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KINGS HILL CONCEPT SUBDIVISION DA PEER REVIEW

FINAL

May 2021

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Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Department of Planning, Industry & Environment

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1.0 Introduction

Umwelt was engaged by the Department of Planning, Industry and Environment (DPIE) to undertake a peer review of biodiversity matters relating to the Kings Hill Concept Subdivision Development Application (DA). This section provides context on the project, the objectives of the review, the methods employed, and the documents relied upon.

We note that V3 of this peer review was re-issued on 28 May 2021 to address a minor typological error and phrasing in relation to biodiversity offset outcomes in Section 2.1 below.

1.1 Background and objectives

The Hunter and Central Coast Regional Planning Panel ('The Panel') deferred determination of a regionally significant development application - PPS-2018HCC047 (Port Stephens Council DA 16-2018-772-1) at 3221 Pacific Highway Kings Hill and 35 Six Mile Road Kings Hill following a public meeting on 22 December 2020. The DA is for a concept residential subdivision of 1900 lots to be completed over 33 stages. The site is approximately 517 hectares (ha) with just over 311 ha zoned for urban purposes and 205 ha zoned E2 Environmental Conservation. Council has endorsed in-principle a voluntary planning agreement (VPA) for the purposes of delivering an in-perpetuity conservation agreement for the Conservation Area. The VPA has not yet been exhibited.

The DA is supported by a suite of documents which includes a Species Impact Statement (SIS) (Kings Hill Development Species Impact Statement (RPS 2020)). The DA was lodged on 23 November 2018 and is being assessed under the former planning provisions. The SIS concludes that with conservation offsets in place, there will be no significant impact on threatened species, populations or ecological communities. Council and an independent ecologist (Matt Doherty of MJD Environmental) engaged by the Council support this conclusion. If this conclusion is accepted, concurrence of the Chief Executive of OEH (now Coordinator-General, Environment, Energy and Science (EES)) is not required.

DPIE commissioned this peer review to consider relevant documentation associated with the DA relating to biodiversity matters, including Council's report to the Panel, the SIS and other relevant supporting information, independent report to Council and submissions, and to provide independent advice to the Panel regarding the development application, specifically in relation to:

- the adequacy of the SIS and whether the conclusions are supported, or otherwise; and
- details of the applicable statutory framework related to the biodiversity assessment and whether the statutory and policy framework that is required to be addressed in order for the Panel to determine the matter has been satisfied.

Specific objectives of this peer review of biodiversity matters relating to the project are as follows:

1. Assess the adequacy of the SIS and provide clear recommendation as to whether its conclusions can be accepted, to assist the Panel to determine whether concurrence from the Chief Executive of OEH (now Coordinator-General, EES) is required.
2. Confirm (or otherwise) that advertising and exhibition requirements for the SIS have been properly executed.

3. Resolve if there is a need for (and if so, the timing required for) referral of the matter to the Australian Government for consideration under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

4. Outline the framework, timing, and any issues that need to be addressed to finalise and publicly exhibit a draft Voluntary Planning Agreement (VPA) which the developer has agreed to enter with Council concerning ongoing management of biodiversity issues on the site.

5. Provide a step-through of the approval pathway applicable to this DA. This shall require review of the DA and supporting documents with respect to their compliance with the legislative requirements for DAs, the statutory planning framework and process for submissions, including changes in legislation that have occurred since the DA was lodged on the 23 November 2018, noting the timing of the transitional arrangements for interim designated areas under the Biodiversity Conservation (Savings and Transitional) Regulation 2017. It is understood that the review shall include but not be limited to:

    a) *Threatened Species Conservation Act 1995*;

    b) *Environmental Planning and Assessment Act 1979* and Regulation (i.e., in relation to biodiversity);

    c) State Environmental Planning Policy (Koala Habitat Protection) 2020;

    d) State Environmental Planning Policy (Coastal Management) 2018;

    e) Draft Remediation of Land SEPP and SEPP 55 Remediation of Land; and

    f) Port Stephens Local Environmental Plan 2013 in relation to ancillary works proposed in the E2 Environmental Conservation zone and B4 Mixed Use zone.

The outcomes of this peer review, including recommendations (**Section 7**) are documented in this report for the Panel's consideration.

1.2 Context

The Kings Hill Development proposes a concept residential subdivision of 1900 lots to be completed over 33 stages. The site is approximately 517 ha with just over 311 ha zoned for urban purposes and 205 ha zoned E2 Environmental Conservation. The development includes:

- R1: Residential Zone - General Residential
- B2: Business Zone – Local
- B4: Business Zone – Mixed Use
- E2: Environment Protect Zones – Environmental Conservation

The initial site preparation works includes the following elements:

- Progressive clearing of vegetation and habitat over an 8+ year period
- Use of sensitive clearing procedures in accordance with a Vegetation Management Plan (VMP)
- Establishment of a 244.25 ha 'like-for-like' Conservation Area including implementation of mitigation works in accordance with a Biodiversity Management Plan (BMP), and

- Implementation of a VPA to provide an in-perpetuity conservation mechanism/ agreement for the protection of biodiversity values within the Conservation Area.

A total of 212.14 ha of native vegetation and threatened species habitat and 59.87 ha of cleared lands is proposed to be progressively impacted by the Proposal for future urban use over an 8+ year timeframe. The site preparation works involved in this process are proposed to be phased and managed in a sensitive manner in accordance with the VMP. Restoration and improvement works are prescribed in a BMP and will be implemented prior to impacts. Mitigation measures proposed include the following:

- Revegetation works in cleared lands to benefit the koala and winter-spring nectar-dependent species
- Habitat enrichment works for the koala
- Habitat enhancement (e.g., installation of hollows, fauna fencing and emplacement of fallen logs)
- Weed management (e.g., removal of lantana and African olive)
- Feral animal control (e.g., wild dogs, feral cats and deer)
- Fencing of Conservation Areas to: curb and deter illegal and uncontrolled activities (e.g., illegal dumping, timber getting, hunting); and manage existing rural activities that impact on native plants and weed dispersal (e.g., grazing by cattle, horses, goats)
- Habitat protection for threatened species, and
- Execution of a VPA to deliver an in-perpetuity conservation agreement to protect threatened species and their habitat in the local area.

An SIS was prepared to assess the impacts of the Development, following initial biodiversity assessments identifying a likely significant impact on threatened species and communities by EcoBiological in 2009. Following the issuing of Chief Executive Requirements (CERs) by the (then) OEH on 9 September 2018, the SIS has been finalised by the proponent. The SIS finds that the Kings Hill Development will not result in a significant impact on threatened species, populations and ecological communities:

> *The Proposal's impact includes sequenced and managed habitat loss over an 8+ year timeframe coupled with the delivery of restoration, mitigation and conservation works designed to attain localised ecological benefit for affected threatened species and ecological communities within the adjacent Conservation Area. The Conservation Area is of sufficient size and character to retain local viable populations of affected threatened species and ecological communities, with in-perpetuity funding and management delivering certainty in the outcome.*
>
> *A nett gain in preferred Koala feed trees is expected through the revegetation of cleared lands intra-forest enrichment. Koala habitat protection measures such as fencing, road underpasses, grids and bridges are also proposed to prevent mortality. These measures, in addition to the managed protection of Koala habitat within the Conservation Area satisfy the requirements specified in the PSC Comprehensive Koala Plan of Management.*
>
> *On balance, it is concluded that the habitat loss and ecological benefit of the Proposal will deliver a local outcome for affected threatened species and ecological communities that is not likely to have significant impact on these matters.*

1.3 Authorship and methodology

The peer review documented herein was undertake by Travis Peake and Allison Riley of Umwelt.

Travis Peake is an ecologist with over 25 years of experience in ecological impact assessments, vegetation classification, biodiversity offsetting and expert review. He prepared the landmark publication "The Vegetation of the Central Hunter Valley, NSW", which provided him with thorough and expert knowledge of the distribution and conservation status of vegetation throughout the Hunter Region. This report led to comprehensive listings of threatened ecological communities (TECs) and flora in the region.

He has frequently provided independent expert analysis and advice to state/territory and Commonwealth government agencies, as well as the NSW and Commonwealth Threatened Species Scientific Committees. He has been sought to participate in numerous expert panels for State and Commonwealth Government agencies, including for the following areas: threatened species; threatened ecological communities; derived native grasslands; systematic flora survey; ecological mine rehabilitation; biodiversity offsetting; ecological restoration; policy and legislation review; ecological impact assessment. He has delivered numerous presentations for international, national and regional conferences, seminars and workshops. He is highly experienced in providing expert witness testimony at the Land and Environment Court, Federal Court and for government inquiry panels and mediation exercises, having provided expert reporting over 25 court matters. Travis is an Accredited Person to deliver the BAM under the BC Act 2016.

In January 2021 Travis was appointed as a member of the NSW Native Vegetation Panel, for expertise in ecology, under section 60ZE(2)(c) of the Local Land Services Act 2013. This is a 3-year term. The NVP is a government agency.

Allison Riley is an ecologist with over 20 years of experience in preparing ecological assessments and biodiversity conservation strategies for projects assessed under Part 4 and Part 5 of the EP&A Act, including the former NSW Biodiversity Offsets Policy, BioBanking and Biodiversity Certification Schemes. Allison is an Accredited Person to deliver the BAM under the BC Act 2016.

Allison's area of expertise is in the management and delivery of complex biodiversity impact assessments and biodiversity conservation strategies and Commonwealth EPBC Act referrals, which cover many hundreds to thousands of hectares. This expertise has given Allison well developed survey design and delivery skills which are highly relevant to the peer review. Allison also has high level experience in developing strategic biodiversity assessments in accordance with the relevant Commonwealth and NSW legislation and biodiversity offset policies.

Travis and Allison were supported in some components by other staff but are responsible for all findings presented here. A briefing was conducted by DPIE staff and from the Panel on 22 March 2021, and they attended a site inspection, conducted by the proponent and their consultants, on 30 March 2021, which also included the provision of further information by the proponent. Travis and Alison presented their preliminary findings to the Panel on 29 April 2021.

1.4 Documents reviewed

As part of this Peer Review, the following documents were reviewed and considered:

- Dique, David (2021) Species Impact Statement (SIS) Peer Review – Kings Hill Development on 3221 Pacific Highway and 35 Sic Mile Road, Kings Hill. Letter to Adam Smith, APP, dated 18 March 2021.
- Doherty, Matt (2020) Memo from Matt Doherty (MJD Environmental) to Steve Peart and Ryan Falkenmire (Port Stephens Council) dated 16 September 2020.
- Doyle, Justin (2021) Kingshill Development No 1 Pty Ltd & Kingshill Development No 2 Pty Ltd Development: 3221 Pacific Highway Kings Hill and 35 Six Mile Road Kings Hill. Impact of mitigation measures on criteria for assessment of significance of impact to threatened species, populations and communities. Memorandum of advice 9 February 2021.
- JW Planning Pty Ltd (2020) Concept Development Application Pursuant to Section 4.22 of the Environmental Planning & Assessment Act 1979. Kings Hill Urban Release Area. Concept Proposal for Residential Subdivision & Stage 1 Subdivision Works (Initial Site Preparation Works) & Establishment of In-Perpetuity Conservation Area. Originally prepared 23 November 2018, revised 27 July 2020.
- Port Stephens Council Planners Assessment Report prepared for HCCRPP DA 16-2018-772-1.
- PSC Memorandum – PSC Response to HCRPP Key Issues Discussed at the 12 August 2020 Briefing
- PSC Ordinary Council Minutes – 8 December 2020 Voluntary Planning Agreement – Kings Hill Development
- RPS (2020) Kings Hill Development Species Impact Statement 24 July 2020 (version 7).
- RPS (2020) Kings Hill Development Concept DA 16-2018-772-1 Response to Public Submissions
- Wasiak, Jason (2020) Addendum to concept DA 16-2018-772-1 Kings Hill Developments 3221 Pacific Highway, Kings Hill. Letter from Jason Wasiak to Ryan Falkenmire, PSC, dated 24 September 2020.

