccana							2	1				
Eucalyptus paniculata	5	3										
Eucalyptus punctata	2	2										
Eucalyptus umbra subsp. umbra											2	1
Euchiton gymnocephalus					0.1	10						
Euchiton spp.	0.1	5									0.1	5
Eustrephus latifolius			0.1	1							0.1	1
Exocarpos cupressiformis							1	1				
Exocarpos strictus	0.2	2										
Gahnia aspera			0.2	20								
Galium leiocarpum	0.1	30										
Glycine clandestina	0.1	10	0.1	10	0.1	20	0.1	10			0.1	2
Glycine tabacina	3	50	0.1	10	0.2	40	0.1	10			0.1	2
gonocarpus tetragynus									0.1	10		
Goodenia heterophylla							0.5	30	0.1	5	0.1	10
Goodenia rotundifolia	0.5	50	0.2	30	0.1	30						
Grevillea montana			0.1	5								
Hardenbergia violacea	0.2	20	0.2	20	0.1	10	0.1	1	0.1	1	0.1	2
Hibbertia aspera	0.1	2	0.1	1	0.1	10	0.1	2	0.1	2		
Hibbertia obtusifolia							0.1	2	0.1	4		
Hibbertia pedunculata			0.1	2	0.1	10						
Hypericum gramineum					0.1	10						
Imperata cylindrica	1	100	1	100	0.2	50						
Indigofera australis					0.1	5						
Kennedia rubicunda											0.1	2
Lagenifera gracilis	0.1	20	0.2	40	0.2	100	0.2	50	0.2	40	0.1	20
Laxmannia gracilis			0.1	1								
Lepidosperma laterale	0.5	50	0.3	30	0.2	50	0.2	20	0.1	5	0.5	60
Leucopogon ericoides									0.1	2		
Leucopogon juniperinus							0.1	1				
Lissanthe strigosa			0.3	20	0.5	30	0.2	20	0.2	10	0.3	10
Lobelia purpurascens	5	50	0.3	50	0.2	100	0.5	50	0.1	2	1	60
Lomandra cylindrica			0.1	10								
Lomandra filiformis	0.2	20	0.1	20	0.2	200	0.1	10			0.1	10
Lomandra glauca	0.1	5							0.5	50		
Lomandra longifolia			0.1	10	0.1	25	4	40	0.1	1	0.1	10
Lomandra multiflora	0.2	20	0.1	20	0.1	20	0.1	10	0.1	5	0.1	5
Macrozamia flexuosa			0.1	5	0.5	25			0.1	2		

MEMO

Date: 15 July 2021
Regarding: PR130430 Kings Hill: EEC Classification

Species	LHSGIF 1		LHSGIF 2		LHSGIF 3		LHSGIF 4		LHSGIF 5		LHSGIF 6	
	C	A	C	A	C	A	C	A	C	A	C	A
Marsdenia viridiflora subsp. viridiflora					0.1	5						
Melaleuca nodosa			0.5	1	0.2	5			20	50		
Melaleuca styphelioides					1	10						
Microlaena stipoides	0.5	50	0.2	20	0.1	10	0.1	10	0.2	30	2	200
Myrsine variabilis					0.1	10						
Opercularia diphylla			0.1	20			0.1	5	0.1	10		
Oxalis perennans			0.1	10	0.1	30						
Ozothamnus diosmifolius	0.1	1							0.1	2		
Panicum simile	0.5	50	2	200	1	500	1	80	0.1	10	5	100
Persoonia linearis	0.2	3	0.1	10			0.5	5	1	4	0.2	2
Phyllanthus hirtellus	0.2	10	0.2	20	0.2	50	0.5	30	0.1	5	0.2	20
Pimelea linifolia			0.1	1					0.1	5		
Platysace ericoides			0.1	1								
Poa labillardierei	0.1	5	0.3	50	0.2	50						
Podolobium ilicifolium			0.1	1								
Pomax umbellata	0.1	5	0.1	40	0.5	30	0.2	10			0.2	30
Pterostylis erecta	0.1	50					0.1	10	0.1	10	0.1	10
Pterostylis longifolia									0.1	10		
Pterostylis spp.									0.1	20		
Pultenaea myrtoides									0.2	10		
Pultenaea spinosa	7	45			1	20						
Pultenaea euchila									0.1	1		
Pultenaea villosa					0.1	5	0.2	5	0.1	5	0.1	4
Rytidosperma longifolium	0.2	30	0.1	10	0.1	50						
Rytidosperma pallidum			0.1	5					2	20		
Rytidosperma racemosum					0.1	20						
Rytidosperma tenuius							0.1	5			0.1	10
Solanum prinophyllum	0.1	3									0.1	5
Sonchus oleraceus	0.1	10										
Stackhousia viminea	0.2	20										
Styphelia triflora	0.1	1										
Thelymitra spp.							0.1	1				
Themeda triandra	0.3	30	2	200	0.1	50	0.2	20			8	100
Vernonia cinerea	0.2	20	0.1	20	0.1	50	0.1	10			0.1	10
Vittadinia sulcata					0.1	5						
Wahlenbergia gracilis					0.1	10						

KINGS HILL CONCEPT DA

MEMORANDUM OF ADVICE

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1. The purpose of this advice is to develop the matters raised at the briefing of the Hunter Central Coast Planning Panel on 17 June 2021.

2. I have concluded that:

   a. the Panel has no power to decide whether concurrence is required: that is a function given exclusively to Council;

   b. even if Council decided that concurrence was required, the concurrence authority has no power to refuse concurrence on the ground that the DA did not propose offsetting any residual impacts on biodiversity, or to impose a condition on its concurrence to require offsetting for that purpose;

   c. neither the Threatened Species Guidelines nor the seven-part test is a focal point for consideration of biodiversity issues, wherever arising in the determination of the application;

   d. neither is exhaustive of the matters to be considered in determining those issues;

   e. in deciding if the DA involves likely significant impacts on threatened species or their habitats, or in deciding to grant or refuse consent, the decision-maker must consider mitigation measures including the proposal to enhance the carrying capacity of the conservation reserve for koala, phascogale and other species;

   f. offsets compensate for residual impacts of the project on biodiversity, mitigation measures reduce the likely impacts of the proposal: reserving part of the existing habitat and enhancing its carrying capacity by ecological restoration is not an offset, in the context of this DA;

g. the threatened species guidelines cannot require decision-makers to ignore mitigation measures, if they have been incorporated in the DA. It is obligatory to consider the development proposal as a whole, including its proposals for ecological restoration and adaptive management;

h. restoration of koala habitats by tree species selection is a critical part of the Government's *Koala Strategy* (2018), is recommended by DPIE's *Koala Habitat Revegetation Guidelines* (2020), and is supported by over 40 years scientific research into koala habitat preferences: to describe the SIS prescriptions as novel is to disregard this evidence even if that is the correct question to ask, which it is not;

i. Umwelt has adopted a legally flawed approach to the threshold question of significant impact, and it has disregarded evidence that the threshold of significance has not been exceeded;

j. The SIS correctly determined and additional research has confirmed that the area to be cleared does not largely comprise an EEC.

Concurrence authority

3. It is common ground that the DA is for regionally significant development, and for that reason the Panel is the consent authority: s 4.5(b), *Environmental Planning and Assessment Act 1979* (EPA Act). Although the Panel is the consent authority, s 4.7(2) allocates some of the functions of a consent authority to Council "to be exercised on behalf of the panel". A function that is allocated to Council is abstracted from the functions that would otherwise be exercisable by the Panel as consent authority. When exercised, it is taken to have been exercised by the Panel, hence the words "on behalf of". Section 4.8(2) uses the same language allocating the functions of Council as consent authority to a local planning panel or a council officer.

4. Section 2.15(a) provides that:

"*A… regional planning panel has the following functions:*

a. the functions of the consent authority under Part 4 for regionally significant development that are (subject to this Act) conferred on it under this Act.

