Expert comment on BCF Charge System - BCT Preliminary Design Approach - Issues paper for stakeholder meetings

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This document has been prepared in response to a request from the Environmental Defenders Office for expert consideration of the *BCF Charge System - BCT Preliminary Design Approach - Issues paper for stakeholder meetings* (**Issues Paper**). The views in this document are those of the authors and should not be attributed to any other person or organisation.

Q1. Do you have any feedback on the proposed BCF Charge System's design principles including their suitability, any issues/concerns or any additional principles that should be considered?

1. Developers should be charged the highest rather than the average price.

The theoretical principle of cost-effectiveness is embedded within the design principles and Biodiversity Offset Scheme (**BoS**) itself. In orthodox economics, it is better to achieve any environmental target at minimum cost, where cost refers to opportunity cost – the foregone benefit from an alternative use of the land, labour and capital.

In theory, a market-based system such as the BoS leads to the minimum cost criteria being met. Land with biodiversity-credit potential that has low-valued alternative uses (low opportunity costs) will be less expensive per credit and high-valued land will be more expensive. As such, low-valued land and credits will be offered to the market or Biodiversity Conservation Trust (**BCT**) first and biodiversity loss will be offset at minimum cost.

However, in practice, uncertainty and a lack of information prevails, and institutional factors such as historical farming norms drive decision making. Therefore, it is not known whether low-cost or high-cost credits will be offered to the BCT, leading to the design principle of **charging developers an average price**. This covers the BCT for the risk that high-valued land may need to be used for offsetting.

Instead, we believe developers should be charged the highest price for the following reasons:

1.1 The Biodiversity Assessment Methodology (**BAM**) imperfectly measures biodiversity.

A simplifying assumption underlying both the orthodox economic theory of biodiversity markets and the principle of average price is that the biodiversity potential of low-valued and high-valued land is the same if they earn the same credits. Thus the cost of a given amount of biodiversity is minimised by buying credits for low value land as opposed to higher value land.

However, the simplifying assumption is incorrect: rather than being the same across all land, biodiversity potential varies across land in a different logic to that of the market for land, and the BAM only imperfectly captures the variation in biodiversity value. For example, connectivity is not

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valued in the BAM but it is critical for delivering biodiversity values. Hence the average price, which attracts only low to average value land to the market, has no necessary relationship to the value of the biodiversity being created at the offset site. Developers must be charged the highest price to allow the BCT the maximum potential to match the actual biodiversity loss of development to the offset being purchased.

1.2 The average price method deters high value land from being offered as offsets.

The average price method incentivises the BCT to seek the lowest-priced offset in order to avoid a deficit – which is referred to as adverse selection in the economics discipline. But, as above, a focus on the lowest price offsets runs the risk of creating pockets of biodiversity that are not connected and that do not maximise the offset's biodiversity potential.

In addition, the reverse auction system used by the BCT, which again minimises the cost of offsets, worsens the incentives for higher value land owners to offer their land as offsets.

Thus the BCT will be limited in its search for suitable offsets.

1.3 The average price method is inconsistent with *NSW Government Guide to Cost-Benefit Analysis* (2017).

Developers should be charged the highest priced credits because this is consistent with the NSW Government's approach to cost benefit analysis (The Treasury 2017). The *NSW Government Guide to Cost-Benefit Analysis* (2017) explains that the highest-valued alternative use of land must be used as the opportunity cost for a development proposal, such as a new reserve, library, or road. This is even the case where the government owns the land and it is in minimal productive use. For example, land being used as a park and being proposed for use as a new public transport station should be valued at its highest valued, residential or commercial-development use despite its current zoning conditions. Applying this principle to offsets, the highest-valued agricultural land, and thus the highest-valued credits, should determine the opportunity cost of any development proposal.

1.4 Since the value of externalities from biodiversity loss are unknown, the precautionary principle should be applied.

The underlying theoretical reason for the developer charge is that development destroys biodiversity and creates an externality for current and future generations. As the offset price has no relation to the true underlying external cost of development, and instead, under current practice, reflects land prices, developers should be charged the highest price as a matter of precaution. The highest price for an offset creates the greatest disincentive to destroy biodiversity, which is the only way to truly get "no net loss" in biodiversity.