2.0 SIS Adequacy Assessment

Objective 1	*Assess the adequacy of the SIS and provide a clear recommendation as to whether its conclusions can be accepted, to assist the Panel to determine whether concurrence from the Chief Executive of OEH (now Coordinator-General, Environment, Energy and Science) is required*

The authors reviewed the SIS, and relevant supporting documentation, primarily through the lens of whether the information presented, and conclusions drawn are appropriate upon which to determine that concurrence is not required. Our review found that a number of areas raise concerns regarding adequacy and the conclusions drawn in the SIS, hence the need for concurrence should be revisited. These are documented in the following sections, as well as general points on the SIS itself, together with a conclusion summarising overall adequacy.

In undertaking our assessment, we have heeded the unambiguous statements in the CERs regarding the consideration of ameliorative measures (including biodiversity offsets) when assessing the significance of impacts. Section 8 of the CERs states:

> *An 'Assessment of Significance' (s. 5A EP&A Act) is to be provided for each of the affected species (threatened species, populations or ecological communities) identified in the SIS, incorporating relevant information from sections 5.1 to 7 of the SIS." Section 7 comprises ameliorative measures, which includes 'compensatory strategies' in line with the OEH offset principles, provided in Appendix 1 of the CERs.*

Within the covering letter from OEH (dated 9 September 2018) it is stated that:

> *If the consent authority determines that the proposal is likely to have a significant effect on threatened species, populations or ecological communities (including their habitat), then the concurrence of the Chief Executive of OEH is required before consent may be granted.*

Furthermore:

> *The consent authority must ensure that the SIS is compliant with the CERs.*

Therefore, this review takes into account the project's proposed ameliorative measures, including the biodiversity offset package, when considering the significance of impacts on threatened species, populations and ecological communities (and their habitats).

Other aspects of the SIS, including survey effort and findings, if not reported on here are regarded as either adequate or not material or relevant to this review.

2.1 Koala

Section 5.3.23 of the SIS summarises the extent and quality of habitat in the subject site based on a wide range of surveys and investigations undertaken as part of the SIS. BioLink (2019a) estimated 27 koala individuals as likely to occupy the subject site, with 8 individuals likely to occur within the impact footprint. The total area of habitat on the site for the koala was estimated to be approximately 152 ha, based on the presence of koala feed trees. The assessment of significance assessed the impact of 152ha of direct impact.

In the assessment of significance provided for the koala is Section 8.2.20 of the SIS, the SIS author identifies the local population as being the Kings Hill hub, as described by BioLink (2019a), comprising an area 1,377 ha. The loss of 152 ha of known koala habitat constitutes approximately 11% of the area of the local population. The direct impact to 8 individuals (inferred by Biolink 2019a based on population estimates and carry capacity) represents 16% of the minimum 50 koalas that comprise a 'hub' (minimum population size of 50 koala individuals identified in BioLink 2019b in Appendix K).

The conclusion reached in Section 8.2.20.5 of the SIS is that the proposal will not result in a significant impact on the koala, is based on the following avoidance and mitigation measures:

- A total of 38.47 ha or 12.9% of KHD's land zoned R1 are to be excluded from development and incorporated into conservation
- Revegetation of cleared areas with preferred koala food trees
- Koala fencing, road grids and bridges to mitigate impacts associated residential development
- A revegetation program comprising the establishment of Swamp Mahogany (*Eucalyptus robusta*) in detention basins that will be located within the Proposal impact footprint. These canopy species may be available to the koala for foraging purposes following maturation, and
- Intra-forest enrichment plantings with the purpose of increasing foliar nutrient value across the Conservation Area.

The SIS contends that additional compensatory measures are not considered necessary (i.e., the proposal, inclusive of the amelioration measures specified in the SIS, is not likely to have a significant impact on affected species), however compensatory measures are proposed to further safeguard and strengthen the protection of local habitat for threatened species, including notably the koala (RPS 2021). A total of 189.46 ha of known koala habitat is proposed to be retained and managed in-perpetuity in the proposed conservation area.

The 'no significant impact' outcome of the SIS relies on the implementation of a key mitigation strategy (forest nutrient enrichment) that is novel and, 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 impact mitigation strategy for the koala relies substantially on supplementary plantings of preferred koala food trees within retained forest communities and in currently cleared areas (referred to as intra-forest enrichment plantings or forest enrichment strategy). The implementation of this strategy is not considered to be sufficient to determine that the proposal will not result in a significant impact on the local population of the koala as discussed further below.

Forest Enrichment Program (Marsh and Youngentob 2019).

The outcomes of the significance assessment for the koala rely heavily on the implementation of the proposed forest enrichment program. Researchers from ANU were commissioned to undertake a study to understand the nutritional quality of eucalypts at Kings Hill, Raymond Terrace, for koalas and to use the nutritional quality data to estimate the carrying capacity of the site (Marsh and Youngentob 2019).

Specific objectives of the Marsh and Youngentob (2019) surveys were to:

1. Determine the mean and range in nutritional quality of potential koala food tree species at Kings Hill.
2. Determine the mean nutritional quality of selected transects at Kings Hill, within and outside of the development zone, and the mean nutritional quality of the site as a whole.
3. Use the mean transect and site nutritional quality data to estimate the carrying capacity for koalas at Kings Hill.
4. Investigate whether koala scat observations within the Kings Hill site coincided with areas of higher nutritional quality.

The results of the study concluded:

- Notably, koala scats located by detector dogs did not always correspond with the locations where trees with high digestible N, low FPC or low UBF*[1] concentrations were sampled.
- If the mean of all trees collected at Kings Hill is used to infer the quality of the site as a whole, the Kings Hill site could support koalas at a density of around 0.5 to 0.75 animals per hectare.

It is noted that the Marsh and Youngentob (2019) study did not consider the application or the efficacy of the methodology as an impact mitigation strategy design to ensure that the long-term viability of the koala population in the proposed conservation area or the local population of the koala more broadly. The SIS does not provide any evidence that the forest enrichment program has been previously successfully applied as an impact mitigation strategy and therefore it should be considered novel. The studies also do not conclusively indicate that the feed nutrients are driving population size and distribution (based on the measured carrying capacity of the site), and consequently, do not demonstrate that such a mitigation measure will necessarily mitigate the impacts of habitat loss on the local koala population.

We note that expert review and analysis by Dr Frank Lemckert (Ecological 2020) states that the proposed enrichment works are novel (refer to Appendix L of SIS). We note that Dr Lemckert also states: *if the relative composition of species remains within benchmark levels, and trees of local genetic provenance are used, the presence of trees that provide better nutrient values will be very unlikely to have a negative impact on the local environment as most [fauna] species would be positively impacted by the presence of more easily obtained nutrients.* However, Dr Lemckert does not provide any commentary on the effectiveness of the nutrient enrichment strategy to mitigate the impacts of the proposal such that the local population of koala will not be placed at risk of extinction. It is noted that the research conduct for the SIS and proposed as part of the impact mitigation strategy is likely to provide highly valuable insights into the long-term conservation status of the koala.

[1] * N-Nitrogen FPC-formulated phloroglucinol compound UBF-unsubstituted B-ring flavanone

As a result, in our view, whilst it may contribute to an increase in preferred koala food trees and availability of nutrients in a generally nutrient poor ecosystem, the proposed forest enrichment program should not be relied on as an impact mitigation strategy for the koala that would materially reduce the risk of the project having a residual significant impact on the koala and the precautionary principal should be applied to the assessment of significance.

In-perpetuity Conservation Area

As noted above, the project proposes to establish a 244.25 ha 'like-for-like' Conservation Area to offset the proposed impact on 212.14 ha of native vegetation and threatened species habitat and specifically impacts to 152 ha of koala habitat. The proposed offset is approximately 115% of the proposed impact on native vegetation. This offset, whilst a beneficial measure, is not of such a quantum that it is considered sufficient to negate the risk of a residual significant impact, even taking into account the potential benefit of increased nutrients for the koala through the enrichment program. Offset ratios in the order of between 2:1 and 5:1 are considered to be industry standard.

Cumulative Impacts

Cumulative impacts are assessed in Section 5.1.3 of the SIS. The cumulative impact assessment section provides an overview of EcoBiological (2009) assessment that was prepared as part of the re-zoning application. The SIS does not provide sufficient consideration of the cumulative impacts of the proposal on the koala, including specific consideration of the ancillary works associated with the transport interchange, sewer and water associated with this development but subject to other approvals.

Summary

Given that there is considerable uncertainty in relation to the extent of the connection between the koalas in the Kings Hill hub and other areas on the lower north coast, the assessment of significance should apply the precautionary principle and consider the impacts of the proposal with reference to the Kings Hill hub local population. The loss of 152 ha of known habitat within this local population represents approximately 11% of the total area of the local population and could be considered significant.

In addition, as discussed above, the proposed biodiversity offset in the form of a conservation area is beneficial but is not considered to be of a large enough size compared to the impact that it justifies the conclusion formed in the SIS that it mitigates the risk of a significant residual impact.

As also discussed above, the proposed forest enrichment program is not considered to be a measure that provides sufficient certainty to be relied on as an impact mitigation strategy for the koala that would materially reduce the risk of the project having a residual significant impact on the koala.

In summary, there is a real chance or possibility that the project as described will have a residual significant impact on the koala, despite taking into account ameliorative and compensatory measures.

2.2 Brush-tailed Phascogale

Section 8.2.21.3 of the SIS identifies that:

> *the Brush-tailed Phascogale has been observed within the subject site since 2004 (HWC 2004; Firebird ecoSultants Pty Ltd 2013 and current investigations). Surveys performed as part of this investigation are considered adequate for this species (Section 4) and appear consistent with the results of surveys performed over the past 15-20 years for this area (HWR 2004, EcoBiological 2009, PEA Consulting 2010, Firebird ecoSultants Pty Ltd 2013; Arcadis 2019). The Brush-tailed Phascogale is considered to occur throughout the entire subject site in low densities, with higher activity levels likely in areas of dense hollow-bearing tree occurrence and mature forest with rough-barked trees; habitat features that are widespread throughout the subject site and locality (Firebird ecoSultants Pty Ltd 2013).*

The extent of surveys undertaken as part of the SIS are considered adequate to identify the likely extent and area of occupancy of the brush-tailed phascogale in the subject site.