…"

Section 4.7(2) confers the consent authority functions for regionally significant development on the Panel, but subject to the qualification that certain of those functions are to be exercised on behalf of the Panel by Council. Except insofar as there is overlap, those functions cannot also be exercised by the Panel because they have been conferred "subject to this Act" (s 2.15(a)) and therefore subject to s 4.7 that allocates those functions to Council. Conversely, no power is conferred on the Panel by the Act to exercise those functions on its own behalf, or where it disagrees with Council's exercise of the functions allocated to it.

5. Before the 2018 Act, s 23G(2)(a) provided that a regional panel had "any of the council's functions as a consent authority that are conferred on it under an environmental planning instrument" and subsection (2A) provided that the functions of a consent authority "may only be conferred on a regional panel in accordance with subsection (2)(a) and this subsection". Clause 123E of the EPA Regulation provided that the regional panel may for the purpose of determining a DA obtain assessment reports in addition to any assessment report or other information provided by the council in dealing with the application or obtain other technical advice or assistance as it thinks fit. The position then was the obverse of the current arrangements. Council was the consent authority, but the determination function of Council was allocated to the Panel, which it exercised on behalf of Council. Former cl 13F of the SEPP (Major Development) 2005 conferred a council's determination function on the panel (cl 13F(1)(a)), but the assessment function was expressly not conferred (cl 13F(2)(d)). Later, cl 21 of the SEPP (State and Regional Development) 2011 made equivalent provision. The SEPPs excluded the Panel from exercising Council's powers in relation to concurrences: cl 13F(2)(a), SEPP Major Development; cl 21(2)(a), SEEP SRD.

6. These provisions were considered in *Ku-ring-gai Council v Sydney West JRPP (No 2)* (2010) 181 LGERA 11. Biscoe J described council's assessment function as a condition precedent to the power of the panel to determine the application. In that case, the question was whether an opinion concerning a road widening scheme for which private land had been reserved under an old planning scheme ordinance had to be formed by council as part of carrying out its procedural functions in relation to a DA, or on the other hand by the panel in the exercise of its determination function. The Court held that it was the panel that was responsible for forming the opinion that the purpose of the reservation "cannot be carried into effect within a reasonable time after the appointed day": [65], largely because the opinion function was inextricably joined with the consent function imposed on the panel ([66]). Biscoe J decided that if the formation of the opinion was part of the determination of the DA, then it had been allocated to the panel, to the exclusion of council. If on the other hand it was not part of the determination function then it remained with council, not the panel: [67]. In other words, it was a binary choice. In that case, the Act and the SEPP did not expressly allocate the function, and so the Court was required to fill the gap. There is no gap in the case of the concurrence function.

7. The 2018 Act did not alter the substance of the division of functions, but it made the panel the consent authority rather than council so that now council would be exercising its allocated functions on behalf of the panel, rather than the converse. The previous format found in the SEPP was inserted in the Act. In my opinion, it would be an error to construe s 4.7(2) as a departure from the binary operation of its predecessors. If it was intended to depart it, then different language would have been used.

8. The question of overlapping assessment functions was considered by the Court of Appeal in *Rossi v Living Choice Australia Ltd* [2015] NSWCA 244, again under the old provisions. Council's "assessment" of the DA had been attacked by Mr Rossi as legally deficient but relief was sought against the panel, which determined the DA. The Court concluded that council was not a proper party because its "assessment" raised no justiciable question different

to the question that would have arisen from considering whether the panel erred in determining the DA. The Court said that the way in which it operated "was to leave with the council certain administrative functions (including receipt of development applications and notification of determinations) and more significant, but resource intensive functions, including the preparation of assessment reports": [10]. The Court criticised the division of function between council and the panel:

> "*… it is unfortunate that the EPA Act fails to identify with clarity the respective roles of a regional panel and the council.*" [23]

However, the Court made it clear that council's errors in carrying out its allocated function were to be visited on the panel, and not on council.

9. The new Act both conflates and streamlines the earlier provisions. No departure from the binary nature of the allocation of functions is suggested by these changes.

10. Section 4.7(2)(c) therefore confers upon Council the function of obtaining any concurrence and undertaking any consultation that the consent authority is required to obtain or undertake. There is no overlapping function that is conferred on the Panel, because its functions are those that remain after Council's functions have been abstracted. Where there is a possibility of overlap – typically, in the case of assessment – the conferral of a function on Council is expressed not to be exhaustive: see s 4.7(2)(b) where the assessment function does not limit the assessments the Panel may undertake. No similar qualification is made in para (c), which indicates that this function is exhaustive and does not overlap. Accordingly, the Panel has no function in relation to concurrence matters.

Concurrence obligations in this case

11. Under cl 28(1) of the *Biodiversity Conservation (Savings and Transitional) Regulation 2017* (the Regulation) the provisions of the EPA Act that would have been in force if it had not been amended by the *Biodiversity Conservation Act 2016* (the BC Act) continue to apply, and Part 7 of the BC Act does not

apply to the determination of this DA. The Umwelt report advises that the *Threatened Species Conservation Act 1995* (TSC Act) was preserved by cl 28 (p 28). That advice is wrong and should be ignored by the Panel. It is necessary to understand what changes the BC Act made to the EPA Act, in order to ascertain what was preserved by the Regulation for the purposes of this DA.

12. The BC Act transferred the provisions of the EPA Act dealing with biodiversity issues to Part 7 of the BC Act. For present purposes, this included the seven part test (former s 5A), the requirement that applications likely to significantly affect threatened species or endangered ecological communities or their habitats be accompanied by a species impact statement (SIS) (former s 78A(8)), the requirement for concurrence in such cases (former s 79B) and the application of the seven part test and the threatened species assessment guidelines to the evaluation of the development application under former s 79C (now s 4.15).

13. These were sweeping changes to the position before the BC Act commenced. Two new provisions reinforced those changes. First, s 1.7 of the EPA Act relevantly provides that the Act has effect subject to the provisions of Part 7 of the BC Act that relate to the operation of the EPA Act in connection with the terrestrial environment. Second, s 7.5 of the BC Act provides that Part 7 of that Act prevails to the extent of any inconsistency with the EPA Act or any instrument made under that Act. To reinforce the point, subsection (2) provides that a reference in the EPA Act or any other Act or instrument or document to the EPA Act was a reference to that Act as applying in accordance with Part 7 of the BC Act.

14. The process for assessing biodiversity impacts of DAs is undertaken pursuant to s 7.7 of the BC Act which imposes a new threshold test for determining whether the development is likely to significantly affect threatened species or ecological communities or their habitats. However, most DAs that are assessed under these provisions that involve land clearing would trigger quantitative thresholds that require additional assessment. The concurrence

requirement was removed from the EPA Act and transferred to the BC Act. In the ordinary case, s 7.12 imposes a concurrence requirement if the development is likely to significantly affect species or communities or their habitats but no biodiversity development assessment report (BDAR) has been prepared: s 7.12(2)(a).

15. Nothing in this advice is intended to reflect upon the division of functions between the Panel and Council under the new scheme for biodiversity assessment. Given that most cases involving land clearing would trigger a quantitative threshold for preparation of a BDAR, it is unlikely that such a DA would also trigger the concurrence requirement. However, there will be other DAs not involving extensive land clearing which may for other reasons significantly affect threatened species, communities or their habitats for which no BDAR has been prepared. In those cases, consent cannot be granted without the concurrence of the Environment Agency Head, defined in s 1.6 to mean the Chief Executive of the Office of Environment and Heritage or its successor.

16. With these changes in mind, it is necessary to adopt the fiction imposed by the Regulation that none of these provisions have been repealed and replaced but continue alive in their state immediately before the commencement of the BC Act on 25 August 2017.

17. As Mr Doyle points out, another difficulty is that the Regulation does not expressly preserve the *Threatened Species Conservation Act 1995* in its state immediately before repeal by the BC Act, despite the fact that it intersected with the preserved provisions of the EPA Act. To make matters more confusing, Parts 5 and 6 of the BC Act (the offsetting scheme) do apply, but are only made obligatory by the assessment scheme under Part 7 of the BC Act. To that extent, Parts 5 and 6 are still born under the transitional scheme. It appears that any entity may voluntarily subject itself to the offsetting scheme with the agreement of the government, but cannot be forced to do so. This is similar to the limitation placed upon the power of the concurrence authority

under former s 79B of the EPA Act to impose conditions on its concurrence to the DA.

