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Review of the ecological assessment component of the Draft Master Plan for the proposed Iron Gates Residential Release development

David Milledge

18 February 2016

Introduction

1. The ecological assessment component of the Draft Master Plan for the Iron Gates Residential Release development proposal is provided as two annexures. These comprise Annexure 1 - Part 1 Ecological Assessment (Annexure 1 Part 1) and Annexure 1 - Part 2 Original Flora and Fauna Assessment (Annexure 1 Part 2). However, Annexure 1 Part 1 cannot be claimed to represent an ecological assessment as it consists predominantly of a collection of poorly argued and invalid responses to questions and criticisms made in relation to the information presented in Annexure 1 Part 2 (as previously reviewed by Milledge 2014, attached as Appendix 1). Unfortunately Annexure 1 Part 1 suffers from the same level of confusion, error and omission that characterises Annexure 1 Part 2 and with regard to the latter, it is difficult to understand how this document has not been substantially revised following the results of the claimed peer review (Annexure 1 Part 1, comment under Richmond Valley Council's RFI dated 18/11/14, Point 8).

2. No additional field investigations of the site appear to have been undertaken to address the failings of the original ecological assessment (Annexure 1 Part 2; see Milledge 2014) apart from a check on the identity of the 159 stems of the ground orchid that was previously identified and mapped as one of two species of swamp orchids (*Phaius australis* or *P. tancarvilleae*). These plants have now been confirmed as the Christmas Orchid *Calanthe triplicata* (Annexure 1 Part 1, comment

under David Millage (sic) Public Submission Response - Dated 4/12/2014), which is not listed as a Threatened species (*TSC Act 1995*).

3. Further, no Threatened fauna species additional to those seven species assessed in Annexure 1 Part 2 (s.6) have been considered under the "7-part test" for assessment of significance (s.5A, *EPA Act 1979*). This represents a failure to fully comply with the requirements for preparation of a Draft Master Plan under State Environmental Planning Policy (SEPP) No. 71 - Coastal Protection (*EPA Act 1979*), considering several additional Threatened fauna species are likely to occur in the site and to be significantly affected by the proposed development.

Overall design of the proposal

4. Despite a number of claims that the proposal "has been designed to avoid environmental impacts" (Annexure 1 Part 1, comment under OEH letter dated 22/12/2014, Indirect Impacts and Buffers, Points 4 and 5, and elsewhere), this is clearly erroneous as the lot and road layout physically isolates the most important stand of an Endangered Ecological Community (EEC) in the site. The stand conforms to the description of the Littoral Rainforest of the South East Corner, Sydney Basin and North Coast Bioregions EEC (*TSC Act 1995*) and is surrounded by roads which in turn appear to be bordered by 1m high concrete walls positioned against the rainforest (Hyder Consulting 2015, Sediment and Erosion Control Plan Sheet 2 of 5). Residential development is also proposed to surround the EEC, apart from a small section in its south-eastern corner, and to claim that connectivity is maintained to an adjoining area of the EEC to the south via "twin 300mm culverts" (Annexure 1 Part 1, comment under Points 9 and 10) demonstrates little understanding of the operation of fauna corridors and road underpasses. Pipes of such small diameter, particularly when their main purpose is drainage, cannot be expected to function as dedicated fauna underpasses and could not be expected to allow passage of "non-volant" Threatened species such as the Brush-tailed Phascogale *Phascogale tapoatafa*, Common Planigale *Planigale maculata* or Koala *Phascolarctos cinereus*, as well as a range of other terrestrial and scansorial vertebrate species.

5. No functional buffers are provided to the main area of the EEC and the numerous assertions throughout Annexure 1 Part 1 that perimeter roads will act as buffers demonstrates a poor understanding of the design principles for buffers required to protect significant vegetation communities and habitats. Such buffers should comprise wide, densely vegetated perimeters that constrain the entry of introduced plant and animal species and mitigate processes such as desiccation and wind-throw that would otherwise degrade the community.

6. SEPP No. 26 (*EPA Act 1979*), designed to protect littoral rainforests in NSW, requires a buffer of 100m to mapped littoral rainforest stands (apart from where residential zoning is already in place). Although the stand in question is not designated under SEPP No. 26 and is zoned for residential use, a substantial vegetated buffer is required to ensure its survival in the long-term. A vegetated

buffer to avoid impacts on biodiversity is also recommended in the submission on the development proposal by the Office of Environment and Heritage (OEH; as quoted in Annexure 1 Part 1, OEH letter dated 22 December 2014, Point 9), which recommends redesign of the layout to locate building envelopes at least 50m from retained vegetation (OEH letter, Point 7). It is considered that 50m should be the minimum width adopted for a vegetated buffer wherever the proposed development abuts the edge of the Littoral Rainforest EEC.

7. Confusingly, Annexure 1 Part 1 refers to "a proposed vegetated buffer" within the development site (comment under OEH letter dated 22 December 2014, Points 4 and 5) but the location of this is not provided and there is no reference to such a buffer in Annexure 1 Part 2.

8. The proposed location of roads and concrete barriers immediately adjacent to the main stand of the Littoral Rainforest EEC, contrary to the claims in Annexure 1 Part 1 that this provides a buffer, will exacerbate harm to the EEC. Desiccation, wind-throw, the invasion of introduced plants such as Asparagus Fern *Protasparagus aethiopicus* and *P. africanus*, Fishbone Fern *Nephrolepis cordifolia*, Lantana *Lantana camara*, Morning Glory *Ipomoea cairica* and Bitou Bush *Chysanthemoides monilifera*; and predation by introduced animals such as the Cane Toad *Rhinella marina,* Black Rat *Rattus rattus*, Red Fox *Vulpes vulpes* and Feral Cat *Felis cattus*, domestic animals including dogs and cats, the dumping of garden rubbish from adjoining lots and incursions by local residents are all likely to combine to result in the modification and eventual decline of the EEC in this area. None of these threats have been considered and assessed in any detail in Annexure 1 Part 1 (or Annexure 1 Part 2, s.6) and no specific measures to avoid or mitigate their impacts are proposed. The majority of threats, which are formally listed as Key Threatening Processes (KTPs) under the *TSC Act 1995*, are dismissed as "Not applicable" in the 7-part test for significance (Annexure 1 Part 2, s.6), apparently on the basis that the relevant threatening species were not recorded during the inadequate 2014 Planit survey. Even when a species responsible for a KTP (such as Lantana) is noted as present in the site or known from the locality, the threat is dismissed, without any explanation or supporting information, as unlikely to increase impacts (Annexure 1 Part 2, s.6). This is despite established evidence that shows that such impacts are exacerbated in proximity to residential development.