The SIS does not identify the extent of the local population of the brush-tailed phascogale or the locality as relevant to the assessment. As the definition of the *locality* and *local population* is an essential aspect of determining the significance of an impact, the absence of this information is critical to assessing the SIS conclusion (DECC 2007)

The proposal will impact the brush-tailed phascogale by reducing the extent of habitat of the local population by 203.6 ha. Section 8.2.21.4 of the SIS identifies the habitat in the direct impact area as comprising 60.49 ha foraging habitat only and 143.11 of foraging and breeding habitat. Justification of the breakdown of foraging versus foraging and breeding habitat is not clear, although Section 4.4.25 of the SIS identifies areas of arboreal surface roughness as an indicator of high foraging habitat value for the brush-tailed phascogale along with the presence of tree hollows (shown on Figures 4.80 and 4.28 respectively). The method for determining the relationship between tree hollows and arboreal surface roughness and the delineation of habitat for the species is not provided. This analysis is considered pertinent to the question of the importance of the habitat to be removed, in relation to the long-term survival of the species.

In relation to the *importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality* (Section d (iii) of the assessment of significance detailed in the Table in Section 8.2.21.4 of the SIS), the SIS states:

> *The Brush-tailed Phascogale relies on large areas of native vegetation for foraging and breeding. The area of habitat to be removed is sufficiently large to satisfy a breeding Brush-tailed Phascogale female and male as is the area of habitat to be retained in the Conservation Area. The species is largely sedentary and as such would likely use the habitat for breeding and foraging purposes. The habitat to be removed is not likely to be important in natal dispersal as it should be noted that the Proposal has accommodated sufficient connected vegetation to maintain local and regional movement. The recent bushfires of the 2019-20 summer season have had an adverse impact on occupied habitat along the NSW east coast that may provide habitat for this species (i.e., 2,715,381 ha of dry and wet sclerophyll forest; BCD 2020). In light of the in-perpetuity protection and management of a larger patch of habitat within the Conservation Area, which has the purpose of maintaining a local viable population of this species, and absence of widespread and damaging wildfires in the lower NSW North Coast bioregion (i.e. lands south of a line between Smiths Lake and Barrington Tops to the Hunter River representing a land area of ~550,000 ha), it is considered that the habitat to be removed by the Proposal is not regarded as important to the long-term survival of the species in the locality.*

In addition to consideration of corridors and the impact of recent bushfires described in the excerpt above, the importance of the habitat for the brush-tailed phascogale should consider the area and quality of the habitat in the locality (the locality corresponds to the local population of the species).

In the absence of identifying the extent of the local population of the species or adequately determine the importance of the habitat to be removed in the broader context of the species, it is difficult to determine whether the local population of the brush-tailed phascogale will be placed at risk of extinction following the removal of 203.6 ha of known habitat and taking into account the identified ameliorative measures proposed. **It is possible that the proper application of the seven-part test based on the identification of the local population and/or appropriate caution would find that there would be a significant impact on the brush-tailed phascogale.**

2.3 Lower Hunter Spotted Gum – Ironbark Forest EEC

Overall, the SIS considers the potential presence of Lower Hunter Spotted Gum – Ironbark Forest EEC (LHSGIF) at the site and finds that only a very small proportion of the candidate vegetation type is consistent with the EEC listing. Our review suggests that the reasoning used to rule out the rest of the candidate vegetation type is inadequate.

The SIS does not provide a clear and logical documentation of the steps undertake to map, classify and assess the plant community types (PCTs) and threatened ecological communities (TECs) present at the site. These shortcomings are addressed below, and lead into our view that the presence of the LHSGIF EEC is likely to be much more widespread in the development area and subject to a significant impact.

2.3.1 Vegetation Mapping and Floristic Survey

One important aspect of determining the PCTs and TECs present is to assess the geology and soil types present, or likely to be present. The SIS relies upon the soil landscape mapping as a proxy for geology. The soil types are addressed, but not clearly. For example, Section 2.1.2.4 of the SIS discusses the soil types, and provides a map at Figure 2.2 which is labelled 'Soil landscapes within the study area', however the figure displays the grouping of 'soil processes' (such as 'erosional', 'residual' etc), and not soil landscapes. The analysis of the Lower Hunter Spotted Gum – Ironbark Forest TEC in Section 6.1.1.2 of the SIS relies heavily on soil types, however no map is provided.

Section 2.1.2.6 states that "Seven native plant community types (PCTs) are mapped within the study area (NPWS 2003) (with minor modifications made for the subject site as recommended by BioLink 2017)". However, the BioLink (2017) report is not provided as an Appendix to the SIS and is not otherwise publicly available for analysis. This statement seems to suggest that the mapping of PCTs is based on a modelling product that is 18 years old (NPWS 2003), which has been superseded by other government vegetation mapping (Greater Hunter Vegetation Map) and that amendments made to that product relied upon by the SIS were undertaken and documented in a report that has not been provided (BioLink 2017).

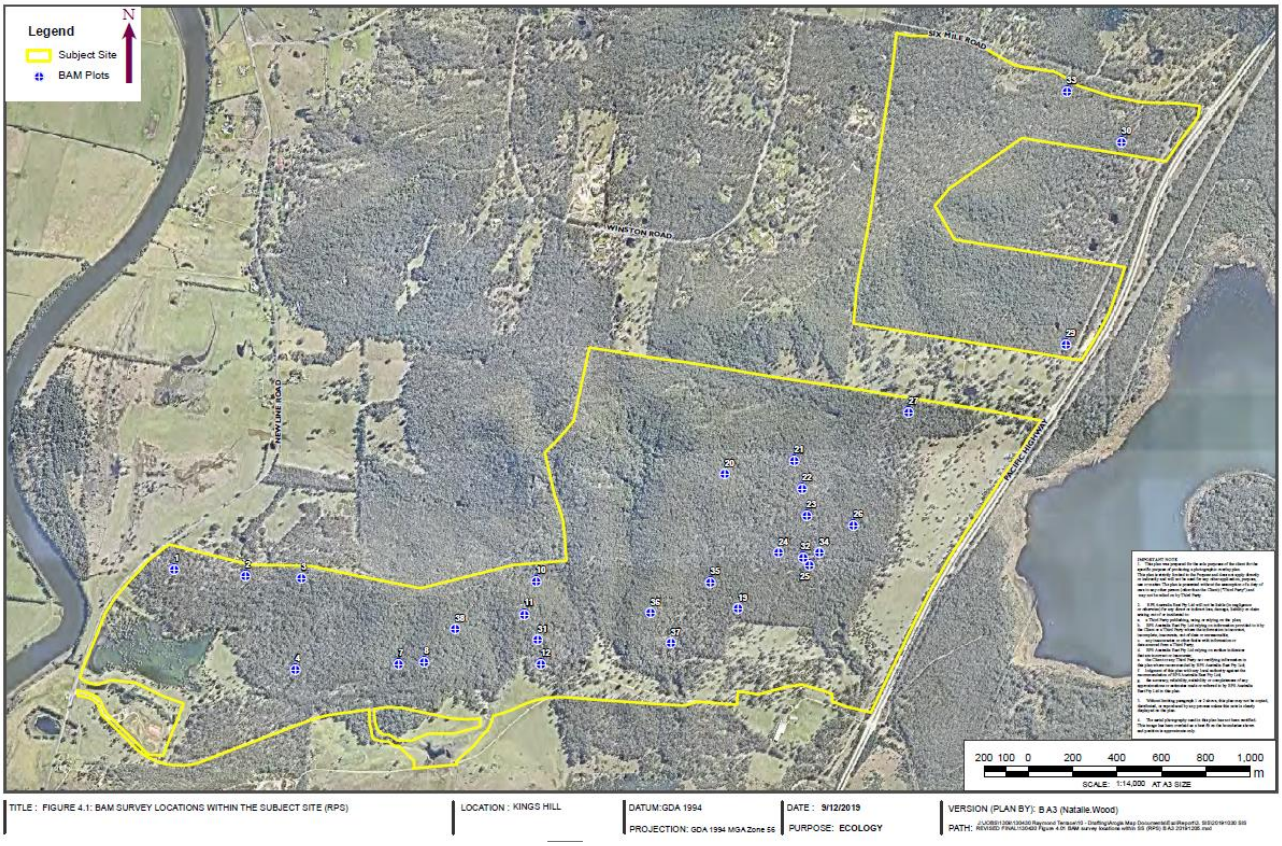
A substantial part of the development area appears to comprise Exotic Grassland, although this vegetation type is not mapped (for example in the PCT map, Figure 2.3). We have inferred that the areas not attributed to a PCT are predominantly Exotic Grassland and comprise up to 59.87 ha. Section 2.1.2.8.1 of the SIS describes the composition of the Exotic Grasslands. Couch (*Cynodon dactylon*) is listed as a dominant exotic grass species, however *Cynodon dactylon* is regarded by the Royal Botanic Gardens Sydney (the NSW premiere authority) as a native species (https://plantnet.rbgsyd.nsw.gov.au). The SIS must state clearly why this species has not been considered to be native, as this allocation biases the outcome towards a more exotic (non-native) grassland. Furthermore, Section 2.1.2.8.1 (p. 39) states that "The dominant native species recorded in a 400 m^2 quadrat was the native grass *Microlaena stipoides* which covered

approximately twenty percent of the quadrat." The location of this plot is not described. Section 4.3.2.1 Table 4.10 displays the SIMPER output for PCTs of the subject site (the statistical analysis supporting the classification of PCTs) and the sections on Exotic Grassland (low relief) and Exotic Grassland (high relief) appear to comprise a not unimportant abundance of native species. There is a reasonable probability that some or all of the areas mapped as Exotic Grassland should be regarded as derived grassland forms of a native PCT, which, given that there could be in the order of 59 ha of Exotic Grassland to be impacted. As addressed below, there is no evidence of floristic plot-based sampling within Exotic Grassland since Cumberland Ecology surveys in 2014, therefore these areas could now support regenerating woodland or forest. This, in turn, might require offsetting and indeed might also constitute a form of TEC. The evidence presented in the SIS is inadequate to reject this possibility.

Section 3.1.3 documents the outcome of database searches to detect the presence of BC Act listed TECs in the "locality". The list presented appears to be appropriate. Figure 3.1 shows "Threatened ecological communities within the locality" and the paragraph preceding it states that "mapped occurrences [of TECs] within the study area are shown in Figure 3.1." The source of the mapping is not stated here or on Figure 3.1. The map in Figure 3.1 shows the presence of four TECs within the study area.

Section 4.2.1.1 briefly mentions the various pre-existing mapping products that have contributed to the development of the overall PCT map for the study area. In this case, a report prepared by Cockerill (2013), which was broad-scale vegetation mapping for the Lower Hunter Strategic Assessment, is mentioned, but there is still no mention of considering mapping prepared for the Greater Hunter Vegetation Map. The contribution of a range of vegetation mapping products that were considered is not mentioned, except, once again, the dependence on the BioLink (2017) report, which has not been provided. Section 4.2.1.2 briefly describes the floristic sampling effort undertaken at the site. It appears that the floristic survey effort was largely based on work undertaken by Cumberland Ecology (2019 – in Appendix F of the SIS). It is noted that the age of this work is not appropriate, in that of the 76 BBAM (Biobanking Assessment Method – NSW method used to collect biodiversity data preceding current BAM approach) plots surveyed, 31 were sampled in 2009, and 45 in 2014. Thus, the most recent age of Cumberland Ecology floristic sampling is now 7 years old. Table 4.1 in Section 4.2.1.2.1 displays the plot survey effort against requirements, and this is based on the BBAM requirement. It is not clear if this "requirement" is based on the contemporary development footprint or a different, older footprint. Furthermore, it does not appear that grasslands (e.g., the Exotic Grassland vegetation type mentioned above) were sampled. Figure 2.1 in Cumberland Ecology (Appendix F of the SIS) appears to show that several plots were sampled in grassland, however the data provided in appendices to that report do not indicate if this is true, or the date on which they were sampled (although they would have been sampled either 7 or 12 years ago).