1.5 The developer charge should be high enough to encourage avoidance and minimisation before offsetting.

Charging the high price rather than the average price as a disincentive to destroy biodiversity supports the mitigation hierarchy. The mitigation hierarchy is imperfect when applied within a political-economic application, such as a biodiversity market system, because it does not mention cost. At each level of the hierarchy, economic trade-offs occur, but the hierarchy does not account for these trade-offs. Therefore the greater are the costs of offsets, the more likely the mitigation hierarchy will operate to save biodiversity. That is, developers are more likely to avoid or minimise the loss of biodiversity the greater is the cost of offsetting.

In terms of application, cost impact thresholds must be created to encourage avoidance and minimisation. We do not purport to say what those thresholds would be in this submission, but the safe minimum standard (**SMS**) is a useful way to frame a new mitigation hierarchy. The SMS would apply in the following way: avoid unless the cost of doing so is unacceptably large; minimise unless the cost of doing so is unacceptably large. While this is still imperfect as "unacceptably large" is ambiguous, research could be conducted to refine the meaning of these terms and create a meaningful mitigation hierarchy.

Furthermore, the cost of avoidance and minimisation could be assessed to set the offset charge because in practice there is a tradeoff between avoiding and minimising, versus offsetting. In economic theory, if the mitigation hierarchy was designed correctly, avoidance and minimisation costs per acre will be equal to offset charges per acre in equilibrium, and therefore the avoidance and minimisation charges could be used to set the offset charge.

2. Additional design principles

2.1 The charge should be equal to the value of the biodiversity being destroyed, not relative to an underlying biodiversity decline.

Currently, the BoS allows credits to be created for averted biodiversity loss, which occurs when unsecured biodiversity assets are secured. For example, an unsecured patch of remnant native forest is assumed to decline in the future and securing it in a Biodiversity Stewardship Agreement creates credits. The underlying assumption of declining biodiversity feeds through into the overall BoS. Effectively, a developer is paying for the loss of biodiversity at the development site relative to an underlying decline in biodiversity rather than the value of the biodiversity being destroyed. This disincentivises development action that avoids biodiversity loss at the site.

2.2 Secure biodiversity creation before it is destroyed.

If biodiversity creation is not secured before it is destroyed by developers, a net loss of biodiversity occurs. For example, if developers destroy biodiversity in year 0 and the offset for that destruction occurs over the next 50 years under a Biodiversity Stewardship Agreement, biodiversity has been reduced.

A design principle based on securing biodiversity before it is destroyed could be operationalised by converting credits destroyed and created into time-sensitive credits. For example, credits associated with the creation of biodiversity in 50 years could be worth half of the otherwise identical credits associated with creating biodiversity in 25 years. Biodiversity destroyed at a development site would require additional credits in total because each offset credit would be worth less when they create biodiversity in the future. This again incentivises avoidance and minimisation and therefore speaks to design principle 3.

Furthermore, if the BCT bought offset credits before they were needed for development, they would know the actual price to charge developers. This of course would need upfront funds but the cost of those funds could be charged to developers, ensuring that revenue neutrality of the government's investment in offset credits. Biodiversity would then be created (or at least credits secured) before it was destroyed.

2.3 Landowners should not pay the BSA establishment costs.

Landowners pay upfront for transaction and administrative costs (referred to as "BSA establishment costs"), which, in the example provided in the Issues Paper, is roughly $50,000. This upfront cost discourages landowner participation. It also appears that both landowners and developers pay the establishment costs. The landowner pays $50,000 to an ecological consultant and for other administrative purposes, and the developer pays $50,000 to the BCT as part of the charge. We assume that the landowner is returned the $50,000 through the Total Fund Deposit or the opportunity cost payment or profit payment. However, in our opinion, and to encourage participation of landowners in the BoS, **the BSA establishment costs should be provided free of charge to the landowner**. There is a great deal of information uncertainty on the part of landowners and removing the risk of an upfront payment should be part of the design principles.

Q2. Do you have any feedback on the BCT's approach for design and development of the econometric model?