9. Contrary to the assertion in Annexure 1 Part 1 (comment under OEH letter dated 22 December 2014, Points 4 and 5), the proposed development will also fragment core habitat for Threatened fauna species by isolating the main stand of Littoral Rainforest EEC from the eucalypt (or moist open sclerophyll forest) communities to the west and north west and the open dry heath and wet heath communities to the north east. The eucalypt and heath communities will also be isolated from each other. Threatened fauna species that will be adversely affected by these impacts include the Brush-tailed Phascogale, Common Planigale and Koala.

Assessment of impacts on Threatened communities and species and operation of Key Threatening Processes - the 7-part test of significance

10. A number of likely impacts from the proposal on *TSC Act 1995* matters that were not assessed, or inadequately assessed in Annexure 1 Part 2, (e.g. Milledge 2014), continue to be ignored or are summarily dismissed in Annexure 1 Part 1. This has severely compromised the s.5A assessment (7-part test, *EPA Act 1979*) in determining whether a significant effect is likely on Threatened communities or species as a result of the development proposal and abrogated the requirement for a Species Impact Statement (SIS).

Assessment of impacts on the Littoral Rainforest EEC

11. As described in s.2 above, the proposal is likely to result in a suite of detrimental impacts on the main stand of the Littoral Rainforest EEC in the site. In addition to these, the positioning of lot boundaries only a road's width from the EEC has the potential to subject areas of littoral rainforest (and other Threatened species' habitats) to clearing or under-scrubbing under the 10/50 Vegetation Clearing Scheme for bushfire protection. This threat does not appear to have been considered in either Annexure 1 Part 1 or Annexure 1 Part 2 and represents another omission in assessing the potential for a significant effect on this EEC under the 7-part test.

Selection of Threatened species for assessment under s.5A (*EPA Act 1979*), the 7-part test

12. The two criteria that were listed in Annexure 1 Part 2 (s.6) for the selection of Threatened species for assessment of a significant effect under the 7-part test were stated as species that were "recorded on the site" or species that were "considered potential occurrences within the area based upon available habitat components".

13. However, the latter criterion was not used in the selection process as only the one Threatened flora species (the mis-identified swamp orchid *Phaius* sp.) and the seven Threatened fauna species recorded during the flawed 2014 Planit survey (Annexure 1 Part 2) were examined under the 7-part test. Species that were not recorded were dismissed without explanation, which resulted in a failure to assess impacts from the proposal on key Threatened species such as the Common Planigale, Eastern Blossom-bat *Syconycteris australis* and Eastern Long-eared Bat *Nyctophilus bifax*. These are species that if they had been adequately targeted and assessed under the 7-part test are likely to have demonstrated the need for the preparation of a SIS to fully assess and mitigate potential impacts from the development on Threatened biodiversity.

<u>Eastern Blossom-bat and Eastern Long-eared Bat</u>

14. The reason offered to explain the failure to adequately survey for the Eastern Blossom-bat, Eastern Long-eared Bat and other Threatened microchiropteran bat species using mist-nets and harp traps - that these species may be at "risk of injury and death" (Annexure 1 Part 1, comment under David Millage (sic) Public

Submission Response - Dated 4/12/2014), is invalid. Such methods are standard techniques and are recommended in the Working Draft Guidelines for Threatened Biodiversity Survey and Assessment (DEC 2004). Mist netting is stated to be "the only suitable technique for the capture of the Common (Eastern) Blossom-bat" (s.5.3.4 vii, DEC 2004) and is listed as an additional appropriate survey method for this species in Table 5.9 (DEC 2004). Harp traps are indicated in the same table as the appropriate method for surveying the Northern (Eastern) Long-eared Bat.

Common Planigale

15. Although the Common Planigale is not specifically mentioned in the Working Draft Guidelines (DEC 2004), pit-fall trapping is listed as an appropriate survey method for small mammals and is frequently referred to in the published literature as the only effective survey method for the Common Planigale (e.g. Lewis 2005).

16. Despite information on the number of pit-fall traps employed being corrected (Annexure 1 Part 1, comment under David Millage (sic) Public Submission Response - Dated 4/12/2014) to accord with the number mapped (Annexure 1 Part 2, Attachment 3), no data have been provided on the dimensions or placement of traps and there is no indication whether drift fences were employed. Drift fences are considered to enhance capture rates of the Common Planigale (Lewis 2014) and the Working Draft Guidelines (DEC 2004) state that "Each pit must have at least 5m of drift fence either side (i.e. a 10m minimum per hole)".

17. However, irrespective of this information, the survey effort for the Common Planigale was insufficient to detect this relatively rare, sparsely distributed species. For example, Lewis (2005) in a survey in the Tweed LGA captured only three individuals in 600 trap nights. Survey effort by Planit (Annexure 1 Part 2, Table 4 corrected) amounted to only 25 trap nights and traps were not placed in two of the site's most important fauna habitats, the eucalypt forest and littoral rainforest, and only on the periphery of the development footprint (Annexure 1 Part 2, Attachment 3).

Koala

18. A 7-part test was undertaken for the Koala (Annexure 1 Part 2, s.6), which was recorded from the site on the basis of scratches observed on smooth-barked eucalypts in the eucalypt forest (Annexure 1 Part 2, Table 6). However, no significant effect was found for this species because it is claimed that "the proposal will remove approximately 2508m^2 of potential koala habitat which is considered unlikely to significantly impact the species considered (sic) the surrounding environment within the locality provides upwards of 20,000ha of similar habitat" (Annexure 1 Part 1, comment under David Millage (sic) Public Submission Response - Dated 4/12/2014). However, no assessment appears to have been undertaken of the occurrence, local habitat preferences, condition or conservation status of local Koala populations and the assumption that up to 20,000ha of suitable habitat is available is invalid as it is known that large areas of apparently suitable habitat in the locality are unoccupied (e.g. McLachlan 1995, McKinley *et al.* 2011, D. Milledge unpubl. data).

19. In addition, the Koala survey of the site was not comprehensive as apparently no scat (faecal pellet) searches using a technique such as the SAT method (Phillips and Callaghan 2011) were undertaken (Annexure 1 Part 1, comment under David Millage (sic) Public Submission Response - Dated 4/12/2014) particularly in the main littoral rainforest stand where numerous Koala scats were detected at the bases of Red Mahoganies *Eucalyptus resinifera* during a survey conducted in 1998 (Milledge 1998).

20. Although call playback and spotlighting are useful methods for detecting the Koala, scat searches are widely recognised as an effective survey tool for detecting the species (Phillips and Callaghan 2011). This is especially the case if individuals are temporarily absent from a survey site due to part of their home ranges falling outside the site, and it is preferable to employ all three methods when surveying for the species.