Section 4.2.1.2.1 goes on to indicate that RPS sampled 28 BAM (Biodiversity Assessment Method – current standard biodiversity assessment approach in NSW) plots in 2018 (although note that Table 4.3 in Section 4.2.2.1 suggests that RPS also sampled floristic plots in 2019, however the split between 2018 and 2019 is unclear). It is assumed that these plots included floristic sampling, because although they were conducted in accordance with the BAM guidelines, that requirement does not extend to the collection of full floristic data at plots. The SIS does not contain a table of flora species by plot recorded by RPS for the 28 BAM plots sampled. Therefore, although there have been 28 plots sampled within an acceptable timeframe prior to the SIS exhibition (EES typically require ≤5 years), it is not apparent as to whether floristic sampling was conducted at these plots. Table 4.3 in Section 4.2.2.1 does not shed any light on this either. We cannot draw a conclusion on whether contemporary floristic sampling is adequate. Furthermore, none of the RPS BAM plots appear to occur within Exotic Grassland (Figure 4.1 of the SIS). It is likely, therefore, that the more rigorous statistical analyses of vegetation types to determine PCTs (presented in Section 4.3.2.1) is based on old (7-12 years old) data and is not reflective of the current value (or type) of vegetation present.



Above: Figure 4.1 of the SIS – BAM survey locations. These potentially collected full floristic data, although this is not clear. They represent the most recent collection of systematic full-floristic data and the only such sampling that is less than 7 years of age. Note that none appear to be placed in Exotic Grassland.

2.3.2 Lower Hunter Spotted Gum – Ironbark Forest EEC

Section 4.3.2.1 describes the PCTs of the study area. In the description of PCT 1590, the description includes the following statement:

> *This community is the dominant community across the study area and is highly variable in terms of floristics and structure. The canopy species vary across the study area with spatial distribution, topography, and aspect, although Corymbia maculata (Spotted Gum) is a core component of the canopy in all areas.*

The following statement is also made:

> *Lower lying, flatter terrain supports further variation. In these areas the canopy is dominated by Corymbia maculata (Spotted Gum) and the ironbarks Eucalyptus siderophloia and Eucalyptus fibrosa (Red Ironbark). The shrub layer ranges from dense to sparse, tending to be dominated by Melaleuca nodosa (Prickly-leaved Paperbark), particularly in the occurrence on the northern property. Examples of this variation within the study area are shown in Plate 4.6 and Plate 4.7.*

In Section 6.1.1 the SIS addresses LHSGIF EEC. The SIS considers, in Sections 6.1.1.1 and 6.1.1.2 respectively, the possibility of PCT 1600 and PCT 1590 corresponding with LHSGIF. At Section 6.1.1.1. the SIS correctly states that:

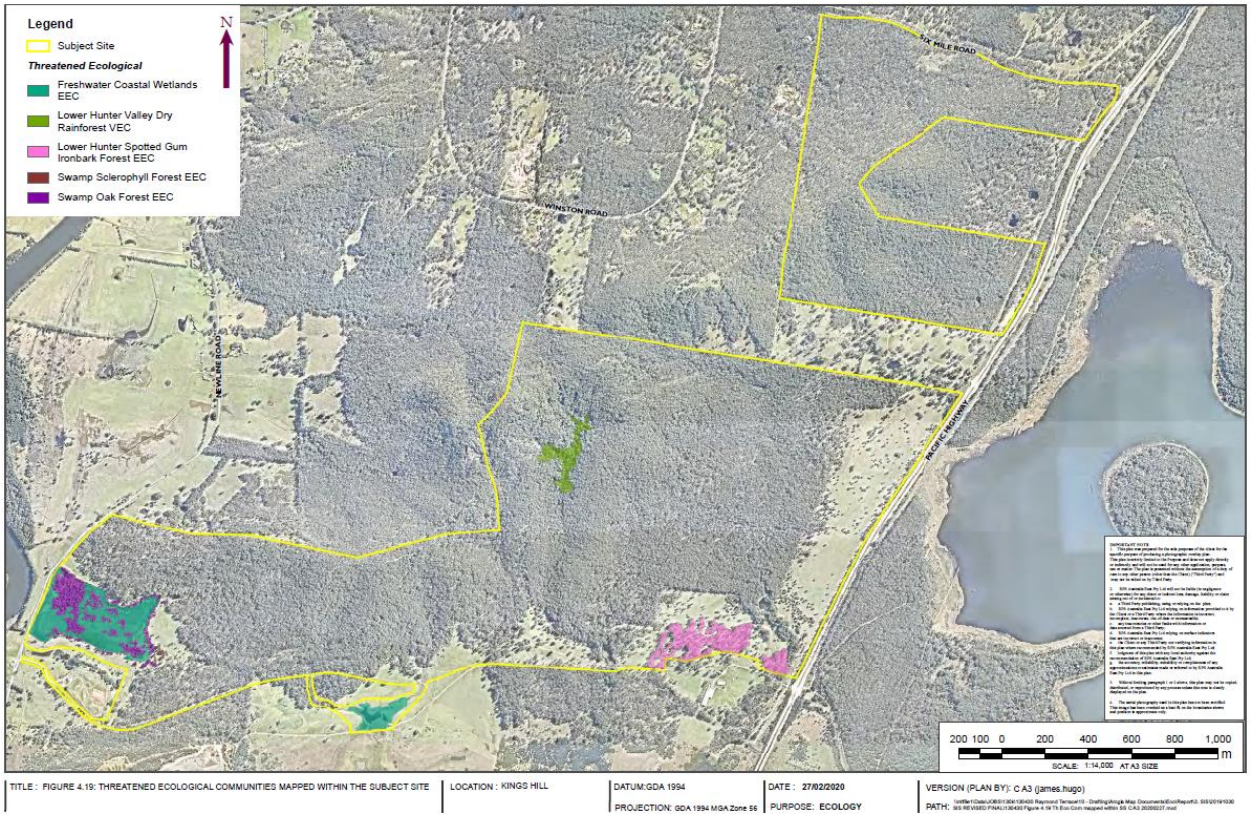
> *The assigning of LHSGIF EEC to vegetation within the subject site has not been predicated by published relationships with PCTs. More appropriately, a merits-based approach has been adopted where the description of the gazetted listing has been taken into account.*

The principle of this approach is supported in our review. The text then goes on (p. 415) to state that:

> *The fundamental indicators for the positive identification of LHCGIF EEC are as follows:*
>
> - *Comprises a high percentage of the prescribed 'assemblage of species' mentioned in Part 1.1 of the listing, notwithstanding the limitations mentioned in paragraph 1.2; and*
>
> - *Must occur within the Sydney Basin or North Coast bioregions (Part 2.1).*

This approach is also supported, although it is noted with caution that "high percentage" is a relative term. The 'part' and 'paragraph' references relate to the Final Determination to list the EEC.

In Section 6.1.1.1 the SIS concludes that PCT 1600 is equivalent to the LHSGIF EEC, in its entirety – that is, an impact of 6.21 ha that would be cleared for the development. The location of PCT 1600, and therefore the mapped LHSGIF EEC, is shown in the excerpt from Figure 4.19.



Above: excerpt from Figure 4.19 showing threatened ecological communities in the subject site.

Section 6.1.1.2 of the SIS addresses the correspondence of vegetation that has been mapped as PCT 1590 with the LHSGIF EEC. The SIS (p. 417) finds that:

> *Unequivocally, the combination of environmental gradients (i.e., mean annual rainfall and edaphic environmental gradients) and vegetation composition, represent clear discriminating factors in dismissing alignment between PCT 1590 and LHSGIG EEC within the subject site. Reliance is placed on the description of floristic composition provided in Section **4.3.2.1** for PCT 1590, notably the statistical analysis results provided in **Figure 4.21** and **Table 4.9**, and the environmental gradients that typify the subject site (i.e., mean annual rainfall and soils).*

Table 6.1 is presented, which details a comparison of relevant parts and paragraphs of the Final Determination for LHSGIF EEC. However, as stated in the excerpt above, and obviated by the text in Table 6.1, **there has been significant reliance on factors <u>other</u> than those regarded as fundamental on p. 415 (and reproduced above), that is the high percentage of the 'assemblage of species' and the particular area (Sydney Basin or North Coast Bioregions)**. A key element of Table 6.1 is the first entry, the assessment against part 1.1 of the Final Determination. The right-hand column lists species that are regarded (by the SIS author) as being "absent (or in very low abundance and never characteristic)"; "uncommon (and never characteristic)"; "commonly encountered (but not necessarily characteristic)"; and "frequently encountered (characteristic)". The Final Determination itself lists 44 species that comprise the assemblage of species. Those 44 species are presented in the table, categorised as above. The SIS found the following numbers (without discriminating between variants): absent – 2 species actually present, comprising *Phyllanthus hirtellus* and *Pomax umbellata* (5% of the Final Determination species assemblage); uncommon – 8 species (18%); common – 8 species (18%); and frequently encountered – 12 species (27%). In total, 63% of the species assemblage is present (or 68% if the initial two species are included). In the authors' combined extensive experience with TEC analysis, and given that the LHSGIF EEC is likely at its distributional limit in the study area, this is a high to very high proportion of the Final Determination's assemblage of species. Even if only the frequently encountered species were included, a 27% representation is not of its own merit enough to conclude that the EEC is not present.

The other factors that are relied upon to discriminate against the presence of LHSGIF EEC for PCT 1590, being edaphic and mean annual rainfall matters, are not supported by this review. The Final Determination (part 4.2) clearly indicates that the LHSGIF EEC is "…not restricted to yellow podzolic and solodic soils", although the analysis provided seems to suggest that the absence of these soils in the development footprint is a contradictory matter. Further, the Final Determination (part 4.5) suggests that the mean annual rainfall for "successive treatments" have recognized the LHSGIF EEC to occur in an area where the "annual rainfall is in the range 750 – 1000 mm." The analysis provided in the SIS states that the nearest weather station (Kinross) has an average annual rainfall of 1044.6 mm, which is slightly higher than the range recorded in the Final Determination. In any case, both edaphic factors and average annual rainfall are regarded to be supplementary, and not determinative. Indeed, when referring to all material presented in Part 4, the Final Determination itself states, that:

> *The following information is additional to that required to meet the definition of an ecological community under the Act, but is provided to assist in the recognition of Lower Hunter Spotted Gum Ironbark Forest in the field. Given natural variability, along with disturbance history, Lower Hunter Spotted Gum Ironbark Forest may sometimes occur outside the typical range of variation in the features described below.*

In summary, the SIS has not adequately refuted the presence of a substantial occurrence of LHSGIF EEC corresponding with PCT 1590 in the development area because:

- Despite PCT 1590 being split into variants in the PCT description in Section 4.3.2.1, no analysis was undertaken in this manner, therefore the floristic analysis against the EEC must be undertaken against the whole body of data for PCT 1590.