18. For the reasons explained above, s 4.7(2)(c) allocates to Council the task of:

> "*Obtaining any concurrence, and undertaking any consultation, that the consent authority is required to obtain or undertake.*"

Former s 79B provided for consultation and concurrence. It contained general provisions as well as provisions specific to threatened species. On its proper construction, the general provisions are irrelevant and have, in the case of threatened species development, been displaced by the specific provisions. It is useful to set them out:

> "*(3)* ***Consultation and concurrence – threatened species****. Development consent cannot be granted for:*
>
> *…*
>
> *(b) development that is likely to significantly affect a threatened species, population, or ecological community, or its habitat,*
>
> *without the concurrence of the Chief Executive of the Office of Environment and Heritage…*
>
> …
>
> *(5) In deciding whether or not concurrence should be granted under subsection (3), the Chief Executive… must take the following matters into consideration:*
>
> *(a) any species impact statement that accompanied the development application,*
>
> *(b) any assessment report prepared by the consent authority,*
>
> *(c) any submissions received concerning the development application,*
>
> *(d) any relevant recovery plan or threat abatement plan,*
>
> *(e) whether the development proposed is likely to reduce the long-term viability of the species, population or ecological community in the region,*
>
> *(f) whether the development is likely to accelerate the extinction of the species, population or ecological community or place it at risk of extinction,*
>
> *(g) the principles of ecologically sustainable development,*
>
> *(h) the likely social and economic consequences of granting or of not granting concurrence.*

…

(8A) ***Threatened species requirements****. The Chief Executive… may grant concurrence under this section conditional on the taking of specified action (**voluntary action**) as provided by subsection (8B) that the Chief Executive considers will significantly benefit threatened species conservation, but only if the Chief Executive is satisfied that the person who proposes to carry out the development to which the concurrence relates has agreed to take the voluntary action and agrees to the imposition of a condition.*

(8B) The voluntary action that can be required by a condition imposed under this section is any one or more of the following:

(a) the reservation of land under Part 4 of the National Parks and Wildlife Act 1974 or the entering into of a conservation agreement relating to the land under that Act,

(b) action to secure the protection of land for conservation purposes by a method that the Chief Executive considers satisfactory,

(c) action to restore threatened species habitat on land referred to in paragraph (a) or (b),

(d) the contribution of money for a purpose referred to in paragraphs (a)-(c).

(9) ***Giving effect to concurrence****. A consent authority that grants consent for the carrying out of development for which a concurrence has been granted must grant the consent subject to any conditions of the concurrence…*

(10) ***Avoidance of consents subject to concurrence****. If, by… subsection (3), a development application may not be determined by the granting of consent without the concurrence of the specified person, a consent granted:*

(a) without that concurrence, or

(b) not subject to any conditions of the concurrence,

is, subject to sections 102-104 voidable.

(11) However, if the specified person fails to inform the consent authority of the decision concerning concurrence within the time allowed for doing so, the consent authority may determine the development application without the concurrence of the specified person and a development consent so granted is not voidable on that ground."

These provisions are preserved by the Regulation.

19. It appears that it is thought by some that the power to condition concurrence enables the Chief Executive to compel participation in an offsetting scheme under the BC Act. With respect, that is incorrect. The Chief Executive only has the power to impose a condition for voluntary action, that is, where the applicant for development consent has agreed to the imposition of a condition. That action may indeed include various forms of offset discussed in subsection (8B) but it cannot be imposed without the agreement of the applicant. The negative corollary is that the general power to impose a condition on a concurrence decision does not extend to requiring this kind of action, without the agreement of the applicant for development consent: *R v Wallis* (1949) 78 CLR 529 at 543-4, 550. The matters for consideration listed in subsection (5) would not entitle refusal of concurrence because the applicant has declined to be involved in an offsetting scheme. First, as Part 7 of the BC Act has been displaced, the offsetting scheme in that Act is voluntary: it depends upon a stewardship agreement which can only be entered into with the agreement of the owner of the land: s 5.5, BC Act. Any insistence by the OEH on participation in the scheme would breach the negative corollary to former s 79B(8A) and (8B), which also requires the agreement of the developer. Insistence upon a right granted by the legislation cannot be a ground for refusing concurrence. That would undermine the voluntary nature of any offsetting scheme and directly contradict the right to refuse to participate in "voluntary" action.

20. It follows that any assumption by the Chief Executive or others that the power of concurrence can require participation in an offsetting scheme, whether under Parts 5 and 6 of the BC Act or otherwise, is wrong.

21. Former s 79B(11) imposes a time limit on concurrence by reference to "the time allowed for doing so". That time limit is imposed by cl 62(1) of the EPA Regulation which is incorporated by reference in ss (11). The time allowed for doing so must be taken to mean, in this case, 21 days after the OEH had been provided with the submissions made during the exhibition period, so long as council (acting in the shoes of the consent authority) has notified the concurrence authority of the DA and accompanying documents, and the

submissions made within the exhibition period. If no decision by the concurrence authority has been made within 21 days of receiving the last of them, the power to grant or refuse concurrence has expired. Whether in fact it has expired in this case depends on the steps taken by Council in its exercise of the consent authority functions devolved by s 4.7(2) to it to process the DA. I am instructed that Council has decided in the exercise of this power that concurrence is not required because the DA does not meet the threshold requirement of a likely significant effect. In my opinion, that concludes the matter.

Does the SIS involve offsetting?

22. Parts 5 and 6 of the BC Act can be put to one side. The applicant does not seek to avail itself of the offsetting scheme and, as the Panel heard, its ecologists vehemently deny that they need to offset the impact of the project because of the way in which it has been designed.

23. This is a fault line between the ecologists. With respect, Umwelt's view that the conservation reserve is an offset is wrong. In *Bulga Milbrodale Progress Association Inc v Minister for Planning and Infrastructure and Warkworth Mining Ltd* (2014) 200 LGERA 375, Preston CJ discussed OEH's "Principles for the Use of Biodiversity Offsets in New South Wales", and described offsets as measures used to address the impacts that remain after avoidance and mitigation measures have been put in place: [147]. He gave a specific example of avoidance:

> "*Avoidance of impacts may be achieved through planning and assessment of the project including suitable site selection and project design. An example would be modifying the project to avoid an area of biodiversity value, such as an endangered ecological community or habits of threatened species or populations.*" [148]

In a passage adopted on appeal in *Warkworth Mining Ltd v Bulga Milbrodale Progress Association Inc* (2014) 200 LGERA 375 at [327], he said that:

> "*If after all reasonable avoidance and mitigation measures have been implemented, there are still residual impacts, offsets can then be*

> *considered. Offsets do not reduce the likely impacts of a project, but rather compensate for residual impacts.*" [150]

Mr Aitkens of RPS has carefully explained that the conservation reserve was designed to avoid impacts, not to offset them. Great care was taken in site selection and project design, to the extent that, unusually for a developer, land that was zoned for residential uses has been sacrificed and added to the reserve, specifically because it harboured important ecological values.

24. Although this might seem an arid dispute, it does make a fundamental point about the difference in approach between the project ecologists and the Umwelt review. The recent rezoning decision made it inevitable that there would be impacts from land clearing and edge effects from urban development. The edge effects are dealt with by mitigation measures that are not criticised by Umwelt: indeed, they are supported. The purpose of selecting a conservation area and funding its long term management was to ensure the ongoing viability of koala (and other fauna populations) by improving their security, creating corridors for movement and enhancing the carrying capacity of the habitat. None of these measures are criticised for having a likely adverse impact. Population viability is secured by limiting the clearing of better quality habitat and protecting and improving habitat over the long term. To treat these measures as an offset assumes the answer to the question, because an offset is only necessary if there are residual impacts after avoidance and mitigation strategies have been deployed. It assumes that a significant impact has already occurred which requires offsetting. The SIS demonstrates that that is not the case.

Are mitigation measures relevant to the threshold test?