21. Because of the inadequacies in the assessment of the potential for a significant impact (7-part test) on the local Koala population, it cannot be accepted that a significant effect will not occur as a result of the development and such an effect remains a distinct possibility.

22. As for the claim that Koalas will be able to "continually utilise the Littoral Rainforest within the main development" (Annexure 1 Part 1, comment under David Millage (sic) Public Submission Response - Dated 4/12/2014), this is clearly erroneous as the area will be surrounded by a road bordered by a concrete barrier (s.2 above) and enclosed along 88% of its perimeter by residential development. It is also highly unlikely that Koalas will use the twin 300mm culverts that are claimed to "help ensure that connectivity is to remain between the central EEC and external habitats" (Annexure 1 Part 1, comment under David Millage (sic) Public Submission Response - Dated 4/12/2014).

Potential impacts from filling the site

23. No information is provided on the type or properties of fill proposed to be imported into the development site (Hyder Consulting 2015, s.3.1.1) and this has the potential to adversely affect the habitat of several Threatened fauna species known from the site including the Wallum Froglet *Crinia tinnula*, Common Planigale, Squirrel Glider *Petaurus norfolcensis*, Eastern Blossom-bat *Syconycteris australis* and Grey-headed Flying-fox *Pteropus poliocephalus*. Nutrient enrichment of the site's acidic waters will degrade breeding habitat for the Wallum Froglet and changes to vegetation will disadvantage the other species, particularly nectarivorous species such as the Eastern Blossom-bat.

24. The site's vegetation communities growing on low-nutrient sands, particularly the heath communities, are likely to be highly susceptible to nutrient enrichment resulting from leaching from imported fill. Without constraints on the type of fill to be imported, such as limiting this to the same type and nutrient status as soils supporting surrounding vegetation, the habitats of the Threatened fauna species listed above are likely to be substantially adversely modified over time.

Operation of Key Threatening Processes

25. As noted above (s.2), the majority of threats to biodiversity likely to result from the proposed development, many of which are formally listed as KTPs (*TSC Act 1995*), are dismissed as "Not applicable" with no consideration of whether they are likely to continue to operate or increase in impact (Annexure 1 Part 2, s.6). No attempt is made to redress this discrepancy in Annexure 1 Part 1, which represents a serious flaw in the assessment of the potential for a significant effect under the 7-part test.

    Introduced plants

26. Despite the presence of Lantana, listed as a threat to the Littoral Rainforest EEC (OEH website, Littoral Rainforest in the South East Corner, Sydney Basin and NSW North Coast Bioregions, accessed February 2016) in the site and the high likelihood of colonisation by other listed weed species following the development of the proposal (s.2 above), the only mitigation measure proposed is that they be "removed in the work zone" (Annexure 1 Part 2, s.6). No additional consideration of impacts from weed species or proposals for mitigating measures are provided in Annexure 1 Part 1.

27. It is likely that the KTPs "Invasion and establishment of exotic vines and scramblers", "Invasion of native plant communities by Bitou Bush and Boneseed" and "Invasion, establishment and spread of *Lantana camara*", will continue to operate and increase in impact, or begin to operate if the development proposal proceeds in its present form. This is likely to lead to serious degradation and decline in the Littoral Rainforest EEC such that the local population will become substantially adversely modified and is likely to be placed at risk of extinction.

    Introduced predatory animals

28. The assessment of threats to the site's biodiversity from introduced predatory animals and the design of mitigation measures is essentially limited to domestic animals and specifically dogs and cats, that are proposed to be controlled by a "dog and cat restriction" covenant (Annexure 1 Part 2). Such covenants are unlikely to be effective in mitigating impacts on native animals from domestic dogs and cats and a total ban on these animals should be applied throughout the development.

29. No further consideration of the threats posed by predatory species such as the Cane Toad, Red Fox and Feral Cat is provided in Annexure 1 Part 1.

    Cane Toad

30. Although the Cane Toad was recorded during site surveys (Annexure 1 Part 2, s.4.5.4, s.6) and optimal habitat for this species comprises the mown lawns with artificial lighting that are associated with residential areas close to bushland (Seabrook 1991), Annexure 1 Part 2 (s.6) claims that the proposal is unlikely to increase the impact of the KTP "Invasion and establishment of the Cane Toad". As well as Cane Toads being favoured by the proposed residential development of the

site, the provision of bioretention basins with submerged areas adjacent to the Littoral Rainforest EEC (Hyder Consulting 2015, s.7.2.1, Sediment and Erosion Control Plan Sheet 2 of 5) will provide ideal breeding habitat for this pest species that is likely to exponentially increase its population in the site, with consequent highly detrimental effects on biodiversity. Threatened species known from or likely to occur in the site that could be adversely affected by an increase in Cane Toad population include the Wallum Froglet, Wallum Sedge Frog *Litoria olongburensis* and Common Planigale.

Red Fox

31. The Red Fox is noted as known from the locality of the site (Annexure 1 Part 2, s.6) and can be expected considered to occur in the site. The development proposal is likely to result in an increase in Fox predation pressure on a range of small and medium-sized terrestrial and scansorial vertebrate species as Foxes are attracted to residential areas in bushland settings by the provision of pet food left in allotment yards and by other readily available food sources. Threatened species known from or likely to occur in the site that could be predated by Foxes include the Bush Thick-knee *Burhinus grallarius*, Brush-tailed Phascogale, Common Planigale, Koala and Squirrel Glider. As a result of an increase in Red Fox predation pressure, the development proposal is in conflict with the objectives of the Red Fox Threat Abatement Plan (*TSC Act 1995*) and this likelihood should have been properly assessed under Part (f) of the 7-part test.

Feral Cat

32. Cats were recorded during site surveys although these were not determined as feral (Annexure 1 Part 2, s.4.5.2, s.6). However, Feral Cats are highly likely to use the site due to its proximity to human settlement and may increase in number with establishment of the proposed development as the result of fragmentation, disturbance and increased edge effects. The dog and cat restrictive covenant will provide no protection from predation by the Feral Cat which, as with the Red Fox, is likely to impact populations of a range of small and medium-sized terrestrial and scansorial vertebrate species in the site including the Threatened Brush-tailed Phascogale, Common Planigale and Squirrel Glider, and also small, slow-flying megachiropteran and microchiropteran bat species including the Threatened Eastern Blossom-bat and Eastern Long-eared Bat.

33. From an examination of the above information, it is considered that the operation and increase in impacts of the KTPs "Invasion and establishment of the Cane Toad", "Predation by Feral Cats" and "Predation by the European Red Fox" are likely to have detrimental effects on the life cycles of a number of Threatened fauna species. In combination with other impacts these threats are likely to result in a significant adverse effect on at least one and possibly three other species under s.5A of the *EPA Act 1979*.