- In the SIS the 'bar' is set very high for species to be considered "characteristic", although this is not the case in the Final Determination – there is no discrimination regarding the contribution of individual species to the assemblage of species; in any case, in this analysis we find that there is an ample dominance of 'characteristic' and other species to support the presence of the EEC corresponding with PCT 1590.

- The SIS does not present floristic data for the plots that contribute to the PCT 1590 (from either RPS or Cumberland Ecology data), therefore an appropriate independent analysis cannot be undertaken.

- The age of the floristic data sampled, ranges from 2-3 years to 7-12 years, with the only definite floristic data being obtained from the 7–12-year-old plots; and the reliance on different age ranges for this analysis is not explained.

- The SIS relies heavily on 'non-fundamental' factors in refuting the presence of LHSGIF EEC correspondence with PCT 1590, despite its statement that the 'fundamental' factors are of pre-eminence.

The seven-part test of significance presented in Section 8.3 assumes a loss of 5.05 ha, which corresponds with PCT 1600 and does not take into account some or all of PCT 1590 being LHSGIF EEC. It is noted that it is possible or indeed likely that some or all of the PCT 1590 to be protected within the Conservation Area could also be LHSGIF EEC. If this was the case, then the total loss of EEC would be in the order of 164.14 ha (or more if some of the Exotic Grassland proves to be LHSGIF EEC), while the potential maximum offset could be 112.41 ha. There could, therefore, be an offset outcome of just 0.68 ha protected for every 1 ha lost, or in other words a protection to loss ratio of 0.68:1. In our view this would fall well short of meeting the OEH *Principles for the Use of Biodiversity Offsets in NSW*, particularly Principle 6, which states that:

> *Enhancement of biodiversity in offset areas should be equal to or greater than the loss in biodiversity from the impact site.*

The proposed offset outcome would also fall well short of contemporary biodiversity offset outcomes under the BAM, and indeed for major or significant projects under the FBA (Framework for Biodiversity Assessment – precursor of the BAM for major projects), both policies/legislation that have been in effect or even superseded during the development of the SIS.

It is also of note that the amelioration measures for the koala (see Section 2.1 above) rely on the deliberate manipulation, over time, of the canopy tree species abundance of PCT 1590. The impact of this deliberate action on the LHSGIF EEC in the Conservation Area has not been considered, and would need to be.

In conclusion, this review finds that there is an at least reasonable probability that some or all of the vegetation mapped as PCT 1590 (159.09 ha) corresponds with the Lower Hunter Spotted Gum – Ironbark Forest EEC. Furthermore, some of the vegetation mapped as Exotic Grassland (59 ha) could correspond with the EEC as well. **It is very likely that, on the assumption that a reasonable proportion of PCT 1590 is TEC, the proper application of the seven-part test would find that there would be a significant impact on the Lower Hunter Spotted Gum – Ironbark Forest EEC.**

2.4 Pterostylis chaetophora

Overall, there is no definition of 'locality', 'local occurrence', 'local population' in relation to the seven-part tests, so the definitions used in the *Threatened Species Assessment Guidelines* (DECC 2007) are assumed to have been considered, although this isn't explicitly stated.

A search of the NSW Government's Bionet website (16 May 2021) shows several *Pterostylis chaeotophora* records in the study area and local area.

The species is regarded as flowering during September-November (PlantNET, Bionet Threatened Biodiversity Data Collection, and the CERs).

The timing of targeted threatened flora surveys (Section 4.2.1.3 p. 112) was as follows:

- RPS: 27-31 August 2018, 3-7 September 2018, 8-12 and 31 October 2018, 1-2 November 2018 and 14, 17-18 and 23 October 2019,

- Cumberland Ecology (Appendix F): 23-25 January 2017 and 16-17 and 23-24 August 2018.

Note that the above time periods do not concur with those (more extensive) surveys put forward in Section 4.2.2.1 table 4.3 (p. 132). Of relevance to this discussion, additional surveys dates to those above include 17-20 September 2018, 5, 17, 24-25 and 30 October 2018, and 7-9 November 2018 by RPS; and October 2017 by Cumberland Ecology.

The Cumberland Ecology report states in Section 2.4 that:

> *The Hunter area experienced its lowest soil moisture on record between September 2017 and January 2018. It is, however, unlikely that survey results are impacted by these dry conditions, except for the targeted surveys conducted in October 2017.*

Section 4.2.2.5.2 of the SIS states that:

> *The weather conditions at the time of the flora surveys were generally favourable for plant growth and production of features required for identification of most species.*

In Section 4.3.1.1 the SIS states that:

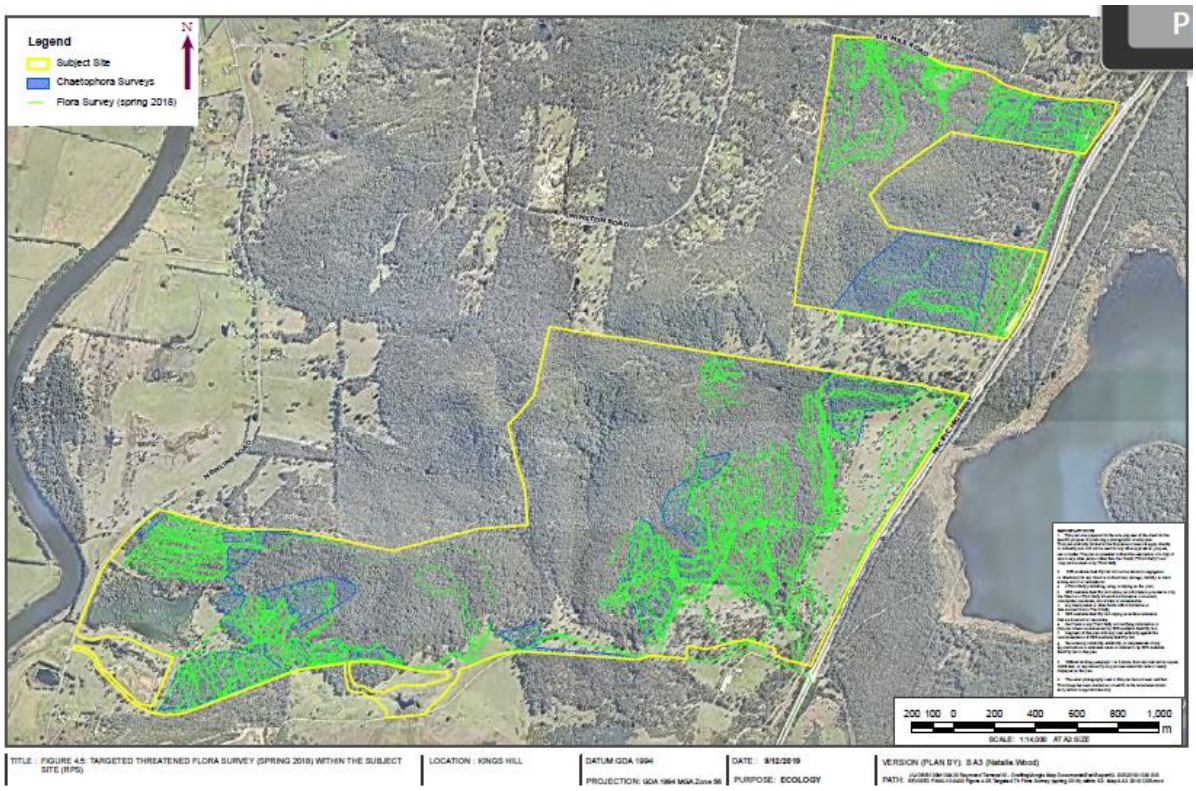
> *It is considered that the survey methods and effort expended are comprehensive and have provided an accurate appraisal of the occurrence of threatened flora within the subject site.*

Section 4.4.4 of the SIS states that the stratified survey for *Pterostylis chaetophora* was performed using parallel transects generally in accordance with the Guide to Surveying Threatened Flora in NSW (OEH 2016).

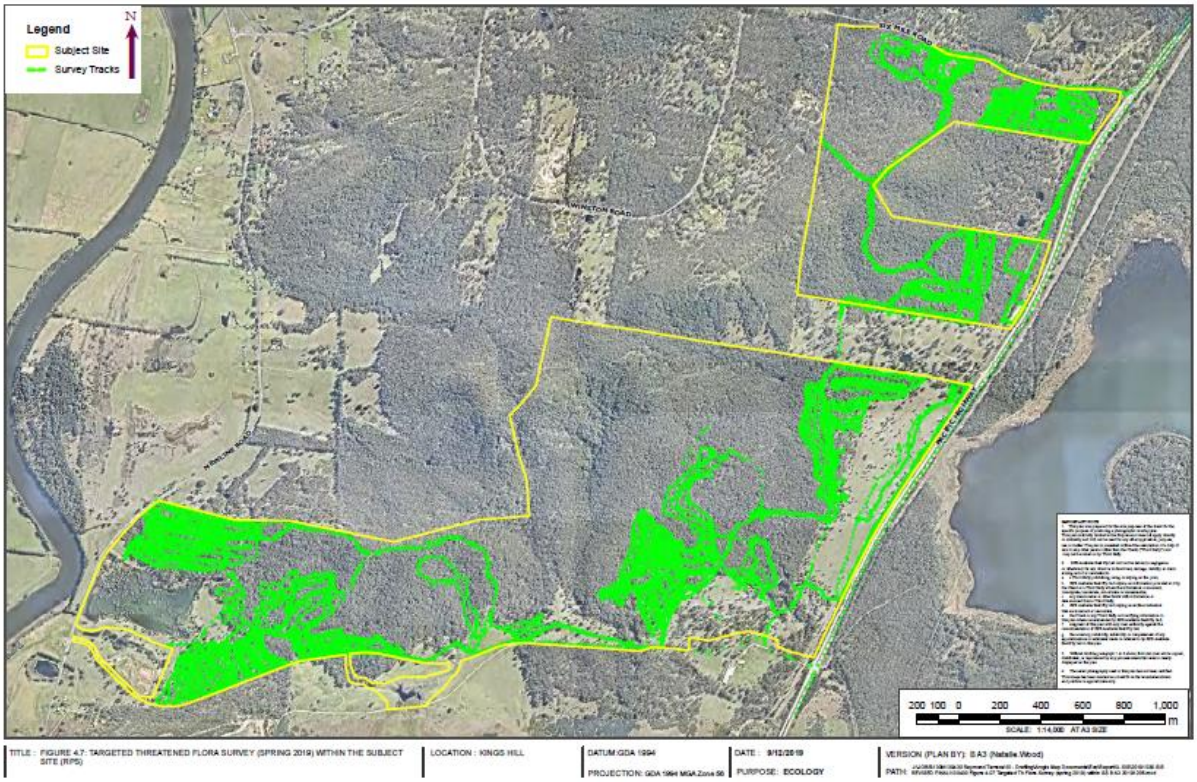
Section 4.2.1.3 of the SIS states that:

> *Stratification units were developed for the targeted surveys of ground orchids (i.e. Pterostylis chaetophora) in the October – November flowering period (surveys performed in 2018 and 2019). These stratification units were delineated from the literature [i.e. grassy forests with melaleuca midstorey as indicated by the habitat profile provided by the Threatened Species Profile Database (OEH 2019b), habitat description for this species as provided in the OEH CERs and habitat conditions observed at the nearby Ferrodale 'reference site' located approximately 1 km to the northeast of the subject site]. The stratified survey was performed within vegetation described as Seaham Spotted Gum Ironbark (MU 16).*

The following figures show the spring 2018 and spring 2019 targeted threatened flora survey effort, respectively, with the *Pterostylis chaetophora* surveys depicted on the spring 2018 survey effort figure.