25. There is a Departmental view that the threshold test of likely significant impact must disregard mitigation measures. This view is wrong as numerous decisions of the Land and Environment Court have found: *Friends of Tumblebee Inc v ATB Morton Pty Ltd (No. 2)* (2016) 215 LGERA 157 at [77]-[78]. In determining whether an application exceeds this threshold, the consent authority (or in this case Council) must consider the application as a

whole. If avoidance and mitigation measures are incorporated in the application rather than merely being imposed by conditions of consent, then those measures must be considered in determining whether the development exceeds the threshold.

26. A question arises whether the threatened species assessment guidelines qualifies this position. First, the guidelines must be taken into account in answering the threshold question: former s 5A. Second, they are not a legislative stricture. Third, s 5A is not the controlling provision. The threshold question is asked for the purposes of former s 79B in order to determine whether Council must notify the Chief Executive because his or her concurrence is required before the consent authority can determine the DA. That is the controlling provision. Section 5A is expressed to apply to the administration of s 79B, but it does not displace the obligation in answering the threshold question to have regard to the development, as that term is deployed in s 79B. Fourth, the development in that context is the various works and land uses that are described in the application for development consent. To the extent that the application includes the provision of a conservation area and various other mitigation works, they must be regarded in determining the threshold question. They are part and parcel of the development.

27. The assessment guidelines cannot lawfully exclude an aspect of the development for the purpose of determining the threshold question. That would be a case of the stream rising higher than its source: *Australian Communist Party v Commonwealth* (1951) 83 CLR 1 at 258. It is of course open for the guidelines to question whether particular mitigation measures would succeed or whether there is evidence to support their claim to benefits, and the guidelines do so. What the decision-maker must not fail to consider is the proposed development itself. That is a fundamental element in determining the threshold question: *Allen Price & Scarratts Pty Ltd v Shoalhaven City Council* [2021] NSWLEC 1362 (APS) at [150], [154]-[157], [264].

28. I do not think that the real question is whether the guidelines should be applied but whether the guidelines could change the question to be determined under s 79B(3) by severing the development application and requiring a consent authority to ignore the parts of it which mitigate impacts. If a guideline did so, it must be disregarded because it is contrary to the Act.

What is the legal status of s 5A and the guidelines?

29. A question may be asked whether the factors for consideration in former s 5A (the seven-part test) and the guidelines should be given weight, as a focal point or fundamental element in the threshold decision, or in determining the DA.

30. The answer depends on whether the seven-part test or the guidelines enjoy some special statutory status. The guidelines are precisely that: they are not requirements and the only obligation in relation to them is to take them into account, insofar as they are consistent with the Act: *APS* at [154]. If they are not, they should be disregarded.

31. The seven-part test must be considered in determining the threshold question and may be taken into consideration under former s 79C in determining whether to grant consent to the DA, but in the *Shenhua* case (*Upper Mooki Landcare v Shenhua Watermark Coal and Minister for Planning* (2016) 126 LGERA 40) the Court decided that there was no legal obligation on the decisionmaker under s 79C:

> "…*to consider and decide whether the development is likely to significantly affect threatened species, populations or ecological communities, or their habitats, other than the general duty to consider the development application. That general duty to consider the development application imports a requirement to consider the information in and the documents accompanying the development application:* Davis *at [76]-[78], [90], [95].*" (at [122])

Although these comments were in the context of State significant development (SSD), they are equally appliable to other development, as s 79C applied to both.

32. A positive or negative answer to any one or more factors contained in the seven-part test "does not prescribe an affirmative answer to the enquiry, nor does it preclude a negative result": *Friends* at [81]; *Davis v Gosford City Council* (2014) 87 NSWLR 699 at [93]. The decision-maker is not restricted to the factors contained in the seven-part test in its deliberation: the factors are not exhaustive: *Davis* at [92]. There may be additional facts and circumstances relevant to the enquiry: *Friends* at [82].

33. There is some authority for the proposition that a policy to which regard must be had in making a discretionary planning decision should, if it is reasonably specific to the proposal, be treated as a focal point or a fundamental element in the decision-making process: *Zhang v Canterbury City Council* (2001) 51 NSWLR 589 at [72], [73]. This decision concerned a DCP which imposed a standard on permissible development, in that case a brothel, that it be situated a certain distance from sensitive land uses. Earlier, the Court of Appeal had in *North Sydney Council v Ligon 302 Pty Ltd (No. 2)* (1996) 93 LGERA 23 decided that a DCP could impose a requirement or standard, without affecting its validity.

34. The EPA Act was amended in 2012 specifically to overcome these authorities by inserting former ss 74BA and 74C(5), now ss 3.42 and 3.43(5). As supporting a more general proposition, *Zhang* and its progeny have now been disapproved. In *Goodwin Street Developments Pty Ltd v DSD Builders Pty Ltd* (2018) 98 NSWLR 712, the Court of Appeal (Basten JA, Leeming and White JJA agreeing) considered the application of *Zhang* to the adjudicator's statutory obligation to consider certain matters under s 22(2) of the *Building and Construction Industry Security of Payment Act 1999*. A trial court had, in accordance with *Zhang*, treated these matters as equivalent to a requirement to give them weight as a fundamental element in the decision or as the focal points by reference to which the relevant decision should be made: [18]. After citing [72] and [73] of *Zhang*, the Court said:

> "*21. If those passages are taken to imply that every matter identified as a mandatory consideration has to be considered as a "fundamental element" in, or a "focal point" of, the decision-making process, that reasoning should*

> *not be accepted. Read in context, it is reasonably clear that those passages were not intended to state a legal principle of such general application.*"

Despite what *Zhang* stated, the Court said that a refusal to give any weight to particular material "does not demonstrate that the decision-maker failed to have regard to a mandatory consideration", citing *Minister for Immigration and Citizenship v SZJSS* (2010) 243 CLR 164 at [33]-[36].

35. *Zhang* has been treated as authority for elevating the provisions of a DCP above other considerations which are required to be taken into account under s 4.15 and its predecessor, former s 79C. To the best of my knowledge, no decision about the status of DCPs or other guidelines has considered the change in legislation since *Zhang* was decided and the purpose of the legislative change. Recourse to the explanatory note or the second reading debate would have demonstrated that *Zhang* was intended to be overridden.

36. In any event, *Goodwin* has decided that *Zhang* states no general principle of administrative law, and has reverted to the pre-existing position, explained by Mason J in *Peko-Wallsend*, that a decision-maker was entitled to look at a factor for consideration and decide to give it no weight. Importantly, any suggestion that guidelines or policies should be given determinative weight because of their status is contrary to another principle, that an inflexible application of a policy or guideline should not prevent consideration of the merits of a particular case. Sometimes called the "no fettering principle", it requires decision-makers not to approach a matter blindfolded by policy or guidelines, even if they constitute mandatory factors for consideration.

Has Umwelt correctly applied the EPA Act?

37. As is clear from the authorities cited above, the threshold test is not to be answered solely by reference to the seven-part test in former s 5A or the guidelines. Indeed, it is difficult to find any court decision where that has occurred, and to do so would be contrary to authority. As I have demonstrated above, it is necessary to take into account the development as a whole, including impacts and benefits that are assessed in the DA and, in this case

in particular, the SIS. Selecting merely one component of the SIS and giving that determinative force without considering the other evidence is an error of law.

38. Another legal error is the invocation of the precautionary principle as a reason for dismissing the SIS conclusion that the proposed mitigation measures (for example, for koala) are likely to reduce impacts to the extent that they are negligible. Umwelt's approach was rejected in *Shenhua* in the context of determining whether to grant development consent, but in my opinion the same reasoning applies to the threshold test when giving weight under the precautionary principle to the risk of failure of a mitigation measure. Preston CJ adopted this submission at [141]:

> "*[133] Shenhua submitted that there is no legal obligation on a consent authority to be certain about the impacts of a development on the environment or components of it or the successive measures to mitigate the impacts of a development before granting consent to the development. The statutory scheme under the EPA Act, especially for large scale projects such as SSD, accepts that there will often be risks which cannot presently be reduced to certainties, and it addresses the pervasiveness of risk by permitting the imposition of conditions which ensure effective long term management of these risks. This was what the PAC did… by imposing conditions… requiring… the preparation and implementation of a koala plan of management and a koala translocation management plan.*"

After observing that PAC did in fact consider the uncertainties relating to the size of the koala population and the likely success of koala translocation [142], Preston CJ said:

> "*There was no legal duty on the PAC… to make definitive findings of fact at the level of particularity alleged by the applicant, about the precise size of the population of koalas that will likely be impacted by the Project or the certainty of success of the koala translocation program, before determining to grant consent to the Project.*" [143]

39. What the applicant proposed in that case (and in this) was an adaptive management program involving monitoring koala health, population size, translocated koala health and distribution and the potential risks to successful implementation of the plan and the contingency measures to mitigate against these risks:

> "*Such an adaptive management approach is an appropriate response to deal with the uncertainty and risk concerning the impacts on the koalas and the measures to mitigate the impacts on the koalas. The conditions of consent embodying this adaptive management approach are within power and do not impermissibly defer consideration of the matters the subject of adaptive management until after the grant of consent.*" [144].