Potential for a Significant Effect on a Threatened Ecological Community and Threatened Species under s.5A of the *EPA Act 1979*.

34. As a result of the cumulative impacts from the activities and threats associated with the Iron Gates Residential Release development proposal, as detailed above, it is considered likely that there will be a significant adverse effect on the main stand of the Littoral Rainforest EEC in the site so that its floristic composition will be substantially adversely modified and the local occurrence placed at risk of extinction.

35. There is also likely to be a significant adverse effect (under s.5A, *EPA Act 1979*) on the life cycle of the Eastern Blossom-bat and probably on the life cycles of the Common Planigale, Koala and Eastern Long-eared Bat due to these cumulative impacts. As a consequence, it is considered that a Species Impact Statement, as required under s.5A of the *EPA Act 1979* should have been prepared for the proposal.

Summary and Conclusions

36. Contrary to the claim on the Department of Planning and Environment's website (Draft Plans and Policies, On Exhibition) that the Draft Master Plan for the Iron Gates Residential Release "sets out to deliver a new housing opportunity in a way that is mindful of the important environmental .... value of the area", in my opinion the proposal sets out to fail to protect and sustain the important environmental value of the area as it is likely to have a significant adverse impact on the site's Threatened ecological community and species values and on its biodiversity values generally.

37. As a result of the failure to undertake additional field surveys and assessments, together with failing to satisfactorily redress the omissions, misconceptions and errors contained in Annexure 1 Part 2 (Original Flora and Fauna Assessment), the ecological assessment presented in the Draft Master Plan remains substantially flawed and does not adequately consider and redress the likely impacts on the Littoral Rainforest EEC and key Threatened fauna species known from or likely to occur in the site's habitats.

38. The design of the site layout isolates the main stand of the Littoral Rainforest EEC, and KTPs likely to continue to operate and increase as a result will severely modify its floristic composition and eventually lead to its demise.

39. Isolation and fragmentation of habitats will also adversely affect a number of Threatened fauna species supported by the site's habitats and together with the probable continued operation and increase of KTPs, will most likely cause the extinction of local populations of at least one and possibly three of these species.

40. A SIS should be prepared to fully assess and mitigate the likely adverse impacts on Threatened biodiversity from the proposal, which requires major modification to reduce impacts to a level where they will not have a significant adverse effect on the site's Threatened ecological community and Threatened species attributes.

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Appendix 1

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Review of the Flora and Fauna Assessment for the proposed Iron Gates Residential Development, Evans River, Northern NSW, with particular regard to Threatened Species and Communities and potential impacts on these values

David Milledge

4 December 2014

1. Introduction

In November 2014 Landmark Ecological Services was requested by EDO NSW to undertake an independent expert review of the Statement of Environmental Effects (SEE, Planit 2014a) for the Iron Gates Residential Development with respect to the Terrestrial Flora and Fauna Assessment prepared by Planit Consulting (Planit 2014b).

In particular, EDO NSW requested information on:

i) the presence of Threatened species (as listed on the schedules of the NSW *Threatened Species Conservation* (*TSC*) *Act 1995*) and their habitats in the Iron Gates site (Lots 277, 276 and 163, Parish of Riley; Planit 2014);

ii) the likely impacts from the proposed development on these Threatened species and their habitats; and

iii) the likelihood of any harm having occurred to the Threatened species, communities and their habitats resulting from the lack of remediation of the site as ordered by the NSW Land and Environment (L&E) Court in 1997.

I have had previous field experience in the site, having undertaken investigations there on 19 and 20 September 1996 (Milledge 1996), 27 March 1997 (Milledge 1997) and 19 March

1998 (Milledge 1998) in conjunction with a number of cases before the L&E Court at that time.

Following the recent request from EDO NSW, I viewed the site again on 28 November 2014 from its eastern boundary along the drain that I observed there in September 1996 and subsequently in 1997 and 1998 (Milledge 1996, 1997, 1998).

I have been provided with a copy of Division 2 of Part 31 of the *Uniform Civil Procedure Rules 2005* and the *Expert Witness Code of Conduct* in Schedule 7 of *the Uniform Civil Procedure Rules 2005*. I have read the *Expert Witness Code of Conduct* under the *Uniform Civil Procedure Rules 2005* and agree to be bound by it. I believe that my report complies with the code.

2. Threatened Species and Communities Known or Likely to Occur in the Site

During my investigations in the site on 19 and 20 September 1996 (as part of L&E Court proceedings at that time), I recorded two Threatened microchiropteran bat species (*TSC Act 1995*), comprising the Hoary Wattled Bat *Chalinolobus nigrogriseus* and the Greater Broad-nosed Bat *Scoteanax rueppellii* (Milledge 1996). I also found evidence of Koala *Phascolarctos cinereus* use of the site in the form of numerous scats at the bases of Red Mahogany *Eucalyptus resinifera* emergents in the Littoral Rainforest during investigations on 19 March 1998 (Milledge 1998).

The recent fauna surveys conducted by Planit resulted in two of these Vulnerable species (*TSC Act 1995*), the Koala and Hoary Wattled Bat being detected, as well as five additional Threatened fauna species (Table 1). The latter consist of the Vunerable Wallum Froglet *Crinia tinnula*, Squirrel Glider *Petaurus norfolcensis*, Grey-headed Flying-fox *Pteropus poliocephalus*, Little Bent-winged Bat *Miniopterus australis* and Large-footed Myotis *Myotis macropus* (Planit 2014b). In addition to their *TSC Act* listing, both the Koala and Grey-headed Flying-fox are listed as Vulnerable under the Commonwealth's *Environment Protection and Biodiversity Conservation* (*EPBC*) *Act 1999*.

However, the Planit assessment makes no reference to any of the fauna investigations conducted in the site prior to and in relation to the L&E Court cases between 1996 and 1998 (Phillips 1991, 1998, Leggett 1992, Lim 1993 , Milledge 1996, 1997, 1998). Consequently they have overlooked the occurrence of the Greater Broad-nosed Bat plus records of the Threatened Black-necked Stork *Ephippiorhynchus asiaticus*, Square-tailed Kite *Lophoictinia isura*, Bush Stone-curlew *Burhinus grallarius*, White-eared Monarch *Carterornis leucotis*, Brush-tailed Phascogale *Phascogale tapoatafa* and Eastern Blossom-bat *Syconycteris australis* from the site (Table 1).