Above: excerpt from Figure 4.5 – targeted spring 2018 threatened flora survey; not blue hatching for area of particular survey interest for *Pterostylis chaetophora*.



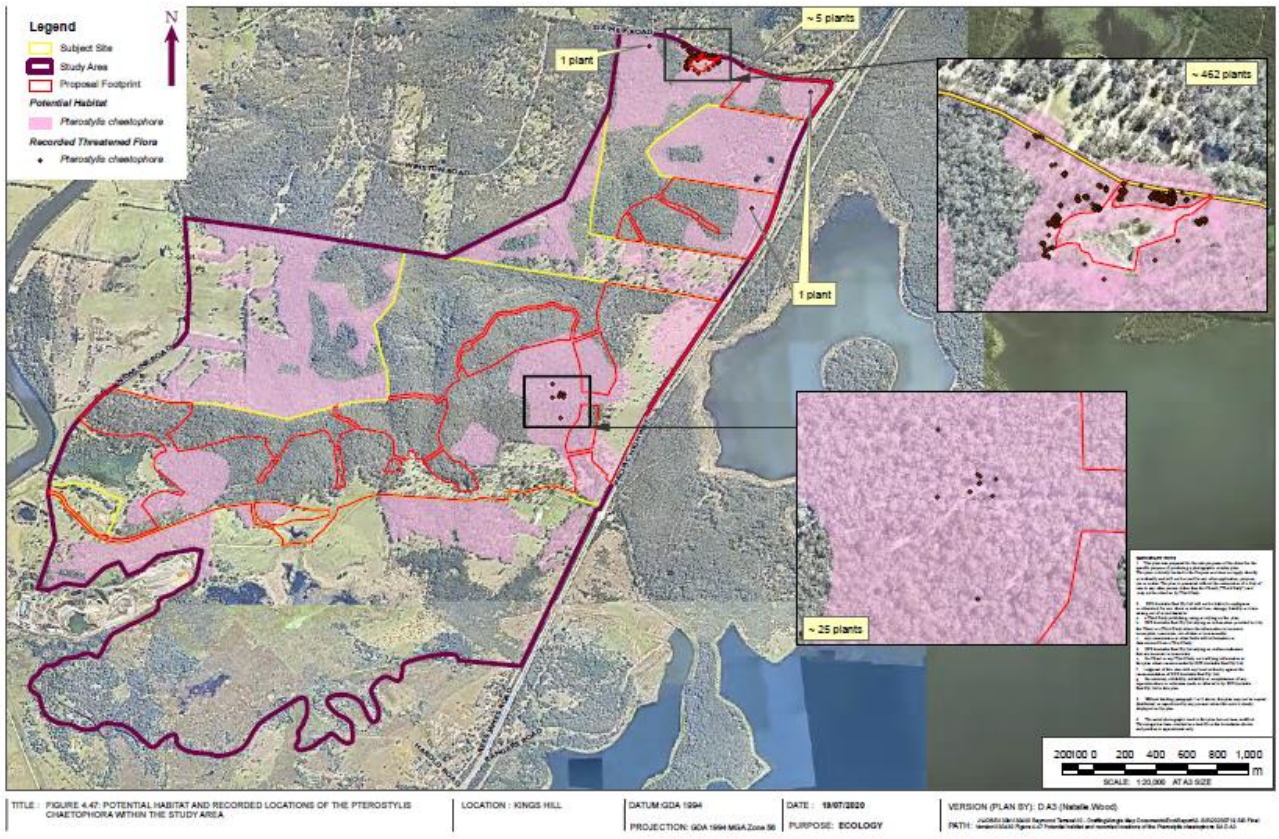
Above: excerpt from Figure 4.7 – targeted spring 2019 threatened flora survey.

Section 4.2.1.3 of the SIS describes the threatened flora targeted surveys. It states that the spring 2018 survey was adequate for surveying *Pterostylis chaetophora* and refers to the OEH (2016) *Threatened Flora Survey Guidelines*. They require 5-10 m parallel transects for terrestrial orchids – 5 m in dense vegetation and 10 m in more open vegetation. The transects displayed in Figure 4.5 (p. 114) and Figure 4.6 (p. 115) appear to be much more widely spaced than 5-10 m. The "Chaetophora surveys" areas shown in blue hatching in Figure 4.5 (p. 114) depicts the location of targeted *Pterostylis chaeotphora* surveys. It is unclear if these are the only places searched thoroughly for *Pterostylis chaetophora*.

The survey effort within the stratification areas depicted on Figure 4.5 (p. 114) is not displayed, unless it is the general threatened flora transects that are overlayed. If this is the case then substantial areas of the targeted "Chaetophora surveys" areas have not been surveyed.

Despite the claim that the surveys were conducted in accordance with the *Threatened Flora Survey Guidelines* (OEH 2016), the density of parallel transect lines displayed in the figures seems to suggest otherwise. Extensive parts of the target areas for *Pterostylis chaetophora* were not surveyed. It is also not possible to determine which transect lines displayed on the RPS Figures 4.5 and 4.7 relate to the species and not other threatened flora species.

Figure 4.47 (p. 206) of the SIS shows the results of the *Pterostylis chaeotophora* surveys. Of interest, there seems to be little, if any, relationship between the "Chaetophora surveys' areas displayed on Figure 4.5 and where the species was actually recorded in relative abundance. This, coupled with the knowledge that the survey effort was not in accordance with OEH (2016), and that key parts of the target areas were not sampled, leads to the conclusion that the survey effort was inadequate.



Above: excerpt from Figure 4.47 showing survey results for Pterostylis chaetophora; compare this with the location of target surveys (blue hatching) on Figure 4.5 above.

The introductory text prior to the seven-part test of significance in Section 8.1.3.3 of the SIS states that:

> *Surveys performed are considered adequate for this species (**Section 4**) with the results being representative of occurrence. The species was observed in small low number clusters within the area to be cleared, with the individual count numbering approximately 20 individuals. A large sub-population numbering ~460 individuals was observed within the Conservation area. The seven-part test of significance is thus conducted on the expected loss of 118 individuals (4.66 ha of habitat), in the context of 1,467 individuals (and 8.62 ha of habitat) being protected in the Conservation Area.*

In relation to the impact of the development on the species, Section 5.3.3 of the SIS states that:

> *The Proposal will remove 1.41 ha of occupied habitat (30 m buffer from known individuals) comprising ~20 plants. Habitat removal is to be in accordance with a Phased approach (i.e. three Phases over 8+ years), which has the purpose of proportioning impacts over time using methods and processes outlined in the VMP. The majority of the estimate[d] habitat removal (i.e. ~60% of 1.41 ha) is to occur in Phase 1 following consecutive 20% losses in Phases 2 and 3. In executing the VPA, the Proposal will allow for an in-perpetuity protection and management outcome comprising 4.36 ha of occupied habitat containing ~470 individuals.*

The seven-part test of significance is thus conducted on the expected loss of ~20 individuals (1.41 ha of habitat), in the context of ~470 individuals (and 4.36 ha of habitat) being protected in the Conservation Area. The calculation of the number of individuals impacted, and the footprint of impact, appears to be based on estimates that result from direct counts, despite inadequate sampling, and there appears to be no precautionary approach undertaking to extrapolating or further estimating impacts.

In conclusion, this review finds that the survey effort conducted for *Pterostylis chaetophora* was likely to be inadequate in coverage, and inadequate in intensity/density. The conduct of the seven-part test, without appropriate caution, on the raw information obtained at the end (or post) one flowering season is not likely to properly represent the distribution and abundance of the species, or the footprint of its habitat, in the development area (or possibly the Conservation Area). **It is very likely that the proper application of the seven-part test based on appropriate survey effort and/or appropriate caution would find that there would be a significant impact on *Pterostylis chaetophora***.

2.5 Corybas dowlingii

Section 2.2.1.1 and other parts of the SIS opine that *Corybas dowlingii* is no longer recognized as a species, rather that the entity is a 'stable hybrid' between *Corybas aconitiflorus* and *Corybas barbarae* (i.e. *Corybas × dowlingii*), with the conservation status of this stable hybrid assessed by as being of least concern. This is based on a taxonomic treatment by Wagner et al. (2020), which is a professional assessment of the taxonomy of this entity, but is nonetheless not the ultimate arbiter of whether or not an entity is a listed species in relation to impact assessment legislation in NSW. A check of PlantNET, the official plant species website of the Royal Botanic Gardens Sydney, on 16 May 2021, shows that *Corybas dowlingii* is currently recognized as a species in NSW. Likewise, it is currently listed under Schedule 1 of the BC Act (last updated 17 July 2020) as an endangered species. Although the SIS author might contend that there is some disagreement as to the entity's suitability as a species, it must be assessed as it is currently recognized. The SIS does this.

Overall, there is no definition of 'locality', 'local occurrence', 'local population' in relation to the seven-part tests, so the definitions used in the *Threatened Species Assessment Guidelines* (DECC 2007) are assumed to have been considered, although this isn't explicitly stated.

A search of the NSW Government's Bionet website (16 May 2021) shows at least one record of *Corybas dowlingii* in the study area.

Section 4.4.2 of the SIS states that surveys for *Corybas dowlingii* are in accordance with the Guide to Surveying Threatened Flora in NSW (OEH 2016).

Section 4.2.1.3 of the SIS describes the threatened flora targeted surveys. It states that the winter 2018 survey was adequate for surveying *Corybas dowlingii* and refers to the OEH (2016) Threatened Flora Survey Guidelines. They require 5-10 m parallel transects for terrestrial orchids – 5 m in dense vegetation and 10 m in more open vegetation. The transects displayed in Figure 4.4 (p. 113) appear to be 100+ m wide, or more, and sometimes less.

The timing of targeted threatened flora surveys (Section 4.2.1.3 p. 112) was as follows:

- RPS: 27-31 August 2018, 3-7 September 2018, 8-12 and 31 October 2018, 1-2 November 2018 and 14, 17-18 and 23 October 2019,

- Cumberland Ecology (Appendix F): 23-25 January 2017 and 16-17 and 23-24 August 2018.

This species is known to be a winter flowering species. The NSW Threatened Species Scientific Committee's Final Determination to list *Corybas dowlingii* states that the flowering period for the species is June-August. PlantNET does not list flowering periods. The CERs state June to (early) August, and mid-late July, with peak flowering in early- to mid-June. The NSW Government Bionet Threatened Biodiversity Data Collection (checked in April 2021) specifies June and July but not August as survey months for *Corybas dowlingii*.