Details of the econometric model have not been provided. However, it is undeniably the case that using past trades to determine the charge builds the price of past trades into the system, and these prices have never been the value of biodiversity destroyed. Credit transactions have been fundamentally determined by the opportunity cost of the land at the offset site, rather than the value of biodiversity being destroyed. A more fundamental "cost-based approach" would determine the cost of biodiversity being lost and this could benefit from an econometric model. For example, hedonic pricing methods, which have been used in modelling for DPIE, could be used to determine the lost value of destroyed biodiversity. DPIE also possesses a travel cost model that values the recreational benefits of biodiversity reserves. Other non-market benefits of biodiversity could also be valued. For example, the climate regulatory functions of local biodiversity, the nutrient cycling performed, and the flood and soil erosion mitigation of existing forest stands can all be valued along with the existence, altruistic or intrinsic value of species and ecosystems using contingent choice or contingent valuation modelling. In short, while econometrics may be useful, using past trades to determine the charge for developers should never be the method to which it is applied.

If past prices are used, the principle of like-for-like requires that the trades used must be of the same plant community type in roughly the same location, and not be from multiple plant community types in an Offset Trading Group (**OTG**). This would require roughly 15 trades for a meaningful econometric model but even then the standard errors for a fitted regression estimation would be very high. Thus, the practicality of this approach is questionable given the relatively few prior trades that have occurred.

Q3. Do you have any feedback on the design of the cost-structure model or other potential inputs that should be factored into its development?

As mentioned above, the "cost-structure model" is not really a cost-based approach. A cost-based model would assess the cost of lost biodiversity to set the charge and this requires an alternative modelling approach with estimations of the non-market values of lost biodiversity (see Q2). At the moment, the replacement cost of some of the biodiversity being lost is used for the "cost-structure model". This includes the BSA establishment cost, the cost of restoration (yearly payments determining the Total Fund Deposit (**TFD**)), the opportunity cost of the land, and any profit for the landowner. As mentioned in Q1, given that the BoS allows for avoided loss credits, only some of the lost biodiversity is being replaced so the replacement cost can never be the total cost of lost biodiversity. In addition, the replacement cost approach is a lower bound estimate of the non-

market value of environmental assets. As such, the cost-structure model needs to be amended to account for the actual cost of lost biodiversity to the local and wider community.

Q5. Do you have any feedback or analysis that might assist the BCT in determining typical opportunity costs for landholders looking to enter into a BSA?

There are two basic options, as recognised in the Issues Paper. First, as with the example provided on pages 10-11, the forgone profit per hectare, converted to foregone profits per credit, could be used as the opportunity cost of a BSA. Landowners will no longer be able to use their land for grazing, forestry, or other activities. Second, this reduction in yearly profits is theoretically factored into the land value, which in financial terms is equal to the present value of the sum of future profits. Of course, land values are determined by many other things, there is a high degree of uncertainty and the land market itself is "thin", in the sense that there are fewer buyers and sellers than a hypothesised perfect market. Thus, full and accurate capitalisation of future profits is unlikely to occur in practice.

If there are enough Biodiversity Stewardship Agreements (**BSAs**) being struck and the land has been sold post-BSA, a hedonic pricing model could be used to analyse the impact of BSAs on land value. However, this is unlikely to be the case and it would therefore be difficult to assess the change in land value. We recommend pursuing the forgone profit per hectare option but distinguishing the land value by land types and classes and, again, securing the necessary offsets before development so that the actual cost of the offset is known. The actual opportunity cost rather than the average, expected foregone profit should drive the developer charge.

In addition, the highest value of the land should determine the opportunity cost. This is an economic principle embedded within the *NSW Government Guidelines for Cost Benefit Analysis* (2017). Thus, even when a landowner chooses to use their land for grazing instead of cropping, the higher value of cropping must be used for the opportunity cost. Again, this will depend on land types and classes.

Q6. Do you have feedback or inputs regarding the reasonable profit/risk margins for landholders looking to enter into a BSA?