Records of several of these species are also contained in the Atlas of NSW Wildlife (Milledge 1996, Atlas of NSW Wildlife search November 2014; Table 1) and had Planit conducted an adequate literature and Atlas search these records would have been obvious. This should have resulted in Planit listing these species as recorded from the site rather than as only of "possible" occurrence.

Further, due to the presence of core habitat in the site and records within 5km of the site in similar habitats, Planit should have considered a number of additional Threatened (*TSC Act 1995*) species as likely or highly likely to occur. These include the Wallum Sedge Frog *Litoria olongburensis*, Little Lorikeet *Glossopsitta pusilla*, Masked Owl *Tyto novaehollandiae*, Common Planigale *Planigale maculata* and Eastern Long-eared Bat *Nyctophilus bifax*. The Wallum Sedge Frog is also listed as Vulnerable under the *EPBC Act 1999*.

The categorisation by Planit of Threatened fauna species known from or likely/highly likely to occur in the site as of only "possible" occurrence, particularly species such as the Common Planigale, Eastern Blossom Bat and Eastern Long-eared Bat, also indicates a poor knowledge of the local habitat and ecological requirements of these species.

The swamp sclerophyll forest, shrubland and wet and dry heathland vegetation communities on coastal floodplain in the site (Milledge 1996, Planit 2014b) represent core habitat for the Common Planigale. Similarly the littoral rainforest in the site (Milledge 1996, Planit 2014b) provides core roosting habitat for both the Eastern Blossom Bat and Eastern Long-eared Bat; and the adjacent swamp sclerophyll forest, shrubland and wet and dry heathland vegetation communities supply core foraging habitat. The high values of these habitats to all three species in the site were clearly identified in previous reports (Milledge 1996, 1997, 1998, Phillips 1998) and should have been taken into consideration in the Planit assessment.

Table 1 Threatened Fauna Species Recorded in the Iron Gates Site

	Reference					
Threatened species	Phillips 1991, 1998	Leggett 1992	Lim 1993	Milledge 1996, 1997, 1998	Planit 2014b	Atlas of NSW Wildlife
Wallum Froglet *Crinia tinnula**	+				+	+
Black-necked Stork *Ephippiorhynchus asiaticus***						+
Square-tailed Kite *Lophoictinia isura**		+				
Bush Thick-knee *Burhinus grallarius***		+				
White-eared Monarch *Carterornis leucotis**		+				
Brush-tailed Phascogale *Phascogale tapoatafa**	+		+			+
Koala *Phascolarctos cinereus**#	+			+	+	+
Squirrel Glider *Petaurus norfolcensis**					+	
Grey-headed Flying-fox *Pteropus poliocephalus**#					+	
Eastern Blossom-bat *Syconycteris australis**	+					+
Little Bent-winged Bat *Miniopterus australis**					+	
Hoary Wattled Bat *Chalinolobus nigrogriseus**				+	+	+
Large-footed Myotis *Myotis macropus**					+	
Greater Broad-nosed Bat *Scoteanax rueppellii**				+		+

* listed as Vulnerable under the *TSC Act 1995*
** listed as Endangered under the *TSC Act 1995*
# also listed as Vulnerable under the *EPBC Act 1999*

In addition, important habitat for the Koala in the site was demonstrated to be represented by the emergent Red Mahoganies in the littoral rainforest in 1998 (Milledge 1998) and more recently by the Forest Red Gums and Scribbly Gums that occur as dominant, co-dominant or sub-dominant species in the open dry sclerophyll forest and woodland communities within the site (Planit 2014b).

Planit also recorded one of two Threatened flora species and one Threatened (Endangered) Ecological Community in the site (s.4, Planit 2014b). The latter is representative of the Endangered Littoral Rainforest of the South East Corner, Sydney Basin and North Coast Bioregions listed under the *TSC Act 1995* and also the Critically Endangered Littoral Rainforest and Coastal Vine Thickets of Eastern Australia listed under the *EPBC Act 1999*. The occurrence of the littoral rainforest in the site and its conservation significance were identified during L&E Court proceedings between 1996 and 1998 (e.g. Milledge 1996, 1997, 1998).

The two Threatened flora species considered by Planit comprise the Greater Swamp Orchid *Phaius tancarvilleae* and Lesser Swamp Orchid *P. australis*. Assignment to one of these two species was not attempted due to the difficulty of correct identification unless plants are flowering (which did not occur during their surveys), but Planit may have been premature in consigning these orchids to the *Phaius* genus due to their similarity with another orchid species, the Christmas Orchid *Calanthe triplicata*, which also occurs locally. It would have been advisable to defer treatment of these orchids as Threatened species pending confirmation by genetic analysis or observation of flowering, but notwithstanding, Planit should not have provided exact locations of plants (s.6.1.1, Planit 2014b) as they are routinely targeted by unauthorised orchid collectors.

In summary, 14 Threatened fauna species are known from the site (Table 1) and another five Threatened fauna species can be considered likely or highly likely to occur on the basis of the presence of suitable habitat. The Threatened plant species claimed to be present requires confirmation as it could be another non-Threatened orchid species. However, if its identity is confirmed as a species of *Phaius*, all detailed information relating to the species and individual locations should be suppressed.

3. Adequacy of Planit's Fauna Survey Methods and Reporting

Despite the claim that 38 Threatened species "were targeted during the fauna survey or reviewed in the context of documented ecology and available habitats" (Planit 2014b), Planit failed to use appropriate survey methods for detecting several Threatened species highly likely to occur in the site and likely to be impacted by the proposed development. In particular, suitable methods were not employed to detect the Common Planigale, which

requires the use of multiple pit-fall traps with drift fences, and the Eastern Blossom Bat and Eastern Long-eared Bat, which require the use of harp traps or mist nets.

Although two pit-fall traps are stated to have been employed (confusingly Attachment 3, Planit 2014b indicates four locations), many more traps with drift fences are necessary to establish the occurrence of the Common Planigale. No mist nets or harp traps appear to have been used, which are the standard methods for detecting the Eastern Blossom-bat and Eastern Long-eared Bat respectively, as the former cannot be surveyed by spotlighting or the latter by the Anabat call recording method.

It is unclear if Koala scat searches were undertaken using a standard method (e.g. Phillips and Callaghan 2011), but as no mention of the finding of scats was made (in contrast to descriptions of Koala scratches on Forest Red Gums *Eucalyptus tereticornis* and Scribbly Gums *E. signata*, s.4.5.2, Planit 2014b), it is assumed that these were not conducted systematically, if at all. This represents a major deficiency in the survey as in 1998 relatively high levels of Koala activity were recorded on the basis of scats found at the bases of emergent Red Mahoganies *Eucalyptus resinifera* in the littoral rainforest (Milledge 1998, Phillips 1998).