40. Far from failing to consider the precautionary principle or the principle of conservation of biological diversity and ecological integrity (part of ESD), Preston CJ said that these two principles did not demand consideration at a level of particularity. The grant of consent and the adoption of adaptive management implemented a proportionate response to the impacts even though there was uncertainty as to the success of translocation. The conditions imposed were designed to reduce those uncertainties to:

> "*… ensure that koalas are given the best chance of survival both in any translocation programs and through the establishment of additional habitat (albeit in the long term). The PAC had discharged its obligation to have regard to ESD principles.*" [181]-[182]

41. Although Umwelt has called in aid the precautionary principle at an earlier stage of consideration, whether the threshold has been exceeded, its arguments largely reflect those that were dismissed by the Court in considering whether there had been a failure to take into consideration these factors at the stage of determining the *Shenhua* DA. The *Shenhua* decision is directly applicable because, instead of leaving these matters to conditions of consent, the applicant in this case has anticipated the need for close control of land clearing, the relocation of fauna and the restoration of existing habitat and has offered both a VMP and BMP as part of its adaptive management program to reduce uncertainties in mitigating impacts. That risk reduction strategy must be considered both in assessing whether the threshold has been exceeded and in determining the DA. In *Nambucca Valley Conservation Association v Nambucca Shire Council* [2010] NSWLEC 38, Biscoe J applied a test that the mitigation measures must be "practical, enforceable and effective" ([119]-[126]), and Adam AC adopted that test in preference to the DECC 2007 guideline, taking into account ecological restoration as a mitigative measure in deciding that the threshold had not been exceeded: *APS*, [267], [275]. Umwelt's failure to do so was legally erroneous.

Must the Panel consider the mitigation measures in the proposed reserve?

42. Although it does not seem to be spelt out in terms, the Umwelt report advises that at least one mitigation measure to increase nutrient availability within the conservation reserve by habitat restoration should be disregarded in considering the threshold question because there is no evidence that the program "has been previously successfully applied as an impact mitigation strategy and therefore it should be considered novel" (p 8). Because it is "novel", the report states:

> "*In our view, the SIS has not adequately demonstrated that this mitigation measure has been used successfully in a similar situation (DECC 2007). As a result, the information presented, and conclusions drawn in the SIS in relation to the koala are insufficient to determine that concurrence is not required.*"

The reference to DECC 2007 is to the threatened species assessment guidelines referred to in former s 5A of the EPA Act. This is perhaps the most important conclusion reached by Umwelt in recommending that concurrence be obtained, because the proposal exceeded the threshold of likely significant impact.

43. By referencing the guidelines, presumably Umwelt meant this passage, which is the source for a Departmental view that mitigation measures should not be considered in determining the threshold question:

> "*Proposed measures that mitigate, improve or compensate for the… development… should not be considered in determining the degree of the effect on threatened species, populations or ecological communities, unless the measure has been used successfully for that species in a similar situation.*" (DECC, p 12)

44. Umwelt proposes that there must be evidence that it has been used "successfully in a similar situation". That question is only determinative if the threshold test stands or falls on the forest enrichment strategy. It does not, for the reasons explained above, but I shall assume it does, in order to address Umwelt's reasoning.

45. To have been used successfully in a similar situation would require a consideration of carefully staged broad-scale land clearing within sparsely used secondary koala habitat, after the reservation of an adjoining area of presently used habitat, with appropriate enrichment or revegetation, weeding, fencing to avoid koala egress to unsuitable habitat and ingress of feral predators, and other mitigation measures, secured in the long term by a funding mechanism and a legally binding dedication. It would also need an assessment of leaf nutrients, and evidence of breeding, gene flow to surrounding lands and so on. No doubt comparability would also extend to edaphic factors (soils, hydrology and slopes) as well as vegetation species.

46. That is, with respect, too narrow an approach. It is unlikely that any other comparable site can be found, because this proposal goes well beyond what is usually provided by subdivision in threatened species habitat.

47. Umwelt also dismisses the restoration proposal as novel, which is the way that it applies the guidelines cited above. This is to misunderstand the way that scientific knowledge has been transferred and adapted for management application to habitat restoration and fauna conservation: *APS* at [266].

48. Any habitat restoration project relies on a variety of evidence-based practices. Restoration ecology is a branch of science to which Australian scientists have made a significant contribution in the last three decades. In 1988, the Ecological Society of Australia held a symposium on restoration ecology, which Australia's leading scientists attended either personally or as referees of the published proceedings: Saunders et al, *Australian Ecosystems: 200 Years of Utilisation, Degradation and Reconstruction* (1990). Much of the early scientific work was associated with Dr Saunders and Dr Richard Hobbs, and from 1990 they co-authored or were associated with numerous publications in the refereed literature about restoration ecology based on their experience as Government-funded scientists in Western Australia. For the last 30 years, papers about restoration ecology and in particular, ecologically sustainable forest management for east coast fauna have been published in the refereed literature, and major works such as Dr Andrew Smith's study on

koala conservation and habitat requirements in the Pine Creek State Forest have been republished in compilations, usually edited by the State's leading zoologist, Daniel Lunney: see e.g. *Conservation of Australia's Forest Fauna* (2nd ed.) 2004, p 591.

49. As befits a separate scientific discipline, there is now a professional association of restoration ecologists, the Society for Ecological Restoration. It is recognised by both the Australian and State and Territory Governments, and has published a national standard: *National Standards for the Practice of Ecological Restoration in Australia* (ed. 2.2, June 2021). It was first published in 2017. This national standard is now applied throughout the nation. More importantly, the New South Wales Government has applied it specifically to the restoration of koala habitat.

50. NSW has published guidelines for koala habitat restoration, which are based upon the national standard: DPIE, *Koala Habitat Revegetation Guidelines* (2020), p 7, para 4.1. Both the Department's website (when referring to and adopting the Guidelines) and the Guidelines themselves describe them as "evidence-based":

> "*This management guide provides evidence-based recommendations to help land managers, community groups and private landholders identify, connect and revegetate koala habitat using best-practice methods.*" (Guidelines, p 2).

The Guidelines recommend improving koala habitat by "increasing the number of preferred trees within and adjacent to habitat areas" (p 7), which is synonymous with forest enrichment. Numerous articles in the refereed literature relating to koala habitat restoration are cited, including Dr Smith's paper in Lunney (2004). The Guidelines also reference five case studies where restoration has occurred indicating in some cases high degrees of success (Guidelines, pp 21-26).

51. Each aspect of the restoration project is justified by research in the refereed scientific literature, or site-specific analysis by leading scientists in their respective fields. Consider relocation, which will occur as vegetation is

gradually reduced in the development area and koalas are either captured and removed to the reserve or are naturally displaced and move there of their own accord (if they are present at all, given their low numbers). This is not translocation properly so called, because it is not transferring the koala to new habitat or even restored habitat but enabling it to continue to use its existing habitat. There is little doubt from the scat analysis by OWAD that the koalas are mobile within their existing territory, so translocation is a misnomer. In any event, let us assume there is translocation: is that novel in the relevant sense used by Umwelt? The largest translocation project for koala was undertaken because of the over population of Phillip Island. The results are documented now in the refereed literature: Menkhorst et al, *Survival and Movements of Koalas Translocated from an Over-abundant Population*, Wildlife Research 46 (7) 557-565. In Menkorst's earlier literature review, he concluded that a minimum viable area for a translocation area was 100 ha: Menkhorst (2017) *Literature Review: Responses of Koalas to Translocation*, Arthur Rylah Institute for Environmental Research Technical Report Services No. 279. There is more than enough habitat area to accommodate the relocated koalas. The point is that there is now significant scientific support and practical examples of its success, as there is with the restoration of koala habitat to increase the palatability of its food and other resources.

