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Dear Gavin,

**Re: Biodiversity Development Assessment Report for future seniors living
development of Lot 2 DP1219123, Lot 4 DP1219124 and Lot 6 DP1217806,
Manor Road, Harrington - Koala Food Tree Offsets.**

As per request, we provide information in regards to the most effective offset arrangement for Koalas in respect to the DA.

The proposed development is a retirement village providing 293 dwellings comprised of a variety of single story detached villas, plus recreational and medical facilities. The development area will be filled to a level of 3.2m AHD so as to be 100mm above the 1% AEP (including 2100 climate change allowance) flood planning level. This is likely to necessitate removal of all vegetation on site including most of the trees in the Manor Rd road reserve.

Four primary preferred Koala food will be removed (1 Swamp Mahogany and 3 Forest Red Gum).

The site qualifies as Potential Koala Habitat due to the abundance of Scribbly Gum (*E. signata*) which is listed in Schedule 2 of SEPP 44, but preferred Koala Food Trees (pKFTs) as per the Koala Recovery Plan (NPWS 2008) were limited to only 4 trees on site (2 being <3m high). A handful of others occur in the eastern and one in the western end of the Manor Rd road reserve, outside the area needed to be re-formed for the road upgrade.

Evidence of Koala activity on site was limited to a single scat under a planted Swamp Mahogany located adjacent to the original dwelling on southeast boundary of the site. An adjacent neighbour reported once seeing a Koala in the large Forest Red Gum on the lower eastern boundary but no scats were found. These trees occur in open paddock, requiring a Koala to cross nearly 500m of open ground and close to yards containing dogs to access.

A Koala was observed in the eastern end of Manor Rd road reserve where a handful of Swamp Mahogany occur, and only a single old scat under a Scribbly Gum. This narrow peninsular of habitat however is considered a cul-de-sac not a linkage given it does not interconnect to other habitat.

The balance of evidence suggest that although the site appears likely to be adjacent to Core Koala Habitat to the northwest where a sizeable patch of Swamp Mahogany occurs, it does not support breeding; does not contain an area of major activity; and is not frequently used (ie part of the home range of a resident Koala): hence it is not recognised as Core Koala Habitat. A Koala Plan of Management is thus not considered required to satisfy SEPP 44.

The loss of Koala habitat is legally offset under the legislation via the Ecosystem Credits: the legislation and the design of the Biodiversity Assessment Methodology is to ensure no net loss. The BAM Calculator (BC) determined the following credit requirements:

- Ecosystem Credits: 232 as follows:
 - PCT 1184: 223
 - PCT 1235: 9
- Species Credits:
 - Squirrel Glider: 51

The loss of Koala habitat is statutorily offset via Ecosystem credits for PCT 1184 which includes Koalas as an Ecosystem species, at a roughly equivalent ratio of approximately 1:10 (the BAM is designed to require significantly larger areas of land to be secured to offset loss). This far exceeds offsets under Individual Koala Plans of Management (IKPoM) which if the site had contained Core Koala Habitat, would have required.

However, Mid Coast Council (MNC) have requested additional offsets specifically for the Koala, in the form of “*4 times the Koala feeding trees*”. It is unclear if this refers to the need to offset the loss of 4 primary preferred KFTs, or approximately 150 Scribbly Gums ranging in height and maturity from about 3-20m tall on site. Some 600 trees would be needed to meet this offset requirement, which would be extremely difficult to accommodate practically within the development and (as detailed subsequently) may not lead to the best biodiversity outcomes.

Scribbly Gum (*E. signata*) was listed in Schedule 2 of SEPP 44 as a primary preferred Koala food tree in 1995, however research since to date on the complexity of Koala food selection (which is still poorly understood by nonetheless much better than it was in 1995), has failed to identify Scribbly Gum as a primary preferred species for the Koala across its range (OEH 2018 NPWS 2008, Phillips 2000, Biolink 2013, Phillips and Hopkins 2009). It is not recognised in draft or approved Comprehensive Koala Plans of Management in Kempsey (KSC 2011, Phillips and Hopkins 2009), Port Macquarie (PMHC 2018), or the former Greater Taree LGA (AKF 2002), or Coffs Harbour (Lunney et al 1999a, 1999b) where *E. signata* may be found.

Some localised use of Scribbly Gum has been recorded on the mid north coast (eg. Darkheart 2004, Friends of the Koala pers. comm. to MCC), but this is virtually almost always in association with a primary preferred food species eg. Tallowwood and Swamp Mahogany, as reflected by research suggesting other species such as Blackbutt (*E. pilularis*) have been mistaken for food trees by Koala's been seen in such trees, but using them for other reasons eg. shade and refuge during movements (Biolink 2013).