Another deficiency in the Planit fauna survey methodology was the use of camera traps (trail cameras) that appear to have been set in inappropriate locations (as shown by photos in s.4.2.1, although no locations are provided in the Fauna Survey Maps, Attachment 3; Planit 2014b) and for only five days/nights, which is insufficient time to detect the rarer, cryptic and more sparsely distributed species that should have been the subject of these investigations. Such species include the Threatened Brush-tailed Phascogale, Koala and Long-nosed Potoroo *Potorous tridactylus*, and these are unlikely to have been recorded by cameras placed in locations such as those shown in the photos included in s.4.2.1 (as referred to above). Cameras also did not appear to have detected invasive predators such as the European Red Fox *Vulpes vulpes* and Feral Cat *Felis catus*, despite several observations of Feral Cats during spotlighting/observational surveys (Planit 2014b), emphasising the inadequate time period over which they were employed.

As well as the confusion and omissions referred to above, the Planit report contains a number of other omissions that flow through to the interpretation of results and assessment of potential impacts from the proposed development. No quantitative data are provided on the results from the various methods used (e.g. Elliott and cage trapping, hair traps, call playback, spotlighting etc, Planit 2014b), which prevents an evaluation of the adequacy of their application and of the numbers or levels of activity of species of interest or concern. Also, no locations (MGA co-ordinates, mapped records) are provided of the locations of Threatened (*TSC Act 1995*) fauna species detected, which confounds an evaluation of the likely impacts from the proposal. The presentation of such data is standard practice in ecological reporting and their omission prevents a proper review of the report's findings and claims. Similarly, the provision of references is standard scientific practice and although the Planit assessment is extensively referenced throughout the text, none of these references are indexed to allow checking of the numerous claims that they are quoted to support.

Confusion is added to the assessment of Planit's findings by the statement that 26 mammal species were recorded in the site during surveys, of which two were "scheduled as Vulnerable under the *Threatened Species Conservation Act 1995* or *Environment Protection*

and Biodiversity Conservation Act 1999" (s.4.5, Planit 2014b), when 25 mammal species were recorded of which six are listed as Vulnerable on the schedules of the *TSC Act 1995*.

To summarise, Planit's methodology was inadequate to detect several Threatened species that can be expected to be dependent on the site's habitats and the reporting of results is confused, with the omission of key data and references preventing any independent analysis of the findings.

4. Likely Damage to Threatened Fauna Species, Communities and their Habitats from the Development Proposal

A preliminary review of the development proposal as contained in the SEE and the Flora and Fauna Assessment (Planit 2014a, b) indicates that substantial impacts on Threatened species and their habitats would occur if the development were to proceed. Although lack of access to the site has prevented a detailed independent assessment at this time, it is clear that the development footprint will destroy a minimum of 1.4ha of heathland and shrubland dominated by Broad-leaved Paperbark *Melaleuca quinquenervia* and Banksia *Banksia spp* species (Table 15, Planit 2014b), 0.16ha of open dry sclerophyll forest and woodland (Table 15, Planit 2014b) and approximately 8.0ha of regenerated shrubland and woodland (Attachment 2, Planit 2014b).

The Paperbark and Banksia heathlands and shrublands are likely to provide core foraging habitat for the Threatened Wallum Froglet, Common Planigale, Eastern Blossom Bat, Grey-headed Flying-fox, Little Bent-winged Bat, Eastern Long-eared Bat and Hoary Wattled Bat. The open dry sclerophyll forests and woodlands are likely to provide core foraging and additionally, breeding habitat for the Brush-tailed Phascogale, Koala, Squirrel Glider, Hoary Wattled Bat and Greater Broad-nosed Bat. The regenerated shrublands and woodlands are also likely to supply foraging resources for the Common Planigale, Little Bent-winged Bat, Eastern Long-eared Bat, Hoary Wattled Bat and Greater Broad-nosed Bat.

However, larger areas of the open dry sclerophyll forest and woodland, heathland and shrubland vegetation communities than those estimated by Planit as requiring clearing for the development footprint (Table 15, Planit 2014b) are likely to be cleared for upgrading bushfire trails and for asset protection zones about buildings (despite the claim in the SEE that these will be contained within the development footprint).

Indirect detrimental impacts are likely on the littoral rainforest, as residential lots and roads impinge directly on its entire perimeter without any provision for an adequate buffer, with the existing regenerated buffer along the eastern edge proposed for clearing (Attachments 1 and 2, Planit 2014b). This will result in desiccation of the rainforest edge causing dieback, wind shear with tree collapse and weed invasions, particularly of garden weeds. Noise from urbanisation, light and predation from domestic and introduced animals, particularly cats and the Black Rat *Rattus rattus* are likely to further impact on any colonies of Eastern Blossom Bats and Eastern Long-eared Bats using this habitat for roosting and breeding, with detrimental effects on the local viability of their populations.

Isolation of the littoral rainforest with its emergent tall eucalypts by residential development will destroy its value as Koala habitat and may also put at risk the viability of the local Koala population.

The proposal is also likely to exacerbate the impact of introduced predators on Threatened species in other vegetation communities, particularly predation by the Red Fox and Feral Cat which are both Key Threatening Processes (*TSC Act 1995*, and contrary to the claim of no effect by Planit 2014b). As indicated in the Planit report, the Feral Cat is already affecting vertebrate communities in the site (s.6.1 Planit 2014b).

Although it is not possible to accurately predict the likelihood of a significant effect on Threatened species under s.5A of the *Environmental Planning and Assessment* (*EPA*) *Act 1979* due to lack of site access and relevant survey information, it appears probable that the proposal will have a significant effect on the Threatened Eastern Blossom Bat and Eastern Long-eared Bat, and possibly on the Common Planigale and Koala. This is due to the potential for the cumulative impacts from the proposal to place local populations at risk of extinction, particularly in relation to impacts on the littoral rainforest in the site.

These impacts may also result in a substantial modification to the structural and floristic composition of the Endangered Ecological Community termed Littoral Rainforest of the South East Corner, Sydney Basin and North Coast Bioregions, placing its long-term occurrence in the site at risk of extinction.

These findings suggest that the preparation of a Species Impact Statement may be required.

5. Harm to Threatened Fauna Species, Communities and their Habitats Resulting from Previous Works

As with assessing whether the proposal is likely to have a significant effect on Threatened species, communities and their habitats, lack of access to the site and relevant current survey information make it difficult to gauge whether harm has resulted to Threatened species, communities and their habitats as a result of previous site works and the lack of remediation, as ordered by the L&E Court in 1997.