52. The NSW Government has also now published a framework to monitor koala populations, and explained by reference to the scientific literature the various aspects of koala biology and ecology which affect the persistence of it in habitat: DPIE, *NSW Koala Monitoring Framework* (2021). The Framework emphasises the importance of genetic diversity and of assessing "functional genetics and geonomics over space and time to inform future translocation and genetic rescue by determining populations that show evidence of local adaptation" (p 25). It concludes that such adaptation "can build genetic resilience in populations, including resistance to disease and increased drought tolerance" and advises that:

> "*External scientists with genetic expertise should provide high-level advice on the direction of any genetic works.*" (p 25)

53. That work has been undertaken on this population by OWAD and its correspondents. There is now a survey of gene flows of koalas throughout the coastal Port Stephens local government area, with the exception of the Tomago aquifer. It has established that the population on site is genetically distinct from the populations to the east of the motorway, but is genetically indistinguishable from the populations to the west and north of the subject land. There is little evidence of gene flow across the motorway. This is a striking conclusion. OWAD also tested for chromosomal richness as a measure of genetic diversity: OWAD, *Raymond Terrace Koala Survey Report*, 24 January 2019, p 21-22, and compared the results with three koala populations in South-East Queensland. It recommended further sampling in the region to determine whether the individuals that occurred on site are isolated and genetically distinct and may be experiencing genetic erosion due to isolation or whether they are part of a larger population that is genetically fit, with strong gene flow and good migration rates in and out of neighbouring populations in the greater landscape (p 24). That study was undertaken: OWAD, *Port Stephens LGA Koala Genetic Sampling Report*, 12 December 2019.

54. It was that second report that discovered that there were two distinct population clusters in the LGA, that the cluster to the east of the motorway was genetically less diverse than the cluster to the west. Of all the areas investigated the highest level of genetic diversity was found on the subject land and there was evidence that that cluster was connected to other populations in the greater landscape up to 200km to the north in the Port Macquarie region (p 1). A comparison of genetic differentiation suggested that there was greater mixing between koalas north and south in that landscape than east to west (pp 1-2). OWAD's first report demonstrated that the koala was breeding and now it is clear that despite chlamydia (which is endemic to NSW koalas), the population was healthy and was part of the larger population within the LGA to the west of the motorway. OWAD concluded that the Kings Hill koalas were genetically more similar to Port Macquarie koalas than they are to koalas on the Tomaree Peninsula (p 37).

The results of the genetic analysis, which the Framework considered essential, had been ignored by Umwelt.

55. The first factor in s 5A requires consideration of population dynamics. The development proposal is to provide useable habitat, freed of the existing threatening processes of land degradation, roadkill, feral predation and fire risk, to enable koalas to successfully breed, as they have done in other habitats and as they may already have done within the proposed reserve. OWAD established that it was a breeding population, but could not establish the place of breeding (breeding has now been positively correlated with foliage nutrient levels: De Gabriel et al, para 63 below).

56. Whether in considering the threshold question or in determining whether to grant consent to the DA, it does not seem to me that these mitigation measure can lawfully be ignored. That would be to breach s 79B and s 79C (s 4.15), the first because it obliges the decision-maker on the concurrence question to take into account the development proposal including mitigation measures and the second because it would be to preference the guidelines, a policy document, over the obligation of the Panel in the exercise of its planning discretion, to have regard to the merits of the case and the proposed development. To disregard those merits in favour of a policy guideline is to fetter discretion, in breach of the no fettering rule. In effect, it would be tantamount to disregarding an aspect of the application, consideration of which is the subject matter of the decision to grant or refuse consent.

57. The problem with the Umwelt report is that it discounts the conservation reserve as suitable habitat for a viable population of koala because of what it describes as the novelty of the Forest Enrichment Strategy. It is the word “novel” that appears in each of the paragraphs (pp 7-8) that engages with the guidelines. “Novel” approaches to mitigation must be disregarded, and so Umwelt has disregarded it. The Forest Enrichment Strategy is merely an example of restoration ecology, no different to silvicultural practices in forestry worldwide, but in this case supported by evidence that selection of trees likely

to be more palatable to the koala will increase the carrying capacity of the forest reserve. There is nothing novel about this strategy.

58. Another difficulty with describing the strategy as novel is that it is precisely the strategy now adopted by the Government itself in its *Koala Habitat Revegetation Guidelines* (2020), which are evidence-based. The Guidelines were developed at the conclusion of six years of policy making, research and consultation on reviving the koala in New South Wales. The Chief Scientist and Engineer reported on koala populations in New South Wales in 2016, which then led to the *NSW Koala Strategy* in 2018, a critical element in which was protecting and improving koala habitat by ecological restoration: pp 15-17.[1]

59. Meanwhile, the Australian Government, having listed the koala as vulnerable under the EPBC Act, has engaged in extensive consultation and scientific research to produce the draft *National Recovery Plan for the Koala* for east coast populations, including NSW. It adopted four planning strategies and two physical strategies. Strategy 5 is for strategic habitat restoration which:

> "…*increases the overall habitat available for Koalas and increases the connectivity between areas of habitat, which is important to the long-term survival of Koala populations.*"

Action 5c is to implement on-ground revegetation or restoration programs, including the establishment of climate resilient and nutritious feeding trees outside traditional ranges of Koala habitat trees. This is not what is proposed on the subject land, and in Action 5c it is described as a trial. The development proposal is to increase the percentage of trees known to be palatable to koalas within their existing range. Apart from drought, the greatest threat to the koala from climate change presently is heat and trees with extensive canopy are included in the proposal's restoration program to enable the koala to regulate thermal stress.

[1] Another promise was to develop a best practice koala planning guideline to assess and mitigate impacts on koalas from development proposals (p 18). That guideline would no doubt have been of assistance to the Panel, but despite three years to develop it, it has not yet emerged.

60. Strategy 6 is for active metapopulation management, including consideration of fire, koala movement, genetics, infection and disease and habitat needs (p 30). All of those factors are considered in the SIS. Action 6b is to build on:

> "*existing best-practice Koala translocation and post-care release guidelines for wild and captive populations, ensuring they are fit-for-purpose, informed by the latest research in metapopulation processes, genetics, disease and gut flora... If translocations are required, implement Koala translocations in accordance with an appropriate decision framework and national guidelines (Wildlife Health Australia 2020)…*"

The reference to existing standards reinforces the point made earlier that the science of translocation, including to restored habitats, is already established and cannot be described as "novel".

61. The NSW strategy for habitat restoration to increase the carrying capacity of koala habitat (*NSW Koala Strategy* (2018)) encourages precisely the kind of work proposed in the conservation reserve: *Koala Habitat Revegetation Guidelines* (2020). Although the SIS was published before these guidelines were made, it could be regarded as an exemplar of the methodology that the State has now adopted for habitat restoration. It is supported by good science in the fields of koala management (Phillips), population (OWAD), genetic diversity (OWAD), regional significance (OWAD), leaf palatability (ANU), and peer review (Lemckert, Dique). It is to be implemented by an extensive and detailed biodiversity management plan (SIS, appendix C).

62. In *APS*, Adam AC noted in the context of the dispute in that case about consideration of measures never previously applied to a species or community that:

> "*Whether extrapolation from measures apply to other species is appropriate and whether how similar the circumstances of the particular matter are… to those of other cases would be matters for expert opinion.*" [266]

Dr Lemckert expressed that opinion in the SIS:

> "*The science behind the idea of increasing habitat quality through selected growth of trees is well established in that the distribution and breeding success of koalas is well known to be correlated with folia nutrient levels… This results in the typical distribution of koala populations where*

> *populations of breeding koalas are restricted to specific locations where folia nutrient content is highest or where toxins are low enough to make their consumption acceptable for the nutrition that they will gain. The quality of the available food is based on the species of trees present, which is why Schedule 2 of SEPP 44 provides an indicative list of locally preferred feed trees for koalas in different management areas. Therefore, if the composition of feed trees at a site has direct bearing on the extent that koalas are able to use a location, it follows that the habitat values of a site will improve for koalas if more preferred feed trees become available.*" (SIS Appendix L, p 2)

Dr Lemckert then considered whether species selection within the conservation reserve would have any adverse impacts and concludes that it would not.