Such observed localised browsing is also not restricted to Scribbly Gum, as noted in the recent review of Koala food trees in NSW (OEH 2018). *Melaleuca quinquenervia* is also at times used by Koalas on the mid north coast, often when flowering (Cheyne Flanagan, Koala Preservation Society, pers. comm.); and *Allocasuarina torulosa* was found to be used in Pine Creek State Forest (State Forests NSW 2000). There is also the infamous localised bark-chewing Koalas in the Monaro region east of Canberra (SMRC 2019). The latter is due to trace nutrients being

concentrated in a specific species which the Koala is targeting (a bit like marsupial licking of salt concentrations in some soil profiles), but the localised use of non-pKFTs may be a complex interaction of seasonal nutrient demands by the Koala's physiology, soil fertility, and the nutritional value of the species at a specific time eg. trace element availability. Some observations however could also be erroneous association with a Koala in a non-food tree with feeding which has been recognised as a problem in identifying pKFTs unless laboratory scat analysis is undertaken (Biolink 2013, State Forests 2000, Osawa 1993, Moore and Foley 2005, 2002).

Dr Phillip's has explained localised use of non-primary preferred trees as supplementary food trees: non-essential to Koala's nutritional requirements, but supplementing its nutritional needs. For this reason, Koala habitat mapping has focussed on classifying habitat in terms of the proven pKFTs; and management has focussed on retention and increasing the number of recognised primary browse species as studies have qualified the nutritional value of these trees which are essential for the survival and lifecycle stages of the Koala eg. lactation (OEH 2018, Phillips 2015, Biolink 2013).

Review of the draft landscape plan notes 160 Swamp Mahogany are to be planted, which represents an offset ratio of 1:40 to the 4 pKFTs lost. This far exceeds any Individual Koala Plan of Management ratio for replacement of pKFTs.

Swamp Mahogany, unlike Tallowwood and Forest Red Gum, is also uniformly preferred across its range and all soil types by the Koala (NPWS 2008, Phillips 2000, OEH 2018, EPA 2015, Biolink 2013, 2012, 2008, 2005a, 2005b, Phillips and Hopkins 2009). This number of offsets will thus significantly increase the local carrying capacity of the study area as the trees mature to a level they can support Koala grazing.

However, planting KFTs within development precincts is increasingly recognised as an unfavourable outcome for the Koala. Many studies have shown a consistent trend of decline where habitat is progressively altered from natural state to various forms of development even when pKFTs are retained (McAlpine et al 2006, PMHC 2018, Adams-Hosking *et al* 2015), most likely due to the fact that Koala mortality increases due to increased exposure to key threats: vehicle strike and dog attack. Port Macquarie-Hastings Council (PMHC) for instance, have recognised that the concept of retaining habitat within new subdivisions since 1995 has contributed (with other threats such as Chlamydia) to the decline of the local Koala population, and have a draft Comprehensive Koala Plan of Management (CKPoM) which has a policy of avoiding this approach (PMHC 2018).

If offsets are to be planted on site amongst the road and dwelling matrix as landscape plantings, they should avoid being located to encourage Koalas to move through this hazardous matrix, but rather traverse the fringes and link to natural areas. Consideration also has to be given to avoiding creating a bushfire hazard to residents on and adjacent to the development. Conversely, the plantings can also be located so that should adjacent habitat be burnt out by bushfire, they may act as a short term fire refuge until the habitat recovers.

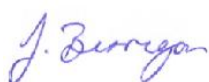
This advice was given to the proponent, and the proposed landscape plan appears to have made a good effort (bearing in mind all constraints) to address this by locating some of the plantings on the western side adjunct to the adjacent forested lot where Core Koala Habitat is expected to occur, and the remainder along the large lot residential/retirement village interface to the south linking to the public riparian reserve. The latter is a good location as opposed to

locating adjacent to Manor Rd due to the increased traffic volumes there and hence higher risk of vehicle strike.

The planting of 160 Swamp Mahogany to replace loss of 4 PKFTs also has other key biodiversity benefits. It is a primary source of nectar for the non-breeding migratory and critically endangered Swift Parrot and Regent Honeyeater; and a valuable winter food source for the vulnerable Squirrel Glider and Grey-headed Flying Fox. Scribbly Gum does not offer these values, hence planting Swamp Mahogany is the better biodiversity choice.

Given the above, we consider the proposed offset planting of 160 Swamp Mahogany meets and exceeds any Koala-related offset requirement under SEPP 44 or other existing legislative instrument given the very low current and potential use of the site in the absence of planting these trees given current the rarity of pKFTs on site.

Yours faithfully,



Jason Berrigan.
Director, JBEnviro

B. Nat. Res. (Hons). Grad. Cert. (Fish.).
MECANSW, MRZNSW, MABS, MAHS, MAPCN

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