However, it is apparent that areas of Threatened fauna species' core habitat that were present in the site prior to 1996 have been replaced by natural regeneration that no longer provides such core habitat. For example, the stands of shrubland dominated by Hickory Wattle *Acacia disparrima* in the east of the site (Fig. 1) no longer provide the nectar resources that would have been available to the Threatened Eastern Blossom Bat and Grey-headed Flying-fox from the Banksia-dominated heathland and shrubland that occurred there prior to bulldozing.

Similarly, the floristic composition of the wetland occurring in the north-eastern section of the site, particularly the area of State Environmental Planning Policy No. 14 (SEPP 14, Coastal Wetlands) Wetland No. 147 is likely to have changed due to drawdown of the water table effected by the deep drain excavated along the eastern boundary of the site in 1996 (Fig. 1). This may have resulted in the loss of core habitat for the Wallum Froglet and Wallum Sedge Frog, although contrary to the claim by Planit (s.6.2, 2014b), some wetland vegetation typical of the SEPP 14 vegetation type "Melaleuca forests" remains in the site (Fig. 2) and this is

likely to expand back to the mapped boundary of SEPP No. 14 Wetland No. 147 if the eastern drain is filled.

It is also apparent from an examination of aerial photographs taken in 2013 and 2014 (Figs 3 and 4) that additional clearing of vegetation has occurred recently on the site. This has included areas regenerated after the clearing in 1996 and also areas that were not cleared in 1996, particularly on the northern boundary of the site (Figs 3 and 4). This clearing is likely to have destroyed foraging habitat of the Threatened Common Planigale, Little Bent-winged Bat, Eastern Long-eared Bat, Hoary Wattled Bat and Greater Broad-nosed Bat and damaged the western and southern edge of the littoral rainforest by exposing it to edge effects and weed invasion.

In summary, lack of remediation of the site following clearing and draining in 1996, together with additional clearing in 2014, is likely to have removed and damaged the habitat of a number of Threatened fauna species and damaged an Endangered Ecological Community.

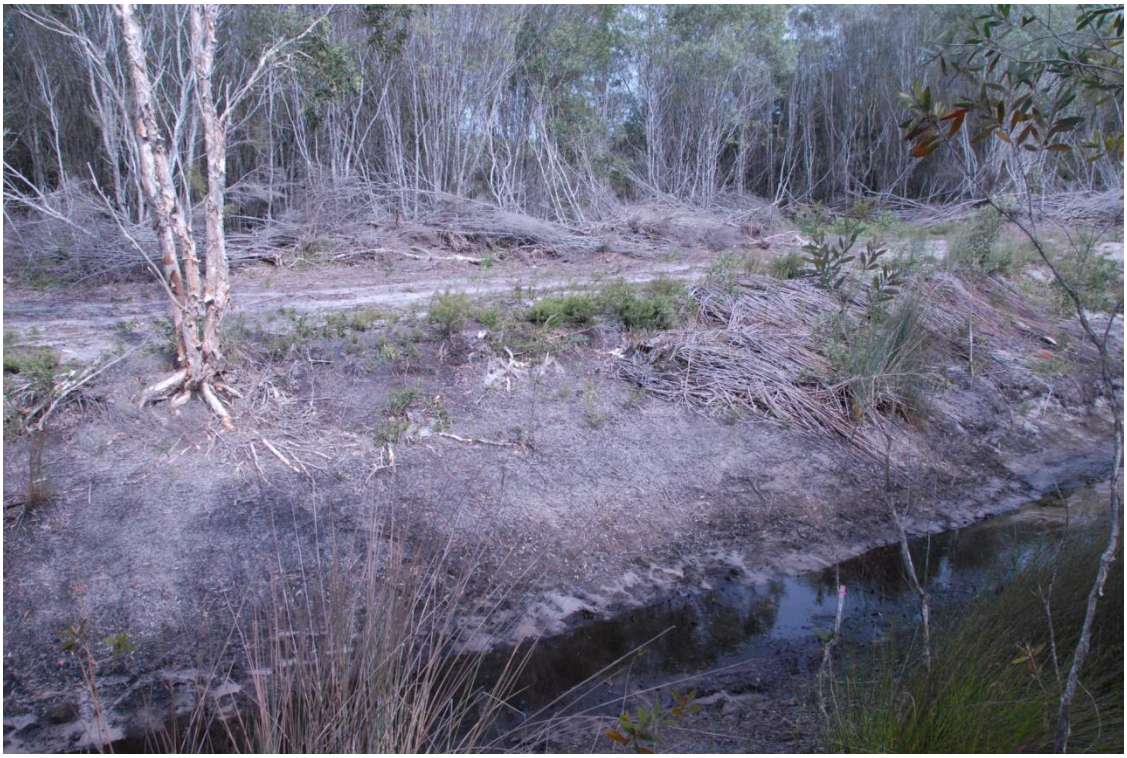

Figure 1 Photograph taken from the eastern boundary of the Iron Gates development site in November 2014 looking west and showing the deep drain excavated in 1996 and the dense stand of Hickory Wattle that has since regenerated in the east of the site.

Figure 2 Photograph taken from the eastern boundary of the Iron Gates development site in November 2014 looking south and showing the SEPP No. 14 Wetland No. 147 extending into the site on the right hand side of the boundary clearing.