63. Research about the nutrient / population relationship for arboreal mammals commenced over 40 years ago with the Eden studies managed by Dr Braithwaite: Moore et al, *The Role of Nutrition in the Conservation of the Marsupial Folivores of Eucalypt Forests*, in Lunney (2004). Specific attention was given to koalas: Lunney (2004) at 552-553, which not only emphasised the importance of the 1% threshold for available nitrogen in leaf matter, but acknowledged that the presence of plant secondary metabolites (PSMs), which deter feeding and are produced by some eucalypts to defend against herbivores, played a significant role in the nutritional value of foliage (556). The implication of this research for conservation of arboreals including the koala was then discussed (563-566). Although some questions remain unanswered, the process of applying laboratory research on captive populations to wild animals had begun well before the turn of the century. In 2005, *Nature* published a letter report by Moore and Foley, *Tree Use by Koalas in a Chemically Complex Landscape*, (Vol 435, 26 May 2005). It concluded that plant chemistry restricts the use of trees by the koala and thus limits the food available to koalas and potentially influences koala populations. This provided "a mechanism for foliar chemistry to influence the distribution and abundance of this vertebrate herbivore" (p 490). In results which can clearly be extrapolated to the koala, De Gabriel et al, *The Effects of Plant Defensive Chemistry on Nutrient Availability Predict Reproductive Success in a Mammal*, *Ecology* 90 (3) 2009, pp 11-719, concluded that leaf tannins

interact with protein to produce spatial variation in the nutritional quality of eucalypt foliage:

> " *…which is related to demography in a wild population of a marsupial folivore, the common brush tail possum… tannins reduce the digestibility of nitrogen in vitro, creating variation in available N concentrations among the home ranges of individual possums in an otherwise homogenous habitat. This was strongly correlated with reproductive success: females with better quality trees in their home range reproduced more often and had faster growing offspring. These results demonstrate a powerful mechanism by which spatial variation in plant chemistry may control herbivore population dynamics in nature*."

Although the study was of possum, the conclusion was applied generally to herbivore population dynamics.

64. The following year, a study by Youngentob et al, *Foliage Chemistry Influences Tree Choice and Landscape Use of a Gliding Marsupial Folivore*, J Chem Ecol (2011) 37: 71-84 (which included Dr David Lindenmayer, one of Australia's leading mammal ecologists) had "implications for the management and conservation of this (the greater glider) and other folivorous species". Dr Youngentob was the co-author of the ANU report that is part of the SIS and on which it relies for the forest enrichment strategy. Her co-author, Dr Karen Marsh, conducted the field and laboratory components of the research (p 82). The authors recommended that:

> "*…land managers give preference to conserving tracts of eucalypt forest where marsupial folivores occur. Areas where animals are not sighted may not have the same capacity to support them for several reasons, including inadequate forage quality. The ability to accurately measure variation in plant nutrients and PSMs on a landscape scale could become an important conservation tool. Large-scale mapping of foliage chemistry could help to identify areas that are suitable or unsuitable habitat for certain animals and to monitor changes to the chemical quality of landscapes that could influence their ability to support some species*."

65. Then a broader study was published by Wallace et al, *Food for Folivores: Nutritional Explanations Linking Diets to Population Density*, Oecologia (2012) 169: 281-291, which established that the concentration of available nitrogen (an indicator of palatability for koala) was closely corelated with tannin (a PSM) concentrations that explain the nutritional value of leaves for herbivorous

mammals “that can readily be extrapolated to habitats” (p 281). The authors concluded that the concentration of available nitrogen gave a better indication of the nutritional value of leaves. The recommended methodology was applied by ANU in its study for this project. Youngentob et al (including again Dr Lindenmayer) then published “*Where the Wild Things Are: Using Remotely Sensed Productivity to Assess Arboreal Marsupial Species, Richness and Abundance, Diversity and Distributions* (2015) 21 977-990”. For the first time, the hypothesis that highly productive habitat supported a greater abundance and diversity of herbivores than less productive areas was proven at a landscape level in an NSW eucalypt forest. Plant productivity and forage quality can therefore be used in conjunction with other environmental characteristics to assess habitat quality and potential biodiversity value. Selecting the wrong species to revegetate a forest can reduce koala populations: Au et al, *A nutritional mechanism underpinning folivore occurrence in disturbed forests*, *Forest Ecology and Management*, 2019. By parity of reasoning, selecting the appropriate species can have the opposite effect. Other studies about koala are reported by ANU in appendix I to the SIS

66. The relationship between forest productivity and koala population densities has now been established. This science was applied by ANU in its study of the nutritional quality of the Kings Hill koala habitat. It identified four species with high concentrations of digestible N, some with good concentrations, and others that were poorer in digestible N (ANU 2019, Figure 3). It correlated this evidence with OWAD’s data. That provided the basis for the enrichment strategy.

67. There is nothing novel about vegetation restoration. It is probably the most common mitigation measure for developments involving broad-scale clearing. The value of habitat restoration with preferred tree species to arboreal mammals has been explained, rather than merely assumed, by research over decades into the palatability of eucalypt foliage for arboreal mammals, including the koala. All that the SIS has done is transfer and apply that science

by highly specific surveys of nutrient availability at Kings Hill to demonstrate how it can manifest itself in that particular eucalypt forest.

68. Whether the koala and other mammals will thrive in the conservation reserve will be monitored and management measures can be adapted, another technique which is part of the development proposal and cannot be disregarded.

69. With respect to Umwelt, it has also disregarded the genetic assessment of the koala populations in the region, the preservation and enlargement of corridors for koala movement and gene flow (males are often ejected from colonies), which can also mitigate the impacts of bushfire, drought and climate change. As the assessment of significant impact is qualitative and may consider many factors, not limited to former s 5A or the DECC Guideline, the consideration of mitigation measures is required for this reason as well.

What is a "viable local population"?

70. The first factor for consideration under former s 5A is:

> "*In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the lifecycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.*"

71. The guidelines define the term "local population" to mean the population that occurs in the study area, although it says assessment may extend to include individuals beyond that area if it can be clearly demonstrated that contiguous or interconnecting parts of the population continue beyond the study area if "any individuals occurring in adjoining areas… are known or likely to utilise habitats in the study area" (p 5). The study area is defined to mean the subject site and any additional areas which are likely to be affected by the proposal, either directly or indirectly. The study area should extend as far as is necessary to take all potential impacts into account (p 3).

72. A study area is one defined by the impacts of the proposal: it has nothing to do with whether a viable local population occurs in it. The presence of part of the local population beyond the study area may be the reason why the

development in question will not have an adverse effect on the population within the study area. The guidelines artificially confine the local population, not by reference to species range, gene flow, habitat, population viability or other biological or ecological marker, but simply to the boundaries of the site.

73. The adoption of a boundary/impact approach to defining a local population is wrong, but understandable, given that too little is known about most fauna to provide definitive population data. Without a capture, mark, release and recapture regime, or the kind of scat analysis that OWAD undertook, it is unlikely that sufficient data would be available for the less studied species, such as the phascogale. Assumptions must then be made, as the SIS did in relation to that animal, for which Umwelt unfairly criticises it. Umwelt has wrongly assumed that the first part of the seven-part test must be determined, before the question whether the threshold has been exceeded can be answered, but there are many cases where no definitive answer can be given – in *Friends*, that was the case with the Regent Honeyeater. Many threatened species are cryptic. The most that can be done is to apply known habitat, range and breeding requirements to the project to determine whether the species has sufficient resources to continue to occupy its range over breeding cycles. The steps to improve habitat and increase corridors must also be considered, as the SIS does in some detail.