From the above it appears that that 'winter' survey effort for *Corybas dowlingii* by RPS was 27-31 August 2018, while the effort by Cumberland Ecology were 16-17 and 23-24 August 2018. Section 3.3.2 of the Cumberland Ecology report (Appendix F) notes that the individuals of the species detected in August 2018 was "post-flowering".

Section 4.2.2.5.2 states that:

> *The weather conditions at the time of the flora surveys were generally favourable for plant growth and production of features required for identification of most species.*

In Section 4.3.1.1 the SIS states that:

> *It is considered that the survey methods and effort expended are comprehensive and have provided an accurate appraisal of the occurrence of threatened flora within the subject site.*

The survey effort for *Corybas dowlingii* is displayed on Figure 4.4 of the SIS and on Figure 2.1 of Cumberland Ecology (Appendix F), and reproduced below. The location of the Cumberland Ecology surveys is difficult to interpret in Figure 2.1 because of the selection of colours used to depict the transects. However it appears that the 16-17 and 23-24 August 2018 threatened flora transects do not provide comprehensive coverage of the development area, and while observers might have been spaced 5 m apart, the transects themselves were not. Likewise, although the RPS surveyors might have been spaced 5 m apart, the transects were not.

In addition to the above, Cumberland Ecology (Appendix F) states that:

> *Additionally, in the patch where threatened orchids were identified in 2018, a total of 20 random 2m x 1m plots were surveyed to estimate the species abundance.*

This much more intensive survey effort (shown below) was all within the Conservation Area.

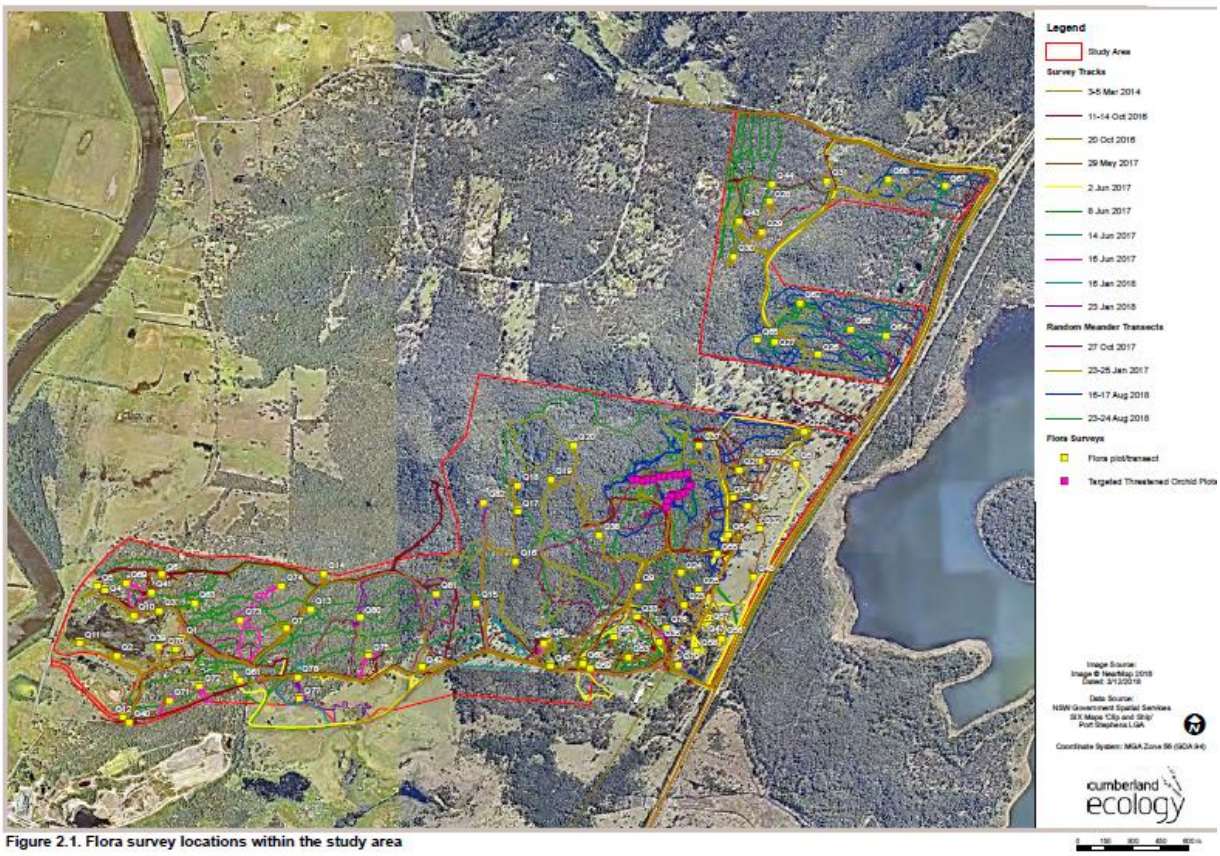


Figure 2.1. Flora survey locations within the study area

Above: excerpt from Figure 2.1 flora survey locations; note the targeted threatened orchid plots in pink.

In total 118 individuals (covering 4.66 ha of habitat) of *Corybas dowlingii* were located within the development footprint, while 1,467 individuals (covering 8.62 ha of habitat) were located within the Conservation Area.

The introductory text prior to the seven-part test of significance in Section 8.1.1.4 of the SIS states that:

> *Surveys performed are considered adequate for this species (Section 4) with the results being representative of occurrence. A count of 1,585 individual plants was recorded within the subject site with 118 individuals occurring within the impact area with the remaining 1,467 individuals occurring within the Conservation Area.*

The seven-part test of significance is thus conducted on the expected loss of 118 individuals (4.66 ha of habitat), in the context of 1,467 individuals (and 8.62 ha of habitat) being protected in the Conservation Area. The calculation of the number of individuals impacted, and the footprint of impact, appears to be based on estimates that result from direct counts, despite inadequate sampling, and there appears to be no precautionary approach undertaking to extrapolating or further estimating impacts.

In conclusion, this review finds that the survey effort conducted for *Corybas dowlingii* was inadequate in coverage, inadequate in intensity/density, and poorly timed. The conduct of the seven-part test, without appropriate caution, on the raw information obtained at the end (or post) one flowering season is not likely to properly represent the distribution and abundance of the species, or the footprint of its habitat, in the development area (or possibly the Conservation Area). **It is very likely that the proper application of the seven-part test based on appropriate survey effort and/or appropriate caution would find that there would be a significant impact on *Corybas dowlingii*.**

2.6 Further comments on the SIS

The SIS is structured in a manner that makes the locating of data somewhat of a challenge. This is particularly evident in relation to the flora survey and vegetation community mapping, whereby the detail regarding floristic plot analysis is 'hidden' within paragraphs of information contained within Section 4.3.2 "General Species Survey Results". This is unfortunate, as the way in which vegetation communities (PCTs) are delineated forms the basis of much of the rest of the report. Further to this, the report does not present the floristic plot data, disenabling the analysis of species presence by vegetation community.

Given that the report relies upon geology and soil types to draw a conclusion that PCT 1590 does not correspond to the LHSGIF ECC, these layers should be presented as figures.

Similarly, the presentation of data in relation to threatened fauna species is also challenging, in that key details regarding the characteristics of the fauna populations was contained within Appendices and not provided in a clear manner in the main text of the SIS.

Seven part tests – overall there is no definition of 'locality', 'local occurrence' or 'local population', so the definitions used in the *Threatened Species Assessment Guidelines* (DECC 2007) are assumed to have been considered, although this isn't explicitly stated.

In light of the review of TECs provided in Section 2.5 of this report, the SIS does not provide adequate consideration of the effect of the forest enrichment program on the floristic and structural integrity of the PCTs and TECs recorded in the proposed conservation area. Further analysis of the impact of the forest enrichment program on the retained vegetation in the proposed conservation area is considered warranted.

The BMP and VMP are considered to be broadly adequate in their approach and objectives, however we note that both documents would require review following the outcomes of any concurrence review from EES.

2.7 Conclusions regarding SIS adequacy

Umwelt recommend that the Panel, as the consent authority, seek concurrence from the former Chief Executive of OEH now Coordinator-General, EES, to determine the adequacy of the SIS and its conclusions. Concurrence is recommended due to the probability of a significant impact on the following:

- Koala
- Brush-tailed phascogale
- Lower Hunter Spotted Gum – Ironbark Forest EEC
- *Pterostylis chaetophora*
- *Corybas dowlingii*.

Other species and TECs not examined in detail by this review might also be subject to a significant impact.

3.0 Adequacy of SIS Advertisement and Exhibition

Objective 2	*Confirm (or otherwise) that advertising and exhibition requirements for the SIS have been properly executed.*

The following timeline relates to the lodgement, notification and advertisement of the DA and SIS:

- DA was lodged with Council 23.11.2018
- SIS V4 (22 May 2019) first notified and advertised 6.6.2019 to 4.7.2019 (29 days)
- SIS V6 (13 March 2020) re-notified 19.3.2020 to 2.4.2020 (15 days)
- SIS V7 (24 July 2020) presented to and considered by the Panel.

The matter of procedural compliance may require a legal review. The following commentary is provided as an outcome of our review, however, we note that it does not constitute legal advice and that this matter may require further review.

The requirements for public exhibition of the SIS at the time the SIS was actually exhibited were governed by clause 89 of the Regs (this has now been repealed). This required the DA and SIS to be notified for 28 days. Clause 89(2)(b) has a specific additional requirement for this DA. The written notice and the published notice *must contain a statement that the development is threatened species development*. The copy of the Ad provided by Port Stephens makes no such reference and we cannot comment on the written notices as it was not available as part of the peer review. With regard to the need for advertising an amended application, clause 90(1)(b) of the EP&A Reg states that where 'the consent authority is of the opinion that the amended, substituted or later application differs only in minor respects from the original application' and in this event under clause 90(2) 'the consent authority may decide to dispense with further compliance with this Division', Clause 90(3) also contains provisions notification of this decision by the consent authority to the proponent. As Umwelt has not reviewed the changes between the originally exhibited SIS and the amended SIS we can make no commentary regarding whether or not the changes would appropriately be considered 'minor'. We note, however, that this is a decision for the consent authority.

Therefore, our review indicates that the original exhibition period should have been 28 days and that a revised exhibition period is only required if the consent authority is of the opinion that amended, substituted or later application differs only in minor respects from the original application. We reiterate our view that this matter may require legal clarification.

4.0 Need for Project Referral

Objective 3	*Resolve if there is a need for (and if so, the timing required for) referral of the matter to the Australian Government for consideration under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).*

In deciding to refer an Action to the Department of Agriculture, Water and the Environment (DAWE) for approval under the EPBC Act, a proponent must determine whether there are any impacts of the proposed action on matters of national environmental significance (MNES) are likely to be significant impacts. The *Significant Impact Guidelines 1.1* describe significant impacts as being important, notable, or of consequence, having regard to their context or intensity.

Under the EPBC Act an Action will require approval from the minister if the Action has, will have, or is likely to have, a significant impact on a MNES. We consider that the direct and indirect impacts of the proposal on the following MNES should be referred to the DAWE because of the chance of a significant impact:

- koala
- migratory species associated with Irrawang Swamp
- Coastal Swamp Oak (Casuarina glauca) Forest EEC
- large -eared pied bat
- swift parrot
- regent honeyeater
- spotted-tailed quoll, and
- grey-headed flying fox.