The example provided on pages 10-11 does provoke some questions:

- We assume that the Total Fund Deposit is held in trust and trust income flows to the landowner for restoration activities equal to their opportunity cost, and that the landowner pays the BSA entry costs.
- If the opportunity cost is paid to the landowner upfront in a lump-sum, this can reduce debt or earn interest or investment returns. However, the landowner has given up a land asset that could in its current condition earn, say, 5-10% per annum in capital gains. Thus, an interest return of, say, 7% could be a negative or positive return on the $770/credit in opportunity costs compared with leaving the land in pasture or cultivation. In theory, the return on different capital items are equal so we can further assume that the return on $770/credit equals the capital gain from land.
- Given those assumptions, a landowner is effectively comparing the $100 per annum per hectare or $20/annum/credit that could be earned in profits from traditional activities (which is far too low for a viable farm) to the interest return on $350/credit assumed profit. While interest returns could make this a viable proposition, the interest or investment return would need to be roughly 6.5% per year on $350/credit.
- However, this does not account for the upfront payment of $50,000 which is a larger number per credit for small farms. In addition, there is a great deal of uncertainty

associated with creating a BSA relative to traditional agriculture, which apart from weather and climate fluctuations is generally known to the landowner.

- As such, the profit must take into account the $50,000 in BSA establishment cost plus be equal to or greater than the profit return on traditional activities and be adjusted by uncertainty and risk aversion.
- In the example provided, we doubt that any landowner would consider entering a BSA agreement.

The BCT charge system must be enough to incentivise landowners to enter into BSAs and the profit for landowners must be greater than the profit on traditional activities, be enough to cover for the risk of upfront payment of BSA establishment costs, and cover for uncertainty and risk aversion in creating a BSA. In the example provided, the profit from traditional activities is grossly undervalued, and it would vary significantly by land type, class and region. Even given this undervaluation, and given a return on investment of 6.5%, the profit calculation does not cover for the BSA establishment costs, and the risks associated with entering into a BSA.

Q7. Is it appropriate to potentially vary the profit/risk margin at the OTG scale and, if so, what rationale should the BCT consider?

At the OTG scale, there are multiple land use types, classes and regional differences in land value. As with Q6, the profit/risk margin and what a landowner could earn per annum will be compared to the forgone profits from traditional agriculture per annum. Thus, the profit/risk margin must be varied based on land types and classes and regional differences in land values. Again, according to economic principles and the *NSW Government Guide to Cost-Benefit Analysis*, the highest value of the land should be used for any given region, land type and class.

Q8. Do you have any feedback on the potential probity or other risks the BCT should consider when applying a market soundings approach?

The market soundings approach is a feasible method for assisting in the determination of BCT charges. Effectively, the market sounding approach seeks to uncover the willingness to accept compensation for lost productive land and it could be useful in determining perceived opportunity cost, the Total Fund Deposit, the uncertainty associated with upfront payment of BSA establishment costs, and the loss in option value. The latter has not been mentioned in the BCT charge issues paper and is significant. An option value is a non-market value measured by the willingness to pay to keep options open for the future. The option value is related to uncertainty and risk aversion and should be explored as a component of the profit/risk margin.

As noted in the Issues Paper, there are “risks” involved in sounding out a market whose participants potentially benefit from the market sounding. However, there is a long history of literature on the contingent valuation and contingent choice methods of non-market valuation in environmental economics which addresses techniques to ensure against biases, including strategic bias, hypothetical bias, and starting point bias.

Q10. What entry threshold should be set for proponents when seeking a BCF charge from the BCT?

Here we comment on Table 4 on page 12. We question the principal that larger land areas would be worth less per credit than smaller land areas. There may be an argument for having diminishing returns to land size once a threshold has been reached and Table 4 could be read in that way - the first 50ha may be worth 3X; the second 50 is worth 2X, and the third 50 is worth 1X. However, there are extreme diminishing returns in this example, and it is not clear if that is what is intended. It

seems that small landholders earn 3X credits and large landholders earn 1X credits, which is conflating total and marginal value. Diminishing returns can be supported in functional ecology literature but the large landholders need to earn 3X for their first 0-100ha, 2.5X for the next 75ha, 2X for the next 50ha, 1.5X for the next 25ha and 1X for anything above 250, for example.

Reference

The Treasury. 2017. *NSW Government Guide to Cost-Benefit Analysis*. TPP17-03. NSW Government. Available at https://arp.nsw.gov.au/assets/ars/393b65f5e9/TPP17-03_NSW_Government_Guide_to_Cost-Benefit_Analysis_0.pdf (Accessed 3rd December, 2020).