74. It is worth analysing the way in which this question is addressed by the DECC guidelines.

75. First, it is wrong to define “local population” without reference to whether the population so defined is viable. The expression in s 5A is “a viable local population”. Therefore, the search must be for the area of habitat that is required for population viability. For a lizard that might be ten square metres, but for a koala, that will be a much larger area.

76. Second, it is population, not individual viability that must be considered. A boundary/impact approach would be appropriate if the test was the viability of an individual as the extent of impact would be determinative. On the other hand, a viable local population would almost inevitably disregard the

administrative boundaries of the proposal yet the definition in the guidelines depends upon them. The comparison between a threatened lizard and a koala makes the obvious point. The DPIE Guidelines consider that a habitat patch size of 50-100 ha is preferable to support a sustainable population (p 5).

77. Third, despite an ungainly gait, koalas are mobile and move between trees and often different habitats depending on the time of day, threatening processes, palatability of leaves and so on. To take one example, koalas in the Tomago aquifer to the south-west of the site occupy *melaleuca quinquenervia* habitat for shelter during hot days. Although melaleucas do grow in ecotones with eucalypts, often the preferred food trees for koalas will be some distance away from the melaleuca stand. I have already referred to male displacement: koalas have been radio tracked over several months travelling up to 40km. Dispersal is essential to gene flow, well beyond the breeding location. Interbreeding must occur for population viability so as to maintain reasonable genetic variability. These koalas do, unlike the population on the eastern side of the Pacific Motorway (OWAD, second report).

78. This question can also be tested by examining DPIE's *NSW Koala Monitoring Framework*, 2021, which gives several examples of local koala populations: the populations of Coffs Harbour, the Pilliga, Liverpool Plains, Gunnedah, Campbelltown and the South Coast (p 8). As is recognised by the Framework, genetic assessment of populations is a much better measure than population counts in determining the area of habitat occupied by the population or the success or failure of management measures (pp 25-28). There will be occasions when a local population occupies a discrete area such as a development site. That will usually be the case because of isolation resulting from habitat fragmentation, or barriers to movement such as major roads or urban communities. Even in those cases, genetic testing will determine how much inbreeding has occurred and whether the level of genetic variability has fallen to a point where the population may no longer thrive. It is of interest that

OWAD concluded in its second report that the populations to the east of the motorway, in particular the Tomaree group, were heading for extinction.

79. I suggest that what describes a viable local population is the minimum area of usable habitat which enables the koala to reproduce successfully over several generations and to maintain the gene flow necessary for a healthy population. As one of the largest forest animals, and also one that does not usually congregate, one would expect that the area necessary for population viability would include areas beyond the direct or indirect impact of this proposal. This is supported by the DPIE Guidelines:

> "*To maintain a viable koala population, at least 40-60% of the landscape should be native forest or woodland for a 1 kilometre radius around where koalas occur, preferably dominated by high and frequent use koala habitat trees (McAlpine et al. 2007)*." (para 4.3)

The conservation reserve meets this prescription.

80. There is some population data in the SIS, with an assessment by Dr Phillips of 50 animals as a minimum viable population and about 900 ha as an estimate of the area of habitat necessary (at least here where most habitat is secondary, not primary) to sustain that population. He did not expect the subject land to sustain more than about 27 koalas, and the area to be displaced ultimately by urbanisation had a nominal carrying capacity of 8 koalas, of which 3 can inhabit the restored wetlands. However, OWAD's scat and genetic analysis found only 10 individuals, which is consistent with the area comprising disturbed secondary habitat, with existing threatening processes. It is obvious from the genetic work that the koalas interbreed beyond the site, assisted by existing corridors.

81. It is necessary to supplement the advice of Dr Phillips with the results of the genetic assessment, which shows a much wider population using similar habitat with similar genetic variability to the west of the motorway. The question should then be what makes that population viable and whether the development proposal will remove its supports. I think it is clear from the second OWAD report that movement corridors have been maintained west of

the motorway, including to Port Macquarie. Despite some land fragmentation and clearing for agriculture, koalas can move across cleared habitat to disperse or to avoid fire and drought or depauperate habitat. Preservation and indeed improvement of habitat corridors, the reduction in feral predators and the improvement in the quality of habitat are three factors that would ensure viability, or at least reduce the risk of unviability. The loss of a small area of secondary habitat, in the context of the much larger local population area, would be insignificant so long as the measures proposed in the SIS to mitigate impacts are followed. For the purposes of the threshold assessment, they must be considered and assumed to occur, in which case they meet (and probably exceed) best practice, as endorsed as recently as this month by the Government in the *Framework*: para 9.2-9.4 (pp 39-41) and see also paras 4.1-4.5 and 5.1-5.4 of the *Koala Habitat Revegetation Guidelines* 2020.

82. Finally, Umwelt concludes as a given that "there is considerable uncertainty in relation to the extent of the connection between koalas in the Kings Hill hub and other areas on the lower north coast". That statement, which then invoked the precautionary principle, could only be made ignoring the result of the second OWAD report which looks at Port Stephens LGA (except for the Tomago aquifer) and compares DNA with the Port Macquarie population. OWAD have reached conclusions about the extent of connection of the populations and about the absence of connection with other populations that are not assailed by Umwelt. Later in the same paragraph Umwelt suggest that 11% of the total area of the local population would be removed by the development proposal but that is to use Dr Phillip's rule of thumb, without being informed by scat analysis that shows a low existing population of koala and the genetic study that suggests that the habitat for the local population extends well beyond Kings Hill. Moreover, the removal of 11% of the habitat area, even if correct, would be the beginning and not the end of the inquiry. Further questions must be asked. First, what is the quality of habitat being removed? Second, what improvements are to be made in the quality of the habitat to which the individuals will be relocated? Third, what improvements will be made to prevent predation, increase safety and enable movement and

dispersal? There is no doubt that this is a sophisticated and to some extent complex analysis, but it is one that has been assayed in the SIS. Taking all those mitigation measures into account it concludes that the threshold is not reached for koala, or for other species (such as the Phascogale whose habitat resources will be increased overall by the proposal).

EEC

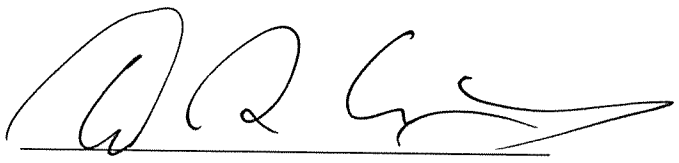
83. Umwelt has challenged the finding by the SIS that Plant Community Type 1590 (PCT 1590) is not part of the Lower Hunter Spotted Gum Ironbark Forest Endangered Ecological Community (EEC). Umwelt suggested that there was a reasonable probability that it was, and on that assumption that the threshold of significant impact would be exceeded: p 16. The test for determining whether an EEC is present on site is to compare the assemblage of species on the site and, if relevant, other diagnostic features such as edaphic and locational factors with the description in the final determination of the Scientific Committee: *Vaw (Kurri Kurri) Pty Ltd v Scientific Committee* (2003) 58 NSWLR 631 at [6]-[9], [198]; *Gales Holdings Pty Ltd v Tweed Shire Council* [2008] NSWLEC 209 at [61]. The SIS did so.

84. The author of the SIS has now undertaken a floristic comparison between plot data from known mapped patches of the EEC with PCT 1590. The analysis (RPS memo, 27 July 2021) confirms the SIS conclusion that PCT 1590 is not compositionally similar to the EEC as described in the final determination. Rather, it is another vegetation community known as Seaham Spotted Gum Ironbark Forest.

85. In my view, this exercise was unnecessary, but having been undertaken, Umwelt's conclusion that it is reasonably probable that PCT 1590 was the EEC, has been invalidated. No question of significance assessment therefore arises.

Conclusion on Umwelt report

86. There are legal flaws in Umwelt's assessment, most significantly its discarding of habitat restoration as novel and therefore not a mitigation measure that need be considered in applying the threshold test. It is also flawed because it has overlooked the implications of the genetic variability of the population and its relationship to other sub-populations west of the motorway, as well as evidence of the population successfully breeding. These omissions significantly affect the value of Umwelt's assessment, because they are aspects of the development proposal which cannot lawfully be ignored.



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