Whilst the significant impact guidelines under the EPBC Act differ to the considerations under the TSC Act, we note that the proponent's application identified that the project would likely result in a significant impact on a number of the above matters.

Proper consideration will need to be given to the potential presence of the Central Hunter Valley Eucalypt Forest and Woodland CEEC within that part of the development footprint that occurs within the Hunter Catchment.

Given the probability of significant impacts on MNES, it is our view that the proposal needs to be referred and that it is likely that a Controlled Action decision/approval would need to be granted prior to works associated with the proposal commencing. Given that 'Phase 0' of the project includes a number of on-ground actions within the proposed Conservation Area, which would form part of the Action, it is recommended that project referral is made prior to any action associated with the project that might result from an approval under the EP&A Act.

Based on the quantum of impacts associated with the proposal, it is considered likely that DAWE will consider the proposal a controlled action requiring approval of the Commonwealth Minister for the Environment.

5.0 Consideration of the Voluntary Planning Agreement

Objective 4	*Outline the framework, timing, and any issues that need to be addressed to finalise and publicly exhibit a draft Voluntary Planning Agreement (VPA) which the developer has agreed to enter with Council concerning ongoing management of biodiversity issues on the site.*

On 8 December 2020 Port Stephens Council resolved to agree in principle to the preparation of a draft Voluntary Planning Agreement for the purposes of securing biodiversity offsets related to Development Application 16-2018-722-1 for land at Kings Hill. The proposed terms of the draft VPA are contained in the Council report of 8 December 2020:

- Approx. 231 hectares of conservation land at Kings Hill will be rehabilitated and enhanced by the Developer, prior to being transferred to Council ownership.
- The Developer will undertake works over 5 years to enhance the conservation land in accordance with a Biodiversity Management Plan, including fencing and weeding. These works have been costed at $3,500,000 and will be entirely funded by the Developer.
- The Developer will provide a bank guarantee of $600,000 as rolling security that these works will be completed.
- If Council is satisfied with the enhancement works completed by the Developer, the Developer will dedicate the conservation land at no cost to Council.
- On dedication of the land to Council, the Developer will make a monetary contribution to Council of $3,000,000 to fund the ongoing management of the conservation land for 40 years, including weed and pest management, bushfire management, fencing and trail maintenance.
- After 40 years, the indicative ongoing costs to Council have been calculated at approx. $80,000 *per annum.*
- The draft *VPA will not impact the obligations of the Developer to pay local infrastructure contributions under the Port Stephens Local Infrastructure Contributions Plan 2020.*

The intention of the VPA is to secure the conservation lands to offset the likely impacts of the development through rehabilitation, maintenance and management and secure funding to cover Council's management costs for 40 years.

The SIS does not include any discussion of the method or metrics by which the funds in the draft VPA have been determined and therefore we are not able to comment on the adequacy of the funding identified in the draft terms outlined above.

We note that the draft VPA is on hold pending the outcome of the Panel's assessment and any outcomes of a concurrence review by EES. In executing the VPA, Port Stephens Council should ensure that the proposed funding mechanism adequately covers the range of ongoing management and monitoring costs, particularly in relation to the management of the highly invasive and ecosystem altering weeds such as African olive (*Olea europaea* subsp. *africana*) and lantana (*Lantana camara*), which are known to occur in the proposed conservation area (refer to Figure 4.23 of the SIS).

We would also recommend that the VPA contain clauses which ensure that any funds provided under the VPA for ongoing maintenance and management of the Conservation Area are expended only for that purpose.

We also note that under the current framework a VPA must be publicly exhibited and include an Explanatory Note.

6.0 Approval Pathway

Objective 6	*Provide a step-through of the approval pathway applicable to this DA. This shall require review of the DA and supporting documents with respect to their compliance with the legislative requirements for DAs, the statutory planning framework and process for submissions, including changes in legislation that have occurred since the DA was lodged on the 23 November 2018, noting the timing of the transitional arrangements for interim designated areas under the Biodiversity Conservation (Savings and Transitional) Regulation 2017.*

The development application was submitted under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The development application was initially lodged with PSC on 23 November 2018, which is prior to 24 November 2018 and was therefore within the transitional period following the enactment of the *Biodiversity Conservation Act 2016* (BC Act). This provided that the Port Stephens local government area (LGA) be considered as an interim designated area under the Biodiversity Conservation (Savings and Transitional Regulation 2017). In this regard Clause 28 (1) of the regulation provides that the former planning provisions of the *Threatened Species Conservation Act 1995* (TSC Act) apply to the DA.

The applicant identified that an SIS, prepared in accordance with Section 111 of the TSC Act, was required as the proposed development was assessed as significantly impacting at least two threatened species listed under the TSC Act being the brush-tailed phascogale (*Phascogale tapotafa*) and the koala (*Phascolarctos cinereus*).

The Chief Executive's Requirements (CERs) were obtained, and the SIS was prepared and submitted to support the assessment of the DA. In accordance with clause 79B(3) of the EP&A Act in force at the time, the concurrence of the (then) Chief Executive of OEH is required for a development that is likely to significantly impact a threatened species, population, or ecological community, or its habitat or, if a Minister is the consent authority, unless the Minister has consulted with the Minister administering the *Threatened Species Conservation Act 1995*. Based on the findings above, our view is that to complete the assessment process the SIS should be referred to DPIE (EES) for concurrence.

With regard to other approval pathway matters, the following is a high-level summary of the key biodiversity related documents with respect to the approval pathway applicable to this DA.

Table 6.1 Summary of key Biodiversity Related document with respect to approval pathway applicable to this DA

Legislation/Planning Policies	Applicability	Comment
Threatened Species Conservation Act 1995	The *Biodiversity Conservation Act 2016* (BC Act) came into force on 25 August 2017 and supersedes the *Threatened Species Conservation Act 1995* (TSC Act). Assessment under the BC Act is not required for this proposal as it is being assessed in accordance with the transitionary arrangements defined in the Biodiversity Conservation (Savings and Transitional) Regulation 2017. The BC Act and associated biodiversity offset schemes are not relevant in this instance.	The SIS has been prepared with the intent of satisfying the CERs issued by the (former) OEH. The outcome of this peer review has determined that there is a very real chance or possibility that the impacts described in the SIS may be significant and that the Panel, as consent authority, should seek concurrence of EES (formerly OEH) prior to determining the DA.
Environmental Planning and Assessment Act 1979 and Regulation (i.e., in relation to biodiversity)	The Act contains a number of legislative links to the BC Act however in this instance they do not have relevance as the TSC Act continues to apply. The Act governs the DA process and the requirements for matters such as the need for a SIS and the exhibition and concurrence requirements as discussed in previous sections of this review. The former planning provisions of the EP&A Act continue to apply to this DA.	The various provisions relating to the DA process and requirements for the SIS must be followed in assessment and determination of the DA.
State Environmental Planning Policy (Koala Habitat Protection) 2020	Applies to DAs within the Port Stephens Local Government Area (LGA). PSC have a Comprehensive Koala Plan of Management (CKPoM) prepared in accordance with SEPP 44 that provides guidelines for the assessment of koala habitat and performance criteria for development applications. The PSC CKPoM operates for the entire PSC LGA. All development having an impact on koala habitat is to be assessed in accordance with this management plan to avoid, minimise and mitigate any impacts on the koala.	Section 5.1.4. of the SIS provides an assessment of the proposal against the PSC CKPoM. Review of the SIS indicates that the performance criteria detailed in the CKPoM have been considered and the outcomes are in accordance with the intent of the Plan; the information to accompany applications has been provided; and the guidelines for koala habitat assessment have been met (notwithstanding our earlier comments in relation to the nutrient enrichment planting and the potential impact of the program on retained vegetation in the conservation area).
State Environmental Planning Policy (Coastal Management) 2018	Promotes an integrated and co-ordinated approach to land use planning in the coastal zone in a manner consistent with the objects of the *Coastal Management Act 2016*. This includes managing development, protecting the environmental assets and	There are no works proposed within a mapped coastal wetland or its buffers accordingly the requirement for an EIS is not triggered. The SIS considers impacts on designated wetlands through

	establishing a land use planning framework for the coast. The subject site comprises three main catchments, two of which directly drain into designated wetlands (803 & 804)	receiving waters (refer to Appendix E – Assessment of the Kings Hill Development Impacts on the Hydrology and Vegetation of Irrawang Swamp and Coastal Wetland 883 (Alluvium 2019))
Draft Remediation of Land SEPP and SEPP 55 Remediation of Land	Clause 7 of SEPP No.55 provides that a consent authority must not consent to the carrying out of development on land unless it has considered whether the land is contaminated, and if the land is contaminated, is satisfied that the land is suitable in its contaminated state (or will be suitable after remediation) for the purpose for which the development is proposed to be carried out.	SEPP 55 does not relate to biodiversity matters. A Preliminary Site Investigation for Contamination (Douglas Partners, 2020) was submitted with the application indicating that the majority of the site is generally unlikely to contain contamination associated with the current or former site activities. There is therefore an assessment to allow the consent authority to consider the requirements of SEPP 55.
Port Stephens Local Environmental Plan 2013 in relation to ancillary works proposed in the E2 Environmental Conservation zone and B4 Mixed Use zone.	The SIS does not mention ancillary works proposed in E2 and B4 zones. This review focusses on biodiversity matters and documentation and therefore no further commentary is provided on this issue.	n/a

7.0 Recommendations

This review has found that the SIS does not adequately address the assessment of impacts on:

- Koala – the proposed offset and mitigation strategy are not considered sufficient to ensure that the development will not significantly impact the koala, and therefore the proposed measures are considered inadequate to mitigate risks to the local population.
- Lower Hunter Spotted Gum – Ironbark Forest EEC – incorrect comparison of the vegetation in PCT 1590 against the Final Determination and significant underestimation of the area of the EEC to be impacted.
- *Pterostylis chaetophora* – likely inappropriate survey effort and under-representation of impacts.
- *Corybas dowlingii* – likely inappropriate and poorly timed survey effort and under-representation of impacts.

Based on the findings of this review, the following recommendations are made:

Recommendation 1: The SIS should be referred to the EES (former OEH) for assessment and concurrence. The EES review should consider the range of technical matters identified in this peer review, including the overall adequacy of the mitigation measures and offsets. It is recommended that the SIS be referred to EES in its current form to expedite the assessment process with EES to identify any further assessment requirements as part of its review, including consideration of the matters raised in this review.

Recommendation 2: The SIS exhibition process should be subject to further review and should it be confirmed that the exhibition process for the SIS was inadequate, this should be addressed prior to determination of the DA.

Recommendation 3: The project should be referred to the Commonwealth for its consideration of whether or not it constitutes a Controlled Action.

Recommendation 4: The Panel should ensure that the VPA is exhibited in accordance with statutory process once finalised and give consideration to the adequacy of funding to ensure that the conservation obligations of the SIS are met by PSC in-perpetuity. The Panel should also ensure that the VPA contains provisions that govern spending of money allocated for management of the conservation area to ensure it is spent for that purpose.

The authors recommend that the panel consider the findings and recommendations of this report.

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