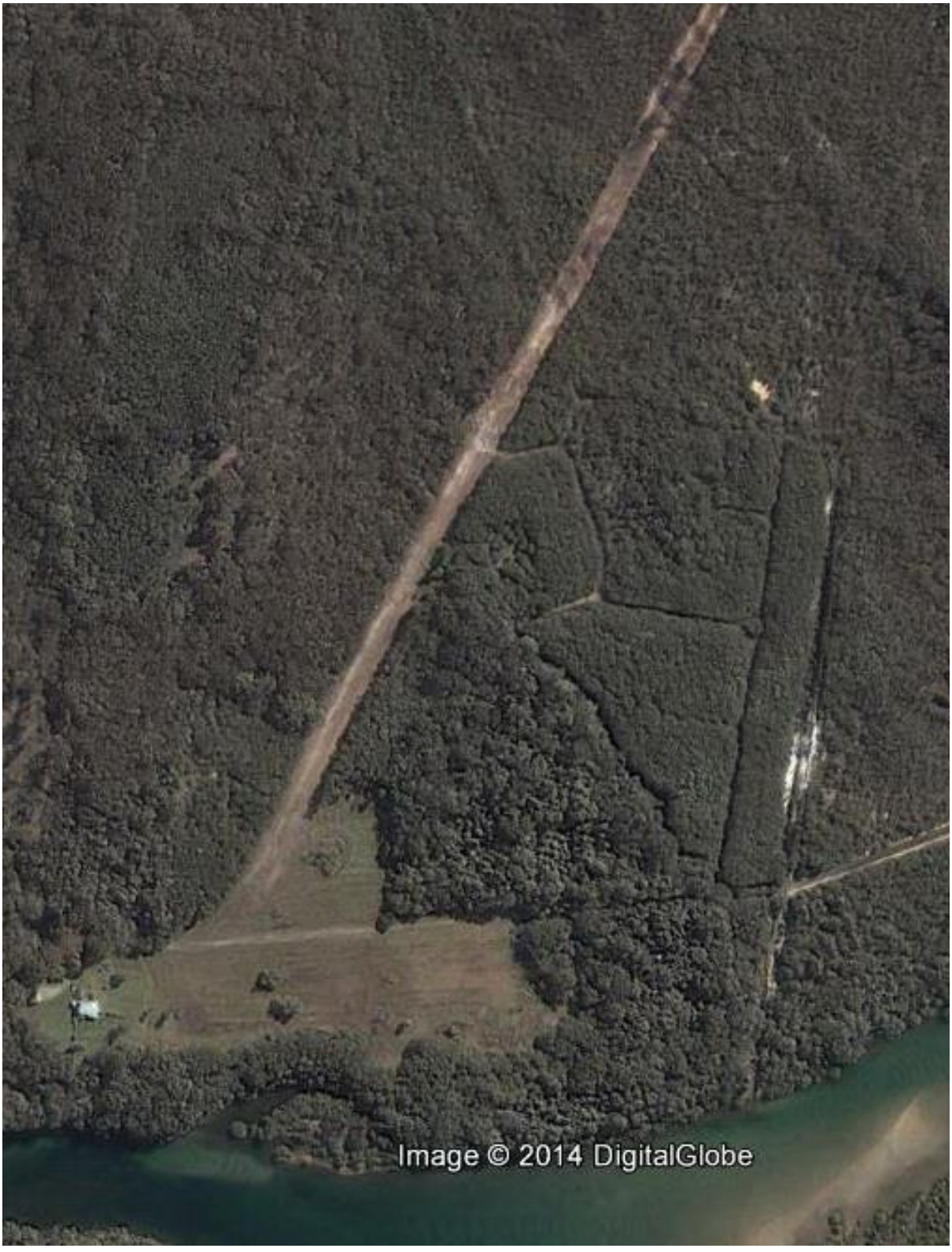

Figure 3 An August 2013 digital image of the Iron Gates development site showing vegetation that has subsequently been cleared in the north, south and south west of the site, as shown by comparison with the aerial photograph provided in the Planit report (see Figure 4).

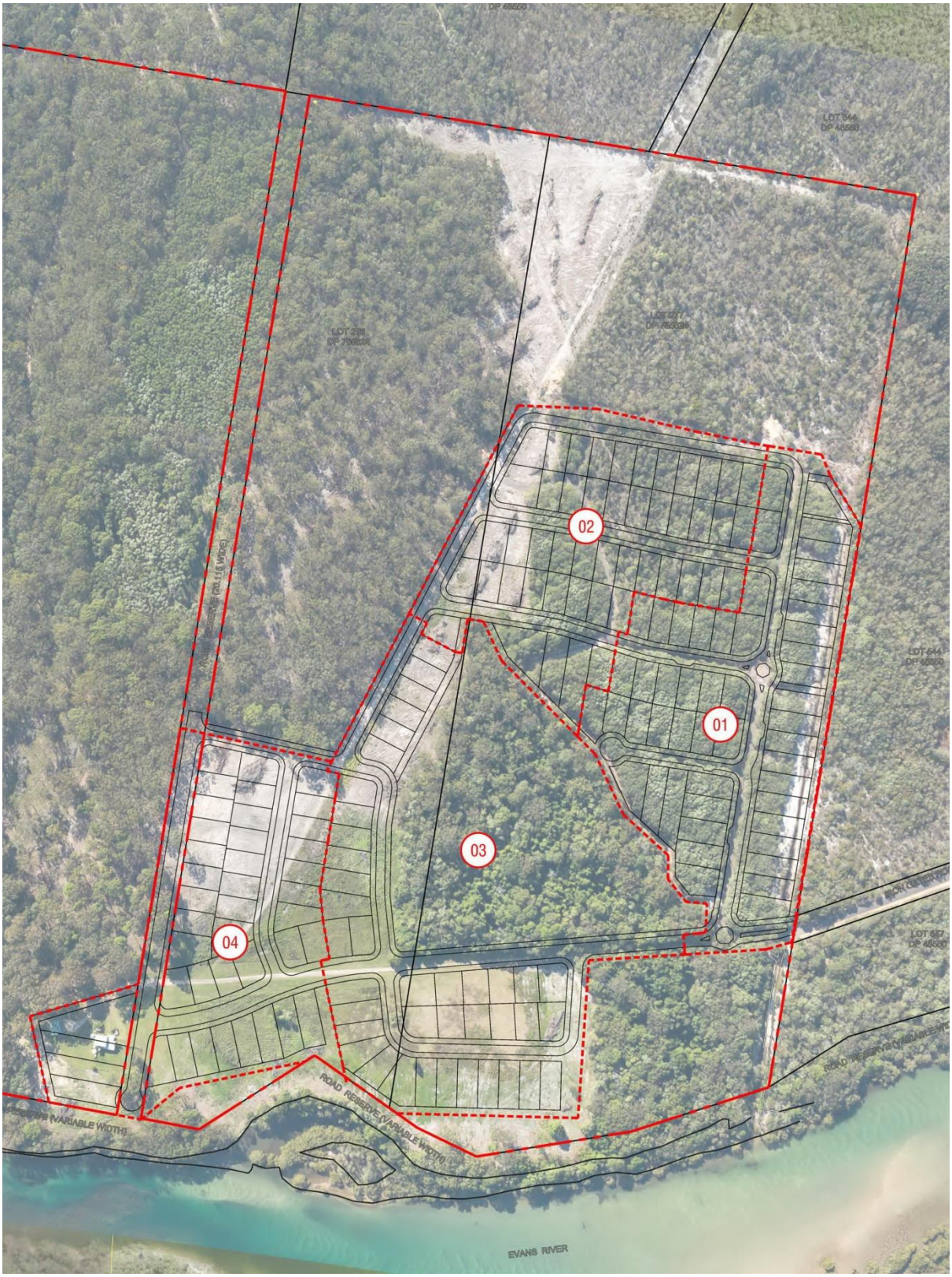

Figure 4 A 2014 aerial photograph of the Iron Gates development site (cropped from Attachment 1, Planit 2014b) showing where vegetation has recently been cleared in the north, south and south west of the site (refer Fig. 3 showing extant vegetation in August 2013).

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